The Economics, Politics and Future of Energy Subsidies

Report from Climate Policy Initiative Workshop, hosted at DIW Berlin[1]

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Summary

At their meeting in Pittsburgh in September 2009, G20 Leaders called for an additional evidence base to support efforts by the member nations to reform and remove fossil fuel subsidies. At a workshop in Berlin in November 2009 we discussed the definition and quantification of energy subsidies, the evaluation of their impact, and the political economy of their reform.

This report discusses these aspects, first for energy-consumption subsidies, and second for support for energy production. The third section explores possible extensions of the scope of energy subsidies to include exemptions from user fees or general taxes and environmental externalities. Each of the three sections explores the role that international cooperation can play in reducing the negative impacts of subsidies.

1. The largest share of energy subsidies are identified on the consumption side

Ronald Steenblik, Trevor Morgan and Peter Wooders discussed past and on-going work by the OECD, IEA and the Global Subsidies Initiative.[2] Studies by the World Bank and Doug Koplow have also provided an important basis for the discussions (e.g., Koplow 2009). In 2006, the IEA estimated that consumption subsidies in 20 of the largest transition and developing countries were running at around $220 billion a year (using 2005 data). More recent figures estimate this number to be $310 billion in 2007 (IEA 2008). The most comprehensive estimates of global aggregates have been produced by the IEA (1999, 2006 and 2008).

The subsidy estimates reported by the IEA and used by the OECD to estimate the effects of phasing out fossil-fuel subsidies (Burniaux et. al. 2009) are based on the Price Gap approach. This approach is the most widely applied to quantify consumer subsidies in the energy sector. It measures only the net effect of various support measures on the market price paid by consumers. The subsidy level is calculated by comparing end-user prices of energy products with the price in international markets

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[2] The workshop presentations can be found online at:
http://www.climatepolicyinitiative.org/news_berlin_cpi_launch.html

adjusted for transport costs. For energy that cannot be traded internationally, such as electricity, estimates are produced using the inferred long-run marginal cost of generating and transmitting electric power in each country. The Price Gap approach is favoured due to its simplicity, ease of measurement and comparison, and the limited data requirements imposed.

According to the latest IEA estimates, the biggest subsidies in absolute terms are found in the major energy oil and gas exporting countries. For example: in Iran, $36 billion out of a total of $55 billion of energy subsidies go to oil products (mostly gasoline); in Saudi Arabia, oil products account for $17 billion out of a total of $25 billion. A large portion of Russia's $50 billion per year in subsidies are for natural gas. India ($20 billion) and Egypt ($12 billion) subsidize imported oil to domestic consumers – typically because regulated prices are kept from rising in line with global oil prices. Energy subsidies in China total about $38 billion, more than half of which go to oil products; although the price of oil is not systematically held below market prices, its volatility is removed through careful regulation of domestic prices leading to subsidised prices at times when international prices are rising (as was the case in 2007). This explains why subsidy levels often change abruptly from year to year, and domestic prices stay constant while global oil and gas prices change. The largest reductions of energy subsidies in the last two decades have been observed in the former Soviet Union, which increased energy prices for domestic consumers as part of the process of transitioning to a market economy.

In addition to global and national assessments, there have been a number of sector-specific studies that have explored subsidies for both energy consumption and production or focussing on specific sectors, e.g.: transport fuels (GTZ 2007 and previous years), nuclear power (e.g. Koplow in the recent report by the Environmental Law Institute, 2009), and biofuels (Global Subsidies Initiative, 2006 through 2009). There remains a need for more systematic reporting by countries and monitoring at the international level. Where data limitations persist, particularly in non-OECD countries, it is likely that estimations will focus on consumption subsidies using the Price Gap approach for international comparisons. Efforts to probe more deeply into country-specific support, such as the IEA country reviews and the GSI country case studies,[3] should be pursued in a systematic and transparent manner so that they may be replicated elsewhere by other organisations.

The majority of the world's consumption subsidies are observed in non-OECD countries, and are typically targeted directly at final consumers. For example, in India domestic electricity consumers and farmers are subsidised through budgetary support to power system investment and cross-subsidized through higher tariffs charged to industrial users. Reduced gasoline and propane prices are often aimed at domestic consumers, but it is not always clear whether some industrial consumers also benefit. Petroleum subsidies in developing countries are highly regressive. Estimates cited in a recent IMF position paper (IMF, 2010) estimate 80 percent of total benefits accrue to the richest 40 percent of households. Whilst kerosene subsidies are typically more evenly distributed amongst income groups, they estimate that around 45% of all African kerosene subsidies accrue to the top two income quintiles.

