




International
Energy Agency

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Implementing Energy Efficiency Policies

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Are IEA member countries on track?



Implementing Energy Efficiency Policies

2009

Are IEA member countries on track?

Concerns about energy security, climate change and rising energy costs make it imperative for all countries to significantly improve their energy efficiency. To assist them in doing so, the IEA has proposed 25 energy efficiency recommendations. These recommendations could, if implemented globally without delay, reduce global CO₂ emissions by 8.2 gigatonnes per year by 2030 – equivalent to roughly two-times the amount of current EU CO₂ emissions.

Yet are IEA member countries doing enough to capture the full potential benefits from energy efficiency policy? This innovative book provides the first assessment of IEA member countries' progress on implementing energy efficiency policy. Using a rigorous evaluation process, it finds that while these countries are implementing a full range of energy efficiency measures, their efforts fall short. Pressing energy, climate and financial challenges require even more energy efficiency policy action – particularly in the transport sector. To address this action gap, IEA member countries must urgently ramp up their energy efficiency policy efforts.

The IEA and its member countries can play a critical role in promoting the Agency's call for “**Worldwide Implementation Now**” (W.I.N.) of energy efficiency. What will it be? W.I.N or lose the opportunity?



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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-eight of the thirty OECD 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 international oil markets.
- To provide data on other aspects of international energy markets.
- 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, including relating to climate change.

IEA member countries:

Australia
Austria
Belgium
Canada
Czech Republic
Denmark
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Japan
Korea (Republic of)
Luxembourg
Netherlands
New Zealand
Norway
Poland
Portugal
Slovak Republic
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States

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.

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International Energy Agency (IEA)

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Foreword

The critical energy challenges of climate change, energy security and economic development grow more pressing by the day. In response, many politicians and decision-makers have voiced support for energy efficiency as the most cost-effective strategy to tackle these challenges.

In this book, the International Energy Agency (IEA) Secretariat asks ‘how have words been translated into action?’ ‘Are IEA member countries on track to maximise their implementation of energy efficiency policy?’ To answer these questions, this book presents a comprehensive and innovative evaluation of energy efficiency policy implementation in the 28 member countries of the IEA. Specifically, this book reports on countries’ progress with implementing the IEA 25 energy efficiency recommendations and equivalent measures. Acting on these recommendations is considered to be indicative of a country’s progress towards establishing a comprehensive and effective set of national energy efficiency policies.

A key theme of my tenure as Executive Director of the IEA is to promote Worldwide Implementation Now (W.I.N) of energy efficiency. I hope this book will play an important role in encouraging all IEA member countries to get on track to capture the full benefits of energy efficiency improvements. What will it be? W.I.N. or lose the opportunity?

Nobuo Tanaka
Executive Director

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This book would not have been possible without the efforts and contributions from IEA member countries.

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Executive summary

■ *Energy efficiency plays a critical role in addressing energy security, environmental and economic challenges.*

■ *The IEA recommendations present an opportunity for significant energy savings.*

■ *This analysis investigates progress with implementing energy efficiency policies in IEA countries up to 31 March 2009.*

■ *There are many positive examples of energy efficiency policy implementation.*

■ *Yet the current suite of energy efficiency policies is not enough.*

■ *No IEA country has fully or substantially implemented more than 57% of the IEA recommendations, and two countries report less than 10% substantial implementation.*

The imperative to significantly improve energy efficiency remains a priority for all countries. Recent meetings of the G8 leaders and the IEA Ministerial Meeting reaffirmed the critical role that improved energy efficiency can play in addressing energy security, environmental and economic challenges.

To support governments with their implementation of energy efficiency, the IEA recommended the adoption of specific energy efficiency policy measures to the G8 summits in 2006, 2007 and 2008. The consolidated set of recommendations to these summits covers 25 fields of action across seven priority areas: cross-sectoral activity, buildings, appliances, lighting, transport, industry and power utilities¹. The IEA estimates that if implemented globally without delay, the proposed actions could save around 8.2 Gt CO₂/year by 2030 – equivalent to twice the European Union's current yearly emissions.

At the 2007 IEA Ministerial Meeting, Energy Ministers placed energy efficiency high on the agenda. They “strongly welcomed” the energy efficiency recommendations and invited the IEA “to evaluate and report on the energy efficiency progress of IEA member and key non-member countries”.

This report evaluates the progress of all IEA member countries in implementing energy efficiency policy, including the 25 IEA recommendations. The report also addresses whether IEA countries are on track to maximise their implementation of energy efficiency policies. Information in this report is current up to 31 March 2009. Conclusions are based on country completion of a detailed questionnaire measuring energy efficiency policy implementation and subsequent IEA review and analysis. In November 2009, the Secretariat intends to conduct an evaluation of the progress reporting process.

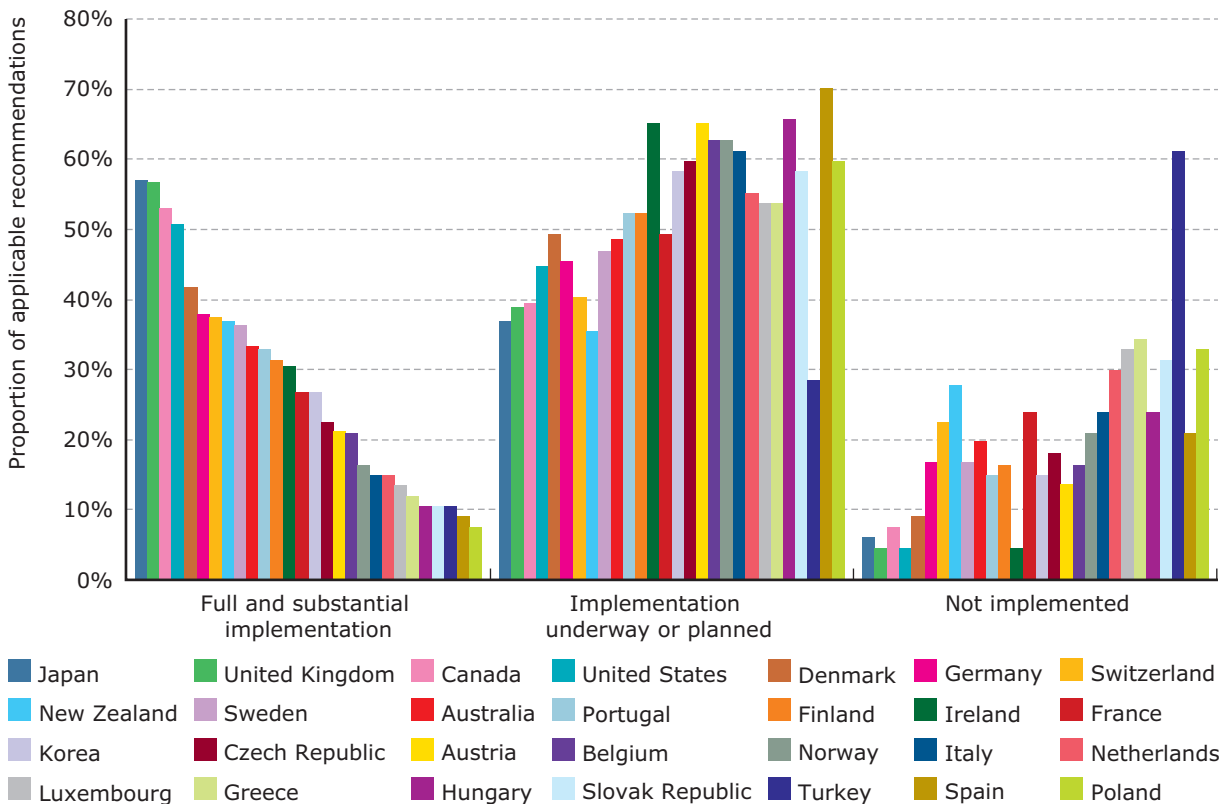
The IEA finds many positive examples of energy efficiency policy implementation in IEA member countries. Governments are investing in a wide array of well-known energy efficiency policies from national strategies to minimum energy performance standards for appliances and equipment. There are also signs of energy efficiency policy innovations. These include the widespread development of energy efficiency strategies and action plans, innovative financial instruments, active policies promoting energy efficiency in buildings, the extensive adoption of standby power policies and policies to phase out inefficient lighting, measures to promote proper inflation of tyres and innovative policies to create incentives for utilities to promote energy efficiency.

But is the current suite of energy efficiency policies enough? Are IEA member countries on track to meet pressing economic, environmental and energy security challenges? The answer to this is no. Evidence in the IEA publications, *World Energy Outlook 2008* and *Energy Technology Perspectives 2008* suggests that there is a need to increase the rate of energy efficiency improvement significantly and urgently across all countries, even beyond what can be achieved with the current 25 IEA recommendations.

There is certainly room for further energy efficiency action in IEA member countries. For example, no IEA member country has ‘fully’ or ‘substantially’² implemented more than 57% of the relevant IEA recommendations, and two countries report less than 10% ‘substantial implementation’ (Figure 1). Another way of looking at this is that even in the countries with the most active energy efficiency policies, around 40% of the potential³ energy savings

1. For further information on the full set of recommendations, see http://www.iea.org/textbase/papers/2008/cd_energy_efficiency_policy/index_EnergyEfficiencyPolicy_2008.pdf and Annex 1.

Figure 1
Level of implementation of applicable IEA recommendations, all IEA countries, all recommendations



Note: Proportion of all recommendations minus those recommendations considered 'not-relevant'.

No IEA country has 'fully' or 'substantially' implemented more than 57% of the applicable IEA recommendations. Two countries report that less than 10% of the recommendations have been 'substantially implemented'.

■ *On a sectoral basis, across all IEA countries, policies for transport stand out as having the least 'substantial implementation'.*

■ *Countries need to increase the rate of energy efficiency improvement significantly and urgently.*

■ *Energy efficiency faces pervasive barriers.*

from the IEA recommendations, or measures that achieve similar outcomes, remains to be captured. On a sectoral basis, across all IEA member countries, policies for transport stand out as having the least substantial implementation (see Figure 2) – although in transport, many policies are 'planned'. The IEA concludes that all its member countries urgently need to expand their implementation of energy efficiency policies, including the IEA recommendations.

Why is it that IEA member countries have not implemented the full suite of cost-effective energy efficiency policies or equivalent measures their leaders endorsed? Energy efficiency continues to face pervasive barriers including lack of access to capital for energy efficiency investments, insufficient information, principal-agent problems and externality costs that are not reflected in energy prices. Political commitment to maximising implementation of energy efficiency policies may also have been challenged by the current economic crisis. Energy efficiency programmes must compete for funding with other priorities such as employment, health and social security. When making decisions about how to allocate

2. That is, considering only those recommendations that have been 'fully' or 'substantially' implemented.
 3. That is, cost-effective technical potential.

■ Energy efficiency is having to compete alongside other priorities.

■ But energy efficiency can deliver significant co-benefits.

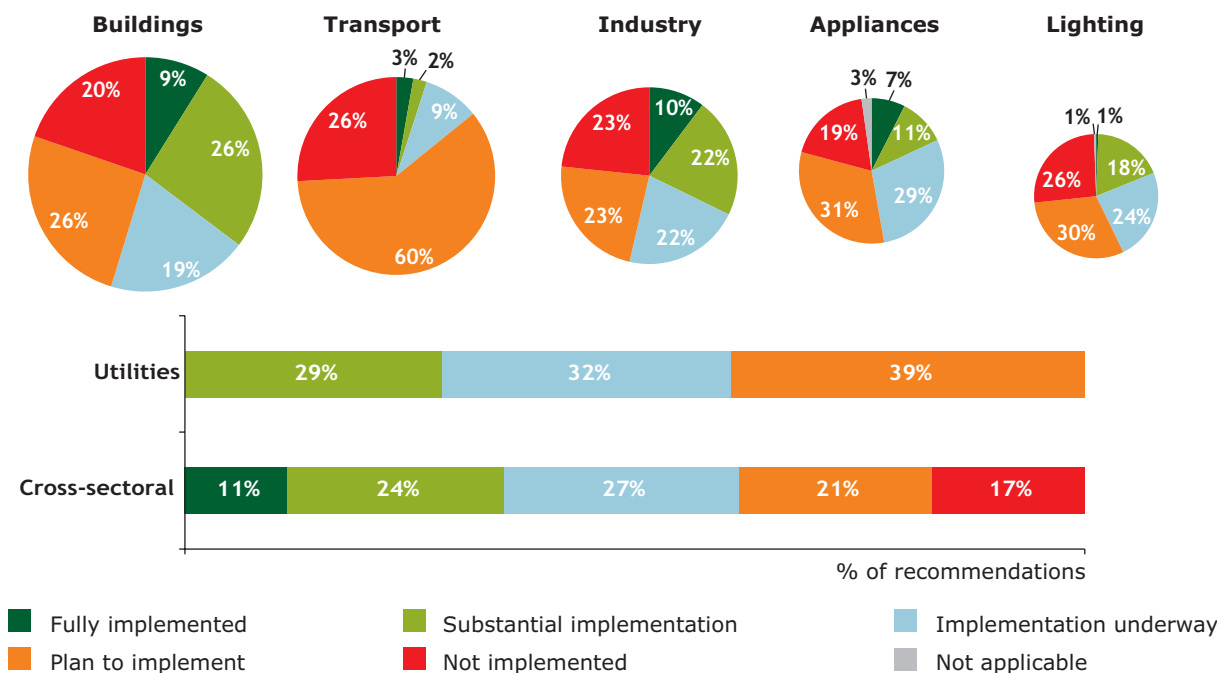
■ The IEA calls for Worldwide Implementation Now of energy efficiency.

limited resources, governments should keep in mind that the benefits of implementing energy efficiency extend beyond energy security and climate change mitigation. Experience shows that energy efficiency investments can deliver significant co-benefits - including job creation and health improvements. Several countries have recognised these co-benefits and allocated substantial stimulus funds to energy efficiency efforts. The IEA supports this increase in funding for energy efficiency and urges other governments to enhance the resources allocated to energy efficiency. Allocating resources to energy efficiency can achieve many policy objectives at the same time.

This report shows that IEA member countries are implementing a full range of energy efficiency activities. However, more action is needed to ensure IEA countries are on track to meet pressing energy-related challenges. To address the action gap, IEA member countries need to urgently extend their efforts in energy efficiency policy.

The IEA and its member countries can play a critical role in promoting “Worldwide Implementation Now” (W.I.N.) of energy efficiency. What will it be? W.I.N. or lose the opportunity?

Figure 2 Progress with implementing IEA 25 energy efficiency recommendations, all recommendations, all IEA member countries



Note: Pie charts have been scaled to reflect relative global energy savings potential of each sector. For example, lighting recommendations are estimated to deliver roughly one-third the energy savings of buildings. Because the IEA does not calculate energy efficiency potential for the utilities and cross-sectoral recommendations, these are presented as bar charts.

Across all IEA member countries, policies for transport stand out as having the least substantial implementation.

Introduction

Background

The imperative to significantly improve energy efficiency remains a priority for all countries. Recent meetings of the G8 leaders⁴ and the 2007 IEA Ministerial Meeting⁵ reaffirmed the critical role that improved energy efficiency can play in addressing energy security, environmental and economic challenges.

The IEA recommended the adoption of a broad range of specific energy efficiency policy measures to the G8 summits in 2006, 2007 and 2008. The consolidated set of recommendations to these summits covers 25 fields of action across seven priority areas: cross-sectoral activity, buildings, appliances, lighting, transport, industry and power utilities⁶.

Implementing the IEA energy efficiency recommendations can lead to significant cost-effective energy and carbon dioxide (CO₂) savings. The IEA estimates that if implemented globally without delay, the proposed actions could cumulatively save around 8.2 giga tonnes (Gt) of CO₂/year by 2030. This is equivalent to about double the current CO₂ emissions in the European Union (EU). Taken together, these measures set out an ambitious road map for improving energy efficiency on a global scale.

Political will to implement the IEA energy efficiency recommendations is high. G8 leaders meeting in St Petersburg (2006) agreed to examine the recommendations in more detail. In Heiligendamm (2007), they welcomed the recommendations and agreed to “take forward the concrete recommendations on energy efficiency presented by the IEA and consider drawing on these when preparing national energy efficiency plans”. In 2008 at Hokkaido-Toyako, G8 leaders made their strongest statement yet: they committed to “maximize implementation of the IEA 25 recommendations on energy efficiency.”

At the 2007 IEA Ministerial Meeting, Energy Ministers also placed energy efficiency high on the agenda. They “strongly welcomed” the energy efficiency recommendations and invited the IEA “to evaluate and report on the energy efficiency progress of IEA member and key non-member countries”.

The IEA 25 energy efficiency recommendations

The IEA 25 energy efficiency recommendations were developed under the G8 Gleneagles Plan of Action. All recommendations drew on extensive ongoing IEA technical/economic modelling, reviews of international policy experience, literature reviews and dialogues with stakeholders.

All recommendations were subject to a rigorous set of criteria. That is, a proposal was justified if it:

- was likely to save a large amount of energy at low cost and with considerable economic advantages to consumers;
- addressed existing market imperfections or barriers by enabling consumers to make informed decisions and fully benefit from their investments;
- addressed a significant gap in existing policy;
- was supported by a degree of agreement that internationally coordinated actions lower costs to governments, manufacturers and consumers.

IEA member countries have expressed implicit support for effective government action to implement the 25 recommendations where appropriate to national circumstances.

4. 2005 Gleneagles, 2006 St Petersburg, 2007 Heiligendamm, 2008 Hokkaido-Toyako and 2009 l'Aquila.

5. Paris, May 2007.

6. For further information on the full set of recommendations, please see http://www.iea.org/textbase/papers/2008/cd_energy_efficiency_policy/index_EnergyEfficiencyPolicy_2008.pdf.

The 25 recommendations are considered by the IEA Secretariat and member countries as a useful compilation of best-practice policies. Progress toward their full implementation is considered to be indicative of country progress towards establishing a comprehensive and effective set of national policies to enhance energy efficiency and address current policy gaps. Individual countries should maximise their implementation without delay, when appropriate to national circumstances.

The IEA Secretariat draws the readers' attention to two additional important observations about the set of recommendations and energy efficiency policy in general. First, the recommendations should be regarded as a cohesive suite of measures because the barriers to energy efficiency are pervasive, dispersed and complex. As such, if governments want to significantly improve energy efficiency, the IEA considers that no single policy implemented in isolation will be effective at achieving this aim. The IEA Secretariat recommends that governments consider implementing the full set of measures. Second, regarding energy efficiency policy in general, implementation is key. Consequently, this document responds to the request to report on progress with implementing energy efficiency policy, including the IEA recommendations.

Purpose and report structure

The overall purpose of this report is to assist IEA member countries to improve their energy efficiency. In doing so, this report aims to encourage countries to implement all cost-effective energy efficiency policy with a particular focus on the IEA 25 recommendations.

The report provides an overview of the areas of energy efficiency policy where the IEA considers a country is on track to maximising its implementation effort, and where further action is required.

The report is divided into several sections. The first section provides an overview of the current energy efficiency policy context across all IEA member countries. This is followed by a section that summarises how well IEA member countries are progressing with implementing the IEA 25 energy efficiency policy recommendations, or other measures that achieve similar outcomes. The section outlines the policy strengths and innovations, as well as the challenges requiring further activity across the whole energy efficiency policy portfolio. It also summarises the level of progress in all member countries with implementing the IEA 25 recommendations. The results for each of the IEA countries are the subject of the 'Country Reports' section. Each country report provides an overview of the country's energy efficiency policy context, specific policy innovations and areas requiring further action. The report concludes with a call for further, targeted action.

Approach

Information in this report is current up to 31 March 2009.

Analysis is based on information gathered from several sources:

- the IEA Energy Efficiency Policies and Measures database⁷ ;
- country responses to the IEA questionnaire relating to progress with implementing the IEA 25 energy efficiency recommendations and subsequent IEA review;
- the IEA energy efficiency indicators database;
- IEA in-depth energy policy reviews;
- regular country energy efficiency policy reports submitted to the IEA Energy Efficiency Working Party;
- IEA expert knowledge of current policy and recent developments in IEA countries.

The approach used in this report applies a five-step colour grading system (Table 1).

7. http://www.iea.org/textbase/pm/index_effi.asp

Table 1
Colour grading system used for reporting progress with implementing energy efficiency policies

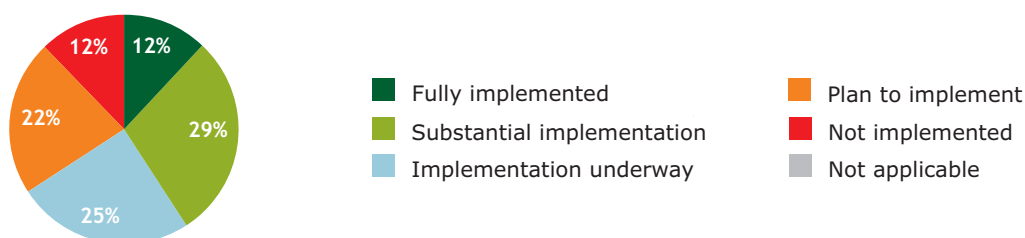
Progress level	Description
Fully implemented	The IEA Secretariat considers that the IEA energy efficiency policy recommendation or that a similar policy has been fully implemented according to defined criteria and delivered the expected outcomes.
Substantial implementation	The policy recommendation has been implemented with some minor limitations or an alternative policy has delivered the expected outcomes to a significant degree.
Implementation underway	Either: The policy recommendation is being implemented and the policy is at a stage where regulations/instruments have been developed and implemented but with significant limitations; Or, a similar policy has partially delivered the expected outcomes.
Plan to implement	The implementation of the policy recommendation, or a policy likely to deliver similar outcomes, is planned. This is indicated by regulations/instruments that have already been developed but are not yet operational.
Not implemented	
Not applicable	Policy recommendation/area demonstrated to be not applicable.

For each recommendation, the IEA defined criteria for achieving each progress level⁸.

All IEA countries completed a self-evaluation questionnaire, and used the five-step grading system to evaluate their own progress with implementing the energy efficiency recommendations or equivalent measures that achieve similar outcomes. Countries could also provide evidence to indicate if they considered the recommendation to be ‘not applicable’ to their country’s context. The completed self-evaluation questionnaires were reviewed and amended by the IEA Secretariat where appropriate.

The results from the questionnaire are presented in pie charts (see Figure 3). When a pie chart shows the results for a single country or sector, interpretation is relatively straightforward. In the case of a single country, Figure 3 could be interpreted to show that the country has ‘fully implemented’ 12% of the IEA buildings recommendations or equivalent measures. In the case where the pie chart summarises the results of all IEA countries for a single recommendation, Figure 3 can be interpreted to show that a quarter of the countries have ‘implementation underway’ for that building recommendation or an equivalent measure. When the pie chart summarises the results for many countries and several recommendations, interpretation is more complex. Figure 3 in this case shows that, out of a table of all 28 countries and all building recommendations, 12% of the cells in that table are dark green. In other words, 12% of the country-by-recommendation matrix is ‘fully implemented’. It is not possible to interpret this matrix by saying that 12% of the countries have implemented the recommendation, or that 12% of the recommendations have been implemented. In some

Figure 3
Progress with implementing building recommendations



8. See http://www.iea.org/Textbase/Papers/2008/cd_energy_efficiency_policy/index_EnergyEfficiencyPolicy_2008.pdf

instances we have purposefully used this approach to present information in order to highlight the aggregate message with respect to implementing recommendations rather than highlighting a single country performance (or lack thereof).

This is the first time the IEA has reported on energy efficiency policy implementation progress. Therefore, this document does not comment on past trends in implementation action.

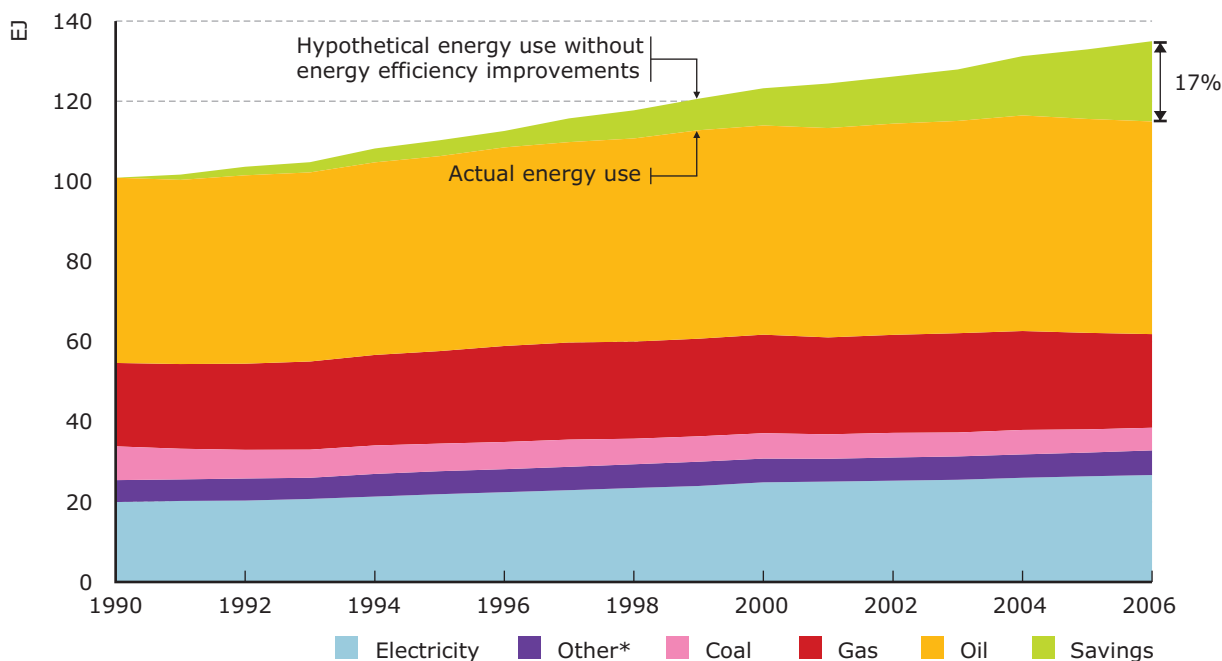
In November 2009, the IEA Secretariat intends to conduct an evaluation of the energy efficiency progress reporting process.

Energy efficiency policy context

Since the oil shocks of the 1970s, IEA member countries have promoted energy efficiency improvements across all sectors. These policies and structural changes in their economies mean IEA member countries have been able to decouple energy use from economic growth. This is shown in the decline in final energy intensity⁹ (Figure 43 - Figure 45) in most IEA countries since 1990.

Without the energy savings resulting from reduced energy intensity, IEA member country energy use would have been significantly greater. For example, IEA analysis shows that, for a group of IEA countries (IEA17)¹⁰, total final energy consumption in the IEA17 would have been 17% higher in 2006 (Figure 4). This represents an annual energy savings of 20 EJ in 2004, and 1.3 Gt of avoided CO₂ emissions (International Energy Agency 2007a).

Figure 4
Economy-wide energy savings from improvements in energy efficiency, IEA17



Note: "Other" includes renewable and district heat.
 Source: IEA indicators database.

During the period from 1990 to 2007, IEA member countries on average decreased their final energy intensity by 1.5% per year. However, the rate of energy intensity decline has not been constant over time. IEA analyses suggests that the rate of energy intensity decline in IEA countries tended to be higher in the two decades before the 1990s (International Energy Agency 2008a) than since the early 2000s. It appears that “the oil price shocks of the 1970s and the resulting energy policies did considerably more to control growth in energy demand and CO₂ emissions than the energy efficiency and climate policies implemented in the 1990s”

9. Energy intensity is the amount of energy used per unit of activity. It is commonly calculated as the ratio of energy use to GDP. Energy intensity is often taken as a proxy for energy efficiency, although this is not entirely accurate since changes in energy intensity are a function of changes in several factors including the structure of the economy and energy efficiency. For a detailed discussion of the energy intensity indicator, please see International Energy Agency (2007a)

10. IEA17: Australia, Austria, Canada, Denmark, Finland, France, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United Kingdom, United States.

(International Energy Agency 2008a, p.26). However, in the last couple of years, the rate of energy intensity improvement has tended to increase - possibly associated with the increase in energy prices and greater attention to climate change issues.

The current global energy efficiency policy context is dominated by three issues - the financial and economic crisis, energy security and climate change concerns. Energy efficiency continues to form a critical part of IEA governments' responses to these issues.

Of particular interest at the moment is the economic crisis. In an attempt to respond to the crisis and the ensuing economic downturn, IEA member countries are implementing stimulus packages - the majority of which include measures for the development of clean energy and energy efficiency. Examples of energy efficiency-related components of stimulus packages include (International Energy Agency 2009a):

- a) In Canada, the 2009 Federal Budget provided an additional CAD 300 million over two years for the ecoENERGY Retrofit Incentive for Houses programme, as well as created a new Clean Energy Fund supporting clean energy research and development projects.
- b) In France, economic stimulus measures have included an incentive scheme for the scrapping of old vehicles, and the launch of a zero-interest loan programme for residential energy efficiency improvements.
- c) In Germany, the government announced EUR 13.3 billion for investments in local and regional authorities. The measures focus on investments in educational institutions - with measures to reduce CO₂ emissions and to enhance energy efficiency, including the use of renewable energies, having priority. The government also increased funding to the KfW CO₂ building modernisation programme. In 2009, a total of EUR 1.5 billion of federal funds will be available for low-interest loans and grants to support the improvement of energy efficiency in residential buildings and local infrastructure. As part of measures to stimulate the auto industry, Germany created an exemption from payment of motor-vehicle taxes for two years for vehicles meeting Euro 5 and Euro 6 standards.
- d) As part of stimulus measures for the automobile industry, the Italian government has introduced a financial incentive scheme for the replacement of old vehicles with newer, more efficient and less polluting ones.
- e) In its stimulus packages, Japan committed funding of JPY 1.6 trillion for a low-carbon society, which includes JPY 370 billion for replacement of older vehicles with new fuel efficient cars and JPY 295 billion for assisting with purchases of energy-efficient appliances. Japan's package also includes funding to subsidize enterprises that introduce energy-efficient facilities and equipment, improve small- and medium-sized enterprises (SMEs) with energy-efficient diagnosis and invest R&D into innovative energy efficiency technologies.
- f) Korea has allocated USD 1.8 billion to support the development of fuel-efficient vehicles, such as electric and hybrid cars, by automakers Hyundai and Kia, a tax break of more than KRW 3 million (around USD 2 399 million) for hybrid car purchases and USD 6 billion to promote green homes, LED lighting in public facilities and energy efficiency in schools.
- g) Norway has earmarked funding worth NOK 9.2 billion for new infrastructure and major renovation projects that will meet new energy efficiency requirements for building standards under its stimulus package.
- h) The Spanish government's economic stimulus package covers a range of sectors, including EUR 8 billion to local authorities for infrastructure investment, which will include measures to promote energy savings and environmental improvements.

- i) The UK government announced that it would bring forward from 2010/11 into 2009/10 GBP 50 million of investment in the Warm Front programme, which supplies insulation and heating measures to vulnerable households. The programme would also receive GBP 100 million of additional funding in 2008/09 and 2009/10. The government has also provided an additional GBP 60 million for energy efficiency and heating measures in social housing, as part of an accelerated Decent Homes Programme.
- j) In the United States, economic stimulus packages passed in October 2008 and February 2009 contain significant increases in funding for energy efficiency across a range of measures. The October 2008 stimulus package comprised mainly tax credits aimed at energy efficiency, while the February 2009 programme includes over USD 30 billion in funding for energy efficiency-related initiatives.

Economic, energy security and environmental challenges have served as catalysts for energy efficiency policy development in the IEA countries. As a result, all IEA countries have been active in developing and implementing energy efficiency policies for several decades, but particularly since the mid-2000s.

In Europe, IEA member countries have taken a particularly active role in responding to, and transposing, energy efficiency-related European Commission directives across all sectors. This activity includes preparing the National Energy Efficiency Action Plans (NEEAPs) (under the Energy Services Directive), transposing and recasting the Energy Performance of Buildings Directive (EPBD) and extending the energy efficiency and labelling requirements for energy-using products and electrical appliances through transposing the Eco-Design and Labelling Directives.

In North America, Canada is implementing the ecoENERGY Efficiency Initiative that promotes smarter energy use across buildings, industry and transport sectors. The United States government has begun updating energy efficiency standards for vehicles, lighting, domestic appliances and federal buildings, as well as supporting utility demand response programmes.

In Asia, Japan and Korea also continue to place energy efficiency at the heart of their energy policy. Through its Act on the Rational Use of Energy, Japan requires energy intensive industries to submit annual reports on the status of their rationalisation of energy use, to draw up medium- and long-term plans for capital expenditures for energy-efficient equipment, and to appoint energy managers. Through its recent amendment of the Act, Japan has extended this requirement to the commercial sector. Japan has extended its successful Top Runner Programme that promotes competition among appliance and equipment manufacturers to improve energy consumption efficiency.

Korea has recently strengthened its energy efficiency policies across several sectors. For example, the 2007 amendment to the Energy Utilization Rationalization Law places energy audit obligations on energy-intensive industry. Similarly, in 2008, the Korean government increased the energy efficiency requirements in its building code.

Turkey is also reinforcing its energy efficiency policy. Under the successful 2007 Energy Efficiency Law, Turkey has put in place policies that promote ESCOs, energy-efficiency in transport, improved energy performance of buildings and energy efficiency leadership in the public sector.

Similar developments can be seen in Oceania. Australia and New Zealand are continuing to refine their national energy efficiency strategies, expand their successful appliance and equipment energy efficiency programmes, increase capacity for energy efficiency improvements in industry and bolster energy efficiency requirements for buildings.

In addition, IEA member countries continue the development or enactment of overarching energy policies that would impact energy efficiency policy development. In the United Kingdom, the Climate Change Act entered into force in November 2008, imposing legally binding greenhouse gas (GHG) emissions reductions targets, which will likely further promote energy efficiency measures and may impact existing schemes. Consultation on a Heat and Energy Saving Strategy was also launched in February 2009. The Australian government unveiled draft legislation for a national emissions trading system (ETS), the Carbon Pollution Reduction Scheme.

Switzerland also submitted two climate change targets for public consultation that vary in the overall target and in the percentage to be met by domestic reductions and through acquisitions of certificates on the carbon market. The Swiss Federal Council will write up the consultation findings and present them in a message to the Parliament in late August. Though an energy policy has not yet been developed by the new US administration, a long-term GHG emissions reduction target (80% by 2050) and reduction of oil imports by 40% within ten years have been identified. Various energy and climate change bills have been introduced into the US Congress and Senate, and a proposed emissions cap-and-trade scheme is currently under discussion.

In Turkey, the Kyoto Protocol was adopted by the parliament in February 2009. Further, secondary legislation implementing the Energy Efficiency Law continues, with a recent set of legislation for industrial energy efficiency projects, as well as certificates, reporting and auditing measures for voluntary agreements and energy services published on 6 February 2009. IEA countries that are EU members, as well as Norway, also participate in the EU ETS, which since 2005 has stimulated efficiency improvements in various industrial sub-sectors.

It is also important to note that IEA member countries are not only making progress at the national level. In many countries, regional agencies are also leading energy efficiency initiatives. For example, in Canada, nine out of ten provinces report significant general energy and energy efficiency policy planning activities. These range from expansion or creation of targeted programmes, such as the new Home Energy Low-income Programme in Prince Edward Island, to overall energy strategies like Ontario's Green Energy Act and Alberta's Provincial Energy Strategy.

These, and many other initiatives, demonstrate that IEA member countries continue to rely on a growing set of policies to influence energy efficiency. But what policies in particular can IEA member countries claim as strengths and innovations in their policy arsenal? And what are the areas of policy that require further strengthening? These questions are addressed in the following chapters.

Strengths and innovations in energy efficiency policy

Table 2

Summary of strengths and innovations in IEA member country energy efficiency policy

Cross sectoral	<ul style="list-style-type: none"> Most countries have some degree of national energy efficiency strategy or action plan. Many countries are developing policies to address barriers to energy efficiency investment. Innovative financial instruments are being created in particular in Germany and Japan. High-quality indicator analysis exists in all countries (particularly Australia, Canada, Switzerland and the United Kingdom). All countries have robust ex ante evaluation of energy efficiency policies and institutional compliance infrastructure. Italy, the United Kingdom and the United States have active energy savings components in their procurement programmes.
Buildings	<ul style="list-style-type: none"> Strong energy efficiency requirements in building codes are in place in Denmark and Germany. Austria, Denmark, France, Germany and the United Kingdom have policies promoting passive-energy houses. Full implementation of building certification is in place in Austria, the Czech Republic, Denmark, Finland, Germany, Ireland, Portugal and the Slovak Republic.
Appliances	<ul style="list-style-type: none"> Nearly all IEA countries have active minimum energy performance standards (MEPS) and associated labelling. Most IEA countries have strong policies that address energy use in set-top boxes. Standby power requirements are either implemented or are planned in all IEA countries except one. Most IEA countries support the development of international test procedures and measurement standards.
Lighting	<ul style="list-style-type: none"> All IEA countries have policies to increase the energy efficiency in the lighting sector. All but two countries have policies to phase out conventional incandescent lamps.
Transport	<ul style="list-style-type: none"> Fuel efficiency standards are in place for heavy-duty vehicles in Japan. Policies aimed at rolling resistance of tyres are planned in most countries. Measures that promote proper inflation of tyres are implemented in the United States and Canada. Stringent fuel efficiency standards for light-duty vehicles exist in EU member states and Japan. Eco-Drive policies are active in most IEA countries. Austria, France, Germany, Italy, Luxembourg, Portugal, the Slovak Republic and Spain adopted vehicle scrappage schemes encouraging purchase of more efficient and less polluting new vehicles.*
Industry	<ul style="list-style-type: none"> Coverage of industry energy statistics is high in all countries, particularly in Canada, Denmark and Switzerland. Well-developed energy efficiency policies for industrial electric motors exist in Australia, Canada, Korea, New Zealand and the United States. Many IEA countries have policies promoting energy management in industry. Several countries have made advances in policies for SMEs (Finland, Ireland, Japan, Korea, Turkey and the United States).
Utilities	<ul style="list-style-type: none"> Over half of the IEA countries have some form of policy to encourage utilities to promote energy efficiency. Two thirds of IEA countries plan to place some form of energy efficiency obligations on utilities. Innovative policies to create incentives for utilities to promote energy efficiency exist in the United States, United Kingdom, France and Italy.

* Japan, the United Kingdom and the United States adopted scrappage schemes post 31 March 2009.

Cross-sectoral

Most IEA member countries have well-developed national energy efficiency strategies with clear targets or goals. For example, all EU member states created or updated existing NEEAPs in compliance with the European Community's Energy Services Directive 2006/32/EC. Of particular note is the United Kingdom's NEEAP which sets an ambitious energy savings target of 18% in 2016. Also of note is the rigorous analytical approach Sweden took to developing its NEEAP. Sweden completed a detailed inquiry in November 2008 into how the country will fulfil its requirements under the EU Energy Services Directive, providing concrete proposals and elements to guide policy development (European Commission 2008). The Swedish government proposed energy and climate policy bills in March 2009 that include an energy efficiency target to reduce energy intensity by 20% between 2008 and 2020. Despite these achievements, there are several areas of concern with the current suite of NEEAPs (discussed below).

Non-EU IEA member countries also set targets for energy efficiency improvements. In July 2008, Canada's Council of the Federation¹¹ committed to achieving a 20% increase in energy efficiency by 2020. In addition, in 2007, Canada's Council of Energy Ministers (federal-provincial-territorial) released the report, *Moving Forward on Energy Efficiency*, to guide and promote energy efficiency while recognising the unique context of different jurisdictions.

Similarly, Japan has adopted the 'Front Runner Plan' for energy conservation. This plan sets forth specific measures for achieving its goal of improving energy consumption efficiency by at least 30% by 2030 compared with 2003.

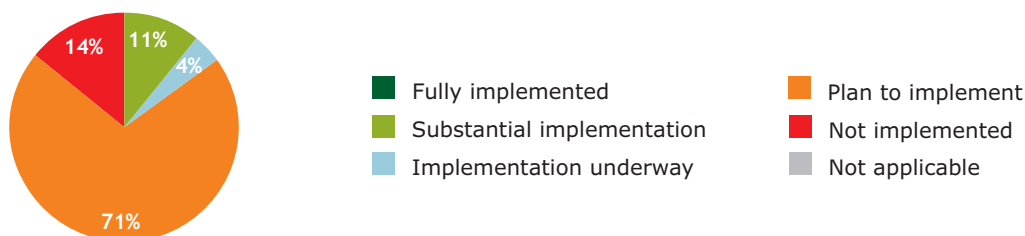
The US government has issued many national energy plans since the mid-1970s – all of which include comprehensive energy efficiency measures (including both descriptions of the wide range of policies and programmes in place, as well as proposals for new actions). The latest such plan, the National Energy Policy (NEP), was issued in 2001. There are also related sector, or programme-specific, plans. For example, the National Action Plan for Energy Efficiency (NAPEE) was developed as a strategy for encouraging electric and natural gas utility-based energy efficiency programmes.

Obstacles such as access to capital and perceived risk associated with energy efficiency projects often limit investment in energy efficiency. Many IEA countries are developing policies to address this issue - most notably the development of a common savings measurement and verification protocol. However, this approach is only at the 'planned to implement' stage in most countries - and four countries have not made any progress in this area (see Figure 5). Given the importance of such a policy, the IEA encourages countries to realise this protocol as soon as possible.

Japan's Flat 35 and Germany's KfW energy efficiency programmes stand out as innovative approaches to financing energy efficiency. In 1996, the Japanese government introduced energy efficiency criteria to the Flat 35 scheme for building renovation loans. To receive the loan, applicants need to demonstrate that their building renovation meets at least the 1980 thermal regulation for buildings. The Flat 35 scheme serves a triple purpose by offering preferential loans to the customer, reinforcement and certification of the thermal regulation, and security to the commercial financial institution offering the loan to customers.

