Towards a Grand Deal on subsidies and climate change

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Abstract

Recent studies have identified public subsidies as a principal cause of unsustainable development. Worldwide, governments are spending up to $US950 billion a year on subsidies. Many of these public subsidies fail to serve their purpose and in fact, often turn out as policy failures as they further distort trade and cause environmental harm. The energy sector is among the most subsidized sectors in the world, receiving over $US240 billion per annum of public subsidies. This article highlights current energy subsidies and their implications. The article examines (i) the global size and distribution of energy subsidies in industrialized and developing countries; (ii) the impact of these subsidies on the economy, equity and the environment and their role as barriers for sustainable development;(iii) the political economy behind public subsidies and the various political and institutional barriers and lock-in mechanisms that cause subsidies to become entrenched in economic and public structures; and (iv) proposals for effective subsidy reform in energy policies, suggesting a global strategy to eliminate energy subsidies. OECD governments are in a position to take the lead, and the UN Framework Convention on Climate Change presents an excellent opportunity of striking a political Grand Deal and linking the reform of energy subsidies to a meaningful participation of developing countries to the Kyoto Protocol. Moreover, if sinks are to be included in the Clean Development Mechanism, it is crucial to include the removal of forestry subsidies in the Grand Deal.

Keywords: Energy subsidies, subsidy reform, reform barriers and Kyoto Protocol.

1. Introduction

Recent studies have identified public subsidies as one of the principal causes of unsustainable development. According to de Moor and Calamai (1997), governments worldwide, dispense over $US700 billion each year on public subsidies in agriculture, energy, water and road transport. Their analysis demonstrates that the bulk of these resources not only fails to achieve desired results but also undermines every aspect of sustainable development. Public subsidies tend to be economically inefficient and trade distorting; they support ecologically harmful practices and usually end up benefiting the wealthier population groups. Recently, van Beers and de Moor (1999) have updated this work and extended the analysis to include subsidies in fisheries, forestry, mining and manufacturing industries. In total, they estimate public subsidies in eight natural resource and industrial sectors at $US950 billion a year and find that many turn out as policy failures. Other studies confirm the policy failure of public subsidies. The OECD (1997 and 1998) concludes that the huge amounts of resources OECD governments spend on subsidizing agriculture, energy, transportation and industrial activities generally encourage pollution, waste generation and excessive use of natural resources while at the same time constituting a large drain on government budgets and the domestic economy. According to Myers (1998), global subsidies reached $US1900 billion a year in recent years of which $US1450 billion can be termed perverse.

This article concentrates on public support policies in the energy sector and highlights the size and implications of current energy subsidies. After summarizing the debate on how to define a subsidy, the article provides an overview of the global size and distribution of energy subsidies. It further examines the implications of energy subsidies to determine whether they are serving their purpose. The main barriers to sustainable energy are discussed as well as lock-in mechanisms that perpetuate current energy

subsidies. The final section suggests proposals for subsidy reform. It is argued that there is an excellent opportunity to strike a Grand Deal within the UN Framework Convention on Climate Change to remove energy subsidies and at the same time increase the participation of developing countries in the Kyoto Protocol.

2. Recapitulating the debate on the subsidy concept

How to define a subsidy has been the subject of extensive debate. For the purpose of this article, however, we will only summarize the key relevant points.[1] What is absolutely crucial in identifying a subsidy is the choice of the benchmark, both in theory and in practice. In theory, the benchmark is the situation in which private welfare is maximized and hence prices should equal marginal private costs; any deviation implies a subsidy. In practice though, it is often unfeasible to determine marginal costs and world market prices are commonly used as the benchmark for identifying a subsidy. Any domestic price deviating from the world market price is a subsidy.[2] De Moor and Calamai (1997) capture these concepts in the following definition of a subsidy:

Subsidies comprise all measures that keep prices for consumers below market level or keep prices for producers above market level or that reduce costs for consumers and producers by giving direct or indirect support.

Two types of economic policy interventions, relevant to this article, stand out particularly from this definition. By regulating domestic prices and keeping them below world market prices, governments support consumption. Subsidized consumer prices increase

[1] The interested reader is referred to de Moor (1997), Myers (1998) and OECD (1998).
[2] This approach is only possible for tradable products. For non-tradables, a cost recovery concept is used by comparing the price charged with the unit cost of production.

domestic consumption and this excess demand may decrease foreign exchange revenues. Or governments may choose to subsidize production — for instance by imposing minimum prices above market level. Producers expand supply and accelerate resource depletion, while public budgets are tapped to pay for the surpluses. Both types of policy interventions may exist at the same time and create a dense web of distortions that produce a sizable fiscal drain. Both producer and consumer subsidies, either through overproduction or overconsumption, may cause degradation to the environment.[3]

Apart from these interventions in market prices, governments employ a wide variety of policy measures to reduce costs or give support to consumers and producers. Particularly popular in OECD countries are tax subsidies, such as tax exemptions, tax deferrals or special tax rates. Another popular form of subsidy is the provision of infrastructure and complementary services with costs only partially recovered from users. The transport sector is a typical example of such subsidization.[4] The many more types of support that exist are outside the scope of this article. De Moor and Calamai (1997) have structured the multitude of existing policy interventions and developed a taxonomy as a practical tool to identify subsidies (see table 1).