3 GSI country studies have previously been conducted for biofuels support. Work is now being undertaken on a variety of energy subsidy country studies. Further information available at: http://www.globalsubsidies.org.

As most consumption subsidies are naturally targeted at final consumers, they usually increase energy imports (consumption subsidies often increase the proportion of imported fuels or reduce the volume of exported fuels), which may explain why to date there have been limited efforts from the WTO to address the topic. The main trade concern arises when low energy prices create advantages for domestic producers in international markets. Thus, in the context of accession proceedings, aspiring WTO Members, like Russia, have been asked to reform their energy-pricing policies.

Domestic consumption subsidies do, however, impose high costs on those economies that provide them. When financed out of general revenues they impose a fiscal burden (sometimes as high as 10% of GDP such as in Iran) and reduce overall GDP through the higher taxes that have to be raised on other economic activities. This has further distortive and dead weight loss implications for the economy at large. For fossil-fuel exporting countries, fuel subsides imply large foregone export revenues. The IEA estimates an economic efficiency burden of subsidies in the order of 1.5% of GDP in Russia and 2.2% GDP in Iran (IEA 1999).

Distortions to consumption and production decisions created by consumption subsidises have implications beyond the subsidised sectors. Consumers and manufacturers use more energy than would be efficient (if faced with un-subsidised prices). Subsidised fossil fuels and other energy sources can slow, halt or even reverse the transition towards cleaner or modern fuel sources. For example, in Mexico it was found to be more effective to distribute free energy-efficient refrigerators when electricity is free or significantly subsidised, given insufficient incentive for uptake in the face of low energy prices. Subsidies also distort investment decisions. In Egypt, despite excellent wind resources, the major obstacle to wind investment is low power prices resulting from subsidies to natural gas for power generation (ElSobki et al. 2009). Also, if governments compensate deficits of publicly owned incumbent energy companies, then the competitive landscape is distorted, inhibiting entry of firms with new (low-carbon) technologies. Subsidies can also distort incentives for energy-efficient building design or retrofits, despite the low social (and sometimes even negative) cost of doing so.

The examples indicate that technological lock-in and path dependency may imply high, and rising, costs of transitions to low-emission trajectories in the presence of fossil-fuel subsidies. However, existing methodologies do not tend to capture detailed distortions within sectors. The modelling approaches also face difficulties to calibrate short-term versus long-term impact and are typically more suited to short-term marginal responses. Existing modelling approaches also fall short of exploring the structural distortions generated by persistent energy subsidies.

Recent estimates suggest that the removal of energy consumption subsidies alone could reduce greenhouse gas emissions by 2% in 2020, rising to 10% in 2050 (Burniaux et al. 2009). Previously the IEA had estimated that the removal of energy consumption subsidies in eight of the largest non-OECD countries would reduce their energy consumption by around 13% with CO_2 emissions falling by around 16%. Clearly, from a climate policy perspective, the removal of fossil-fuel subsidies would deliver significant climate benefits. See a recent study by GSI summarising the modelling estimates to date (GSI, 2010).

Given the fiscal and economic costs of consumption subsidies, it is initially surprising that such large volumes of subsidies can still be observed. Contributing factors

include the strong politicisation of energy prices, where they represent a highly visible and strongly-felt part of frequent purchasing decisions (Victor, 2009). In contrast, the true cost of the subsidies is often hidden and long-term. Additionally, it is often difficult to convince domestic consumers in oil or gas exporting countries that they should pay the world market price (opportunity cost) rather than the production costs faced by the energy carrier.

Removing subsidies and returning the equivalent value to selected consumers as lump-sum transfers would avoid many of the distortions from energy subsidies, and thus could create welfare improvements and ensure that the poor are made no worse off. In practice, this requires credible government commitment to pursue the redistribution policy and careful tailoring of transfer programmes. It is especially challenging in countries with limited policy instruments – e.g., no social security systems that can distribute means-tested benefits. Also, means-tested benefit programs do not allow for tailored compensation for energy price increases, as energy consumption varies widely within income segments. Hence political opposition by 'losers' in any policy reform cannot be avoided.

