



INTERNATIONAL ENERGY AGENCY

OIL SUPPLY SECURITY

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**EMERGENCY
RESPONSE OF
IEA COUNTRIES**

2007



INTERNATIONAL ENERGY AGENCY

OIL SUPPLY SECURITY

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2007

*Electronic updates
of country sections in this book
will be available in the future
at www.iea.org*

INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA) is an autonomous body which was established in November 1974 within the framework of the Organisation for Economic Co-operation and Development (OECD) to implement an international energy programme.

It carries out a comprehensive programme of energy co-operation among twenty-six of the OECD thirty member countries. The basic aims of the IEA are:

- To maintain and improve systems for coping with oil supply disruptions.
- To promote rational energy policies in a global context through co-operative relations with non-member countries, industry and international organisations.
- To operate a permanent information system on the international oil market.
- To improve the world's energy supply and demand structure by developing alternative energy sources and increasing the efficiency of energy use.
- To promote international collaboration on energy technology.
- To assist in the integration of environmental and energy policies.

The IEA member countries are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Republic of Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States. The Slovak Republic and Poland are likely to become member countries in 2007/2008. The European Commission also participates in the work of the IEA.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where the governments of thirty democracies work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD member countries are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Republic of Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States. The European Commission takes part in the work of the OECD.

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International Energy Agency (IEA),
Head of Communication and Information Office,
9 rue de la Fédération, 75739 Paris Cedex 15, France.

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FOREWORD

Oil security remains the cornerstone activity of the International Energy Agency (IEA). Since its foundation in the aftermath of the 1973-74 oil crisis, the IEA has enhanced, refined and strengthened its emergency response mechanisms to offset the impacts of short-term oil supply disruptions. The co-ordinated response carried out after Hurricane Katrina hit the Gulf of Mexico (August 2005) showcases the ability of the IEA to respond effectively and decisively to an oil supply shortfall.

Today's oil market is particularly susceptible to an oil supply disruption; the delicate balance of supply and demand is maintained with very little margin for error. Spare capacity, both upstream and downstream, is limited, resulting in the potential for relatively small outages of supply – whether from severe weather, accidents or geopolitical crises – to have significant impacts. Oil demand growth in developing countries and increased dependency on a shrinking number of producing countries exacerbate market tightness. The need for strategic emergency response mechanisms has never been greater.

This publication, *Oil Supply Security: Emergency Response of IEA Countries 2007*, is the fruit of another cycle of rigorous reviews of member (and accession) countries' emergency response mechanisms. These reviews help countries improve and update their capacity to react quickly and effectively to offset the consequences of oil supply disruptions and to participate fully in an IEA collective response to a major oil supply shortfall.

It also gives insight into stock levels that can be used to cope with supply disruptions. Currently, IEA member countries' stocks stand at 4.1 billion barrels, compared to 3.6 billion barrels in early 2000. At that time stock coverage was at an all time low of about 108 days of net imports, compared to 122 days in 2007.

In response to the rapid increase of oil consumption and net imports in some non-member countries, the IEA has pursued dialogue and information sharing with key transition and emerging economies on topics such as oil security policies and the creation of national strategic oil stocks. Accordingly, this publication includes overviews of how China, India and countries of the Association of Southeast Asian Nations (ASEAN) are progressing with domestic policies to improve oil supply security, based on emergency stocks.

Nobuo Tanaka
Executive Director, International Energy Agency

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Lead author: Cuauhtémoc López-Bassols

Responsible for country sections: Aad van Bohemen, Jason Elliott, Atsushi Suda and Akihiro Tonai

Editorial assistance: Janet Pape and Wataru Matsumura

Maps/graphs: Bertrand Sadin

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All errors and omissions are solely the responsibility of the IEA.

EXECUTIVE SUMMARY

The International Energy Agency (IEA) was founded in 1974 with the mandate to implement the International Energy Program (I.E.P.) – a joint strategy to address oil security issues on an international scale. At that time, 16 countries from the Organisation for Economic Co-operation and Development (OECD) signed the I.E.P. Agreement as a response to the international oil disruption of 1973, and to the wide-ranging macro-economic problems it generated.

Emergency response is still one of the main pillars of the IEA. Becoming a member of the IEA is contingent on countries being members of the OECD and meeting two key obligations: to hold oil stocks equivalent to at least 90 days of net oil imports; and to maintain emergency response measures that can contribute to an IEA collective action during a severe oil supply disruption. Response measures include stockdraw, demand restraint, fuel switching, surge oil production and, if necessary, sharing of available oil supplies. Since the IEA was founded, member countries have taken a number of subsequent decisions that provide significant flexibility as to how and when the IEA responds to a sudden disruption of supplies.

The IEA Governing Board, a body comprising representatives at ministerial or senior official level, defines and determines the implementation of IEA policies. Under the Governing Board, standing groups carry out sectoral analysis, policy review and other operations as necessary. One of these groups, the Standing Group on Emergency Questions (SEQ), is responsible for all aspects of the emergency response. To ensure it considers the full range of related issues, the SEQ takes advice from the Industry Advisory Board (IAB), which is composed of experts from oil companies operating worldwide.

As part of its mandate, the SEQ conducts regular reviews (on a five-year cycle) of the emergency response mechanisms of member countries, thereby ensuring IEA overall preparedness for a rapid response to oil emergencies. These reviews also help to verify that emergency response strategies have adapted adequately to changes in oil market conditions.

Evolving Markets

Oil Supply Security: Emergency Response of IEA Countries 2007 reflects the results of the latest review cycle. It also draws attention to significant changes arising since the last cycle of reviews and the previous edition (2000) of this publication. In the last seven years, the IEA has expanded, adding one new member country (the Republic of Korea) and inviting two more countries (Poland and the Slovak Republic) to join. In addition, the 2005 hurricane season, which wreaked havoc on key elements of the supply chain infrastructure in the Gulf of Mexico, tested IEA capabilities to respond effectively to a

short-term oil supply disruption. This unexpected event highlighted the ways in which the oil market has changed and has become more susceptible to a variety of factors that can disturb the balance of supply and demand.

The risk of oil supply disruptions has grown in recent years and will grow in the near future for a number of reasons including continued demand growth, increased concentration of the remaining oil reserves in a fewer number of countries, the concentration of oil use in the transport sector, and insufficient capacity additions (both upstream and downstream) to keep pace with demand growth. The devastating hurricanes of 2005 also demonstrated that, in today's market, the severity of an oil supply disruption is not only a function of the oil lost. It also relates to the level of commercial stocks, the likely duration of the disruption and the availability of spare production capacity. It is now apparent that at times when the world market has limited excess capacity, a relatively small disruption can have quite severe effects.

Emergency Stocks on the Rise

But the IEA stands prepared. The hurricane response and the recent reviews confirm that key advances have been achieved, particularly in terms of stockholding to support stockdraw in the event of a supply disruption. IEA member countries' stocks remain on an upward trend: since the last publication of this report (2000), they grew by 14% and stood at 4.1 billion barrels at the end of 2006. Stocks grew more than just to compensate for the rise in net imports to IEA member countries; at the end of 2006, total stocks covered 122 days of net imports, compared to the all time lowest level of 108 days in early 2000. There has also been an increase in the number of member countries holding government and/or agency (public) stocks. In 2007, 17 out of the 26 members of the IEA held public stocks. This reflects a rise in the number of member countries with stockholding agencies, which has increased from 4 to 11 since the early 1980s. With the accession of Poland and the Slovak Republic to the IEA, and with Turkey's intention to create an agency, it is anticipated that 20 out of 28 IEA member countries will have public stocks by 2008. In addition, an increasing proportion of all stocks held in IEA member countries is publicly controlled. In the mid-1980s, only one-quarter of all IEA member countries' stocks were publicly held; by 2006, this figure had risen to more than one-third. The collective action of 2005 showed that public product stocks might be necessary when downstream infrastructure is severely damaged and that is why countries who traditionally hold crude oil in their in public reserves are now considering product stocks as well.

Emergency Response Measures

Over time, stockdraw has proven to be the most powerful mechanism available to IEA member countries during an oil supply disruption, but this publication also highlights progress in other areas. Demand restraint is another key measure in the IEA toolkit that can help free up barrels by encouraging oil consumers to reduce their use of oil. This publication places particular emphasis on demand restraint within the transport sector, which currently accounts for more than half of all oil consumption in IEA member countries. Increasing indigenous oil production and switching to other fuel sources in an emergency remain additional options, although these have become limited in scope. In the transport sector, the potential for fuel switching is inconsequential due to the lack of alternative transport fuels so far. In the electricity market, the high level of substitution of natural gas for oil in electricity production means that the traditional "alternative" fuel is already in high demand and not readily available. In fact, under certain circumstances, switching to oil is an appropriate response for

a supply disruption in natural gas in the power and heat sectors. This integration raises an additional question regarding the role of alternative fuels during oil supply emergencies – *i.e.* to what extent supply disruptions of other fuels, such as natural gas, could spill-over into the oil market and cause severe oil demand increases.

Equally important to having emergency response mechanisms in place is the ability to use them at short notice. The IEA has the ability to respond rapidly to an oil supply disruption through real-time communication with member countries and major players outside the IEA. The IEA also has a framework for decision-making which is tested and updated through regular simulation exercises.

Beyond IEA Borders

Oil consumption outside IEA member countries now dominates global oil demand growth. The IEA *World Energy Outlook 2007* (WEO 2007) forecasts that global oil demand will increase from 84.5 mb/d in 2006 to 98.5 mb/d in 2015 and 116.3 mb/d in 2030. Some 42% (13.9 mb/d in absolute terms) of this increase will come from China and India alone. Until the 1990s, these countries were marginal net importers. However, their imports have since taken off, while their domestic production has remained relatively stable. Today, these countries are major net importers – as are most IEA member countries. For this reason, the IEA is promoting dialogue and information sharing on oil security policies and measures with China and India, and with key importing countries belonging to the Association of Southeast Asian Nations (ASEAN). The key objectives of these bridge-building efforts are to promote the well functioning of markets, transparency, stock-building and co-ordination in times of supply disruptions.

The IEA has adopted an “outreach” strategy to promote emergency stock building in these countries and to harmonise emergency response measures across both member and non-member countries, as a means of enhancing the impact of such measures in times of a significant supply disruption. Both China and India have announced substantial plans for stock building. In 2007, China finished constructing and started filling its first storage sites; India began preparations for the construction of its first sites. A brief overview of stockholding plans in China, India and ASEAN countries is included in this publication. To date, the plans announced include a strategic reserve of some 500 mb for China and more than 100 mb for India. Combined, these volumes will rank just under the 2007 level of the strategic reserves of the United States, which is by far the largest public reserve holding among IEA member countries.

The findings contained in the following pages illustrate the growing robustness and agility of the IEA emergency response systems. They also demonstrate the value of the periodic reviews as a means of adjusting specific response mechanisms in order to mitigate the effects of an oil supply shortfall. Perhaps most importantly, they highlight why being prepared is so important for the future.

At the time of writing, the IEA had 26 member countries. The Slovak Republic and Poland have been officially invited to become members. As this book will be the IEA reference on oil security for the coming years, the Slovak Republic and Poland are included in the analysis of this publication as full members of the IEA.

CHAPTER 1

SETTING THE SCENE

Introduction

Against the backdrop of the oil crisis of 1973-74, the need to increase “energy security” was the main objective underpinning the establishment of the International Energy Agency (IEA). With particular emphasis on oil security, the Agency’s founders – a collective of major energy-consuming countries – sought to create effective mechanisms for the implementation of policies on a broad spectrum of energy issues: mechanisms that were workable and reliable, and could be implemented on a co-operative basis. The impetus for the Agency grew out of fundamental changes in economics and politics associated with the international oil market during the period leading up to the Middle East War of 1973-74. It also reflected the ways in which industrialised countries responded to those changes.

Today, this need to ensure energy security is more urgent than ever. Since its inception, the IEA has grown in size and expanded its range of expertise. Through periodic reviews, the Agency has strengthened, tightened and sharpened the emergency response mechanisms created to counteract short-term oil supply disruptions. Recent tests demonstrate that the system continues to be robust and fit to respond when needed – even at short notice.

Establishment of the IEA

Many interacting factors led to the oil crisis in 1973-74. Oil demand had grown rapidly in countries belonging to the Organisation for Economic Co-operation and Development (OECD). A few decades earlier, oil began to erode coal’s dominance as a power source; by mid-century (1950s), it had taken over as the preferred fuel. In fact, to a large degree, oil fuelled the rapid post-war economic growth achieved in OECD member countries. By the 1970s, petroleum was powering transportation, supplying one-third of industrial sector power and roughly one-quarter of electricity generation. This increase in demand for oil, coupled with a decline in oil self-sufficiency in the United States, created a situation in which OECD dependence on oil imports rose steeply in the years leading up to the crisis. Circumstances in the oil-producing countries further complicated the situation. The Organization of Petroleum Exporting Countries (OPEC), established in 1960, commanded a very large spare capacity, which added downward pressure on oil prices. The resultant low prices and apparent abundance of oil encouraged its growing use.

The political impact of changing market conditions was most vivid in the decision by Arab producers to use oil as an economic weapon. In October 1973, several countries belonging to the Organization of Arab Petroleum Exporting Countries (OAPEC, consisting of the Arab members of OPEC plus Egypt and Syria) took concerted action to reduce oil production from about 20.8 million barrels per day (mb/d) to about 15.8 mb/d. Around the same time, OPEC opted to fix prices – at rates in the range of 400% above previous levels. In a relatively short time, the industrialised countries' worst fears were realised: the dominant energy source became scarce and expensive, and oil-consuming countries had little chance to influence the market.

Overall, the embargo caused a shortfall in the international oil market that peaked at 4.3 mb/d. A significant reduction in spare capacity in non-OPEC countries further exacerbated the problems. The stage was set for a drama in which the OAPEC production cuts would disrupt essential oil supplies to industrial countries: little could be done, at least in the short run, to reduce the price spike.

These events alerted policy makers in the industrialised countries to the extent of their dependence on oil imports – and to the inherent vulnerability of this dependence. Sixteen countries belonging to the OECD faced the harsh reality that they had very limited control over one of the commodities most vital to their economies – and no system in place to counter the potentially serious economic and political consequences of an oil supply disruption. These governments agreed to create the IEA and signed the Agreement on an International Energy Program (I.E.P.) in November 1974. This treaty laid the foundation for a multi-faceted system aimed at helping member countries cope with short-term oil supply disruptions in a co-ordinated and unified manner and build more resilient markets in the medium and longer term.

Box 1.1. **Objectives of The International Energy Agency**

Today, the IEA is the energy forum for 26 industrialised countries. In order to join the IEA, countries must first be a member of the OECD. Of the current 30 OECD member countries, 26 are members of the IEA; Poland and the Slovak Republic were invited to join the IEA in 2007 and are expected to complete the accession process before the end of 2008.

Governments of IEA member countries commit to undertaking joint measures to mitigate the impact of oil supply emergencies. In support of this commitment, they also agree to share energy information, co-ordinate energy policies and co-operate in the development of rational energy programmes. These provisions are embodied in the *Agreement on an International Energy Program* (I.E.P.), the treaty pursuant to which the Agency was established in 1974.

Since 1974, the IEA has kept pace with developments in the energy scene. Today the basic aims of the IEA are to:

- maintain and improve systems for coping with oil supply disruptions (examined in detail in chapter 2);
- promote rational energy policies in a global context through co-operative relations with non-member countries, industry and international organisations;
- operate a permanent information system on the international oil market;
- improve the world's energy supply and demand structure by developing alternative energy sources and increasing the efficiency of energy use; and
- assist in the integration of environmental and energy policies.

Evolving Market Conditions

The first half of the 1980s saw a significant shift in the global oil market. Prices remained high, triggering an increase of non-OPEC supplies. Meanwhile, growing demand and higher oil prices prompted serious efforts to implement energy-efficiency measures (a trend that began in the mid-1970s) and to substitute oil with other energy sources. In addition, new oil sources entered the market: production in the Soviet Union doubled between the early 1970s and the mid-1980s, and new frontier production was initiated in Alaska and the North Sea. At the same time, there was a general shift away from oil for power generation, resulting in greater reliance on natural gas and nuclear energy (and, in some cases, a switch back to coal). These factors significantly reduced OECD import dependence; by the mid-1980s, dependence reached its lowest level since the 1960s, when the OECD first became a net oil importer.

Table 1.1
World Oil Supply and Demand 1973-2010
(million barrels per day)

	1973	1980	1985	1990	1995	2000	2005	2006	2010
OECD Demand									
North America	20.4	20.6	19.1	20.7	21.6	24.1	25.5	25.3	26.8
Europe	15.6	14.6	12.8	13.7	14.7	15.2	15.6	15.6	15.8
Pacific	6.4	6.3	5.7	7.2	8.6	8.6	8.6	8.4	8.6
Total OECD	42.3	41.5	37.5	41.6	44.9	47.9	49.7	49.2	51.2
Non-OECD Demand									
FSU	6.3	8.9	8.9	8.4	4.4	3.7	3.8	4.0	4.3
Europe	0.7	1.0	0.8	0.9	0.6	0.6	0.7	0.7	0.9
China	1.0	1.7	1.8	2.3	3.3	4.6	6.7	7.2	9.0
Other Asia	1.9	2.7	3.1	4.5	6.1	7.6	8.8	8.9	9.9
Latin America	2.7	3.3	3.1	3.5	4.3	4.8	5.1	5.3	5.9
Middle East	1.3	2.1	2.9	3.4	4.3	4.9	6.0	6.3	7.5
Africa	1.0	1.5	1.7	2.0	2.2	2.5	3.0	2.9	3.3
Total Non-OECD	14.8	21.2	22.3	24.9	25.2	28.6	34.1	35.3	40.7
Total Demand¹	57.2	62.7	59.9	66.5	70.1	76.5	83.7	84.5	91.9
Supply									
Total OECD	14.3	17.3	20.3	19.0	21.1	21.9	20.3	20.0	19.2
Total Non-OECD (Non-OPEC)	13.0	18.2	20.3	21.6	20.2	22.4	27.9	28.7	30.0
Total Non-OPEC²	27.7	36.3	41.7	41.9	42.7	46.1	50.2	50.8	51.9
Total OPEC	31.2	27.6	17.6	25.3	27.9	31.0	34.2	34.3	
Total Supply³	58.9	63.9	59.3	67.1	70.6	77.1	84.4	85.2	

1. Measured as deliveries from refineries and primary stocks, comprises inland deliveries, international marine bunkers, refinery fuel, crude for direct burning, oil from non-conventional sources and other sources of supply.

2. Non-OPEC supplies include crude oil, condensates, NGL and non-conventional sources of supply such as synthetic crude, ethanol and MTBE. This total also includes "Processing Gains" and "Other Biofuels", which are not shown in either the Total OECD or Total Non-OECD (Non-OPEC) lines.

3. Comprises crude oil, condensates, NGLs, oil from non-conventional sources and other sources of supply.

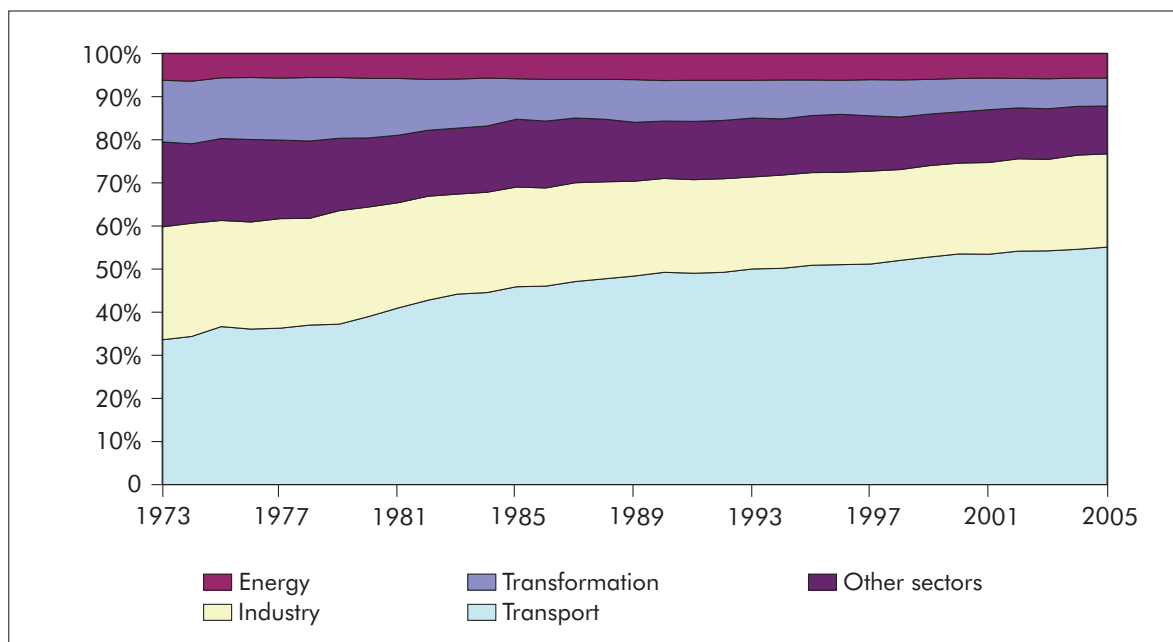
Totals in table might not add up due to rounding.

Source: IEA Monthly Oil Market Report and Medium Term Oil Market Report, July 2007.

By the second half of the 1980s, growing demand for transportation fuels re-stimulated oil demand growth in OECD member countries, causing demand to outpace any increases in domestic supply. As a result, OECD countries' dependence on imported oil has steadily increased, exacerbating the potential of oil supply disruptions, despite efforts to diversify supply sources and improve energy efficiency.

The share of oil used for transportation has grown steadily since the 1980s. In OECD countries, the transportation sector's share of oil consumption has grown from roughly 40% in the early 1980s to 55% in 2005. Transportation is expected to account for the majority of future growth in oil demand.

Figure 1.1
OECD Oil Consumption by Sector, 1973-2005



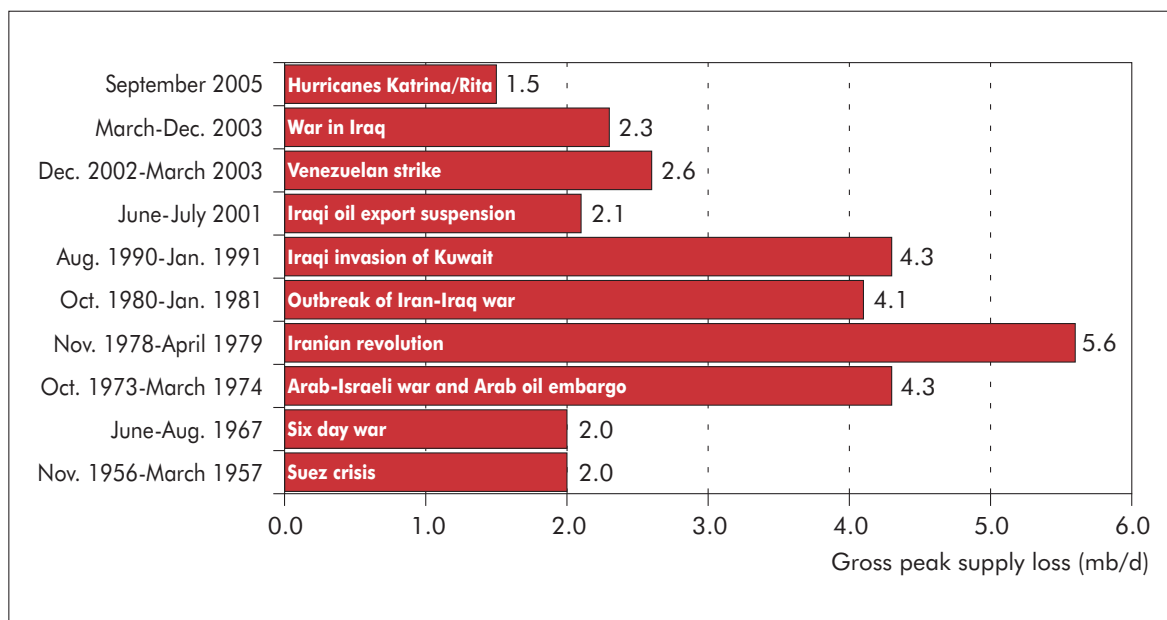
Major Oil Supply Disruptions

Many oil supply interruptions have occurred since oil became a dominant energy source in the 1950s. The first significant disruption was the Suez Canal Crisis in 1956-57. This conflict limited oil traffic in the canal, effectively blocking the passage of approximately half of the canal's transit of oil. The estimated gross peak supply loss was around 2 mb/d. Since 1957, the oil market has experienced several significant disruptions, the largest being the Iranian revolution of 1978-79. More recently, in the summer of 2005, Hurricanes Katrina and Rita battered the Gulf of Mexico, removing some 1.5 mb/d of oil supply from the market (see figure 1.2).

The severity of an oil supply disruption is not, however, only a function of the amount of oil lost. It is also related to the level of commercial inventories, the likely duration of the disruption and available spare production capacity. As such, all supply disruptions must be assessed individually. If the world

market does not have sufficient excess capacity, a relatively small disruption can be quite severe. By contrast, a larger disruption, in terms of gross peak supply loss, can be manageable in the short term if spare production capacity or commercial oil stocks are sufficient to offset the oil supply loss.

Figure 1.2
Major Oil Supply Disruptions



Oil Market Supply Constraints

The emergency response capability of the IEA remains a core function of the Agency. It is the most effective means by which member country governments can swiftly address short-term oil supply disruptions. The risks of such disruptions are expected to continue growing for a number of reasons (which will be discussed below). These risks include continued demand growth, the concentration of oil supply, the concentration of its use in the transport sector and insufficient capacity additions (both upstream and downstream).

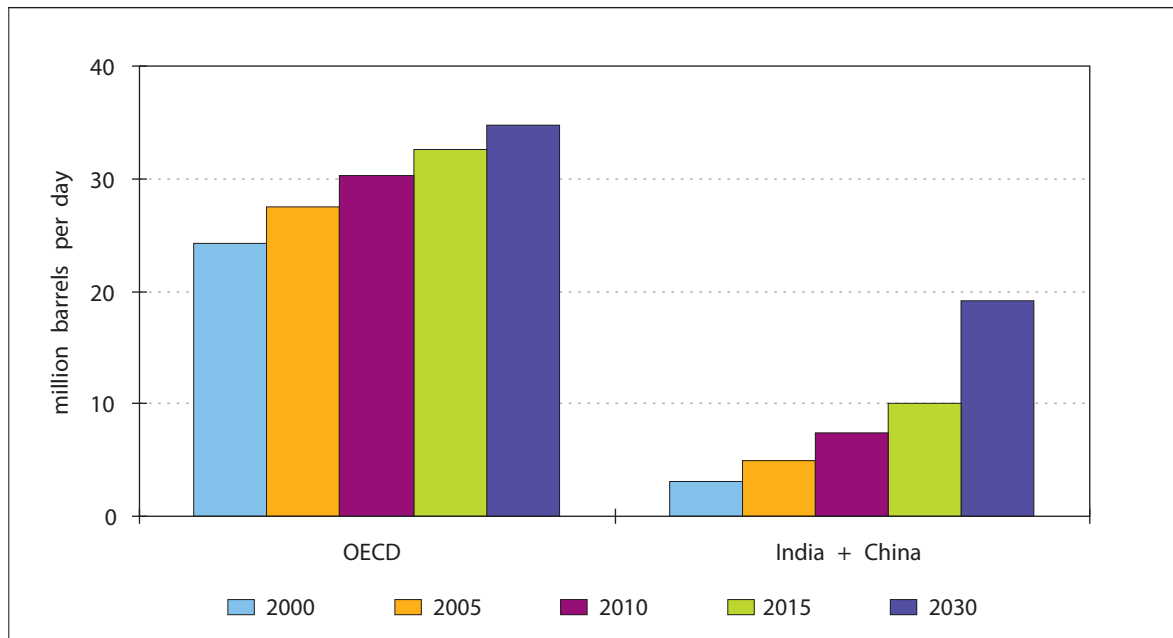
Demand Growth

The *World Energy Outlook* (WEO) (IEA, 2007) Reference Scenario¹ shows that primary demand for oil will grow by 1.3% per year over the 2006-30 period, reaching 98.5 mb/d in 2015 and 116.3 mb/d in 2030. The majority of this growth would come from developing countries, which are experiencing average annual demand growth rates of 2.6%. China would see the largest growth in oil demand by far, as its economy continues to develop in giant strides. Oil demand in China could increase by 3.6% per year, with total demand rising from 7.2 mb/d in 2006 to 16.5 mb/d in 2030. China and India together account for 42% of total increase in demand from 2006 to 2030.

¹ The Reference Scenario is a "business-as-usual" scenario. It includes the consequences of policies that have been decided and are to be implemented. It does not include the consequences of policies that are still under discussion. Those policies are included in the Alternative Policy Scenario.

Thirst for oil in OECD member countries is expected to increase at a much slower rate of 0.4% per year, representing an increase of slightly less than 5 mb/d between 2006 and 2030. However, while demand continues to rise, it is anticipated that non-OPEC production of conventional crude oil and natural gas liquids (NGLs) will peak within a decade, further exacerbating OECD oil dependency. At present, the OECD as a whole imports 58% of all its oil needs; this would rise to two-thirds in 2030 under the Reference Scenario. Less than 30 years ago, present-day OECD countries produced 26% of global oil supplies; this figure would drop to 16% in 2030, including non-conventional oil.

Figure 1.3
Total Oil Net Imports, 2000-2030



Source: WEO 2007

Concentration of Oil Supply

Oil production is projected to concentrate in an ever-shrinking group of countries with large reserves – notably Middle East OPEC member countries and Russia. This concentration would increase global vulnerability to a disruption and heighten the risk that these countries could use their market dominance to impose higher prices. In addition, a large proportion of the additional oil imports of OECD member countries would be transported from the Middle East, along vulnerable maritime routes that are susceptible to sudden closures because of accidents, piracy, terrorist attacks or war. In 2006, 39% of world oil demand passed through four maritime straits: Hormuz, Malacca, Suez and Bab el-Mandab. This percentage could increase substantially to 59% by 2030, making these four straits extremely busy and vulnerable areas (see Figure 1.4).

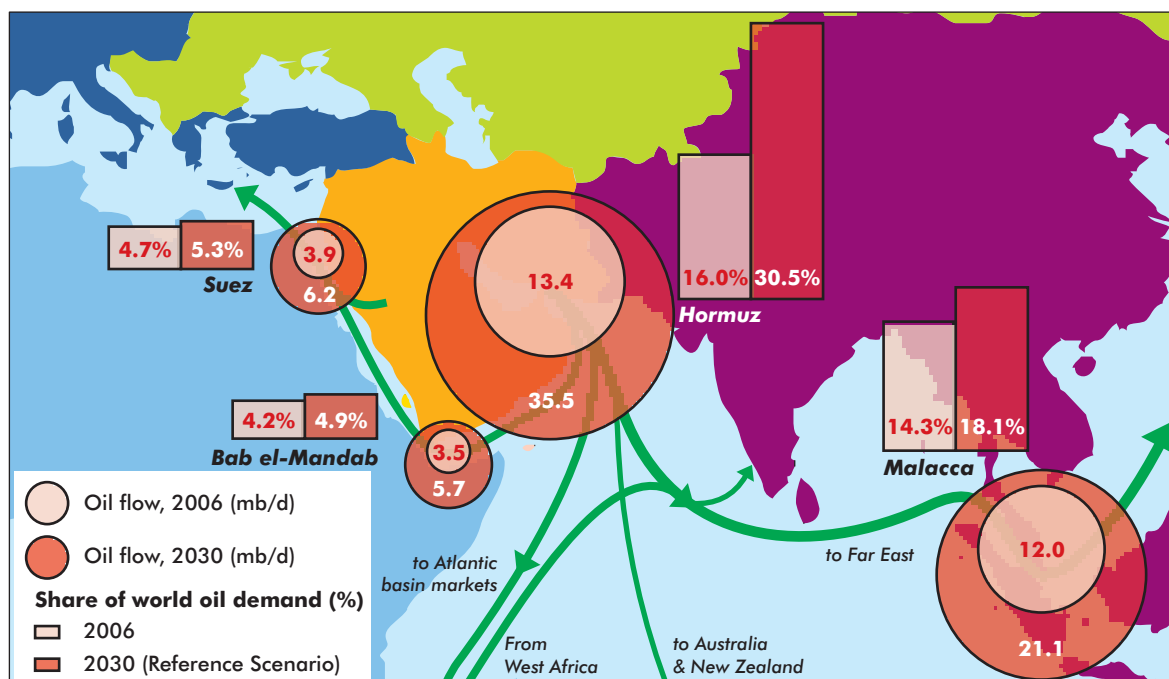
Concentration of Oil Use

The increased concentration of oil usage in the transportation sector will also have a strong influence on oil markets. Most of the expected increase in demand will come from transport, for which no

significant alternative fuel source yet exists.² The growing insensitivity of oil demand to price is due, at least in part, to the increasing concentration of oil demand in the transport sector. This accentuates the potential impact of a supply disruption on international oil prices. Increased fuel costs pass rapidly through to other sectors of the economy; for example, rising transportation costs make delivery of foodstuffs and other products more expensive. In turn, retailers pass these rising costs on to consumers by raising the prices of goods.

Figure 1.4

Oil Export Flows from Middle East and Major Strategic Maritime Channels



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

Source: WEO 2007

The longer oil prices remain at high levels, or the more they rise, the greater the threat to economic growth in importing countries. The burden is particularly severe in developing countries in which food and energy already represent a higher proportion of consumer spending.

Capacity

The capacity of the oil market supply infrastructure to meet consumer demand for oil products is key to keeping the market in balance. Spare capacity and stocks in the supply chain, both upstream (at the well head) and downstream (at the refinery) provide flexibility to the oil market when faced with unforeseen outages.

² In 2005, biofuels accounted for only around 1% of road fuel consumption and are not expected to take a significant share in the medium term.

Despite continued high prices, some analysts question whether anticipated investment in capacity expansion will be adequate and timely, and therefore able to boost capacity sufficiently to meet the projected longer-term demand. By contrast, some producers are concerned that over-investment could lead to a marked increase in spare capacity and excessive downward pressure on prices. At present, sharp increases in development costs are causing slippage in new projects. If the necessary investment is not forthcoming, resulting shortfalls in capacity expansion would increase the vulnerability of oil supply and add upward pressure on prices.

Uncertain Investment Climates

Recent years have witnessed a global resurgence of “resource nationalism”, which strengthens fears that investment in capacity expansion will be insufficient to meet future demand. An overly narrow focus at the national level could impede much-needed foreign investment and technology uptake, thereby compromising the entire industry’s ability to meet demand growth on a sustainable and economically optimal basis. Efforts to change, unilaterally and abruptly, contract terms for foreign and private operating companies may discourage sustained investment. This phenomenon is not new: it is partly cyclical and is – more often than not – combined with high prices. It was this combination of factors, namely high prices and resource nationalism, which underpinned the IEA formation in 1974.

IEA Emergency Response Measures

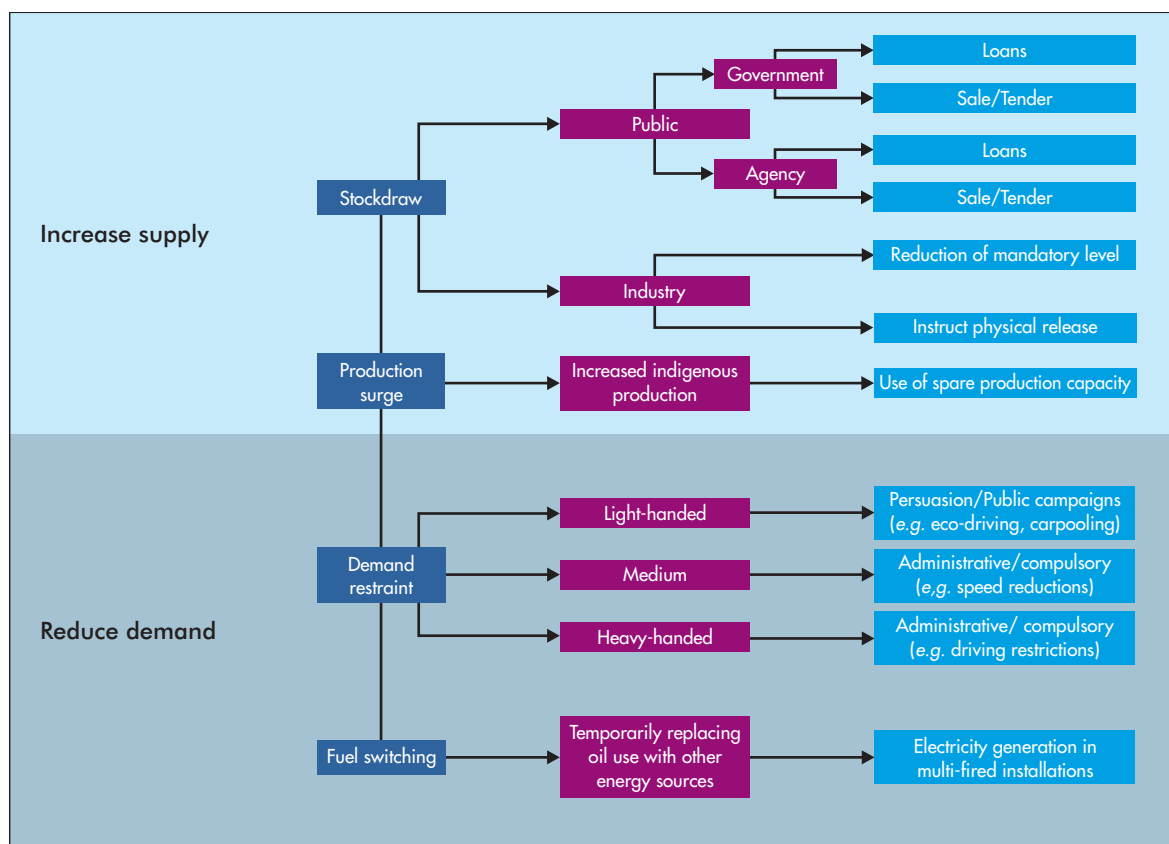
More than thirty years after the establishment of the IEA, emergency response to oil supply disruptions remains a core mission of the IEA. The Agency’s collective response capabilities aim to mitigate the negative impacts of sudden oil supply shortages by making additional oil available to the global market. This is achieved through a combination of emergency response measures designed to increase supply and reduce demand (see Figure 1.5). The IEA emergency policy focuses on alleviating short-term oil supply disruptions. It is not a tool for price management or long-term supply issues, which are more effectively addressed through other IEA policies that encourage, for example oil import reduction, energy conservation, energy diversification, or research, development and investment in alternative energy technologies.

Being ready for swift, concerted and targeted action is more crucial than ever before. The September 2005 collective action taken in response to oil supply disruptions caused by Hurricanes Katrina and Rita (in the Gulf of Mexico) clearly demonstrates the solidarity of IEA member countries. It showed the ability of the IEA to mitigate the impact of an oil supply interruption. The following section describes, in detail, the various components of the IEA response system.

Stockdraw

Among the emergency response measures at hand, stockdraw is the most commonly used. It is the most effective first line of defence for providing additional oil to an undersupplied market, and can be complemented by other emergency measures during a co-ordinated action.

Figure 1.5
IEA Emergency Response System



IEA member countries are obliged to hold stock levels equivalent to at least 90 days of their net imports (see Chapter 2, Box 2.1). Stocks are generally held either by industry or a combination of industry and a public entity - *i.e.* by the government and/or an agency established to fulfil this role. During an oil supply disruption, member countries can release stocks through various options. In countries where there is a substantial obligation on industry to hold stocks, the most common course of action is for the government to allow, temporarily, a decrease in industry's compulsory stockholding levels in line with the country's share of the total IEA response. For countries with publicly held stocks, stock release typically involves offering specified amounts for sale or lease from these public reserves. (Stockholding arrangements are described in detail in Chapter 2, for a country-by-country analysis see Chapter 3.)

At the end of 2006, IEA member countries collectively held 4.1 billion barrels in stocks: 64% or 2.6 billion barrels was held by industry; the rest was held publicly. The IEA minimum stockholding requirement does not stipulate the type of oil held: it can be met with stocks of either crude or refined products. In this respect, there are important differences in the composition of stocks held publicly or by industry. At present, some 83% of publicly held stock is in the form of crude oil. By contrast, industry holds only 45% in crude oil and the majority in oil products.

Significant regional differences in stockholdings are also evident. In IEA North America, some 65% of all stocks are crude oil. Virtually all (99%) public stocks in this region are crude, whereas industry holds 46% of its stocks in this form. IEA Europe holds a greater share of oil products; some 59% of

Box 1.2. **How Does the IEA System Work in Practice?**

In the event of an actual or potentially severe oil supply disruption, the IEA Office of Oil Markets and Emergency Preparedness first assesses the market impact and the need for an IEA co-ordinated response. The assessment includes an estimate of the market's net loss of oil, taking into account any spare production capacity that can be quickly brought online following an exchange of information with producers, producing countries' governments and international organisations.

This assessment is the basis on which the IEA Executive Director then consults with and provides advice to the IEA Governing Board.³ In the past, this consultation process to determine the need for IEA co-ordinated action has been accomplished within 24 hours.

Once the need for co-ordinated action has been agreed, member countries participate according to national circumstances. Each member country's share of the total response is generally proportionate to its share of total IEA oil consumption.

Throughout the decision-making and implementation process, IEA stakeholders benefit from the input and advice of industry experts through the IEA Industry Advisory Board (IAB) (established in 1975). In order to fulfil its role, the IAB participates regularly in IEA meetings on oil supply security. The IAB membership is drawn from the major oil companies with headquarters in IEA member countries.

A sub-group of the IAB, the Industry Supply Advisory Group (ISAG), provides advice on the practical execution of the emergency measures. The ISAG comprises oil supply experts from companies represented on the IAB.

the stockholding is refined petroleum products. This generally reflects EU regulations on stockholding (discussed in Annex II). In the European Union, the tendency is for public and industry to hold similar proportions of crude (public 42%; industry 41%) and products (public 58%; industry 59%). In IEA Pacific, 76% of all stocks are in the form of crude oil and, as in IEA North America, virtually all publicly held stocks are crude (see Figure 1.6).

The aggregate stock level for IEA member countries of 4.1 billion barrels is a significant increase from the mid-1980s, when these barely reached 3.0 billion barrels. The steady growth in aggregate stocks reflects the increase in oil demand and subsequent net imports resulting in larger stockholdings, political decisions by some member countries to increase their public stockholding as well as increased IEA membership (see Figure 1.7).

In an IEA co-ordinated action, both public and industry stocks can be drawn upon to supply the market. However, even if only the 1.5 billion barrels of public stocks are considered, a co-ordinated action has the potential to supply significant volumes of oil over extended periods. At a drawdown rate of 2 mb/d, public stocks would cover 24 months; at a rate of 4 mb/d, these stocks would cover one year.

There is an important distinction to make between stocks and coverage. In recent years, the overall volume of oil stocks held in IEA countries has increased. However, when these stocks are measured in terms of

³ The Governing Board is a body comprising senior energy officials from member countries who decide the major policy actions of the IEA.

days of net imports, a different trend emerges. Over time, as import dependency rises, a given volume of oil will meet fewer days of net imports i.e. the coverage declines. This is the net result of demand growth and declining domestic production, a situation that reflects the current reality of many IEA countries.

Figure 1.6
Total Oil Stocks in IEA Regions

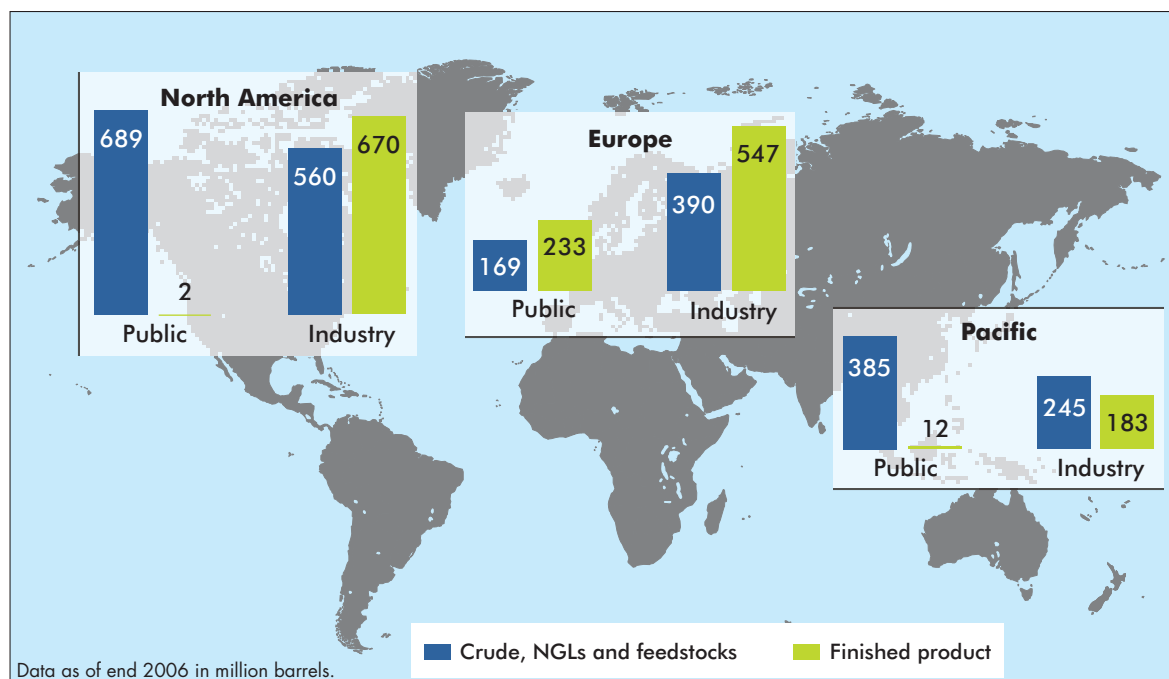
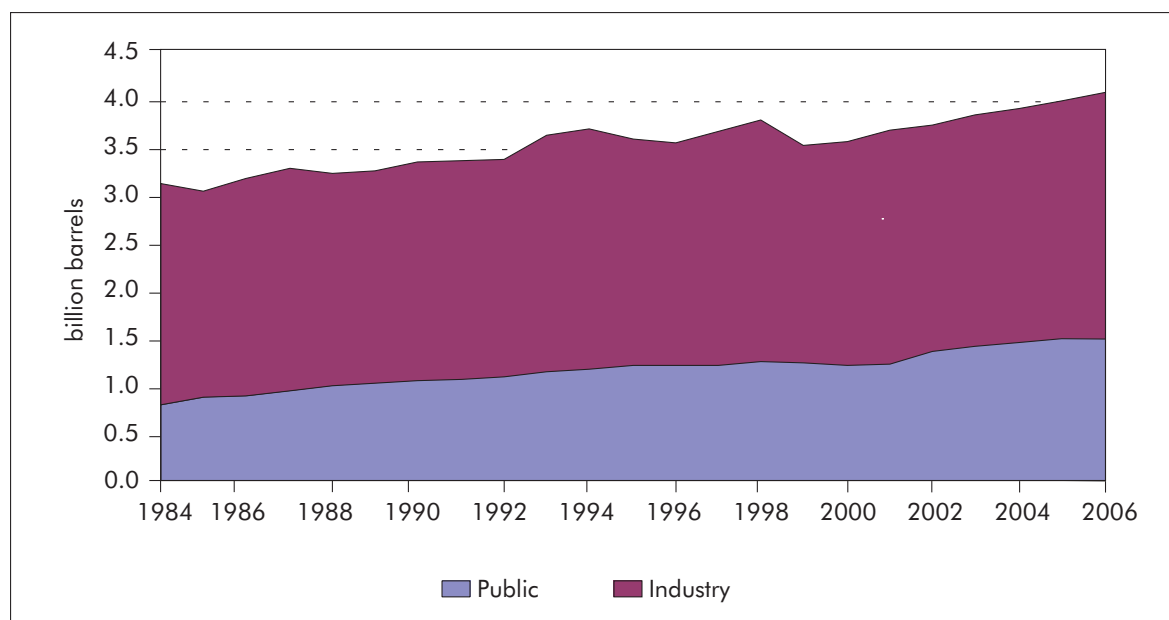


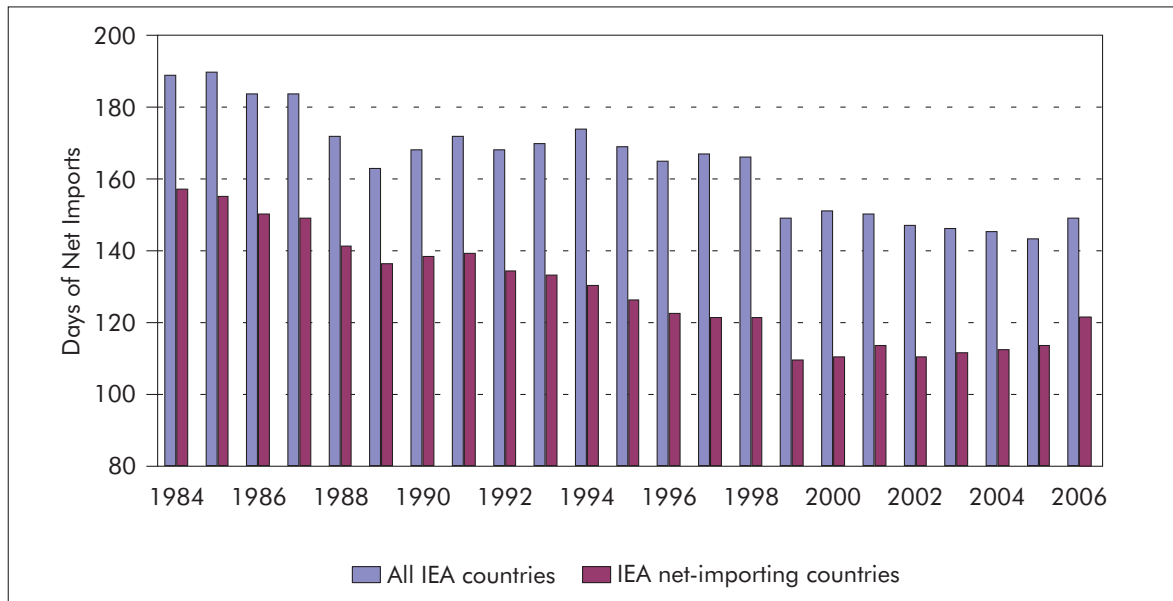
Figure 1.7
Total IEA Oil Stocks at End Year, 1984-2006



Note: includes countries from date of joining the IEA

In 2006, IEA net importing member countries held stocks equating to 122 days of net imports, the highest level in the past eight years. Still, this reflects a decline since 1984, when such stocks reached a peak of 158 days. Days of coverage from net importing member countries reached its lowest level – of only 108 days – in early 2000, but has since increased steadily.

Figure 1.8
Oil Stocks in Days of Net Imports at End Year, 1984-2006



On the whole, the collective stock levels in IEA net-importing member countries have always been well above the minimum level of 90 days. From time to time, individual countries have failed to maintain this threshold. The reasons for this are varied, ranging from compounded effects (such as declining production coupled with unexpected demand growth) to problems associated with lack of physical storage capacity or to the economic conditions prevailing in the market. Stock levels are checked on a monthly basis and a system of peer review by member countries encourages full compliance.

Production Surge

Surge production is another emergency response measure designed to increase the availability of oil supply. More specifically, it is a short-term measure to increase indigenous oil production within a very short period of time. The measure is limited to member countries with significant levels of production, and the potential volume available in a crisis is dependent upon the amount of spare or surge production capacity maintained in individual member countries. In today's oil market climate, this option is much less viable: overall, IEA member countries have little or no spare production capacity. In addition, the need to maintain good oil field practices limits the extent to which oil production can be increased on a short-term basis.

Demand Restraint

Short-term reductions in the use of oil can be an important part of a response to a supply disruption; the most important means of achieving this is through demand restraint measures. One of the key goals of demand restraint measures is to free up oil in an under-supplied market. Such measures are not restricted to one particular sector of consumption. For instance, in the residential sector where oil is used for heating, oil consumption can be substantially reduced through publicity campaigns that encourage people to turn down the thermostat a few degrees during the winter. Where the industry sector uses oil for power a possible limit on operating times may be effective in reducing consumption. Due to the high – and increasing – proportion of oil used for transportation, most demand restraint policies focus on this sector. This sector is more multi-faceted and requires a range of measures. At one end of the spectrum, measures can be very light-handed such as encouraging people to drive less, to car-pool or to drive more efficiently. At the other extreme, very heavy-handed measures can be imposed, such as government-imposed rationing or allocation of oil. (See Chapter 2 for more details on demand restraint capabilities in IEA member countries.)

Fuel Switching

Fuel switching is another measure that, similarly to demand restraint, seeks to reduce the use of oil during a supply disruption. It is a short-term measure that encourages the use of other energy sources as alternatives to oil. This includes, for example, using coal or natural gas rather than oil in electricity production. However, the actual potential to use fuel switching in a crisis has declined significantly in member countries since the 1970s. In particular, the growth in natural gas and gas-only power stations leaves little scope for fuel switching in power generation. Oil-fired electricity generation in IEA countries has declined significantly since 1973, when oil accounted for close to 25% of electricity generation, compared to roughly 5% in 2005. An increasingly important share of oil is used in the transport sector. In 1973, this sector accounted for less than 35% of oil consumption; this percentage has increased to 55% in 2006. In the short run there is virtually no potential to switch to other fuel sources for transportation. (Chapter 2 has a more detailed analysis of fuel switching capabilities in IEA member countries.)

Allocation

In addition to the four measures described above, which aim to either increase the supply of oil or reduce demand, the IEP also contains a burden-sharing element. This measure would re-allocate oil in the event of a very severe supply disruption, drawing oil from countries that are less negatively affected for re-distribution to those countries more severely affected. If the allocation mechanism were to be activated, each member country would be entitled to a “supply right” that represents its fair and equitable share of the oil supplies available to IEA member countries as a group. Thus, in times of a severe emergency, each member’s actual supply of indigenous and imported oil would become subject to international allocation rules.

This relatively cumbersome tool, which bypasses the market, has never been employed as more agile, market-powered tools have been deployed.

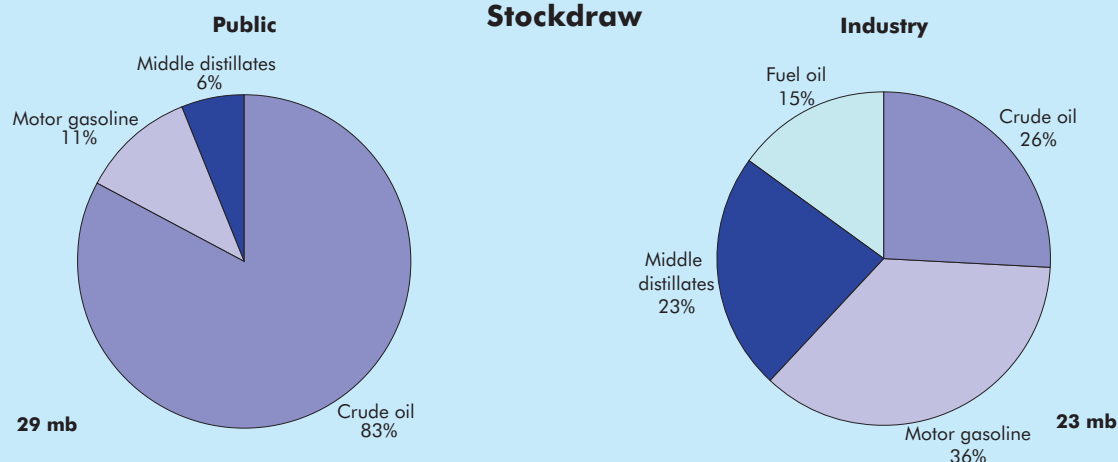
Box 1.3. Hurricane Katrina: Summary of the IEA Response

On 2 September 2005, in the immediate aftermath of the destructive landfall of Hurricane Katrina in the Gulf of Mexico, the IEA announced the agreement of member countries to make available to the market the equivalent of 60 mb of oil. This collective action involved a combination of emergency response measures including the use of emergency stocks, increased indigenous production and demand restraint. Given the nature of the disruption, which also significantly hampered refinery operations in the Gulf region, the IEA response emphasised the release of refined product stocks.

Collectively, IEA member countries drew more than 51 mb from both public and industry stocks. Some 23 mb were made available by lowering stockholding obligations on industry. The remainder, just under 29 mb, was the amount taken up by the market from the almost 39.5 mb of total public stocks offered in the form of loans and sales.

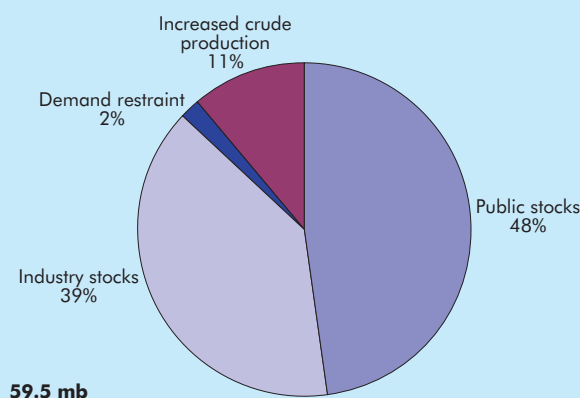
The bulk of the oil drawn from public stocks was in the form of crude oil, reflecting public stockholding practices. By contrast, three-quarters of the stocks from industry were refined products.

Figure 1.9
Stockdraw



Increased indigenous production and demand restraint measures supplemented the oil released from stocks. Thus, the IEA collective action in 2005 brought a total volume of 59.5 mb of oil to the market as a response to the disruption.

Figure 1.10
IEA Co-ordinated Action 2005



Being Prepared is Key

The emergency measures available through the IEA would not be sufficient to effectively deal with a disruption without continuous monitoring and the communication of regular updates on the global oil market, along with regular training and testing. The IEA pursues a range of preparatory activities, many of which require direct participation by member countries.

IEA analysts continuously monitor the market. The Agency's Energy Statistics Division collects, on a monthly basis, comprehensive oil data for OECD member countries. It also gathers data for non-OECD member countries on a periodic basis, according to availability. In case of a crisis, the regular reporting of data is complemented by additional information gathered from various sources including specific emergency questionnaires. IEA oil market analysts use these data for various purposes. Every month, the IEA publishes the *Oil Market Report*, which highlights results of its in-depth data collection and analysis of the oil market, focusing on current issues such as demand, supply, stocks, price and refining. In addition, the Agency produces internal daily and weekly reports. Its strong analytical capabilities enable the IEA to assess supply disruptions quickly and to provide member countries with timely and appropriate information.

Another key element of the IEA system is its ability to communicate with its members on a real-time basis across continents, enabling decisions to be reached within hours. This ability is maintained by periodically conducting Emergency Response Exercises (EREs), which comprise a series of workshops and exercises to train and test policies, procedures and personnel. In addition to the participation of all member countries, the Agency invites candidate countries and major consuming non-member countries to participate. The objective is to ensure countries' readiness to act quickly and effectively by simulating the decision-making process.

In a five-year cycle, the IEA Secretariat and member country representatives conduct peer reviews of each IEA member country's national emergency preparedness. These reviews assess procedures and institutional arrangements. Each member country then receives its report with recommendations; reports and recommendations are discussed by all member countries.

A critical component of the IEA crisis management strategy is robust dialogue with major oil producers and the OPEC Secretariat. IEA/OPEC co-operation to mitigate the effects of an oil supply disruption has already been deployed in a number of occasions as both organisations have a clear interest in the stability of the world oil market.

Recognising that oil consumption and net imports in some non-member countries are increasing rapidly, the IEA promotes dialogue and information sharing on oil security policies and measures with key transition and emerging economies, such as China, India and countries of the Association of Southeast Asian Nations (ASEAN). The IEA also shares information and experience about creating national strategic oil stocks, and intends to co-ordinate future emergency response policies with these countries. For example, in 2002 and 2004, the Agency organised emergency response simulation exercises for oil supply disruptions with participants from China, India and Southeast European countries. In recent years, the IEA also offered training in emergency preparedness statistics for China (2004 and 2006), India and ASEAN member countries (2005), and Central Asian countries (2006).

Considerations for the Future

Oil supply disruptions continue to be a very real threat to global oil markets and to the economic well-being of countries. The supply disruption of 2005, associated with Hurricanes Katrina and Rita, confirmed that the current tightness of the market dramatically changes the scope for a disruption. Today's market can be severely challenged by disruptions of magnitudes that would have been considered a small volume of oil by historical comparison.

The 2005 events and subsequent co-ordinated action reinforced the need for an effective collective emergency response system. Oil supply security will continue to be a challenge for IEA member countries; no doubt the level of risk will be exacerbated by many constraints such as uncertain investment prospects, rapid demand growth and resource nationalism, as well as by events such as industrial accidents, extreme weather, terrorism and geopolitical tensions.

The high level of integration of energy markets raises an additional question regarding the role of alternative fuels during an oil emergency – *i.e.* whether supply disruptions of other fuels could spill-over into the oil market and cause severe oil demand increases. Now that natural gas has surpassed oil as a dominant energy source in power and heat generation, it can no longer be considered an easily available substitute to replace oil losses in those sectors. In fact, switching to oil may also be a remedy for a supply disruption of natural gas in the power sector. Thus, it is all the more critical to understand the linkages between the emergency policies for oil and natural gas to reduce risks and define appropriate remedies to overcome a supply disruption in either (or both) of these energy sources.

Collectively, these elements make the energy market more volatile and create conditions under which global energy markets are more vulnerable to an oil supply disruption. The collective response to the 2005 events and the emergency response exercises demonstrate that IEA countries are well prepared and willing to collaborate to offset a disruption in oil supplies. The emergency response potential of IEA member countries is examined in more detail in the following chapter.

CHAPTER 2

EMERGENCY RESPONSE SYSTEMS IN IEA COUNTRIES

Introduction

The emergency response systems of IEA member countries are a mechanism through which the Agency can co-ordinate action to mitigate the effects of a short-term oil supply disruption. History demonstrates that the measures included in these systems are both necessary and effective.

Part of the IEA mandate is to ensure that the measures remain effective as the oil market evolves. To this end, the IEA conducts country-by-country Emergency Response Reviews (ERRs) on a regular basis. To analyse the ability of IEA member countries to cope with a short-term oil supply disruption, the reviews focus on three key areas: the decision-making structure; stockholding structures and current developments; and other mechanisms for response, namely demand restraint, fuel switching and surge production.

This chapter summarises the findings of the latest cycle of reviews, which was concluded in 2007. It highlights strengths and identifies issues that require further attention.⁴

Decision-making Structure

In most IEA member countries, the responsibility for oil security policy – and, subsequently, for decisions regarding the release of emergency oil stocks or implementation of other emergency measures – is ultimately co-ordinated by one particular government minister.

Responsibility for the preparation and implementation of national emergency measures is typically delegated to the National Emergency Sharing Organisation (NESO), as is the task of liaising with the IEA on matters of international co-ordination during an emergency. The structures of NESOs

⁴ Throughout this chapter Poland and the Slovak Republic are included in the analyses of IEA member countries. Both countries were invited to join the IEA in 2007 and are expected to complete the accession process in the coming year.

differ from country to country, reflecting a wide variety of oil supply and political structures. NESOs also have varying degrees of involvement by oil industry personnel. The permanent core of the NESO structure usually comprises oil market experts from within the governmental department concerned with energy matters. When activated during an emergency, the NESO structure expands to include a broader range of government offices and industry representatives. Most NESOs have a dual mission: in addition to holding governmental authority for national oil emergency management, they monitor domestic oil market activities.

Stockholding Requirements

In accordance with the International Energy Program (I.E.P.), each IEA member country has an obligation to have oil stock levels that equate to no less than 90 days of net imports (see box 2.1). This basic oil stockholding obligation of IEA member countries was first formulated in 1974⁵ with the aim of establishing “a common emergency self-sufficiency in oil supplies”. In 2007, there were three net exporting IEA member countries: Canada, Denmark and Norway. These countries do not have a stockholding obligation under the I.E.P. Agreement.

Box 2.1. IEA Emergency Reserve Calculation: Minimum 90 Days of Net Imports

The IEA minimum stockholding obligation is based on net imports of all oil, including both primary products (such as crude oil and natural gas liquids [NGLs]) and refined products. It does not cover naphtha and volumes of oil used for international marine bunkers.

The 90-day commitment of each IEA member country is based on average daily net imports of the previous calendar year. This commitment can be met through both stocks held exclusively for emergency purposes and stocks held for commercial or operational use, including stocks held at refineries, at port facilities, and in tankers in ports. The obligation specifies several types of stocks that cannot be counted toward the commitment, including military stocks, volumes in tankers at sea, in pipelines or at service stations, or amounts held by end-consumers (tertiary stocks). It also does not include crude oil not yet produced.

Member countries can arrange to store oil outside of their national boundaries and include such stocks in meeting their minimum requirement. This option is particularly important for countries in which storage capacity constraints or supply logistics make domestic storage insufficient. To exercise this option and count the stocks held abroad toward the obligation, the governments involved must sign bilateral agreements assuring unconditional access to the stocks in an emergency.

When evaluating a country's compliance with the 90-day obligation, the IEA applies a 10% deduction to its total stocks, net any oil held under bilateral agreements. This accounts for any volumes that are technically unavailable (such as tank bottoms)(see Annex I).

Of the 26 IEA member countries and two accession countries (Poland and the Slovak Republic), 19 countries also have minimum stockholding obligations as members of the European Union (EU). The EU stockholding obligation differs from that of the IEA in that it requires EU member countries to hold the equivalent of 90 days of consumption of three main product categories.⁶ While the EU

⁵ Initially, the commitment was 60 days with a gradual increase to 90 days, to be reached by 1 January 1980.

stockholding obligation can be met with equivalent volumes of crude oil, based on refinery yields, the IEA stockholding requirement does not specify how the oil is to be held (see Annex II).

Stockholding Systems of Member Countries

Stockholding regimes vary across IEA member countries, reflecting differences in oil market structure, geography and national policy choices related to emergency response. In the case of countries that are also members of the European Union, the stockholding policy reflects the need to comply with both methods of calculating compliance. In general, there are three approaches to guarantee that overall stock levels meet minimum requirements: industry stocks, government stocks and agency stocks. Some countries use only one category of stockholding to meet the minimum obligation; most countries use a combination of categories.

Stockholding Structure

Industry Stocks

Stocks held by industry, whether for commercial purposes or in order to comply with national stockholding rules, can count toward meeting a country's stockholding commitment. Most member governments require certain companies, such as importers, refiners, product suppliers or wholesalers, to hold a minimum number of days of stocks. Generally, the required amount is based on a percentage of the previous year's sales, consumption or imports.

In 2007, 20 out of the 28 countries (26 IEA member countries and 2 candidate countries) opted to meet all or part of their obligation by placing a stockholding requirement on industry. Of the 20 countries imposing minimum stockholding obligations on industry, seven use this approach to meet the totality of their IEA obligation. They are Greece, Italy, Luxembourg, Sweden, Turkey and the United Kingdom. Norway has no IEA stockholding obligation as a net-exporter, however it places an obligation on industry to hold at least 20 days of sales/imports. The following countries do not place such an obligation on industry: Australia,⁷ Canada, the Czech Republic, Germany, Hungary, New Zealand, the Slovak Republic and the United States. These countries place no formal obligation on industry, however, their industry commercial stocks count towards the IEA obligation of 90 days of net imports.

Government Stocks

The second category of stocks is those owned by governments. These are typically financed through the central government budget and held exclusively for emergency purposes. In 2007, eight countries held government stocks: the Czech Republic, Ireland, Japan, the Republic of Korea, New Zealand, Poland, the Slovak Republic and the United States.

⁶ The EU product categories are as follows: Category 1: motor spirit and aviation fuel; category 2: gas oil, diesel oil, kerosene and jet fuel of the kerosene type; category 3: fuel oils.

⁷ Australia places no obligation on industry. However, it relies on stocks held by industry for commercial purposes to cover the relatively small stockholding obligation it has as a marginal net importer.

Agency Stocks

Some countries have a stockholding arrangement that involves establishing a separate agency endowed with the responsibility of holding all or part of the stock obligation. The agency structure and arrangements vary from country to country. Several countries have government-sponsored schemes (*e.g.* Belgium [as of 2007], Finland, Hungary, the Netherlands, Portugal and Spain). Others are industry-led and/or industry-created initiatives (*e.g.* Austria, Denmark, France, Germany and Switzerland). Most agency stocks are held under a co-operative cost-sharing arrangement of the industry.

Table 2.1
Current Stockholding Systems of IEA Member Countries

	IEA Membership	EU Membership	Structure of Stockholding Responsibility
Australia	1979	-	-
Austria	1974	1995	Agency/Industry
Belgium	1974	1957	Agency/Industry
Canada	1974	-	-
Czech Republic	2001	2004	Government
Denmark	1974	1973	Agency/Industry
Finland	1992	1995	Agency/Industry
France	1992	1957	Agency/Industry
Germany	1974	1957	Agency
Greece	1977	1981	Industry
Hungary	1997	2004	Agency
Ireland	1974	1973	Industry/Government
Italy	1974	1957	Industry
Japan	1974	-	Industry/Government
Korea, Republic of	2002	-	Industry/Government
Luxembourg	1974	1957	Industry
Netherlands	1974	1957	Agency/Industry
New Zealand	1977	-	Government
Norway	1975	-	Industry
Poland	Accession country	2004	Industry/Government
Portugal	1981	1986	Agency/Industry
Slovak Republic	Accession country	2004	Government
Spain	1974	1986	Agency/Industry
Sweden	1974	1995	Industry
Switzerland	1974	-	Agency/Industry
Turkey	1974	-	Industry
United Kingdom	1974	1973	Industry
United States	1974	-	Government

“-” Not EU member/No stockholding obligation

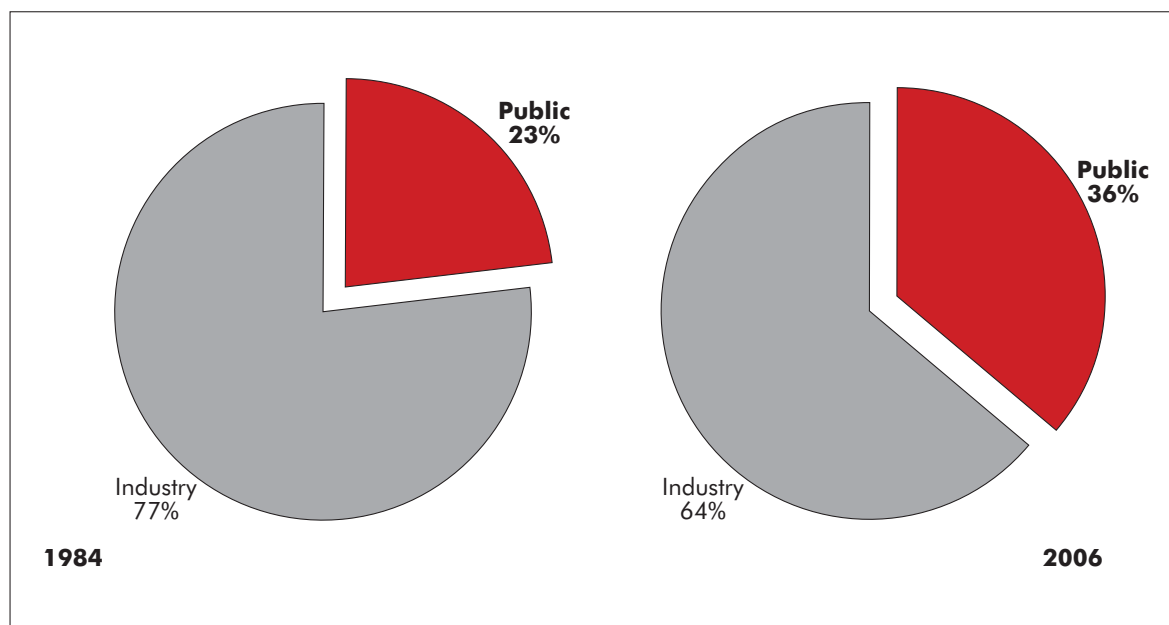
Recent Developments

The IEA refers to government and agency stocks as “public” stocks. Such stocks have the advantage of providing a clear indication of oil available solely for emergency purposes. In recent years, the role of public stocks has increased noticeably in the overall emergency response potential of the IEA, both in terms of the number of countries holding public stocks and in the total volume being held.

In 1984, 10 out of the 21 IEA member countries held public stocks. In 2007, this proportion increased to 17 out of the 26 member countries. This reflects a rise in the number of countries with stockholding agencies, which has increased from 4 to 11 since the early 1980s. With the accession of Poland and the Slovak Republic to the IEA, and Turkey’s intention to create an agency, it is anticipated that 20 out of 28 member countries will have public stocks by 2008.

There is also a trend towards greater volume of stocks, as a proportion of all stocks, being held in public stockholding arrangements. In the mid-1980s, public bodies held about 23% of all stock; at the end of 2006, this figure had increased to about 36%.

Figure 2.1
Public Stocks as Share of Total IEA Stocks



Most countries holding public stocks do not rely on these to fully meet the minimum 90-day obligation, but rather combine public stocks with a stockholding obligation on industry. However, several recent IEA member countries have tended to adopt fully public (government/agency) obligatory stockholding systems. Within IEA Europe, the Czech Republic, Hungary and Germany are currently the only countries with an exclusively government/agency system (Germany has a tradition of public strategic stocks, over and above its EU obligations). The Slovak Republic will be part of this group once it joins the IEA. Belgium has indicated that its stockholding agency will eventually take over the country’s full obligation.

Of those systems that combine both public and industry stocks, the relative proportions vary considerably from country to country. In most of these cases, public stocks cover more than one-half of the country's stockholding obligation. Only three countries, Spain, Poland and Portugal use a mixed system in which the public stockholding entity holds less than 50% of the statutory obligation.

One general attraction of a mixed system is that it can improve overall "visibility" of emergency stocks whilst maintaining an operational link with the oil companies. This should help to ensure rapid drawdown in an emergency. Nevertheless, there is no single, perfect system for maintaining the required minimum stockholding level. Any given stockholding arrangement will have both advantages and disadvantages in terms of efficiency, cost and equity. Ultimately, the choice will depend on the particular country circumstances.

It is important to note that the arrangement for stockholding (industry, agency, or government – or any combination thereof) may differ from the way in which physical stocks are actually held. For example, obligatory stocks may be co-mingled with operational stocks, with the benefit of ensuring that stocks are ready for use - *i.e.* they are already "in" the supply chain. However, this approach makes it difficult to distinguish between operational and obligatory stocks, and to monitor the stockholding obligation. By contrast, it is relatively easy to monitor stocks that are totally segregated from operational stocks (*e.g.* kept in separate emergency reserves or in single-purpose caverns). Segregation may add visibility to emergency stocks, but it may take longer to release such stocks to the market. A more attractive alternative may be to hold segregated public stocks in separate tanks located within commercial tank farms. This approach may offer the dual benefits of the held stocks being visible and easy to check, yet also easy to bring into the operational system in times of an emergency.

Currently, a large proportion of publicly held stocks are segregated – *i.e.* they are not co-mingled with industry operational stocks. This has the benefit of increasing their visibility and thus, injecting a sense of stability to the market.

Several countries have made significant changes in the structure of their emergency stockholding systems during the 2002-07 period; others will implement changes from 2007 onwards. The following examples are noteworthy:

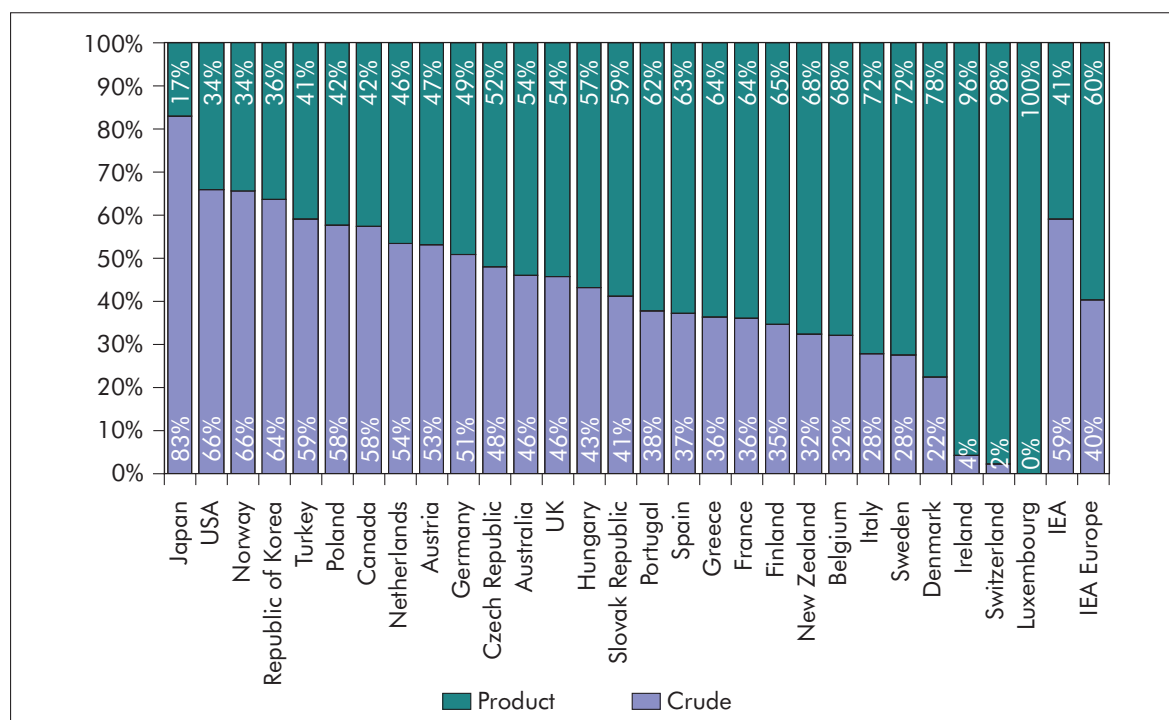
- In Belgium, the responsibility for holding emergency stocks was previously imposed entirely on market operators. New legislation, passed in 2006, involves the creation of a new stockholding agency: *Agence de Pétrole* (APETRA). By 2012, APETRA will be responsible for holding 100% of the national obligation.
- After it was determined that industry stocks fell short of meeting the country's minimum obligations, the government of New Zealand recently reserved oil stocks held in other countries, under arrangements referred to as tickets (see Box 2.2).
- Norway has no stockholding obligation due to its status as a net oil exporter. However, new legislation introduced in January 2007 imposes a 20-day stockholding requirement on market operators.
- New legislation in Poland changed the basis for compulsory stock requirements, shifting it from a calculation based on inland consumption of the three main EU categories to one based on net oil imports according to IEA methodology.
- Historically, Turkey imposed a stockholding obligation entirely on market operators. The government is now planning a stockholding agency.

- The UK government announced in February 2007 that, over a transitional period in 2007/08, it would change the basis for calculating the stockholding obligations on industry, moving from a calculation based on sales to one based on production and imports.

Crude Oil Versus Product Stocks

The IEA stockholding obligation does not specify whether stocks should be held in the form of crude or refined oil. IEA member countries that also belong to the EU typically hold product stocks based on EU regulations. The choice between holding reserves in either crude oil or refined products will depend on specific factors of each individual member country. One factor is the financial burden of storage, which can be significantly higher for refined products than for crude oil. Countries with a large refining industry will likely hold more crude oil, which provides greater flexibility in times of crisis. In countries that have limited domestic refining capacity or rely on product imports to meet a large share of domestic demand, there is a greater tendency to hold reserves of refined products.

Figure 2.2
Total Oil Stocks by Product and Crude, December 2006



As of 2007, total oil stocks in IEA member countries (including both volumes held exclusively for emergency purposes and for commercial or operational use) are weighted toward crude (59%) over petroleum products (41%). This reflects the large volumes of crude in the United States' Strategic Petroleum Reserve (SPR) and Japan's government owned stocks managed by Japan Oil, Gas and Metals National Corporation (JOGMEC). In IEA Europe, the split is reversed, with 40% crude and 60% in petroleum products – a direct result of the EU obligation. Significant differences are also evident from country to country. At one end of the spectrum, Japan holds roughly 80% of its stocks as crude (all government-owned stocks managed by JOGMEC are crude oil). Similarly, the United States

holds all but a fraction (0.3%) of its public stocks in the form of crude oil, while industry holds the majority of its stocks in products. In contrast, Luxembourg and Switzerland hold all or virtually all their stocks in products – and for good reason: the former has no refineries; the latter has only two refineries. To make up for this limited (or complete lack of) refining capacity, both countries have stockholding arrangements that require product importers to stock a given percentage of their imports.

Location and Availability

In specific instances, member countries are able to count stocks held in the territory of other countries in order to fulfil their minimum stockholding requirements. This can include stocks held in other countries for logistical purposes, such as at a neighbouring country's port where volumes are unloaded and delivered by pipeline. Stocks counted towards the minimum obligation can also include stocks held under bilateral agreements between governments, which guarantee access to such stocks during a crisis. This creates efficiencies in stockholding, especially for countries with insufficient storage capacity or in which a major demand centre is located on or near an international border. Interconnectivity of the oil market infrastructure can also facilitate more cost-effective storage by utilising spare storage capacity in neighbouring countries. This flexibility is often an important means of enabling industry participants to meet stockholding obligations imposed by the government. In some cases, the stocks held abroad are actually owned by the company or agency with the stockholding obligation. In other cases, the company or agency does not own the stocks but has the right – based on short-term lease contracts or tickets – to purchase them in a crisis.

Box 2.2. Stockholding Tickets

Many IEA member countries give oil companies or stockholding agencies the choice of meeting their stockholding obligations in two ways: either by owning physical stocks themselves or, for certain amounts, arranging stock cover through leasing agreements, referred to as “tickets”.

Tickets are stockholding arrangements under which the seller agrees to hold (or reserve) an amount of oil on behalf of the buyer, in return for an agreed fee. The buyer of the ticket (or reservation) effectively owns the option to take delivery of physical stocks in times of crisis, according to conditions specified in the contract.

Tickets can be for either crude or refined products; the agreement specifies the quantity, quality and location of the oil for a specified period (typically a calendar quarter). Tickets can be either domestic contracts or contracts between entities in separate countries (the latter must be within the framework of a bilateral government agreement).

The rationale behind oil stock tickets is that a company holding stocks in excess of its obligation can offer such stocks to cover the obligation of another company or agency, either domestically or abroad. Tickets are sold mainly by refiners with excess inventory as a way to offer compulsory stock obligation cover to third-party buyers. In some cases, a company in one country may provide tickets to one of its own affiliates that operates in another country. In all cases, the ticket seller is prohibited from counting the oil in question towards its own stockholding obligation.

Ticketing is a flexible and, generally, cost-effective way for companies or agencies with insufficient stocks to avoid being in breach of stockholding obligations. It essentially provides an alternative to acquiring oil stocks directly and building and/or renting necessary storage capacity.

Table 2.2
Bilateral and “Ticket” Stockholding Controls

	Allowances for Owned Stocks Abroad Held under Bilateral Agreements	Allowances for Stock «Tickets» Abroad Held under Bilateral Agreements
Australia	Not relevant	Not relevant
Austria	Not allowed	Not allowed
Belgium	30% maximum APETRA	30% maximum APETRA
Canada	Not relevant	Not relevant
Czech Republic	18 days maximum	18 days maximum
Denmark	Owned stocks not allowed abroad	10% maximum
Finland	Net NESA; 30% maximum industry	Allowed
France	Obligatory stocks 10% maximum	Obligatory stocks 10% maximum
Germany	Allowed	10% products maximum
Greece	Not allowed	Not allowed
Hungary	Allowed	Not allowed
Ireland	Allowed	Allowed
Italy	Obligatory stocks 10% maximum by country	10% maximum by country
Japan	Not allowed	Not allowed
Korea, Republic of	Not allowed	Not allowed
Luxembourg	35-45 days maximum	35-45 days maximum
Netherlands	COVA 30% maximum	Industry: No limit/COVA not Allowed
New Zealand	Allowed	Allowed
Norway	No bilateral agreements	No bilateral agreements
Poland	ARM not allowed; obligatory industry stocks 5% maximum	Allowed, currently no bilateral agreements
Portugal	Obligatory stocks 20% maximum	Obligatory stocks 20% maximum
Slovak Republic	Allowed	Not allowed
Spain	Obligatory stocks 15% maximum	Obligatory stocks 15% maximum
Sweden	Obligatory stocks 20% maximum	Obligatory stocks 20% maximum
Switzerland	Not allowed	Not allowed
Turkey	Not allowed	Not allowed
United Kingdom	Allowed	Allowed
United States	Not relevant	Not relevant

For acronyms refer to individual country sections or Annex V.

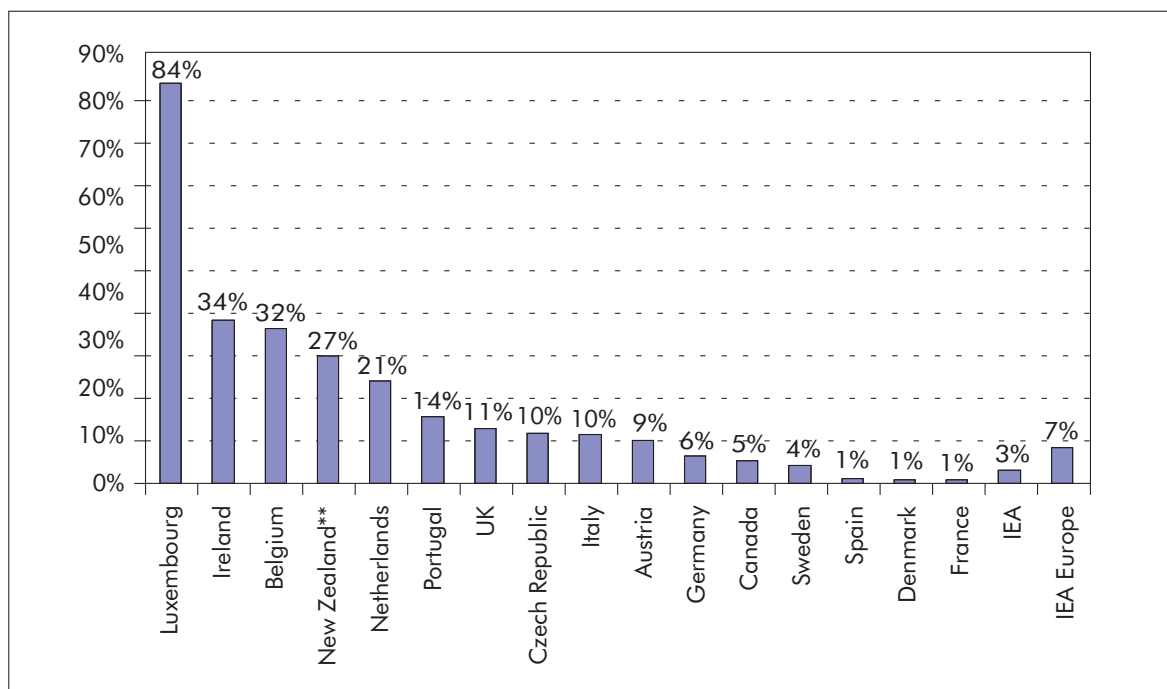
Stocks held abroad under bilateral agreements can be either in the form of volumes owned or amounts leased as tickets. Most IEA member countries allow the use of these bilateral stockholding arrangements to meet the IEA minimum stockholding obligation. At the same time, many countries impose a limit on the share of stock obligations that can be held abroad – normally up to maximum of about 30% of actual stocks. Some countries prohibit completely the holding of emergency stocks in other countries.

In practice, the proportion of stocks held abroad is generally small for the IEA as a whole – less than 3% on average across all member countries. However, it can represent a significant portion of stock cover for some member countries. Because of insufficient domestic storage capacity, Luxembourg has as much as 84% of its stock. Some other IEA member countries also hold abroad a relatively high proportion of their stockholding obligations (see Figure 2.3).

A large part of the stocks held abroad is in the form of ticket arrangements. The use of tickets is quite common in IEA Europe, because, based on the common market, major oil companies see Europe as a whole or as several large regions. They recognise an opportunity to use cross-border ticket agreements with different countries to optimise their stocks *vis-à-vis* their obligations. Nevertheless, several countries specifically prohibit this arrangement including Austria, Greece, Hungary, the Slovak Republic, Switzerland and Turkey.

Figure 2.3

Countries with Stocks Held Abroad (% of Total Stocks), December 2006*



* This includes stocks held abroad under bilateral agreements (both owned and ticketed) and for logistical purposes.

** January 2007.

Monitoring and Non-compliance

All IEA member countries monitor actual oil stock levels on a monthly basis and are able to verify compliance with the minimum stockholding requirements under the IEA and/or EU obligations. In countries that place an obligation on industry, monthly monitoring also permits the verification of individual company compliance.

Most IEA member countries reserve the right to conduct inspections, or spot-checks, to confirm reported stocks data. In the Czech Republic, Germany, Hungary and the Slovak Republic, the central stockholding institution is responsible for meeting the entire stockholding obligation, making data checks less crucial.

Most IEA member countries have a system of fines to penalise non-compliance with regards to compulsory stockholding obligations. In several countries, punishment is, in theory, potentially more severe and may include prison sentences (Austria, Belgium, Japan, Republic of Korea, the Netherlands and Sweden) or the cancellation of trading licences (Spain and Turkey).

Table 2.3
Obligatory Stockholding Compliance and Supervision

	Company Stocks Compliance	Penalties for none compliance
Australia	*	*
Austria	Spot-checks	Fines/prison
Belgium	Spot-checks	Fines/prison
Canada	*	*
Czech Republic	*	*
Denmark	Data-checks	Fines
Finland	Spot-checks	Fines
France	Spot-checks	Fines
Germany	*	*
Greece	Spot-checks	Fines
Hungary	*	*
Ireland	Spot-checks	*
Italy	Spot-checks	Fines
Japan	Spot-checks	Fines/prison
Korea, Republic of	Spot-checks	Fines/prison
Luxembourg	Spot-checks	Fines/prison
Netherlands	Spot-checks	Fines/prison
New Zealand	*	*
Norway	Spot-checks	Fines
Poland	Spot-checks	Fines
Portugal	Spot-checks	Fines
Slovak Republic	*	*
Spain	Spot-checks	Fines/licence
Sweden	Spot-checks	Fines/prison
Switzerland	Spot-checks	Fines/licence/prison
Turkey	Spot-checks	Licence
United Kingdom	Spot-checks	Fines
United States	*	*

* No industry obligation/no penalty.

Timeframe for Decision Making

IEA emergency response measures are set in motion following a Governing Board decision, once a significant supply disruption occurs or is likely to occur in the very near future. Based on IEA analysis of the situation, the IEA executive director will inform IEA member countries (via the Governing Board) of this assessment and specify whether or not activation of the emergency response measures is desirable. If action is recommended, the Executive Director will suggest a volume of oil equivalent to be made available to the market by IEA member countries. Each country's share in the action is then based on its share in total IEA oil consumption. Members will have a short period to react to this assessment. In the absence of adverse reactions, the Executive Director will give official notice of the activation of emergency response measures.

Box 2.3. The Evolution and Flexibility of the IEP

IEA emergency response mechanisms were established, under the 1974 I.E.P. Agreement, to create a concrete and co-operative action plan in the event of a major oil supply disruption. The I.E.P. Agreement outlines four key response measures: release of stocks; restraint of demand; switching away from oil to other fuels; and increasing domestic oil production. In support of the first measure (release of stocks), the Agreement requires that IEA member countries hold in reserve oil stocks equivalent to at least 90 days of net oil imports.

IEP measures were initially designed to take effect in the event of oil supply disruptions involving a loss of 7% or more of normal oil supply, either for the IEA as a whole or any individual member country. However, as oil markets have evolved, so have the tools of the IEA for responding to supply disruptions. Today's reality calls for greater flexibility in determining how and when to resort to emergency measures.

The IEA established the Co-ordinated Emergency Response Measures (CERM), a series of actions that provide a rapid and flexible system of response to actual or imminent oil supply disruptions. CERM measures emphasise and enable the early release of stocks.

In practice, this system can be very efficient. When Hurricane Katrina made landfall at the end of August 2005, causing severe disruption to crude/products supplies in the US Gulf Coast area, the collective decision to initiate emergency measures was taken within 10 hours – even though IEA capitals are spread globally across 16 time zones.

Once there is a decision to activate emergency measures, the proceedings in member countries essentially move through three stages:

- Governments decide the details of their contribution, including volume, timing, method (one measure or a combination of measures) and source of the stock release (government/agency stocks versus industry stocks).
- Member countries draw up legislative decrees or make public postings detailing the actions to be taken and the necessary procedures (*e.g.* the release of stock through tender).
- Once the relevant legislative powers are activated, action is initiated for the offering of stocks to the market.

Based on the experience of Hurricane Katrina in 2005, in most IEA member countries, the length of time required to move through these three stages – *i.e.* from deciding to act to the release of stocks – is two to seven days. Once the stock release procedures have been carried out, the actual physical delivery of stocks to the market can take from one day to as much as three weeks, depending on the emergency stocks structure. In the case of member countries that hold a significant proportion of emergency stocks overseas, the actual physical availability of those stocks in the country itself could take up to six weeks. Such countries may opt instead to swap stocks with another country, which can significantly reduce this period.

Stock Drawdown

The exact method of emergency stocks release varies considerably amongst IEA member countries. In practice, the preferred approach in most countries that impose all of the stockholding obligation

on industry operators seems to have been a uniform reduction in the stockholding obligation by a certain percentage or by specified days of supply. For example, after Hurricane Katrina in 2005, such reductions ranged from less than one day to a maximum of five days. In general, these volumes are made available through the normal channels at market prices. By contrast, Luxembourg convenes a committee of government/industry representative to determine the release and pricing of obligatory stocks. In Switzerland, the release would be allocated according to individual company needs.

A variety of approaches is also used for the release of government/agency stocks. Several countries would conduct the release from public stockholdings through a tender bidding process (Germany, Japan, the Netherlands, Poland and the United States). Most other countries would make the stock available at prevailing market prices (the Czech Republic, Finland, France, Hungary, Ireland, New Zealand, Portugal and Spain). In the Republic of Korea, the government determines the pricing of the release from its stockpile. The Czech Republic, Finland and the United States are examples of countries that sometimes release public stocks in the form of loans.

Financing and Fees

IEA member countries with government/agency stockpiles use a variety of methods to finance both the initial set-up/capital costs and the running costs.

In most IEA member countries with government-held stockpiles or stockholding agencies, the initial set-up/capital costs of the stockpile were financed from the central government budget (the Czech Republic, Finland, Japan, Republic of Korea, Poland, Portugal, the Slovak Republic and the United States). Funds from the central budget also financed New Zealand's recent purchase of stock tickets. By contrast, bank loans were used in Denmark, Germany, Hungary, Ireland and the Netherlands, as well as for Belgium's new stockholding agency. The central storage agencies in Austria and the Netherlands are backed by government loan guarantees.

Central government budgets finance the running costs of stockholding agencies in several countries including the Czech Republic, Japan, the Republic of Korea, New Zealand, Poland, the Slovak Republic and United States. In most other IEA member countries with stockholding agencies, the running costs are recouped through a fee (levy) charged on the volume of product sales (*e.g.* deliveries into domestic consumption). The operational cost associated with the fee is then passed onto the final consumer in retail prices. This system is applied in Finland, Germany, Ireland, the Netherlands, Portugal and Spain. Belgium's new stockholding agency also plans to recoup its running costs through a levy. Denmark discontinued its levy in 1992 after finding that the stockholding agency could cover running costs from a considerable financial surplus built up previously. Hungary charges a levy on crude/products imports. Switzerland charges a levy on products imports to help companies cover the costs of obligatory stocks. France covers the costs of obligatory stocks through a monthly fee charged to industry by the Professional Committee for Strategic Petroleum Stocks (CPSSP), the organisation responsible for ensuring that national stockholding obligations are met. In Austria, the storage agency Erdöl-Lagergesellschaft (ELG) is financed by annual storage fees charged to companies.

In IEA member countries that impose all or part of the stockholding obligations on market operators, the associated costs are recouped through normal market operations.

In Luxembourg, a portion of financial support for obligatory stockholding can be recouped through a specified amount included in consumer prices (“remuneration for storage”). In Turkey, TÜPRAŞ (a privatised company) can avail itself of a subsidy from the government for stocks over and above the necessary level to satisfy the 90 days obligations.

Table 2.4
Government/Agency Stock Financing

	Initial Set-up Costs	Running Costs
Australia	*	*
Austria	Govt. backing	ELG storage fees
Belgium	Bank loans	APETRA levy
Canada	*	*
Czech Republic	Govt. budget	Govt. budget
Denmark	Bank loans	FDO levy
Finland	Govt. budget	NESA levy
France	Industry	CPSSP fees
Germany	Bank loans	EBV levy
Greece	*	*
Hungary	Bank loans	MSZKSZ levy
Ireland	Bank loans	NORA levy
Italy	*	*
Japan	Govt. budget	Govt. budget
Korea, Republic of	Govt. budget	Govt. budget
Luxembourg	*	*
Netherlands	Bank loans	COVA levy
New Zealand	Govt. budget	Govt. budget
Norway	*	*
Poland	Govt. budget	Govt. budget
Portugal	Govt. budget	EGREP levy
Slovak Republic	Govt. budget	Govt. budget
Spain	Bank Loans	CORES levy
Sweden	*	*
Switzerland	Industry	Carbura levy
Turkey	*	*
United Kingdom	*	*
United States	Govt. budget	Govt. budget

* Denotes no government or agency stocks, and therefore no setup or running costs.
For acronyms refer to individual country sections or Annex V.

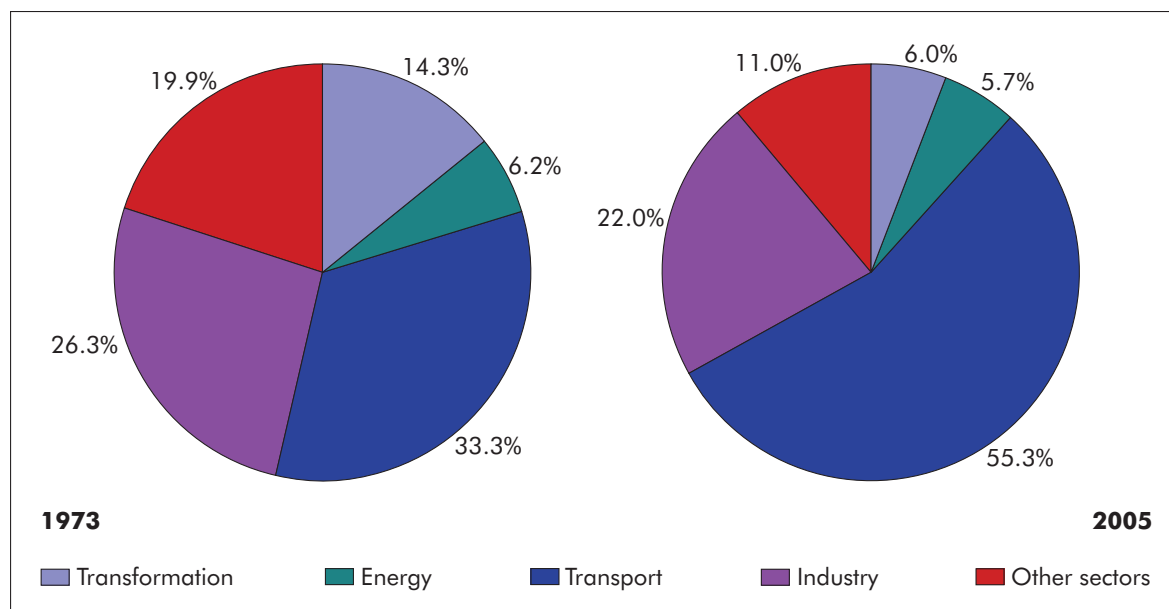
Other Response Measures

In addition to stockdraw, IEA member countries have at their disposal a number of tools that can be used on their own or in combination with stockdraw during a co-ordinated action. Demand restraint and fuel switching are both designed to help temporarily curb the use of oil; surge production, similarly to stockdraw, increases the supply of oil on a short-term basis.

Demand Restraint

Demand restraint measures aim to rapidly reduce oil consumption in a crisis. This can be done, over short periods of time, either by reducing the amount of oil actually used or by limiting the amount of oil supply available to consumers. In both instances, the degree to which measures are applied can range from light-handed (such as public information campaigns to promote voluntary actions) to more medium- and heavy-handed compulsory measures (such as driving restrictions or fuel rationing).

Figure 2.4
IEA Oil Consumption by Sector



Demand restraint measures are not limited to a specific sector of consumption. For example, oil use in the industry sector could be cut by limiting the operation times of particular segments of industry that have high levels of oil consumption. Measures to reduce oil consumption in the “other sectors” (which includes residential use) could include encouraging residents of homes with oil heating to lower the thermostat in winter.

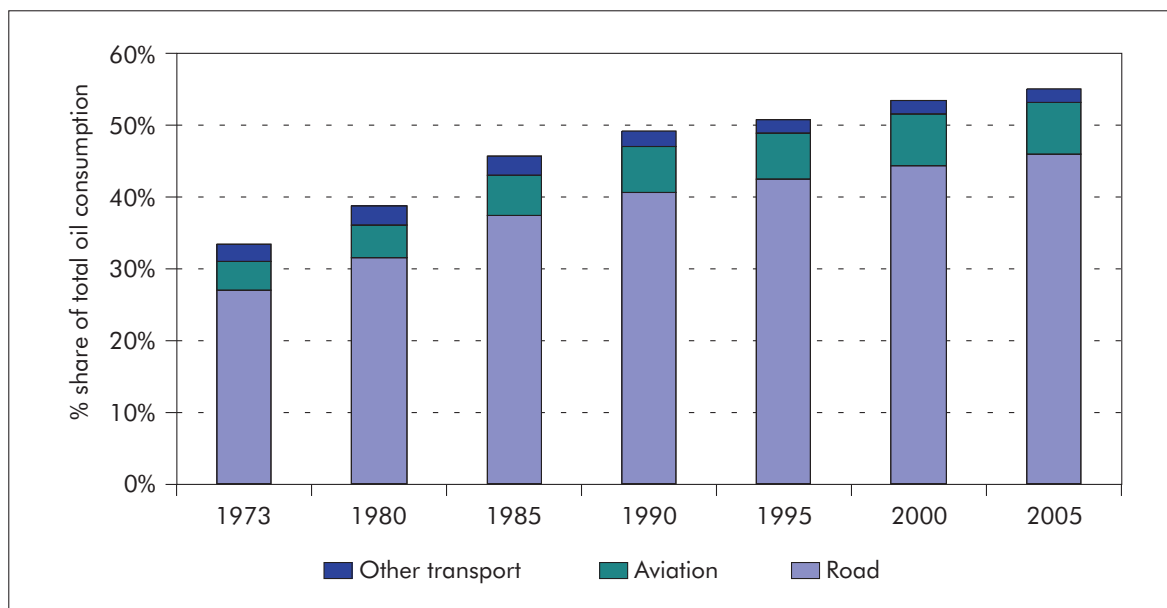
The transportation sector warrants special attention. Demand for oil in the transportation sector has grown steadily over the past 30 years, both in terms of volume and share of total oil demand. In addition, transportation is expected to account for nearly all future growth in oil demand. Currently, transportation consumes more than one-half of all oil used in IEA countries. This includes all transport activities, such as aviation, road, rail and other modes, such as inland water navigation. Because road transportation represents more than 80% of all oil consumption in the transport sector and offers the greatest potential for reductions during a crisis, many short-term measures to cut back on oil demand during a crisis tend to focus on road transportation.

Saving Oil: Focus on Road Transportation

In general, there are two types of policy approaches to reducing oil usage in road transportation.

One approach focuses primarily on providing people with less energy-intensive travel options to reduce fuel consumption. These options tend to offer people more choices in transportation, such as better

Figure 2.5
**Transportation Sector's Share in Total Oil Consumption
 (Total OECD), 1973-2005**



or cheaper public transit, car-pooling, or the promotion of “eco-driving” (efficient driving styles and vehicle maintenance steps). They may also reduce oil consumption through options that reduce the need for transportation (such as promoting telecommuting [working from home] and compressed workweeks) or avoid driving in peak traffic hours (such as flexible work schedules).

The second policy approach is more restrictive in nature, essentially limiting travel options or requiring shifts in behaviour. This approach includes measures such as driving bans, mandatory car-pooling, speed limit reductions or forced changes in work schedules. Not surprisingly, the more restrictive options tend to result in greater estimated reductions in fuel consumption. However, they may also be more “expensive” to society and unpopular – and, therefore, less politically feasible.

Most light-handed demand restraint measures are relatively inexpensive to implement, mainly requiring a good public information campaign with related support through the development of websites or other outreach programmes. In some cases, these measures will provide only modest oil savings. However, an aggressive and successful programme can result in significant fuel savings – up to 1 mb/d across all IEA countries. Public support for certain measures, such as promotion of eco-driving, is likely to be quite good. In fact, these might be good measures to implement any time and on a permanent basis, although their impacts may be highest in an emergency situation, when the public is most likely to be responsive.

The more restrictive, mostly heavy-handed measures described above may be most effective during the early stages of an oil emergency to help avoid “panic” behaviour, such as fuel hoarding. However, harsh control measures that restrict fuel purchases or directly restrict driving – particularly without providing travel alternatives – will ultimately be very unpopular and expensive for countries. In addition, they are probably difficult to maintain for any length of time.

Box 2.4. **Examples of Transport Demand Restraint Measures**

An IEA study assessing the potential savings from demand restraint measures in the transport sector across member countries identified the following policies to be among the most effective in a supply crisis:

- **Eco-driving** includes a wide array of behavioural changes such as more efficient driving styles (*e.g.* changes in acceleration/deceleration and gear shifting patterns), optimal tyre inflation, reducing vehicle weight and other steps. An aggressive and comprehensive public information campaign on the benefits of eco-driving could yield substantial fuel savings. Some countries already run information campaigns of this type at least occasionally; stronger efforts could generate much better compliance, especially during emergencies.
- **Telecommuting and flexible work schedules** can save substantial fuel and can potentially be implemented very quickly. A well-organised “emergency telecommuting” programme could yield large reductions in fuel use, particularly if employers agree in advance to participate and designate certain employees to telecommute during pre-defined situations.
- **Measures to increase car-pooling**, if successful, can provide rapid, large reductions in oil demand. However, success may be very dependent on the level of incentives given to drivers, which could make this option quite costly. Restrictive options that require car-pooling (such as restricting certain traffic lanes to car-pools) are likely to be most effective, but may be seen as inequitable unless relatively limited in application. Programmes focused only on provision of information (such as setting up a website to help potential car-poolers find each other) will likely be more popular, but less effective.
- **Restrictions on driving**, such as odd/even driving bans, can potentially lead to very large savings. However, they may restrict mobility much more than some other measures and, therefore, be unpopular. Multiple-vehicle households tend to be less affected by this type of policy, which may make this option seem less equitable than some others. If conducted over longer periods, the effectiveness of such policies may decline as travellers develop strategies to work around the regulations.
- **Reducing speed limits** on motorways can be very effective for saving fuel, particularly because cars and trucks use much more fuel per kilometre as speeds increase above 90 km/h (about 55 mph). However, success depends on an adequate enforcement regime. Providing clear information to the public regarding the strong links between lower speeds and fuel savings may help increase compliance during an emergency. An appropriate infrastructure must be put in place ahead of time (such as variable speed limit signs) to support rapid change of posted speed limits.

Based on *Saving Oil in a Hurry* (© IEA/OECD 2005)

Regional Differences in Potential Savings

The estimated effectiveness of the available demand restraint measures varies significantly among geographical regions of IEA member countries. This reflects regional variations within the transport sector itself, particularly in terms of the shares of different travel modes and the resulting flexibility of travellers to change modes during a time of crisis.