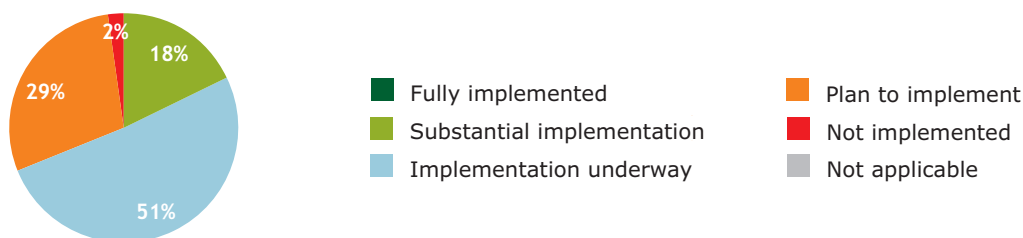
Figure 5

Progress with implementing recommendations relating to common savings measurement, all IEA countries



11. The Council includes all provincial and territorial Premiers.

Figure 6
Progress with implementing indicators-related recommendations, all IEA countries



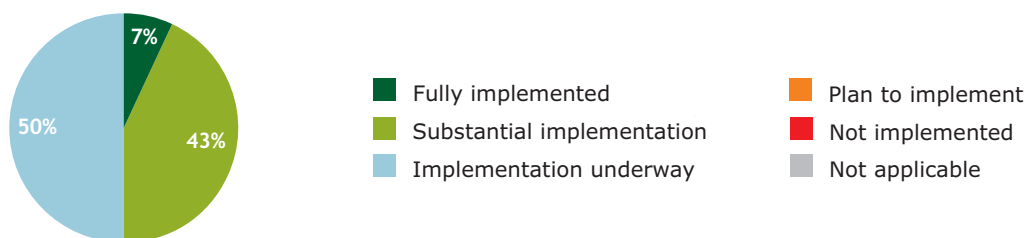
Germany's *Kreditanstalt für Wiederaufbau* (Bank for Reconstruction - KfW) provides another example of innovative energy efficiency investment financing. The KfW is a non-profit public banking group that promotes, among other things, energy conservation. The KfW manages a highly successful loans programme for the refurbishment of old buildings and ecological construction. The aim of this programme is to help customers meet the increased upfront costs when renovating a building. Through this programme, financing for energy efficiency projects is channelled exclusively through regular banks; private individuals cannot apply directly to the KfW. The loan agreement is signed by the applicant and his or her bank which pays out the KfW loan and transfers the applicant's repayment instalments to the KfW Förderbank. Apart from the interest, no further costs such as handling fees are incurred. Despite the success of these examples, a lot remains to be done to fully overcome financial barriers to energy efficiency (see below).

Another area of strength of IEA countries is their attention to collecting the indicators necessary for developing high-quality policy. The IEA considers that for all countries, except one, implementation is either 'under way' or 'planned' relating to the completion of the IEA indicators template (Australia, Canada, Switzerland and the UK stand out as providing the most full completion of the template)¹² (Figure 6). However, given that no country scores 'fully implemented' on the indicator recommendations suggests that there is still room for further effort in this area.

IEA countries have a growing tradition of strong energy efficiency policy evaluation systems. All IEA countries have robust requirements for *ex ante* evaluation of energy efficiency policies and legal and institutional infrastructure for ensuring compliance with energy efficiency requirements (see Figure 7). Most IEA countries have, or are developing robust reporting procedures of monitoring and compliance activities (see Figure 8). Of concern, however, is that around a third of IEA countries can be considered to have inadequate enforcement regimes for energy efficiency regulations (Figure 9).

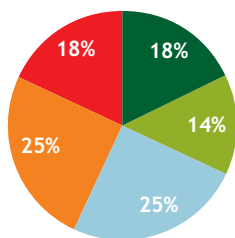
One area not covered by the energy efficiency recommendations but that can nonetheless generate significant energy savings is public procurement. Several IEA member countries, including Italy, Japan, the United Kingdom, and the United States have active energy efficiency components in public procurement programmes.

Figure 7
Progress with establishing legal and institutional infrastructure for ensuring compliance with energy efficiency requirements, all IEA countries



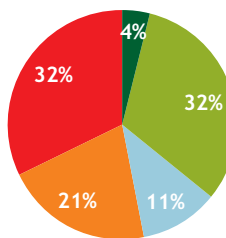
12. Note that the assessment of the degree of implementation of the energy-efficiency indicator recommendations is based on the percentage completion of the IEA energy-efficiency data template. While this method of evaluation gives a broad overview of the degree of energy-efficiency data availability, it has two limitations. First, some aspects of the energy-efficiency data template may be irrelevant for a country. Second, the IEA makes no assessment of the quality of data. The IEA is currently revising the template. As a result, any future progress report will be better able to account for these two issues.

Figure 8
Progress with implementing the recommendation relating to regular and public reporting of monitoring activities, all IEA countries



- Fully implemented
- Substantial implementation
- Implementation underway
- Plan to implement
- Not implemented
- Not applicable

Figure 9
Progress with implementing the recommendation relating to enforcement regimes of energy efficiency regulations, all IEA countries



Buildings

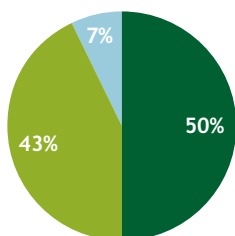
Energy efficiency requirements for buildings are a key feature of all IEA member country energy efficiency policies. Given the energy efficiency potential in the building sector, it is not surprising that many of the energy efficiency-related economic stimulus measures mentioned in the energy efficiency policy context section are aimed at buildings.

IEA member countries perform well in terms of energy efficiency requirements for new buildings, with half the countries reporting ‘fully implemented’ (see Figure 10). In terms of stringency of building code standards, Germany and Denmark stand out as having the most advanced requirements. Germany’s current energy efficiency standards for buildings are strong and these are expected to be raised by a further 30% in 2009 and again by 30% in 2012. Denmark also has strong energy efficiency requirements and the parliament has agreed to raise these by 25% to 30% in 2010 and again by 2015. With this improvement the requirements for all new buildings in Denmark will be below the passive-energy house (PEH) level. Once these amendments are in force, it is expected that both Germany’s and Denmark’s building code energy requirements will be close to the optimum 30-year least life-cycle cost.

Germany and Denmark are not alone in pushing for more ambitious requirements for new buildings. For example, the Netherlands also announced a tightening of standards for new buildings by 25% in 2011 and 50% in 2015.

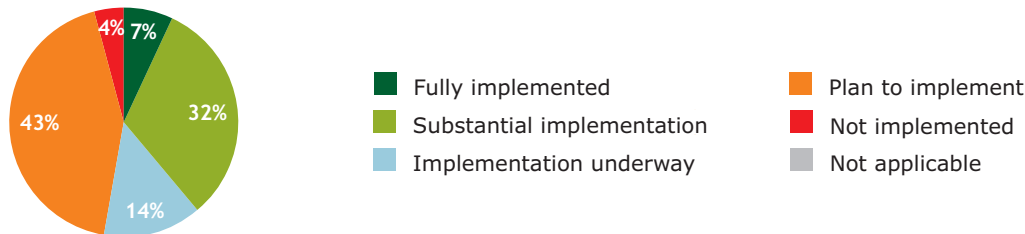
The IEA recommends that energy efficiency standards for new buildings should be set to minimise total costs over a 30-year lifetime. It is encouraging to see that all countries, except one, at least have plans to achieve this level in the future (Figure 11).

Figure 10
Progress with implementing the recommendation relating to mandatory energy efficiency standards for new buildings, all IEA countries



- Fully implemented
- Substantial implementation
- Implementation underway
- Plan to implement
- Not implemented
- Not applicable

Figure 11
Progress with implementing the recommendation relating to 30-year cost-minimising efficiency standards for new buildings, all IEA countries



Many countries have developed policies aimed at promoting and supporting passive and other highly efficient new buildings - with Austria, Denmark, France, Germany, Ireland and the UK having the most advanced policies. In Germany for example, this includes subsidies and policies that ensure capacity development and information campaigns. PEH are hence taking a growing share of the market in Germany and related passive house technologies are becoming more commonly available in most parts of the country. However the experience with PEH and their energy buildings in the six countries mentioned above is only slowly being taken up across many of the IEA countries.

Enhancing the energy efficiency of existing buildings is particularly challenging. While all countries would acknowledge that more needs to be done in this area, it is encouraging to see that all IEA countries have made policy progress in this area. Over 90% of the country-by-recommendation matrix relating to existing buildings is graded as ‘plan to implement’ or better (see Figure 12). Countries have begun to systematically collect information on the existing building stock, examine barriers to energy efficiency in the sector and develop packages of initiatives to enhance existing building energy efficiency. One example among many of a policy to encourage building energy efficiency retrofits is Japan’s Budget Law 2007 (Articles 351 and 352), which includes funding of EUR 15 million for two years to underwrite a provision allowing a tax deduction for the implementation of projects to enhance the energy efficiency of buildings. Eligible expenditures include those aimed at reducing thermal losses, the installation of solar collectors for hot water production, condensing boiler installation and the construction of high-efficiency new buildings. Small building renovations are also eligible.

Figure 12
Progress with implementing recommended policies relating to existing buildings, all IEA countries

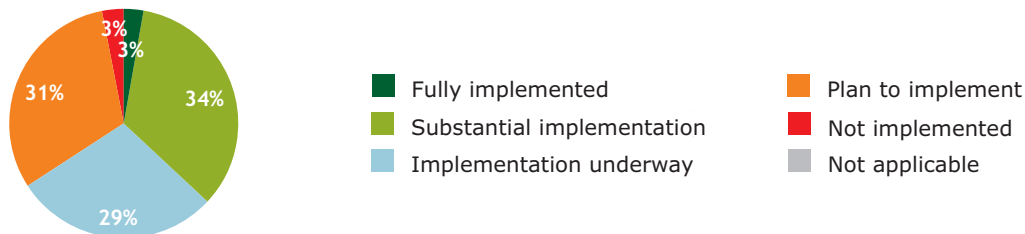
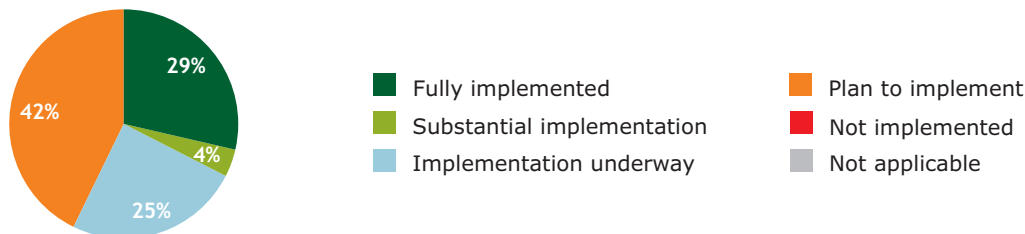


Figure 13
Progress with implementing the recommendation relating to building certification recommendations, all IEA countries



Another encouraging recent policy development in the IEA countries is the increased activity around providing energy-related information for buildings. Of particular interest is the extent with which building energy certification has been fully implemented in several countries including Austria, the Czech Republic, Denmark, Finland, Germany, Ireland, Portugal and the Slovak Republic. Indeed, all IEA countries at least plan to implement some sort of energy certification system in the near future (Figure 13).

Appliances

IEA member countries are actively creating and implementing energy efficiency policies for appliances. The result has been several notable successes in improving the energy efficiency of appliance stock. Nearly all IEA countries have active minimum energy performance standards (MEPS) and associated labelling for a growing list of appliances. For example, New Zealand has a well-developed MEPS programme under its Energy Efficiency (Energy Using Products) Regulations 2002 that applies to 12 product classes. A forward work programme identifies other products for future MEPS and labelling - subject to cost-benefit analysis, consultation and final decisions.

In Europe, MEPS for several types of appliances and products will be introduced in the next few years. These standards will be set by EU regulations that are to be based on the Eco-Design Directive (2005/32/EC). At this stage, the EU Commission has plans for proposing such standards for 19 product groups.

Another example is Japan's approach to promoting energy-efficiency in appliances through its Top Runner Programme. Since 1998, Top Runner has been expanded to target 21 categories of equipment and appliances including commercial-use equipment. Importantly, the Top Runner Programme has recently been expanded to areas of expected high-growth: DVD recorders with integral television tuners, routers and switches.

One of the most successful and widely spread energy efficiency policies in IEA countries has been the attempt to deal with energy use in set-top boxes (STB), which are television devices that convert received signals to viewable images (see Figure 14). Eighty five percent of IEA member countries have fully or substantially implemented the recommendation to establish MEPS for STBs.

Figure 14
Progress with implementing the recommendation relating to energy efficiency regulations for set-top boxes, all IEA countries

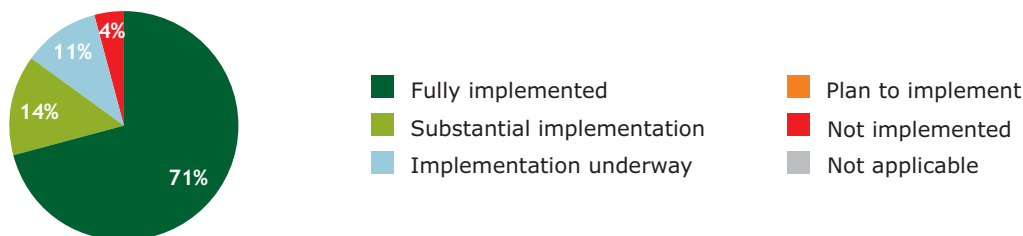
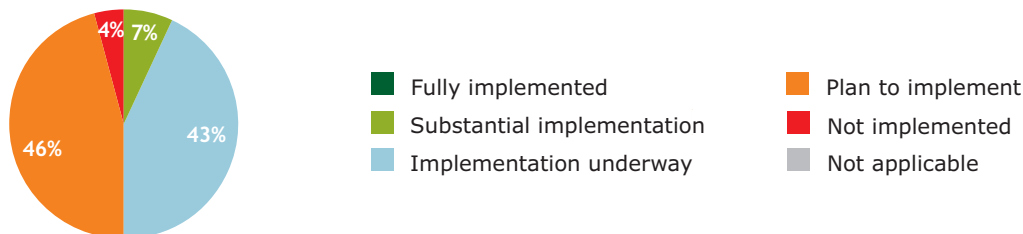


Figure 15
Progress with implementing recommended policies relating to standby power, all IEA countries



All IEA member countries (except Turkey) are also making progress with regulating standby power (see Figure 15). Japan and Korea have made the most progress in this area while most other IEA countries 'plan to implement' a 1-Watt standard or better in the next few years.

In Korea, the e-Standby Programme aims to reduce the power consumed while the device is idle, or standby power, for 20 target products with the 1-Watt standard being adopted in almost every product. A mandatory standby power warning label programme was also implemented in 2008. In this programme, the standby power of every product must be reported and a warning label must be attached to products that do not meet the standards.

In Japan, the standby power consumption of ordinary appliances has been reduced to 1-Watt or less for ordinary appliances and equipment in accordance with a voluntary target set with industry.

The United States has also made progress with encouraging reduced standby power energy consumption. A recently enacted US law requires the US Department of Energy to set MEPS that cover standby power. Standby power will either be included in MEPS governing all of a product's energy use or it will be included in a separate standard for standby energy use. US federal agencies are required to purchase products that consume no more than 1-Watt in standby mode, if available.

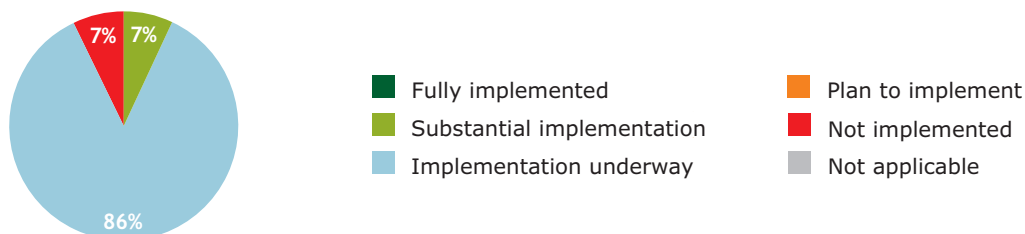
Finally, the effective implementation of energy efficiency policies for appliances and equipment relies upon the use of accurate energy performance measurement standards and protocols. National energy efficiency policy objectives will be undermined by energy measurement standards that fail to reflect actual energy use and/or provide a true in-use efficiency ranking of equipment. For this reason, it is encouraging to see that most IEA countries currently have energy performance measurement standards and protocols in place and are regularly updating these. Furthermore, most IEA countries are planning to support the development and use of, where appropriate, international measurement standards. This will assist performance comparison and benchmarking for traded products.

Lighting

All IEA member countries have pursued policies to increase energy efficiency in the lighting sector. The IEA has identified phasing out conventional incandescent lamps as a first priority for energy-efficient lighting policy. Globally incandescent lamps are estimated to have accounted for 970 TWh of final electricity consumption in 2005 (International Energy Agency 2006). In the hypothetical case that all these lamps were to be replaced by compact fluorescent lamps (CFLs), cumulatively this would reduce global net lighting costs by USD 1.3 trillion from 2008 to 2030, and avoid 6.4 Gt CO₂ emissions at negative abatement cost. All but two IEA countries (New Zealand and Turkey) currently have in place policies to phase out conventional incandescent lamps (Figure 16).

Another important policy development is that around one-third of the IEA countries have established lighting performance levels in building codes. Most remaining countries plan to follow suit in the near future.

Figure 16
Progress with implementing recommended policies relating to phase-out of incandescent lamps, all IEA countries



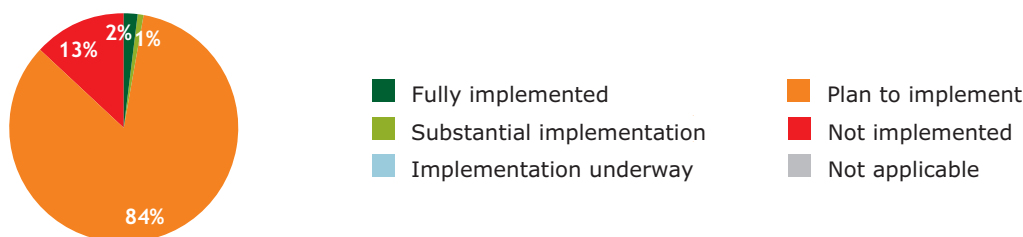
Transport

The transport sector is often regarded as one of the most challenging areas in which to achieve energy efficiency improvements. Despite this, there are clearly some important policy developments in IEA member countries in this sector.

A significant innovation in transport energy efficiency policy is Japan's fuel efficiency standards for heavy-duty vehicles. In March 2006 Japan established Top Runner fuel efficiency standards for heavy-duty vehicles (trucks and buses) with 2015 as the target year. Vehicle makers are required to improve fuel economy so as to ensure that the weighted-average¹³ fuel economy exceeds the standard value by the target year. Japan is the only country in the world with such fuel efficiency standards for heavy-duty vehicles. The IEA encourages other countries to develop similar standards.

Other important developments are policies promoting the energy efficiency of tyres and light-duty vehicles. Roughly 20% of a motor vehicle's fuel consumption is used to overcome tyre rolling resistance. Additional fuel is required when tyres are under-inflated. There is now consensus that policies can achieve as much as a 5% reduction in overall vehicle fuel consumption in this area. Most IEA countries plan to implement policies that encourage low rolling resistance and tyre-pressure monitoring systems (Figure 17). Of particular note are the policies being implemented in Canada and the United States that address tyre pressure, although primarily for safety reasons.

Figure 17
Progress with implementing recommended policies relating to tyres, all IEA countries



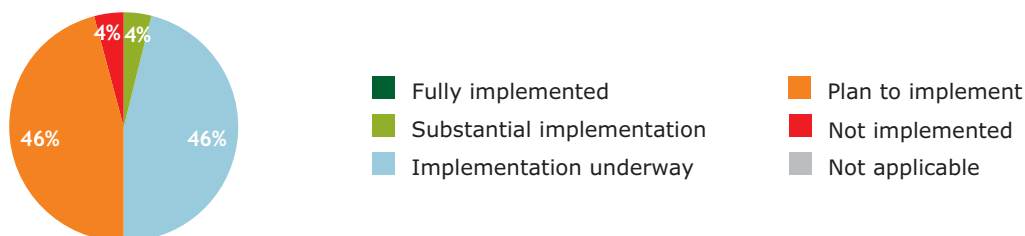
Similarly, most IEA member countries plan to implement fuel efficiency standards for light-duty vehicles. For example, the EU recently established regulations capping CO₂ emissions from new passenger cars at 130 g/km from 2015 onwards. This requirement will be phased in so that in 2012, 65% of each manufacturer's newly registered cars must comply on average with the limit value. This will rise to 75% in 2013, 80% in 2014, and 100% from 2015 onwards. Although the law focuses on CO₂ emissions and therefore also encourages the use of biofuels that are less efficient to use than oil, it is in any case expected to greatly improve overall energy efficiency in new passenger cars. While it is encouraging to see such intentions, a plan to implement is not implementation itself. The IEA urges all countries to expedite the implementation of these policies.

Encouraging eco-drive policies is also important. IEA analysis suggests that over the mid-term (< three years), average fuel savings of 10% are feasible from promoting eco-drive policies. All except one country have made some policy progress in this area (Figure 18). Several countries plan to introduce eco-driving and Australia, Austria, Belgium, Canada, Finland, France, Germany, Ireland, Japan, New Zealand, Sweden, Switzerland, the UK and the US have eco-drive programmes underway. Canada is promoting eco-driving through its ecoENERGY programme that provides tools and resources for existing licensed and learner drivers. Canada's ecoENERGY for Fleets programme will provide more than 200 000 professional drivers of heavy trucks, buses, construction and other vehicles with training in energy-efficient vehicle operating techniques.

Japan has the most extensive eco-driving programme, which it is promoting as an effective means to reduce CO₂ emissions under its Kyoto Protocol Target Achievement Plan. The National Police Agency, the Ministry of

13. Weighted average by number of vehicles shipped for each weight and vehicle category.

Figure 18

Progress with implementing recommended policies relating to eco-driving, all IEA countries

Economy, Trade and Industry, the Ministry of Land, Infrastructure, Transport and Tourism, and the Ministry of Environment established the Eco-Drive Promotion Liaison Committee - a framework for cooperation in promoting eco-driving. In addition, the Act on the Rational Use of Energy calls for transport business operators to promote eco-driving, and the government provides training as well as subsidies for the introduction of Eco-Driving Management Systems (EMS).

Countries are also pursuing other innovative policies that are not part of the set of IEA energy efficiency recommendations. Austria, France, Germany, Italy, Luxembourg, Portugal, the Slovak Republic and Spain have implemented vehicle scrappage schemes to increase the rate of vehicle-stock turnover. For example, in February 2009, Italy enacted a law that provides financial assistance for the replacement of passenger cars and goods vehicles with new reduced-pollution vehicles. Similarly, in the United States, funding for public procurement includes high-efficiency vehicles and tax credits for plug-in hybrid vehicles. The United Kingdom has also introduced new differentiated Vehicle Excise Duties for 2009 and 2010 in an attempt to influence vehicle purchase decisions.

Industry

Industry accounts for nearly one-third of global total primary energy supply (TPES) and 36% of global energy-related CO₂ emissions. The large primary materials industries - chemicals, petro-chemicals, iron and steel, cement, paper, pulp and paper and other minerals and metals - account for more than two-thirds of this amount. IEA analysis shows that substantial opportunities to improve industrial energy efficiency remain. Much of this potential can be captured through the use of high-quality data, policies for promoting use of energy-efficient industrial appliances and improving overall efficiency through energy management.

IEA member countries generally report a high degree of coverage of industrial energy-use statistics. In particular, Canada, Denmark and Switzerland's systems of industry energy data collection are world-class and long-standing. As a result, these countries have the highest completion levels among member countries of the IEA energy statistics templates for industrial data.

Industrial electric motors are estimated to consume around 40% of all global electricity (about 6 000 TWh in 2005). Overall, electric-motor driven systems account for 15% of all industrial final energy demand. Many IEA countries have also implemented, or are planning to implement energy efficiency requirements for industrial motors. Of particular note are Australia, Canada, Korea, New Zealand and the United States which have substantially implemented these energy efficiency requirements.

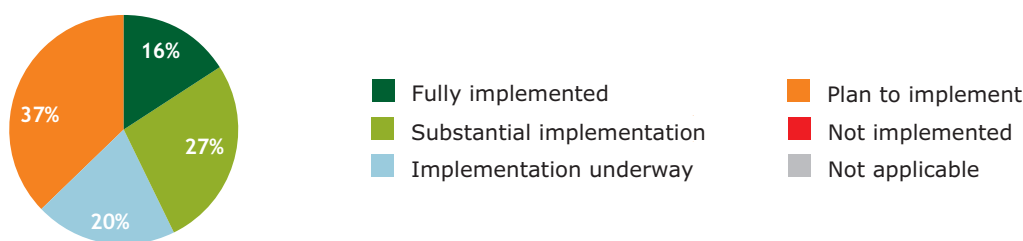
Many countries are also continuing, or expanding, their promotion of energy management in industry. These policies commonly include the provision of energy management tools, training, energy manager certification and quality assurance. Nevertheless, there is some concern about the level of energy management support in several IEA countries (see below).

SMEs consume about 30% of industrial energy use but they have a disproportionately high level of energy savings potential. This arises because there is less focus on energy management practices in SMEs where energy is

usually a small part of total overheads and low staffing levels result in less specialisation on particular cost-management practices. It is encouraging to see that support for energy efficiency in SMEs is increasing across IEA countries. In particular, IEA governments are providing, or planning to provide, assistance with energy audits and the provision of relevant information (see Figure 19). Several countries have made significant efforts in this area including Canada, Finland, Ireland, Japan, Korea, Turkey and the United States. For example, Turkey recently passed legislation that specifically supports energy efficiency services for SMEs, providing training, auditing and consulting.

Figure 19

Progress with implementing recommended policies relating to energy audits assistance and best practices for SMEs, all IEA countries



Utilities

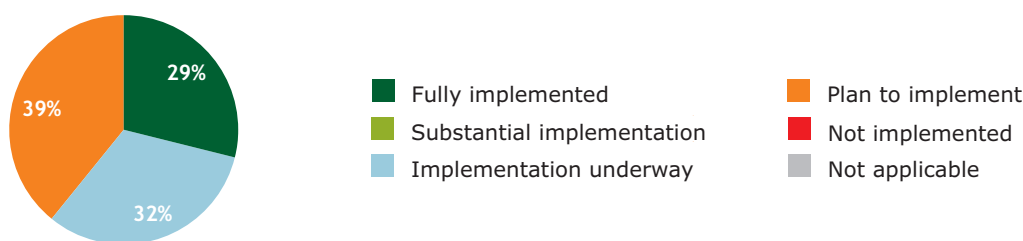
Many IEA countries have had successful experiences in stimulating energy utilities to deliver end-use energy savings to their customers. The arguments for engaging utilities in such schemes are that they:

- have significant financial and human resources;
- have access to the customer (providing they have a retailer function);
- have knowledge of how much energy is sold, to whom and at what time and hence can strategically target conservation efforts;
- typically have competence in marketing and in engineering.

Over half of IEA countries have some form of active policy to encourage utilities to promote energy efficiency (see Figure 20). These policies range from setting energy savings targets for utilities (such as Energy Efficiency Resource Standards as applied in several States of the United States or the United Kingdom Energy Efficiency Commitment) to schemes that allow the certification of energy savings and trading among obligated utilities (such as White Certificate schemes in France and in Italy). Furthermore, many IEA countries have, or are considering, some form of energy efficiency obligation on utilities. Nevertheless, there is concern that many of the potential tools to engage utilities in promoting energy efficiency are not being used to the full extent (see next chapter).

Figure 20

Progress with implementing recommended policies relating to encouraging utilities to promote energy efficiency, all IEA countries



Note: This chart is based on the four elements of the utility recommendation (see Annex 1: Consolidated list of 25 IEA energy-efficiency recommendations). As each of the utility recommendation elements is optional, the IEA has calculated this pie chart based on the element that achieves the highest level of policy implementation in each country.

Challenges and areas for improvement in energy efficiency policy

Table 3

Summary of challenges and areas for improvement in IEA member country energy efficiency policy

Cross sectoral	<ul style="list-style-type: none"> ■ Improve national energy efficiency strategies and action plans further. ■ Ensure greater effort in verification and enforcement of domestic energy efficiency policies. ■ Expand efforts in financing, particularly with the development of savings verification and measurement protocols, establishing public-private partnerships, and implementing findings of subsidy reviews. ■ Increase efforts to promote risk-mitigation instruments such as public-private partnerships. ■ Complete reviews of impacts of fiscal policies on energy efficiency in all IEA countries. ■ Improve quality and coverage of energy indicators.
Buildings	<ul style="list-style-type: none"> ■ Establish stronger energy efficiency requirements for buildings. ■ Strengthen support for PEHs and zero-energy buildings (ZEB). ■ Increase efforts to promote energy-efficient windows and glazing.
Appliances	<ul style="list-style-type: none"> ■ Ensure adequate resources allocated to maintaining stringency of energy efficiency requirements for appliances. ■ Ensure appropriate policies are in place to encourage television service providers to deliver a product which is as energy efficient as possible.
Lighting	<ul style="list-style-type: none"> ■ Develop measures for promoting energy efficiency in non-residential lighting. ■ Support adoption of high-efficiency alternatives to fuel-based lighting.
Transport	<ul style="list-style-type: none"> ■ Ensure the implementation of planned policies. ■ Create fuel efficiency standards for heavy-duty vehicles.
Industry	<ul style="list-style-type: none"> ■ Establish measures to optimise energy efficiency in motor-driven systems. ■ Create policies and measures to assist small and medium-sized enterprises.
Utilities	<ul style="list-style-type: none"> ■ Devote more attention to providing incentives for utilities to promote energy efficiency in all IEA countries.

Cross-sectoral

IEA member countries can improve their cross-sectoral energy efficiency policies in several critical areas. There is considerable room for expanding the coverage and increasing the quality of national energy efficiency strategies and action plans (NEESAPs) across the IEA. Indeed, it is of concern that not all IEA countries currently have a NEESAP. The IEA Secretariat urges all IEA countries that have not yet completed their development of a NEESAP to do so as a matter of urgency.

The quality of existing NEESAPs in IEA countries also needs attention. For example, a review of the current suite of EU national energy efficiency action plans (NEEAPs) identifies several limitations in many of the plans. These limitations include a lack of ambition, innovation, or prioritisation of policies as well as what appears to be a lack of coherence among fragmented measures. Some of these limitations apply equally to all IEA country energy efficiency strategies and action plans. This is of concern because these strategies and action plans can help guide and encourage energy efficiency policy development and implementation by:

- placing energy efficiency policy within the broader policy context;
- prioritising resource allocation across the energy efficiency portfolio;
- capturing synergies between policies and avoiding duplication;
- allocating responsibility for implementation, monitoring and evaluation.

The IEA encourages all IEA countries to review their energy efficiency strategies to ensure they meet international best practice guidelines (see IEA (2009b)). There is growing consensus that national energy efficiency strategies should include several elements including:

- a systems perspective (placing energy efficiency within a broader policy context);
- clear rationales and expectations for goals and scope;
- a focus on critical priorities;
- an action plan;
- targets;
- a learning approach;
- accountability;
- consultation and stakeholder engagement.

The need for high-quality energy efficiency strategies is particularly important in those countries where there is a separation of energy regulatory powers between the national, regional and local governments. In these contexts, energy efficiency strategies can provide coordination between levels of government. This co-ordination can help reduce duplication and costs associated with strategy development.

Another area of concern relates to the verification and enforcement of domestic energy efficiency laws and policies. Around a third of IEA countries can be considered to have inadequate enforcement regimes for energy efficiency regulations. Verification and enforcement are vitally important activities to guarantee energy savings are maximised and to ensure the credibility of implemented schemes. So far, verification and enforcement efforts have varied across IEA countries and by product. As a result, there is evidence of considerable non-compliance in some instances, indicating that further investment in enforcement activities is warranted. In particular, the IEA Secretariat is concerned that several IEA countries are lagging behind in ensuring the transparency and public reporting of monitoring and enforcement activities. The IEA Secretariat urges all countries to strengthen legal and physical capacity to adequately enforce energy efficiency policy measures and maximise their effectiveness.

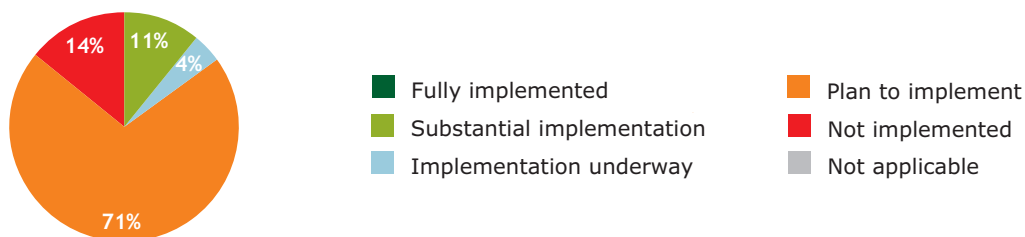
Similarly, evaluation of energy efficiency policies is critical for making sure policies deliver objectives in a cost-effective manner. While all IEA countries generally have a culture of evaluating their energy efficiency policies, the IEA has identified some gaps. For example, the innovative white certificates programmes in France and Italy need to be comprehensively evaluated and the lessons learned from these programmes shared with other countries.

It is encouraging to see that nearly all IEA countries have developed, to a greater or lesser extent, policies promoting energy efficiency investment. These policies are essential for addressing the many impediments to the adoption of cost-effective energy efficiency investments such as:

- the small size of many of the projects;
- the unconventional format of many energy-efficient investments (often the ancillary benefits of energy-efficient technologies are difficult to quantify and thus not amenable to standard cost-benefit analysis);
- initial cost barriers (customers avoid energy-efficient investments because the initial costs of these technologies may be greater than other options, despite the fact that their operating costs may be significantly lower);
- perceived high risk of energy efficiency projects;
- financiers' lack of familiarity with energy efficiency investments; and
- the lack of market information on available financial products for energy-efficient investments.

However, there are three areas of potential concern. First, most IEA countries ‘plan to implement’ a common energy-savings verification and measurement protocol, but have not yet done so (see Figure 21). National protocols are essential for reducing uncertainties in quantifying the benefits of energy efficiency investment and therefore stimulating increased private sector funding of energy efficiency. A common protocol would enhance international comparability of policy performance. Given the importance of this protocol, IEA countries are urged to expedite their activities in this area.

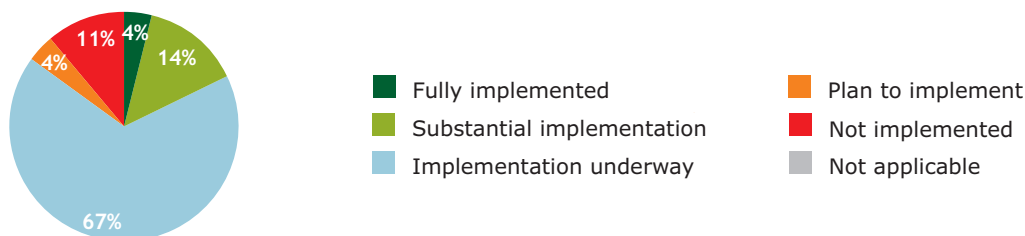
Figure 21
Progress with implementing recommended policies relating to common savings measurement, all IEA countries



Second, IEA member countries could do more to encourage financial institutions to ensure their staff are equipped to deal with energy efficiency projects.

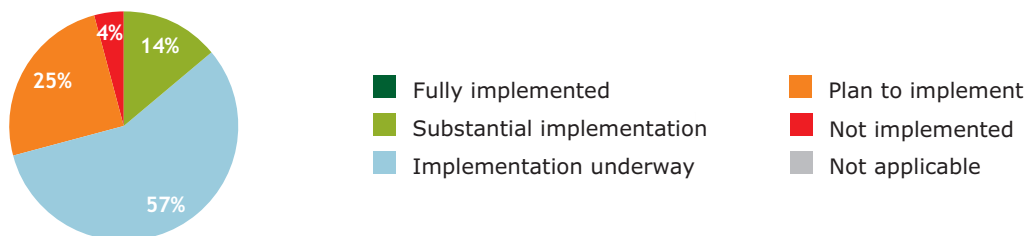
Third, countries could do more to promote risk-mitigation instruments such as public-private partnerships (see Figure 22). International experience suggests public-private partnerships are a highly effective tool for addressing the issue of perceived risk associated with energy efficiency investments (International Energy Agency 2008b). However, available data suggests that most IEA countries have only partial implementation (implementation underway) in this area. The IEA Secretariat urges more effort in implementing the recommended public-private tools and structures to facilitate energy efficiency financing.

Figure 22
Progress with implementing recommended policies relating to public-private partnerships in energy efficiency finance, all IEA countries



Most IEA countries have either completed or have underway a review of how their current fiscal incentive programmes impact on energy efficiency. The challenge facing IEA countries is twofold. First, those countries that have not conducted a subsidy review (New Zealand, Switzerland and Turkey) should do so to ensure that their current fiscal policies do not place undue obstacles in the way of energy efficiency. Second, the challenge is to ensure that the findings from these reviews are implemented in the current economic climate.

Figure 23
Progress with implementing indicators-related recommendations, all IEA countries



IEA countries also need to devote more attention to improving the quality and coverage of their indicators. At present, most countries complete a little over half of the IEA energy indicators template (scored as 'implementation underway') (see Figure 23) - and only four countries are regarded as being able to substantially complete the template (Australia, Canada, Switzerland and the United Kingdom). Given the fundamental role played by indicators in the formulation of high-quality policy, it is essential that all IEA countries devote more resources to this activity.

A final general point relating to cross-sectoral energy efficiency policies is worth making: the need to raise public awareness of the measures currently available. All IEA countries have a range of energy efficiency policies. However, it is likely that many citizens of IEA countries are not aware of the full suite of assistance available to improve energy efficiency. A major challenge for IEA countries will be to raise this awareness.

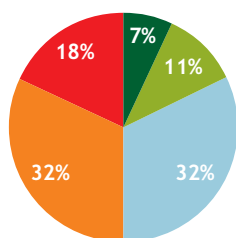
Buildings

Promoting energy efficiency in new buildings is highly cost effective and needs to be at the forefront of building energy efficiency policies. Despite the significant attention given to improving energy efficiency in buildings (see above), there are several critical areas that still need attention. All IEA member countries (except perhaps Germany and Denmark) need to consider setting stronger energy efficiency requirements for buildings. Only Germany and Denmark have energy efficiency requirements that are approaching the optimal 30-year least life-cycle cost level. At the other end of the spectrum, a couple of IEA countries appear to have some levels set at less than a five-year least life-cycle cost.

Energy efficiency standards set the minimum energy performance of new buildings. However, there is also a need to encourage maximum energy-efficiency performance in new buildings and to ensure that these buildings are available in the market place. Construction of these high energy efficiency performance buildings that use very low, or even no net energy, is technically and commercially feasible. Over time, these very low energy-consumption buildings such as PEH (that use 65% to 80% less energy than a standard house) are often less expensive than or close to the cost of traditional design. ZEB are currently more expensive than traditional buildings, but their costs are dropping. The technology for low-energy buildings has been widely available for some time.

Despite the financial benefits of low running costs and technical feasibility, only five IEA countries actively support the introduction of these buildings (see Figure 24); only three IEA countries set market share targets for PEH or ZEB (see Figure 25); and no IEA country currently has updated building codes at a PEH or ZEB level (although some are planning to achieve such levels in codes soon).

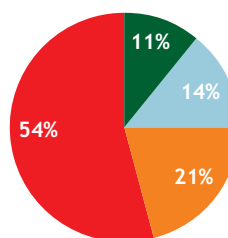
Figure 24:
Progress with implementing recommended policies to support the introduction of PEH or ZEB, all IEA countries



■ Fully implemented
■ Plan to implement

■ Substantial implementation
■ Not implemented

Figure 25:
Progress with implementing recommended policies relating to market share targets for PEH or ZEB, all IEA countries



■ Implementation underway
■ Not applicable

Greater effort to support highly energy-efficient buildings, such as PEH and ZEB, would bolster IEA countries' efforts to improve the energy efficiency of their building stock.

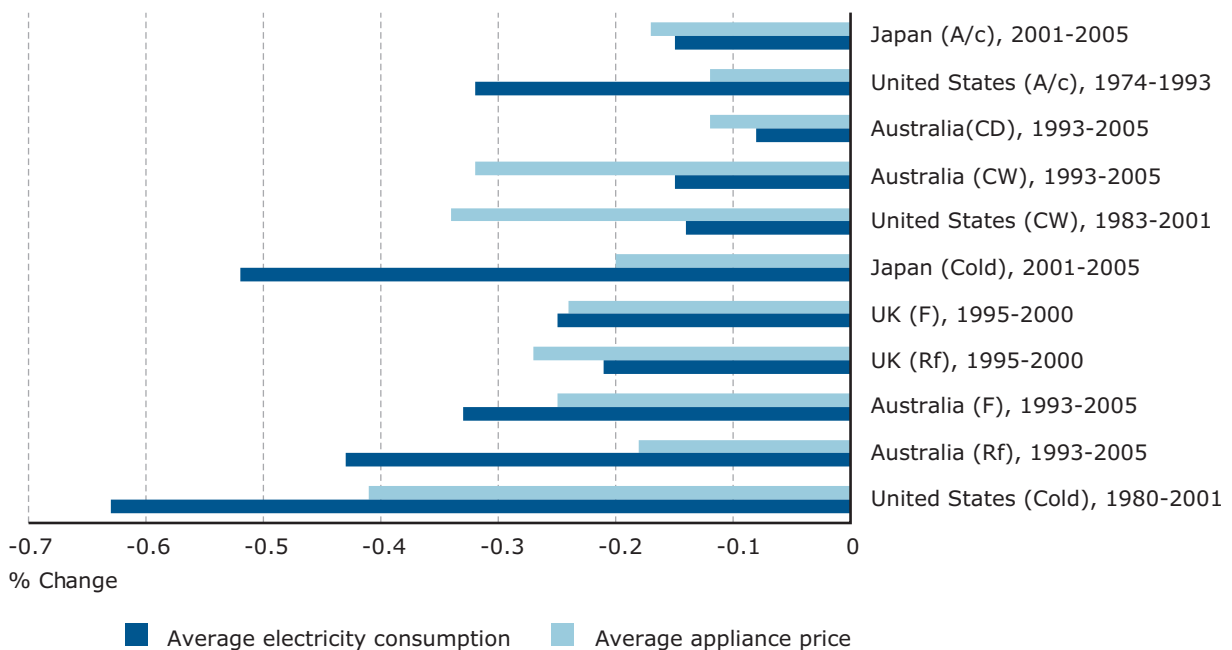
Installation of energy-efficient glazing provides significant energy-savings potential, particularly through the replacement of windows in existing buildings. Indeed, installing energy-efficient windows, when old windows are being replaced, provides one of the most effective means of improving the energy efficiency of existing building stock, as windows are often replaced several times during the life of a building. Furthermore, retrofitting energy-efficient windows appears cost effective in all climates.