[3] See van Beers and de Moor (forthcoming) for an extensive analysis of the theoretical impacts of consumer and producer subsidies.
[4] This is true not only for public transport but also for road and air transport. See van Beers and de Moor (1998).

Table 1. A practical guide to identify subsidies

Subsidy types	Examples
Budgetary subsidies	a) Direct subsidies e.g. grants or payments to consumers or producers b) Budgetary effect of tax policies e.g. tax credits, tax exemptions, tax allowances, tax exclusions and deductions, rate relief, tax deferrals, preferential tax treatment
Public provision of goods and services below cost	Provision of infrastructure and complementary services, public R&D expenditures
Capital cost subsidies	Preferential loans, loan or liability guarantees, debt forgiveness
Policies that create transfers through the market mechanism	a) Domestic-oriented e.g. price regulation, quantity controls, procurement policies b) Trade-oriented e.g. import and export tariffs, non-tariff barriers

Source: de Moor and Calamai (1997)

3. A closer look at energy subsidies

Worldwide, governments in both developed and developing countries are widely and deeply involved in their energy sectors. Energy support comprises a wide variety of public interventions: direct grants to cover losses of coal mines or domestic purchase obligations for coal (see box 1); support to low income households to purchase fuels for heating and cooling; all sorts of tax breaks for energy users, including lower VAT rates; loans at low interest rates; allowing public energy companies to earn lower a than market rate of return; R&D support for nuclear fusion programs; deficit payments to miner pension funds to compensate for the costs of Black Lung Disease and early retirement; end-user energy prices at rates below market level; and, a recent phenomenon, the non-payments of tax bills and bail out operations of public companies. Much of this energy support is not directly visible but hidden in public and economic structures. In total, energy subsidies currently amount to over $US240 billion a year (see table 2).

Table 2. The cost of energy subsidies (1995-98, $US billion)

	OECD countries	non-OECD countries	total
Coal	30	23	53
Oil	19	33	52
Gas	8	38	46
All fossil fuels	57	94	151
Electricity	a)	48	48
Nuclear	16	nil	16
Renewable & end-use	9	nil	9
Non-payments and bail out[b]	0	20	20
Total	82	162	244
% global energy subsidies	34%	66%	100%
Per capita	88	35	44

Notes: a) Subsidies for electricity in OECD countries have been attributed to fossil fuels according the shares.
b) Subsidies from non-payments and bail out operations have not been attributed to energy sources.

Source: van Beers and de Moor (forthcoming)

Table 2 clearly demonstrates that governments are effectively subsidizing pollution and global warming. Two-thirds of all subsidies flow to fossil fuels (coal, oil and gas). In fact, since power generation usually involves burning fossil fuels, adding subsidies for electricity further raises the share to over 80 per cent. Even nuclear energy, with all its risks to human health and the environment, gets more support than renewable energy.

The distinction in table 2 between OECD and non-OECD (mainly developing countries) matches the difference in type of energy support:

> subsidies to energy production are commonly found in industrialized countries;
>
> support to energy consumption are dominant in non-OECD or mainly developing countries.

These two categories have very different economic impacts. Consumer subsidies through low energy prices encourage overuse and waste and, hence stimulate pollution. Underpricing also hurts energy producers, whose revenues and profits are

insufficient for replacing and modernizing existing equipment. The existence of old vintage energy equipment, as for instance in many former centrally planned economies, causes enormous waste of energy between production and consumption points. Producer subsidies, on the other hand, encourage overproduction since they artificially reduce production costs. Producer subsidies are usually accompanied by protection and quantity regulations that generate further distortions in the domestic economy.

Looking at table 2 in more detail, we notice that OECD countries spend an annual $US82 billion on subsidizing energy production, or 40 per cent of global energy subsidies. That is $US88 per capita. Governments in OECD Europe account for about $US50 billion of energy subsidies and the USA and Canada for another $US30 billion each year. OECD producer support is quite pervasive, for three reasons. First of all, most subsidies are hidden through tax breaks, cheap public infrastructure and price regulations; hidden subsidies cover the real cost of support. Second, high-income countries can more easily afford the costs of subsidization. Third, OECD countries are often willing to pay a high price for policy goals such as safeguarding energy security or protecting sector employment.

Most OECD subsidies flow to fossil fuels. In Europe, one-half of the total subsidy bill of nearly $US50 billion is directed to coal through policies such as price support and purchase obligations, particularly in Germany and to a lesser extent Spain and the UK. Total coal subsidies amount to $US295 per ton for Germany and $US85 per ton for Spain. Included in the figures are not only official support figures but also those public expenses that fall outside the formal definition of the Producer Subsidy Equivalent (PSE) such as deficit payments to miner pension funds, subsidies for early retirement schemes or adaptation aid to control water contamination. There is a slight trend, at least in Europe, to reduce subsidies. Coal support in the UK has been substantially cut,

a process that started in the 1980s, and Germany intends to cut its coal support in half (see box 1). Many EU countries are planning to embark on a process of deregulation, privatization and opening residential markets for competition in their energy sectors. Removal of government subsidies would be a necessary element in this process.

