# Environmentally Harmful Subsidies (EHS): Identification and Assessment

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**FINAL REPORT**


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# 1 INTRODUCTION

## 1.1 The report

This report presents the final results of the research undertaken as part of a project *'Environmentally Harmful Subsidies: Identification and Assessment'* developed for the European Commission's DG Environment by the Institute for European Environmental Policy (IEEP) and its partners, Ecologic, IVM and supporting expert, Claudia Dias Soares.

The main report includes the summary of extensive research in a short and readable format. It also includes valuable feedback on initial results gathered during the experts workshop organised in Brussels on 16 September 2009. The annexes reflect our research in greater detail.

## 1.2 Background and aims of the project

The importance of the review and potential reform of environmentally harmful subsidies (EHS) is well recognised and increasing policy support has been given to underline that progress is needed (e.g. OECD, 2006a; OECD 2007a; OECD 2009; TEEB 2009). While there have been some successes in the reform of EHS, there has been much less reform than could have been expected from simply looking at the environmental damage these subsidies cause and the potential global economic savings possible by reform.

While the main barrier to the reform of harmful subsidies has arguably been the resistance by vested interests and associated difficulty of gaining political support to push difficult changes, the review and reform of subsidies has also been hindered by: the lack of an agreed definition of subsidies, of agreed methods to keep track and quantify them, the lack of application of assessment methods and a lack of commitment to keeping a transparent inventory of subsidies.

The difficulties in identifying EHS and assessing the impacts of their removal on the environment has motivated current work, notably by the OECD, towards identifying practical ways in which to identify EHS and assess whether a benefit can be achieved through their reform or removal. Clearly one should recognise that the types of subsidy that need reforming, at least in the first instance, are already broadly known (IEEP et al. 2007). Hence, the recent focus on the political process that lead to a successful subsidy reform, the so called political economy of reform.

In this context, the European Commission is keen to continue to work on mainstreaming the review of EHS into the sectoral policies. The European Commission has been called upon by the EU Sustainable Development Strategy (2006) to draft a roadmap for the reform of EHS, sector by sector, with a view to gradually eliminating them. A roadmap by sector enabling governments to assess their subsidies and to consider to their reform could:

- Provide a framework for the identification of environmentally harmful subsidies;

- Provide a tool to assess whether the subsidy removal will benefit the environment;
- Help to understand the wider implications of subsidy removal including the economic and social dimensions;
- Contain simple guidance on the use of indicators, referring to the levels of subsidisation of an industry and its environmental and social cost, relevant to future measurements and useful in setting baselines for 'reduction rounds' by target dates.

This study is a contribution to the Commission's efforts in this area. It is mostly based on the scientific work carried out by the OECD over the past decade, with the specific aim of applying it in a European context. The application in this project of the tools developed by the OECD is aimed to:

- Test in practice the methodology proposed by the OECD for identification of EHS and their impacts and the impacts of their removal. This implies using the 'quick scan' and 'checklist' tools as well as the principle of 'integrated assessment'.
- Identify shortcomings of the OECD method and possible improvements / adaptations needed to make it operational for practical use in a context of policy making.
- Identify good practice for use by policy makers both at EU and Member State level.
- Provide baseline information and indicators that could be useful for potential future measurements, benchmarking or efficiency target setting (see Chapter 7 for more details).

This is the first study carried out so far for the European Commission to be focused in particular on these aspects.

## 1.3 Approach

To achieve the above aims, the ToR noted four tasks for the study:

***Task 1: Selection of six case studies***
Based on the application of a set of criteria agreed with the Commission, six case studies were selected to be used to test each of the OECD tools. The case studies selected for the purpose of the analysis are:

- VAT reduction for domestic energy consumption in the UK
- Fuel tax exemptions for biofuels in Germany
- Nuclear energy: decommissioning subsidies in Germany
- Fuel taxes: diesel vs petrol in Austria, the Netherlands and the UK
- Company car taxation in the Netherlands
- Irrigation water subsidies in Spain (Pisuerga Channel area)

The results of the case studies are presented in the Annexes.

***Task 2: Testing the OECD tools***

The OECD tools (the quick scan, the checklist and the integrated assessment framework) were tested on the six case studies. In order to perform this task, the team developed systematic guidance on the use of the OECD tools. The aim of the tests were to assess the strengths and weaknesses, the effectiveness, the user friendliness and the data requirements of the tools as well as gain an overall impression of their use.

***Task 3: Levels of subsidisation***

- *Task 3a – development of level indicators:* to measure the level of a subsidy, the team prepared guidance on the use of such indicators. The guidance developed will form the basis of a 'recipe book' on the use of level of indicators, based on the experience of the team in using the indicators as part of the evaluation of the case studies.
- *Task 3b – development of indicators describing the main characteristics of a subsidy:* to present the results of subsidy evaluations in an accessible, meaningful and concise way, the team felt the need to develop a set of indicators which will facilitate the communication of the main features of a subsidy to a wider public of non-specialists.

***Task 4: Critical appraisal of the methods being tested and development of guidelines for EHS removal***

- *Task 4a – development of guidelines for EHS removal:* the results of tasks 2 and 3 are further developed into operational guidelines for policy makers on the use of the proposed EHS identification and assessment tools as part of the EHS reform process.
- *Task 4b – experts workshop:* Experts and policy makers were invited to comment on the project results during a workshop organised in Brussels on 16 September 2009 by the project team. They contributed by providing key insights from their work and experience on the broad implications and usability of the project's findings. The workshop's findings are integrated in the final report. The agenda and the proceedings of the workshop are available in Annex 6.

## 1.4 Structure of the Report

The present report is structured as follows:

- **Chapter 2** introduces the report by setting out the definitions of subsidy and environmentally harmful subsidy;
- **Chapter 3** presents the OECD tools;
- **Chapter 4** illustrates the methodology used for testing the OECD tools;
- **Chapter 5** presents the main results of the critical appraisal of the OECD tools, based on the test performed by the project team using six case studies;
- **Chapter 6** includes the 'integrated tool', which builds on the strengths of the OECD tools and addresses some of the gaps identified in the critical appraisal. It includes operational guidelines for the use of the tool in a policy making process;
- **Chapter 7** includes the 'recipe book' for the calculation of the size of a subsidy;
- **Chapter 8** presents the communication tools developed by the team to enable a broader dissemination of the characteristics and the impacts of environmentally harmful subsidies;
- **Chapter 9** presents conclusions and summarizes the report;
- **Annex 1** contains tables to support the application of the assessment tool;
- **Annex 2** includes case studies on the energy sector;
- **Annex 3** includes case studies on the transport sector;
- **Annex 4** contains the case study on the water sector;
- **Annex 5** contains calculations of the size of subsidies for the case studies;
- **Annex 6** includes the experts workshop proceedings; and
- **Annex 7** provides the long list of case studies assessed during the selection process.

# 2 DEFINITION AND QUANTIFICATION OF ENVIRONMENTALLY HARMFUL SUBSIDIES

**Summary:** This Chapter sets out the commonly used definitions of subsidy and of environmentally harmful subsidy (EHS) and outlines some of the controversial issues related to these definitions. It also examines the issue of quantification of subsides.

## 2.1 Definition of subsidies

As the OECD (2006a) notes, there is no universally accepted definition of a subsidy, rather there are several definitions and the one that a particular study uses is dependent on the perspective from which it is written and on the purpose of the analysis contained therein.