IEA countries demonstrate relatively poor performance with respect to promoting energy-efficient glazing. Only one IEA country has fully implemented the recommendation relating to establishing MEPS for windows and glazing (Portugal) and no country has fully implemented the recommendation relating to labelling of windows. Indeed, eight countries have not implemented any part of the glazing recommendation package. Given the potential for these policies to assist countries to achieve energy savings targets, the IEA Secretariat urges IEA member countries to increase their efforts in this area.

Appliances

As indicated above, IEA member countries have made considerable effort in promoting energy-efficient appliances. This is demonstrated by the improvements in appliance efficiency levels over the last two decades (Figure 26).

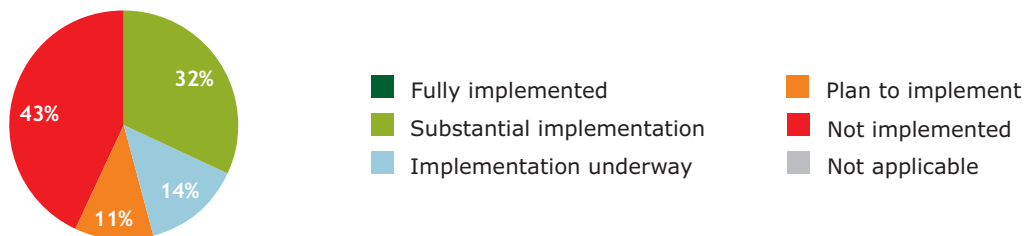
Figure 26:
Recorded fall in average electricity consumption and prices for several major appliance types in selected countries



Source: IEA (2009c).

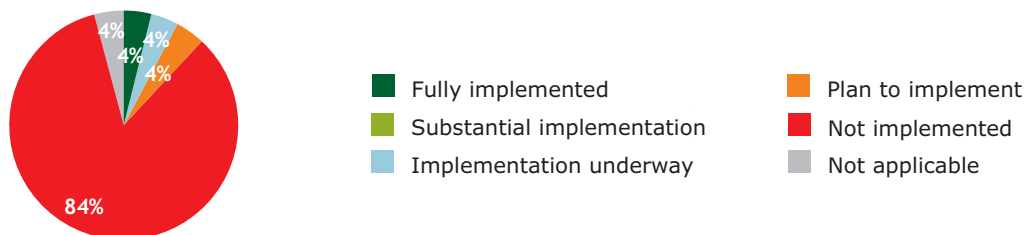
This review of progress identifies two areas of concern. First, it appears almost half of IEA countries have allocated inadequate resources (i.e. 'not implemented') to ensure that stringency is maintained in appliance of MEPS (see Figure 27). This is of concern because resources are needed to ensure MEPS are regularly updated to maintain their relevance in the face of rapidly changing appliance technology.

Figure 27

Progress with implementing recommended policies relating to resources allocated to ensure stringency in appliance MEPS, all IEA countries

Second, very few countries have made progress with policies to encourage television service providers (TVSPs) to ensure their leased set-top boxes are as energy efficient as possible (see Figure 28). This is important because many set-top boxes are purchased by a TVSP and leased to householders who pay the energy bill. In this case there is no incentive for the TVSP to reduce the running cost of equipment (a classic principal-agent problem (International Energy Agency 2007b)). Often consumers have little choice in selecting the model of set-top box. Policies are required to encourage TVSPs to consider energy efficiency, as currently there are no effective market drivers for them to do so. As all TVSPs operate on a licence or franchise agreement with government agencies, the license agreement should include energy performance requirements, covering both the hardware provided to customers and effective power management.

Figure 28

Progress with implementing recommended policies relating to television service provider contracts, all IEA countries

Lighting

IEA member countries have been active in promoting energy-efficient lighting in many areas. However, two areas stand out as requiring further attention - policies that address non-residential lighting systems and those that support the phase-out of inefficient fuel-based lighting.

The majority of electricity used for lighting is for in-door lighting in non-residential buildings *i.e.* within public, commercial and industrial buildings. There are many highly cost-effective opportunities to save lighting energy in these spaces from the use of efficient lamps to the appropriate use of natural daylight and the application of good lighting design. Realising the majority of these savings opportunities can only be addressed through policy measures which target the performance of the lighting system as a whole and that place responsibilities upon the agents who design, install and operate such systems. Such measures are complementary to policies which address the energy performance of specific lighting components, such as lamp energy performance requirements, but aim to address key principal-agent problems which otherwise mitigate against optimised lighting system design, procurement, installation and operation. In this respect, IEA countries have more work to do. Many countries have plans to phase out inefficient street lighting technologies such as mercury vapour lamps. It is important that these countries implement the planned policies as soon as practicable. Also, only Canada, France, New Zealand, the UK, and the US have specified lighting energy limits in new non-residential buildings.

A second area of recommended lighting energy efficiency policy that has received limited attention relates to phasing out fuel-based lighting. More must be done to stimulate the adoption of higher efficiency alternatives to fuel-based lighting in off-grid communities in many parts of the developing world.

Globally, 1.6 billion people have no access to electricity through the grid (International Energy Agency 2008c). As a consequence, these people rely on fuel-based lighting technologies, such as kerosene lamps, to provide illumination. Such lighting is extremely inefficient and costly. Furthermore, it provides inadequate illumination levels for many applications such as reading and gives rise to significant in-door air pollution. In areas where access to the grid is not viable in the near-term, new solid-state lighting technology can provide high-quality solar-powered task lighting at significantly lower economic, environmental and health costs over its life-cycle than fuel-based lighting. Presently, there are limited distribution channels for this technology and the initial costs can be prohibitively high for those with little or no access to credit and constrained cash flow. A global effort that not only supports the transition away from fuel-based lighting to more sustainable alternatives, but also provides access to technology and financing, would have a positive impact on the lives of hundreds of millions of people. It would also move us closer to attaining a variety of international development and energy policy goals. The IEA Secretariat encourages IEA countries to undertake such efforts in the context of their overseas development assistance and related activities.

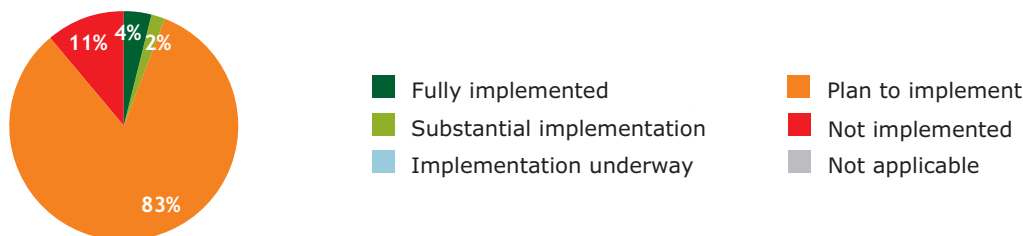
Transport

While there are a few stand-out transport policies in IEA member countries, there is clearly room for more effort. Many of the transport energy efficiency policies in IEA countries are in the ‘plan to implement’ category. This is particularly the case relating to tyres and energy efficiency standards for light-duty vehicles (see Figure 29). Of more concern are those countries that have made little progress across several of the recommended transport energy efficiency policies (Australia, New Zealand and Turkey). The IEA Secretariat urges all IEA countries to pursue the implementation of transport energy efficiency policies with vigour so as to capture the significant energy-savings potential these policies can deliver.

The other area of policy action that is urgently needed in IEA countries is establishing fuel-efficiency standards (and related policies including labelling and financial incentives) for heavy-duty vehicles. Heavy-duty vehicles are responsible for 30% of worldwide fuel use (International Energy Agency 2008c). The transport sector has already achieved significant improvements in vehicle fuel efficiency, but large potential improvements remain. Many barriers prevent the rapid introduction of cost-effective energy-efficient technologies, such as lack of information, fluctuating fuel prices, and risk aversion by both manufacturers and buyers. IEA countries should urgently implement policies aimed at accelerating fuel- efficiency improvements in trucks and other heavy-duty vehicles.

Figure 29

Progress with implementing recommended policies relating to tyres and fuel efficiency standards for light duty vehicles, all IEA countries



Industry

Analysis shows that substantial energy savings opportunities to improve industrial energy efficiency remain (Figure 30).

In order to capture this energy efficiency potential, IEA member countries need to increase their efforts in three areas. First, the IEA is concerned with the low level of attention being given to industrial electric motor-driven systems. While MEPS for motors are planned in many (though not all) IEA countries, few countries

have examined the barriers to the optimisation of energy efficiency in motor-driven systems (see Figure 31). Significant energy savings (perhaps in the order of 10% of global electricity demand (International Energy Agency 2008c), are thought to be achievable from optimisation of electric motor-driven systems. A large part of this saving is achieved through better matching the output of motor driven systems to fluctuations in mechanical loads via the use of power electronics and adjustable speed drives. However, additional policy measures are required. Some of these can target standardised motor-driven applications such as pumps, fans, compressors and circulators, but there are many other less standardised applications where more effort will be required to determine effective policy portfolios.

Figure 30
Projected sector CO₂ savings potentials

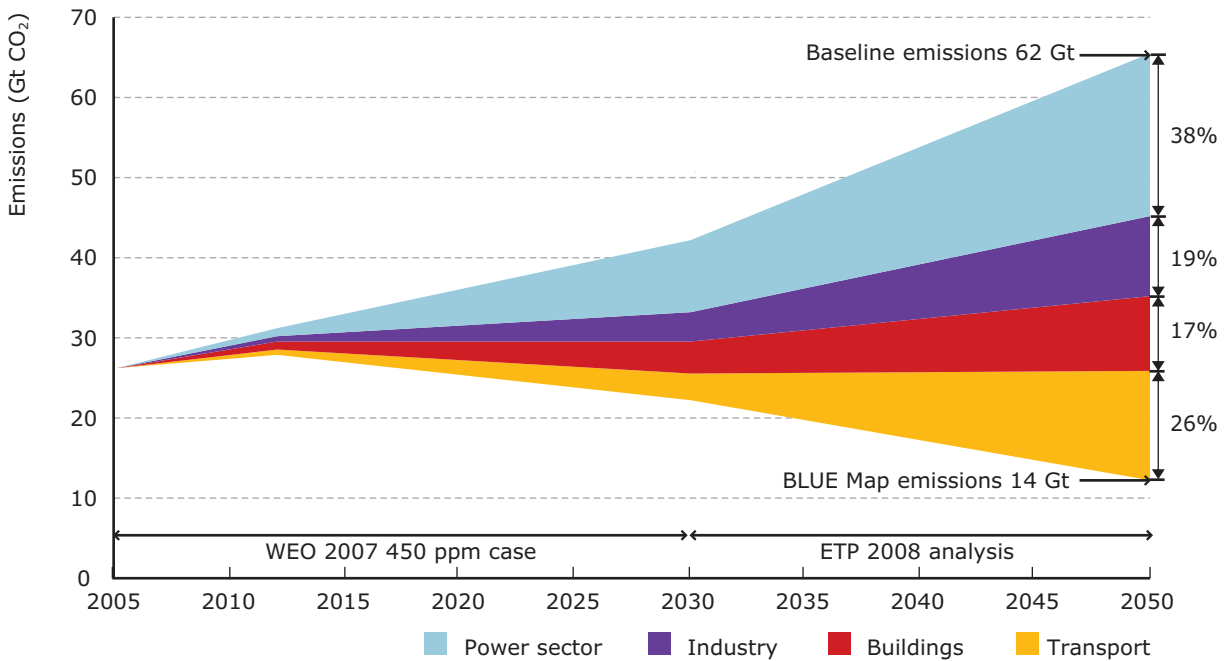
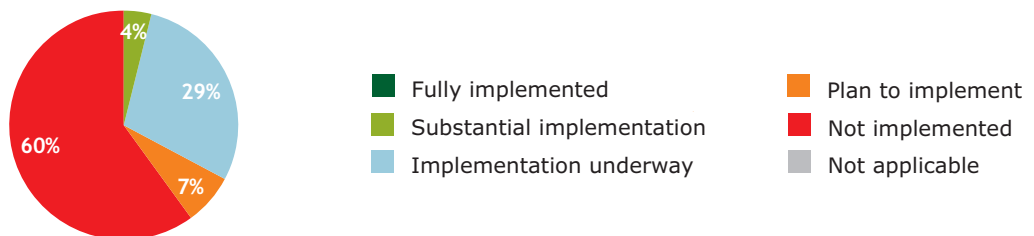
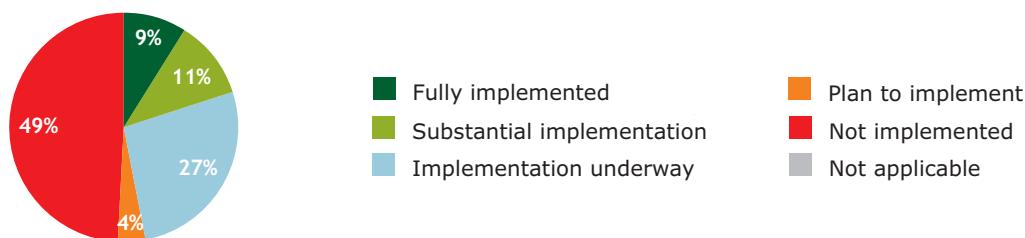


Figure 31
Progress with implementing recommended policies relating to motor energy efficiency standards, all IEA countries



Second, while policies for SMEs are well-developed in several countries, the IEA is concerned that more attention is needed in two areas. First, benchmarking information needs to be made available to SMEs. Second, appropriate incentives need to be developed and implemented to encourage SMEs to make least life-cycle cost capital acquisition decisions. Currently only half of the IEA countries have implemented policies in these areas (see Figure 32).

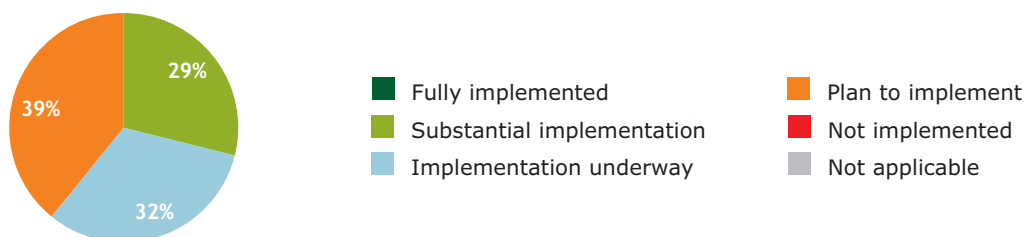
Figure 32
Progress with implementing recommended policies relating to small and medium-sized enterprises, all IEA countries



Utilities

The IEA recommends that countries select either one or more of the suggested policies. In this context around half of IEA member countries have implemented, or plan to implement, at least one of the suggested utility-related policies (Figure 33). Experience suggests that well-designed utility programmes can deliver significant energy savings cost effectively. The IEA encourages all its member countries to continue considering how they can encourage utilities to promote energy efficiency.

Figure 33
Progress with implementing recommended policies relating to encouraging utilities to promote energy efficiency, all IEA countries



Note: This chart is based on the four elements of the utility recommendation (see Annex 1: Consolidated list of 25 IEA energy-efficiency recommendations). As each of the utility recommendation elements is optional, the IEA has calculated this pie chart based on the element that achieves the highest level of policy implementation in each country.

Summarising progress with IEA member country implementation of the 25 energy efficiency policy recommendations

This section provides a brief overview of progress across all IEA member countries on implementing the 25 energy efficiency policy recommendations. Its purpose is to provide a backdrop for further detailed discussion in the later section presenting country-by-country progress reports.

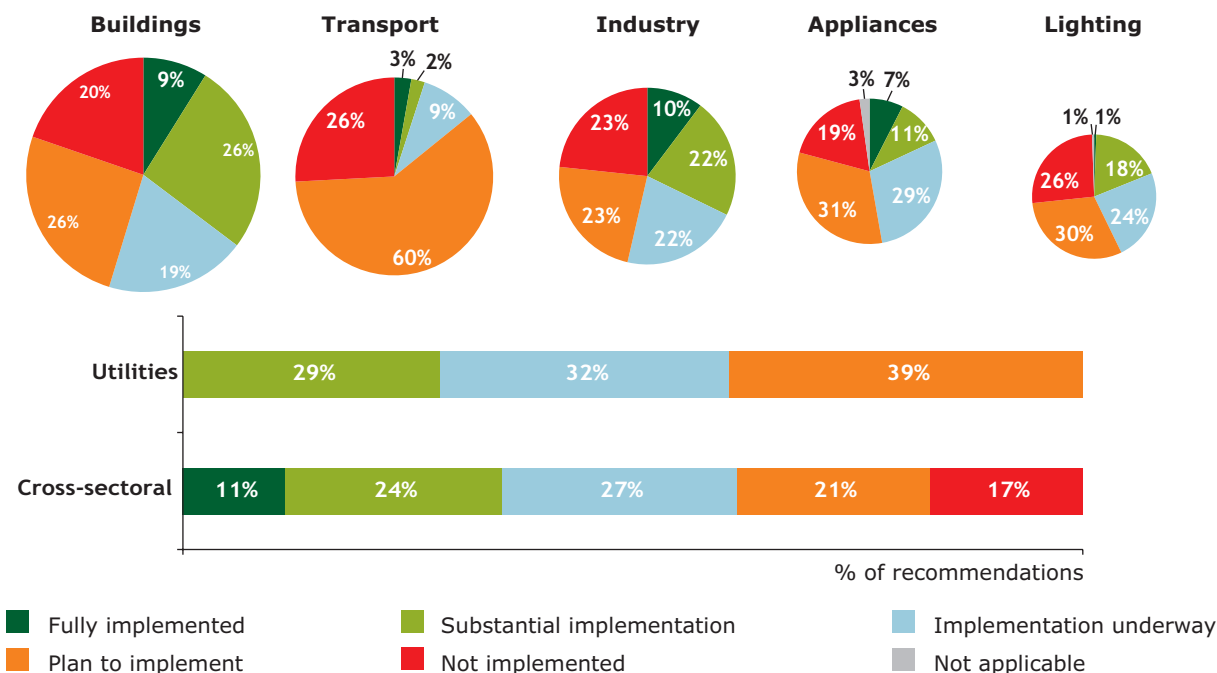
It is important to recall that the recommendations were developed based on identified policy gaps and priorities. This has two implications. First, the recommendations do not cover the broad range of possible energy efficiency policy activity that is ongoing in countries. Rather, they are meant to focus attention on the priority energy efficiency policies identified by IEA analysis.

Second, because the recommendations focus on existing policy gaps, the results presented in the following sections indicate that further effort will be required in each country to fully implement the measures. This is not to negate the good work that is already underway in energy efficiency. Rather, this analysis is presented in the spirit of attempting to assist countries to improve their energy efficiency policy portfolios and capture the significant energy savings potentials.

Combined IEA country progress

Figure 34 summarises the progress made by all IEA member countries with implementing the IEA 25 energy efficiency recommendations. The pie charts have been scaled to reflect relative global energy savings potential of each sector. For example, the lighting recommendations are estimated to deliver approximately one-third as much energy savings as the buildings recommendations. Because the IEA does not calculate energy efficiency potential for the utilities and cross-sectoral recommendations, these are presented as bar charts.

Figure 34 Progress with implementing IEA 25 energy efficiency recommendations, all recommendations, all IEA countries

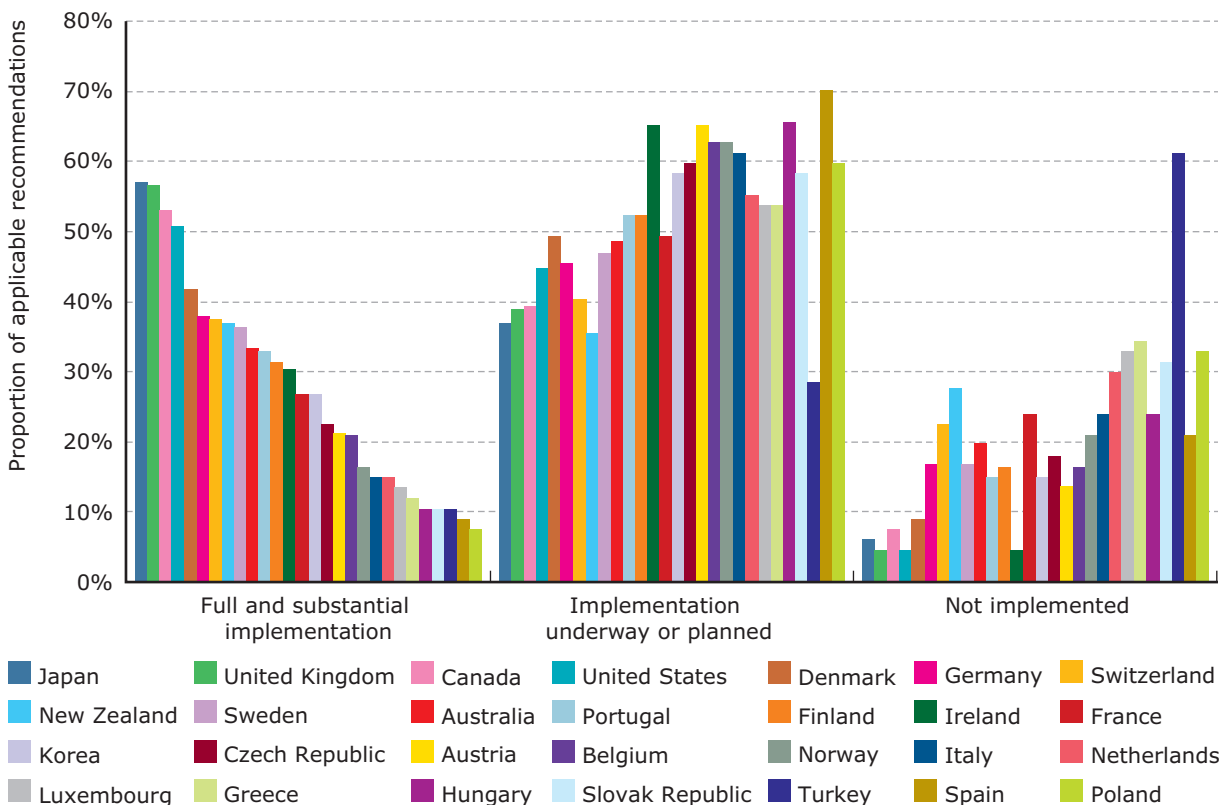


From this overview, it is clear that there is room for further implementation in all sectors. The IEA countries have demonstrated the least implementation (*i.e.* ‘not implemented’) of energy efficiency policies relating to transport. In contrast, when the categories ‘fully implemented’ and ‘substantial implementation’ are considered together, the areas with the most developed policies are buildings followed by industry and cross-sectoral. The area where there is most ‘planned’ policy implementation is by far in transport.

Comparison of degree of progress with implementing recommendations

It is also instructive to compare the degree of progress with implementing the applicable recommendations among IEA member countries (see Figure 35). One concern is that only five countries appear to have ‘fully implemented’ or ‘substantially implemented’ more than 40% of the IEA recommendations: the United Kingdom (57%), Japan (57%), Canada (53%), the United States (51%) and Denmark (42%).

Figure 35
Level of implementation of applicable IEA recommendations, all IEA countries, all recommendations



Note: That is, proportion of all recommendations minus “not-relevant” recommendations.

Figure 35 indicates a relatively high proportion of recommendations in the ‘implementation underway’ and ‘plan to implement’ categories - this is particularly the case with EU countries. This is encouraging in the sense that it indicates high aspirations for energy efficiency policies in the next one to two years. However, the IEA sees this as posing a challenge for countries. A plan to implement is not implementation itself. The IEA encourages countries to ensure that these planned policies are put into action without delay.

Furthermore, the IEA notes that 12 IEA countries¹⁴ are currently implementing¹⁵ fewer than half of the recommendations. Not surprisingly, these countries also received the highest portions of recommendations 'not implemented'.

Comparison of IEA implementation progress by sector

Figure 36 to Figure 42 compare country progress with implementing applicable recommendations in each of the seven sectors covered by the IEA recommendations.

An analysis of progress with implementing **cross-sectoral** recommendations (Figure 36) reveals two distinct groups at either end of the spectrum. First, there are those that have substantially or fully implemented a significant proportion of cross-sectoral recommendations (Canada, Finland, Germany, Japan, New Zealand, Portugal, Sweden, Switzerland, the United Kingdom and the United States). A second group of countries have a high level of 'not implemented' scores (Greece, Norway, the Slovak Republic and Turkey). An interesting distinguishing characteristic between the two groups is the level of compliance and enforcement implementation. That is, those countries that have low levels of cross-sectoral policy implementation tend to also have low levels of implementation for the compliance and enforcement recommendations.

For **buildings** (Figure 37), Denmark, Germany, Portugal, Switzerland and the United Kingdom all stand out as leaders with respect to current implementation of building energy efficiency policies. In contrast, more than two-thirds of the building recommendations remain to be implemented in Greece, Korea, Poland, the Slovak Republic, Spain and Turkey.

In the **appliance** and **lighting** areas (Figure 38 and Figure 39 respectively), policy activity is dominated by actions categorised as either 'implementation underway' or 'plan to implement'. The IEA encourages all countries to extend, improve and implement the planned energy efficiency policies.

The dominant feature of **transport** energy efficiency policies (Figure 40) is that, for most IEA countries, a significant portion of the recommended actions are still only planned. While planned policy implementation is commendable, it is important that these plans urgently gain traction and are implemented. There are also several countries that have not implemented many of the IEA transport recommendations (Australia, New Zealand and Turkey).

The comparison of **industry** energy efficiency policy implementation (Figure 41) again reveals two sets of countries at either end of the spectrum. One group of countries has relatively well-developed industrial policies (Belgium, Canada, the Czech Republic, Ireland, Japan, Korea, Turkey, the United Kingdom and the United States) and demonstrate substantial implementation or better for more than 50% of the recommendations. On the other hand, Greece, Luxembourg, the Netherlands, Poland and the Slovak Republic appear to be not implementing more than half of the IEA recommendations. In particular, these countries score relatively poorly on motors (the recommendation on examining barriers to the optimisation of energy efficiency in electric motor-driven systems and related policies), energy management and policies for SMEs. These countries would do well to enhance their energy efficiency policies in the industrial sector.

Figure 42 shows how individual countries compare in implementing incentives for **utilities** to deliver energy efficiency. One argument that could be made relating to these utility recommendations is that they are not relevant for a particular country because a national government does not have jurisdiction over utilities, or because utilities operate in a free market. However, experience in several IEA countries shows that utility energy efficiency policies can be cost-effective even in these contexts. The IEA encourages all countries to consider how they can motivate utilities to promote energy efficiency.

14. The Czech Republic, France, Hungary, Italy, Luxembourg, Norway, the Slovak Republic, Spain, Turkey, Greece, Netherlands, Poland.

15. That is either 'fully implemented', 'substantial implementation' or 'implementation underway'.

Figure 36
Comparison of country progress with implementing applicable cross-sectoral recommendations

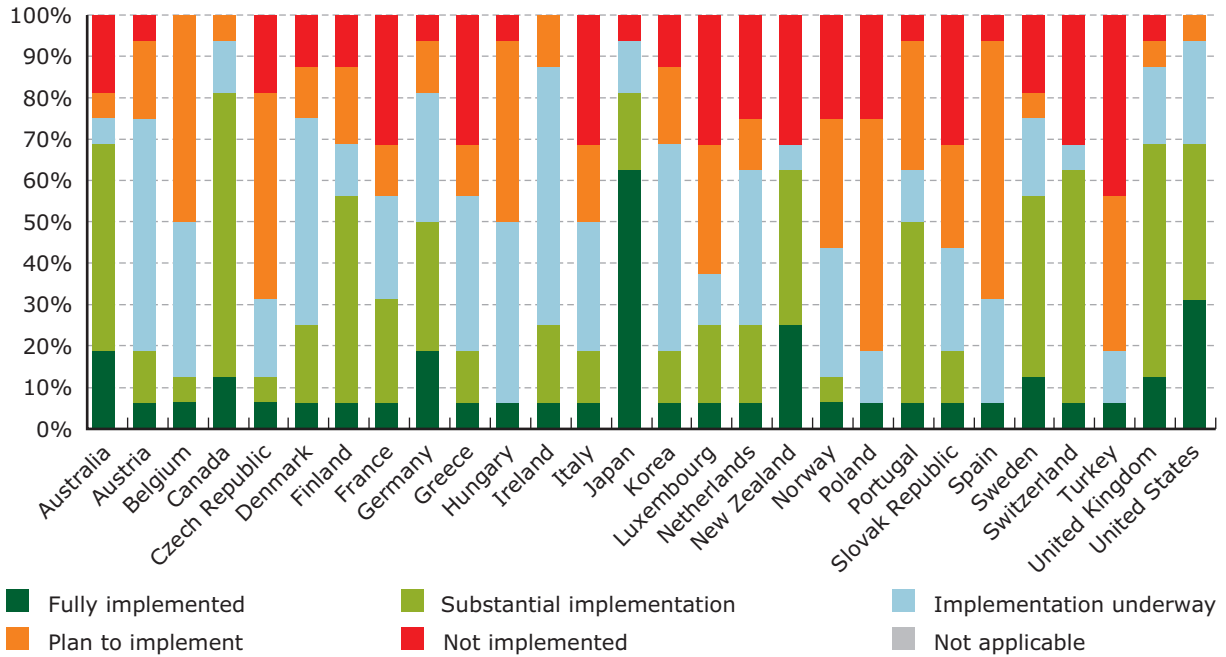


Figure 37
Comparison of country progress with implementing applicable buildings recommendations

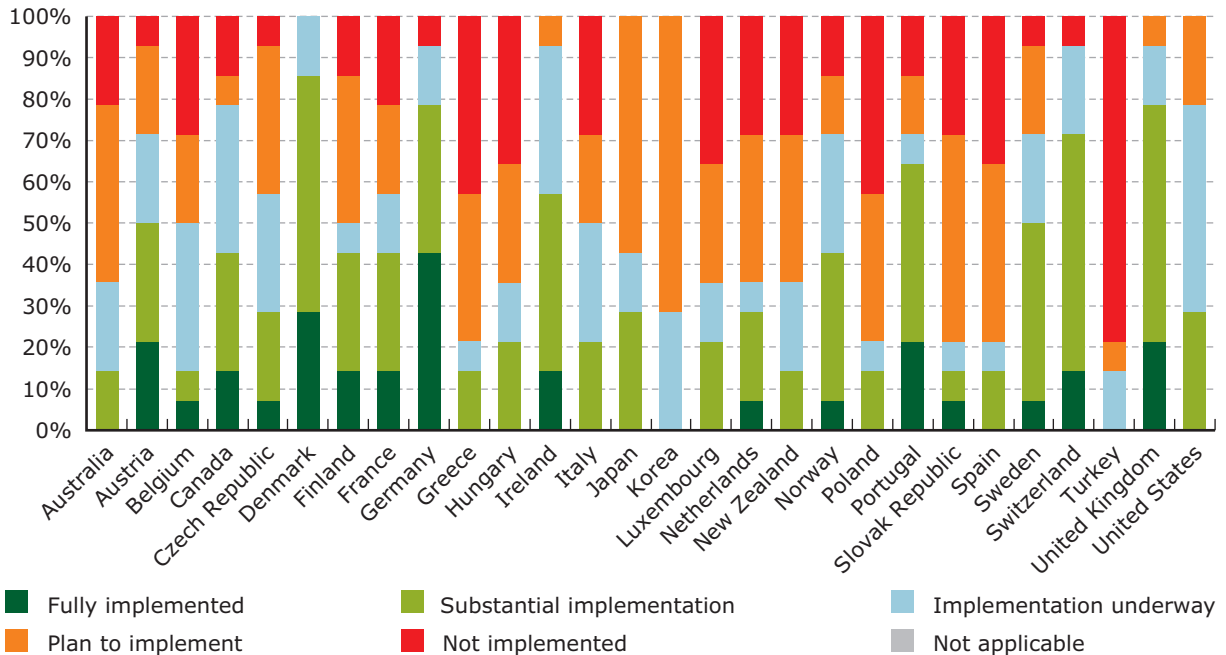


Figure 38
Comparison of country progress with implementing applicable appliance recommendations

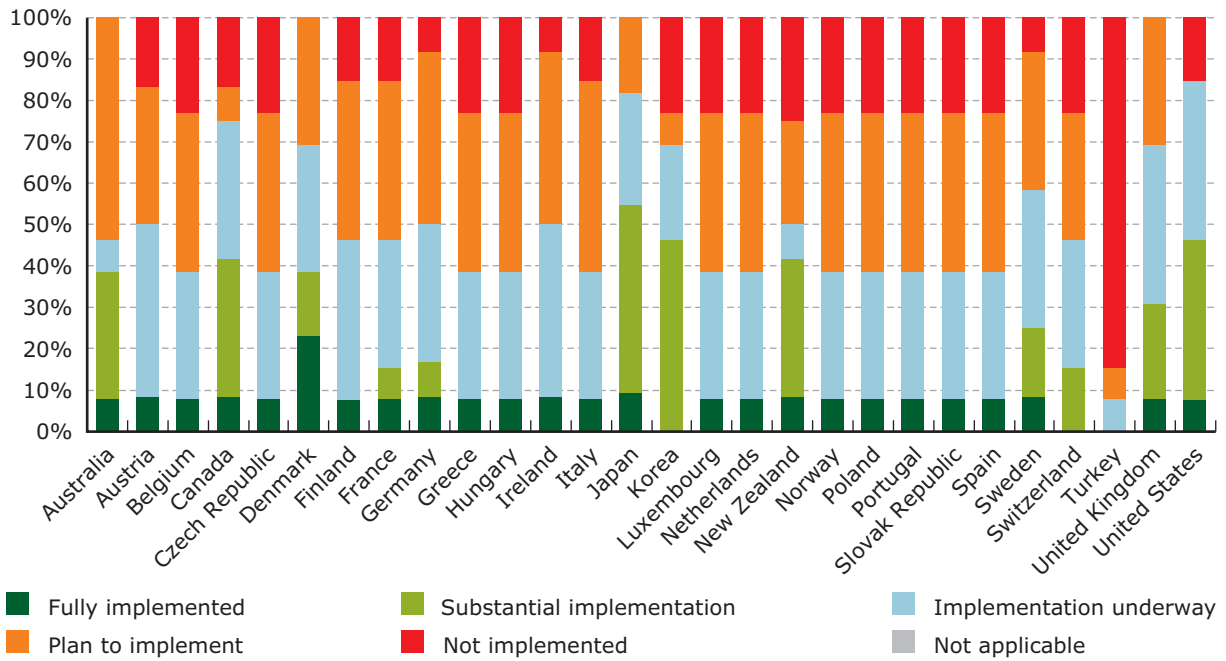


Figure 39
Comparison of country progress with implementing applicable lighting recommendations

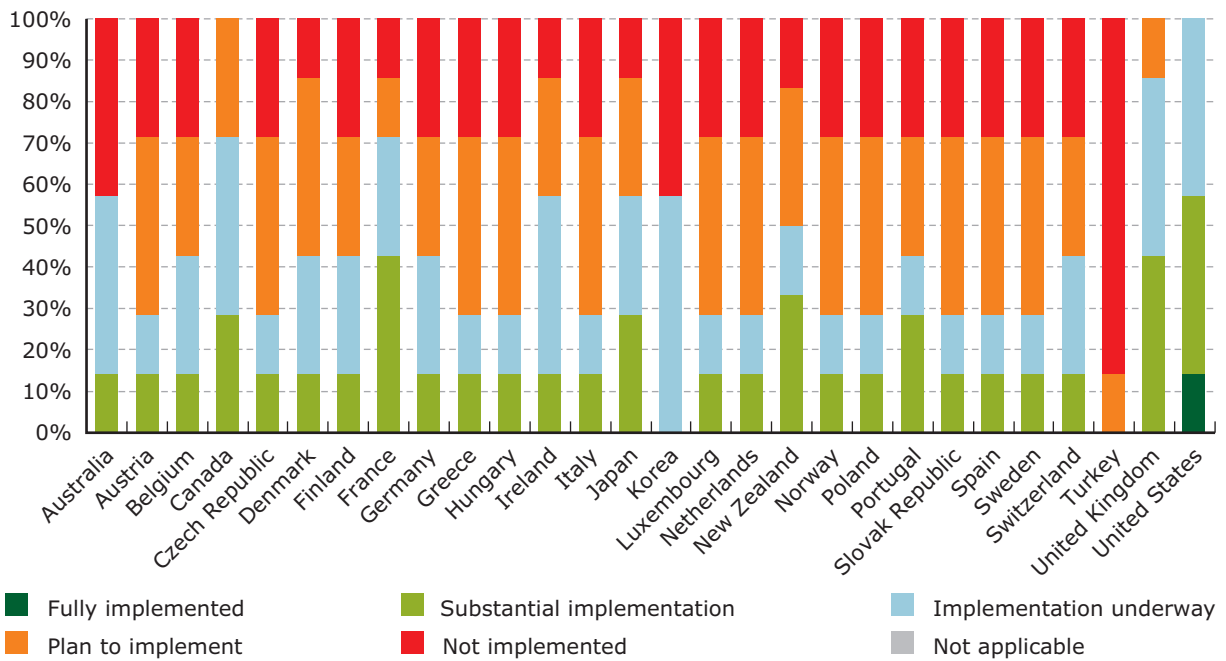


Figure 40
Comparison of country progress with implementing applicable transport recommendations

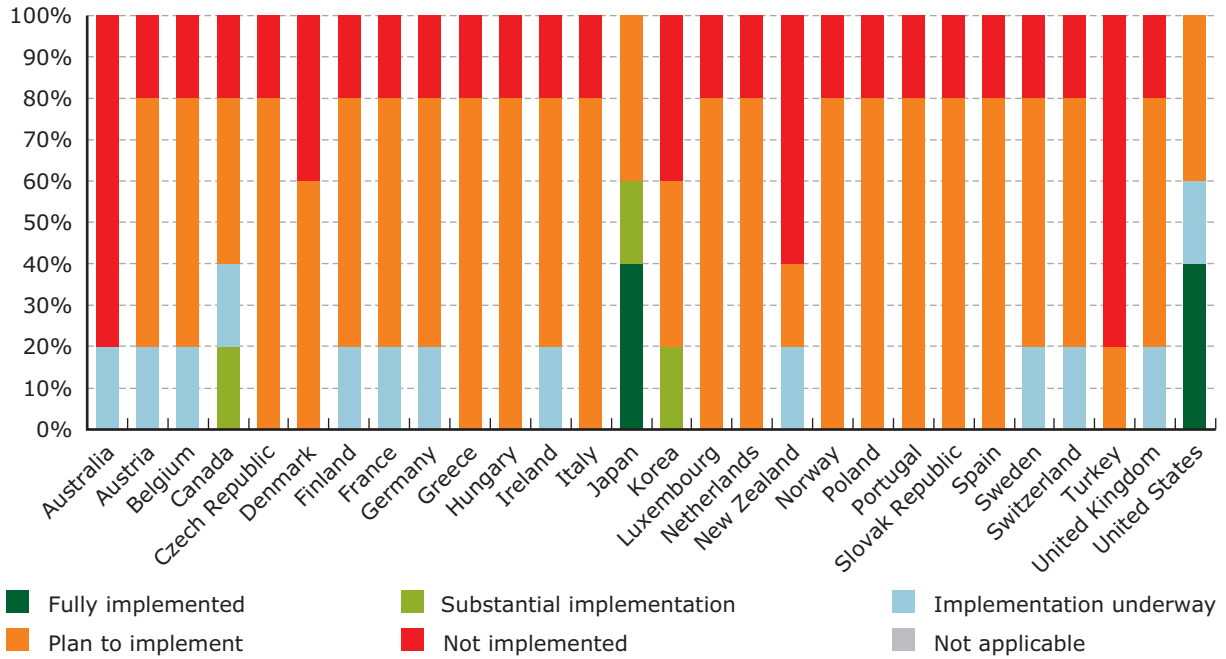


Figure 41
Comparison of country progress with implementing applicable industry recommendations

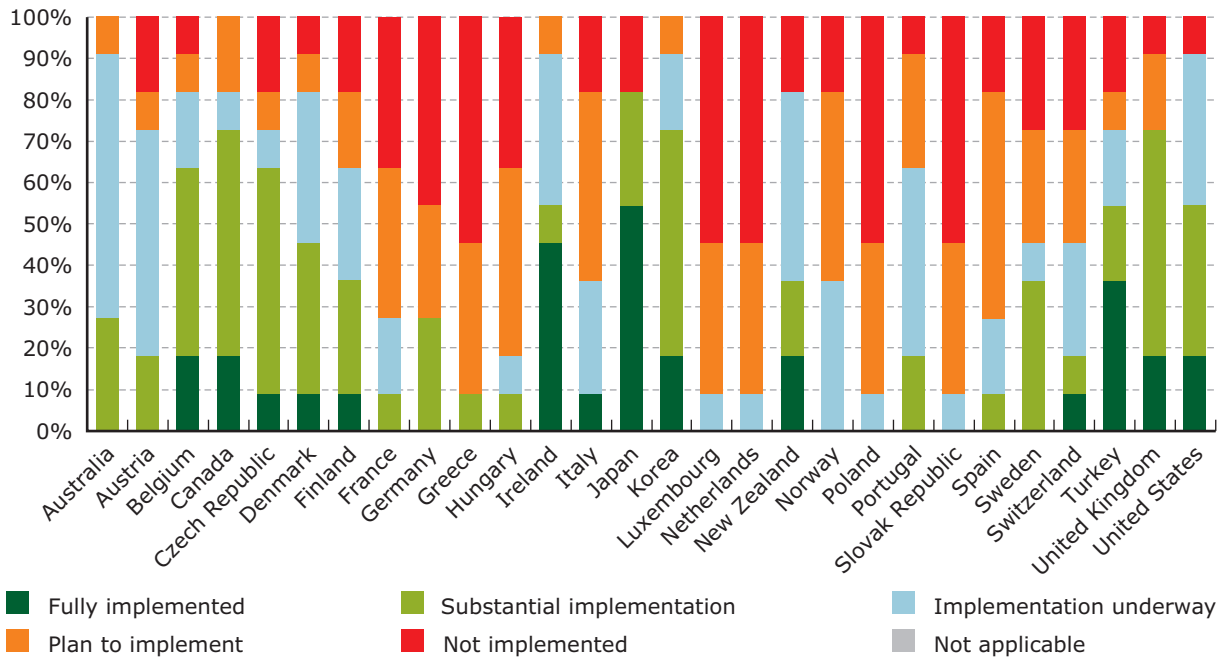
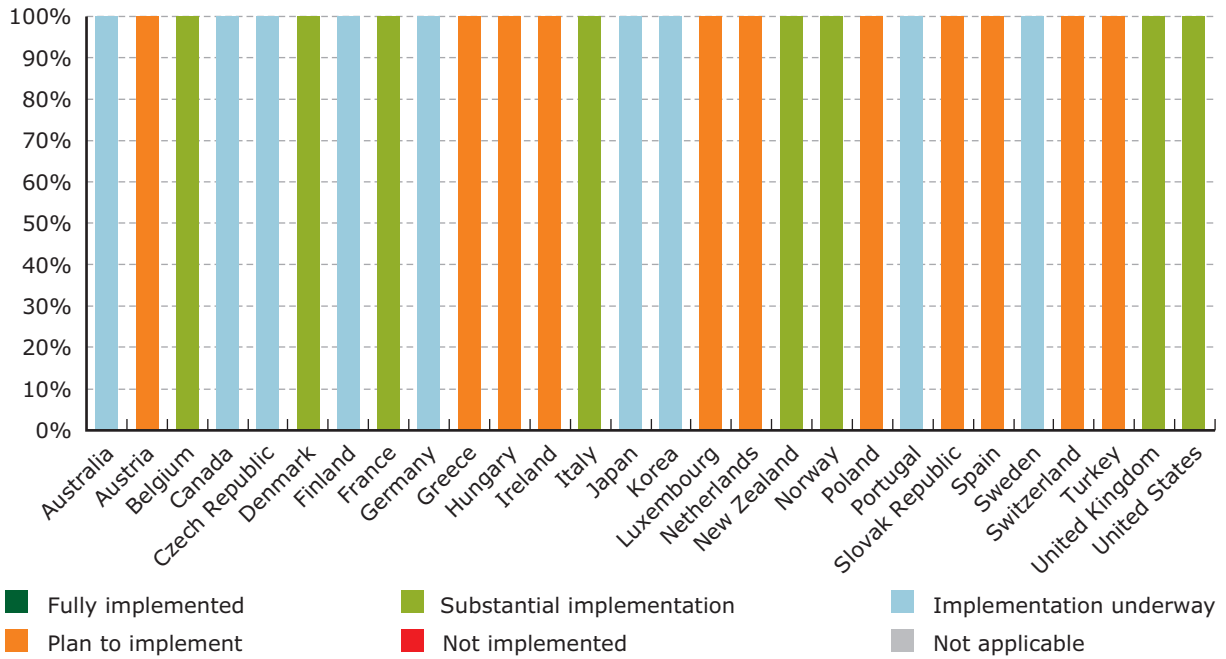


Figure 42
Comparison of country progress with implementing applicable utility recommendations



Note: This chart is based on the four elements of the utility recommendation. As each of the utility recommendation elements is optional, the IEA has calculated this bar chart based on the element that achieves the highest level of policy implementation in each country.