Box 1: Coal subsidies in Germany

The German coal industry is heavily protected and subsidized. The main type of support is through purchase obligations for domestic industries to buy certain amounts of German coal. Until recently, this subsidy was financed through a coal levy on electricity consumers ("Kohlepfennig"). Over the years, the costs have increased to $US7.5 billion a year. In addition, German coal production is supported through other measures, such as deficit payments to miners' pension funds, subsidies for early retirement schemes or 'adaptation' aid to control water contamination or to prevent land subsidence from closed mines. These hidden subsidies add another $US8.5 billion, bringing the total up to $US16 billion a year. The costs are equivalent to $US295 per ton of production or $US100.000 per miner. This staggering outcome suggests that it would now be cheaper to close the mines, fire the miners and give them a handsome salary *not* to work. It would bring about enormous savings and benefits to the budget, the environment and to miners' health.

Recently, the German Government has been forced to reform and cut the coal subsidy. First, a decision by the European Commission ruled that subsidies have to be financed directly from the budget in order to make energy support more transparent. Second, the Federal Court that ruled coal support would in future have to go through the federal budget reiterated this transparency. Finally, the German Government faced the problem that its budget deficit was above the threshold to qualify for the Single Currency Union, putting pressure to reduce public expenditure. Early in 1997, an agreement was reached in Germany to cut producer support to DM5.5 billion, or about $US3.7 billion by 2005. Mining employment will be more than halved to about 42,000. To accommodate the transition, the Government intends to fund early retirement schemes for miners. However, the above agreement would still leave the $US8.5 billion of hidden subsidies largely untouched. Moreover, the retirement schemes would add to the public subsidy bill, raising the costs of coal support to some $US12 billion in 2005, skyrocketing to $US285.000 for each miner. It shows that subsidy addiction is hard to break in a rich country.

Source: van Beers and de Moor (1999)

In North America, energy subsidies are mostly given through tax breaks and capital subsidies for fossil fuels.[5] Nuclear energy is mainly subsidized through cheap public provision of goods and services and R&D support programs, particularly in France, Japan and the USA.

Energy subsidies in developing countries, as opposed to those in OECD countries, aim to support energy consumers by setting end user prices at rates far below world market level. These consumer subsidies run to about $US162 billion per annum and are, again, mostly directed to fossil fuels. The countries of the Former Soviet Union and in Eastern Europe account for $US89 billion of consumer subsidies, or $US220 per capita.[6] However, this is substantially below the size of energy support during the Soviet era, when energy prices were as low as 10 per cent under market prices. The OECD and the World Bank estimated the underpricing of energy in the early 1990s at $US250 to $US300 billion annually.[7] In the post-Soviet era, the transition to a market economy forced governments to increase energy prices substantially, thereby cutting consumer subsidies. Currently, energy prices have come closer to world market levels to about 70 per cent, still implying subsidy rates of 30 per cent. In most Eastern European countries, subsidy rates range from 16 up to 37 per cent in 1995 and for fossil fuels in particular even higher (compare table 3).

Table 3. Subsidy rates[a] (%) in selected developing and former socialist countries, 1995/1998 ($US bln)

[5] Among the notorious tax breaks is the percentage depletion allowance in the USA, which allows fuel producers to deduct a certain percentage of their gross income rather than the standard deduction of development costs. This tax break was equivalent to a federal tax revenue loss of $US745 million in 1992.

[6] The recent IEA (1999) evaluation of energy underpricing in eight of the largest developing and transition countries have been used to update earlier estimates on consumer subsidies in non-OECD countries in van Beers and de Moor (1998). This IEA study includes estimates for China, India, Indonesia, Iran, South Africa, Venezuela, the Russian Federation and Kazakhstan for the period 1997-98. For other socialist countries, the earlier World Bank subsidy calculations (see Larsen, 1994) have been updated to 1995 levels by adjusting for the changes in the percentage subsidy rates and the (negative) growth rate of commercial energy use.

[7] See Burniaux et al (1992) and Larsen (1994).

	Coal	Oil	Gas	Electricity	Total
Poland[b]	26	1	6	n.a.	18
Czech Republic[b]	28		29	n.a.	22
Rumania[b]	33	2	54	n.a.	37
Bulgaria[b]	33	24	23	n.a.	29
Hungary[b]		2	34	n.a.	16
Russian Federation[c]		2	46	42	33
China[c]	40		19	38	11
Iran[c]		87	78	48	80
India[c]	18	53	23	24	14
Venezuela[c]	86	22		63	58
Indonesia[c]		51	28		28
Kazakhstan[c]	20		56	57	18
South Africa[c]	8	2		20	6

Notes:

n.a. not available

a Subsidy rates are defined as the price gap between domestic and world market prices relative to world market level. Note that electricity subsidies are excluded.

b Subsidy rates in 1995 based on World Bank (1997).

c Subsidy rates in 1997/98 based on IEA (1999).