The level of public transit infrastructure is one example of the difference in the flexibility of the current transportation systems. IEA member countries in Europe, Japan and the Republic of Korea tend to have higher levels of public transit and lower levels of car ownership as compared to Canada and the United States, or to Australia and New Zealand. As a result, measures to increase public transit ridership in Europe, Japan or the Republic of Korea result in significantly larger reductions (by percentage) of

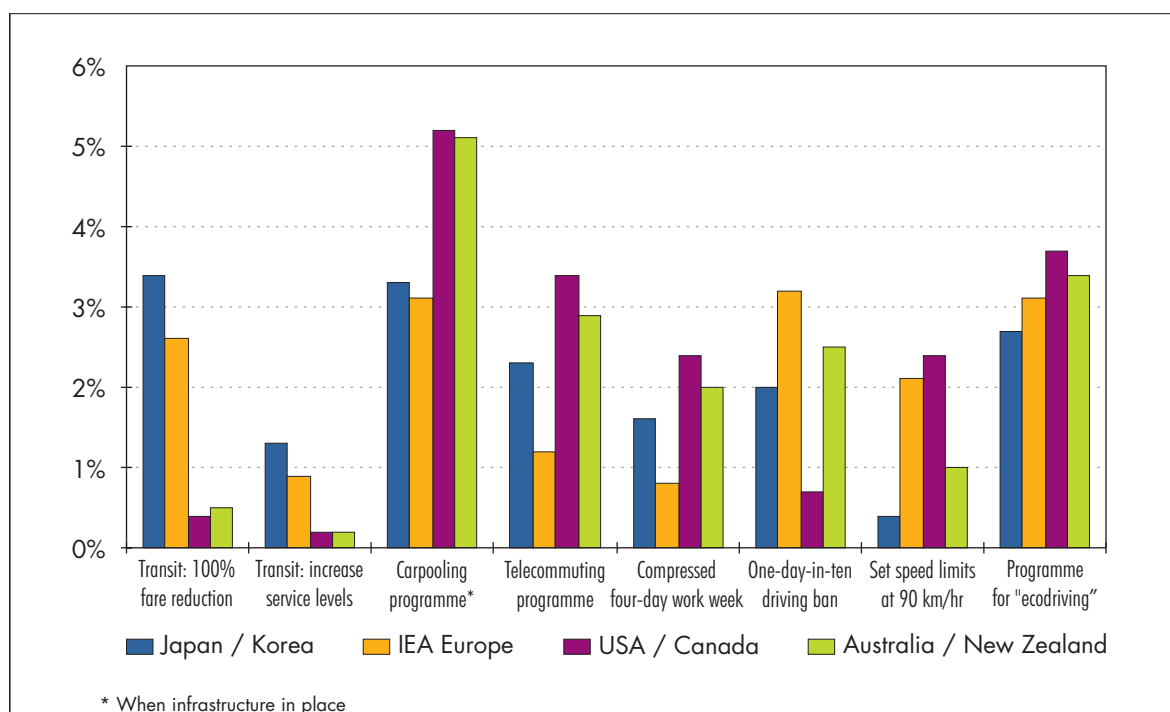
petroleum use, relative to the other countries. Conversely, car-pooling policies appear less effective in Europe and most effective in North America and in Australia and New Zealand, where levels of solo driving are relatively higher. Thus, the latter countries derive a greater benefit from increased car-pooling.

The potential of telecommuting and flexible work policies is least effective in Europe, relative to other regions. Current levels of solo car driving for commute trips in Europe are already relatively low. Thus, the benefit of telecommuting or flexible work schedule policies is relatively greater in those countries that have more solo car commute trips.

Driving bans appear most effective in Europe and least effective in North America. In this case, the difference is a function of the relative levels of household car ownership. Average car ownership per household is highest in North America, which means that households are more likely to have at least one car available on any given day that a driving ban is enforced (such bans are usually set by licence plate number).

Speed limit reduction and enforcement policies appear most effective in Europe and North America, where there is relatively higher motorway usage and, in the case of Europe, higher maximum speed limits. Thus, relative to other IEA member countries, Europe and North America derive greater benefit from a speed reduction.

Figure 2.6
**Reduction (%) in Total Petroleum Fuel Use for Selected Measures,
by IEA Region**



Source: *Saving Oil in a Hurry* (© OECD/IEA, 2005).

Table 2.5
Summary of Oil-saving Effects of Measures

Potential oil savings by category, if implemented in all IEA countries	Measure
Very Large More than 1 million barrels/day	Car-pooling: Large programme to designate emergency car-pool lanes along all motorways, designate park-and-ride lots, inform public and match riders. Driving ban: Odd/even licence plate scheme, provide police enforcement, appropriate information and signage.
Large More than 500 000 barrels/day	Speed limits: Reduce highway speed limits to 90 km/h, provide police enforcement or speed cameras, appropriate information and signage. Transit: Set fares for public transit to zero. Telecommuting: Large programme, including active participation of businesses, public information on benefits of telecommuting, minor investments needed in infrastructure to facilitate. Compressed workweek: Programme with employer participation, public information campaign. Driving ban: One in ten days based on licence plate, provide police enforcement and signage. Eco-driving: Promote efficient driving styles and vehicle maintenance steps, intensive public information campaign.
Moderate More than 100 000 barrels/day	Transit: Reduce by 50% current public transit fares. Transit: Increase weekend and off-peak transit service, increase peak service frequency by 10%. Car-pooling: Small programme to inform public, match riders.
Small Less than 100 000 barrels/day	Bus priority: Convert all existing car-pool and bus lanes to 24-hour bus priority usage, convert some other lanes to bus-only lanes.

Source: *Saving Oil in a Hurry* (© OECD/IEA, 2005).

Fuel Switching

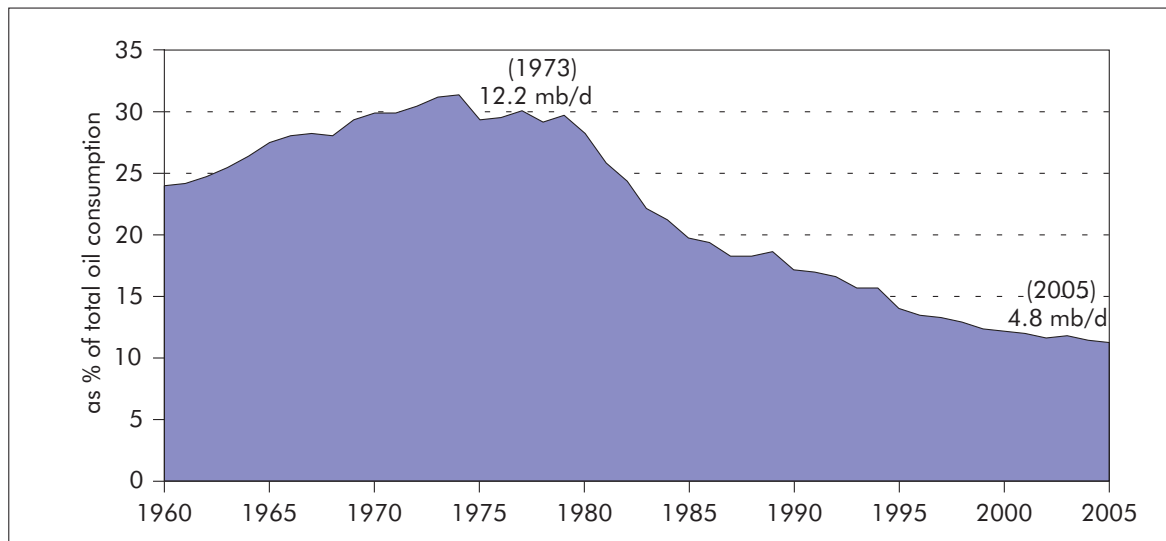
Fuel switching is another measure that IEA member countries can employ in order to contribute to a collective emergency response. Switching away from oil into other energy sources reduces the use of oil, thereby making available additional supply to the market.

Market Developments Limit Potential

The role of oil in economic sectors has changed significantly since the creation of the IEA, consequently reducing the scope of fuel switching. Oil's share of the overall energy supply mix of IEA countries has dropped from 54% to slightly more than 40%, reflecting increased use of natural gas and the development of nuclear energy replacing oil in electricity generation. In 1973, oil was used for 26% of the total electricity generated in all IEA countries; by 2005, this share was 5%.

The way in which oil is used has also changed, becoming increasingly concentrated in the transportation sector and within the industry sector in the petrochemical industry. In both cases the potential for fuel switching is limited. The share of all oil being used for heat and power generation has decreased significantly, from a peak of some 31% in 1973-74 to a mere 11% in 2005 (roughly 4.8 mb/d). Short-term fuel switching is only truly possible within these two sectors; thus, its potential to be effective in a time of crisis is likely to have been negatively affected.

Figure 2.7
Oil Used in Heat and Power Generation (Total IEA), 1960-2005



Current Fuel Switching in the IEA

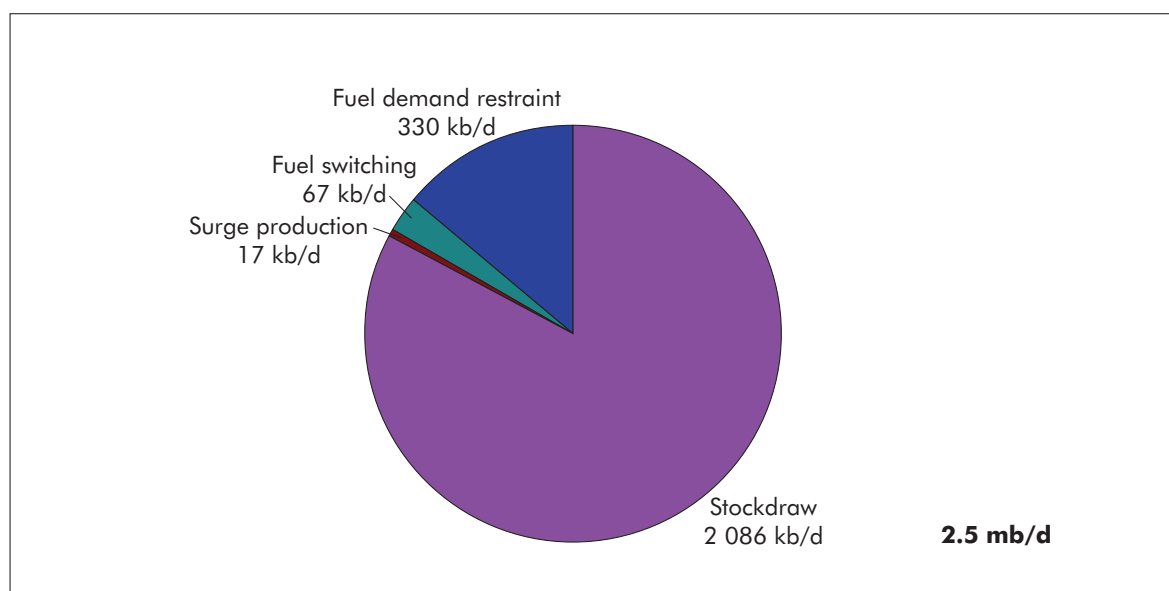
Natural gas remains a major alternative to oil and has continued to replace the use of oil in power generation, particularly in the transformation and industry sectors. This has resulted in a continued reduction in the capability to switch away from oil during a disruption. According to the recent cycle of Emergency Response Reviews completed in 2007, five IEA member countries have legal authority to activate fuel-switching measures during an oil crisis (Denmark, Japan, Korea, Portugal and Spain). However, several other countries, without legal ability to enforce fuel switching, reported that they are able to replace a portion of the oil used for heat and power generation with other energy sources. For example, Austria uses multi-fired plants for heat and power generation in the transformation and industry sectors, and has the capacity to switch at least 5-7% of their total oil consumption to natural gas. The Czech Republic, Finland and Ireland each have capacity to switch 3-10% of total oil demand using dual-fired generating power plants.

However, many countries see little potential for fuel switching in the future, as their industry has not created new capability to switch away from oil to another fuel in times of crisis. The main reason for this is that, because of its price and environmental merits, natural gas has already substituted heavy fuel oil consumed in electricity generation. In addition, there is little chance that countries will choose to install multi-fired power plants. If they did, this option would impose heavier costs on the private sector.

Fuel Switching in Practice

Two examples of IEA co-ordinated action illustrate a significant change in fuel switching as a potential emergency response measure. In 1991, IEA member countries decided to activate a contingency plan to address a possible oil supply shortfall during the First Gulf War by making 2.5 mb/d of oil available to the market. Approximately 2.7% of the total volume (67 kb/d) was to come from fuel switching (Figure 2.8). In the 2005, during IEA collective action following Hurricane Katrina, none of the oil made available came from fuel switching (see Box 1.3).

Figure 2.8
IEA 1991 Contingency Plan



Production Surge

IEA member countries with domestic oil production may be able to raise indigenous production for a short period of time, in order to increase available supplies in a crisis situation. This measure is limited to countries with significant levels of production. The potential volume available in a crisis is dependant upon the amount of spare production capacity maintained in the country. The extent of such capacity would depend on particular circumstances, and would be constrained by the need to maintain good oil field practices.

The aggregated capacity of IEA countries to increase oil production is considered insignificant, as producers generally maximise production rates and do not maintain stand-by spare production capacity. However, during a disruption, member country governments may take steps to facilitate bringing online any additional production possible. This can include temporarily relaxing regulations that may apply in normal times, primarily for oil-well safety conditions. Typically, such surge production can only be achieved over a short period of time (*e.g.* a number of months) and carries a risk of damaging wells and reservoirs.

Concluding Remarks

The measures described in this chapter are the primary means through which IEA member countries participate in a collective response during a short-term oil supply disruption. Each country determines which emergency response measures are most appropriate, depending on their domestic market conditions. IEA member countries can take different measures in a co-ordinated manner, relying on a single measure or a combination of several measures. The next chapter describes in detail the oil infrastructure and emergency response policies of individual member countries.

CHAPTER 3

EMERGENCY RESPONSE SYSTEMS OF INDIVIDUAL IEA COUNTRIES

The ability of the IEA to co-ordinate a swift and effective international response to an oil supply disruption stems from the strategic efforts of member countries to maintain a state-of-preparedness at the national level. This chapter provides general profiles of the oil infrastructure and emergency response mechanisms of 26 IEA member countries, and two accession countries (Poland and the Slovak Republic).

Each country profile is set out in the following sequence:

Infrastructure Map

Key Data

Oil Statistics, 1990-2010

Origin of Oil Imports, 2006

Background

Country Overview

Energy Outlook

Market Features and Key Issues

Oil Supply Infrastructure

Refineries

Ports/Pipelines

Storage

Decision-making Structure

Stocks

Stockholding Structure

Crude or Products

Location and Availability

Monitoring and Non-compliance

Stock and Drawdown Timeframe

Financing and Fees

Other Measures

Demand Restraint

(Any other relevant measures)

Disclaimer

This chapter on individual member countries' emergency response system was written by the IEA. All countries provided valuable information and comments. All opinions, errors and omissions are solely the responsibility of the IEA.

Oil Infrastructure of Australia



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

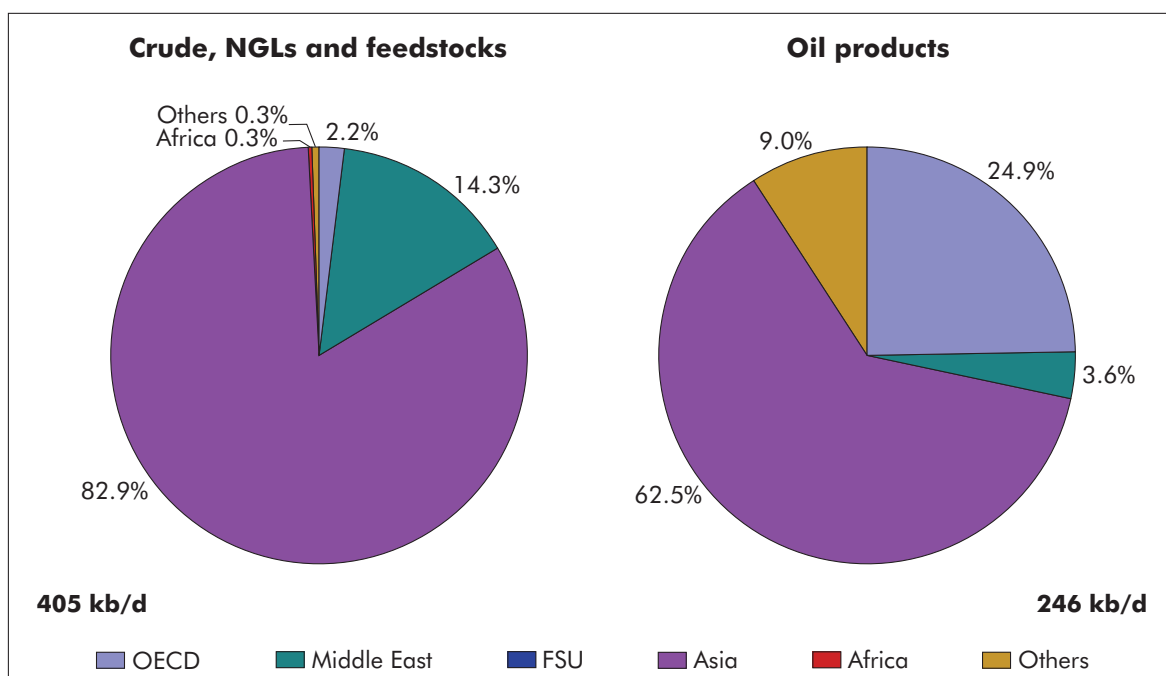
AUSTRALIA

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	643.0	579.9	802.4	540.9	525.9	701.4
Demand (kb/d)	736.8	810.0	872.5	919.0	920.4	992.5
<i>Motor gasoline</i>	297.9	302.8	308.1	332.3	325.9	
<i>Gas/diesel oil</i>	175.3	199.0	228.2	273.8	282.2	
<i>Residual fuel oil</i>	40.5	36.8	36.0	29.5	20.6	
<i>Others</i>	223.0	271.3	300.1	283.5	291.7	
Net imports (kb/d)	93.8	230.1	70.0	378.2	394.5	291.0
Import dependency (%)	12.7	28.4	8.0	41.1	42.9	29.3
Stocks in days of net imports	287.0	404.0	209.0	109.0	107.0	
Refining capacity kb/d		704.7	812.4	755.0	704.7	766.1

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

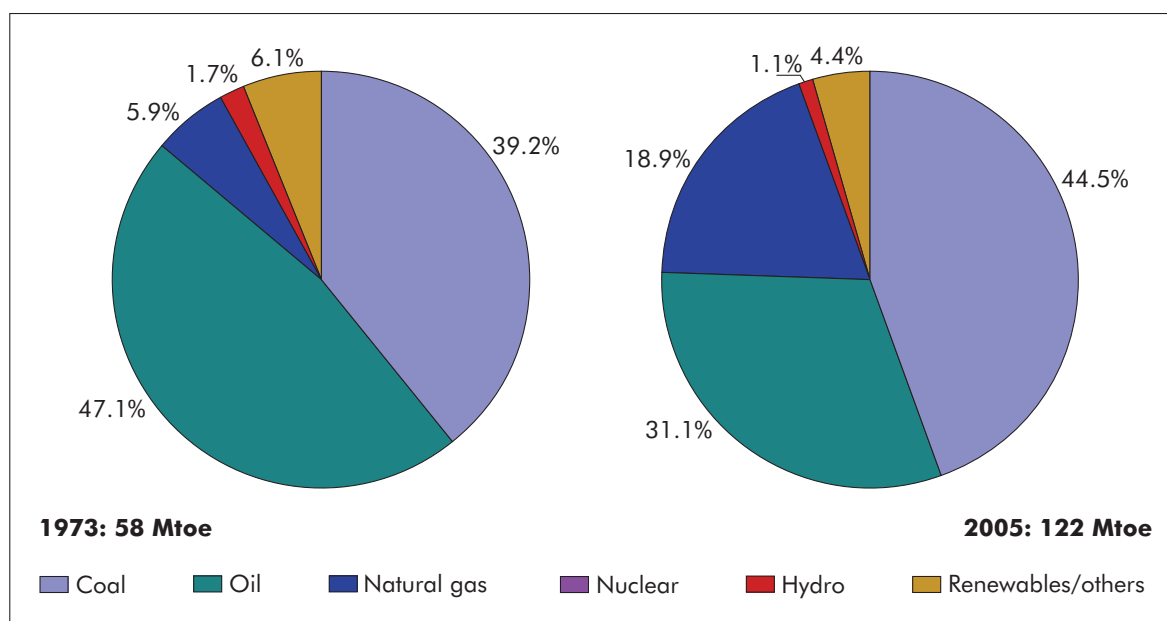
Country Overview

Australia is a significant energy producer and exporter, particularly in the Asia-Pacific market. It has been a substantial oil producer for the last 30 years; in 2006, domestic production represented nearly 60% of the country's oil demand. Crude oil production has declined from its peak level in 2000, but is expected to rebound in 2007 and then to rise steadily to 2010. Beyond 2010, in the absence of significant future discoveries, domestic production is expected to enter a period of steady decline.

Australia does not impose minimum stockholding requirements on oil companies; rather, it relies on the industry's normal stockholding practices to meet the country's minimum 90-day obligation as a member of the IEA. The Australian emergency policy is to rely on the domestic market to respond to supply shortfalls, including industry's capacity to bring online additional supply and consumer response to price signals. In a declared state of emergency, the Australian government has legislative powers to direct industry activities including production, refining, stocks and distribution practices.

Energy Outlook

Total Primary Energy Supply



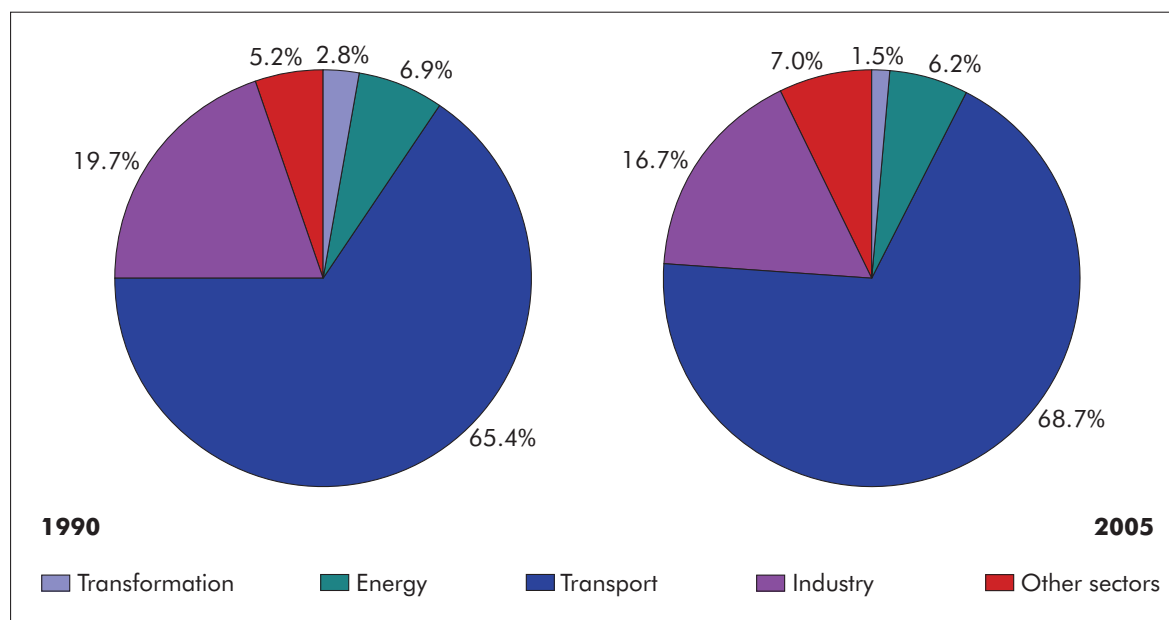
Australia has significant primary energy reserves. Coal remains Australia's principal fuel source, accounting for 44.5% of total primary energy supply (TPES) in 2005. At the same time, Australia is the world's largest coal exporter. Australia is also a significant exporter of LNG; over the past 20 years, domestic consumption of natural gas has increased steadily. In 2005, oil accounted for 31% of the country's energy supply mix, compared to the IEA average of 40%.

Australian oil production increased rapidly in the late 1960s and early 1970s following the discovery and development of fields in the offshore area of Bass Strait, situated between the southern coast of Victoria and the island of Tasmania. Production spiked between 1999 and 2001, reflecting the development of new projects in the area west and northwest of Darwin, including the Timor Sea. Declining production due to maturing fields has been offset by the development of a number of offshore fields on Australia's western and north-western coastlines. Most of these new fields are small in size (generally less than 50 kb/d), heavily capital-intensive to develop and are expected to have relatively brief production plateau. Total production, including NGLs, is expected to reach 735 kb/d in 2009 but enter a decline thereafter.

The Australian government is taking steps to encourage exploration, and ultimately production, using taxation incentives designed to lower the cost of petroleum exploration in remote offshore areas. The tax measures apply to annual offshore petroleum acreage releases from 2004 to 2008. In its 2007 Offshore Petroleum Acreage Release, the government is opening up 34 areas for petroleum exploration in an effort to stimulate new oil developments.

Market Features and Key Issues

Oil Consumption by Sector



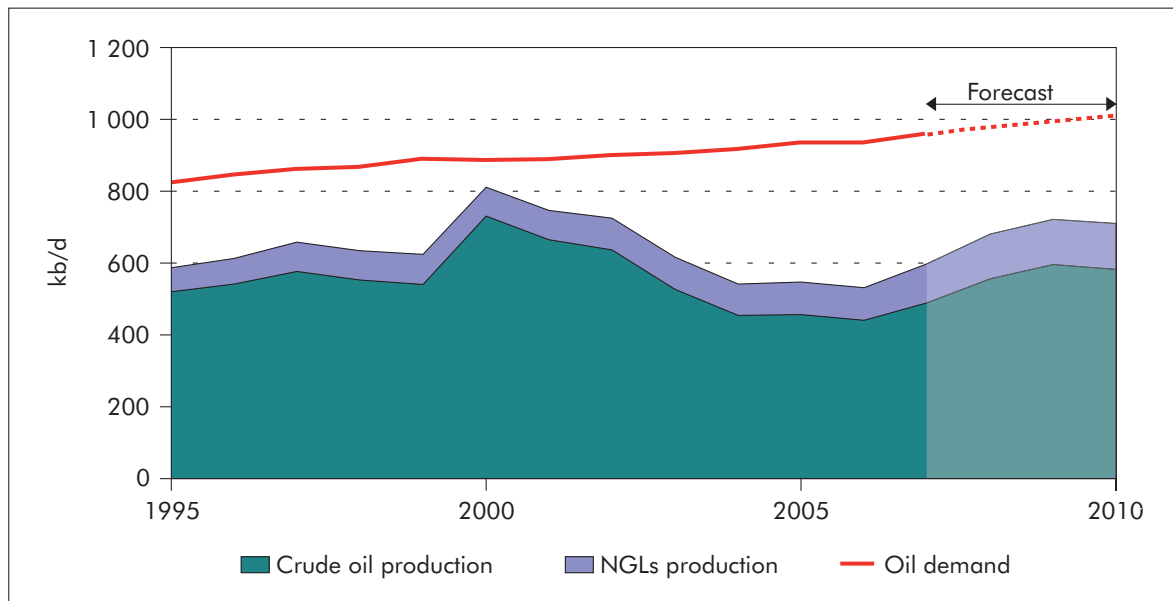
Total oil demand in Australia has increased steadily in recent decades, rising to 920 kb/d in 2006. This is largely due to demand growth for transport fuels, a sector that represents nearly 70% of all oil usage in the country. Motor gasoline is the dominant fuel used in Australia. However, diesel demand has increased more rapidly since 2000, averaging around 4.3% annually compared to 1.6% for gasoline.

Even with significant levels of domestic production, imports play an important role in Australia's oil supply. This is due largely to geography and the type of crude oil produced domestically. Around 75% of domestic crude oil production comes from offshore regions in the northwest; however, more than 80% of the country's refinery capacity is on the eastern coast. Thus, it is often more economic

to export some crude oil directly to Southeast Asian countries such as Singapore, Japan and Korea for refining than to the eastern states of Australia. Also, indigenous crude oils are not appropriate for producing heavier fractions such as bitumen, lubricating oils and diesel. Australian crude oil is generally lighter, sweeter and, therefore, more highly valued. Thus, domestic refiners source oil from overseas both for reasons of economy and to produce a greater variety of products.

In 2000, domestic production represented more than 90% of demand; however, this fell to below 60% in 2006. Production is once again increasing, but is expected to reach a peak in 2009, at which time it will represent just over 70% of demand. Beyond this point, in the absence of significant new discoveries, domestic production will decline and result in greater import dependency.

Domestic Oil Production and Demand, 1995-2010



Oil Supply Infrastructure

Refineries

There are seven refineries in Australia, with a total crude distillation capacity of 705 kb/d. An eighth, the Port Stanvac refinery in Adelaide, was mothballed in 2003 for economic reasons, reducing the country's total capacity by some 75 kb/d. The only refinery in Western Australia, Kwinana (south of Perth), has the single largest distillation capacity at just over 132 kb/d, or roughly 19% of the country's total capacity.

Australian refineries use both domestic and imported crude, primarily from the country's Bass Strait production in the south and from Southeast Asian producers. Refiners produce mostly gasoline and diesel fuel, as well as smaller volumes of jet fuel, bitumen and LPG. In 2006, Australia enacted higher fuel quality standards that have required refineries to upgrade facilities.

Pipelines

Australia has four main trunk lines for transporting oil and oil products by pipeline. The company Epic Energy operates a pipeline running 659 km (409 mile) from Moomba to Port Bonython, which carries crude oil and a mixture of NGLs. Santos operates a significant part of the oil pipeline network, including the Jackson to Brisbane line that spans nearly 797 km (500 miles), and the Mereenie to Alice Springs line that covers 270 km (168 miles). In addition, Esso Australia Ltd. operates the Longford to Long Island Point pipeline (southeast of Melbourne), which runs 190 km (118 miles).

Storage

Australia's oil stocks are held commercially within the supply chain. No strategic stocks are held by the government.

Decision-making Structure

The Energy Minister is responsible for co-ordinating an emergency response in the event of an oil supply disruption. Within the Department of Industry Tourism and Resources (DITR), the Resources Division and the Energy and Environment Division function as the permanent National Emergency Sharing Organisation (NESO). The National Oil Supplies Emergency Committee (NOSEC) includes representatives from Australian state and territory governments, as well as from industry and the Australian Institute of Petroleum. In the event of a disruption, the minister will initially consult with NOSEC to assess potential implications and appropriate response measures. The minister will also consult other relevant Commonwealth Government agencies including the Department of Prime Minister and Cabinet, the Department of Foreign Affairs and Trade, the Treasury, and the Office of National Assessments.

In the event of an actual or likely fuel shortage with national implications, the Governor-General may, when circumstances require, declare a national liquid fuel emergency under the Australian government's *Liquid Fuel Emergency Act of 1984 (LFE Act)*. This *Act* is administered by the minister. It was amended in June 2007 to improve the administrative and economic efficiency of the government's national liquid fuel emergency response arrangements.

A declaration must be made by way of proclamation by the Governor-General of Australia, upon the recommendation of the minister. A national emergency can only be declared if the Governor-General is satisfied that the situation meets the following criteria: the use of emergency powers is in the public interest; there is no real prospect of averting the shortage through voluntary augmentation of supplies by oil companies; and the minister has provided the opportunity for prior consultation with the relevant ministers for energy in all Australian states and territories.

The emergency powers of the *LFE Act* give the Australian government wide-ranging authority to control the drawdown, transfer and sale of industry stocks of crude oil and liquid fuels, and to control bulk and retail sales of fuel across Australia. In addition, Australia's state and territory governments have in place their own legislative and administrative arrangements to address a supply disruption occurring within their own jurisdictions.

Oil exploration and production oversight is shared between the Australian government and state and territory governments, with the latter having jurisdiction over onshore projects. Offshore project jurisdiction is shared between the Australian government and the government of the adjacent state or territory.

Stocks

Stockholding Structure

Australia does not have public stocks, nor is there any minimum stockholding requirement imposed on oil companies operating in the country. The Australian government relies on the normal stockholding practices of the domestic oil industry to meet its 90-day net import obligation as a member of the IEA.

Prior to 1 January 2007, Australia had never been in breach of this commitment. However, a short-term decline in domestic production in 2006 had an adverse affect on Australia's stockholding obligation.

Crude or Products

At the end of 2006, approximately 45% of Australia's stocks consisted of crude oil. The remaining 55% of stocks consisted of gasoline, gas/diesel oil and fuel oil.

Location and Availability

Australia signed a formal bilateral stockholding agreement with New Zealand. This agreement was primarily reached in order to allow New Zealand to obtain ticket-stockholding arrangements in Australia.

Monitoring and Non-compliance

Companies report stock levels to the Australian government on a monthly basis through the office of Australian Petroleum Statistics. If necessary, more frequent reporting of stock levels could be implemented to monitor compliance with a direction issued under the *LFE Act*. The *Act* also sets out penalties for failure to comply with reporting directives.

Stock and Drawdown Timeframe

Australia's major industry suppliers of petroleum products are represented on NOSEC by their national supply managers. Thus, decisions by the Australian NESO in response to a supply disruption

would include their close consultation. The role of stocks in the country's overall response would be through their participation with NESO, and any stockdraw would be through the normal supply and distribution system. The Australian government does not have the power to control the price of these products; its policy is to allow the market to determine the price at which products are sold. However, some state and territory governments may choose to use their price control powers to prevent profiteering by the oil industry in the event of a supply disruption.

Financing and Fees

All stockholding costs are recouped by oil companies through their normal operations – *i.e.* are passed on to consumers through retail prices.

Other Measures

Demand Restraint

At the first sign of an oil disruption, the Australian government's policy is to allow the market mechanism to operate to reduce demand, *i.e.* to allow oil price increases to flow through to consumers. The government would monitor the effect of natural price increases that flow from the supply disruption on patterns of demand without intervening in the market.

If price increases do not lead to an adequate decline in consumption, the Australian government would pursue a voluntary, industry-based bulk rationing strategy. This would involve seeking the co-operation of industry to voluntarily place its consumers on allocation systems, *e.g.* fuel purchasers would be able to purchase a set percentage (for example, 80%) of their normal fuel purchases. This approach considers that the use of voluntary, industry-based measures to influence bulk sales is an efficient and effective response tool that would reinforce the normal operations of the market and minimise government intervention. At the same time, the Australian government would encourage the general public to voluntarily reduce oil consumption by promoting public transportation, car-pooling, multiple taxi-hire arrangements and other strategies designed to reduce overall fuel demand.

If further government response is required in the form of a regulated fuel-rationing system, the Australian government has a detailed plan for retail rationing that was developed as part of its LFE Response Plan. Implementation of this Plan would require the *LFE Act* to be invoked. Following the declaration of a national emergency, state and territory governments would be responsible for implementing the required measures for achieving the desired level of reduction in oil demand.

The national response plan anticipates a multi-phase approach to demand restraint that encompasses voluntary restraint and a system of rationing. Rationing would occur on a sliding scale of severity, according to the level of restraint required. The plan incorporates an overriding objective of ensuring that those users that are deemed to be essential to the health, safety and welfare of the community (*e.g.* fire, police, ambulance services, etc.) always have access to fuel.

In some instances, it may be necessary to issue permits/coupons to identify user classifications during retail rationing. Individual state and territory governments are responsible for issuing such permits; usually, police or transport offices would issue permits within individual jurisdictions. Enforcement of the demand restraint system would take place on authority of the Australian government.

Whilst the federal government response anticipates voluntary restraint and rationing, state and territory governments have the authority to implement their own measures – provided such measures do not conflict with those imposed by the Australian government. State and territory government measures include less heavy-handed measures such as permanent clearways to avoid excessive queuing at service stations and speed limit reductions.

Surge Production

Australia's capacity to rapidly increase production during a supply disruption is considered insignificant. However, it is possible that higher oil prices may make previously uneconomic fields viable propositions. In an extended disruption, such fields could become a source of additional supply.

The *Petroleum (Submerged Lands) Act* provides the legal authority for the Australian government to direct producers to take all necessary and practical steps to increase or reduce the rate at which oil is being recovered within a licensed area or pool. However, the Australian policy is to rely on market prices and commercial considerations to determine the optimal level of indigenous crude production.

Oil Infrastructure of Austria



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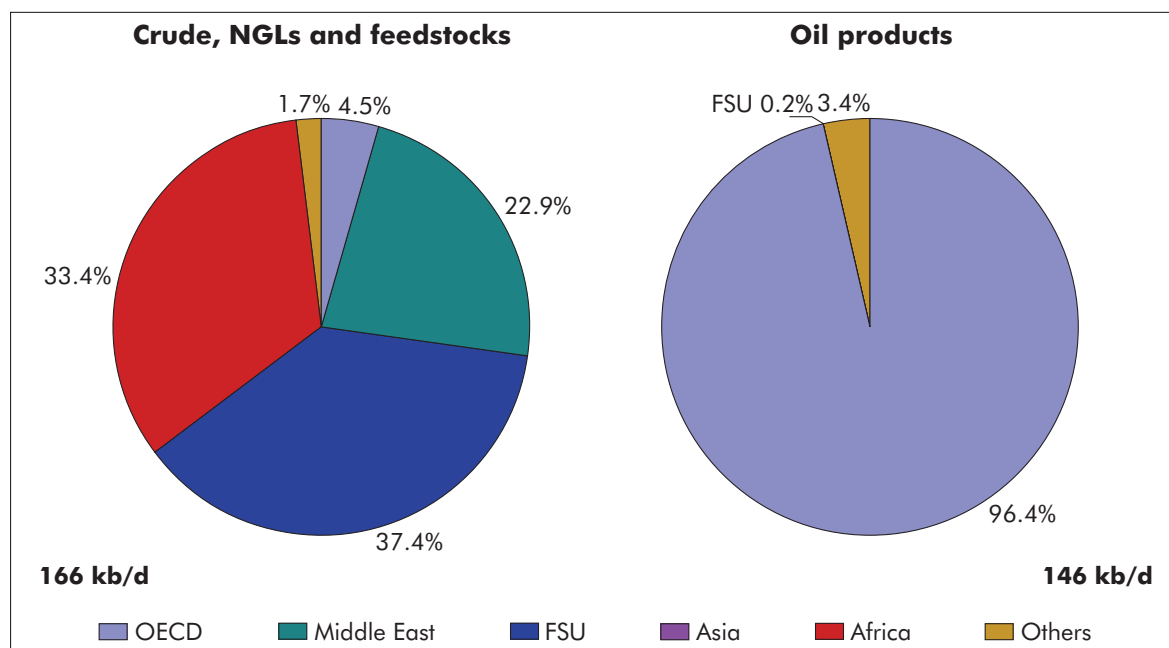
AUSTRIA

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	23.5	21.2	19.7	18.9	20.0	17.8
Demand (kb/d)	215.0	230.7	246.2	294.9	301.6	312.7
<i>Motor gasoline</i>	59.1	55.5	45.7	47.9	46.3	
<i>Gas/diesel oil</i>	68.3	93.1	120.3	166.2	163.8	
<i>Residual fuel oil</i>	39.5	33.5	23.5	19.6	19.4	
<i>Others</i>	48.1	48.6	56.6	61.2	72.1	
Net imports (kb/d)	191.5	209.4	226.5	276.0	281.6	295.0
Import dependency (%)	89.1	90.8	92.0	93.6	93.4	94.3
Stocks in days of net imports	105.0	102.0	104.0	92.0	102.0	
Refining capacity kb/d		210.0	208.6	208.6	208.6	213.2

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

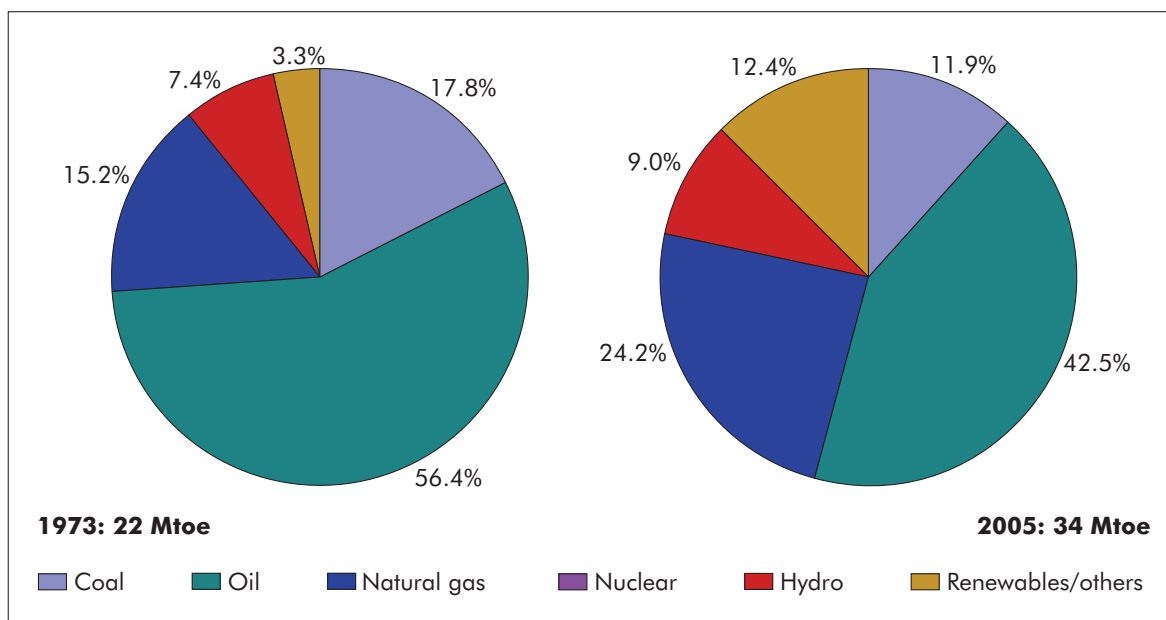
Country Overview

One of the main aims of Austrian energy policy is to reduce the country's dependence on energy imports. In 2006, domestic production met less than 7% of Austria's total oil supply; the vast majority came from a variety of exporting countries. Domestic production is predicted to further decrease in the coming years.

Austria has only one oil refinery, which is one of the largest inland refineries in Europe. It receives supplies from the TransAlpine (TAL) pipeline. Austria meets its stockholding obligation by placing stockholding requirements on industry. Most obligatory stocks are held by the non-profit stockholding company *Erdöl-Lagergesellschaft* (ELG). In an IEA co-ordinated action, Austria would likely lower the stock obligation on industry, thereby allowing the use of obligatory stocks.

Energy Outlook

Total Primary Energy Supply

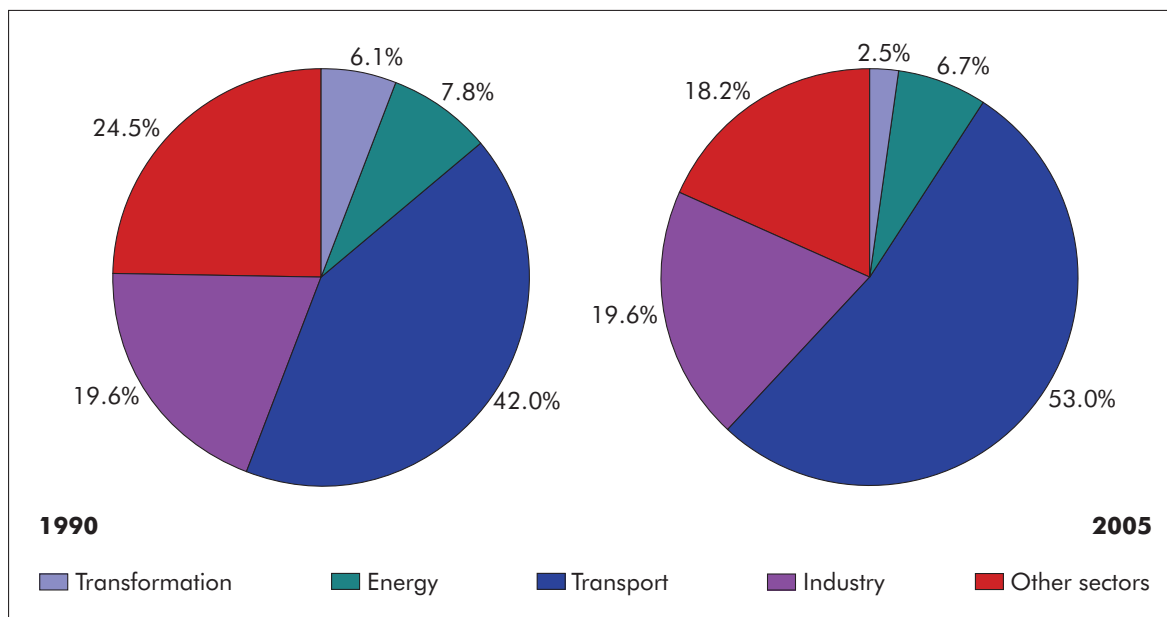


Austria produces a very limited amount of its energy needs domestically. Oil production currently stands at 20 kb/d and is due to decline further in the coming years, reaching 18 kb/d in 2010. In 2006, domestic production met less than 7% of the country's total oil demand; the vast majority came from a variety of exporting countries. Austria's total primary energy supply (TPES) has increased by 57% since 1973; in 2005, it reached 34 million tonnes of oil equivalent (Mtoe). The proportion of oil in TPES has fallen from a share of 56% in the early 1970s, when oil played a predominant role in the country's energy mix, to slightly under 43% in 2005. In fact, the share has remained stable at

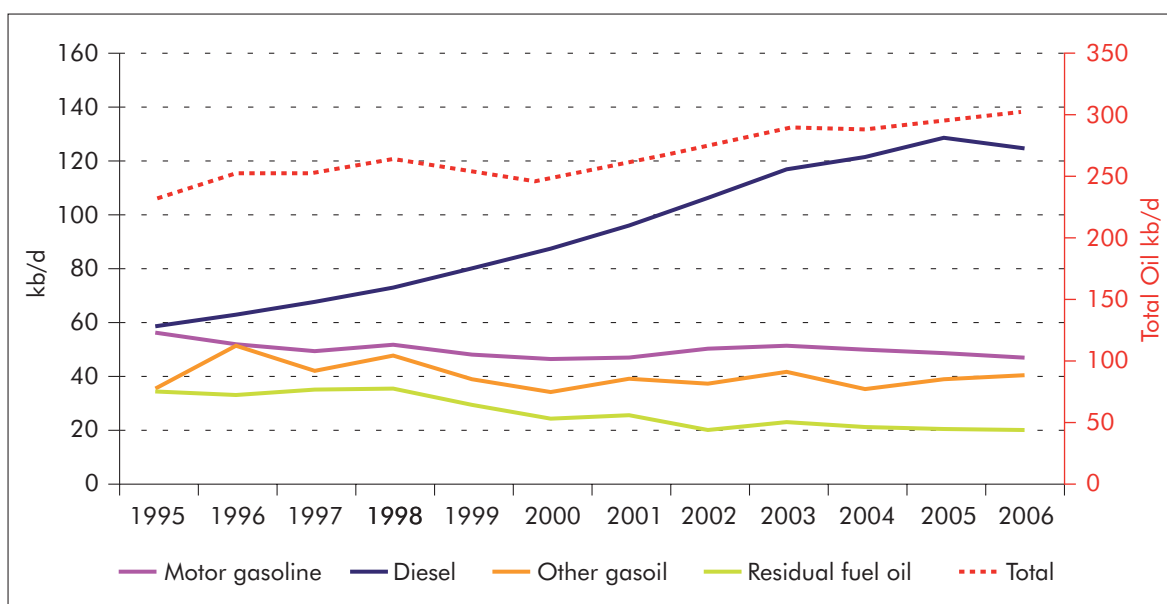
roughly 45% since 1990. Austria has seen a significant shift from coal to natural gas. In 1973, coal represented 18% of TPES. Over the past 30 years, the share of natural gas in TPES has increased by almost 60%; the use of natural gas increased by more than 150% in the same period. In 2006, total oil demand was 302 kb/d. This is 31% higher than 1995, when demand reached 231 kb/d, reflecting an average annual increase of 2.5%.

Market Features and Key Issues

Oil Consumption by Sector



Oil Demand by Product, 1995-2006



Oil consumption in Austria's transport sector has increased by more than 70% since 1990, at an average growth rate of 3.7% per year. In contrast, the use of oil in other end-use sectors has fallen. Demand for diesel fuel in the road transport sector grew rapidly between the mid 1990s and 2006, rising at an average of 7.2% per year. Diesel now has the largest share of the market for oil products. Conversely, use of gasoline decreased over the same period, returning to 1970s levels.

Oil Supply Infrastructure

Refineries

Austria has only one refinery: the Schwechat facility near Vienna, which is entirely owned and operated by OMV (former *Österreichische Mineralölverwaltung*). With a capacity of about 200 kb/d (10 million tonnes [Mt] a year), Schwechat is one of the largest inland refineries in Europe. It processes indigenous and imported crude oil, and produces a full range of oil products for domestic consumption including diesel (36%), gasoline (22%) and heating oils (21%). Refining capacity is expected to increase to 213 kb/d by 2010.

Pipelines

Austria receives crude oil via the TAL pipeline, which links Trieste (Italy) with Ingolstadt (Germany). At Würmlach (Austria), the TAL has a branch line (AWP – Adria-Wien-Pipeline) to the OMV refinery at Schwechat. In 2004, the TAL total throughput of crude oil was up to 800 kb/d (39.5 Mt/year) of a total capacity of 850 kb/d; 150 kb/d (7.6 Mt/year) were transported via the AWP to the Schwechat refinery.

A new crude oil pipeline is planned, leading from Bratislava (Slovak Republic) to the Schwechat refinery. This connection could provide Austria with access to Russian oil supplies from the Druzhba pipeline and, conversely, give the Slovak Republic access to oil imports from Trieste. The capacity would allow the transport of 100 kb/d (5 Mt/year) of crude oil.

Storage

In 2007, total storage capacity in Austria was about 8.8 mb (1.2 Mt) for crude oil and roughly 33 mb (4.5 Mt) for oil products. Apart from storage at its refinery, the OMV main product tank farm is located in St. Valentin (near Linz) at the end of a product pipeline from Schwechat. The pipeline has a capacity of 30 kb/d (1.5 Mt/yr); the tank farm has a capacity of around 3.9 mb (520 Kilotonnes [Kt]) of oil products. The ELG has crude storage capacity at Lannach (near Graz) with a total capacity of 3.9 mb (520 Kt), of which some 2.3 mb (300 Kt) are currently in use.

Decision-making Structure

The legal framework for emergency management in Austria is the *Energy Steering Law* (*Energielenkungsgesetz* of 1982) and the *Stockpiling and Reporting Law* (*Erdöl-Bevorratungs-und Meldegesetz* of 1982), both of

which were amended in June 2006. There is also relevant regulation within the comprehensive country defence policy (*Umfassende Landesverteidigung*).

The Austrian National Emergency Sharing Organisation (NESO) is embedded, on a stand-by basis, in the Department of Energy and Mining of the Federal Ministry of Economics and Labour. NESO also includes industry experts. In a crisis, the Energy Steering Council, which consists of representatives from various ministries, energy industry and Social Partners, would act within the Austrian NESO as an advisory body to the Minister for Economics and Labour.

Austria prefers the voluntary participation of oil companies in the allocation process. At the same time, the *Energy Steering Law of 1982* enables the Federal Minister of Economics and Labour to enforce any transactions concerning the fulfilment of Austria's potential international obligations.

Stocks

Stockholding Structure

The *Stockholding and Reporting Law* guarantees the availability of emergency reserves covering 90 days of net imports. It also obliges all importers to hold emergency stocks equivalent to 25% of their previous year's net imports, plus an additional 10% to account for unavailable stocks. Thus, the actual stock obligation effectively amounts to 27.5% of the previous year's imports.

Companies subject to stockholding obligations are described as "compulsory stockholders". Stocks counted towards meeting the obligation can be crude oil or oil products, and must be owned by the stockholder. Oil products covered by stockholding regulations are divided into three groupings:

- gasolines;
- kerosene, jet fuel and gas oils; and
- fuel oils.

All importers (also distributors and consumers where applicable) of crude oil and/or oil products (including biofuels) are subject to stockholding requirements. In order to guarantee electricity supply, operators of fossil fuel power stations with a generating capacity of at least 50 Megawatt (MW) are also obliged to hold fuel stocks. These stocks must be sufficient to continue supplying electricity at maximum capacity for 30 days or to cover internal consumption needs. Such stocks must be held on site, unless government permission is granted for use of a nearby storage site with adequate transport facilities.

Companies may fulfil their stockpiling obligations in one of three ways. The company itself may build and manage stocks. Two or more companies may enter a common stockholding agreement. Or, companies may choose to transfer the stockholding obligation to a licensed stockholder with federal guarantee (most likely the ELG).

Most importers choose to hold their stocks at the private, non-profit stockholding company the ELG, which is an official licensed stockholding entity, privately owned by OMV and three international companies. The ELG holds more than 98% of the Austrian compulsory stocks.

Crude or Products

Companies subject to compulsory stock obligations may substitute crude oil for oil products, but only up to a limit of 20% of the stock obligation of each of the three main product categories. They can also interchange oil products up to the same limits. At the end of 2006, roughly 58% of held stocks were held as crude oil (including NGL and feedstock) and 42% in oil products.

Compulsory stocks are not held separately from normal working or operational stocks. Product is turned over regularly in the course of normal supply operations, thereby ensuring that the quality remains in line with the latest norms governing specifications.

Location and Availability

Because of the country's supply system and geographical position, Austria requires all compulsory stocks to be held within its national territory. Austria has no bilateral stockholding agreements with other countries and does not permit the use of stock tickets to meet minimum stockholding requirements.

Monitoring and Non-compliance

According to Austrian legislation, compulsory stocks must be maintained at the required levels at all times. Companies are obliged to report, on a monthly basis, their current levels of mandatory stocks. Frequent inspections are envisaged by law, especially in times of crisis.

The Federal Ministry of Economics and Labour is responsible for ensuring that compulsory stockholders fulfil their obligations. To this end, the ministry requires monthly reporting of stock levels by holders and carries out physical inspections and audits of accounts. The ministry can also order random physical inspections of both the quantity and quality of stocks and of the storage equipment. In cases of non-compliance, the ministry can impose fines and even imprisonment. In practice, this has not occurred as all stockholders generally meet their obligations.

Stock and Drawdown Timeframe

A 1995 amendment to the *Energy Steering Law of 1982* allows the government to activate any measures needed to comply with international legal obligations based on decisions of the executive bodies of international organisations.

Upon its activation, all Austrian stocks are subject to the *Energy Steering Law of 1982*. However, first priority would be placed on emergency stocks held under the *Stockpiling and Reporting Law of 1982*. The *Energy Intervention Powers Act of 1982* contains a great deal of legal flexibility; thus, no special procedures have been established.

Sending out a notification based on the *Stockpiling and Reporting Law*, or implementing steering decrees based on the *Energy Intervention Powers Act of 1982*, would take the Federal Minister of Economics and Labour one or two days. As most emergency stocks are co-mingled with operational stocks, during times of crisis a drawdown can be initiated within hours.

Stocks would be released onto the market by oil companies, in accordance with the regulations of the *Energy Intervention Powers Act of 1982*. Prices would reflect the actual market prices.

Financing and Fees

The Austrian government provides no financial support to companies for fulfilling their stockholding obligation. These costs are reflected in the final consumer price for fuels.

The ELG is somewhat exceptional: because this company is obliged to offer contracts to hold stocks on behalf of importing companies, there is a federal liability for capital risk. The ELG charges a fee to companies wishing to avail themselves of its services, which is generally a constituent part of companies' internal price structure. From 1 April 2006, the ELG yearly fees were set as follows: crude oil at EUR 36.50/tonne (t) (EUR 4.90/barrel); motor gasolines at EUR 43.50/t (EUR 5.00/barrel); automotive diesel oil and heating gasoil at EUR 42.50/t (EUR 5.60/barrel); and residual fuel oil at EUR 31.50/t (EUR 4.80/barrel).

Compulsory stocks costs are part of consumer prices and are borne directly by consumers. On 1 September 2007, costs for stockholding were on average EUR 0.913/100 litre for gasoline (EurosUPER) and EUR 1.032/100 litre for diesel.

Other Measures

Demand Restraint

The Austrian government considers that demand restraint measures would be the main response in a *domestic* oil supply crisis. Measures to restrain oil demand would be initiated in three stages, depending on the nature and severity of the crisis, and would target the transport sector, which consumes more than 50% of total oil demand.

The initial stage of light-handed measures would focus primarily on public campaigns for voluntary energy saving; such measures could be implemented within one or two days. Medium-handed measures would include compulsory restrictions such as lower speed limits and driving bans; these would require a lead time for implementation of one or two weeks. Finally, a heavy-handed stage would rely on coupon rationing for the private sector and allocation for fuel oil use in industry. In this area, the *Energy Steering Law of 1982* provides a wide range of demand restraint measures that cover almost all refined products and crude oil.

Fuel Switching

In Austria, all of the oil-fired power plants can switch to natural gas within minutes, creating the potential to switch 3.2 kb/d of oil (1% of total oil consumption). Fuel switching would take place on

a voluntary basis by the operators of electric power plants. Many households in Austria can also switch their heating systems from oil to wood or coal.

Other

The *Energy Steering Law* allows the Minister of Economics and Labour to relax product specifications for a limited period, subject to approval by the Ministry for Environment. The most likely modifications could allow a higher benzene content in gasolines and higher sulphur content in heating oil and gas oils.

Oil Infrastructure of Belgium



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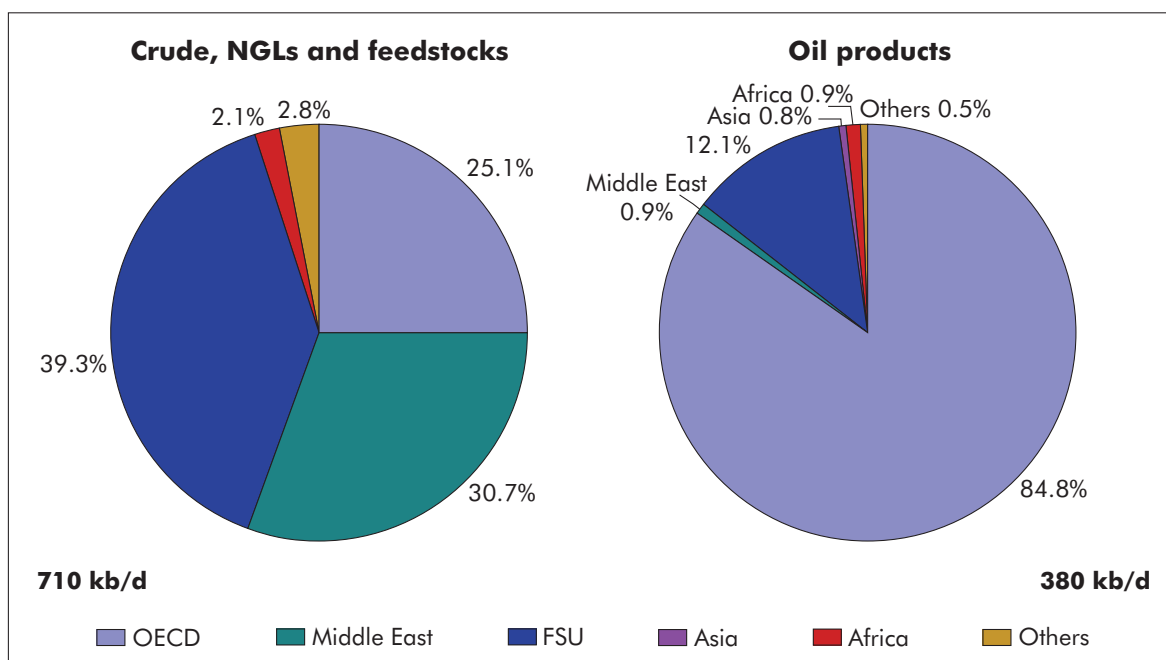
BELGIUM

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	-	-	-	-	-
Demand (kb/d)	462.8	498.6	587.4	599.5	591.7	563.8
<i>Motor gasoline</i>	63.1	65.6	51.9	40.8	34.0	
<i>Gas/diesel oil</i>	185.0	212.6	231.0	251.7	243.3	
<i>Residual fuel oil</i>	102.5	102.4	113.6	165.1	170.7	
<i>Others</i>	112.2	118.0	191.0	141.9	143.7	
Net imports (kb/d)	462.8	498.6	587.4	599.5	591.7	593.8
Import dependency (%)	100	100	100	100	100	100
Stocks in days of net imports	89.0	93.0	89.0	89.0	100.0	
Refining capacity kb/d		614.0	719.0	803.0	790.6	806.9

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

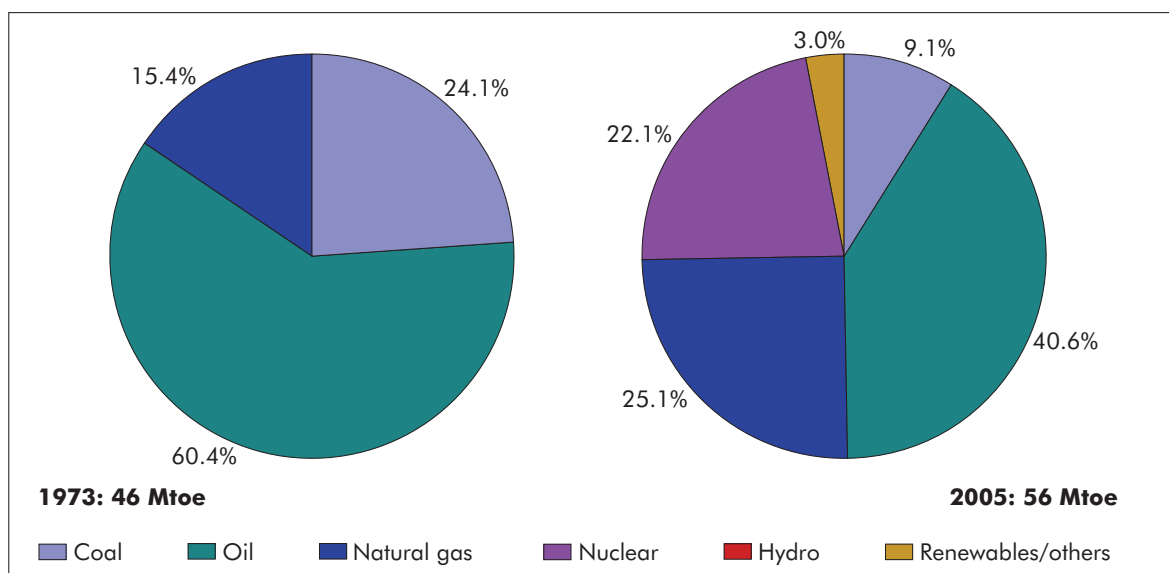
Country Overview

Because of its geographical location and infrastructure, Belgium is the second-largest centre for oil product transport in Europe (after the Netherlands). Five refineries operate on Belgian national territory, all in the Antwerp region. There is no indigenous oil production. Belgium imports large volumes of oil: in 2006, the country imported more than 700 kb/d of crude oil⁸ and 380 kb/d oil products. However, almost half of all imported oil is subsequently exported again, partly as refined products.

Belgium is the latest IEA member country to create an agency designed to manage emergency stocks. The *Agence de Pétrole* (APETRA) was inaugurated in April 2007 and is expected to build up gradually its stocks, reaching 100% of Belgium's 90-day stockholding obligation by 2012. During the same period, the stockholding obligation on industry will be reduced to zero. In an IEA co-ordinated action, Belgium would likely participate by releasing the public stocks of APETRA.

Energy Outlook

Total Primary Energy Supply



In 2005, oil accounted for 41% of Belgium's total primary energy supply (TPES), a sharp drop from the early 1970s when its share of the energy mix stood at 60%. In 2006, Belgium imported 1 090 kb/d of oil, of which 65% was crude oil (including NGLs and feedstocks). Russia was the biggest source of crude oil imports, followed by Saudi Arabia, Iran and Norway. Natural gas has largely replaced fuel oil in power generation and is gradually replacing it in residential heating, for both economic and environmental reasons.

Belgium does not have any indigenous oil production and is, thus, totally dependent on imports to meet its oil needs.

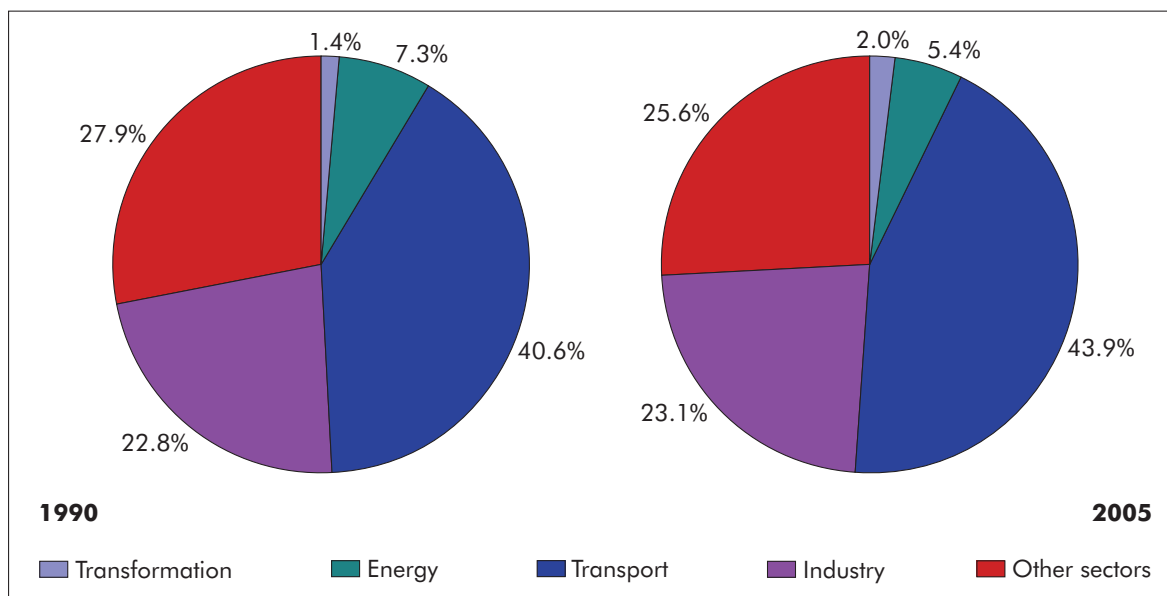
⁸ Including NGLs and feedstocks.

In 1995, Belgium's oil demand reached 499 kb/d. This figure increased by 18% in 2000, but has since increased only slightly, reaching 592 kb/d in 2006. Oil demand is now expected to decline by an average of 1.2% per year, reaching 564 kb/d in 2010.

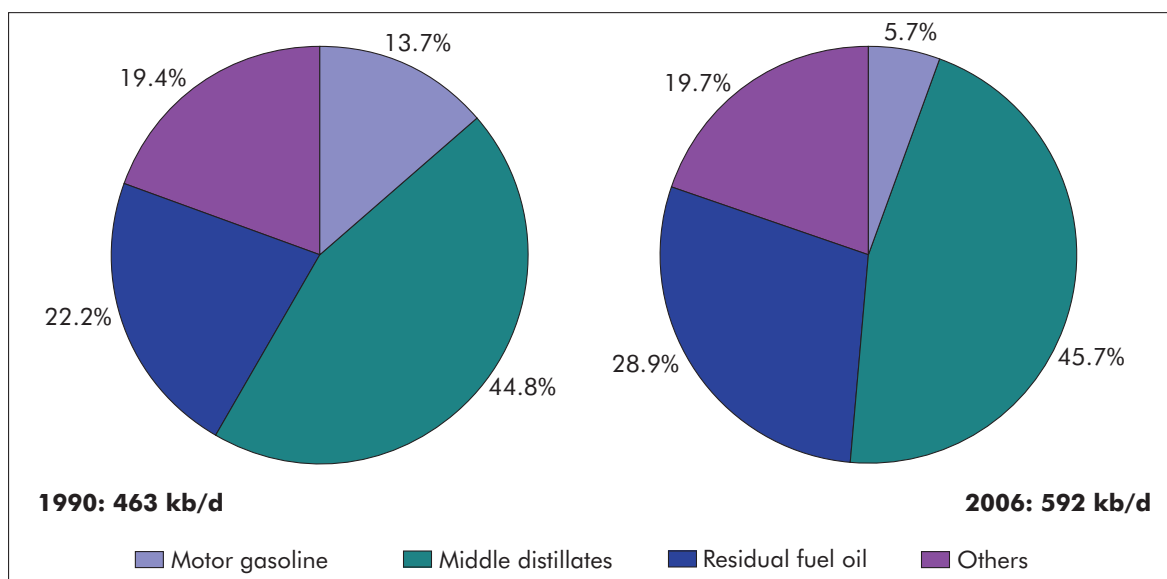
Market Features and Key Issues

The transport sector accounts for an increasing share of Belgium's domestic oil consumption; its share rose from 41% in 1990 to almost 44% in 2005. As in other European countries, there has been a shift towards increased use of diesel fuel in the transport sector.

Oil Consumption by Sector



Oil Demand by Product



The proportion of motor gasoline in product demand has declined by more than 50%, from 14% in 1990 to 6% in 2006. In real terms, demand for motor gasoline fell by 48% since 1995. Demand for diesel has risen more than 50% since 1995. This is in line with the majority of European countries, in which diesel has become the most important transportation fuel.

Oil Supply Infrastructure

Refineries

Belgium has five refineries – all of which are located in Antwerp – with a total crude distillation capacity of around 790 kb/d. Refining capacity is expected to reach 807 kb/d by 2010.

The most notable change in refinery activity in recent years is the increase of desulphurisation capacity, which reflects EU specifications to reduce sulphur content for gasoline and gas/diesel oil.

Pipelines

The main crude oil pipeline serving Belgium is the Rotterdam-Antwerp pipeline (RAPL), which originates in Rotterdam (the Netherlands) and travels into the Antwerp area. It has a capacity of 575 kb/d.

Belgian companies use part of the Central European Pipeline System (CEPS) to transport oil products. The CEPS is a North American Treaty Organisation (NATO) pipeline network in Europe comprising 6 000 km of pipeline interconnected to roughly 8.2 mb (1.3 mcm) of oil storage capacity. NATO maintains this distribution system primarily to provide fuel supply support to military bases. However, for many years, the pipeline's surplus capacity has been leased for civilian storage, transportation and delivery of oil products. The contracts signed between NATO and the oil companies are based on market prices and supervised by the Ministry of Economic Affairs.

Storage

Belgium's storage facilities for crude oil and product are concentrated in the Antwerp region, as are the import facilities for crude oil and refineries.

Decision-making Structure

The National Oil Board (NOB) was created by the *Royal Decree of 11 October 1984* and is charged with the supply and distribution of oil products in time of crisis. It also serves as Belgium's National Emergency Sharing Organisation (NESO).

The permanent unit of the NOB is situated within the framework of the Energy Administration. In a crisis, it can be expanded to include experts from the Department of Economic Affairs, other ministerial departments and the oil industry. All proposed measures would have to be considered by the Inter-Ministerial Economic Commission (CEI), which represents various government departments. The Minister of Economy would then submit the proposals to the Council of Ministers for final approval.

The NOB main tasks are organised according to the goals associated with three phases of activity, each of which are assigned to specific groups:

- **Monitoring Phase.** To monitor market developments and update information required for the implementation of crisis measures, carried out by the Oil Division of the Energy Administration.
- **Active Phase.** To propose measures to the Council of Ministers and to monitor their implementation during a crisis, carried out by the Oil Division and personnel from other departments.
- **Operational Phase.** To implement measures and communicate with other international bodies: Benelux, the EU, the IEA and NATO.

Stocks

Stockholding Structure

The legal framework for compulsory stock obligations in Belgium was originally established by a *Royal Decree of 11 October 1971*, which was subsequently amended on 9 June 1976. This legislation prevailed until a new law was passed on 26 January 2006.

Under the 1971 and 1976 legislation, all refiners and importers were obliged to hold quantities of oil products and crude oil such that the aggregate fully met 90 days of domestic consumption of the relevant products (gasoline, distillates and fuel oil). All the quantities in domestic facilities were co-mingled with operational stocks; significant volumes were held abroad under a number of bilateral arrangements.

The new 2006 legislation established a compulsory stockholding corporation, the *Agence de Pétrole* (APETRA). From 1 April 2007, APETRA is mandated to take over the country's stockholding obligation from refiners and importers, reaching full coverage of the obliged emergency stocks within five years.

During the five-year transitional period, oil companies and large direct importing consumers will be required to hold compulsory stocks equivalent to 15 days of net imports. APETRA will fulfil the balance of the overall national requirement. The proportion held by APETRA is scheduled to rise progressively to 100%. Over the same period, the proportion held by oil companies and importers will decline by three days each year, eventually falling to zero.

During the transition period, APETRA is authorised to hold stocks on behalf of any operator not able to meet its individual obligation. The operator will pay a service fee to APETRA.

APETRA stock requirements may be held by both Belgian and foreign oil companies, and retained within their normal operating systems. The Agency may also purchase, by tender, crude oil and/or finished products.

Crude or Products

Under the new legislation, oil companies and importers must hold their compulsory stock obligations as finished products or blended stocks.

APETRA may hold its share of compulsory stocks as either crude oil or refined products. The legislation does not limit the amount of crude oil held by APETRA. However, its reserves must comply with Belgium's stockholding obligation to the EU, which limits the amount of crude substitution. In the case of holding crude oil, APETRA must use product yields approved by the Directorate General for Energy within the relevant ministry. Also, if APETRA purchases crude oil towards its stock obligation, it must fix both refining yields and refining costs for that crude with a Belgium refinery that will process the crude in the event of an emergency stockdraw.

Location and Availability

In the past, compulsory stocks in Belgium have been routinely co-mingled with industry operational stocks. As APETRA will be renting storage capacity from existing operators, this practice will continue. In fact, it serves as a way to ensure that the quality of compulsory stocks meets prevailing norms as defined under the new legislation. If necessary, APETRA may also build or hire new dedicated storage.

Because of the compact nature of its territory, Belgium has no directive on the geographical dispersion of compulsory stocks. The co-mingling of compulsory and operational stocks should help to ensure sufficient dispersion in the event of an emergency.

When contracting products and crude storage to meet its stocks obligation, APETRA is to give preference to volumes located within Belgium. Crude stocks held in Rotterdam at the head of the RAPL pipeline (which feeds directly into the Belgian refining system and is owned by Belgian refineries) are counted as oil within the country's supply chain.

APETRA may hold up to a maximum of 30% of its stocks in a country that has a bilateral agreement with Belgium (such stocks can also be co-mingled with operational stocks). Currently, Belgium has bilateral agreements with France, Germany, Ireland, Luxembourg and the Netherlands. Informal arrangements exist with the United Kingdom; talks on formal agreements are under way.

Belgium permits stock tickets abroad, to a limit of 30% of total compulsory stocks. The stock tickets arrangement must be authorised by the governments concerned.

Monitoring and Non-compliance

APETRA, oil companies and large consumers incurring a compulsory stock obligation must inform the Directorate for Energy of the Ministry of Economic Affairs and Energy of the location and composition of their stocks. This information must be reported by the 15th of each month, describing stocks held at the beginning of that month. The minister may authorise physical checks to ensure full compliance with all provisions of the legislation. Penalties for infringements (including those relating to monthly reports, failure to pay levies to APETRA, or a shortfall in compulsory stock obligations) range from fines to imprisonment for up to one year.

All of APETRA operations are subject to direct control by the Ministry of Economic Affairs and Energy. One member of the APETRA board is a government commissioner appointed by the King on the recommendation of the Minister for Economic Affairs and Energy.

Stock and Drawdown Timeframe

During a supply crisis, the Minister of Economic Affairs and Energy would have the power – after consultation with the Council of Ministers on proposals drawn up by the NOB – to order the release of compulsory oil stocks in order to safeguard the national economy or to meet supply obligations to other IEA member countries. It is expected that the decision-making process would take about 48 hours. In theory, actual release of stocks could follow immediately.

In the case of compulsory stocks co-mingled with commercial stocks, supplies would be made available through the normal logistical chain. For stocks held abroad under bilateral agreements, authorities estimate that delivery to Belgium would require a lead time of 10 to 15 days.

Financing and Fees

APETRA activities are financed through fees levied on all quantities of the relevant products delivered for domestic consumption. Every oil company that pays excise and national taxes on oil products must also pay levy fees to APETRA. The base calculation for the APETRA fees, which has been decided by the government and promulgated by Royal decree, reflects several cost factors such as renting or writing off stockholding capacity, renewing the product, the external and internal control of the stocks, and the interest paid on bank loans.

APETRA finances its own purchases of crude/products through bank loans. The government does not provide financial support to industry for holding minimum reserves.

Other Measures

Demand Restraint

Belgium legislation makes provision for several demand restraint measures, ranging from reduced speed limits and driving bans to oil rationing. Some measures are relatively easy to legislate but very difficult to implement and monitor (*i.e.* bans on the filling of gasoline containers).

The NOB has compiled a crisis management manual that describes how to use stocks in an allocation procedure and includes updated lists of the priority end-users of petroleum products. These lists serve as a reference for drawing up ministerial decrees that focus on specific products or consumer groups.

Belgium has at its disposal a number of dormant decrees, mainly to implement demand restraint measures. The Minister of Economic Affairs and Energy could activate these measures after deliberation

of the Council of Ministers. Additional demand restraint measures would be proposed by the NOB after consultations with other national or international bodies.

Fuel Switching

Fuel switching in Belgium is driven primarily by market prices and is not subject to any legal obligation. The use of oil has been declining in power generation: it currently accounts for only 2% of power supply and is expected to be eliminated completely in the near future. Thus, there is little potential for fuel switching in the power sector.

The *IEA Short-term Fuel-Switching Survey 2001* showed that within Belgium's transformation and industry sector, 63% of oil capacity could be switched to another fuel source. This represents a fuel-switching potential away from oil of 31 kb/d – approximately 6% of Belgium's total oil consumption.

Others

To date, Belgium has no crisis policy in place for disruptions in natural gas supply, which it imports (based on long-term contracts) from the Netherlands (36%), Algeria (30%), Norway (29%), and Germany (5%). The contract with the Netherlands allows for increased purchases of Dutch gas in case of supply disruptions in Algeria. In addition, Belgium holds some stocks of natural gas in storage facilities at Loenhout (900 million cubic metres [mcm]), Anderlues (164 mcm) and Dudzele (66 mcm). There are plans to increase the capacity at Loenhout to 1 000 mcm.

Oil Infrastructure of Canada



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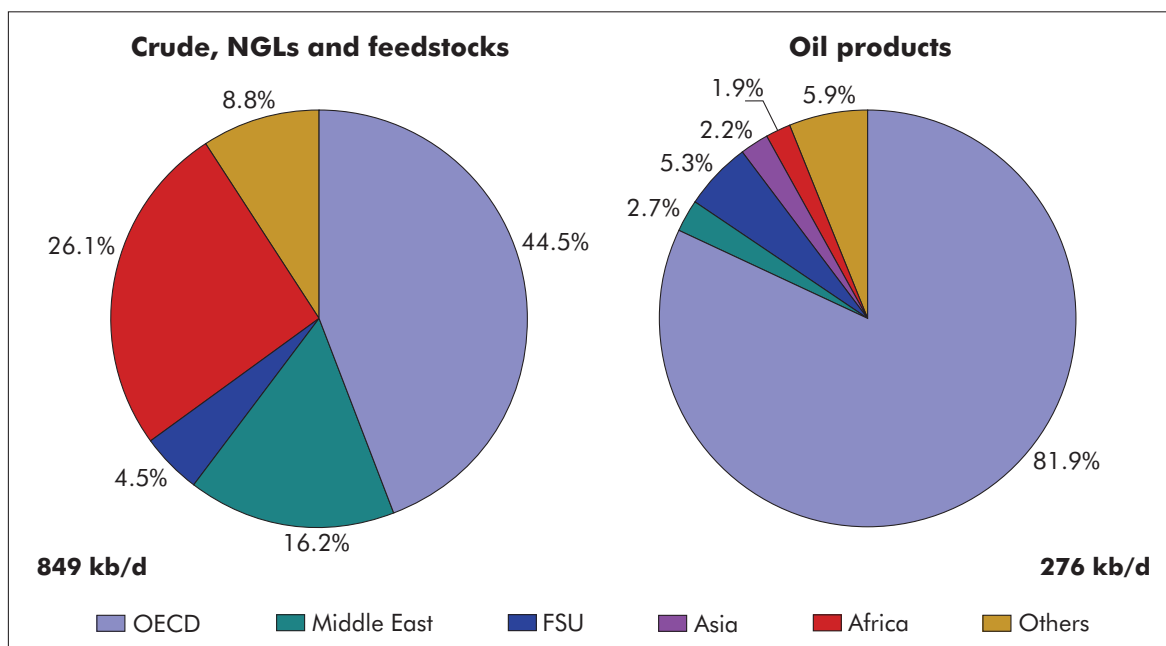
CANADA

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	1 964.7	2 398.8	2 722.6	3 055.6	3 189.8	3 488.6
Demand (kb/d)	1 732.9	1 811.7	2 027.2	2 297.3	2 228.8	2 335.9
Motor gasoline	583.1	602.1	656.7	701.3	702.8	
Gas/diesel oil	409.1	433.2	500.1	543.1	537.4	
Residual fuel oil	174.7	114.6	131.9	161.2	126.3	
Others	566.0	661.8	738.5	891.7	862.3	
Net imports (kb/d)	-231.8	-587.1	-695.4	-758.3	-961.0	-1 152.7
Import dependency (%)	*	*	*	*	*	*
Stocks in days of net imports	-	-	-	-	-	
Refining capacity kb/d		1 907.8	1 911.7	2 017.4	2 041.2	2 103.2

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

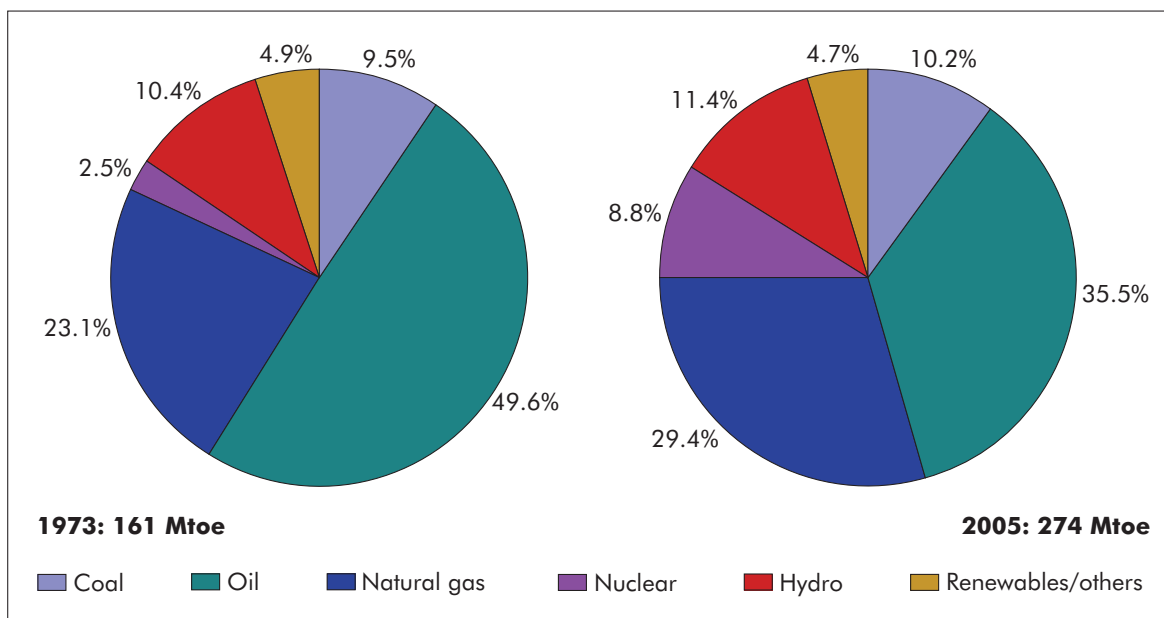
Canada is a net oil exporter and is the only IEA member country with growing indigenous oil production. Canadian oil production is rising; new oil sands and offshore production more than replace declining production from aging fields. This places Canada in a unique position as an IEA member country. Any analysis of Canada's emergency preparedness must fully consider the country's role as a stable and growing supplier of oil, and the contribution that this makes to the collective security of all IEA member countries.

At the same time, Canada is not immune to the risks of a supply disruption. Despite increases in nearby offshore production, refiners in the country's eastern provinces rely on imported crude oil. In an oil supply disruption, the provinces have authority to implement demand restraint measures and facilitate increases in indigenous production. In the event of a severe disruption, for which a national emergency is declared, the federal government could invoke legislation under the Energy Supplies Emergency Act and activate the Emergency Supplies Allocation Board (ESAB). In case of emergency, ESAB has a mandate to fulfil three roles: to prepare, develop and maintain "in a state of readiness" programmes to allocate crude oil and petroleum products; to restrain demand for petroleum products; and to ration gasoline and diesel fuel.

Energy Outlook

Energy consumption in Canada is driven by sustained economic and population growth, and by the fact that Canada remains an energy-intensive economy because of its status as a key producer and

Total Primary Energy Supply



exporter of vast quantities of primary and secondary energy. Canada is among the world's largest energy producers and exporters.

Conventional oil reserves in Canada are estimated at some 5.2 billion barrels; proven recoverable unconventional oil reserves from the oil sands are estimated at 174 billion barrels. Potential reserves of Canadian oil sands have been estimated at 315 billion barrels.

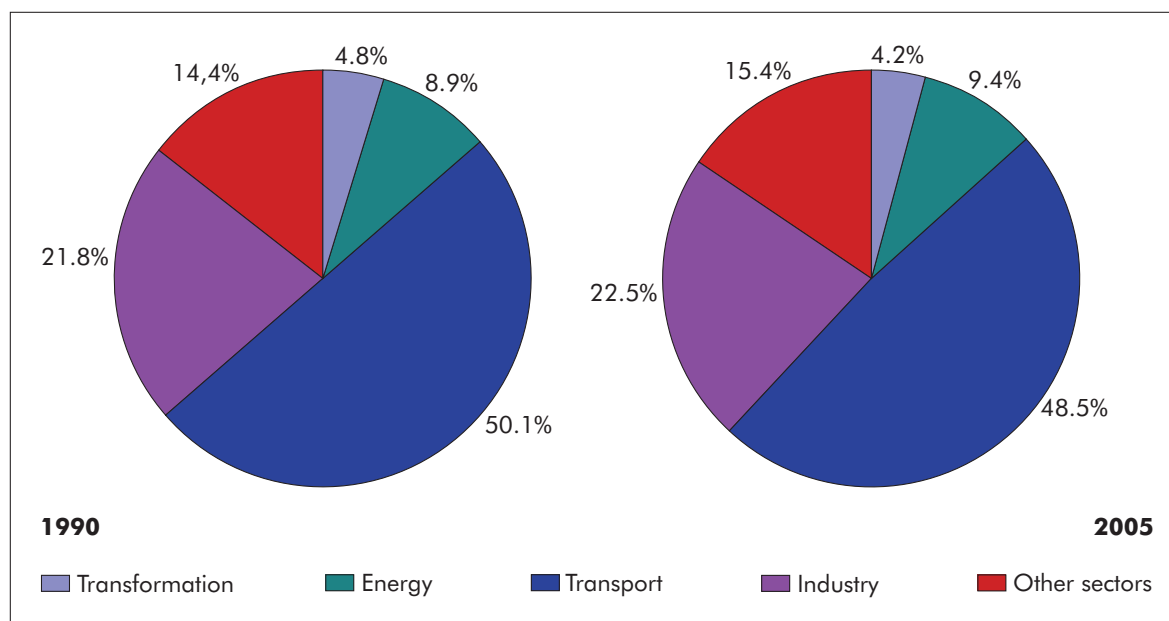
Total Canadian production of crude oil and equivalent hydrocarbons averaged 3.2 mb/d in 2006. Roughly 1.15 mb/d of this production came from the Alberta oil sands, in the form of bitumen and synthetic crude oil. NGLs (including pentanes and condensates) and conventional crude oil (including some 316 kb/d of offshore production) accounted for the rest.

Oil production in Canada is rising: new oil sands and offshore production have more than replaced declining production from aging fields. Total production is expected to reach some 3.5 mb/d by 2010, with Alberta oil sands production accounting for 1.7 mb/d.

Total oil demand in Canada averaged 2.2 mb/d in 2006. Motor gasoline was the predominant product consumed, accounting for nearly one-third of the total. The transportation sector accounted for some 50% of oil consumption, unchanged from the 1990s.

Market Features and Key Issues

Oil Consumption by Sector



Canada is a growing net exporter, yet it remains effectively a dual oil market. Crude oil is exported from the west and the Atlantic offshore, but imported in the eastern and central regions.

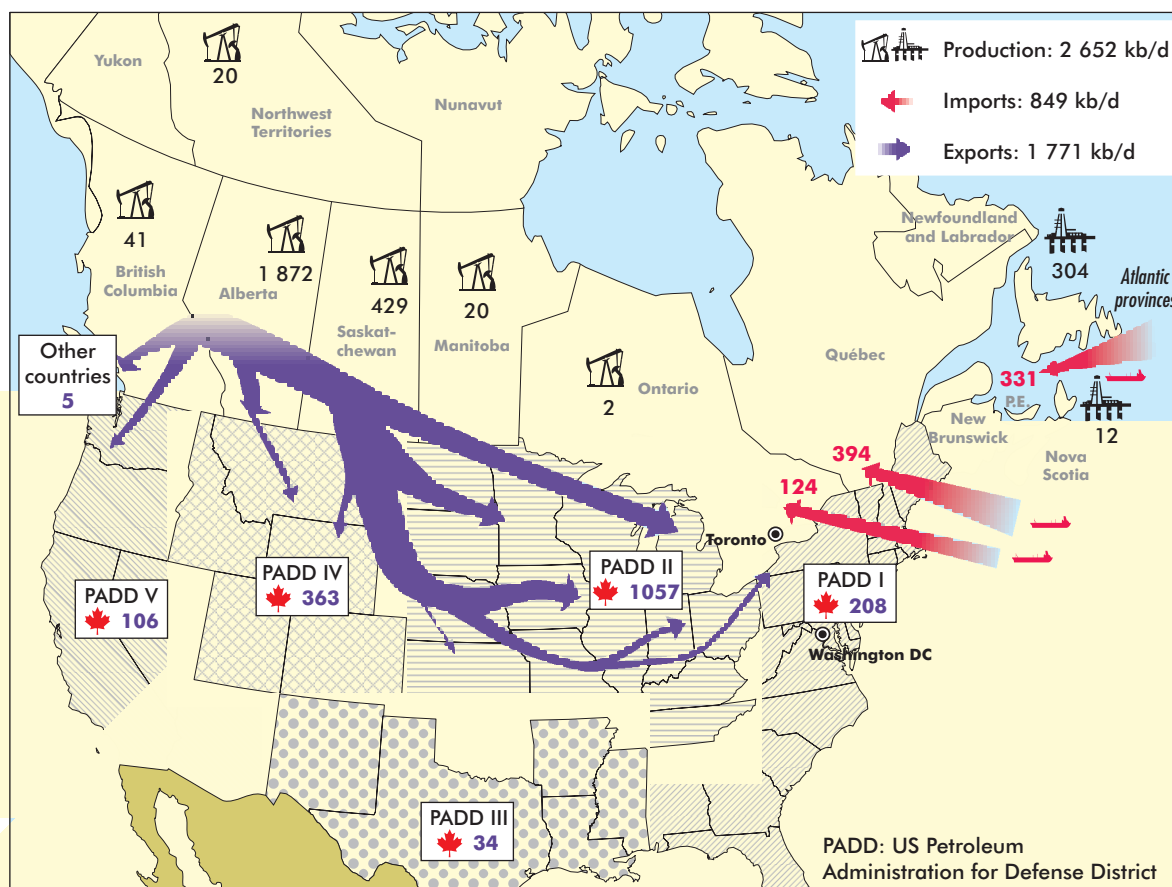
Canada exports about two-thirds of all indigenous oil production, nearly all to the United States. In 2006, Canada exported close to 1.8 mb/d of crude oil to the United States, making Canada the largest crude oil exporter to the US market. Canadian exports now account for some 18% of total

US crude oil imports. Canada also exported substantial refined products such that total oil exports, almost entirely to the United States, were 2.3 mb/d in 2006.

Due to logistics and transportation costs, Canadian refiners located in Québec and the Atlantic provinces import roughly half of their crude runs from overseas. These imports flow by tanker into Newfoundland, Nova Scotia, New Brunswick and Québec. Canadian imports are also received at the US seaport of Portland (Maine) and transported by pipeline to Montréal (Québec) and the province of Ontario. Approximately 849 kb/d of oil was imported into eastern Canada in 2006. Just over one-third of these imports came from the North Sea; some 44% of the total was obtained from OPEC sources.

Figure 3.1

Canadian Crude Oil Production, Imports and Exports, 2006



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

Source: Statistics Canada.

Oil Supply Infrastructure

Refineries

Canada has 19 refineries with a total crude oil refining capacity of just over 2 mb/d. There are three main refining centres: Edmonton (Alberta), Sarnia (Ontario), and Montréal (Québec). Other refineries

are distributed across the country, but there are no such facilities in the provinces of Manitoba and Prince Edward Island, or in the northern territories. Sixteen of the refineries produce a full range of petroleum products. One Ontario refinery is a petrochemical plant; two facilities (in Alberta and Saskatchewan) are primarily asphalt plants with limited distillate production.

Canadian refineries have undergone significant rationalisation over the past 30 years; the number of refineries has dropped by half since the 1970s. Since the early 1990s, refining capacity has been more static; national utilisation rates have remained above 90% for most of the last decade. A 95% utilisation rate is considered optimum, as it allows for normal maintenance and seasonal turnarounds.

Most refineries in Ontario and western Canada were designed to process the light sweet crude oil that is produced domestically. To cope with declining production in conventional light sweet crudes and growing production from the oil sands, these refineries have had to reconfigure operations and invest in the facilities upgrading necessary for processing heavier crude slates. Refineries in eastern Canada are dependent on imported oil and generally refine a more diverse range of crude qualities, with around one-third consisting of light sweet crude and the majority being heavier, mostly sour grades.

Ports and Pipelines

Virtually all Canadian oil produced in western Canada is subsequently shipped to domestic and US markets through three main pipeline systems:

- Enbridge Pipeline, which accounts for the bulk of Canadian exports, delivers 2.2 mb/d of oil from Edmonton (Alberta) into the province of Ontario and the US Great Lakes region.
- Express Pipeline delivers crude from Alberta into the US state of Wyoming (170 kb/d) and onward into Illinois (120 kb/d) via its Platte Pipeline connection.
- Trans Mountain Pipe Line (TMPL), which can transport both crude and products (225 kb/d), delivers oil mainly from Alberta west to Vancouver (British Columbia) and the Puget Sound region of the United States.

Canada will need to expand pipeline capacity to match increased output from the oil sands, even though various pipeline expansion projects have already been completed. The Enbridge Spearhead reversal line links oil sands production to markets in the US Midwest and the Gulf of Mexico at a rate of some 125 kb/d. Enbridge has also proposed a new pipeline called the Alberta Clipper to deliver heavy crude oil from Hardisty (Alberta) to Superior (Wisconsin). Kinder Morgan (formerly Terasen), operator of TMPL, is developing a major pipeline project designed to transport oil sands production to British Columbia for export to the United States and to Asia-Pacific markets.

A steady supply of diluent is required to transport heavy oil and bitumen through pipelines. These light hydrocarbons are becoming relatively scarce in Alberta but remain quite plentiful in the United States. Enbridge has proposed a new 180 kb/d pipeline to import diluent from the Chicago (Illinois) area to Edmonton (Alberta), thereby ensuring that adequate supplies of reasonably priced diluent are available to support growth in oil sands production.

To offset the loss of production following the closure of an Ontario refinery, the Trans-Northern petroleum product pipeline was reversed. This pipeline now allows the delivery of refined products from Montréal (Québec) to Toronto and other terminals in eastern Ontario. In Québec, Ultramar

plans to construct a 250 km pipeline from their refinery in St-Romuald to their primary market in Montréal. The pipeline will transport up to 100 kb/d of petroleum products, reducing the company's reliance on other forms of transport (mainly unit trains) between St-Romuald and Montréal.

Decision-making Structure

Canada's energy policy derives, in part, from the constitutional division of power between the federal and provincial/territorial governments, which gives both levels of government a major role in energy policy. The provinces/territories own all natural resources within their geographic boundaries and are responsible for the conservation, development and management of those resources. The federal government is responsible for matters relating to inter-provincial and international trade, programmes and policies in the national interest (including national economic development and energy security), and resource management on federal lands.

In the event of disruptions to energy supply, Canadian provinces and territories have authority to implement demand restraint measures. Under certain circumstances (*e.g.* after declaring a national emergency in response to an oil supply reduction of 7%), a provision exists for the federal government to take measures under the authority of the *Energy Supplies Emergency Act*, which empowers the Energy Supplies Allocation Board (ESAB) to reallocate energy supplies within Canada. The *Emergencies Act* is another legislation that provides for special and temporary measures to ensure safety and security when a national emergency is declared. The federal government, through the ESAB, can order requisitions of energy supplies or their disposal; however, this kind of process is time consuming.

In non-emergency times, the Oil Division of Natural Resources Canada (NRCan) serves as the core staff for the National Emergency Sharing Organisation (NESO). In an emergency situation – when the enabling legislation is activated – the ESAB can mobilise a much larger emergency organisation, comprising a chair and five members. The chair is appointed by the Governor-in-Council and reports to the Minister of NRCan. The board includes representatives from oil companies and industry organisations (through the Petroleum Industry Advisory Committee - PIAC), and from other federal and provincial government departments (through the Provincial Advisory Committee - PAC). The board is supported by the Oil Division of NRCan. The use of the federal government's emergency powers requires provincial consultation before taking emergency action to address some form of market failure.

Stocks

Stockholding Structure

As a net oil exporter, Canada does not have an IEA emergency reserve commitment. All stocks currently held in Canada are commercially owned; oil companies are not required to hold emergency stocks in normal times.

However, in a national emergency, the ESAB would have the authority to regulate company stocks and to penalise companies for contravention of its orders under the *Energy Supplies Emergency Act*. The ESAB has the authority to regulate building, storage and disposal of stocks, including industry stocks,

during a declared national emergency. The threshold level would be decided by the government, in consultation with the oil industry, at the time of an emergency. The mechanism requires that all companies submit monthly reports on their stock situation to the ESAB.

Crude or Products

At the end of 2006, total stocks held by industry in Canada were roughly two-thirds crude and unrefined oils, and one-third finished products. By comparison, the share of unrefined oil within total stocks was some 50% in 1995 and 60% in 2000.

Location and Availability

Industry holds storage facilities along the supply chain for normal operations. Industry stock levels have been relatively stable over the last five years in terms of forward demand coverage (stock level divided by the average daily demand of the next three months). On average, product inventories provide about 40 days of forward demand; crude oil inventories have consistently been in the range of 10 to 12 days. Regional variations exist: refiners in the western provinces typically maintain about five to seven days of reserve; refiners in eastern Canada, which typically run imported crude oil, average 15 to 20 days.

Monitoring and Non-compliance

In normal times, oil companies are not required to hold emergency stocks. However, in an emergency, the ESAB would have the authority to regulate company stocks and to penalise companies for contravention of its orders under Section 41 of the *Energy Supplies Emergency Act*. Monitoring mechanisms include the submission of data from industry, as well as the possibility of audit.

Stock and Drawdown Timeframe

In a declared emergency, Canada could implement a mandatory allocation programme, requiring oil companies to drawdown commercial stocks. NESO would request data from companies, which ESAB would use to assess the situation and take a decision. The ESAB decision would be communicated to companies and the stock drawdown initiated. Stocks would be released onto the market by companies meeting their crude oil entitlement and the product entitlements of their customers. ESAB has the power to establish parameters for prices, as well as to set prices, if necessary, at the time of emergency. This sequence of events would require about two to three weeks.

Canada's emergency policy emphasises market mechanisms and would avoid, as much as possible, heavy allocation actions. Thus, it is unlikely that commercial stocks would be directed in such a manner.

Financing and Fees

There are no stockholding obligations on the oil industry in Canada; all oil stocks are held by market operators. Oil companies recoup the costs of stockholding through their normal operations and consumer pricing.

Other Measures

Demand Restraint

Without the declaration of a national emergency, the Canadian federal government does not have the legal authority to implement demand restraint measures. Prior to a federal declaration, demand restraint measures would be under provincial/territorial jurisdiction and would be handled on a voluntary basis, through joint co-operation of industry and the provinces. In a declared emergency, compulsory demand restraint would be implemented at the federal level through an allocations programme for crude oil and products. The provinces and territories would implement further demand restraint measures to complement federal actions.

The specific procedures for demand restraint are described in the *Energy Supplies Emergency Act*. Additionally, the *Emergencies Act of 1988* provides a more flexible approach to achieving demand restraint by allowing the Governor-in-Council the authority to “requisition, use or dispose” of energy commodities. Both of these legal instruments require that the Governor-in-Council first declare an energy-related national emergency.

Prior to a declared state of emergency, activities at the federal level would include media campaigns to encourage voluntary consumption reductions and the prevention of hoarding. Once a national emergency is declared, ESAB would activate allocation plans according to the policies and procedures outlined in the following programmes:

- The *Crude Oil Allocation Program* apportions available crude oil from offshore and domestic sources to refineries throughout Canada. It can also be used to free up crude for export, in the case of a supply re-allocation under the IEP emergency sharing system.
- The *Petroleum Products Allocation Program* controls the volume of products that refiners and other major suppliers may sell to wholesale customers. This would be based on historical consumption patterns and on the use of oil products. The allocation factors would be issued for three basic priorities of use: (a) health, welfare and security of Canadians (e.g. hospital services, fire and police protection, national defence or public transit); (b) economic stability (e.g. most industrial and commercial activities, including public utilities, postal services, residential heating, taxis and road maintenance); and (c) discretionary activities related to maintenance of the standard of living (e.g. supplies of gasoline at service stations and of fuels for heating commercial buildings). Users in the first two categories would receive their supplies directly from the wholesalers. As the definition of the second category is quite general in the legislation, NESO has developed a detailed list of users in this category.

- *The Rationing Program* controls the distribution of gasoline and diesel fuel through coupons. This falls under federal jurisdiction and is considered a measure of last resort. It would take up to six months to fully activate and implement.

Surge Production

Canadian oil producers generally seek to maximise rates: thus, surge production capacity is considered relatively limited. Moreover, it can only be sustained over a short period. If maintained for more than a few weeks or months, it carries increased risk of damaging wells and reservoirs.

The federal government has little control over surge production because most oil resources are under provincial jurisdiction. In a crisis, provincial regulatory boards are able to relax the best production practices (including the gas-to-oil ratios); however, they could not force oil companies to take advantage of this measure in order to increase production. In a declared national emergency, the *Energy Supplies Emergency Act* gives the federal government the authority to control oil production. It is estimated that this intervention process would require a minimum of two weeks.

Box 3.1. **Canada's Contribution to the IEA Collective Response of 2 September 2005**

The experience from the IEA collective response action, following Hurricanes Katrina and Rita, provides an example of how Canada's provincial regulatory boards can respond in a disruption. The Alberta Energy and Utilities Board (AEUB) took steps in early September to allow for increased oil production on a temporary basis. In particular, the AEUB suspended its maximum rate limitation systems, which made it possible to increase production by 30 kb/d. The suspension was extended through to the end of 2005. In the period from September to October 2005, Canada estimates that the AEUB action brought 1 mb of additional oil to the market.

In addition to the AEUB response, industry estimates that production from Canadian oil sands facilities increased (over August 2005 levels) by an average of 51 kb/d in September (1.53 mb) and 127 kb/d in October (3.93 mb). The combined total of increased production for the two months reached 6.5 mb. This additional production was partially offset by reduced production from Newfoundland, where the Terra Nova offshore production facility entered a planned shutdown during the same period.

Oil Infrastructure of the Czech Republic



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

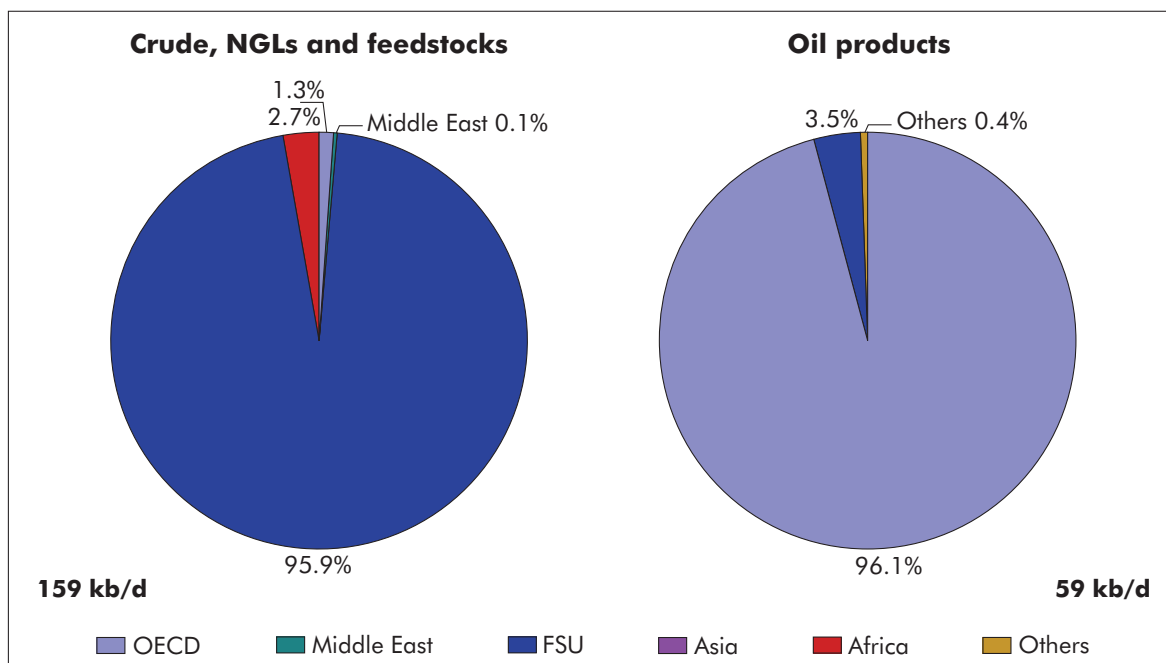
THE CZECH REPUBLIC

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	6.0	7.4	12.1	7.7	5.2
Demand (kb/d)	184.1	168.4	169.8	212.2	208.4	221.8
Motor gasoline	26.9	37.9	42.9	47.5	46.4	
Gas/diesel oil	68.9	54.5	57.6	78.7	81.4	
Residual fuel oil	41.8	22.9	16.2	9.6	7.5	
Others	46.5	53.1	53.1	76.5	73.1	
Net imports (kb/d)	184.1	162.4	162.4	200.1	200.8	216.6
Import dependency (%)	100	96.4	95.6	94.3	96.3	97.7
Stocks in days of net imports	57.0	58.0	103.0	111.0	117.0	
Refining capacity kb/d		307.1	186.1	198.0	198.0	202.0

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

Since the Czech Republic joined the IEA in 2001, oil consumption in the country has increased by 3.5% per year. This demand growth has been due primarily to the increased use of diesel fuel, which accounted for more than one-third of total oil demand in 2006. More than 97% of oil demand is met by imports, largely in the form of crude oil from countries of the former Soviet Union (FSU). Finished products are expected to constitute a growing share of the Czech Republic's future import dependency; demand growth will widen the gap between output from domestic refineries and the products consumed by the Czech market.