Country reports

This section outlines each IEA country's progress with implementing energy efficiency policy, with a particular focus on the IEA 25 recommendations.

The overall aim of these country progress reports is to assist governments with enhancing their energy efficiency policy. It is important to note that these country reports do not attempt to mention every energy efficiency policy in each country. Rather, they focus on a selection of successful and innovative policies as well as areas for further action.

Before proceeding with individual country reports, an overview of final energy intensity changes in all IEA countries is presented below.

Figure 43
Changes in final energy intensity in IEA countries (purchasing power parity) from 1990 to 2007

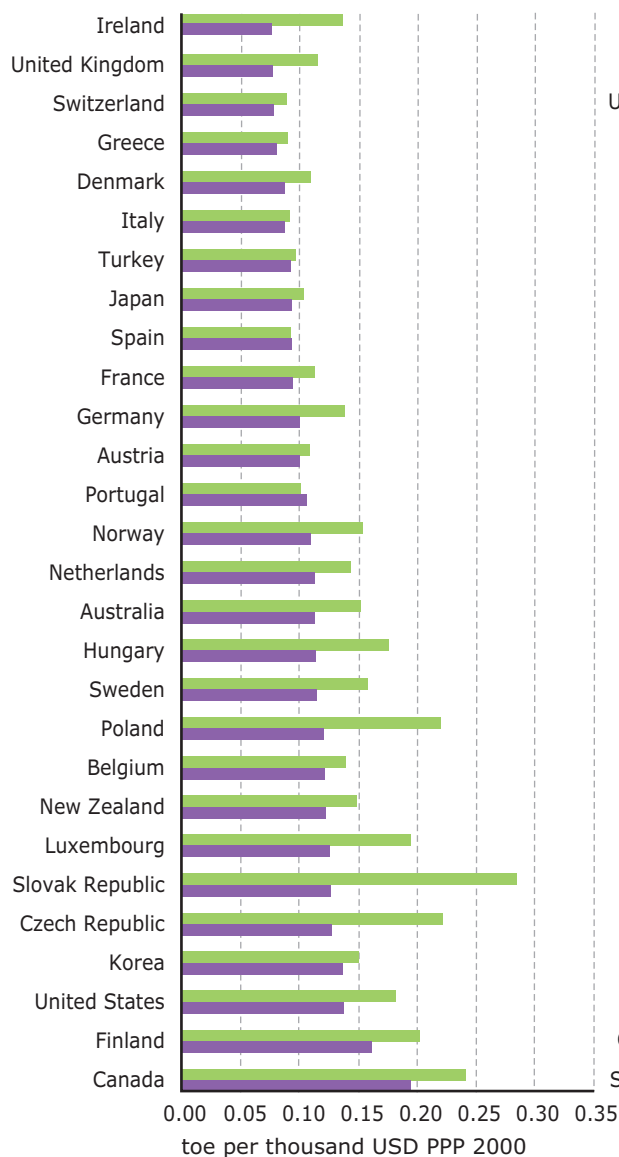


Figure 44
Changes in final energy intensity in IEA countries (market exchange rates) from 1990 to 2007

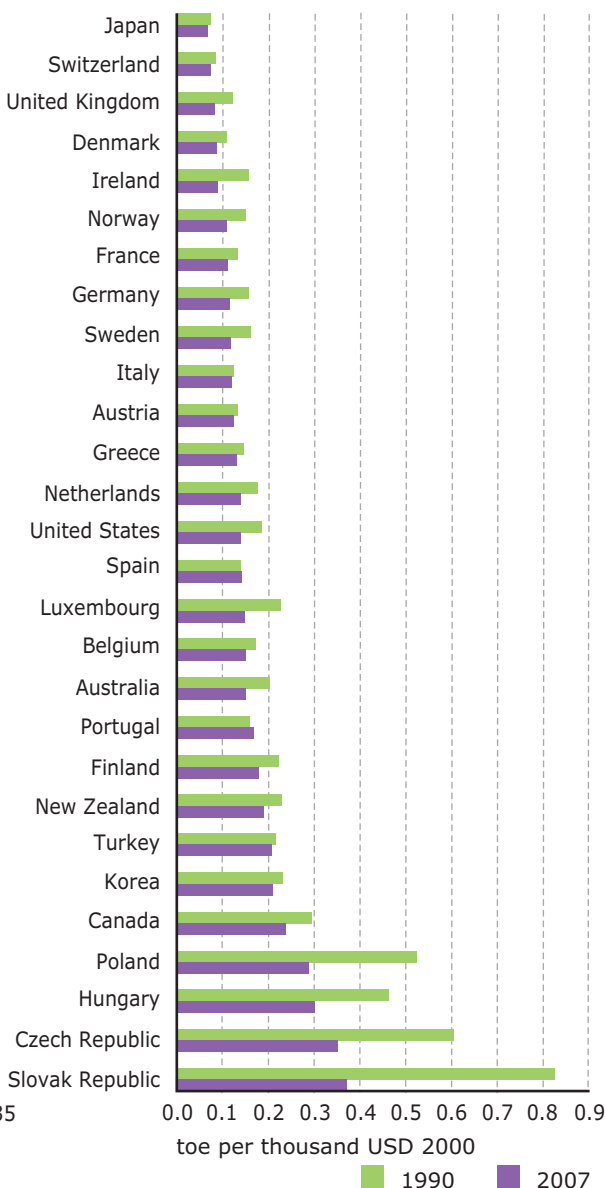
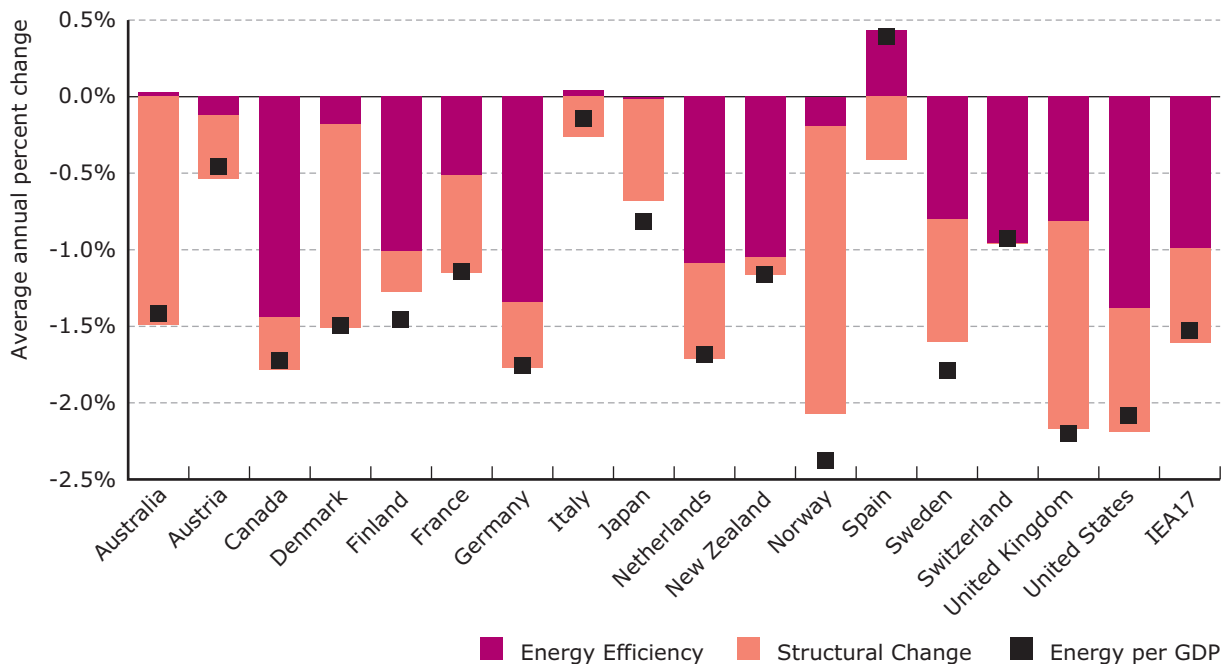


Figure 43 shows that in 2007, Ireland and the United Kingdom have the lowest energy intensities of any IEA member country in terms of purchasing power parity (PPP). When using market exchange rates (MER), in 2007, Japan and Switzerland have the lowest energy intensities of any IEA member country (Figure 44).

All countries, with the exception of Portugal and Spain, have demonstrated relatively consistent declines in energy intensity since 1990, with the Czech Republic, Ireland, Poland and the Slovak Republic, making the largest gains in energy intensity.

Figure 45

Decomposition of final energy intensity changes for IEA17 countries, 1990 to 2006



Note: The following sectors are not included in this analysis: mining and quarrying, fuel processing, electricity, and gas and water supply. Industries in the category "other industries" are analysed only to a very limited extent in this study.
Source: IEA indicator database

Furthermore, it is possible to 'decompose' or separate out the changes in energy efficiency and changes in economic activity and structure that affect aggregate energy intensity (Figure 45). For example, Figure 45 shows that Finland's aggregate energy intensity decreased by around 1.3% per year from 1990 to 2006. Just over 1% of this decrease can be attributed to improved energy efficiency. The rest resulted from changes in economic activity and structure.

Energy efficiency progress report, Australia

Context

Due largely to its relatively inexpensive energy prices, long freight-transport distances and the dominance of energy intensive industry, Australia's energy intensity is higher than the average in IEA member countries. Over time, Australia's economy has become more service-driven resulting in a decrease in energy intensity, adjusted for PPP, of around 1.7% per year between 1990 and 2007.

Australia has a federal system of government and energy efficiency policy responsibility is spread across different levels of government. Energy efficiency policy is co-ordinated with state and territorial governments through the Council of Australian Governments (COAG), an intergovernmental body comprising the Prime Minister, state premiers, territory chief ministers, the President of the Australian Local Government Association, and the Ministerial Council on Energy (MCE), which comprises commonwealth, state and territory energy ministers. The MCE oversees and coordinates the development of national energy policy. The National Framework on Energy Efficiency (NFEE), delivered by the MCE, has been the primary policy mechanism through which cross-government energy efficiency policy is implemented. Additionally, aspects of energy efficiency policy relating to buildings are implemented through the Local Government and Planning Ministers Council (LGPMC) (comprising commonwealth, state and territory planning ministers, the LGPMC oversees and coordinates national approaches to local government and planning).

In December 2008, the Commonwealth government released its Carbon Pollution Reduction Scheme (CPRS) White Paper, which details an ETS and framework for the transition to a low emission economy.

Strengths and innovations

Australia has a long history of energy efficiency policy development and has developed an impressive suite of energy efficiency policies. Through the NFEE, COAG aims to define future directions for national energy efficiency policy in Australia's residential, commercial and industrial sectors. Stage one of the NFEE has already demonstrated success by increasing public awareness and knowledge about energy efficiency and developing energy efficiency regulations. In addition to NFEE, on 2 July 2009 COAG agreed to a comprehensive ten-year National Strategy for Energy Efficiency (NSEE) to accelerate energy efficiency improvements for households and businesses across all sectors of the economy.¹⁶ The strategy will complement the CPRS by addressing barriers that prevent the efficient uptake of energy-efficient opportunities.

The government has also announced it will increase resourcing for energy efficiency. As part of the CPRS White Paper, the Climate Change Action Fund (CCAF) will provide AUD 2.75 billion over five years to, among other things, assist industry and community organisations pursue greater energy efficiency. The Australian government also recently announced its AUD 4 billion Energy-efficient Homes Programme, which provides assistance to install ceiling insulation and solar hot water systems in owner occupied or private rental properties.

The government is also attempting to increase awareness of building energy efficiency. A Nationwide House Energy Rating Scheme (NatHERS) has been implemented which rates the thermal performance of housing on a star scale from one to ten. Australian governments have agreed to an increase in energy efficiency requirements for new residential buildings from 2010 and for all classes of commercial buildings (from 2011), as well as the phase-in of mandatory disclosure of building energy efficiency at the time of sale or lease. For commercial buildings, the National Australian Built Environment Rating System has been developed and has achieved a high level of industry recognition.

16. The 2009 Progress Report includes policy action taken before 31 March 2009. Measures implemented as a result of the 2 July 2009 NSEE are therefore not taken into account in the scores.

Australia has a high quality appliance standards and labelling programme. Regulations currently exist for water heaters, white goods, fluorescent light bulbs and air conditioners. The range of appliance and equipment types subjected to minimum energy performance standards (MEPS) and labelling regulation has steadily increased, as has the stringency of some MEPS categories. As a result of higher MEPS governing lighting, the sale in Australia of energy-inefficient light bulbs is being phased out.

The Energy Efficiency Opportunities (EEO) programme is a high-profile policy aimed at industry. It requires companies that use 0.5 PJ or more of energy annually to undertake detailed energy assessments in order to identify opportunities to improve energy use. Firms are required to publicly report the outcomes. This measure covers almost half of Australia's total energy end-use. Activities under the EEO programme are supported by a range of capacity building tools, guidance materials, case studies and workshops which enable companies to learn how to understand and improve their energy productivity.

Challenges and areas for improvement

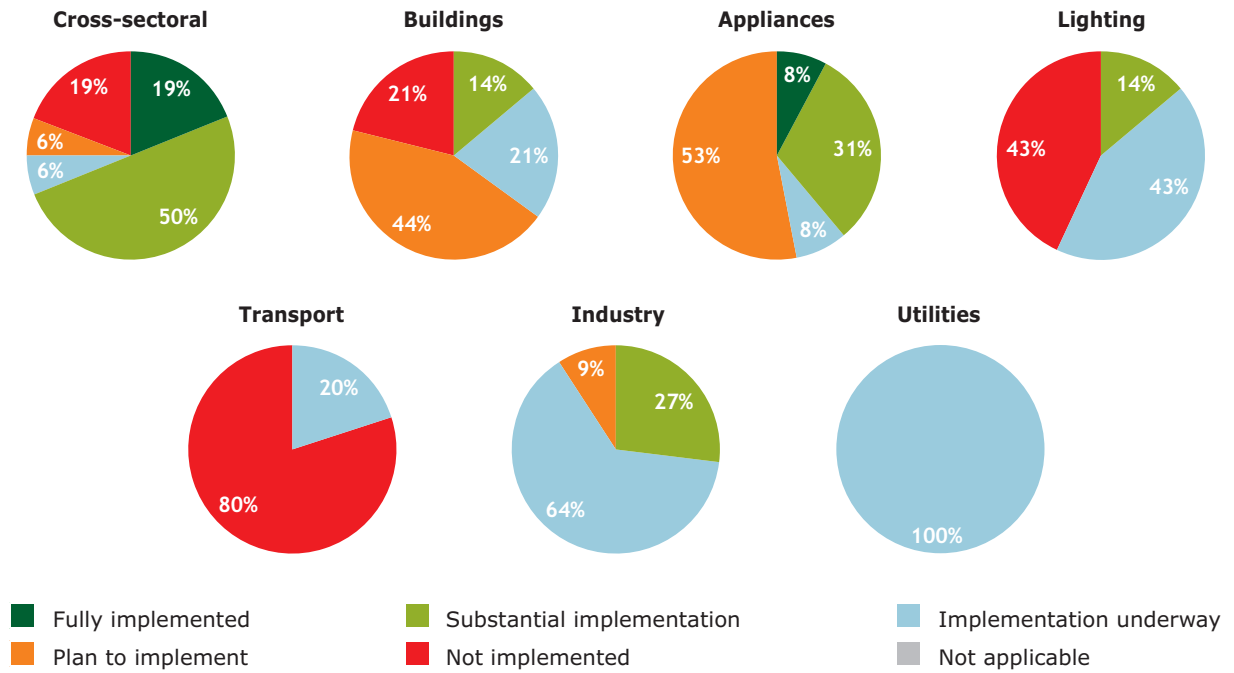
Despite the strengths of Australian energy efficiency policy, there are several areas that warrant further attention. Specifically, the IEA has identified the need for governments to promote the benefits of energy efficiency investments to financial institutions as well as to assist them with developing energy efficiency investment products. The Government has few initiatives directly targeting financial institutions and energy efficiency - although, the EEO programme makes information on energy efficiency opportunities available to investors in Australia's largest companies.

Many challenges exist in Australia's building sector. There is currently no system for the national collection of data on energy efficiency of existing buildings. Though Australian governments have agreed to an increase in energy efficiency requirements for new residential buildings, in the 2010 update of the Building Codes of Australia (BCA), the BCA is not yet applied by all state governments. Additionally, there may be a shortage of workers with the skills to design, build, operate and maintain high-performance, energy-efficient buildings. These challenges are addressed in the NSEE, as outlined above.

Australia has a particular challenge with the energy efficiency of its transport system. Australia's geographic circumstances mean there is a need to travel longer distances compared to other countries. This equates to high car ownership and passenger kilometres per capita, greater reliance on air travel, and a significant reliance on long-distance freight transport. The government's response to this challenge has been to focus on policies promoting public transport and increasing public awareness of vehicle fuel efficiency, such as mandatory fuel labelling for light-passenger vehicles. However, there are many other policy options available to the government. For example, many countries are planning to develop and implement cost-effective mandatory fuel-efficiency standards for vehicles, regulations for non-engine components and the promotion of eco-driving.

Addressing data gaps continues to be a challenge. Increasing focus on energy efficiency and international comparisons has increased the need for good data. But data can be costly and has in the past not been viewed as a high priority. Under the NFEE, and to continue under the NSEE, Australia will improve the information available to develop, monitor and evaluate energy efficiency policies and outcomes. The Energy Efficiency Data Project (EEDP) is a collaborative effort involving the Commonwealth government and all state and territory governments. The EEDP has identified a number of energy efficiency information gaps and is in the process of developing a strategic action plan to address these gaps.

Australia's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Austria

Context

Energy efficiency is an integral part of Austria's energy policy. Energy intensity, adjusted for PPP, has decreased on average 0.5% per year between 1990 and 2007, compared with the IEA member country average of 1.5% (see Figure 43).

Following its commitment under the EU Energy Services Directive, Austria's NEEAP aims to achieve a 9% energy efficiency improvement target for 2016 and a 2% intermediate target for 2010. Many of Austria's measures go beyond EU legislation, particularly the EPBD, and offer diverse financial, legislative, promotional and informational instruments and transposition with more stringent provisions.

Strengths and innovations

Austria has done much to stimulate increased investment in energy efficiency. The Austrian Chamber of Commerce established the Energy Institute of the Economy (Energieinstitut der Wirtschaft) with the aim of promoting energy efficiency in Austrian companies. The Mineral Oil Industry and the Federation of Electricity Generating Companies of Austria (Verband der Elektrizitätsunternehmen Österreichs, VEÖ) also designated funds to finance measures to improve energy efficiency. Finally, the KLIEN fund (Klima- und Energiefonds) provides financing for energy efficiency projects, among others.

Another Klima programme, Klima:Activ provides advice, financing and detailed systems analysis to industry and SMEs. Voluntary agreements under this programme seek to achieve energy savings through co-operation between states in training energy advisors and through the introduction of energy management systems in the food industry and for motors. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS.

In the building sector, Austria has made good progress in addressing the "principal-agent" problem, setting mandatory building codes, and requiring energy certification schemes that ensure buyers and renters get information on the energy efficiency of buildings. Austria has also lent strong support to the development of energy-efficient technologies, such as those used in PEH and ZEB. As a result, a high proportion of new builds incorporate these technologies. Austria should speed up efforts to set targets for PEH and ZEB market share of all new construction by 2020. It should also advance plans to use these buildings as a benchmark for energy efficiency standards in future updates of building regulations.

Challenges and areas for improvement

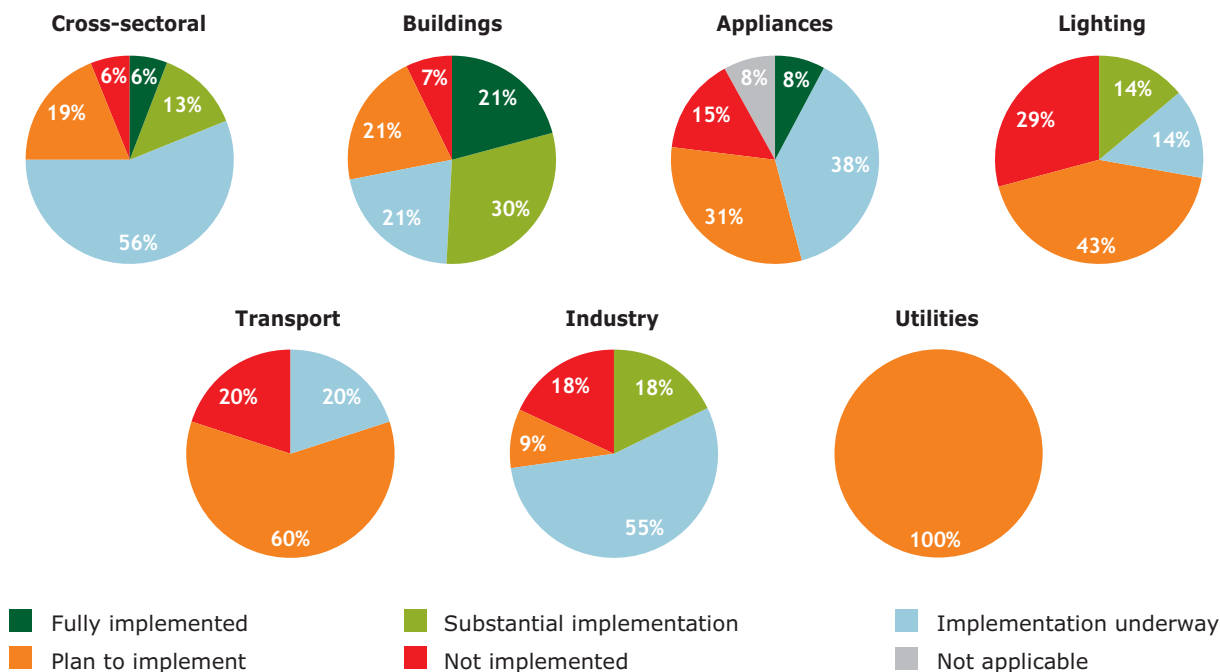
Considerable energy savings potential remains in all sectors of Austria's economy. In the area of lighting, Austria, like other EU countries, has an established comparative energy label for household lamps and plans to develop new standards for office, residential and outdoor lighting products under the EU Eco-Design Directive. More can be done in this area to ensure that general service lighting systems in new non-residential buildings, or substantial retrofits of existing non-residential buildings, should draw no more than 10 W of power per square meter when averaged over the entire building. Austria could also do more to support international efforts to stimulate the adoption of higher efficiency alternatives to fuel-based lighting in off-grid communities in developing countries.

In the transport sector, Austria requires NoVA, a tax progressively linked to a vehicles fuel consumption that is paid at the time of vehicle registration. Fuel taxation, however, is low, leading to fuel tourism. Austria should consider increasing the fuel tax. Austria should also push the EU to consider implementing policies that require mandatory fuel-efficiency standards for heavy-duty vehicles. Several EU measures address transport,

including an EU cap for fleet average CO₂ emissions of 130 g/km from new passenger cars that will apply in full from 2015 onwards. In addition, the European Commission made a proposal that the mandatory fitting of tyre pressure monitoring systems should be extended to heavy-duty vehicles.

Regarding utilities, the government should move ahead with implementing the agreements being prepared by the Ministry of Economy, Family and Youth and the Electricity, Gas, Heat, Energy Trade and Mineral Oil Organization.

Austria's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Belgium

Context

Energy efficiency policy is primarily under the purview of the three Belgian regions - Brussels-Capital, Flanders and Wallonia. In accordance with the EU Directive on energy end-use efficiency and energy services, Belgium's indicative target is to achieve 9% energy efficiency improvement between 2007 and 2016 (equivalent to 27 515 GWh). In 2007, the country submitted to the European Commission a NEEAP consisting of one federal and three regional plans. Each region has set an energy efficiency target and adopted a number of diverse measures to promote energy efficiency. Although there is no specific federal target¹⁷, the federal government contributes to enhancing energy efficiency by energy-related taxes and various fiscal incentives, MEPS for equipment, energy labelling, soft loans and other measures. A coordination body, CONCER/ENOVER, has been set up to harmonise and create synergy between the policies implemented by the federal government and the three regions.

Energy intensity of Belgium's economy is higher than the IEA average. This is in part due to a very energy-intensive industrial sector with a large share of iron and steel industry and chemicals. Energy intensity, adjusted for PPP, grew through most of the 1990s. It started improving in 1999 and declined on average by 2.7% per year between 2000 and 2007, for a 0.8% per year average decline from 1990 to 2007.

Strengths and innovations

Belgium has made important strides in energy efficiency policy in recent years. In particular, the Federal Plan on economic recovery has a strong focus on energy efficiency.

The regions and the federal government have made significant efforts to improve energy efficiency in buildings, which account for the largest share of domestic primary energy demand. The federal government has set up a EUR 250 million "Fund for the Reduction of Energy Costs", which serves to finance energy efficiency improvements in households. As part of its economic recovery plan, the federal government has provided EUR 210 million over five years for improving energy efficiency in public buildings. Belgium continues to transpose the EPBD into domestic law. The Belgian regions have mandatory energy efficiency standards for new buildings in building codes and are working towards strengthening them. The regions are also developing systems for certification of buildings' energy performance.

With regard to industry, Belgium makes efforts to encourage implementation of comprehensive energy management procedures and practices. The regions provide energy efficiency advice and information for businesses and the public sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS.

As for utilities, in the Flanders and Brussels-Capital regions' distribution network operators are required to encourage energy savings for their final customers. Electricity network operators in Flanders are obliged to reach annual energy savings of 2% for residential users and 1.5% for non-residential ones.

Belgium provides fiscal incentives (both at the federal and regional levels) to enterprises making investments in energy efficiency. The Flanders and Wallonia regions have voluntary agreements with energy-intensive industry and the Brussels-Capital region is considering a similar mechanism. At present, the Brussels-Capital region has a system of 'eco-dynamic' labels which are given to enterprises with sustainable management practices.

17. The national target is the sum of the three regional ones.

Challenges and areas for improvement

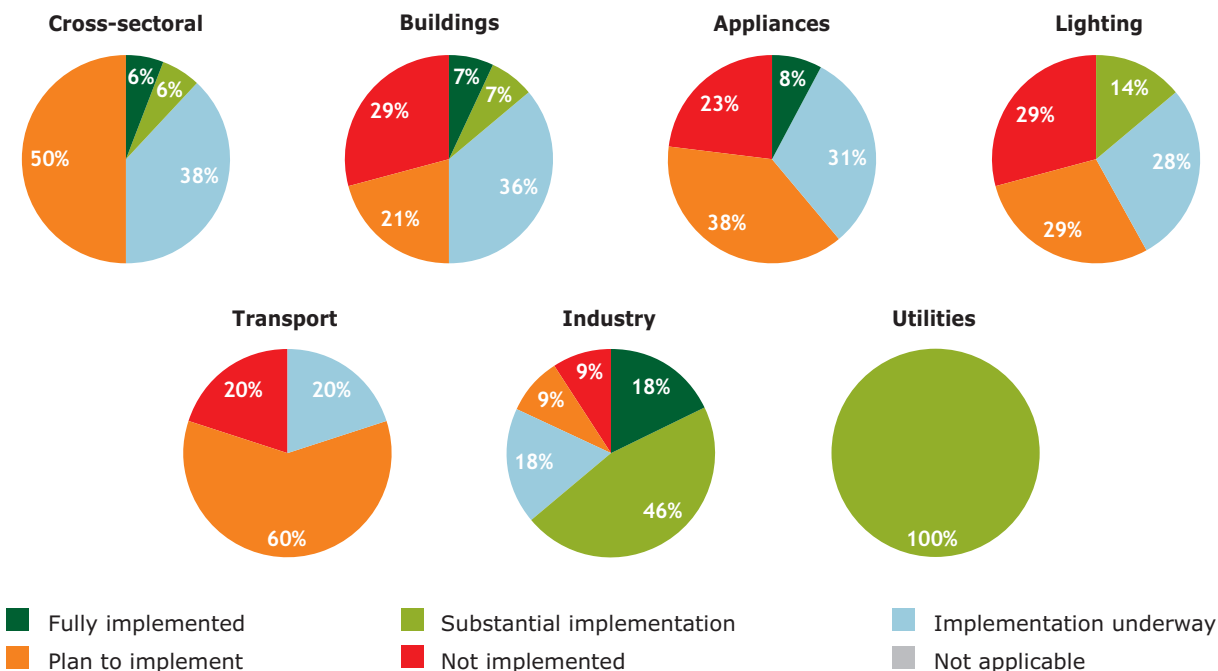
The overall effectiveness of Belgian energy efficiency policy could be improved further by addressing several challenges. First, there is room for improvement in streamlining the existing support measures. There is overlap between federal, regional and local policies and measures covering various sectors and there seems to be no clear understanding among various stakeholders, including end-users, about how all these different policies interact. In particular, there are many financial support schemes targeting the same measure, especially in the building sector. Better co-ordination of the financial support schemes and improving information is therefore strongly recommended.

In the building sector, additional measures could be introduced to improve energy efficiency. For example, Belgium currently lacks actions to promote efficient windows and other glazed areas, which represent great opportunities for energy savings. Belgium should also consider using the so called passive-energy houses as a benchmark for energy efficiency standards in future revisions of building regulations.

Another challenge is the proper enforcement of the implemented measures in a coordinated and harmonised way. Also, there is no clear evaluation of the cost-effectiveness of the existing policies, and of their exact impact on energy consumption. Monitoring and evaluation of the implemented measures should be enhanced at all levels.

While there is significant potential for further energy efficiency improvements in most sectors of the Belgian economy, reducing energy use in the transport sector is the most challenging, as in all IEA countries. Implementing EU transport related policies will be an important step in addressing energy efficiency in the sector.

Belgium’s progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Canada

Context

Canada has a higher energy intensity, adjusted for PPP, than any IEA country. This is largely due to its high concentration of output in energy-intensive sectors, cold climate, large distances and high standard of living, with minimal constraints on space occupation. Final energy consumption has grown continuously over the past decade, though at a lower rate than the economy as a whole. Energy intensity has been improving as a result, dropping at an average rate of 1.3% per year between 1990 and 2007 adjusted for PPP (see Figure 43).

Figure 45 shows that the majority of annual intensity improvements from 1990 to 2006 were due to energy efficiency gains, with the rest resulting from changes in sector mix. New targets have been set to cut emissions of the major GHG-emitting industries by a total of 150 Mt CO₂ by 2020. Canada is also aiming to improve efficiency in the transport sector, with recent legislation regulating the fuel efficiency of cars and light trucks.

Strengths and innovations

Canada is committed to working to increase energy efficiency. In August 2008, Canadian provinces and territories committed to achieving a 20% increase in energy efficiency by 2020, largely through improvements to building codes, broader regulation of energy-using products, green building policies for new government-funded facilities, and home energy audits and retrofit assistance. In addition, federal and provincial or territorial governments are collaborating in different ways to achieve combined energy efficiency objectives. Provincial and territorial governments are using federal energy efficiency tools to complement their own energy efficiency programmes and policies.

Canada is a world leader in the development and analysis of energy efficiency indicators. Building on this analysis, the federal government, via the Office of Energy Efficiency (OEE) works to improve energy conservation and energy efficiency in every sector of the Canadian economy. The OEE has developed a series of ecoENERGY programmes to promote the efficient use of energy; the annual federal budgetary processes have provided significant funding for energy efficiency programmes. The ecoENERGY Efficiency Initiative is investing more than CAD 675 million between 2007 and 2011 to promote smarter energy use in every sector of the Canadian economy. While most schemes are voluntary, they are complemented by amendments to the Energy Efficiency Regulations, which will either set a minimum energy performance standard for a series of new products or will make existing standards more stringent. The current series of amendments started to come into force in 2007¹⁸. National standards for lighting efficiency will be implemented through regulations under Canada's Energy Efficiency Act, and developed with industry and provincial and territorial governments¹⁹. The new standard will phase out inefficient incandescent general service lighting by 2012.

The ecoENERGY for Buildings and Houses programme includes a package of instruments. These instruments include new design tools and training so that designers, builders, owners and operators can learn about and use best practices, new technologies, and energy rating and labelling systems. There are also plans to update the Model National Energy Code for Buildings in cooperation with provinces and territories, with a view to encourage other levels of government to adopt more stringent building energy codes by 2010/11.

In terms of energy management, Canada is a leader in supporting industrial energy efficiency programmes that encourage industries to improve energy management activities and adopt more energy-efficient end-use technologies and practices.

18. Regulations under the Energy Efficiency Act, in effect since 1995, set minimum energy-performance levels for a number of energy-using products such as appliances, lighting, and heating and air-conditioning systems. Broadening and strengthening the Act means that 80% of the energy used in homes and businesses will soon be regulated.

19. This policy intention was announced in April 2007 and pre-published in the Canada Gazette in March 2008.

In the transport sector, 12 provincial and territorial bodies responsible for driver education use the Autosmart Driver Kit developed by the OEE to educate young drivers on fuel efficiency. For example, Manitoba Public Insurance has recently incorporated an Autosmart component into its curriculum and many provinces display the OEE publications in their licensing bureaus.

Challenges and areas for improvement

Despite Canada's energy efficiency policy achievements, there are additional means by which Canada could continue to improve its energy efficiency policy portfolio. Promoting energy efficiency in Canadian buildings is one area requiring further effort. First, specific policies in support of highly energy-efficient buildings, such as PEH and ZEB would improve Canada's building energy efficiency, particularly in the cold climate zones. Second, Canada should aim to base the level of energy efficiency requirements in its building codes on 30-year least life-cycle costs, so as to ensure the path to PEH or ZEB as a standard for building regulation. Introducing similar energy efficiency requirements for building refurbishment would also help to capture the large potential energy savings in existing buildings. It is encouraging that all governments (federal, provincial, territorial) have agreed to work collaboratively to enhance the Model National Energy Code for Buildings (MNECB) by 25% by 2011. This target is already included in the Ontario Building Code, effective from January 2012. Unfortunately, this level still falls far below the 30-year least life-cycle cost recommendation of the IEA.

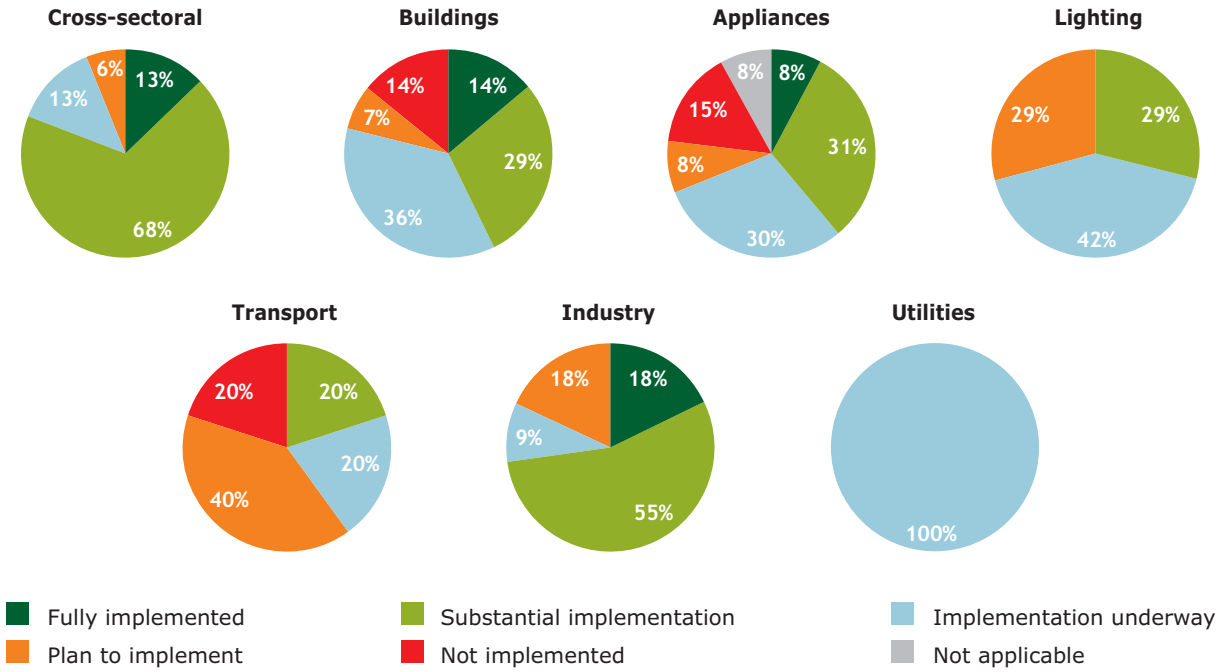
Third, these initiatives should be complemented by a package of measures (including an evaluation of existing subsidies, financing and other instruments) to address the most important barriers to energy efficiency in buildings, both existing and new.

At a cross-sectoral level, co-operation between provincial and federal energy ministers on developing a NEEAP could be further strengthened. The Foundation for Action policy document agreed on by Canada's Council of Energy Ministers in 2007 provided a basis for further cooperation. Unfortunately, the document does not provide a clear nation-wide strategy on energy efficiency, nor time-bound quantitative targets for energy savings. Several provinces have established such targets within provincial-level strategies. However, this is not the case in all provinces and where adopted, timeframes and measurements are not consistent. In this context, nation-wide targets and/or harmonised measurements and timeframes would be desirable to help maximise opportunities for energy savings across the country.

Canada has made some progress in the transport sector. Canada uses a mix of voluntary standards for vehicle fuel efficiency that are harmonised with US fuel efficiency regulations, a voluntary memorandum of understanding with the Canadian automotive industry to reduce GHG emissions through to 2012 and federally promoted eco-driving and tyre maintenance schemes. This success should be built upon and further attention given to two areas. Consideration needs to primarily be given to mandatory fitting of tyre-pressure monitoring systems (TPMS) and strengthening the fuel efficiency requirement. Explicit regulations for the fuel economy of heavy-duty vehicles are also needed.

International experience suggests that utilities can assist with delivering cost-effective energy savings. Canada should give further consideration to establishing incentives for utilities to promote energy efficiency.

Canada's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, the Czech Republic

Context

Energy intensity, adjusted for PPP, in the Czech Republic declined on average 3.2% per year from 1990 to 2007. This is more than the IEA member-country average of 1.5% for the same period. Since 1990, government policies aiming to improve the energy intensity of industry and buildings, have been in place. Since 2000, the Czech Republic has established national programmes focused on energy savings and the use of renewable sources. Activities undertaken as part of these programmes are reviewed and analysed in terms of costs and benefits, mostly by the Czech Energy Agency (CEA), and updated as necessary. The Czech Republic continues to implement relevant EU Directives and Regulations in the field of energy efficiency, such as the Energy Savings Directive and the EPBD.