There are documented case studies of attempted and successful fossil-fuel subsidy reform (e.g., UNEP 2008; von Moltke et al., 2004). Their further study is important in order better to understand the underlying political economy of subsidy inertia. This would provide useful information to help to develop reform efforts, as well as to identify key stakeholders in any reform agenda. It is also likely to help to identify key distributional, political and sector-specific concerns that will need to be addressed in the process of subsidy reform. Further work might also be valuable where it assesses the impacts of subsidy reduction, rather than only full subsidy removal.

The role of international cooperation will be important in fulfilling the G20 goals of removing fossil-fuel subsidies. International mechanisms can provide standards for estimating and reporting subsidies, which is a vital first step to co-ordinated subsidy reform. Ideally, international cooperation would provide welcome external pressure, and an opportunity, for countries to commit to a schedule for removing subsidies. Annex 1 countries, as defined by the UNFCCC, and multilateral financing agencies can provide ancillary support to help developing countries in this process.

A role for the G20 and international cooperation may exist more generally to support the energy subsidy reform agenda. Getting countries to commit publicly to reporting their fossil-fuel subsidies would be a big first step towards reform. There may also be an important role to be played by the international community to incentivize action at the domestic level or support specific country commitments to accelerate domestic actions. Because of the political sensitivities of any subsidy reform program, domestic initiative and ownership is essential for a successful implementation.

2. Subsidies on the production side

Many subsidies in OECD countries take the form of producer support, both direct and indirect. While these subsidies typically do not distort end-user prices (and hence are overlooked by Price Gap measures), they can have far-reaching consequences for production and investment decisions. Global estimates put production subsidies at up to $100 billion (according to the GSI, 2009), of which OECD countries alone may account for almost $60 billion per annum (Pershing et al. 2004).

Fuel-specific support

A pertinent example in Europe has been the use of coal subsidies by the UK, Spain and Germany. For example, German coal subsidies were still almost 2 billion euros in 2008 (Hergott, 2009) including support both for the production of domestic coal and financial support for mine closures. Support is also provided indirectly. For example, Spain requires its electric utilities to use domestically produced coal, and the United States and the EU impose high tariffs on imports of ethanol from certain countries, including Brazil. These subsidies clearly distort international trade in energy and can lock in inefficient production practices and slow the transition to superior technologies or fuel sources.

Some studies are trying to capture such subsidies, often within the framework of the Producer Support Estimate (PSE). So far, the level of detail of analysis that is necessary to provide robust insights has only been achieved in case studies which focus on specific sectors in individual countries (e.g. Earthtrack 2003).

Estimates are further complicated by the different sources, recipients and categories of producer support. Whilst distortions induced between producers and consumers, can be estimated through the price gap approach, those provided through government transfers or support are typically harder to measure. Direct, budgetary grants are relatively easy to measure. But information on equity injections, tax expenditures and transfers through intermediaries such as banks are usually more obscure. Less direct government transfers to producers include loan and risk guarantees and insurance or the assumption of liability for accidents. The PSE aggregates these various subsidy types.

These differences matter for estimation of subsidy level and for the type and extent of economic distortions they generate. Domestic producer support, for example, tends to alter the relative share of domestic and imported fuel consumption, rather than distorting final user consumption decisions. Marginal technology support, for example through feed-in-tariffs, is unlikely to have large consumption-distorting effects, although it may influence investment decisions.

Funding can be provided directly by energy users or through the general budget.

- If funding is provided through charges applied to energy users, then energy usage costs are not subsidised, though production choices will be distorted (which is usually the intention).

- Demonstration projects for new technologies are often funded from the general budget. If these projects only provide a small share of total energy, they have a limited impact on energy prices and usually do not encourage higher levels of energy consumption.

- Public funding for established technologies (e.g. clean-coal technologies in the 1990s) and their infrastructure, explicit risk guarantees provided by the public or implicit underwriting of risks of accidents or bankruptcy (e.g., for nuclear power) reduce the costs charged to energy consumers, and can thus be considered as energy subsidies.

Separately from the question of whether a scheme results in a subsidy for energy consumption, it is possible to evaluate what type of subsidy a scheme creates for energy production. Subsidies to protect domestic fuel sources, such as the coal

subsidies in Germany and Spain, are often justified in the name of energy security and regional employment. Similarly, subsidies to support the research, development and diffusion of new technologies can be motivated by interests to reduce energy import dependency and by climate objectives. However, such subsidies can be structured in a way that is either accessible to all producers or only to domestic producers.