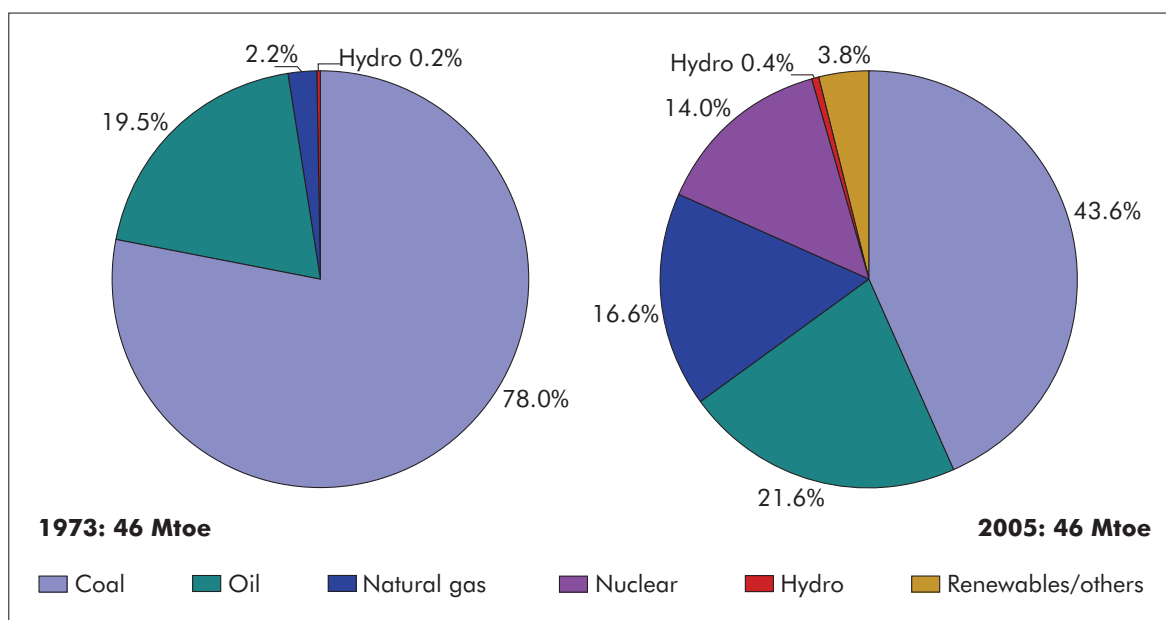
In an oil supply disruption, the Czech Republic's emergency response policy focuses on the release of public stocks, likely in the form of loans, accompanied by complementary demand restraint measures. The Administration of the State Material Reserves (ASMR) oversees the government oil stocks and is responsible for maintaining and implementing emergency measures. The ASMR oil stocks cover the entire Czech stockholding obligation of the European Union.

Energy Outlook

In 2005, oil represented more than 20% of the Czech Republic's total primary energy supply (TPES). This proportion has remained relatively stable over the past 30 years.

The dominance of coal declined significantly due to increased energy supplies from natural gas and nuclear energy. The share of natural gas in TPES has increased from 2% in 1973 to 17% in 2005.

Total Primary Energy Supply



Natural gas consumption is expected to continue rising by around 1-2% annually in the coming years.

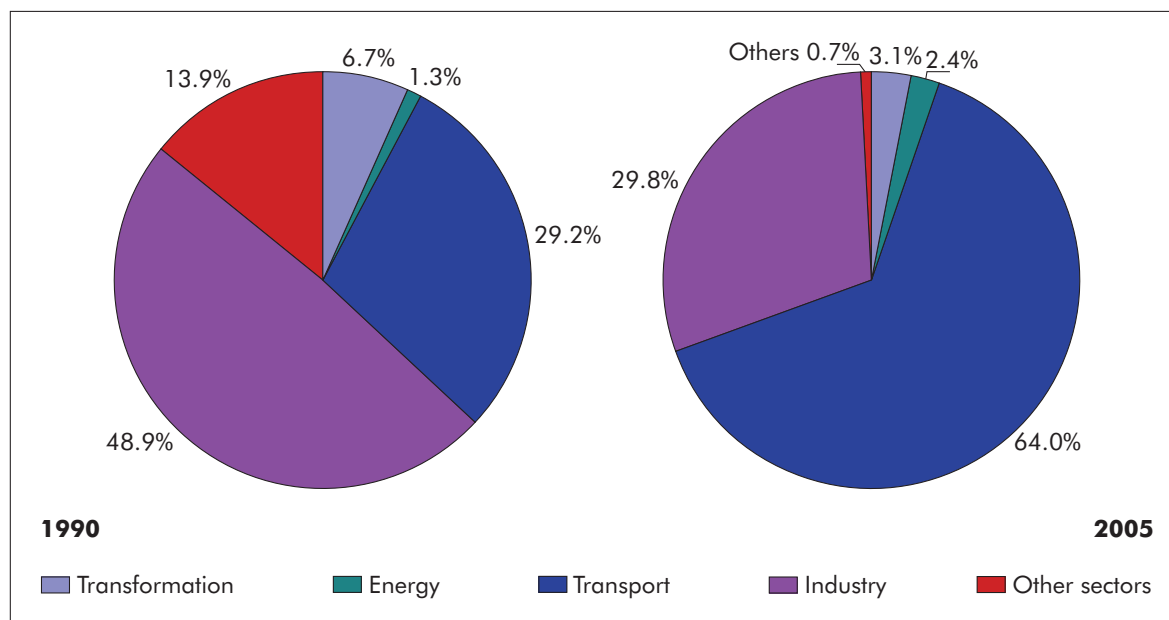
At 208 kb/d, oil demand in 2006 was down slightly from the previous year; however, Czech oil demand has increased steadily in recent years. In the period from 2000 to 2006, oil demand grew by an annual average rate of 3.5%. This growth is expected to slow down slightly to 2010, with oil demand reaching 222 kb/d.

The Czech Republic does not have significant natural reserves of crude oil. Crude oil imports in 2006 averaged nearly 160 kb/d, supplied almost entirely by countries of the FSU through the Druzhba pipeline. Product imports for the same period averaged almost 60 kb/d, while product exports were 25 kb/d, with trade in refined products almost entirely conducted with other OECD member countries (primarily the Slovak Republic). Net imports, including both crude oil and refined products, accounted for over 96% of demand.

Market Features and Key Issues

Demand for transportation fuels is the main driver behind total oil demand growth; the transport sector accounts for 64% of consumption. Demand growth for gas/diesel oil averaged 6% per year from 2000 to 2006, at which time diesel for transport use made up 39% of total oil demand. This exceptional growth in demand has been due to a rapid dieselisation of the Czech car fleet, as well as a significant rise in the number of heavy goods vehicles transiting the country following the Czech Republic's accession to the European Union in 2004.

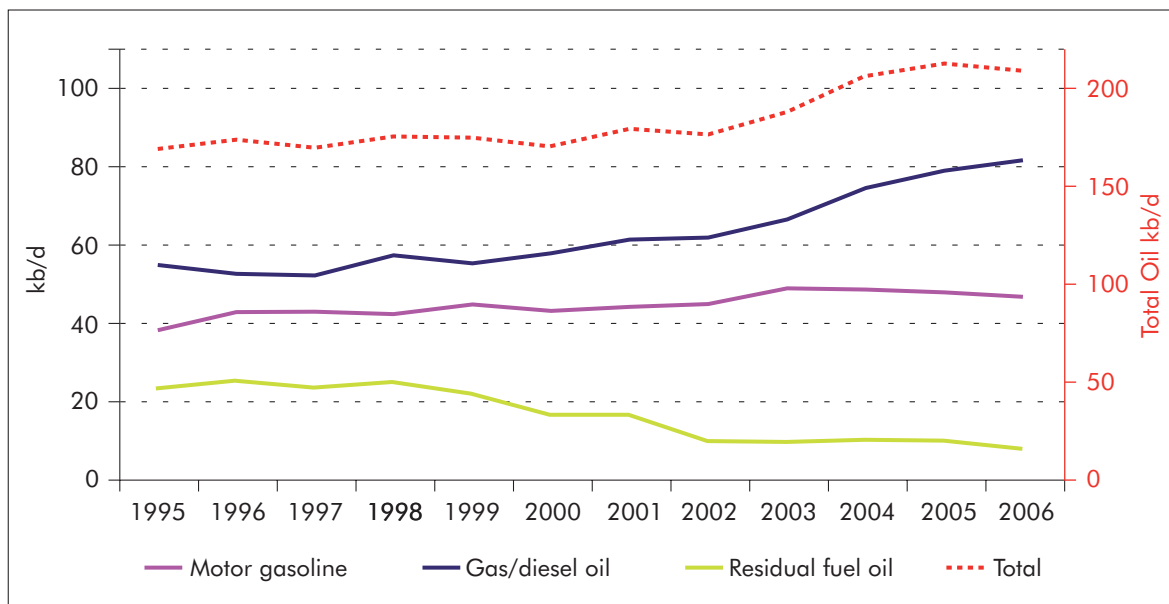
Oil Consumption by Sector



Total output of finished products from Czech refineries averaged 175 kb/d in 2006, with all but a fraction of the crude input coming from imported supply. However, as domestic refinery output does

not match product demand, product trade is necessary to meet domestic consumption patterns. Of the total net import dependency, the share of refined products has increased over the past decade, rising from 12% in 1995 to nearly 20% in 2006.

Oil Demand by Product, 1995-2006



Oil Supply Infrastructure

Refineries

The Czech Republic has three refineries that contribute to a total crude oil refining capacity of 198 kb/d (9.9 Mt/yr). The two main refineries, Litvínov and Kralupy, account for more than 90% of this capacity. Refining capacity is expected to reach 202 kb/d in 2010.

Pipelines

The Druzhba pipeline is the main crude oil supply channel. Originating in Russia and transiting the Ukraine and the Slovak Republic before terminating in the Czech Republic, this pipeline delivers Russian and domestically produced crude oil. The Czech section has a capacity of 180 kb/d (9 Mt/yr). The Ingolstadt-Kralupy-Litvínov pipeline (IKL) has been in operation since 1996, with a capacity to bring 200 kb/d (10 Mt/yr) of oil via Germany. This line is connected, in Germany, to the international TransAlpine (TAL) pipeline, which originates in Trieste and offers the potential to diversify imports. At present, only 20 to 30% of this pipeline's capacity is used. Both the Druzhba and IKL pipelines are operated by the state-owned company Mezinárodní Ropovody (MERO).

The domestic crude oil producer, *Moravské naftové doly*, connected to the Druzhba pipeline in 2003, thereby allowing the Kralupy refinery to receive by pipeline batches of domestic crude for processing.

An oil products pipeline network, operated by the state-owned company CEPRO, connects the country's domestic refineries to the main consumer regions. The pipeline system also connects to the Slovnaft refinery in the Slovak Republic, which enables the import and export of oil products by pipeline.

Storage

MERO and CEPRO provide storage facilities of crude and oil products, respectively, for the public stocks of the Administration of the State Material Reserves (ASMR). At the end of 2006, MERO crude storage capacity was 9.4 mb, including 1.3 mb of storage at its facilities in Vohburg, Germany. Its central tank farm near Kralupy was fully modernised in 2003 and offers considerable scope for capacity expansion. Two new tanks will be operational in 2008, increasing MERO storage capacity by more than 1.57 mb (250 000 cubic metres).

CEPRO has 16 storage sites along its product pipeline network, with a total storage capacity of nearly 9.5 mb (1.5 mcm). CEPRO will connect a 17th facility to the network in 2008. Approximately 75% of CEPRO storage capacity is reserved for public stocks; the remainder is available for use by all fuel-trading companies in the Czech Republic. In addition to its stockholding role, CEPRO is a refined product trading company. This facilitates its ability to ensure necessary turnover of product stock.

Decision-making Structure

The chair of the ASMR serves as the head of the National Emergency Sharing Organisation (NESO) and is responsible for initiating and co-ordinating a response to an oil supply disruption. The ASMR is responsible for stockpiling and supply security of the main resources considered essential for the protection of public interests during crises. ASMR reserves include agricultural goods, metals and industrial materials; however, oil and oil products make up 60% of the overall reserves holdings.

Act 189 of 1999 on Emergency Oil Stocks and Managing States of Oil Emergency is the legal basis for emergency policy in the Czech Republic, providing the principle statutory authority for the ASMR role in an oil emergency.

Within the ASMR, the Oil Security Division has the leading role in co-ordinating NESO and liaising with industry and the IEA. The Ministry of Industry and Trade and the Czech Statistical Office also play central roles in NESO. The wider NESO structure includes other ministries as well as industry representatives; it meets at least twice per year.

The Czech Republic's emergency response policy relies initially on industry participants to respond to a supply disruption through industry consultation and voluntary actions. These measures would generally be sought in the early stages of a response. If NESO, which includes industry representatives, deemed such actions insufficient to deal with the disrupted supplies, the chair of the ASMR would seek a government declaration of an emergency and an order to release ASMR stocks. Demand restraint measures would likely be used in parallel, adjusted according to the severity and anticipated duration of the crisis.

Stocks

Stockholding Structure

The Czech Republic uses the public stocks of the ASMR to fully meet its minimum stockholding obligation as a member of the European Union. These reserves are held, on behalf of the ASMR, by the state-owned companies MERO and CEPRO (and to a smaller extent by the three domestic refineries and other private companies). There are no stockholding obligations on industry; however, in a declared state of emergency, the government has statutory powers over industry's commercially held stocks.

Legislation specifies that ASMR stocks must be equivalent to at least 90 days of consumption, as required by the European Union, and no less than the amount necessary to meet the IEA net import requirement. The ASMR typically holds stocks in excess of the 90 days of consumption in order to facilitate stock turnover while maintaining consistently more than the minimum level.

Crude or Products

The composition of ASMR stocks is legally limited to a maximum of 60% crude or semi-finished products, and at least 40% refined petroleum products.

The ASMR total public stocks at the end of 2006 were 15 mb. Roughly 45% of this (6.7 mb) was in the form of crude oil. More than one-half of all refined products were in the form of diesel oil. Stocks held by industry were roughly one-third crude oil; approximately one-quarter of total product stocks was in the form of diesel oil.

Location and Availability

The ASMR does not hold storage capacity itself: volumes of public stocks are held by designated storage operators and refiners. For the most part, the state-owned companies MERO and CEPRO hold crude and product, respectively. Storage capacity used for ASMR stocks must meet certain requirements regarding minimum size and drawdown rates. All volumes of the ASMR crude oil are held in separate tanks; approximately 5% of product stocks are co-mingled with commercial stocks.

There are no restrictions or requirements for specific locations of ASMR stocks within the Czech Republic. ASMR stocks may be held outside the Czech Republic under bilateral agreement, with a limit of no more than 18 days of internal consumption.

MERO has storage facilities in Germany. However, all of ASMR crude stocks are currently held in MERO central storage facilities or at the domestic refineries.

The Czech Republic has bilateral stockholding agreements with Germany and the Slovak Republic; however, no ASMR stocks are currently held abroad. By contrast, industry operating in the Czech Republic regularly holds stocks in neighbouring countries for logistical purposes.

Monitoring and Non-compliance

The ASMR is responsible for monitoring quantities and qualities of stocks held on its behalf. It must also report total stock levels and composition to both the Czech government and the European Union. The Czech Statistical Office is responsible for data collection, including all industry stocks, and reports monthly to the IEA.

The ASMR is also able to monitor industry activities on a daily basis through a voluntary reporting system established by its industry association. The Czech Association of Petroleum Industry and Trade (CAPPO), also a NESO member, provides the ASMR with a regular overview of supplies coming into the country.

Stock and Drawdown Timeframe

The ASMR is required to hold at least 90 days of consumption, according to requirements set out by the European Union. The chair of the ASMR may release stocks held in excess of this minimum level but government approval is required to draw stocks below this level.

Because the ASMR typically holds stocks above this minimum level, the Czech Republic is able to respond rapidly in a disruption – without having to wait for government approval or an emergency declaration. Should the volume of excess stocks prove insufficient for the immediate situation (*e.g.* be unable to meet the Czech Republic's share in an IEA action) the chair of the ASMR could seek government endorsement to draw emergency stocks below the minimum required level.

In a drawdown of public stocks, whether directed by the ASMR chair or through government approval, volumes may be either sold in a tender process or offered on loan. The ASMR posts such offers on its website and market participants are expected to address the ASMR directly. Loans are the preferred method of release, and are subject to a fee ranging from 0.9% to 1.2% of the market value of the oil. Establishing a date for the replenishment of oil stocks borrowed is an integral part of the contractual conditions, as are penalties for breach of the contract. CEPRO and MERO act on the orders of the ASMR to drawdown the appropriate stocks. All fees and penalties are paid directly to the ASMR.

When the drawdown requires the approval from ministers and the heads of state, the process is expected to take less than three days. Maximum drawdown rates of public stocks range from 125 kb/d to 185 kb/d for crude oil (depending on the pipeline used) and more than 800 kb/d for finished products.

Financing and Fees

Public stocks are financed by the state budget. Time-swaps are sometimes used to refresh oil stocks. The annual financial costs of purchasing, storing and logistics, and management of public and/or company emergency stocks amount to around EUR 7-8/tonne.

Other Measures

Demand Restraint

The Czech Republic would likely use demand restraint measures in conjunction with the drawdown of public stocks. In the case of public stock release not requiring government approval, appeals for voluntary measures would be made to the public (*e.g.* educating the public about fuel-efficient driving techniques or calling for increased use of public transportation and car-pooling).

In the case of seeking a declared emergency, demand restraint measures would be specified in the proposal presented by the ASMR chair to the government. Once the proposal is approved – a process that could take two to six days – the ASMR would hold a press conference and initiate a mass media campaign. Measures could then be implemented within two to five days following the public announcement.

Demand restraint measures available to the ASMR include limiting motor vehicle speed and imposing driving restrictions (only on certain days or for specific kinds of transportation, or based on odd/even car plates). In more extended disruptions, fuel rationing is also available as a policy measure: it would consist of a card system for priority users and coupon distribution to private vehicles. In a declared emergency, the government also has the power to order private companies to drawdown their stocks.

Legislation assigns responsibility for ensuring compliance with these different measures to various components of the Czech government such as the police and transportation boards, which have the authority to impose fines for violations. The ASMR, in conjunction with the Czech Statistical Office, is responsible for monitoring the effectiveness of the measures.

Oil Infrastructure of Denmark



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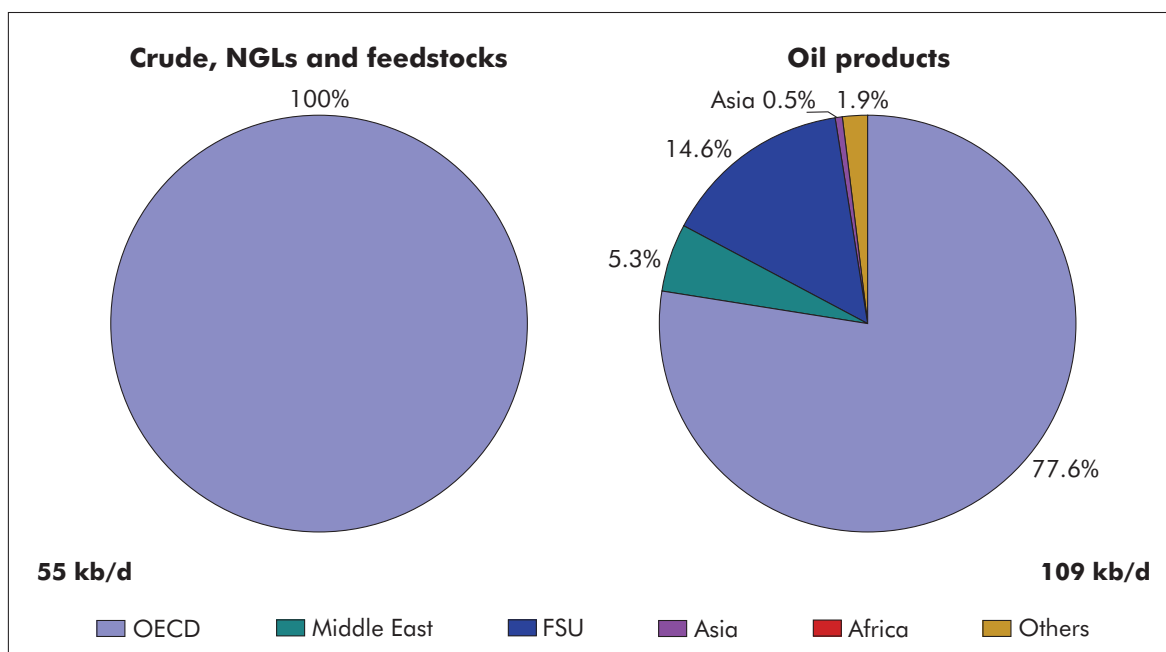
DENMARK

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	121.7	186.0	363.0	377.4	342.2	289.5
Demand (kb/d)	192.4	222.8	210.1	183.6	190.5	191.0
Motor gasoline	37.2	44.3	45.8	43.4	42.7	
Gas/diesel oil	92.3	97.0	86.8	83.4	84.9	
Residual fuel oil	28.8	33.0	22.5	19.4	25.2	
Others	34.2	48.5	55.0	37.4	37.7	
Net imports (kb/d)	70.8	36.8	-152.9	-193.7	-151.7	-98.5
Import dependency (%)	36.8	16.5	*	*	*	*
Stocks in days of net imports	605.0	4 805.0	-	-	-	
Refining capacity kb/d		188.2	135.0	176.4	176.4	179.5

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

Oil and gas were discovered on the continental shelf in the North Sea in the late 1960s. Since then, Danish oil production has increased steadily to satisfy domestic demand. Denmark achieved self-sufficiency in oil and gas in the 1990s and became a net exporter in the same period. In 2006, Denmark produced mostly light and low sulphur crude at a volume of 342 kb/d, almost twice its domestic demand for oil.

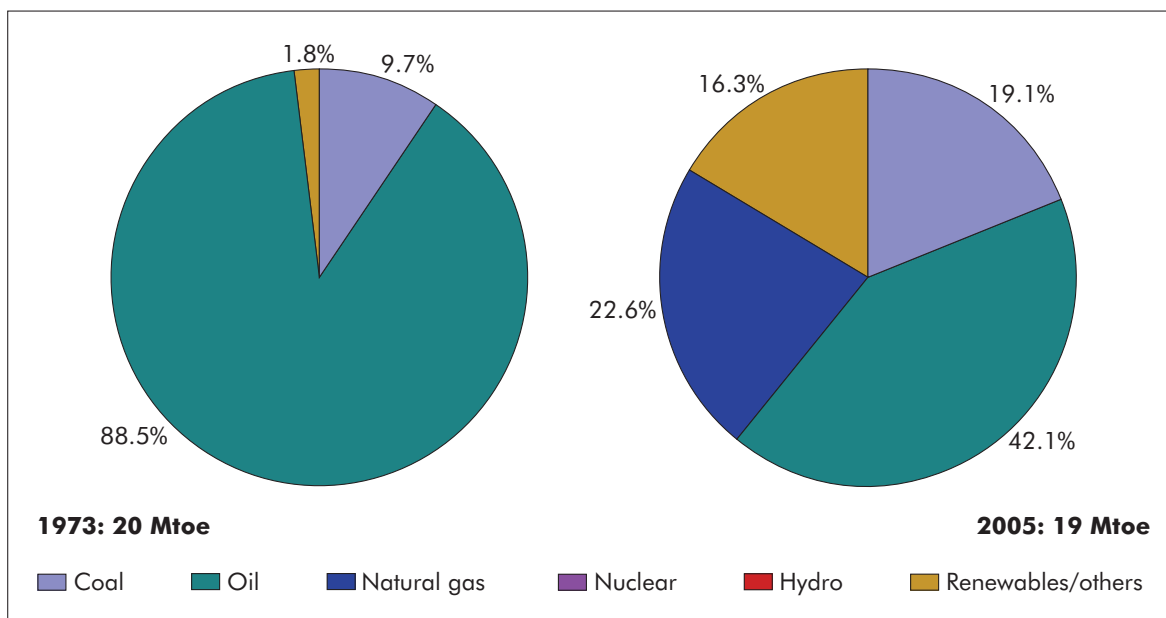
Denmark is expected to remain a net oil exporter until approximately 2015. This period may be extended by a potential contribution of added production deriving from new technologies and further research in the North Sea region, both of which would drive up the production curve.

As a net exporter, Denmark has no stockholding obligation to the IEA; it does have a stockholding obligation as a member of the European Union. Denmark meets this obligation by placing minimum stockholding requirements on industry. The majority of this requirement is covered by the non-governmental stockholding association *Foreningen Danske Olieberedskabslagre (FDO)*, known in English as the Danish Oil Reserve Stock Association. The rest is covered by the industry itself. In an IEA co-ordinated action, Denmark would likely participate by lowering the obligation on industry.

Energy Outlook

Denmark's energy mix has changed radically over the past quarter-century. In 2005, oil represented 42% of the share of total primary energy supply (TPES) – almost half of what it was in 1973. From 1990 to 2005, oil consumption declined slightly. The emergence of natural gas, which represented

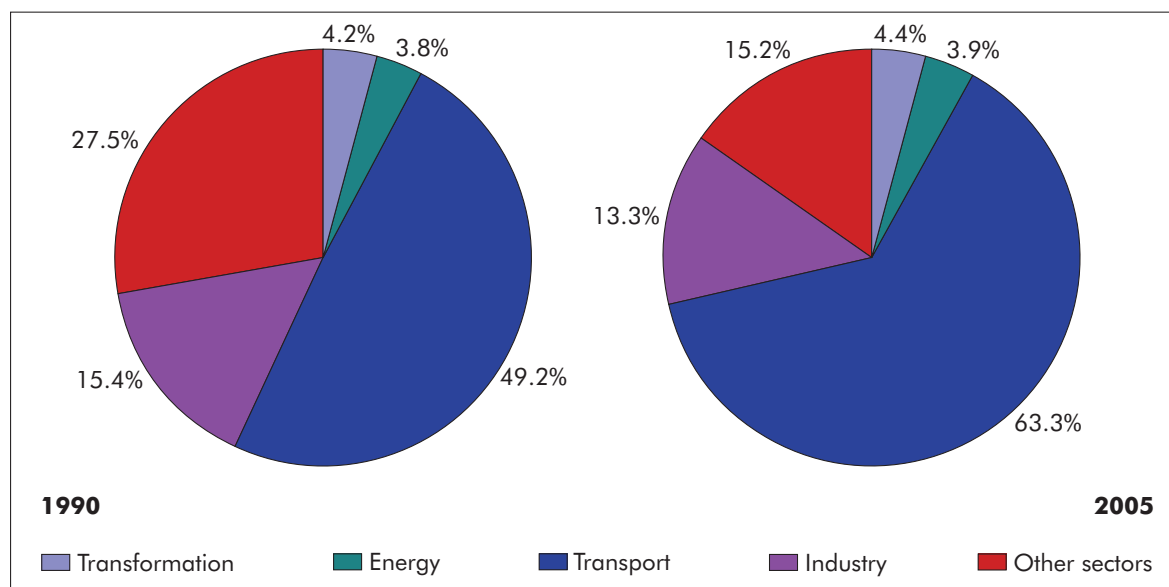
Total Primary Energy Supply



23% of the energy mix in 2005, led to the erosion of oil's share in Danish TPES. A tremendous increase in the proportion of renewable sources has also played a significant role in the last 30 years.

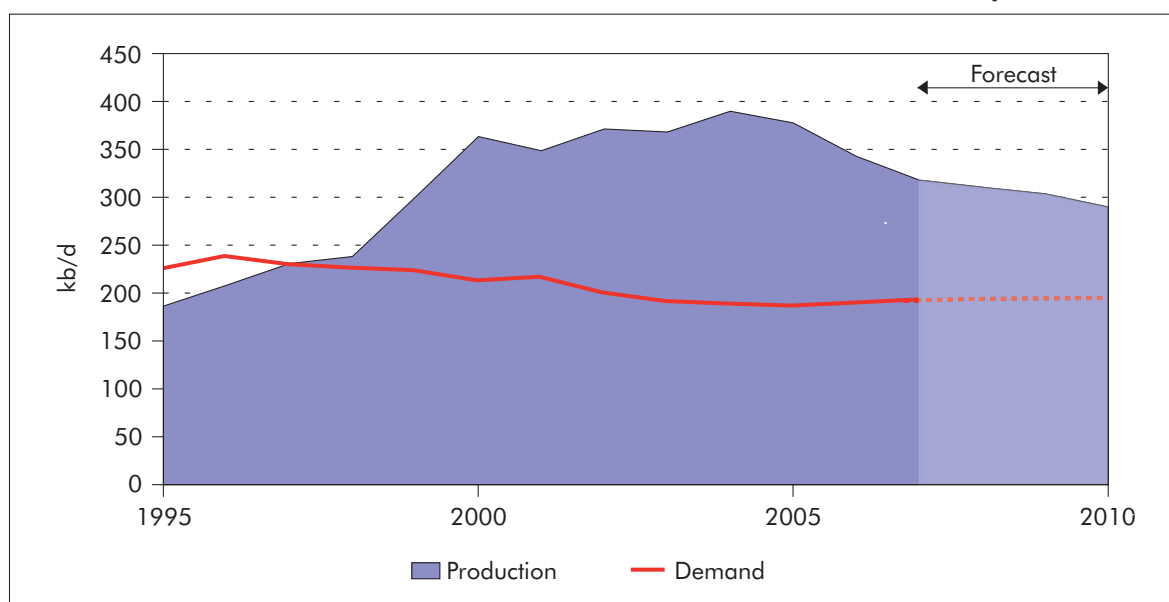
However, the transport sector shows a marked contrast: energy needs in this sector are almost entirely met by oil. In fact, the share of oil consumption in transport rose from almost 50% in 1990 to 63% in 2005, increasing on average by 1.8% per year. This steady demand growth was virtually unaffected by price fluctuations and evolving energy policy, particularly in the areas of energy conservation and efficiency measures.

Oil Consumption by Sector



Market Features and Key Issues

Oil Production in North Sea and Domestic Demand in Denmark, 1995-2010



The Danish oil market is relatively small. Indigenous production is expected to continue meeting domestic demand for several decades. Thus, oil security is less of a concern to Denmark than to net oil-importing countries within the IEA. Denmark currently exports its excess production to other countries, mainly in Europe. As of January 2007, proven estimated reserves stand at 1 158 mb.

A key concern in Denmark is that, unless new oil resources are found, its North Sea oil production is likely to mature within the next few years. This is especially disquieting because domestic consumption will outpace the projected indigenous production by the mid-2020s. New production technology and research in the upstream sector may yield additional oil resources.

Oil Supply Infrastructure

Refineries

Denmark has two refineries, one in Kalundborg and the other in Fredericia. The Kalundborg refinery, owned by Statoil, primarily runs Norwegian crude but is flexible to run condensates and other crudes (e.g. Danish crude). All crude oil, including condensates, is supplied by ship. The Fredericia refinery, owned by Shell, processes mostly Danish North Sea crude oil, which is supplied by pipeline.

The total capacity of the refineries (176 kb/d) corresponds approximately to all consumption in Denmark. However, as the refineries are not equipped with catalytic crackers, Denmark produces a surplus of heavy products and has a deficit of light products, especially diesel oil. As a result, the country usually exports heavy products and imports light products to keep oil products balanced in the market. Refining capacity is expected to reach 180 kb/d in 2010.

Ports and Pipelines

Denmark has a main pipeline system in Jutland, which extends from Hamburg to North Jutland; it is owned and operated by the Danish military forces. In addition, the FDO owns and operates a number of pipelines in Jutland and Zealand, including one from the Kalundborg refinery to the Hedehusene terminal. This pipeline supplies a large volume of oil products to the Copenhagen area.

Storage

Denmark has a number of coastal and inland storage facilities that also serve as terminals for the distribution system, mainly by truck. The major storage sites are located at the two refineries in Denmark located at Fredericia (Shell) and Kalundborg (Statoil), and at a major terminal at Hedehusene in Zealand.

Both the Fredericia refinery and the Hedehusene terminal have a throughput of roughly 17 kb/d (1.0 mcm/yr). Four additional terminals (Aalborg, Aarhus, Copenhagen and Fredericia) have a collective throughput of between 8.5 kb/d (0.5 mcm/yr) and 17 kb/d (1.0 mcm/yr).

The total storage capacity in Denmark is estimated to be 31.5 mb (5 mcm). The facilities play an important role in the domestic distribution of oil products from domestic refineries and import terminals.

Decision-making Structure

The Danish Minister for Transport and Energy is responsible for energy matters, including security of oil supply and relations with the IEA and the European Union. Within this ministry, the Danish Energy Authority (DEA) handles all matters regarding energy, including the preparation of an implementation plan, which is submitted to the minister. Under the DEA, the Danish National Emergency Sharing Organisation (NESO) is organised by relevant units (e.g. emergency data). NESO is the core body to co-ordinate issues among all stakeholders, such as the Danish member of the IEA Governing Board, the press officer of the DEA and various ad hoc groups that could be established in case of an oil crisis. In a crisis, NESO would be expanded with other DEA staff in order to implement emergency measures in co-operation with other energy sector operations.

In a supply shortage, NESO would convene meetings of the Danish Oil Advisory Board in order to create an opportunity for relevant authorities – including the oil industry – to assess the crisis, evaluate response options and define implementation measures. The board has representatives from the following agencies and organisations:

- The DEA and other authorities including mandatory participation of the Ministry of Foreign Affairs and the Danish Competition Authority.
- All major oil companies, both downstream and upstream.
- The Danish company Energinet.dk, which is the transmission system operator (TSO) for electricity and natural gas, as well as the owner and operator of the major transmission networks for electricity and natural gas.
- The Association of Danish Power Companies.
- The Association of Danish Oil Companies.
- The Danish Oil Reserve Stock Association (FDO).

Stocks

Stockholding Structure

Due to its status as net exporter, Denmark currently has no stockholding obligation to the IEA. However, it continues to have an obligation to the European Union. In keeping with the EU regulation that reduces obligations for net exporters, Danish authorities require industry to hold stocks corresponding to 81 days of oil consumption. The private sector covers the entire stockholding obligation through a non-governmental stockholding association established (by the private sector) in 1964. The FDO

is financed by oil companies and operates the stockholding on their behalf; it currently holds about 70% of the Danish compulsory stocks, mostly as finished products. Individual companies hold the remaining 30% in their commercial tanks.

The compulsory stockholding regulations stipulate that any company that produces or imports more than 1 Kt/yr must hold compulsory stocks corresponding to 22.2% of their annual domestic sales. The obligation is divided into two types of oil stocks:

- *Emergency Stocks*, which are held by the FDO and are stored in underground, reinforced concrete tanks.
- *Minimum Stocks*, which are held in conventional oil tanks. The FDO also holds a large part of these stocks; the remainder are held by the private sector.

Crude or Products

Legislation allows for compulsory product stocks to be held as crude oil up to a maximum of 40% each for the obligations on gasoline and distillates, and up to 50% for fuel oil.

Most of the FDO stocks are oil products, with approximately 20% currently in the form of crude oil. This was introduced in order to increase response flexibility and as a partial solution to quality problems arising from FDO stocks not being co-mingled with operational stocks (see below).

Location and Availability

Danish regulations stipulate that compulsory stocks must be stored in Denmark or in another EU member state, in accordance with a bilateral agreement. No other type of stocks can be taken into account for fulfilment of the stock obligation.

At present, Denmark has bilateral stockholding agreements with Estonia, Finland, Ireland, the Netherlands, Sweden and the UK. Denmark relies on the authorities in the other state to guarantee the availability of the stocks in case of a supply crisis.

Denmark does not allow stocks to be held abroad except through a ticket system. It also stipulates that companies cannot fulfil more than 10% of their obligation through stocks held abroad. In 2007, total stocks held abroad amounted to some 2.1 mb, representing around 8% of Denmark's total oil stocks.

Monitoring and Non-compliance

The DEA is responsible for monitoring compulsory stocks. All companies, including the FDO, report monthly data on their stocks to the DEA, which calculates the yearly stockholding obligation for each company according to the compiled figures. Under the legal requirement, companies are obliged to verify their data submissions annually with their chartered accountant. The data are then cross-checked with the data reported by other companies.

If the stockholding companies do not hold the required stocks, the DEA may report the company to the police. The police will investigate the matter and may initiate proceedings against the company. According to the legislation, it is a matter for the law courts to fine a company that is non-compliant.

Stock and Drawdown Timeframe

The government of Denmark has statutory powers to drawdown stocks, including those held by FDO, in order to participate in an IEA co-ordinated response.

When the need arises for a compulsory stockdraw, the DEA prepares an implementation plan and submits this plan to the Minister for Transport and Energy. The DEA also co-ordinates its actions with the FDO and with countries in which significant quantities of stocks are held under bilateral agreements. Ministerial decisions on the required stockdraw are expected to be taken within 24 hours. They are then communicated to the DEA, which ensures implementation.

The actual drawdown of FDO stocks is initiated through an instruction from the DEA to release certain quantities of stocks (expressed in volume terms per product category). In the case of company-held compulsory stocks, the procedure is to lower temporarily the percentage of held stock (in terms of sales/consumption during the previous calendar year). This instruction can be given within one day of the government's decision. In general, the stocks in company tanks are then ready for use.

Financing and Fees

All Danish stocks are held and financed by private parties: there is no financial support from the government for the industry's stockholding obligations. The costs of holding compulsory stocks are deemed to be included in consumer prices and borne directly by consumers.

The FDO was previously financed by a levy on all domestic sales of gasoline, distillates and fuel oil. The FDO abandoned this practice in 1992. Due to a reduction in the country's stockholding obligation and the amortisation of storage facilities, the FDO found itself with a considerable financial surplus. It has since used this surplus to finance its operations.

Other Measures

Demand Restraint

In an oil disruption, Denmark would consider demand restraint to be a complementary measure to the use of compulsory stocks. Demand restraint initiatives would include public campaigns for saving oil in transport (particularly road transport) and in domestic heating.

Denmark might also implement compulsory measures such as rationing or even direct bans. These are legally authorised by government provisions.

Fuel Switching

Danish potential for fuel switching – from oil to coal or natural gas – in power and/or heating plants is very limited: most central power plants currently use either coal or natural gas and are not oil-fired except at peak capacity. This limited potential for fuel switching is, in general, due to many years of energy policy designed to reduce domestic oil consumption. However, the country has prepared the legal basis for fuel switching, and can ask industry to save oil in case of a supply emergency.

Surge Production

Danish oil production in the North Sea currently operates at full capacity. Thus, there is little potential for surge production. In an emergency situation, it may be possible to stimulate a minor surge production, depending on the duration of the crisis.

Oil Infrastructure of Finland



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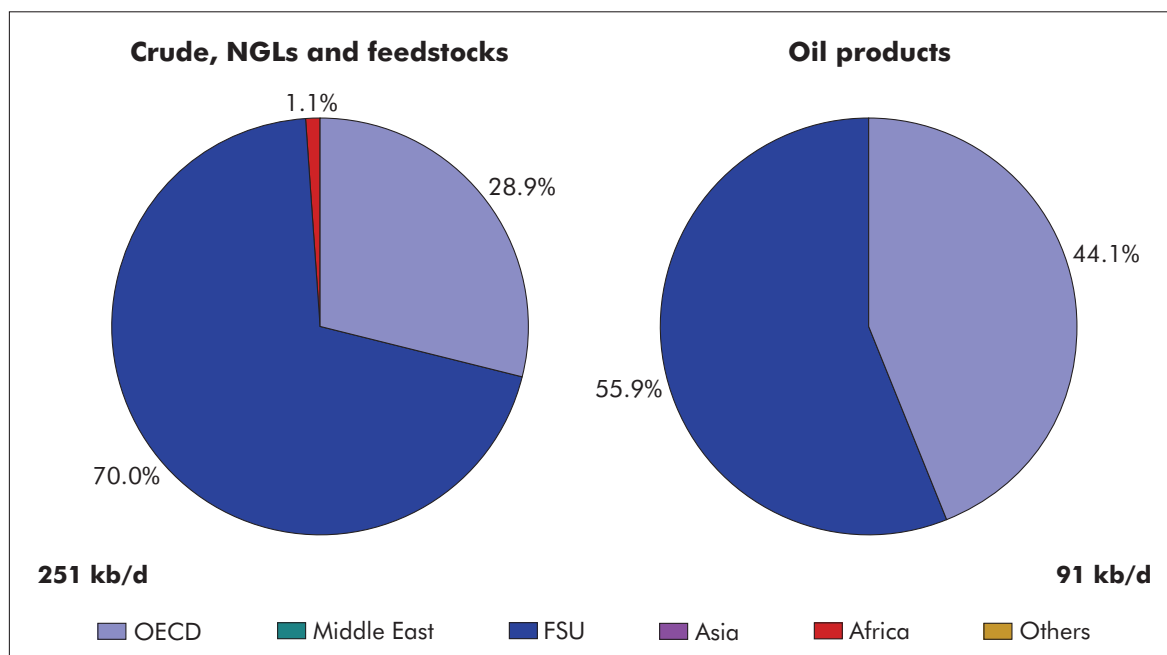
FINLAND

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	-	-	-	-	-
Demand (kb/d)	225.5	203.1	200.4	215.8	221.0	236.1
<i>Motor gasoline</i>	46.0	43.9	41.2	43.4	42.9	
<i>Gas/diesel oil</i>	85.8	80.8	79.9	84.4	82.8	
<i>Residual fuel oil</i>	41.9	33.8	31.1	34.6	36.6	
<i>Others</i>	51.9	44.7	48.1	53.5	58.7	
Net imports (kb/d)	225.5	203.1	200.4	215.8	221.0	236.1
Import dependency (%)	100	100	100	100	100	100
Stocks in days of net imports	155.0	175.0	127.0	117.0	122.0	
Refining capacity kb/d		200.0	200.0	251.8	251.8	257.1

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

Finland has no domestic oil resources. Thus, it imports all of its crude oil via the international market from countries such as Norway, Russia and various EU countries. Finland has taken steps to diversify its energy sources as a means of reducing supply risks.

The Finnish economy performed well in the late 1990s, averaging real GDP growth of 5.3% from 1998 to 2000. However, the economic pace has since slowed. Consequently, the pace of growth of oil consumption is also declining.

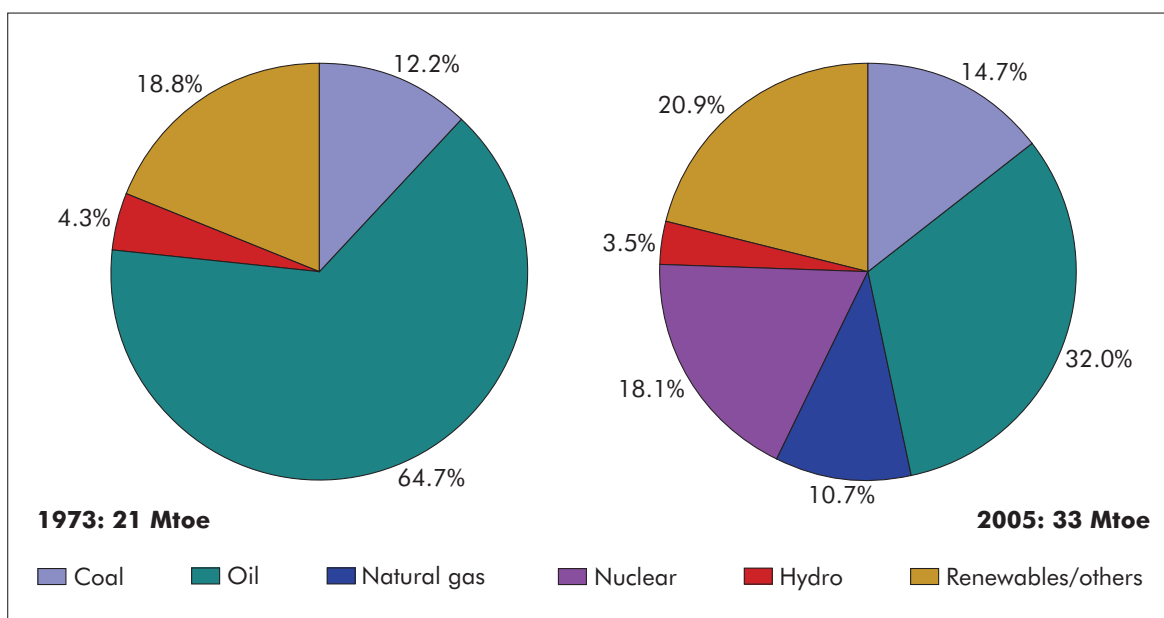
Energy security is of high importance in Finland, particularly because of its policy of military non-alliance, its critical dependence on sea transportation, and its harsh winter climate conditions.

Finland meets its IEA obligation by holding public stocks in an agency (the National Emergency Supply Agency – NESAs) and by placing an obligation on industry. In times of an emergency, Finland has a general policy to first release compulsory stocks held by industry. Public stocks are generally not released until commercial industry stocks and the obligatory stocks have been used.

Energy Outlook

Total primary energy supply (TPES) in Finland totalled 33 Mtoe in 2005, reflecting an average annual growth rate of 1.5% since 1973. In 2005, oil represented 32% of TPES, significantly lower than its 1973 share of 65%. This decrease is the result of a decline in oil use by industry and the replacement of oil by nuclear power as an electricity-generating fuel.

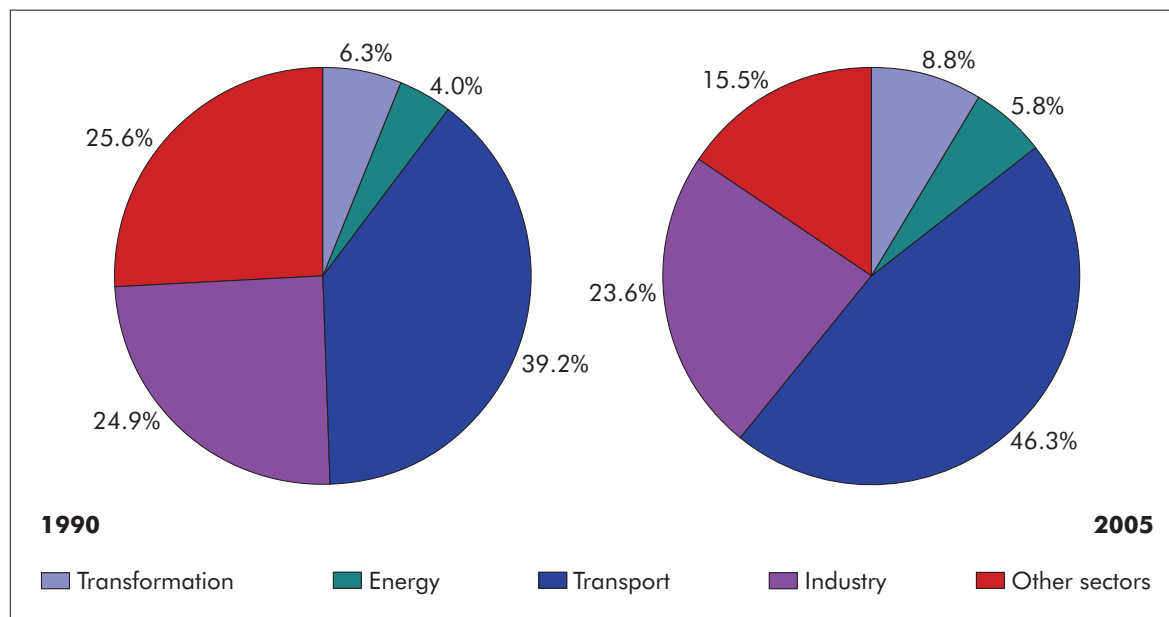
Total Primary Energy Supply



Finland's primary fuel supply is diverse. Oil remains the largest contributor, but four other fuel sources contribute at least 10% each: renewables (21%), nuclear (18%), coal (15%) and natural gas (11%).

In 2005, the transport sector accounted for 46% of total oil consumption; industry consumed 24% and the transformation sector consumed 9%. The share of oil in the transport sector has increased in the last 16 years. In real terms, total oil consumption declined by almost 5% from 1990 to 2005.

Oil Consumption by Sector



Market Features and Key Issues

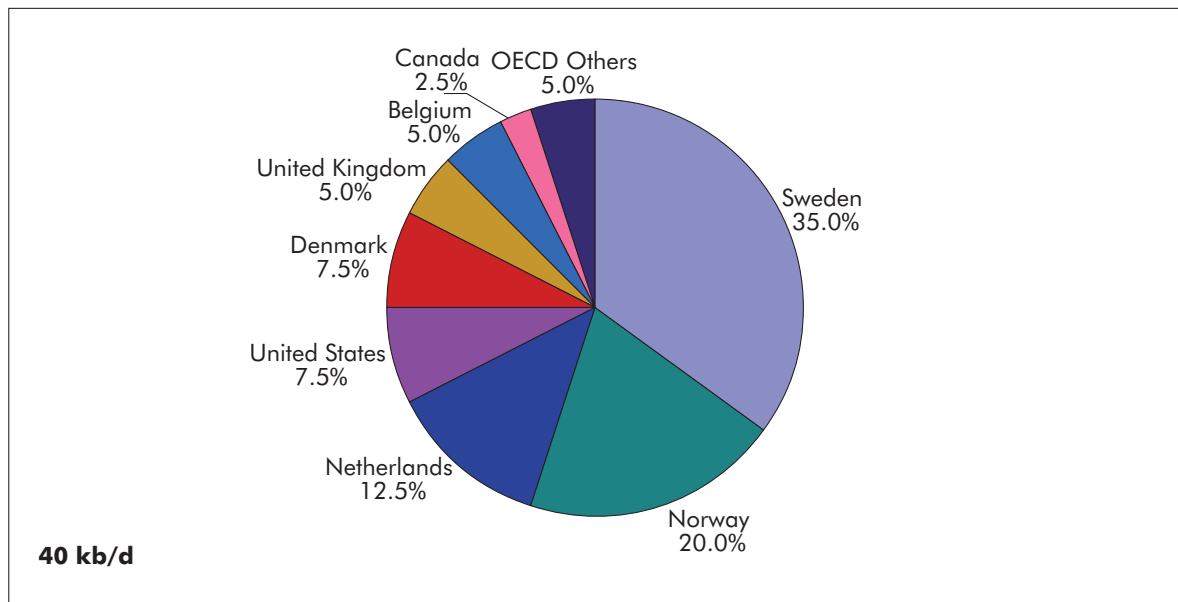
The majority of Finland's TPES is imported. In fact, the country's oil import dependency has been 100% for an extended period. The cold climate and the significance of Finland's energy-intensive industry make the reliable supply of energy particularly important.

Since 1991, companies have been free to import oil to Finland. However, to date, the relatively limited range of importing sources for crude and products remains a critical issue for oil supply security.

In 2006, countries in the region of the former Soviet Union (FSU) provided 70% of Finland's crude oil (including NGLs and feedstocks) imports. Gasoil represented more than 55% of Finland's total oil imports; most of this was also imported from the FSU.

Finland also depends highly on its neighbouring countries (such as Sweden and Norway); in 2006, these neighbouring countries provided almost one-quarter of all oil products imports. Around 44% of all Finnish oil product imports came from OECD countries; of these, more than 50% were from Sweden and Norway.

Oil Product Imports by OECD Country, 2006



Oil Supply Infrastructure

Refineries

Finland has two oil refineries, Porvoo and Naantali, that provide a total refining capacity of about 252 kb/d. Both refineries are owned by Neste Oil Oyj and both have tanker ports for imports in their refinery terminals.

Ports and Pipelines

There is no oil pipeline connection to Finland. Most crude oil imports from Russia are carried by tankers. Oil products, such as gasoil and heavy fuel oil, are imported by rail from Russia and EU countries. During winter, tankers travelling to both refinery terminals are assisted by ice breakers, if necessary.

Storage

Finland has approximately 25 coastal and inland storage facilities. Major seaside terminals are located in Hamina, Inkoo, Tahkoluoto, Kokkola and Kemi, as well as at the refineries in Porvoo and Naantali.

Finland's total storage capacity is roughly 63 mb (10 mcm). All terminals play an important role in the distribution of oil products within the country.

Decision-making Structure

Within Finland's Ministry of Trade and Industry, the Department of Energy is responsible for energy issues related to the security of supply in both normal times and in crisis situations. The Department forms the core of the Finnish National Emergency Sharing Organisation (NESO).

NESO also includes personnel from the National Emergency Supply Agency (NESA: the public stockholding agency), the National Board of Economic Defence, and the Finnish industry. Its powers are based on the *Security of Supply Act* (enacted in 1992) on adoption of certain provisions and the application of the IEA Agreement in the International Energy Program.

Stocks

Stockholding Structure

Finland's stocks are held both in a public agency and by industry. NESA, the public stockholding agency, started operations in 1993 and is responsible for state-owned oil stocks. According to the emergency reserve target set by the Finnish government, NESA must hold a total of five months' consumption volume of stockholding, including compulsory industry stocks. This enables the country to meet both IEA and EU oil stock requirements.

In terms of industry stocks, a stockpiling obligation is imposed on oil importers. In addition, several industries are required to hold two months' equivalent volume of their stock sales. This includes any company with annual imports of more than 39.5 kb (5 Kt) of aviation gasoline and jet fuel, more than 84.5 kb (10 Kt) of motor gasoline, or more than 147.5 kb (20 Kt) of crude oil.

Crude or Products

Finnish importers of crude oil have an obligation to hold stocks of crude. However, they can apply for a permit from NESA to substitute up to 50% of this crude oil stocks obligation with oil products. Likewise, importers of oil products have an obligation to hold stocks of the same products, but can apply for permission to substitute their obligation for a particular product by other finished products. Substitution of oil products by crude oil is not allowed.

As of December 2006, Finland's emergency reserves contained 9 mb of crude oil and 17.6 mb of oil products (12% gasoline; 60% middle distillates; 17% residual fuels; and 11% others). The latter satisfies the country's EU stockholding requirement of holding three types of products category.

Location and Availability

Both compulsory stocks and NESA-owned stocks are located on the coastline of Finland, with transportation possible by sea, road or railway.

Public stocks owned by NESAs are not allowed to be held outside Finland. By contrast, up to 30% of industry-owned compulsory stocks can be held outside the country, but only within the Baltic Sea area. It is also necessary to have an official bilateral agreement between the countries involved. Currently, Finland has two bilateral agreements, with Sweden and with Estonia. However, no oil stocks were held abroad under the bilateral agreements in 2006.

Finland does permit stocks ticket arrangements. However, at the end of 2006, no stocks were being held abroad under this arrangement, either by NESAs or by private companies. No foreign companies were holding stock tickets in Finland at that time.

Monitoring and Non-compliance

NESA is responsible for ensuring the implementation of oil stockpiling obligations. The Agency is empowered to establish, on an annual basis, the quantities of oil to be stockpiled and to supervise the compulsory stocks and their use. Stockholders who fail to meet the obligations can be sentenced to imprisonment for infringement or subject to fines.

Stock and Drawdown Timeframe

Based on permission granted by the Ministry of Trade and Industry, NESAs may authorise industry holders of compulsory stocks to undercut the prescribed minimum threshold. Companies themselves make decisions on the practical release of such compulsory stocks. As most companies store both compulsory and operational stocks in the same facilities, drawing them down is not problematic.

Drawdown of the state-owned stockpiles would be decided by the government, based on additional stock drawdown needs after the industry stock release. According to Finnish legislation, compulsory industry stocks are released first and state stockpiles are generally released only after commercial and compulsory stockpiles have been used.

The Finnish government can also decide to drawdown state stockpiles to meet an IEA allocation obligation. NESAs would carry this out, using normal commercial offers to oil companies and to major consumers. The price level would follow the world market prices.

Financing and Fees

In order to ensure sufficient budget resources for NESAs, a special tax or levy on energy products is directly allocated to the agency to cover the costs of management and operations.

The costs of stockpiling obligations are borne by the stockholders and, thus, implicitly passed onto consumers in market prices. Compulsory stockpiling costs vary from product to product. The total annual storage costs vary from EUR 10/t to EUR 30/t.

Other Measures

Demand Restraint

The Finnish administration holds the legal obligation to maintain preparedness to implement both light- and heavy-handed demand restraint measures. One example of a demand restraint measure could be, for instance, the lowering of room temperature in space heating. In a severe crisis, the administration could ration traffic fuels or take other more restrictive measures.

Fuel Switching

Finland's fuel-switching capacity is estimated to be approximately 3% of total oil consumption changeable from oil to other fuels used in the industry sector.

Finland is entirely dependent on Russian natural gas imports, which makes it possible for major natural gas users to switch to oil as a back-up fuel. In the event of a gas supply disruption, the majority of natural gas consumption in combined heat and power production can be replaced by coal and/or fuel oil in local heat production.

Oil Infrastructure of France



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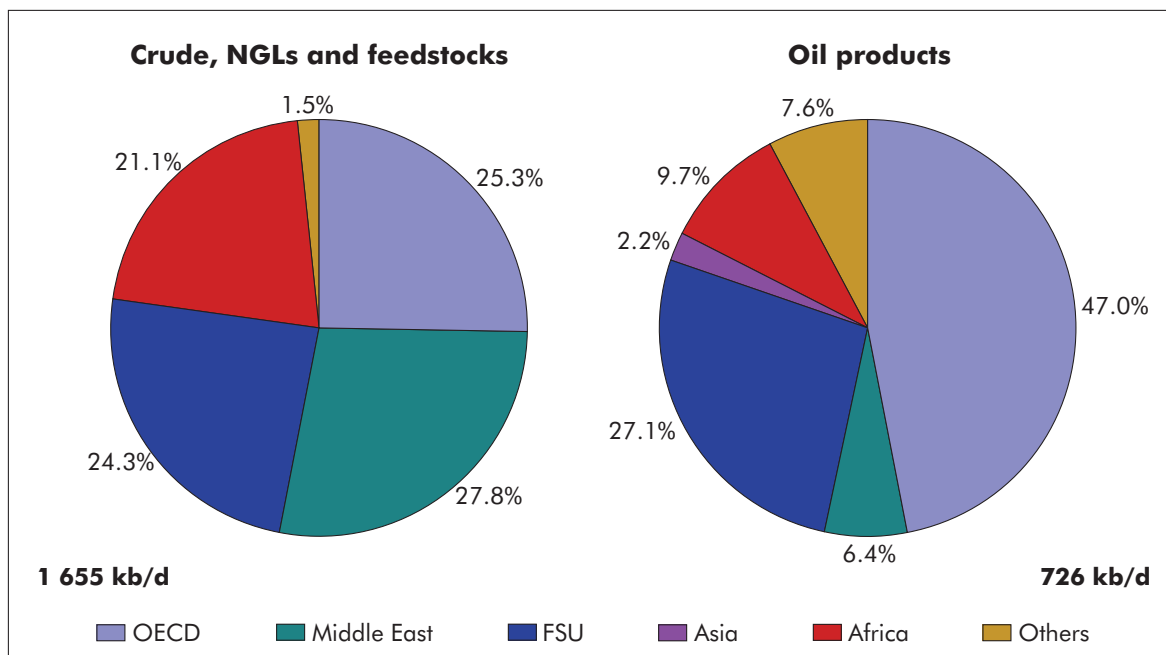
FRANCE

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	71.4	61.5	35.9	24.7	22.7	13.9
Demand (kb/d)	1 826.0	1 919.2	2 000.3	1 989.9	1 962.1	1 972.4
Motor gasoline	393.2	362.1	320.8	250.6	235.7	
Gas/diesel oil	737.0	845.3	922.8	1 001.3	991.8	
Residual fuel oil	174.1	151.8	136.5	118.3	119.9	
Others	521.7	559.9	620.2	619.7	614.7	
Net imports (kb/d)	1 754.7	1 857.7	1 964.4	1 965.3	1 939.4	1 958.5
Import dependency (%)	96.1	96.8	98.2	98.8	98.8	99.3
Stocks in days of net imports	82.0	98.0	95.0	104.0	107.0	
Refining capacity kb/d		1 768.4	1 901.9	1 951.3	1 958.8	1 997.5

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

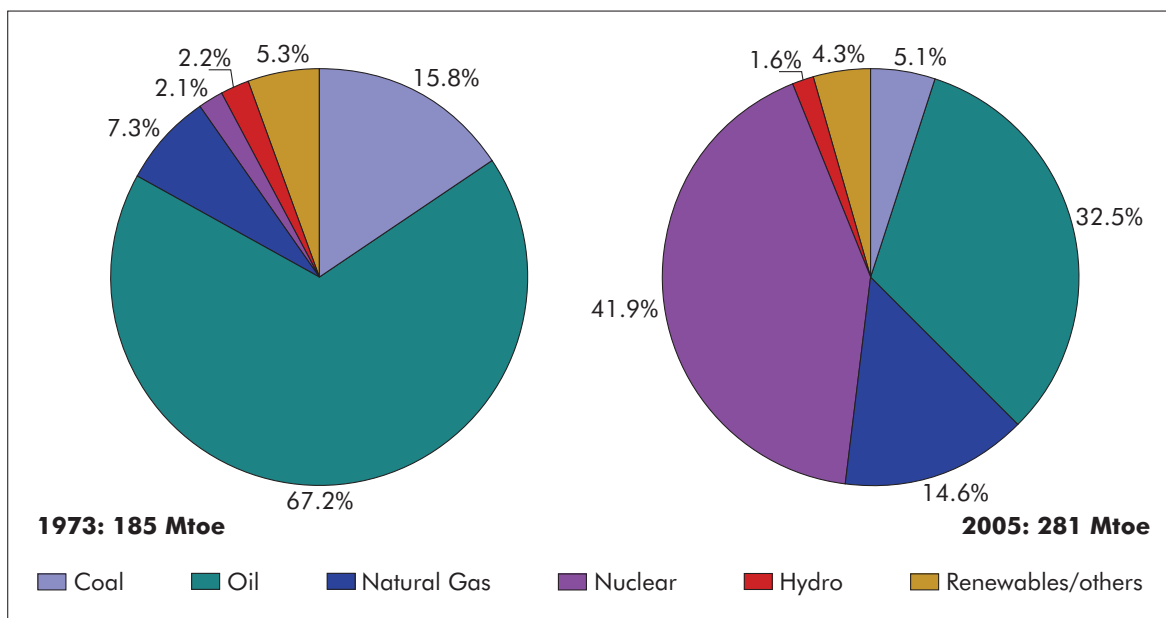
Oil represents slightly less than one-third of the total primary energy supply (TPES) in France. This relatively low figure is the result of the country's efforts, beginning in the early 1980s, to reduce energy import dependence and produce domestically half of its overall energy needs. Total oil demand, which is met almost entirely through imports, has remained relatively flat over the past decade. Although overall oil demand is not expected to increase significantly in the coming decade, diesel consumption will continue to make up a growing share of total oil demand.

France considers the use of emergency reserves as its primary response measure in a supply shortfall. The country fulfils its minimum stockholding requirements to both the IEA and the European Union by placing stockholding obligations on industry. Approximately 70% of this industry obligation is delegated to the central stockholding agency, *Comité Professionnel des Stocks Stratégiques Pétroliers / Société Anonyme de Gestion des Stocks de Sécurité* (CPSSP/SAGESS). The remainder of the stock obligation is held directly by industry. In an emergency, oil operators can be authorised to draw on stocks below the minimum levels normally required. Alternatively, the French authorities may choose to release specific products from agency stocks.

Energy Outlook

France produces almost half of its energy needs domestically; imports provided 51% of total TPES in 2005.

Total Primary Energy Supply



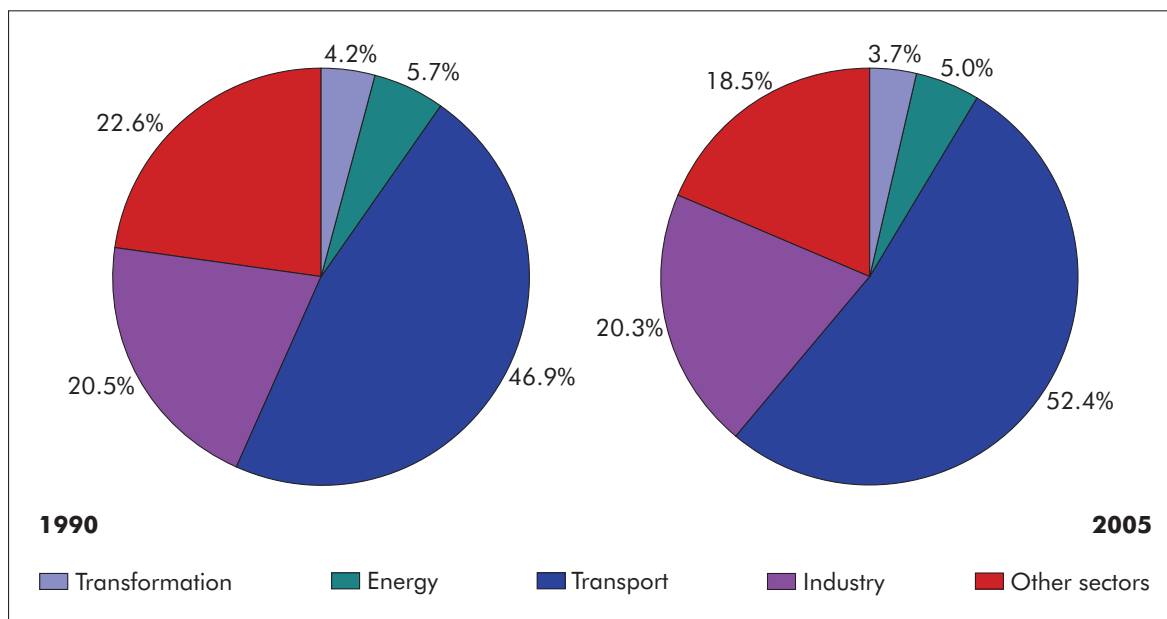
Oil accounted for 32.5% of France's TPES in 2005, a figure that has remained relatively stable since the early 1990s, but represents a major drop from the 1970s when oil provided more than two-thirds of the country's energy supply. Total oil demand in France, averaging almost 2 mb/d, has been relatively flat in recent years and is not expected to increase significantly in the next decade.

The development of nuclear power has largely been responsible for oil's declining share in the energy supply mix. However, natural gas has also taken a growing share, rising by an average of 3.5% per year between 1995 and 2005. By contrast, average annual growth for TPES from all energy sources combined was only 0.9%.

Market Features and Key Issues

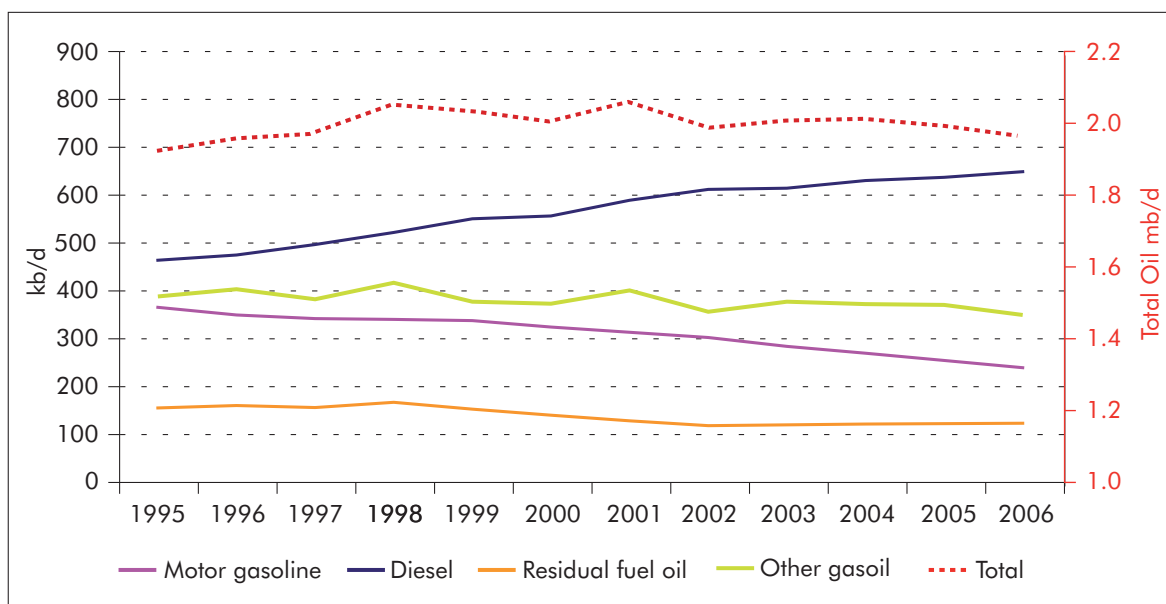
France does not have significant natural reserves of crude oil, and therefore relies on imports for some 99% of its oil needs. Crude oil imports are supplied principally by Norway and OPEC member countries; approximately half of total product imports come from other OECD member countries. Gas/diesel oil represented more than half of all product imports in 2006, coming mainly from European OECD member countries and from Russia. France exports significant volumes of refined products, almost one-third in the form of motor gasoline.

Oil Consumption by Sector



Middle distillates represent the dominant share of oil demand in France. This reflects the composition of the French transportation sector, which accounts for more than half of total oil consumption, being predominately of diesel vehicles. Rising fuel prices have led to a steady increase in the proportion of diesel cars in the French vehicle fleet; diesel cars currently represent around 70% of new vehicle sales.

Oil Demand by Product, 1995-2006



From 2000 to 2006, demand for diesel grew by an average annual rate of 2.6%, while motor gasoline demand declined by 5% per year. This trend is expected to continue at least until 2010, albeit with a reduced average growth rate of diesel demand (1.8%).

The high proportion of diesel oil in total demand has created a mismatch in the French market: domestic refineries are not able to produce the volumes demanded by French consumers. This imbalance is illustrated in France's general trade flows in refined products: excess gasoline production is exported (principally to the US market) and imports are required to make up the shortfall for diesel demand.

Oil Supply Infrastructure

Refineries

There are 13 refineries in France with a total crude oil refining capacity of 1 959 kb/d (97 Mt/yr). To date, oil demand growth has not required an increase in domestic crude distillation capacity. However, expansion in conversion units will be necessary to correct the imbalance in middle distillates and gasoline capacities. Hydro-cracking capacities will also need to be expanded in order to increase output of middle distillates. Investments in deep conversion units would allow for running heavier crude slates.

The domestic refinery sector is expected to invest some EUR 3.5 billion in the period from 2006 to 2010. This is largely in response to the need for expansion in desulphurisation units, a consequence of significant reductions in the maximum allowable sulphur content of motor fuels in the European Union. In 2010, refining capacity is expected to reach 1 997 kb/d.

Ports and Pipelines

Crude oil is imported into four main sea ports (Dunkerque, Le Havre, St. Nazaire and Fos-sur-Mer), around which all but three of the nation's refineries are concentrated. Refined product imports are received at about a dozen other ports along the maritime coasts. Fos-sur-Mer, in the south near Marseille, is the most significant port and receives almost half of all French crude imports. In the north, the port of Le Havre receives the second most significant volumes, representing roughly one-third of total crude imports.

Most refineries are able to receive crude supplies from nearby ports. Thus, the French pipeline system is used primarily to move refined products to main consumer regions and distribution centres. All pipeline networks, with the exception of one, are privately owned but must guarantee third-party access. The Trapil company is responsible for operating a major part of the product pipeline networks, including the network of lines from Le Havre to Paris (LHP), the Mediterranean-Rhone pipeline (PMR), and the main south-to-north lines of the *Oléoducs de Défense Commune* (ODC, formerly part of the NATO network). The Donges-Melun-Metz (DMM) is the exception to the privately owned networks; it operates based on a government concession.

Almost all inland transportation of crude oil in France is by pipeline. Crude oil unloaded at Le Havre is transferred by pipeline to the refinery at Grandpuits (southeast of Paris). The South European Pipeline (SPSE) can supply up to 700 kb/d (35 Mt/yr) of crude from the port of Marseille to north-east France, Germany and Switzerland, even though only about two-thirds of the pipeline's total capacity is utilised currently. Roughly half of the crude oil in the SPSE network is to supply German and Swiss refiners.

Storage

Stockholding facilities in France are located primarily at the refineries and close to the main oil ports. All storage capacity is held by industry, which has sought to rationalise spare storage capacity in recent years. As a result, several small, non-financially viable storage sites were closed and overall capacity has declined since 1999. The number of depots eligible for strategic stockholding of refined products also fell during this period, from 285 to 235. Total storage capacity of these 235 product depots is approximately 75.5 mb (12 mcm). With the trend towards more efficient stockholding, capacity has concentrated into larger depots: some 20% of these storage sites hold 80% of the total capacity.

Additional storage is located at the Manosque site in the south-east of France, which provides underground storage capacity of up to 37.7 mb (6 mcm) in salt caverns for crude and finished products. This storage site was developed for strategic reserves following a 2003 study on stockholding strategy by the central stockholding agency (CPSSP/SAGESS). The potential technical capacity of the salt domes at Manosque is close to 63 mb (10 mcm), thus providing the possibility for future expansion. This storage is connected by pipeline to the Fos-sur-Mer oil processing hub. Following expansions undertaken in 2007, this pipeline will have a capacity of some 300 kb/d.

Decision-making Structure

In France, the Ministry of Ecology, Sustainable Development, and Town and Country Planning is responsible for energy-related issues. Within this ministry, the General Directorate for Industry and

Raw Materials (DGEMP) has the task of formulating and executing government policy in the sector of energy and raw materials. Within DGEMP, the Directorate for Energy and Mineral Resources (DIREM) is responsible for security of hydrocarbon supply, monitoring of strategic stocks and management of supply crises.

The main role of the DIREM team is to define and implement government policy regarding oil emergencies. It is responsible for maintaining the industry's emergency response plans and is the permanent core of the French National Emergency Sharing Organisation (NESO), acting as the focal point for other ministerial departments and industry participants. During a crisis, NESO can be expanded by participants who have been appointed, on a voluntary basis, from a network of some 100 professionals from the oil industry and the distribution sectors.

Release of stocks in the early stages of a supply disruption would likely be the primary emergency response measure of France. However, the specific conditions of a disruption would ultimately determine the emergency response measure employed, which could include demand restraint measures as well as the relaxing of product specifications to increase available supplies.

Stocks

Stockholding Structure

France fulfils its minimum stockholding requirements to both the IEA and the European Union by placing stockholding obligations on industry. All industry operators are required to hold a volume equivalent to 27% of the stock released for domestic consumption in the previous calendar year. In this way, France ensures a minimum coverage of 98.5 days of consumption.

In meeting the 27% stockholding requirement, industry operators are obliged to hold a portion of the oil through a central stockholding agency, CPSSP/SAGESS. They may choose to delegate either 56% or 90% of their stockholding commitment to the agency. Thus, companies are obliged to be directly responsible for either 44% or 10% of their strategic reserve obligation. Typically, industry participants such as major supermarket chains (which have an obligation due to the sales of vehicle fuels) choose to delegate the maximum amount possible to the agency and to meet their remaining obligation through tickets. Operators, such as refiners, typically opt to hold 44% of their obligation with the agency, and are able to co-mingle this amount with their operational stocks.

The CPSSP oversees the stockholding strategy. It is managed by a board of directors composed of six refiners, four other oil industry operators, and representatives from four government agencies. The government representation on the board includes DIREM and three other agencies, all of which have the right of veto. Each year the agency calculates the obligation of individual operators, incorporating the previous year's consumption as well as the fees necessary for building and maintaining the designated stock levels. The new obligation level becomes effective as of the 1 July of the same year.

SAGESS is a privately-owned and managed entity with the function of holding and maintaining emergency reserves under the direction of the CPSSP. Market participants (Total, Shell and BP) created SAGESS in order to find efficiencies in meeting the stockholding obligation. SAGESS provides the technical role of managing the publicly held reserves in France, such as overseeing the depots

eligible for strategic stockholding, managing product stock turnover and organising the rental of additional storage capacity from domestic industry participants.

Crude or Products

The stockholding requirement on industry covers four product categories: motor gasoline, gas/diesel oil, kerosene jet fuel and fuel oil. Companies are able to substitute the product obligation with crude oil, according to EU legislation.

The product mix of emergency reserves reflects domestic demand patterns and, thus, consists mainly of gas/diesel oil.

The share of oil held by CPSSP/SAGESS depends on the option chosen by the industry operators. However, there is a trend towards greater amounts being delegated to the agency as the major supermarket chains gain a growing market share of motor fuel sales. At end 2006, the agency held roughly 70% of the total minimum obligation imposed on industry. This equated to just over 100 mb, composed of one-quarter crude oil and three-quarters refined product (of which almost 80% was held in the form of gas/diesel oil).

All of the almost 25 mb of crude oil delegated to CPSSP/SAGESS at end-2006 was of light, low-sulphur quality. Roughly three-fourths of the volume was of Libyan and Saharan Blend quality crude, located in the Manosque salt caverns; the remainder, primarily Brent Blend, was held with refiners in the north of France.

Location and Availability

All storage capacity in France is owned by industry, and is located primarily at the refineries and close to the main oil ports. Stocks held to meet the emergency reserve obligation must be stored in depots approved by SAGESS. However, there is no obligation to have these separated from commercial stocks.

In order to maintain a wide geographical cover of emergency reserves, CPSSP/SAGESS holds gasoline and middle distillates reserves in each of the seven defence zones that comprise the French territory. Reserves in each zone contain enough stock to cover no less than 10 days of gasoline consumption and 15 days of middle distillates consumption.

A maximum of 10% of company stocks can be held in other EU countries, provided that such stocks are subject to bilateral agreements. At present, France has agreements with Belgium, Germany, Ireland, Luxembourg and Spain. An informal agreement exists with the United Kingdom.

Approximately 20% of the total stockholding delegated to CPSSP/SAGESS is covered through ticketing. CPSSP arranges with refiners the terms and conditions of ticketed oil to be held on behalf of the agency. Industry participants are also able to use ticketing to cover the portion of their obligation not delegated to the agency. About one-third of this amount is covered by tickets. Overall, stock held through ticketing accounts for approximately one-quarter of the total obligation. All but a fraction of this ticketed stock is held domestically.

Monitoring and Non-compliance

DIREM is responsible for monitoring, on a monthly basis, the statistical reporting of operators subject to strategic stock requirements. DIREM works with French customs officials to perform direct inspections and impose fines for irregularities. It also closely monitors ticketing in order to verify proper accounting of these stockholding arrangements.

Stock and Drawdown Timeframe

France has considerable leeway in how it may implement an emergency stockdraw. In a supply disruption, the French administration may allow oil operators to draw on stocks below the minimum levels they are normally required to cover directly. This gives the operators greater flexibility in responding to market needs. Alternatively, the administration may choose to release specific products from agency stocks. The measures taken depend largely on the particular crisis.

The Minister Delegate for Industry has the authority to release emergency stocks. The *1992 Law 92-1443* allows for a reduction of the stockholding obligation, even without the activation of crisis procedures. It also authorises DIREM to issue instructions to CPSSP/SAGESS to make available a specified quantity of emergency stocks.

As strategic stocks are generally located close to commercial stocks, they can be released rapidly in an emergency drawdown.

Financing and Fees

No financial assistance or public funding is provided to industry in order to maintain emergency reserve requirements. Industry participants must pay CPSSP a fee to cover the storage costs of the oil delegated to the agency. The fee is at a slightly higher rate per tonne for the 90% option than for the 56% option. In turn, CPSSP rents storage capacity from industry operators.

Other Measures

Demand Restraint

The French government would decide on specific demand restraint measures, based on the proposal of the Minister of Industry (DGEMP). The prefects of both the departments and the defence zones have authority to decide locally on certain measures. The entire NESO, particularly DIREM, co-ordinates the response measures at the national level.

DIREM maintains an exhaustive list of possible measures, ranked according to expected results and categorised by five main characteristics: the speed of implementation; the level of government necessary for implementation (national, defence zone, or department); the duration; the resulting level of market

distortion (light-handed to heavy-handed measures); and the sector of implementation (transport, industry, housing, etc.). Implementation is based on the principle of equal treatment of the stakeholders and citizens in the area in which the measures are employed. Some measures are compulsory; some rely on persuasion. In either case, their effects may be short or medium term. The list is updated regularly to reflect the lessons learned from each new experience in crisis management.

Emergency response measures would be implemented in stages. Immediate measures would include campaigns to raise public awareness of potential savings in oil product consumption and strict enforcement of existing regulations (e.g. speed limits or temperatures of buildings). Subsequent measures would involve stiffening these regulations, prohibiting certain activities (e.g. motorised sports events, Sunday traffic), limiting the distribution of certain products (e.g. shorter opening hours of service stations) or replacing oil products with alternative energy sources (e.g. gas, electricity or waste). These measures could be complemented by persuasion techniques that would have immediate effects, such as encouraging the use of public transport, promoting proper vehicle maintenance and rationalising transport systems. As a last resort, the rationing and allocation of road fuels to priority consumers could be envisaged.

In a 2001 study, the French government estimated that oil savings using non-compulsory measures would not exceed 2% of normal consumption (roughly 40 kb/d). In the case of mandatory rationing, the maximum amount of savings possible would be no more than 9% (180 kb/d). Mandatory short-term measures in the transportation sector, including reducing the maximum speed limit from 130 km/h to 120 km/h, would result in savings of less than 5% of domestic consumption (100 kb/d).

Oil Infrastructure of Germany



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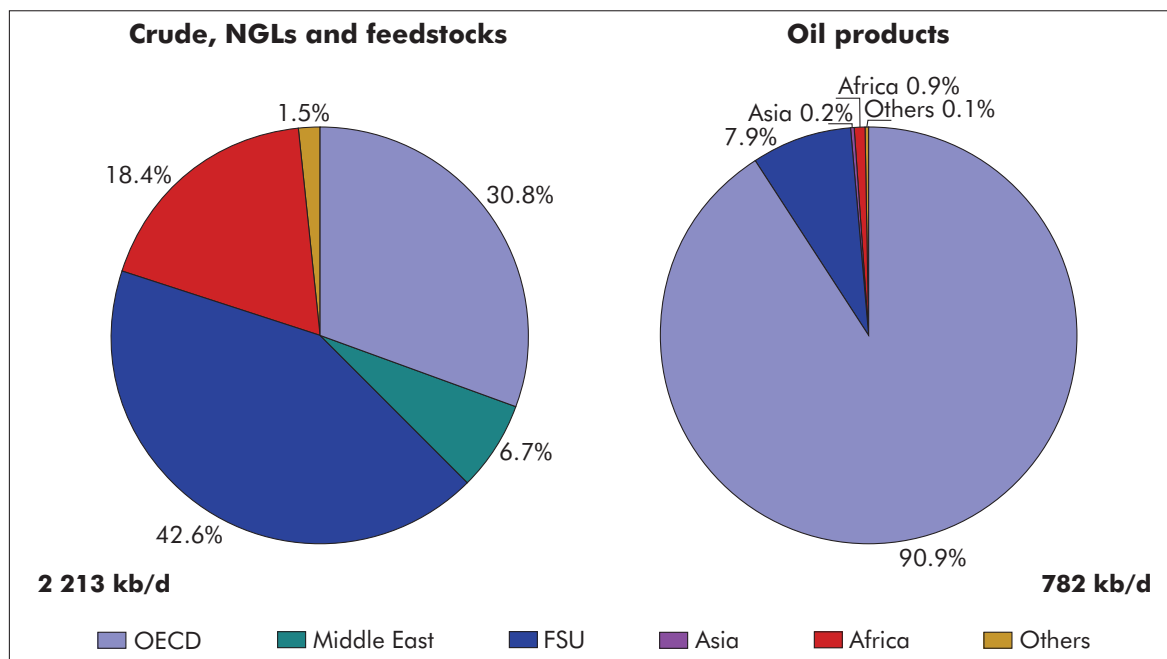
GERMANY

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	102.7	75.3	80.7	76.0	66.7	87.3
Demand (kb/d)	2 681.8	2 881.8	2 772.0	2 629.3	2 663.7	2 611.2
Motor gasoline	724.0	697.6	665.1	542.4	523.2	
Gas/diesel oil	1 107.8	1 256.6	1 168.3	1 118.7	1 174.1	
Residual fuel oil	212.9	195.0	168.1	175.8	178.0	
Others	637.0	732.6	770.4	792.5	788.3	
Net imports (kb/d)	2 579.0	2 806.5	2 691.3	2 553.3	2 596.9	2 523.9
Import dependency (%)	96.2	97.4	97.1	97.1	97.5	96.7
Stocks in days of net imports	115.0	120.0	115.0	117.0	117.0	
Refining capacity kb/d		2 316.9	2 275.3	2 323.2	2 417.4	2 465.7

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

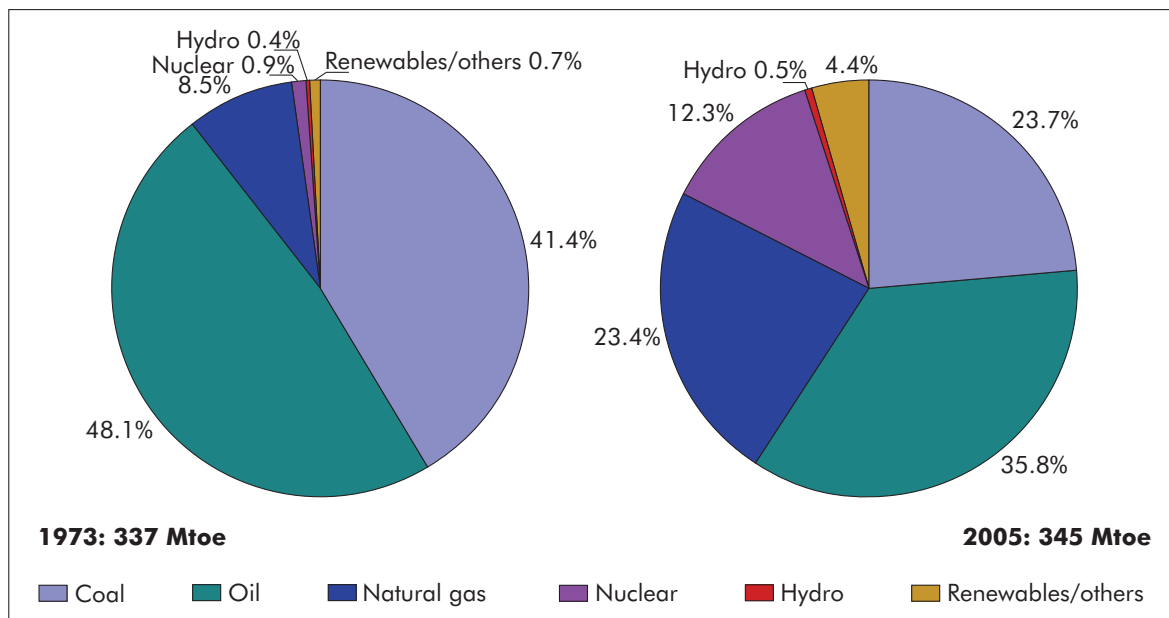
Germany is one of the three largest net oil-importing countries of the IEA. It has considerable and complex oil trade links with other IEA countries, especially those of North-West and Central Europe, as well as with Russia. Because of its size and central location in Europe, Germany plays a vital role in European energy security. Russia is one of Germany's most important suppliers of oil and gas. Thus, part of Germany's policy is to develop a long-term strategic energy partnership with Russia in all areas of energy and security of supply. Germany has the largest refining capacity in Europe.

Germany has maintained a stockholding agency, the *Erdölbevorratungsverband* (EBV), since the late 1970s. The EBV now holds all compulsory stocks. In an emergency situation, Germany is expected to draw on these agency stocks.

Energy Outlook

Oil's share of Germany's total primary energy supply (TPES) has decreased slightly since the 1970s, when it accounted for almost half of Germany's energy needs. In 2005, it stood at 36%. The proportion of coal has also fallen, from 41% in the 1970s to less than one-quarter in 2005. Comparing figures from 1973 and 2005, total energy consumption in Germany has increased moderately (only 2.4%) from 337 Mtoe to 345 Mtoe.

Total Primary Energy Supply

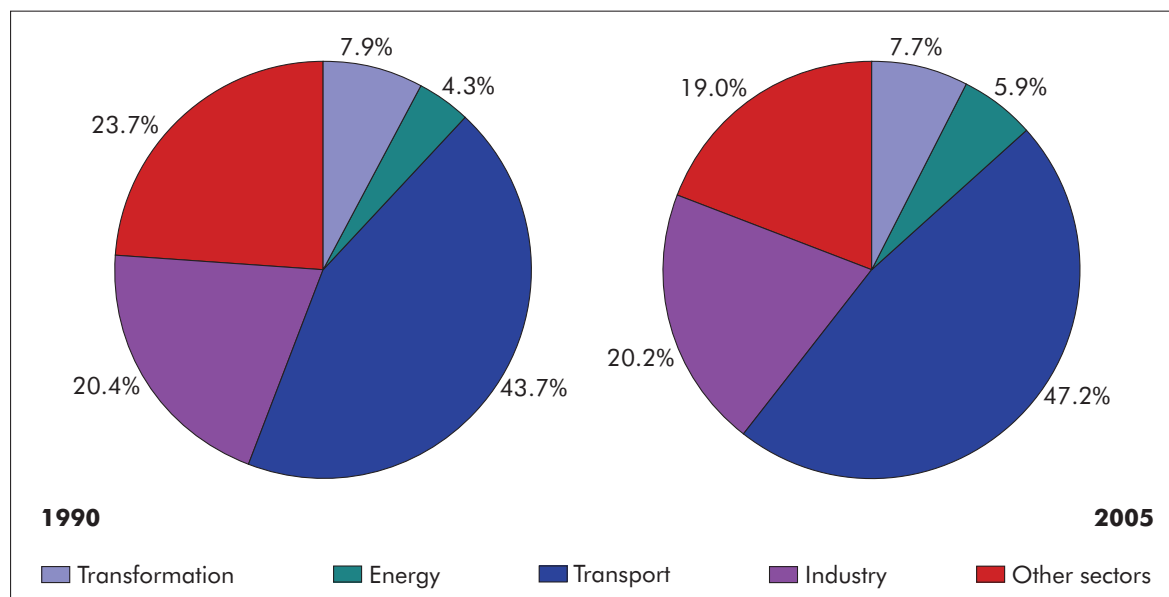


Several factors should significantly reduce Germany's reliance on oil products over the next 20 years. These include a combination of increased efficiencies and higher price levels, coupled with switching of fuels in

the transport sector (away from gasoline into diesel and biofuels) and in power generation and home heating (away from oil into natural gas). Germany's total oil demand has been declining since it peaked in the late 1970s. In 2000, it stood at 2.8 mb/d, and is expected to decline to 2.6 mb/d in 2010.

Germany has only a very small amount of indigenous production; thus, it can be considered nearly totally dependent on oil imports. Domestic production of crude oil has increased slightly since 2000, but still represents only about 3% of gross domestic oil consumption. Production is expected to decline slightly in 2010, reaching only 87 kb/d.

Oil Consumption by Sector



Market Features and Key Issues

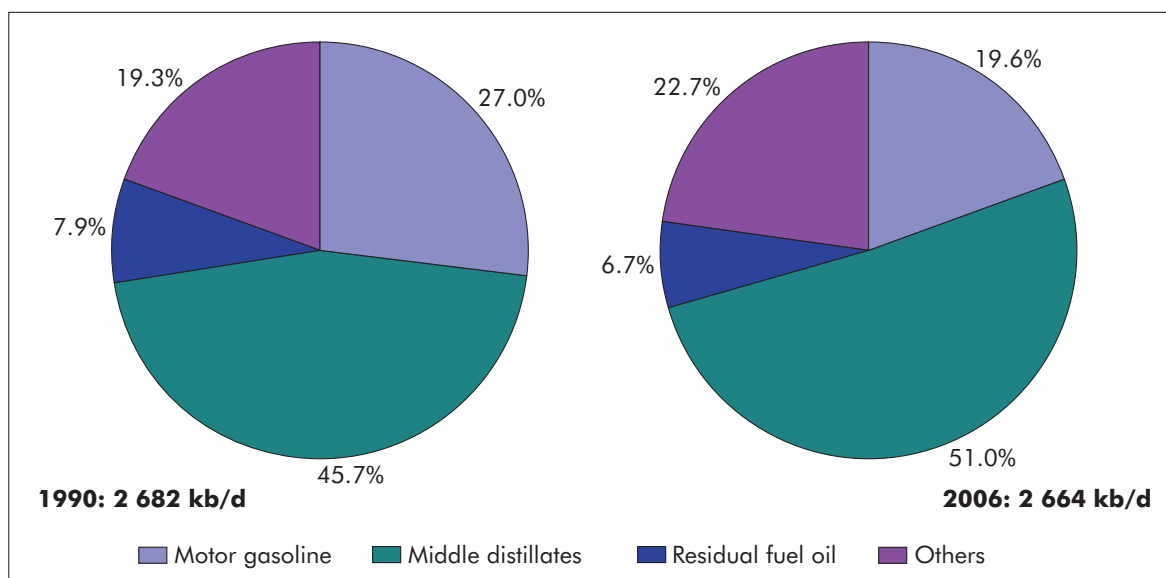
The volume of oil demand in Germany has declined almost continuously since 1998, with gasoline and light heating oil experiencing the largest reductions. By contrast, consumption of diesel, kerosene and naphtha has increased.

This decline in gasoline consumption can be attributed to several factors: more efficient vehicles; changes in consumer travel patterns because of the considerable price increases; a switch to more diesel cars; and the increased use of filling stations across borders. Although there are more diesel cars, the rate of increase in diesel consumption has slowed for the same reasons. The role of biodiesel as a motor fuel is increasing: in 2005, biodiesel consumption reached 12.7 mb (1.8 Mt). Some 4.9 mb (0.7 Mt) of this figure was sold as a maximum of 5% mixture with diesel, and is therefore included in the statistics for diesel consumption.

Four key factors drove the decline in the consumption of light heating oil: reduced consumption because of increased prices; efficiency measures in the building and heating sectors; the influence of competition with natural gas; and –in recent years– increasing shares of renewables in the market.

Imports of oil (crude oil and products) to Germany have declined slightly in the last decade: in 1998, they were just over 3.1 mb/d; in 2006, they were just under 3.0 mb/d.

Oil Demand by Product



The combination of declining domestic deliveries and increased refinery production has created a surplus of oil products in Germany. Exports of oil products have increased from an average of less than 300 kb/d in the 1990s to almost 570 kb/d in 2006.

Oil Supply Infrastructure

Refineries

Germany's refinery capacities (primarily atmospheric crude oil processing) have slightly increased in recent years, through elimination of bottlenecks and expansion measures in existing plants. In 2000, capacity was about 2.3 mb/d; it now stands at 2.4 mb/d and is expected to increase moderately to almost 2.5 mb/d by 2010.

Ports and Pipelines

The German crude oil supply system comprises three ports at the North Sea (Wilhelmshaven, Brunsbüttel, Hamburg), the port of Rostock on the Baltic Sea, and the pipeline infrastructure. The pipelines are privately owned and operated by oil companies. There is no pipeline infrastructure between the western and the eastern parts of the country.

In normal times, only a small amount of crude oil is imported via Rostock; these facilities mainly support exports of Russian crude. However, if needed, they can be used to bring limited crude supplies into Germany. About half the German crude imports arrive via pipelines from France, Italy and the Netherlands. Refineries in the eastern part of Germany are supplied via the Druzhba pipeline from Russia, which carries about 20% of total crude imports.

Storage

Germany's total storage capacity amounts to approximately 428 mb (68 mcm). Storage facilities are distributed throughout the country, with primary stockholding capacity located close to refineries and ports. Germany also has seven salt cavern sites for storing oil, most of which are situated in Lower Saxony (north-western Germany).

Decision-making Structure

The German National Emergency Sharing Organisation (NESO) is a joint body comprising representatives from government, the *Erdölbevorratungsverband* (EBV) – known in English as the Oil Storage Association – and industry. NESO responsibilities are distributed among members as follows:

- *Bundesministerium für Wirtschaft und Technologie* (BMW: Federal Ministry of Economics and Technology) serves as the political and operational head of NESO. In this capacity, it prepares and takes decisions about stock release and demand restraint, in co-operation with the members described below (the KVR, the KGV, the EBV, and BAFA).
- *Bundesamt für Wirtschaft und Ausfuhrkontrolle* (BAFA: Federal Office of Economic Affairs and Export Control) co-ordinates data collection and data processing, and also takes administrative decisions related to international and national allocation of oil during severe supply disruptions.
- *Erdölbevorratungsverband* (EBV: Oil Storage Association) co-ordinates stock release following a decision of BMW.

Oil companies are represented in NESO by two complementary bodies:

- *Koordinierungsgruppe Versorgung* (KGV: Supply Co-ordination Group) is a group of oil industry and trade experts for supply, refining and distribution. The KGV provides practical advice on these matters to the BMW, thus supporting its decisions regarding issues such as demand restraint and stockdraw. The group conveys decisions to industry and co-ordinates the implementation of measures; it also acts as mediator in the voluntary offer and the national allocation process.
- *Krisenversorgungsrat* (KVR: Emergency Supply Council) is a policy-oriented body comprising the chair of the KGV and the chair and deputy chair of the EBV supervisory board, all of whom represent industry and trading companies. The KVR advises the BMW and settles fundamental issues that KGV is not able to resolve.

NESO headquarters are at the EBV in Hamburg. NESO co-ordinates the regular crisis tests in normal periods, which are carried out with the participation of the BMW, the BAFA, the EBV and the KGV. In addition, the EBV conducts crisis exercises twice per year to check systems and organisation. In crisis periods, the BMW activates NESO, while the chair of the KVR convenes the KVR and the KGV.

Stocks

Stockholding Structure

In 1978, Germany established a public stockholding organisation – the EBV. The *Oil Stockholding Law* requires the EBV to hold stocks equivalent to 90 days of net imports and of processed volumes of the main products (gasolines, middle distillates and fuel oils). These requirements comply with EU legislation and IEA commitments. The 90-days equivalent of the quantities of refinery output and net imports of major oil products is calculated on the average amounts of the three preceding calendar years, or during the last year, whichever figure is larger. Membership in the EBV agency is compulsory for refiners and importers.

The EBV board of directors is appointed by a supervisory board (*Beirat*) of nine delegates, comprising one representative from each of the Ministry of Economics, the Ministry of Finance and the Upper House of Parliament (*Bundesrat*) and six industry delegates (three representatives of the refining industry and three representatives of the importing and trading companies). Board members are elected for three years at an annual meeting of the members. Responsibility for day-to-day operations is delegated to the EBV management (comprising ex-industry personnel), within the boundaries established by law.

The EBV has authority to run down excess stock to 105% of its requirements, but must ensure that its sales do not disrupt the oil market. The EBV is not allowed to initiate sales activity for speculative purchases.

Crude or Products

The EBV holds 45% of its stocks in the form of crude oil and 55% as product.

The EBV owns more than 90% of its stocks. The remaining stock (maximum 10%) may be “delegated” to the EBV by oil industry operators. Such stocks are generally stored in clearly marked tanks at common storage farms; the leasing company cannot transfer the oil without the written consent of the EBV.

Some EBV stocks are stored in commercial tank farms in separate tanks (*i.e.* they are not co-mingled with industry operational stocks). All the EBV owned and “delegated” stocks are fully available in a crisis and can be quickly passed into the normal distribution chain for delivery to consumers (products) or refiners (crude oil). In addition to these compulsory stocks, at the end of 2006 the oil industry held 36 mb of crude oil and 55 mb of product; the majority of these stocks also meet the IEA definition for the emergency reserve commitment.

The EBV is required to ensure that product specifications of compulsory stocks conform to prevailing legislation. It achieves this by replacing stocks at an appropriate rate, so as not to create any market disturbance. The EBV has full authority to decide the most effective modalities for achieving this stock turnover. Generally, the EBV keeps above ground stocks in commercial storage. At present, the EBV is primarily concerned with volumes; the individual depots are responsible for quality. However, the EBV routinely inspects stocks in separate storage for any quality deterioration, and takes any necessary action.

Location and Availability

By law, EBV stocks must be distributed evenly throughout the regions of Germany. The EBV is required to hold a minimum of 15-days supply of finished products in each region. In practice, almost half of all stocks are stored in Lower Saxony (Niedersachsen). This region has substantial salt cavern facilities that allow for relatively cheap, long-term storage. Emergency transportation capacities exist between regions, although there is no pipeline infrastructure connecting the western and the eastern parts of the country.

Almost 100% of Germany's compulsory stocks are held within its national territory, although the EBV occasionally holds very small amounts in other countries. Germany has formal bilateral agreements to hold emergency stocks with Belgium, Italy and the Netherlands. A bilateral agreement with France allows Germany to hold emergency stocks in France for the benefit of German stockholding obligations. Bilateral agreements with the Czech Republic, Luxembourg, Portugal and Slovenia support storage in Germany of emergency stocks for the benefit of these countries. These agreements ensure the monitoring and availability of stocks for emergency purposes in Germany and in the other countries.

Commercial stocks owned by German companies but located in other countries with which there is a formal bilateral agreement are taken into consideration when assessing total available stocks. This relates primarily to crude oil held in storage at pipeline heads and readily available for transfer to inland German refineries.

In principle, Germany allows stock tickets arrangements, but for products only and restricted to a maximum of 10% of the stockholding obligations. There are no specific restrictions or checks made on such arrangements. German authorities discourage such arrangements and generally regard tickets held abroad as an ineffective means for covering supply disruptions. However, in the case of turnover of products stocks (related to new quality requirements), ticket arrangements are used to temporarily delegate the volumes concerned in another country.

In order to meet its stockholding obligations, the EBV owns part of Germany's storage facilities (mainly those underground). However, it still rents most of its storage capacity. In total, the EBV uses about 200 mb (32 mcm) of storage, of which salt caverns account for 60% and tank farms for 40%.

Monitoring and Non-compliance

In Germany, only the EBV is required to hold compulsory stocks; this is the main reason for its existence. The Federal Office of Economics and Export Control undertakes reviews to ensure compliance and appropriate supervision.

Stock and Drawdown Timeframe

In the event of an oil supply emergency, only the Minister of Economics and Technology has the authority to issue a decree permitting the release EBV stocks. Such a decree can be issued only on three conditions: that a stock drawdown is necessary to prevent an imminent disruption in energy supplies; to remedy a disruption that has already occurred; or to meet EU or IEA obligations.

The *Oil Stockholding Law of 1978* states that the allocation of stocks released by the EBV will be determined in proportion to the share of total EBV contributions made by member companies. In practice, ten of the member companies account for about 96% of the total contributions. However, if necessary, the ministerial decree can authorise that EBV stocks be allocated to specific companies in order to secure the supply of vital goods/services for the population or public installations. This may occur, for example, if only one or two regions suffer a supply disruption.

In an emergency, the government can reach a decision on whether to release compulsory stocks within one day. One of the EBV main functions is to prepare, in advance of such a decision, drawdown plans that could be implemented immediately to ensure the supply of products and facilitate the processing of crude within one week. Normally, the EBV would start by drawing down product stocks, thereby “buying” enough time for the release and processing of crude stocks. The EBV has negotiated processing contracts with German refiners.

Financing and Fees

The German government offers no financial support for the EBV. According to the Ministry of Economics and Technology, the historical costs of EBV stocks are some EUR 3.6 billion, all of which have been financed by bank loans.

The EBV annual operating costs (*e.g.* storage, management, interests, repayments or shutting down of caverns) are approximately EUR 450 million (EUR 22/t). The *Oil Stockholding Law* requires that all of these costs be met by a fee (or levy) payable by individual member companies on every tonne of eligible product (gasoline, distillates and fuel oil) delivered for domestic consumption. Effective 1 April 2007, the fees per tonne are EUR 5.53/t for gasoline, EUR 4.14/t for middle distillates and EUR 3.70/t for fuel oils.

In commercial transactions, the EBV levy must be identified as a separate component of the invoice price.

Other Measures

Demand Restraint

The *Energy Security Law of 20 December 1974* gives the German government the legal authority to intervene in the market in an oil supply emergency. It states explicitly that administrative demand restraint measures shall be implemented only if solving the problem by market-oriented means either is not possible or cannot be achieved in time or by adequate means. Also, the demand restraint measures must not be disproportionate to the scale of the problem.

The law defines two sets of demand restraint measures. The first set of light-handed measures comprises, among others: persuasion, public appeals to reduce consumption; speed limits reductions; Sunday or alternate weekend driving bans; and recommendation to the oil industry to refill heating oil tanks only when they fall short of a certain filling level.

The second set of measures is more heavy-handed and includes rationing schemes. Only in case of a severe disruption would Germany consider rationing of heating oil, gasoline or diesel fuel. Existing regulations set out the basic principles and elaborate full details of these rationing systems.

Appropriate delegation of legal authorities is contained in the *Energy Security Law*. It is also clearly stated that prior to activation of the IEP trigger of an international co-ordinated response, only the light-handed measures would be considered for implementation at the national level.

Light-handed measures are prepared by the government, making it possible to take decisions on short notice and minimising the time required for implementation. Rationing of heating oil does not involve coupons and could be done on short notice. Rationing of gasoline/diesel fuel would involve administrative preparation for the delivery of coupons and thus would require a lead time of four weeks before becoming fully operational. This rationing system would be the last resort in a very severe crisis; the preparation time could be bridged by a stockdraw.

The first effects of the demand restraint measures can be expected from the beginning of full operation. Monitoring will be carried out by the monthly statistical reports of the oil industry and by ad hoc reviews, if necessary.

In addition, the German government would undertake information campaigns through the mass media from the beginning of a crisis. These campaigns would aim to explain the situation as well as the measures taken.

Fuel Switching

In 2001, the estimated fuel switching capacity in Germany was around 17 kb/d. In 2004, only 1.9% of the electricity generated was fuelled by oil products. Thus, the current potential for fuel switching is quite limited.

Oil Infrastructure of Greece



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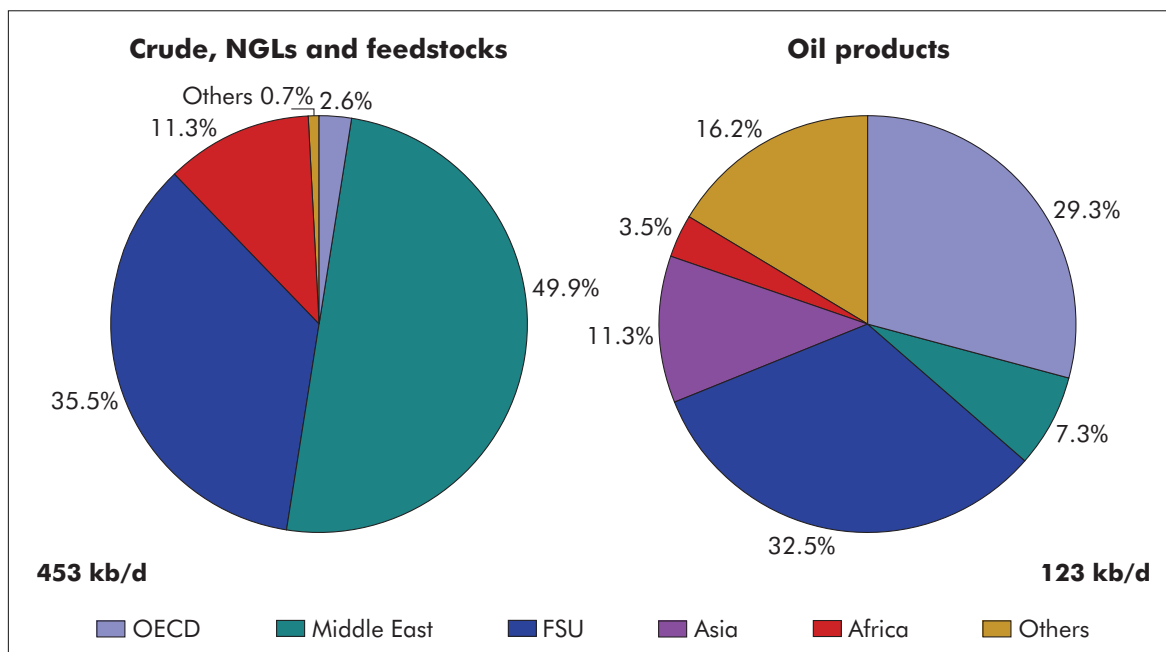
GREECE

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	16.9	9.3	5.9	1.8	1.8	0.9
Demand (kb/d)	314.1	355.5	399.2	424.5	445.0	447.7
<i>Motor gasoline</i>	56.1	64.2	75.7	90.7	91.6	
<i>Gas/diesel oil</i>	107.0	123.0	144.4	161.3	164.1	
<i>Residual fuel oil</i>	92.5	103.5	107.1	99.4	108.0	
<i>Others</i>	58.5	64.8	72.0	73.1	81.3	
Net imports (kb/d)	297.2	346.1	393.3	422.6	443.2	446.7
Import dependency (%)	94.6	97.4	98.5	99.6	99.6	99.8
Stocks in days of net imports	114.0	78.0	82.0	92.0	115.0	
Refining capacity kb/d		400.5	382.5	401.4	413.0	441.5

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

Greece has hardly any domestic oil production and thus relies heavily on imports, primarily from the Middle East and North Africa, but increasingly from Russia and the Caspian Sea region. The share of oil in total energy consumption is gradually declining, as the country increases its reliance on natural gas.

