CARROTS AND STICKS: TAXING AND SUBSIDISING ENERGY

Economic Analysis Division

HIGHLIGHTS

- Subsidies on oil and energy in general in non-OECD countries are far higher than in OECD countries. Iran and Indonesia together subsidise oil more than the OECD subsidies energy in total.
- Non-OECD subsidies go mainly to fossil-fuel and electricity consumption. Most OECD subsidies go to production, perhaps half to renewables and nuclear power.
- OECD countries tax oil far more than they subsidise it. Environmental and energy-security benefits – as well as the need for revenue – provide a strong justification for heavy taxes on oil products.
- Those non-OECD countries that continue to provide large subsidies to energy would gain tremendously from their removal as well as from reform of their tax policies.

Defining Energy Subsidies

There is enormous confusion about what is meant by an energy subsidy and limited information about the size of such subsidies. The narrowest and perhaps most commonly used definition is a direct cash payment by a government to an energy producer or consumer. But this is just one way in which governments can stimulate the production or use of a particular fuel or form of energy, including oil. Broader definitions attempt to capture other types of government interventions that affect prices or costs, either directly or indirectly. The IEA has defined energy subsidies as any government action that concerns primarily the energy sector that lowers the cost of energy production, raises the price received by energy producers or lowers the price paid by energy consumers.[1] This definition has been widely adopted.

There are many different types of energy subsidies. Some have a direct effect on price, like grants and tax exemptions, while others act indirectly, such as regulations that skew the market in favour of a particular fuel or government-sponsored technology research and development. How governments choose to go about subsidising energy depends on a number of factors, including the overall cost of the programme and the impact – financial and otherwise – on different social groups. A simple per-unit cash payment to producers or consumers is the simplest and most transparent form of subsidy, but can involve considerable accounting and transaction costs and puts a direct financial burden on the national treasury. Governments like to keep subsidies 'off-budget' for political reasons; on-budget subsidies are an easy target for pressure groups interested in reducing the overall tax burden. For this reason, subsidies often take the form of price controls that keep set prices below full cost, especially where the energy company is state-owned, or the form of requirements on energy buyers to take minimum volumes from a specific, usually indigenous, supply source. Subsidies may be aimed at producers, such as a grant paid for each unit of production, or to consumers, such as a rebate or exemption on the normal sales tax. Both types of subsidy tend to lower the final price to consumers.

Taxes have the opposite effect on prices to subsidies, so one needs to make a distinction between gross and net subsidies. In some cases, subsidies are more than offset by special taxes and duties that raise the final end-use price to above free market levels (taking account of normal sales taxes applied to all goods and services). This is often the case with oil products, which are usually heavily taxed. By contrast, subsidies often exceed taxes on non-oil forms of energy – especially in non-OECD countries. What matters in practice is the overall impact of all subsidies and taxes on the absolute level of prices and costs and the competitiveness of each fuel or technology.

Estimates of the Size of Energy Subsidies

Most countries subsidises (and tax) oil in one way or another, but they vary greatly in size – in absolute terms and relative to taxes. Estimating their size depends heavily on definitions and methodologies. Differences in definitions make comparisons of individual studies of the size and impact of oil and other energy subsidies in specific countries or regions difficult. For example, some studies include even the cost of defending oil supplies from the Arabian Gulf, which greatly adds to the overall size of subsidies.

Hard data on energy subsidies is extremely patchy. Few studies have attempted to quantify subsidies for the world as a whole, because of data deficiencies and the sheer scale of the exercise. The most comprehensive studies are now somewhat dated [2]. What is clear from the evidence available, however, is that subsidies are much higher in non-OECD countries than in the OECD. A major study carried out by the World Bank in 1997 put fossil-fuel consumption subsidies alone at $48 billion in twenty of the largest countries outside the OECD and $10 billion in the OECD. The 1999 *World Energy Outlook,* which examined eight of the largest non-OECD countries[3] covering almost 60% of total non-OECD energy demand, put the total value of energy subsidies in those countries – as measured by the difference between actual and estimated market prices – at around $95 billion. The bulk of these subsidies went to electricity and coal. End-use prices were found to be on average about one-fifth below market levels in those countries. A subsequent IEA/EAD review of OECD subsidies in 2000 estimated total OECD energy subsidies at $20-30 billion.[4] Subsidies, both in gross terms and net of taxes, have fallen over the last two decades in most OECD and non-OECD countries in aggregate. Global consumption subsidies dropped by more than half in the five years to 1996 according to the World Bank. The biggest reduction has occurred in the transition economies and in China, where coal subsidies have been largely phased out.