Source: World Bank (1997), IEA (1999), van Beers and de Moor (forthcoming)

Price reforms and subsidy reductions in former socialist countries have been achieved primarily in industrial sectors and in transportation. For political reasons mainly, energy price increases have been rather limited for households. The actual effects of price reform, however, have been partly offset by a new phenomenon, namely the non-payment of energy bills. In several countries, privileged users are exempt from penalties on delinquent payments. Such policies effectively set prices at zero rates and encourage excessive consumption of energy resources. The formal approval of non-payments and bailing out operations by governments is considered a subsidy according to the definition of section 2. Rough estimates based on Bagratian and Gurgen (1997) suggest that in 1994, non-payments in energy sectors in the Russian Federation amounted to 8 per cent of GDP. The IEA (1999) values the non-payments of energy bills in the Russian Federation even at $US85 billion in 1997. Nearly 20 per cent of

energy bills are not paid, with state enterprises as the main defaulters. In several cases, governments conduct bailout operations, which effectively reward defaulters and penalize bona fide payers. The situation is even worse in other States, such as in the Ukraine. Van Beers and de Moor (1998) estimate the subsidy from non-payments and bailout operations between $US10 and $US30 billion.

The remaining $US73 billion of energy support reflects consumer subsidies in other developing countries, or $US17 per capita in those countries. Subsidy rates vary widely from 6 per cent in South Africa up to 80 per cent in Iran (see table 3). Most of it is, again, directed towards fossil fuels, either directly or indirectly (through electricity). Primarily social considerations motivate governments to subsidize electricity at rates of 38 and 24 per cent respectively. The largest subsidizers in absolute terms are countries like China and India that account for $US44 billion of subsidies. Until the early 1980s, China also heavily supported coal and oil consumption. Over the years, however, China has made some progress in gradually cutting down subsidies to a level of 40 per cent in 1998 (see box 2). Oil is also quite heavily subsidized, mainly by resource rich and oil exporting countries as Iran, Venezuela and Indonesia. Subsidy rates run from 20 per cent up to 87 per cent of the reference price. Although lower transport costs may justify domestic prices below world market level, the price gap is usually much larger than economically justified.

4. Evaluating the motives and impact of energy subsidies

Historically, the rationale to subsidize energy has been to fuel economic growth, both in industrialized and in developing countries. The type of support, however, is different as industrialized countries subsidize energy production while developing countries support

energy consumption. The growth motive changed somewhat after the oil crises in the 1970s, as OECD governments in particular deemed energy support necessary to safeguard domestic energy supply (and growth) and to make the national economy less susceptible to external shocks. Governments in developing countries subsidize energy consumption primarily to generate economic growth and boost industrial development as a means to bring about welfare and prosperity.[8] Energy subsidies are considered necessary to avert possible barriers to growth.

Studies on subsidies show that energy subsidies are ineffective in fueling economic growth or in reducing the vulnerability of the domestic economy to external shocks. In fact, the analyses strongly suggest that energy subsidies hamper economic development. Eliminating both producer and consumer subsidies would provide better incentives for a more efficient resource allocation and would yield a negligible to positive economic impact. Analyses with economic models by the OECD (see Burniaux et al., 1992) show an increase in global welfare by $US35 billion if consumer subsidies in non-OECD countries would be removed. Real income for the world as a whole would increase by 0.7 per cent annually while the terms of trade would improve by 0.5 per cent per year. The distribution of this welfare gain, however, would be uneven, with several winners but also some losers. Most former socialist and developing countries would see their welfare improve, sometimes even up to 20 per cent. The major loser, however, would be China, where the worsening in terms of trade results in an average real income loss of 0.7 per cent per year. Other losers would be energy exporting countries with an estimated decrease in real income by 5 per cent annually. Case study evidence further supports the conclusion that reforming energy subsidies in developing countries benefits economic development. In most countries where energy price reform

[8] A special underlying reason for consumer subsidies in the former Soviet Union has been the desire to maintain political and social stability in the new republics and in Eastern European countries.

had taken place, such as in Colombia, Ghana, Indonesia, Turkey and Zimbabwe, GDP growth has been higher than before the reform. Indeed, energy price increases were rather complementary with economic recovery, according to Hope and Singh (1995). This result has recently been re-confirmed by the IEA (1999). Removing consumer subsidies in eight large non-OECD countries produces efficiency gains and promotes economic growth by 0.7 per cent GDP, see table 4.

Table 4. Economic and environmental effects of removing consumer subsidies, 1997-1998

	subsidy rate (in % reference price)	efficiency gain (in % GDP)	CO_2 reduction (in %)
Russian Federation	33	1.5	17
China	11	0.4	13
Iran	80	2.2	50
India	14	0.3	14
Venezuela	58	1.2	26
Indonesia	28	0.2	11
Kazakhstan	18	1.0	23
South Africa	6	0.1	8
Total	21	0.7	16
in % non-OECD			10
in % world			5

Source: IEA (1999), van Beers and de Moor (forthcoming)

Energy subsidies further become environmentally harmful as most are directed to fossil fuels. World Bank and OECD calculations show that global subsidy removal could reduce CO_2 emissions by about 10 per cent worldwide. It is estimated that such action would lead to a 7 per cent drop in CO_2 emissions in former socialist and developing countries and allow those countries to stabilize their emissions at 1990 levels. In the OECD region, subsidy removal will reduce CO_2 emissions by up to 250 million tons. For specific countries, such as the USA, the OECD (1997) has calculated that the environmental gains of reducing subsidies run from 40 up to 200 million tons of CO_2.