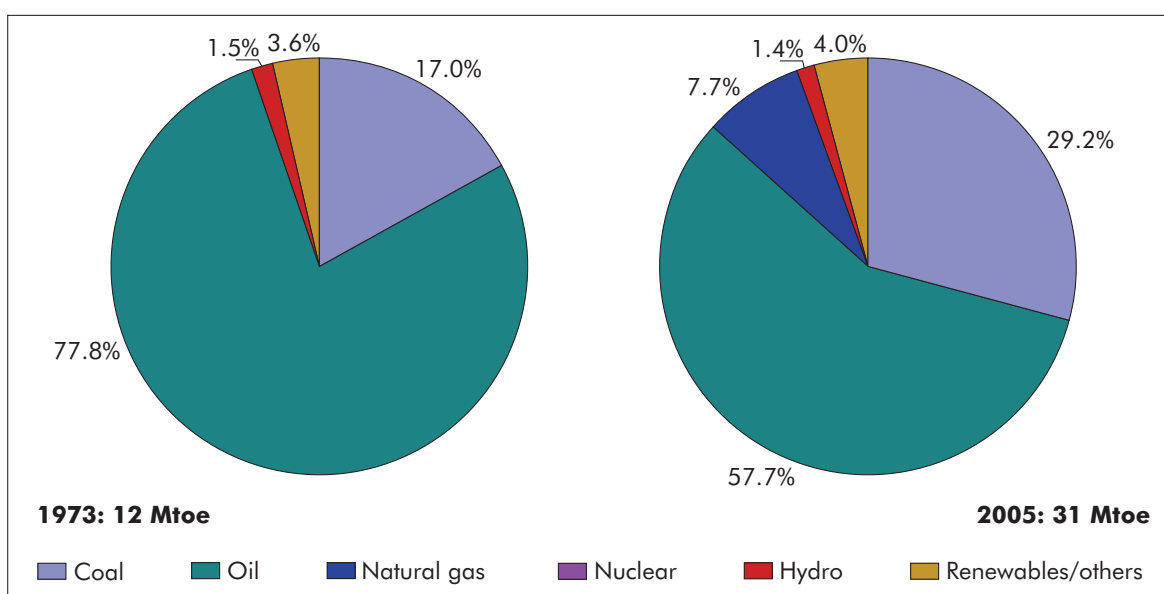
Since the partial privatisation in 1998 of the Public Petroleum Corporation of Greece, the Greek administration has had to revise government policies, procedures and oil security issues including the collection of oil stockholding data. It started with a comprehensive review of oil and emergency policies, which culminated in the adoption by Parliament of a new oil law in 2002.

Greece meets its stockholding obligation by placing stockholding requirements on industry. In an IEA co-ordinated action, Greece would likely lower the stock obligation on industry, thereby allowing the use of obligatory stocks.

Energy Outlook

Total primary energy supply (TPES) in Greece increased from 12 Mtoe in 1973 to 31 Mtoe in 2005, reflecting an average annual growth rate of 2.88%, or a total increase of 148%. Although oil consumption rose as well, the share of oil in TPES dropped sharply – from 78% in 1973 to 58% in 1990. Since then, the share of oil in the overall energy mix has been more or less constant even though oil demand has risen in line with economic growth. The biggest increase in share of the energy mix came from the use of coal, which rose from 17% to 29%. Remarkably, Greece had hardly any natural gas consumption up to 1996; its share has since increased to 8% in 2005.

Total Primary Energy Supply

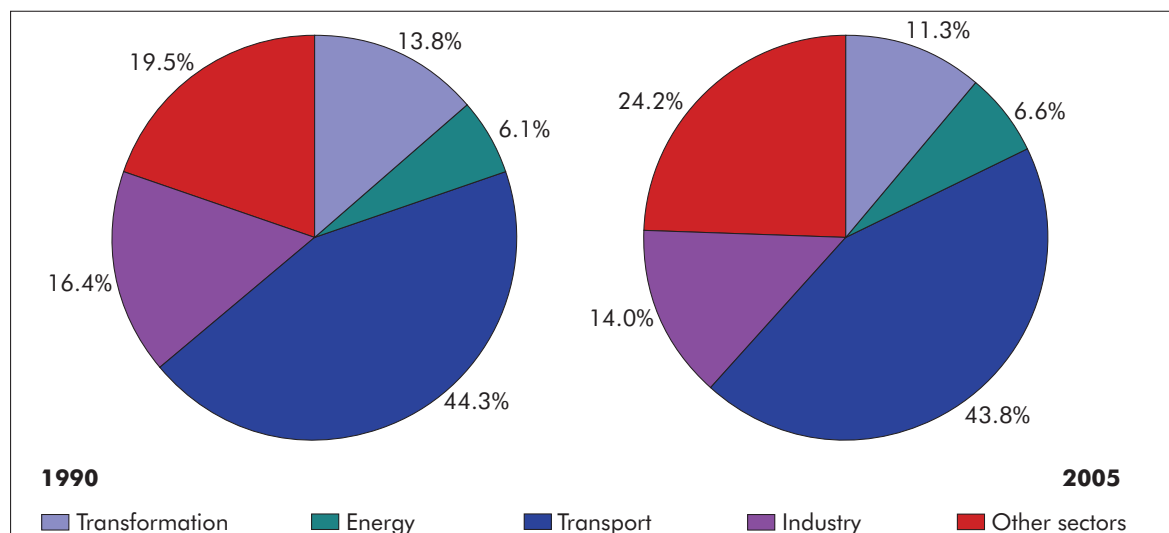


Market Features and Key Issues

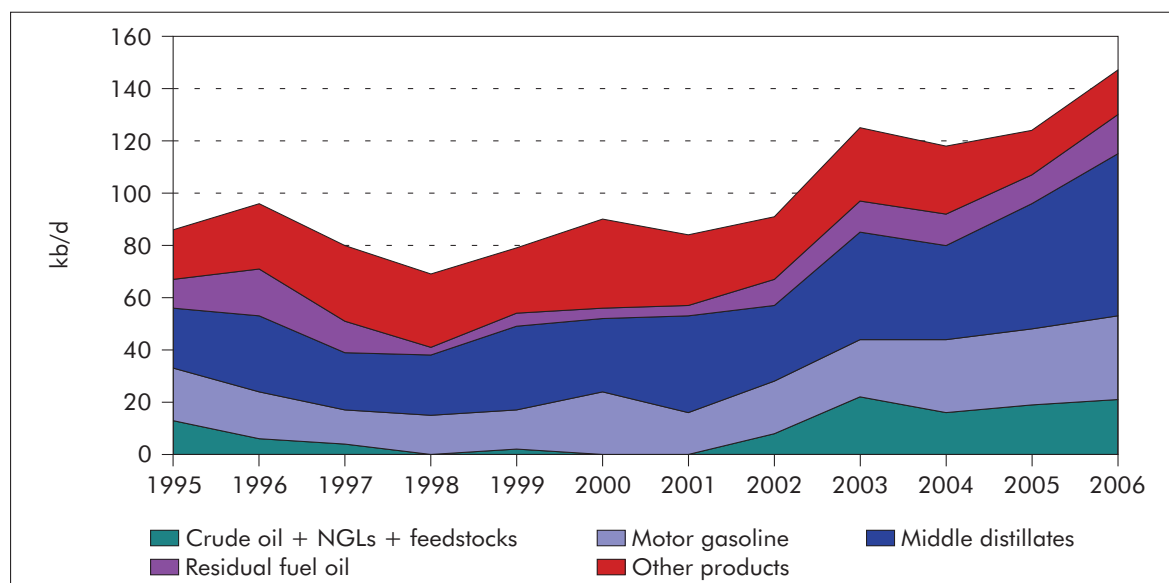
Oil consumption in Greece is spread over quite a large, isolated area with long logistic chains; this has a strong influence on distribution costs. The country's geography results in significant distribution of petroleum products by sea.

Domestic demand for petroleum products grew by 2.3% per year between 1990 and 2006. In 2006, Greece consumed nearly 445 kb/d of refined petroleum products. Transport is the major oil consuming sector, accounting for 44% of demand in 2005; this has changed little from the 44% in 1990, suggesting that transport has essentially kept pace with the overall growth in demand for oil products.

Oil Consumption by Sector



Oil Exports, 1995-2006



In 2006, Greece imported about 575 kb/d of oil, with crude oil (including NGLs and feedstocks) accounting for about 80% of the total (453 kb/d), and oil products the rest (123 kb/d). At the same time, Greece exported about 147 kb/d; the dominant export product was middle distillates.

Oil Supply Infrastructure

Refineries

Greece has four refineries with a total crude distillation capacity of 413 kb/d. Approximately three-quarters of this capacity is owned by Hellenic Petroleum, including two refineries located in the Athens area and a third near Thessaloniki. The fourth refinery, jointly owned by the Greek group Vardinoyannis and Saudi Aramco, is located on Corinth.

In the late 1990s, Hellenic Petroleum Corporation was created from the re-organisation and partial privatisation of the state-owned Public Petroleum Corporation of Greece. In 2007, the state held about 35% of the shares of Hellenic Petroleum but retained control of its management.

Pipelines

There are two oil pipelines in Greece. The first, a 220-km, 16-inch crude pipeline with a capacity of 50 kb/d (2.5 Mt/yr), connects the Thessaloniki port with the Octa refinery in Macedonia. The second, a 53-km, 10-inch JET A-1 pipeline with a capacity of 42 kb/d, connects the Aspropyrgos refinery with the new Greek airport in Athens.

A third pipeline has been in planning stages for about 10 years, and progress is now underway. The proposed Burgas-Alexandroupolis oil pipeline would link the Bulgarian Black Sea port of Burgas with Alexandroupolis on the Mediterranean coast of Greece. This 300-km pipeline would allow Russia to export crude oil (up to 300 kb/d) via the Black Sea, bypassing the Bosphorus Straits.

Storage

At the end of 2006, Greece had a total oil storage capacity of 62 mb. Almost 73% of this capacity is owned by Hellenic Petroleum (located at its three refineries or at various smaller storage sites) and almost 25% is owned by Motor Oil Helas.

Decision-making Structure

The core of the Greek National Emergency Sharing Organisation (NESO) is a permanent structure that resides in the Directorate of Petroleum Policy (DPP) within the Ministry of Development. Other participants include directorates within the same ministry and oil industry experts.

In an oil supply crisis, the Ministry of Development would convene a Management Committee. The committee would be directly organised by the Secretary General of Development, who would also act as its president. This committee advises the minister on measures to take during an oil supply crisis and has responsibility to draw up a plan of emergency measures. Once the ministerial committee approves the plan, the Minister for Development is responsible for enacting the agreed measures.

Stocks

Stockholding Structure

Greece introduced compulsory stockholding legislation for oil market operators in the mid-1980s. Previously, the state itself was responsible for stockholding.

In principle, there is a stockholding obligation for any company licensed to import crude oil or oil products for distribution or for direct consumption (large users) within the national market. This definition includes refiners, importer and/or distributors, and large consumers such as power plants and Olympic Airways. There is no agency to manage any aspect of the country's compulsory stocks obligations.

Companies with stockholding obligations are required to submit an annual report to the DPP by mid-February, detailing imports and exports during the previous calendar year, including quantities delivered to the international shipping industry and the Greek armed forces. The reporting company is also responsible for assessing its compulsory stock obligation based on its net imports and must communicate this to the DPP.

The DPP is responsible for checking each company's submission. If the DPP assesses a different level of obligation than any company's self-assessment, the revised obligation must be met within 30 days of notification by the DPP.

Crude or Products

As a member of the European Union, Greece's compulsory stocks obligations are incurred in terms of the three EU product categories (gasoline, distillates and residual fuel oil). However, the obligation may be partially fulfilled by holding an appropriate level of crude stocks. The calculation of crude equivalent volumes for products is linked to the previous year's product yield.

At the end of 2006, roughly one-third of stocks held by industry were in the form of crude oil; more than half of all refined product stocks held were in the form of middle distillates.

Location and Availability

According to Greek legislation, compulsory stocks must be maintained in certified storage tanks intended for this purpose. This does not mean that operational or commercial stocks must be kept separately in other tanks. In practice, compulsory stocks are co-mingled with operational stocks.

Greece also allows companies to include toward their obligation any oil volumes on board of vessels within national territorial waters – provided the consignee is either the obliged stock holder or a third party that owns storage capacity which is certified for holding compulsory stocks.

All compulsory stocks must be held within Greek national territory; there are no bilateral stockholding agreements with other countries, nor are there any stockholding ticket arrangements.

Monitoring and Non-compliance

In 2003, the responsibility for data collection, monitoring and physical inspection of storage was transferred from Hellenic Petroleum to the DPP. Companies with compulsory stock obligations are required to submit a monthly report to the DPP, not later than the first business day after the 20th calendar day of each month. The report must state their closing stock levels at the end of the previous month and must be accompanied by certificates from Customs verifying the stated stock levels.

The DPP is responsible for making periodic physical checks to ensure compliance. If any company is found to be violating its obligation, the DPP will report the matter to the Minister for Development, who may impose an appropriate fine on the offender.

The DPP is also responsible for keeping a register of parties subject to compulsory stocks obligations, as well as a separate register of storage tanks intended for holding compulsory stocks.

Stock and Drawdown Timeframe

Because Greek compulsory stocks are held by industry and co-mingled with commercial and operational stocks, the release of such stocks during an oil supply disruption can be smooth and would not be subject to any undue delay.

Financing and Fees

All stocks are held and financed by market operators; there is no financial support for the industry stockholding obligations. Compulsory stocks costs are deemed to be included in consumer prices and are borne directly by consumers.

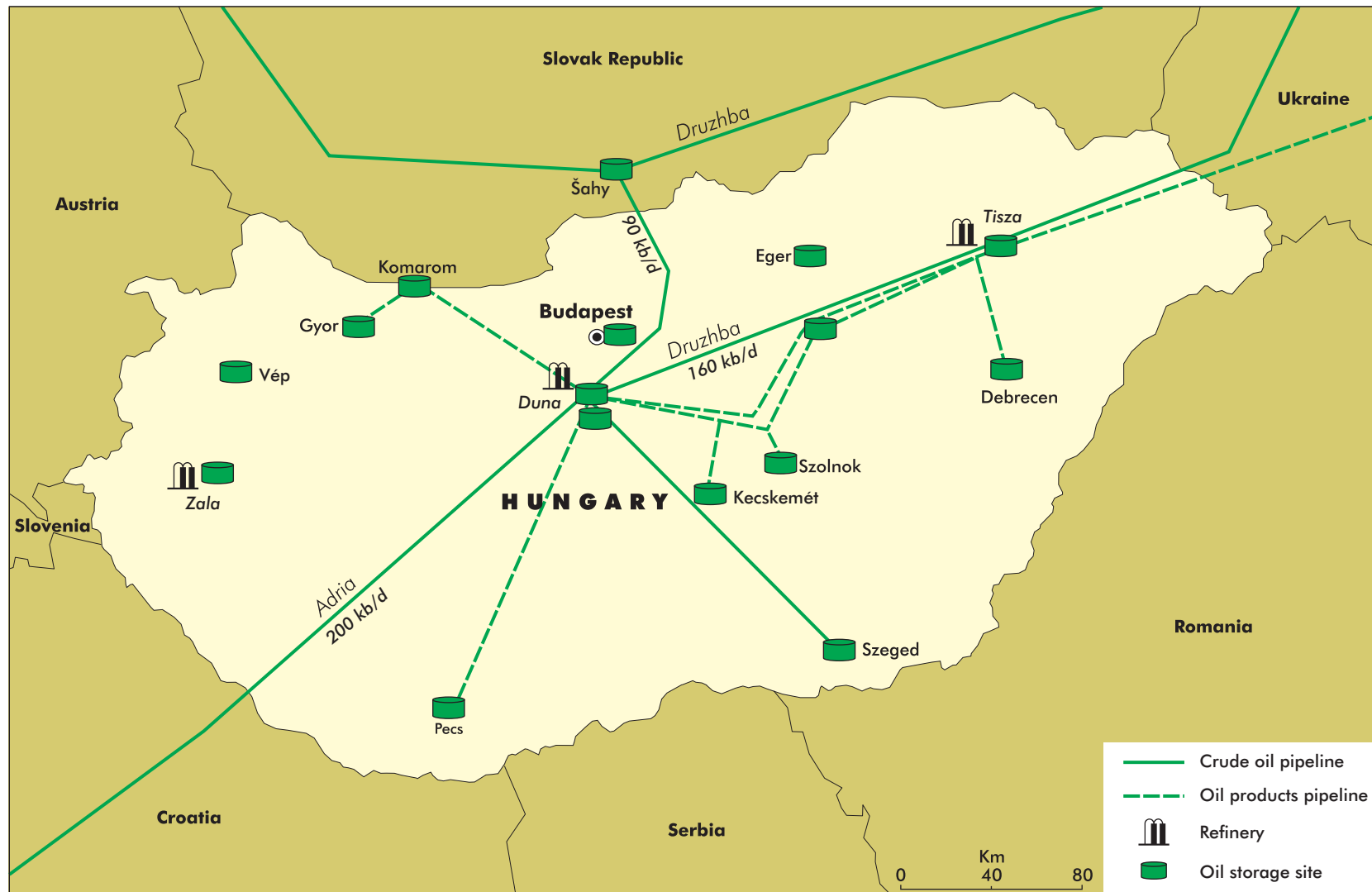
Other Measures

Demand Restraint

Ministerial decisions of 2003, as well as the *National Emergency Plan*, provide the legal framework for implementing demand restraint measures under the authority of Minister of Development. The measures are described in detail in the *National Emergency Plan*. Depending on the estimated length

and the severity of the crisis, the demand restraint measures to be applied range from persuasion measures (information campaigns through mass media) to compulsory measures (lowering speed limits, driving bans based on odd/even number plates, lowering temperature in buildings, etc.).

Oil Infrastructure of Hungary



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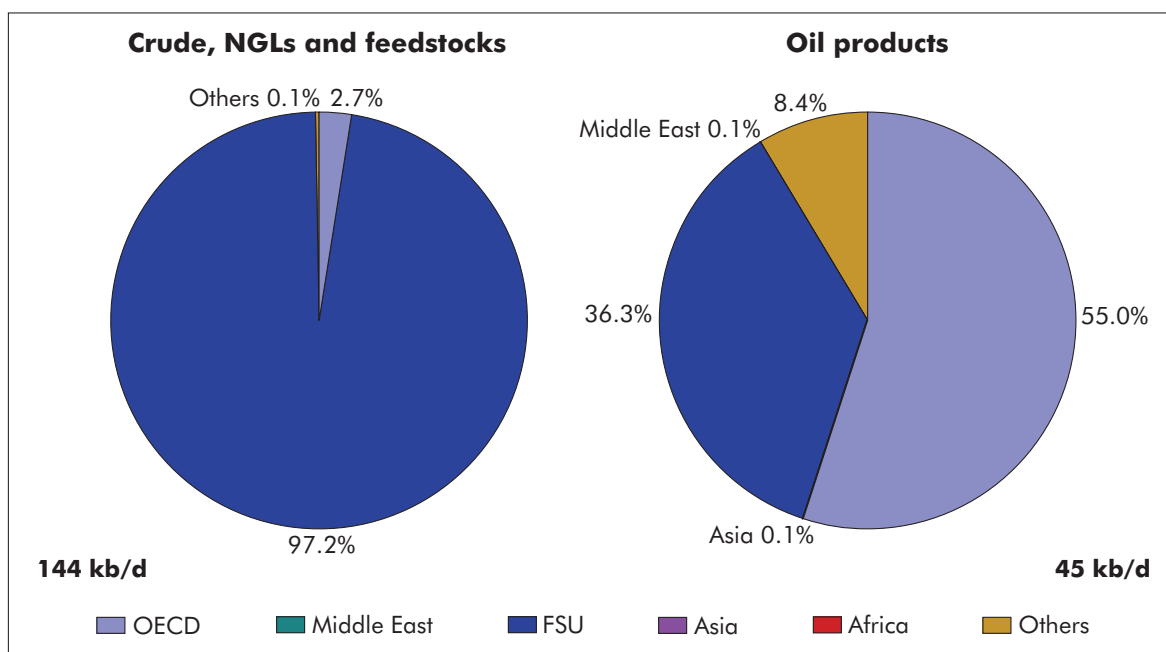
HUNGARY

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	62.0	60.4	38.2	36.6	33.1	22.3
Demand (kb/d)	177.5	155.9	143.2	157.0	165.6	184.4
<i>Motor gasoline</i>	41.4	33.0	30.8	34.4	36.4	
<i>Gas/diesel oil</i>	66.1	37.3	40.7	56.9	57.4	
<i>Residual fuel oil</i>	30.3	44.2	26.8	4.6	4.3	
<i>Others</i>	39.7	41.4	44.9	61.1	67.5	
Net imports (kb/d)	115.5	95.5	105.0	120.4	132.5	162.0
Import dependency (%)	65.1	61.3	73.3	76.7	80.0	87.9
Stocks in days of net imports	77.0	112.0	233.0	186.0	160.0	
Refining capacity kb/d		241.5	232.0	161.0	161.0	190.3

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

Oil represents roughly one-quarter of the total primary energy supply (TPES) in Hungary and is expected to remain at this level for the coming decade. Domestic oil production will continue to decline, further increasing dependence on imports. Imports currently meet 80% of the country's oil needs; most are in the form of crude oil, almost exclusively supplied from Russia via the Druzhba pipeline.

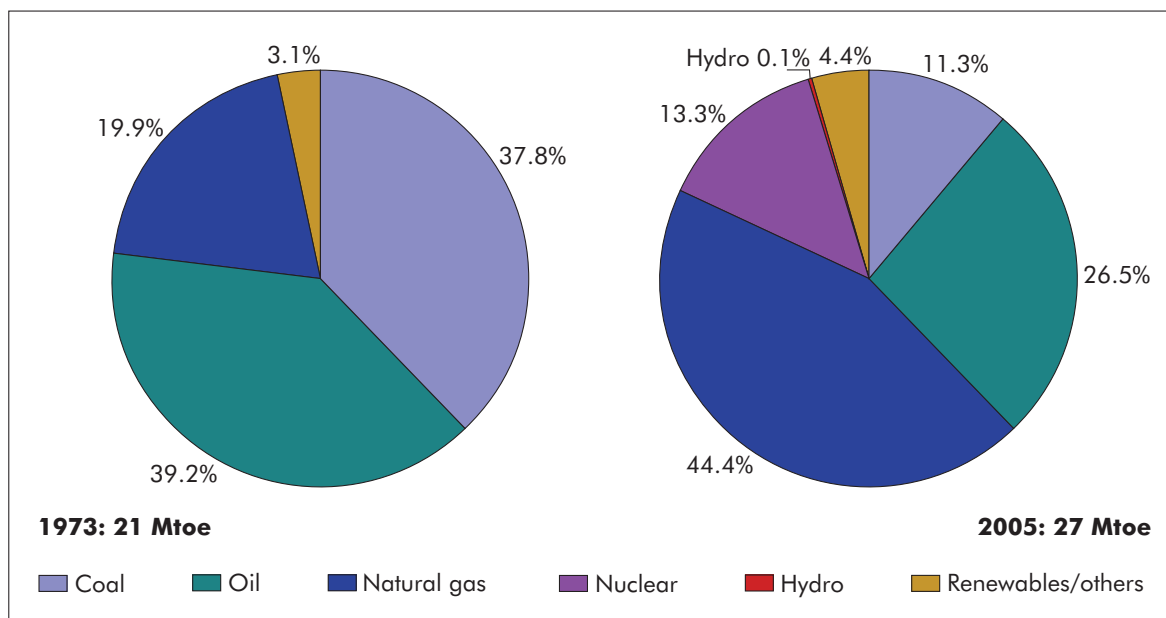
The use of publicly held crude and product stocks is central to Hungary's emergency response policy. The country's public reserves are held by the Hungarian Hydrocarbon Stockpiling Association (MSZKSZ), which is also responsible for maintaining emergency reserves of natural gas. The public oil stocks of the MSZKSZ equate to more than 100 days of net imports. When counted together with industry stocks, the total puts Hungary well beyond meeting the IEA minimum stockholding obligation. In an IEA co-ordinated response to a supply disruption, Hungary would respond with the release of public stocks.

Energy Outlook

The energy supply of Hungary has changed dramatically over the past 30 years. In the 1970s, three-quarters of the country's TPES came from coal and oil. By the late 1980s, natural gas exceeded both fuels' share in the supply mix; it has since remained the country's largest single energy source. Increased use of nuclear energy has also eroded the share of both oil and coal in the overall energy supply mix.

Overall energy demand is not expected to rise significantly in coming decades, with growth of less than 1% per year. The share of oil in TPES is expected to remain roughly constant.

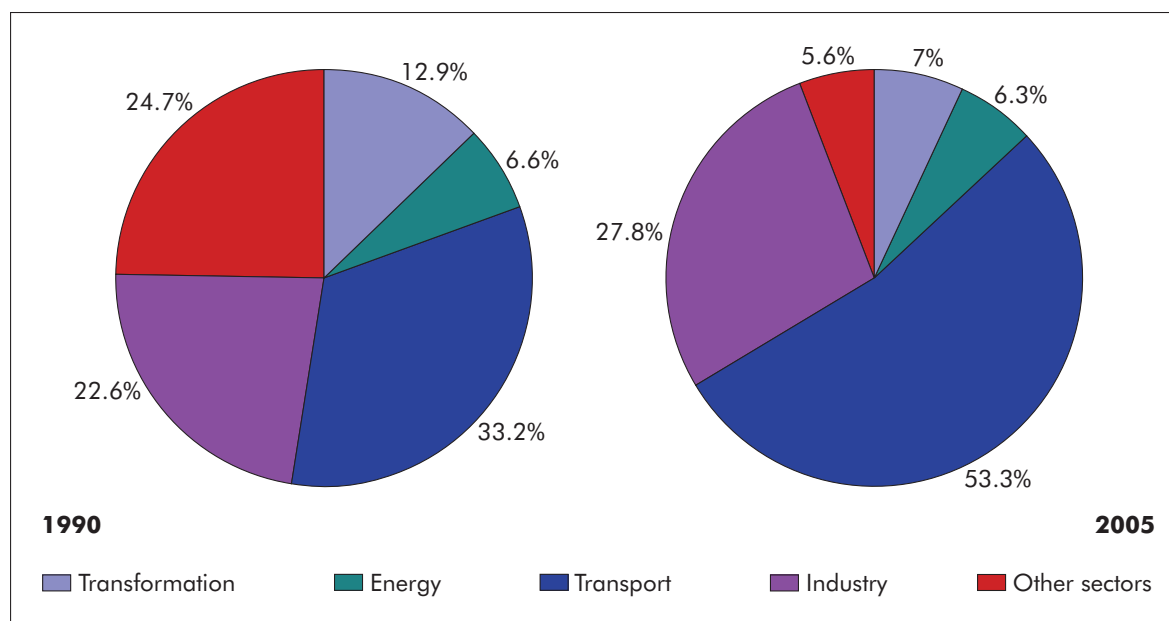
Total Primary Energy Supply



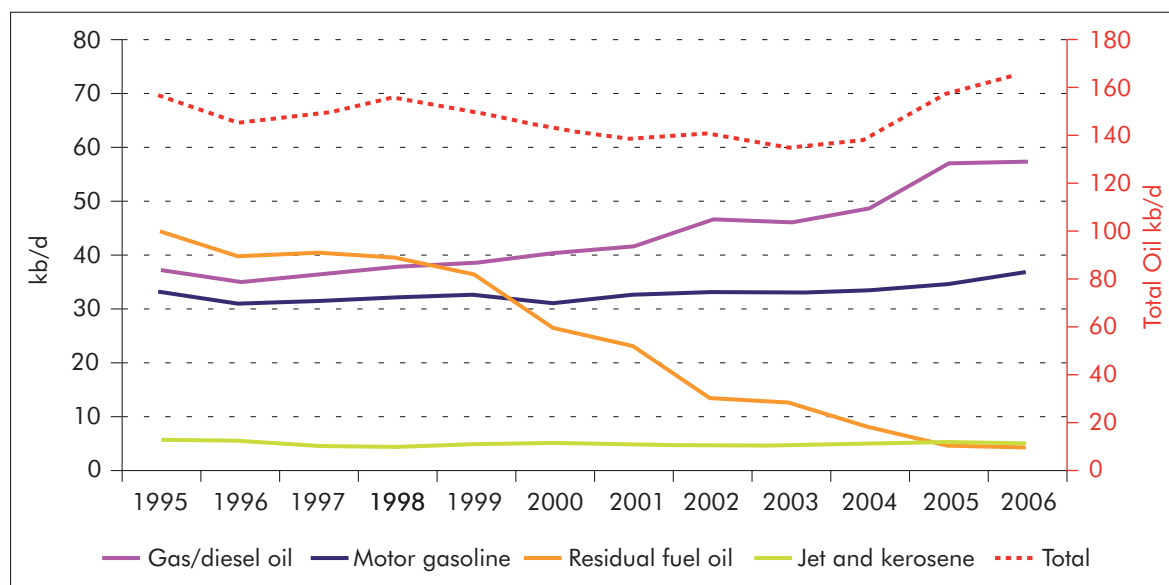
Domestic sources of oil are primarily found in the southeast of the country. Total oil production peaked in 1985 when it averaged 64 kb/d, representing approximately 31% of oil demand at the time. In 2006, production averaged 33 kb/d, equating to 20% of oil demand. By 2010, domestic production is expected to decline to just over 22 kb/d, roughly 12% of future oil demand in Hungary. Oil demand in Hungary averaged 166 kb/d in 2006, representing an average annual growth of 2.5% since 2000. Oil demand growth is expected to continue at a similar rate, reaching 184 kb/d by 2010.

Market Features and Key Issues

Oil Consumption by Sector



Oil Demand by Product, 1995-2006



The share of oil used in the transportation sector has increased significantly since 1990, rising from roughly one third to well over half of oil consumption in Hungary. Increased demand for automotive diesel has been largely responsible for oil demand growth. In the period from 2000 to 2006, gas/diesel demand growth averaged 5.6% annually, compared to 2.5% for motor gasoline. Transport fuels will continue to drive overall oil demand growth, with diesel demand outpacing all other fuels.

Oil Supply Infrastructure

Refineries

Hungary has four refineries, all of which are owned and operated by MOL, which was formerly state owned. The main refinery is the Duna refinery at Százhalombatta (central Hungary), which is currently the only crude processing refinery in the country. It has a total crude oil distillation capacity of 161 kb/d. The Tisza refinery (eastern Hungary) mothballed roughly 60 kb/d of distillation capacity in 2001 and is currently undertaking only diesel desulphurisation, MTBE production and gasoline blending. The Zala refinery (western Hungary) also mothballed 10 kb/d of distillation capacity in 2001 and now produces only bitumen. The Almásfüzitő refinery is engaged in lubricant production.

Pipelines

The Druzhba pipeline is Hungary's main crude oil supply channel. Originating in Russia and transiting the Ukraine, the section that terminates in Hungary is part of the Druzhba's southern branch. With a capacity of 160 kb/d (7.9 Mt/yr), this pipeline is able to deliver Russian crude oil to the Duna and Tisza refineries. The Adria pipeline, with a capacity of 200 kb/d (10 Mt/yr), links the Duna refinery to the Croatian port of Omišalj. This pipeline was originally intended to deliver Middle Eastern or African crude oil imports to Hungary; however, it has mainly been used in the opposite direction, transiting Russian crude oil to the Sisak refinery in Croatia. A further pipeline connection from the Duna refinery to Šahy (Slovak Republic) extends the Adria to the Slovak section of the Druzhba. This connection has a capacity of 90 kb/d (4.5 Mt/yr) and provides further flexibility in finding alternative supply routes in the event of an interruption of the normal supply.

Product exports from MOL refineries utilise barge transport on the Danube River as much as possible. MOL operates 1 200 km of internal product pipelines. Thirteen connected depots cover the supply of retail stations and wholesale customers in Hungary.

Storage

There is approximately 12.6 mb of product storage capacity in Hungary, roughly three-quarters of which is owned by MOL.

Decision-making Structure

The Minister of Economy and Transport is responsible for all aspects of oil supply security. Hungary's National Emergency Sharing Organisation (NESO) operates under the supervision of the minister. The permanent NESO body, the Division of Energy Management, operates under the supervision of the Director General for Energy. In a declared oil supply disruption, the expanded NESO would report directly to the minister. The Deputy State Secretary for Energy and Industry would also play a prominent role in the decision-making process. NESO includes appointed experts from certain partner ministries (e.g. the Ministry of Defence, the Ministry of the Interior, the Ministry of Environment Protection and Water), as well as representatives of the Hungarian Hydrocarbon Stockpiling Association (MSZKSZ), MOL and the Hungarian Petroleum Association (MÁSZ).

In the case of emergency, the Minister of Economy and Transport has significant scope of authority and power of decision regarding the public stocks of the MSZKSZ. Decisions regarding emergency measures are taken in consultations with the agency's board of directors, which includes representatives of Hungarian and multinational oil companies, as well as from the Ministry of Finance, the Ministry of Economy and Transport. The general meetings of the board of directors offer a permanent consulting and decision-making forum for emergency response.

Stocks

Stockholding Structure

Hungary places no separate compulsory stock obligations on industry. At the beginning of 1997, Hungary established a central stockholding agency responsible for storage operations, called the Association of Crude Oil and Oil Products Stockpiling (KKKSZ). New legislation under the *Natural Gas Act of January 2006* required the building of a natural gas strategic reserves; consequently, the KKKSZ was re-named as the Hungarian Hydrocarbon Stockpiling Association (MSZKSZ).

The MSZKSZ is responsible for covering Hungary's full stockholding obligation as a member of the European Union. Therefore, it must hold stock levels no less than 90 days of domestic consumption of the three main product categories (gasoline, middle distillates and fuel oil). In practice, the agency holds levels in excess of the minimum requirement.

The MSZKSZ is an independent not-for-profit company. It is financed by compulsory membership of all crude and oil product importers in Hungary: membership levies are proportionate to the percentage of oil the company imports. Decisions concerning stockholding practices are made by the agency's board of directors.

Crude or Products

At its general meeting, the board of directors determines the composition of reserves in accordance with the statutory provisions. One-third of the stocks are required to be kept in crude oil and two-thirds in the form of petroleum products.

Total public stocks of the MSZKSZ at the end of 2006 were 10 mb. Some 6 mb of this was in the form of refined product stocks, with roughly one-third motor gasoline and two-thirds middle distillates. At the same time, of the 6.5 mb of stocks held by industry for commercial purposes, roughly 55% was in the form of refined products, principally middle distillates.

Location and Availability

All volumes of compulsory oil stocks are owned by the MSZKSZ. They can be stored either in MSZKSZ-owned or co-owned storage tanks, or in capacity rented from the domestic market. All strategic stocks must be available for withdrawal within 48 hours of the government's order for release.

Hungary has a formal bilateral stockholding agreement with Slovenia to hold ex-territorial stocks; however, in practice no such stocks are currently held outside the state. A small amount of Slovenian oil stocks are held in the territory of Hungary.

Hungary does not allow stock ticket arrangements

Monitoring and Non-compliance

The MSZKSZ is an independent body that is solely responsible for maintenance and supervisions of stocks, whether held by companies or by the association itself.

Stock and Drawdown Timeframe

In the event of a supply disruption, the drawdown of the stocks is ordered by the Minister of Economy and Transport, based on consultations with NESO members. As the MSZKSZ is a member of NESO, the drawdown activity can be started immediately.

Members of the MSZKSZ will have the right to buy from the government stock release a percentage of products that is proportionate to their membership levy of the MSZKSZ. They have 48 hours to declare their quota, after which those not drawing their right, or those who have not responded, forgo all access to the stockdraw. The minister then has the right to choose how to apportion the excess stock.

The time lag for physical delivery of stocks to market after a release decision depends on the type of stock released. In the case of crude oil stored at refineries, it would require several days. However, the bulk of products stocks are stored in commercial tank farms and delivery could be started within a couple of days. The lag time would be used to fulfil the stockdraw regulations (allocation for the member companies, signing commercial contracts, presenting bank guarantees, etc.).

Financing and Fees

All emergency stocks are owned by the MSZKSZ. The purchase and storage of stocks are financed by short- and medium-term bank loans. The interest payments and the storage costs are covered by the

storage contribution levies paid by members (all importers are obliged to be members). A government decree defines the fee charged on every tonne of imported crude oil or oil product. Principal payments are made only in case of the release and sale of stocks.

Changes to the volume of stocks are allowed through the use of time-swaps, which are applied to reduce the costs of stockpiling on the condition that such action will not reduce the stock level to less than 90 days. Thus, only a surplus is used for time-swaps, or the MSZKSZ buys first and sells later.

Other Measures

Demand Restraint

Hungary has long-standing rules and legislation (since 1979) that give the Minister of Economy and Transport wide authority to implement demand restraint measures. In a supply disruption, the minister is entitled to take measures to restrict consumption; these measures would be outlined in a decree issued jointly with the other ministers concerned in the regulation.

There are three stages of demand restraint: light-, medium- and heavy-handed measures. Light-handed measures can be executed within a few days and can result in a 2-4% reduction in consumption. The medium-handed measures would need one to two weeks for implementation and should result in a 4-8% reduction of consumption.

In the case of heavy-handed measures, the following rules come into force:

- Fuel oils
 - For large consumers, a crisis committee determines quotas, based on a reconciliation of interests with the Hungarian Chamber of Commerce and Industry, which the various industrial branches will share on the basis of distribution patterns.
 - For small consumers, the problems are handled by restrictions of delivery and by determining retail quotas.
- Motor fuels would be subject to sector-specific measures as follows:
 - Restricting use by the chemical industry.
 - Introducing rationing tickets in the private sector, with the collaboration of the municipal organisations.
 - For the public sector, the local authorities would distribute tickets based on allocated quotas.
 - The Chamber of Commerce and Industry would allocate the quotas for the trading and services sector.

It would take two or three months after introducing these measures for the first effects of reduced consumption to be realised.

Oil Infrastructure of Ireland



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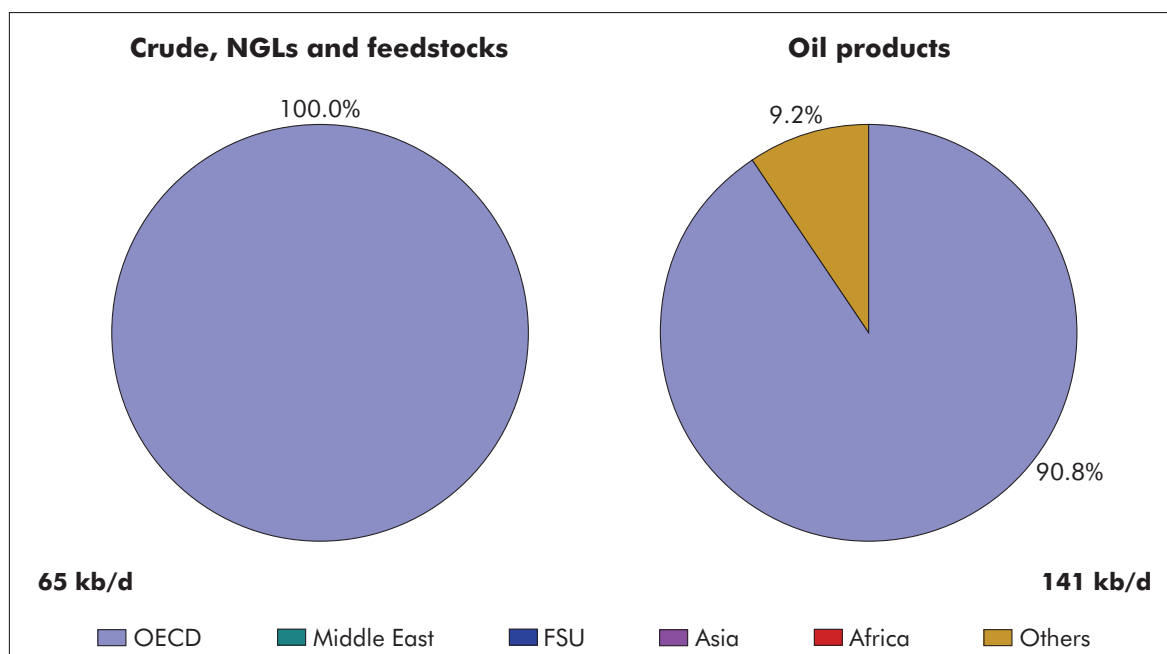
IRELAND

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	-	-	-	-	-
Demand (kb/d)	92.1	117.0	170.1	191.8	192.4	207.8
<i>Motor gasoline</i>	20.5	24.0	34.5	39.6	40.0	
<i>Gas/diesel oil</i>	34.5	44.3	64.1	75.2	77.7	
<i>Residual fuel oil</i>	16.9	23.9	31.7	23.0	18.6	
<i>Others</i>	20.2	24.7	39.8	54.0	56.1	
Net imports (kb/d)	92.1	117.0	170.1	191.8	192.4	207.8
Import dependency (%)	100	100	100	100	100	100
Stocks in days of net imports	102.0	97.0	106.0	112.0	113.0	
Refining capacity kb/d		52.5	71.3	71.0	71.0	72.4

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

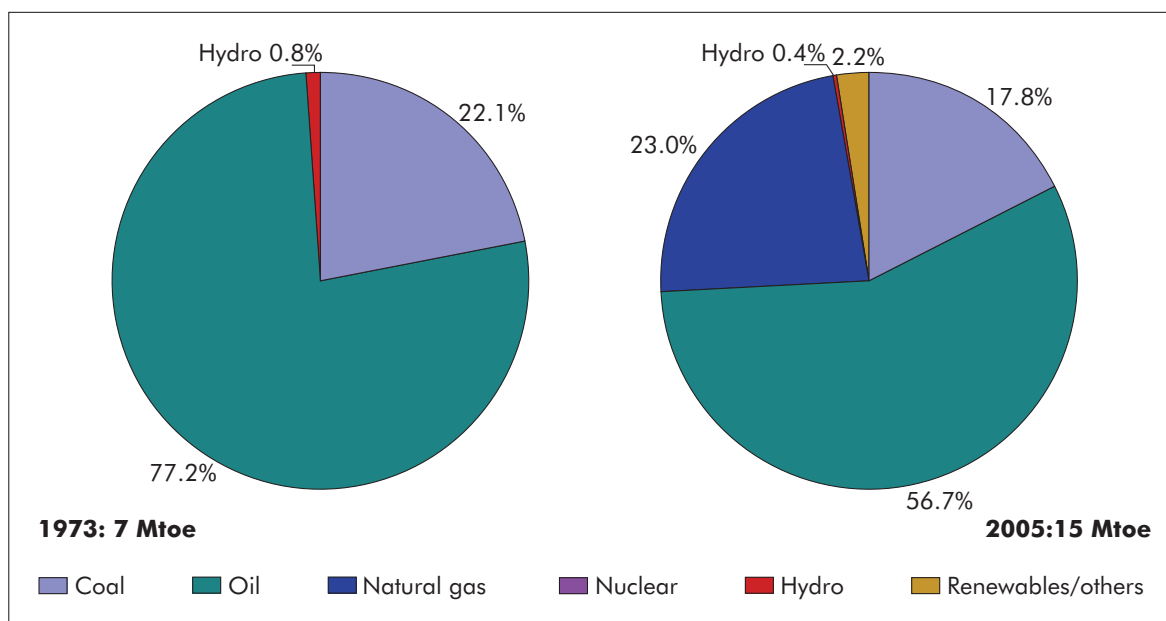
Country Overview

Ireland has some natural gas resources; however, to date, the country has had no indigenous oil production. All crude oil is imported, mainly from sources in the North Sea via production facilities in Norway and the United Kingdom. Ireland's high dependence on imported oil makes the country particularly sensitive to the volatility of the oil market. Ireland's energy demand is forecasted to grow by an average of 1.9% annually to 2020, with continued heavy dependence on oil.

Ireland meets its stockholding obligations through government and industry stockholdings. The National Oil Reserves Agency (NORA), the State Agency under the aegis of the Department of Communications, Energy and Natural Resources, holds compulsory strategic stocks, some of these in the form of tickets. In addition, certain industry players are expected to maintain "prudent" levels of commercial stocks. In an oil supply shortfall, Ireland would most likely draw stocks from NORA.

Energy Outlook

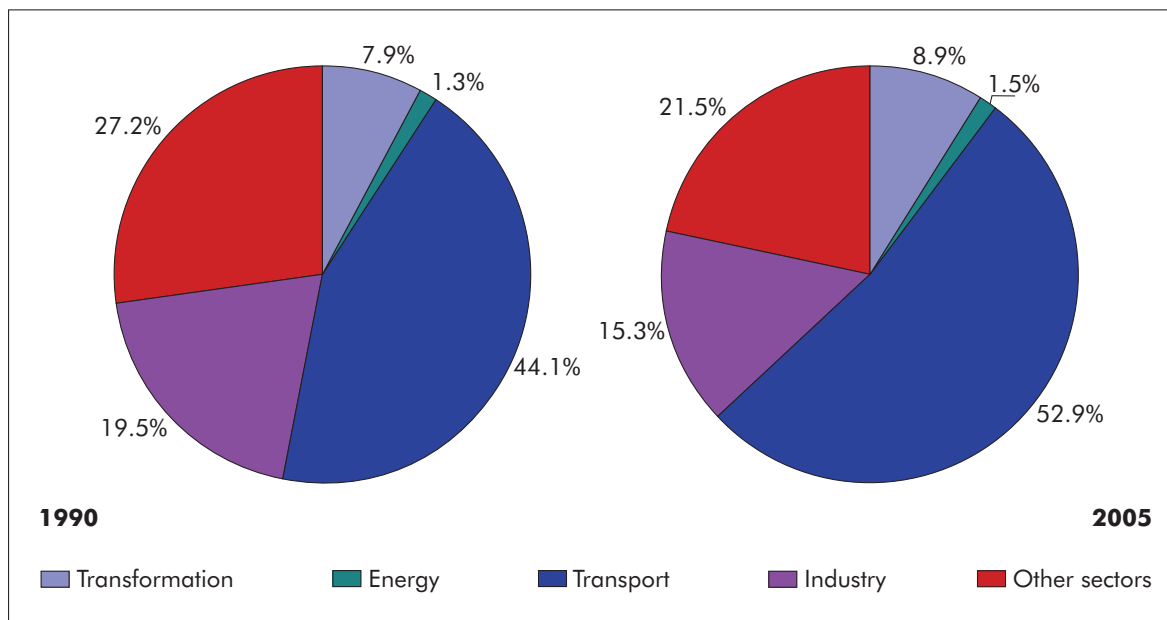
Total Primary Energy Supply



Oil remains the dominant energy source in Ireland, accounting for 57% of the country's total primary energy supply (TPES) in 2005. Primary consumption of oil in 2005 is 54% higher than in 1973. More significant is that the 2005 figure is 75% higher than 1990. Between 1990 and 2006, annual oil demand growth averaged 4.7%. This demand growth has been primarily due to the increase of oil use in the transport sector, spurred by Ireland's strong economic performance in the last decade.

In 2005, the transport sector accounted for the majority of total oil consumption in Ireland, reaching a 53% share.

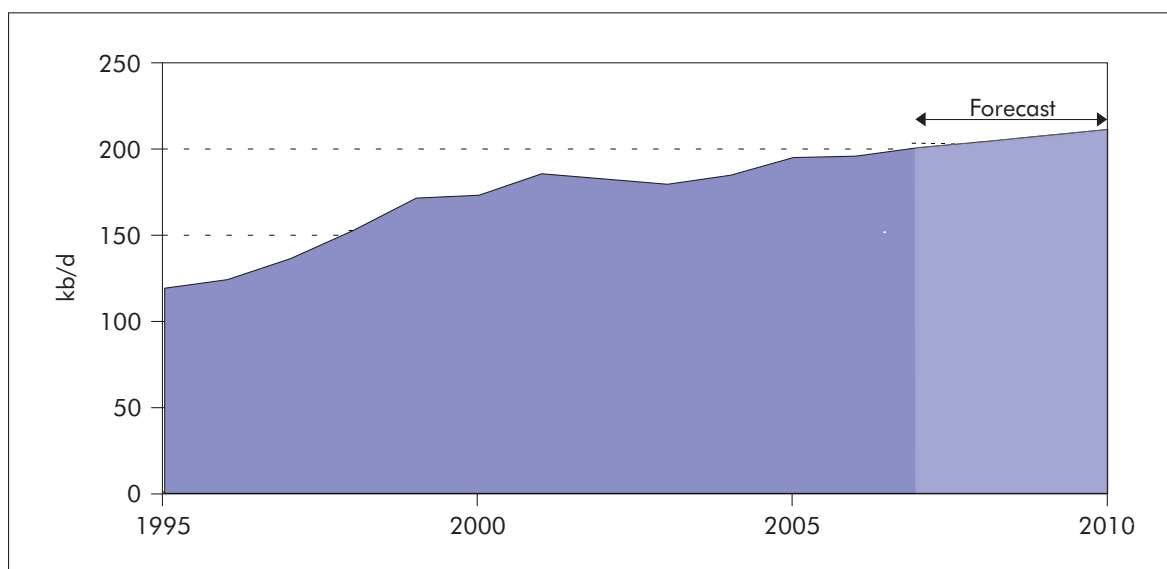
Oil Consumption by Sector



Market Features and Key Issues

Oil is a significant contributor to Ireland's energy mix; its share in Ireland's TPES and in total consumption is amongst the highest in IEA member countries. The average annual growth of oil demand in Ireland is estimated at 3.9% from 1995 to 2010, driven primarily by oil use in the transport sector, which accounts for over half of total oil consumption.

Oil Demand, 1995 - 2010



Ireland imports 100% of its oil requirements. Being geographically isolated and having no indigenous oil production or interconnecting pipeline infrastructure, Ireland is totally dependent on seaborne imports. In 2006, Ireland sourced most of its crude oil from the North Sea. Finished products not produced by Ireland's only refinery are sourced primarily from the United Kingdom.

A variety of players undertake downstream distribution and retail activities in Ireland, including Irish affiliates of oil majors, small- and medium-sized Irish companies, and independent retailers. These companies focus on marketing to meet growing consumer and industrial demand, based on just-in-time imports.

The government of Ireland was previously involved in operational aspects of the oil industry through the Irish National Petroleum Corporation (INPC). Its role ceased in July 2001 with the sale of the Whitegate refinery and the Whiddy Island oil terminal to the Tosco Corporation. These facilities are now owned by ConocoPhillips.

Oil Supply Infrastructure

Refineries

Ireland has only one refinery, located in Whitegate (County Cork), which is in the southern part of the country and has a private oil jetty. Crude oil is imported from the North Sea, primarily from Norway. Refinery capacity in Ireland increased from 56 kb/d in 1975 to 75 kb/d in 2006. Finished oil products for domestic consumption not supplied through the Whitegate refinery are sourced mainly from refineries in the United Kingdom.

Pipelines

There is no oil pipeline infrastructure in Ireland; national retail distribution is principally by road. In addition, Ireland has no oil pipeline interconnection with any other country.

Storage

Ireland has storage facilities distributed around the country. The main tank farms are located at the Whiddy Island oil terminal (Bantry, County Cork), the Whitegate oil refinery (Whitegate, County Cork), and oil company depots in Dublin Port. Ireland's total storage capacity is about 3.2 mb (420 Kt) of crude oil and approximately 17.5 mb (2.335 Mt) of product.

Decision-making Structure

The Minister for Communications, Energy and Natural Resources is responsible for Ireland's emergency response preparedness. The Oil Supply Division of this ministry serves as Ireland's NESO.

In emergency situations, NESO would work in close co-operation with the oil industry and the National Oil Reserves Agency (NORA).

Under the *Fuels Acts of 1971 and 1982*, the minister is empowered to regulate the acquisition, supply, distribution or marketing of fuels, including petroleum products – if the government decides that an emergency situation warrants such action. Under the *National Oil Reserves Agency Act 2007*, the drawdown of NORA stocks may be authorised by way of a ministerial decision.

Stocks

Stockholding Structure

Since 1995, the responsibility for maintaining Ireland's compulsory stock obligations has rested with NORA, which acts as an agent of the Minister for Communications, Energy and Natural Resources. NORA holds compulsory strategic stocks, some of these in the form of tickets. NORA is required to hold strategic oil stocks at a level determined at least once per year by the minister.

Oil companies that import oil or deliver products into the domestic market for consumption and large oil consumers are expected to hold “prudent” levels of operating stocks. However, these operators are not required to hold any compulsory stocks.

Crude or Products

NORA may hold its stocks in either crude oil or products, or as a combination of both. NORA holds all compulsory stock obligations in the form of finished products across the three classification categories used by the European Union.

Location and Availability

Emergency stocks can be held in Ireland and/or in EU member countries with which a bilateral oil stockholding agreement has been concluded. The Irish authorities do not impose any restrictions as regards to the location of emergency stocks stored abroad under bilateral agreements.

Ireland has formal bilateral stockholding agreements with Belgium, Denmark, France, the Netherlands, Sweden and the United Kingdom. At the end of 2006, oil stocks owned by NORA but held abroad accounted for about 10% of its obligation; some 40% of NORA obligation was covered by stock tickets abroad.

There is a commitment to rebalance Ireland's strategic oil reserve by maximising the country's wholly owned stocks of oil and the level of stocks held in Ireland, subject to increased storage availability and value-for-money considerations. This strategy is outlined in the government white paper, *Delivering a Sustainable Energy Future for Ireland*, launched on 1 October 2006.

Monitoring and Non-compliance

The Minister for Communications, Energy and Natural Resources receives detailed monthly statistical returns from oil supplying companies and large oil consumers engaged in direct imports of crude and products. Individual company data is cross-checked against returns by other companies and against import data provided by the Irish customs authorities.

In addition, the ministry carries out regular audits to ensure the accuracy of statistical reporting and compliance by industry.

Stock and Drawdown Timeframe

During an oil shortage, the Minister for Communications, Energy and Natural Resources would authorise the release of NORA stocks; NESO would notify NORA of the quantity and grade(s) of stocks to be released. In the event of stocks being required in Ireland, drawdown would be based on the previous year's market share as reported to the ministry by each oil company. NORA would issue letters of invitation/contracts to all oil companies entitled to a share of the stocks. Stocks would be released into the market via the oil companies at prevailing market prices.

Each oil emergency situation must be assessed individually. However, it is expected that decisions for drawdown/release of NORA stocks would be made within a time frame of 24 to 48 hours.

NORA-owned stocks held in storage by oil companies within Ireland could be delivered into the market within 48 hours of a decision to drawdown stocks, thereby supplementing available commercial stocks held by oil companies. NORA-owned stocks stored abroad and oil held as stock tickets would be shipped or swapped, as appropriate and as quickly as possible.

NORA stocks can be drawn down in any order or combination of orders. Depending on the given circumstance, NORA may deem it most appropriate to take the following actions: release wholly owned stocks stored in Ireland; release wholly owned stocks stored outside of Ireland; utilise stock ticket contracts; or, indeed, any combination thereof.

Financing and Fees

Oil companies do not receive financial assistance to support the costs of their stocks. NORA receives no funding from the government; rather it negotiates commercial bank loans for the purchase of its wholly owned oil stocks. Other operational costs, including the financing of commercial loans, are financed by a levy imposed on domestic deliveries and paid by oil marketing companies and oil consumers. The levy – known as “The NORA Levy” – applies to the sale of all oil products (other than exempted products). These funds finance the agency's operation. The previous NORA levy of 0.476 Euro cents per litre has remained unchanged since the agency was established in 1995. It has been increased to one Euro cent per litre since the 1st of November 2007.

In 2006, total operating costs for NORA were EUR 29.6 million, which included storage costs of EUR 18 million. Levy income totalled EUR 37 million.

Other Measures

Demand Restraint

The *Fuels Acts of 1971 and 1982* provide for significant powers for government intervention in the market in the event of a major oil supply disruption. Under this legislation, the government may make an order authorising the Minister for Communications, Energy and Natural Resources to intervene. The criteria for such intervention is that the government is of the opinion that the exigencies of the common good necessitate the regulation or control, by the minister on behalf of the state, of the acquisition, supply, distribution or marketing of fuels (including oil) held by private sector oil companies.

In such circumstances, the minister does not take ownership of oil held by private oil companies. However, the minister may restrict the export of such oil and require companies to sell it to the Irish market.

Once the government makes an order to intervene, the minister is empowered to make an order (or multiple orders) to regulate or control a certain fuel or fuels. Under the *Fuels Acts*, the minister may implement demand restraint measures by introducing ministerial orders to set a limit for minimum sales, to restrict opening hour for filling stations, or to restrict storage and distribution of oil. If the minister introduced an order to reduce speed limits, enforcement of the maximum speed limit would be carried out by the national police force.

Fuel Switching

Ireland's electricity utility – the Electricity Supply Board – has the capability of switching from fuel oil to natural gas, up to a maximum of 2.8 mcm/d.

Oil Infrastructure of Italy



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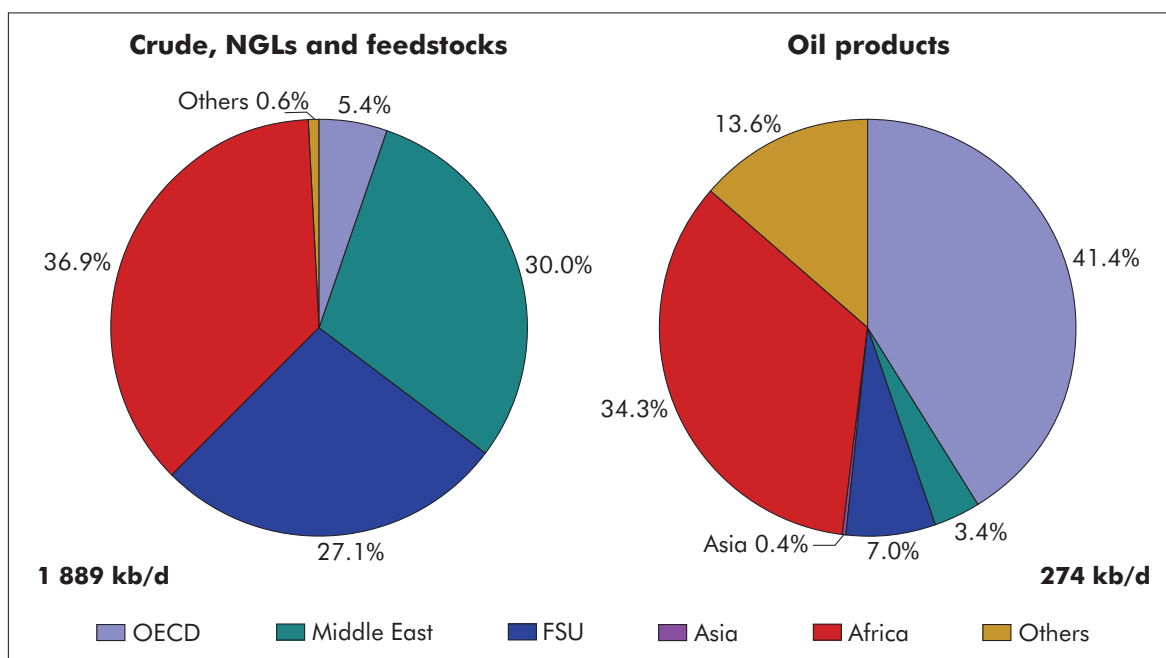
ITALY

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	90.3	96.2	78.0	124.6	124.8	115.3
Demand (kb/d)	1 873.8	1 943.6	1 854.5	1 755.7	1 734.1	1 664.4
Motor gasoline	301.8	444.4	398.0	326.7	307.3	
Gas/diesel oil	566.0	516.7	562.1	649.9	654.0	
Residual fuel oil	551.4	578.5	456.0	304.2	305.3	
Others	454.7	404.0	438.4	474.9	467.4	
Net imports (kb/d)	1 783.6	1 847.4	1 776.5	1 631.1	1 609.3	1 549.2
Import dependency (%)	95.2	95.1	95.8	92.9	92.8	93.1
Stocks in days of net imports	104.0	88.0	92.0	103.0	99.0	
Refining capacity kb/d		2 259.8	2 340.6	2 320.9	2 337.2	2 403.2

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

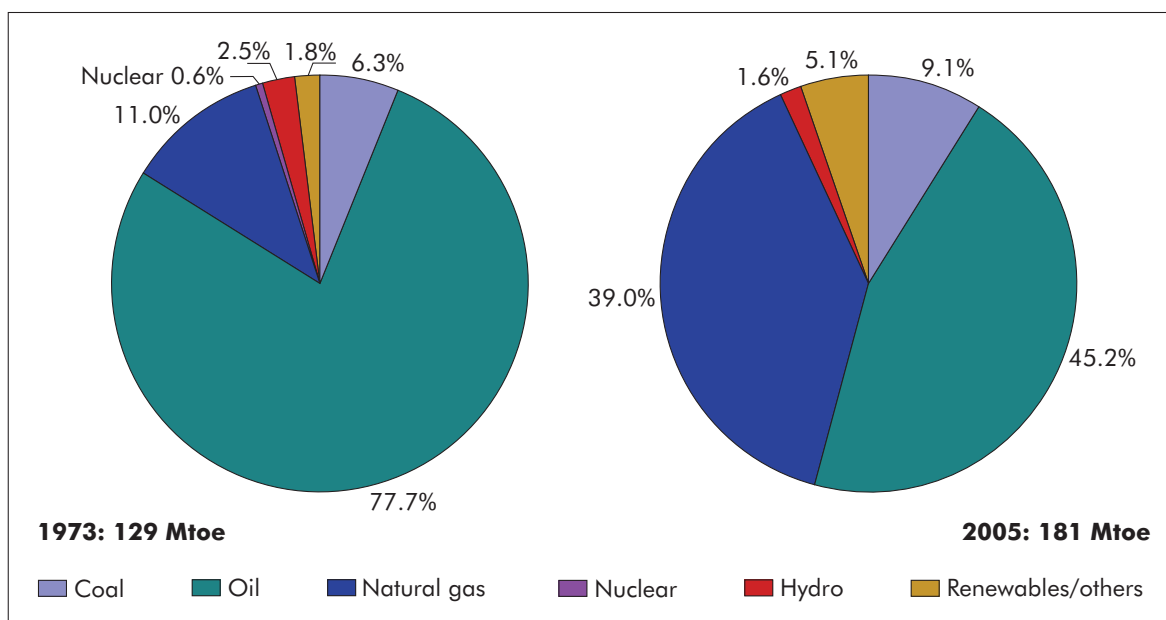
Italy is one of Europe's main refining countries, and is second only to Germany in the amount of crude distillation capacity. At the same time, Italian oil demand has been declining over the past decade, growing ever more concentrated in the transportation sector and dominated by the use of diesel oil. In addition, there has been a significant shift from oil to natural gas in electricity production, which has narrowed the possibility to make such a switch during an oil supply disruption.

Italy fulfils its minimum stockholding requirements to both the IEA and the European Union by placing stockholding obligations on industry. In an emergency, oil operators can be granted permission to draw on stocks below the minimum levels required.

Energy Outlook

Italy's energy supply mix remains dominated by oil and natural gas. Combined, these fuels have accounted for roughly 85% of total primary energy supply (TPES) since 1973. The increased use of natural gas in power generation has resulted in a shift away from oil, reducing oil's share of total energy sources from more than three-quarters to slightly less than one-half. Italy's TPES is expected to grow in the coming decade, largely driven by electricity demand; however, this growth in demand will be covered by the continued trend towards natural gas usage.

Total Primary Energy Supply



Oil demand in Italy has been declining steadily in recent years. Consumption averaged 1.7 mb/d in 2006, roughly equivalent to the 1985 level. This trend is expected to continue, with demand falling

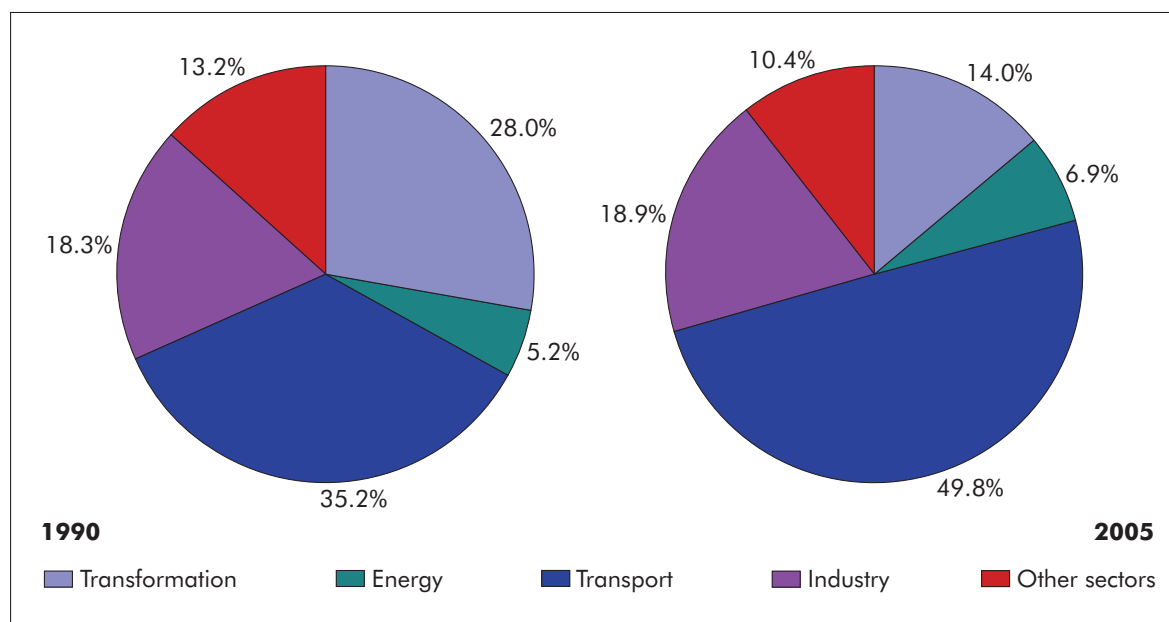
further to an average of 1.66 mb/d by 2010. Total domestic production, which averaged 125 kb/d in 2006, is expected to remain relatively flat.

Italian refineries rely heavily on imports, with crude from Libya and Russia being the dominant sources. The country's refinery capacity exceeds domestic oil consumption, making Italy a net exporter of refined products. Total net import dependency for oil, accounting for both crude imports and product net exports, was almost 93% in 2006.

Market Features and Key Issues

As natural gas replaces oil in electricity generation, the use of oil is increasingly concentrated in the transportation sector. The transport sector's share in overall consumption rose from 35% in 1990 to 50% in 2006.

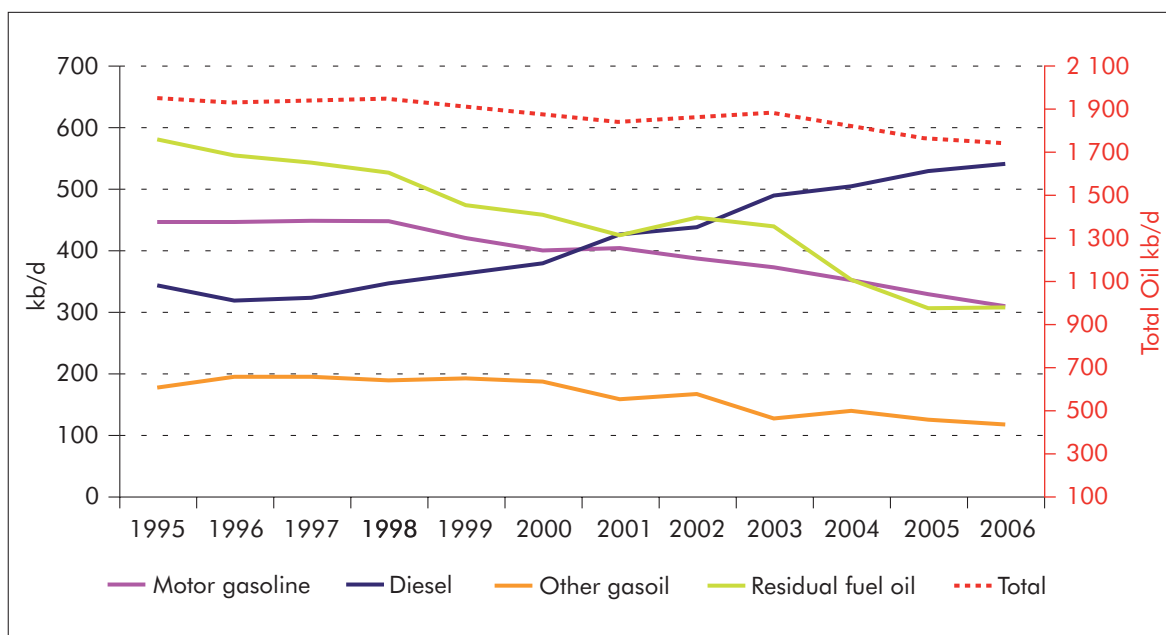
Oil Consumption by Sector



The breakdown of product demand by sector clearly shows the decreased use of residual fuel oils for electricity generation and the dieselisation of the Italian car fleet. Since peaking in 1995, total oil demand decreased by an annual average rate of 1% to 2006. Use of motor gasoline and residual fuel oil declined by 3.3% and 5.6%, respectively. Over the same period, diesel consumption grew by an average of 4.2% per year.

Italy exported some 520 kb/d of refined products in 2006, with gasoline and diesel each accounting for roughly one-third of the total. Some three-quarters of the diesel was exported to other European countries; one-quarter of the gasoline exports went to the United States.

Oil Demand by Product, 1995-2006



Oil Supply Infrastructure

Refineries

Italy has an important role as Europe's largest refining centre, and is a net exporter of refined products, providing a large share of its finished products to other countries.

There are 16 refineries operating in Italy, with a total crude distillation capacity of slightly more than 2.3 mb/d. Four of these refineries are located in the northern part of the country (in the Po Valley); the others are situated along the Mediterranean coast.

Industry has made substantial investments to adapt the refineries to changing markets – particularly the drop in demand for heavy fuel oil in the power sector and the growth of cleaner fuel consumption in the transport sector. All Italian refineries now comply with the EC Directive on lower sulphur content. However, further investment in desulphurisation capacity is necessary in light of ever-growing demand for diesel fuels of high quality specifications coupled with greater availability of sour rather than sweet crude oils.

Ports and Pipelines

The majority of crude and product pipelines is located in the north of the Italian peninsula. Because most refineries are situated along the coast, Italy has relatively few crude oil pipelines. The four inland refineries in the north receive crude by pipeline from Genova, Venezia and Vado Ligure.

Two major crude oil pipelines originate on the Italian coast and supply refineries in neighbouring countries. The Central European Line (CEL) has a capacity of 1 mb/d and supplies crude oil loaded at the port of Genova to the Swiss refinery at Collombey. A branch of the CEL that previously supplied oil to Ingolstadt (Germany) was closed in early 1997 due to environmental concerns and high re-development costs. The TransAlpine (TAL) pipeline provides oil from the port of Trieste to refineries in Austria, Germany and the Czech Republic. The trunk line, from Trieste to Ingolstadt (TAL-IG), has a diameter of 40 inches and a capacity of 850 kb/d.

Storage

Italy has 704 industrial and commercial depots across the country, with a total storage capacity of some 163 mb (25.9 mcm). This is split roughly into one-third crude and two-thirds finished products.

Decision-making Structure

Responsibilities for energy policy design and implementation are shared between the government and regional authorities. The Ministry of Economic Development, formerly the Ministry of Productive Activities, is responsible for energy policy and for maintaining an operating handbook on emergency procedures and measures for oil supply disruptions.

Within the ministry, the Oil Office of the Energy and Mineral Resources Directorate functions as the permanent body of the National Emergency Sharing Organisation (NESO). As such, the Oil Office monitors the oil market and maintains contacts with industry and the IEA. This permanent body is also responsible for monitoring industry's compliance with minimum stockholding requirements.

In a disruption, the ministry would convene the full NESO body, called the Conference of Services. This includes representatives from several relevant ministries: the Ministry of Foreign Affairs; the Ministry of the Interior and its Department for the Civil Defence; the Ministry of Transport; the Ministry of Defence; the Ministry of Environment; the Ministry of Health; and the Ministry of Communications. The Conference of Services also includes representatives from the oil industry and industry associations.

The Conference of Services, chaired by a representative of the Ministry of Economic Development, would meet within 24 hours and would decide the measures to respond in a supply disruption.

Stocks

Stockholding Structure

All stocks in Italy are held by industry. Legislation passed in 1998 established the National Reserve Stock Agency. To date, this agency has not played a role in the holding or managing of emergency reserves.

Italian legislation requires that total compulsory stocks for the country as a whole must not be less than 90 days of internal consumption during the preceding calendar year. This applies to the three categories covered by EU obligations. The holdings requirements are then increased by the difference needed to meet the country's obligations as an IEA member – *i.e.* to hold total oil stocks of at least 90 days of net imports. The Ministry of Economic Development calculates Italy's overall minimum stockholding needs and determines how this is allocated across all industry operators.

There are approximately 100 companies with stockholding obligations in Italy. Refiners processing for third parties abroad or for export must hold stocks equivalent to 23 days supply of the products obtained from such processing arrangements. This amount is deducted from the national obligation calculated by the ministry. The balance is then allocated to all operators that delivered products (from EU Categories I, II and III) into domestic consumption in the preceding calendar year.

In addition, secondary storage licence holders (small products depots authorised by the local prefecture) are required to hold stocks equivalent to 10% of gross tank capacity. As these depots are distributed widely over the country, such a compulsory stock requirement ensures broad product availability in an emergency.

Italy allows companies with individual stockholding commitments to transfer their commitments to another company through leasing or storage rental agreements.

Crude or Products

Italy stipulates that all compulsory stocks must be held as products. However, companies may hold crude to meet up to 40% of light/middle distillate stocks obligations and up to 50% of fuel oil stock obligations.

At the end of 2006, Italy's overall stock cover equated to nearly 100 days of net imports. This was composed of roughly one-third crude and two-thirds refined products. Some 40% of the refined product stocks were in the form of middle distillates.

Location and Availability

Compulsory stocks are not held separately from normal working or operational stocks. Companies are allowed to meet some or all of their stockholding obligations in the form of tickets, either domestically or in other EU member countries.

At the end of 2006, some 16 mb of compulsory stocks were held in other countries, representing roughly 11 days of net imports. At the same time, Italian companies were holding about 10 mb of oil on behalf of other countries.

Italy has bilateral agreements with Germany, Spain and Slovenia. It is also in the process of formalising an agreement with the Netherlands.

Monitoring and Non-compliance

Companies are obliged to report, on a monthly basis, to the Ministry of Economic Development the exact location, product and quantity of stocks. In times of possible tensions on the international markets or in a supply crisis, the ministry can demand more frequent reporting. In collaboration with the Revenue Guard Corps and the Customs Agency, the ministry monitors each company's compliance with the decree obligations.

The standard sanction for breaching stock obligations is a fine of EUR 5.165/t per day, for each tonne by which the company falls short of its prescribed minimum for that specific location.

Stock and Drawdown Timeframe

The NESO decision to use emergency reserves in a supply disruption would be announced in a ministerial decree that would authorise companies to reduce their mandatory stocks by a certain amount and to make these stocks available to the market. NESO would inform oil companies about the content of the ministerial decree through a directed and personalised communication to each company, which would include an indication of its share of stock drawdown.

Financing and Fees

No financial support is given to oil companies for holding stocks to meet minimum obligations.

Other Measures

Demand Restraint

The Conference of Services, once activated by the Minister of Economic Development, has the legal authority to decide upon and implement demand restraint measures. These include appeals to the public for voluntary measures to limit consumption and reduce domestic heating. Eventually, the ministry may also impose driving restrictions.

During the crisis, monitoring activities would be intensified, including increased frequency of reporting of stock levels and product deliveries to the market. Industry participants would also be required to submit forecasts of anticipated sales on a regional basis. The regional prefectures would become responsible for monitoring deliveries to vital sectors and making initial data verification of regional reporting.

Should the crisis become more severe, the restraint measures would be tightened. Regional shortages of oil products could be addressed through a redistribution of supplies, subject to the approval by the ministry.

Oil Infrastructure of Japan



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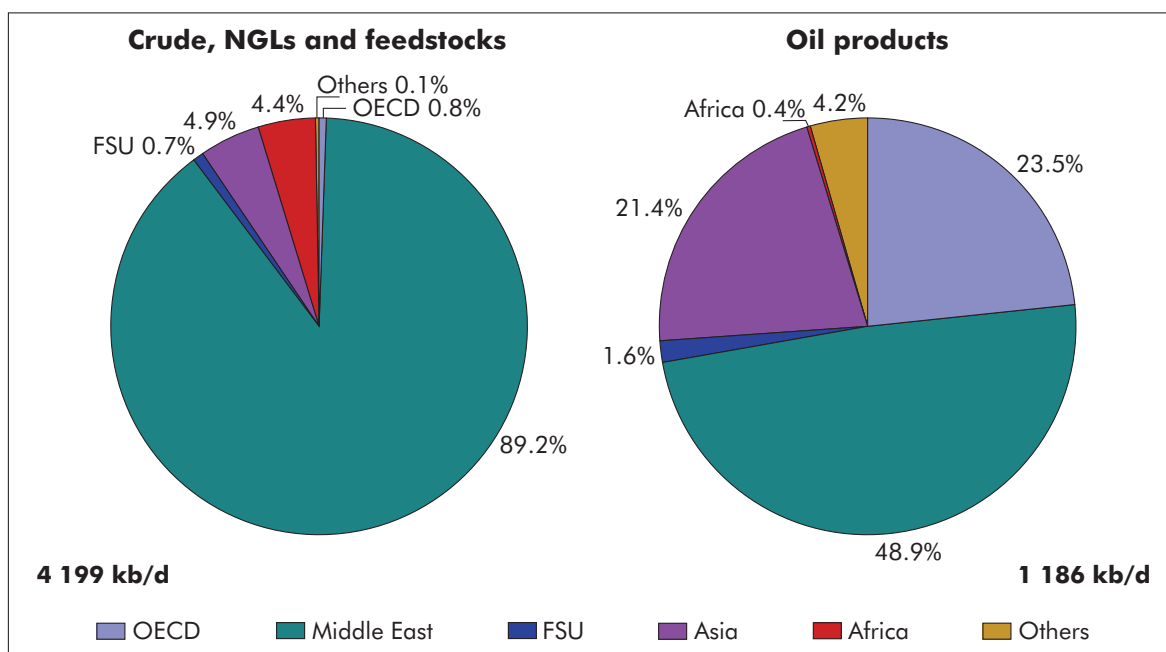
JAPAN

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	13.3	18.7	17.5	18.5	18.5	21.8
Demand (kb/d)	5 302.6	5 699.2	5 497.8	5 310.1	5 163.8	5 114.7
Motor gasoline	726.4	878.4	998.6	1 044.7	1 028.5	
Gas/diesel oil	1 112.4	1 273.1	1 242.2	1 151.6	1 082.9	
Residual fuel oil	896.5	805.7	645.5	575.7	542.0	
Others	2 567.3	2 741.9	2 611.4	2 538.1	2 510.4	
Net imports (kb/d)	5 289.3	5 680.4	5 480.3	5 291.7	5 145.3	5 092.9
Import dependency (%)	99.7	99.7	99.7	99.7	99.6	99.6
Stocks in days of net imports	112.0	113.0	118.0	136.0	148.0	
Refining capacity kb/d		4 846.7	4 997.7	4 706.9	4 676.7	4 896.5

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

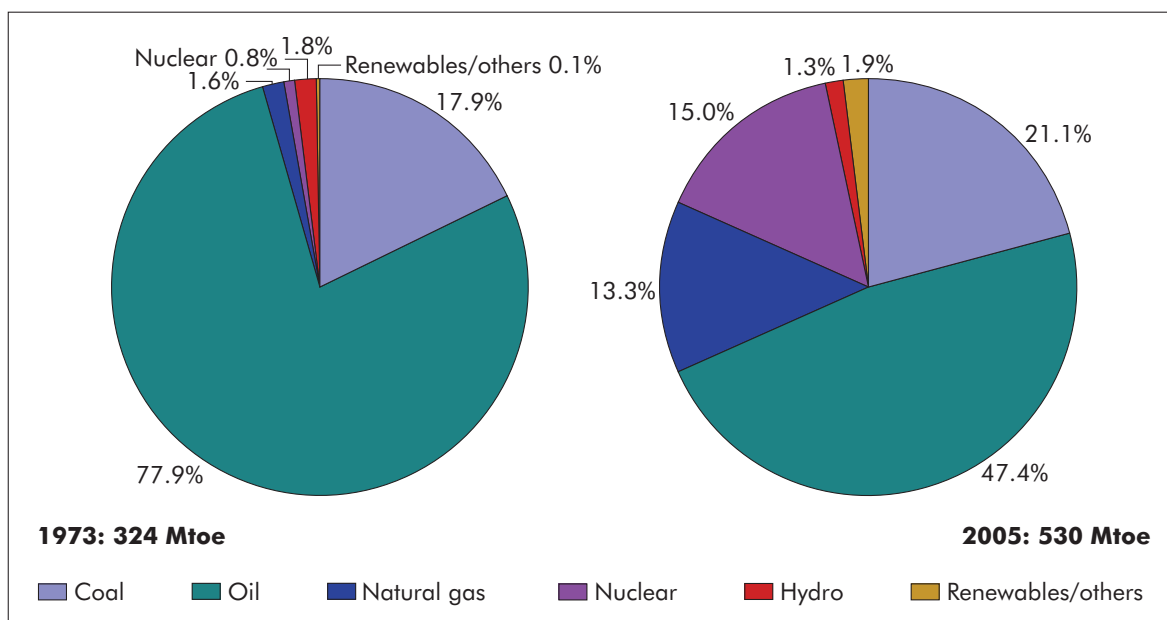
Japan has very limited domestic oil reserves and relies almost entirely on imports to meet its consumption needs. In 2006, Japan imported 5.4 mb/d of oil and consumed 5.2 mb/d. These volumes make Japan the second-largest net importer of oil behind the United States and the third-largest consumer of oil behind the United States and China.

Between 1990 and 2005, oil demand in Japan decreased on average by 0.2% annually, mainly due to a lower economic growth rate and energy savings derived from energy-efficiency technologies. Since 1980, Japan has had the lowest electricity consumption per GDP among IEA member countries.

National oil security is a high priority: Japan is entirely dependent on oil imports and the sources of these imports are currently concentrated in one region, the Middle East. To ensure oil supply security, Japan has emergency reserves consisting of both government stocks (managed by a stockholding agency called the Japan Oil, Gas and Metals National Corporation or JOGMEC) and obligatory industry-held stocks. In an oil supply shortfall, Japan would respond by either using the public stocks of JOGMEC, or lowering the obligation on industry.

Energy Outlook

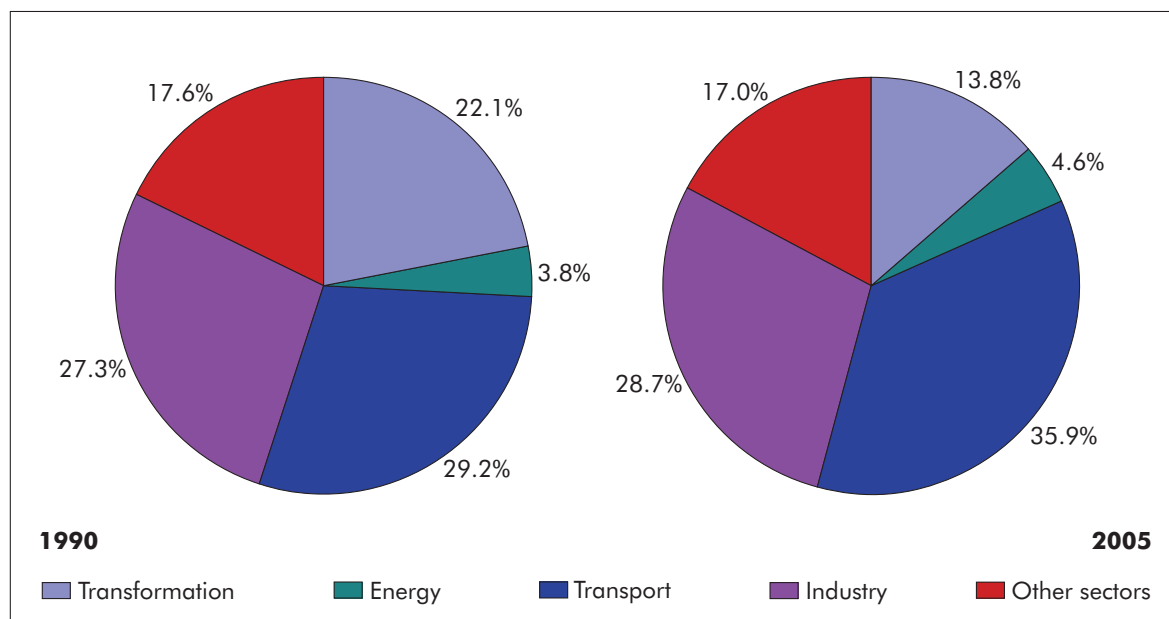
Total Primary Energy Supply



Japan's total primary energy supply (TPES) was approximately 530 Mtoe in 2005. Oil accounted for 47% of TPES, yet its share decreased by 40% compared to 1973, primarily due to increases in nuclear power and natural gas in the energy portfolio. However, the oil share is still higher than the OECD average (41%) because oil is an important source for electricity production. In real terms, oil consumption in 2005 was practically the same as it was in 1973.

The transport sector has the major share (36%) of oil consumption, followed by the industry sector (29%). Oil consumption in the transport sector has increased by 21% since 1990, but was much lower than the 2005 average of 55% for IEA member countries.

Oil Consumption by Sector

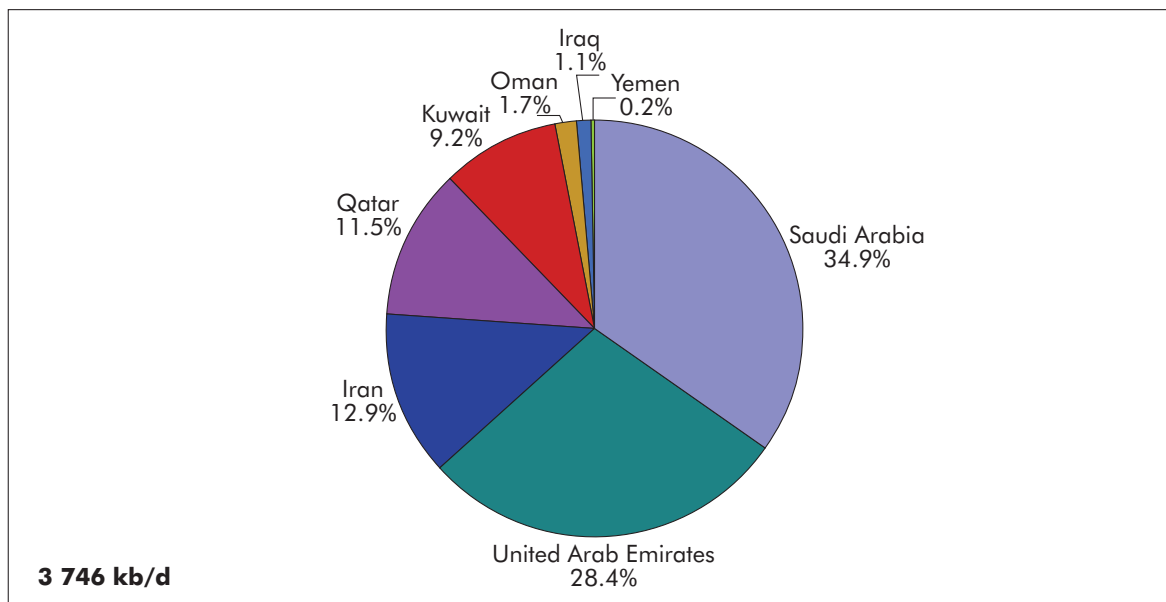


Looking ahead to 2010, demand for oil in Japan is predicted to decline by 1% compared to the 2006 figure of 5.2 mb/d. Domestic production, which is almost negligible already, is expected to decline moderately.

Market Features and Key Issues

Japan relies entirely on oil imports to satisfy its demand. In 2006, total crude oil (including NGLs and feedstocks) imports were 4.2 mb/d (total oil imports were 5.4 mb/d), almost 90% of which came from countries in the Middle East. From all Middle Eastern crude oil imports Saudi Arabia accounted for 35%, the United Arab Emirates for 28%, Iran for 13%, Qatar 11.5% and Kuwait 9%. Japan's dependency on imports of Middle Eastern oil was also high in the 1970s, but had dropped to 67.4% in 1987. The figure has since risen steadily because it became increasingly difficult for importers to diversify sources.

Middle East Crude Oil (Including NGL and Feedstocks) Imports, 2006



Oil Supply Infrastructure

Refineries

Japan has 30 oil refineries, situated primarily in coastal areas. As of January 2007, total refining capacity was 4.7 mb/d, down from 5.0 mb/d in 2000. The refining market in Japan showed overcapacity in recent years, as consumption of petroleum products declined. Refining capacity is expected to increase moderately by 2010, reaching 4.9 mb/d or almost 5% more than in 2006.

The Japanese refinery sector has recently been rationalised through deregulations undertaken since the mid-1990s. The goal of these efforts was to strengthen market mechanisms. The results have been quite positive: market functions have been enhanced, and Japanese companies are more competitive and have lower operational costs.

Pipelines

Unlike IEA European countries, Japan does not use pipelines to deliver oil products to the domestic market. Most imported oil is unloaded at refineries and/or terminals in coastal areas. Coastal tankers then transport products directly to the facilities of heavy users such as petrochemical companies and the electric power industry. For smaller customers, such as residential/commercial consumers, tank lorries distribute oil to local oil terminals and, subsequently, to service stations and customers.

Storage

The total storage capacity managed by JOGMEC amounts to 252 mb, all of it located in ten sites around the country. JOGMEC also rents some 107 mb storage capacity from private companies. In total, (including industry's storage capacity) Japan's storage capacity is well above 900 mb.

Decision-making Structure

The Agency for Natural Resources and Energy (ANRE), a part of the Ministry of Economy, Trade and Industry (METI), has taken a lead role in strengthening Japan's strategic oil reserves plan since 1971.

In case of emergency, ANRE is mandated to take full responsibility to ensure a stable and efficient energy supply in the market. It also has authority to promote appropriate use of stocks in order to stabilise the Japanese economy. Under Japanese legislation, METI could also order the ANRE to activate an oil-sharing system by launching emergency response measures. This could include initiatives such as releasing emergency stocks and restraining oil demand.

In April 2003, the Japan Oil, Gas and Metals National Corporation (JOGMEC) was established to manage the state petroleum stockholdings, which were previously managed by the Japan National Oil Corporation (JNOC). Under the new system, JOGMEC acts on a contractual basis under government supervision to fulfil a comprehensive role in organising Japan's emergency stockholding, including emergency stock release to reduce oil market tightness in a short-term oil supply disruption.

METI also has the legal power to lower the industry stock obligation. In peacetime, industry is required to hold at least 70 days of consumption volume. During a crisis, each company may be called upon to make additional oil available to the market.

Stocks

Stockholding Structure

Japan's emergency reserves comprise both public stocks (managed by JOGMEC) and obligatory industry-held stocks.

As of December 2006, Japan maintained about 320 mb of government oil stocks, including 100 mb in storage tanks rented from private companies. Public stocks, which are managed by JOGMEC, have been built gradually and are held separately from commercial stocks.

Private stocks are mandatory for the industry, with an obligation to maintain at least 70 days of stockholding proportional to the volume of imports, production and sales for each company. Industry stocks reached 270 mb as of December 2006.

In 2006, Japan held 590 mb of total reserves, equivalent to about 148 days of net imports.

Crude or Products

Strategic reserves held by the Japanese government and managed by JOGMEC are all in crude oil form. This reflects the facts that Japan has sufficient refining capacity and that holding processed oil products is less cost-effective.

Hurricanes Katrina and Rita demonstrated the need for all IEA member countries to be prepared to supply products to the global market in crisis situations. As part of a new national energy strategy (launched in May 2006), Japan is now considering ways to reinforce the role of its public stock by also holding emergency product stocks.

Location and Availability

Japan's stockholding law stipulates that all government/compulsory stocks must be held domestically. As of October 2007, Japan has no bilateral stockholding agreements with other countries, nor does it hold any stock tickets. Japan and New Zealand are expected to sign a bilateral stockholding agreement by the end of 2007.

Monitoring and Non-compliance

Under law, companies subject to the obligation must record the volume of petroleum stocks in their possession twice per month. METI then checks the volume of stockholdings once per month and, if necessary, makes on-site inspections.

If companies fail to fulfil the obligation, METI has the right to recommend or issue an order to satisfy the compulsory stock level. If such an order is not followed, METI can then impose a penalty of up to one year in prison or a fine of up to USD 25 000 (JPY 3 million).⁹

Stock and Drawdown Timeframe

METI has the jurisdiction to make decisions to release oil stockholdings, in accordance with Japanese laws. Necessary procedures are initiated by ANRE immediately after the decision.

ANRE and JOGMEC then initiate a tender process for the sale of government crude oil. Delivery of the crude oil takes approximately 14 days after the release decision by METI. Current government stockholdings would make it possible to release up to 4.9 mb/d for approximately two months.

To date, government stocks have never been released for emergency reasons. However, private stock releases (through the lowering of obligations) have been made on three occasions: during the oil crisis of 1979-80, the Gulf War in 1991, and in the aftermath of Hurricanes Katrina and Rita in 2005.

⁹ Calculated on the average exchange rate from January to September 2007 of USD 1= JPY 119.

Financing and Fees

The cost of government stockholdings is estimated to be about USD 38/Kt¹⁰ (JPY 4330/Kt) of oil. (This figure is based on a trial calculation for the fiscal year 2005.) Individual companies cover the cost of industry stockholdings.

Other Measures

Demand Restraint

Upon the outbreak of an emergency – and with careful consideration of its magnitude – Japan's Council for the Promotion of Energy and Resources Conservation Measures would convene to define a concrete demand restraint plan. This council comprises administrative officials at the vice-minister level of relevant ministries and agencies, as well as other authorities.

The government has the legal authority to activate, as necessary, every appropriate measure to reduce oil consumption at every stage of an oil supply disruption. In the early stage of a crisis, the government directions would call on public sector (national government, local governments, and related organisations) to save energy in the following ways:

- Setting moderate temperature in using air conditioners.
- Turning off unnecessary lights.
- Restraining car use.
- Promoting more energy efficient cars.

For the second stage, the business community and households and citizens are requested by the law to save energy in the same ways.

These energy conservation measures can be strengthened as needed.

Fuel Switching

In the event of a natural disaster or any other state of emergency, METI can advise the Japanese electric power industry to revise supply plans based on an order issued under the *Electricity Business Act*, to secure an adequate power supply. In this advice/order, METI may ask/induce the companies to switch to non-oil energy sources such as coal, natural gas, nuclear power or hydropower.

¹⁰ Based on an average exchange rate from May 2005 to March 2006 of USD 1= JPY 113.95.

Oil Infrastructure of the Republic of Korea



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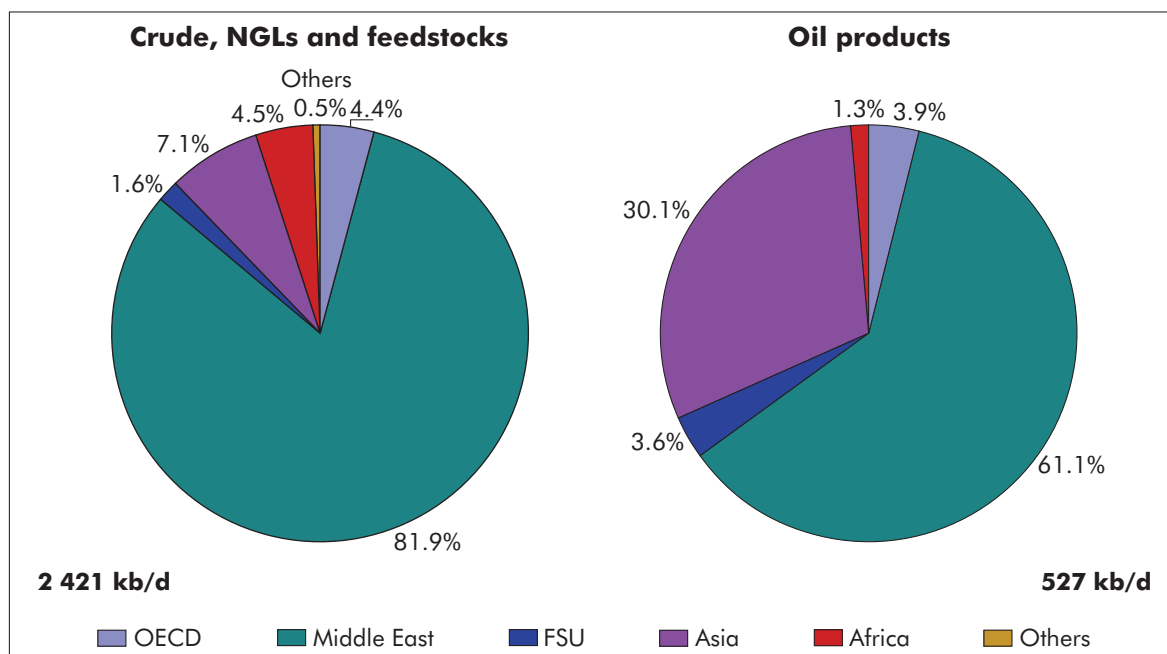
REPUBLIC OF KOREA

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	-	13.0	9.8	11.0	10.0
Demand (kb/d)	1 048.3	2 009.4	2 136.3	2 192.2	2 174.3	2 345.4
Motor gasoline	64.9	163.9	170.5	162.9	163.9	
Gas/diesel oil	279.1	481.6	379.1	413.7	412.8	
Residual fuel oil	333.1	558.9	487.3	434.1	417.7	
Others	371.1	805.0	1 099.3	1 181.5	1 179.9	
Net imports (kb/d)	1 048.3	2 009.4	2 123.3	2 182.4	2 163.3	2 335.4
Import dependency (%)	100	100	99.4	99.6	99.5	99.6
Stocks in days of net imports	23.0	57.0	92.0	110.0	140.0	
Refining capacity kb/d		1 818.0	2 438.0	2 576.5	2 735.0	2 790.0

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

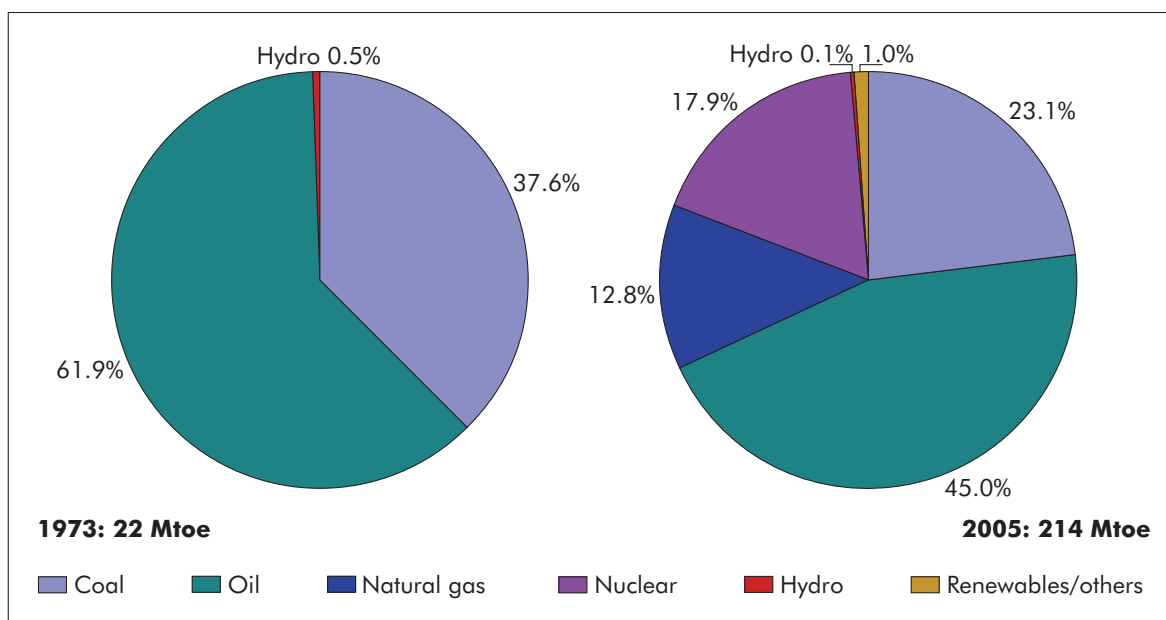
The Republic of Korea depends almost entirely on imports to meet its oil demand. Due to the wider use of automobiles in the last 20 years, oil demand in the transportation sector has increased more than twofold. Nevertheless, the industrial sector remains the major oil user, consuming 40% of the total supply. In fact, Korea has been in the highest rank of oil supply per GDP ratio of OECD countries since 1995.

In preparation for an oil supply disruption, Korea holds government strategic stocks and has an obligation on industry. In the event of a crisis, Korea would generally consider drawing down its public stocks.

Energy Outlook

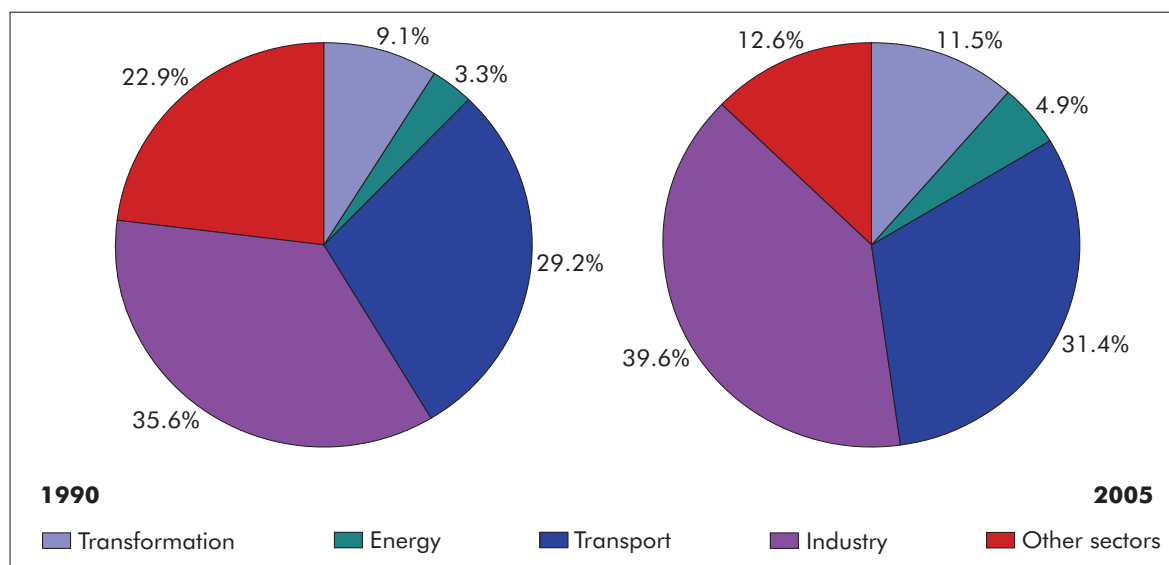
Korea's total primary energy supply (TPES) stood at 214 Mtoe in 2005, reflecting an average annual increase of 7.4% since the early 1970s when TPES was 22 Mtoe. Oil's share in the energy mix has declined since the 1970s, when it accounted for 62% of TPES – and from a peak of 68% in 1978. However it still represents 45% in 2005, followed by coal (23%), nuclear energy (18%) and natural gas (13%).

Total Primary Energy Supply



Transport and industry have remained the main oil-consuming sectors in Korea over the last 16 years. Together, they represent more than two-thirds of Korean oil consumption. Since the 1990s, oil consumption has increased at an average of 4.7% per year.

Oil Consumption by Sector

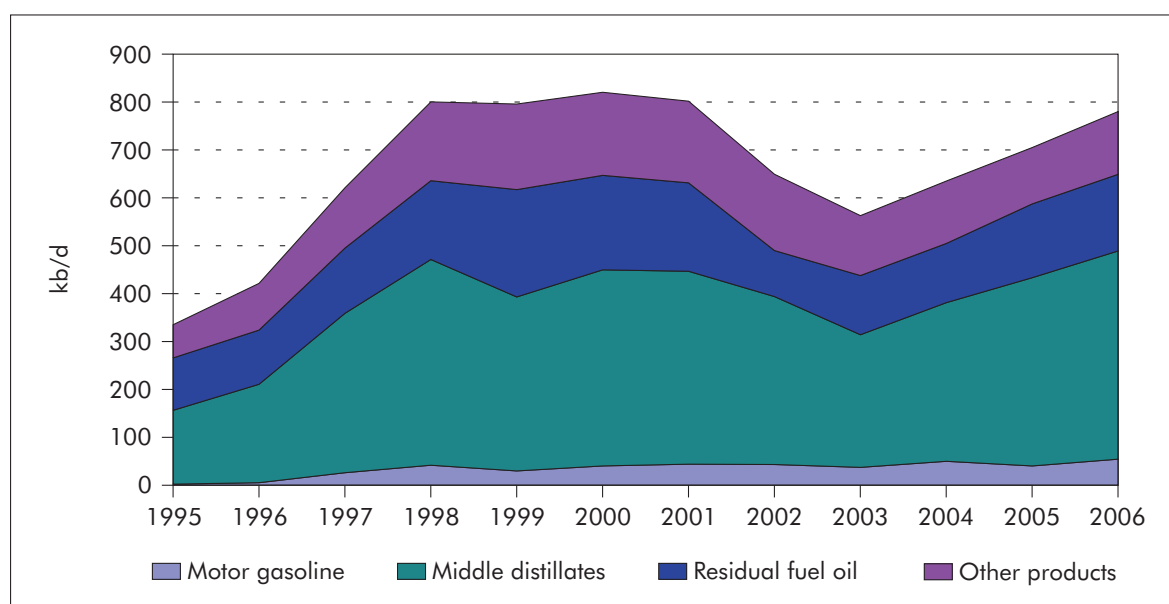


Since joining the IEA in 2002, Korea's oil demand has remained stable at around 2.2 mb/d. Oil demand will increase to 2.3 mb/d in 2010, with an annual growth rate of 1.9%.

Market Features and Key Issues

In the late 1980s, Korea's oil consumption increased rapidly, showing almost double-digit growth rates that exceeded GNP growth during the same period. Korea has had the highest level of net oil import per GDP ratio of OECD countries since 1990.

Exports of Oil Products, 1995-2006



Korea imports almost all its oil requirements. It is highly dependent on Middle Eastern oil, the source of more than 80% of its total crude oil (including NGLs and feedstocks) imports. To strengthen its ties with the region, the Korean oil industry has been promoting partnerships with the United Arab Emirates and Saudi Arabia, effectively allowing Arab companies to be shareholders in major Korean oil companies.

The Korean refining sector has more than enough processing capacity to satisfy domestic consumption. Thus, companies are able to export oil products, mainly to neighbouring Asian markets. In 2006, Korea exported 780 kb/d; more than half of these exports were in middle distillates, with residual fuels being the next most important export.

Oil Supply Infrastructure

Refineries

Korea's total refining capacity was about 2.74 mb/d in 2006, with 91% utilisation. This large capacity gives Korea the ability to export almost 780 kb/d.

Refining companies plan to expand their upgrading facilities, largely in response to growing demand for light products in global oil markets. In particular, S-Oil, a domestic refining company, is expanding its upgrading capacity from 188 kb/d to 338 kb/d by 2010.