### Box 1: The choice of subsidy definition

At the project workshop, participants stressed the importance of the choice of the definition of a subsidy, noting that ultimately the definition chosen in a particular context is a political choice and the implications of this choice should be made clear.

A summary of the coverage of the most common definitions used and the types of subsidies covered, whether on-budget (i.e. visible in budget accounts or able to be estimated from budget accounts) or off-budget, is given in Table 1. The types of subsidy listed in the Table below can be found in the energy, transport and water sectors, as well as in other sectors of the economy.

### Table 1: Mapping types of subsidy to definitions

| Type of Subsidy | Definitions of a subsidy | | | |
|---|---|---|---|---|
| | ESA | WTO | OECD | Pieters [1] |
| **On-budget subsidies** | | | | |
| Direct transfer of funds, e.g. grants | X | X | X | X |
| Potential direct transfers of funds, e.g. covering liabilities | | X | X | X |
| Government provides goods or services other than general infrastructure | | X | X | X |
| Government directs other bodies to do any of the above | | X | X | X |
| **Off-budget subsidies** | | | | |
| Market price support | | X | X | X |
| Government revenues due are foregone or not collected, e.g. tax credits | | X | X | X |

[1] In Pieters, 2004 and OECD, 2005.

| | | | | |
|---|---|---|---|---|
| Tax exemptions and rebates | | X | X | X |
| Preferential market access | | X | X | X |
| Accelerated depreciation allowances | | | X | X |
| Regulatory support mechanisms, e.g. feed-in tariffs, demand quotas | | | X | X |
| Selective exemptions from government standards | | | X | X |
| Resource rent for foregone natural resources | | | X | X |
| Implicit subsidies, e.g. resulting from the provision of infrastructure | | | | X |
| Implicit income transfers resulting from a lack of full cost pricing | | | | X |
| Implicit income transfers resulting from non-internalisation of externalities | | | | X |

*Source: IEEP et al. 2007*

The definition that is most widely used in the policy context, probably because of its broad scope, is that of the OECD (2005), which defines subsidies as:

> *'A result of a government action that confers an advantage on consumers or producers, in order to supplement their income or lower their costs'*

This definition allows several government support measures to be considered as subsidies. It includes on-budget subsidies, which appear on national accounts as government expenditure and includes direct cash transfers, low interest loans or reduced rate loans, the government provision of goods and services and subsidies to R&D. It also includes indirect subsidies such as tax exemptions and rebates, preferential market access, limited liabilities, accelerated depreciation allowances, and selective exemptions from government standards. These subsidies do not appear on national accounts and are therefore referred to as 'off-budget' subsidies.

The above definition does not include implicit subsidies that result from non-internalisation of externalities or lack of full cost pricing. Pieters (1997) proposed a slightly broader definition of a subsidy that addresses this by defining subsidies as 'deviations from full costing'. While the identification of circumstances where there is a deviation from full cost pricing may not be that difficult, the definition of subsidies as 'deviations from full costing' is clearly normative and difficult to measure. The measurement of the extent of such a subsidy requires that we know with some precision how to account for externalities and therefore that we know exactly where to draw the baseline against which a subsidy is measured. Consequently, the lack of internalisation of external costs is generally not considered as a subsidy by economist, mainly because

externalities are difficult to measure due to the assumptions, uncertainties, and significant economic modelling required (Honkatukia, 2002).

What in practice 'defines' (for definition we mean in this context the quantification not the mere identification) a subsidy is what one chooses as the baseline (or counterfactual) and whether it is considered to be the market price/cost or the social cost (i.e. the externality). In practice, this varies from sector to sector. In the energy sector, for example, the baseline is widely considered to be equal to market prices or costs , whereas it is thought to be the marginal social cost in the transport sector (see Box 2).

**Box 2: Are externalities a subsidy?**

In practice, the issue of uninternalised externalities is treated differently across different sectors. For example, in the transport sector the divergence between price and marginal social cost is so significant that the generally accepted definition of subsidy includes the failure to internalise the marginal social cost of transport modes (mainly road and air transport) (OECD, 2005). In contrast, there is no consensus on the definition of an energy subsidy. The most commonly used definition considers a subsidy to be 'any government action that lowers the cost of energy production, raises the price received by energy producers, or lowers the price paid by energy consumers' (IEA (1999); OECD (2005); UNEP (2008)). Environmental externalities are not considered to be a subsidy in this definition. In the water sector, the failure to include the full cost of water provision through water and water services pricing is considered to be a subsidy (OECD, 2005).

While a broad definition, including both full cost pricing for resources and internalisation, is operationally difficult, it is important to recognise that such implicit subsidies exist and can be quite significant in all sectors.

In the case of lack of full cost recovery, it is relatively easier to define the man made component of costs (i.e. the difference between full costs and the costs covered, e.g. for water provision), than to calculate the allocated resource costs of limited natural resources (shadow prices) and it is very difficult for externalities. Note that where a government is inactive (i.e. not responsive to a problem) and clearly should be active (e.g. is negligent to formal duties and obligations which should require it to respond), then it can be arguably regarded as a subsidy as it confers favourable treatment on the activity. This is similar to criminal liability as regards negligence, even though it is here much more difficult to allocate clear responsibilities, not least because of the absence of legislation on the issue. While there is an argument for extending the concept of subsidy to the lack of full implementation of the polluter pays principle, as this is effectively a cross subsidy between society and the polluting activity, given the levels of uncertainty, this study does not consider externalities as a subsidy per se, but it allows for their quantification through the marginal social cost method, once a subsidy has been identified.

## 2.2 Definition of environmentally harmful subsidies

Having discussed what defines a subsidy, here we will discuss what constitutes an 'environmentally harmful' subsidy. Currently there is no commonly agreed definition of an environmentally harmful subsidy (EHS). One possible definition, which draws on

the OECD's 1998 and 2005 definition of 'subsidy' examined in the above section, might define an environmentally harmful subsidy as:

> 'A result of a government action that confers an advantage on consumers or producers, in order to supplement their income or lower their costs, *but in doing so, discriminates against sound environmental practices.'*
>
> *Adapted from OECD 1998, 2005*

This definition is relatively broad and has the advantage of potentially encompassing a range of subsidies, including off-budget subsidies. As discussed above, this definition excludes consideration of 'non-action'. In some cases non-action (e.g. not applying road pricing to cover costs of roads, not internalising externalities) can also lead to prices not reflecting environmental and social costs and hence create implicit subsidies. As discussed above the consideration of externalities and lack of full cost recovery as subsidies varies in practice from sector to sector (see Box 2).
Once the definition of what constitutes a subsidy is chosen, what determines that the subsidy is environmentally harmful needs to be established (see Box below).

**Box 3: Debating EHS definitions and use of terminology**

The difficulties in agreeing a precise definition of EHS were highlighted during discussions at the project workshop. Regarding the use of the term 'environmentally harmful subsidies'; some participants felt the term EHS cultivated negativity and may be an obstacle to progress with their reform; whereas others believed it was necessary to be straightforward and 'call a spade a spade'. The issue of determining the relevant reference level that constitutes an 'acceptable' level of environmental damage, along with associated property rights was also considered as a crucial matter.