From a WTO perspective, subsidies that favour domestic production are actionable if they cause injury to the domestic industry of another Member. However, such subsidies have so far not been challenged under WTO rules. This reticence to challenge existing fossil fuel subsidies might result from the interest of all countries in retaining some domestic subsidies for energy (e.g., in the name of energy security) or from the benefits energy-exporting countries enjoy from strategic behaviour in fossil fuel markets. This might limit their interest in enforcing competitive market outcomes.

Subsidies for technology development have traditionally been tailored to the needs of domestic industries (see, e.g., Steenblik and Coroyannakis, 1995). Such R&D subsidies for energy have so far not been challenged at the WTO, but they have been central to the long-running dispute between the European Commission and the United States in respect of subsidies to Boeing and Airbus. Because most governments provide such R&D assistance, and do not wish to set a precedent that would call into question their own expenditure, there has so far been little interest shown by governments in challenging public support for demonstration projects.

The increasing emphasis on strategic technology deployment programs creates a grey area for WTO jurisprudence, however. Feed-in tariffs can be designed so as to be accessible for technology from all producers, or they can be coupled with a local-content requirement, as has been the case in Brazil, Canada, China and Spain (Lewis 2007). More research is necessary to assess how such discrimination affects the innovation and market for new technologies, and whether it can be defended under WTO rules.

3. Expanding the scope of measured energy subsidies

One of the most frequently cited definitions of a subsidy used in the energy field is that contained in a 1998 study by the OECD, which defines a subsidy as *"any government measure that keeps prices for consumers below market levels, or for producers above market levels, or that reduce costs for consumers and producers"* (OECD 1998). Similarly, 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" (IEA, 1999)*.

These definitions are broadly in line with the definition of a subsidy contained in Article 1 of the WTO Agreement on Subsidies and Countervailing Measures (ASCM). This definition is the most universally used definition of a subsidy, and has the merit of being accepted by all 153 of its Member economies. The definition contains three basic elements: (i) it must involve a financial contribution (ii) by a government or any public body within the territory of a Member (iii) and confer a benefit.[4] The main support element not covered in the ASCM definition (because the WTO deals with

[4] http://www.wto.org/english/tratop_E/scm_e/subs_e.htm.

tariffs and technical barriers to trade through different processes) are transfers between consumers and producers (or vice versa) resulting from tariffs or non-tariff barriers to trade. These elements are, however, picked up through the market price support and market transfers measurements in, respectively, the producer support estimate (PSE) and consumer support estimate (CSE) aggregate indicators used by the OECD.

The existing compilations of energy subsidies usually do not capture many elements that might be considered support which not only alters costs faced by consumers and producers, but can also have large and important distortive impacts. On the consumption side, these include the failure to charge user fees for energy services, and discretionary tax exemptions on energy commodities. For example, in many countries consumers have to pay value added tax on products. If value added tax is not applied to energy, then this creates an incentive to increase energy consumption relative to other commodities and services. Thus, failure to tax energy in line with other goods and services, or differential taxation of energy across user groups, could be interpreted as an energy subsidy. In addition, many countries have only partial collection or enforcement of user fees associated with energy services, particularly electricity supply. The failure to charge and collect user fees reflects a powerful consumption subsidy that can be distortive in both technology choice and quantity of consumption.

Expanding the scope of the analysis would make international discussions on energy subsidies more balanced. The quantifications discussed in section one of this paper showed that OECD countries typically do not use subsidies that can be measured using a simple price-gap approach. Enhancing the scope of the analysis, would be likely to change the picture. The challenge of consistent and comparable methodologies is highlighted in a recent review of EIA subsidy estimates in the US. The report by Koplow (2010) examines the politicisation of scope and method to previous estimates. His findings suggest EIA studies have consistently underestimated the level of subsidies in the US. Further, the report emphasises the difficulties of establishing consistent and transparent methodologies for monitoring subsidies over time.

Whether the value of non-internalized externalities should be included in the accounting is a bone of contention between those responsible for generating subsidy estimates and environmental economists. Increasingly, countries are formulating a shadow price of carbon, and they make this price explicit using carbon taxes and emission trading schemes. Preferential regulatory treatment in cases where a government has generally regulated or taxed emissions could in these cases be regarded as conferring a subsidy. However, if the country fails to implement a carbon price this would not be treated as a subsidy for the benefiting sectors under current definitions. Nonetheless, there was agreement that, in addition to measuring subsidies, it is important also to quantify externalities associated with energy production and use. A recent IMF paper estimates 'tax-inclusive subsidies' and counts the deviation from optimal or pigovian taxation level to estimate total support to petroleum products. The paper uses estimates from literature for optimal petroleum taxation based upon Ramsey Rule, the externality cost of consumption (e.g. congestion) and global external costs such climate change. Thus the calculations project global tax-inclusive subsidies to be around $740 billion in 2010 (up from $520 billion in 2008), 70 percent of which occur in G20 countries (IMF, 2010).