Pipelines

Korea has no crude pipelines. In 2007, the country had 1 661 km of refined products pipelines. The most important is the South-North Pipeline (SNP) owned by the Deahan Oil Pipeline Corporation (DOPCO), which stretches 910 km and has a capacity of roughly 379 k/d. DOPCO owns two other smaller pipelines: the Gyungin is 78 km and has a capacity of 136 kb/d; the Hosea runs 93 km with a capacity of 90 kb/d. The combined capacity of all DOPCO pipelines is 1.0 mb/d.

In 1999, the Korean government amended legislation, thereby deregulating procedures for licensing new pipeline construction. The new legislation also extends to new provisions on construction and safety management for all pipelines.

Storage

Under the current stockholding plan, started in 2002, the government aims to have 146 mb of oil storage capacity and to hold 141 mb of crude and products oil stock by 2010.

In 1999, Korea initiated a programme known as *International Joint Stockpiling*, under which the government leases surplus tank capacity owned by the Korea National Oil Corporation (KNOC) to industry, including foreign companies. Within a current KNOC storage capacity of 121.2 mb, the surplus storage capacity in the public sector was estimated at 45.4 mb as of December 2006.

Decision-making Structure

Under the *Petroleum and Petroleum-Alternative Fuel Business Act*, the Ministry of Commerce, Industry and Energy (MOCIE) has the authority to decide oil demand and supply settlement measures, petroleum distribution and other emergency response measures.

In case of oil emergency, MOCIE is authorised to order KNOC to release the stocks into the market. MOCIE can also lower the obligatory requirement for industry stocks. Both policy measures allow Korea to implement emergency response actions in co-ordination with global emergency responses for a major oil supply crisis.

Stocks

Stockholding Structure

As of December 2006, Korean emergency reserves were split almost equally between government and industry stocks. The total emergency reserve accounts for 140 days of Korean net imports.

Korean crude refiners and oil product importers are obliged to hold at least 40 days of stocks, in either crude or products, based on a 12-month average of the previous year's sales. For LPG importers and petrochemical companies, the minimum obligation is 30 days of domestic sales volumes. All companies must report their stocks levels to KNOC on monthly basis.

Korea started its first strategic stockpiling plan in 1980. By 1988, it achieved its initial goal of having a governmental stockpile of 44 mb, equivalent to 66 days of oil consumption. At the time, Korea also had 40 days of private stocks, bringing the total stock level to more than 100 days of oil consumption.

Due to rapid demand growth during the 1980s, the Korean strategic stockpile declined drastically compared to its consumption level. Consequently, the government launched a second phase of the stockpiling plan (1990-99), adding 52 mb of oil and completing five new storage facilities.

In the third phase of the oil stockpiling plan (from 2002 onwards), Korea will expand oil storage capacity for public stocks from 121.2 mb to 146 mb. Likewise, public stocks will be increased from 75.7 mb to 141 mb by 2010.

Crude or Products

In December 2006, the Korean government held 76 mb of oil stocks, comprising 84% crude and 16% products. Korea does not impose specific requirements on oil companies.

Location and Availability

KNOC is responsible for maintaining the national oil reserves, which are stored in a variety of facilities around the country – from above ground tanks to underground rock caverns.

Private companies holding emergency oil stocks can co-mingle compulsory and commercial stocks.

Korea has no bilateral agreements to hold stocks on foreign territory. However, there are contracts for leasing spare stockpiling facilities in Korea to foreign companies. Each lease contract allows KNOC to retain precedent purchase right over the stocks filled in the leasing facilities so that KNOC can use them during an emergency. However, these stocks are not counted as emergency stocks in Korea.

Monitoring and Non-compliance

KNOC is responsible for monitoring quantities, qualities and locations of held stocks, as well as for collecting figures from industry as required by law to maintain the emergency reserve.

KNOC is authorised to visit commercial storage facilities to verify physical stock levels. The government has a legal authority to penalise non-compliant companies.

Stock and Drawdown Timeframe

During a crisis, Korea would be able to drawdown crude oil from the government strategic oil reserve on a certain scale during the first month. For the first three days, the drawdown would be at a maximum rate of 4.7 mb/d. Over the next six days (days 4 to 9), the maximum drawdown rate would fall from 3.9 mb/d to 1.7 mb/d. For the next 21 days (days 10 to 30), the maximum drawdown would stabilise at 1.27 mb/d.

Upon receiving stock release orders from MOCIE, KNOC would release government oil stocks to the five refining companies with broad logistic networks across the country. The pricing scheme for such stocks would be based on international oil prices, the Korean economic situation and other relevant factors.

The Korean government would provide public information through the mass media on oil-stock release including amounts, types, time and period of oil-stock release.

Financing and Fees

Korea does not provide financial support for building compulsory industry stocks. All refiners and importers must self-fund the operational costs of meeting emergency requirements. These costs are passed on to consumers.

Other Measures

Demand Restraint

The Korean government regards demand restraint as a measure that can complement a strategic oil release. Current legislation empowers the government to implement oil demand restraint measures. The minister of MOCIE would make decisions on demand restraint measures according to the degree of gravity of a given oil supply disruption.

Korea's demand restraint measures are divided into the following stages:

- Light-handed measures such as restrictions on vehicle use in the public sector.
- Medium-handed measures in which oil demand and supply would be adjusted through regional oil allocation, allocation to major oil consumers and suppliers, and through restrictions on the operation of oil refineries.
- Heavy-handed measures including restrictions and prohibition of oil use and transfer. These measures would be activated only when a serious impediment to the oil supply occurs or appears imminent.

Fuel Switching

Fuel switching is defined as an emergency response in Korea's legal framework; however, its priority remains less viable than other tools. Due to facility and equipment constraints, there is little potential to switch away from oil to other energy sources, such as natural gas.

Oil Infrastructure of Luxembourg



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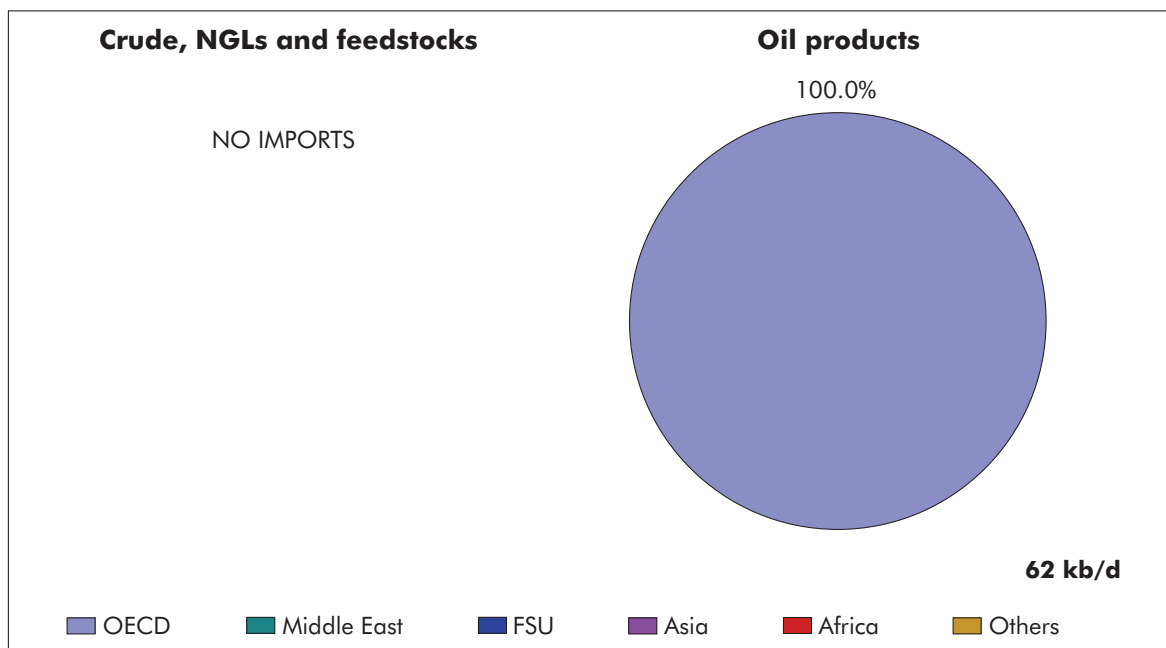
LUXEMBOURG

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	-	-	-	-	-
Demand (kb/d)	33.1	37.0	47.6	63.8	61.3	58.5
<i>Motor gasoline</i>	9.5	11.9	13.4	11.2	10.3	
<i>Gas/diesel oil</i>	15.5	18.5	26.3	42.7	41.7	
<i>Residual fuel oil</i>	4.3	1.8	0.1	0.1	0.0	
<i>Others</i>	3.8	4.9	7.7	9.9	9.2	
Net imports (kb/d)	33.1	37.0	47.6	63.8	61.3	58.5
Import dependency (%)	100	100	100	100	100	100
Stocks in days of net imports	72.0	87.0	92.0	87.0	98.0	
Refining capacity kb/d		-	-	-	-	-

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

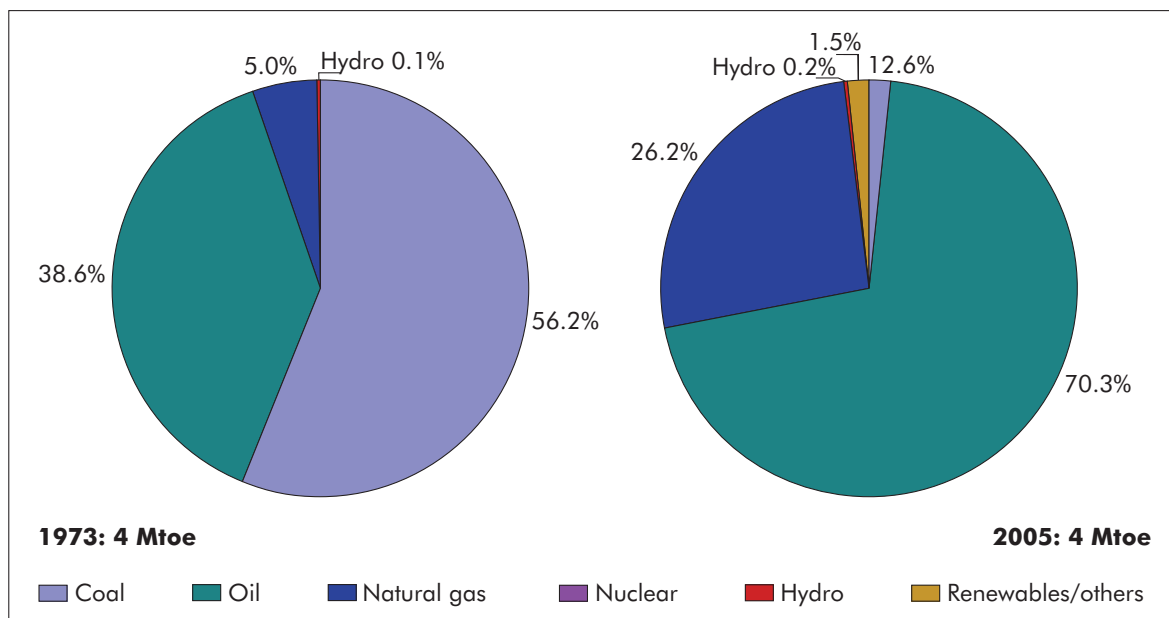
Luxembourg is the smallest country within the IEA. However, its population is the wealthiest per capita. Energy consumption per inhabitant is high because of the country's iron and steel industry, and because of large sales of transportation fuels. Luxembourg is unique amongst IEA member countries for several reasons. It has no indigenous oil production and no oil refineries. It imports all its oil requirements as finished oil products. Because of its small size and lack of indigenous sources, Luxembourg's oil market is greatly influenced by the energy policies and markets in surrounding countries. In addition, some 84% of Luxembourg's oil stocks are held abroad (December 2006).

All of Luxembourg's compulsory stocks are held by industry. Due to the lack of storage facilities and the growing stockholding obligations, a large proportion of stock is held abroad in the form of tickets. During an international oil supply disruption, Luxembourg is expected to allow industry to reduce its obligation on compulsory stocks.

Energy Outlook

Having no domestic oil production, Luxembourg imports all its oil requirements. It has the highest level of energy dependency of IEA member countries. Oil accounted for 70% of Luxembourg's total primary energy supply (TPES) in 2005. This represents a decline from its level of 74% in 2000, but an increase from the 1970s at which time oil accounted for 39% of the energy mix. Luxembourg imported 62 kb/d of products in 2006. Belgium is by far the biggest exporter of oil products to Luxembourg, accounting for three-quarters of imported oil products in 2006.

Total Primary Energy Supply



Luxembourg has the largest oil supply per capita ratio in the world. With 61 kb/d, total oil demand in 2006 was almost 30% higher than in 2000 and 65% higher than in 1995, reflecting an annual average growth of slightly more than 4% from 1995 to 2006. Until recently, fuel tax differences between Luxembourg and its neighbours led to significant cross-border refuelling. Changes to the fuel tax structure in Luxembourg are expected to discourage this practice and reduce overall demand in the coming years by an average annual rate of about 1.2%, reaching 58.5 kb/d per year in 2010.

Remarkably in 1973 more than half of the TPES was coal. Since then its use was phased out; its share was reduced to less than 2% in 2005. At the same time, the share of natural gas increased sharply from 5% to well over 25%.

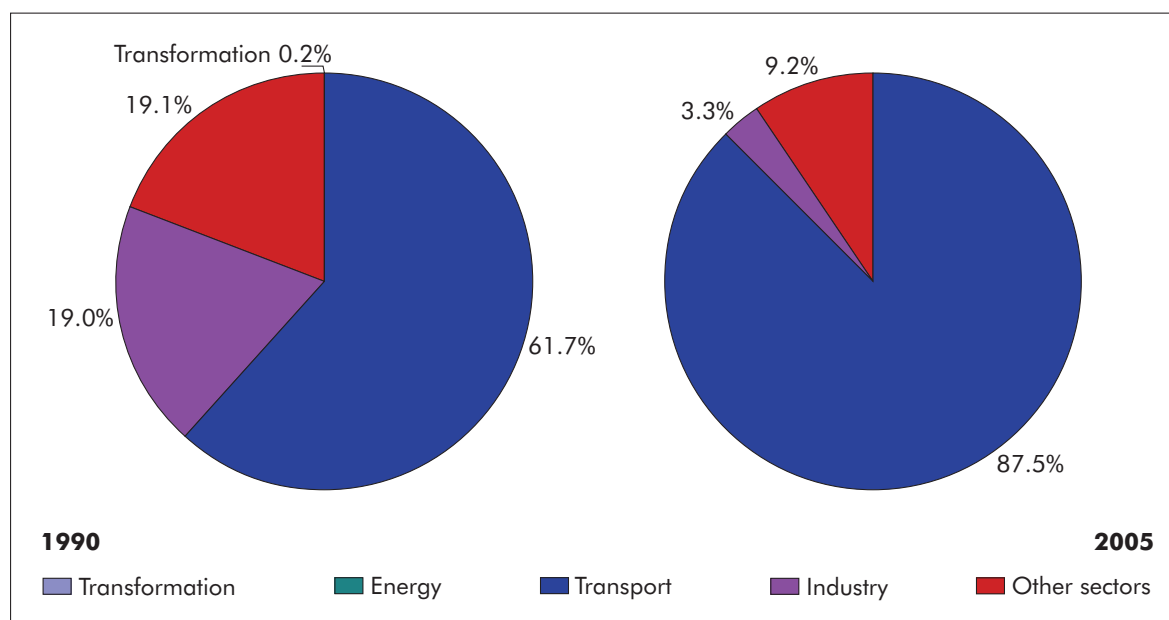
Market Features and Key Issues

The government of Luxembourg sets a maximum price on gasoline, automotive diesel, heating oil and LPG. The pricing formula is based on the published price of oil products in Rotterdam, to which the government adds a standard cost of transport from Antwerp to Luxembourg, a standard distribution margin and the cost of compulsory storage. There are around 25 changes in price every year.

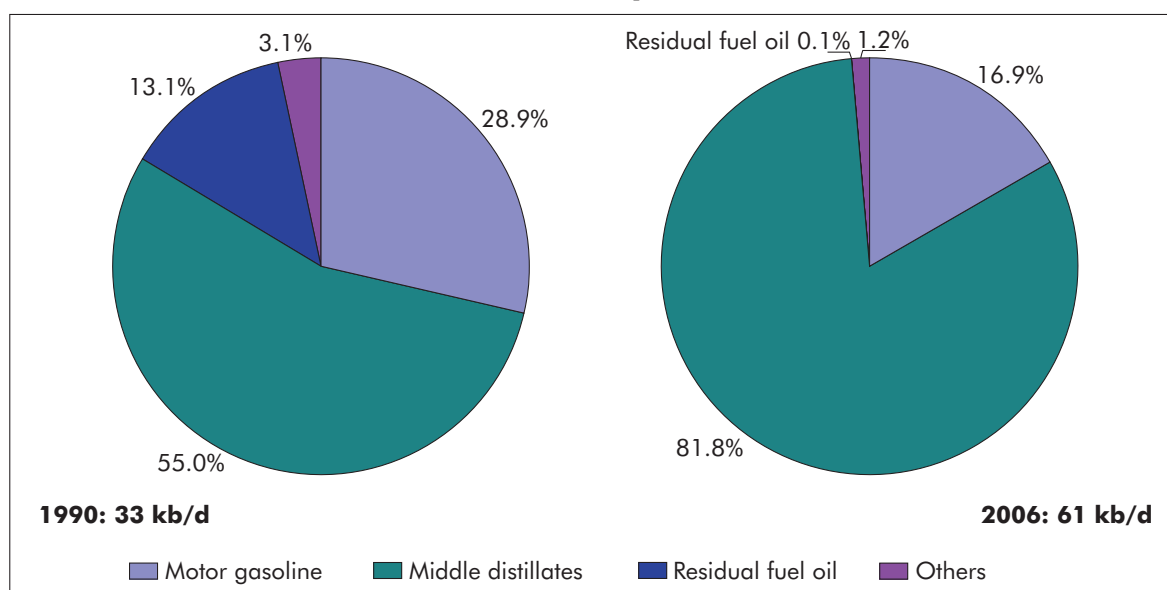
Energy taxes are low in Luxembourg compared to its neighbouring countries, particularly on automotive fuels. As a result, low gasoline and diesel prices have induced foreign drivers to refuel in Luxembourg, leading to a large growth in transport fuel sales. Luxembourg recently took steps to reduce the tax difference, and believes that automotive fuel sales have peaked and will start to decline.

Oil consumption is concentrated mainly in the transport sector, which accounted for 87.5% of consumption in 2005. This is a significant increase from the 1990s, when its share was slightly less than two-thirds. By contrast, oil's share in the industrial and heating sectors has declined dramatically in recent years.

Oil Consumption by Sector



Oil Demand by Product



Oil Supply Infrastructure

Refineries

There are no refineries in Luxembourg.

Pipelines

Aviation kerosene is imported to Luxembourg via the Central Europe Pipeline System (CEPS). Apart from this, there are no other pipelines in the country. In 2001, oil supply was imported through the following means: 38% by road, 32% by rail, 15% by barge (river) and 14% by pipeline (i.e. aviation kerosene). Products are increasingly transported by road, which is more flexible than rail, barge or pipeline.

Storage

Luxembourg has three main storage facilities, located at the inland port of Mertert with a capacity of 490 kb (78 000 cubic metres), at Bertrange-Hollerich with 755 kb (120 000 cubic metres) and at Dippach-Leudelange with 113 kb (18 000 cubic metres). There are plans to increase storage capacity at the port of Mertert by up to 943 kb (150 000 cubic metres).

Decision-making Structure

In the event of an oil supply emergency, the Minister for Economic Affairs and Foreign Trade has the legal authority to take a decision on emergency oil sharing, including stockdraw “if oil products supply

is endangered". The law does not fix a threshold for activating emergency measures. The minister is also empowered to authorise participation in an early co-ordinated emergency response mechanism (CERM).

The National Emergency Sharing Organisation (NESO) in Luxembourg is established on an informal basis under the authority of the Minister for Economic Affairs and Foreign Trade. Due to the size of the country and the pricing system for oil products, a strong relationship exists between the administration and the association of oil importing companies. This relationship can be further strengthened in emergency situations by including industry experts in the activated NESO.

Stocks

Stockholding Structure

In Luxembourg, all importers of crude oil and/or petroleum products are obliged to maintain stocks of petroleum products equivalent to at least 90 days of deliveries into domestic consumption during the previous calendar year. This applies to each of the three categories covered by the EU compulsory stock obligations (gasoline, distillates and fuel oil).

Crude or Products

Since the country has no refining capacity, all compulsory stock obligations must be held in the form of finished products.

Location and Availability

Compulsory stocks are held by oil companies, and are typically co-mingled with commercial stocks. Total oil stocks in Luxembourg tend to be only about 20 days of supply in terms of total oil consumption.

Emergency policy stipulates that a significant portion of stock should be held on national territory, specifically, the equivalent of 45 days for gasoline and 55 days for distillates – based on the previous year's supply. The difference needed to fulfil the 90-day IEA requirement can be stored in other EU countries under bilateral agreement.

Luxembourg has formal bilateral agreements with Belgium, France, Germany and the Netherlands, and typically makes full use of the allowance permitted for holding stock obligations abroad. In practice, most stocks are held in the ARA (Amsterdam, Rotterdam and Antwerp) area.

Stock tickets are permitted. There are no restrictions on the total volume of stock tickets held in Luxembourg or abroad (within the limitations of the bilateral agreements). Due to the lack of storage facilities and the growing stockholding obligations, the proportion of tickets in the total of physical volume of finished products increased in recent years and now stands at 84%. Stock tickets must be certified by the administration of the country concerned in order to be counted as contributing to coverage of the obligation.

Monitoring and Non-compliance

Oil importers are required to submit reports to the authorities, by the 15th of each month, stating their stock levels at the beginning of that month. The police and customs authorities may check levels at any time, on request of the Minister for Economic Affairs and Foreign Trade. Infringements are punishable by either fines or imprisonment of up to two years – or both.

Stocks held outside Luxembourg must be certified by the administration of the country in which they are held.

Stock and Drawdown Timeframe

In the event of an oil supply emergency, the Minister for Economic Affairs and Foreign Trade has the legal authority to take a decision on emergency oil-sharing, including stockdraw. A decision to organise a stockdraw would be expected to take two to three days.

No specific provisions exist for the use of stockdraw in sub-crisis or crisis situations. However, the government has the legal powers, at any moment, to use compulsory stocks held by companies.

Stockdraw during an emergency would be organised by means of ministerial decrees as a general measure, or by individual notification to stockholding companies. NESO would co-ordinate the actual release and pricing of compulsory stocks onto the market. This would be done in consultation with an expanded NESO body comprising government officials, oil company executives and consumer representatives.

The physical delivery of stocks to market after the decision for release is expected to take one week.

Financing and Fees

Importers subject to stockholding obligations recoup the costs of compulsory stocks by passing them on to consumers through market prices. The government of Luxembourg sets a maximum price on gasoline, automotive diesel, heating oil and LPG. The pricing formula includes a fee to cover the cost of compulsory storage. The current fees are EUR 5.95 per kilolitre for gasoline and EUR 6.45 per kilolitres for distillates.

Other Measures

Demand Restraint

Luxembourg is party to common Benelux guidelines for emergency situations involving demand restraint measures. These guidelines provide four levels of co-operation:

Information

- Information campaigns in order to promote reduced heating, illumination and car use.

- Speed limitation in residential areas and reinforced control and regulations.

Consultation

- Decision to set standards for heating and illumination.
- Speed limitations on country roads.

Co-ordination

- Speed limitation on motorways.
- Driving bans.
- Limited opening hours for filling stations.
- Limited deliveries to consumers.
- Limited deliveries to retailers.
- Introduction of tickets for consumers.

Uniformity

- Closing of the filling stations on determined days

The law does not stipulate a threshold for activating emergency measures or a rigid scheme of the various steps. However, there are common Benelux guidelines for the implementation of demand restraint measures. In the case of Luxembourg, the Minister for Economic Affairs and Foreign Trade can take decisions deemed necessary, even prior to the activation of IEA measures.

Cross-border traffic could still be a problem in a crisis and may warrant the implementation of a rationing system. The standing Benelux Commission intends to strengthen co-operation with France and Germany in order to avoid major cross-border problems.

An information campaign could be started immediately after an *ad hoc* decision. Other light-handed measures, such as speed limitations on roads and reduced home heating, can be implemented within two days after consultation with Benelux-partners. The first volumetric effects would be measurable after two weeks.

More severe measures, such as speed limitations on motorways, driving bans and reduced deliveries, would have to be co-ordinated at the Benelux level and eventually with other neighbouring countries. In this case, administrative preparations and decisions would take about one week. The timetable from implementation of decisions to full operation would be rather brief and the first volumetric effects would be measurable after two weeks.

Fuel Switching

The capacity of Luxembourg to replace oil products by other fuels on a short notice is generally low. Many medium-sized industries (including those with co-generation) have moved from residual fuel oil to natural gas. The proportion of private households and buildings connected to natural gas has increased considerably. Therefore, a simultaneous disruption of natural gas and oil supply would aggravate the situation. The government is promoting the development of alternative and renewable energy sources (*e.g.* wind, bio-gas, wood, water and waste) within the framework of its long-term policy.

Oil Infrastructure of The Netherlands



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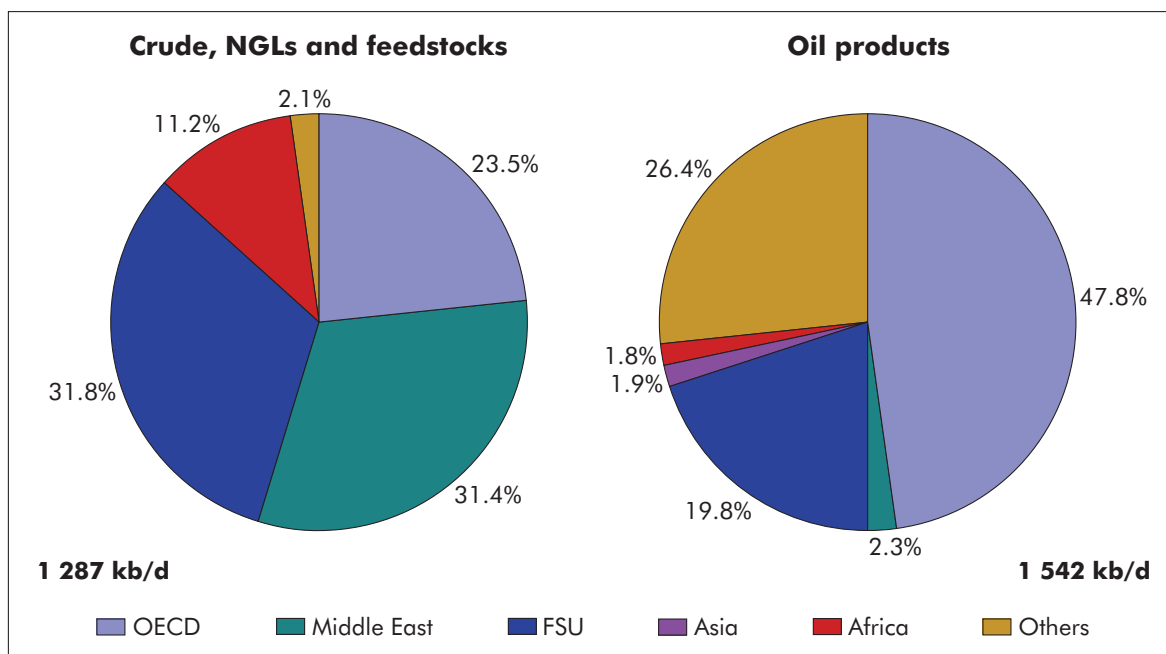
THE NETHERLANDS

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	78.7	70.5	48.5	46.8	41.8	58.7
Demand (kb/d)	734.5	767.3	854.5	1 021.5	1 011.0	1 051.1
Motor gasoline	79.8	93.1	93.1	94.9	96.6	
Gas/diesel oil	150.5	158.2	177.9	192.1	198.8	
Residual fuel oil	182.1	183.1	208.8	275.2	287.0	
Others	322.1	332.9	374.7	459.3	428.7	
Net imports (kb/d)	655.8	696.8	806.0	974.7	969.3	992.4
Import dependency (%)	89.3	90.8	94.3	95.4	95.9	94.4
Stocks in days of net imports	257.0	204.0	195.0	220.0	189.0	
Refining capacity kb/d		1 186.5	1 187.8	1 227.5	1 211.9	1 236.4

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

The Netherlands is an oil hub for Western Europe, especially with the ports of Rotterdam and Amsterdam. Flows of crude oil and products enter the country, crude oil is processed in one of the refineries, and large quantities of products are exported. Rivers and pipelines connect the port areas with the hinterland. Large storage capacity is available to facilitate this hub position.

The emergency response system of the Netherlands is based on a mixed system of mandatory emergency reserve stocks held by both the industry and a government agency. In times of an international collective action, the most likely response by the Netherlands would be a drawdown of agency stocks.

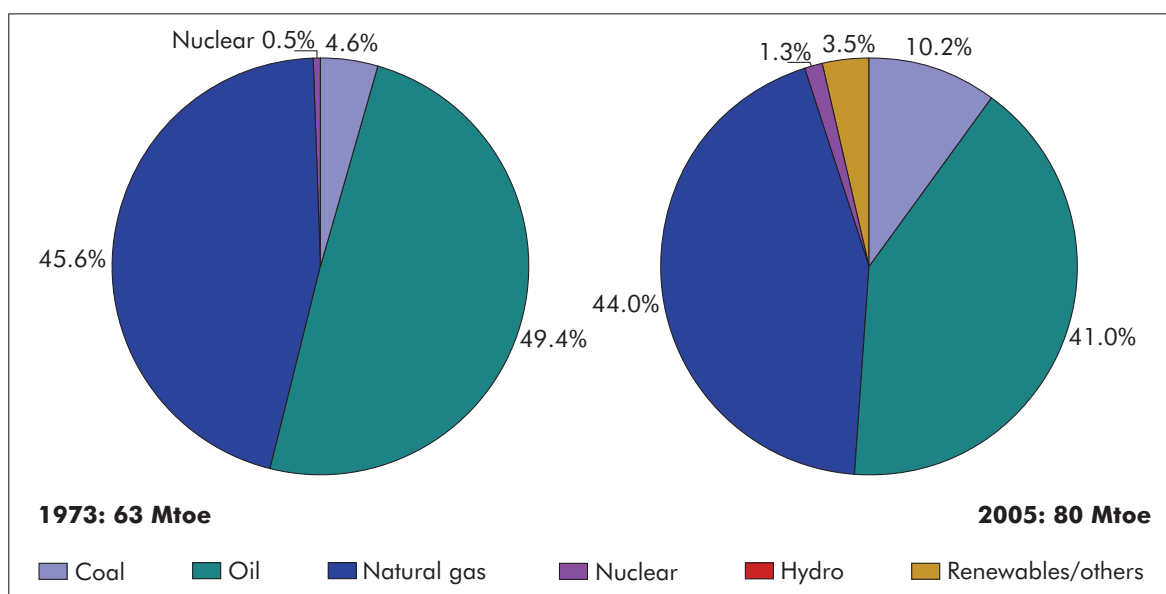
Energy Outlook

The share of oil in total primary energy supply (TPES) in the Netherlands decreased over the past 30 years, from 49% in 1973 to 41% in 2005. This recent figure is close to the average for OECD Europe and is projected to remain stable at least until 2010.

During the same period, the role of natural gas has been almost unchanged, declining from 46% in 1973 to 44% in 2005. By contrast, use of coal has risen from 5% in 1973 to 10% in 2005, reflecting a decrease in the residential sector but marked increase for electricity production. The nuclear energy and renewable energy sectors have emerged, but remain marginal.

The Netherlands has been an important producer of natural gas since the 1960s. Production is about 75 bcm annually, of which almost half is exported. Natural gas is, by far, the dominant fuel in the residential sector and is growing rapidly in the power sector.

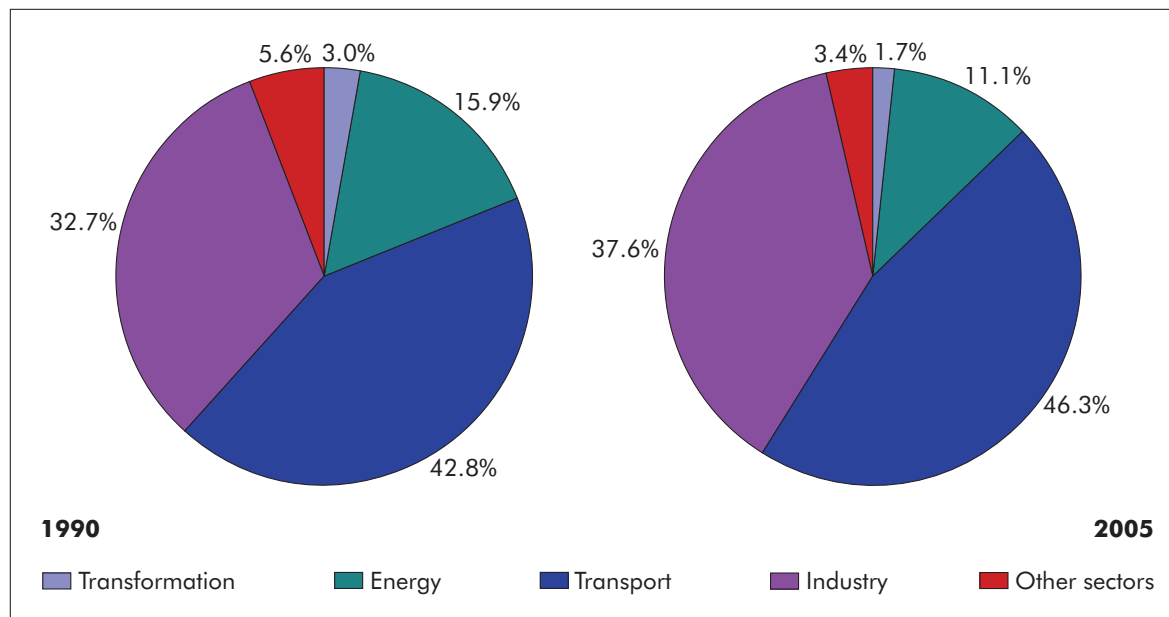
Total Primary Energy Supply



Indigenous oil production was expected to decrease significantly in the coming years. However, recent high oil prices and new recovery techniques have led to the re-opening of the Schoonebeek oil field, which was closed in the 1970s. Domestic oil production is now expected to increase in the coming years, from 42 kb/d in 2006 to 59 kb/d in 2010.

Oil demand in the Netherlands rose from 767 kb/d in 1995 to 1 mb/d in 2006, an annual average increase of 2.5%. In 2005, total oil consumption by the main sectors breaks down as follows: 46% for transport, 38% for industry, and 16% for “other sectors”.

Oil Consumption by Sector



Diesel use in transport in the Netherlands is increasing rapidly: total diesel consumption climbed by more than 50% between 1995 and 2006. By contrast, gasoline consumption grew by only 3%. Competition from the small diesel car is the main factor behind the declining use of LPG as a motor fuel. In addition, stricter regulations for LPG-filling stations have led to the closure of a number of stations in urban areas.

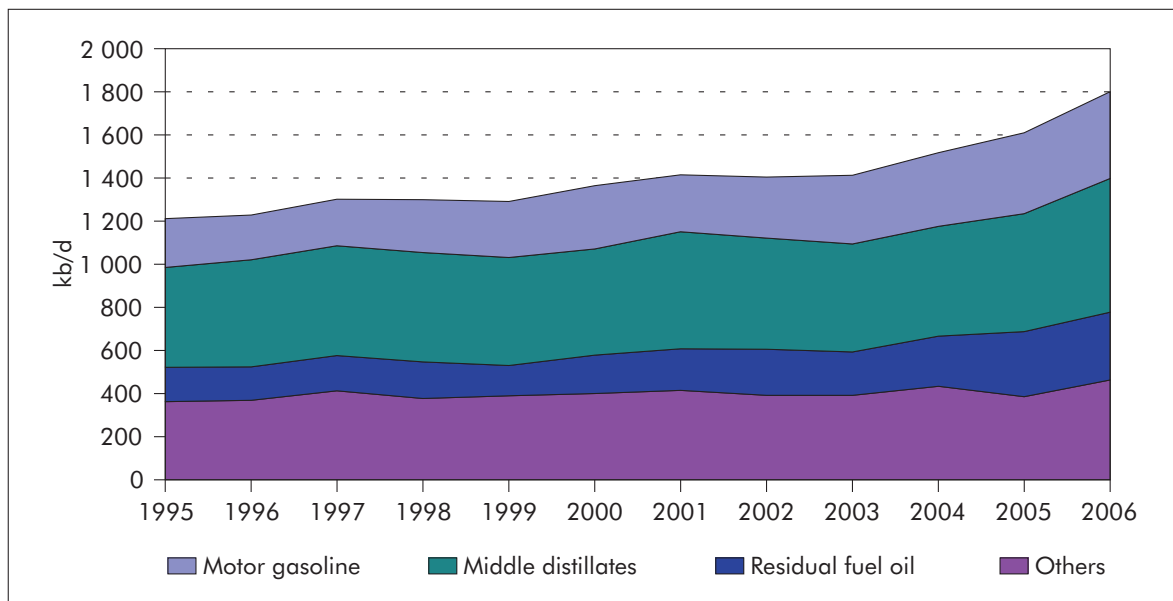
Traditionally, large volumes of oil flow into and out of the Netherlands, reflecting the country's heavy involvement in international oil trade. In 2006, 2.8 mb/d of oil and oil products were imported to the Netherlands. This oil came mainly from countries in the former Soviet Union (FSU), Northern Europe and the Middle East. In 2006, The Netherlands exported 1.8 mb/d of oil products. Domestically, the Netherlands is about 95% dependent on oil imports.

Market Issues and Key Features

The Dutch oil sector is of major importance for the Western European oil market. Thanks to its location in the Rhine/Meuse delta and deep water port, Rotterdam has long been the biggest harbour in the world.

In 2006, the Netherlands imported about 1.3 mb/d of crude oil (including NGL and feedstocks) and 1.5 mb/d of refined products, the latter volume making it the second-largest importer of oil products in the world (after the United States). At the same time, the Netherlands is also the second-largest global exporter of oil products (after Russia), demonstrating the country's role as a distribution hub for Western Europe. The significance of this oil hub becomes more evident when considering that the above figures do not account for the 0.9 mb/d of crude oil that transits through the Dutch *entrepot* or the fact that several independent tank storage companies have large stockholding capacities in the Netherlands. The Netherlands oil sector imports, transits and exports volumes of crude oil and petroleum products that are (collectively) several times greater than the volume of inland oil use.

Export of Oil Products, 1995-2006



Oil Supply Infrastructure

Refineries

There are five refineries in the Netherlands, with a total crude distillation capacity of roughly 1.2 mb/d. One of the refineries (Total) is located in Vlissingen; the other four (ExxonMobil, KPC, BP, and Shell) are located in the Rotterdam area.

European energy legislation places high priority on environmental sensitivity, which has led to very strict sulphur limits for Dutch refineries. This explains why there are no recent refinery expansions in the Netherlands.

Ports and Pipelines

Dutch ports are of international importance. The Rotterdam area is well connected with the hinterland, both by river and by pipeline. There are two major crude oil pipelines: the Rotterdam-Rhine (RRP)

pipeline to Germany's Ruhr region has a capacity of 400 kb/d; the Rotterdam-Antwerp (RAP) pipeline to Belgium's Antwerp area has a capacity of 600 kb/d. In addition, there is a major product pipeline, the Rhine-Main (MMP) pipeline to Germany, with a capacity of 250 kb/d.

Storage

Total storage capacity in the Netherlands is estimated at some 189 mb (30 mcm). Most is in the Rotterdam area, but Amsterdam and Vlissingen also have abundant storage capacity.

In addition to the large terminals of the oil companies, several independent tank storage companies have large stockholding capacities in the Netherlands. The largest is the Maasvlakte Olie Terminal (MOT) near Rotterdam. A joint venture of BP, ExxonMobil, Kuwait Petroleum, Shell, Total and Vopak, the MOT is one of the world's largest oil terminals comprising crude oil in 36 tanks with a total capacity of 27 mb (4.3 mcm).

Decision-making Structure

The Minister of Economic Affairs is responsible for Oil Emergency Policy. The Dutch National Emergency Sharing Organisation (NESO) prepares and advises the Minister of Economic Affairs and/or the Cabinet on matters of oil emergency measures and their implementation.

In normal times, NESO comprises officials from the Ministry of Economic Affairs. In emergency situations (as well as for test purposes), the basic NESO organisation is enlarged to include officials from other relevant departments. Contact between NESO and industry is co-ordinated through the Oil Industry Advisory Group. NESO would also be in contact with other departments, international organisations and the Dutch stockpiling agency (Centraal Orgaan Voorraadvorming Aardolieproducten - COVA or in English: the National Petroleum Stockpiling Agency).

During a crisis, NESO would convene a number of "Measure Groups" to prepare and execute specific measures. These groups would be staffed by representatives from the various ministries and from the oil industry. It is important to note that although industry would be consulted and would have a role in the preparation and implementation of specific measures (*e.g.* stockdraw and refinery measures) within NESO, it would not participate in decision-making within the governmental structure.

Stocks

Stockholding Structure

The Netherlands has a mixed system, in which both the industry and a government agency COVA are required to hold emergency stocks.

According to Dutch legislation, any company that brings more than 100 Kt of qualifying products into the Dutch market (in any given calendar year) is obliged to hold 5% of such excess quantities as compulsory stock. In total, this equates roughly to 13.5 days of net imports.

COVA was established in 1978 as an independent stockholding agency; it is formally structured as a non-profit foundation and is therefore exempt from corporation tax. It is responsible for holding the balance of the total national requirement of 90 days of net imports – *i.e.* approximately 76.5 days of net imports. Every year in March, the Dutch authorities calculate the new stockholding obligation of the industry, based on the figures from the previous year. The authorities then calculate the obligation for COVA. COVA must comply with these obligations by 1st July and companies by the 1st April of that year.

Company stock obligations are held as part of normal operating inventories. Due to their international activities, refining and supplying companies tend to hold unusually high volumes of stocks as part of normal operations. In effect, the Netherlands is always holding well in excess of its obligations under both EU and IEA requirements.

Crude or Products

The industry can fulfil stockholding obligations through either crude oil or products. As the obligation stemming from the *Stockholding Law* is formally calculated in tonnes of products, the industry can use – in line with the EU directive – a conversion factor (yield) to calculate from crude oil into products.

COVA holds much of its overall stock obligations as crude oil. At the end of 2006, crude oil accounted for roughly 58% of COVA obligations. Of the refined products held by COVA, roughly three-quarters was automotive diesel oil and the remainder was motor gasoline.

Location and Availability

Due to the high cost of storage in the Rotterdam area, around 9.6 mb (1.3 Mt) of COVA crude oil stocks (or 30% of its total obligation) are held in salt caverns near Wilhelmshaven (Germany). The remaining quantities of crude are held in above ground storage in the Netherlands.

COVA obligation is subject to a restriction that only up to 30% of its stocks can be held abroad. This restriction is not based on formal law, but on a guideline of the executive board of COVA.

The 2001 *Oil Stockholding Act* significantly reduced the obligation on industry while raising COVA obligations. As a result of the changes in the stockholding law, COVA can use stock tickets or reserved stocks with a third party. However, COVA has an internal policy on such tickets whereby they can be used only for products stored within the Netherlands. Moreover, stocks tickets may not account for more than 25% of the total compulsory stockholding obligation. In 2006, almost half of COVA gasoline stocks were held under ticket arrangements, as were about one-fourth of the diesel/middle-distillate obligations, totalling 19% of the COVA obligation.

Company stocks may also be held abroad, without restriction, as long as bilateral agreements are in place. At the end of 2006, the Netherlands had formal bilateral agreements with Belgium, Denmark,

Germany, Ireland, Luxembourg, New Zealand, Slovenia, Sweden and the United Kingdom. The government is on the verge of signing additional bilateral agreements with Italy and Portugal. It is also considering agreements with several other countries.

There are no restrictions in the *Oil Stockholding Act*, nor in the bilateral agreements on the amount of stock tickets abroad. Tickets are handled in the same way as the other Dutch obligatory stocks. However, within the bilateral agreements, the countries involved have the opportunity to ask for extra control checks in addition to the regular checks that are mandated in the stockholding law.

In 2006, about 5.9 mb (800 Kt) of crude oil and oil products were held as reserved stocks tickets in other countries. About 70% of this volume was crude oil; the remainder was products. At the same time, the Netherlands held about 4 Mt of crude oil and oil products on Dutch territory as reserved stocks tickets under contracts with companies and agencies of other countries. Occasionally, foreign companies hold owned (non-ticket) stocks in the Netherlands under bilateral agreements.

Monitoring and Non-compliance

Under the 2001 *Oil Stockholding Act*, companies with stockholding obligations (including both national obligations and/or reserved stocks obligations by tickets) are required to submit monthly reports on their relevant stock levels to the Ministry of Economic Affairs. The reports are checked by the ministry, which may delegate the Tax Inspection Service of the Ministry of Finance to conduct audits of the records and on-site physical checks.

Any suspected infringement is reported to the Fiscal Intelligence and Control Service/Economic Inspection Service (FIOD/ECD) of the Ministry of Finance for further investigation. If an infringement is confirmed, prosecution will result. Penalties include fines and – in severe cases – the company's board members may be imprisoned.

COVA is also subject to monitoring by the Ministry of Economic Affairs. If the ministry believes that COVA is “seriously neglecting its duties”, the agency will be given opportunity to rectify its shortcomings within a time period determined by the ministry. If COVA fails to comply, the minister could institute whatever measures were deemed appropriate.

Stock and Drawdown Timeframe

In an oil crisis, all compulsory stocks are at the disposal of the Minister of Economic Affairs, who has the authority to invoke a variety of statutes, depending on the situation. In principle, a decision to authorise a stockdraw could be taken within 24 hours.

Any stockdraw would firstly focus on making COVA stocks available through a tendering mechanism. It would be carried out in full co-operation and consultation with international bodies and/or other countries.

Once their obligation to hold stocks has been lowered, companies with a stockholding obligation are expected to co-operate through voluntary drawdown of their stocks. An order to companies to drawdown their inventories would only be considered in a very severe crisis.

The time required for physical delivery of stocks would depend on the specific circumstances. In times of great urgency, it could be realised within one day. If normal market procedures are followed (offering process, tender procedures, etc.), the delivery would take some weeks. Repatriating underground crude from Germany would need extra time for transport and processing, and could take about six weeks. In most circumstances, however, the Dutch authorities expect to use stocks swaps as a means of gaining access to stocks held in Rotterdam and Wilhelmshaven.

Financing and Fees

In 2006, the total annual budget of COVA was about EUR 79 million (EUR 22 million for financing costs, EUR 1 million for general management costs, and EUR 55 million for stocks management - *i.e.* storage tank rental, ticket costs, refreshment and control). These costs work out to some EUR 19.1/t for COVA stocks.

COVA is financed by a levy imposed on domestic deliveries of gasoline, kerosene (excluding sales for international air traffic), diesel, heating oil, petroleum and LPG. The current structure of levies was established in 2001 at EUR 5.90/1 000 litres for gasoline, diesel and heating oil and EUR 5.90/t for LPG. These fees remained unchanged until the fourth quarter of 2004, at which time the levy was lowered to EUR 5.30/1 000 litres and EUR 5.30/t.

In the Netherlands, LPG is included as a qualifying product for the levy because it accounts for an unusually high proportion of inland deliveries. No levy is charged on domestic deliveries of residual fuel oil because volumes are marginal.

The levies are paid by companies that bring the qualifying products into the domestic Dutch market, and are defined by the payment of excise duty. Both the excise duty and the COVA levy are collected by the tax authorities; the latter is passed on to COVA.

No financial support is given to companies subject to compulsory stockholding obligations. Thus, costs are implicitly passed on to final consumers in market prices.

Other Measures

Demand Restraint

The Netherlands is moving towards a “24-hours/7-days a week” economy. Thus, the Dutch administration is less likely to initiate demand restraint measures in response to an oil disruption. However, on the basis of Article 5 of the I.E.P. Agreement, the Netherlands has defined a programme of demand restraint measures that would help reduce the rate of final oil consumption.

The Dutch demand restraint programme focuses first on voluntary measures. If voluntary measures prove to be inadequate, Dutch authorities can proceed to obligatory measures. NESO would aim to reduce the private and recreational use of petroleum products, while leaving basic economic activities untouched, as much as possible.

Decisions to implement demand restraint measures would be taken by the Minister for Economic Affairs, or by the Cabinet, based on a proposal by this minister. The minister would be advised by the NESO Operational Team (within the ministry) and by an Interdepartmental Policy Team for the Cabinet.

NESO has prepared the following set of demand restraint measures, which could be implemented on short notice:

- Communication to the public, including a call for voluntary reduction of oil consumption.
- Reduction of speed limits.
- A Sunday driving ban (allied with a ban on pleasure boating and flights).
- Supply of priority end-users and critical infrastructure sectors.
- Request for appropriate refinery action.
- A ban on filling containers to limit hoarding.

Lead time for the implementation of these measures is short.

The Netherlands no longer has an “off-the-shelf” programme for rationing of motor fuels. This measure is considered disruptive to market competition and is, by its nature, very complicated to accomplish. If implemented, it would need to be customised according to the circumstance to avoid misallocations.

Oil Infrastructure of New Zealand



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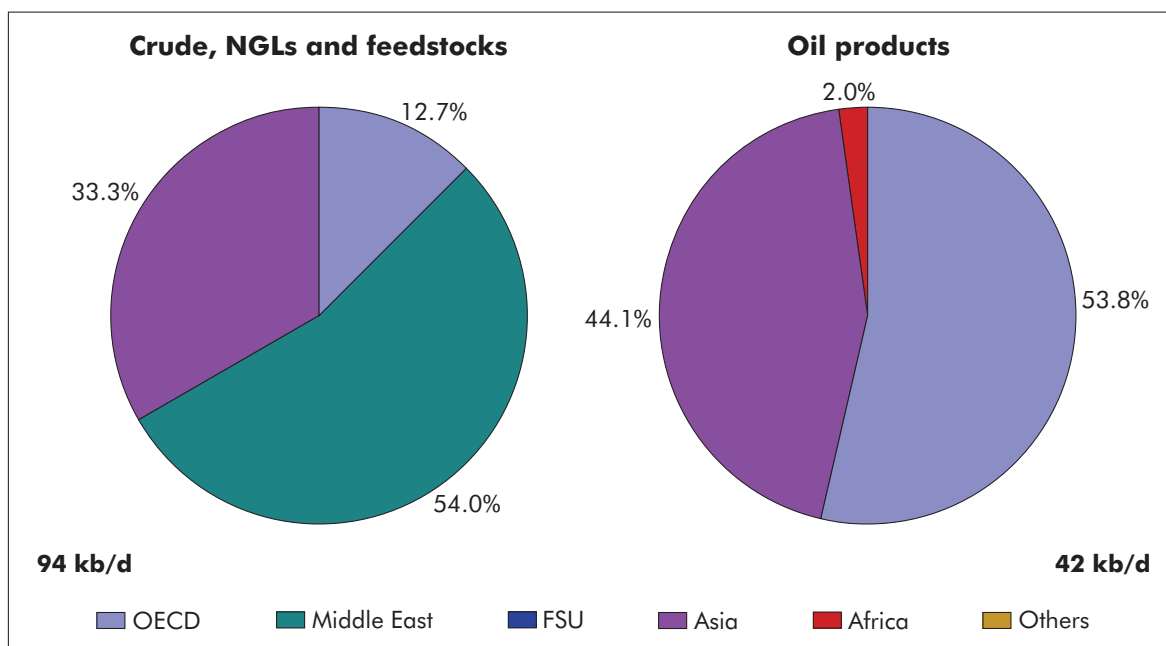
NEW ZEALAND

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	58.1	47.2	44.6	24.2	23.9	80.0
Demand (kb/d)	105.3	122.8	131.6	152.4	150.4	163.5
<i>Motor gasoline</i>	45.1	49.1	50.4	55.3	53.0	
<i>Gas/diesel oil</i>	23.2	33.7	42.4	50.3	50.7	
<i>Residual fuel oil</i>	6.7	7.3	4.9	5.6	4.6	
<i>Others</i>	30.3	32.8	33.9	41.2	42.1	
Net imports (kb/d)	47.1	75.7	87.0	128.2	126.5	83.5
Import dependency (%)	44.8	61.6	66.1	84.1	84.1	51.1
Stocks in days of net imports	143.0	102.0	108.0	74.0	62.0*	
Refining capacity kb/d		89.0	98.0	103.6	103.6	134.0

Oil Imports, 2006



* Low compliance level following reduced domestic production, compliance restored on 1st January 2007.

Background

Country Overview

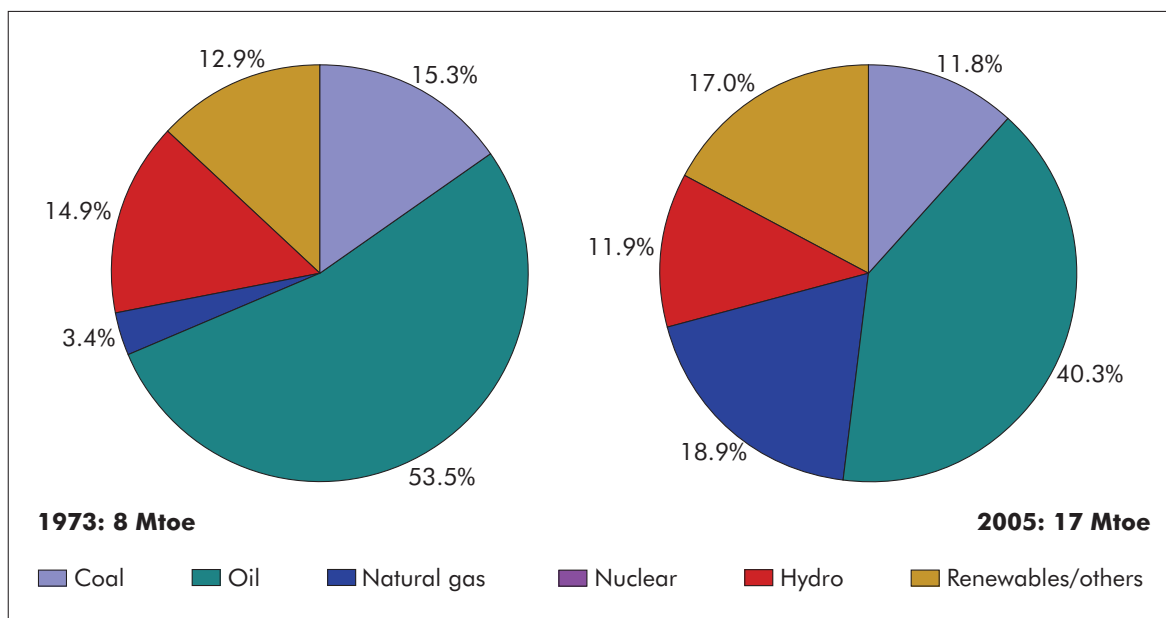
New Zealand's relative geographical isolation from the global oil market supply chain creates a particular challenge to oil supply security. Oil consumption has grown steadily since the mid-1980s, and although there is some domestic production, imports are necessary to meet the majority of New Zealand's oil demand. Most imports are in the form of crude oil, primarily from the Middle East. New Zealand's sole refinery is able to supply approximately three-quarters of the country's product demand.

Until recently, New Zealand had no government stocks; it relied on the industry's normal stockholding practices to meet the country's overall minimum 90-day obligation as a member of the IEA. Rising import dependency over the past decade resulted in the country being temporarily in a state of non-compliance with regards to minimum stock levels. In response to this, the New Zealand government acquired stockholding in other IEA member countries, in the form of ticket reservations. In an IEA co-ordinated action, New Zealand would likely contribute to the collective response by releasing these public stocks and implementing a campaign for voluntary demand restraint.

Energy Outlook

Compared to most IEA countries, New Zealand has relatively abundant domestic fossil fuel resources. It has large reserves of coal – a large share of which is exported – and some reserves of natural gas and oil. To date, the country has been fully self-sufficient in natural gas supplies; however, domestic natural gas fields are declining rapidly.

Total Primary Energy Supply



All of New Zealand's oil production is from fields in the Taranaki Basin, located on the west coast of the North Island. Most of the basin is located offshore, but the majority of small producing fields are onshore. Most oil produced in New Zealand is light, sweet crude. However, New Zealand's sole refinery is geared towards sour crude. Thus, most oil produced in New Zealand is exported. All oil from New Zealand fields is transported to market via tanker.

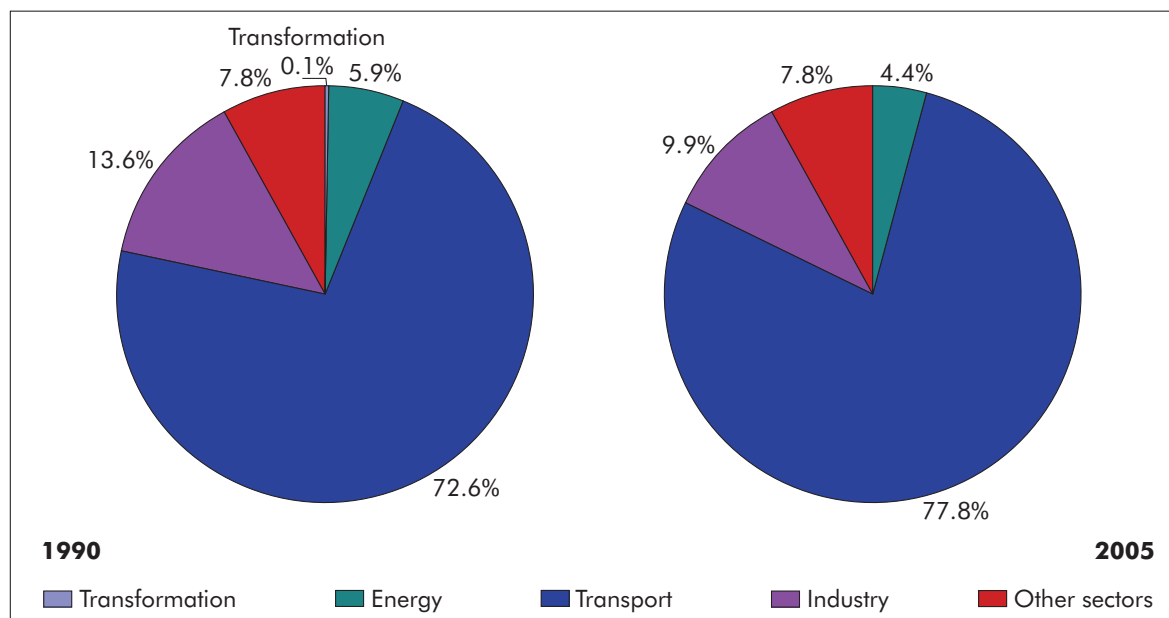
New Zealand's oil production peaked in 1997 at about 67 kb/d and has since been declining rapidly: it fell by nearly 65% between 1997 and 2006. However, recent developments in the Taranaki Basin will bring oil production growth in the short to medium term. Historically, the Maui field has been the basin's largest source of production, accounting for over two-thirds of the total. Four new fields (Tui, Kupe, Maari and Pohokura) in the basin are expected to raise total crude and NGL production to more than 80 kb/d by 2009.

Exploration activity has increased in recent years. The main focus remains on Taranaki, but there has also been activity in other areas including: the east coast of the North Island; off the east coast of the South Island; and in the lower South Island. The New Zealand government recently accepted bids for exploration in the Great South Basin (off the bottom of the South Island), which is seen as the most likely location for a major oil/gas find.

Market Features and Key Issues

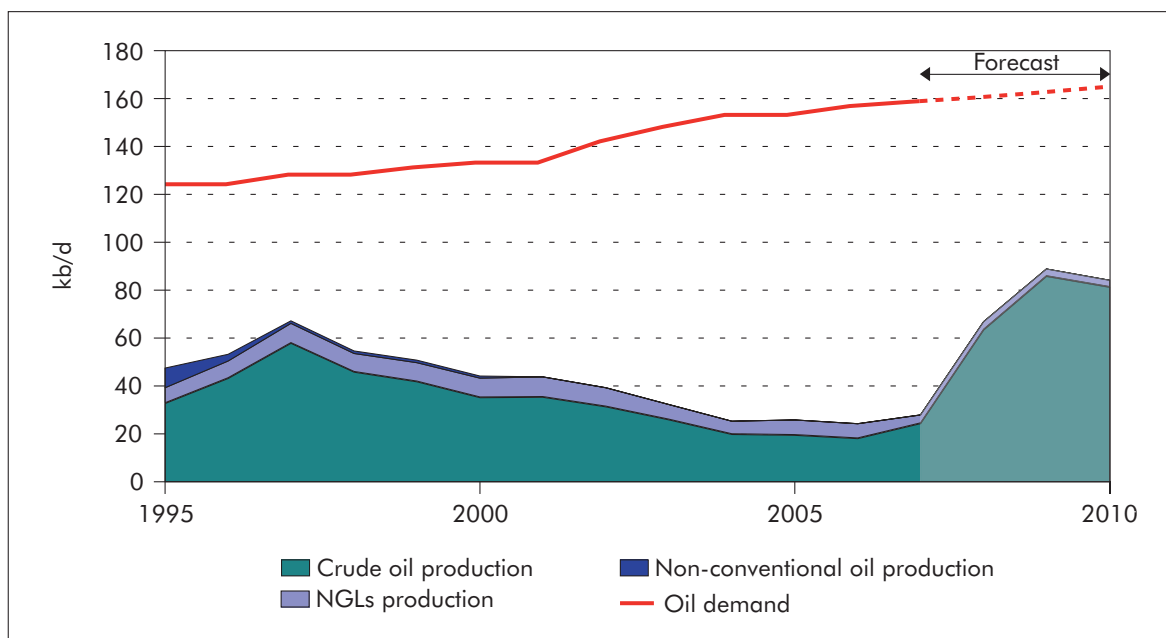
New Zealand's oil demand has grown steadily since the mid-1980s, driven primarily by transport consumption. Demand for gas/diesel oil has grown at a rapid pace, averaging 3.6% in the period from 2000 to 2006, compared to a rate of 1.8% for total oil demand. Oil demand is expected to continue to grow at a very similar rate, reaching some 163 kb/d by 2010. This will be driven only by transportation fuels, as consumption in all other sectors is expected to remain the same or decline.

Oil Consumption by Sector



Due to the widening gap between indigenous oil production and demand, imports have been increasingly necessary to meet New Zealand's oil needs. With growing net imports, the volume of oil necessary to cover 90 days has risen significantly. As a result, the relatively stable stock levels held by industry since 2002/03 have represented an ever-decreasing number of days of net import cover. Beginning in 2004, the overall stock level in the country fell significantly below the 90 days stockholding obligation of the IEA. In order to address this shortcoming, the government of New Zealand decided to tender for ticket contracts, which provide the option to purchase stock in an emergency at market prices. A global tender for the additional stocks was released in late 2006. As a result, the government secured tickets for 3.7 mb (457 Kt) of motor gasoline and diesel for 2007, and 1.4 mb (170 Kt) for 2008. Beyond this point, the need for further ticketing will depend on the actual volumes of expected additional domestic production brought online.

Domestic Oil Production and Demand, 1995-2010



Oil Supply Infrastructure

Refineries

New Zealand has only one refinery, the New Zealand Refining Company (NZRC) at Marsden Point, near Whangarei on the North Island. With a capacity of just over 100 kb/d, the NZRC is able to supply approximately three-quarters of the country's refined product demand. For the most part, the refinery runs imported, mostly sour crude oil, coming primarily from Saudi Arabia and other near-Middle East countries, as well as from Australia, Indonesia and Malaysia.

The NZRC is a "toll refiner" – *i.e.* it charges a fee to convert crude oil and other feedstock into refined products. This fee is based on the difference between the value of initial feedstocks and final products, according to reported Singapore prices. NZRC profits are not affected by downstream pricing decisions of the four oil companies that own the majority of the refinery.

Pipelines

The NZRC also owns the Refinery to Auckland pipeline (RAP), which transports refined products to bulk storage facilities in the greater Auckland area, New Zealand's major petroleum market. The pipeline has a capacity of some 53 kb/d (2.6 Mt/yr), however only about 90% of this capacity is currently utilised. About half of the refinery's production is distributed via the RAP pipeline; the balance is transported by coastal tanker and road to the rest of New Zealand.

Storage

Coastal distribution delivers refined product from the NZRC to a number of locations around New Zealand, at which industry receives finished products (from the NZRC via coastal distribution as well as imports). There are oil product storage locations at the following ports: Auckland, Tauranga, Napier, Wellington, New Plymouth, Nelson, Lyttelton, Timaru, Dunedin and Bluff. The country's main storage facility at Wiri (South Auckland) services the Auckland market and receives product from the NZRC via the RAP. Total storage capacity in the country is estimated at 5.7 mb (0.9 mcm) for crude and intermediate oils, and at 8.8 mb (1.4 mcm) for refined products.

The major oil companies in New Zealand employ a system that enables each company to draw product from any location, subject to having access arrangements with a specific storage provider. This system offers a great deal of flexibility and efficiency to the domestic supply chain. It works on an accounting system in which stock volumes are credited to companies based on a combination of the refinery production as it accrues to the individual company processing at the NZRC and as supplemented by periodic imports. A company's ability to draw stock from the system is subject to having a positive stock balance.

Decision-making Structure

The Ministry of Economic Development is responsible for issues related to oil supply security and, in a disruption, would take the lead in developing a plan of action. New Zealand's National Emergency Sharing Organisation (NESO) comprises staff from this ministry, as well as representatives from oil companies and from the NZRC. In an oil supply emergency, NESO would invite additional non-members to participate in consultations, including representatives of large user groups such as the Road Transport Forum and the Automobile Association.

In an oil supply disruption, an emergency meeting of the Officials' Committee on Sustainable Energy would be called to consider appropriate emergency response measures. This committee is chaired by the Ministry of Economic Development and includes officials from the Department of the Prime Minister and Cabinet, the Treasury, the Ministry of Transport, the Energy Efficiency and Conservation Authority, and the Ministry of Foreign Affairs and Trade. The analysis and recommendation of the committee would then be forwarded to the Minister of Energy, who is expected to copy the advice to the Prime Minister and the ministers of Finance, Transport, and Foreign Affairs and Trade. The proposed plan would have to be approved by Cabinet before it could be implemented.

There are two main legal instruments available to authorities during an oil supply disruption: the *International Energy Agreement Act of 1976 (IEA Act)* and the *Petroleum Demand Restraint (PDR) Act of*

1981. The *IEA Act* is designed to enable New Zealand to carry out its obligations as a member of the IEA. This includes ensuring compliance with international obligations in terms of petroleum supplies; the *PDR Act* is intended to deal with demand and distribution issues in a supply crisis.

Stocks

Stockholding Structure

New Zealand places no minimum stockholding obligation on industry. Until the recent acquisition of government owned-ticket reservations, New Zealand relied on the industry's normal stockholding practices to meet the country's overall minimum 90-day obligation as a member of the IEA.

As of the 1 January 2007, the New Zealand government acquired ticket reservations for stocks held in other IEA member countries, representing some 3.7 mb of public stocks. In 2008, tickets will be at a minimum 1.4 mb; however, they may be increased, subject to levels of domestic production. After 2008, ticket requirements will depend on domestic production levels – thus, they may not always be required. All tickets are held directly by the New Zealand government, rather than through an agency on the government's behalf.

Crude or Products

At the end of 2006, total stocks held by industry in New Zealand were some 7 mb, of which roughly one-third was crude and unrefined oils, and two-thirds were finished products. Of the product stocks held, approximately two-thirds were transportation fuels including gasoline, aviation kerosene and gasoil/diesel.

The public stocks held in other countries are entirely refined product stocks, the majority of which is in the form of gasoline.

Location and Availability

As of 1 January 2007, New Zealand has formal bilateral stockholding agreements with Australia, the Netherlands and the United Kingdom that support ticket arrangements for stocks of refined products. In an emergency, these stocks held outside of the country may be released onto the global market. If needed domestically, the stocks can be transported directly or swapped with stock held closer to New Zealand in order to reduce transport costs and delivery time. New Zealand and Japan are expected to sign a bilateral stockholding agreement before the end of 2007.

Monitoring and Non-compliance

As New Zealand has no compulsory stockholding requirements, there is no monitoring of individual company compliance. The government relies on accurate data from the oil companies in order to assess

whether or not the total level of stocks in the country are sufficient to meet the IEA stockholding obligation. New Zealand authorities assure the accuracy of the company reporting by undertaking audits of the information supplied. The *IEA Act* allows the Minister of Economic Development to direct any petroleum-supplying company to keep books, accounts, and records, and to furnish returns and information as requested. Any company who fails to comply with these directions commits an offence against *the Act* and is liable, on summary conviction, to a fine.

Stock and Drawdown Timeframe

All oil stocks held in the territory of New Zealand are company stocks held for operational and commercial purposes. The legal powers for the drawdown of oil stocks are contained within the wide powers of the *PDR Act*.

The procedure for the release of emergency stocks in New Zealand is decided by the Minister of Energy in consultation with colleagues, and is expected to take 4 to 10 days. However, depending on where the stock is required, it is estimated to take 15 to 45 days for physical delivery of stocks to the market, after the stockdraw decision has been made.

Oil companies that are affected by the emergency have initial responsibility for responding to an oil supply disruption. The oil emergency response strategy of drawing on industry stocks would be activated only under two scenarios: if required to fulfil New Zealand's obligations to the IEA; or if petroleum supplies to New Zealand are materially disrupted and government involvement is necessary to rectify the situation and/or minimise the impact.

Financing and Fees

All industry stockholding costs are recouped by oil companies through their normal operations. The public stock ticket reservations are financed through the government's general budget.

Other Measures

Demand Restraint

In a supply disruption, New Zealand would conduct a comprehensive public information campaign encouraging consumers to take a series of voluntary measures to conserve oil. These would include telecommuting, using public transport, car-pooling and staggering start times to relieve highway congestion. The New Zealand authorities estimate that these measures could reduce the number of trips by approximately 10%, producing a 3.5% (5 kb/d) overall reduction in oil products consumption.

The country's demand restraint campaign would also include a detailed promotion of eco-driving, encouraging drivers to use their vehicles as efficiently as possible. This includes voluntary speed reductions, avoiding rush hour traffic, using the vehicle's vents or opening windows for ventilation

instead of using air conditioning, not carrying excess weight and avoiding cold starts by combining several errands into one trip. It would also involve checking the tuning of the car's engine, the condition of its air filters and the inflation of its tires. Authorities estimate that these measures would reduce oil consumption by approximately 3% for cars and freight vehicles, resulting in an overall reduction of 2% (3 kb/d).

The public information campaign would also target industrial and agricultural users of oil, encouraging them to conserve in different ways. It is estimated that these sectors could achieve a savings of 5% of their consumption, equating to an overall oil savings of 0.5% (0.8 kb/d).

Legal powers made available through the *PDR Act* also make it possible to impose more restrictive demand restraint measures, should these be considered necessary.

Oil Infrastructure of Norway



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

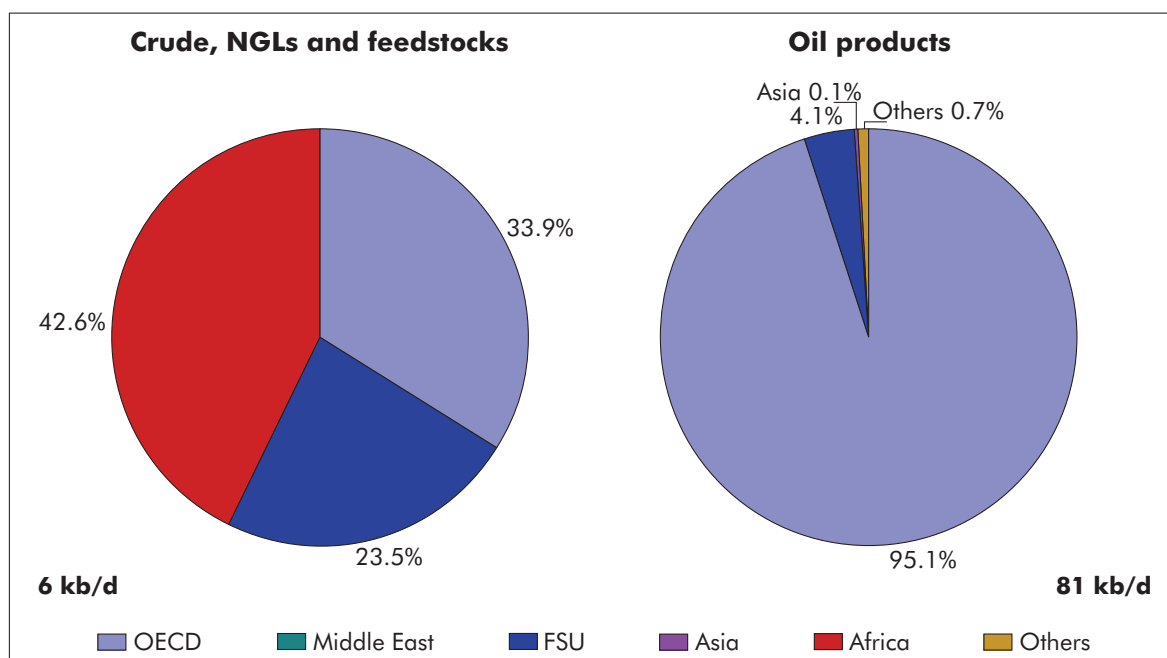
NORWAY

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	1 717.6	2 901.6	3 345.7	2 969.0	2 778.3	2 200.4
Demand (kb/d)	200.4	208.4	210.4	221.6	235.6	273.2
Motor gasoline	41.4	38.6	37.4	36.6	35.4	
Gas/diesel oil	66.7	72.4	79.4	87.1	91.0	
Residual fuel oil	12.5	12.2	10.4	10.0	10.8	
Others	79.8	85.3	83.3	87.9	98.4	
Net imports (kb/d)	-1 517.2	-2 693.2	-3 135.3	-2 747.4	-2 542.6	-1 927.2
Import dependency (%)	*	*	*	*	*	*
Stocks in days of net imports	-	-	-	-	-	
Refining capacity kb/d		284.7	358.0	310.0	310.0	316.2

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

Norway joined the IEA in 1975, on an agreement allowing the government to decide whether and how to join an IEA emergency sharing system, including emergency stockdraw response measures. As Norway is a net exporter of oil, it is not bound by the IEA 90-day stockholding commitment.

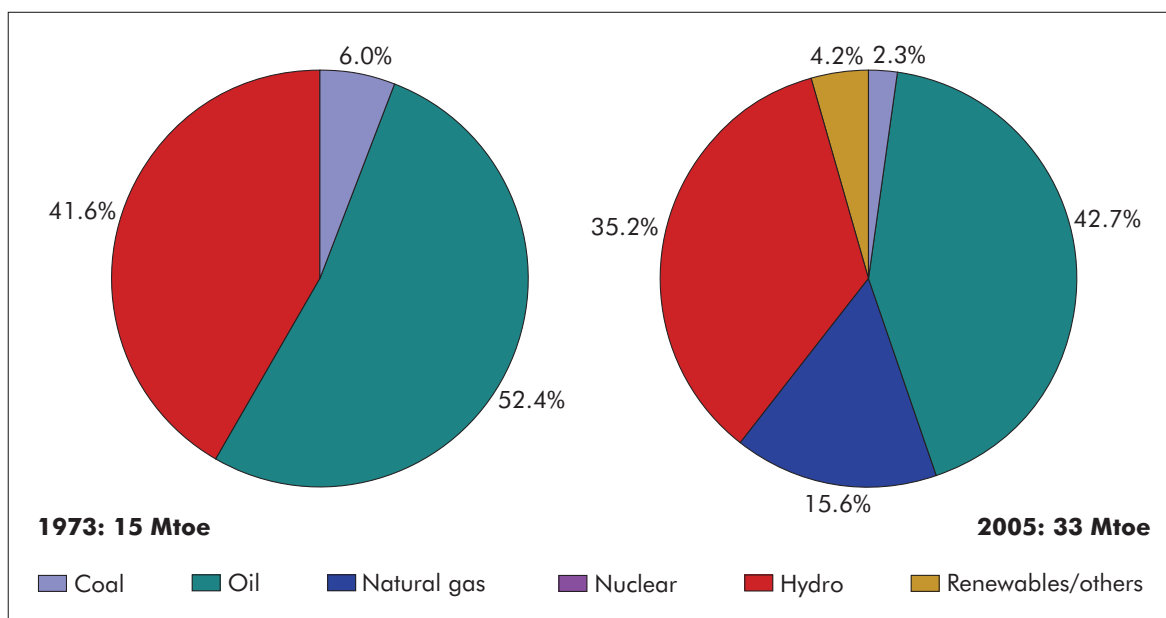
Crude oil resources on the Norwegian Continental Shelf (NCS) have been the main driver of the growth of petroleum production in Norway. Since 2002, however, oil production has been declining; in the absence of significant new discoveries, the peak of oil production may have been reached.

Until 2006, Norway held a certain amount of governmental stocks for oil emergencies. These stocks were sold off when new legislation was introduced in January 2007 that obliged the industry to hold emergency stocks. Release of company-held stocks is the preferred action in an oil supply disruption.

Energy Outlook

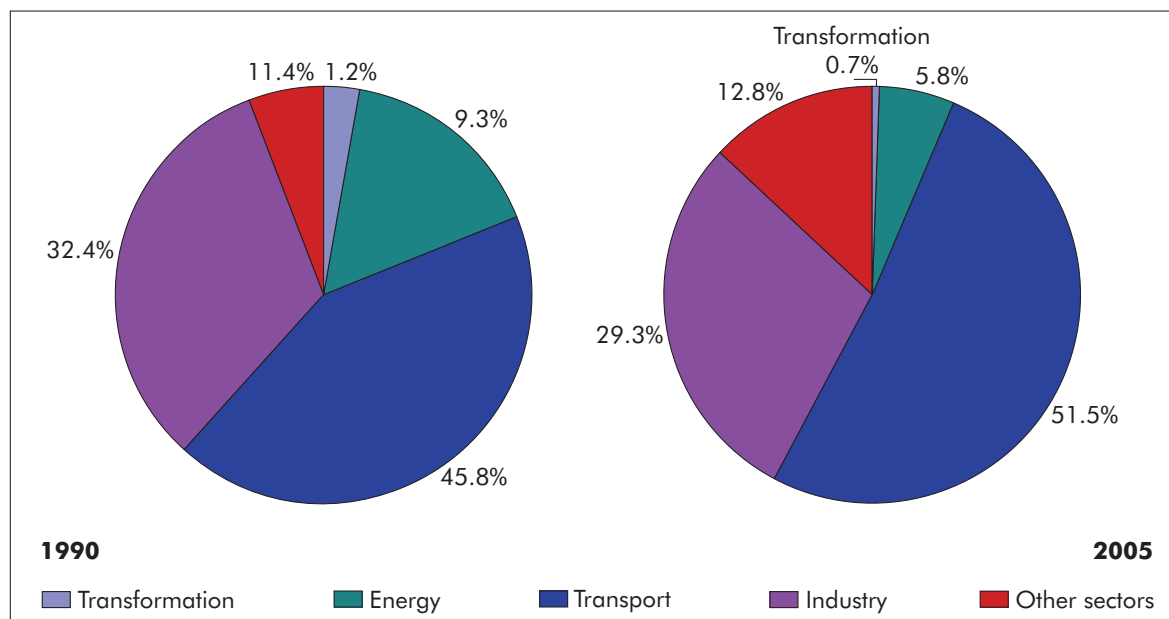
Total primary energy supply (TPES) in Norway reached 33 Mtoe in 2005, reflecting an average annual growth of 2.5% since the early 1970s. Having decreased significantly from 1990, oil now accounts for 43% of TPES, followed by hydro power supply at 35%. By contrast, the share of natural gas increased considerably reaching 16% in 2005, as compared to a negligible proportion in 1973, and 9% in 1990.

Total Primary Energy Supply



With respect to consumption, oil is used primarily in the transport sector; transport accounted for 51.5% of oil consumption in 2005. By contrast, the industrial sector's share was 29%.

Oil Consumption by Sector



In 2006, oil demand reached 236 kb/d, an increase of 13% on 1995 figures. This trend is set to continue with an anticipated average growth rate of 3.8% from 2006 to 2010, at which time demand is expected to reach 273 kb/d.

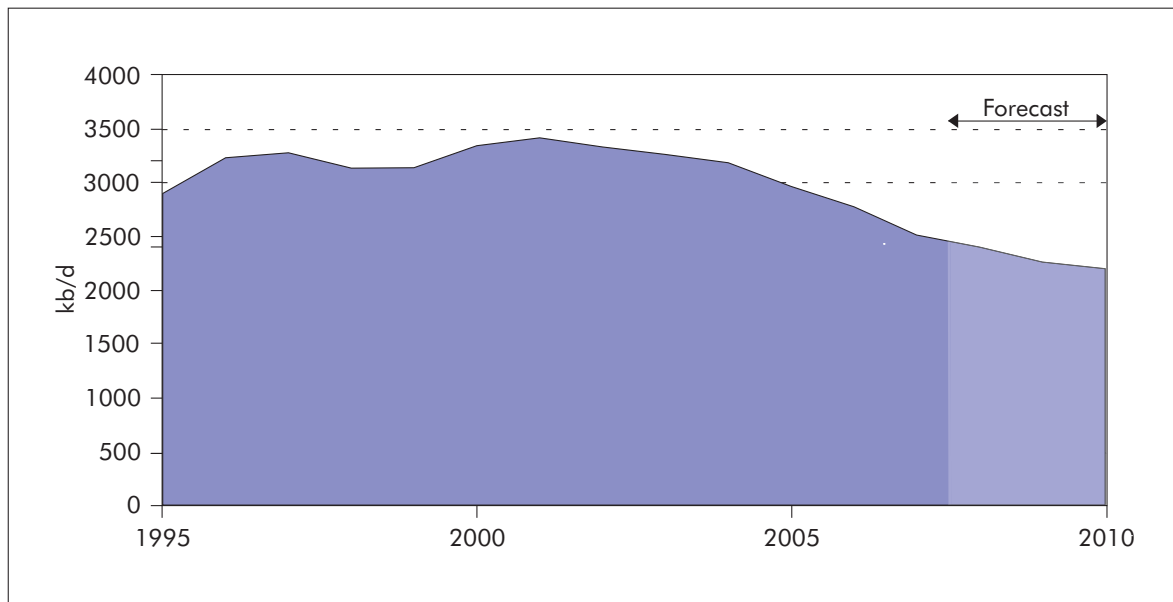
Market Features and Key Issues

Norway is the fourth-largest OECD oil producer after the United States, Mexico and Canada; it produced 2.8 mb/d in 2006. Norway exported 2.6 mb/d of oil in 2006, around 70% of which went to countries in Europe. These volumes put Norway as the seventh-largest world oil producer and third-largest exporter.

During the last few years, NCS oil production has been decreasing slightly. Should no new resources be found, it is expected to have peaked. In 2010, production in Norway is projected to stand at 2.2 mb/d, a decline of 15% on 2006 figures. At the end of 2006, total proven reserves were estimated at 7.8 billion barrels.

In order to meet the challenges related to mature fields, the Norwegian authorities have undertaken several policy changes. The two most important ones are opening the shelf to a wider range of companies, and making all exploration areas around mature fields available through annual licensing rounds.

Norwegian Continental Shelf (NCS) Oil Production, 1995-2010



Oil Supply Infrastructure

Refineries

Norway has two refineries situated at Mongstad (close to Bergen) and at Slagen (south of Oslo). In 2006, total processing capacity was approximately 310 kb/d. The Mongstad plant (200 kb/d) has roughly twice the capacity of the Slagen plant. Both refineries purchase crude oil and sell products globally.

Approximately 30% of the output from these refineries (90 kb/d) is consumed by the domestic market; the rest is exported. Remaining domestic consumption of oil products (some 150 kb/d) is produced at foreign refineries. Refining capacity is expected to reach 316 kb/d in 2010, slightly higher than the 2006 capacity of 310 kb/d.

Pipelines

Norway has established an extensive network of sub-sea oil pipelines to link offshore oil fields with onshore terminals. Norsk Hydro operates the Oseberg Transport System (765 kb/d) to connect the Oseberg field with the Sture receiving terminal. Norsk Hydro also operates another pipeline (265 kb/d) called Grane, linking its Grane field to Sture. The Sture terminal's storage capacity is 6.3 mb of crude oil.

Statoil manages the twin pipelines system called Troll I and II (565 kb/d), connecting the Mongstad terminal to offshore oil fields. The terminal can store 9.4 mb of crude oil. Most of the crude is exported from Mongstad by tankers, but the refinery retains a certain amount for its own use.

Norpipe Oil AS is operated by ConocoPhillips Skandinavia AS. This oil pipeline (810 kb/d) is about 354 km, starting at the Ekofisk Centre and crossing the UK Continental Shelf to come ashore at Teeside. A tie-in point for UK fields is located about 50 km downstream of Ekofisk.

Storage

Norway has 23 main storage facilities, spread over 17 localities, as well as about 50 distribution storage facilities. If the sub-storage and inland depots are included, Norway has about 400 storage facilities altogether, all of which are owned by Norwegian oil trading companies. In addition to the Slagen and Mongstad refineries, which together can store around 15.7 mb of crude, Norway has three other types of storage facilities:

- **Main storage or terminals** store gasoline, gas oil/diesel and heating oil, and are normally supplied by tankers directly from the refineries.
- **Distribution storage** of oil products is supplied by tankers from the refineries or main storages.
- **Coastal storages or sub-storage** delivers bunker oil to boats; facilities are supplied by boat and operated by independent dealers.

Decision-making Structure

The Norwegian emergency response organisation was re-organised in 2006 and renamed the Oil Emergency Organisation (EO). The re-organisation included repealing the designation National Emergency Sharing Organisation (the former NESO), reflecting the Norwegian policy change to give priority to the use of stock release rather than implementing demand restraint measures.

The EO comprises officials from the Ministry of Petroleum and Energy (MPE), the Ministry of Foreign Affairs, the Ministry of Finance, and Statistics Norway, as well as industry representatives.

The Oil Emergency Board was re-organised in 2002, mainly to improve its ability to advise the MPE on all questions related to oil supply emergencies, domestically as well as globally. Upon request from the MPE, the board members will ensure that the preferred Norwegian crisis management measure – *i.e.* stockdraw – is put into effect by making oil available to the market. The board comprises high-level representatives from Norwegian oil companies.

Stocks

Stockholding Structure

Despite being a net exporter, Norway had held government stocks until 2006 based on laws established in 1956. In January 2007, Norway introduced new legislation that imposes an obligation on companies

to hold stocks of products equivalent to 20 days of their sales/imports in the domestic market. Under the new laws, the government stocks are being sold off.

Previous legislation allowed government control of company stocks only in case of war. By contrast, the new laws mandate government control of company stocks during peacetime in the event of a supply disruption.

Crude or Products

The new stocks legislation covers only petroleum products; however, in wartime, the government can take control of all crude oil stocks as well as industry-held product stocks.

Location and Availability

The new compulsory stocks are co-mingled with commercial stocks. There are no restrictions on location of stocks outside of Norway, although no stocks are currently held abroad. At present, Norway has no bilateral stockholding arrangements with other countries.

Monitoring and Non-compliance

No details currently exist concerning the supervision and reporting of stock levels during normal situations. However, the new legislation includes provision for fines of up to EUR 1.24 million¹¹ (NOK 10 million) per infringement of the resolution.

Stock and Drawdown Timeframe

The Minister of Petroleum and Energy decides on the measures in an emergency. The decision to participate in an IEA action is taken jointly by the Minister of Petroleum and Energy and the Minister of Foreign Affairs. Under the new compulsory stocks regime, companies are required to release the stocks in an effective and immediate manner.

Financing and Fees

There is no financial support to cover the cost of the company stock obligations; companies are allowed to pass on any additional costs through consumer prices.

¹¹ Based on exchange rates of August 2007 for EUR 1= NOK 8.06.

Other Measures

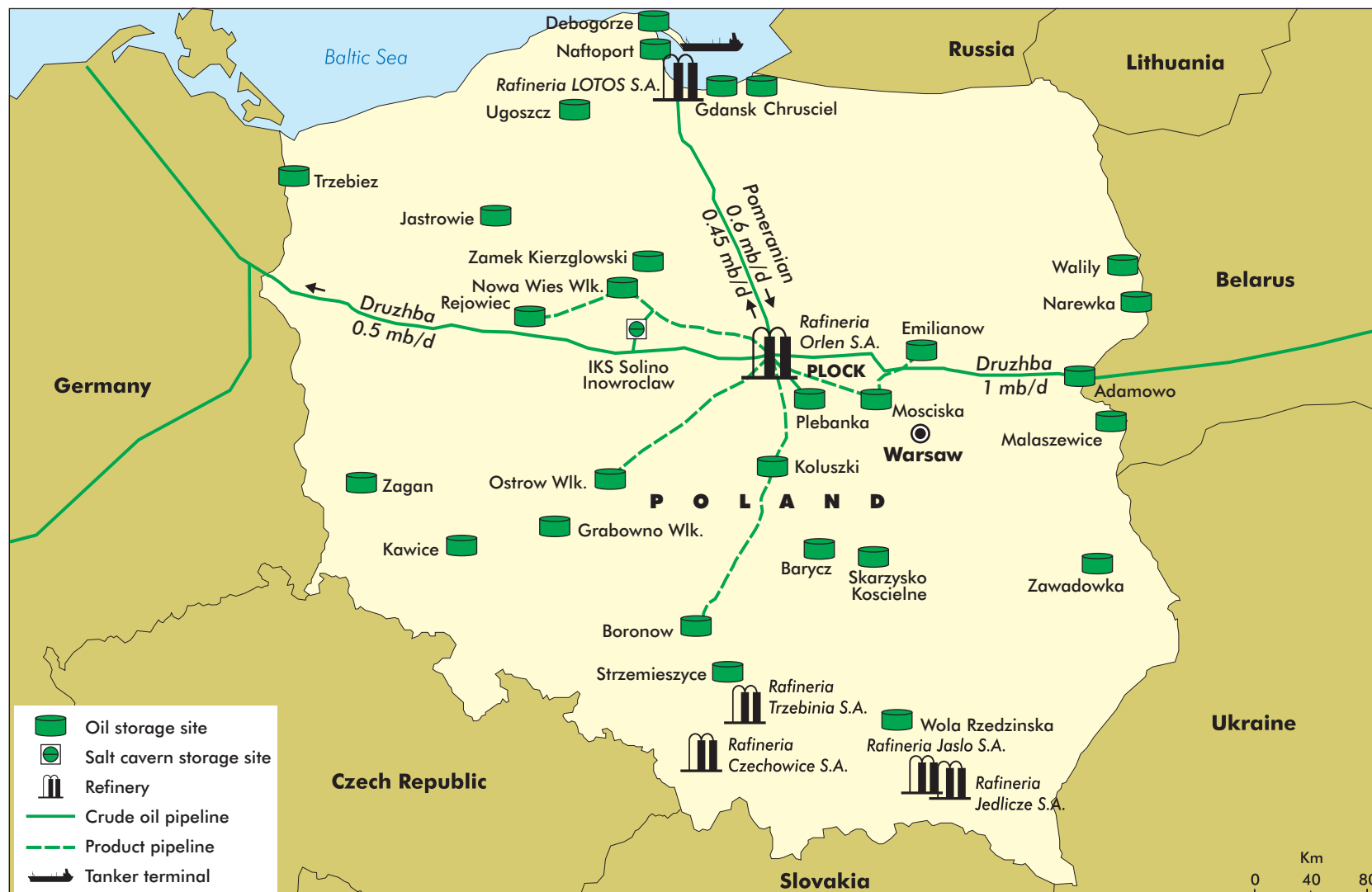
Demand Restraint

Norway considers that, in today's oil market, traditional demand restraint measures (such as restrictions on deliveries) are less reliable as measures in an IEA emergency response. This is mainly because of the lengthy preparation time and uncertain effects.

However, the legal arrangements from 1983 that enable the demand restraint system have not been formally abolished. If activated, this system would cover comprehensive measures, including light- and heavy-handed restrictions ranging from persuasion-based saving campaigns to rationing by cards.

Under the current scheme, the heavy-handed restraint measures have always been regarded as a last resort, should the government anticipate that the actual crisis would last for at least six months and that domestic consumption would need to be reduced by 20% or more.

Oil Infrastructure of Poland



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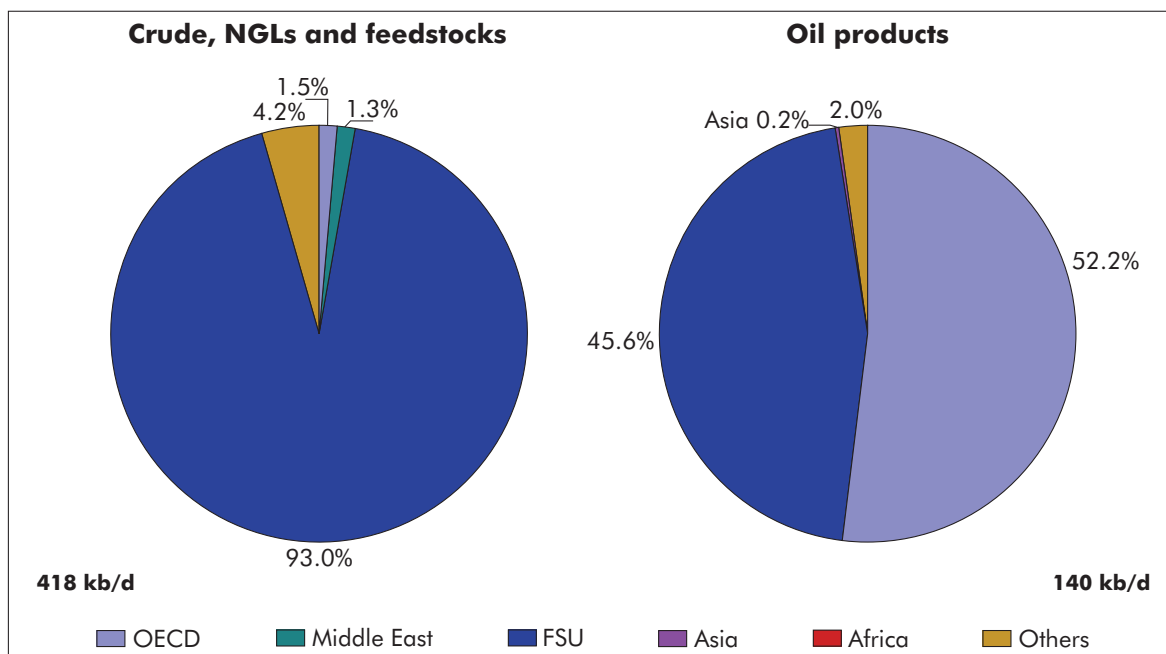
POLAND

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	3.0	6.0	14.6	28.0	29.4	20.6
Demand (kb/d)	283.0	318.6	411.2	472.8	505.2	548.4
Motor gasoline	71.5	101.5	115.5	92.7	95.0	
Gas/diesel oil	104.3	105.5	149.1	195.2	216.2	
Residual fuel oil	51.7	45.9	40.6	36.6	41.3	
Others	55.5	65.6	106.0	148.3	152.7	
Net imports (kb/d)	280.0	312.6	396.6	444.8	475.8	527.8
Import dependency (%)	98.9	98.1	96.5	94.1	94.2	96.2
Stocks in days of net imports	25.0	23.0	75.0	79.0	87.0	
Refining capacity kb/d		352.0	382.0	350.0	500.0	507.0

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

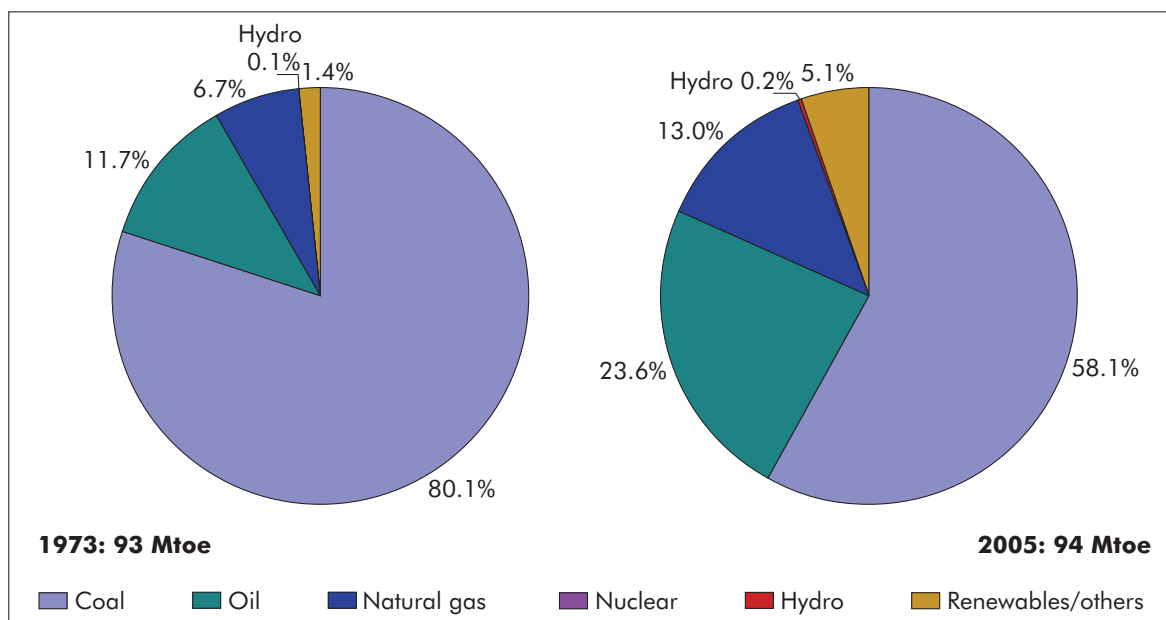
Oil represents less than one-quarter of Poland's total primary energy supply (TPES), which remains dominated by indigenous sources of coal. Total oil demand is expected to grow moderately in the coming decade. The resulting need for expansion in both refinery and storage capacities – as well as the heavy reliance on imports of Russian crude oil – are among the main challenges facing Poland's oil market. However, capacity expansion and investment in the country's supply infrastructure are already well underway, with an emphasis on strengthening the existing potential for supply diversification via the Baltic Sea.

The use of stocks held for emergency purposes, both by industry and by the government, is central to Poland's emergency response policy. The Ministry of Economy is responsible for maintaining and implementing emergency response measures. Under the supervision of this ministry, the Material Reserves Agency (ARM) is responsible for holding some 14 days of state-owned emergency reserves, as well as for monitoring the stockholding obligation on industry. Industry's obligation will be progressively increased, from the 66 days required at end 2006 to 76 days by the end of 2008.

Poland is in the process of becoming a member of the IEA. As a member of the European Union, the country has a schedule to reach minimum stockholding obligations by the end of 2008. In preparation for IEA membership, Poland passed legislation in early 2007 that maintains the target of 90 days by end of 2008, but changed the basis of calculation from consumption to net imports.

Energy Outlook

Total Primary Energy Supply



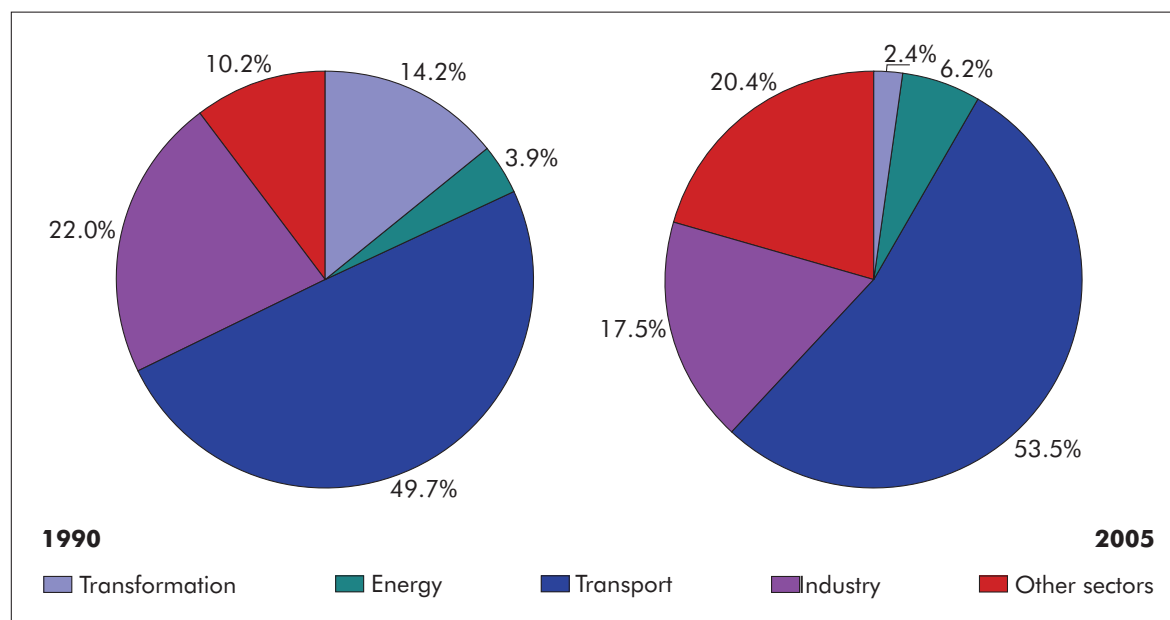
The energy balance of Poland remains dominated by indigenous sources of coal, which represented 58% of TPES in 2005, having declined from 80% in the early 1970s. Overall, TPES is expected to grow by some 1.7 to 2.1% annually in the coming decade. Dependence on both lignite and hard coal is projected to continue declining gradually, as natural gas is expected to take a growing share of the energy mix.

Polish oil demand reached an average 505 kb/d (22.7 Mt) in 2006, representing an average annual growth rate of 3.5% since 2000. Projection assumptions from primary energy supply outlook suggest an annual average growth rate in oil demand of between 3 and 3.5% over the coming decade.

Market Features and Key Issues

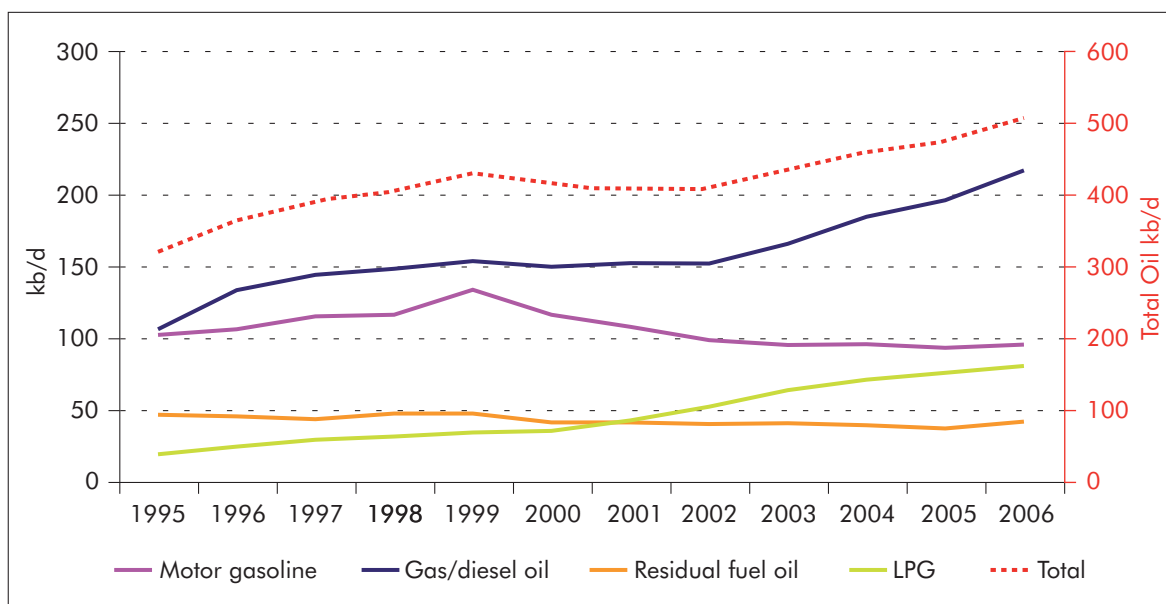
Poland does not have significant natural reserves of crude oil. As a result of low indigenous production, Poland's oil demand is mainly met by imports. Total oil import dependency in 2006 was 94%, with some three-quarters of the total in the form of crude oil. Russia is the principal source of crude oil imports (93%), delivered via the Druzhba pipeline. Almost half of all product imports are provided by countries of the former Soviet Union. The vast majority of imports are via land routes; oil imports by sea currently represent only around 2% of the total.

Oil Consumption by Sector



Approximately 54% of total oil demand is consumed in the transportation sector. Broken down by product, diesel oil and motor gasoline account for more than half of Poland's total oil demand. Since 1990, the share of diesel oil and LPG in the total motor fuels consumption has increased rapidly, at the expense of gasoline.

Oil Demand by Product, 1995-2006



LPG plays an increasingly important role in Polish demand for automotive fuel. A growing number of gasoline vehicles in the country's car fleet are now fitted with LPG installations in order to take advantage of price differentials. Due to different tax rates, the price of LPG is around 40 to 45% lower than that of gasoline.

Oil Supply Infrastructure

Refineries

Poland has six refineries, with total primary distillation capacity of 500 kb/d (24.8 Mt/yr). Two main refineries, located at Plock and Gdansk, account for more than 95% of the country's total capacity. The remaining four refineries are located in the southern part of Poland and have very small processing capacities, ranging between 2 kb/d and 10 kb/d (0.14 Mt/yr and 0.6 Mt/yr). Two companies, PKN Orlen and Grupa Lotos, account for the entire Polish refining industry.

The planned expansion of the Gdansk refinery would increase Poland's total refining capacity to more than 590 kb/d (29.3 Mt/yr) by 2012. This expansion would exceed projected demand over the same period, thus maintaining Poland's current situation of having refinery capacity greater than domestic demand.

The vast majority of crude supply to the Plock and Gdansk refineries is delivered from the Druzhba/Pomeranian pipelines; however, both are also capable of being supplied by the Baltic Sea. The southern refineries process crude supplied by railway.

Ports and Pipelines

The Druzhba and the Pomeranian are the main pipelines for transporting crude oil in Poland. These supply Russian crude directly to the refineries at Plock and Gdansk, and transit volumes on to the Germany refineries at Schwedt and Spargau. Russian exports via the sea terminals at Gdansk and Rostock (Germany) are also possible; however, the Polish and German refineries have supply priority.

The Druzhba Pipeline crosses the country from east to west, running two parallel lines from the Belarus border, via Plock, to the German border (approximately 660 km). The section from the Belarus border to Plock currently has a capacity of 1 mb/d (50 Mt/yr). A third line is under construction on this section and will eventually replace the first line, raising the section's capacity to 1.3 mb/d (63 Mt/yr) by the end of 2007. The section from Plock to the German border has a capacity of some 545 kb/d (27 Mt/yr).

The Pomeranian Pipeline is a 234-km line linking Gdansk with Plock. In the direction from the Gdansk port to Plock, the line has a capacity of 0.6 mb/d (30 Mt/yr); from Plock to Gdansk, the capacity is 0.45 mb/d (22 Mt/yr).

An oil products pipeline network, consisting of four main lines, connects the refinery at Plock to various storage depots. The largest of these lines is the connection from Plock to Ostrow Wielkopolski in the south west, with a capacity of some 80 kb/d (4 Mt/yr). Current utilisation rates of these lines average around 60%.

The main oil port terminal is in Gdansk and has a capacity of approximately 700 kb/d (34 Mt/yr). Operated by two companies, Naftoport and Port Północny, the port is used primarily for Russian crude oil exports. Two smaller terminals also offer the potential for imports of diesel and fuel oil: Gdynia, just north of Gdansk, with a capacity of about 70 kb/d (3.5 Mt/yr); and Szczecin, on the northwest coast near the German border, with a capacity of 30 kb/d (1.5 Mt/yr).