Anderson and McKibbin confirm these findings in a recent paper (1997); their analysis of the removal of global coal subsidies points to a reduction in global CO_2 emissions by 8 per cent by 2005. Again, also the recent IEA study (1999) adds to the robustness of this result by concluding that removing consumer subsidies in eight large non-OECD countries can cut CO_2 emissions up to 16 per cent, or nearly 5 per cent in terms of global emissions (compare table 4). Although this would *not* be enough to achieve the goal of stabilizing global carbon emissions at their 1990 level, it is a firm step to comply with the internationally agreed greenhouse gas reduction targets set in Kyoto. Moreover, removing energy subsidies could produce multiple benefits by reducing other emissions such as methane, NO_x and SO_2. In the long run, eliminating fossil fuel subsidies would also provide a more level playing field for market penetration by renewable forms of energy by making the latter more competitive.

Another key goal of consumer support in developing countries is to provide the poorest population groups with cheap energy. Low energy prices are judged vital in helping the poor. Again, public subsidies have proved to be rather ineffective in serving this purpose. Empirical evidence shows that the equity implications of energy price reforms are quite modest: the maximum income loss is slightly over -3 per cent and usually concerns low-income urban households. These groups depend largely on the use of commercial fuels. However, they are *not* typical for the poorest population groups, which are commonly rural households using non-commercial fuels. Subsidies for gasoline mainly benefit car owners, surely *not* a group of poor consumers.

The conclusion is that energy subsidies are now failing to serve their purpose. Gradually, domestic energy subsidies have become expensive ways of protecting sector investments and employment. Businesses and governments have engaged in long-term investments in fossil fuel based energy production; a sudden replacement by

renewables will lead to large disinvestments and capital losses and is therefore considered too costly. Moreover, domestic energy sectors typically account for a large, if not dominant, part of employment in the region, thereby creating firm social pressures to preserve jobs. The persistence of the energy subsidies is probably best demonstrated by the coal subsidy per miner: over $US100,000 in Germany and nearly $US30,000 in Spain.

Box 2. Breaking coal addiction in China

Price reforms in China started in late 1978, first in agriculture and slowly spread through the economy. Overall, reforms were implemented as a dual-track system: state controlled supply declined continuously and prices were more and more subjected to market conditions. The key strategy in all cases was to develop a free market parallel to the controlled market, where state supply was fixed at lower prices. Supply in the free market grew rapidly and prices in the controlled market were raised towards the free market level. Similarly, a gradual reform of the Chinese coal sector started in the mid-1980s, but results have really emerged over the last few years. Coal prices are now close to parity with (less than 10 per cent below) international prices. Cooking coal, however, remains heavily subsidized up to 73 per cent. Still, the reform policy has cut down subsidies by about $US25 billion to a level of approximately $US10 billion in 1995. Energy intensity has fallen by about 30 per cent since the mid 1980s. This implies that a reduction of 1.1 billion metric tons of CO_2 emissions was brought about by the reform.

Source: Kumar and Osband (1997), de Moor and Calamai (1997), Watson et al (1998)

5. Barriers to sustainable energy

More than two-thirds of all energy subsidies flow to fossil fuels. Price and tax subsidies boost the artificial rates of return of the use of fossil energy sources and stimulate their use. Moreover, quantity regulations and requirements to purchase domestically produced energy, for example like the coal purchase obligation in Germany, continue to push for the use of fossil fuels. As a result, current subsidies place renewable energy technologies at a competitive disadvantage. This barrier is further enforced by the worldwide availability and large stocks of fossil fuels that lead to a downward pressure on fossil fuel prices. An example is crude oil. There is a widespread misconception that oil prices in the late 1990s are high, especially when they are assessed in real terms. Table 5 provides a revealing picture of how crude oil prices have developed over the last 25 years.

Table 5. Nominal and real crude oil prices in $US/barrel 1973 – 1998

	Nominal oil price	Real oil price
1973	4.2	4.2
1974	9.1	8.2
1980	13.5	10.7
1982	33.9	25.3
1985	27.5	19.8
1988	14.8	10.3
1991	19.3	12.8
1994	15.6	10.1
1997	19.2	12.1
1998	13.4	8.2