Strengths and innovations

The Czech Republic has seen several of its energy efficiency policies successfully implemented, notably in industry and buildings.

Several programmes offer investment assistance, training and energy management support to enterprises. Such support is combined with mandatory energy audits and reporting, leading to a well-integrated approach. In addition, the Czech Republic also has programmes which specifically aim to facilitate energy efficiency and renewable energy investments in SMEs. Energy audits for SMEs are also supported. The Czech government has financed the creation of an energy services company, EkoWATT, which provides consulting, analysis, audits and surveys for a wide variety of both private and public actors.

In the building sector, the Decree No. 291/2001 Coll. sets out the details of energy efficiency for heating consumption in buildings. Decree No. 137/1998 Coll. concerning construction regulation established that the thermo-technical and energy properties of buildings must be met by both new construction and refurbishment. The specific energy consumption set up by this decree is binding for all constructions and reconstructions financed by public means.

The Czech Republic has also had some success in improving the energy efficiency of existing buildings, with 25% of old panel-block apartment buildings being refurbished since 1990. In addition, as of January 2009, the EPBD has been fully implemented, including provisions on mandatory energy performance certificates for both new and existing buildings, along with penalties in case of non-compliance.

As outlined in its 2007 NEEAP, the Czech Republic will require that utilities offer both information and energy services to end-users, a policy that is currently under implementation.

Challenges and areas for improvement

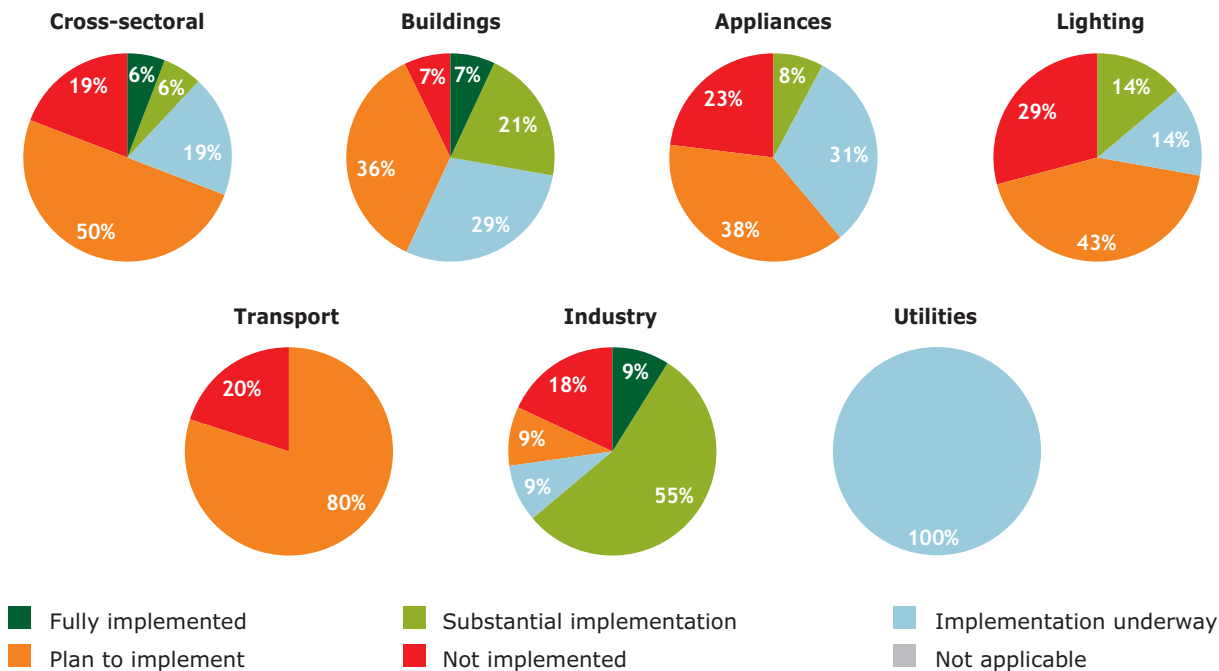
Great potential for more energy efficiency improvement still exists in the Czech Republic. Policies targeting appliances, equipment and lighting could benefit from increased implementation. Adequate resourcing to ensure and improve the stringency of MEPs standby power regulations could also be strengthened.

Several cross-sectoral policies could also be implemented or improved. While the Czech Republic has some positive experience in promoting public-private partnerships, further strengthening the private sector's capacity to support investments in energy efficiency could be beneficial and reduce reliance on public funds.

The transport sector represents the biggest challenge in improving Czech energy efficiency. Energy use in this sector is growing faster than in any other area and shows no signs of decline. Mandatory fuel efficiency

standards for both heavy and light-duty vehicles have not yet been established at the EU level. Despite this, the Czech Republic could consider introducing other measures that improve energy efficiency in the transport sector, such as eco-driving policies.

The Czech Republic's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Denmark

Context

As a member of the EU, Denmark has substantially adopted much of the EU legislation. Energy intensity, adjusted for PPP, in Denmark has declined on average 1.3% per year between 1990 and 2007. The decrease in energy intensity is largely due to structural changes in the economy (Figure 45).

Strengths and innovations

Policies on energy use and energy efficiency in particular are often made following general agreement among all political parties in Denmark, which allows for long-term policies that are less likely to be dislodged by changing governments.

Denmark has very substantial energy efficiency policies for buildings and is a world leader when it comes to building standards and requirements. The Danish building code is among the strictest in the world, and a large majority in Parliament has already decided that these requirements will be strengthened by 25% to 30% first in 2010, then again in 2015 and 2020. After 2015, requirements for all new buildings will require less energy use than a passive house. The government's long-term vision adopted in April 2009 is for all buildings to be 'plus energy' houses, meaning they produce more energy than they use.

In addition, Denmark has energy requirements for the refurbishment of existing buildings. Energy certification for the sale and rental of all types of buildings has been mandatory for more than a decade. Public buildings have mandatory energy efficiency improvement requirements, based on the regular certification of these buildings every five years.

Many initiatives for appliances in Denmark are run by the Electricity Saving Trust (EST), which collects a tax on every kWh sold in the household and service sectors. The EST runs various information and certification schemes aimed at consumers. Many initiatives have supported the mandatory EU labelling of household appliances, resulting in a high share of appliances that meet the most efficient categories (A or A+ and A++), since energy labelling is well known and understood by consumers.

The quality of statistical information collected in Denmark is high and this information is combined with certification schemes for buildings, sale of appliances and various other initiatives. In industry, such information collection is combined with energy management schemes.

Challenges and areas for improvement

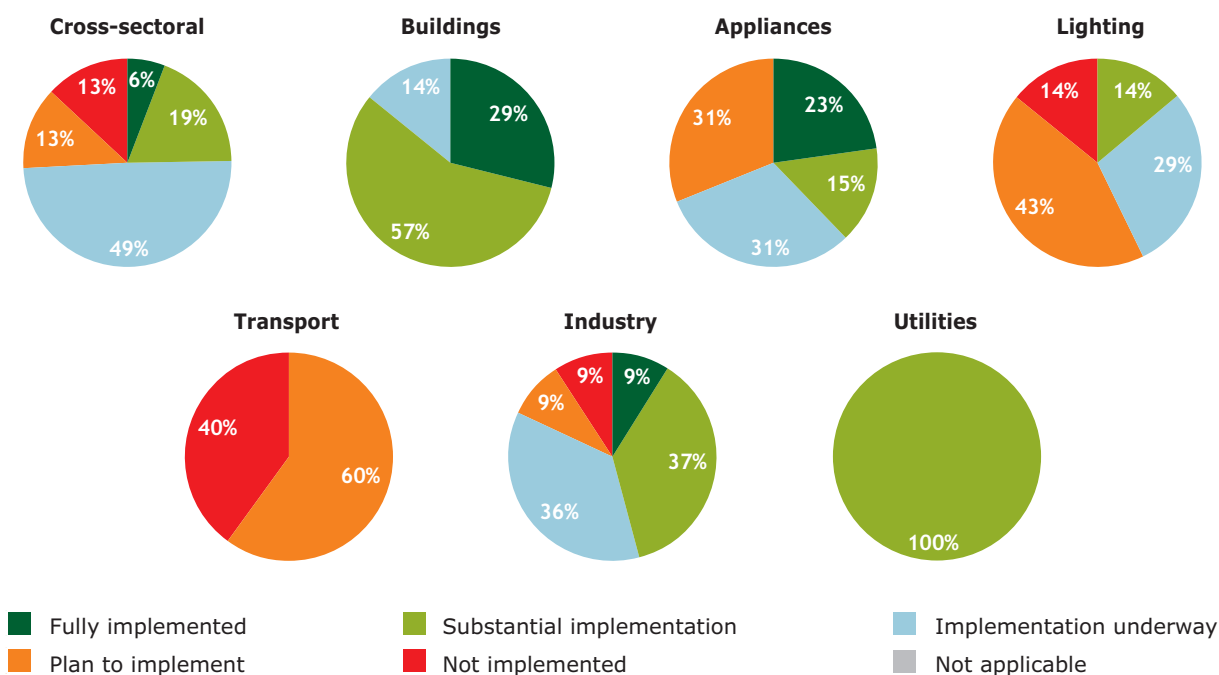
Despite its achievements, Denmark can further improve its energy efficiency policy portfolio. One area that Denmark could usefully consider expanding is its enforcement systems. Enforcement of energy efficiency policy is important for maximising energy savings and for ensuring the credibility of schemes. Denmark could establish and implement a suite of enforcement actions commensurate with the scale of any non-compliance and the value of lost energy savings.

There is also room for improvement with respect to policies promoting the financing of energy efficiency. The IEA has identified the need to promote the benefits of energy efficiency investments to financial institutions and to assist them with developing energy efficiency investments.

In the commercial and public sector, Denmark should continue its efforts to implement energy-efficient lighting systems. Specifying MEPS for general service lighting in commercial buildings and targeted measures to stimulate better control of lighting in unoccupied spaces have a significant potential to improve Denmark's energy efficiency. For appliances, Denmark should ensure timely transposition of appliance and labelling requirements under relevant EU Directives.

Transportation is the area where Denmark requires greatest effort to improve its energy efficiency policies. Denmark should, for instance, work for quick implementation of planned EU-wide policies including a cap for fleet average CO₂ emissions of 130 g/km from new passenger cars that will apply in full from 2015 onwards. Denmark should also consider actively encouraging the development of EU policies that address fuel efficiency standards in heavy-duty vehicles.

Denmark's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Finland

Context

Finland's energy intensity declined 1.4% per year between 1990 and 2007, compared with the IEA member-country average of 1.5%. Finland's significant heavy industry sector and cold climate have resulted in Finland having a higher energy intensity, adjusted for PPP, than most other IEA member countries.

Finland's energy efficiency policy is mostly conducted by the Ministry of Employment and the Economy (MEE) along with Motiva Oy, a state-owned company which acts as the Finnish energy efficiency agency. Policy guidelines are provided by the Action Plan for Energy Efficiency (APEE), and the National Energy and Climate Strategy (NECS). Improvements in industrial energy efficiency are mainly achieved through voluntary agreements between the MEE and industry. New agreements were signed in December 2007, covering the 2008 to 2016 period.

Strengths and innovations

Despite the importance of highly energy-intensive industries such as basic metals or paper pulp, in total output, Finland has achieved a 40% decrease in industrial energy intensity between 1990 and 2005. This result mostly stems from the extensive use of voluntary agreements, in which 80% of energy-intensive industries participate. Once signed by a company, the agreement commits the company to implement energy efficiency measures, including energy management systems with appropriate monitoring and reporting requirements. This mechanism is the main tool in the application of energy efficiency policy in Finland. As such, it is also used with municipal federations and local authorities. Overall, the first batch of agreements, applied from 1998 to 2007, covered 60% of Finland's total final consumption (TFC). It has been estimated that it allowed 7.1 TWh in energy savings by 2005.

The voluntary agreements are enforced through energy audits. Finland pioneered this field through its Energy Audit Programme, created in 1992. The programme provides guidelines, auditor training and authorisation, along with monitoring and promotion activities. While voluntary, the MEE subsidises 40% to 50% of the programme, which is supervised by Motiva Oy. The Energy Audit Programme includes various initiatives specifically targeting SMEs.

Concerning appliances, the sector showed a significant improvement in energy efficiency. Finland has an extensive energy labelling regulation, supervised by TUKES (Safety Technology Authority in Finland), stemming from the implementation of EU directives on labelling of household electrical appliances. High-efficiency appliances rated A, A+ and A++ grew from 12% of appliance sales in 1999 to more than 92% in 2004.

Due to the substantial domestic heating required by its climate, Finland has also emphasised improving building insulation in almost all new heated buildings. Building codes passed in June 2007 have insulation requirements that are 20 to 30% stricter than those in the previous 1985 regulation.

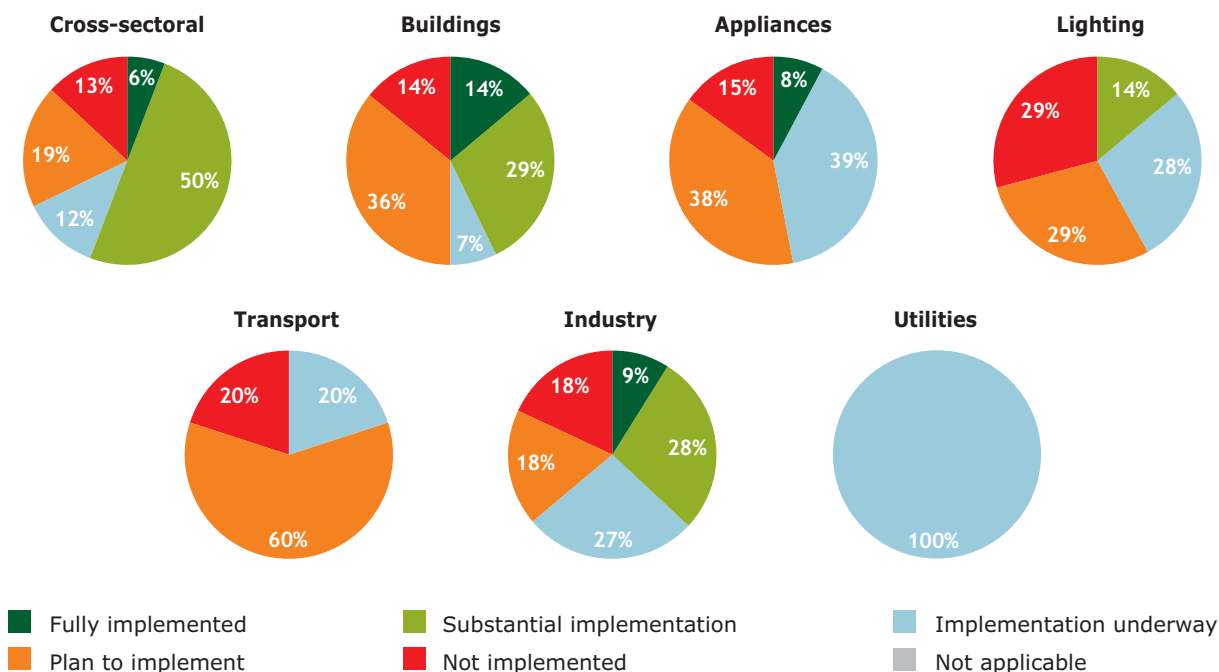
Challenges and areas for improvement

Voluntary agreements form the basis of Finland's energy efficiency improvements and though these are valuable in terms of flexibility, they have some disadvantages. Their voluntary nature could mean that industries define objectives which are easier for them to fulfill. This can prevent more ambitious objective setting, or deter more creative energy-efficiency initiatives. The wide scope of companies and organisations covered by the mechanism makes these issues more likely.

In transport, despite progress on the energy efficiency of passenger cars, Finnish car fleet average CO₂ emissions remain higher than the EU average. Vehicle fuel efficiency standards at an EU level will likely be beneficial to Finland. Other policies targeting energy use and CO₂ emissions from transport could be envisaged, in addition to eco-driving policies, which Finland is currently implementing. In this context, the November 2007 revised vehicle taxation policy will help to reach the EU objectives to reduce CO₂ emissions of light-duty vehicles by 130g/km by 2015.

Finally, while building efficiency requirements are high compared to other European countries, regulation provides builders with a 20% 'range' around official specifications. It is thus possible to build new homes that are 20% less insulated than the building codes appear to demand. Though this flexibility is understandable and sometimes useful, it lessens the actual impact of the building-efficiency regulation. More stringent enforcement of insulation and efficiency requirements would thus be useful.

Finland's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, France

Context

France has pursued energy efficiency policies along with energy diversification since the oil shocks of the 1970s. These efforts are estimated to have saved 15 Mtoe to date. Energy efficiency currently forms a key part of France's climate change mitigation, energy security and environmental policies. The government aims to reduce energy intensity by 2% per year by 2015, and 2.5% per year by 2030. Energy intensity has been steadily decreasing; final energy intensity, adjusted for PPP, decreased on average by 1.1% annually between 1990 and 2007 (see Figure 43). Just under half of annual intensity improvements from 1990-2006 were due to energy efficiency gains, the rest were due to structural changes in the economy (see Figure 45 above). The government is now aiming for specific energy efficiency improvements in the transport and building sectors.

Strengths and innovations

France has a range of sound energy efficiency policies in place. In the area of lighting, France's building codes specify installed lighting energy limits. These building codes are further supported by mandatory building energy labelling and whole building energy-performance requirements. Regarding the building sector more generally, the national government's 2007 environmental and energy sustainability plan, *Grenelle de l'environnement*; includes elements for a very active policy for efficient buildings at a national level. This includes a programme to facilitate a breakthrough of technology to ensure that by 2020, the majority of new buildings consume little energy or are net positive²⁰, with an intermediate target that at least a third of all new construction be low, or positive, energy by 2013. The Grenelle strategy also provides for demonstration projects for positive energy buildings in the coming years and a gradual reduction of energy consumption in all new buildings. These ambitious objectives are now implemented in the Plan Bâtiment. Its core incentive programme, the *Eco-Prêt à Taux Zéro* (zero-interest loan), will help spur investments to improve energy efficiency in existing private homes.

Funding for the zero-interest loan for energy efficiency improvements doubled as part of France's economic stimulus plan. In addition, the 2009 Finance Law provides a zero-interest loan for the purchase of a new or existing home. This loan is significantly increased if the home exceeds current building code requirements (low and positive energy buildings). In addition, tax credits for interest paid on home acquisition or construction loans have been modified to ensure all construction meets the latest thermal efficiency standards, and are increasingly preferential when current standards are exceeded.

France has had innovative financing products for the residential sector since 2007, when in partnership with banks, low-interest loans for residential energy conservation projects were offered and financed through a tax-free savings account.

In the appliances and transport sectors, EU Regulations and Directives apply. Recent special stimulus measures targeting automakers provide EUR 400 million in R&D for the development of innovative, low-carbon and efficient vehicles.

The Eco-Design Directive will improve the energy efficiency of most new products outside the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS.

20. Meaning that they produce more energy than they consume.

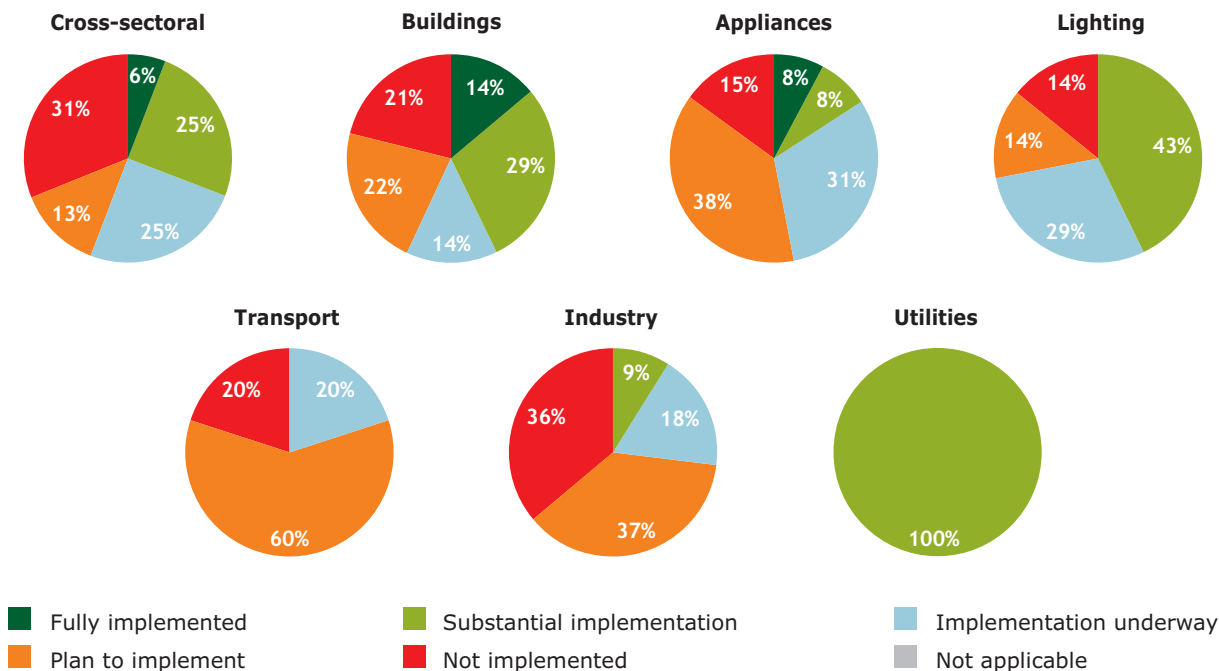
Challenges and areas for improvement

Despite achievements in energy efficiency in France, many areas for improvement remain. The collection of data on buildings' energy efficiency could be improved and studies of barriers in this sector are urgently needed. Such information could be used to develop a comprehensive policy package of measures to improve the energy efficiency of new and existing building stock based on the declarations and targets set in the Grenelle strategy. Still, the new renovated house ('Maison Rénovée') certification, which makes use of the Energy Efficiency Diagnosis (DPE) building efficiency grading scheme, is a significant step towards the establishment of a standardised efficiency measure in the construction sector.

With regard to transportation, an EU cap for fleet average CO₂ emissions of 130 g/km from new passenger cars will apply in full from 2015 onwards. Concerning the maintenance of tyre inflation pressure, which is an important fuel-saving measurement, the European Commission's proposal for the mandatory fitting of tyre pressure monitoring systems should be extended to heavy-duty vehicles. It is also noted that the new car taxation scheme (bonus-malus system) is already in place in France and could be extended to favour green tyres, which improve fuel economy through better design.

Finally, enforcement of domestic laws and policies that transpose the EU energy efficiency directives is the responsibility of member states. Enforcement is important for maximising energy savings and for ensuring the credibility of the schemes. France needs to ensure that it has comprehensive legal and physical capacity so as to adequately enforce these policy measures and optimise their effectiveness.

France's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Germany

Context

Since the oil shocks of the 1970s, Germany has promoted energy efficiency improvements across its economy, and particularly in the industrial and residential sectors. German industry decoupled energy consumption from growth relatively early on in the 1970s. Energy consumption has remained steady since 1990. Overall energy intensity has been steadily decreasing since 1990, due to a combination of policy packages aimed at improving energy efficiency, as well as structural changes in the economy. Energy intensity, adjusted for PPP, has declined on average 1.9% per year between 1990 and 2007 (see Figure 43). Most of the decline between 1990 and 2006 was due to energy efficiency improvements (see Figure 45).

Following its commitment under the EU Energy Services Directive, Germany's 2007 NEEAP aims to achieve 9% energy efficiency improvement between 2007 and 2016, incorporating a target of 933 PJ, with an interim target of 510 PJ for 2010. Germany's measures target energy efficiency improvements in all sectors, with most projected energy savings coming from the residential sector, seen as holding untapped and cost-effective improvement potential.

Strengths and innovations

Germany has made significant strides in its energy efficiency policy in recent years. With regard to the building sector, Germany is a global leader. Energy requirements in German building codes are set at the national level. The existing standards are currently being raised by 30% and will likely be raised again in 2012 by 30%. Once these improvements are achieved, it is expected that Germany's building code energy requirements will be close to the optimum of a 30-year least life-cycle cost. At the same time, Germany has different policies to support passive and other highly-efficient new buildings. These include subsidies and policies that ensure capacity development and information activities. Passive houses are taking a growing share of the market in Germany and related passive-house technologies are becoming more commonly available in most parts of the country.

Additionally, Germany has a range of policies in place for the energy-efficient refurbishment of existing buildings, including a high target to increase the refurbishment process in the old building stock. The German government just increased funding to the *Kreditanstalt für Wiederaufbau* (KfW) CO₂ building modernisation programme. The KfW, a non-profit public banking group, manages a loans programme for the refurbishment of old buildings and ecological construction. The goal of this programme is to help customers meet the increased upfront costs of energy efficiency refurbishment.

The Eco-Design Directive will also improve the energy efficiency of most new products outside of the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS.

In the area of lighting, Germany, like other EU countries, has an established comparative energy label for household lamps and plans to develop new standards for office, residential and outdoor lighting products under the EU Eco-Design Directive. Germany also has relatively advanced architectural practices for 'day lighting'.

With regard to transportation, an EU cap for fleet average CO₂ emissions of 130 g/km from new passenger cars will apply in full from 2015 onwards. Concerning the maintenance of tyre inflation pressure, which is an important fuel-saving measurement, the European Commission's proposal for the mandatory fitting of tyre pressure monitoring systems should be extended to heavy-duty vehicles.

Challenges and areas for improvement

Despite its recent achievements, there remains room for Germany to further improve its energy efficiency policy portfolio. With regard to buildings, although policies exist to increase energy efficiency requirements for new buildings, national targets could be set to ensure a certain market share for PEH, ZEB and other ultra low-energy consuming new constructions by 2020. Building codes could be set to meet this target in all new buildings.

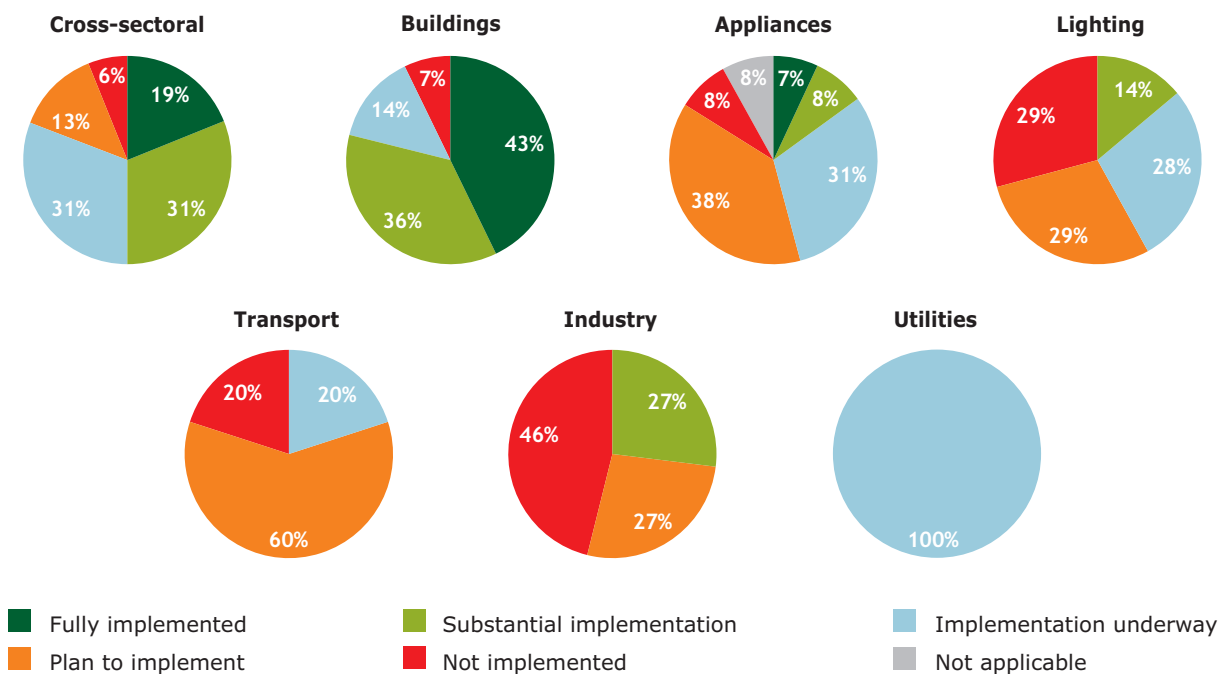
Enforcement of domestic laws and policies that transpose the EU energy efficiency directives is the responsibility of member states. Enforcement is important for ensuring energy savings are maximised and for ensuring the credibility of the schemes. Germany needs to ensure that it has comprehensive legal and physical capacity so as to adequately enforce these policy measures and maximise their effectiveness.

In the industrial sector, Germany should move forward with its plans to adopt mandatory MEPS for electric motors in line with international best practice. It should also examine barriers to the optimisation of energy efficiency in electric motor-driven systems and then implement comprehensive policy portfolios aimed at overcoming such barriers.

Germany should also continue to strengthen its policies to assist SMEs implement energy efficiency. The increase in resources allocated to the special fund for energy efficiency in SMEs is important. The government should further strengthen this by ensuring that the planned project Partnership for Climate Protection, Energy Efficiency And Innovation²¹ is implemented without delay and that this project encourages energy audits, provision of energy efficiency benchmarking information as well as the adoption of least life-cycle cost capital acquisition.

Germany also needs to consider enhancing the incentives for utilities to promote energy efficiency. This could include establishing policies to decouple utility revenue and profits from energy sales, or allowing energy efficiency measures to be bid into energy pools.

Germany's progress with implementing IEA energy efficiency recommendations



21. A collaborative project between the Federal Ministry of Economics and Technology (BMWi) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) together with the Association of German Chambers of Industry and Commerce (DIHK).

Energy efficiency progress report, Greece

Context

As in many other IEA member countries, TFC in Greece has increased in recent years. Energy intensity, adjusted for PPP, has improved on average 0.6% per year from 1990 to 2007. Improvements are due mainly to advances in the transport sector, including measures to renew the vehicle fleet and improve public transportation.

Progress in other sectors has not been as strong as in the transport sector. Increased demand for electricity and oil is putting a strain on the Greek energy supply system. The main challenges for Greek energy efficiency policy are slowing the increase in TFC, particularly by managing oil consumption and peak electricity demand.

Strengths

Energy efficiency requirements in Greece closely follow key EU legislation (96/57/EC and 92/75/EC). In 2007, Greece published a NEEAP describing its energy efficiency improvement measures to achieve the savings targets set out in Article 4(1) of the Directive.

The successful implementation of these energy efficiency improvement measures across all sectors could lead to energy savings of at least 16.41 TWh in 2016, helping Greece meet the 9% indicative target outlined by the EU. The transport sector offers a savings potential of 36%, the largest of any sector. The service and residential sectors come next, with potential savings of 30% and 29%, respectively. Measures to improve data collection and analysis are under way, as are efforts to improve and provide support for implementation, monitoring and verification of the NEEAP.

Since 2000, the dominant instrument to improve industrial energy efficiency has been the Operational Programme for Competitiveness 2000 to 2006 (OPC). This programme enforces investments in the field of the rational use of energy and drives the promotion of renewable and other indigenous energy sources.

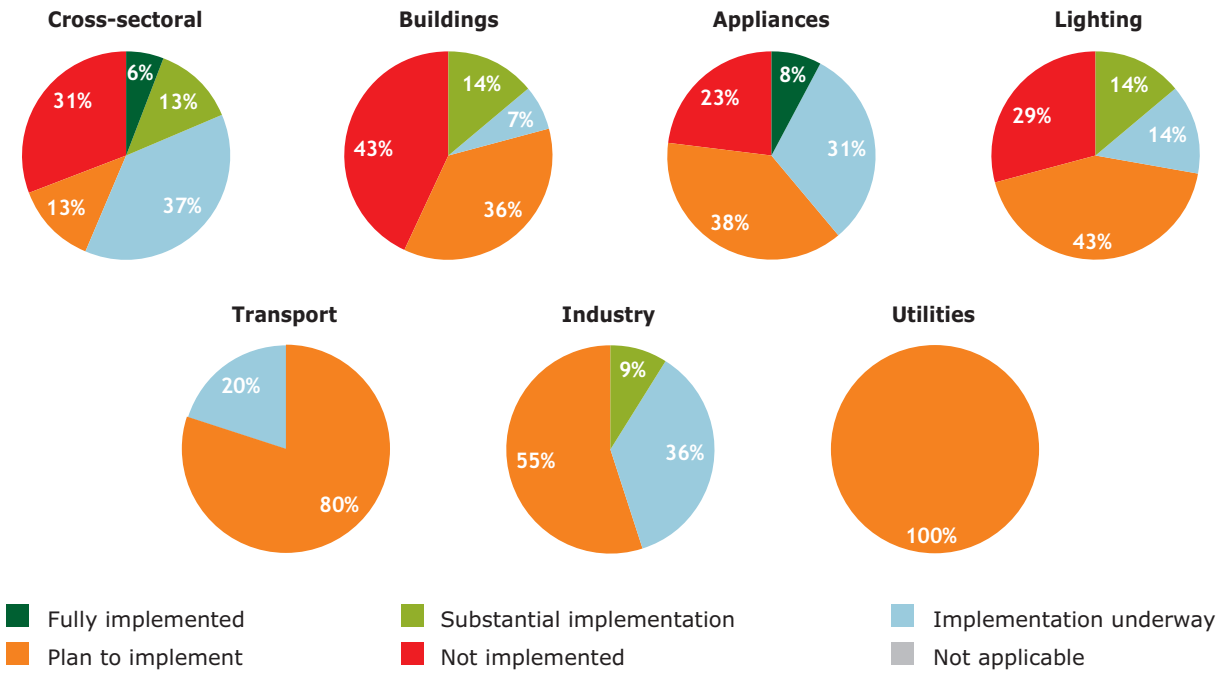
Voluntary agreements have been established for office equipment, coordinated by Energy Star.

Challenges and areas for improvement

The transposition of some EU legislation is still underway. While Greece transposed the Buildings Directive in May 2008 and enacted the relevant regulations in early 2009, Greece needs to increase its transposition efforts.

Energy efficiency in the public sector has been promoted by a number of Joint Ministerial Decisions relating to the following: reactive power in electrical installations; obligation to connect to the natural gas networks; substitution of all incandescence and fluorescence lamps of low energy performance with fluorescent lamps (class A or B); and the preventive maintenance of air-conditioning installations at least once per year. The Decisions also regulate MEPS in public procurement and the designation of energy officers in all public buildings. Timely implementation of these decisions will be critical to assisting Greece with improving its energy efficiency.

Greece's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Hungary

Context

Energy conservation has been important in Hungary since the 1970s, and a long-term renewable energy and efficiency plan to 2010 was elaborated in 1999.

Hungary's final energy intensity, adjusted for PPP, declined 2.5% per year from 1990 to 2007. Significant changes in the country's industrial sector, with less energy-intensive sub-sectors replacing more intensive ones, primarily drove this reduction in final intensity. Energy saving measures have traditionally focussed on industry and existing residential buildings, with the latter still an important policy area. However, the Hungarian government has recently been taking a wider approach, seen in its 2008 NEEAP, targeting other building types, transport and cross-sectoral issues. The NEEAP sets a 9% national energy savings target for 2016. Much policy development has stemmed from its membership in the EU since 2004, with continuing transposition and implementation of EU Directives covering important energy end-use sectors.

Strengths and innovations

Hungary has made significant efficiency improvements in the industrial sector, through a shift towards manufacturing and towards newer and more energy-efficient equipment. The increasing use of combined heat and power (CHP) in the industrial sector, and facilitative policies such as soft loans for energy efficiency investments provided through a revolving fund, have also contributed to these improvements. Other 'good practice' policies initiated in the industrial sector are the introduction of mandatory reporting on energy use and energy managers in industry.

Residential energy consumption has remained relatively stable since 1998; Hungary has various financial incentive programmes specifically targeting this sector. Hungary's National Energy Programme has successfully refurbished existing inefficient residential buildings through providing subsidies in the form of low-interest loans and grants. Another programme has targeted refurbishments in large prefabricated residential buildings, while a separate scheme specifically subsidises investments to modernise heating systems. Effective use of various EU funds has also led to energy saving investments in public sector facilities. Implementation of EU comparative energy labelling for appliances has also been successful in Hungary, with visible market penetration of 'A class' appliances.

In addition, Hungary supports CHP with a feed-in tariff, 21% of Hungarian power generation occurs in CHP plants (with 80% of a well-developed district heating system supplied by CHP). District heating companies also undertake energy efficiency improvement activities for secondary heating systems in buildings. In addition, large electricity and gas utilities are required to provide information services on efficiency-related questions to their customers free of charge.

In terms of compliance and enforcement, Hungary's Energy Centre houses considerable expertise on energy efficiency policy, and holds responsibility for monitoring and reporting on the implementation of Hungary's NEEAP. The Energy Centre has a mandate to issue annual reports monitoring progress with NEEAP implementation.

Challenges and areas for improvement

Hungary's budget deficit has steadily increased, and in 2006, the government began undertaking austerity measures that have impacted the budget allocation and funding available for energy efficiency programmes. Budget cuts at the Energy Centre are a concern, given its important role in energy efficiency policy implementation.

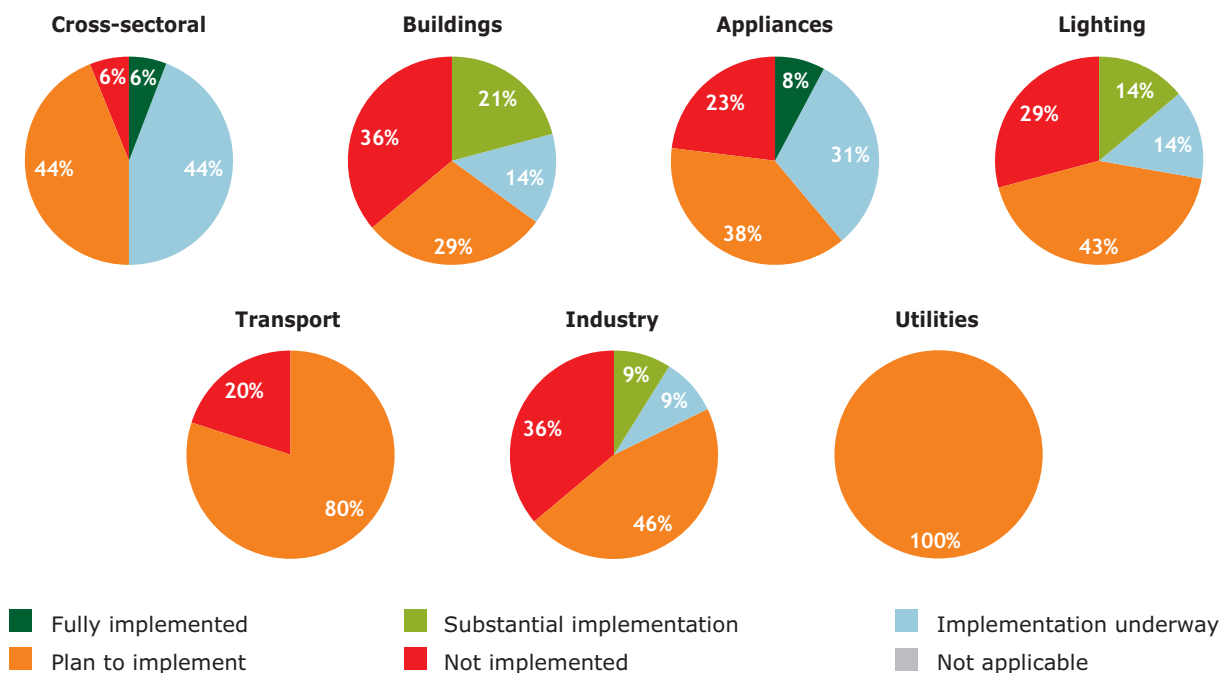
This concern is strongly felt in the residential sector. Though significant potential for improvement has been identified, most policies take the form of subsidies. In times of economic contraction, this means there are not

enough resources to provide budget support for energy efficiency investments. For example, in 2005, certain programmes did not run due to budget constraints. Certain industrial sector energy efficiency programmes also often rely on financial incentives, and may thus be affected. This challenge has been recognised in Hungary's latest NEEAP, which explicitly aims to develop instruments other than investment aids to promote energy efficiency. In addition, there are limited policies pushing regulations and requirements for new buildings further, such as supporting ZEB or PEH.

Among the energy efficiency recommendations, those targeting appliances and lighting have been the least implemented. Rigorous implementation of the EPBD and Eco-design directive for energy-using products remains important, since outside of EU regulated activity there are not many policies for lighting and appliances. Hungary may wish to move towards implementing lighting energy performance standards for non-residential buildings. In line with the recommendations, Hungary may also consider widening the application of current energy management requirements, including to SMEs, for which a policy gap remains.

Finally, though fleet renewal in Hungary has meant that energy use in the transport sector has not seen significant increases in recent years, transport policies are conspicuously absent from Hungary's NEEAP.

Hungary's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Ireland

Context

Ireland has a very pro-active energy efficiency policy and a national target of 20% energy savings in 2020 adopted as part of the government's Energy Policy Framework 2007 to 2020, "Delivering a Sustainable Energy Future for Ireland". The energy intensity, adjusted for PPP, of Ireland's economy is among the lowest in the IEA and has been declining steadily since 1990 at an average rate of 3.4% per year. This is an impressive achievement compared to the average decline rate in IEA countries of just 1.5% per year. Ireland's new NEEAP was published in May 2009. It will update and expand the 2007 Action Plan submitted to the EC in the context of the EU Energy Services Directive.

Strengths and innovations

Ireland's energy efficiency policy is sound in many respects. Sustainable Energy Ireland (SEI) was set up in 2002 as Ireland's national energy agency with a mission to promote and assist with the development of sustainable energy. The country has made particularly good progress across the building sector. Its Low Carbon Homes programme, launched in 2008, supports very low energy/low-carbon buildings. Irish mandatory minimum energy efficiency standards for buildings are among the highest in Europe. There are plans to further strengthen the standards for both housing and non-residential buildings in 2010 and to implement a low-energy/carbon standard in 2013. Measures are in place to monitor and enforce compliance. Owners of buildings are obliged to provide prospective buyers or tenants with a certificate indicating the building's energy efficiency and an accompanying advisory report indicating how the energy efficiency can be improved. In addition, the national Home Energy Saving Scheme was launched in February 2009 with a budget of EUR 50 million. The Scheme is expected to support the upgrade of up to 30 000 homes in 2009.