As noted in OECD 2005, determining the environmental harmfulness of subsidies is a major challenge. Indeed all production and consumption activities have an environmental impact. In general, a subsidy is harmful to the environment if it leads to a higher level of production and consumption that it would be the case without the support measure. Following on from this, another definition of EHS is the following:

> *'All other things being equal, the [environmentally harmful] subsidy increases the levels of output/use of a natural resource and therefore increases the level of waste, pollution and natural exploitation to those connected'*
>
> *Adapted from OECD 2005*

The above definitions of EHS are considered generic and by no means perfect (see Box 3), they are nonetheless the most widely used and accepted by the scientific community. An analysis of case studies in various sectors by the OECD found that what actually qualifies as an EHS varies over time and place. The OECD therefore developed models (or tools) for the analysis of the linkages between financial support to an activity and its environmental impacts. They constitute an attempt to unfold the linkages and the circumstances that cause, mitigate, or have rebound effects, on the environmental harmfulness of a subsidy. The meaning of this definition may not be clear at first sight. Note that in order to improve the situation, a comparison must be

made between the decrease in the subsidised activity and the increase in the alternatives. Eliminating a subsidy does not make purchasing power disappearing! So to the increase of the levels of natural resource use, waste or pollution includes these effects of the economic activities that take the place of the previously subsidised activity.

While the OECD tools are not presented as an authoritative methodology, they are among the most widely respected tools for the identification and assessment of EHS. They are illustrated in the next Chapter.

## 2.3 Quantification of subsidies

The various definitions of subsidies and their limitations contribute greatly to the difficulties of their quantification.

There have been numerous efforts at quantifying subsidies over the years. However there are often significant variations in the estimates produced given the different definitions used across sectors and countries and by different organisations and analysts.

Some examples of how the level of estimates depends on what is being measured and/or what definition is used are given by the following two cases (from IEEP et al, 2007):

- *Subsidies to coal in Germany:* in 2003, State aid for coal accounted for €3.3 billion as measured by DG Competition, State Aid Scoreboard. However, if we take into consideration external costs, subsidies by regulation, as well as tax exemptions and financial transfers, hard coal in Germany was subsidized by €22.2 billion, rather than the €3.3 billion in 2003 (Meyer B., 2004).
- *Transport subsidies accounting*: if comparing road investments to receipts from fuel taxes then there appears to be little subsidy in many countries; if one includes externalities (environmental and social, including congestion), then there is a clear under-pricing (IEEP et al, 2007).

For instance, the total on-budget volume of the subsidy will be of particular interest to those wishing to clarify the 'drain on the public purse' (these are often the numbers that gain NGO and press attention). Note that it is easier to obtain and analyse on-budget values than off-budget ones.

From a competitiveness perspective, subsidies will be analysed from their cost/price impacts relatively to competing products on the market. For instance, this is an issue of particular concern for state aid and WTO rulings (these quantification efforts run however into difficulties in determining the true cost curve of production, given commercial confidentiality issues and associated lack of data transparency).

The resource use perspective will consider subsidies looking at whether the price reflects the true resource price (shadow price) of the good, and 'shadow prices' are difficult to calculate (also they are dynamic numbers depending on the opportunity cost of the resource in question).

When it comes to implicit subsidies relating to not paying for pollution impacts, this mainly concerns those affected (e.g. individuals, local authorities whose beaches are affected by oil spills, activities affected (e.g. tourism, oyster farms)), and interests NGOs and the press.

Existing estimates are either purpose specific (e.g. for accounting or trading purposes), or are calculated mainly as part of ad hoc studies. The OECD has been working on quantification, so has the EEA, at the EU level. Some data on the size of subsidies are presented in Box 4.

**Box 4: Examples of estimates for the scale of subsidies**

This box presents some examples of the estimate of the scale of subsidies, building on two EEA studies, on energy and transport respectively.

The EEA's estimates suggest that EU average annual subsidies for **fossil fuels** accounted for almost 75% of total EU energy subsidies in 2001 and of these, coal is the largest recipient (see figure and Table below). A recent estimate of the Global Subsidy Initiative calculates producer and consumer subsidies to be at least US$ 500 billion a year globally (GSI 2009). This is equivalent to 1% of world gross domestic product, the figure that the Stern Review estimated necessary to stabilise the world temperature rise to 2°C (Stern 2006).

**Figure 1 Indicative estimates of total energy subsidies, EU15, billion EUR (2001)**

| | Solid fuel | Oil and gas | Nuclear | Renewables | Total |
|---|---|---|---|---|---|
| 2001 On- budget | > 6.4 | > 0.2 | > 1.0 | > 0.6 | > 8.2 |
| 2001 Off- budget | > 6.6 | > 8.5 | > 1.2 | > 4.7 | > 21.0 |
| Total | > 13.0 | > 8.7 | > 2.2 | > 5.3 | > 29.2 |

**Note:** Electricity subsidies allocated to fuels on basis of generation inputs. Excludes external costs.

*Source: EEA (2004) cited in IEEP et al 2007; for information on sources and types of subsidy included in these estimates, see IEEP et al 2007.*

**Table 2 Overview of total transport annual subsidies by incidence & mode (billion 2005 EUR) – EU 15**

| | Total | Type of subsidies | Observations |
|---|---|---|---|
| **Road** | 128 | Infrastrucure: 113<br>On-budget (excl. PSO): 6<br>Fuel-tax exemptions : 0<br>VAT exemptions: 9 | Road subsidies are mainly for infrastructure (almost 90% of total subsidies for road) |
| **Rail** | 72 | Infrastrucure: 37<br>On-budget (excl. PSO): 33<br>Fuel-tax exemptions : 0<br>VAT exemptions: 3 | On-budget very relevant - almost as large as infrastructure. Funding found for PSO—not included among on-budget subsidies—is even larger at €42 billion per year. |
| **Air** | 26 | Infrastrucure: -1<br>On-budget (excl. PSO): 1<br>Fuel-tax exemptions : 8<br>VAT exemptions: 18 | Mostly off-budget—in the form of exemptions from fuel taxes as well as VAT on international flights |
| **Water** | 14 | Infrastrucure: 10<br>On-budget (excl. PSO): 1 | Amount of subsidies considerably lower compared to other modes (10% of those |

| | | | |
|---|---|---|---|
| | | Fuel-tax exemptions : 3<br>VAT exemptions: 0 | for roads). Mostly infrastructure (70% of total subsidies for water) |
| **Total** | 241 | Infrastrucure: 159<br>On-budget (excl. PSO): 42<br>Fuel-tax exemptions : 11<br>VAT exemptions: 29 | Infrastructure subsidies are the most relevant part (more than 65% of total subsidies |

*Source: IEEP elaboration of data from EEA, 2007 - cited in IEEP et al 2007*

Note: This Table is based on incomplete data; the total value of transport subsidies remains unknown. This note must accompany any use of this Table. Infrastructure subsidies equal infrastructure costs minus infrastructure charges (thus negative values are possible). Numbers may not add due to rounding.

Thus, the definition of what is meant by a 'subsidy' is ultimately a political choice. It would be therefore pointless to argue for a conceptually perfect definition of a subsidy, rather, as suggested by Steenblik (2003), it would be far more useful to outline practical criteria to allow their quantification. This implies establishing indicators for the measurement of subsidies for policy purposes. As a contribution to advancing this debate, the project team developed a user guide (or 'recipe book') to the main approaches to subsidy measurement by the OECD (see Chapter 7), including the calculation of marginal social costs of subsidies.