OECD countries mainly subsidise energy production. OECD subsidy policies take various forms, from direct grants to cover losses in coal production and tax allowances for fuel producers to price support and loans at low interest rates or favourable conditions to domestic producers. Publicly-funded R&D accounts for $10 billion. The bulk of OECD subsidies go to fossil fuels and most of the rest to nuclear (mainly through R&D). Coal subsidies, as estimated using the IEA's PSE, amounted to around $7 billion in 2001 (the last year available), but are thought to have declined since. EU state aid to the coal industry was €6.3 billion in the same year. Germany still accounts for the bulk of these subsidies. Around 7% of OECD coal production was subsidised at the start of the current decade. A 2000 DOE study put US federal energy subsidies at $6 billion, with half going to fossil fuels and only 5% to renewables. But another study by Koplow and Martin, commissioned by Greenpeace, puts oil-industry subsidies alone at between $5 billion and $12 billion. An earlier Greenpeace study estimated total European Union energy subsidies during the first half of the 1990s at $16 billion, of which 63% went to fossil fuels, 28% to nuclear and a mere 9% to renewables. The share of renewables in total OECD energy subsidies has undoubtedly increased sharply in recent years, but comprehensive figures are not available.

In non-OECD countries, most energy subsidies go to consumers – usually through price controls that hold end-user prices below the full cost of supply. Electricity is thought to be the most heavily subsidised form of energy. Oil is heavily subsidised in some countries, notably Iran and Indonesia. As quantified in WEO-2005, Iran subsidies oil product sales to the tune of $11 billion in 2003, with a further $3 billion going to electricity and almost the same amount to natural gas. In 2003, energy subsidies in **Iran** were equal to 10% of GDP – by far the highest share in the world. Oil subsidies in **Indonesia** averaged $6 billion per year between 2000 and 2005 according to a recent study by the Asian Development Bank. With the recent increase in world prices, Indonesian oil subsidies are thought to have ballooned to over $7 billion in 2004 and more than $12 billion in 2005 – equal to 5%

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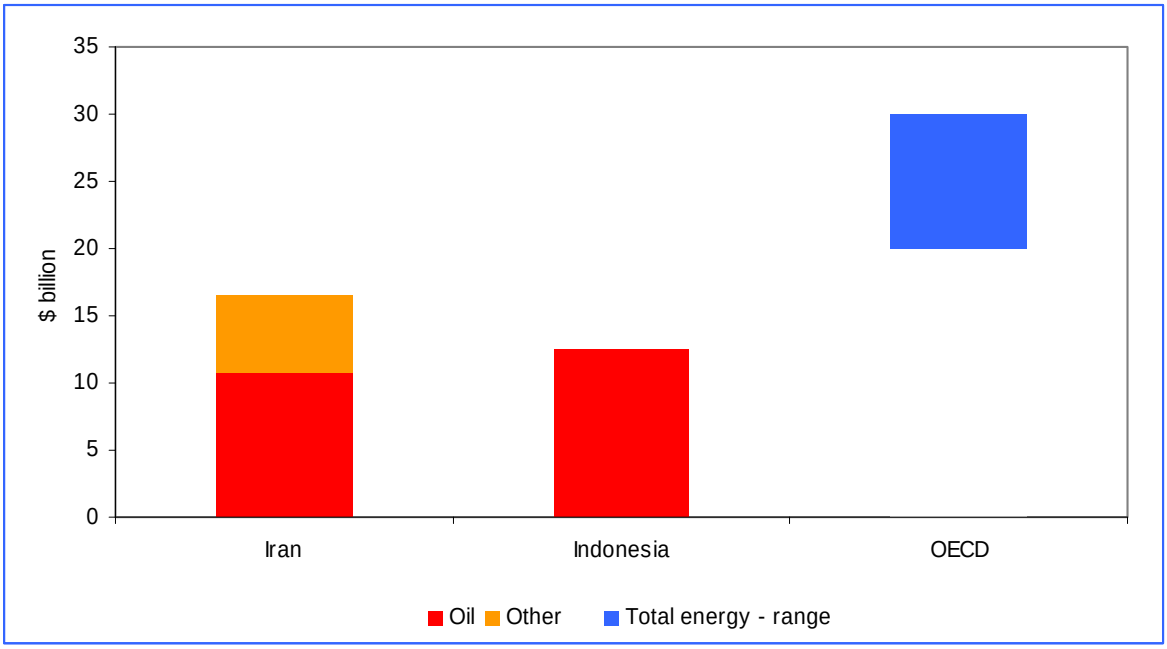
[1] See, for example, *World Energy Outlook 1999*, *Reforming Energy Subsidies* – a joint IEA/UNEP report released in 2002 – and the official IEA submission to UN-CSD Meeting in April 2001.
[2] WEO-2006 will provide an updated estimation of global energy subsidies.
[3] China, Russia, India, Indonesia, South Africa, Iran, Venezuela and Kazakhstan.
[4] EAD Working Paper, *Energy Subsidies in OECD Countries* (2000), reproduced in Von Moltke et al (2003).

of GDP and almost a third of total government spending. *Iranian and Indonesian subsidies to oil alone are equivalent to perhaps all energy subsidies in OECD countries as a whole* (Figure 1).