Ireland is also among the leading countries in providing incentives for industrial energy efficiency improvements. It has made significant progress in the development and adoption of a formal energy management policy. In particular, the SEI Energy Agreements Programme helps companies analyse their energy use and opportunities for savings, and advises on appropriate monitoring and management. SEI also implements other effective measures to stimulate industrial energy efficiency such as providing high quality information on energy efficiency best practices.

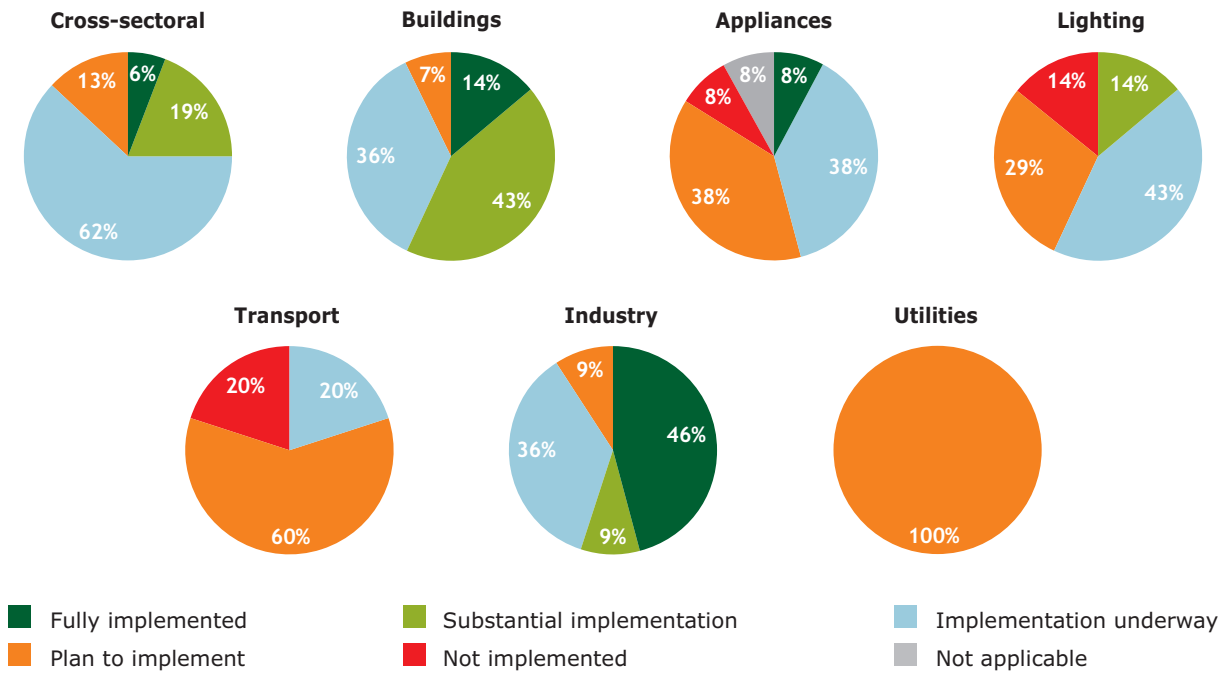
Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS.

Challenges and areas for improvement

Despite Ireland's energy efficiency policy achievements, it could continue to improve its policy portfolio by supplementary measures. In the appliances and transport sectors, in particular, implementation of additional policies and measures could be enhanced. In transport, Ireland has good initiatives to promote eco-driving, and should now focus more attention on fuel-efficient tyres and mandatory fuel-efficiency standards in line with EU policy.

As for appliances, the Eco-Design Directive will improve the energy efficiency of many new products. In the area of lighting, Ireland, like other EU countries, plans to remove incandescent light bulbs from the market. It could also speed up the implementation of measures to phase out inefficient fuel-based lighting in non-residential buildings.

Ireland's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Italy

Context

Recently, Italy has taken stronger national action in energy efficiency, introducing in 2007 its NEEAP which set an overall energy efficiency target of 9.6% by 2016.

Compared to other IEA countries and major economies, Italy's energy intensity has traditionally been low. However, while the energy intensity of many other IEA countries has constantly improved over the past 30 years, Italy's energy intensity has remained relatively stable since the early 1980s and is now at a similar level to the average for IEA European countries. From 1990 to 2007, Italy's energy intensity, adjusted for PPP, decreased on average 0.2% per year compared with the IEA country average of 1.5%, (see Figure 43). Intensity improvement is due more to structural changes than to improved energy efficiency (see Figure 45).

Strengths and innovations

In the recent past, the Italian administration has made a number of amendments to energy efficiency policy. The White Certificates Scheme was amended by Inter-ministerial Decree, and its duration extended from 2009 to 2012. The White Certificates scheme is an ambitious instrument to take advantage of Italy's energy efficiency potential, aimed at promoting energy efficiency and delivering emission reductions in all energy end-use sectors.

The transposition of the EU Energy Services Directive into domestic law has continued. These changes have been, in some cases, supported by fiscal changes in annual budget laws.

The Eco-Design Directive will also improve the energy efficiency of all new products outside the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS.

Italy has been particularly proactive in providing financial support for energy efficiency. The 2008 to 2011 Economic and Financial Programming Document recently approved by the Italian government provides for the pursuit and extension of fiscal measures to encourage energy efficiency of buildings and energy-use equipment. Draft Law no. 691 (currently being discussed in Parliament) also provides specific authority for the government to boost energy savings and renewable energy sources.

Articles 351 and 352 of Budget Law 2007 included funding of EUR 15 million for three years (2007 to 2009) to underwrite a provision allowing a tax deduction worth 55% of the total amount of 2007 expenditures for the implementation of projects to enhance the energy efficiency of buildings.

The Budget Law 2008 confirmed the above fiscal incentives and added further measures including the extension of the above scheme to 2010 and the expansion of the range of eligible measures to include expenditure related to the replacement of heating plants with heat pump and geothermal low enthalpy systems. Specific measures targeting the industrial sector in the Budget Law of 2007, Articles 1110 to 1115 include a provision to facilitate the establishment of a revolving fund of EUR 200 million per year to provide financial assistance to the sector to encourage the installation of higher performance technologies and the development of new low-emissions or zero-emissions energy sources and technologies.

Budget Law 2007 included provisions for the establishment of a Sustainable Mobility Fund of EUR 90 million per year for three years (2007 to 2009) to provide incentives for the enhancement of energy efficiency and the environmental sustainability of motor vehicles.

Challenges and areas for improvement

Despite Italy's achievements in energy efficiency, there remain many possibilities for the country to improve its energy efficiency policy portfolio. Although the government has made recent efforts to establish a NEEAP, Italy still lacks a comprehensive and consistent, evidence-based energy efficiency strategy. This should include short- and long-term targets, within an overall framework covering at least up to 2020.

Overlapping incentives are potential consequence of the absence of an energy efficiency strategy, in particular in the case of the building sector. Here, the recent fiscal incentives significantly overlap the White Certificates incentives, while further regional incentives could also apply. The risk of double- or triple-funding of measures is increased by the lack of a co-ordinating body between the different agencies responsible for energy efficiency at the national, regional and provincial level. The Italian government should therefore consider establishing a robust monitoring mechanism preventing access to multiple subsidies for the same measure.

Further actions are also required in the financial sector to ensure future investment in energy efficiency. The Italian government can do more to encourage financial institutions to provide training to their staff on energy efficiency products. There is also a need for the Italian government to support the development of criteria and financial tools for evaluating energy efficiency projects.

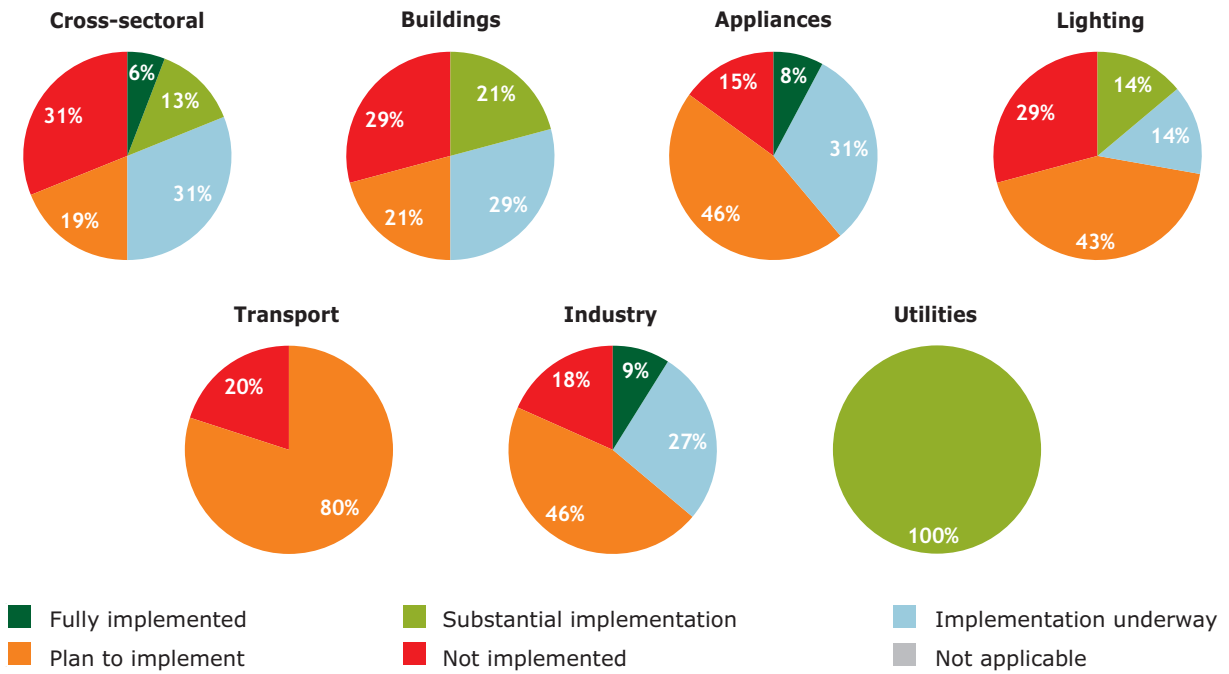
The White Certificates scheme has delivered significant positive results so far, including the gradual development of new forms of partnership among various stakeholders. However, the scheme would benefit further from the development of complementary initiatives aimed at helping consumers get access to information on energy saving opportunities. The commendable efforts by government and the energy regulator to improve the working of the scheme are compromised by the absence of a comprehensive evaluation of the cost effectiveness and lessons from the White Certificates scheme.

There is significant potential to substantially strengthen the energy efficiency of Italy's building stock. Italy urgently needs to transpose the EPBD, ensure it is fully implemented in all regions and substantially strengthen energy efficiency requirements for both new and existing buildings. Italy also needs to establish policies to support the construction of PEH or ZEB. In the area of lighting, there is scope to add specific lighting provisions within building codes.

In the industrial sector, Italy's NEEAP needs to provide a clearer road map as to how much of the energy savings can be achieved in the absence of explicit measures. Italy's NEEAP does not contain clear messages on necessary actions relating to energy collections and auditing for industry, which could help to realise some of the country's energy savings potential in this sector.

More generally, implementing measures under the revised EU Labelling and Eco-Design Directives will represent a considerable expansion of mandatory requirements for appliances in Europe. Italy needs to ensure that it has comprehensive legal and physical capacity to enforce these policy measures adequately and maximise their effectiveness.

Italy's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Japan

Context

Japan has improved energy efficiency by around 30% in the last 30 years as a result of action undertaken by the public and private sectors. Japanese TPES per GDP is one of the lowest in the world owing to vigorous energy conservation measures taken for various sectors. However, since the mid-1980s, this improvement has levelled off somewhat, with an average annual decline in energy intensity, adjusted for PPP, of 0.6% between 1990 and 2007. Japan's decreasing energy intensity during this period was due mainly to structural changes in the economy, rather than to energy efficiency improvements (see Figure 45). As a result, Japanese energy intensity advantage over other countries has steadily been eroded. The Japanese government is now aiming for an improvement of at least another 30% in terms of final energy consumption per unit of GDP by 2030 compared with 2003.

Energy conservation measures in the industrial sector, which accounts for the largest portion of the energy consumption in Japan, and the civil (commercial/residential) sector have been enhanced in a broad range of fields through regulation and government support programmes.

Strengths and innovations

Japan has strong energy efficiency policies across many sectors, particularly the industrial sector. Japan has comprehensive energy demand and supply data in the General Energy Statistics database and a robust system for tracking energy consumption in the industrial sector – especially after the improvement of the statistical methodology underlying the system in 2002. The Act on Rational Use of Energy provides a mandatory reporting and monitoring scheme for industrial energy consumption, as well as periodic reporting on energy saving plans. The act has been amended and is estimated to cover about 90% of industrial energy consumption and 50% of commercial energy consumption. In the building and transport sectors, Japan has a strong system of energy efficiency reporting. The Japanese government is planning to introduce a system of penalties against failure to meet reporting obligations and expand application of the reporting obligation to cover small- and medium-sized houses and buildings.

Japan has an innovative policy to promote energy efficiency in appliances and equipment. Through the Top Runner Program, Japan encourages competition among appliance and equipment manufacturers to improve energy consumption efficiency. Japan will expand the scope of the target equipment and appliances of this programme, which currently covers 21 categories of equipment and appliances, to include commercial-use equipment and will review the MEPS of the appliances upon the arrival of the target year. The programme covers about 70% of energy consumption in the residential sector.

The government plans to support private-sector business operators investing in energy conservation measures through the introduction of energy-efficient equipment and the development of energy conservation technologies (budgets, tax schemes and policy-based finance). Specifically, it will support the introduction of energy-efficient equipment such as highly efficient water heaters, the implementation of energy efficiency assessment and the use of the ESCO scheme.

In the transport sector, Japan is the only country in the world with fuel standards for heavy-duty vehicles. These Top Runner standards were established in March 2006 and require vehicle makers to improve fuel economy so as to ensure the average fuel economy for each weight category of each vehicle type exceeds the standard value by the 2015 target year.

Japan has addressed access to finance, a key barrier to energy efficiency, through its Flat 35 energy efficiency home loan programme. In 1996, the Japanese government introduced energy efficiency criteria to the Flat 35 scheme for building renovation loans. To receive the loan, applicants need to demonstrate that their

building renovation meets at least the 1980 thermal regulation for buildings. The Flat 35 scheme serves a triple purpose by offering preferential loans to the customer, reinforcement and certification of the thermal regulation, and security to the commercial financial institution offering the loan to customers.

Challenges and areas for improvement

Despite being a leader in energy efficiency policy, Japan can make improvements in several areas. Mandatory building requirements for energy efficiency should be further strengthened to include all types of residential, commercial and public-use buildings regardless of their size. Further action should be taken to promote PEH and ZEB and improved efficiency for windows. In addition, more effort could be undertaken to target existing buildings, including strengthening building certification schemes.

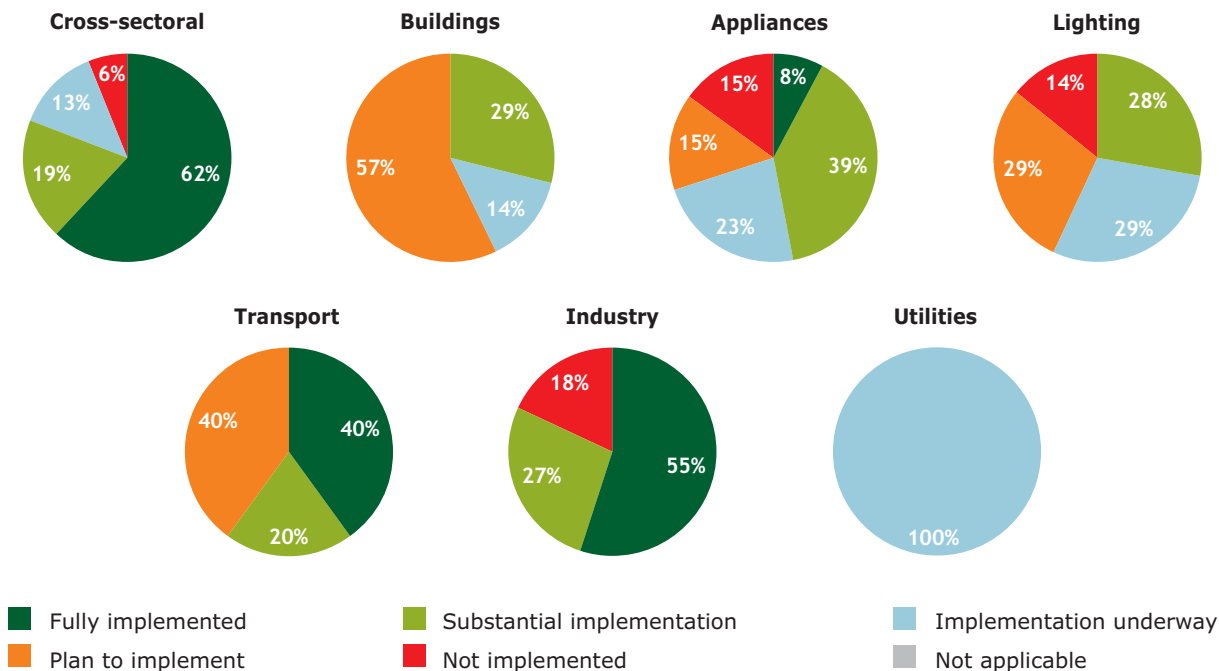
In the transport area, the Japanese government launched a debate on the adoption of an internationally compatible method of testing tyre-rolling resistance. It is also considering ways to properly manage tyre pressure, including educating users on the effects of the installation of tyre-pressure monitoring systems. Japan should move quickly on these issues.

Although the Act on the Rational Use of Energy addresses lighting in residential buildings, Japan can do more to manage lighting and avoid illumination of unoccupied spaces. Japan needs to adopt measures with performance requirements for lighting systems within building codes and ordinances applicable to the installation of lighting in commercial, public, industrial and outdoor sectors. Japan could also adopt measures to phase out mercury vapor street lighting.

With respect to appliances and equipment, verification and enforcement processes form a vital component of national standards and labelling programmes. They ensure the credibility of the scheme for consumers, and safeguard investments made by manufacturers in more efficient products. A high degree of transparency and visibility in these processes therefore not only acts to deter non-compliance, but provides confidence to participants. The system used in Japan, which is based on self-declaration by manufacturers of both performance and sales data, contains many elements of a good verification and enforcement regime. However, it would benefit from greater transparency, such as the regular publication of testing results, data on non-compliance and the results of enforcement action, and increased verification of sales data.

Performance targets for products under the Top Runner programme have tended to be set according to market and engineering analysis. An alternative approach used in some countries is to aim for performance levels that reflect least life-cycle cost, which may yield more ambitious targets and improve the impact of this programme.

Japan's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Korea

Context

Korea is an energy-intensive country, ranking eleventh highest worldwide in terms of energy consumption and ninth in terms of oil consumption. Korea's economy has relied on energy-intensive industry, such as steel, petro-chemicals and cement. As a result energy consumption in the industrial sector is extremely high, accounting for 55% of total national consumption.

Korea's energy intensity, adjusted for PPP, has been declining relatively steadily since its peak in 1997, falling at an average annual rate of 0.6% between 1990 and 2007. Despite this declining trend, Korea's energy intensity is still expected to remain above that of most IEA countries through 2010.

With respect to the transport and building sectors, long-term sectoral energy consumption reduction goals were set in July 2006. The target is to reduce emissions by 7% in the transport sector and by 6% in the building sector by 2020, as compared with projected emissions.

The Ministry of Knowledge Economy (MKE) and the Korea Energy Management Corporation (KEMCO) are the administrators of energy efficiency policies and measures. In general, the MKE shapes energy efficiency policies and its affiliated KEMCO executes energy policies and measures on behalf of the MKE.

Strengths and innovations

Korea has made headway in its energy efficiency policies, especially in the industrial and appliances sectors. As part of efforts to improve energy efficiency in the industrial sector, the Korean government has been signing 'Voluntary Agreements for Energy Saving and GHG Reductions' with energy-intensive plants. The government provides these plants with preferential loans for investments in energy saving facilities. Preferential loans are also offered for ESCO investment activities, which have reached more than KRW 100 billion.

In addition to this, the Energy Utilization Rationalization Law was amended in 2007, obliging energy-intensive industrial companies to undertake energy audits on a regular basis. A similar energy audit programme is also carried out for SMEs. Energy management capacity development assistance is currently planned for implementation in the industrial sector, which could improve the effectiveness of current policies by enhancing the effectiveness of Voluntary Agreements. 'Energy Saving through Partnership', aiming for information sharing of energy saving technology, has been actively underway among energy-intensive industries.

Designed for energy efficiency improvements in appliances, 'Energy Efficiency Labels and Standards Program', 'High-efficiency Appliance Program' and 'e-Standby Program' have also been implemented by the Korean government.

Korea's white goods are among the most energy-efficient in the world. The efficiency level of the refrigerators, air conditioners and washing machines stand out as highly successful examples. For instance, the average refrigerator reduced its annual power consumption per litre by 55% from 1996 to 2008. The average air conditioner's Energy Efficiency Ratio (EER) has increased by 22% in the last decade, while on average a washing machine's power consumption per kg has decreased by 22% in the last five years.

Korea has adopted the IEA Standby Power programme and is one of the few IEA countries to have successfully implemented the 1-Watt standby power programme. Furthermore, the government also plans to lower the standby power standard of all electronic goods to 1-Watt by 2010. In addition, Korea requires that goods failing to meet the Standby Power Reduction Standard display a Standby Warning Label, the only country to do so.

To improve fuel efficiency in transport, fuel efficiency standards for light-duty vehicles are combined with mandatory fuel efficiency labelling. In addition, the Korean government has made commendable progress in establishing a public transport system and has created clear incentives resulting in reduced single-passenger vehicle transport and the purchase of smaller cars.

For building energy savings, the government is also operating Building Energy Saving Design Codes requiring or recommending installation of energy saving equipment. The Code has increased its insulation standard by 22% in 2008. In addition, the government mandates energy audits every five years for buildings with energy consumption above 2 ktoe per year. Buildings that achieve outstanding energy performance can be exempted from this requirement.

Challenges and areas for improvement

The majority of the IEA's 25 recommendations are currently being implemented in Korea, and the IEA looks forward to forthcoming developments in Korean energy efficiency policies, particularly in the transport, building and lighting sectors.

In the transport sector, current light-duty vehicle fuel efficiency standards could be further strengthened. More concrete policy measures could also be taken to promote fuel-efficient tyres and eco-driving.

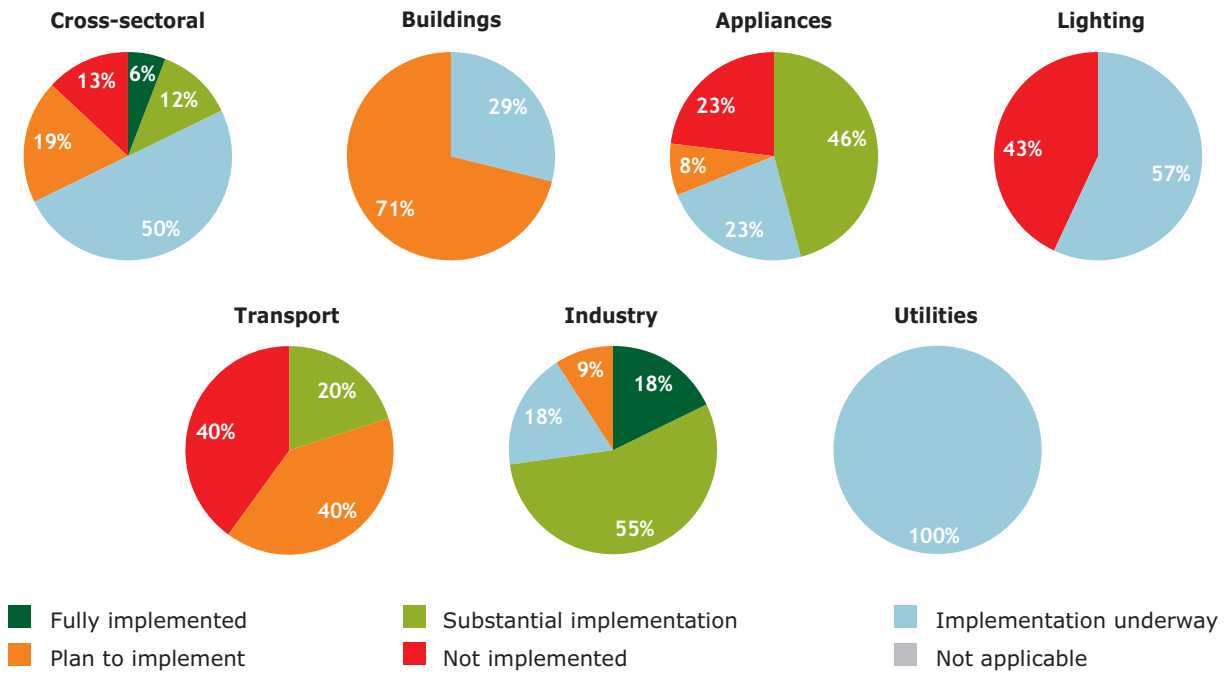
While Korea does have mandatory Building Energy Saving Design Codes, their scope could be further expanded by covering smaller buildings. There is room to improve their stringency. Moreover, energy efficiency policies targeting windows and existing buildings should be improved; the government is already conducting studies for future development.

With regard to appliances and equipment, the progress made in energy efficiency policy measures for television products is relatively behind those of the other appliances. This is an important area for improvement given the increasing market share for these products and since Korean television products are relatively dominant in the world home appliances market.

According to the government, lighting consumes approximately one-fifth of national electricity. Further efforts to strengthen policies targeting efficiency in lighting should therefore be pursued. While it is commendable that the government has established a road map for phasing out incandescent lamps, these efforts should not be limited to residential buildings.

In the utilities sector, the IEA encourages the government to plan and implement the Energy Efficiency Resources Standard which is currently being contemplated.

Korea's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Luxembourg

Context

Luxembourg's energy intensity has improved over the past two decades and is now similar to the IEA Europe average. Energy Intensity, adjusted for PPP, has decreased by 2.5% per year from 1990 to 2007, mainly owing to structural changes in industry and the overall economy. There are also improvements in energy efficiency. In 2007, for each 1000 US dollars of GDP, the country used 0.15 toe of final energy (adjusted for MER).

Although Luxembourg's economy is characterised by high value-added financial services, it also has substantial heavy industry in relation to the size of its economy, unlike IEA countries of comparable size and wealth.

Broken down by sector, transport was the largest energy user in 2007, accounting for 59% of TFC. Industry's share was 25% and the other sectors (residential and services, and the primary sector) accounted for 16% of the total. These shares have been fairly stable over the past five years. In comparison, the IEA averages in 2005 were 32% for industry, and 34% for both transport and other sectors.

Energy use in industry and the residential/commercial sector has remained relatively flat since the mid-1990s. Industry has modernised and restructured itself, and, counterbalancing the impact of rapid population growth, energy use in buildings has become more efficient. The transport sector, in turn, has seen a dramatic increase in energy use over the past decade. This can be largely attributed to transit traffic, that is fuel sales to foreign lorries crossing Luxembourg and to daily commuters from across Luxembourg's borders. The government estimates that these sales account for around 80% of TFC in transport.

Strengths and innovations

Luxembourg's energy efficiency policies in the buildings, appliances and equipment, and lighting sectors are relatively well developed.

The government has implemented several energy efficiency policy measures in the building sector, such as mandatory energy standards in building codes and energy performance certificates for residential buildings. According to its NEEAP, the building sector is expected to reduce its energy consumption most, mainly by improving thermal insulation. In addition, new public buildings are required to be as energy-efficient as possible, and must evaluate the feasibility of connecting to cogeneration plants and/or renewable sources of energy.

Mandatory MEPS for appliances are currently being implemented, and the government is also planning to introduce an energy labelling programme for household appliances.

In the lighting sector, the government is moving forward to phase out inefficient incandescent bulbs.

With regard to the transport sector, the government has taken several measures such as raising fuel prices, implementing a CO₂-related vehicle tax, and providing financial incentives for least-polluting cars.

An innovative measure targeting the finance gap has been a partnership agreement between the government and the financial sector in May 2008. This has led to participating banks offering reduced interest rates on loans financing the construction of passive houses or low-energy houses.

Challenges and areas for improvement

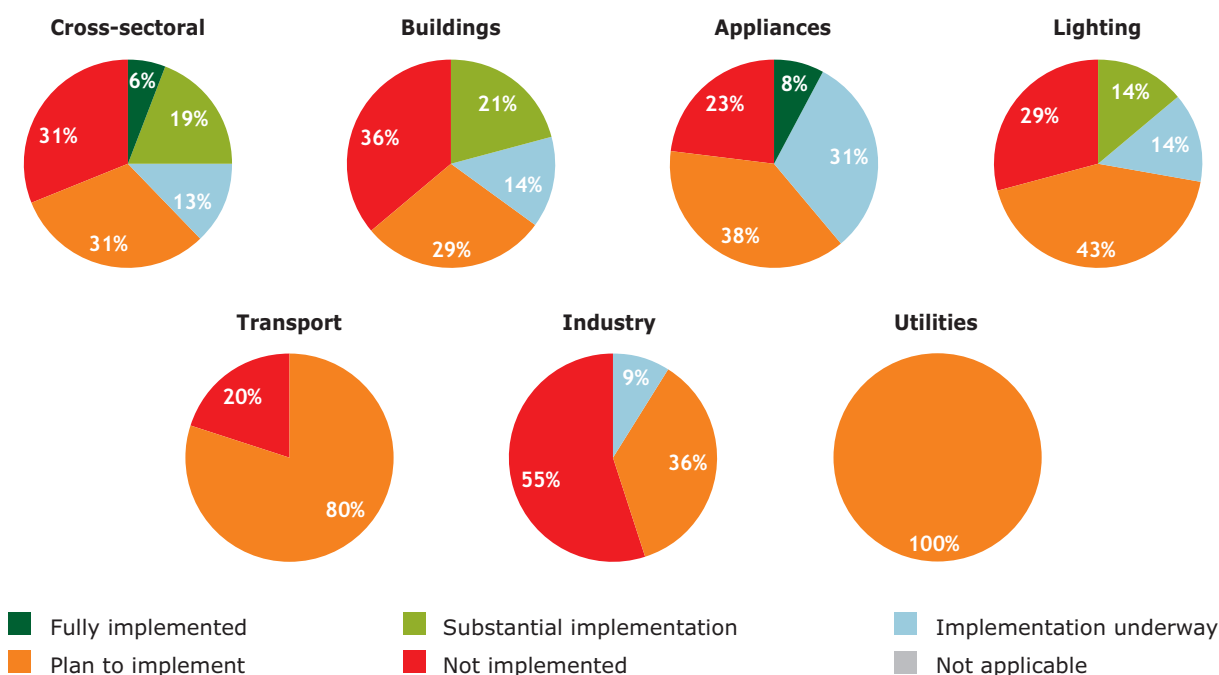
Luxembourg can improve its energy efficiency policies in many areas, including in industry, transport and utilities. In the industry sector, energy management policies across industry would be useful, and planned

energy efficiency improvement measures in non-ETS industries, expected to start in January 2010, are welcome.

The high level of transit traffic in Luxembourg makes implementation of transport efficiency policies tricky. Given this context, Luxembourg will need to develop innovative measures to address this sector.

End-use efficiency improvements in the utilities sector are another recommended target area. Strengthened policies targeting lighting and appliances could also contribute, notably for television products for which measures are currently lacking.

Luxembourg’s progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, the Netherlands

Context

Energy efficiency forms a key part of the Netherlands' climate change mitigation, energy security and environmental policies. Under its *Clean and Efficient* programme, the Dutch government has set up a target to achieve an annual energy efficiency improvement of 2% by 2020, which is more than twice the current rate. Other key policy documents – *Energy Report 2008* strategy and the *Energy Transition* framework – also put strong emphasis on energy efficiency. The Netherlands' energy efficiency policies and measures are outlined in its NEEAP submitted to the EC in 2007 in the context of the EU Energy Services Directive.

At present, the energy intensity of the Netherlands' economy is slightly higher than the IEA average. This is mainly due to its energy-intensive industrial sector, including refineries and chemicals. Energy intensity has been declining steadily since the 1970s although the decline rate has slowed down in recent years from an average 1.9% per year between 1990 and 2000 to 0.7% per year between 2000 and 2007. This gives the Netherlands an average yearly energy intensity improvement, adjusted for PPP, of 1.4% from 1990 to 2009.

Strengths and innovations

In recent years, the Netherlands has made energy efficiency one of its key policy priorities and set a very ambitious energy efficiency improvement target. To achieve this target, the government plans to spend about EUR 1.2 billion over the period 2008 to 2011 to stimulate energy efficiency improvements in different sectors. Moreover, in the economic recovery programme for 2009 and 2010, EUR 0.5 billion will be allocated to energy efficiency measures.

In designing its mix of policy measures, the government takes into consideration cost-effectiveness criteria. In 2010, the energy and climate policies will be evaluated to see whether the country is on track to meet its 2020 policy goals, whether the policy measures are effective and how costs have evolved since the policies' implementation. The Netherlands uses strong instruments to spur energy efficiency research and development and actively participates in international programmes and projects in this area.

The Netherlands continues to transpose the EPBD into domestic law and has strong building codes. For new buildings, the energy performance coefficient is being tightened considerably from 0.8 to 0.6 in 2011 and to 0.4 in 2015, with the aim of reducing energy use by 50% in new buildings. By 2020, the aim is that all new buildings will be energy neutral. In addition, measures specifically targeting existing buildings and energy performance certificates are also in place.

In the area of appliances and equipment, a major component of the Netherlands' policy entails transposition and implementation of the Eco-Design Directive. This Directive will improve the energy efficiency of many new products outside the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS. In the area of lighting, the Netherlands, like other EU countries, has an established comparative energy label for household lamps and plans to develop new standards for office, residential and outdoor lighting products under the EU Eco-Design Directive.

In the industrial sector, the Netherlands supports energy efficiency improvement through long-term agreements. These agreements set energy efficiency targets for each sector and each company. The government supports this exercise by providing the necessary expertise to help draft the energy-efficient investment plans.

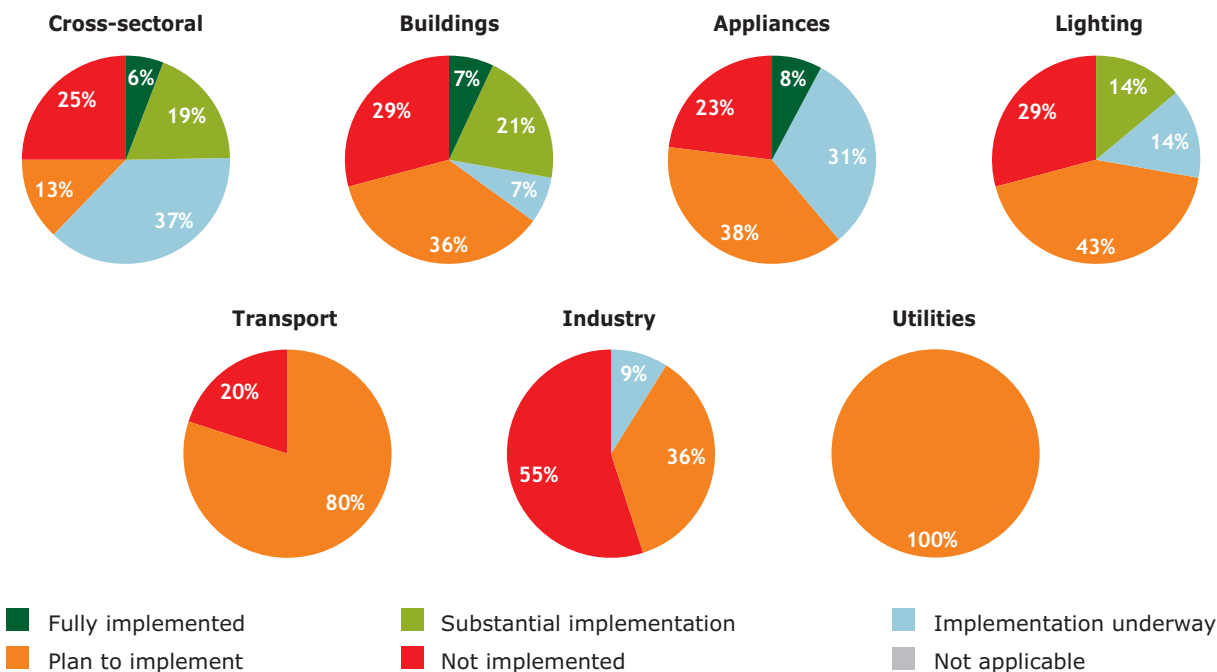
Challenges and areas for improvement

Having set ambitious policy objectives, the Netherlands now faces the challenge of implementation. It needs to ensure that it has comprehensive legal and physical capacity so as to adequately enforce existing and planned policy measures and maximize their effectiveness. Enforcement of domestic laws and policies that transpose the EU energy efficiency directives is the responsibility of member states.

Improving transport efficiency is one of the most difficult challenges, as in most IEA countries. The government seeks to stimulate more efficient driving habits and reduced traffic in urban areas. It should also pursue plans related to fuel-efficient tyres and mandatory fuel-efficiency standards. Concerning the maintenance of tyre inflation pressure, which is an important fuel-saving measurement, the European Commission’s proposal for the mandatory fitting of tyre pressure monitoring systems should be extended to heavy-duty vehicles.

In the industrial sector, the Netherlands could usefully extend its support for SMEs. In particular, the government could provide energy performance benchmarking information and develop incentives for SMEs to adopt least life-cycle cost capital acquisition procedures. There is also much room for stimulating energy efficiency improvements in utilities.

The Netherland’s progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, New Zealand

Context

New Zealand's final energy intensity, adjusted for PPP, has declined relatively consistently since 1990 at an average of 1.2% per year. New Zealand's energy intensity in 2007 was slightly higher than the IEA average – mainly because of the large proportion of energy-intensive sectors in the New Zealand economy. According to the Energy Efficiency and Conservation Authority (EECA), between 2001 and 2007, overall energy efficiency improvements saved New Zealand 38 PJ of energy.

Transportation is the largest and fastest-growing energy consuming sector in New Zealand. In 2007, transport accounted for 42% of total consumer energy, outstripping the industry sector (32.4%), the residential sector (12.3%), the commercial sector (9.0%) and the agriculture sector (4.2%).

New Zealand's government changed in November 2008 and its priorities for energy include security of energy supply, energy affordability and environmental responsibility. New Zealand has historically relied on a 'light-handed' approach to market regulation. Under this policy, the government relies more on competition and economic regulation supported by market based sector specific competition policy, rather than detailed regulation for specific programmes, services or products. The newly elected New Zealand government is committed to a more light-handed regulatory approach to energy efficiency policy compared to the previous government. The recently released subsidised insulation and heating retrofit programme for older homes is an example of this approach where direct action with end-users is preferred over extra regulation of a market.

Strengths and innovations

New Zealand has a long history of promoting energy efficiency policies. The country has a strong legislative and institutional base for its energy efficiency policies. New Zealand's Energy Efficiency and Conservation Act (2000) provides the basis for promoting energy efficiency. The Act established the Energy Efficiency and Conservation Authority (EECA) as a stand-alone entity with an enduring role to promote energy efficiency across all sectors of the economy. The Act also empowers the preparation of regulations implementing product energy efficiency standards and labelling, as well as the disclosure of information to compile statistics on energy efficiency, energy conservation and renewable energy. EECA led preparation of the New Zealand Energy Efficiency and Conservation Strategy (NZECS) on behalf of the government.

Through EECA, New Zealand has developed a world-class energy efficiency indicators and monitoring system. In addition, EECA performs comprehensive ex-ante and ex-post evaluations of the central government's energy efficiency programmes they are responsible for. New Zealand can also claim a strong compliance and enforcement regime for many of its energy efficiency policies and programmes, such as MEPS, energy efficiency product labelling and aspects of the building code.

New Zealand works in conjunction with Australia, and other international partners, to implement MEPS, and mandatory performance labelling for a wide range of energy using products. In addition to MEPS, New Zealand implements a mandatory fuel economy labelling scheme covering light passenger vehicles manufactured from the year 2000 onwards²² and sold domestically, including imported used cars (an aspect of vehicle fuel economy labelling that is unique to New Zealand).

In the industrial sector, New Zealand is the only IEA country to have fully implemented mandatory MEPS for electric motors in line with international best practice.

22. Exemptions apply to motorcycles and vehicles over 3.5 tonnes and to vehicles where the information is not available - most likely those manufactured prior to 2000.