Under current WTO ACSM rules,[5] subsidies arising from tax exemptions require demonstration of specificity in the effects of those exemptions. Here, specificity extends only to those cases where differential tax regimes are applied within a specific sector, thus favouring a particular commodity. Where tax exemptions apply to a specific pollutant (such as greenhouse gas emissions) rather than exempting specific commodities or users, they would fall outside the WTO requirements of specificity.

The distortive effect, here a carbon-specific distortion rather than an intra-sector distortion, would not be captured in subsidy measurement. In countries with carbon price mechanisms, exemption or exclusion for certain sectors from these measures may constitute a subsidy but whether they would be actionable under WTO subsidy rules has yet to be determined.

The clarification and measurement of the size and scope of such support represents a gap in current subsidy estimation. Under the UNFCCC principle of common but differentiated responsibility, many countries will seek to implement a variety of carbon-pricing mechanisms where specific user groups may seek exemptions. It will be important for those countries to pursue carbon policies in such a way that is consistent and comprehensive, and does not unduly favour specific users, enterprises or sectors, whilst also balancing concerns around possible carbon leakage. Here an expansion of the scope of measurement of energy subsidies can help inform the design of policy; in particular, in the absence of harmonised international carbon prices, it will be important not only to understand the extent of domestic distortions but also the international effects of such support.

This could then also offer a mechanism for the international community to work together in the implementation of carbon pricing, as one core component of climate policy. International cooperation on carbon pricing, building on the concept of energy subsidies, could play a key role in international climate cooperation for two reasons.

First, it is not clear how quickly global carbon markets will emerge. International cooperation mechanisms building on the experience or frameworks used to limit energy subsidies could offer OECD countries one route to cooperate on carbon pricing. While this is unlikely to deliver the level of carbon prices necessary to trigger a low-carbon transition in advanced countries, it might contribute to a minimum carbon pricing level to facilitate diffusion of technologies across a wider set of countries.

Second, the discussion at the workshop confirmed that international investors are still struggling to interpret the climate-policy framework, in particular the robustness and effectiveness of the implementation of carbon-pricing schemes (e.g. through emissions trading). Mechanisms to measure, and thus also manage, externalities building on the experience or frameworks developed for energy subsidies might offer an opportunity to increase the transparency and robustness of low-carbon investment frameworks.

However, any attempts to expand the definition of energy subsidies would need to be considered carefully. Expanding the definition to include the value of a larger set of externalities would reduce the clarity of the concept and thus enhance opportunities for its perversion in political processes, thus rendering it useless even

[5] http://www.wto.org/english/docs_e/legal_e/24-scm_01_e.htm#ArticleI.

for the achievement of the initial objectives. It could also reduce the level of political support, and thus risk the positive dynamic that was developed under the G20 process. From this perspective, a separate discussion of energy subsidies and carbon pricing might be preferable.

4. Conclusion

There is a need for expanded measurement and reporting of energy subsidies as part of the G20 ambition to phase out fossil-fuel subsidies. Future work should seek to address the challenges and shortcomings of existing work, particularly the current reliance on price-gap-based measurements. Such estimates can constitute an underestimation of the overall volume of energy subsidies. The limited scope of work to date on energy subsidies reflects: (i) limited resources devoted to collecting the data necessary for more comprehensive measurements; and (ii) the focus on the lowest common denominator to facilitate consensus in discussions.

Linking impact evaluations with political economy considerations will be important to move the reform agenda forwards. The technology and innovation consequences of subsidies have an important connection to policy instruments to address climate change — both in terms of the application of low-carbon subsidies and policy instruments for low-carbon energy supplies in the presence of fossil fuel subsidies, and due to the failure to internalize fossil-fuel externalities.

International cooperation will be vital in fulfilling the G20 goals of removing fossil-fuel subsidies, providing opportunities for transparent, regular and independent evaluation of volumes and impacts of subsidies. This could provide a useful first step towards reform. International platforms could furthermore allow national governments to make commitments to subsidy removal programs, thus enhancing the credibility and effectiveness of transition strategies. Finally, donor countries and multilateral financing agencies can provide potential sources of support for the removal of subsidies, for example motivated by climate benefits.

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