Moreover, because most subsidy data are compiled for other reasons, the categories into which they have been aggregated may not facilitate the analysis of their environmental effects (see Steenblik, 2003). A common reporting framework, organised in such a way as to enable aggregate indicators useful for monitoring to be produced is recommended (see Steenblik, 2003; OECD 2005). Such a development would improve consistency and comparability across sectors and countries. An important development in this respect is the ongoing work coordinated by Eurostat on the development of a system of accounts including EHS (for more on the System of Integrated Environmental and Economic Accounts (SEEA), see Box 5).

**Box 5: Ongoing efforts at subsidy quantification**

In spring 2010, Eurostat will establish a Task Force on the subject of environmentally related subsidies, where interested countries from EU and EFTA countries will test methods to see whether they can be internationally harmonised. The methods are also being discussed in the context of the planned System of Integrated Environmental and Economic Accounts (SEEA) UN standard that is due to be published in 2012.

The SEEA is a satellite system to the system of national accounts that has been under development since the early 1990s. The system brings together economic and environmental information in a common framework to measure the contribution of the environment to the economy and the impact of the economy on the environment. It aims to provide policy makers with indicators and statistics to monitor these interactions and provide a database for strategic planning. This is an international system based on a UN initiative. In Europe, the information is harmonised and coordinated by Eurostat. The SEEA covers: flows of materials per industry (energy, material, and emissions waste); economic variables (labour, taxes, subsidies, costs, products and services); and natural resources (stocks, quality, value).

Under the Swedish system of SEEA, subsidies are classified as 'environmentally motivated' subsidies (EMS), potentially damaging subsidies, and other subsidies. Subsidies are classified through a detailed review of budget proposals to determine which budget lines have an environmental motive. The SEEA definition of subsidies covers on-budget subsidies to industry, transfers to international beneficiaries and households, as well as capital transfers. While some off-budget subsidies such as tax exemptions can be calculated from SEEA data where there is a direct link between emissions and taxes, other off-budget subsidies such as preferential market access and exemptions from government standards are not currently included given difficulties in obtaining such data.

Source: Adapted from presentation given by Viveka Palm (Head of Unit, Environmental Accounts and Natural Resources, Statistics Sweden), at the project workshop.

To date, quantification efforts have mainly focused on on-budget subsidies given that the quantification of off-budget subsidies is complex, and in some cases impossible, as it often requires that the benefit is calculated on the basis of differential treatment against a norm or baseline which is a subjective decision. However, off-budget subsidies can be very significant in monetary terms and have an important impact on prices in a given sector. The case studies examined in this project primarily explore the consequences of differential tax treatment and were selected to examine the methodological aspects of identifying and quantifying off-budget subsidies in more detail.

## 2.4 Summary

The main findings of this Chapter are the following:

- Definitions of subsidy vary depending on the purposes of the analysis (e.g. trade, budget, policy);
- Ultimately the definition chosen in a particular context is a political choice and the implications of this choice should be made clear;
- Following on from the previous point, there is a need for awareness that analyses using different definitions could lead to different conclusions;

- There is a need for the development of indicators that allow for the quantification of subsidies and allow governments to report, monitor and assess their impacts;
- A agreed definition of what constitutes 'environmentally harmful subsidies' is still lacking. The issue of determining the relevant reference level that constitutes an 'acceptable' level of environmental damage, along with associated property rights was also considered as a crucial matter;
- Determining the environmental impacts of a subsidy can only be done on a case by case basis;
- Policy makers considering new subsidies or considering reforming existing subsidies are likely to need to understand the linkages between the existing subsidies and the underlying economic and environmental reality – and will need tools/methods to help in this activity. This is the rationale behind the development of the OECD tools, illustrated in the following Chapter.

# 3 OECD TOOLS FOR THE IDENTIFICATION AND ASSESSMENT OF ENVIRONMENTALLY HARMFUL SUBSIDIES

**Summary:** This Chapter includes a description of the three OECD tools developed for the identification and assessment of environmentally harmful subsidies: the 'quick scan', the 'checklist' and the 'integrated assessment framework'. The main features of the tools and insights on the crucial elements behind the tools are illustrated.

The definition of EHS noted in the previous section is generic. An analysis of case studies in various sectors by the OECD found that what actually qualifies as an EHS varies over time and place. The OECD therefore developed roadmaps and checklists for the assessment of circumstances that mitigate, or have rebound effects, on the environmental harmfulness of a subsidy.

Three tools have been developed by the OECD:

1) **Tool 1 - the 'quick scan'**: the quick scan (OECD, 1998) *inter alia* shows that there is no direct linkage between the amount of and nature of support and the environmental impact;
2) **Tool 2 - the 'checklist'**: the 'quick scan' approach was developed further with the 'checklist' (OECD, 2005) which enables governments to assess whether, given the circumstances, removal of a subsidy will benefit the environment;
3) Tool 3 - **the 'integrated assessment framework'**: the 'integrated assessment framework' (OECD, 2007a) includes a sustainability perspective and ensures that social and economic trade-offs are included in the assessment. This Chapter provides a brief overview of the aims and structure of the three OECD tools.

While these three OECD tools were not presented as an authoritative methodology; they are among the most widely respected tools for the identification and assessment of EHS.

## 3.1 Tool 1 - The quick scan

The 'quick scan' model (OECD, 1998) aims to help policy makers identify support measures whose reform could bring win-win results for the environment and the economy. The main questions that the tool aims to answer are the following:

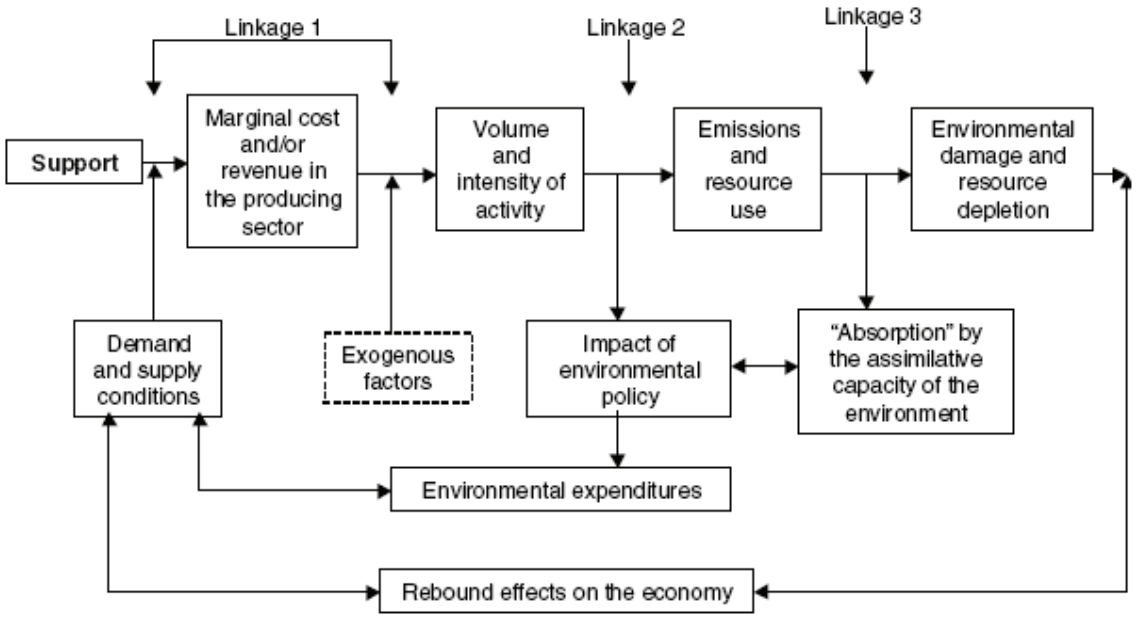
- Does the support succeed in transferring income to the intended recipient? And if so,
- Is the support likely to have a negative impact on the environment?