Challenges and areas for improvement

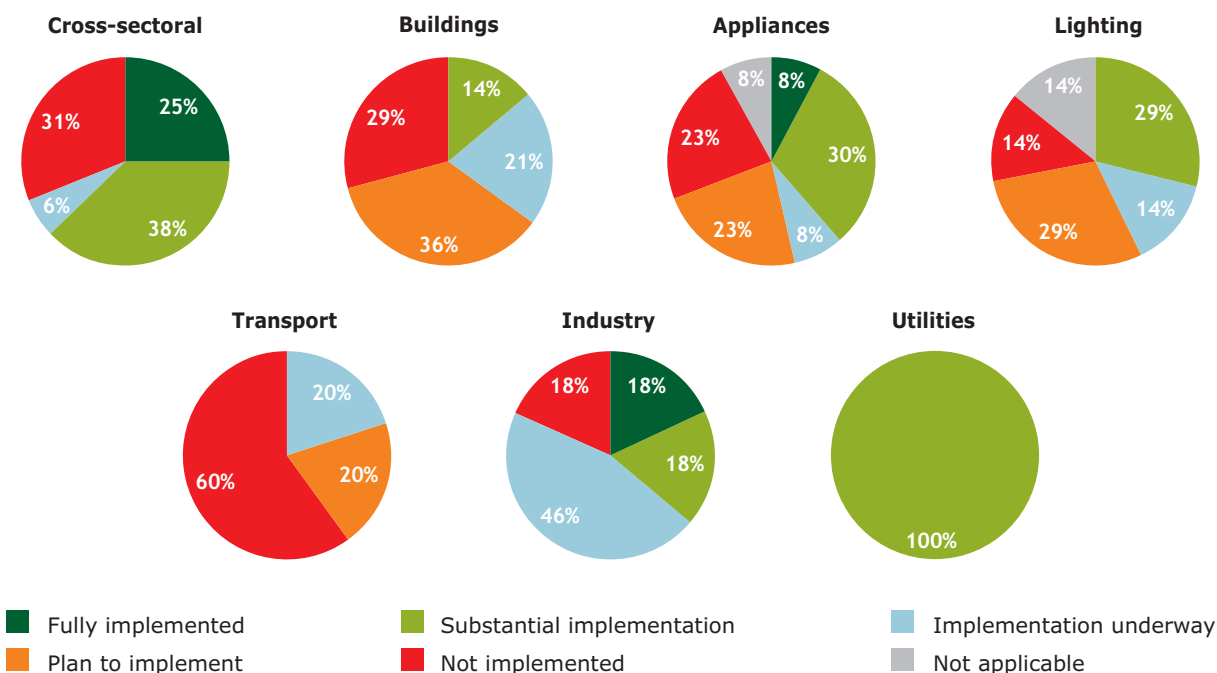
Despite the strengths in New Zealand’s energy efficiency policy, there are several areas for improvement. New Zealand banks have demonstrated their support for the government’s residential energy efficiency policies, such as offering to top up mortgages for home improvements at no additional cost. However, the New Zealand government has few initiatives aimed at capitalizing on the willingness of financial institutions to promote energy efficiency. The IEA has identified the need to promote and help quantify the benefits of energy efficiency investments to financial institutions through a common energy efficiency savings verification and measurement protocol.

In the building sector the IEA is concerned to see the lack of policies promoting energy efficiency beyond the requirements in the building code. Many countries recognise the huge cost-effective potential in the building sector. The IEA acknowledges that much of New Zealand has a temperate climate, which affects New Zealand’s energy building use. But energy efficiency gains can still be realised by implementing policies to provide information on building use (HERS and building certification) and to promote and develop PEH and ZEB.

While New Zealand has a well-developed product efficiency programme, it has yet to implement appliance and lighting energy efficiency policies. Policies to promote greater energy efficiency (via MEPS) for flat-screen high-definition televisions and networked devices are critical as these technologies gain increased market share and account for a growing portion of energy demand. New Zealand has a very good lighting programme (www.rightlight.govt.nz) which focuses on a partnership with lighting suppliers, provides information to consumers on energy-efficient lighting technologies and supplies subsidies for CFL lighting. However, there are currently no plans to implement the IEA recommended phase-out of incandescent lamps.

New Zealand should be commended for its innovative use of vehicle fuel efficiency labelling. However, given the prominence of transport energy use growth in the New Zealand economy, more policies are needed. In particular, New Zealand needs to address the current lack of fuel efficiency standards for light-duty vehicles.

New Zealand’s progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Norway

Context

Although not an EU member country, Norway is required to adopt much of the EU legislation as part of its participation in the European Economic Area (EEA). In addition to meeting requirements under the EEA, Norway has chosen to opt into many EU programmes, institutions and activities, especially in the area of energy efficiency.

Norway's energy intensity, adjusted for PPP, has declined on average 2% per year between 1990 and 2007. This is one of the highest rates of decrease among IEA member countries. The decline in energy intensity is largely due to structural changes in the economy (principally a shift away from energy-intensive sectors), with energy efficiency accounting for just under 0.2% per year (see Figure 45).

Strengths and innovations

Norway has a strong set of energy efficiency policies. The Norwegian government has recently strengthened Enova, one of Norway's primary implementing agencies for energy efficiency policy by renewing its contract for the 2008 to 2011 period and increasing its budget by 50%, granting the agency NOK 1 190 million (USD 170 million). These measures were in an effort to mitigate the international financial crisis through augmenting energy efficiency action. The Norwegian government has also joined forces with 15 cities under the programme 'Cities for the Future' to increase the ambition of energy efficiency action, among other measures.

In the building sector, Norway is making progress with implementing the EPBD Directive, although it is somewhat behind some EU countries. It is also developing a national standard for PEH that will be used as a benchmark for energy efficiency regulations and labelling. Enova is offering a grant programme for passive houses and collecting annual statistics on energy efficiency in existing buildings.

The availability of cheap and clean domestically-produced electricity has encouraged the development of energy-intensive industry in Norway. Energy efficiency improvements have been made in this area as a result of a decrease in industrial activity and measures implemented through Enova and the EU Energy Services Directive. Norway has joined the second phase of the ETS (2008 to 2012), along with Iceland and Liechtenstein, and will likely achieve further efficiencies in heavy industry and the heat and power sector as a result.

In the area of lighting, Norway is planning or in the process of implementing several measures under the EU Eco-Design Directive. Municipalities and other owners of large facilities and outdoor lighting infrastructure can apply to an Enova programme for assistance with refurbishing street lighting.

Norway has an innovative approach to promoting energy efficiency. Rather than requiring utilities to deliver energy efficiency, Norway imposes a grid tariff levy. This levy contributes to a special energy fund that is managed by Enova. The recent evaluation shows that Enova has proven a very cost-effective manager of the energy fund.

Challenges and areas for improvement

Despite its recent achievements, Norway can further improve its energy efficiency policy portfolio. Enova has overseen implementation of energy efficiency policies and provided yearly reports on activities, impacts and results. However, Norway can do more to guarantee transparent and fair procedures for compliance including ensuring regular reporting in instances of non-compliance and establishing and implementing enforcement actions. Enforcement is important for maximising energy savings and for ensuring the credibility of schemes.

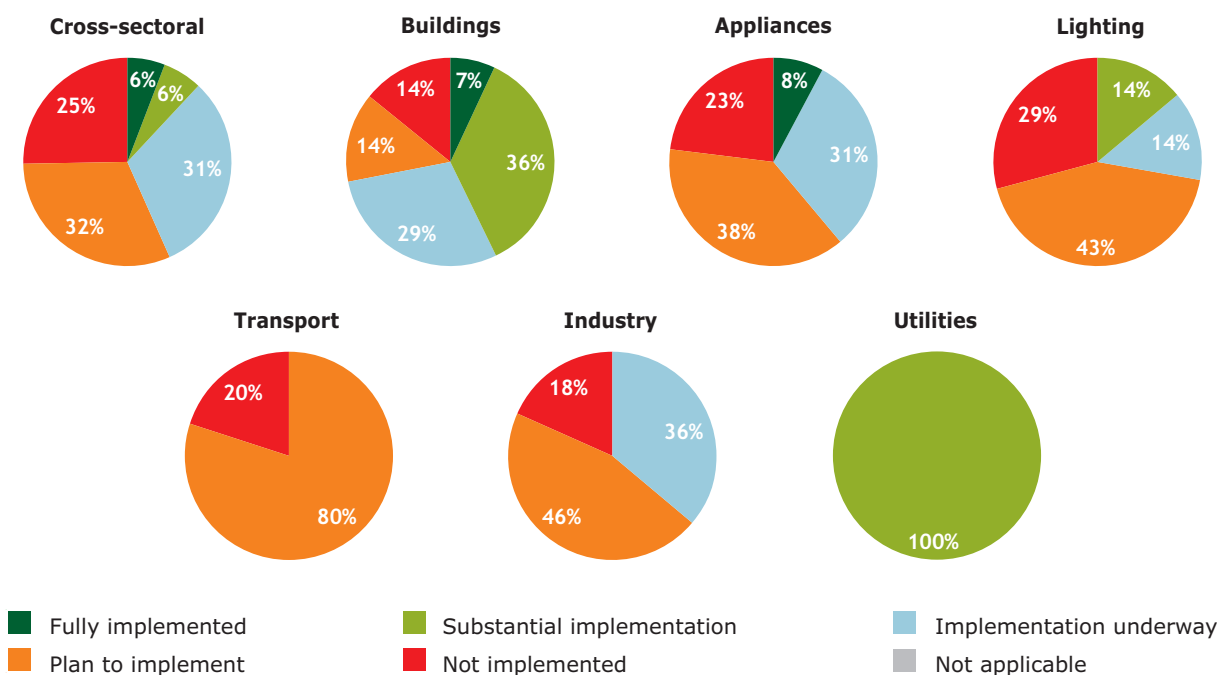
There is also room for improvement with respect to policies promoting the financing of energy efficiency - particularly from the private sector. The IEA has identified the need to promote the benefits of energy efficiency investments to financial institutions to assist them with developing energy efficiency investment products and risk-mitigation measures.

Norway's building policies need attention. This is particularly the case for policies relating to promoting energy-efficient glazing and window products.

With regard to transportation, Norway should implement planned EU-wide policies including a cap for fleet average CO₂ emissions of 130 g/km from new passenger cars that will apply in full from 2015 onwards without delay. Norway should also consider creating policies that address fuel efficiency standards in heavy-duty vehicles.

Norway should continue its progress with implementing EU Directives in the appliance and equipment sector while adequately resourcing mandatory energy performance levels.

Norway's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Poland

Context

Energy efficiency is becoming a prominent component of Poland's energy security and environmental policies. It is one of the key objectives of the country's draft *Energy Policy to 2030* expected to be adopted by the end of 2009. Polish energy efficiency policy is increasingly guided by the EU requirements. In accordance with the EU directives on Energy End-use Efficiency and Energy Services, Poland has an indicative target to reduce energy consumption by 9% in 2016. Poland's energy efficiency policies and measures are outlined in the NEEAP submitted to the EC in 2007. At present, the legal framework for energy efficiency is set by the 1997 Energy Law but a new draft energy efficiency law is under development.

Poland's energy intensity, adjusted for PPP, dropped on average 3.5% per year between 1990 and 2007. Energy intensity declined at a particularly remarkable average rate of 7.1% per year between 1995 and 2000 (compared to the average 1.8% for all IEA countries), but the decline rate slowed to an average 2.2% per year between 2000 and 2007.

Strengths and innovations

Although historically Poland has been a supply-oriented country because of its coal and gas industry, there have been many positive developments in the area of energy efficiency policy in recent years. Poland has made progress in transposing various EU Directives, such as the EPBD, the Eco-Design Directive for energy-using products, and the Energy Services Directive into Polish legislation. All of these Directives are expected to have a significant positive impact on energy efficiency and energy savings, as they cover important consumption sectors. The Eco-Design Directive will improve the energy efficiency of many new products outside the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS.

To reduce energy consumption in buildings, Poland has set up a Thermal Modernization Fund, which supports energy efficiency investments. The fund covers up to 20% of loans used for investing in the modernisation of buildings and the reduction of their energy consumption. Between 1999 and 2008 the number of approved applications amounted to 14 134.

Challenges and areas for improvement

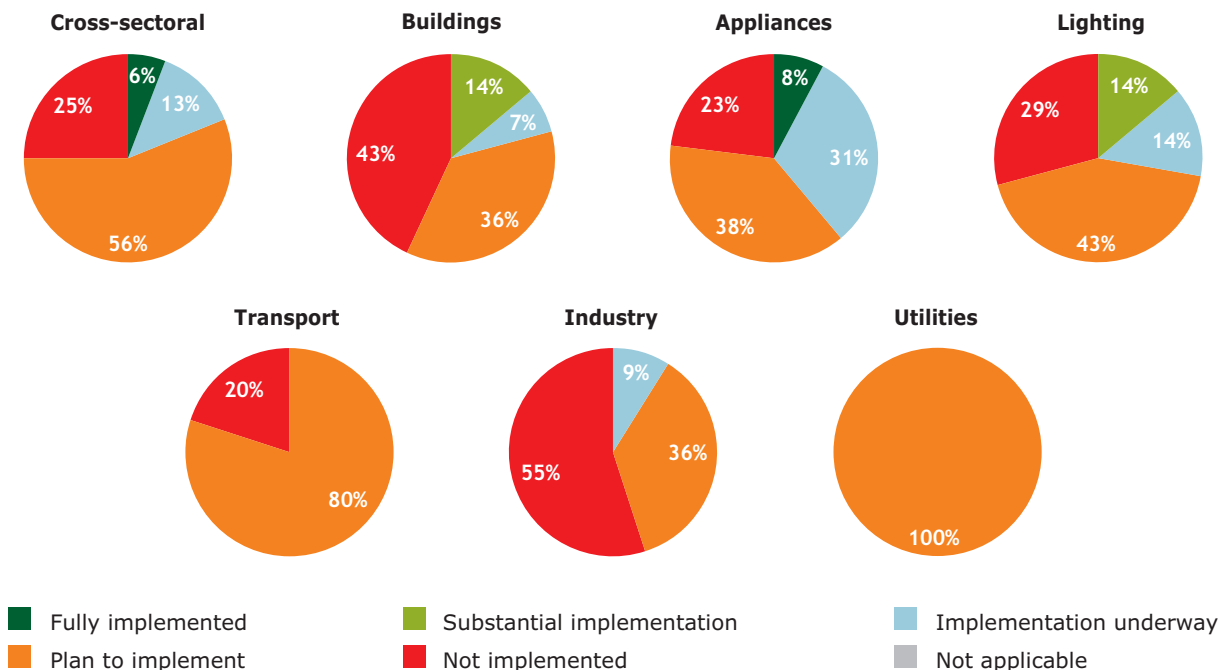
Energy efficiency policy in Poland can be strengthened further. One key short-term challenge is the adoption and implementation of a new energy efficiency law²³. This law and relevant executive orders are expected to provide the necessary legal and regulatory framework to ensure the full implementation of EU energy efficiency directives and to further enhance monitoring, enforcement of and compliance with energy efficiency requirements.

Significant gaps in policy implementation remain in the buildings, utilities, industry and transport sectors. Only a few of the IEA recommendations related to these sectors have been implemented. Poland is encouraged to put more emphasis on stimulating energy efficiency improvements in these sectors, which have relatively large savings potential. In the building sector, for example, Poland should consider developing policies that support PEH and ZEB as well as promoting energy-efficient glazing.

23. At the time of preparing this report, a draft energy-efficiency law was being developed by the Ministry of Economy.

In the forthcoming law, Poland plans to introduce the White Certificates system. If properly implemented, white certificates can be an effective way to stimulate energy savings; Poland is therefore encouraged to pursue this initiative. As for appliances, there appears to be a lack of policies in areas not covered by EU legislation. While MEPS exist, as does an appliance labelling programme, there is a gap when it comes to ensuring the stringency of these standards is maintained. Progress with reviewing and developing appropriate test standards and measurement protocols would likely be useful in meeting energy efficiency goals.

Poland's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Portugal

Context

The Portuguese government has placed energy efficiency policy at the heart of its energy portfolio. Portugal published its NEEAP, 'Portugal Efficiency 2015', in 2008. The Plan sets a target of reducing energy consumption by 9.8% by 2015, and elaborates a series of 12 programmes establishing various targets to 2015 and measures to be taken across various sectors in order to achieve this goal. A key strength of the plan is its interaction with both the National Climate Change Programme (PNAC 2006) and the National Allocation Plan for Emission Allowances (PNALE).

Portugal's energy intensity, adjusted for PPP, dropped on average 0.3% per year between 1990 and 2007. This is lower than the IEA average of 1.5%.

Strengths and innovations

Portugal can be proud of many aspects of its energy efficiency policy portfolio. An energy certification system for buildings became mandatory in July 2007 and every building is required to have an energy consumption certificate, stating the building's energy consumption and proposed measures towards its reduction, where necessary. Furthermore, two new buildings-related regulations were put in place; the Regulation on Energy Systems and Air Handling in Buildings (RSECE) and the Regulation on Thermal Behaviour Characteristics in Buildings (RCCTE). This regulatory package will have a significant impact on the energy efficiency of buildings by establishing higher construction standards, notably by enforcing a mandatory obligation to install thermal solar panels in all new buildings. Also, the Energy Intensive Consumption Management System (SGCIE) has been launched; this programme aims at promoting energy efficiency and monitoring energy consumption in energy intensive installations (CIE).

A tax on low energy efficiency light bulbs came into force in March 2008. The tax aims at compensating for the environmental costs related to the inefficient use of energy and is applied to manufacturers, retailers and others that market lighting products.

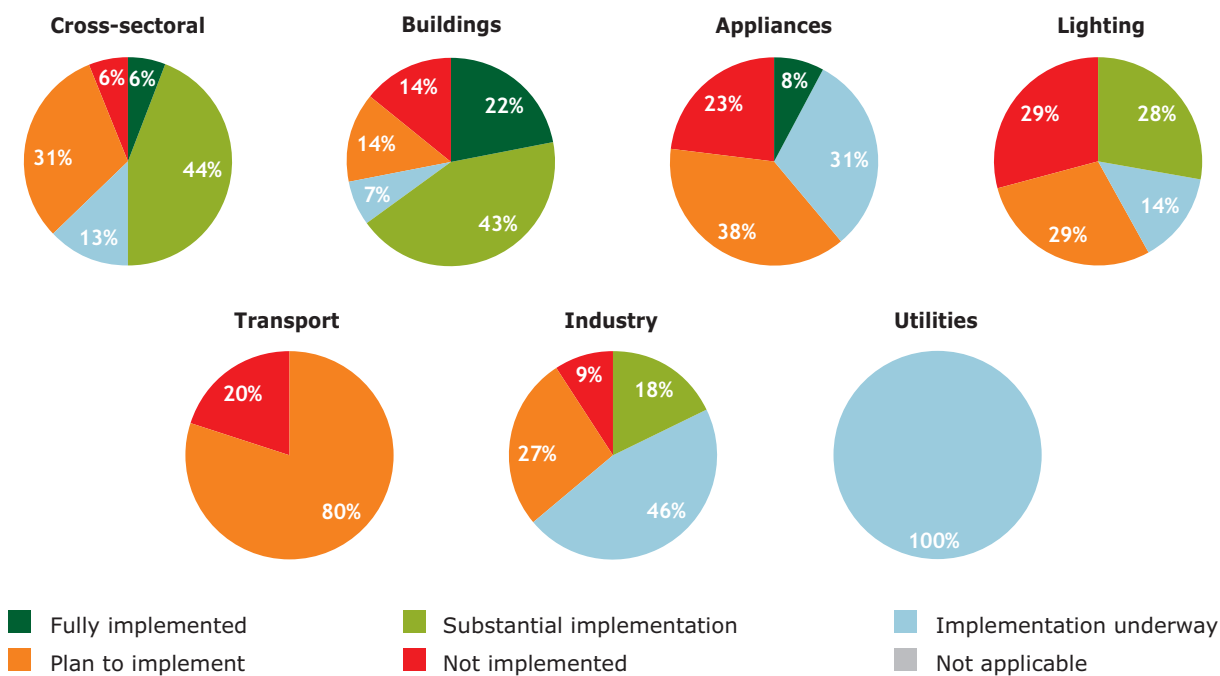
Challenges and areas for improvement

The largest single component in the expected 9.8% efficiency savings by 2015 is forecast to come from the transport sector (3.8%, or over one-third). Given the trends in transport highlighted in the government's own emissions projections, this target seems optimistic without further additional measures, faster delivery of related infrastructure projects, or some other change in transport behaviour designed to reduce individual car use in urban areas.

While the PNALE is a structured and well designed programme, much work remains to be done in order to convert the good intentions into practical results. One means by which the government's energy efficiency goals across all sectors could be accelerated is by encouraging greater participation from the private sector. Potential private sector investment needs to be matched by public investment in energy end-use data collection across all sectors and relating to all energy types.

Energy efficiency measures in the industrial sector also require strengthening. In particular, Portugal should work to establish measures to optimise energy efficiency in motor-driven systems.

Portugal's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, the Slovak Republic

Context

Of all IEA countries, the Slovak Republic's energy intensity has decreased most dramatically since 1990, by 4.6% per year between 1990 and 2007. Enormous changes in the economy and energy sector, as well as real efficiency gains in industry, have resulted in a sustained energy intensity improvement over the past decade; despite significant economic growth, energy use has remained largely stable. While efforts to develop a strategy targeting energy conservation began in 1999, more broad and comprehensive energy efficiency objectives were adopted in 2006, and have since continued. The Slovak Republic currently aims to improve energy efficiency by 1% per year, as laid out in the EU Energy Services Directive. The Slovak NEEAP sets a national energy savings target of 9% for 2016, with an intermediate target of 3% in 2010. This will entail achieving an average of 4 135 TJ per year of savings in final energy consumption. Since joining the EU in 2004, the Slovak Republic has pursued transposition and implementation of major EU Directives covering important energy end-use sectors.

Strengths and innovations

While in one sense energy efficiency policy development in the Slovak Republic has been relatively recent, several positive measures have borne fruit or are currently being considered. Since 2002 an appliance standard and labelling scheme has been successfully implemented, notably due to targeted awareness campaigns, and have proved cost-effective. Pushing forward gains already achieved in the industrial sector, the Slovak Republic is implementing audit and energy management programmes, including for SMEs.

The Slovak government is also planning to establish a financial instrument to ensure energy efficiency efforts are adequately resourced. The resources required to implement this new instrument are currently under approval, with precise measures to be supported identified, so as to avoid overlap with existing financial mechanisms. A feed-in tariff is being developed to support CHP.

Significantly, the Slovak government has recognised the importance of policy monitoring and evaluation, and is currently focussing efforts on developing monitoring systems for specific policies (such as building energy certificates), as well as for its overall NEEAP. There appears to be renewed emphasis on the implementation of the Action Plan, and on ensuring the development of appropriate secondary legislation.

In the building sector, the Slovak government has mandatory energy efficiency standards in building codes, which are currently being amended and updated to implement EU legislation, including the roll-out of mandatory energy certificates. A voluntary window labelling scheme is also in place, implemented by an association of Slovak window manufacturers and importers (SLOVOKNO). In June 2009, the Slovak government adopted a new thermal insulation programme which provides the possibility for window refurbishment, among other measures.

Over the past four years, various EU Directives have been transposed into Slovak legislation, such as the EPBD, the Eco-Design Directive for energy-using products, and the Energy Services Directive. All of these are expected to have a significant positive impact on energy efficiency and energy savings, as they cover important consumption sectors.

Challenges and areas for improvement

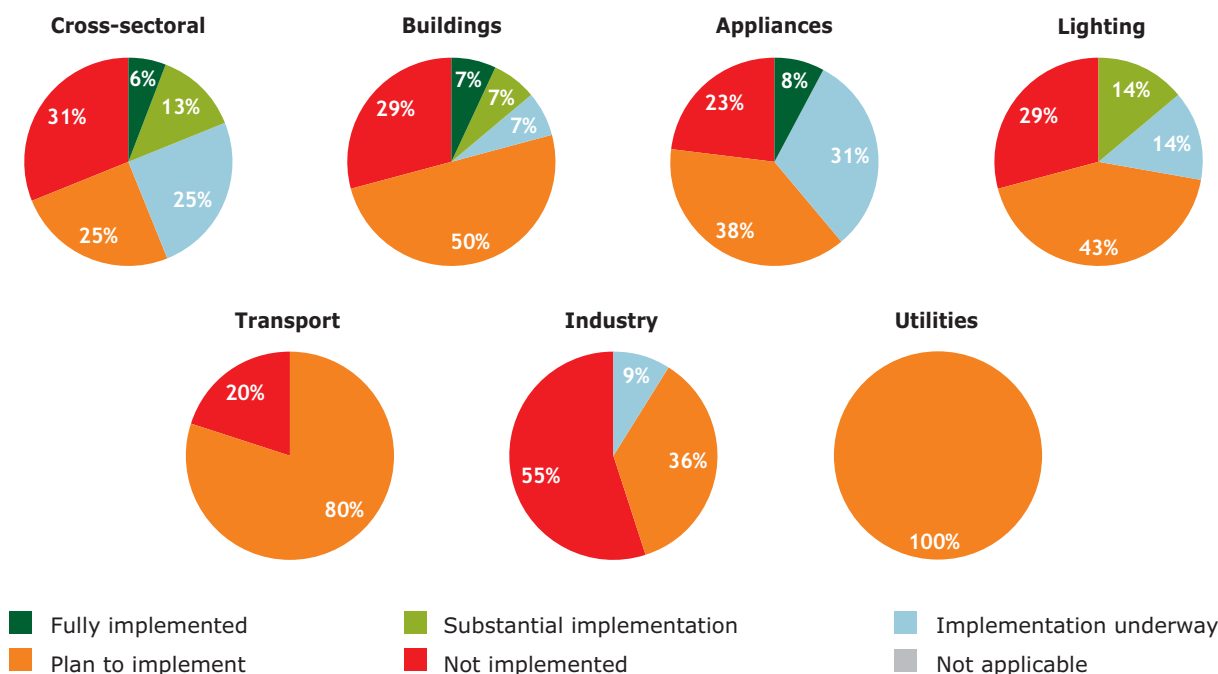
While the Slovak Republic has undertaken measures to strengthen monitoring, reporting, and compliance systems, these remain weak in several areas, mainly regarding public reporting and enforcement. Ongoing efforts in this area are welcomed and encouraged. This can be seen in both new and existing measures of the Slovak NEEAP, where refurbishment and thermal improvement programmes are either not monitored or only partly monitored.

Besides implementation of the EPBD, which will strengthen codes and minimum requirements and establish energy performance certificates, the Slovak Republic does not have ambitious measures that give impetus to development of PEH or ZEB. However, incorporating a definition of and criteria for PEH or ZEB into new technical standards by 2010 is envisaged. The NEEAP also mentions a programme to support low-energy and passive houses to be implemented 2009, to which the Slovak government may consider giving more impetus. Support mechanisms for this programme are to be established after 2010. While the most recent thermal insulation programme and a voluntary labelling scheme are both favourable to improved window efficiency, no other measures directly targeting windows or other glazing products have been considered.

In the area of appliances and lighting, there appears to be a lack of policies in areas not covered by EU legislation, particularly for lighting. While MEPS exist, as does an appliance labelling programme, there is a gap when it comes to ensuring the stringency of these standards are maintained. Progress with reviewing and developing appropriate test standards and measurement protocols would likely be useful in meeting energy efficiency goals.

The most significant gaps in policy implementation remain the transport, industry and utilities sectors. Two programmes targeting energy audits and energy management were announced in the 2008 NEEAP, and further implementation of these is strongly encouraged. A lack of major policies targeting the transport sector led to new measures being introduced in the Slovak NEEAP, though none echo those of the IEA energy efficiency recommendations.

The Slovak Republic's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Spain

Context

Spain's energy intensity is slightly below the IEA average. In 2007, for each thousand USD of GDP (MER), the country needed 0.14 toe of final energy. Energy intensity, adjusted for PPP, has remained virtually flat from 1990 to 2007, increasing at around 0.08% per year. GDP grew by 67% from 1990 to 2007, but the positive effect of this growth on energy intensity was offset by the effects of increasing wealth on energy use. As Spaniards have become richer, private car use has grown and so has oil use in road transport, by around 87%, making transport the largest energy user (38% of TFC). Also, electricity use in services and households increased at an above-average rate, and more than doubled in the period.

Spain's energy efficiency policy is laid out in the 2004 to 2012 Energy Saving and Efficiency Strategy (E4) and the Action Plan 2008 to 2012. The goal is to save 16.9 Mtoe of final energy in 2012, equalling an estimated 12.4% of TFC that year as compared to business-as-usual. Spain's measures target energy efficiency improvements in all sectors, with a good half of the projected energy savings coming from the transport sector and a quarter from industry.

Strengths and innovations

After a period of strong growth in economy and energy use, Spain has increased its ambition for energy efficiency in recent years and can offer several good practices to other countries. In the area of household appliances, Spain subsidises the replacement of inefficient appliances with new efficient ones (labelled A or higher) through the Renova programme. Since 2006, some 1.8 million appliances have been replaced, mostly washing machines and fridges, but also dishwashers and freezers. The programme has managed to help raise general awareness of energy efficiency and introduce higher-efficiency appliances into the Spanish market.

In the area of lighting, Spain, like other EU countries, has an established comparative energy label for household lamps and plans to develop new standards for office, residential and outdoor lighting products under the EU Eco-Design Directive. Spain is also subsidising the replacement of traffic lights with LED technology in some 600 municipalities, affecting a quarter of all traffic lights in the country. The annual electricity savings are estimated at 90 GWh.

The Eco-Design Directive will also improve the energy efficiency of many new products outside of the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS.

With regard to transportation, Spain revised in January 2008 its car registration tax to reflect CO₂ emissions. An EU cap for fleet average CO₂ emissions of 130 g/km from new passenger cars will apply in full from 2015 onwards. Concerning the maintenance of tyre inflation pressure, which is an important fuel-saving measurement, the European Commission's proposal for the mandatory fitting of tyre pressure monitoring systems should be extended to heavy duty vehicles.

Challenges and areas for improvement

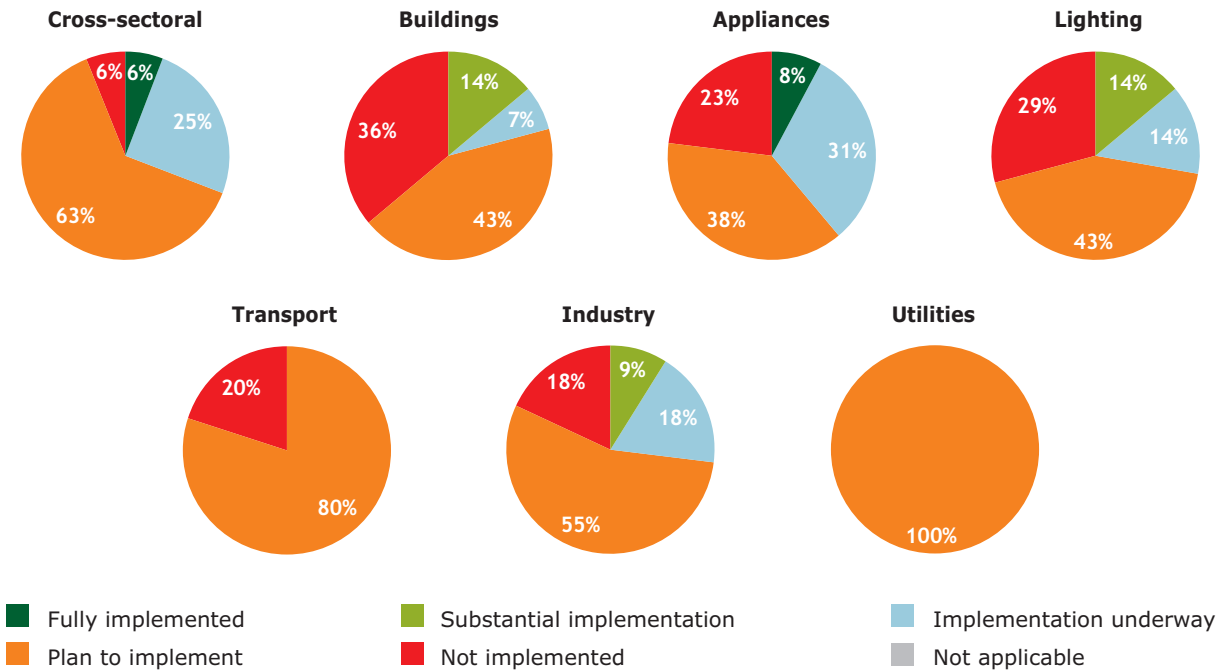
In the past two years, Spain has announced an impressive number of measures it plans to take to improve energy efficiency; now these plans need to be implemented across all autonomous communities. In the building sector, measures should focus on improving energy efficiency in existing buildings, now that the construction-boom years are over and demand for new buildings will be low in the near future. At the same time, however, national targets could be set to ensure a certain market share for PEH, ZEB and other ultra low-energy consuming new constructions by 2020, or building codes could be set to meet this target in all new buildings.

In the transport sector, Spain is developing a strategy for sustainable mobility which is to have a strong element of energy efficiency. Spain should finalise and implement the strategy without delay.

With regard to utilities, Spain should consider measures to encourage utilities to play an active part in funding and/or delivering end-use efficiency improvements among their customer base. These measures could also include placing energy efficiency obligations on utilities. Given that Spain’s energy efficiency strategy projects a quarter of savings to come from industry, current efforts to introduce energy management capability, and measures aimed at improving efficiency in SMEs, should be further strengthened. The government should consider developing requirements for formal energy management policies.

Much of Spain’s legal requirements for energy efficiency stem from the EU level. Enforcement of domestic laws and policies that transpose the EU’s energy efficiency directives is the responsibility of member states. Enforcement is important for ensuring energy savings are maximised and for ensuring the credibility of the schemes. Spain needs to ensure that it has comprehensive legal and physical capacity so as to adequately enforce these policy measures and maximise their effectiveness.

Spain’s progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Sweden

Context

Since the early 1970s, Sweden's TFC has remained remarkably steady, while TPES has grown by a third. This stability results partly from more efficient use of energy and a relatively slow economic growth. But it mostly reflects changes in the structure of energy supply: secondary energy – electricity and heat – has replaced on-site use of fuels, mainly oil. Electricity use has almost doubled in the period, and space heating is now dominated by district heating, electric heating and heat pumps. In addition, CHP is widely used.

Sweden's energy intensity is roughly equal to the IEA average. In 2007, for each thousand USD of GDP (in terms of MER), the country needed 0.12 toe of final energy. Though it may not seem so, this is in reality an impressive achievement, given the large heating requirements of a cold climate, and the energy needs of the dominant heavy industries, primarily pulp and paper and iron and steel. Energy Intensity, adjusted for PPP, has decreased by 1.9% per year from 1990 to 2007, mainly owing to structural changes in the economy - services and light industry are growing faster than the energy-intensive sectors - but there are also improvements in energy efficiency.

Following its commitment under the EU Energy Services Directive, Sweden's 2008 NEEAP aims to save 9% of final energy from the annual average of 2001 to 2005 to 2016, incorporating a savings target of 32.3 TWh. Sweden's measures target energy efficiency improvements in all sectors outside the EU Emissions Trading Scheme, with most projected energy savings coming from the residential sector.

Strengths and innovations

Sweden has a long tradition of highly effective measures to enhance energy efficiency across sectors, in particular through taxes and public awareness campaigns. With regard to the building sector, Sweden has relatively high energy efficiency requirements in its building code at the moment. In addition to its stringency, other commendable features of the building code are its flexibility and openness to innovation. The code sets a goal for the overall efficiency (energy use per floor area), but leaves it to planners and builders to decide on how to reach this goal. Turning to energy efficiency in existing buildings, apartments are typically heated with district heating, 40% of which is produced at high-efficiency CHP plants. Outside the district heating areas, heat pumps have become a standard solution for family houses, and they provide heating for close to 80% of new family houses. Swedish households are also in the forefront of using automated meter-readers to reduce electricity consumption.

In industry, the companies participating in the voluntary 'Programme for Energy Efficiency in Energy-Intensive Industry' are exempted from the electricity tax. The companies must implement standardised energy management systems; audit their energy use; invest in efficient use of electricity, with a payback period of maximum three years; and adhere to the life-cycle costs principle in equipment purchases. Since 2005, the participating companies represent around half of total electricity used in industry, and have managed to cut their annual electricity use by 1 TWh (3%). At an annual cost of around EUR 15 million in tax exemptions, some EUR 110 million of private investment in energy efficiency have been triggered.

The Eco-Design Directive will also improve the energy efficiency of many new products outside the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the EU ETS.

In the area of lighting, Sweden, like other EU countries, has an established comparative energy label for household lamps and plans to develop new standards for office, residential and outdoor lighting products under the EU Eco-Design Directive.

With regard to transportation, Sweden revised its annual tax on car use in late 2006 to reflect CO₂ emissions. This has resulted in a growing market share for diesel cars, thus improving energy efficiency. An EU cap for fleet average CO emissions of 130 g/km from new passenger cars will apply in full from 2015 onwards. Sweden is one of several IEA countries with a well-developed Eco-drive programme.

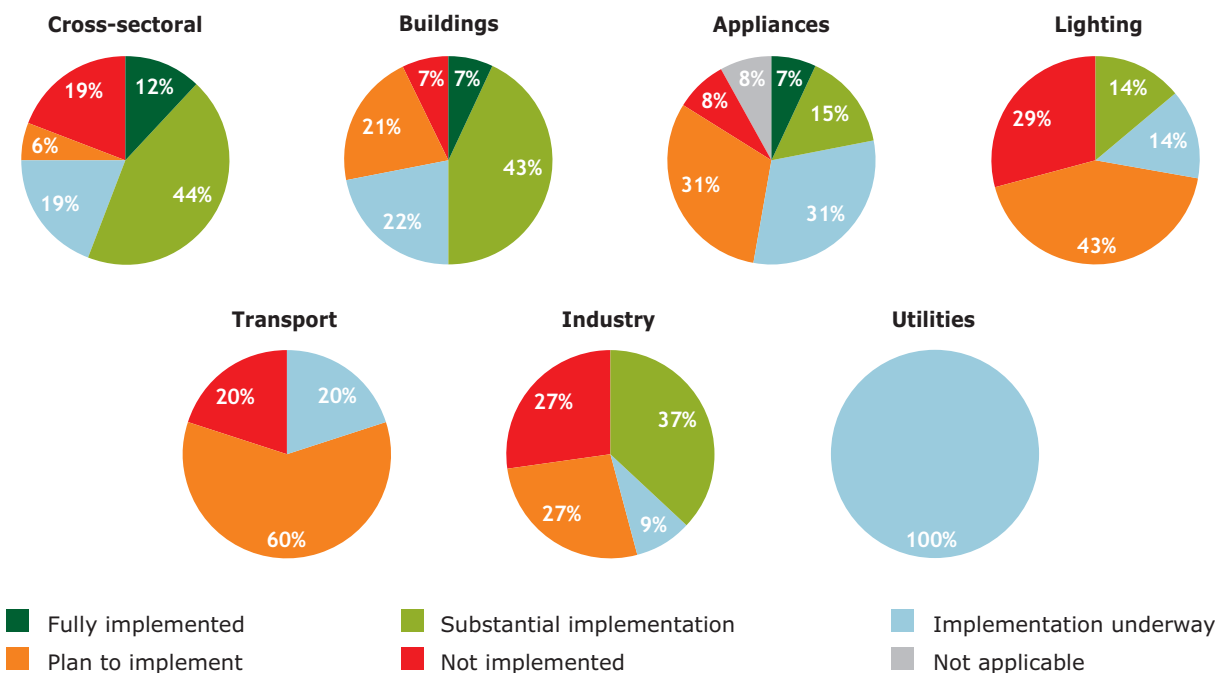
Challenges and areas for improvement

Despite its many achievements, there remains room for Sweden to further improve its energy efficiency policy portfolio. With regard to buildings, although relatively strict requirements exist for new buildings, national targets could be set to ensure a certain market share for PEH, ZEB and other ultra low-energy consuming new constructions by 2020, or building codes could be set to meet this target in all new buildings. In this context, the government’s recent plan to develop a national strategy to increase the share of low-energy buildings is very welcome. Also, the government should consider additional incentives for improving the energy efficiency of the existing building stock.

Sweden should continue to increase efforts to implement energy efficiency in SMEs. This includes the plan to provide information to SMEs, enabling energy performance benchmarking that could be compared internationally, and developing appropriate incentives to adopt least life-cycle cost capital acquisition and procurement procedures.

Building on the incremental increases in energy and carbon taxes since 1991, Sweden should also continue and increase the use of financial incentives to improve energy efficiency in the private sector. This should include raising awareness in the financial sector of the potentials offered by financing energy efficiency projects.

Sweden’s progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, Switzerland

Context

Switzerland has the second lowest energy intensity among the IEA countries (in MER terms). In 2007, per USD 1 000 of GDP, Switzerland used 0.07 toe of final energy. The intensity is low partly because the Swiss economy relies heavily on high value-added services, and heavy industry is scarce (Figure 45). Switzerland's economic structure and energy consumption patterns have been fairly stable from 1990 to 2007, energy intensity, adjusted for PPP, improved on average 0.8% per year.

Switzerland's 2008 Action Plan for Energy Efficiency aims to reduce fossil fuel use by 20% by 2020 and to cap electricity demand growth at 5% between 2010 and 2020. The plan includes 15 broad measures, with most projected energy savings coming from the residential and service sectors.

Strengths and innovations

To respond to the pronounced needs for co-ordination and co-operation in energy efficiency policy of a highly decentralised federal state, Switzerland has set up the SwissEnergy programme for 2001 to 2010. The programme is managed by the federal government and includes a wide array of projects, most of them voluntary. The projects are normally run with close co-operation between the federal government, cantons, municipalities, industry and environmental and consumer associations. Programme results are subject to detailed monitoring and verification by the federal government.

With regard to the building sector, Switzerland revised the energy efficiency requirements in 2008 to limit energy consumption in new buildings to 60 kWh per m², and in to-be-refurbished existing buildings to 90 kWh per m². Both limits are around 30% stricter than the previous ones. Commendably, the building code sets a goal for overall efficiency (energy use per floor area), but leaves it to planners and builders to decide how to reach this goal.

Switzerland also has a popular voluntary labelling system for high-efficiency buildings and building components. The label is applicable for new and renovated buildings and it comes in several levels of standards (Minergie, Minergie-P, Minergie-Eco). They all set an overall limit on energy use for heating, hot water, ventilation and air-conditioning. The Minergie label has also been developed for individual building components, such as walls, roofs and floors, windows and exterior doors. By summer 2007, some 7 400 buildings with a total floor area of 7 million m² had been Minergie-certified. About 12% of new residential buildings and 15% of new office buildings have the certificate, and almost one building in five is built to meet the standard.

In the transport sector, Switzerland is following an effective policy for shifting freight from road to rail. In 2001, it introduced a vehicle-specific heavy-vehicle fee, based on weight, mileage and pollutant emissions. The revenue from the fee is spent on infrastructure projects in the cantons and on improving transalpine railways to meet the country's goal of cutting the number of lorries crossing the Swiss Alps by half from 1999 to 2010. The fee has raised energy efficiency by triggering fleet renewal and better logistics. Switzerland is also preparing to introduce fuel-efficiency standards for light-duty vehicles in line with the EU Directive aiming at reducing CO₂ emissions by new cars to 130g/km by 2015. Such standards might be achieved by a penalty system similar to the one in the EU or a bonus-malus ('feebate') system that will encourage the purchase of low-CO₂ emitting cars.