Only 2% of Poland's total imports enter the country via its seaports. As the total capacity of these oil ports exceeds Poland's total oil demand, they provide a significant alternative route for supply in disruption.

Storage

Total storage capacity at the end of 2006 is estimated at 49 mb (7.8 mcm). This includes storage used for operational, commercial and mandatory industry stocks, and for government-owned emergency reserves. Efforts to expand storage capacity are underway; the total is expected to reach 73.5 mb (11.7 mcm) by 2010.

The largest crude storage capacity holder in Poland is the state-owned pipeline operator PERN, with some 17.7 mb of capacity at the end of 2006. PERN has facilities located near Plock (Plebanka), at Gdansk, and near the eastern border (Adamów), all of which rent storage capacity to the refineries and to the ARM.

The state-owned Liquid Fuel Logistics Operator (Operator Logistyczny Paliw Płynnych – OLPP) is the main product storage operator in Poland. The company has 22 fuel storage depots distributed across the entire country. The five largest of these facilities (Koluszki, Nowa Wieś Wielka, Boronów, Rejowiec, and Emilianów) are connected by pipeline to the Plock refinery.

Capacity expansions in early 2007 included the development of a salt dome storage site at Inowrocław, 40 km west of Plock. This site consists of seven crude caverns and three product caverns, for a total capacity

of more than 31 mb (5 mcm or some 4.3 Mt). The crude caverns are connected to the Druzhba pipeline to supply the Plock refinery; the product caverns are connected to the Plock refinery by product pipeline.

Decision-making Structure

The Minister of Economy is responsible for Poland's overall energy policy, including maintaining and implementing emergency response measures for oil supply disruptions.

Poland's National Emergency Sharing Organisation (NESO) is headed by the Governmental Group on Energy Emergency Management. It includes high-level representatives from various ministries, and functions as an advisory body to the Minister of Economy. The chair of this group is the Deputy Minister of Economy, who is responsible for oil and gas issues. The group's high-level representation across relevant ministries facilitates decision making at the level of the Council of Ministers, as is necessary. In an emergency, the group would convene within 24 hours. High-level officials from industry could be invited to join the group at that time.

The legal basis for the oil crisis management is the *Act of 16 February 2007*, which details all available measures to respond to domestic disruptions or international commitments. The Act provides for three general levels of emergency response:

- **Level 1** concerns local and regional disruptions and pre-crisis situations. The response would be based on market forces and actions taken by the oil industry on a voluntary basis. Refiners and importers of crude oil or refined products are obliged to establish internal crises management plans with procedures for the following activities:
 - Obtaining additional supplies of crude oil or oil products from other sources or supply routes.
 - Implementing changes in the structure of fuel production.
 - Implementing the drawdown of emergency stocks.
 - Submitting information on actual or imminent disturbances in supplies.
- **Level 2** concerns a national crisis. The government would take actions such as reducing the stockholding obligation on industry or selling state stocks based on the needs of the domestic oil market. Demand restraint measures would also be implemented, depending on the nature of the disruption.
- **Level 3** concerns an international crisis and Poland's participation in a co-ordinated action. Actions undertaken would be similar to those of Level 2, but the volumes of oil to be released would be based on the Polish share in the co-ordinated action rather than the domestic market needs.

Stocks

Stockholding Structure

As a member of the European Union, Poland has a minimum stockholding obligation of 90 days of consumption, which it will reach by the end of 2008. Poland meets this obligation by holding 14 days of government-owned reserves and placing a minimum stockholding obligation on industry.

In preparation for becoming a member of the IEA, Poland passed legislation in early 2007 that maintains the target of 90 days by end of 2008 but changes the basis of calculation from consumption to net imports.

The ARM is responsible for holding, financing and managing the state reserves of the main resources considered essential for national security. Under the direction of the Ministry of Economy, ARM manages the state-owned oil emergency reserves and also monitors the stockholding obligation on industry.

All liquid fuel producers and importers are obliged to hold minimum stock levels based on their production or imports from the previous calendar year. The minimum obligation at the end of 2006 was 66 days. This will be raised to 73 days at the end of 2007 and to 76 days at the end of 2008. LPG is given specific treatment, reflecting its growing importance in the total mix of oil product demand: producers and importers must hold three days cover of LPG by the end of 2007. This will be increased progressively to a stockholding obligation of 30 days by the end of 2011. This obligation may be met by holding volumes of motor gasoline that equal the calorific value of the LPG obligation.

Polish legislation requires the ARM to hold oil stocks equivalent to no less than 14 days of net imports. The ARM must also make yearly adjustments in the volume of stocks held, in order to guarantee Poland's full compliance with international stockholding obligations. Thus, if for any reason the combination of public stocks and stocks held by industry failed to meet minimum obligations, the ARM level of public stockholding would be increased by the necessary amount. Industry typically holds stocks in excess of its actual obligation, thereby providing an additional buffer for meeting the minimum 90 days of net imports.

Total public stocks of the ARM at the end of 2006 were 6 mb (800 Kt). As this was prior to changes in the basis for stockholding calculations, the volume equated to 12 days of 2006 net imports. At the same time, industry stocks were 35.6 mb (4.7 Mt), with slightly more than half in the form of crude oil. This includes both the volumes held for commercial purposes and amounts necessary to meet minimum obligations. Industry has typically held commercial stocks (*i.e.* amounts in excess of the obligation) of around 7.5 mb to 10.5 mb (1 Mt to 1.4 Mt). The combined total of public and industry stocks levels at the end of 2006 was 41.5 mb (5.5 Mt), equating to 87 days of 2006 net imports.

Crude or Products

Of the ARM public stocks, more than four-fifths of the volume was held in the form of crude oil, with the remainder as diesel oil and a smaller volume of motor gasoline.

A maximum of 55% of the industry stockholding obligation may be held in the form of crude oil. This will be lowered to 50% in 2010, requiring half of all compulsory industry reserves to be held in the form of refined products.

Location and Availability

The ARM stocks of crude oil are held mainly in storage tanks rented from PERN, with some amounts in the salt dome storage facilities of PKN Orlen. Volumes of gasoline and diesel oil stocks are held in storage rented from OLPP. No amount of public stocks is allowed to be held outside the territory of Poland.

Compulsory industry reserves may be co-mingled with operational and commercial stocks. It is also permitted to fully cover the obligation through ticketing. In this case, a limit of 5% of the total obligation can be held outside of Poland, provided there is a bilateral stockholding agreement between governments. At present, Poland does not have bilateral agreements with any other countries.

Monitoring and Non-compliance

Compliance with minimum stockholding obligations is monitored by the ARM. The ARM holds a register of companies subject to stockholding obligation and companies are obliged to register within 30 days of commencing production or imports of liquid fuels. By the end of 2007, a total of approximately 150 companies will have a stockholding commitment.

Companies are required to submit monthly reports on oil stocks, including information on the quantity of stocks and their location (in the breakdown by fuels) to the ARM. Non-compliance with this reporting obligation is subject to financial penalties. The Minister of Economy also has the legal authority to require more frequent data submissions from oil companies, should this be deemed necessary. Each month, the ARM submits the consolidated data to the NESO Secretariat, the Department of Oil and Gas within the Ministry of Economy. Information provided in these monthly reports are cross-checked with monthly statistics surveys collected by the Energy Market Agency (Statistics Agency of Poland). The oil companies with stockholding obligations may be audited through spot inspections conducted by inspectors of the ARM, which has the authority to impose fines for non-compliance.

Stock and Drawdown Timeframe

The procedures for a release of emergency stocks in Poland depend on the nature of stock to be drawn. The government may decide to draw on state reserves held by the ARM or mandatory stocks held by industry. Industry stocks would be made available either through the relaxation of minimum stockholding obligations or by directing industry to make compulsory stockdraws.

Public stocks of the ARM would be released upon the decision of the Minister of Economy. These could be made available to the oil industry through a number of options, including auction, tender or sales to specific entities. The Minister of Economy would consider offers and conditions of release; in special cases, this could include delivery to specific entities free of charge. In the case of releasing state stocks of crude oil, refiners may be required to process crude oil for products according to instructions of the ministry.

Given the current market structure, it is estimated that emergency reserves of crude oil could be drawn down at an average rate of 57 Kt/d (420 kb/d); refined products could be drawn at a rate of 37 Kt/d (287 kb/d).

Financing and Fees

Public oil stocks are financed from the state budget and from any revenues of the ARM. No financial assistance or public funding is provided to industry to meet emergency reserve requirements. There are no exemptions for small operators.

Other Measures

Demand Restraint

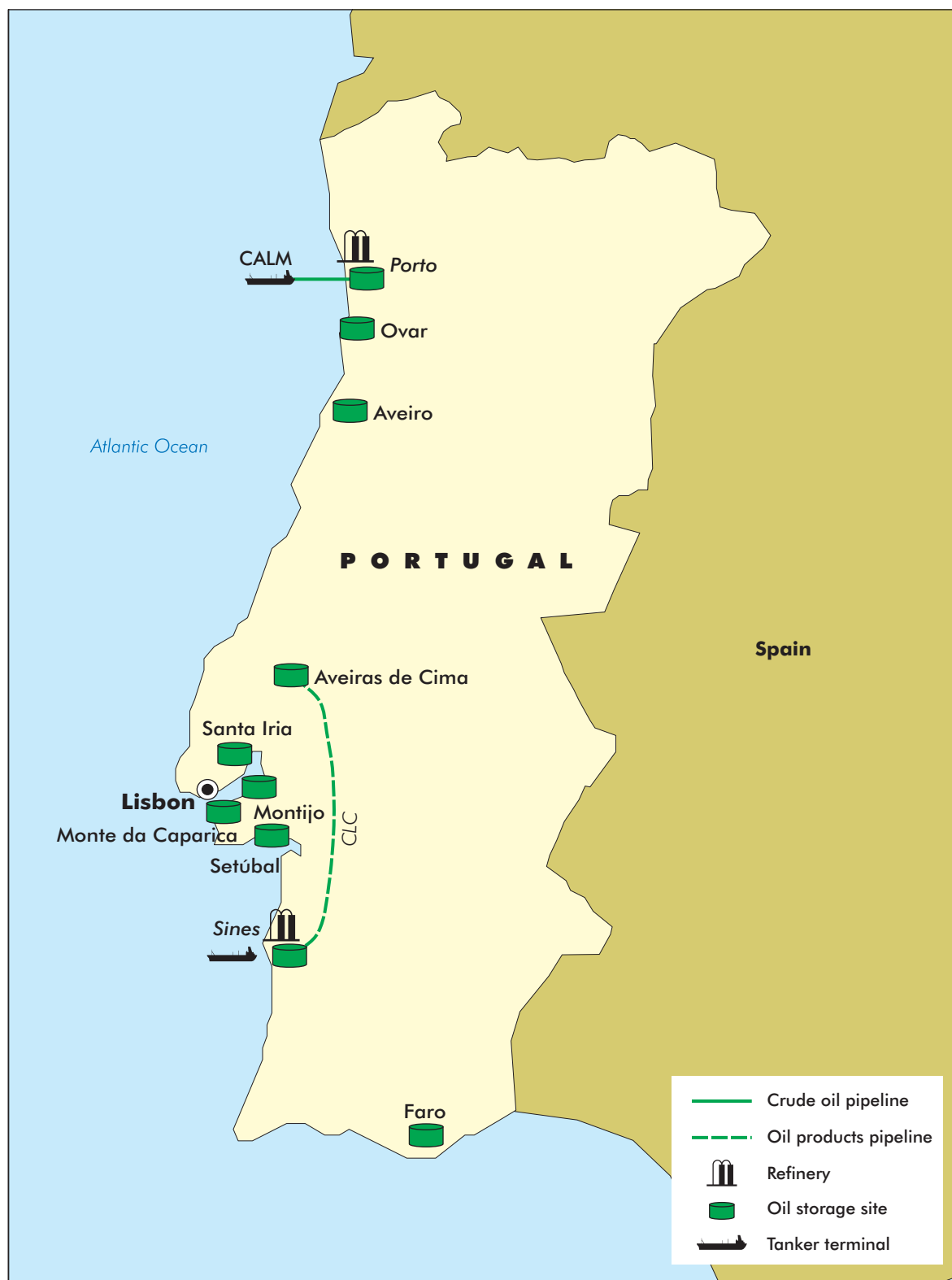
Light-handed demand restraint measures, in the form of an information campaign to promote reduced fuel consumption, would likely be implemented as a secondary measure in parallel with the use of emergency reserves. Polish legislation also allows authorities to adopt demand restraint measures that:

- Limit the quantity of fuels sold (*e.g.* limits on filling stations opening hours, total volumes sold or per-customer purchase limits).
- Lower maximum speed limits.
- Restrict the use of motor vehicles (*e.g.* week-end bans, or bans based on odd/even number plates).
- Ration fuels.

The legislation does not restrict the use of demand restraint measures to any particular criteria (*e.g.* magnitude of disruption). However, due to the restrictive nature of the measures, they are likely to be used only in a severe disruption.

The demand restraint measures would be introduced by an ordinance of the Council of Ministers, based on a proposal from the Minister of Economy. NESO would prepare the recommendations for the Minister of Economy, who takes the final decision on the scope of measures to be introduced by the Council of Ministers. The demand restraint measures would enter into force immediately after publication of the ordinance. No additional time would be required for implementation, with the exception of a rationing system, which would need a lead time of around four weeks for the distribution of coupons.

Oil Infrastructure of Portugal



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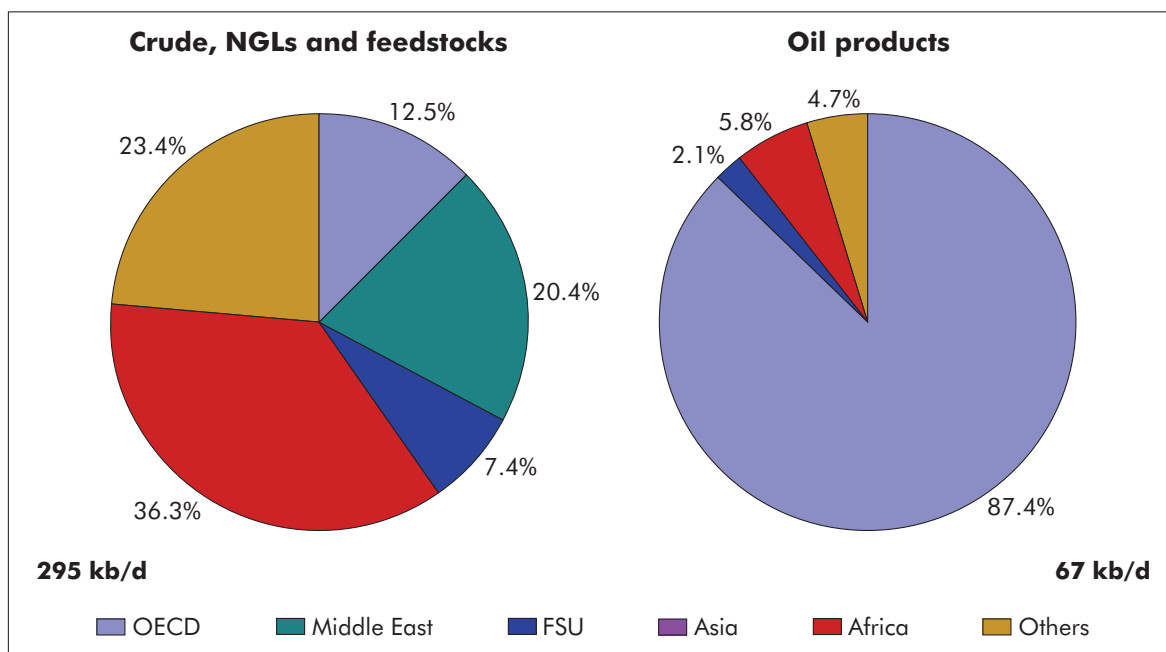
PORTUGAL

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	-	-	-	-	2.0
Demand (kb/d)	251.0	289.9	332.8	336.9	305.9	315.3
<i>Motor gasoline</i>	31.7	43.7	49.0	41.8	38.9	
<i>Gas/diesel oil</i>	54.2	66.8	101.2	115.1	111.7	
<i>Residual fuel oil</i>	79.1	82.1	69.0	63.8	48.1	
<i>Others</i>	85.9	97.3	113.6	116.2	107.1	
Net imports (kb/d)	251.0	289.9	332.8	336.9	305.9	313.3
Import dependency (%)	100	100	100	100	100	99.4
Stocks in days of net imports	103.0	78.0	84.0	99.0	103.0	
Refining capacity kb/d		304.3	304.3	304.2	304.2	310.3

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

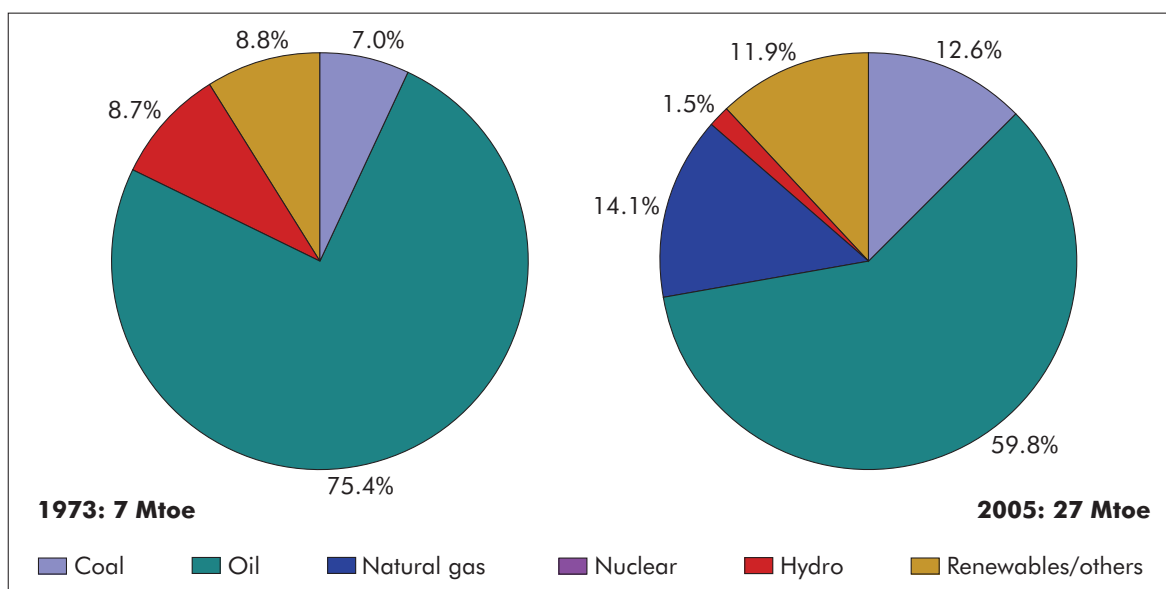
With few indigenous sources of energy, Portugal depends on imports for 90% of its overall energy needs and for the totality of its oil needs. Portugal has no cross-border pipelines; thus, the vast majority of these imports are shipped through the harbours at Sines and Porto. The main import sources are well diversified: one-third comes from OECD Europe, one-third from several OPEC countries, and the rest from various other sources.

Portugal fulfils its minimum stockholding requirements to both the IEA and the European Union by holding public stocks and by placing stockholding obligations on industry. The public stockholding agency, *Entidade Gestora de Reservas Estratégicas de Produtos Petrolíferos*, EPE (EGREP), is responsible for holding one-third of Portugal's emergency reserve requirement. In an emergency, the Portuguese authorities may grant oil operators permission to draw on stocks below the minimum levels they are normally required to directly. Alternatively, the authorities may choose to release the public stocks of EGREP.

Energy Outlook

Oil heavily dominates the energy balance of Portugal, accounting for 60% of total primary energy supply (TPES) in 2005, although this represents a decrease from 75% in 1973. By contrast, oil's average share of TPES across the European Union is 40%. Until the 1990s, high oil consumption in Portugal was due to its extensive use in electricity generation. In the late 1980s, oil consumption for electricity began to decline due to the increasing use of coal. Further reductions have occurred more recently with the arrival (in 1997) of natural gas power plants on the market once Portugal became connected to the Magreb pipeline coming from Algeria.

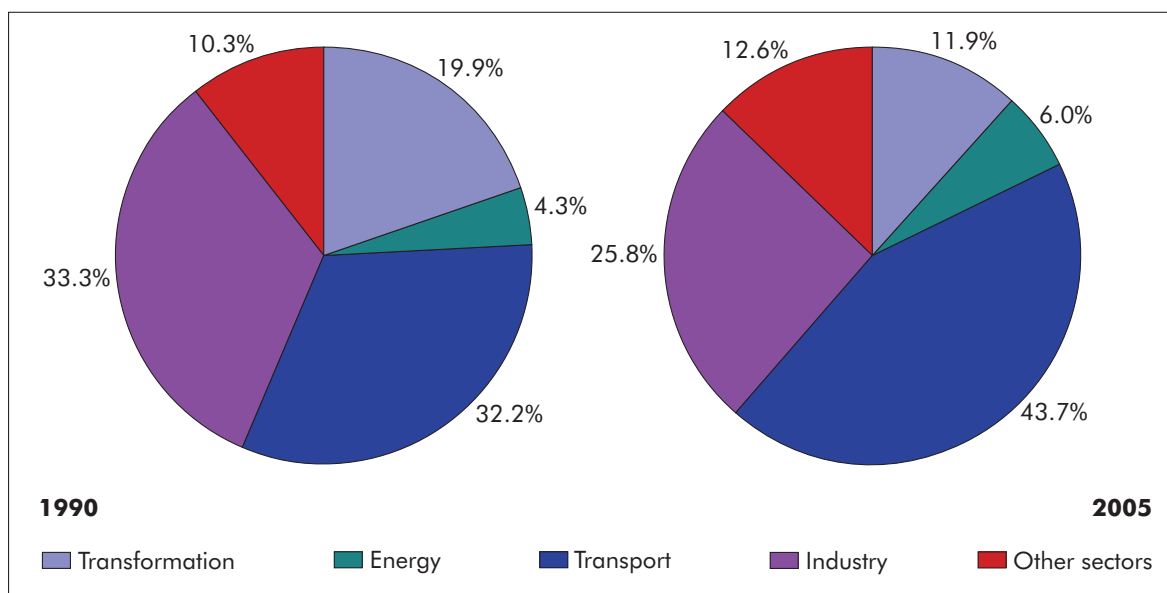
Total Primary Energy Supply



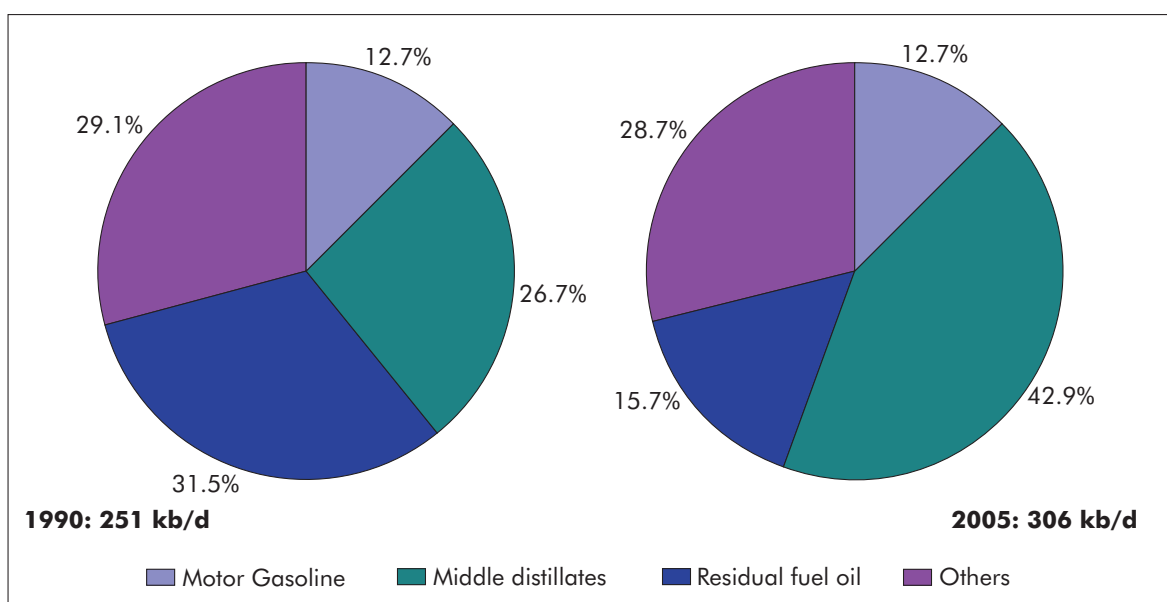
The Portuguese energy forecast anticipates a continued decrease in oil's share of the energy mix, to some 54% in 2010. Portuguese oil demand increased in the 1990s but has stabilised, mostly due to the compensation effect of switching fuel sources in power generation. At the same time, the share of diesel fuel in oil demand has increased.

Market Features and Key Issues

Oil Consumption by Sector



Oil Demand by Product



The dieselisation of the Portuguese car fleet becomes apparent in the breakdown of demand by product: the share of middle distillates has grown significantly over the past decade. In the 10-year period to 2006, oil demand overall grew an average of 0.5% per year; demand for diesel grew at a rate of 5.8% per year. At the same time, oil consumption has become increasingly concentrated in the transportation sector, which now accounts for nearly half of all oil usage.

The growing portion of diesel oil in total demand has created a mismatch between the volumes of products produced by domestic refineries and what is consumed on the Portuguese market. As a result, Portugal has become an exporter of gasoline (principally to the US market), but requires imports to meet excess diesel demand.

Oil Supply Infrastructure

Refineries

Portugal has two refineries, with a total primary distillation capacity of some 304 kb/d; both are owned by Petrogal (itself part of Group Galp Energia). The southern refinery, at the port of Sines, accounts for the majority of the refining capacity (215 kb/d). It was recently revamped with a fluid catalytic cracking unit and a hydro-treating unit in order to comply with the new EU regulation on fuel specifications. The Porto refinery, in the north, is comparatively less complex. It comprises a hydro-skimming unit and a desulphurisation plant, and produces lubricants and aromatics. In 2010, refining capacity is expected to reach 310 kb/d, an increase of 2% compared to 2006.

Ports and Pipelines

Portugal is not connected to any cross-border pipelines for crude oil or oil products. Consequently, almost all imports to the Portuguese oil market come in by ship, mainly through one of the two major ports. The port at Sines, connected to the country's main refinery, can receive tankers of any size and is operational year-round. The harbour at Porto, Leixões, regularly encounters difficult conditions in winter that can limit its ability to operate and is, therefore, connected to a floating platform anchored offshore (CALM).

Oil products are distributed to inland areas through the Companhia Logística de Combustíveis (CLC) pipeline, a multi-product pipeline between the Sines refinery and the tank farm at Aveiras (45 km north of Lisbon). The CLC pipeline has the capacity to carry some 80 kb/d of seven products, in sequence and by cycles. From the tank farm, oil products are transported by truck. Some rail transportation is used to carry jet fuel from Sines Refinery to the Algarve airport.

Storage

At the end of 2006, Portugal had a total oil storage capacity of nearly 40 mb for both commercial operations and mandatory industry and agency stocks. Almost 85% of this capacity is owned by Galp Energia, and is located at its two refineries or at various smaller storage sites. Most of Galp Energia's

storage capacity is for crude oil. The company uses some 8 mb of the capacity for its own stockholding obligation and rents approximately 9.5 mb to other market players for their compulsory stockholding obligations.

Overall, Portugal has limited storage capacity to meet its stockholding obligation. In 2004, Portugal changed its laws to allow for foreign tenure of stocks under bilateral agreements.

Decision-making Structure

Two bodies provide the core of the Portuguese National Emergency Sharing Organisation (NESO): the Directorate General of Energy and Geology (DGEG) within the Ministry of Economy and Innovation and the *Comissão de Planeamento Energético de Emergência* (CPEE). NESO also includes representatives from industry and officials from relevant administration departments. In case of crisis, the CPEE may evolve into the *Conselho Nacional de Emergência Energética* (CNEE), which would be composed of high-level representatives and serve as a council to the minister. NESO can be activated in two ways: through the declaration of an emergency situation by the minister responsible for energy; or through legislation of the Civil Emergencies Planning Board (under the authority of the Minister of Defence).

The Minister of Economy and Innovation is responsible for measures, the activation of the full NESO structure, and preparation of a proposal to the prime minister to prolong or end the declaration of the emergency. During a disruption, the Portuguese Council of Ministers would decide upon measures to be taken.

Stocks

Stockholding Structure

Each year, the DGEG calculates the minimum stockholding obligation of Portugal as a member of both the European Union and the IEA. It then places a minimum stockholding obligation on industry participants, equating to 70% of the EU obligation and based on consumption of the three main product categories. The remaining 30% of this obligation is covered by the public stockholding agency, EGREP. EGREP is also responsible for holding the additional volume of oil needed to meet the IEA stockholding obligation, based on net imports.

The obligation for fuel oil used for power generation is calculated on a rolling average from the previous 12 months rather than sales from the previous calendar year. This is mainly because of huge swings in fuel oil consumption by power stations, depending on the availability of climate-sensitive hydroelectricity.

EGREP is a public corporation under the supervision of both the Ministry of Finance and the Ministry of Economy and Innovation. Its main function is to set up and maintain national strategic oil stocks comprising at least one-third of the national obligation as defined under EU rules, as well as the difference between total EU and IEA stock obligations. EGREP must own at least 25% of its stocks.

The Minister of Economy and Innovation holds three main responsibilities: co-ordinating the allocation and sale of stocks during an energy supply crisis; authorising the sale of surplus reserves held by EGREP (if such an occasion arises); and approving the amounts companies have to pay to EGREP.

Crude or Products

Portuguese policy stipulates that at least one-third of the individual stock obligations of companies (including EGREP) must be held as products. This applies separately to each category of qualifying products; volumes to be held are calculated by product category, not by individual product. Semi-finished products are counted as finished product within the appropriate qualifying product category.

If an obliged stockholder (including EGREP) wishes to hold crude oil instead of part of its product stock obligation, the product yield must be agreed with DGEG.

Location and Availability

Historically, legislation did not allow for stocks to be held outside of Portuguese territory. As storage capacity was very tight, new legislation in 2004 and 2005 opened the possibility of holding stocks abroad, subject to certain conditions under bilateral agreements.

The DGEG can authorise individual stockholders to hold compulsory stocks in another EU member country, provided the stockholder is able to certify that it is unable to secure competitive access to sufficient Portuguese storage capacity to fulfil its obligation.

Stocks held abroad must be held in another EU member country. Individual companies may not hold more than 10% of their obligation abroad and there is also a minimum quantity (20 Kt) that may be authorised. In total, not more than 20% of the country's overall obligation may be held abroad; this includes volumes held as stock tickets. These criteria effectively allow EGREP to hold more than 20% of its obligations abroad.

Portugal has bilateral agreements with Germany and Spain, and is concluding another one with the Netherlands.

The 2001 law requires all compulsory stocks to comply with prevailing product quality legislation. To ensure adequate stock rotation, compulsory stocks are mostly co-mingled with normal operational stocks. There is little geographical dispersion of compulsory stocks.

Monitoring and Non-compliance

Operators must submit detailed monthly reports on stock quantity and location to the DGEG by the 15th of each month.

Tanks used for compulsory stocks must be approved by the DGEG. In turn, the DGEG maintains updated lists of approved tanks, thereby allowing clear identification of compulsory stocks locations. If one company holds stocks on behalf of another company, both the quantities and the location

of the stocks must be reported to the authorities to facilitate cross-checking, reporting and physical inspections.

The monitoring of stock levels is based on stockholding report systems, verification of physical availability of stocks and bookkeeping, with cross-checking procedures in place if required.

The DGEG has authority to issue fines to companies found to be non-compliant with stockholding obligations. The amount of the fines is graduated in proportion to the gravity of the infringement, or for repeated offences. In practice, penalties for infringement were imposed occasionally in the past, but have not been necessary in recent years.

Stock and Drawdown Timeframe

Only the Minister for Economy and Innovation may take the decision to drawdown obligatory stocks. In taking such a decision, the minister is required to take into account international agreements and prevailing supply market conditions. A ministerial order would determine the degree of stock release. It is a basic requirement on all operators holding compulsory stocks that their stocks be available for use at all times, and in a manner that can be checked.

Any drawdown decided by the minister must result in products being supplied to the market. As compulsory stocks are mostly stored together with commercial stocks, any stocks released would be immediately available for physical delivery to distribution channels.

A decision for drawdown/release would take about one week. Physical delivery of domestically held product stocks would take place in a few days; crude or product stocks held abroad would enter the market within an estimated 35 days.

Financing and Fees

EGREP is financed by payments made by supplying companies that have a compulsory stock obligation. EGREP aims to balance its budget on an annual basis. The 2007 fees are as follows: EUR 4/t for gasoline (Category A); EUR 3.78 /t for gasoil (Category B); EUR 3.32/t for fuel oil (Category C); and EUR 2.42 /t for LPG (Category D).

Other Measures

Demand Restraint

Portugal's demand restraint measures were formalised by the law of 2001, which specifies a set of persuasive and compulsory measures. Persuasive measures designed to stimulate the population to reduce oil consumption include media awareness campaigns, publication of leaflets and explanatory guides, display of posters in public locations, and direct action by state or public administration agents.

If further action is required, the following compulsory measures are envisaged:

- Restrictions on the use of passenger cars (e.g. driving bans, interdiction of motor sport events, reduction of speed limits or requirements concerning occupancy).
- Restrictions on under-utilised public or commercial transportation.
- Restrictions on the use of energy-consuming equipment (e.g. limiting operating times and lighting levels, reducing use of heating and cooling in public or private buildings).
- Imposition of operating rules for energy-consuming equipment.
- Enforcement of fuel switching.

The law of 2001 also allows for measures that indirectly promote energy saving, such as the introduction of flexible working hours or the increase of energy tariffs and charges.

Fuel Switching

The law of 2001 specifically mentions fuel switching as an emergency response measure. In reality, only about 1% of total installed power generation capacity is dual-fuel fired (fuel oil and natural gas) and could potentially switch out of oil in case of a crisis (provided it is not already running on natural gas). In addition, it may be viable to switch off an oil-fired plant and substitute it with another power source, running on a different fuel. This measure was used in the past to replace fuel oil with hydropower, and may well be possible in a future crisis.

Others

As an exceptional emergency measure, the law of 2001 provides the possibility to increase available supplies by relaxing energy product specifications and/or emission standards.

Oil Infrastructure of The Slovak Republic



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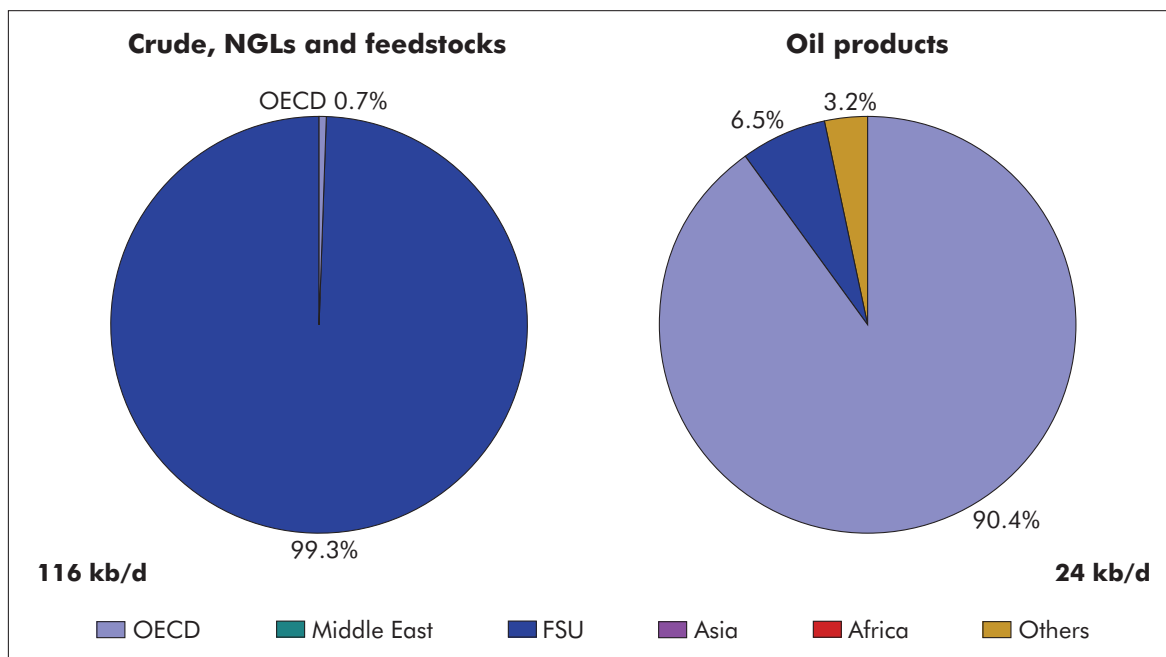
THE SLOVAK REPUBLIC

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	1.0	1.0	7.6	7.8	8.1
Demand (kb/d)	106.7	64.7	66.8	78.5	79.9	84.3
<i>Motor gasoline</i>	10.9	12.4	13.9	14.9	15.2	
<i>Gas/diesel oil</i>	26.7	18.7	17.1	22.8	24.2	
<i>Residual fuel oil</i>	27.5	10.3	3.4	6.2	7.2	
<i>Others</i>	41.7	23.3	32.3	34.7	33.4	
Net imports (kb/d)	106.7	63.7	65.8	70.9	72.1	76.2
Import dependency (%)	100	98.5	98.5	90.3	90.3	90.4
Stocks in days of net imports	57.0	82.0	130.0	111.0	127.0	
Refining capacity kb/d		193.4	115.0	115.0	115.0	128.5

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

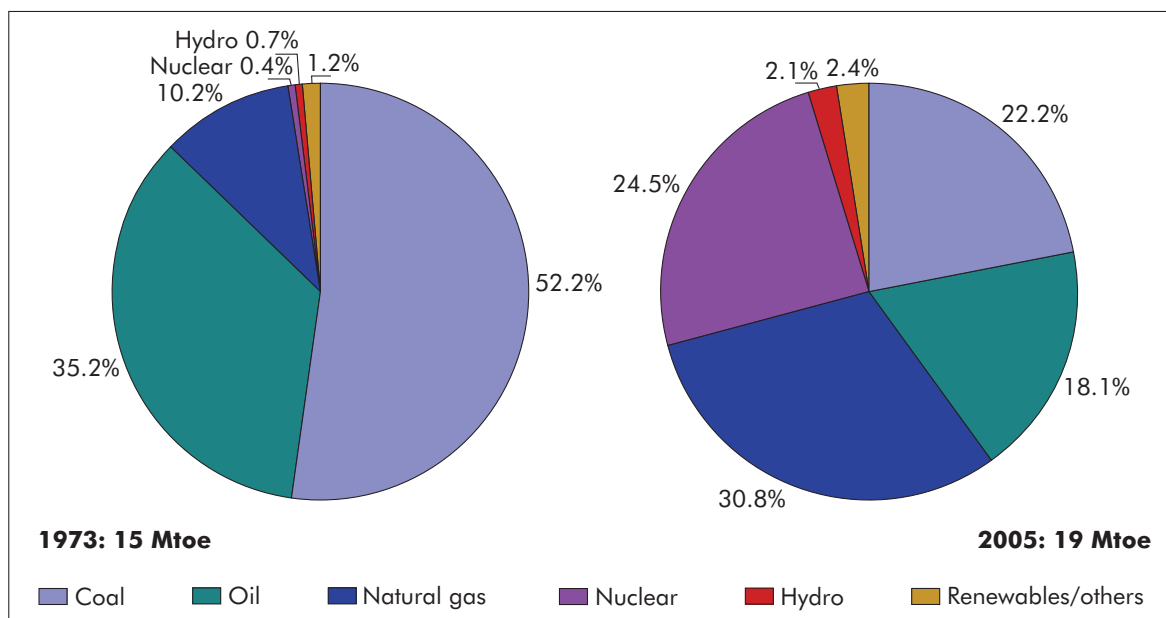
Country Overview

Oil represents less than one-quarter of the total primary energy supply (TPES) in the Slovak Republic and it is expected to remain at this level for the coming decade. Despite being heavily dependant on imports of Russian crude oil, the Slovak Republic is a net exporter of refined products, providing an important share of product supply to its neighbouring countries. The Slovak Republic also transits significant volumes of both crude oil and natural gas. Its transmission capacity of 400 kb/d far exceeds domestic refining needs; thus, approximately 290 kb/d of crude oil transits through the country each year. For this reason, the country plays an important role in Europe's oil supply chain.

The use of publicly held crude and product stocks is central to the Slovak Republic's emergency response policy. The state's emergency reserves are overseen by the administration of the State Material Reserves (ASMR), which is also responsible for maintaining and implementing emergency measures. The ASMR is steadily building public oil stocks in order to cover the Slovak Republic's entire stockholding obligation of the European Union. As the IEA methodology of accounting for obligations includes both public- and industry-held stocks, the Slovak Republic already holds stocks well in excess of 100 days of net imports.

Energy Outlook

Total Primary Energy Supply



Energy supply of the Slovak Republic has changed dramatically over the past 30 years. The most significant change is a move away from coal as the dominant primary energy supply source. In

1996, natural gas exceeded coal's share in TPES and has since remained the country's largest single energy source. Increased use of nuclear energy has also eroded coal's dominant position. The development of these two energy sources has also reduced oil's share in the overall energy supply mix. In 2005, oil provided over 18% of the country's TPES, a decrease from the 21.5% in 1990 and significantly below the 1970s level of some 35%.

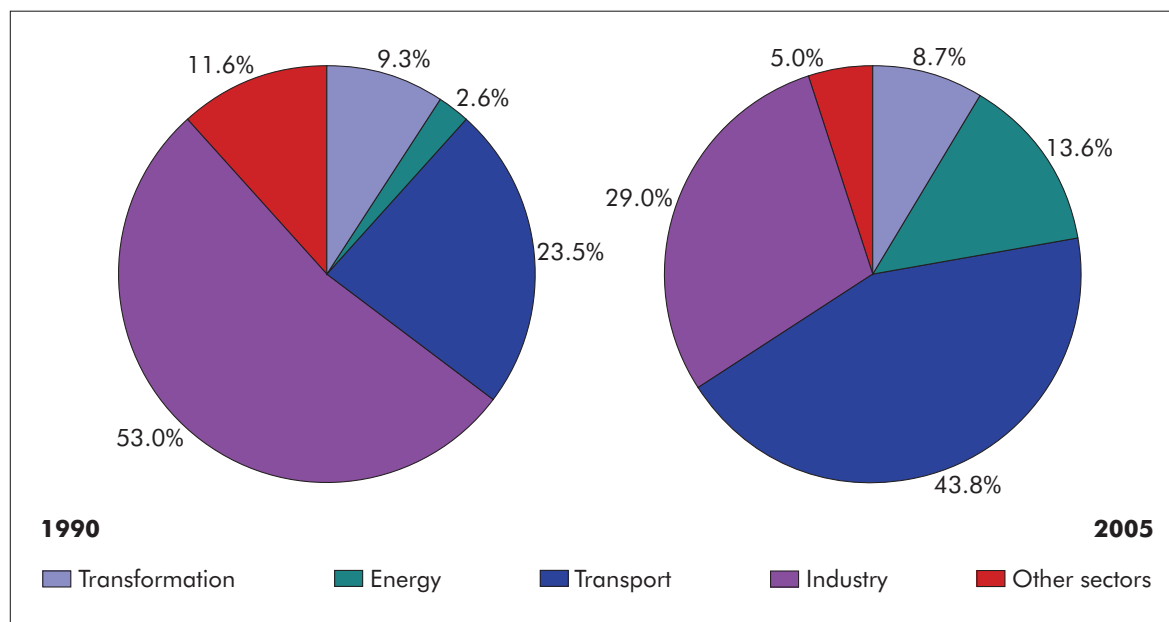
Overall energy demand is not expected to rise significantly in coming decades, with a slight decrease to 2010, followed by growth of less than 1% per year. Natural gas is expected to continue to provide a growing share of TPES, rising to 33% by 2010. During the same period, the share of oil is expected to increase to 21%.

Oil demand in the Slovak Republic averaged 80 kb/d in 2006, representing an average annual growth of 3% since 2000, at which time oil demand averaged 67 kb/d. Oil demand growth is expected to continue, albeit at a reduced rate, reaching 84 kb/d by 2010.

Market Features and Key Issues

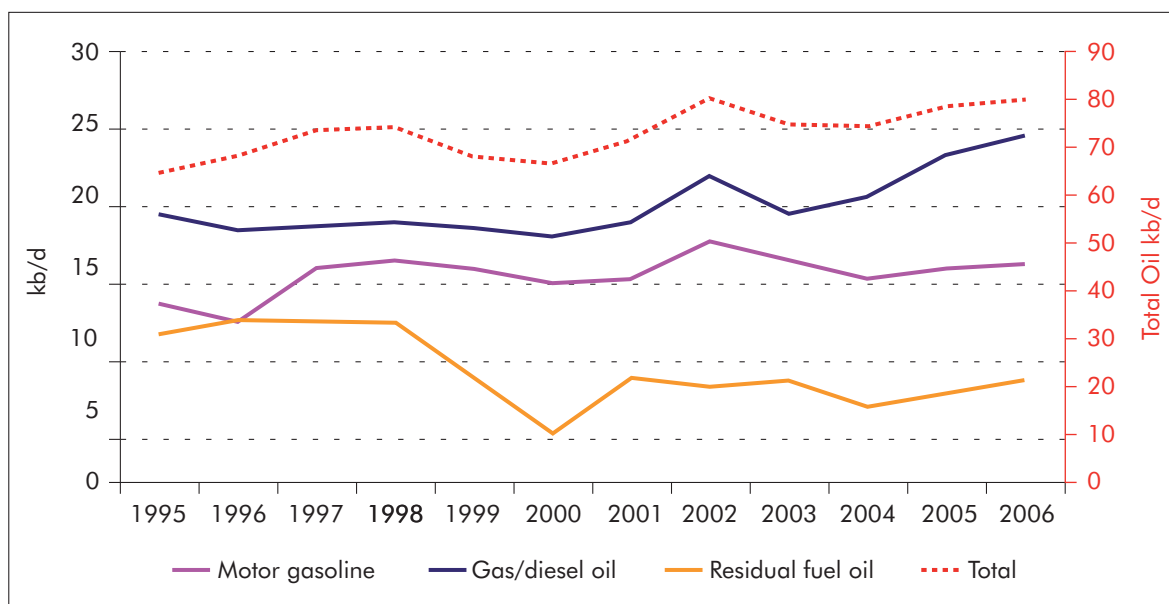
The excess refinery capacity in relation to domestic oil consumption allows the Slovak Republic to be a net exporter of refined products to neighbouring countries. Total oil net import dependency, accounting for both crude imports and product net exports, was 90% in 2006.

Oil Consumption by Sector



The transport sector accounts for 44% of oil consumed in the Slovak Republic. Total oil demand growth is driven largely by gas/diesel oil, which includes both transport and heating usages. Between 2000 and 2006, demand growth for gas/diesel oil averaged some 5% per year. Diesel for transport use made up almost 30% of total oil demand in the country.

Oil Demand by Product, 1995-2006



Total output of finished products from domestic refining in 2006 averaged 140 kb/d. Product imports for the same period averaged 24 kb/d; total exports, mostly gas/diesel oil, were 73 kb/d. Almost all of the trade in refined products was conducted with other OECD member countries, primarily neighbouring countries.

Oil Supply Infrastructure

Refineries

One refinery in the Slovak Republic provides a total crude oil distillation capacity of 115 kb/d (5.8 Mt/yr). Located in Bratislava, the refinery is run by Slovnaft, which is the largest energy company in the country and a member of the Hungarian group MOL. A second, smaller refinery, located in the centre of the country near Dubová, was temporarily closed in 2007 in order to be upgraded to meet European product specifications. When in operation, it processes mostly domestic crude with a distillation capacity of 3 kb/d.

The Bratislava refinery was upgraded in recent years to increase the yield of light products. Prior to the improvements in 1998, light products accounted for 61% of total production. In 2005, some 85% of total production was of light products, including motor gasoline (31%) and motor diesel (48%). Slovnaft is in the process of expanding the refinery and expects capacity to reach 129 kb/d by 2010.

Pipelines

Transpetrol is the sole operator of the crude pipeline network located within the territory of the Slovak Republic; its operations also include crude storage for both its customers and the ASMR.

The main crude oil supply channel is the Druzhba pipeline, which originates in Russia and transits Belarus and the Ukraine before travelling through the Slovak Republic and continuing on to the Czech Republic. The section within the Slovak Republic, part of the Druzhba's southern branch, has five pump stations and consists of two parallel lines for almost all its length. The Slovak section of the pipeline has a total capacity of some 400 kb/d (20 Mt/yr); however, only half of this is utilised to supply Slovak and Czech refiners.

The Adria pipeline provides an alternative route of supply from the Adriatic Sea. Originating in the Croatian port of Omišalj and passing through Hungary, this line connects to the Slovak section of the Druzhba pipeline at Šahy. The portion entering the Slovak Republic has a total capacity of 90 kb/d (4.5 Mt/yr). This line has not been used for many years but is maintained in serviceable condition in co-operation with Hungary.

During a crisis, the Slovak Republic could avail itself of another alternative supply route by using the Ingolstadt-Kralupy-Litvínov (IKL) pipeline. The IKL connects the Czech refinery at Kralupy to the TransAlpine (TAL) oil pipeline network that runs between Ingolstadt (Germany) and the port of Trieste (Italy) and could, thus, contribute to providing oil supplies to Slovak refineries. The IKL line has a capacity to deliver 200 kb/d (10 Mt/yr) to the Kralupy terminal in the Czech Republic. Utilising this alternative supply route for the Slovak Republic would entail the reverse pumping of the Druzhba pipeline between Kralupy and Bučany.

In 2003, the Slovak Republic conducted a study to assess the feasibility of extending the connection between the Bučany pump station and the Bratislava refinery in order to connect the Druzhba pipeline to the Austrian refinery at Schwechat. To date, there has been no further development on this. If built, such a connection could also provide an alternative supply of crude oil from Trieste (Italy) by reversing the intended flow direction.

Slovnaft operates an oil products pipeline network that connects its refinery in Bratislava to three of the main product terminals that hold public stocks. The pipeline system is used by Slovnaft for commercial purposes and has a maximum transport capacity of 36 kb/d (240 cubic metres per hour). It also connects to the Czech Republic pipeline network.

Storage

Total oil storage capacity in the Slovak Republic at end-2006 was just over 6 mb, evenly divided between crude and product. These stocks are held principally by Transpetrol, Slovnaft and the ASMR. Projects to expand crude storage facilities will increase total capacity to 7.6 mb by the end of 2008. Capacity amounts do not include the operational stocks at the Slovnaft refinery, which provide additional crude and product storage in the amount of 755 kb each.

Transpetrol's crude storage capacity at the end of 2006 was just over 3 mb, located at two locations along the Druzhba pipeline. The largest of these is the Šahy facility, with 2.1 mb; the Budkovce facility accounted for the remaining 0.9 mb. The Budkovce site has been undergoing a modernisation process to replace two tanks that do not comply with EU standards. This project will result in a net increase of 0.6 mb by the end of 2008. In addition, a new storage facility near Bučany will be completed in 2007/08, adding almost 1 mb of capacity with the construction of two 75 000 cubic metre tanks. This will increase Transpetrol's total storage capacity to 4.6 mb by the end of 2008.

Total refined product storage capacity (3.1 mb) is owned, for the most part, by the ASMR and Slovnaft. Slovnaft's capacity of 1.1 mb is spread over six storage sites, including four facilities along the product pipeline network. The ASMR storage capacity of 1.4 mb is located in five of the storage facilities of Slovnaft. The two entities have joint ownership of these terminals.

Decision-making Structure

The ASMR functions as an independent body, and reports directly to the government through the Council of Ministers. It is responsible for stockpiling and supply security of the main resources considered essential for the protection of public interests during crises. As such, the ASMR reserves comprise a wide variety of items including raw materials, food stuffs and industrial equipment. However, oil reserves constitute a main priority for the ASMR and are treated separately.

The chair of the ASMR serves as the head of the National Emergency Sharing Organisation (NESO) and is responsible for initiating and co-ordinating a response to an oil supply disruption. The Oil Security Commission, which includes representatives from various ministries as well as from industry and the petroleum association, acts as a permanent advisory body of the ASMR chair in his capacity as NESO head. Within the ASMR, the Oil Emergency Department has the lead role in co-ordinating NESO activities and liaising with industry representatives.

In a supply disruption, the ASMR would prepare measures for managing the emergency and convene an emergency NESO meeting to discuss these measures. The ASMR chair, as the NESO chair, would then submit a draft order to the government which, based on the recommendations, would issue an official decision.

The use of publicly held crude and product stocks is central to the Slovak Republic's emergency response policy. The Slovak Republic considers the use of loans from public reserves as the most effective way of participating in an *IEA collective action*. In a *domestic* situation that warrants the declaration of a state of emergency, the country's policy relies on industry participants to make an initial response to a supply disruption. Implementation of demand restraint measures and the drawdown of both commercial and public stocks would be a subsequent strategy if the initial efforts proved insufficient.

Stocks

Stockholding Structure

The Slovak Republic uses the public stocks of the ASMR to meet its minimum stockholding obligation as a member of the European Union. At the end of 2006, these stocks amounted to 73 days of consumption. This EU obligation will be raised annually until it reaches 90 days at the end of 2008. There are no stockholding obligations on industry. However, in a declared state of emergency, the government has statutory powers over industry's commercially held stocks.

Under the IEA methodology, which allows for industry-held stocks to count towards meeting the minimum stockholding obligation, the Slovak Republic consistently holds above 90 days of net

imports. The combined total of public and industry stock levels at end-2006 was 7.5 mb, equating to 127 days of 2006 net imports (roughly 68 days of public stocks and 59 days of industry stocks).

Crude or Products

As it builds reserves to meet the EU 90-day obligation, the ASMR stockholding strategy is to move towards maintaining public stocks with a composition of half crude and half refined products.

Total public stocks of the ASMR at the end of 2006 were 3.8 mb. Roughly 53% of this (2 mb) was in the form of crude oil (Russian export blend quality). Within the portion of refined product stocks, almost 60% were in the form of diesel oil. At the same time, stocks held by industry for commercial purposes (3.6 mb) were roughly one-quarter crude and three-quarters product.

Location and Availability

ASMR stocks of crude oil are held at the Transpetrol terminals located on the Družba pipeline at Šahy and Budkovce. The public reserves of motor fuels (gasoline, gas/diesel and jet kerosene) are held in six different locations: at the three terminals of Kl'áčany, Hronský Beňadik and Stožok (which are connected to the Slovnaft product pipeline); at the storage sites of Horný Hričov and Kapušany; and at the refinery Petrochema Dubová. A small volume of residual fuel oil is held by two private companies near Budkovce, in the eastern region of the Slovak Republic.

Public stocks held by private companies under contract with the ASMR are not permitted to be co-mingled with commercial stocks. They must be kept in separate tanks that are clearly marked as state emergency reserves. The product stocks are refreshed every three to five years by the company holding the stock, based on the contract agreement. The stockholder must keep detailed records. The ASMR has the right to carry out regular inspections of both the records and the storage terminals. The Slovak Republic has a bilateral stockholding agreement with the Czech Republic.

Monitoring and Non-compliance

As a member of the European Union, the Slovak Republic is responsible for meeting and maintaining the agreed compliance schedule to 2008. The operations required to achieve this are carried out by the ASMR.

Thus, the ASMR is responsible for monitoring quantities and qualities of stocks held on its behalf. It is also responsible for reporting oil statistics, including information on all industry stocks and supply flows, to the IEA on a monthly basis. To fulfil these requirements, the ASMR monitors industry activities and assesses market conditions on a continuous basis. In an emergency, the ASMR has the legal authority to collect all data deemed necessary for managing the supply shortage.

Stock and Drawdown Timeframe

The Slovak Republic could initiate a drawdown of public stocks under two main scenarios: within the framework of a domestic emergency and in conjunction with demand restraint measures; or in order

to participate in an IEA collective action. In either case, the ASMR would propose to the extended NESO the conditions for a stock release, including the volume and types of stocks to be released, and the terms of release (likely in the form of loans). The ASMR chair would submit the NESO draft proposal to the government in an extraordinary meeting convened to discuss the emergency response. A final decision would be adopted with immediate effect. The process from decision making through to the physical availability of the public stocks would be three to four days.

Financing and Fees

In accordance with the agreed timeline to reach the EU obligation of having public stocks equivalent to 90 days of consumption, the ASMR has been expanding the volume of reserves. By the end of 2008, the ASMR will need to hold approximately 4.7 mb, as compared to the 3.8 mb held at the end of 2006. The building of these public stocks is financed by the state budget, in which it appears as a separate line item. Additional financing is raised through the sale of the ASMR non-oil reserves.

Turnover of emergency stocks, with respect to the approved storage life, is executed using the “price-for-price” system. This means the same price applies to stocks removed from the reserve and to stocks returned to the reserve at a later date.

According to estimates by the ASMR, it will be necessary to invest large sums in purchasing and maintaining emergency stocks over the next two years: approximately EUR 39.5 million (SKK 1 350 million) in 2007 and EUR 42.5 million (SKK 1 450 million) in 2008.¹² However, beyond 2008, the costs of financing emergency stocks should fall significantly once the level of government-held stocks has risen to the required level of 90 days.

Other Measures

Demand Restraint

Demand restraint measures would be specified in the ASMR chair’s proposal to the government, likely in parallel with the release of public stocks. The level of the demand restraint measures would depend upon the severity of the crisis. In the initial stages, they would consist primarily of a mass media campaign calling for voluntary reductions in oil consumption.

Additional measures available to the Slovak government include the ability to limit motor vehicle speed, limit motor vehicle use on certain days or for specific kinds of transportation, or impose usage restrictions based on odd/even licence plates. They could also limit the opening hours of petrol stations, and regulate or otherwise direct the actions of oil importers and exports. The government also has the power to order private companies to drawdown their stocks in an emergency.

¹² Based on average exchange rates for January to June 2007 of EUR 1= SKK 34.1.

Legislation (*Act 170/2001*) assigns responsibility for ensuring compliance with these different measures to various components of the Slovak government and sets fines for non-compliance. Industry and other bodies of the state administration would be obliged to provide all data deemed necessary by the ASMR for the monitoring and evaluation of the measures. NESO would meet regularly to evaluate the effectiveness of the measures in comparison to the current and past data, which might be collected on a weekly, bi-weekly or monthly basis. Depending on the results, the measures would be modified as deemed appropriate.

Oil Infrastructure of Spain



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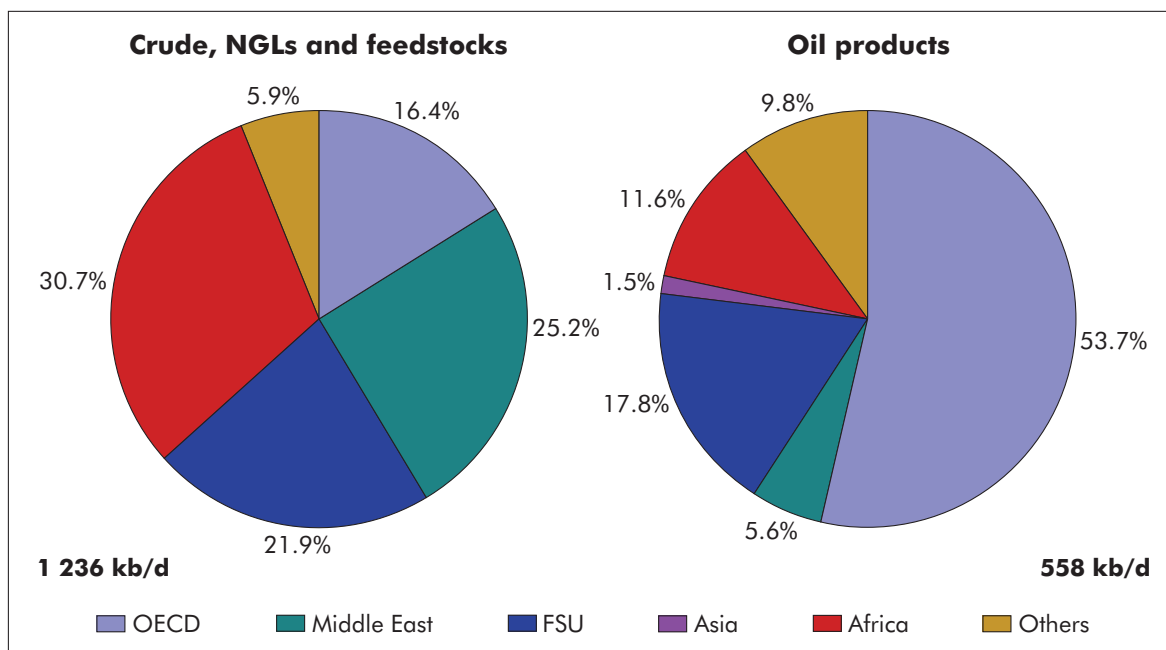
SPAIN

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	27.3	17.3	4.7	3.3	2.9	2.3
Demand (kb/d)	1 010.1	1 189.4	1 433.6	1 607.8	1 591.5	1 636.1
Motor gasoline	188.6	197.4	196.8	172.1	164.4	
Gas/diesel oil	316.1	380.9	529.5	705.6	722.4	
Residual fuel oil	190.6	232.2	246.6	247.4	225.4	
Others	314.9	378.8	460.7	482.6	479.3	
Net imports (kb/d)	982.9	1 172.1	1 428.9	1 604.4	1 588.6	1 633.9
Import dependency (%)	97.3	98.5	99.7	99.8	99.8	99.9
Stocks in days of net imports	87.0	87.0	89.0	90.0	95.0	
Refining capacity kb/d		1 283.0	1 315.5	1 271.5	1 271.5	1 497.6

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

Spain has very little domestic oil production and relies heavily on imports, the sources of which are distributed quite evenly amongst Africa (31%), the Middle East (25%), countries of the former Soviet Union (FSU) (22%), and OECD countries (16%). These shares have been relatively stable over the last 15 years with two exceptions: imports from the OECD have declined from a 25% share in 1990; those from the FSU show a sharp increase from a 1990 level of less than 10%.

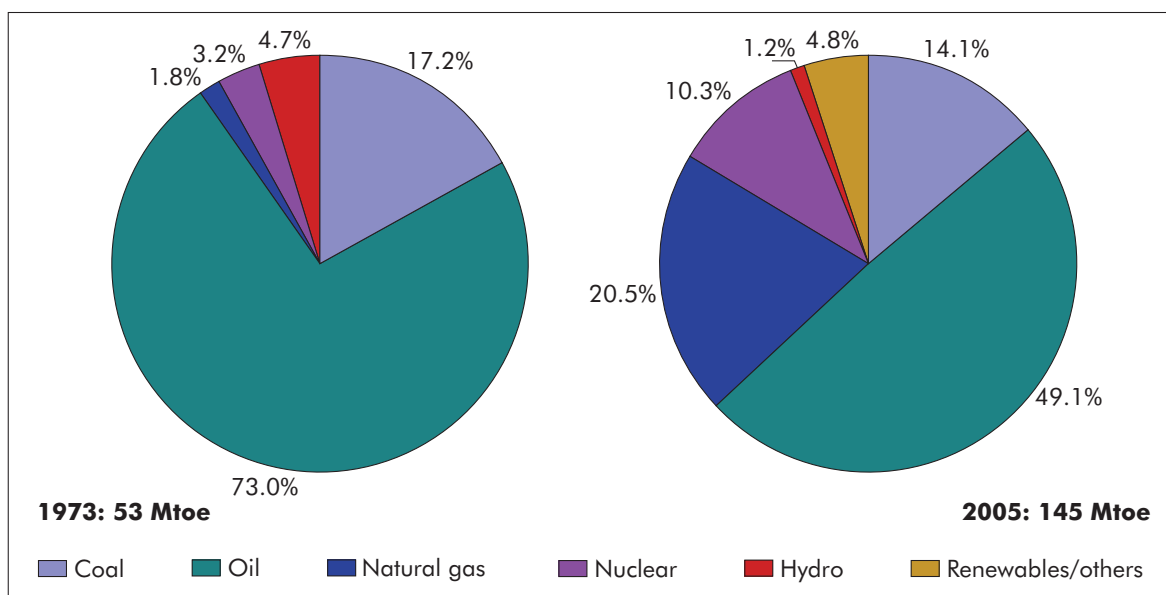
Although oil consumption is still rising, the share of oil in total energy consumption is gradually declining as the country increases its reliance on natural gas and nuclear energy.

Until 1995, Spain's emergency reserves were held only by industry. At that time, an agency was created for holding public stocks – the *Corporación de Reservas Estratégicas de Productos* (CORES). By the end of 2007, CORES will be responsible for holding 50% of Spain's emergency reserves. In an IEA co-ordinated action, Spain would likely respond by selling its public stocks and lowering the stock obligation on industry, thereby allowing the use of industry's obligatory stocks.

Energy Outlook

Total primary energy supply (TPES) in Spain increased from 53 Mtoe in 1973 to 145 Mtoe in 2005. This reflects an average annual growth rate of 3.2%, or a total increase of 176% over this period. Although oil consumption also rose, its share in TPES dropped sharply – from 73% in 1973 to 49% in 2005. The biggest increase came from the use of natural gas: an increase from just 2% in 1973 to 20.5% in 2005. Nuclear energy also had a steep rise, from 3% in 1973 to 10.3% in 2005. Coal consumption remained relatively stable, at 17.2% in 1973 and 14.1% in 2005. Hydro and renewables/others also saw increases, from 4.7% to 4.8% and 1.8% to 1.2% respectively.

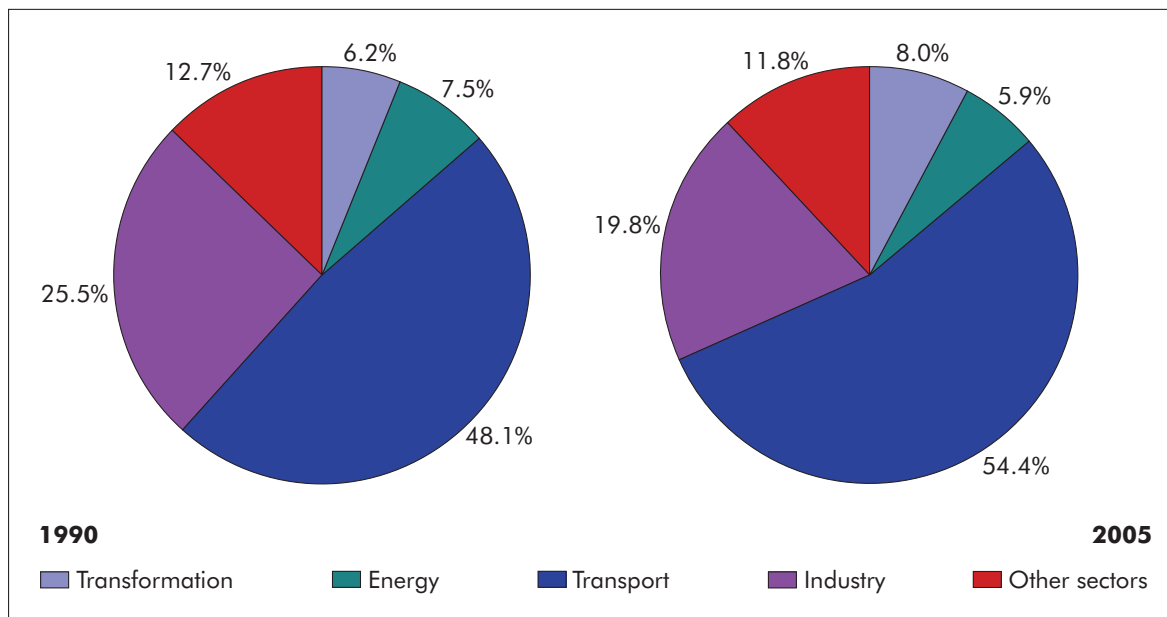
Total Primary Energy Supply



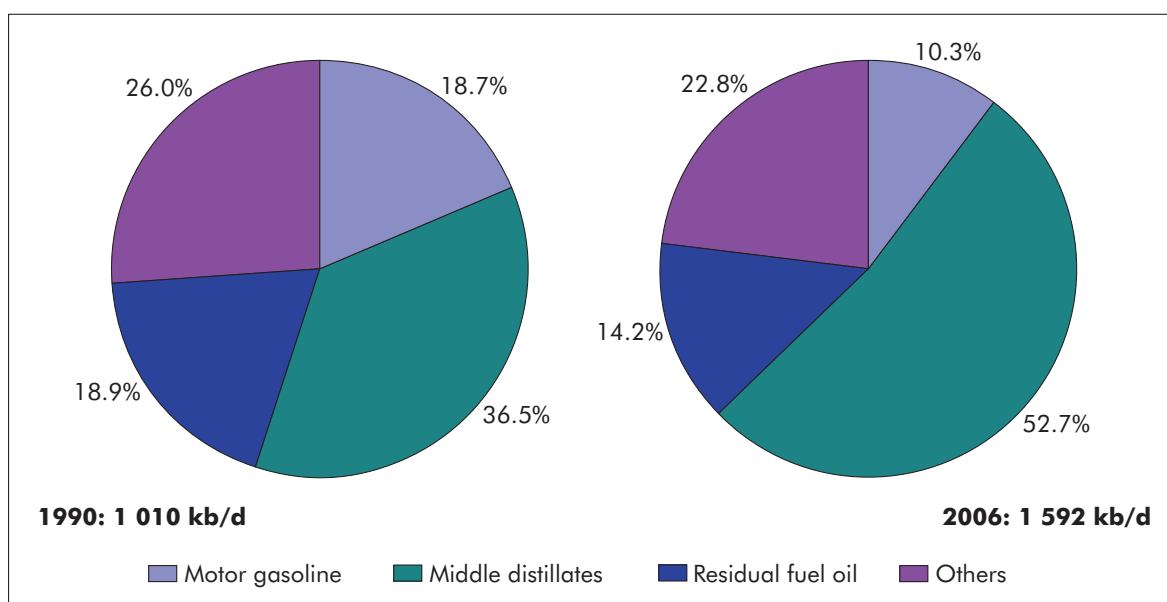
Almost all natural gas consumed must be imported; in 2006, the majority of natural gas imported came from Africa 67.3% (Algeria 32.5%, Nigeria 20.5%, Egypt 12.4% and Libya 1.9%) and from Qatar (15.4%). Smaller volumes came from Trinidad and Tobago (9.2%), Norway (5.9%) and other countries (2.2%). Spain tries to diversify its natural gas imports, and has set a ceiling of 60% for supplies coming from any single country.

Market Features and Key Issues

Oil Consumption by Sector



Oil Demand by Product



Domestic demand for petroleum products grew by 2.9% per year between 1990 and 2006, or by 58% in total. In 2006, Spanish demand of refined products stood at nearly 1 600 kb/d. Transport, the major oil-consuming sector, accounted for 54% of consumption in 2006, an increase from 48% in 1990.

From 1990 to 2006, Spain experienced a remarkable shift away from gasoline towards gasoil. The share of gasoline in total oil demand fell by almost half, from 19% to 10%. At the same time, the share of middle distillates rose from 36% to 50%. In 2006, Spain exported gasoline (82 kb/d) and imported gas/diesel oil (278 kb/d).

Oil Supply Infrastructure

Refineries

There are ten refineries in Spain, nine of which are on the coastline (including one on the Canary Islands) and receive their crude oil directly by ship. Puertollano is the only inland refinery. Out of the ten refineries, five are owned by Repsol YPF, S.A. (about 56% of total refining capacity), three by Cepsa (about 33% of refining capacity), one by BP and another one in Tarragona is owned by ASESA (50% by Repsol YPF, S.A. and 50% by Cepsa) only for bitumen. Total refining capacity is about 1.3 mb/d.

Pipelines

Spain has one crude oil pipeline, which is 358 km in length and links the inland refinery of Puertollano with the port of Cartagena; it has a capacity of roughly 151 kb/d (7.5 Mt/yr).

An extensive network of pipelines for petroleum products is operated by Compañía Logística de Hidrocarburos S.A. (CLH). The system links the eight main peninsular refineries and the main import ports. The network also includes 24 storage plants that serve the mainland and five other storage plants that serve the main airports.

CLH pipelines have a combined length of 3 473 km. The 29 pumping stations are operated from the CLH control centre at Torrejón, just outside of Madrid. This pipeline network covers the whole peninsular territory and is available to every agent operating in the Spanish market. Thus, the network minimises transport by tank trucks and other transport means.

Storage

The refineries have a storage capacity of 58 mb (9.2 mcm) for crude oil and other raw materials and 51 mb (8.1 mcm) for petroleum products.

The CLH has 38 storage facilities for the earth-bound sector with 41 mb (6.5 mcm) capacity and another 28 storage facilities for airports with a storage capacity for petroleum products of 0.9 mb (0.144 mcm). Every operator or importer has the right to access Spain's logistic system of pipelines and storage under non-discriminatory, transparent and objective conditions.

In addition to CLH facilities, another 23 companies have 43 storage and distribution plants with a total capacity of 23 mb (3.7 mcm). The seven most important storage and distribution plants of these other companies are also connected to the CLH pipeline network.

Decision-making Structure

The Spanish National Emergency Sharing Organisation (NESO) is part of a rather complex structure of emergency organisations in Spain.

On the *ministerial level*, the Government Delegate Commission for Crisis Situations (CDGSC) holds ultimate responsibility for handling crises. This ministerial commission is supported on *tactical level* by the National Committee of Civil Emergency Planning (CNPCE). On the *operational level*, nine sector-working committees are placed under the CNPCE, including the National Energy and Mining Resources Committee (CSREM), which forms the basis for NESO. The main functions of these committees are supply/demand analysis, demand restraint plans and preparation of rationing schemes.

The CNPCE is the body that must propose to the CDGSC the measures to be adopted in response to a supply disruption, following consultation with the affected sector committees. Members of the CSREM include: the General Directorate of Energy and Mines from the Ministry of Industry, Tourism and Trade; the Corporation of Strategic Reserves of Petroleum Products (CORES); and the National Energy Commission (CNE). The CSREM also includes various operators, logistics and storage companies. To ensure the effectiveness of the CSREM, representatives from the Ministry of Industry, Tourism and Trade, the CNE, CORES and from reporting companies that are members of the CSREM, participate in various training seminars and workshops.

The Department for Infrastructures and Monitoring of Crisis Situations (DISSC) is a body directly linked to the President's Cabinet, and would also play a role in a supply shortage. It is in charge of the proper functioning of the National Crisis Situation Management System, including the study and proposal of the legal framework.

Stocks

Stockholding Structure

Since 1995, when CORES was established, Spain has had a mixed system for holding emergency reserves. Previously, the country obliged only industry to hold such reserves.

CORES began operations on 31 March 1995, as a public corporation under the authority of the Ministry of Industry, Tourism and Trade. However, it is not part of the general administrative structure of the state. CORES has compulsory membership for all companies authorised to distribute oil products in Spain.

CORES has three main roles:

- To set up and manage strategic stocks (initially 30 days of Spain's obligation, but increasing to 45 days by the end of 2007).
- To monitor the minimum stockholding obligation of the industry (45 days by the end of 2007).
- To store (for a fee) the compulsory stockholding of any retailer or importer lacking suitable storage capacity on Spanish territory.

CORES is also responsible for setting fees (approved by the Ministry of Industry, Tourism and Trade) collected from companies to finance its activities. From 2005 onwards, CORES also became responsible for monitoring minimum stocks of LPG and natural gas that are required to be held by operators in those sectors. However, CORES will not hold any strategic stocks of these fuels.

On the industry side, companies obliged to hold emergency stocks include refiners, wholesalers, retailers and some large consumers. Retailers and large consumers have an obligation only if they buy from companies that do not have an obligation to hold emergency stocks themselves. Basically, this means that retailers and large consumers have an obligation as far as they directly import oil products.

Crude or Products

Parties subject to compulsory stock obligations are supposed to hold their strategic reserves as products. However, they have the option of holding stocks in the form of crude oil or semi-finished products, up to a maximum of 40% of both EU categories I and II (gasoline and distillates) and up to a maximum of 50% of EU category III (fuel oil).

CORES is required to guarantee that the quality of products stocks held as strategic reserves are suitable for consumption in their appropriate end-uses, and to ensure that prevailing product specifications are fully met.

Location and Availability

Historically, CORES has hired storage within the existing Spanish distribution infrastructure of logistic companies and refiners. New, purpose-built storage (commissioned by CORES), became operational in 2006 and is enabling the agency to expand its coverage of emergency stocks from 30 to 45 days by the end of 2007. CORES is required to ensure that strategic stocks are distributed geographically such that they are able to reach consumption centres continuously for 30 days (45 days from end-2007).

Spain has bilateral agreements with France, Italy and Portugal, thereby allowing Spanish operators to place part of their security stocks within these territories. Operators must seek permission from the General Directorate of Energy Policy and Mines, which is granted on a case-by-case basis. Each particular authorisation contains details regarding products, qualities, location of stocks, duration and repatriation engagements. Any change in these conditions implies re-initiating the authorisation procedure. The amount of emergency reserves a company can hold abroad is limited to 15% of its obligation.

Monitoring and Non-compliance

Companies obliged to hold compulsory stocks are required to submit monthly reports to the Ministry of Industry, Tourism and Trade and to CORES, detailing stock levels and location of crude oil and of products stocks. This information must be submitted by the 20th of each month, giving data for the previous month.

CORES appoints agents to check that compulsory stock obligations are being met and to ensure that agreements regarding storage of stocks are being carried out. These agents have right of access to inspect

business premises and storage facilities, and to examine the records of parties subject to stockholding obligations (or of other contracting parties).

If a company does not comply with its stock obligation, CORES will automatically inform the CNE. In turn, the CNE will initiate a legal procedure to confirm the infringement and determine its degree. The CNE then reports the situation to the ministry, which will establish the amount of the penalty. Penalties for failure to meet compulsory stock obligations are adjusted according to the degree of infringement and can range from fines (up to EUR 3 million) to, in extreme cases, revoking of the authorisation to operate in Spain.

Stock and Drawdown Timeframe

The Spanish government has authority to draw stocks during an emergency under a wide range of situations, including those not foreseen in the I.E.P. Agreement. To do so, the Spanish Council of Ministers must first declare a crisis situation. Once a crisis is declared, the government can lower the stockholding obligation on industry and/or impose a direct intervention scheme upon CORES.

CORES would then release the emergency stocks in one of two ways: through a tender to all operators, at market prices; or directly by the operators following the instructions of the authorities. CORES is responsible for producing a procedure manual to cover emergency stock releases and its proposals are subject to approval by the Ministry of Industry, Tourism and Trade.

In the case of an international emergency situation – officially declared by the IEA – the Ministry of Industry, Tourism and Trade shall establish the necessary measures to meet Spain's international commitments.

Financing and Fees

The running costs of CORES are financed through fees for each unit sold or consumed, which are paid by the obliged entities (i.e. industry operators). The fees are approved annually by the Ministry of Industry, Tourism and Trade, based on CORES prior proposal, which is drafted on the basis of an annual budget (after this budget has been considered by the CORES General Assembly). In 2007, the fees were EUR 2.98/cubic metre for gasoline, EUR 3.06/cubic metre for middle distillates, and EUR 2.66/t for fuel oil.

The capital costs of CORES, incurred by purchases of oil stocks and building storage facilities, must be financed by borrowing from banks or from the capital markets.

Other Measures

Demand Restraint

In an oil supply crisis, the Minister of Industry, Tourism and Trade would propose to the Council of Ministers a general action plan. Upon government approval, a wide range of demand restraint

measures can be activated immediately. These measures range from public appeals and information campaigns to more restrictive action such as reducing speed limits on highways, limiting the opening hours for retail petrol stations, and rationing of oil products. The time from implementation to first measurable volumetric effects depends largely on the types of demand restraint measures adopted. The scope and sequence of measures would depend on the magnitude of the crisis.

The various measures have been prepared by specialised working groups in collaboration with CORES and the other relevant bodies including: the Ministry of Public Works; the Ministry of Agriculture, Fishing and Food; and the Ministry of Health and Consumption. These bodies are responsible for co-ordinating actions in their fields, often working with administrations in Spain's autonomous regions. Representatives of the industry association will also be involved.

Fuel Switching

Spanish legislation provides the legal authority with respect to fuel switching. Due to the increasing importance of natural gas, Spain is currently expanding the number of dual-generating power plants. Thus, in case of an emergency, Spain could decrease fuel oil consumption in the electricity generation sector. It is estimated that switching out of oil in both the transformation and industry sectors could reduce consumption by 7%.

Oil Infrastructure of Sweden



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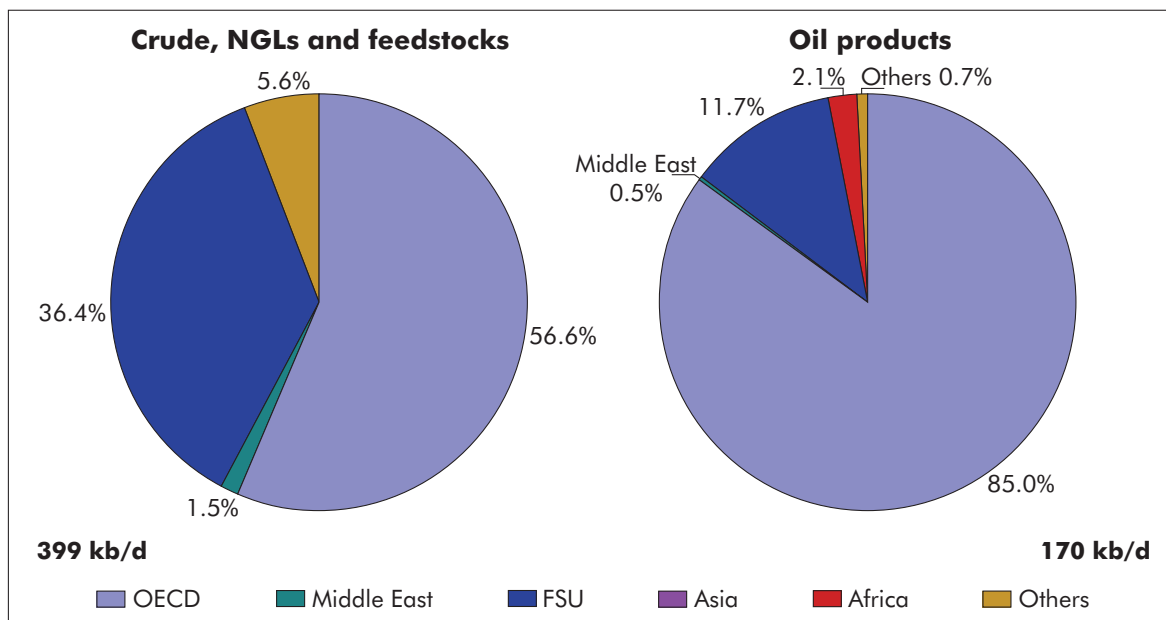
SWEDEN

Key Data

Oil Statistics 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	-	-	-	-	-
Demand (kb/d)	335.7	388.0	362.8	356.4	356.7	383.8
<i>Motor gasoline</i>	96.4	98.4	91.8	94.0	91.7	
<i>Gas/diesel oil</i>	107.3	113.3	111.2	102.4	104.3	
<i>Residual fuel oil</i>	49.6	64.4	55.7	58.0	61.5	
<i>Others</i>	82.3	111.9	104.0	102.0	99.1	
Net imports (kb/d)	335.7	388.0	362.8	356.4	356.7	383.8
Import dependency (%)	100	100	100	100	100	100
Stocks in days of net imports	169.0	129.0	130.0	145.0	127.0	
Refining capacity kb/d		427.5	427.0	434.0	434.0	442.7

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

Oil represents more than one-quarter of the total primary energy supply (TPES) in Sweden. This is a significant reduction from the level of more than 73% in 1973, resulting from the development of nuclear and renewable energy sources.

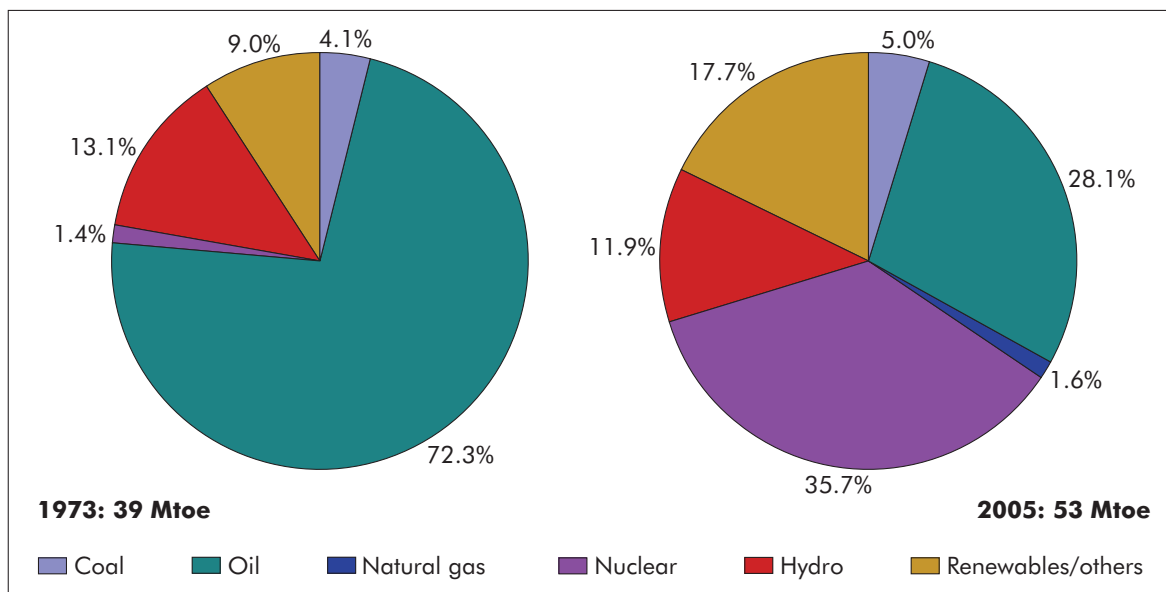
Sweden relies completely on imports to meet oil demand, more than half of which come from three countries: Denmark, Norway and Russia. In contrast, Swedish refinery capacity exceeds domestic demand. Since the 1970s, the country has been a net exporter of finished products.

Sweden fulfils its stockholding requirements to both the IEA and the European Union by placing minimum stockholding obligations on industry. During a supply disruption, Swedish authorities could reduce the minimum obligation, thereby granting operators permission to draw stocks below the minimum level.

Energy Outlook

In 2005, Swedish TPES was 53 Mtoe, compared to 48 Mtoe in 1990 and 39 Mtoe in 1973. From 1973 to 2005, energy consumption has increased at an average annual rate of roughly 1%. The share of oil in the energy mix has declined significantly over the past 30 years, from more than 70% in 1973 to some 28% in 2005. This is largely due to the development of nuclear and renewable energy, which have jumped, respectively, from 1% to 36% and 9% to 18% in the 32-year period.

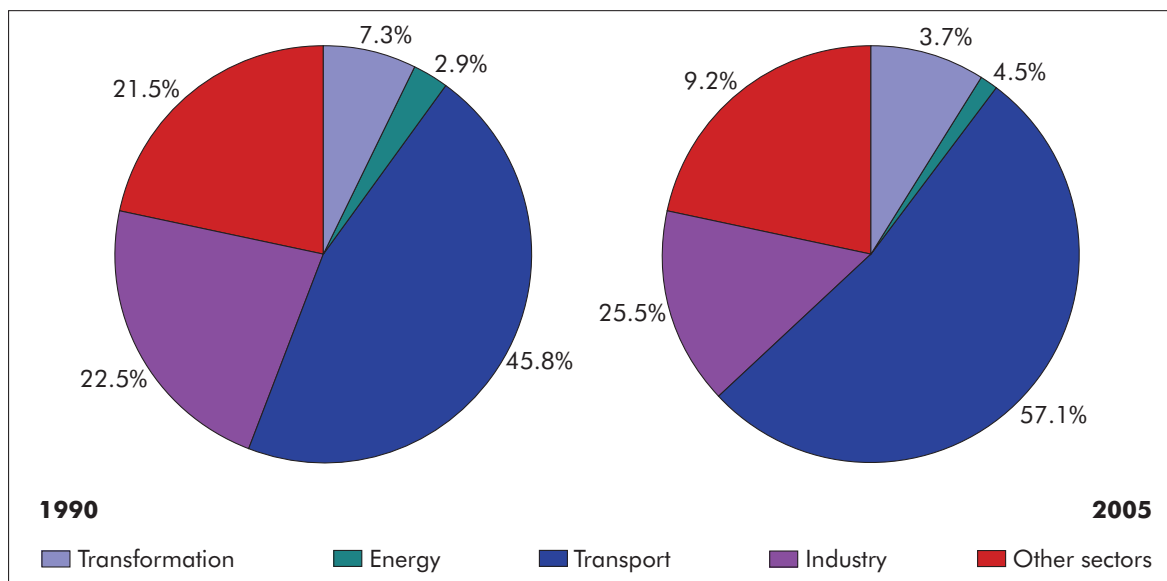
Total Primary Energy Supply



Oil demand has declined from the mid-1990s, when it reached 388 kb/d; in 2006, demand stood at 357 kb/d. However, it is expected to pick up slightly in the coming years at an average annual rate of 1.8%, reaching 384 kb/d in 2010. The transport sector accounts for more than half of all oil used: in

fact, transport demand is more than twice the amount used by the industrial sector. Since 1990, the share of oil in the transport sector has increased by 26%.

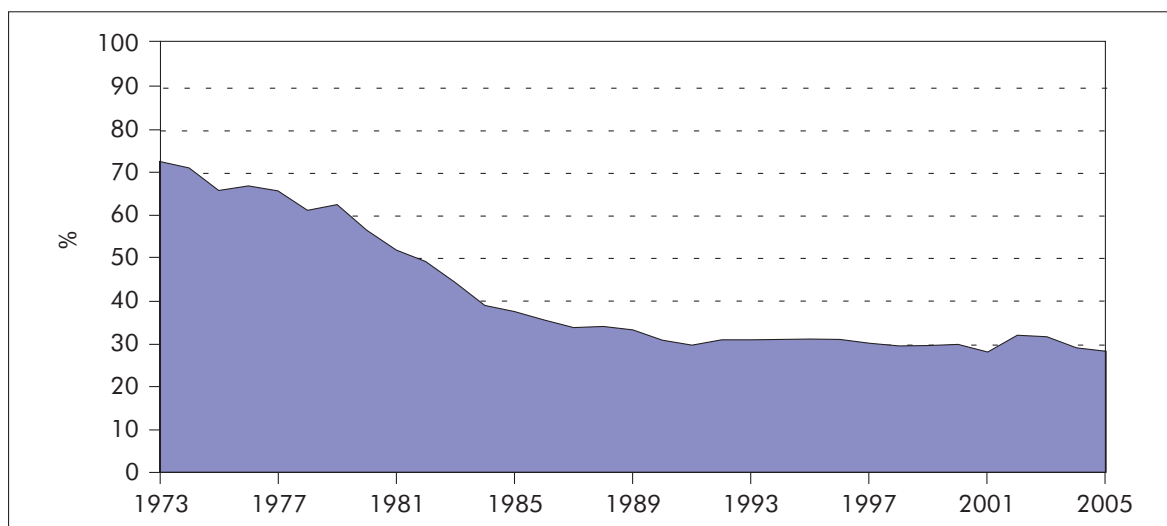
Oil Consumption by Sector



Market Features and Key Issues

The Swedish oil market has undergone significant structural changes during the last 30 years, largely as a result of the declining share of oil in the overall energy mix. After the oil crisis of the 1970s, the Swedish government made a concerted effort to decrease oil dependence. This effort was quite successful. By the early 1980s, oil's share of TPES had fallen to around 40%; it has remained stable at slightly less than 30% since the early 1990s. The lower share of oil in the energy mix is largely due to the use of nuclear energy to replace fuel oil for electricity production and the use of district heating to displace heating oil.

Share of Oil in Total Primary Energy Supply, 1973-2005



While Sweden depends fully on imports to meet domestic oil demand, the country exports a significant amount of oil products. In 2006, Sweden imported almost 400 kb/d of crude oil (including NGLs and feedstocks), primarily from Russia (36%), Denmark (26%) and Norway (25%). In the same year, with refining capacity exceeding domestic demand, Sweden exported around 220 kb/d of refined products.

Oil Supply Infrastructure

Refineries

Sweden has four main large-scale refineries, with a total crude distillation capacity of 434 kb/d: Nynäs Refining AB, Preemraff Lysekil, Preemraff Göteborg, and Shell Refining AB in Göteborg. Refining capacity is expected to reach 443 kb/d in 2010, an increase of 2% compared to 2006.

Responding to market demand for more environmentally friendly products, some refineries (*e.g.* Preemraff in Lysekil) are undertaking major investments to produce greater volumes of sulphur-free gasoline and diesel oil. The aim of this movement also reflects legislation established in 2002, which called for a gradual transition to sulphur-free transport fuels from 2005–08.

Pipelines

Due to Sweden's small market and sparse population, the oil distribution infrastructure relies on road distribution rather than pipelines. Currently, some 800 road tankers carry out secondary distribution to consumers and retail outlets.

Storage

Sweden has approximately 30 coastal and inland storage facilities. Major depots are located in Göteborg, Lysekil, Gävle, Stockholm, Norrköping and Malmö, with a total storage capacity of nearly 62 mb (9.8 mcm). These facilities play an important role in the domestic distribution of oil products from domestic refineries and import terminals.

Decision-making Structure

The Swedish Energy Agency within the Ministry of Enterprise, Energy and Communications has the main responsibility for emergency response and decision making. Within the agency, the Sustainable Energy Management team is the core of Sweden's National Emergency Sharing Organisation (NESO).

Close co-operation with industry is a key element in the Swedish NESO. Representing the industry is the Swedish Petroleum Institute, which plays an important role in the work of NESO. Other players, such as independent oil consultants and institute researchers, interact with NESO when appropriate.

Stocks

Stockholding Structure

Sweden meets its stockholding requirements to both the IEA and the European Union by placing minimum stockholding obligations on oil industry participants. Oil companies and large consumers are obliged to hold at least 25% of the total amount of products sold or consumed, on a net basis, during the previous calendar year.

There are three main categories of companies obliged to hold stock: companies selling or importing more than 50 000 cubic metres (roughly 314 kb) of refined products annually; power plants consuming more than 5 000 cubic metres (roughly 32 kb) of oil products annually; and district heating plants or gas turbine plants with more than 5 MW installed capacity.

Crude or Products

As per EU legislation, companies with the obligation to hold product reserves are able to substitute a portion of this with crude oil. At the end of 2006, Sweden's overall stockholding equated to nearly 127 days of net imports. This was composed of roughly 70% refined products, mostly in the form of middle distillates. The other 30% was stored in the form of crude oil.

Location and Availability

The Swedish Energy Agency sets requirements concerning the location of the compulsory stocks. This includes whether a certain proportion of the stocks held by sellers is kept underground or protected in some way, or whether the stocks must comprise oil products with certain properties.

Ticket arrangements for stocks held abroad are allowed, according to specific rules set out in Swedish Energy Agency regulations. Such arrangements must be granted beforehand by the agency and formalised by a contract covering a period of not less than three months and not more than one year.

Bilateral agreements for stockholding abroad are subject to a maximum of 20% of an organisation's total stockholding requirement for each stock category.

Sweden currently has formal bilateral agreements with Denmark, Estonia, Finland, Ireland, the Netherlands and the United Kingdom. Stocks held in those countries on behalf of a Swedish company must be owned by the Swedish company or by a company in the country involved.

Monitoring and Non-compliance

The Swedish Energy Agency prepares a list specifying stocks to be held by those subject to stock obligations, which is sent to all concerned parties. Those subject to stock obligations must report monthly to the agency, indicating the amount of fuel held in stock at the end of the previous month, as well as its locations and methods of storage.

The Swedish Energy Agency (or its designated inspectors) is entitled to inspect the stocks held under the obligations, and can also examine the accounts and other documents relating to company stockholding operations.

Any company failing to maintain compulsory stocks must pay the state a special storage penalty charge. This penalty charge corresponds to the estimated capital cost of the product for one month, plus a surcharge of 60% for failing to meet the requirement.

Stock and Drawdown Timeframe

Drawdown of compulsory stocks held by companies would take place based on an agreement established in October 2003 between the Swedish Energy Agency, the Swedish Petroleum Institute and six major oil companies operating in Sweden. The stock drawdown would be set in motion in the event of a peacetime oil crisis, and carried out in a cost-effective manner.

Such a stock drawdown would be conducted in co-ordination with, and under the supervision of, the Swedish Energy Agency. The agency and individual companies would agree on a time period for the re-establishment of the stocks, which would not exceed three months.

Depending on circumstances, a government decision on whether to authorise a stockdraw is expected to take seven to 14 days.

Financing and Fees

The costs of compulsory stocks are borne by the stockholders (both companies and large consumers); costs are effectively passed on to consumers through market prices.

Official estimates for 1997 show operating costs and capital costs for all products in Sweden as averaging EUR 5.5/cubic metre (SEK 50 /cubic metre).¹³

¹³ Based on average 2002 exchange rates for EUR 1= SEK 9.09.

Other Measures

Demand Restraint

The Swedish Energy Agency has the legal authority to implement a variety of demand restraint measures with government approval and without parliamentary ratification. There is one exception: the Agency is not empowered to implement rationing without first receiving parliamentary approval.

- The first step would be an information campaign focused on reducing private driving and heating at home. To reduce driving, it may also focus on encouraging people to switch from personal to public transportation, use car-pooling, or practice eco-driving, etc. The information campaign would be expected to start approximately one week after a government decision.
- The second step, about a month after the decision, would focus on reducing driving speeds, introducing higher parking fees, and imposing bans on Sunday or weekend driving. It may also include temperature and hot water restrictions in public buildings.
- Finally, as a third step, the Agency would use a rationing system for more severe shortfalls.

The agency has recommended to the government new legislation and technical solutions for a revised rationing system.

Oil Infrastructure of Switzerland



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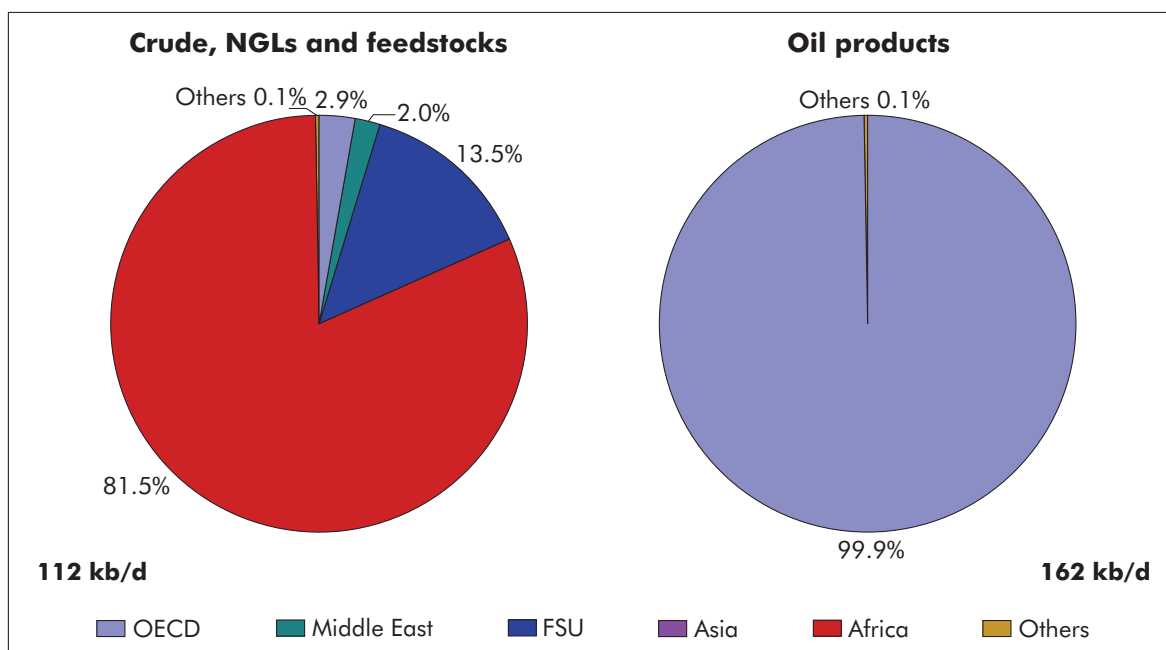
SWITZERLAND

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	-	-	-	-	-	-
Demand (kb/d)	267.8	266.7	274.1	271.6	278.1	286.9
<i>Motor gasoline</i>	86.2	83.1	92.0	83.3	80.7	
<i>Gas/diesel oil</i>	130.8	130.2	125.3	139.3	144.8	
<i>Residual fuel oil</i>	9.3	7.9	3.6	2.5	2.7	
<i>Others</i>	41.6	45.5	53.3	46.5	49.9	
Net imports (kb/d)	267.8	266.7	274.1	271.6	278.1	286.9
Import dependency (%)	100	100	100	100	100	100
Stocks in days of net imports	156.0	111.0	150.0	149.0	148.0	
Refining capacity kb/d		132.0	132.0	132.0	132.0	134.7

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

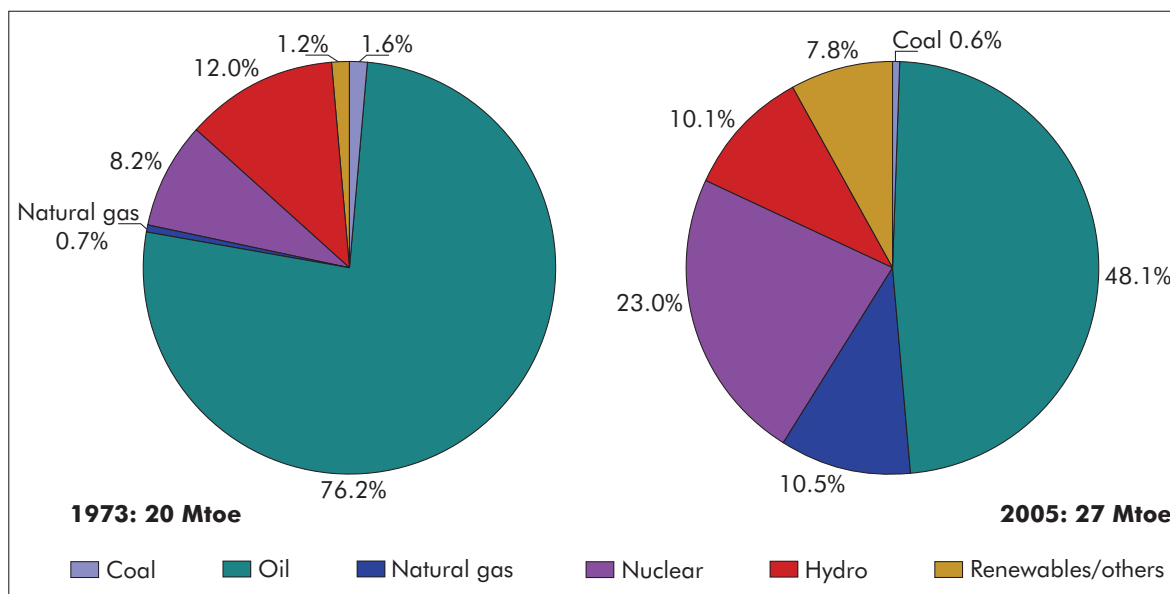
Switzerland generally lacks natural resources. In 2004, the country produced only about 23% of its total primary energy supply (TPES) needs. Switzerland has no domestic oil production, and is entirely dependent upon foreign oil. Therefore, Switzerland has always followed a robust stockholding policy, covering more than the 90-days of net imports as required by the IEA, and intends to do so in the future.

In Switzerland, all stockholding obligations are covered by industry. These reserves are kept in the country and held by the industry and managed by a private agency Carbura. In an oil supply disruption, Switzerland would release oil to the market by stock release entitlements, which are attributed to the stockholders according to their individual supply shortage.

Energy Outlook

In 2004, Switzerland had the lowest oil supply/GDP ratio of all IEA member countries. In 2005, oil represented 48% of TPES. This is a significant fall from the 1970s, when oil accounted for more than two-thirds of the energy mix. Natural gas and renewable energy have both taken a larger share of Switzerland's TPES in the past few decades. Nevertheless, oil will continue to be the country's major energy source.

Total Primary Energy Supply

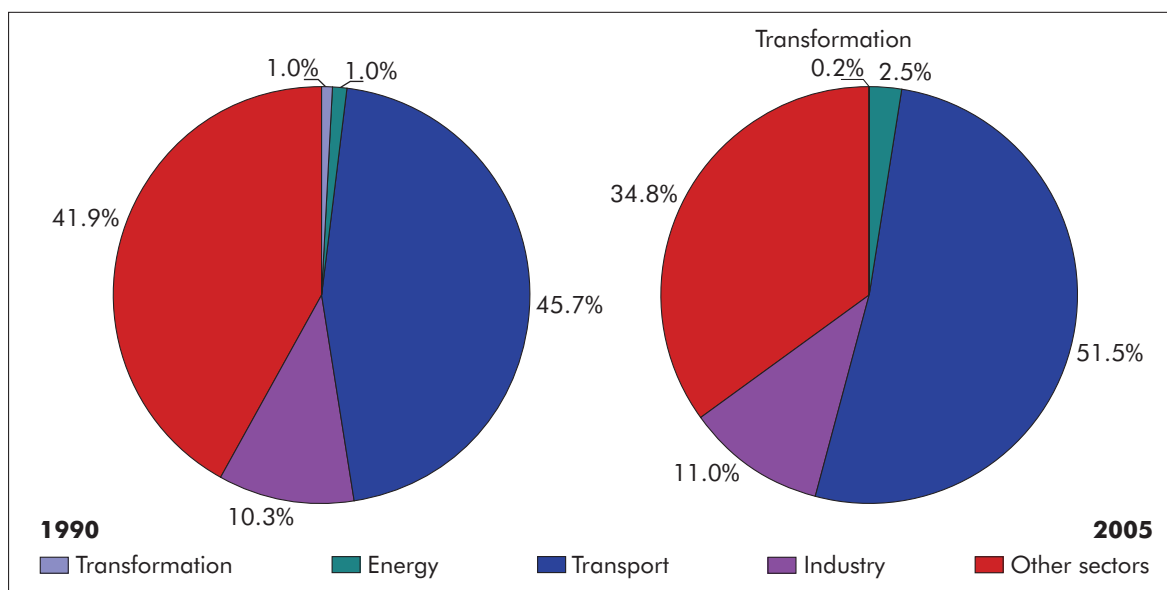


As Switzerland is a transit country (for products other than oil) from southern to northern Europe and vice versa, the transportation sector accounts for more than 50% of the oil consumption, having increased from 46% since 1990. In volume, oil consumption in this sector has not increased much since the 1990s.

In 2006, Switzerland imported 274 kb/d of oil, of which 41% was crude oil (including NGLs and feedstocks) and the remainder was oil products. Switzerland's oil demand is expected to pick up slightly between 2006

and 2010, reaching 287 kb/d in 2010. Crude imports are mainly light, low-sulphur crude oil. The import structures for both crude and oil products are well-diversified in geographic origin and logistics.