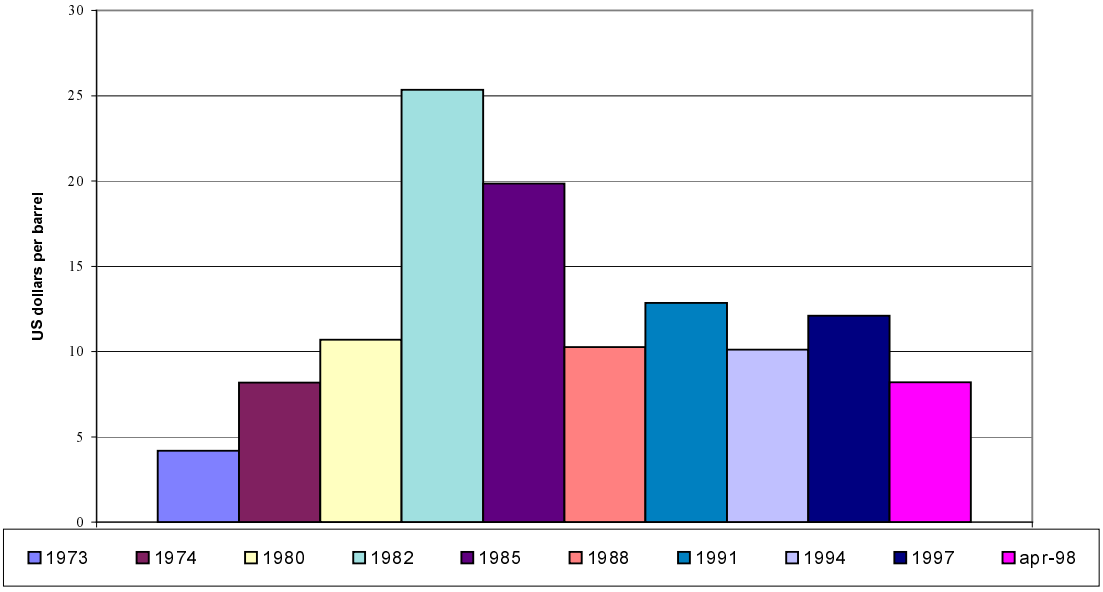
Nominal oil prices have been adjusted with the USA Consumer Price Index to get real oil prices.

Source: calculations based on OECD Economic Outlook, several years

Table 5 clearly shows the increase of nominal oil prices in the 1970s and the beginning of the 1980s, as well as the decline in the 1990s. Based on nominal prices, one can see

that the oil price in 1998 is about three times higher than in 1973. However, in real terms, the 1998 oil price is still at the level of 1974 (see also figure 1). This low level of real oil prices effectively blocks further market penetration of renewable energy resources. In September 2000, oil prices stood at nearly $US35 per barrel, implying a real level of around $US17 in constant 1981 prices -- not a dramatic price level in a historical perspective (see figure 1).[9]

Fig. 1. Real crude oil prices, 1973 - 1998



Sources: see table 5.

Both energy subsidies and market prices for fossil fuels have individually served as effective barriers to the penetration of sustainable forms of energy. Moreover, their combination has become an absolute impediment. When oil prices go down, producer

[9] This contrasts with the reactions of many European governments (the Governments of France, the Netherlands, Belgium, Germany, Italy and Finland) in September 2000 to 'compensate' (mostly through tax subsidies) the road freight transport sector for the allegedly high fuel prices.

subsidies rise and hence aggravate the barrier. Consumer subsidies would then be reduced, but the low fossil fuel prices would still inhibit the spread of renewables. In the case of rising oil prices, consumer subsidies increase as well and reinforce the price barrier. Producer subsidies, however, would decline, and hence make renewable energy resources more attractive. However, the quantity regulations or purchase obligations usually associated with producer subsidies may pose an absolute limit to a further penetration of sustainable energy. The only remedy from an economic viewpoint is to both increase fossil fuel prices and remove current fossil fuel subsidies.

6. Explaining the lock-in mechanisms that lead up to subsidy addiction

If current energy subsidies generally counteract efforts towards sustainable energy use, why do they still exist? After all, it is difficult to believe that governments would deliberately introduce and perpetuate subsidies with such negative implications. On the contrary, subsidies are usually proclaimed as useful and beneficial. Of course, many public subsidies were introduced long before the environment was of any real concern to governments. Current energy subsidies may well be detrimental, but only in view of recent environmental considerations. Apart from this observation, there are a number of lock-in mechanisms that create addiction to subsidies and make subsidy reform so extremely difficult to pursue. Van Beers and de Moor (forthcoming) structure these lock-in mechanisms and reform barriers into four categories:[10]

economic barriers

institutional and political barriers

technical barriers

international barriers

[10] This article will only briefly touch upon the main barriers.

6.1 Economic barriers

Public subsidies change behavior and it is exactly this change in decision making processes and economic structures that acts as an economic barrier to reform. Subsidies create rent and induce rent-seeking behavior by subsidy recipients. When governments start subsidizing activities through taxes or energy prices, producers and consumers react by adjusting their production and consumption towards earning as much rent as they possibly can. Certainly when the subsidy is given over a longer period, public support is considered to be a structural phenomenon and the change in behavior will also be structural. Rent seeking causes subsidies to become enshrined in public and economic structures. Subsidies get further capitalized into assets and create entitlements by recipients. A process of subsidy addiction sets in, making subsidy beneficiaries economically dependent on support. Removal or reform could put them in economic peril. Some beneficiaries may be in serious debt, and subsidy removal would drive them into bankruptcy. Lobby groups of vested interests will forcefully oppose any attempt to reform and will advocate continuation of support, thereby pointing either to the directly visible benefits or the painful costs of removal.