Figure 1: **Energy Subsidies in Iran, Indonesia and the OECD**



Source: Iran – IEA, *World Energy Outlook 2005*; Indonesia – Asian Development Bank, *Asian development Outlook 2005*; OECD – IEA Working Paper, *Energy Subsidies in OECD Countries* (2000).

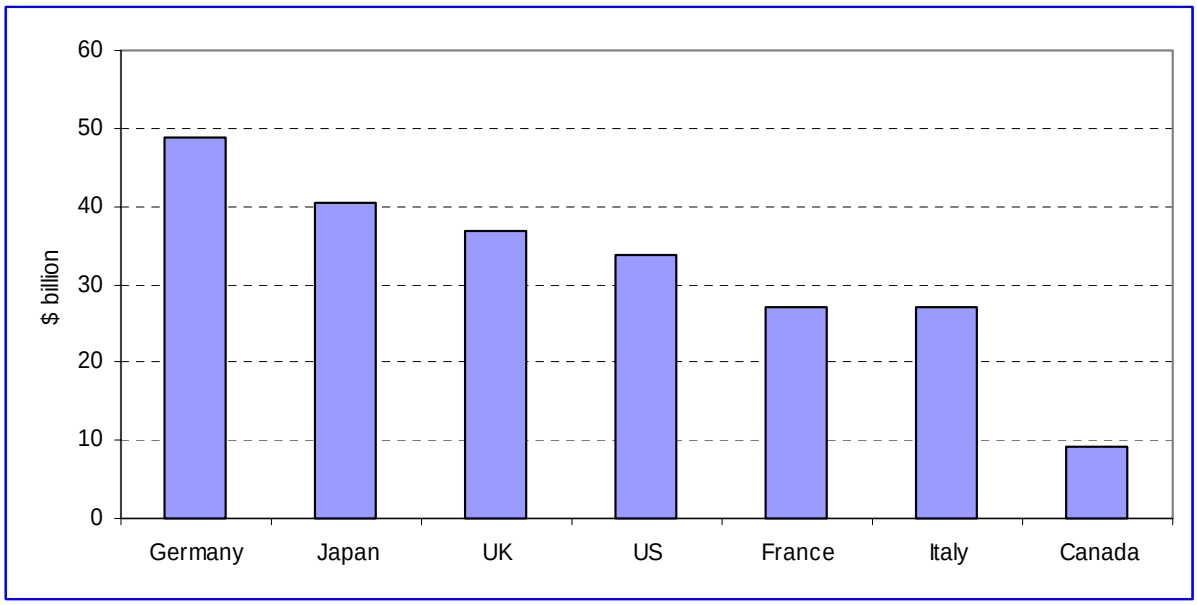
China is an exception among developing countries, in that oil subsidies go mainly to production. These were running at $4 billion per year in the 1990s. While wholesale and retail oil product prices remain regulated, retail taxes more than offset any embedded subsidies: retail gasoline and diesel prices including taxes are currently close to US levels. Wholesale prices have recently been held below import cost levels, causing refiners to make large losses. The pump prices of motor fuels in India are also above supply costs, but some oil products – notably LPG and kerosene – remain subsidised for social reasons. The total cost of these subsidies reached almost $5 billion in FY2004. Electricity subsidies are also very large in India.

Taxes on Energy Consumption

In most countries, energy taxes are larger than subsidies. In the OECD, taxes on energy far exceed subsidies. In the seven largest OECD countries, for example, revenues from special duties and taxes on sales of oil products (not including value-added taxes) alone amounted to $223 billion in 2003 – ***at least 7 times more than the total amount of energy subsidies for the OECD as a whole***. Taxes were highest in Germany, at close to $50 billion (Figure 2).

Almost every OECD country levies taxes on the sale of coal, natural gas and/or electricity as well as oil. Rates vary considerably, but are generally much lower than for oil. The sale of non-oil forms of energy are less often taxed in non-OECD countries and rates are generally lower.