The 'quick scan' tool is based on the concept that the effects of support on the environment are not determined solely by the effects of the levels and composition of

the subsidy, as the environmental impact also depends on the other conditions (e.g. environmental policy filters) in place. The tool identifies three main linkages (see Figure 1) between support measures and their ultimate environmental effects:

- *Linkage 1: the impact of the support on the volume and composition of output in the economy*. This linkage identifies the relationship between the type of subsidy, its point of impact (e.g. input, output), the price elasticity of demand and supply associated with the subsidised activity and ultimately the impacts on the levels of production and consumption. This in turn is what creates pressure on the environment.
- *Linkage 2: the mitigating effect of environmental policies in place.* This linkage takes into consideration policies and emission abatement techniques that impact on environmental expenditure by the industry and therefore influence demand and supply with a multiplier effect.
- *Linkage 3: the assimilative capacity of the affected environment*. This linkage represents the dose-response relationship, which might be a highly site-specific factor, particularly when the emissions have predominantly local or regional effects, and would therefore be evaluated through dedicated studies. However, in the case of pollutants that have global effects (such as $CO_2$ emissions or CFCs) effects are not site-specific and this linkage is irrelevant.

**Figure 1: Linkages between support measures and environmental effects**




*Source: OECD (2005)*

The quick scan tool (OECD, 1998) describes the relationship between a support measure and the resulting environmental impact through the examination of three partial linkages. The analysis follows the pattern of the quick scan flowchart (see Figure 1), gathering information for Linkage 1, Linkage 2 and finally Linkage 3.

The application of the 'quick scan' tool by the OECD (OECD, 1998) focuses on the analysis of **Linkage 1** and in particular on identifying the role that price elasticities of demand and supply play in determining: the *leakage* of support to downstream or

upstream sectors (which were not intended recipients of the support), and their effects on the *volume* of activity which determines the environmental impact of the support.

The impacts of a subsidy on the environment depend on the point of impact of a subsidy (conditions of the support) and on the size of the subsidy, which ultimately determines the subsidy's distortionary impacts on the marginal costs or revenues of the recipient sectors. Their impacts on volumes are determined by the price elasticities of demand and supply. Price elasticity of demand and supply of the subsidised activity determine the magnitude of volume responses to price changes and the proportion of the support that leaks away to other non-targeted sectors (information on price elasticities may in some cases also be needed to calculate the size of particular subsidies, e.g. tax expenditures).

An important contribution of the OECD report (1998) is the classification of subsidies by their point of impact (i.e. input, output income and profit), to understand the main economic characteristics of a subsidy and consequent likely impacts on the environment.

Using this classification, more recent OECD work (OECD 2004, 2005) provided a clearer understanding of the link between type of subsidy, point of impact and the impact of subsidy removal on the environment. The latter forms the knowledge basis for the development of the 'checklist' (Tool 2).

**Box 6: The point of impact of a subsidy (conditionality)**

Subsidies are always conditional on something. The OECD 1998 classifies subsidies according to their point of impact within a firm depending on whether they impact on: outputs (this type of support increases the revenues of a sector), variable costs or raw material and intermediate product inputs (this type of support lowers the costs of production) or profit and income (this type of support has no direct impact on the input or output market). In further work (OECD, 2005), the point of impact on demand was included in the analysis. These main points of impact are also called subsidy 'conditionalities'.

Different conditionalities or points of impact of the subsidy will cause different responses from producers and consumers in terms of their modes of production and levels of production and consumption, as well as differences in levels of pollution and rates of exploitation. Subsidies differ considerably in the degrees of freedom left to the subsidised polluter to produce environmentally benign, or conversely force the producer to use inputs and technologies that are relatively damaging to the environment. Subsidies to sales for example do not limit the technology choices open to producers as severely as a subsidy contingent on the use of a particular input. It is important to identify all conditionalities of a subsidy in order to explore the differences in potential responses of firms to removal of the subsidy.

For a more extensive discussion of the classification of subsidies by point of impact see OECD 1998, Chapter 3. Further discussion is included in OECD 2005, pp. 79-85, where subsidies to consumption (i.e. point of impact is demand) are included. The latter forms the knowledge basis for the development of the 'checklist' (Tool 2).

Because of the complexity and data requirement difficulties associated with quantifying the environmental impact of a subsidy and linkages 2 (on the mitigating effect of environmental policies in place) and 3 (on the assimilative capacity of the environment), the OECD only draws general conclusions regarding the effects of these two linkages. In our application of the tool to case studies, the approach taken in this study was to recommend that analysts draw qualitative conclusions on these two linkages and quantitative conclusions only where possible.

The second linkage **(Linkage 2)** assesses the mitigating effect of environmental policies in place. This part of the analysis is concerned with the emissions or environmental impacts that result from a volume of activity excluding those 'filtered' by environmental policies. Environmental policies may be put in place in an attempt to reduce the negative impact on the environment of a particular support measure. However, these policies may have specific aims that do not encompass all possible environmental impacts of the support. Furthermore, it could be more expensive to implement certain environmental policies than to reduce their causal factors.

**Linkage 3** of the quick scan deals with the specificities of the environmental variables that influence on the significance of an environmental impact produced by a subsidy.

**Box 7: The assimilative capacity of the environment**

The assimilative capacity of the environment is one factor to consider where regulations or standards relating to emissions or products do not apply. This might be a highly site-specific factor, particularly when the emissions have predominantly local or regional effects, and therefore will have been / would need to be evaluated through dedicated studies. However, in the case of pollutants that have global effects (like $CO_2$ emissions or CFCs) effects are not site specific and the assimilative capacity issue for differential policy assessment is no longer relevant (even though the issue of assimilative capacity remains ecologically important). Because of the complexity and data requirement difficulties related to assessing the assimilative capacity of the environment, for the purposes of this study it was considered acceptable to draw qualitative conclusions where it was not possible to draw quantitative conclusions.

The quick scan tool highlights the importance of:

- The classification of subsidies by their initial point of impact (conditionality);
- The importance of elasticity and the concept of subsidy leakage;
- The role of policy filters.

Additionally, factors such as other governmental policies, autonomous technical and economic changes will reinforce or countervail the effects of support. The taxation regime also influences the mix of inputs used in production and thus the environmental impacts.

The 'quick scan' could help governments in identifying which subsidies to remove; however a partial or general equilibrium model would be required to take into consideration all linkages and effects on the economy. This is, however, a potentially very resource intensive task and, in practice, the 'quick scan' method was considered rather demanding (OECD, 2005). This was the reason behind the development of a

checklist, building on the main linkages identified in the quick scan, presented in the following section.