6.2 Institutional and political barriers

Apart from the economic interests, there are also institutional and political lock-in mechanisms that lead to subsidy addiction. Both subsidy provider and recipient often favor hidden forms of support, such as tax or price subsidies, in order to hide their addiction and to prevent public debate. The government seeks to support political constituencies but wishes to cover up the real costs. Recipients prefer hidden subsidies because these types of support are often overlooked during fiscal stress and budget cuts. Additionally, there may also not be a great deal of enthusiasm for reform on the

part of management and organizations that administer the subsidies. They might be skeptical about the need for reform or feel threatened that their expertise will lose value.

6.3 Technical barriers

There are also technical barriers that create and preserve subsidy addiction, especially in the former centrally planned economies and developing countries. In many cases, governments lack the skills to pursue reform. They may lack either administrative or institutional skills and have no experience in setting up reformative legislative, administrative and control systems. It may also be that countries lack the necessary financial resources to bridge the first volatile stages of the transition process and they may need short run foreign funds to get started.

6.4 International barriers

A prisoners' dilemma of who will start subsidy reform reflects an international barrier. Current global energy support is a good example. Governments may be reluctant to unilaterally remove energy subsidies out of fear of losing international competitiveness or in the belief that the benefits of domestic reform will be eroded by increased imports. Unilateral reform may therefore be ineffective in achieving the intended objectives, and governments may want to await international action before implementing reform domestically.

7. Towards a Grand Deal on subsidies and climate change

This section focuses on how to overcome the main barriers to reforming energy subsidies reform by exploring domestic and international policy strategies. In line with

the previous section, options for economic reform, political and institutional reform, and international reform (see table 6) are discussed.

Table 6. Options and strategies for reforming energy subsidies

Economic reform		Political and institutional reform	
OECD	Non-OECD	OECD	Non-OECD
decoupling from energy production	*decoupling from energy consumption*	*improve transparency*	*improve transparency*
tax reform	pricing policies	alternatives	alternatives
re-regulation	deregulation	buy out	accommodate
liberalize	financial discipline		no bail outs

Source: van Beers and de Moor (forthcoming)

The thrust of economic reform in current energy policies is to decouple subsidies from production in OECD countries and from consumption in non-OECD countries. Specifically, tax reform is needed in OECD countries by removing the various tax breaks that favor energy production. Price protection policies should be eliminated and a further liberalization of the energy sector should be pursued. This requires not only a deregulation but also a re-regulation of public energy policies. Governments in non-OECD countries should raise energy prices but at the same time use part of the revenues to finance targeted direct income support programs at the poor, such as fuel coupons, vouchers or credit options. There is a critical role to play for international donors and finance organizations, both public and private, as far as providing the additional funds to co-finance such reform policies. Eventually, the energy sector can be fully liberalized; a successful route is to develop a free market in parallel with the state controlled market, as for instance China has demonstrated (see box 2). Governments should vigorously deal with non-payments and refrain from bailouts.

There are several strategies to be considered in overcoming institutional and political barriers to subsidy reform. *The first priority is to create more transparency in subsidy policies.* Exposing the costs and implications of subsidies will make clear the often implicit choices and priorities and will enhance control of government policy. Creating more transparency increases the political costs of irresponsible policies and even better, rewards responsible action by policy makers. Governments may start creating more transparency by developing an information framework and evaluating and monitoring subsidies regularly. Independent experts or organizations outside the government should do this monitoring.[11] Furthermore, several simple elements should be institutionalized in subsidy policies. Subsidies should be bound to a certain time-horizon by imposing sunset-clauses of say a maximum of five years. After that, support should gradually be reduced.[12] Subsidies should also be restricted to a maximum support level to avoid open end policy measures.

A necessary element is to develop policy alternatives that better address and target the same objectives. Usually, direct income support or direct employment subsidies are far more cost-effective than current subsidies linked to production, consumption or inputs. Direct subsidies are the least distortionary in terms of their impacts on resource allocation and trade and they benefit the intended recipients far more. It would be more cost-effective to provide targeted support to the specific groups through fuel coupons, vouchers or credit options than imposing overall price controls. Additionally, political reality often requires that governments ease the pain of adjustment and even consider

[11] One may also consider introducing a burden of proof for subsidy policies that would require governments to prove why support is necessary, why in that particular format; and clearly show costs and economic, environmental and social implications. Such a burden of proof could develop into a control instrument to be used by parliaments and NGOs. The increasing role that information and communications technology plays in today's society facilitates such monitoring and control.

[12] This is not a guarantee that governments will not perpetuate the subsidy but it creates at least an opportunity for subsidy evaluation.

buy-outs in cases when bankruptcy is at stake. Buy-outs can be a pragmatic, structural solution that may be less costly and damaging than perpetuating current subsidies.