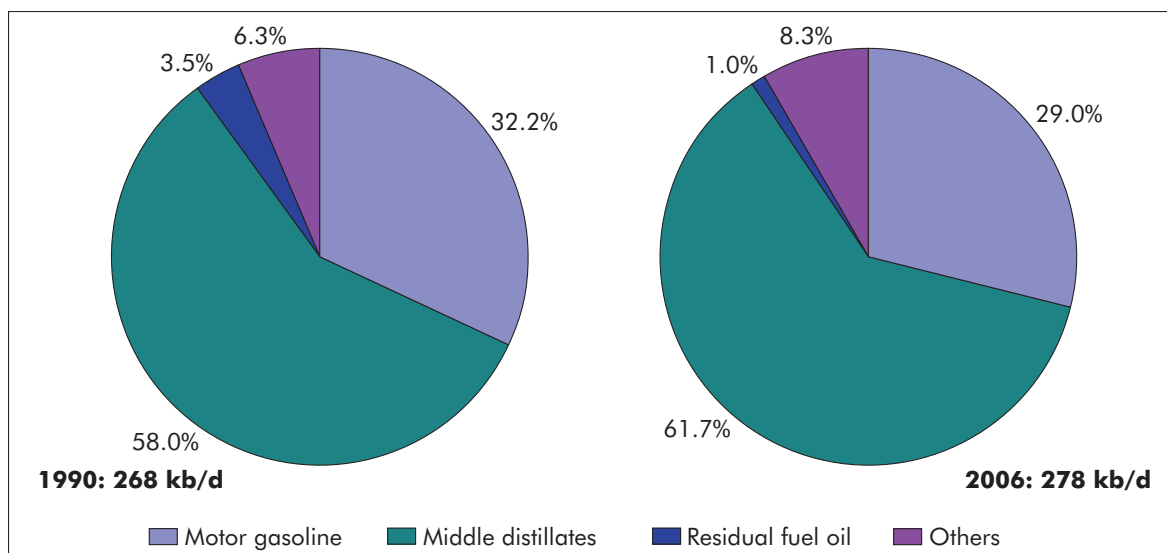
Oil Consumption by Sector



Market Features and Key Issues

Middle distillates make up a large part (62%) of Switzerland's oil consumption. This can be attributed to two factors: heating oil is still the largest fuel for heating purposes and Switzerland plays an important role as a transit country, requiring high use of diesel for transport. These high consumption levels are exacerbated by the relatively low taxes on motor gasoline in Switzerland as compared to neighbouring countries, which lead to some "tank tourism". In recent years, the Swiss vehicle fleet has become increasingly fuelled by diesel; thus, the increase in diesel consumption has almost been mirrored by a decline in the proportion of demand for motor gasoline.

Oil Demand by Product



Oil Supply Infrastructure

Refineries

There are two refineries in Switzerland: one in Cressier with a capacity of 60 kb/d and one in Collombey with a capacity of 72 kb/d. As domestic consumption is about 282 kb/d, Switzerland can refine less than half of its oil product needs. Approximately 65% of products needed are imported, all from neighbouring countries.

Pipelines

Some 45.5% of Switzerland's total oil supply is transported through three pipelines – two for crude oil and one for oil products – that originate in the south (Fos-sur-Mer and Lavera in France, and Genoa in Italy). The rest is transported via the Rhine river railway and, to a lesser extent, by truck from refineries in Italy or in countries to the north (south Germany, Belgium, France and the Netherlands).

Storage

The total storage capacity in Switzerland is about 50 mb (7.9 mcm) and is evenly distributed around the country.

Decision-making Structure

The Swiss National Emergency Sharing Organisation (NESO) operates on a stand-by basis and combines governmental authority for national oil emergency management with domestic oil industry experts. The main body of the Swiss NESO is the Crisis Reaction Team (CRT), which is chaired by a delegate from National Economic Supply. This small tactical body comprises all relevant parties and is activated for short-term engagements. It proposes the necessary measures to the Federal Department of Economic Affairs.

In times of long-term crises and heavy supply disruptions, a second body would be activated: the Emergency Assessment Task Force. This body comprises representatives of all relevant parties involved in importing, refining, wholesaling and consuming oil in Switzerland. This task force would evaluate the disrupted supply situation on a case-by-case basis to determine the most effective measures, and would submit a proposal for their implementation to the Federal Council (the Swiss government).

Stocks

Stockholding Structure

Switzerland's geographical position and its general lack of natural resources prompted the government to impose – as early as the 1930s – strategic stock obligations on a wide range of imported goods.

Crude oil and/or oil products have never been singled out for particular attention, but are included among a wide range of essential goods required to sustain the economy.

The current legislation is based on the *1982 Federal Law on National Economic Supply* and two Ordinances published in 1983 relating to the *Main Principles of Stockpiling* and the *Compulsory Stock Holding of Transport and Heating Fuels*.

Companies wishing to import oil into Switzerland must obtain a licence from Carbura. This private corporation was established in 1932 and continues to operate under statutes approved by the Swiss Federation. Carbura acts on behalf of the Federal Office for National Economic Supply (FONES); the granting of an import licence is conditional upon the company signing a contract with FONES. This contract obliges the importer to hold an amount of compulsory stocks proportionate to its share of total oil imports. Ownership of these stocks remains with the importer, but control over their disposal lies with the Swiss authorities. The government contracts are established individually with each importing company and specify not only the quantity and quality of the product, but also the location at which it is held.

Typically, the amount of cover is targeted at 4.5 months for gasoline, diesel and heating oils, and three months for jet fuel. The actual figure of cover is calculated on the average level of imports over the preceding three years. In total, this approach represents approximately 135 days of imports for gasoline, diesel and heating oils, and 90 days of jet fuel imports – well above IEA requirements.

Crude or Products

Compulsory stocks in Switzerland consist only of products. They are normally co-mingled with industry operational stocks; in fact, it is not uncommon for several companies to store compulsory stocks in a single tank. This facilitates regular turnover of product stock in the course of normal supply operations, thereby ensuring that the quality of compulsory stocks is always consistent with the prevailing norms.

Location and Availability

There are no geographical restrictions for the location of emergency stocks within Switzerland, but they cannot be stored outside Switzerland. Because they are typically co-mingled with normal operational stocks, compulsory stocks are available through normal distribution channels in the event of a drawdown being authorised.

Switzerland does not have any bilateral arrangements with other countries and none of its stocks are held outside federal territory. Switzerland does not permit stock ticket arrangements.

Monitoring and Non-compliance

Carbura acts on behalf of FONES in monitoring, on an ongoing basis, individual companies with regard to their stockholding obligations. As mentioned above, it is quite common for several companies to store stocks in the same tank. Monitoring is achieved through daily bookkeeping,

showing the ownership and the distinction between commercial and compulsory stocks. Penalties for any infringement of a company's stock obligation can be severe and, in extreme cases, could result in withdrawal of the company's import licence and/or prosecution of its management.

Stock and Drawdown Timeframe

In the event of a supply disruption, the Federal Department of Economic Affairs would take the decision to authorise the release of oil stocks. This would take the form of issuing stockdraw entitlements to individual oil companies. In this respect, entitlements may differ from company to company, according to the extent of disruption to their individual supplies and their supply commitments in the Swiss market.

The decision for a stockdraw would take about two days to organise; legal activation of the ordinance would take another ten days. Since compulsory stocks are not held separately from operational stocks, the Swiss authorities estimate that the process should not take more than five days before compulsory oil stocks actually become available for delivery into normal distribution channels. The Swiss authorities have considerable experience with stockdraws. They manage, in close co-operation with the private industry, practical aspects of oil stockholding related to compulsory stock rotation and temporary compulsory stock release. The latter is usually due to a modification of the overall and/or individual stockholding obligation, or to import changes.

For pricing compulsory stock augmentations or liquidations, Carbura maintains a price calculation scheme reflecting prices in the Swiss oil market. This price scheme is under the control of the market participants and FONES. Compulsory stocks are released at market prices in normal times (stocks rotation), as well as in a crisis situation.

Financing and Fees

An important principle of the Swiss compulsory stocks system is that oil companies required to hold such stocks do not have to carry the resulting financial burden. Compulsory stock costs are financed by levies imposed on the import of oil products, which Carbura collects from the oil companies. Oil companies can recover these levies through the selling price to consumers. The income generated by these levies covers Carbura operational costs including storage costs, capital, interest, tank costs, depreciation, etc. There is separate fund for each product (e.g. motor gasoline, heating oil, diesel and jet fuel). The levies are not published, but are communicated to the members of Carbura.

As of January 2007, levies on oil product imports to help finance compulsory stock obligations are structured as follows:¹⁴

Motor gasoline	CHF 3.3 (EUR 2.04)/cubic metre
Diesel	CHF 11.3 (EUR 7.00)/cubic metre
Heating oil	CHF 0.30 (EUR 0.18)/cubic metre
Jet fuel	CHF 3.0 (EUR 1.85)/cubic metre (for volumes delivered to Geneva and Zürich airports)

¹⁴ Based on average exchange rates for January 2007 of EUR 1= CHF 1.62.

Compulsory stockholding costs vary from product to product and depend very much on interest rates prevailing on the Swiss financial market. In 2004, the annual average cost for compulsory stockholding was approximately CHF 21.0/t (EUR 13.0/t).

Other Measures

Demand Restraint

In the event of a supply disruption resulting in an IEA collective action, Switzerland can implement demand restraint measures in various stages. In a first stage of a crisis (*e.g.* the first six months), Switzerland would use emergency reserves (compulsory stock releases). During the second stage, heavy-handed demand restraint measures might be introduced such as a pro rata allocation system for heating oil and a rationing system for transport fuels (*e.g.* motor gasoline and diesel). Additional light-handed measures might be implemented in either stage and might include any of the following: persuasion, reduced speed limits, Sunday driving bans, etc.

This approach provides time to prepare, decide upon and implement demand restraint measures that reflect the severity of the situation. Plans for an information campaign are already available.

The decision process follows the usual procedure for governmental affairs at the federal level of the Swiss government. The decision process for the emergency response programme implies the consultation of governmental bodies, some of which are already represented in NESO.

Fuel Switching

Fuel switching is not viable as a measure to reduce oil consumption in Switzerland, primarily because dual- and multiple-firing plants use natural gas as fuel under normal circumstances. In the event of a gas supply disruption, these plants would most likely switch to oil or other alternative fuels. In addition, the vast majority of electricity generation in Switzerland is based on hydro power (53%) and nuclear plants (42.5%); only about 1.5% of electricity is produced using gas.

The simultaneous occurrence of an oil disruption and a gas supply shortfall would, under extreme circumstances (*e.g.* harsh winter conditions), complicate the energy crisis management process in Switzerland. However, industrial gas consumers (*e.g.* the cement industry) might switch to light heating oil, coal or even to scrap wood. Additional light heating oil stocks are maintained to cover these kinds of situations (they do not comprise any part of the IEA emergency stocks).

Oil Infrastructure of Turkey



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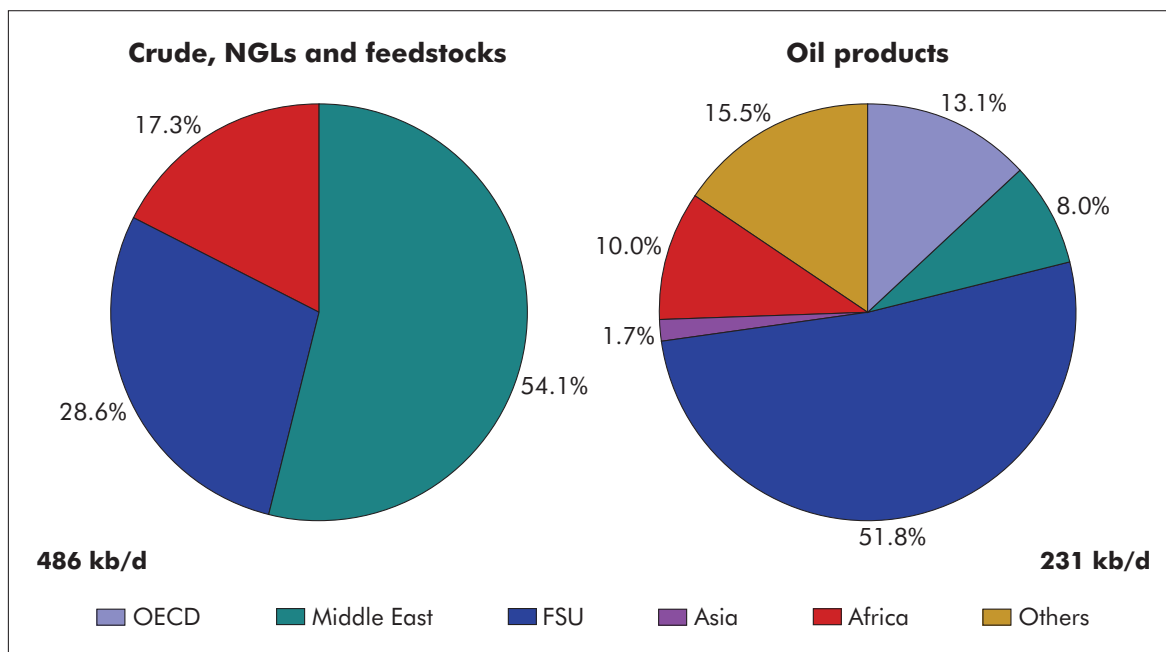
TURKEY

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	72.5	67.7	52.8	43.5	41.7	38.8
Demand (kb/d)	477.0	608.0	666.7	659.1	616.7	639.2
<i>Motor gasoline</i>	74.0	100.2	83.5	62.0	61.8	
<i>Gas/diesel oil</i>	153.7	179.8	184.8	216.4	232.2	
<i>Residual fuel oil</i>	119.8	144.6	141.5	118.1	85.3	
<i>Others</i>	129.6	183.5	257.0	262.6	237.4	
Net imports (kb/d)	404.5	540.3	613.9	615.6	575.1	600.3
Import dependency (%)	84.8	88.9	92.1	93.4	93.2	93.9
Stocks in days of net imports	75.0	80.0	87.0	80.0	90.0	
Refining capacity kb/d		646.0	690.9	618.0	618.0	630.0

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

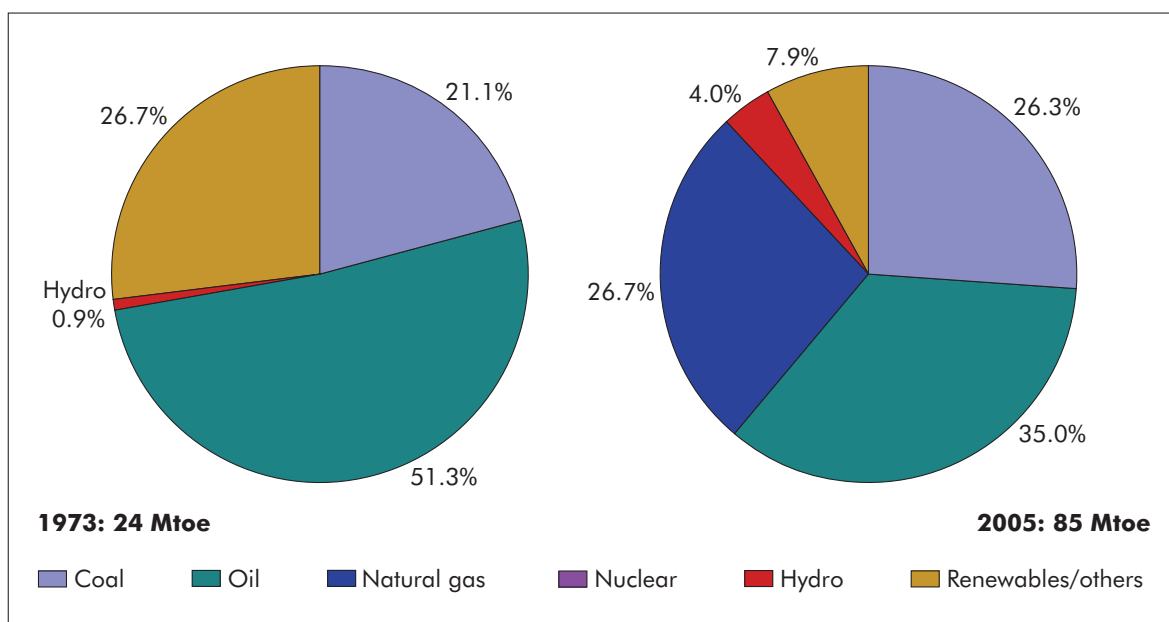
Turkey recently experienced a robust economic recovery following a financial and currency crisis in 2001, which led to severe economic contraction. After peaking at 8.9% in 2004, the GDP growth rate slowed down to 6% in 2005, as was reflected in a number of factors such as depreciation of the Turkish new lira, a decline in Turkey's stock market and rising inflation. Turkey's oil demand fell from 667 kb/d in 2000 to 617 kb/d in 2006 but is expected to pick up as the economy grows, reaching 639 kb/d in 2010.

Due to its unique geographical position, Turkey is the hub of regional hydrocarbon delivery networks and plays a significant role in bridging (via pipelines) eastern supply and western demand. In addition, the Turkish Straits carry intensive oil tanker traffic, placing a high burden on the Turkish Authorities to assure vessel traffic in these narrow straits.

Turkey's emergency oil reserves consist of only industry obligations. Thus, its first response in an oil supply disruption is expected to be a lowering of these obligations. However, the government is also advancing with legal arrangements to establish a stockholding agency.

Energy Outlook

Total Primary Energy Supply



In 2005, Turkish total primary energy supply (TPES) was 85 Mtoe, a significant increase from 24 Mtoe in 1973. Of the total, oil has the largest share with 35%, followed by natural gas with 27%, coal with

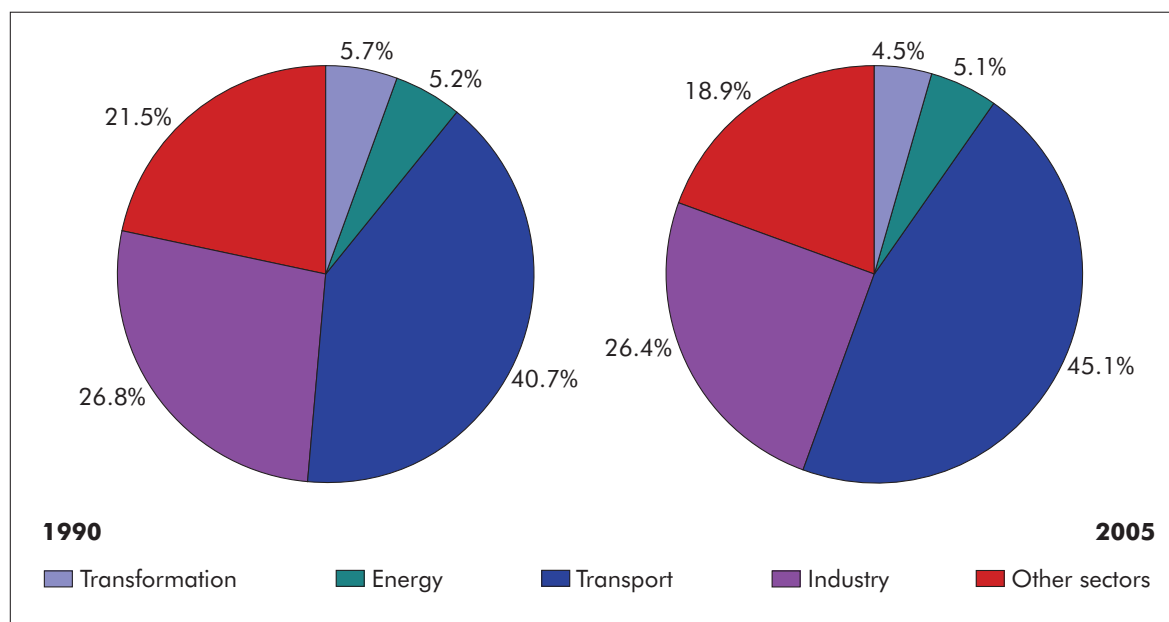
26%, and renewable resources (including hydraulic) with 12%. Natural gas has become an essential part of the fuel mix, despite the fact that its use was virtually non-existent in the early 1970s.

Total oil demand increased from 608 kb/d in 1995 to 617 kb/d in 2006 and is expected to increase further, at a rate of almost 1% per year, to 639 kb/d by 2010.

Although Turkey's domestic production is limited, the country has an estimated proven reserve of 300 mb. However, oil production has already started declining due to depletion of oil fields. Despite huge efforts to discover new resources, the Turkish government projects a rapid decline in production over the next 15 years, which will leave the country fully dependent on foreign sources to meet demand for crude oil.

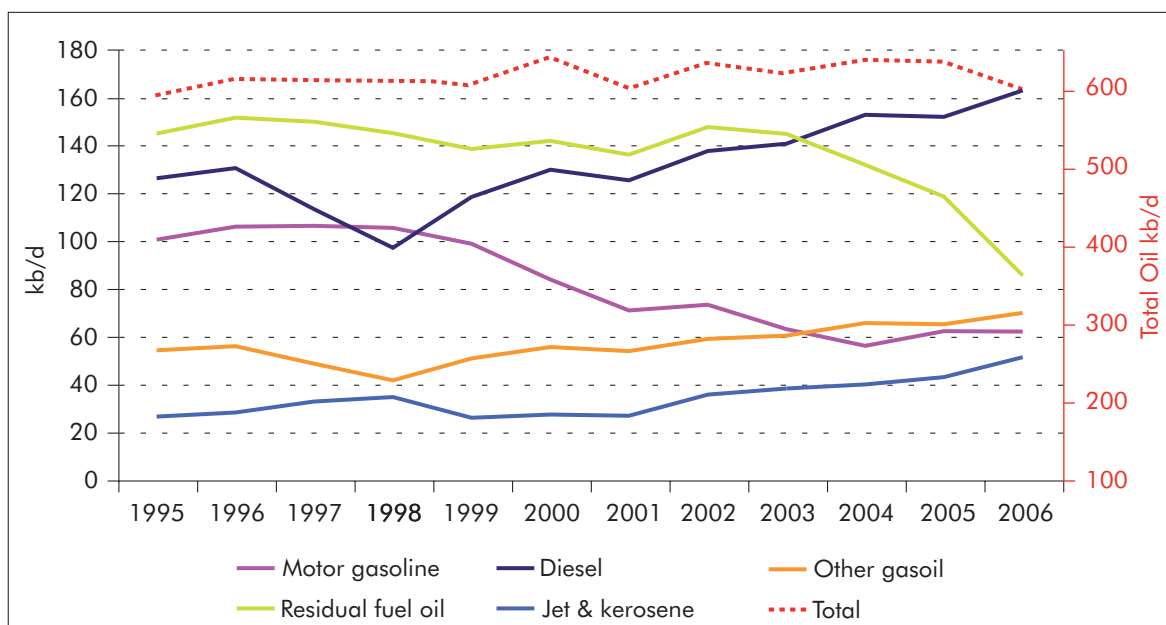
The two major oil-consuming sectors are transport (45%) and industry (26%). The distribution of oil consumption by sector has remained quite constant since the 1990s. In real terms, it has increased on average 1.8% per year.

Oil Consumption by Sector



Market Features and Key Issues

The breakdown of oil product consumption in Turkey has changed considerably over the past 13 years. Diesel consumption grew by 29% between 1995 and 2006, an annual growth rate of 2.4%. By contrast, motor gasoline consumption dropped by 38%, or 4.3% annually. This reflects both an increase in the number of diesel-powered vehicles and a rapid increase in diesel use in the agricultural sector. Over the same period, motorisation also stimulated astonishing growth – of 94% – in demand for jet and kerosene oils, albeit from a very low starting point.

Oil Demand by Product, 1995-2006

Oil Supply Infrastructure

Refineries

The Turkish refining sector is dominated by the company TÜPRAŞ, which was completely privatised by the government in an effort to streamline management and make operations more efficient.

In 2006, total refining capacity was 618 kb/d with 95% utilisation. Refining capacity peaked in 2004 and has since been declining, mainly due to the closure of one refinery. In order to meet increasing demand for petroleum products, Turkey will need to increase refining capacity by 2010.

As of 2005, TÜPRAŞ has invested EUR 1.3 billion in its four major refineries. It plans to invest another EUR 1.2 billion in the future to meet European standards on operation and product quality, and to expand its refining capacity.

Ports and Pipelines

Turkey plays a key role in the transportation of oil among neighbouring nations, primarily via the following five pipelines:

- Iraq-Turkey Crude Oil Pipeline: 1 297 km in Turkey (total 1 876 km); 1.41 mb/d capacity.
- Baku-Tbilisi Ceyhan (BTC) Crude Oil Pipeline: 1 076 km in Turkey (total 1 776 km); 1 mb/d capacity.

- Ceyhan-Kırıkkale Crude Oil Pipeline: 448 km totally in Turkey; 100 kb/d capacity.
- Batman-Dörtyol Crude Oil Pipeline: 511 km totally in Turkey; 90 kb/d capacity.
- Şelmo-Batman Crude Oil Pipeline: 42 km totally in Turkey; 16 kb/d capacity.

The BTC pipeline began operations in May 2006 and has a capacity of 1 mb/d, transporting oil from the Azeri-Chirag-Guneshli oil field in the Caspian Sea to the Mediterranean Sea. This pipeline has become an important alternative route for petroleum resources coming from the Caspian Sea to Western markets; it also serves to mitigate tanker traffic in the Turkish Straits.

Construction recently began on a by-pass pipeline travelling 660 km from the Black Sea port of Samsun to the Mediterranean port of Ceyhan. This pipeline will provide an alternative passage from the Black Sea to the Mediterranean and also ease congestion and safety problems in the Turkish Straits.

Storage

Most Turkish storage facilities, which are used for delivery of domestic demand for oil products, are in urban areas near four major refineries: İzmit, İzmir, Batman and Kırıkkale. As of 2006, Turkey has 74 licensed storages and distributors, with a total storage capacity of approximately 26 mb (4.10 mcm). Additional capacity supports the operations of the refinery and petroleum pipeline transmission license holders.

Decision-making Structure

The National Oil Stock Commission (NOSC) has direct responsibility for implementing necessary measures for stockholding and maintenance. It also sets parameters and takes decisions in five key areas:

- The actual number of days of the national petroleum stocks.
- The liabilities, term, type, quantity and locations of stocks.
- Procurement of petroleum and services used for national petroleum stocks.
- Sales of national petroleum stocks.
- Other decisions and measures related to stocks and stockholding.

The commission is chaired by the Undersecretary of the Ministry of Energy and Natural Resources (MENR). It comprises representatives of several additional bodies including the Ministry of Defence, the Ministry of Interior Affairs, the Ministry of Finance, the Ministry of Foreign Affairs, and the Energy Market Regulatory Authority (EMRA), as well as the Undersecretaries of the Treasury and of the General Directorate of Petroleum Affairs.

Stock release decisions are taken by the commission, and communicated to EMRA by the General Directorate of Petroleum Affairs on behalf of the MENR. The MENR carries out the secretarial work to implement the decisions taken by the commission. It also acts as the counterpart for legal processes regarding the decisions of the commission.

Stocks

Stockholding Structure

Turkey's emergency oil reserves consist of operational and obligatory stocks held by industry, of which 38% are obligatory stocks. At present, Turkey does not have a compulsory stock agency to govern industrial and governmental oil stocks. However, by the end of 2006, a draft bill had been prepared to establish an agency that would manage governmental stocks.

Refinery and fuel distribution licensees are obliged to keep a minimum of 20 times the average supplied daily product. These stocks must be held at their own storage or licensed storage facilities, but may be stored as a whole or separately, according to the status of the licensee. Consumers that use 20 Kt or more on an annual basis are obliged to keep 15-days supply of each type of liquid fuel in their consumption inventory.

Turkish refineries retain the remaining portion of stocks needed to reach the national obligation of 90 days of net oil imports.

Crude or Products

As Turkey is not part of the European Union, it has no regulation requiring oil stocks to be held in specific categories. However, the government is trying to establish new regulations to ensure future alignment with EU regulations.

Location and Availability

Total estimated oil storage capacity in Turkey is around 74 mb (11.8 mcm). The country does not impose any restrictions in relation to the location of storage. However, emergency oil stocks must be held domestically. Thus, Turkey has no bilateral agreements with other countries, nor are any foreseen in the near future. Stock ticket arrangements are not included in the law for emergency stocks.

Monitoring and Non-compliance

EMRA controls obligatory oil stocks. Thus empowered, EMRA can conduct regularly scheduled on-the-spot inspections. It can also order a company to provide any data or documents related to its stockholding obligations.

EMRA is authorised to implement penalties if there is a deficiency in obligatory stocks. This could include cancelling the import licence of an oil product importer if the company fails to meet its stockholding obligation. To expand audit and control activities, EMRA made an agreement with the Ministry of Internal Affairs, which has a nationwide network of auditors/inspectors.

Stock and Drawdown Timeframe

To date, Turkey has no detailed stock drawdown regulations. It intends to conduct a study on stock drawdown procedures after the privatisation of refineries, but no firm decision has been taken as yet.

Once regulations and procedures are established, it is expected that the decision-making procedure will take 24 hours; another 24 hours will be needed for the release of physical stocks. Thus, the time frame for the stocks release process is expected to be two days.

Financing and Fees

The costs of compulsory oil stocks are financed by companies operating in the market, and implicitly passed on to consumers through market prices. However, such an increase on consumer prices will be determined by EMRA with a maximum of EUR 7.5/t.

In the case of imports not directly destined for refining, such costs shall be covered by the importers themselves. Companies are obliged to provide EMRA with information regarding the accounting of this funding structure on an annual basis.

Other Measures

Demand Restraint

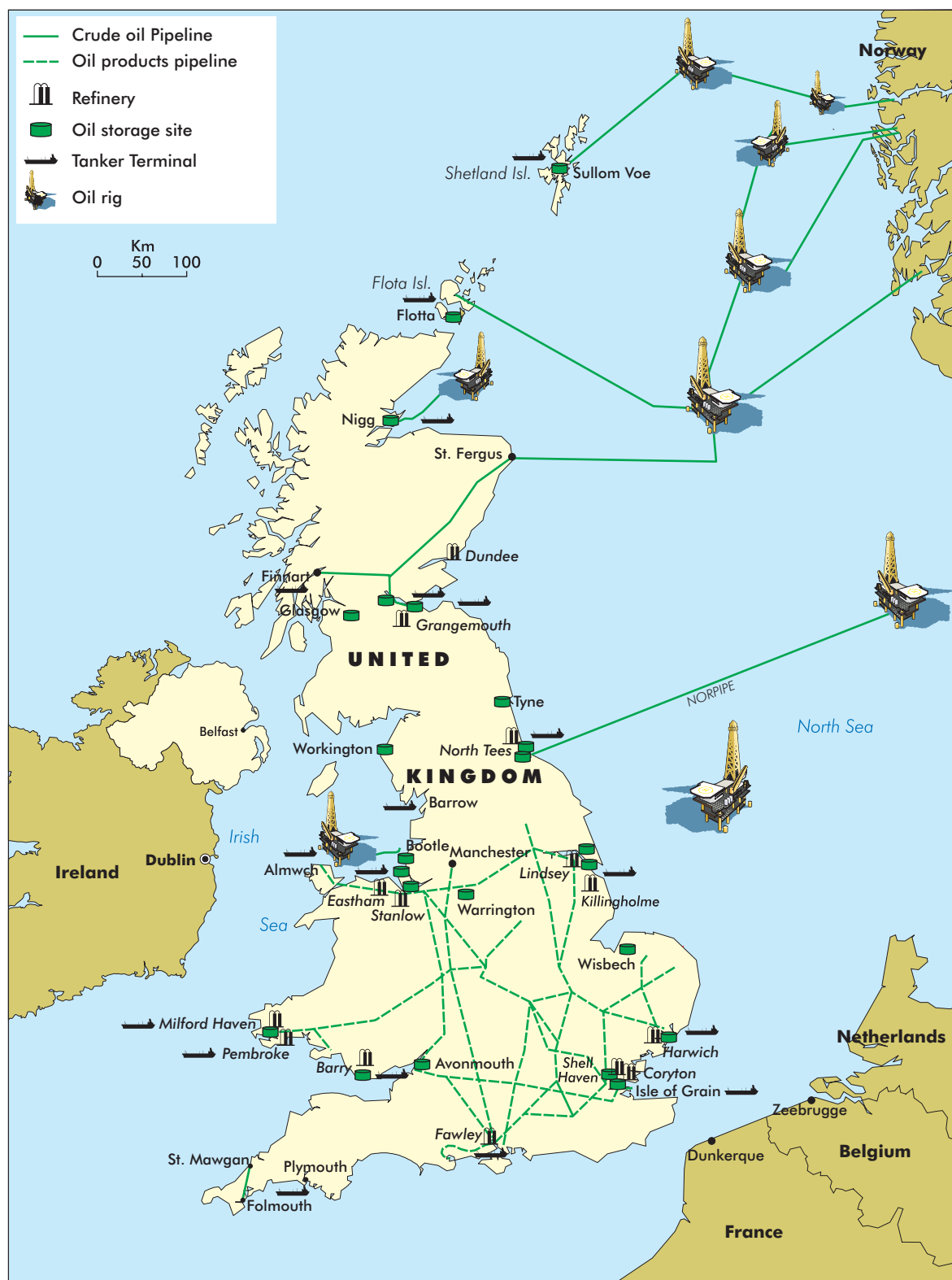
The Turkish demand restraint programme covers wide-ranging measures such as energy-saving campaigns and compulsory restraint measures (*e.g.* weekend and short-distance driving bans, delivery quotas of gasoline, and rationing). Turkey has strong legal authority to decide which policy mix is most appropriate and effective in a given emergency.

NOSC would prepare the demand restraint programmes and propose to the Turkish Emergency Management General Directorate (TEMGD) to implement the measures, with the co-operation of 81 local governments. The central government would carefully monitor and control the implementation. Parliamentary ratification is not required to implement the various demand restraint measures – with the exception of rationing.

Fuel Switching

Turkey does not consider fuel switching a particularly efficient measure. Since 1987, natural gas has substituted heavy fuel oil in power generating plants, industry and home heating sectors; it has also replaced naphtha as a feedstock in fertiliser plants. Thus, there is little opportunity for fuel switching.

Oil Infrastructure of The United Kingdom



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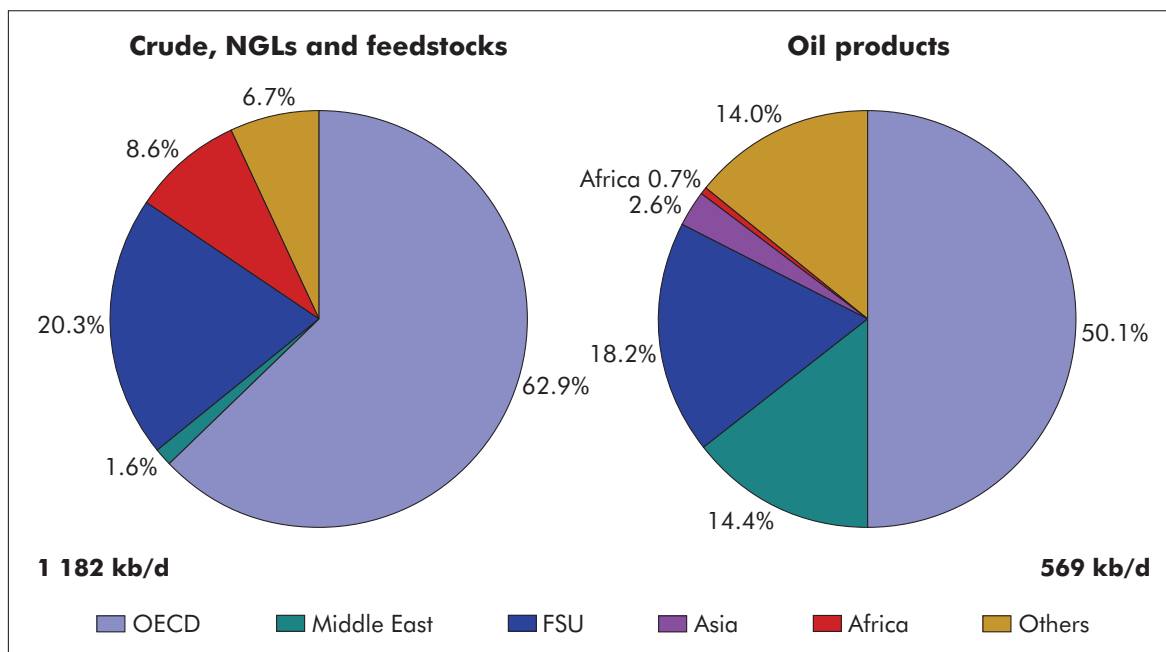
THE UNITED KINGDOM

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	1 939.9	2 793.9	2 704.8	1 840.5	1 662.2	1 262.8
Demand (kb/d)	1 775.9	1 817.4	1 759.8	1 834.6	1 830.5	1 859.5
Motor gasoline	562.8	508.3	498.7	435.4	428.8	
Gas/diesel oil	414.4	459.4	504.7	559.6	569.4	
Residual fuel oil	269.7	182.7	81.6	89.9	89.3	
Others	529.0	666.9	674.8	749.7	743.0	
Net imports (kb/d)	-163.9	-976.5	-945.0	-5.9	168.3	596.6
Import dependency (%)	*	*	*	*	9.2	32.1
Stocks in days of net imports	-	-	-	-	1 115.0	
Refining capacity kb/d		1 869.2	1 784.7	1 825.4	1 887.1	1 925.0

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

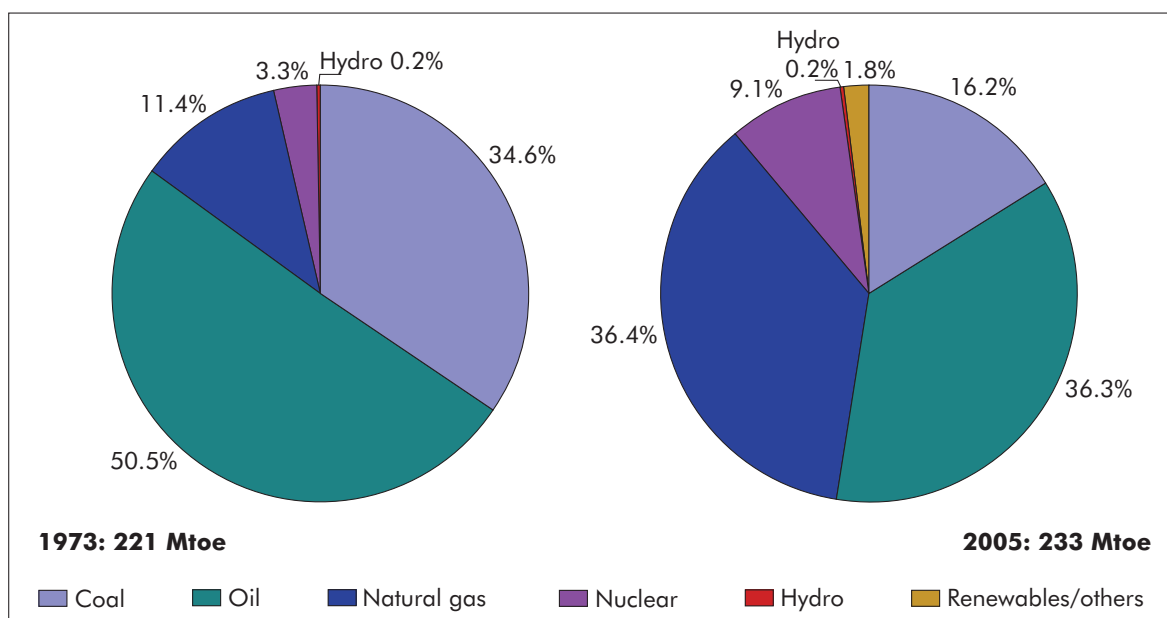
The United Kingdom is one of the major oil producers among IEA member countries; until recently, it had the distinction of being one of only four IEA net exporting countries. However, UK North Sea oil and gas production has been declining since its peak in 1999. In 2006, the country became a net importer of oil. As reliance on imports is currently only marginal, oil stocks in the country represent well beyond the 90-day minimum net import cover. Yet, as domestic production further declines, the country will face a growing need to hold larger volumes of emergency reserves. Responding to the country's evolving storage needs, the UK government is in the process of changing its stockholding regime.

As a member of the European Union, the United Kingdom has a minimum stockholding obligation. It meets this obligation by placing compulsory stock requirements on oil companies operating in the country, based on sales to final consumers. Changes envisioned to the stockholding regime include basing the industry obligation on production and imports, rather than sales. In an IEA co-ordinated action, the United Kingdom would contribute to the collective response mainly by lowering the obligation on industry.

Energy Outlook

Natural gas and oil are the United Kingdom's dominant primary fuels; in 2005, together they accounted for 73% of the country's energy supply mix. The country's major fuel supply trend of the last 30 years has been the rise in the share of natural gas at the expense of coal and oil. Increased exploitation of

Total Primary Energy Supply

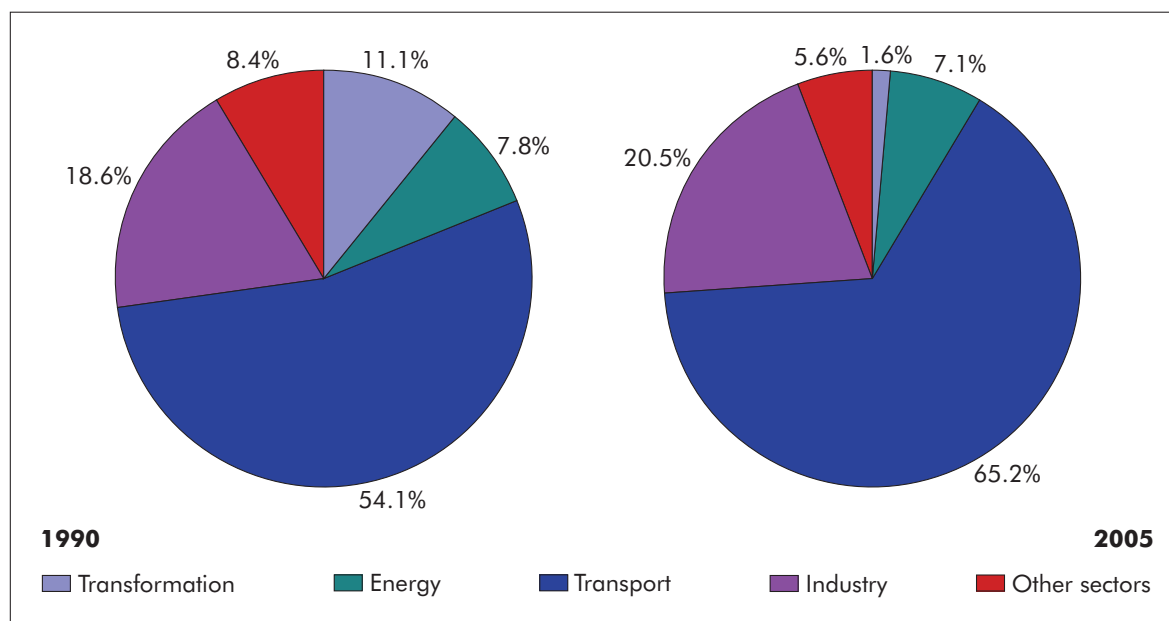


substantial gas reserves in the UK Continental Shelf in the North Sea led to greatly expanded natural gas use, particularly in the 1990s when the country built substantial gas-fired combined cycle gas turbines for electricity generation. In recent years, coal supply has continued to fall while oil supply has stabilised and is now increasing, largely due to transport demand.

UK domestic oil production peaked in 1999, when output of both crude and NGLs averaged 2.93 mb/d. In 2006, this fell to 1.66 mb/d, the result of accelerating decline from mature fields. UK production could see a slowing in decline, largely as a result of the start up of the Buzzard field in January 2007, which is expected to plateau at 200 kb/d by mid-year. Other new start-ups are likely to be smaller than Buzzard but will, nevertheless, help stem overall production decline in the period through 2010, when production is expected to average 1.26 mb/d. However, the anticipated long-term trend for oil (and natural gas) production shows continuing decline.

Total UK oil demand in 2006 averaged slightly more than 1.8 mb/d. The transportation sector accounted for nearly two-thirds of this demand, with motor gasoline, gas/diesel oil, and jet kerosene being the main transportation fuels. Future oil demand growth will be the result of increases in the use of these fuels. By contrast, oil's use in the transformation sector has fallen dramatically: in the early 1970s, this sector accounted for around one-quarter of all oil used in the country; in 2005, it accounted for only 2%.

Oil Consumption by Sector



Market Features and Key Issues

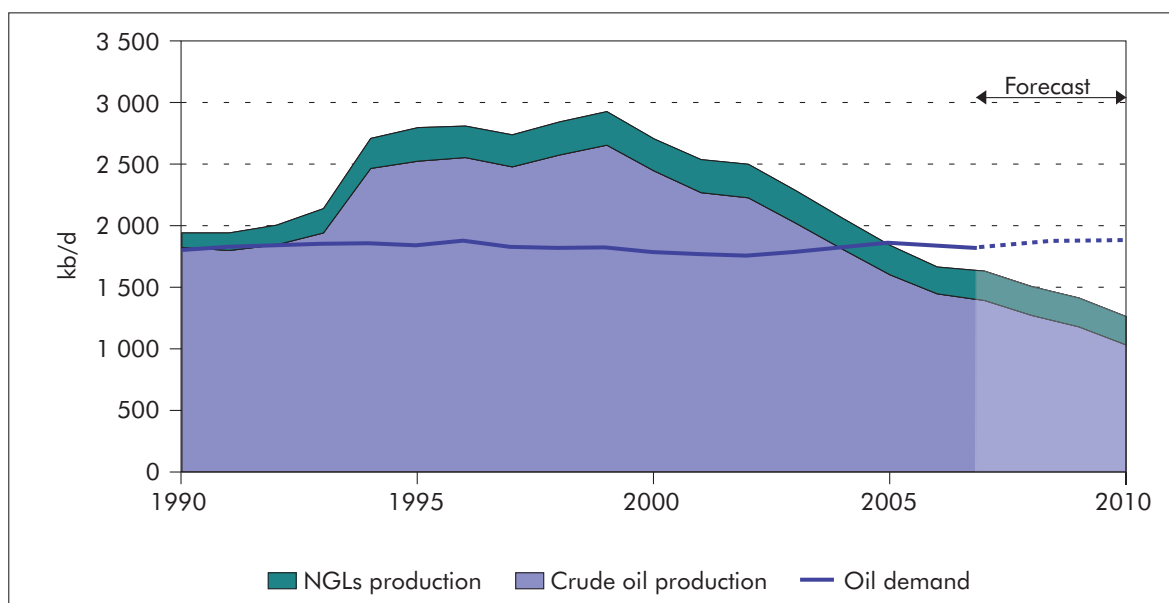
Due to the decrease in indigenous production, in the coming years the United Kingdom will need to hold larger volumes of emergency reserves in order to comply with its IEA and EU obligations. As an oil producer, the country has a 25% derogation from its minimum stockholding obligation with the EU, which is based on domestic consumption. This means that the United Kingdom must maintain stocks of at least 67.5 days, rather than the normal EU requirement of 90 days of consumption.

In 2006, the United Kingdom became a net importer of oil; thus, for the first time the country also had a stockholding obligation as a member of the IEA. As net imports were marginal (representing less than 10% of oil demand), the volume of oil needed to meet the IEA 90-day requirement is currently rather small and is easily met by the stocks being held to meet the EU obligation.

The decline in UK production will eventually lead to an increase in the country's stockholding needs. As production decreases, the EU derogation will be phased out and the obligation will gradually increase to 90 days. The UK government expects the derogation to start being phased out between 2016 and 2018. During the same period, the government expects net imports to reach a level at which the IEA minimum stockholding obligation will exceed that of the European Union.

The UK government announced in February 2007 that, over a transitional period in 2007/08, it would change the basis for calculating the stockholding obligations on industry, moving from a calculation based on sales to one based on production and imports.

Oil Production and Demand, 1990-2010



Oil Supply Infrastructure

Refineries

There are nine major refineries in the United Kingdom, which account for nearly all of the country's total crude distillation capacity of 1.89 mb/d. Three other refineries, with a relatively small production capacity, are dedicated to refining products that meet the needs of specific industries including lubricants, specialist pharmaceuticals or road-making materials.

UK refineries have sufficient capacity to produce more than enough of the country's needs for motor gasoline. However, the United Kingdom imports significant quantities of gas/diesel oil and aviation kerosene fuel due to strong demand for these products.

Ports and Pipelines

Within the United Kingdom, the final leg of the distribution of oil products to consumers is mostly by road tanker (particularly for fuels for road transport). However, the country's distribution network also involves a significant set of pipeline systems. These systems often comprise single pipelines that distribute several different products using batch flows, e.g. a volume of petrol being followed by a volume of gas/diesel oil, etc. The major pipeline systems are as follows:

- UK Oil Pipelines Ltd (UKOP): Jointly owned by Shell, BP, Total and Texaco through BPA, this pipeline links Coryton refinery (Essex) to Stanlow refinery (Cheshire), and also feeds major distribution terminals at Buncefield (Hertfordshire) and Kingsbury (Warwickshire). Separate aviation fuel pipelines link Heathrow and Gatwick airports.
- Mainline System: Majority (65%) owned by Esso, Texaco, Total and Shell, this line links refineries in South Wales to feed Kingsbury. Esso is the pipeline operator.
- Esso Midline: Links Fawley refinery (Hampshire) with Stanlow via Kingsbury.
- Finaline: Links Lindsey refinery (Lincolnshire) with Buncefield terminal (Hertfordshire). Total is the operator.
- Government Pipeline System: Covers the main estuaries in the United Kingdom supplied by links to the East Coast refineries (Coryton, Fawley and Stanlow), mainly distributing aviation fuel. This pipeline is operated by the Ministry of Defence's Oil Pipelines Agency (OPA).
- South East Pipeline: Links Fawley with West London and Esso's Purfleet terminal in Essex.
- West London aviation fuel pipeline: Jointly owned by BP, Shell, Texaco and Total.

Several other smaller capacity pipelines also exist. In addition, several inland distribution terminals are linked to refineries through rail supply channels.

Storage

Refineries contain the main storage facilities for crude oil and oil products in the United Kingdom, and therefore represent one of the major locations of the UK emergency oil reserves. Additionally, there are major product distribution terminals – which are self-contained, separate storage and distribution facilities – linked to refineries either by rail or pipeline. Altogether, these refinery and stand-alone terminals comprise a total of 64 larger scale distribution terminals. These terminals supply products either directly to final consumers (such as individual petrol retail stations) or to commercial depots (which manage further distribution). The major distribution terminals usually handle higher capacity deliveries using large-size tankers. Commercial depots cover smaller scale deliveries, such as those to depots owned by road haulage companies and used as central supply points for their own vehicles.

Decision-making Structure

The Secretary of State for Business Enterprise and Regulatory Reform is responsible for issues related to oil supply security within the United Kingdom. Under the authority of the Secretary of State, the Department for Business, Enterprise and Regulatory Reform (BERR -formerly known as Department for Trade and Industry) serves as the National Emergency Sharing Organisation (NESO) and has responsibility for initiating and co-ordinating a response to a supply disruption. Within BERR, teams of resilience specialists, economists and statisticians (all reporting to the Director-General for Energy) form the internal core group of the UK NESO and undertake the normal daily monitoring of the oil market. In a supply disruption, BERR would consult other departments as appropriate, such as the Cabinet Office, the Foreign and Commonwealth Office, and HM Treasury together the Prime Minister's Office.

The *Energy Act 1976* is the legal basis for emergency policy; it provides the principal statutory authority for NESO and recognises the UK obligations under the I.E.P..

In the event of an international crisis, BERR can also call upon industry experts: a key component of the UK emergency response system is the joint industry and government response team. Industry would be closely involved through the UK Petroleum Industry Association (UKPIA), with representation at both chief executive and technical levels.

Stocks

Stockholding Structure

There are no public stocks in the United Kingdom; the country's minimum stockholding requirements are met by placing obligations on industry. The UK government is currently in the process of changing its stockholding regime, modifying the basis for calculating the stockholding obligations on industry over a transitional period of 2007/08.

Directives for stock obligations in the United Kingdom are based on the EU regulations – *i.e.* they are calculated as deliveries to final consumption (less deliveries for non-energy use, bunker supplies for sea-going vessels and military consumption). Under the current system, obligations are based on companies' deliveries into final consumption in the previous calendar year (final consumption being the stage in the supply chain at which product is sold to final consumers, e.g. deliveries or sales to petrol stations). The current obligation requires refineries to hold stocks equivalent to 67.5 days of the previous year's deliveries; non-refinery companies (supermarkets and distributors) are required to hold 48.5 days. Other stocks, such as stocks held offshore, can also contribute towards meeting the obligation.

Under the new system, obligations will be based on companies' supply to the market. In the case of refiners, this is defined as production + imports – exports; for non-refining importers, it is calculated solely on imports. Obligations will continue to be based on activity in a previous 12-month period, but this will be brought forward and new obligations will be issued on a quarterly basis.

Crude or Products

Crude oil and other feedstocks may be counted towards the stock obligations in accordance with directions by the authorities. Blending components (including naphtha where applicable) are counted directly on a tonne-for-tonne basis towards the three EU product categories.

At the end of 2006, roughly half of the stocks held in the United Kingdom were in the form of crude oil or feedstock; roughly half of all product stocks were made up of middle distillates.

Location and Availability

There are no restrictions on the location of compulsory stocks in the United Kingdom. However, companies must report, on a monthly basis, the location of all stocks held towards an obligation. Compulsory stocks are not held separately from commercial stocks.

Compulsory stocks can be held in three ways:

- by the company itself in the United Kingdom;
- by third parties, on behalf of the company, within the United Kingdom; or
- by the company, by an affiliate or by third parties in another EU member state, provided that the stocks concerned are recorded and held under a bilateral agreement between the United Kingdom and the relevant member state.

Under the EU directive on stockholding, the United Kingdom has formal bilateral treaties with Denmark, Ireland, the Netherlands and Sweden. The United Kingdom also has informal arrangements with Belgium and France. The country also has a bilateral treaty with New Zealand under the IEA International Energy Program, which allows UK companies to hold stocks on behalf of New Zealand.

Companies holding stocks abroad under bilateral agreements must have plans in place to repatriate such stocks in case of an emergency, thereby ensuring that those stocks would be available in the United Kingdom as soon as reasonably possible. The emergency plans would be stipulated in any consent given by the UK government to the stocks being held under the relevant bilateral agreement.

Monitoring and Non-compliance

BERR collects information on a monthly basis to monitor each company's compliance with its compulsory stocks and to ensure the United Kingdom's fulfilment of its minimum stock obligation. Companies are required to report each month on the stocks held at the end of the previous month.

Regarding stock tickets, companies in the United Kingdom are required to provide monthly returns to BERR, although dispensation may be given if an inter-company contract covers a fixed twelve-month period. The stockholding companies report their stocks on an ownership basis and BERR makes the ticket adjustments. To ensure accuracy, BERR also cross-checks company stock claims with the stock cover notifications provided by holding companies.

The Secretary of State may, from time to time, wish to verify the existence of oil stocks being held in the United Kingdom – either in compliance with directions issued under the *Energy Act 1976* or in relation to the terms of a bilateral agreement by which a UK company has agreed to hold stocks on behalf of a company or agency in any other member state. The *Act* allows persons authorised by (or on behalf of) the Secretary of State to enter a company's premises (after giving advance notice of their intentions), to make such inspections and enquiries as may be reasonably necessary to satisfy the Secretary of State that the company is complying with the terms of any relevant direction or bilateral agreement. In practice, no regular physical inspections are made; however, the authorities use data cross-checking systems, with reference to customs data, and also monitor the products balances implied by the supply/demand data provided by companies (particularly refiners).

Occasionally, temporary relaxations from stockholding obligations are permitted by the authorities, for a short period of time where a company cannot reasonably be expected to anticipate the problem which has arisen (such as a tanker accident).

Stock and Drawdown Timeframe

A decision about compulsory stock drawdown in the United Kingdom would lie with the Secretary of State for BERR, in consultation with Cabinet colleagues. BERR officials would liaise closely with the IEA, the European Commission and other member countries to agree on the actual emergency measures to be taken, how they would be implemented and the volume of oil involved.

For the United Kingdom, the initial measure implemented is likely to be stockdraw, implemented by a reduction in companies' obligations to hold stocks. Companies would be asked to decide upon their individual implementation plans and advise BERR. Stocks will be expected to be drawn down within an agreed time frame (probably one month). BERR would always prefer to proceed by consent; however, if company-specific implementation plans cannot be agreed, BERR would use its legal powers to direct companies to release stock. The price of the stock released would be determined by their market value at that time.

BERR would monitor stock reporting by compulsory stockholders and advise the IEA of progress. The monitoring process would generally be on a monthly basis although more frequent reporting (weekly) could be required, dependent on the situation. Using these data, BERR would also determine if the stockdraw has been successful and liaise directly with any company unable to meet the stockdraw targets.

At the conclusion of an emergency response, BERR would advise compulsory stockholders when the stockdraw is no longer required (following decision by the IEA) and agree on a reasonable timeframe for companies to rebuild stocks.

Financing and Fees

The costs of compulsory oil stocks are financed by the companies operating in the market, and thus implicitly passed on to consumers through market prices.

Other Measures

Demand Restraint

Under the *Energy Act 1976*, the UK government has the authority to control the production, supply, acquisition and use of oil and oil products, as it deems necessary. In principle, the United Kingdom seeks to allow market mechanisms to resolve temporary disruptions as much as possible. In a disruption requiring government action, light-handed measures are preferred; more heavy-handed demand restraint and allocation measures would be unlikely. However, should a serious crisis emerge, these could be introduced as necessary.

Demand restraint measures in the United Kingdom are set out in the National Emergency Plan for Fuel (NEP-F). A number of measures can be considered as part of an emergency response to any situation involving fuel supply disruption, ranging from light-handed measures to the allocation and rationing of oil products.

Demand Calming Measures cover a series of sensible measures that consumers could use to reduce consumption of petroleum products at any time. These would be communicated to the general public according to prepared plans for dissemination (including media involvement) to ensure that adequate and appropriate information is available to the public, as well as to suppliers and retailers.

Forecourt Supply Management (FSM) is a process to restrict the amount of fuel that retail customers may purchase at any one time under the *Maximum Purchase Scheme*. The FSM has three main purposes:

- To quickly conserve the fuel available at sites by restricting supply to customers at times of very high demand, thereby ensuring as wide availability of fuel as possible.
- To provide fair allocation of fuel to customers, if there are long-term shortages of transport fuels.
- To encourage drivers not to keep their fuel tanks more full than they normally do.

FSM measures would be introduced under the emergency powers in the Energy Act 1976, which also provides for the imposition of criminal penalties upon parties that do not adhere to FSM measures.

Designated Filling Stations (DFS) provides defined customers with priority access to road transport fuels. DFS would be introduced under the emergency powers of the Energy Act 1976. BERR would implement the scheme by designating a number of filling stations for the provision of fuel for priority use only, under both the Utilities Fuel Scheme and Emergency Services Scheme. Fuel suppliers would be instructed to give priority deliveries of fuel to these sites. If the DFS is implemented, BERR would publish a list of the DFS locations on its website.

Priority Schemes make provision for emergency services and other defined responders (such as utility companies) in an emergency. Truck stops would also be prioritised to refuel heavy goods vehicle fleets needed to support the movement of food and health products. These schemes would be implemented in conjunction with DFS, as a process to control the supply of road transport fuels to a defined number of UK filling stations that will receive supplies for priority use only. Unlike the previous priority use scheme, these schemes work on the basis of identification by vehicle type and logo rather than driver-based pre-registration. The purpose of priority schemes is to make the best use of reduced quantities of fuel to minimise the impact on emergency and other essential services that underpin daily life. The

schemes would be introduced quickly. The priority schemes would be introduced under the emergency powers in the *Energy Act 1976*, which also allows for the imposition of criminal penalties if it is found that fuel products supplied for priority use are used for other purposes.

Bulk Distribution Scheme provides a framework for the allocation and prioritisation of fuels to bulk customers of petroleum fuels. The scheme applies to all petroleum fuel consumed within the UK inland market in the following product groups: petrol, diesel, burning oil (kerosene), gas oil, fuel oil, LPG, and marine and aviation fuels (UK allocation for Priority Use).

The bulk distribution scheme applies to individual grades of fuel. Hence, if there is no supply or distribution problems of a particular grade(s) of fuel within any given region, that grade(s) should be available as normal. The scheme does not apply to international marine and air bunkering, in which case IEA-determined criteria would apply; however, the scheme does cover domestic allocation of marine and aviation fuels.

Oil Infrastructure of The United States of America



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

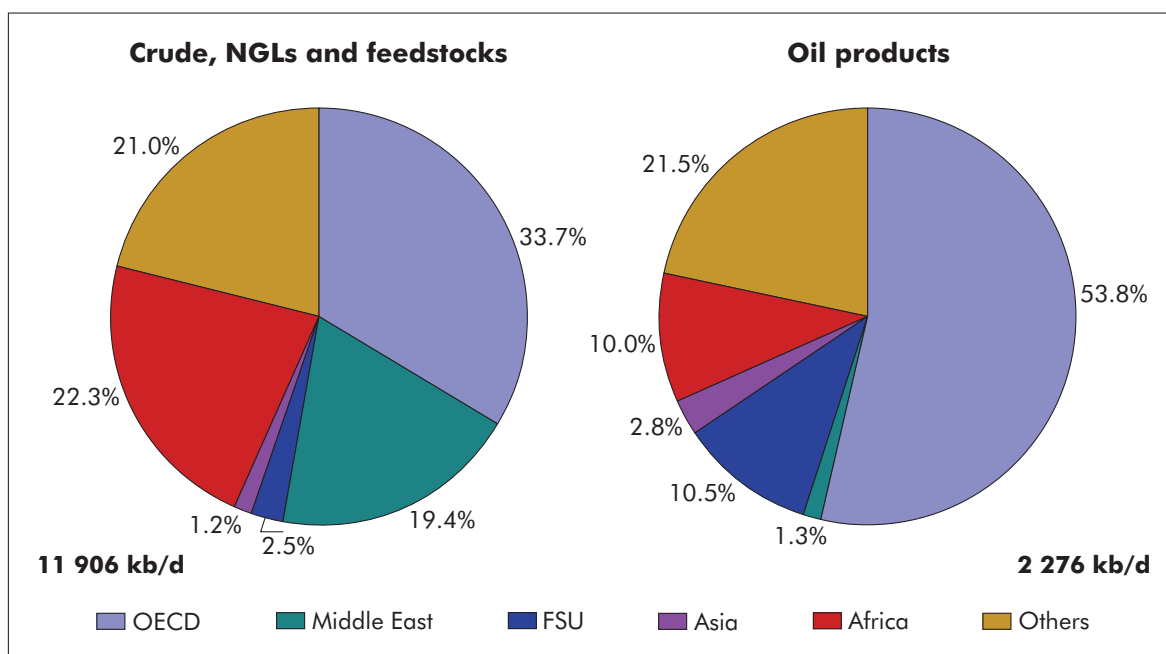
THE UNITED STATES OF AMERICA

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	8 994.6	8 614.7	8 083.6	7 323.3	7 372.0	7 589.9
Demand (kb/d)	17 201.0	17 983.4	19 996.2	21 149.5	21 024.8	22 242.9
Motor gasoline	7 286.8	7 837.4	8 532.8	9 226.3	9 323.5	
Gas/diesel oil	3 051.3	3 270.2	3 787.1	4 200.0	4 262.0	
Residual fuel oil	1 281.8	921.7	991.7	1 015.3	785.1	
Others	5 581.1	5 954.1	6 684.5	6 707.9	6 654.2	
Net imports (kb/d)	8 206.4	9 368.6	11 912.6	13 826.1	13 652.8	14 653.0
Import dependency (%)	47.7	52.1	59.6	65.4	64.9	65.9
Stocks in days of net imports	201.0	164.0	119.0	114.0	118.0	
Refining capacity kb/d		15 318.6	16 541.0	16 774.9	17 272.6	18 356.3

Oil Imports, 2006



See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

Oil demand in the United States has averaged roughly 21 mb/d since 2004 and is expected to reach more than 22 mb/d by 2010. Moreover, it will continue to rise steadily in the coming decades, reaching some 27 mb/d by 2030. In recent years, domestic crude production has declined, although the impact has been moderated by deepwater offshore production, mainly in the Gulf of Mexico. Still, net imports will continue to meet a growing share of demand. Domestic refinery capacity is not expected to keep pace with demand growth, and as a result refined products will make up a greater share of the rising total net imports.

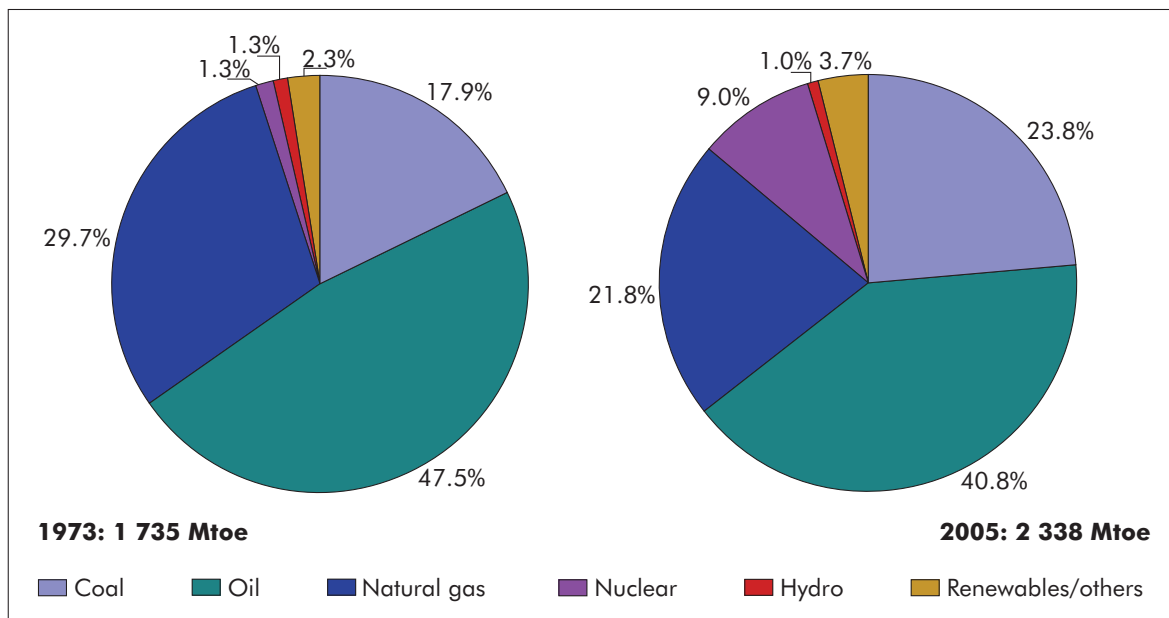
The United States meets the minimum stockholding requirements of the IEA through a combination of crude stocks held by the Strategic Petroleum Reserve (SPR) and stocks of both crude and product held by industry. However, there are no compulsory stock requirements for oil companies. The US emergency policy is to respond quickly to a major supply disruption with the release of crude oil from the SPR, relying on market forces to allocate the oil effectively.

Energy Outlook

Fossil fuels dominate the US energy supply mix, with oil and gas accounting for nearly two-thirds of total primary energy supply (TPES).

Proven crude oil reserves at the start of 2006 were some 21.8 billion barrels, with the vast majority concentrated in four states. The Gulf States of Texas and Louisiana account for 42% of the total; the remaining bulk of reserves can be found in Alaska (20%) and California (18%).

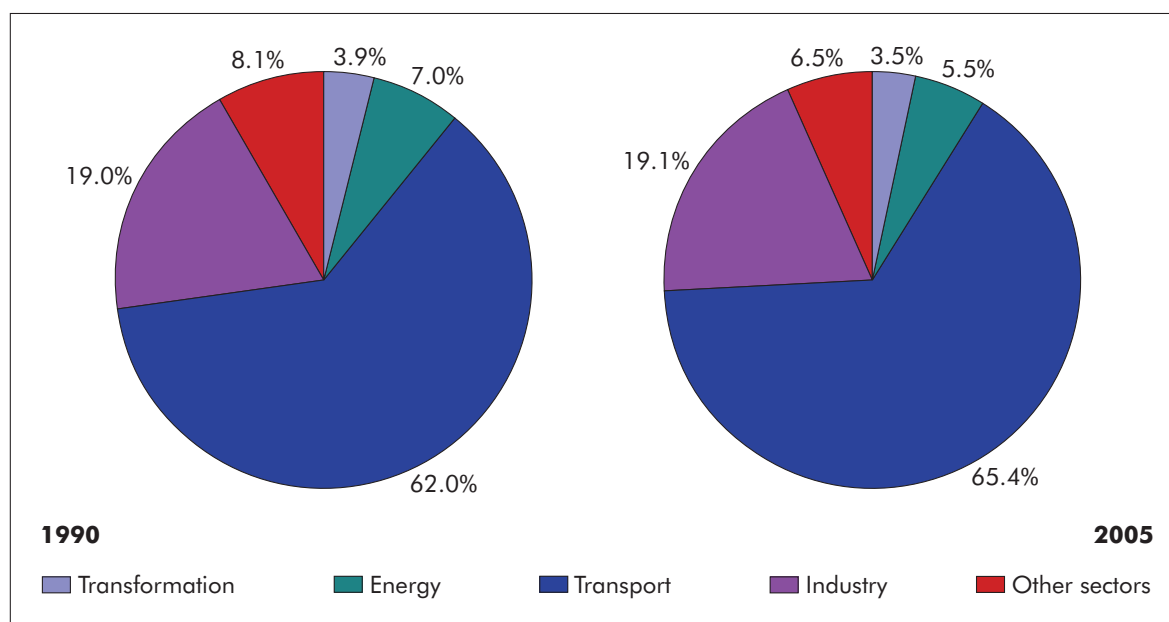
Total Primary Energy Supply



Total US indigenous oil production averaged 7.4 mb/d in 2006, compared to the nearly 9 mb/d averaged in 1990. Deepwater offshore production, mainly in the Gulf of Mexico, has moderated the overall crude production decline in recent years. In fact, it is expected to temporarily reverse the downward trend until about 2015, at which time production is expected to peak.

Total US oil demand in 2006 averaged slightly more than 21 mb/d. The transportation sector accounted for some two-thirds of this demand, with the main transportation fuels being motor gasoline, middle distillates (ultra-low-sulphur diesel), and jet kerosene. Projections for future oil demand reflect the continued growth in the use of these fuels. Despite expected technological improvements to increase efficiencies of motor vehicles and aircraft, growth in demand for each mode of transport is expected to outpace gains in fuel efficiency.

Oil Consumption by Sector



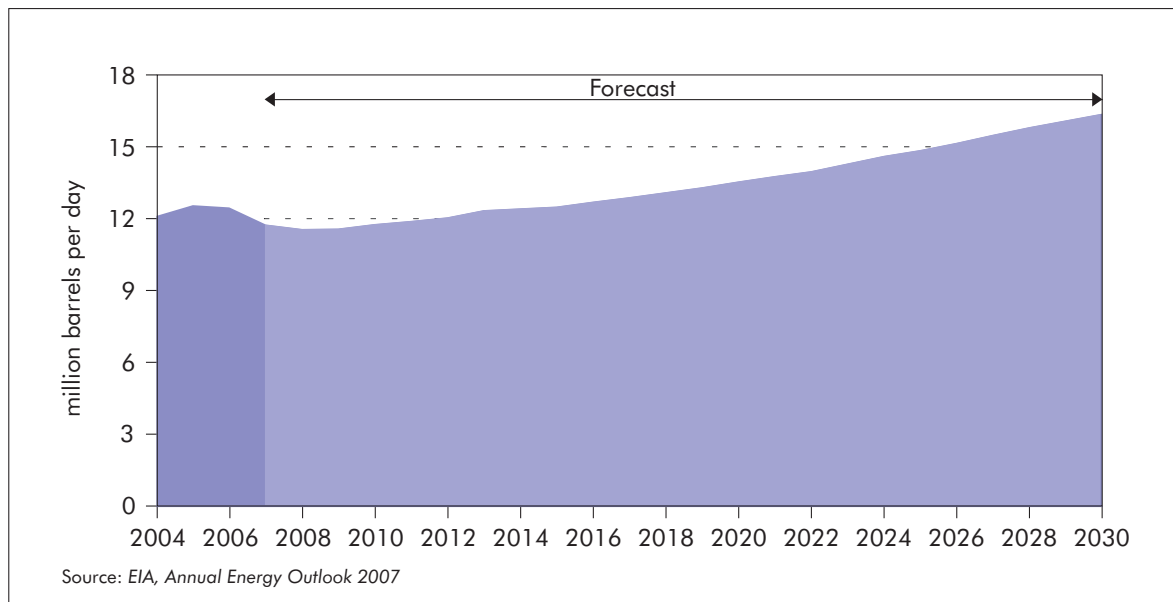
Market Features and Key Issues

In 2006, almost half of all crude imports came from OPEC member countries; about one-third was provided by the two neighbouring countries, Mexico and Canada. The bulk of refined product imports were in the form of motor gasoline (primarily blending components). Slightly less than half of all product imports were supplied by other IEA member countries. In the same year, exports averaged 1.3 mb/d, almost 90% of which were refined products.

Despite some increase in indigenous production, growing oil demand will increase US reliance on net imports. According to the Energy Information Administration (EIA), total net imports will rise steadily from 2008 onward, averaging growth of more than 1.5% per year to 2030.¹⁵

¹⁵ Projections are based on EIA *Annual Energy Outlook 2007 with Projections to 2030*, Reference Case. The territorial definition of the United States used by the EIA is narrower than that used by the IEA, which includes the US territories.

Total Net-Imports, 2004-2030



These rising net imports pose challenges to future emergency preparedness in the United States, including the need for expansion of refinery capacity to avoid a growing dependence on product imports. Moreover, as net imports rise, a static level of public stocks will gradually decrease in terms of days of cover. For example, past growth in import dependency has steadily reduced the days of net import cover of public stocks in the SPR, from nearly 120 days in 1985 to a current level of some 52 days. In response, the United States has plans to increase the SPR to its maximum authorised level of 1 billion barrels, and is considering further expansion, potentially up to 1.5 billion barrels by 2027.

Oil Supply Infrastructure

Refineries

Total crude oil refining capacity is more than 17.2 mb/d, having gradually increased since the mid-1990s from a level of 15.3 mb/d. All capacity added during this period has been to existing facilities. Of the country's total refining capacity, almost half (8.3 mb/d) is in the Petroleum Administration for Defense (PAD)¹⁶ District III, predominantly in the Gulf Coast states of Texas and Louisiana.

In addition to no new refinery capacity having been built over the past 30 years, many refineries have closed. The total number of operable refineries has fallen from 324 in the early 1980s to 149 by the beginning of 2006. In general, the refineries that closed were relatively small and less economical, especially when faced with additional investment costs needed to meet environmental requirements.

Refiners are subject to significant regulations, including distinct regional standards that require the production of many different kinds of gasoline and diesel fuel to meet demand in different parts of the country. This has the effect of raising costs and reducing profitability. Closures have also coincided

¹⁶ The United States is divided into five Petroleum Administration for Defense Districts, or PADDs. These were originally created during World War II for purposes of organising fuel allocations.

with an increase in utilisation rates, rising from 69% in the early 1980s to an average of around 90% in recent years. Still, capacity expansion is lagging behind demand growth.

Additional capacity will be built onto existing refineries over the next decades, reaching more than 18.3 mb/d by 2010 and 20 mb/d by 2030. Ongoing investment in equipment for desulphurisation, alkylation, coking and other processes will continue to expand the ability of US refiners to handle lower quality crude oils.

Ports and Pipelines

The United States has a vast network of crude and product pipelines covering much of the continent. The main trunk lines bring Canadian crude south to refiners in the mid-west and northeastern regions, as well as both crude and product north from the Gulf Coast.

The main crude lines include:

- The Enbridge Pipeline, which accounts for the bulk of Canadian imports, can deliver up to 2.2 mb/d of oil from Edmonton into the US Great Lakes region.
- The Capline Pipeline supplies crude oil from the Louisiana Gulf coast to refineries in the Midwest with a capacity of 1.1 mb/d.
- The Seaway Pipeline transports up to 350 kb/d of crude oil from the Texas Gulf coast to Cushing (Oklahoma), which is the delivery point for crude traded on the New York Mercantile Exchange (NYMEX) and a distribution point for supplies to refineries in the central and mid-western regions.
- The Louisiana Offshore Oil Port (LOOP) is a deepwater port in the Gulf of Mexico off the coast of Louisiana with a capacity of approximately 1.2 mb/d. It can unload crude oil imports from the world's largest tankers, which are too large for US inland ports.

The main product lines include:

- The Colonial Pipeline, which originates in Houston (Texas) and terminates at New York harbour, delivers an average of some 2.38 mb/d of gasoline, home heating oil, aviation fuel and other refined petroleum products to the south and eastern United States.
- The TEPPCO Pipeline comprises two product pipelines originating in the Texas Gulf Coast and travelling to the northeast coast of the United States. The Centennial pipeline provides some 210 kb/d; the TE products pipeline provides 340 kb/d.
- The Explorer Pipeline transports more than 500 kb/d of products from Port Arthur (Texas) through the Midwest to Chicago (Illinois).

Storage

Total working storage capacity in the US refinery sector is approximately 688 mb, with approximately 60% for finished products. This is the maximum volume of oil that the 149 operable refineries could

safely store, less the unavailable tank bottoms, at the start of 2006. This volume is distributed across PAD districts in approximately the same proportion as refinery capacity.

The United States also has salt caverns at the four SPR storage facilities, with a combined volumetric capacity of 727 mb at the end of 2006.

Box 3.2. **Infrastructure Damage during the 2005 Hurricane Season**

The significance of the Gulf Coast region to the oil industry became apparent in the aftermath of the destructive hurricane season of 2005. The concentration of production and refinery capacity in the Gulf of Mexico allowed for the large magnitude of disrupted volumes. In the months prior to Hurricane Katrina, US Gulf of Mexico production averaged 1.5 mb/d. By mid-September, the region's production levels dropped to one-third that amount. As much as 5 mb/d of refinery capacity was taken offline in September; by the end of October, some 1.3 mb/d remained offline. Flooding damage further complicated efforts to restart refineries that had been shut-in during the storms. Total loss of crude and refined products supplied from the region is estimated at a cumulative 162 mb through to the end of 2005.

During normal conditions, the Gulf Coast region is estimated to supply some 4 mb/d to 5 mb/d of products to other regions of the United States. A large portion of these deliveries is transported by pipeline. For example, the Colonial Pipeline moves 1.3 mb/d of gasoline and 1 mb/d of distillates through the southeast and north to New Jersey. Tankers and barges deliver additional volumes. The region also moves some 1.9 mb/d of crude oil, both domestic and imported, via pipeline to refineries in the mid-continent. Other significant links in the nation's supply chain include the Louisiana Offshore Oil Port (LOOP), which takes in approximately 1.2 mb/d of imported crude oil, and the Capline pipeline, with a capacity to deliver over 1 mb/d to PAD District II refiners.

In most cases, physical damage from the hurricanes to the pipeline network was limited. The more debilitating factors were the loss of electricity supply and the congestion of roads and waterways, which severely hampered the region's ability to move oil – and therefore cut off supplies both regionally and nationally. Anecdotes from industry indicate that such breakdowns in the infrastructure were a main obstacle to returning to normal operations and deliveries. Electricity outages at pump stations, closed waterways, and downed cellular phone communications seriously hampered the logistics of supplying crude to refineries and delivering finished products to demand centres.

Decision-making Structure

The United States' emergency response policy is based on the principle of allowing markets to allocate scarce oil resources during a disruption. It seeks to prevent or mitigate the economic damage resulting from a disruption through government response measures that complement, rather than supplant, market forces. In the event of a disruption, the administration's policy is to make early use of the SPR.

The *Energy Policy and Conservation Act* (EPCA) is the legal basis for emergency policy, providing the principal statutory authority for a National Emergency Sharing Organisation (NESO) and recognising the US obligations under the I.E.P. The EPCA provided for the establishment of the SPR, including

guidance for the President of the United States in determining when strategic stocks should be used in a disruption. The President is empowered to order a drawdown of the SPR.

The US Department of Energy (DOE) serves as NESO and, thus, has responsibility for initiating and co-ordinating a response to a supply disruption. Within the DOE, the Office of Policy and International Affairs has the lead role in co-ordinating NESO and for drawing together personnel from the various government offices, under the auspices of an emergency management team, to formulate and manage a response. Technical working teams address specific issues as they arise; an executive team comprising departmental leadership makes key decisions.

Stocks

Stockholding Structure

The *Energy Policy and Conservation Act* provides for the establishment of the SPR, allowing for strategic reserves of up to 1 billion barrels. Under the *Act*, the US government has exclusive authority over the drawdown and distribution of oil from the SPR. However, it has no powers over industry stocks.

In November 2001, the US administration set a goal of filling the SPR to a volume of 700 mb, which was completed in August 2005. The *Energy Policy Act of 2005* directed the Secretary of Energy to acquire oil as expeditiously as practicable to fill the SPR to its authorised capacity of 1 billion barrels. At the end of 2006, total stock levels in the SPR were 690 mb. Together with the Northeast Home Heating Oil Reserve (2 mb), total public stocks equated to roughly 52 days of net imports.

At the same time, total oil stocks held by industry stood at slightly more than 1 billion barrels, or 66 days of net imports.

Crude or Products

At the end of 2006, all but a fraction of the public stocks in the United States were held as crude oil. By contrast, industry stocks were almost 60% in the form of finished products.

All of the public crude oil in the SPR is light (with API gravities greater than 30 degrees). Each of its facilities maintains two segregations for sweet and sour crude streams. In total, the SPR inventory is one-third sweet crude oil and two-thirds sour crude oil.

Location and Availability

The SPR comprises four storage sites, two in Texas (Bryan Mound and Big Hill) and two in Louisiana (Bayou Choctaw and West Hackberry). At the end of 2006, these facilities had a combined volumetric capacity of 727 mb.

In response to the government directive in 2005 to increase the SPR to its maximum authorised level of 1 billion barrels, the SPR office has developed plans for a new site with a capacity of 160 mb in salt domes at Richton (Mississippi). It has also developed plans for expanding two existing sites (Big Hill and Bayou Choctaw) by a combined amount of 113 mb.

The heating oil reserves are held in the following locations (at the specified volumes): Amerada Hess in Woodbridge, New Jersey (1 mb); Magellan Midstream Partners in New Haven, Connecticut (0.5 mb); Motiva Enterprises in New Haven, Connecticut (0.25 mb); and Motiva Enterprises in Providence, Rhode Island (0.25 mb).

The United States does not have any bilateral stockholding agreements with other countries, and does not use tickets.

Monitoring and Non-compliance

As there is no compulsory stockholding obligation on industry, there is no compliance monitoring. However, it is possible to monitor industry stockholding trends through the weekly data collection of the EIA. The office of the SPR also reports the volumes of public crude stocks on a weekly basis.

Stock and Drawdown Timeframe

The drawdown and release of SPR stocks is primarily accomplished by means of a competitive sale. Detailed procedures, which can be used to participate in an IEA co-ordinated action, are contained in two DOE documents: *Drawdown and Distribution Management Manual for the SPR* and the *Standard Sales Provisions for SPR Petroleum*. These documents outline the functions of both the government and industry in conducting a drawdown and distribution of the SPR crude oil inventory. The provisions contain contract terms and conditions to be included in contracts for the sale of SPR oil. The principal method for distributing SPR oil under this plan would be by price-competitive sale, open to all interested qualified bidders. Awards would go to the highest bidders.

Following a decision to begin a drawdown of the SPR, the process would involve the following key steps:

- Issuance of a Notice of Sale to prospective offers requesting bids for purchase of SPR oil.
- Completion of final readiness preparations for drawing down and delivering SPR oil.
- Receipt and evaluation of bids and notification of successful bidders.
- Receipt of financial guarantees from successful bidders (typically letters of credit) to assure their ability to pay for the oil and perform under the sales contracts.
- Awarding the sales contracts and the recipients arranging for the oil's transportation from the SPR terminals.
- Drawing down oil from the storage sites to the terminals and delivering it into the purchaser-arranged commercial pipelines and vessels.

The President of the United States makes the decision on emergency stock release. The time involved in organising the decision will be contingent on the nature of the precipitating event (the more serious the event, the quicker a decision process might be expected to proceed). Typically, a decision might be expected in 24 to 48 hours.

The Secretary of Energy has authority to use an oil exchange programme in which the oil being released is returned in a larger volume or better quality of oil at a later date. This authority has been used to facilitate rapid responses to local disruptions by providing crude deliveries to refiners faced with supply difficulties.

Crude oil from the SPR would enter the market within 13 days of the initial presidential decision and may be drawn down at a maximum rate of 4.4 mb/d for the first 90 days. The maximum rate is subsequently reduced every 30 days to 3.8 mb/d, 3.5 mb/d and 1.9 mb/d.

Financing and Fees

The financing and operating costs of the SPR, as well as the Northeast Home Heating Oil Reserve, are covered through the government budget; no fees are charged to market operators or consumers to recover the costs. The costs of the operators' working stocks are covered through normal market price mechanisms.

Any purchases for the SPR are made through tender offers and are relative to market prices. In recent years, the primary method for adding volume to the SPR has been through a royalty-in-kind programme, with the oil provided by producers drilling on federal lands. The EPCA also permits the use of the oil exchange programme for the purpose of building inventory.

Other Measures

Demand Restraint

The US demand restraint programme consists of two measures. The Federal Energy Management Program (FEMP) focuses on reducing energy consumption in federal activities. A complementary public information programme encourages voluntary demand restraint.

FEMP initiatives are ongoing programmes in federal agencies to reduce energy consumption, including the use of petroleum-based fuels in their facilities, operations and vehicle fleets (through either fuel reduction or use of alternative fuels). Information and lessons learned from federal efforts are shared with state and local governments, as well as with the private sector.

Public information campaigns to encourage voluntary demand restraint include public statements by government officials and public service announcements disseminated by mass media. Public announcements contain tips on saving energy and encourage consumers to reduce oil use through actions such as car-pooling, using public transportation and reducing non-essential travel.

Other

In a disruption, the US emergency plan contains some scope for making additional supplies available by relaxing some regulations that apply under normal circumstances regarding product specifications or usage.

In response to the disrupted supplies in September 2005, the administration took the following additional actions:

- The Environmental Protection Agency (EPA) waived regulations to allow use of “winter blend” gasoline throughout the country, making available the considerable stock of reformulated gasoline already in storage.
- The Department of Homeland Security (DHS) rescinded the *Jones Act* restrictions on tanker transportation of fuel supplies. This allowed more tankers and barges to transport gasoline into ports around the country, thereby compensating for supply disrupted because of pipelines running at lower capacity.
- The Treasury Department increased the supply of diesel fuel by permitting “dyed” diesel fuel (fuels restricted to specific users) to be sold commercially.

CHAPTER 4

ASEAN, CHINA AND INDIA

Recent changes in the oil market make it increasingly important to think of oil supply security beyond the scope of IEA member countries. Thus, the IEA has adopted an outreach programme that seeks to create opportunities for dialogue, information sharing and co-operation with countries in which oil demand is growing rapidly and security planning is becoming a priority issue for governments.

This chapter provides an overview of the stockholding plans of China and India, as well as countries belonging to the Association of Southeast Asian Nations (ASEAN). The profiles are set out in the following sequence:

ASEAN

- Oil Infrastructure Map

Key Data

- Oil Statistics, 2006
- Oil Statistics, 1990-2010

Background

- Regional Overview
- Energy Outlook
- Market Features and Key Issues

Emergency Response and Policy Measures

- Regional Oil Security Policy Developments
- Status of Strategic Oil Stockholding in ASEAN Countries

Future Challenges

China

- Oil Infrastructure Map

Key Data

- Oil Statistics, 1990-2010
- Origin of Crude Oil Imports, 2006

Background

- Country Overview
- Energy Outlook
- Market Features and Key Companies

Oil Supply Infrastructure

- Pipelines
- Refining Sector

Emergency Response Policy and Recent Developments

- Oil Security Policy
- Strategic Petroleum Reserves Plan in China

Legislation

- Public Stocks
- Industry Stocks

Decision-making Structure

- Institutions Responsible for Emergency Response
- Reserve Mobilisation
- Stockholding Structure
- Other Measures

India

- Oil Infrastructure Map

Key Data

- Oil Statistics, 1990-2010
- Origin of Oil Imports, 2004-2005

Background

- Country Overview
- Energy Outlook
- Market Features and Key Issues

Oil Supply Infrastructure

- Refineries
- Ports and Pipelines
- Storage

Decision-making Structure

Stocks

- Stockholding Structure
- Stock and Drawdown Timeframe
- Financing and Fees

Oil Infrastructure of the Association of Southeast Asian Nations (ASEAN)



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

ASSOCIATION OF SOUTHEAST ASIAN NATIONS (ASEAN)¹⁷

Key Data

Oil Statistics, 2006

Country	Production kb/d	Demand kb/d	Net imports kb/d	Refining capacity kb/d
Brunei Darussalam	220.2	13.7	-	8.6
Cambodia	-	-	-	-
Indonesia	1 061.9	1 214.6	152.6	992.7
Lao PDR	-	-	-	-
Malaysia	749.8	520.8	-	544.8
Myanmar	21.9	42.0	20.2	57.0
The Philippines	25.0	343.3	318.3	333.0
Singapore	-	920.0	920.0	1 336.6
Thailand	314.2	932.0	617.8	729.1
Viet Nam	367.4	280.9	-	-
ASEAN	2 760.5	4 267.3	1 506.8	4 001.9

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d) ^{1/}	2 451.5	2 808.2	2 848.4	2 783.6	2 760.5	1 952.4
Demand (kb/d) ^{2/}	2 091.4	2 980.7	3 514.6	4 291.3	4 267.3	4 811.2
Net imports (kb/d)	-360.0	172.4	666.2	1 507.7	1 506.8	2 858.8
Import dependency (%)	*	5.8	19.0	35.1	35.2	59.4
Refining capacity kb/d^{3/}	2 850.0	3 918.0	3 975.9	4 001.9		

1/ Brunei, Indonesia, Malaysia, Myanmar, Philippines, Thailand and Viet Nam.

2/ ASEAN minus Lao PDR and Cambodia.

3/ ASEAN minus Lao PDR, Cambodia and Viet Nam (no Brunei in 2000 data).

¹⁷ This section on the Association of Southeast Asian Nations (ASEAN) was written by the IEA. The ASEAN Council on Petroleum (ASCOPE) provided valuable input. Other sources, such as *the World Energy Outlook 2007*, reports from various energy analysts and press reports were used as well. The ASCOPE is in no way committed to the content of this chapter. All errors and omissions are solely the responsibility of the IEA.

Background

Regional Overview

The Association of Southeast Asian Nations (ASEAN) is a geo-political and economic organisation of countries located in Southeast Asia, which was founded in 1967. As of 2007, the 10 members are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. ASEAN aims include the acceleration of economic growth, social progress, cultural development and energy security. Although some ASEAN member states are net oil exporters and others are net oil importers, they all recognise the importance of energy security for their economic growth.

ASEAN Demographic and Economic Indicators, 2006

Country	Total population	Gross domestic product at current prices	Gross domestic product per capita at current prices	
	Thousand	USD million	USD	USD PPP
Brunei Darussalam	383.00	11 571.79	30 213.60	25 094.10
Cambodia	14 163.10	7 256.31	512.30	3 226.00
Indonesia	222 051.00	364 258.76	1 640.40	4 321.30
Lao PDR	6 135.30	3 521.77	574.00	2 332.10
Malaysia	26 686.20	156 924.24	5 880.40	12 184.90
Myanmar	57 289.10	11 951.03	208.60	1 958.80
The Philippines	86 910.30	117 457.07	1 351.50	5 332.70
Singapore	4 483.90	132 273.38	29 499.60	32 379.60
Thailand	65 233.00	206 645.13	3 167.80	9 163.50
Viet Nam	84 221.90	60 965.20	723.90	3 373.30
ASEAN	567 556.80	1 072 824.68	1 890.30	5 210.20

Source: ASEAN Secretariat (see www.aseansec.org for details)

Over 1998-2005, the ASEAN region achieved an average annual GDP growth of 5%, overcoming the Asian economic crisis of 1997. In 2006, the region recorded a combined GDP of about USD 1 073 billion, with a GDP growth of around 6%. Average annual GDP growth of the ASEAN region over the next two decades is forecasted at 4%. Sustained by this vigorous economic growth, oil demand is expected to increase at a rate of 3% per year until 2010, reaching around 5 mb/d.

Since the creation of ASEAN, oil security and emergency preparedness issues have been an integral part of the member countries' common agenda. In 1986, ASEAN countries established a regional treaty known as the 1986 *ASEAN Petroleum Security Agreement* (1986 APSA). This was designed to allocate crude oil and products among member states in times of both oil shortage and oversupply in the region. However, the 1986 APSA has not been invoked to date, as consensus across the member states has not been finalised. In 1999, ASEAN ministers decided to review the provisions of the 1986 APSA. The review and revision of 1986 APSA has been conducted by the ASEAN Council on Petroleum (ASCOPE). In 2005, the ASEAN ministers agreed that stockpiling shall be on a voluntary

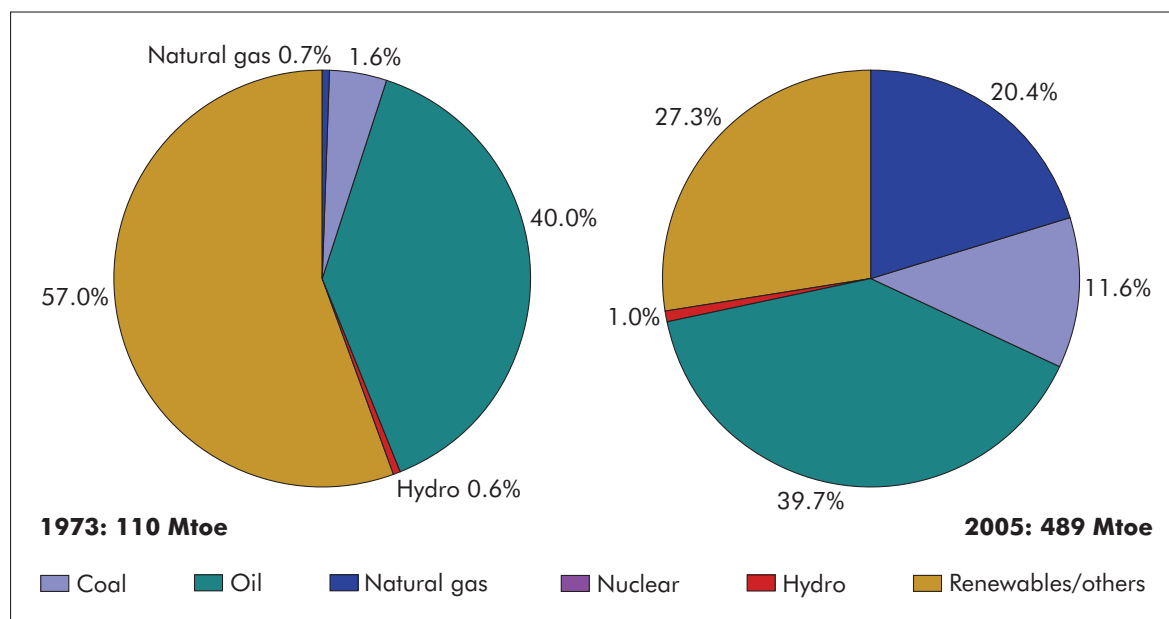
and commercial basis and that this principle shall be included in the revised APSA, which is expected to be finalized and signed by the middle of 2008.

In recent years, ASEAN countries have made – and continue to make – positive policy changes, particularly in the net oil importing countries. They have also instituted rules, regulations and procedures to reduce their exposure to oil supply disruptions, with a major focus on introducing industry stockholdings obligations.

Energy Outlook

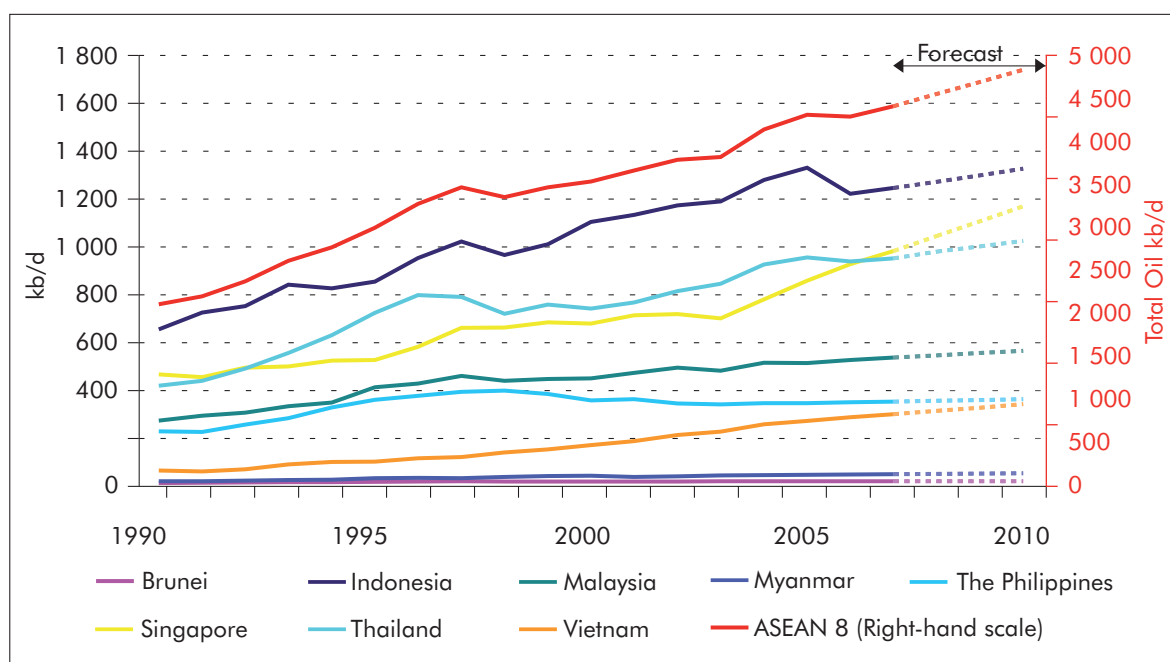
The total primary energy supply (TPES) mix in ASEAN countries has evolved between 1973 and 2005. Oil remains the most significant source of energy in the region; its share in TPES has not decreased much from its level in the 1970s of 40%. In 2005 it stood at 39.7%. Natural gas and coal have an increasingly significant role, primarily in stationary applications in the power and industry sectors. The opportunities for further large scale fuel mix substitution will be reduced as demand growth is concentrated in the transport sector.

Total Primary Energy Supply



Oil demand in the ASEAN 8 countries (excluding Cambodia and Lao PDR) grew robustly over the period of 1986 to 2006, at an average annual rate of 5%. Even with a financial crisis in the late 1990s, the region's oil demand continued to increase. The vigorous oil demand is expected to keep growing at close to 3% per year until 2010, reaching around 5 mb/d. The emerging oil demand is attributed largely to strong energy consumption in the region's transport sectors. This is being driven by increasing demand for transport services, and by a large and increasingly affluent population, whose life styles are modernising towards those of industrialised countries.

ASEAN 8* Oil Demand, 1990-2010

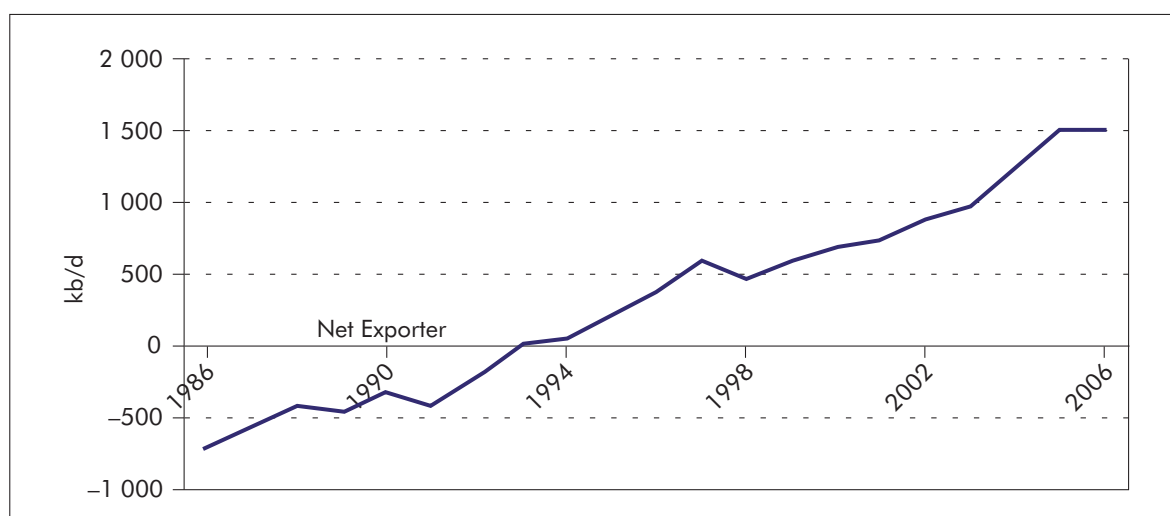


*ASEAN 8 Countries excludes Cambodia and Lao PDR.

Market Features and Key Issues

The ASEAN region is a major producer of oil and gas in the Asia Pacific. Seven of the ASEAN countries (excluding Cambodia, Lao PDR and Singapore) have combined proven oil reserves of around 9.5 billion barrels, accounting for more than one-quarter of all proven reserves in the Asia Pacific region. The same countries have gas reserves totalling 221 000 Billion cubic feet (Bcf) (6 260 bcm), or more than half the proven reserves in the region. Brunei and Indonesia rank among the world's top five producers of liquefied natural gas (LNG).

Net Oil Imports for ASEAN 8* Countries, 1986-2006



* ASEAN 8 Countries excludes Cambodia and Lao PDR.

Three major ASEAN economies – Singapore, Thailand and the Philippines – are highly dependent on oil imports. Malaysia remains a major oil exporter, but is expected to become a net importer before 2015. Indonesia, an OPEC member and previously a major oil exporter, became a net oil importer in 2004. Total oil production in ASEAN states has not increased since 1990, and has not been able to keep pace with the dynamic growth in regional demand.

The ASEAN 8 countries as a whole became net importers in 1993. Since then, oil import dependency has been increasing and is expected to follow a similar trend in the future. Consequently, many ASEAN governments are increasingly committed to liberalising their oil and gas sectors, and are seeking to attract private sector investment into the upstream and downstream oil and gas sectors while reducing the role of their national oil companies (NOCs).

For instance, in 2001, Indonesia's new *Oil and Gas Law* liberalised the industry to promote foreign direct investment as a means of increasing national oil and gas production. The new legislation achieves two aims. First, it reduces the role of Indonesia's NOC, Pertamina, in sectoral regulatory and licensing matters, and breaks its monopoly in downstream refining and retailing. At the same time, the new legislation aims to stabilise and clarify the rules and procedures for foreign direct investment. Myanmar provides another example of recent steps taken to address the growing gap between domestic oil supply and demand. Recognising the declining indigenous crude oil output, and recent growth of domestic demand for petroleum products, the Myanmar government granted the industry permission to increase imports of finished petroleum products.

Bottlenecks in the downstream sector (*i.e.* oil refining, distribution and retailing) remain frequent in the ASEAN region. Thailand and Indonesia have limited refining capacity, and must import finished petroleum products. Viet Nam does not have a domestic refinery; in addition, its transportation and retail distribution networks are fragmented. Limited refining capacity poses a significant challenge to Myanmar's oil supply. Cambodia has neither indigenous oil production nor a domestic refinery, and its petroleum product transportation and distribution networks remain fragmented.

The high rate of oil demand growth across the region has resulted in an increasing demand for storage capacity for crude oil and petroleum products. Singapore is encouraging foreign direct investment in independent storage facilities to counteract this shortage at the national level.

Another crucial issue is oil tanker capacity and tanker security in the Malacca Strait. The strait between Indonesia, Malaysia and Singapore is only 3 km wide at its narrowest passage. In addition to many other goods, approximately 12 mb/d of global oil tanker traffic uses this strait, carrying on the order of 14.3% of world oil demand. The combination of shallow reefs, thousands of tiny get-away islands, piracy and traffic congestion (some 900 commercial vessels pass through each day) makes the Malacca Strait a highly sensitive choke point.

The Malacca Strait is the trade route for most oil carriers travelling from the Arab Gulf, Africa and Suez to East Asia. Rising oil demand in the Asian region could prompt a significant increase in the volume of oil passing through the Straits the volume transiting this route could represent some 18.1% of world oil demand by 2030.¹⁸

¹⁸ WEO 2007.

Figure 4.1
The Malacca Strait



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In the South China Sea, a region with important hydrocarbons reserves, many territorial issues have arisen, with claims for various areas by China, Taiwan, the Philippines, Viet Nam, Indonesia, Malaysia, Brunei, Cambodia and Thailand. However, over time, many of these claims are being resolved, paving the way for increased regional oil production.

For example, a memorandum of understanding was signed in March 2005 by China, the Philippines and Viet Nam to resolve the issue of hydrocarbons exploration – without renouncing their respective territorial claims. The three countries agreed to jointly conduct seismic surveys and share the costs of exploration. A Chinese vessel conducts the survey and sends the data to Viet Nam for processing; data are then passed on to the Philippines for analysis.

Malaysia and Thailand reached a similar agreement in 1979 to end a dispute over rights in the Gulf of Thailand. The two countries are now producing oil and gas from a Joint Development Area. In August 2007, Brunei and Malaysia announced that they had reached an agreement on a maritime border dispute in an area with high oil and gas potential. The agreement will redefine maritime borders, which could open the door for a resolution of conflicting oil claims.

The risk of accidents and piracy/terrorism for oil carriers in the Strait of Malacca has prompted Malaysia, Thailand and other interested parties to assess the feasibility of constructing a pipeline across the Malaysia Peninsula, as an alternative to the sea route. Thailand considered such a proposal

in early 2000, but ultimately decided the project was not economically viable. More recently, Malaysia is considering a 300-km pipeline across the northern Malaysian states that could divert some 20% of oil currently shipped through the strait. A proposed project would also include two refineries, storage facilities and further upgrades. However, there is some doubt that it will be economically feasible.

Emergency Response Policy and Measures

Regional Oil Security Policy Developments

In response to sharply growing oil demand and import dependence, ASEAN countries are developing various national energy policies and programmes that will have impacts on each member country's energy security.

At the regional level, in 1986, ASEAN countries established a regional treaty known as the 1986 *ASEAN Petroleum Security Agreement* (1986 APSA). The key principle of the 1986 APSA is to mitigate the impact of an oil supply disruption in one or more of the ASEAN member countries by activating a sharing scheme – the ASEAN Emergency Petroleum Sharing Scheme – for crude oil and petroleum products. The 1986 APSA also seeks to address a critical oil oversupply situation by requiring ASEAN oil importing countries to take more ASEAN-produced crude in the event of an oversupply.

The 1986 APSA oil-sharing mechanism has never been invoked – including during the Gulf Crisis when the Philippines requested its activation. In fact, it is not clear that the 1986 APSA procedures and price determinant mechanisms would operate adequately even if the Agreement was invoked. In 1999, ASEAN energy ministers agreed to revise the 1986 APSA.

To date, the revision of 1986 APSA remains under development. A new draft agreement incorporates both short-term response measures (*e.g.* demand restraint, fuel switching and a Co-ordinated Emergency Response Mechanism, the ASEAN CERM), and medium- and/or long-term measures (*e.g.* fuel mix and fuel source diversification, energy efficiency and market liberalisation). The ASEAN CERM is an annex to the new draft APSA, and is intended to operationalise the short-term measures of the new APSA. The ASEAN CERM aims to be a framework for regional consultations and co-ordination, under which assistance will be made on a voluntary basis. Maintaining strategic oil stocks is seen as a voluntary long-term measure.

Status of Strategic Oil Stockholding in ASEAN Countries

ASEAN countries' national emergency preparedness policies and implementation plans continue to evolve – and reflect differences in each countries' economic development, availability of indigenous resources, oil demand patterns, and oil import dependency. For most ASEAN countries, costs associated to building and holding public oil stocks are prohibitive. Rather than holding government-owned stocks, these governments work closely with their domestic petroleum industries and NOCs to ensure adequate days of operational/commercial stocks are on-hand.

The current status of ASEAN countries on emergency response measures is briefly described below. The number of days of stocks is generally expressed in days of consumption.

Brunei Darussalam

The *Contingency Plan for Refined Petroleum Product Imports* sets an obligatory level of stockholding as 21 days within the industry. In times of emergency, the government has a mandatory right to purchase and control all crude and oil product stocks held by the industry.