The quick scan was tested on six case studies mainly using qualitative analysis and some evaluation of first order effects using some basic micro economic reasoning. In order to facilitate the application of the tool, a step-by-step template was developed, including some guidance for its use. A step-by-step guidance on the tool is included in Table 3. For the OECD won guide to the quick scan, see OECD (1998, Chapter 3).

**Table 3: Applying the quick scan tool**

| Steps in the analysis | Definitions and guidelines from OECD |
|---|---|
| ***Linkage 1: Support-Output in the economy*** | The impact of the support measure on the volume and composition of output in the economy. This part of the analysis examines the link between the type of subsidy, its point of impact (input, output, profit or income), the price elasticity of demand and supply associated with the subsidised activity, and finally the impacts on the levels of production and consumption. This in turn is the factor that ultimately exerts pressure on the environment. |
| **STEP 1: Describe the type of subsidy** | Subsidy types:<br>• Support that increases the marginal revenue of a sector through market price regulations;<br>• Support that is conditional on the purchase of a product or the use of a production process;<br>• Support that is non-conditional on input or production<br>See OECD 1998, pp.39-48 for guidance on these categories. |
| **STEP 2: The point of impact (conditionality) of the subsidy** | Subsidies are always conditional on something, e.g. level of production, use of particular inputs, introduction of a mandated technology etc. The main points of impact within the firm are on output, input use, profit and income, while the main point of impact outside the firm are on demand. These main points of impact are also called conditionalities. For further information see OECD 1998, pp. 20-21 and OECD 2005, p.80.<br>Different conditionalities or points of impact of the subsidy will cause different responses from producers and consumers in terms of their modes of production and levels of production and consumption, as well as differences in levels of pollution and rates of exploitation. It is important to identify all conditionalities of a subsidy in order to explore the differences in potential responses of firms to removal of the subsidy. For information on the importance of conditionalities, see OECD 2005, pp. 79-85 |
| **STEP 3: Intended recipients of the subsidy** | Who is the subsidy aimed at? Input producer, finished product producer, input consumer, or finished product consumer. |

| | |
|---|---|
| **STEP 4: Describe the intended recipient sector, including demand and supply conditions, exogenous factors acting on the sector and the degree of market openness** | It is important to understand how different forces in the sector interact and the choices open to the affected sectors, including the possibilities for substitution.<br><br>In describing the *sector*, describe the type of industry being subsidised, as well as the upstream and downstream markets and how these are linked to the levels of input and output of the recipient sector.<br><br>*Upstream markets* are the preceding stages of production that supply inputs. While *downstream markets* are the subsequent stages of production or the market for the finished product.<br><br>*Demand and supply conditions* take into account the choices open to the affected sectors and the possibility for substitution.<br><br>*Exogenous factors* are external factors affecting the sector such as competition and trade. |
| **STEP 5: Price elasticity of demand and supply of the input and output markets** | According to the OECD (1998), in principle all that is needed to assess the effects of a support measure or its removal is data on the price elasticities of demand and supply for the relevant markets. This information gives an indication of how effective the support is in changing the composition of production of the entire economy and can aid the identification of support measures that are a priority for reform.<br><br>*Price elasticity of demand and supply* is the sensitivity of supply and demand to changes in price. Elasticities determine the magnitude of volume responses to price changes and the proportion of the support that leaks away from the intended recipients to other sectors. For more information see OECD 1998 pp.45–48 and OECD 2005 pp. 93-98. |
| **STEP 6: Size of the subsidy** | The monetary value of the financial subsidy, and also its share relative to turnover or product price. |
| **Linkage 2: Output - Emissions and/or resource depletion** | This part of the analysis is concerned with the emissions or environmental impacts that result from a volume of activity excluding those 'filtered' by environmental policies. |
| **STEP 7: Environmental policies in place or emission abatement techniques that mitigate the impacts of the support** | Environmental policies may be put in place in an attempt to reduce the negative impact on the environment of a particular support measure. However, these policies may have specific aims that do not encompass all possible environmental impacts of the support. Furthermore, it could be more expensive to implement certain environmental policies than to reduce their causal factors.<br><br>For further information see OECD 2005 pp. 89-98. |
| **STEP 8: Impacts of the environmental** | Environmental policies in place may not be as effective as they are intended to be. It is important not to assume that the |

| | |
|---|---|
| **policies in place on emissions and volume of activity** | introduction of an environmental policy will address all possible environmental impacts of the support. |
| **STEP 9: Describe the impact of environmental policies in place on environmental expenditures by the industry, if possible** | Environmental expenditure can have a rebound / multiplier effect on the economy. |
| **Linkage 3: Emissions / Depletion - Actual environmental damage** | This part of the analysis examines the extent to which increased emission levels or resource depletion lead to actual environmental damage ('dose-response' relationship). This is often highly site-specific, particularly when the emissions have predominantly local or regional effects and therefore must be evaluated through dedicated studies. However, in the case of pollutants that have global effects (like $CO_2$ emissions or CFCs) effects are not site specific and general conclusions can be drawn. |
| **STEP 10: Describe the size of the environmental damage** | Environmental damage refers to the increased emissions, waste, pollution, resource depletion caused as a result of the support measure. |
| **STEP 11: Provide insights on the assimilative capacity of the environment to these impacts** | *Assimilative capacity* refers to the capacity of the environment to absorb a certain amount of emissions, depletion or damage, without suffering (irreversible) degradation.<br><br>The actual environmental damage caused by changes in levels of pollution and resource depletion that results from the support depends on the assimilative capacity of the environment. If this capacity is high, more damage can be tolerated by the environment before it becomes a significant problem. |

Detailed results of the application of the quick scan tool to the six case studies can be found in the Annexes. Box 8 below provides some brief examples of the results from three case studies.

**Box 8: Testing the quick scan tool on case studies**

**Example 1 - Irrigation subsidies in Spain**

The application of water subsidies for irrigation in Spain is likely to have an impact on the amount of water extracted/used for irrigation, as arguably a low price does not encourage efficient use. This in turn can lead to wastage, groundwater depletion, pollution (particularly due to increased concentration of nitrates), soil salination and biodiversity loss. The subsidy is successful in transferring income to its intended recipients - farmers. The subsidy has clear environmental impacts and is worthy of further scrutiny to assess whether its reform/removal would benefit the environment. The subsidy also provides substantial support to the sector and its removal can have significant environmental (positive) and economic (negative) effects.

**Example 2 - Fuel tax differentiation in the UK, Austria and the Netherlands**

The taxation of diesel at a lower rate than the equivalent energy product (unleaded petrol) is

likely to have a negative impact on the environment given that it increases diesel use and demand. The support makes diesel cheaper for private transport and in the case of commercial use, for freight and agricultural industries and arguably may be successful in transferring income to its intended recipients. Note that truckers and farmers generally have a weak bargaining position vis a vis their suppliers (e.g. fuels) and customers (e.g. supermarkets for farmers). Any subsidy to them will leak away to both suppliers and customers through price changes. The net result will probably be a rather small decrease in transport prices, that benefit haulage companies (dispatchers), *not* the truckers which are always listed as the intended recipients. Other fiscal factors, such as circulation and registration taxes based on $CO_2$ emissions are also relevant to the overall picture of how government support related to transport fuels affects the environment. The support is worthy of further scrutiny to assess whether its reform/removal would benefit the environment and to increase understanding of the way subsidies affect consumer choice, environmental pollution and the transport intensity of products.