Ideally, energy subsidies should be removed worldwide. Since no country may be willing to act on its own, the key question is how to break this dilemma and to start getting global subsidies removed. One suggestion is to consider organizing a series of Green Rounds on Subsidies to agree upon subsidy reform and to provide mutual assistance. Bergsten (1996) has advocated moving towards an open global economic system and to strike a 'grand bargain' between Northern and Southern countries as an insurance policy against the return of protectionism. Subsidy reform could get the ball rolling. Building upon this suggestion, there may be an excellent political opportunity to start a global process of removal of energy subsidies and subsidy reform within the UN Framework of Climate Change Convention (FCCC). In 1997, the so-called Annex-I countries – mainly countries in the OECD, Eastern Europe and the FSU – drafted the Kyoto Protocol and committed themselves to national targets to reduce greenhouse gas (GHG) emissions. A prominent issue regarding the ratification of the Protocol is the involvement of the non-Annex-I countries, mainly developing countries. Their involvement is absolutely essential in the fight against climate change, as GHG emissions are expected to grow in developing countries in the future. Some Annex-I countries, in particular the USA, have indicated that they would ratify the Kyoto Protocol only after non-Annex-I countries also take up commitments to reduce GHG emissions. On the other hand, many developing countries claim that the current situation is mainly the result of past industrial and associated emissions growth of OECD countries and hence the prime responsibility of those countries. They should therefore be the first to pursue and realize real GHG reductions.

The removal of energy subsidies may cause a breakthrough in this stalemate by demonstrating real progress among Annex-I countries and getting the commitment from non-Annex-I countries to use renewable sources of energy. If OECD countries promise to remove their fossil fuel subsidies and assist non-OECD countries in their reform through financial and technology transfers, the non-Annex-I countries would have to join the regime of the Kyoto Protocol and accept national ceilings on GHG emissions.[13] Most feasible would be a phased removal of energy subsidies, gradually decreasing the level of support, and differentiated in time and by income level. For instance, OECD countries could commit themselves to phase out energy subsidies completely within a period of five to seven years, while middle-income developing countries could aim at 10 years and low-income countries could target for a 50 per cent reduction within 10 years and a complete elimination in 15 years. This global strategy offers benefits to all parties:

OECD countries would take a significant step forward in realizing their Kyoto targets at fair, leveled costs;

Non-OECD countries would benefit from the financial and technology transfers and further allow for a much more sustainable economic growth;

Implications for international trade would be minimal;

The environment would benefit both from the removal of fossil fuel subsidies and from the global effort to fight climate change.

Another aspect that may need to be integrated in this Grand Deal, is the removal of subsidies in the forestry sector. Forests are sinks, that is they have the potential to sequester carbon. The Kyoto Protocol allows parties to employ sinks for realizing national GHG emission targets. Moreover, there is a good chance that sinks will be included in the Clean Development Mechanisms, one of the Kyoto instruments that

[13] Apart from the benefits of financial and technology transfers, removing energy subsidies is also in the developing countries' own interests as it actually promotes economic growth, see section 4 and in particular table 4.

allows countries to earn emission credits abroad to comply with their national Kyoto targets.[14] Therefore, deforestation as well as reforestation would have an important impact on climate change policies. Many governments, however, firmly subsidize the clearing of forests. Worldwide, public subsidies to the forestry sector run up to some $US35 billion a year, of which $US30 billion can be found in non-OECD countries. Most of these subsidies reflect the failure of governments to capture the economic rent associated with the right to log. The prices for timber that the processing industry has to pay, are often unrealistically low and this obviously stimulates deforestation.[15] Forestry subsidies are hence counterproductive in any policy to fight climate change and global warming. In fact, forestry subsidies are environmentally doubly counterproductive, first they contribute to excessive forest clearing and the resulting losses in biodiversity, and second, they impede a further carbon sequestration by forests. If sinks play an important role in climate change policies, it is essential to include the removal of forestry subsidies in the Grand Deal. While governments will miss some income from the royalties (rents) from logging, bringing sinks into the CDM would provide national governments in forest-rich countries the incentive to stop subsidizing forest clearance and still receive financial resources, now for maintaining and preserving forests.[16]

[14] The decision to include sinks in the CDM was at stake at CoP-6, November 2000. This Climate Change Conference failed to achieve consensus. However, as most governments at CoP6 felt they were very close to a compromise, the Parties decided to re-convene in May 2001 to see whether an agreement can be closed. If there will be an agreement, the author believes that it will comprise the inclusion of sinks in the CDM at least from the second budget period onwards.

[15] Empirical research indicates that rent capture is commonly less than one-third of the market value, but in many countries it is much lower. See van Beers and de Moor (forthcoming) for an in-depth analysis.

[16] Estimates of the economic value run up to an average of $US2500 per hectare, 25 per cent more than the value of timber production. In absolute terms, Myers (1998) estimates the carbon sink function of forests at a dazzling $US3700 billion compared to the $US400 billion of commercial logging.

8. Evaluation

An excellent opportunity exists to conclude an agreement on the removal of energy and forestry subsidies and at the same time push for a greater commitment to the fight against climate change and global warming. This Grand Deal should be discussed and decided at the annual Conference of Parties (CoP). It is hoped that OECD governments, in particular major actors as the EU and the USA, will demonstrate political leadership and actively support this proposal. More concretely, governments should agree at CoP-7 or -8 on a proposal to remove energy and forestry subsidies as a key early-action policy in exchange for global participation in the post-Kyoto period.

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