Figure 2: **Total Tax Revenues from Excise Taxes on Sale of Oil Products in Selected OECD Countries**



Note: Excludes VAT.
Source: OECD, *Revenue Statistics 2005*.

Rationale for Energy Subsidy and Tax Policies

In practice, government tax and subsidise energy for a variety of reasons. The main reason for taxing energy is to raise revenue, but market failures provide a rationale for taxing energy to ensure that prices reflect the full economic, environmental and social costs associated with their supply and use. Market failures can also provide a justification for subsidising some forms of energy.

Left to their own devices, free markets in energy services do not always work effectively. In particular, they do not take account of social and environmental benefits and costs that might be associated with certain types of energy activities. Governments often intervene in the oil market and the energy market generally to achieve social and environmental objectives and to fix any problems in the way those markets operate. Air is a classic example of a public good – a major source of market failure – and one that directly concerns energy. Governments have a responsibility to intervene to protect air quality by regulating emissions from energy-related and other activities, since individual polluters would otherwise not pay for the environmental damage. Levying charges on polluting activities is one way of making the polluter pay for that damage—the 'polluter pays principle'. Taxes on the sale of energy is the most obvious way in which such environmental externalities can be internalised in the price paid by consumers. Supply security can also provide a reason for taxing energy – as market prices do not reflect the risk of severe economic damage that could result from a major disruption to energy supplies.

Taxes on oil are, therefore, justified by the environmental and energy-security benefits that those taxes yield, in addition to the revenues that they generate. By driving up retail prices, taxes curb the growth in domestic demand, reduce air-borne emissions and lower import needs. Oil-based transport fuels are almost always the most heavily taxed forms of energy – because the demand for those fuels is price inelastic and revenues are, therefore, predictable and little effected by changes in tax rates – especially in the near term.

Subsidising less or non-polluting activities can achieve similar end-results. If taxes are the stick, then subsidies are the carrot. An energy subsidy – in theory at least – can be justified if the gain in social welfare that it brings about exceeds the net economic and environmental cost. But experience shows that energy subsidies – particularly those that encourage consumption of fossil fuels – rarely yield a

net gain in social welfare in practice. Even where the net benefits are arguably positive, energy subsidies may not be the most efficient way of achieving social policy goals. On the other hand, subsidies to renewables are generally recognised to be an effective way of overcoming market barriers to their development and deployment and are increasingly used around the world. Similarly, a case can be made for subsidising clean fossil fuel technologies, including those that improve the efficiency of fuel consumption.

There are rarely good reasons for subsidising the consumption oil – even though many developing countries still do so. Social considerations, such as concern for the poor, sick or otherwise disadvantaged are often put forward as a reason for subsidising the sale of oil products. But such subsidies are economically very costly and usually run counter to the goal of sustainable development. They often lead to higher consumption and waste, exacerbating the harmful effects of oil use on the environment. They can also place a heavy burden on government finances and weaken the potential for economies to grow. In addition, they rarely end up helping the poor people that need them most, because rich people can afford to use more oil.

Energy security is sometimes used as a justification for subsidising the production of oil. Support to indigenous producers can reduce dependence on imports and, therefore, the vulnerability to a disruption in oil imports. This is the main justification put forward for the large subsidies given to oil and gas producers in the United States and in several other countries. In practice, however, protection against international competition and job promotion may be a more important aim than energy security. It is arguably more effective to divert subsidies to non-oil production technologies and tax the consumption of oil as a way of reducing oil import dependence and enhancing security.

While enormous progress has been made in eliminating harmful energy subsidies in both OECD and non-OECD countries, a lot more still needs to done. The need for reform extends to taxes. In all OECD countries and most other countries, oil taxes exceed subsidies. But energy tax structures are rarely rationale in the sense that relative tax rates reflect environmental and social externalities. Oil is by far the most heavily-taxed forms of energy in most countries. Yet externalities are arguably greater for coal and so that fuel ought to be more heavily taxed than oil. Politicians are often reluctant to increase taxes on coal – either because they want to protect local mining activities or because they are concerned about the impact on the international competitive of heavy industries that rely heavily on coal.

So while there are convincing reasons for OECD countries to tax oil heavily and subsidise renewables, there is no case for subsidising coal, as a handful of countries continue to do. And there is considerable scope for reforming OECD tax structures to better reflect environmental externalities. But several non-OECD countries – including many oil-producing countries – have a lot further to go in reforming their subsidy policies, especially in eliminating fossil fuel and electricity consumer subsidies, as well as in reforming their tax systems. The scale of these subsidies is much larger than those in OECD countries and the harmful effects – on economic growth, the environmental and social welfare – much greater.