Challenges and areas for improvement

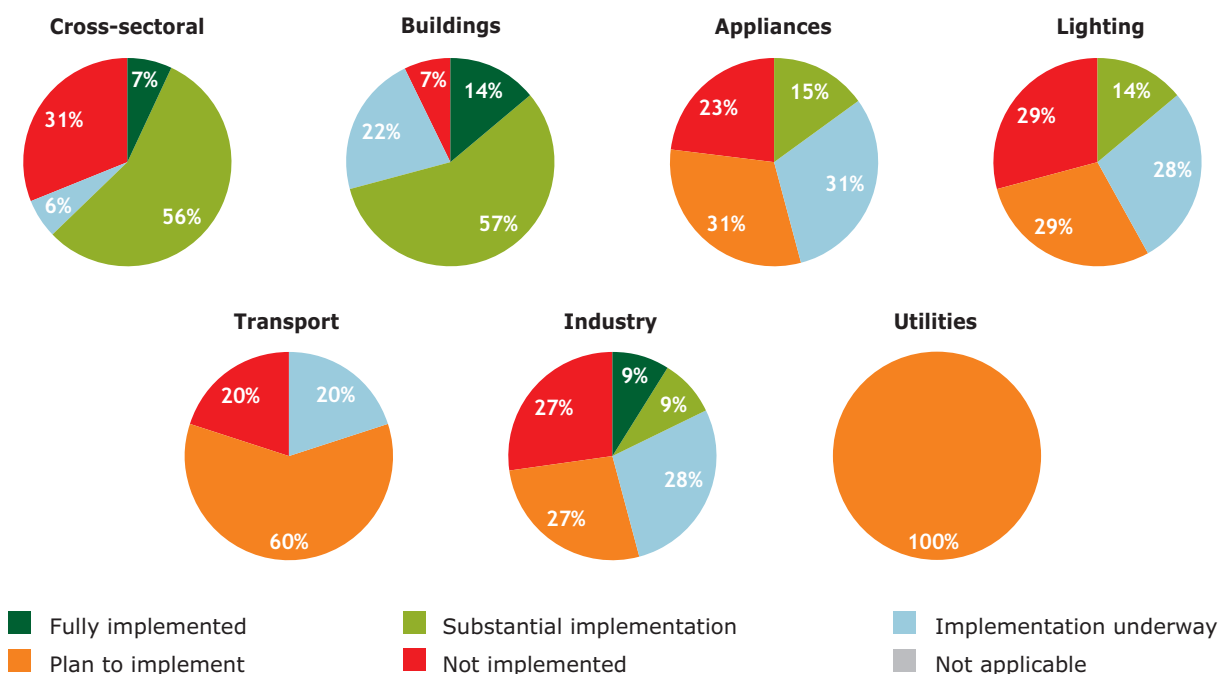
Despite its many achievements, there remains room for Switzerland to further improve its energy efficiency policy portfolio. With regard to buildings, although relatively strict requirements exist for new buildings, targets could be set to ensure a certain market share for PEH, ZEB and other ultra low-energy consuming

new constructions by 2020. Building codes could also be set to meet this target for all new buildings²⁵. The government should ensure prompt delivery of the planned additional incentives for improving the energy efficiency of existing building stock.

Switzerland should also continue to increase the use of financial incentives to improve energy efficiency in the private sector. This should include raising awareness in the financial sector of the potentials offered by financing energy efficiency projects. The government should also encourage the financial sector to train their staff and develop evaluation criteria and financial tools for energy efficiency projects.

In the transport sector, Switzerland should swiftly implement mandatory fuel efficiency standards for light-duty vehicles as planned. With regard to utilities, Switzerland should consider measures to encourage utilities to play an active part in funding and/or delivering end-use efficiency improvements among their customer base. These measures could also include placing energy efficiency obligations on utilities.

Switzerland's progress with implementing IEA energy efficiency recommendations



25. In June 2009 the Swiss Parliament approved the implementation of a building refurbishment programme of CHF 200 mio per year starting in 2010 and financed by partial earmarking of the CO₂-tax.

Energy efficiency progress report, Turkey

Context

Turkey's energy intensity, adjusted for PPP, comes close to the IEA average. In 2007, per USD 1 000 of GDP (MER), Turkey used 0.2 toe of final energy. Energy intensity has remained relatively stable, decreasing on average 0.3% per year from 1990 to 2007. The economy and energy use have grown in parallel. Growth in energy use has been above average in heavy industry (steel, cement and chemicals), where much potential remains for efficiency gains.

In recent years, Turkey has started to pay closer attention to the benefits of energy efficiency for securing energy supplies to a rapidly growing economy, reducing pollution and saving money. Turkey's energy efficiency policies and measures are based on the 2007 Energy Efficiency Law. The country is aiming to reduce its energy intensity by at least 15% by 2020. Priority policies and programmes include setting up an energy efficiency service market; establishing energy management systems in industry and the building sector, conducting energy efficiency training programmes, supporting energy efficiency projects and voluntary agreements and raising public awareness.

Turkey will likely see the fastest medium – long-term growth in energy demand among the IEA countries. It has a young and urbanising population and TFC per capita is still low. Ensuring sufficient energy to a growing economy has been and remains the government's main energy policy concern, and Turkey has wide-ranging plans for further improvements in energy efficiency.

Strengths and innovations

Turkey has a number of energy-efficiency policies it can be proud of. Turkey has successfully established an energy management system for industry, the largest end-use sector (39% of TFC in 2007). It has also set up a programme for training certified energy managers. Under this programme, 760 energy managers were trained by June 2009.

The 2007 Energy Efficiency Law extended the scope of energy managers and they are now obligatory for all power plants with a capacity of at least 100 MW, all industrial facilities consuming at least one ktoe per year, commercial buildings consuming at least 0.5 ktoe per year or having an area of at least 20 000 m² and public buildings consuming at least 0.25 ktoe or having an area of at least 10 000 m². Under the Building Managers Training Programme, 450 energy managers are being trained in 2009.

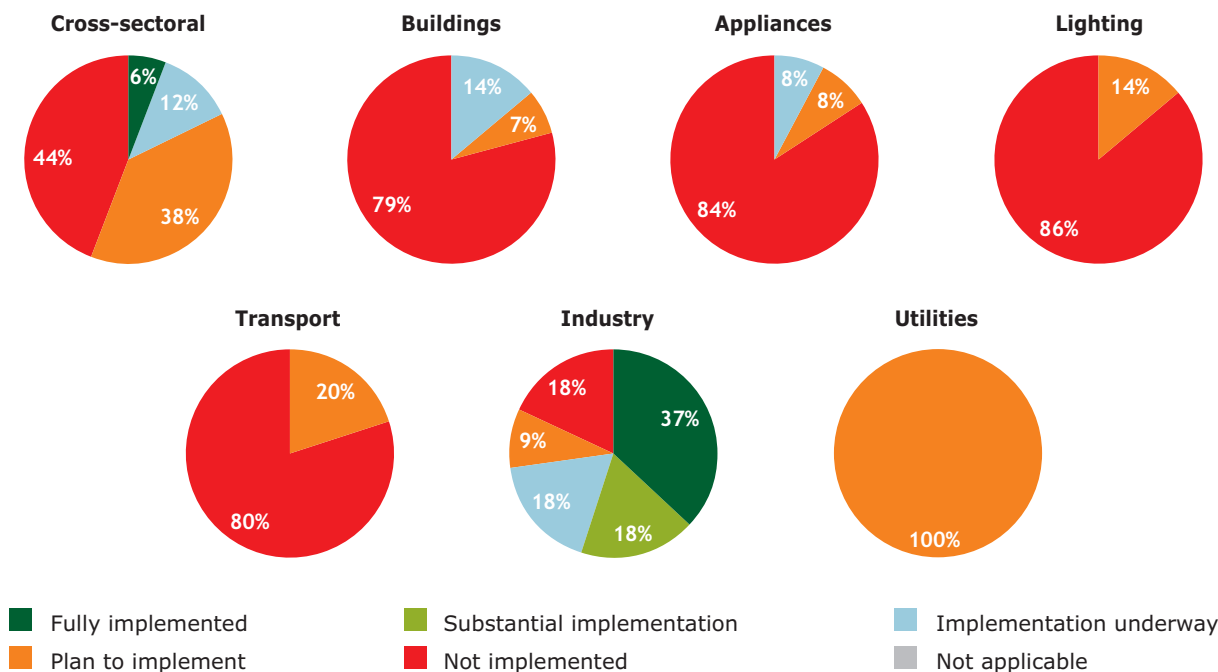
Challenges and areas for improvement

As a rapidly growing country, Turkey is catching up with other IEA countries in terms of living standards. As a result, it is expected that the fleet of cars and appliances will grow rapidly in coming decades. The country will also see significant new construction. Consequently, it will need to devote increasing attention to improving its energy efficiency. There are a lot of energy-efficiency savings that can be achieved in Turkey. In the transport sector, it is a positive sign that Turkey is planning to implement eco-driving policies. Plans for establishing and implementing fuel efficiency standards are also encouraged. Turkey can take advantage of the best practices of other countries to avoid locking itself into unsustainable energy consumption patterns.

Turkey should also address the need for financial resources and mechanisms, technical knowledge and qualified staff in the area of energy efficiency. It should continue to develop statistics on sector-specific energy consumption and energy efficiency indicators in order to develop and evaluate energy efficiency policies and measures.

Turkey should examine possibilities for economic incentives to accelerate energy efficiency gains and continue to increase public awareness of energy efficiency as a means to improve energy security, save money and mitigate climate change. It should also set MEPS for appliances and lighting according to international best practice.

Turkey's progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, the United Kingdom

Context

The United Kingdom pursues energy efficiency as a central component of its energy policy and seeks to achieve an 18% reduction in energy consumption between 2007 and 2016 across all sectors.

Total final energy consumption in the United Kingdom rose considerably less than in OECD countries as a whole between 1973 and 2004. The role of energy efficiency in climate change mitigation policies has been emphasised particularly since 2003, when the government set the goal for 50% of the UK's expected GHG emission reductions to 2020 to come from energy efficiency improvements. Between 1990 and 2007, the United Kingdom achieved 2.3% in annual energy intensity, adjusted for PPP, improvement (see Figure 43), and overtook all IEA countries, except for Ireland, as the country with the lowest energy intensity. The decrease in energy intensity was largely due to structural changes, with end-use efficiency improvements of around 0.8% per year (see Figure 45 above).

Strengths and innovations

The UK energy efficiency policy portfolio has many strengths. The United Kingdom has made good progress across the building sector – implementing measures to strengthen building codes based on a zero-carbon approach, setting objectives for PEH, constructing a package of initiatives to address market barriers and making information available to all actors in the building sector. Furthermore, the United Kingdom has building codes that specify installed lighting energy limits related to the recommended light levels. As of October 2008, all buildings sold, built or rented need an Energy Performance Certificate. The UK MEPS for buildings will be increased by steps in 2010 and 2013 so that by 2016, all new-build dwellings will be zero carbon. There are plans for these requirements to extend to non-residential buildings by 2019.

In the area of appliances and equipment, a major component of UK policy entails transposition and implementation of the Eco-Design Directive. Implementation will improve the energy efficiency of many new products outside of the transport sector.

Indirectly, further efficiencies will also be achieved in heavy industry and in the heat and power sector as a result of the implementation of the EU ETS. The United Kingdom has made other advances in the industrial sector. The UK Carbon Trust encourages implementation of comprehensive energy management procedures and practices and provides a comprehensive package of energy and carbon management advice and information for business and the public sector.

Challenges and areas for improvement

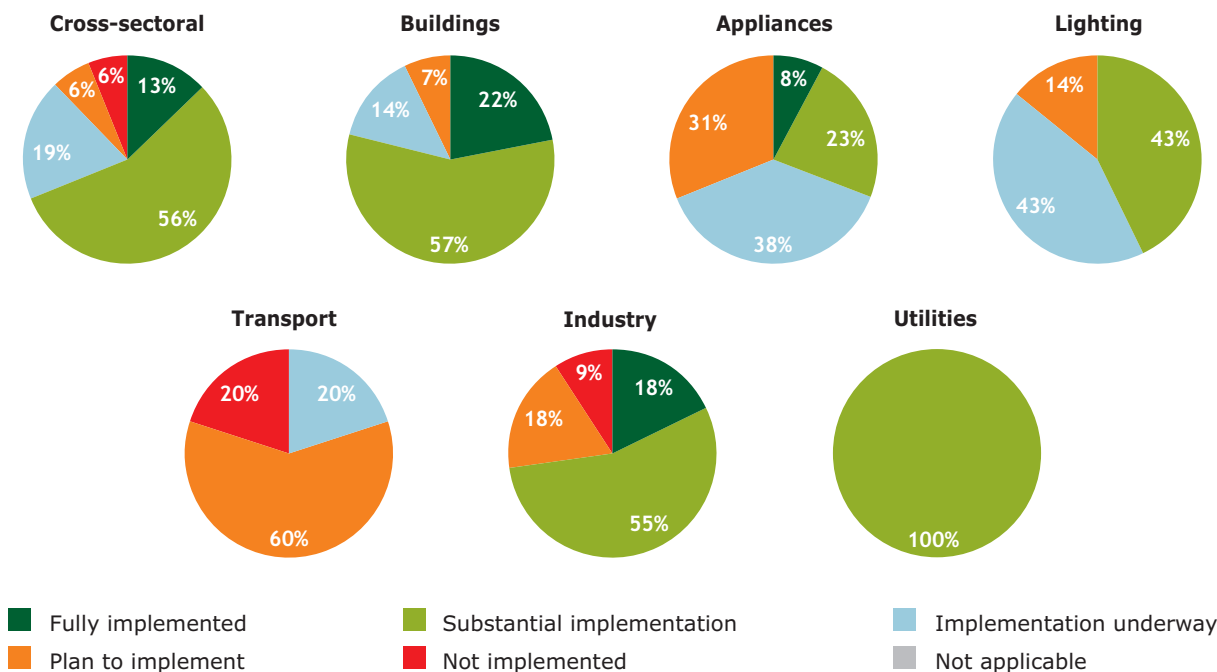
There remains room for improvement of the UK energy efficiency policy. EU-wide measures for fuel efficiency tyre standards should be implemented without delay. The United Kingdom should also encourage the EU to develop mandatory fuel efficiency standards for heavy-duty vehicles.

In the utility sector, the United Kingdom has promoted innovative policies including its successful Reduction Target (CERT). The UK government should consider complementing the CERT with policies that decouple utility revenue and profits from energy sales in order to allow energy savings to compete on equal terms with energy sales. The UK government should also consider establishing policies that would allow energy efficiency measures to be bid into energy pools on an equal basis with energy supply options.

There is also room for improvement with respect to policies promoting the financing of energy efficiency – particularly from the private sector. The Warm Front Programme and other fuel poverty programmes are limited in scope as they target only the low-income segment of the population. Although the United Kingdom can be praised for the extension of the Landlord’s Energy Saving Allowance to cavity wall and loft insulation, the country still needs to conduct an overview of the entire fiscal regime as well as promote the implementation of a national measurement and verification protocol for energy efficiency.

Finally, enforcement of domestic laws and policies that transpose the EU energy efficiency directives is the responsibility of member states. Enforcement is important for maximising energy savings and for ensuring the credibility of the schemes. The United Kingdom needs to ensure that it has comprehensive legal and physical capacity so as to adequately enforce these policy measures and optimise their effectiveness.

The United Kingdom’s progress with implementing IEA energy efficiency recommendations



Energy efficiency progress report, The United States

Context

Energy efficiency has been a feature of US energy policy since the 1970s. Viewed originally as a way to reduce dependence on foreign oil, energy efficiency measures have led to significant improvements in US energy intensity and are now seen as one cost-effective way to mitigate GHG emissions. Between 1990 and 2007, energy intensity declined on average of 1.6% per year, adjusted for PPP (see Figure 43). Most of the decline between 1990 and 2006 was due to energy efficiency improvements (see Figure 45).

While the United States made energy efficiency gains in new appliances, equipment, lighting and vehicles in 2008, most analysts agree that substantial further gains are economically justified.

The significant economic downturn in the United States and the inauguration of a new president in January 2009 led to important changes in energy efficiency policy. The 2009 economic stimulus package includes new energy efficiency related initiatives and substantial additional funding for existing programmes. The direct and indirect funding for these programmes totals more than USD 30 billion and will be spent over two years. This funding for energy efficiency programmes and incentives is more than five times greater than the 2008 levels. The new Administration has also indicated that among its top priorities will be actions to increase the scope and stringency of vehicle fuel economy and appliance and equipment efficiency standards.

Strengths and innovations

The US government has shown broad support for energy efficiency in the 2009 stimulus act, the Fiscal Year 2009 appropriations bill and in other recent energy policy proposals. Existing energy efficiency programmes and investments across sector lines and at federal, state and local levels will be strengthened by increased funding, as will new programmes outlined in the stimulus package.

One new funding initiative included in the 2009 stimulus is the Energy Efficiency and Conservation Block Grants programme. USD 3.2 billion will go to local governments for efficiency related initiatives. Some grants will be awarded through a competitive process, and others will be available by application.

Relating to the transportation sector, the United States is ahead of other countries in requiring all light-duty vehicles manufactured after September 2007 to contain tyre pressure monitoring systems. There have also been extensive public and private information campaigns promoting proper inflation of tyres. Recent stimulus funding increased the plug-in hybrid electric vehicles tax credit and provided significant funding to various battery, alternative fuel and high efficiency vehicle programmes.

In terms of energy management, the United States is a leader in supporting industrial energy efficiency programmes at the state level that encourage industries to improve energy management activities and adopt more energy-efficient end-use technologies and practices. Related to utilities, the stimulus allocated USD 4.5 billion for investment in transmission, distribution and end-use metering systems for smart grids. The United States is also a leader in utility-based demand-side management programmes, with most states having implemented regulation or other measures encouraging utilities to deliver end-use efficiency improvements.

USD 300 million of stimulus money will go to efficient appliance rebates and Energy Star programmes that provide consumers with the opportunity to select the most efficient models on the market. The Energy Star efficiency label covers 50 different categories of products and has been successful in putting efficient appliances on the market, resulting in energy and cost savings. In response to the growing energy consumption of appliances and the penetration of new technologies, the Energy Star label now applies to all types of

televisions, and to energy used in all modes of operation (including standby etc). In the lead-in to the switch to digital television in 2009, Energy Star has also developed a labelling programme for set-top boxes and television Service Providers, enabling householders to choose the most energy-efficient services.

Another successful US residential programme, the Weatherization Assistance Program (WAP), has received an additional USD 5 billion in stimulus money. Running since 1976, the WAP targets low-income households and improves the energy efficiency of homes to reduce energy costs. Careful programme evaluations have demonstrated that the improvements have been cost-effective, and the programme has resulted in significant energy savings. Expanding funding for the programme and thus the number of homes that can be targeted is a welcome move.

In the area of lighting, the United States has gradually expanded the scope of its MEPS and labelling programme to cover an increased number of lighting products and adopted regulations to phase-out inefficient incandescent lamps.

Challenges and areas for improvement

The recent growth in energy efficiency policy activity comes with its challenges. The United States must effectively manage the rapid growth of its energy efficiency programme activity and investment to improve energy efficiency policy in several sectors. Given the short time frame for spending the increased budget allocation for energy efficiency, this will not be easy.

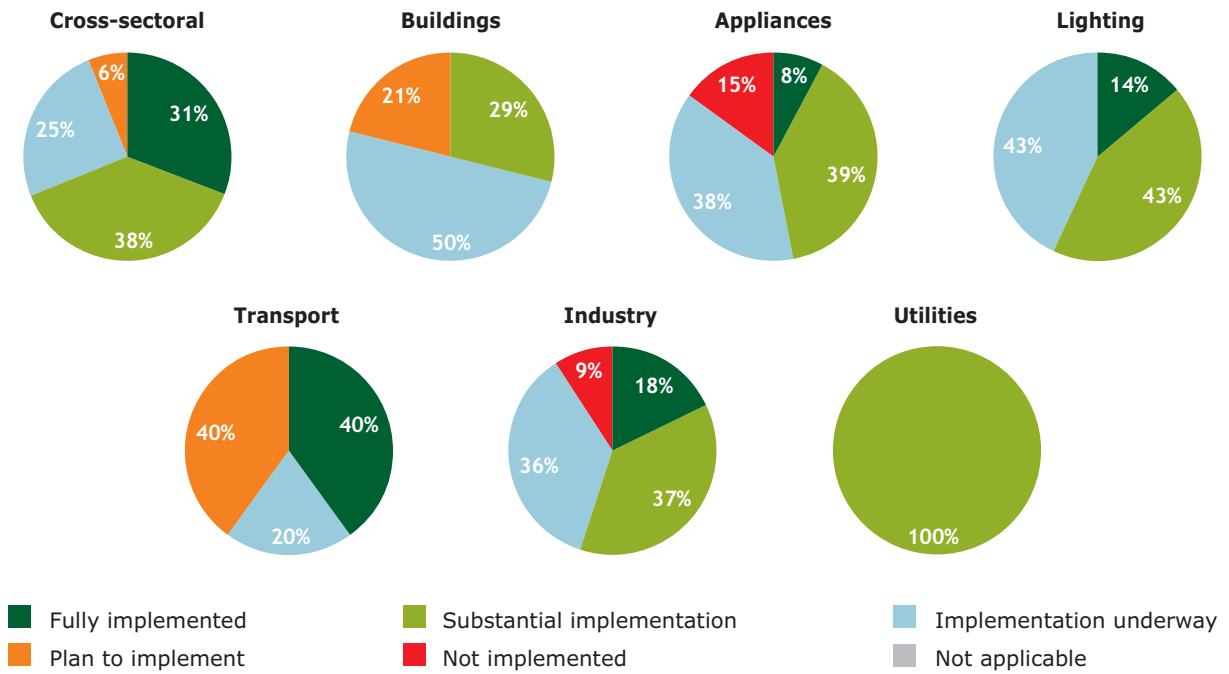
In the building sector, two improvements are needed in the energy efficiency components of building codes. The model codes developed with support from the federal government should be strengthened by basing them on a 30 year life-time assessment. Second, there are significant variations in the quality of energy efficiency requirements in building codes across the states. The federal government needs to encourage the implementation and enforcement, in all states, of energy efficiency requirements and should encourage every state to adopt mandatory building codes. An important step toward this objective was taken recently when all states receiving energy-related stimulus funds were required to commit to full implementation of current model-energy codes.

In the area of appliances and equipment, the verification and enforcement processes form a vital component of national standards and labelling programmes, ensuring the credibility of the scheme for consumers, and safeguarding investments made by manufacturers in more efficient products. A high degree of transparency and visibility in these processes therefore not only acts to deter non-compliance, but provides confidence to participants. The system used by the US Department of Energy (DOE), which is based on self-declaration and the mutual oversight of competing manufacturers, has ensured nearly universal compliance with US energy efficiency standards and labelling requirements. However, the system would benefit from greater transparency, such as regularly publishing testing results and periodically conducting independent tests. The capacity of DOE to undertake these tasks on a regular basis has not kept pace with the expanding scope and activity of the programme. Therefore, further increases in capacity, together with the development of new oversight and enforcement procedures are warranted.

The United States has recognised that improvements to fuel-efficiency standards are needed. The US Department of Transportation (DOT) has recently established more stringent fuel economy standards for all light-duty vehicles. DOT has also been required by the US federal government to establish procedures for rating the rolling resistance of tyres and disseminating these ratings to consumers by the end of 2009. In conjunction with these efforts, the United States should consider establishing labelling, and possibly maximum rolling resistance limits, where appropriate, for road-vehicle tyres.

To assist energy efficiency financing, the United States is the only country with an existing protocol (the IPMVP) for measuring energy efficiency savings. The IPMVP is an important element for promoting energy efficiency financing. However, it has not been adopted nationally and could benefit from further promotion by the federal government.

The United States' progress with implementing IEA energy efficiency recommendations



Call to action

Leaders at many high-level energy and environment meetings have declared their intention to take more active measures regarding energy efficiency. At the 2007 IEA Ministerial Meeting, Energy Ministers placed energy efficiency high on the agenda. They “strongly welcomed” the IEA energy efficiency recommendations and invited the IEA “to evaluate and report on the energy efficiency progress of IEA member and key non-member countries”.

Many countries have begun the process of implementing energy efficiency policies. Indeed, action in some countries and sectors has been impressive. For example, this analysis has highlighted widespread development of energy efficiency strategies and action plans, innovative financial instruments, active policies promoting energy efficiency in buildings, the widespread adoption of standby power policies and policies to phase out inefficient lighting, measures to promote proper tyre inflation, and innovative policies to create incentives for utilities to promote energy efficiency.

However, more action is urgently needed. No country has ‘fully’ or ‘substantially’ implemented more than around 57% of the IEA recommendations - and most countries considerably less than this.

What is the cause of this action gap? And why is it that IEA member countries have not yet implemented the full suite of recommended cost-effective energy efficiency policies their leaders have endorsed? Energy efficiency continues to face pervasive barriers including lack of access to capital for energy efficiency investments, insufficient information, principal-agent problems and externality costs that are not reflected in energy prices.

Political commitment to maximising implementation of energy efficiency policies may also have been challenged by the current economic crisis. Energy efficiency programmes must compete for funding with other priorities such as employment, health and social security. When making decisions about how to allocate limited resources, governments should keep in mind that the benefits of implementing energy efficiency extend beyond energy security and climate change mitigation. Experience shows that energy-efficient investments can deliver significant co-benefits - including job creation and health improvements. Many IEA countries have recognised these co-benefits and allocated substantial stimulus funds to energy efficiency efforts. The IEA supports this increase in funding for energy efficiency and urges other governments to also enhance the resources allocated to energy efficiency. Allocating resources to energy efficiency can achieve many policy objectives at the same time.

To address the action gap, the IEA concludes that IEA member countries need to urgently extend their efforts in energy efficiency policy.

Energy efficiency action in IEA member countries

This report has demonstrated that if IEA member countries are to achieve their energy, environment and economic development goals, urgent targeted action is needed across all sectors. These actions are outlined in Table 4.

Table 4
Summary of actions needed in IEA member countries

		IEA recommendation number*
Cross sectoral	All IEA countries need to:	
	■ Further improve their national energy efficiency strategies and action plans.	1.2 a)
	■ Give greater attention to enforcement, compliance and evaluation.	1.3
	■ Expand efforts in financing, particularly with development of savings verification and measurement protocols, establishing public-private partnerships, and implementing findings of subsidy reviews.	1.1
	■ Increase efforts to promote risk-mitigation instruments such as public-private partnerships.	1.1 a) v)
	■ Complete reviews of impacts of fiscal policies on energy efficiency.	1.1 a) iii)
	■ Improve quality and coverage of energy indicators.	1.4
Buildings	All IEA countries (with the possible exception of Germany, Denmark and Sweden) need to:	
	■ Establish stronger energy efficiency requirements for buildings.	2.1a) and 2.1b)
	All IEA countries need to:	
	■ Strengthen support for passive-energy houses and zero-energy buildings.	2.2
	■ Increase efforts to promote energy-efficient windows and glazing.	2.5
Appliances	All IEA countries need to:	
	■ Ensure adequate resources allocated to maintaining stringency of energy efficiency requirements for appliances.	3.1 b)
	■ Ensure appropriate policies in place to encourage television service providers to deliver products that are as energy efficient as possible.	3.3c) iii)
Lighting	All IEA countries need to:	
	■ Develop measures for promoting energy efficiency in non-residential lighting.	4.2
	■ Support adoption of high-efficiency alternatives to fuel-based lighting.	4.2 b)
Transport	All IEA countries need to:	
	■ Ensure the implementation of the transport energy efficiency policies that are planned.	5
	All IEA countries except Japan need to:	
	■ Establish fuel-efficiency standards for heavy-duty vehicles.	5.3
Industry	All IEA countries need to:	
	■ Develop or strengthen energy efficiency standards for electric motors.	6.2 a)
	■ Establish measures to optimise energy efficiency in motor-driven systems.	6.2 b)
	■ Develop further policies to assist small and medium-sized enterprises.	6.4
Utilities	All IEA countries need to continue to consider how to incentivise utilities to promote energy efficiency.	7

* See Annex 1.

Concluding remark

This report identifies a full range of energy efficiency activities in IEA member countries. However, more action is needed to ensure IEA countries are on track to meet pressing energy-related challenges. The IEA and its member countries can play a critical role in promoting “Worldwide Implementation Now” (W.I.N) of energy efficiency. What will it be? W.I.N or lose the opportunity?

Abbreviations and acronyms

CFL	Compact fluorescent lamp
CHP	Combined heat and power
CO ₂	Carbon dioxide
EPBD	Energy Performance of Buildings Directive
EU	European Union
ETS	Emission trading system
Gt	Giga tonnes (1 X 10 ⁹ tonnes)
IEA	International Energy Agency
MEPS	Minimum energy performance standards
MER	Market exchange rates
NEEAP	National Energy Efficiency Action Plan
PEH	Passive-energy house
PPP	Purchasing power parity
SME	Small and medium-sized enterprise
TPES	Total primary energy supply
TFC	Total final consumption
ZEB	Zero-energy building

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Annex 1

Consolidated list of 25 IEA energy efficiency recommendations

1. Cross-sectoral policies to support energy efficiency

1.1. Increased investment in energy efficiency

- a) Governments should facilitate the private sector's involvement in energy efficiency investments by:
 - i) Adopting, and publicising to the private sector, a common energy efficiency savings verification and measurement protocol, to reduce existing uncertainties in quantifying the benefits of energy efficiency investments and stimulate increased private sector involvement;
 - ii) Encouraging financial institutions to train their staff and develop evaluation criteria and financial tools for energy efficiency projects;
 - iii) Reviewing their current subsidies and fiscal incentive programmes to create more favourable grounds for private energy efficiency investments;
 - iv) Collaborating with the private financial sector to establish public-private tools to facilitate energy efficiency financing;
 - v) Promoting risk mitigation instruments, such as securitisation or public-private partnerships; and
 - vi) Putting in place institutional frameworks to ensure regular co-operation and exchanges on energy efficiency issues between the public sector and financial institutions.

1.2. National energy efficiency strategies and energy efficiency goals

- a) Governments should set goals and formulate action plans for improving energy efficiency in each sector of their domestic economies, utilising on-going IEA works for developing sectoral energy efficiency benchmarks and compiling best practices;
 - i) Best practice action plans should:
 - I. Assess energy consumption by end-use in all sectors;
 - II. Identify the economy's energy savings potentials; and
 - III. Establish objectives and adequate methods for evaluating the success of the plan.
- b) Energy efficiency policy agencies should be adequately resourced.

1.3. Compliance monitoring, enforcement and evaluation

- a) Governments should ensure that both voluntary and mandatory energy efficiency policies are adequately monitored, enforced and evaluated so as to ensure maximum compliance. At a minimum, this should include:
 - i) Considering and planning for optimal compliance, monitoring and evaluation procedures at the time new policies and measures are formulated;
 - ii) Establishing legal and institutional infrastructure for ensuring compliance with energy efficiency requirements;

- iii) Ensuring transparent and fair procedures for assessing compliance; including specification of the methods, frequency and scope of monitoring activities;
- iv) Ensuring regular and public reporting of monitoring activities, including instances of non-compliance;
- v) Establishing and implementing a suite of enforcement actions commensurate with the scale of non-compliance and the value of lost energy savings; and
- vi) Establishing and implementing a robust system for evaluating policy and programme success during and after implementation.

1.4. Indicators

- a) Governments should ensure that their energy efficiency policies are supported by adequate end-use information by substantially increasing their efforts to collect energy end-use data across all sectors and relating to all energy-types.
 - i) This will require governments to increase the resources allocated to energy end-use data collection.
 - ii) At a minimum, governments should ensure that they are able to complete and submit the annual energy efficiency data template developed by the IEA in co-operation with other organisations.

1.5. Monitoring and reporting progress with IEA energy efficiency recommendations

- a) Governments should agree to track progress in implementing each of the concrete recommendations and to provide the IEA with regular updates.

2. Energy-efficient buildings

2.1. Building codes for new buildings

- a) i) Governments that do not currently have mandatory energy efficiency standards for new buildings in building codes should urgently set, enforce and regularly update such standards.
- ii) Those governments that currently have mandatory energy efficiency standards for new buildings should significantly strengthen those standards.
- b) Energy efficiency standards for new buildings should be set by national or state governments and should aim to minimise total costs over a 30-year lifetime.

2.2. Passive-energy houses and zero-energy buildings

- a) Governments should support and encourage the construction of buildings with very low or no net energy consumption (passive – energy houses and zero – energy buildings) and ensure that these buildings are commonly available in the market.
- b) Governments should set objectives for PEH and ZEB market share of all new construction by 2020.
- c) Passive – energy houses or zero – energy buildings should be used as benchmark for energy efficiency standards in future updates of building regulations.

2.3. Existing buildings

- a) Governments should systematically collect information on energy efficiency in existing buildings and on barriers to energy efficiency.
- b) Standardised indicators should also be calculated for energy efficiency in buildings for international comparison, monitoring and selection of best practices.
- c) Based on this information governments should construct a package of initiatives to address the most important barriers to energy efficiency in buildings.
 - i) This package should set standards to ensure that energy efficiency improvements are achieved during the refurbishment of all buildings; and
 - ii) Also, the package should increase awareness of efficiency in the building sector and raise the market profile of a building's energy performance.

2.4. Building certification

- a) Governments should take actions to make building energy efficiency more visible and to provide information on major energy saving opportunities. This should include:
 - i) Mandatory energy certification schemes that ensure that buyers and renters of buildings get information on the energy efficiency of buildings and major opportunities for energy savings; and
 - ii) Structures that ensure that energy efficiency information is available to all actors in the building sector at all times.

2.5. Windows and other glazed areas

- a) Governments should set up a policy package to improve energy efficiency in windows and other glazed areas. This policy package should include:
 - i) Minimum energy efficiency standards for windows and other glazing that are based on least lifetime costs;
 - ii) A requirement for window and glazed-product manufacturers to provide energy efficiency labelling for their products; and
 - iii) Governments establishing demonstration projects for efficient windows and implementing energy-efficient window procurement policies.

3. Energy-efficient appliances

3.1. Mandatory energy performance requirements or labels

- a) Governments should adopt mandatory energy performance requirements and, where appropriate, comparative energy labels across the spectrum of appliances and equipment at a level consistent with international best practices.
- b) Adequate resources should be allocated to ensure that stringency is maintained and that the requirements are effectively enforced.

3.2. Low-power modes for electronic equipment

- a) Governments should adopt the same “horizontal” 1-Watt limit and apply it to all products covered by an International Electrotechnical Commission definition of standby power with limited exceptions.
- b) Governments should adopt policies which require electronic devices to enter low-power modes automatically after a reasonable period when not being used.
- c) Governments should ensure that network-connected electronic devices minimise energy consumption, with a priority placed on the establishment of industry-wide protocols for power management.
 - i) In order to enhance energy efficiency across electronic networks, governments should:
 - I. Instruct relevant public and private standards authorities to ensure that industry-wide protocols are developed to support power management in appliances and equipment, including networked devices;
 - II. Ensure such protocols are developed and implemented.

3.3. Televisions, television “set-top” boxes and digital television adaptors (DTAs)

- a) The IEA concludes that international best practice with respect to energy-efficient set-top boxes are policies that establish a minimum efficiency standard for Digital Television Adaptors. These regulations should:
 - i) Specify the maximum power levels while “on” and “off”; and
 - ii) Ensure that the consumer can easily switch the unit to the lower power level.
- b) A second aspect of best-practice is to ensure that government-subsidised units meet higher efficiency requirements.
- c) Governments should implement energy efficiency policy measures for TVs and set-top boxes designed to:
 - i) Promote the best performing current TV products and technologies;
 - ii) Stimulate the market entry of new television technologies which aim to halve TV energy consumption compared to current performance levels; and
 - iii) Minimise the energy used by TVSP customers in receiving TV services by ensuring that such requirements are included in relevant franchise or licensing agreements that allow TVSPs to operate.

3.4. Test standards and measurement protocols

- a) Governments should:
 - i) Review energy measurement standards currently used, to determine whether they are consistent with national policy requirements; and
 - ii) Support the development and use of international measurement standards, where appropriate, in order to assist performance comparison and benchmarking for traded products while also reducing compliance costs.

4. Best practice in energy-efficient lighting

4.1. Best practice and incandescent phase-out

- a) The IEA recommends that governments endorse the objective of across-the-board best practice in lighting.

- b) Governments should move to phase out the most inefficient incandescent bulbs as soon as commercially and economically viable.
 - i) In aiming for this objective, there is a need both for appropriate time scales and performance targets to be established; and
 - ii) Also government and industry actions must be coordinated internationally to ensure a sufficient supply of good quality higher efficiency alternative lamps.

4.2. Non-residential buildings and phase-out of inefficient fuel-based lighting

- a) Governments should put in place a portfolio of measures to ensure energy-efficient least-cost lighting is attained in non-residential buildings. The portfolio of measures should include the following:
 - i) The inclusion of energy performance requirements for lighting systems within building codes and ordinances applicable to the installation of lighting in the commercial, public, industrial, outdoor and residential sectors. These requirements should:
 - I. Include targeted measures to stimulate better control of lighting and the avoidance of illumination of unoccupied spaces;
 - II. Specify that general service lighting systems in new non-residential buildings, or substantial retrofits of existing non-residential buildings, should draw no more than 10W of power per square metre of internal floor area when averaged over the whole building;
 - III. Be based upon a review of recommended lighting levels, including a full peer review comparing local recommendations with those applied internationally to ensure that there are no excessive lighting levels recommended in national guidelines; and
 - IV. Hasten the phase-out of inefficient street lighting technologies such as mercury vapour lamps.
- b) Governments should support international efforts to stimulate the adoption of higher efficiency alternatives to fuel-based lighting in off-grid communities e.g. via supporting the diffusion of solar powered solid state lighting devices.

5. Energy-efficient transport

5.1. Fuel-efficient tyres

- a) Governments should:
 - i) Adopt new international test procedures for measuring the rolling resistance of tyres, with a view to establishing labelling, and possibly maximum rolling resistance limits where appropriate, for road-vehicle tyres; and
 - ii) Adopt measures to promote proper inflation levels of tyres.
 - I. This should include governments, acting in cooperation with international organisations including UNECE, making the fitting of tyre-pressure monitoring systems on new road vehicles mandatory.

5.2. Mandatory fuel efficiency standards for light-duty vehicles

- a) Governments should:
 - i) Introduce new mandatory fuel efficiency standards for light-duty vehicles if they do not already exist, or, where they do exist, make those standards more stringent;
 - ii) Announce the more stringent content of the proposed standards as soon as possible; and
 - iii) Harmonise, where appropriate, as many aspects of the future standards as possible.

5.3. Mandatory fuel efficiency standards for heavy-duty vehicles

- a) For heavy duty vehicles, governments should introduce:
 - i) Fuel efficiency standards; and
 - ii) Related policies including labelling and financial incentives based on the vehicle's fuel efficiency.

5.4. Eco-driving

- a) Governments should ensure that eco-driving is a central component of government initiatives to improve energy efficiency and reduce CO₂ emissions.
 - i) Governments support for eco-driving should include promotion of driver training and deployment of in-car feedback instruments.

6. Energy efficient industry

6.1. High-quality energy efficiency data for industry

- a) Governments should support the IEA energy efficiency indicator work that underpins critical policy analysis by ensuring that accurate energy intensity time series data for industrial sectors is reported regularly to the IEA.

6.2. Minimum energy performance standards for motors

- a) Governments should consider adopting mandatory minimum energy performance standards for electric motors in line with international best practice.
- b) Governments should examine barriers to the optimisation of energy efficiency in electric motor-driven systems and design and implement comprehensive policy portfolios aimed at overcoming such barriers.

6.3 Energy management

- a) Governments should consider providing effective assistance in the development of energy management (EM) capability through the development and maintenance of EM tools, training, certification and quality assurance.

- b) In addition, governments should encourage or require major industrial energy users to implement comprehensive energy management procedures and practices that could include:
 - i) The development and adoption of a formal energy management policy:
 - I. Progress with implementation of this policy should be reported to and overseen at company board level and reported in the company report.
 - II. Within this policy companies would need to demonstrate that effective organisational structures have been put in place to ensure that decisions regarding the procurement of energy-using equipment are taken with full knowledge of the equipment's expected life-cycle costs and that procurement managers have an effective incentive to minimise the life-cycle costs of their acquisitions.
 - ii) The appointment of full-time qualified energy managers at both the enterprise and plant-specific level as appropriate; and
 - iii) The establishment of a scheme to monitor, evaluate and report industrial energy consumption and efficiency at the individual company, sector and national level.
 - I. As a part of this effort, appropriate energy performance benchmarks should be developed, monitored and reported at levels deemed suitable in each sector.

6.4. Small and medium-sized enterprises

- a) Governments should consider developing and implementing a package of policies and measures to promote energy efficiency in small and medium-sized enterprises (SMEs). This package should include:
 - i) A system for ensuring that energy audits, carried out by qualified engineers, are widely promoted and easily accessible for all SMEs;
 - ii) The provision of high quality and relevant information on energy efficiency best practice;
 - iii) The provision of energy performance benchmarking information which ideally would be structured to allow international and within economy comparisons; and
 - iv) Appropriate incentives to adopt least life-cycle cost capital acquisition and procurement procedures.

7. Energy utilities and energy efficiency

- a) Governments and utility regulators should consider implementing mechanisms that strengthen the incentives for utilities to deliver cost-effective energy savings to end-users such as:
 - i) Establishing regulation which decouples utility revenue and profits from energy sales and allows energy savings delivery to compete on equal terms with energy sales; or
 - ii) Placing energy efficiency obligations on energy utilities, the stringency of which is periodically raised based on continuing cost effectiveness in delivering energy services, and where:
 - I. Such obligations may be tradable and structured such that utility costs are recoverable through the rates;
 - II. The obligations are designed to be consistent with any corresponding mandatory or voluntary CO₂ emission target imposed on utilities; or
 - iii) Allowing energy efficiency measures to be bid into energy pools, on an equal basis to energy supply options; or
 - iv) Other appropriate policy measures that encourage utilities to play an active part in funding and/or delivering end-use efficiency improvements among their customer base.



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