**Example 3 - Reduced VAT for domestic energy use in the UK**

The application of a reduced rate of VAT on energy products (electricity, natural gas, heating, oil and coal) for domestic use does not encourage efficient/reduced energy use, and the associated production, distribution and use of domestic energy is likely to have a negative impact on the environment in terms of greenhouse gas emissions, acidification, depletion of non-renewable energy resources etc. Only a small part of the subsidy reaches the intended recipients (low-income households), high-income households receive most of the benefits, as the income elasticity of demand for energy is positive. The support is considered to be worthy of further scrutiny to assess whether its reform/removal would benefit the environment.

*More on these case studies is presented in the Boxes including results of the application of the Checklist (Tool 2) and the Integrated assessment (Tool 3).*

A critical appraisal of the quick scan tool was produced on the basis of the application of the tool to the case studies - see Chapter 5 for further details.

## 3.2 Tool 2 – The checklist

Lessons learnt on the difficulties of application of the quick scan led to the development of a more pragmatic and simplified 'checklist' for subsidy removal by Pieters in 2003 (OECD, 2003 and 2005). The checklist builds on the main elements of the quick scan. Examined in the previous section. This checklist aims to help governments to 'focus attention on those conditions under which subsidy removal could indeed have significant beneficial environmental effects' (OECD, 2005) and to identify which subsidy schemes to prioritise for removal or reform on environmental grounds. Note that policy makers must already have insights where to look for possibly environmentally damaging subsidies.

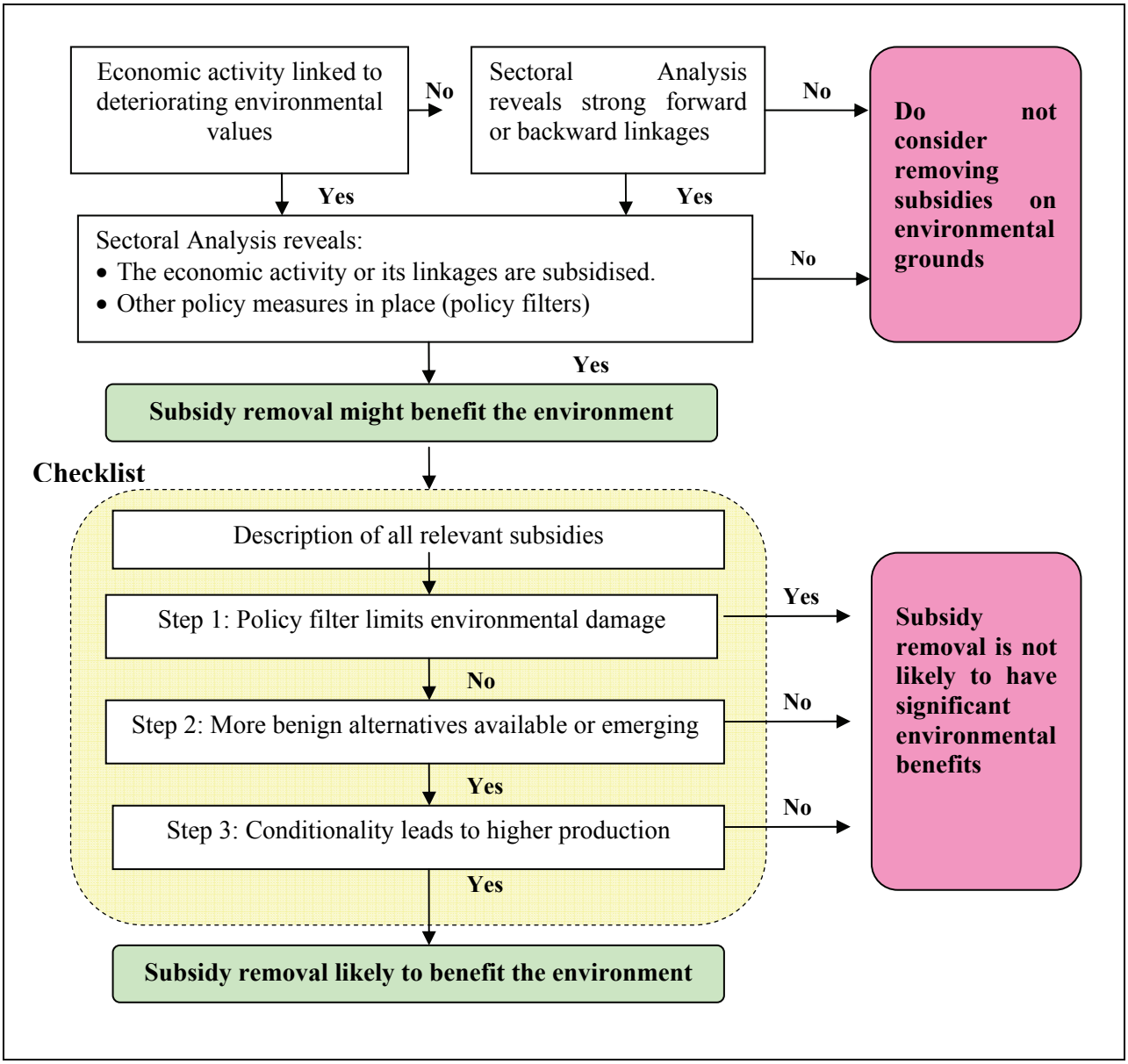
The checklist is a qualitative tool which rests on the idea that decision makers already have access to the relevant data and information in order to assess each linkage that it contains.

As reported in OECD 2005, the checklist aims to enumerate economic characteristics of subsidies that may serve as predictors for first order effects on those industries that are directly affected by the removal of a certain subsidy. It is beyond the scope of the checklist to estimate the effects of subsidy removal using general or partial equilibrium

models which take the responses of other sectors into account. However, as Pieters noted at the experts' workshop organised for this project, the checklist could provide reference for a more detailed analysis, eventually leading to deploying economic modelling.

The checklist follows a step-by-step approach, each step allows the analyst to make a decision on whether the subsidy removal would bring benefits to the environment, via a yes/no question.

**Figure 2: Flowchart of the checklist**




Source: Adapted from OECD 2005

Prior to the application of the checklist, focused on whether removal brings benefits, one needs to identify a subsidy and understand the severity of the environmental damage relating to the activity subsidised (top section of Figure 2). The environmental

impact of an activity should be assessed using an environmental impact assessment (EIA).

Following the selection process, the checklist follows a step-by-step approach. It asks three fundamental questions (adapted from OECD 2005):

1. Step 1: What restrictions on production, pollution or resource depletion result from regulations, standards and similar environmental policies (i.e. the policy filter); and what will happen to the policy filter once the subsidies are removed? This step mainly overlaps with the 'linkage 2' identified in the quick scan. If the policy filters are effective in mitigating the impacts of the subsidy, then subsidy removal is not likely to bring environmental benefits. If not, the assessment should consider the second step.

2. Step 2: What technologies and products are likely to replace the previously subsidised products and modes of production; and how do the environmental profiles of these competing products and modes of production compare with those of the previously subsidised ones? If environmentally more benign technologies and products likely to replace the previously subsidised products and modes of production are available now or emerging, subsidy removal is likely to bring significant environmental benefits. If the technologies and products likely to replace the previously subsidised products and modes of production are equally or more damaging to the environment, the subsidy's removal is not likely to bring significant environmental benefits.