Cambodia

Cambodia has no mandatory oil stocks. However, the authorities are planning legislation necessary for oil emergency preparedness, which may include national and commercial stockpiling provisions.

Indonesia

The national oil company, Pertamina, has a legal obligation to hold a minimum of 20 days of its commercial oil stocks. Indonesia's new energy law, which was approved by the parliament in August 2007, includes articles that allow the Indonesian government to prepare an Energy Buffer Reserve, and to create a National Energy Council (NEC), chaired by the President. The NEC will determine the volume and location of the Energy Buffer Reserve. The NEC is expected to formulate the country's national petroleum reserve policy in 2008.

Lao PDR

The government has a policy to reserve 10% of total oil imports for emergency purposes.

Malaysia

As it holds full ownership of the NOC Petronas, the Malaysian government does not consider holding emergency oil stocks as necessary. However, legislation clearly endows the prime minister with authority to issue directions on the company's operations in the case of emergency – including full control over Petronas's stocks, which are estimated at around 30 days.

Myanmar

Myanmar has legislation obliging a minimum level of commercial stockholding on domestic or international companies operating in the country. In addition, as Myanmar Petroleum Products Enterprise (MPPE), the state monopoly oil enterprise, controls the downstream sector, the government has control over such operational stocks in the event of a supply disruption.

Philippines

Based on a Presidential Executive Order issued in October 2002, the government requires its oil refineries to maintain a minimum inventory level of 15 days. Traditionally, Philippine oil companies have maintained a much higher level of stocks than required, at times keeping as much as 50 days. The Philippine government has been exploring the establishment of a strategic petroleum reserve as an essential part of its national oil emergency preparedness policy. The financing and implementation of such a strategy are under consideration.

Singapore

Power-generating companies in Singapore are obliged to hold 90 days of fuel oil stocks. However, there is no mandatory stockholding requirement for refineries or private oil companies operating in Singapore and obligatory crude oil stockpiling was abolished in 1983. Operational stocks in refineries are estimated at around 50 days.

Thailand

The *Fuel Act of 1978* places mandatory stockholding obligations on all refiners, retailers and importers in the private sector that have operations greater than 100 Kt/yr. As of 2007, the government requires refiners to hold 5% of their yearly sales of crude oil and oil products, and retailers and importers to hold 5% for crude oil and 10% for oil products. Their total levels must not be less than 36 days. At the end of 2006, stockholding levels, including operational stocks, were equal to about 45 days of national demand. The Thai government has been studying a preparedness plan for prevention and solving oil shortages. Thailand has not yet allocated financial resources for setting up a national petroleum stockholding entity but is studying the possibility.

Viet Nam

Viet Nam does not have legislation mandating its domestic petroleum industry to maintain a specified level of stocks, but commercial companies and the government currently have operational stock levels of 24 days and 6 days respectively. The Vietnamese government has considered the establishment of a national petroleum stockpiling entity, and with the assistance of Japan, a Basic Master Plan has been drawn up. The government is now working on formulating a comprehensive Energy Master Plan, which includes a Stockpiling Master Plan to enhance Viet Nam's oil security in the mid-to-long term. The government previously announced a plan to build, by 2010, emergency stocks made up of government strategic stocks equivalent to 30 days of net imports.

Future Challenges

Co-operation in the ASEAN region is essential for improving security of oil supply in the face of future supply disruptions. Several factors provide vivid examples of the shared risks of ASEAN countries: the rapidly increasing dependence on oil imports (largely from the Middle East), the significance of the Malacca Strait chokepoint for oil and LNG imports, and the potential for maritime border disputes in the South China Sea. At the same time, the benefits of regional co-operation are evident in the

co-ordinated efforts of Singapore, Malaysia and Indonesia to police piracy in Malacca Strait, and in the fruitful efforts of ASEAN countries to resolve maritime border disputes.

The fast-increasing oil import dependency associated with the dynamic ASEAN economies remains of concern; only Thailand has a clearly legislated emergency response scheme in place. Significant work lies ahead if all ASEAN countries are to establish similar oil emergency response policies to reduce the risks of oil supply disruptions and their impacts on national and regional economies.

Recent dialogue between ASEAN countries and the IEA highlights the importance of international exchange on best practices for emergency response policy and procedures. It also emphasises the need to establish points of contacts between the IEA and ASEAN countries to support the exchange of information and data in the event of a global supply crisis. Despite challenges facing ASEAN countries in regards to oil emergency response policy, some degree of harmonisation of the ASEAN and the IEA crisis response would contribute to calming the global oil market and meeting a physical supply shortfall.

Oil Infrastructure of People's Republic of China



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

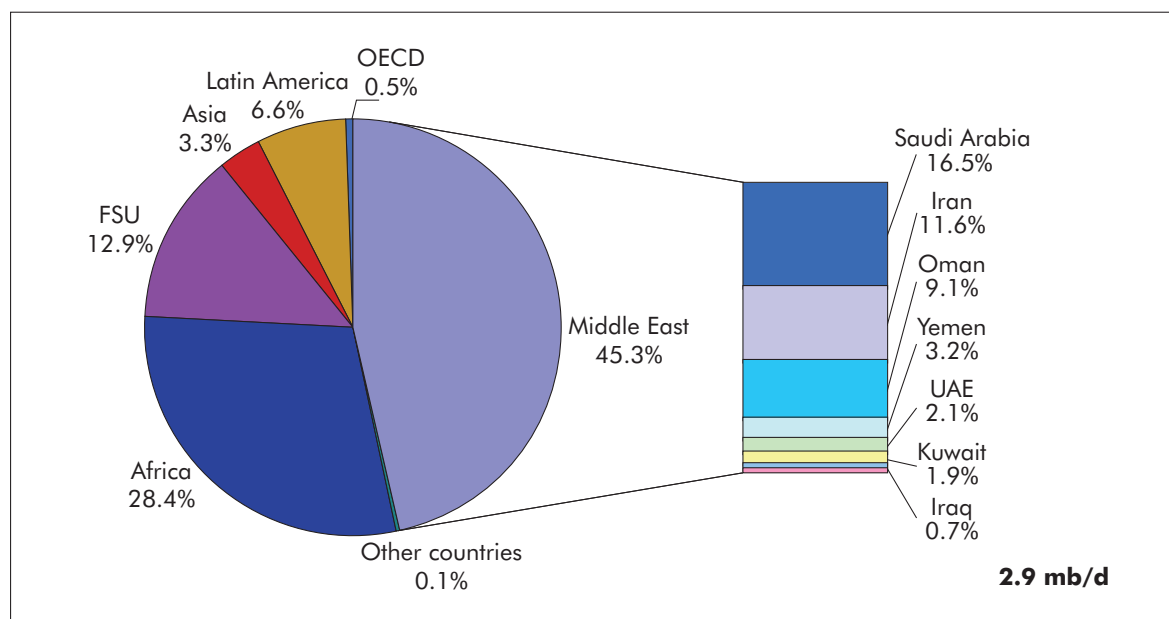
PEOPLE'S REPUBLIC OF CHINA¹⁹

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	2 768.1	2 986.5	3 228.8	3 617.3	3 674.0	3 893.7
Demand (kb/d)	2 253.0	2 283.0	4 553.0	6 693.2	7 157.0	8 975.2
Net imports (kb/d)	-515.1	296.5	1 324.2	3 075.9	3 483.0	5 081.5
Import dependency (%)	*	9.0	29.1	46.0	48.7	56.6
Refining capacity kb/d		2 867.0	4 347.0	4 649.6	6 246.0	8 762.0

Crude Oil Imports, 2006



Sources: China Oil, Gas and Petrochemicals.

¹⁹ This section on China was written by the IEA. The National Development and Reform Commission (NDRC) of the People's Republic of China provided valuable input. Other sources, such as *the World Energy Outlook 2007*, reports from various energy analysts and press reports were used as well. The NDRC is in no way committed to the content of this chapter. All errors and omissions are solely the responsibility of the IEA.

Background

Country Overview

Over the last decade, the economy of the People's Republic of China's has been expanding rapidly: real GDP is reported to have grown at 10.2% in 2005 and 10.7% in 2006. Together with this strong economic growth, China's demand for energy has surged: the country became a net oil importer in 1993 and is already the world's third-largest, behind the United States and Japan.

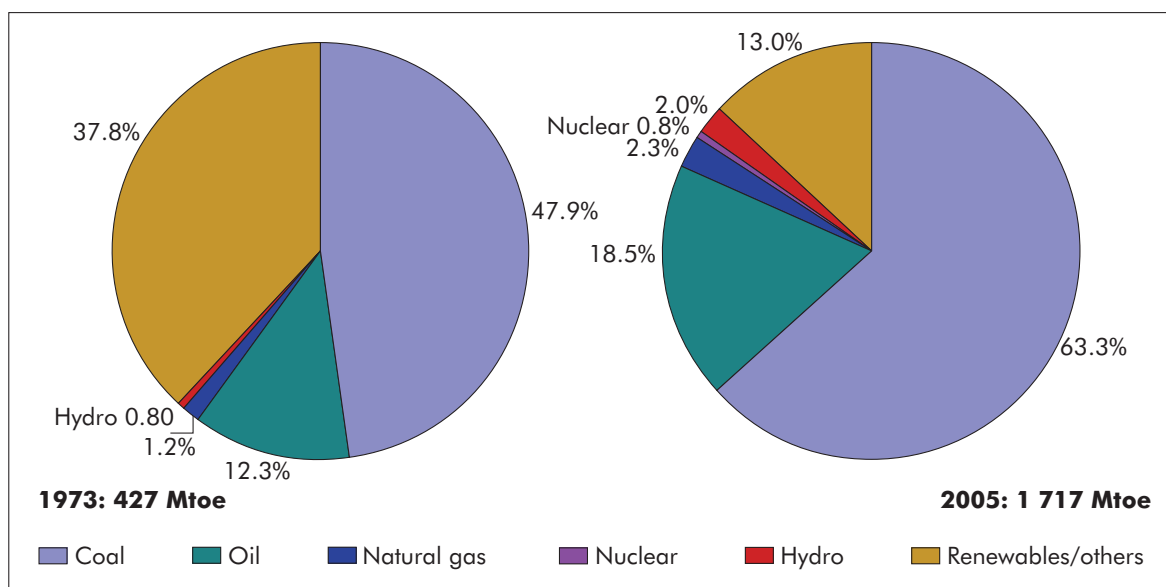
China's oil demand will continue to grow steadily towards 2030. With an average annual growth rate of 3.6%, it is forecasted to reach almost 10 mb/d before 2015 and 16.5 mb/d by 2030.

As China has become more and more dependent on oil imports, it has recognised the importance of developing an oil emergency policy, and has begun to act. China has modelled some elements of its plan on the IEA measures.

China has been pursuing the first phase of its national emergency stockholding plan since 2004, and aims to have combined storage capacity of 102 mb in 2008. Current plans suggest that the 102 mb storage capacity will be filled by 2010. The Chinese government has a target of establishing its strategic petroleum reserves – a volume equivalent to 90 days of net oil imports – by 2020.

Energy Outlook

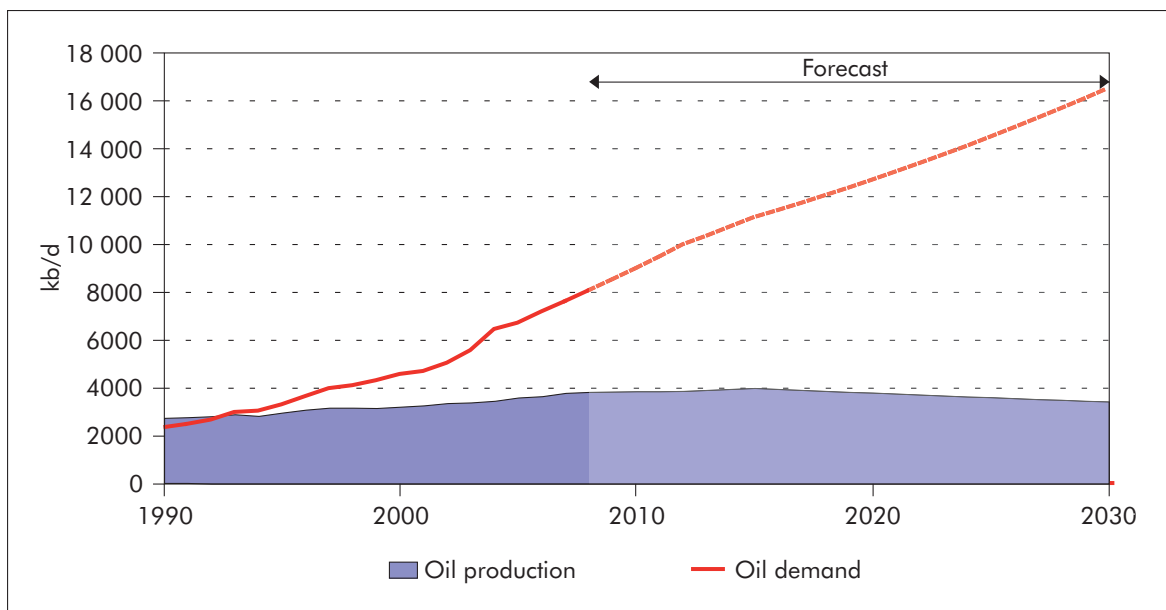
Total Primary Energy Supply



In 2005, China's energy self-sufficiency ratio was 91.4%. In 2005, the country's total primary energy supply (TPES) was 1.7 billion tonnes of oil equivalent, divided as follows: 63% coal and coal products; 19% oil; 2% natural gas; 2% hydro; 13% combustible renewables, waste as well as other renewables; and 1% nuclear.

Through economic reform launched in 1979, China has achieved robust economic and social development, becoming one of the fastest-growing nations in the world. In absolute terms, China's TPES experienced an average annual growth of 9.7% between 1973 and 2005.

Production and Demand for Oil, 1990-2030



Source: IEA. OMR for data 1990-2012, WEO 2007 for 2015 and 2030

China became a net oil importing country in 1993; its oil import dependency rate reached 48.7% in 2006, at which time China imported 3.5 mb/d of oil and oil products. Roughly 75% of these imports were crude oil, originating mainly from the Middle East, Africa, Russia and the countries of the former Soviet Union (FSU).

Market Features and Key Companies

The Chinese oil market is dominated by four major state oil enterprises (SOEs): China National Petroleum Corporation (CNPC); China Petroleum and Chemical Corporation (Sinopec); China National Offshore Oil Corporation (CNOOC); and China National Chemicals Import and Export Corporation (Sinochem). Each company is profiled below.

CNPC

CNPC, established in 1988 as a large SOE, is a comprehensive energy company that has integrated a broad range of upstream and downstream oil and gas businesses. It ranks ninth in the world's top 50 big oil companies. The company also manages technical services for oil and gas development projects, including logistics and manufacturing. In 2005, CNPC produced 2.1 mb/d (105.85 Mt) of oil, 36.67 billion cubic metres (bcm) of natural gas and 71.16 Mt of oil products. PetroChina is the internationally listed subsidiary of CNPC.

Sinopec

Sinopec is another major SOE. The company has an integrated system covering oil production, refining and sales. The petrochemical business is also a core activity, including maintaining a comprehensive retail network. Sinopec's subsidiary, the China Petroleum and Chemical Corporation, went through IPOs by listing the stocks in global stock exchange markets. In 2005, Sinopec produced 790 kb/d (39.27 Mt) of crude oil and 6.3 bcm of natural gas. It also produced 149 Mt of refined products.

CNOOC

CNOOC is the third-largest oil company in China and takes responsibility for China's offshore oil and gas exploration. In 2005, CNOOC crude oil production stood at 645 kb/d (31.97 Mt), of which 565 kb/d (27.89 Mt) were from domestic fields. It also produced 7.03 bcm of natural gas, of which 5.75 bcm were from domestic fields.

Sinochem

Sinochem is a large SOE that produces oil, fertiliser and chemical products, and is also involved in the trade and sales of these products. Its activity extends to overseas oil exploration, production and refining, including oil storage services.

Oil Supply Infrastructure

Pipelines

In recent years, China has been establishing a domestic oil pipeline network. To keep pace with rapid growth of oil demand, it has also undertaken efforts to further expand and integrate the delivery capacity of its major national oil companies.

In 2005, the CNPC pipeline network delivered almost half of the crude oil transported for the domestic market; the rest typically travelled by rail.

PetroChina currently owns and operates more than 9 654 km of crude oil pipelines and more than 1 930 km of refined product pipelines. In January 2006, the Chinese government gave the company approval for two trans-China pipelines. One will start in Lanzhou (northwest Gansu Province) with a capacity of 160 kb/d. The second will begin at Jinzhou (northeast Liaoning Province) with a capacity of 80 kb/d. PetroChina also plans to begin operations in 2007 of a new 1 930 km pipeline that will bring 400 kb/d of crude oil from Urumqi (Xinjiang Uygur Autonomous Region in the west) to Lanzhou (Gansu Province).

Sinopec is also actively expanding its pipeline network. In June 2006, the company announced plans to construct a 225 km crude pipeline connecting its storage terminals at Tianjin's Nanjiang port with its petrochemical complex in Beijing. In October 2004, Sinopec began constructing a 225 km crude oil pipeline that will eventually connect Yizheng with Changling. Once completed,

the pipeline is expected to supply 540 kb/d of oil to Sinopec's five refineries along the Yangtze River. In addition to crude oil pipelines, China also has an expanding network of oil product pipelines.

Refining Sector

China has a total of 6.2 m/d of crude oil refining capacity as of January 2006. The sector is dominated by Sinopec and CNPC. The refinery industry has recently been modernised and consolidated, a process in which many small refineries were shut down (though many persist), and processing capacities at larger refineries were expanded and upgraded.

Refinery utilisation rate in China has increased from 67% in 1998 to 94% in 2004. This is driven by the recent need to increase refining capabilities in order to meet growing demand for oil products.

One of the major issues for the downstream sector of the Chinese oil industry is the lack of refining capacity suitable for the heavier and sour crude oil imported from Middle Eastern producers, which have a large share of Chinese crude oil imports.

Emergency Response Policy and Recent Developments

Oil Security Policy

Minimising the risk of an oil supply disruption is one of the highest energy policy priorities for China, particularly because of its determination to maintain sustainable economic development.

In 2003, China announced that it would establish a strategic petroleum reserve, and the next year established a National Oil Reserve Office (NORO) within the National Development and Reform Commission (NDRC) to carry out this plan. In 2006, the State Council approved the 11th Five-Year Plan (2006-10). The Plan emphasised more efficient energy resource utilisation and comprehensive environmental protection, setting a target to reduce energy consumption per unit of GDP by 20%. The State Council also approved mid- and long-term development plans for China's oil refining and ethylene industry. These include policy guidelines for environmental protection within the industry and a recommendation to accelerate the construction of strategic oil reserves.

Strategic Petroleum Reserves Plan in China

The construction of the first phase of this national oil reserve began in 2004, and includes four sites: Zhenhai (Sinopec) and Aoshan (Sinochem) in Zhejiang Province, Huangdao (Sinopec) in Shandong Province, and Dalian (PetroChina) in Liaoning Province, together amounting to 102 mb, which is equal to 37 days of China's net oil imports in 2005. As of the end of 2007, the Zhenhai site had been completed and filling had begun, though a portion had been leased to

Sinopec for commercial storage. The Aoshan site was near completion, and some oil had already been taken in. The remaining two sites were expected to be finished in 2008. Initial plans for a rapid build-up of reserves had been hampered by rising and persistently high oil prices. Statements from NDRC in September 2007 indicated that current strategic holdings stood at 2 to 3 Mt (15 mb to 22 mb), and that it would have 12 Mt (88.5 mb) of strategic crude reserves by 2010, subject to market conditions. The longer-term aim was to have stocks equivalent to 90 days' net imports by 2020.

The First Phase of China's SPR

SPR Site	Location	Capacity		Stock Type	Scheduled Completion Time		Refinery
		Million cubic meters	Million barrels		First part	Second part	
Zhenhai*	Zhejiang Province	5.2	33	Crude	2005	2006	Sinopec
Aoshan	Zhejiang Province	5.0	31	Crude	2006-2008		Sinochem
Huangdao	Shandong Province	3.0	19	Crude	2007	2008	Sinopec
Dalian	Liaoning Province	3.0	19	Crude	2006-2008		PetroChina
Total		16.2	102				

* Completed in 2006

The government is planning second and third phases of construction of strategic crude storage facilities, each on the order of 28 Mt (206 mb, for a total of 512 mb if all phases are built). Details, including timing and location, have yet to be confirmed. NDRC is considering the use of underground caverns in phases two and three, similar to the SPR programme of the United States. A variety of locations are under consideration, and several local administrations have actively courted selection. Sites in Hebei Province (Tangshan), Guangdong Province (Maoming, Zhanjiang, Guangzhou, and Shenzhen), Hainan Province, and Gansu Province (Lanzhou) have been put forward as candidates. The first two provinces are located near large centres of demand, Hainan is located not far from shipping routes from the Middle East and Africa, and Lanzhou is on the route to the Xinjiang Uygur Autonomous Region, site of some of China's largest oil reserves.

Meanwhile, oil companies are constructing their own commercial storage facilities for crude at various sites around the country. Some portion of these may be subject to rules, still in preparation, regarding compulsory industry stocks. In addition, the Ministry of Commerce is encouraging the build-up of commercial reserves of oil products. NDRC has reportedly begun investigating the feasibility of developing a reserve of aviation fuel.

Legislation

Public Stocks

The Chinese government has not yet published laws regarding oil security and its SPR systems. As of 2007, the NDRC is drafting an umbrella Energy Law and regulations for management of the national oil reserve. These are expected to be released prior to the completion of the first phase of SPR site construction in 2008.

Industry Stocks

The NDRC is also drafting legislation regarding the emergency stock requirement for industry, which will be known as the *National Oil Reserve Management Regulation*. This will require Chinese oil enterprises to hold certain amounts of obligatory product reserves in addition to their commercial stocks.

Decision-making Structure

Institutions Responsible for Emergency Response

The Energy Bureau (EB) of the NDRC holds major responsibility for the state's national oil reserves, including legislation and implementation plans. These efforts are carried out in co-ordination with the Ministry of Finance and the Ministry of Commerce.

The National Oil Reserve Office (NORO) was established in 2004 as a division of the EB, and given responsibility to implement China's SPR policy. The NDRC oversaw the creation in 2007 of a public stockholding agency called the National Oil Reserve Centre (NORC), which answers to the NORO.

The Office of the National Energy Leading Group (ONELG; sometimes referred to as the State Energy Office), under the authority of the National Energy Leading Group headed by the Premier, co-ordinates with other energy resource-related authorities as it engages in energy strategy and policy formulation, and oversight of drafting of energy legislation.

Reserve Mobilisation

When oil market supply is subject to significant changes or unforeseen incidents, the NDRC will propose to the State Council its plans for mobilising the emergency oil reserves. After State Council approval, the NDRC will carry out the approved actions.

Stockholding Structure

As operators in the storage tank management sector, state-owned enterprises such as Sinopec, Sinochem, and CNPC (PetroChina) will take a role of holding the reserve stocks. These companies are already engaged in the site construction process mentioned above.

In terms of industry stocks, oil and petrochemical enterprises in China currently have only commercial stocks. However, once the government introduces the industry stock obligation, those companies will be obliged to hold certain levels of stocks for emergency purposes.

Other Measures

Other than utilising the SPR, China has not yet developed alternative measures for short-term oil crisis management. However, the government is proposing longer term policies and measures to develop a more stable and energy-efficient economy. These policies and measures focus on areas such as energy efficiency, renewable energy and energy diversification.

Oil Infrastructure of India



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

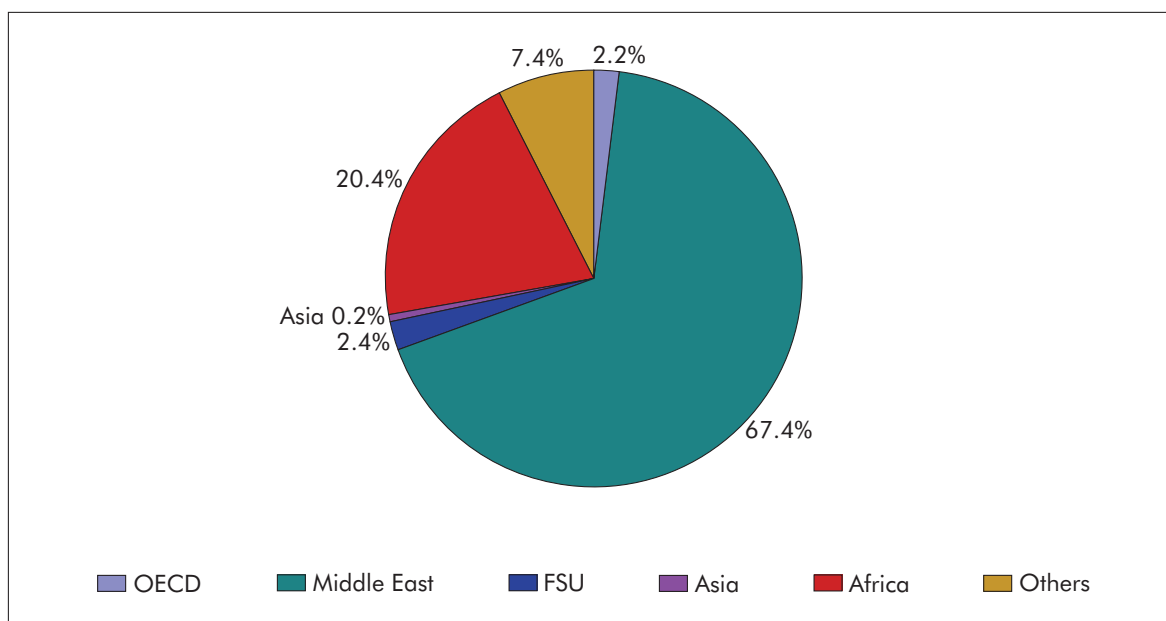
INDIA²⁰

Key Data

Oil Statistics, 1990-2010

	1990	1995	2000	2005	2006	2010
Production (kb/d)	691.2	783.7	748.0	774.5	792.2	871.1
Demand (kb/d)	1 186.1	1 663.7	2 335.8	2 575.9	2 639.6	2 946.9
Net imports (kb/d)	494.9	880.0	1 587.8	1 801.4	1 847.4	2 075.8
Import dependency (%)	41.7	52.9	68.0	69.9	70.0	70.4
Refining capacity kb/d		1 086.0	1 858.0	2 254.6	2 256.0	4 336.0

Oil Imports, 2004-2005



Source : Draft report of the Expert Committee on Integrated Energy Policy (December 2005).

²⁰ This section on India was written by the IEA. The Ministry of Petroleum and Natural Gas of India provided valuable input. Other sources such, as *the World Energy Outlook 2007*, reports from various energy analysts and press reports were used as well. The Ministry of Petroleum and Natural Gas of India is in no way committed to the content of this chapter. All errors and omissions are solely the responsibility of the IEA.

See Annex I for definitions and the methodology used in this chapter.

Background

Country Overview

With almost 1.1 billion inhabitants, India is the second most populous country in the world and the seventh-largest country by geographical area. In 2005, India's GDP was about USD 644 billion. In terms of purchasing power parity (PPP)²¹, GDP stood at USD 3 362 which makes it the fourth-largest economy in the world (after the United States, China and Japan). Per capita income in PPP terms is around USD 3 582, about one-tenth of the OECD average. GDP growth in 2005 was 9.2%.

India has about 5.6 billion barrels of proven oil reserves (January 2007). The combination of rising oil consumption and fairly stable production levels leaves India increasingly dependent on imports to meet consumption needs; most of these imports are coming from the Middle East. In 2006, the country produced an average of 792 kb/d of total oil liquids, of which 87% (687 kb/d) was crude oil. During 2006, India's demand for oil reached 2.64 mb/d.

In 2004, India decided to build a strategic petroleum reserve (SPR) in a phased manner. The work on the first phase started in 2007, with invitations for tender for the construction of rock caverns with a capacity of some 37 mb (5 Mt), which equates to 20 days of net imports or 15 days of consumption in 2005. The work is planned to be finished in 2010, after which the rock caverns will begin to be filled. A second phase is projected (but not yet scheduled), which would expand the storage capacity to 45 days of consumption (roughly 110 mb or 15 Mt). The Integrated Energy Policy of 2006 states that the effectiveness of the reserves can be increased through co-operative operation with the reserves of other countries, such as IEA member countries.

Energy Outlook

Total primary energy supply (TPES) in India more than tripled from 1973 to 2005, from 165 Mtoe to 537 Mtoe, at an average rate of 3.8% per year. Natural gas increased dramatically from 0.5 Mtoe in 1973 to 29 Mtoe in 2005. Coal and coal products also experienced a substantial rise in this 32-year period, from 36 Mtoe to more than 200 Mtoe. Oil followed a similar trend, rising from 0.5 mb/d (25 Mtoe) to 2.6 mb/d (129 Mtoe). Renewables (mostly combustible renewables and waste) grew as well, but less spectacularly (from 100 Mtoe to 159 Mtoe), which explains their drastic decrease as a share of total energy consumption.

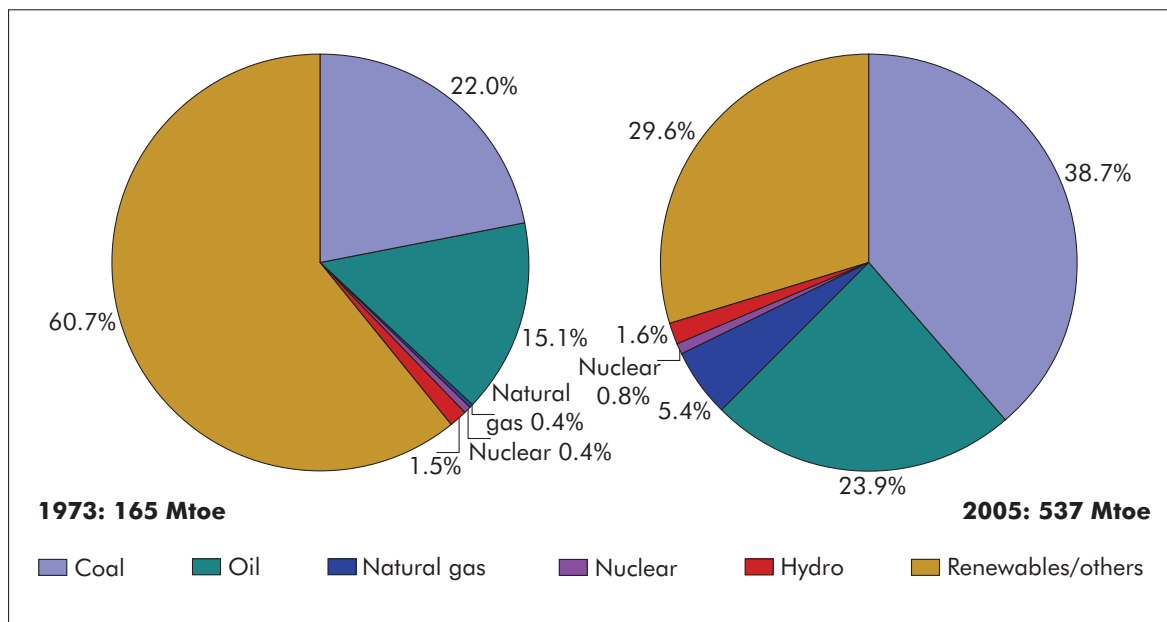
This increase in energy consumption is expected to continue. According to IEA long-term projections outlined in the *World Energy Outlook 2007* Indian primary energy demand in the Reference Scenario²² is set to increase from 537 Mtoe in 2005 to 1 299 Mtoe in 2030. Coal will remain the main source of energy in the foreseeable future. At the same time, total oil consumption is expected to increase from 2.6 mb/d (133 Mtoe) in 2006 to 3.7 mb/d (188 Mtoe) by 2015 and to 6.5 mb/d (328 Mtoe) by 2030. Despite new oil field discoveries, depletion of existing oil fields will lead to a decrease in India's

²¹ Purchasing power parity (PPP) compares costs of a fixed basket of traded/non-traded goods and services in various currencies, and thereby yields a broad-based measure of standard of living.

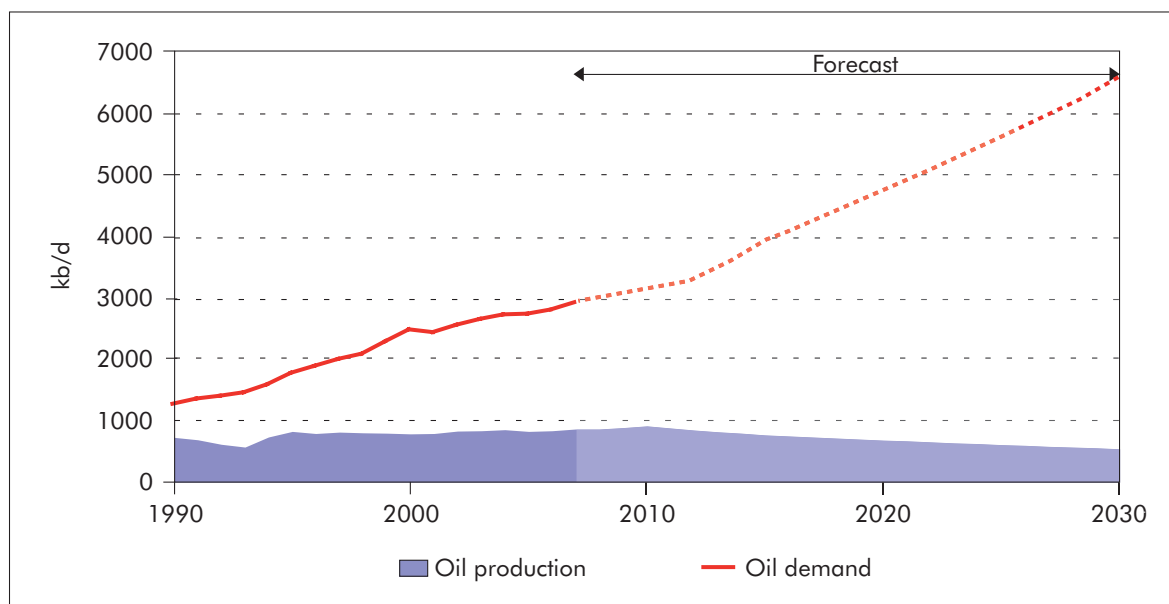
²² The Reference Scenario is a "business-as-usual" scenario with an average GDP growth for India of 6.3% over the projection period to 2030. It includes the consequences of policies that have been decided and are to be implemented. It does not include the consequences of policies that are still under discussion. Those policies are included in the Alternative Policy scenario.

oil production, from 792 kb/d in 2006, to 730 kb/d in 2015 and 517 kb/d in 2030. Such a decrease would imply that India's oil import dependency will increase sharply (in line with oil demand) to reach about 6 mb/d, or around 90% in 2030.

Total Primary Energy Supply



Production and Demand for Oil, 1990-2030



Source: IEA. OMR for data 1990-2012, WEO 2007 for 2015 and 2030

Market Features and Key Issues

As a net importer of crude oil, the Indian government has introduced policies aimed at increasing domestic oil production and oil exploration activities. The *New Exploration and Licensing Policy* (NELP) was implemented in 1997. The NELP allows foreign companies the opportunity to participate in the exploration and production of domestic sources of oil.

Up to mid-2007, there had been six NELP rounds of bidding. The first round of bidding (1997) received less response than was expected in terms of proposed investments and was extended to 1999. Because of this low response rate, the Indian government decided to improve the framework conditions of NELP at each new round of bidding. In 2004, the Indian government lifted all ceilings on foreign direct investment in oil and gas projects, effectively deciding – for the first time – to allow foreign companies to own 100% of assets. Despite the improved conditions of the NELP frameworks, the majority of oil and gas fields were awarded to Indian national oil companies (NOCs).

The government phased out the administered price mechanism (APM) on oil products in 2002, replacing it with the new market determined price mechanism (MDPM). Under the MDPM, all petroleum product prices would be set by the market, with the exception of kerosene and LPG. The government continues to subsidize LPG and kerosene, which are used predominantly for cooking, with a view to social desirability. Although diesel and gasoline officially fall under the MDPM, the government caps their prices too. Thus, domestic retail prices do not reflect import parity prices under the MDPM, forcing oil marketing companies to incur losses on sales of both products.

In 2005 and 2006, the Indian government issued relief subsidies of USD 1.3 billion and USD 6 billion respectively by the way of government bonds to oil marketing companies that faced financial difficulties due to capped fuel prices. In 2005, government bonds covered about one-third of the so-called “under-recoveries” (losses) incurred by the marketing companies; in 2006, the share of the government bonds reached almost 50%. As retail prices remain capped, bonds will most likely be issued again in 2007. The government is striving to reduce its share to one-third again, and has requested the upstream companies not involved in retailing, the stand-alone refineries and the gas company GAIL to also carry about one-third of the burden of the under-recoveries. This plan would leave one-third of the burden to be covered by the marketing companies.

Total oil consumption in the transport sector in India rose from about 513 kb/d (24 Mt) in 1990 to around 717 kb/d (34 Mt) in 2005, reflecting the modest growth of the vehicle fleet over the last years. In the projection period up to 2030, demand for transport fuels will soar; its share in final energy demand is expected to rise from just over 10% in 2005 to over 20% in 2030 or more than 150 Mt. In 2006, India counted 13 vehicles per 1000 inhabitants (excluding two- and three-wheelers); this number will rise to 93 in 2030.

Oil Supply Infrastructure

Refineries

In April 2007, India had 19 refineries (mostly located on the coastline) with a total crude distillation capacity of about 3 mb/d. Only one refinery, Reliance Petroleum’s plant at Jamnagar, is wholly owned

by a private company. This is India's largest refinery, with a capacity of 660 kb/d. The Indian Oil Corporation (IOC) is the largest state-owned player in the refining sector, with a total of 950 kb/d of refining capacity at seven plants (in 2007).

India is currently building four new refineries and undertaking major capacity expansions of existing refineries. In 2007, Reliance Petroleum was constructing a second facility at the Jamnagar site, which will have a capacity of 580 kb/d when completed in 2009. The IOC announced expansion plans that will almost double its refining capacity by 2012. In total, refinery capacity in India is announced to grow from 2.25 mb/d in 2006 to about 4.7 mb/d in 2012, giving India a potential to export refined products of 1.5 mb/d to 2 mb/d by 2012.

The Indian government is implementing a policy by which India will become a major product exporter, thus exploiting its geographic location between East and West. India faces much less resistance towards building refineries than many other countries. India is already a net exporter of oil products, which are one of the country's major export items.

Ports and Pipelines

India has 12 major ports and three major crude oil pipelines. Most of the oil and gas production sites and facilities are located in the western part of the country.

Storage

Storage capacity held by oil companies in 2006 was enough to cover 24 days of consumption (33 days of net imports) for crude oil and 36 days of consumption (50 days net imports) for products. These storage facilities are for commercial stocks only. In 2007, the government began preparations for the construction of strategic storage sites (see Stockholding Structure).

Decision-making Structure

In the event of an oil supply shortage, the release and sale of strategic crude will be decided through an Inter-Ministerial Empowered Committee chaired by the Secretary of the Ministry of Petroleum and Natural Gas. Other members of this committee include: the Secretary of the Department of Expenditure; the Secretary of the Ministry of Finance; the Home Secretary; the Secretary of the Planning Commission; the Defence Secretary; the Secretary of the National Security Council; and the Secretary of the Ministry of Shipping.

For downstream operations during a crisis, the central government may invoke section 43 (1) of *The Petroleum and Natural Gas Regulatory Board Act 2006*, which states:

“In the event of a war or natural calamity or such other similar circumstances leading to disruption of supply of petroleum, petroleum products, or natural gas, the Central Government may, for ensuring the continuous supply of petroleum, petroleum products or natural gas, by notification, either take over the control and management of any storage site, facilities and business premises of any entity and retail outlets or suspend its operations or entrust, to any agency of the Central

or State Government for such time and manage it in such manner, as may be specified in that notification.”

Thus, in an emergency, the government can take over control of the whole downstream sector. The same act stipulates that before doing so, the government should consult the affected entities. However, “in case of any urgency or in cases where the circumstances do not permit serving of notice”, the opportunity of a consultation may be dispensed in order to maintain the uninterrupted supply of petroleum.

Stocks

Stockholding Structure

In 2004, India began planning for a strategic oil reserve of about 110 mb (15 Mt). The Integrated Energy Policy of 2006 clearly states that India strives for a total coverage of 90 days of net imports. As net imports will rise sharply in the coming decades, this is a moving target.

As a first phase, the government of India decided to set up 37 mb (5 Mt) of strategic crude oil storage at three locations: Mangalore (11 mb or 1.5 Mt); Vizag (7.4 mb or 1.0 Mt); and Padur near Udipi (18.5 mb or 2.5 Mt). These proposed storage sites are located near the eastern and western coastlines so that they are readily accessible to the refining sector and are adapted to marine distribution. Construction of the rock caverns is expected to start at the end of 2007 and to be completed in 2010, after which the rock caverns can begin to be filled. Once the first phase of the strategic stock plan is completed, the proposed strategic stocks will be equivalent to 15 days of consumption or 20 days of net imports, based on 2005 levels.

The construction of the proposed strategic storage facilities is being managed by the Indian Strategic Petroleum Reserves Limited (ISPRL), which is owned by the Oil Industry Development Board (OIDB). The government of India chose the agency model of stockholding instead of government-owned stocks.

Indian oil companies are not required by law to hold industry emergency stocks. Thus, the strategic storage of the ISPRL would be in addition to the existing storage of crude oil and petroleum products held by the oil companies. ISPRL stocks would provide an emergency response mechanism in case of short-term supply disruptions. By 2009-2010, oil companies are expected to hold a total of 47 days of consumption cover (72 days of net imports) with their commercial stocks.

To date, only the first phase of the strategic stock building has been detailed. It is unclear when the second phase of the 2004 decision to build a strategic reserve of 110 mb (15 Mt) would be taken up. In the mean time, net imports are increasing rapidly. In 2005 figures, the reserve of 110 mb (15 Mt) would have given net import coverage of about 60 days; in 2015 this will be reduced to around 37 days; by 2030, it will account for only 18 days.

To have net import coverage of 45 days, India would need a reserve of 135 mb (18.4 Mt) in 2015 and 276 mb (37.6 Mt) in 2030 (according the Reference Scenario in the *WEO 2007*). Total cumulative costs to build such a reserve would reach around USD 25 billion in 2030.

Stock and Drawdown Timeframe

In the event of a disruption in supplies – or any unforeseen global event leading to scarcity of supplies and/or abnormal increase in prices – the release of crude oil can be decided by the Inter-Ministerial Empowered Committee.

If and when the Committee decides to act in an emergency, the sale of the strategic crude oil to various refineries (including private refineries) will be priced according to prevalent prices at that time – ensuring that the price is not below the acquisition cost or the replenishment cost of the crude oil, whichever is higher. Losses in transmission and/or operation will also be taken into account when determining the sale price of the strategic crude oil. The Committee can also consider the issue of crude on a replacement basis (*i.e.* crude for equivalent crude), or under any other mechanism it finds appropriate.

Financing and Fees

In 2006, the total projected capital costs for the strategic reserves were estimated as follows: USD 180 million (INR 7 286 million) for the Mangalore site; USD 166 million (INR 6 706 million) for the Vizag site; and USD 247 million (INR 9 975 million) for the Padur/Upidi site.²³ In total, the construction costs are estimated at USD 594 million (INR 23 968 million) for the first phase of 15 days of consumption. Filling costs under this same projection stood at USD 2 200 million (INR 88 700 million), based on USD 55 per barrel. Operation and maintenance costs were projected for USD 22 million (INR 900 million) per year.

The strategic stocks of the ISPRL are to be financed through three mechanisms: surcharges on petroleum products; a 2% increase in customs duty; and use of the receipts for the Oil Development Fund under the *OIDB Act of 1974*.

²³ Exchange rate of USD 1 = INR 40 (INR: Indian rupees).

ANNEX I

DEFINITIONS AND METHODOLOGY

This annex provides definitions and methodologies to better understand the data presented in the individual country sections. Unless otherwise noted, data presented in this publication are based on country submissions of energy statistics to the IEA, primarily through the questionnaires of monthly and annual oil statistics in thousand metric tons. Definitions for oil supply and demand are consistent with the IEA monthly Oil Market Report (OMR).

Key Data Table Definitions

Production

Indigenous production of crude oil, NGL and various types of heavy oil-like hydrocarbons from different locations within national boundaries (on-shore, off-shore). Production includes only marketable production, and excludes volumes returned to formation. It includes various types of heavy oil-like hydrocarbons and natural gas-based, coal-based and renewable-based (biofuel) sources which are used as oil product equivalents and are included in the definition of demand. These non-conventional oils include other hydrocarbons and alcohols, biodiesel, synthetic oil production, oil shales, coal-based and natural gas-based oil substitutes and methane-based blending components such as MTBE (methyl tertiary butyl ether).

Data projections for 2010 are based on IEA forecasts from the Medium Term Oil Market Report, July 2007. Data in thousand barrels per day.

Demand

This is oil demand derived from total inland deliveries plus refinery fuels and bunkers minus backflows from the petrochemical sector. It is thus equivalent to oil consumption plus any secondary and tertiary stock increases. Data projections for 2010 are based on IEA forecasts from the Medium Term Oil Market Report, July 2007. Data in thousand barrels per day.

Motor gasoline

Motor gasoline is used as a fuel for land based spark ignition engines. Motor gasoline may include additives, oxygenates and octane enhancers, including

	lead compounds such as TEL (tetraethyl lead) and TML (tetramethyl lead). This category includes motor gasoline blending components (excluding additives/oxygenates), <i>e.g.</i> alkylates, isomerate, reformat, cracked gasoline destined for use as finished motor gasoline. Data in thousand barrels per day.
Gas/diesel oil	Gas/diesel oil includes transport diesel, heating oil and other gasoil. Transport diesel oil is used to power diesel engines in buses, trucks, trains and cars. Heating oil is used to heat domestic/residential and commercial buildings, as well as industrial boilers. Gasoil is also used for power generation, although to a much smaller extent than fuel oil. Data in thousand barrels per day.
Residual fuel oil	This covers all residual (heavy) fuel oils including those obtained by blending. Fuel oil is used by power generation utilities to produce electricity and heat, by industrial users for process heat and by the commercial sector to provide heating fuel for their buildings. It is also the most important fuel for international marine bunkers. Data in thousand barrels per day.
Others	Includes LPG, ethane, naphtha, kerosene, jet fuel and other petroleum products. Data in thousand barrels per day.
Net imports	This is demand minus production (a negative number denotes net exports). Data in thousand barrels per day.
Import dependency (%)	Net imports divided by demand. A “*” denotes no import dependency
Stocks in days of net imports	Total oil closing stock as of 31 December of the given year expressed in days of net-imports (Based on IEA methodology see below “IEA methodology for calculating minimum stockholding obligation and compliance”). A ‘-’ denotes net exporter status. References to days of net-imports in non-IEA member countries differ slightly as the detailed methodology is not applied but rather a basic calculation of stocks divided by net-imports is used.
Refining capacity kb/d	<p>This refers to atmospheric crude oil distillation. This is the first stage in the refining process of separating crude oil components at atmospheric pressure by heating, and subsequent condensing, of the fractions (unfinished petroleum products) by cooling.</p> <p>The data corresponds to the first of January of the given year except for 2006 which is based on most recent data <i>i.e.</i> 1st January 2007. Data in thousand barrels per calendar day (a unit measuring the average rate of oil processing in a petroleum refinery, with allowances for downtime over a year). Based on data provided by countries and/or the Oil and Gas Journal. Data projection for 2010 are based on IEA forecasts from the Medium-Term Oil Market Report, July 2007.</p>

Country Sections' Graphs Definitions

Trade

Origin of imports

OECD: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, the Republic of Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

Middle East: Includes Bahrain, Iran, Iraq, Kuwait, the Neutral Zone, Yemen, Oman, Qatar, Saudi Arabia, Syria and the United Arab Emirates.

FSU: Former Soviet Union: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

Asia: Includes all countries of the Asia-Pacific region not part of the OECD, the major oil producing countries of this category being: Brunei, China, Hong Kong, India, Indonesia, Malaysia, Papua New Guinea, Singapore, Korea and Vietnam.

Africa: Includes all countries in Africa. The major oil producing countries in Africa are: Algeria, Angola, Cameroon, Congo, Democratic Republic of Congo, Egypt, Gabon, Libya, Nigeria and Tunisia.

Other: All countries not specified in regions defined above or where origins are unspecified.

Total Primary Energy Supply

TPES is made up of production + imports - exports - international marine bunkers \pm stock changes of the following energy sources:

Coal

Includes all coal, both primary (including hard coal and lignite) and derived fuels (including patent fuel, coke oven coke, gas coke, BKB, coke oven gas and blast furnace gas). Peat is also included in this category.

Natural Gas

Gas includes natural gas (excluding natural gas liquids) and gas works gas.

Nuclear

Nuclear shows the primary heat equivalent of the electricity produced by a nuclear power plant with an average thermal efficiency of 33%.

Hydro

Hydro shows the energy content of the electricity produced in hydro power plants. Hydro output excludes output from pumped storage plants.

Oil

Includes primary products (*e.g.* crude oil and NGLs), secondary inputs to refineries and finished products.

Renewables/others

This category incorporates:

Combustible renewables & waste comprises biomass and animal products (wood, vegetal waste, ethanol, animal materials/ wastes and sulphite lyes), municipal waste (wastes produced by the residential, commercial and public

service sectors that are collected by local authorities for disposal in a central location for the production of heat and/or power) and industrial waste.

Other includes geothermal, solar, wind, tide, wave energy, electricity and heat. Unless the actual efficiency of the geothermal process is known, the quantity of geothermal energy entering electricity generation is inferred from the electricity production at geothermal plants assuming an average thermal efficiency of 10%. For solar, wind, tide and wave energy, the quantities entering electricity generation are equal to the electrical energy generated. Direct use of geothermal and solar heat is also included here. Electricity is accounted for at the same heat value as electricity in final consumption (*i.e.* 1 GWh = 0.000086 Mtoe). Heat includes heat that is produced for sale and is accounted for in the transformation sector.

Oil consumption by sector

Total oil consumption, classified in the following sectors:

Transformation	Transformation covers oil used in the process of transformation of oil to another energy form, <i>e.g.</i> oil into electricity, heat, etc.
Energy	Covers consumption of oil by the energy transformation industries (for heating, light and operation of equipment) as well as oil used in oil and gas extraction, coal mines, pipeline losses and distribution losses.
Transport	Oil used for all transport activity (aviation, road, rail, domestic navigation, pipeline transport), regardless of the sector in which the activity occurs. This includes all consumption in transport excluding international marine bunkers, but including lubricants, waxes, etc. used in the transport sector. Also includes consumption in support of the operation of oil and gas pipelines.
Industry	This includes all industrial consumption of oil, including consumption of petrochemical feedstocks and non-fuel uses, such as consumption of lubricants, waxes, white spirit, bitumen, etc. Industrial consumption of oil for the production of electricity (autoproduction) is excluded.
Other sectors	Includes residential, commercial and public services, agriculture and other (not specified) use. Consumption of lubricants, waxes, white spirit, etc. is also included.

Other Key Definitions

Inputs to refineries	Comprise crude oil, natural gas liquids, refinery feedstocks and additives as well as other hydrocarbons.
Refined products	Petroleum products comprise refinery gas, ethane, LPG, aviation gasoline, motor gasoline, jet fuels, kerosene, gas/diesel oil, residual fuel oil, naphtha, white spirit, lubricants, bitumen, paraffin waxes, petroleum coke and other petroleum products.

Middle distillates	The aggregate of gas/diesel oil, kerosene-type jet fuel and other kerosene.
Oil proven reserves	Figures are based on information provided by member countries, IEA estimates, and data from “Worldwide Look at Reserves and Production”, <i>Oil and Gas Journal</i> (December 2006).
Storage	Where possible, storage capacity is shown in barrels. For the most part, this is converted from cubic metres using the conversion factor of 6.2898. When information was only available in tonnes, a general conversion to barrels was made for comparison purposes, using a conversion factor of 7.37 for crude oil and a generic conversion factor for oil products of 7.5.

Abbreviations of Units

Energy

toe	tonne of oil equivalent
Mtoe	million tonnes of oil equivalent

Gas/Capacity

Tcf	thousand cubic feet
mcm	million cubic metres
bcm	billion cubic metres
tcm	trillion cubic metres
kl	kilolitre

Mass

Kt	kilotonnes (1 tonne x 10 ³)
Mt	million tonnes (1 tonne x 10 ⁶)
t	tonne

Oil

b/d	barrels per day
kb/d	thousand barrels per day
mb/d	million barrels per day

Power

kW	kilowatt
MW	megawatt
GWh	gigawatt-hour

Conversion Factors

Oil data collected from IEA member countries are reported in thousand tonnes. This publication has converted data to barrels using conversion factors based on actual density. Note that, with the exception of European countries, data are generally collected for local purposes in volume terms and converted to tonnes for submission to the IEA. The conversion factors used are therefore the same, to the extent possible, as those used by the countries in making their submissions to ensure correct volumetric data. The following are the average conversion factors and major exceptions used in calculations within this publication.

Average Conversion Factors

(barrels/tonnes)

Standard		Major Exceptions	
Crude oil	7.37		
NGL	10.3	Japan	8.85
		Korea	8.85
Refinery feedstocks	7.4	US	7.46
Additive	7.5	US	8.3
Non-crude	7.4	Canada	6.8
		US	8.3
Refinery gas	8	Australia	9.71
		Canada	6.6
		Japan	6.99
		Korea	6.99
		US	7.45
Ethane	16.85		
LPG	11.6	Norway	12.73
Naphtha	8.9	OECD Pacific	8.5
		Canada	8.5
		US	8.5
Aviation gasoline	8.9		
Motor gasoline	8.45	OECD Pacific	8.53
		Canada	8.53
		US	8.53
Jet/kerosene	7.88	OECD Pacific	7.93
		Canada	7.93
		US	7.93
Other kerosene	7.88	OECD Pacific	7.74
		Canada	7.74
		US	7.74
Gas/diesel oil	7.46		
Residual fuel oil	6.45	OECD Pacific	6.66
		Canada	6.66
		Mexico	6.43
		US	6.66
Petroleum coke	5.5		
Other products	ranging from 6.17 to 8.0		

IEA Methodology for Calculating Minimum Stockholding Obligation and Compliance

The IEA minimum stockholding obligation is based on the average daily net imports of the previous calendar year. This covers all petroleum, including both primary products (such as crude oil and natural gas liquids [NGLs]) and refined products, with the exception of naphtha and volumes of oil used for international marine bunkers. Refined products are converted to *crude oil equivalent*, the amount of crude necessary to produce a given amount of product.

A country's 90 day emergency reserve commitment is defined as: daily net imports x 90.

Daily net imports are defined as:

- net imports (adjusted for stock changes)²⁴ of crude oil, NGL and feedstocks, from which is deducted a naphtha yield of 4%;²⁵
- plus net imports (adjusted for stock changes) of all oil products (excluding naphtha and international marine bunkers) converted to crude oil equivalent by multiplying by a factor of 1.065;
- divided by the number of days in the year.

A country's emergency reserves, which are counted towards meeting its 90 day commitment, are defined as its total oil stocks (net any bilateral stockholding arrangements), adjusted in the following way:

- a naphtha yield of 4% is deducted from stocks of crude oil, NGL and feedstocks;
- oil product stocks (with the exception of stocks of petrochemical naphtha and of international marine bunkers) could be counted as emergency reserves in either of the following ways:
 - all existing product stocks, converted to crude oil equivalent by the general IEA factor of 1.065;
 - only stocks of the three main product groups (gasolines and naphtha for gasoline production, middle distillates and heavy fuel oil) which are converted to crude oil equivalent by an average factor of 1.2.²⁶
- a 10% deduction is made in order to account for unavailable stocks (such as tank bottoms).

Days of net import cover is the result of: emergency reserves ÷ daily net imports.

²⁴ Net imports are adjusted for stock change such that increases of stocks in a given year are not counted as part of the daily net imports amount, while stock reductions in a given year are added to the daily net import figure. Thus, oil imported for the purpose of building emergency reserves does not add to the emergency reserve commitment.

²⁵ For most IEA countries, a 4% deduction is made to reflect a naphtha yield, based on a weighted average across the IEA. Countries for which the national yield is above 7% may opt to use their actual national naphtha yield factors or volume to adjust their net imports.

²⁶ This factor is used to convert an aggregate of the three main products into an amount of crude oil required in average refinery operations to produce those products. The use of this factor assumes that products, other than the three main products and naphtha, are stocked in proportion to their refinery yield.

ANNEX II

SUMMARY OF EUROPEAN UNION LEGISLATION CONCERNING CRISIS MEASURES AND OIL STOCKS

Council Directive 2006/67 of 24 July 2006, provides the legal basis for holding mandatory stocks in the European Union (EU).

According to this directive, the Member States must maintain at all times stocks of petroleum products at a level corresponding to at least 90 days of average daily consumption in the preceding calendar year. A deduction in the obligation of up to 25% can be made in order to account for domestic production.

Mandatory Oil Stocks for EU Member States

The level of 90 days must be maintained for each of the three categories:

- Category I: motor spirit and aviation fuel (aviation spirit and jet fuel of the gasoline type);
- Category II: gas oil, diesel oil, kerosene and jet-fuel of the kerosene type (middle distillates);
- Category III: fuel oils.

The stockholding obligation in each category can be met with oil stocks held in the form of crude oil and intermediate products, as well as in the form of finished products. While finished products are accounted for using their actual tonnage, crude oil can be applied towards the product obligation in one of the following methods:

- (i) in the proportions of the quantities for each category of product obtained during the preceding calendar year from the refineries of the Member State; or
- (ii) on the basis of the production programmes of the refineries of the Member State for the current year; or
- (iii) on the basis of the ratio between the total quantity manufactured during the preceding calendar year in the Member State of products covered by the obligation to maintain stocks and the total amount of crude oil used during that year, up to a maximum of 40% of the total obligation for

the first and second categories (petrol and gas oils), and up to a maximum of 50% for the third category (fuel oils).

In order for stocks to be counted towards meeting the obligation, the government of the Member State must have clearly established statutory powers to take control over the stocks in a supply disruption. At all other times, Member States must ensure the availability and accessibility of these stocks and establish arrangements allowing for the identification, accounting and control of these. Article 6, paragraph 2 of the Directive 2006/67 provides detail on the stocks which may be counted towards meeting the stockholding obligation.

A Member State may establish stocks within the territory of another Member State. These stocks can be used towards meeting its stockholding obligation, provided that, *e.g.*:

- a specific storage agreement has been concluded between the two governments concerned (Council decision 68/416 of 20 December 1968 provides additional rules on such agreements);
- these stocks remain at the free disposal of the Member State on whose behalf the stocks are held.

Data

Member States must submit to the Commission a monthly statistical summary of their existing stocks at the latest by the 25th day of the second month after the month to be reported.

Disruptions in the Supply of Crude Oil and Petroleum Products

If a supply disruption arises, the Commission convenes, at the request of any Member State or on its own initiative, a group of delegates from the Member States (Oil Supply Group). Under the Commission's chairmanship, this group will carry out the necessary consultations in order to ensure co-ordination of the measures to be taken.

The related EU legislation includes:

- a) Council Directive 73/238 of 24 July 1973 which stipulates that in case of difficulties in the Community oil supply, Member States will be able to:
 - draw on emergency stocks (in accordance with Council Directive 2006/67);
 - reduce consumption (demand restraint measures).
- b) According to Council Decision 77/706 of 7 November 1977, in case of oil shortfalls the Commission may set a target for reducing consumption of petroleum products by up to 10% of normal consumption, for a maximum period of two months.
- c) Commission Decision 79/639 of 15 June 1979 lays down detailed rules for the implementation of Council Decision 77/706. In accordance with Article 4 of this Decision, a Member State may,

instead of restricting consumption, draw on stocks of crude oil and/or petroleum products held in excess of its obligation (under Directive 2006/67).

Differences in Calculation Methods Between the EU and the IEA

The EU calculation method is different from the IEA method both for calculating the storage obligation and for determining the level of stocks which count towards meeting the minimum stockholding obligation. For a description of the IEA method, see *IEA methodology for calculating minimum stockholding obligation and compliance*; Annex I.

For the storage obligation, the main difference in the two methods is the basis for establishing the 90 days:

- The IEA uses a basis of net imports of total oil (including both primary products, such as crude oil and natural gas liquids [NGLs], and refined products).
- The EU uses a basis of domestic consumption for the three product categories described above. A deduction of up to 25% from the stockholding obligation is allowed to take account of indigenous production.

When evaluating the level of stocks which count towards meeting the minimum obligation, the main differences in the two methods include the following:

- the IEA converts stocks of refined products into crude oil equivalents (the amount of crude necessary to produce a given amount of product).
- the EU converts the stocks of crude oil and feedstocks into finished product equivalents.
- the IEA applies a 10% deduction to the overall total stock levels in order to account for unavailable stocks; the EU does not make such a deduction.

The difference in methodologies can result in different levels of stock necessary to meet the minimum obligation. In general, for countries having no or relatively low levels of domestic crude oil production in relation to their oil consumption, the IEA method results in a higher stockholding obligation. This largely reflects the 10% deduction the IEA method makes to account for unavailable stocks and the fact that the three product categories used in the EU calculation method do not cover all oil products.

For countries with significant domestic crude oil production, the EU method results in a greater stockholding obligation, reflecting the use of consumption as a basis for the obligation. While domestic crude production results in a lower reliance on imports, and thus a lower net-import stockholding obligation, it does not have an impact on domestic consumption. Moreover, as the IEA uses a net import basis, countries which are net-exporters have no stockholding obligation. The EU method results in all of its Member States having a stockholding requirement. For example, as a net exporter, Denmark has no IEA stockholding obligation and the UK, a marginal net-importer, has a relatively small stockholding obligation to the IEA. However, both Denmark and the United Kingdom must hold a substantial level of stocks under EU regulations. As they are granted a 25% reduction in the obligation due to their domestic production levels, their actual stockholding obligation is therefore: $90 \times 75\% = 67.5$ days of consumption.

ANNEX III

LEGAL BASIS FOR EMERGENCY RESPONSE ORGANISATIONS, STOCKHOLDING AND THE IMPLEMENTATION OF STOCKDRAW AND OTHER EMERGENCY MEASURES

	Legislation	Powers
Australia	The Liquid Fuel Emergency Act of 1984, as amended in 2007.	Emergency Response Organisations The Act provides a comprehensive national approach to manage a severe fuel shortage.
	The Liquid Fuel Emergency Act of 1984, as amended in 2007.	Stockholding Minister(s) may specify quantity, locations and period of duration of reserves.
	The Liquid Fuel Emergency Act of 1984, as amended in 2007. <u>Section 12-15</u> The Petroleum Submerged Lands Act (PSLA)	Implementation of stockdraw and other emergency measures The Australian Government could require maintenance of stocks, stockdraw, the physical transfer of fuels, the sale of liquid fuels to designated customers and the regulation of refinery operations. The Act has a provision for the Australian Government to be able to direct petroleum producers to take all necessary and practical steps to increase or reduce the rate at which oil is being recovered within a licensed area or pool.
Austria	The Energy Steering Law of 1982 as amended in 1987, in 1988 and in 2006. The Stockholding and Reporting Law of 1982 as amended in 1995 and in 2006.	Emergency Response Organisations These Laws provide the legal framework for Austrian emergency management.
	The Stockholding and Reporting Law of 1982 as amended in 1995 and in 2006.	Stockholding The Law obliges all importers of crude oil and oil products to maintain emergency reserves equal to 25% of the previous year's net imports, plus 10% for unavailable stocks.

	Legislation	Powers
Austria (Continued)	The Energy Steering Law of 1982 as amended in 1987, in 1988 and in 2006.	Implementation of stockdraw and other emergency measures The Law provides for the Minister for Economic Affairs to determine by ordinance a certain percentage for stock drawdown.
Belgium	Royal Decree of 11th October 1984 (MB 27th November 1984).	Emergency Response Organisations The Decree provides powers to create the National Oil Board, the single body responsible for oil crisis management, to implement IEA emergency measures and function as NESO.
	Act of 26th January 2006. Amending the Act of 10 June 1997 on the general arrangements for the holding, movement and control of excisable products)	Stockholding The Act establishes the public limited company, APETRA, responsible for holding and managing the compulsory stocks of oil and petroleum products. APETRA is mandated to take over the country's stockholding obligation from refiners and importers, starting with 75 days coverage in 2007 and reaching full coverage of the obliged emergency stocks within five years.
	Act of 26th January 2006.	Implementation of stockdraw and other emergency measures The Act gives the power to the Minister for Economic Affairs to order the release of compulsory oil stocks.
Canada	The Energy Supplies Emergency Act of 1978/79 as amended in 1990.	Emergency Response Organisations The Act provides the primary basis for the Canadian Federal Government to respond to oil emergencies.
	The Emergencies Act of 1988.	The Act provides the statutory power to deal with and establish planning and preparedness programmes for different national emergencies. Canadian legislation provides the basis for establishing the Energy Supplies Allocations Board (ESAB) which has the necessary powers to impose demand restraint, allocate crude oil and products and ration gasoline and diesel fuel in an IEP or national emergency.
	<i>(No compulsory stockholding legislation exists. As a net exporter, Canada is not obliged to hold emergency stocks under the I.E.P.)</i>	Stockholding
	The Energy Supplies Emergency Act of 1978/79 as amended in 1990.	Implementation of stockdraw and other emergency measures In a declared national emergency, the Act gives the power to the ESAB to regulate the use of stocks and would have the authority to set prices.

	Legislation	Powers
Czech Republic	The Act N° 189/1999 on Emergency Oil Stocks as amended in 2004. The Act N° 97/1993 on the Competence of the Administration of State Material Reserves as amended in 1996, in 1999, in 2000 and in 2004.	Emergency Response Organisations The Administration of the State Material Reserves (ASMR) is the core of NESO.
	The Act N° 189/1999 on Emergency Oil Stocks as amended in 2004.	Stockholding The Act specifies that ASMR stocks must be no less than 90 days of net imports, meeting IEA and EU stockholding requirements.
	The Act N° 97/1993 on the Competence of the Administration of State Material Reserves as amended in 1996, in 1999, in 2000 and in 2004.	Implementation of stockdraw and other emergency measures The Act empowers the ASMR to release the state-owned stocks and to control company stocks in time of emergency.
Denmark	The Act N° 1275/2000 on the Compulsory Stocks of Mineral Oil and Mineral Oil Products. The Act N° 165/1975 on the Information and Selling Obligations regarding hydrocarbons.	Emergency Response Organisations These Acts provide the Minister of Transport and Energy with powers to establish a NESO, administer an oil emergency, require oil companies to sell crude oil and products in fulfilment of international allocation commitments.
	<i>(No stockholding legislation exists under the I.E.P. as Denmark is a net exporter. However Denmark is obliged to hold stocks equivalent to 67.5 days of the previous years' consumption under EU Directives.)</i> The Act N° 1275/2000 on the Compulsory Stocks of Mineral Oil and Mineral Oil Products.	Stockholding The Act obliges oil companies to hold emergency stocks equal to at least 81 days of consumption of the previous calendar year.
	The Consolidated Act N° 88/1986 on the Supply Measures.	Implementation of stockdraw and other emergency measures The Act empowers the Minister of Transport and Energy to establish provisions regarding the use, distribution, price equalisation, and physical placing of stocks.
Finland	The Act N° 1682/1991 on the Adaptation of Certain Provisions in the International Energy Program and its application.	Emergency Response Organisations The Act provides the Council of State with wide-ranging powers to meet I.E.P. requirements. This includes the necessary power to establish a NESO within the Ministry of Trade and Industry.
	The Act on the Compulsory Stockholding of Imported Fuels of 1983 as amended in 1997.	Stockholding All major crude oil and products importers are obliged to maintain emergency stocks corresponding to 2 months of the average of previous three calendar years' net imports.

	Legislation	Powers
Finland (Continued)	The Act N° 1390/1992 on the Security of Supply.	Under the Act, State-owned stocks are held by the National Emergency Supply Agency.
	The Act N° 1682/1991 on the Adaptation of Certain Provisions in the International Energy Program and its application.	Implementation of stockdraw and other emergency measures The Act enables the Council of State to enforce implementation of stockdraw.
France	The Law N° 74-908 of 29th October 1974 on Energy Savings.	Emergency Response Organisations Law No. 74-908 is the legal basis for emergency policy and allows the Administration to meet its obligations under the I.E.P.
	The Law N° 92-1443 of 1992.	Law No. 92-1443 focuses principally on oil supply disruptions and confirmed the deregulation of the national oil sector. This law provides the Administration with the legal basis for taking actions to improve emergency preparedness, and to implement measures during a supply disruption.
	The Law N° 92-1443 of 1992. Article 2-4.	Stockholding Defines the obligation to hold emergency stocks for all operators.
	The Ministerial Decrees N° 93-131 of State on 29th January 1993 (revised).	The Decrees require that each operator builds and maintains oil stocks equivalent to 27% of the previous year's consumption of crude oil and products which is equal to 98.5 days of consumption.
Germany	The Law N° 74-908 of 29th October 1974 on Energy Savings. The Governmental Order of 1959 on the Organisation of National Defence. The Law on the Oil Regime in 1992 and its Implementing Decrees and Orders.	Implementation of stockdraw and other emergency measures These Laws, Decrees and Orders, together with the Law 92-443, give the legal and regulatory authority to drawdown emergency stocks in any circumstance.
	The Energy Security Law of 1974.	Emergency Response Organisations The Law provides the basis for the voluntarily creation of the German NESO as a co-operative body of government, industry and EBV.
	The Oil Stockholding Law of 1978 as amended in 1987 and 1998. Section 3	Stockholding The Law requires the EBV to hold, on behalf of member companies, oil stocks of each of three categories of oil products: motor gasolines, middle distillates and heavy fuel oils, at least at the level of 90 days of consumption of the previous calendar year in order to comply with I.E.P. and EU commitments.
	The Oil Stockholding Law of 1978 as amended in 1987 and 1998. Section 30	Implementation of stockdraw and other emergency measures The Federal Minister of Economics and Technology shall have the power to order stockdraw, for the purpose of preventing imminent or existing problems in securing energy supplies and/or meeting obligations arising from the I.E.P. Agreement and EC directives.

	Legislation	Powers
Greece	The Law N° 3054/2002 on the Organization of the mineral oils market and other provisions.	Emergency Response Organisations The Law provides the Minister of Development with the statutory power to deal with Emergency Measures for crises in the supply of liquid fuel.
	The Law N° 3054/2002 on the Organization of the mineral oils market and other provisions.	Stockholding The Law obliges oil companies to hold stocks of three categories of products, crude oil or feedstock, corresponding to 90 days of their net imports in the domestic market during the previous calendar year.
	The Law N° 3054/2002 on the Organization of the mineral oils market and other provisions.	Implementation of stockdraw and other emergency measures The Law provides the Minister of Development with the statutory power to control and draw down the emergency reserves maintained by oil companies.
Hungary	The Law IL of 1993 on the Security Stockpiles of Imported Petroleum and Petroleum Products as amended in 1997 and in 2004.	Emergency Response Organisations The Law provides for the establishment and operation of a NESO under the supervision of the Ministry of Economy and Transport.
	The Law IL of 1993 on the Security Stockpiles of Imported Petroleum and Petroleum Products as amended in 1997 and in 2004.	Stockholding The Hungarian Hydrocarbon Stock-piling Association (MSZKSZ) maintains, on behalf of member companies, stock levels no less than 90 days of domestic consumption of the three main product categories (gasoline, middle distillates and fuel oil).
	The Law IL of 1993 on the Security Stockpiles of Imported Petroleum and Petroleum Products as amended in 1997 and in 2004.	Implementation of stockdraw and other emergency measures The Law provides the Ministry of Economy and Transport with the statutory power to order the release of the security stockpiles in case of energy supply crises and when the EU, or the IEA, declares emergency measures.
Ireland	The Fuels (Control of Supplies) Act of 1971 and 1982.	Emergency Response Organisations The Act provides the Minister for Communications, Energy and Natural Resources with the statutory power to deal with emergency measures in oil supply crises.
	The Fuels (Control of Supplies) Act of 1971 and 1982. The National Oil Reserves Agency Act 2007.	Stockholding Under the Acts the National Oil Reserve Agency (NORA) is responsible for ensuring that sufficient stocks are in place to meet stockholding obligations. Oil importers and large oil consumers are not required to hold strategic stocks but are expected to hold a prudent level of operating stocks.

	Legislation	Powers
Ireland (Continued)	The Fuels (Control of Supplies) Act of 1971 and 1982.	Implementation of stockdraw and other emergency measures The Act enables the Minister for Communications, Marine and Natural Resources to control all aspects of fuel distribution within the country.
Italy	The Legislative Decree N° 22 of 31 January 2001.	Emergency Response Organisations The Decree provides the Ministry of Economic Development with the statutory power to deal with emergency measures in oil supply crises.
	The Legislative Decree N° 22 of 31 January 2001.	Stockholding The Decree establishes the legal basis for stockholding obligations on industry. The Ministry of Economic Development establishes on a yearly basis the total oil stock amount to be held for the country overall, in accordance with the obligations of the European Community and the IEA. The total amount of stock holding obligations is distributed proportionally among the various companies present on the market on the basis of the amounts of products (for the three categories foreseen by the European Community) sold in the previous year.
	The Legislative Decree N° 22 of 31 January 2001.	Implementation of stockdraw and other emergency measures The Decree provides the Ministry of Economic Development with the statutory power to use and remove the reserve stocks in case of difficulties of supply and when the EU or the IEA declares emergency measures.
Japan	The Establishment Law of the Ministry of Economy, Trade and Industry	Emergency Response Organisations The Law provides wide powers including the ability to establish a NESO in the Agency of National Resources and Energy.
	The Petroleum Stockpiling Law of 96/1975, as amended in 1978, in 1981, in 1983, in 1995, in 1999, in 2000, in 2001, in 2002, in 2003 and in 2007.	Stockholding The Law obliges major oil refiners, oil marketers, oil importers and LPG importers to maintain emergency stocks equivalent to 70 days of the previous year's domestic consumption.
	Japan Oil, Gas and Metals National Corporation Law of 94/2002 as amended in 2002, in 2004 and in 2005.	In 1978 the Government initiated its national stockpiling programme through JOGMEC (formally JNOC).
	The Petroleum Stockpiling Law of 96/1975, as amended in 1978, in 1981, in 1983, in 1995, in 1999, in 2000, in 2001, in 2002, in 2003 and in 2007.	Implementation of stockdraw and other emergency measures The Law gives the power to the Ministry of Economy, Trade and Industry to reduce the stockholding obligations of companies and/or to release the national stockpiling in a sub-crisis situation.

	Legislation	Powers
Japan <i>(Continued)</i>	The Petroleum Supply and Demand Adjustment Law of 122/1973, as amended in 1983, in 1999, in 2001 and in 2004.	The Law gives the power to the Government to order stockdraw by companies in a declared emergency and/or under the IEP trigger.
Korea	The Petroleum and Petroleum-Alternative Fuel Business Act, as amended in 2004 and in 2005. The Basic Energy Act.	Emergency Response Organisations These Acts provide the Ministry of Commerce, Industry and Energy (MOCIE) with the statutory power to deal with emergency measures for crisis in the oil supply.
	The Petroleum and Petroleum-Alternative Fuel Business Act, as amended in 2004 and in 2005. Korea National Oil Corporation Act, as amended in 1998.	Stockholding The Act obliges major oil refiners, oil marketers and oil importers to maintain emergency stocks at the level, which the MOCIE requires. The Korea Government maintains its national stockpiling through KNOC.
	The Petroleum and Petroleum-Alternative Fuel Business Act, as amended in 2004 and in 2005. The Basic Energy Act. The Energy Use Rationalisation Act.	Implementation of stockdraw and other emergency measures The minister of MOCIE has the authority to make an energy demand and supply plan in case of an energy crisis and can decide on emergency response measures, including oil release, decreasing the level of private compulsory oil stocks and demand restraint.
Luxembourg	The Law of 22nd September 1982 on Oil Supply in Case of Emergency.	Emergency Response Organisations The Law provides for the constitution of NESO under the authority of the Minister for Economic Affairs and Foreign Trade.
	The Decree of 31st October 1973.	Stockholding The Decree defines a compulsory stock level of oil products for all oil importers as 90 days of the previous year's consumption.
	The Law of 22nd of September 1982 and 8 th December 1981 amended in 1991.	Implementation of stockdraw and other emergency measures The Law gives the Government the legal authority to take decisions on emergency sharing, including stockdraw, if oil product supply is endangered.
The Netherlands	The Oil Stockholding Act of 2001.	Emergency Response Organisations The Act provides the Minister of Economic Affairs with the statutory power to deal with emergency measures for crisis in the oil supply. The NESO is part of this ministry.

	Legislation	Powers
The Netherlands (Continued)	The Oil Stockholding Act of 2001.	Stockholding The Act stipulates stockholding obligations in the following manner: <ul style="list-style-type: none"> • Companies which sell more than 100,000 tonnes (the threshold) of oil products to the inland market are obliged to hold 5% of volumes sold above this threshold. • the public stockholding agency COVA is responsible for holding the balance between the industry obligations and the national commitment towards the IEA.
	The Oil Stockholding Act of 2001.	Implementation of stockdraw and other emergency measures The Act gives the Minister of Economic Affairs the power to instruct COVA and companies to draw down their compulsory stocks.
New Zealand	The International Energy Agreement Act of 1976; The Petroleum Demand Restraint Act of 1981; The Petroleum Demand Restraint (Regulations Validation and Revocation) Act of 1981.	Emergency Response Organisations These Acts provide the Ministry of Economic Development with powers to implement all obligations of New Zealand under the I.E.P. including the setting up of a NESO.
	The International Energy Agreement Act of 1976.	Stockholding The Act stipulates that the Ministry of Economic Development has the authority to order the maintenance of stocks by oil producers, refiners and importers at a level required by the I.E.P..
	The Petroleum Demand Restraint Act of 1976.	Implementation of stockdraw and other emergency measures The Act provides for regulations on stock drawdown and to impose restrictive demand restraint measure.
Norway	The Act of Supply and Contingency Measures of 1956, as amended in 1975.	Emergency Response Organisations The Act authorises the establishment and operation of the NESO.
	<i>(As a net exporter, Norway has no stockholding obligation under the I.E.P.)</i> The Act of Petroleum Product Storing for Emergency Purposes of 2006.	Stockholding Under the Act, companies that produce or import petroleum products are obliged to store product stocks corresponding to 20 days of normal consumption.
	The Act of Petroleum Product Storing for Emergency Purposes of 2006. The Act of Supply and Contingency Measures of 1956, as amended in 1975. The Royal Decree of 1983.	Implementation of stockdraw and other emergency measures These Acts and Decree provide the government with the statutory power to require oil companies to release their stocks in the event of an oil supply disruption.

	Legislation	Powers
Poland	The Act of 16th February 2007	Emergency Response Organisations Act on stocks of crude oil, petroleum products and natural gas, the principles of proceeding in circumstances of a threat to the fuel security of the State and disruption on the petroleum market. This is the legal basis for Poland's oil crisis management.
	Decree No 71 of 11 May 2006	The Decree establishes the statutes of the NESO.
	The Act of 16th February 2007	Stockholding The Act gives the Material Reserves Agency (ARM) the responsibility of managing public oil reserves and monitoring the stockholding obligation on industry. The Act requires the ARM to hold no less than 14 days of net imports. The Act provides statutory powers over all industry stocks, and obliges all liquid fuel producers and importers to hold minimum stock levels based on their production or imports from the previous calendar year. The minimum obligation rises from 66 days at end 2006 to 73 days at the end of 2007 and 76 days at the end of 2008. Additionally, producers and imports of LPG have an obligation which will be progressively increased from 3 days cover by end 2007 to 30 days by end 2011. This obligation may be met by holding the volumes of motor gasoline which equal the calorific value of the LPG obligation.
	The Act of 16th February 2007	Implementation of stockdraw and other emergency measures The Act provides the Minister of Economy with the statutory power to release both industry and state oil reserves. Industry stocks would be made available either through the relaxation of minimum stockholding obligations or by directing industry to make compulsory stock draws. The Act provides legal authority to implement demand restraint measures. Specific measures are stipulated in articles 40 and 41 of the Act.
Portugal	Decree Law N° 114/2001 on the Crisis situation and response measures. Decree Law N° 10/2001 on the Petroleum Reserves, as amended in 2001 and in 2004. Decree Law N° 31/2006, new framework law of the petroleum sector.	Emergency Response Organisations These Laws provide the Government of Portugal with powers to set up a NESO, in which the Minister of Economy and Innovation has the leading role.

	Legislation	Powers
Portugal (Continued)	Decree Law N° 10/2001 on the Petroleum Reserves, as amended in 2001 and in 2004.	Stockholding The Law obliges oil companies to hold 70% of Portugal's EU-obligation, based on the consumption of three product categories. The Decree also sets the legal framework for a stockholding agency (EGREP), which has to hold the balance between the industry obligations and the national commitment towards the IEA based on net imports.
	Decree Law N° 10/2001 on the Petroleum Reserves, as amended in 2001 and in 2004.	Implementation of stockdraw and other emergency measures The Law provides the Minister of Economy and Innovation with the statutory power to order a drawdown of industry and agency reserves.
The Slovak Republic	The Act N° 170/2001 on the Emergency Stocks of Crude Oil and Oil Products and on Managing Crude Oil Emergency, as amended in 2006. Resolution 109, Principles and Ways of Managing Crude Oil Emergency.	Emergency Response Organisations The Act provides the Government of the Slovak Republic with powers to set up a NESO, in which the Administration of the State Material Reserves (ASMR) has the leading role. The Resolution outlines specific emergency procedures for oil supply disruptions.
	The Act N° 170/2001, as amended in 2006.	Stockholding The Act obliges the ASMR to hold stocks of three groups of products, crude oil or feedstock, corresponding to 90 days of consumption during the previous calendar year.
	The Act N° 170/2001, as amended in 2006.	Implementation of stockdraw and other emergency measures Under the Act, the ASMR would give a proposal for stock release to the Government of the Slovak Republic in case of a supply disruption. The Act also gives the Government the power to order private companies to draw down their stocks in an emergency. Article 6(2) of the Act stipulates the demand restraint measures available to the Government during an oil crisis.
Spain	The Royal Decree N° 1716/2004 on the Regulating Maintenance Obligation of Minimum Security Stocks, Natural Gas Diversification of Supply Provisioning and Stockholding Agency (CORES). The Royal Decree N° 1194/2004 on the Establishing the Composition of Commission for Crisis Situations. The Law N° 34/1998 on the Hydrocarbons Act.	Emergency Response Organisations These Royal Decrees and Law provide the Government of Spain with powers to set up a NESO, under control of a ministerial committee called the Government Delegate Commission for Crisis Situations (CDGSC).

	Legislation	Powers
Spain (Continued)	The Royal Decree N° 1716/2004 on the Regulating Maintenance Obligation of Minimum Security Stocks, Natural Gas Diversification of Supply Provisioning and Stockholding Agency (CORES). The Law N° 34/1998 on the Hydrocarbons Act.	Stockholding The Royal Decree and Law stipulate stockholding obligations in the following manner: <ul style="list-style-type: none"> • Companies are obliged to hold 45 days of consumption of three product categories, plus a 10% margin. • The public stockholding agency CORES is obliged to hold 45 days of consumption of three product categories, plus a 10% margin.
	The Royal Decree N° 1716/2004 on the Regulating Maintenance Obligation of Minimum Security Stocks, Natural Gas Diversification of Supply Provisioning and Stockholding Agency (CORES). The Royal Decree N° 1194/2004 on the Establishing the Composition of Commission for Crisis Situations. The Law N° 34/1998 on the Hydrocarbons Act.	Implementation of stockdraw and other emergency measures The Royal Decrees and Law provide the Government of Spain with the statutory power to release the reserves held by CORES and companies in crisis situations.
Sweden	The Rationing Act (1978/268). The Oil Crisis Act (1975/197).	Emergency Response Organisations These Acts are the legal authority to establishing and operating NESO. The Sustainable Energy Management team within the Swedish Energy Agency is its core.
	The Contingency Storage of Oil and Coal Act (1984/1049), as amended in 1995 and in 2002.	Stockholding The Act obliges the oil industry to hold stocks, corresponding to at least 25% of consumption or sales during the previous calendar year.
	The Contingency Storage of Oil and Coal Act (1984/1049), as amended in 1995 and in 2002. The Agreement between the Swedish Energy Agency, Swedish Petroleum Institute and six major oil companies.	Implementation of stockdraw and other emergency measures The Act and Agreement provide the Government of Sweden with the statutory power to release the contingency stocks held by industry in crisis situations.
Switzerland	The Federal Law of National Economic Supply of 8th October 1982, as amended in 2001.	Emergency Response Organisations Entitles the Government of Switzerland to take measures in order to ensure the supply of oil in case of serious supply disruptions. Allows the setting up and operation of a NESO to implement IEP measures and respond flexibly to international oil disruptions.

	Legislation	Powers
Switzerland (Continued)	The Federal Law on National Economic Supply of 1982, as amended in 2001. The Ordinance on the Main Principles of Stockpiling of 1983. The Ordinance on Establishing Compulsory Stocks on Fuel Oils and Transport Fuels.	Stockholding The Law and the Ordinances provide for coverage of 4.5 months of net imports of gasoline, diesel and heating oil, and three months for jet fuel. The stockholding obligation is imposed on all oil importers.
	The Federal Law on National Economic Supply of 1982, as amended in 2001.	Implementation of stockdraw and other emergency measures The Law gives power to the Government to order stockdraw of industry stocks.
Turkey	Petroleum Market Law (2003/5015)	Emergency Response Organisations The Law provides the Government of Turkey with powers to set up the National Oil Stock Commission (NOSC: functions as the Turkish NESO), in which the Ministry of Energy and Natural Resources (MENR) has the leading role.
	Petroleum Market Law (2003/5015)	Stockholding The Law stipulates stockholding obligations for oil industry in the following manner: <ul style="list-style-type: none">• Refineries and distributors are obliged to keep at least 20 times of the average supplied daily product amount.• Large consumers are obliged to keep at 15 days of their consumption.
	The National Protection Law No. 79 of 1960, as amended in 1980.	Implementation of stockdraw and other emergency measures The Law provides the Government with a broad range of authority to control company stockdraw.
The United Kingdom	The Energy Act of 1976.	Emergency Response Organisations The Energy Act 1976 provides powers, subject to an Order in Council, for the Secretary of State for Business, Enterprise and Regulatory Reform to regulate or prohibit the production, supply, acquisition or use of fuel where there exists, or is imminent, an actual or threatened emergency in the UK affecting fuel supplies, or in order for the UK to meet its international obligations in the event of a reduction or threatened reduction in fuel supplies. These powers are the basis for the Department for Business, Enterprise and Regulatory Reform's authority to function as the UK NESO.
	The Energy Act of 1976.	Stockholding The Act provides powers for the Secretary of State to direct "any person who...produces, supplies or uses crude liquid petroleum, or petroleum products" to hold stocks of such products based on "quantities...supplied...to the United Kingdom market in past periods".

	Legislation	Powers
The United Kingdom <i>(Continued)</i>	The Energy Act of 1976.	Implementation of stockdraw and other emergency measures The powers provided by the Act allow the Government to implement stockdraw by companies or take other measures.
The United States of America	Executive Order 11912 as amended. The DOE Organization Act. The Energy Policy and Conservation Act (EPCA) as amended in 1990, 1992 and 1998, Sections 251-254. EPCA, Section 254. The Energy Supply and Environmental Co-ordination Act, Section 11. The Federal Energy Administration Act, Section 13.	Emergency Response Organisations The President, by the Executive Order, authorises the DOE to function as the NESO. Authorises the NESO to transmit to the IEA information and data related to the energy industry necessary to carry out the I.E.P. Authorises the NESO to collect confidential or proprietary oil supply information or data from U.S. oil companies.
	EPCA, Section 151-167.	Stockholding These Sections of the EPCA provide for the establishment of the Strategic Petroleum Reserve (SPR) to be available for the purposes of reducing the impact of future disruptions in supplies of petroleum and fulfilling obligations under the I.E.P.
	EPCA, Section 3(8).	Implementation of stockdraw and other emergency measures This section defines severe energy supply interruption, a key criterion the President is to use in deciding whether a drawdown of the SPR is called for.

ANNEX IV

DEVELOPMENTS IN IEA EMERGENCY MECHANISMS 1974-2007

This Annex outlines the main developments contributing to the emergency preparedness of the IEA since the plan for its creation was put forward at the Washington Energy Conference of February 1974.

1974

February-October: The Washington Energy Conference chaired by Mr. Henry Kissinger and subsequent work by the Energy Co-ordination Group in Brussels resulted in the negotiation of the Agreement on an International Energy Program (The I.E.P. Agreement) as a legally binding international agreement.

November: Sixteen of the 24 member countries of the Organisation for Economic Co-operation and Development (OECD) signed the I.E.P. Agreement and formed the International Energy Agency (IEA), an inter-governmental autonomous agency of the OECD. The sixteen signatories of the I.E.P. are: Austria, Belgium, Canada, Denmark, Germany, Ireland, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

The I.E.P. Agreement outlines three main objectives: to reduce IEA member countries' dependence on imported oil; to secure a commitment from member countries to hold minimum levels of emergency reserves (initially equal to 60 days of net imports); and to establish an agreement to share available oil supplies in the event of a major supply disruption.

1975

February: Norway agreed to participate in the work of the IEA under the terms of a special agreement.

The Industry Advisory Board (IAB) was established. In the event of the activation of the emergency system, the IAB is responsible, through its Industry Supply Advisory Group (ISAG) for the practical execution of the allocation programme under the supervision of the IEA.

May: The first IEA Ministerial meeting reviewed the world energy situation, confirmed that an emergency response system was in place which could be activated whenever needed and set guidelines for the Agency's future work.

September: IEA member countries agreed to increase their emergency oil reserve commitment from 60 to 70 days of net oil imports by the beginning of 1976.

1976

October: The first Allocation Systems Test (AST-1) was carried out, with the goal of assessing the effectiveness of technical machinery, communications and procedures necessary in an emergency to implement the IEP oil sharing programme.

November: IEA countries agreed to increase their emergency oil reserve commitment to 90 days of net imports by the beginning of 1980.

1977

January: New Zealand joined the IEA.

July: Greece joined the IEA.

October: The second IEA Ministerial meeting agreed on *12 Principles for Energy Policy*; it also initiated the annual review of the energy policies and programmes of member countries.

1978

April: The AST-2 was carried out and, for the first time, involved reporting company affiliates and the National Emergency Sharing Organisation (NESO) of member countries.

December: In response to the cessation of exports from Iran following the revolution, the IEA activated the Emergency Data System. During its period of activation, disrupted supplies remained above the threshold for triggering the IEP Emergency Sharing System. The world oil market is estimated to have lost 5.6 mb/d of gross peak supply during this period.

1979

March: Given the tightness of oil supplies, the Governing Board agreed to guidelines for member countries to reduce oil consumption.

May: Australia joined the IEA.

October: The AST-3 was carried out. The scope of the disruption assumed during this test was considerably larger than in the first two tests. Communications between the ISAG and NESOs improved as the prohibition of direct contact between these two groups was eliminated. Furthermore, the addition of a deputy manager and a marine adviser strengthened the ISAG.

1980

July: The Governing Board established the IEA Dispute Settlement Centre, which provided a voluntary system of binding arbitration for disputes among participating oil companies arising out of oil supply emergency actions.

October: The Governing Board agreed on measures to reduce oil consumption by some 5%, IEA-wide. This in response to the Iran-Iraq war that broke out in late September. The gross peak supply loss was estimated at 4.1 mb/d.

1981

July: Portugal joined the IEA.

December: A Decision on Preparation for Future Supply Disruptions was reached. Since disruptions in oil supply which do not reach the level required to trigger the emergency allocation system could cause damage to member countries' economies through sharp oil price increases a new monthly information system on short-term supply prospects was introduced.

1983

May: The AST-4 was carried out. An improved data processing system designed to handle voluntary actions by participating oil companies to reallocate oil was tested. For the first time voluntary offers of oil from NESOs on behalf of non-reporting companies played an important role in balancing allocation rights and obligations.

1984

July: The Governing Board agreed to establish procedures to enable governments to implement promptly early co-ordinated stockdraw and other measures in a significant supply disruption. The procedures were termed Co-ordinated Emergency Response Measures (CERM).

1985

October-November: The AST 5 took place. A number of NESOs simulated the drawdown of oil stocks (government and company) for the first time. New procedures for resolving trade discrepancies between companies and countries were tested. Also, all initial data transmission and processing procedures were accelerated.

1988

January: The first CERM test was conducted during January and February.

July: The CERM Operations Manual was adopted by the Governing Board.

October: The AST-6 was held in October and November.

In this test, for the first time, countries and companies were given the option to have a direct computer-to-computer link with the IEA for submitting emergency questionnaires. Also, a computer software version of the questionnaires was developed to speed up producing, receiving and processing questionnaire information.

1990-1991

August 1990-February 1991: The Iraqi invasion of Kuwait on 2nd August removed some 4.3 mb/d of oil from the market. The IEA Governing Board agreed on 9th August that individual countries should, where possible, strengthen their individual efforts to increase available oil supplies. However, given the risk of a further supply loss from the Gulf in the event of hostilities, the Governing Board, with the participation of France, Finland (these two countries not yet members of the IEA then) and Iceland, unanimously decided in January 1991 on a Contingency Plan to make available to the market 2.5 mb/d of oil. Stockdraw accounted for some four fifths of the 2.5 mb/d response. The remaining one-fifth (0.5 mb/d) consisted of demand restraint (0.4 mb/d), fuel-switching (0.1 mb/d), and increased indigenous production.

On January 28th 1991, the Governing Board decided the Contingency Plan would remain in effect and would be implemented flexibly, according to supply/demand developments. Seventeen OECD member countries made stocks available according to their national situation. Some countries offered oil to the market from strategic stocks, whereas others reduced industry stockholding obligations, and yet other countries made arrangements with private companies for oil to be made available to the market.

1992

January: Finland joined the IEA.

August: France joined the IEA.

October-November: The AST-7 took place, in this test Finland, France and Germany's eastern *Länder* participated for the first time.

Based on the experience of the Gulf Crisis and the AST-7, a review of IEA emergency response measures was initiated and a revision of the Emergency Management Manual was started.

1994

February: IEA procedures for stockholding and stockdraw were reviewed at a Workshop involving IEA member countries, the Czech Republic, Hungary, the Republic of Korea, Thailand, and oil industry experts of the IEA Industry Advisory Board.

The IEA Governing Board adopted a revised Emergency Management Manual covering all operations required by the Secretariat, Governments and oil companies in a severe emergency.

1995

February: A Governing Board Decision confirmed the need to enhance emergency response flexibility and emphasised that priority should be given to the use of co-ordinated stockdraw and other measures, regardless of the size of the disruption and before activation of the allocation mechanisms.

October-November: A comprehensive test of the emergency data system was held involving all IEA governmental emergency departments and international oil companies operating within IEA member countries.

1996

June: The IEA 'Conference on Long-Term Oil Security' reviewed IEA strategy against the background of oil security as a global concern.

1997

April: The IEA 'Global Oil Security Conference' involved participation by ten non-member countries and several non-member country regional energy organisations. Non-member country participants were briefed on a range of IEA emergency response measures.

June: Hungary joined the IEA.

1998

May: The seminar: ‘The Effects of the Oil Price Drop of 1997/98’ examined the short-term and potential long-term effects of a sustained price drop on oil-producing countries as well as oil consumers.

November: The Emergency Response Exercise (ERE) 98 was held. Its main objectives were to train member government representatives and oil company personnel in IEA emergency procedures. The exercise included the preparation of a three-stage IEA emergency response over a three-week period. This was followed up by training and discussions in Paris. It included a surprise scenario exercise.

1999

September: An Oil Stockholding Seminar and a two-stage Disruption Simulation Exercise were held as part of the follow-up work of ERE 98.

The main objective of the seminar was to assess the current IEA stock situation and develop a strategy for the maintenance and use of emergency stocks in a future oil crisis. The purpose of the Disruption Simulation Exercise was to use hypothetical scenarios in a real-time setting to enhance understanding of the probable development of market reactions in an emergency, with a view to improving the speed and effectiveness of an IEA emergency response.

2000

April: An *ad hoc* informational meeting of the SEQ was held on the oil supply situation of Serbia/Montenegro/Kosovo in response to the oil embargo initiated by NATO, the European Union and Bulgaria, in an effort to deny oil to Yugoslavia. The use of an embargo on oil deliveries by (some) IEA member and applicant countries in a collective manner was unprecedented.

May: With the IEA/ASCOPE Seminar on Asian Oil and Energy Security held in Kuala Lumpur, Malaysia, the IEA strengthened ties with non-member countries, especially those with increasing consumption of oil.

2001

February: The Czech Republic joined the IEA.

April: The IEA welcomed the decision by the Chinese government to build emergency oil stocks which was announced during a joint IEA-China “Workshop on Emergency Oil Stock Issues” in Paris.

2002

March: Korea joined the IEA. The second Emergency Response Exercise (ERE 2) took place in Paris.

October: The Governing Board approved the Initial Contingency Response Plan. This flexible plan was developed in order to facilitate rapid decision-making by the Governing Board during an oil supply crisis.

2004

The third Emergency Response Exercise (ERE 3) took place in Paris, with simulation exercises involving Governing Board members and representatives from ten non-IEA countries.

January: Responding to India's interest in emergency stockholding, the IEA and India shared information at a workshop on 'Emergency Oil Stock Issues' in New Delhi, India.

April: The IEA shared its expertise with Asian countries during a joint IEA/ASEAN/ASCOPE workshop held in Cambodia on 'Oil Supply Disruption Management Issues'.

2005

September-December: On 2 September 2005, in the immediate aftermath of Hurricane Katrina in the Gulf of Mexico, the IEA announced the agreement of member countries to make available to the market the equivalent of 60 million barrels of oil. It was estimated that the gross peak supply loss reached 1.5 mb/d. The announcement came only 48 hours after the hurricane struck, thus demonstrating the ability of the IEA to react swiftly to a crisis. The Collective Action was officially terminated on 31st December, 2005.

2006

June: Responding to the increased dependence on natural gas in IEA countries, the IEA held a 'Workshop on Security of Gas Supply'.

2007

May: The Slovak Republic was invited to join the IEA.

September: The IEA/ASEAN Workshop on Emergency Oil Stockholding was held in Bangkok, Thailand.

October: Poland was invited to join the IEA.

December: Officials from China and India attend IEA committee meetings.

ANNEX V

LIST OF ACRONYMS

AEUB	Alberta Energy and Utilities Board (Canada)
ANRE	Agency for Natural Resources and Energy (Japan)
APETRA	<i>Agence de Pétrole</i> (Stockholding agency in Belgium)
APM	Administered Price Mechanism (India)
APSA	ASEAN Petroleum Security Agreement
ARM	Material Reserves Agency (Stockholding governmental body in Poland)
ASCOPE	ASEAN Council on Petroleum
ASEAN	Association of Southeast Asian Nations
ASMR	Administration of the State Material Reserves (Stockholding governmental body in the Czech Republic)
	State Material Reserves (Stockholding governmental body in the Slovak Republic)
AWP	Adria-Wien-Pipeline (crude oil pipeline in Austria)
BAFA	<i>Bundesamt für Wirtschaft und Ausfuhrkontrolle</i> (Federal Office of Economic Affairs and Export Control, Germany)
BERR	Department for Business, Enterprise and Regulatory Reform (The United Kingdom)
BMWi	<i>Bundesministerium für Wirtschaft und Technologie</i> (Federal Ministry of Economics and Technology, Germany)
BTC	Baku-Tbilisi Ceyhan (crude oil pipeline in Azerbaijan, Georgia and Turkey)
CAPPO	Czech Association of Petroleum Industry and Trade

CDGSC	Government Delegate Commission for Crisis Situations (Spain)
CEI	Inter-Ministerial Economic Commission (Austria)
CEL	Central European Line (crude oil pipeline in Italy and Switzerland)
CEPRO	Oil products pipeline and storage operator in the Czech Republic
CEPS	Central European Pipeline System (oil product pipeline in Belgium, Germany and Luxembourg)
CERM	Co-ordinated Emergency Response Measures
CLC	<i>Companhia Logística de Combustíveis</i> (Oil transportation company in Portugal)
CLH	<i>Compañía Logística de Hidrocarburos S.A.</i> (Oil transportation and storage company in Spain)
CNE	National Energy Commission (Spain)
CNEE	<i>Conselho Nacional de Emergência Energética</i> (National Council for Energy Emergency in Portugal)
CNOOC	China National Offshore Oil Corporation
CNPC	China National Petroleum Corporation
CNPCE	National Committee of Civil Emergency Planning (Spain)
CORES	<i>Corporación de Reservas Estratégicas de Productos</i> (Stockholding agency in Spain)
COVA	<i>Centraal Orgaan Voorraadvorming Aardolieproducten</i> (Stockholding agency in the Netherlands)
CPEE	<i>Comissão de Planeamento Energético de Emergência</i> (Emergency Energy Planning Commission, Portugal)
CPSSP/SAGESS	<i>Comité Professionnel des Stocks Stratégiques Pétroliers / Société Anonyme de Gestion des Stocks de Sécurité</i> (Stockholding agency in France)
CRT	Crisis Reaction Team (Switzerland)
CSREM	National Energy and Mining Resources Committee (Spain)
DEA	Danish Energy Authority
DFS	Designated Filling Stations (The United Kingdom)
DGEG	Directorate General of Energy and Geology (Portugal)
DGEMP	General Directorate for Industry and Raw Materials (France)
DHS	Department of Homeland Security (The United States of America)
DIREM	Directorate for Energy and Mineral Resources (France)

DISSC	Department for Infrastructures and Monitoring of Crisis Situations (Spain)
DMM	Donges-Melun-Metz (oil product pipeline in France)
DOE	Department of Energy (The United States of America)
DOPCO	Deahan Oil Pipeline Corporation (Republic of Korea)
DPP	Directorate of Petroleum Policy (Greece)
EB	Energy Bureau (People's Republic of China)
EBV	<i>Erdölbevorratungsverband</i> (Stockholding agency in Germany)
EC	European Commission
EGREP	<i>Entidade Gestora de Reservas Estratégicas de Produtos Petrolíferos</i> (Stockholding agency in Portugal)
ELG	Erdöl-Lagergesellschaft (Stockholding agency in Austria)
EMRA	Energy Market Regulatory Authority (Turkey)
EO	Oil Emergency Organisation (Norway)
EPA	Environmental Protection Agency (The United States of America)
EPCA	Energy Policy and Conservation Act (The United States of America)
ERE	Emergency Response Exercise
ERR	Emergency Response Review
ESAB	Emergency Supplies Allocation Board (Canada)
EU	European Union
FDO	<i>Foreningen Danske Olieberedskabslagre</i> (Stockholding agency in Denmark)
FEMP	Federal Energy Management Program (The United States of America)
FIOD/ECD	Fiscal Intelligence and Control Service/Economic Inspection Service (The Netherlands)
FONES	Federal Office for National Economic Supply (Switzerland)
FSM	Forecourt Supply Management (The United Kingdom)
FSU	Former Soviet Union
GDP	Gross Domestic Product
I.E.P.	International Energy Program
IAB	Industry Advisory Board
IEA	International Energy Agency

IEA Act	International Energy Agreement Act of 1976 (New Zealand)
IKL	Ingolstadt-Kralupy-Litvínov (crude oil pipeline in Germany and the Czech Republic)
IOC	Indian Oil Corporation
ISAG	Industry Supply Advisory Group
ISPRL	Indian Strategic Petroleum Reserves Limited
JOGMEC	Japan Oil, Gas and Metals National Corporation (Stockholding governmental body in Japan)
KGV	<i>Koordinierungsgruppe Versorgung</i> (Supply Co-ordination Group, Germany)
KNOC	Korea National Oil Corporation (Stockholding governmental body in Korea)
KVR	<i>Krisenversorgungsrat</i> (Emergency Supply Council, Germany)
LFE Act	Liquid Fuel Emergency Act (Australia)
LHP	Le Havre to Paris (oil product pipeline in France)
LOOP	Louisiana Offshore Oil Port (The United States of America)
LPG	Liquified Petroleum Gas
MÁSz	Hungarian Petroleum Association
MDPM	Market Determined Price Mechanism
MENR	Ministry of Energy and Natural Resources (Turkey)
MERO	<i>Mezinárodní Ropovody</i> (crude oil pipeline and storage operator in the Czech Republic)
METI	Ministry of Economy, Trade and Industry (Japan)
MMP	Rhine-Main Pipeline (oil product pipeline in the Netherlands and Germany)
MOCIE	Ministry of Commerce, Industry and Energy (Republic of Korea)
MOL	Hungarian Oil & Gas Company
MOT	Maasvlakte Oil Terminal (The Netherlands)
MPE	Ministry of Petroleum and Energy (Norway)
MSZKSZ	Hungarian Hydrocarbon Stockpiling Association (Stockholding agency in Hungary)
NCS	Norwegian Continental Shelf
NDRC	National Development and Reform Commission (People's Republic of China)
NELP	New Exploration and Licensing Policy (India)

NEP-F	National Emergency Plan for Fuel (The United Kingdom)
NESA	National Emergency Supply Agency (Stockholding agency in Finland)
NESO	National Emergency Sharing Organisation
NGLs	Natural Gas Liquids
NOB	National Oil Board (Austria)
NORA	National Oil Reserves Agency (Stockholding governmental body in Ireland)
NORC	National Oil Reserve Centre (People's Republic of China)
NORO	National Oil Reserve Office (People's Republic of China)
NOSC	National Oil Stock Commission (Turkey)
NOSEC	The National Oil Supplies Emergency Committee (Australia)
NRCan	Natural Resources Canada
NYMEX	New York Mercantile Exchange
NZRC	New Zealand Refining Company
OAPEC	Organization of Arab Petroleum Exporting Countries
ODC	<i>Oléoducs de Défense Commune</i> (oil product pipeline in France)
OECD	Organisation for Economic Co-operation and Development
OIDB	Oil Industry Development Board (India)
OLPP	<i>Operator Logistyczny Paliw Płynnych</i> (Product pipeline and storage operator Poland)
OMV	<i>Österreichische Mineralölverwaltung</i> (Oil Company Austria)
ONELG	Office of the National Energy Leading Group (People's Republic of China)
OPEC	Organization of Petroleum Exporting Countries
PAC	Provincial Advisory Committee (Canada)
PADD	Petroleum Administration for Defense District (The United States of America)
PDR	Petroleum Demand Restraint Act of 1981 (New Zealand)
PIAC	Petroleum Industry Advisory Committee (Canada)
PMR	Mediterranean-Rhone pipeline (oil product pipeline in France)
PPP	Purchasing power parity
RAPL	Rotterdam-Antwerp Pipeline (crude oil pipeline in the Netherlands and Belgium)

RRP	Rotterdam-Rhine Pipeline (crude oil pipeline in the Netherlands and Germany)
SEQ	Standing Group on Emergency Questions
Sinochem	China National Chemicals Import and Export Corporation
Sinopec	China Petroleum and Chemical Corporation
SNP	South-North Pipeline (oil product pipeline in Korea)
SOE	State Oil Enterprise
SPR	Strategic Petroleum Reserve
SPSE	South European Pipeline (crude oil pipeline in France and Germany)
TAL	TransAlpine (crude oil pipeline in Italy, Austria and Germany)
TAL-IG	Trieste to Ingolstadt (crude oil pipeline in Italy, Austria and Germany)
TEMGD	Turkish Emergency Management General Directorate
TMPL	Trans Mountain Pipeline (crude oil and oil product pipeline in Canada)
TPES	Total primary energy supply
TSO	Transmission System Operator
UKOP	UK Oil Pipelines Ltd.
UKPIA	UK Petroleum Industry Association
WEO	World Energy Outlook

Regional Oil Infrastructure Map of North America



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Regional Oil Infrastructure Map of Europe



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