3. Step 3: What are the likely responses of the previously subsidised industries in terms of production volumes, rates of exploitation of natural resources? This depends on the size and conditionality of the subsidy as well as on price elasticities and the distribution of market power. This step of the analysis attempts to determine whether the conditionality of the subsidy (point of impact) leads to higher production. In order to understand this, various characteristics of the subsidy need to be understood. This step builds on the concepts developed in Linkage 1. Furthermore, while some items in this stage would require the use of general equilibrium models, the use of such models is beyond the purpose of the checklist. The aim of this stage in the analysis is to understand the wider consequences of subsidy removal and to determine whether more detailed analysis is required, on a purely analytical basis.

The checklist was tested on six case studies mainly using qualitative analysis and some evaluation of first order effects using some basic microeconomic reasoning. In order to facilitate the application of the tool, a step-by-step template was developed, including some guidance for its use. For the OECD's own guide to the use of the checklist, refer to OECD 2005 pp. 89-98. See also Chapter 6 for guidelines on the application of the checklist.

**Table 4: Applying the checklist**

| Steps in the analysis | Definitions and guidelines from OECD |
|---|---|
| **Policy Filter** | This part of the analysis examines other policy measures such as tradable pollution or extraction quotas, emission standards; production or extraction limits; environmentally based taxes etc) which reduce emissions or rates of extraction and thus mitigate the effects of a subsidy in the environment. If these measures are effective, the removal of the subsidy will bring no or limited environmental benefits.<br><br>Note this section can usefully build on information collected for analysing linkage 2 in the quick scan tool. |
| **Step 1: Describe the environmental policy filter and restrictions placed on production, pollution, and resource depletion levels** | Environmental policies may be put in place in an attempt to reduce the negative impact on the environment of the support measure. It is important to identify such policies and to ascertain their effectiveness in reducing or preventing environmental damage. It could be more expensive to implement certain environmental policies than to reduce their causal factors (ie through subsidy reform/removal).<br><br>Environmental policy filters include policy measures such as tradable pollution or extraction quotas, emission standards; production or extraction limits; environmentally based taxes etc) which reduce emissions or rates of extraction and other limits to production or resource use. For further information see OECD 2005 pp.93-94 |
| **Step 2: What will happen to the policy filter once the subsidy is removed** | In certain situations, where policy filters are in place, the removal of a subsidy may not have much impact on the production of the targeted good or service. In order to understand the impacts of subsidy removal it is important to establish whether the policy filter will be removed with the subsidy. |
| **Step 3: In the light of the above answers, is the policy filter effective in limiting environmental damage caused by the subsidy** | In the light of the above answers, is the policy filter effective in mitigating the environmental impacts caused by the subsidy?<br>o YES - the policy filter is effective in limiting environmental damage. Then the subsidy's removal is not likely to have significant environmental benefits. The use of the checklist ends here.<br>o NO - if the policy filter is found to be not effective in limiting environmental damage, then you should move to step 4. |
| **Availability of more benign alternatives** | This part of the analysis examines the availability of more benign technological alternatives which are currently available or emerging and their environmental profile. It should be noted that this may require some judgement from the analyst (Pieters 2003). |
| **Step 4: Availability of technologies and products that could replace the subsidised product** | It is important to consider the implications of subsidy removal and the likely effects it will have on the sector given alternative products or technologies available. An analysis of alternative products will reveal what competing products would benefit from removal of the subsidy. For a categorisation of the main technological strategies of environmental policy see OECD 1998, |

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| | pp.51-52. |
| **Step 5: Environmental profiles of these competing products and modes of production compared to the subsidised product** | Given that the goal of subsidy reform is to remove harmful elements, it is essential that previously subsidised products are not replaced by others that may cause more environmental harm. The environmental profile of a product or production mode describes the impacts on the environment and how significant these are. Environmental profiles can be compared to identify the more benign option. |
| **Step 6: In light of the above answers, are there more benign technologies and products that could replace those that are subsidised** | In the light of the above, are there more benign alternatives available now or emerging (YES/NO)?<br>• YES - if more benign technologies and products likely to replace the previously subsidised products and modes of production are available now or emerging, then you should move to step 7.<br>• NO - if more benign technologies and products likely to replace the previously subsidised products and modes of production are not available now or emerging, the subsidy's removal is not likely to bring significant environmental benefits. Stop your analysis here. |
| **The extent to which subsidy conditionality leads to higher production** | This step of the analysis attempts to determine whether the conditionality of the subsidy (point of impact) leads to higher production. In order to understand this various characteristics of the subsidy need to be understood, as outlined in the steps below.<br><br>Note this stage in the analysis can usefully build on information gathered for analysing Linkage 1 under the quick scan tool. Furthermore, while some items in this stage would require the use of general equilibrium models, the use of such models is beyond the purpose of the checklist. The aim of this stage in the analysis is to understand the wider consequences of subsidy removal and to determine whether more detailed analysis is required. |
| **Step 7: Size of subsidy** | The monetary value of the financial subsidy, and also its share relative to turnover or product price. |
| **Step 8: Elasticities of supply and demand** | The sensitivity of supply and demand to changes in price. Elasticities determine the magnitude of volume responses to price changes and the proportion of the support that leaks away from the intended recipients to other sectors. For more information see OECD 1998 pp.45–48 and OECD 2005 pp. 93-98. |
| **Step 9: Duration of the subsidy** | Number of years the subsidy has been in place and whether it has a sunset clause. |
| **Step 10: Conditionality of the subsidy** | Subsidies are always conditional on something, e.g. level of production, use of particular inputs, introduction of a mandated technology etc. The main points of impact (conditionalities) within the firm are on output, input use, profit and income, while the main point of impact outside the firm are on demand. For further information see OECD 1998, pp. 20-21 and OECD 2005, p.80.<br><br>Different conditionalities cause different responses from |

| | |
|---|---|
| | producers and consumers in terms of their modes of production and levels of production and consumption, as well as differences in levels of pollution and rates of exploitation. For information on the importance of conditionalities, see OECD 2005, pp. 79-85. |
| **Step 11: Distribution of market power** | Identify the degree of concentration in factor and goods markets (monopoly, free market etc). |
| **Step 12: In light of the above answers, does the conditionality of the subsidy lead to higher production volumes and therefore higher rates of exploitation of natural resources** | In the light of the above points, does the conditionality of the subsidy lead to higher production volumes and therefore rates of exploitation of natural resources? Note that this is considered to be analytically the most difficult task (Pieters, 2003),2 hence some qualitative considerations will be acceptable here if more detailed data are not immediately available.<br>o YES – if it leads to higher volumes, subsidy removal is likely to have significant environmental benefits.<br>o NO - if there the production volumes are not likely to change, the subsidy's removal is not likely to have a significant environmental benefits |

The detailed results of the application of the checklist to the case studies are included the Annexes. In Box 9 below very brief examples of results achieved are summarised.

**Box 9: Testing the checklist tool on case studies**

**Example in the water sector - Irrigation Subsidies in Spain**

There are a number of environmental policy filters including the Water Management Regime (Water Abstraction Plan), the subsidisation of drip irrigation technologies, and the cross-compliance requirements under the Common Agricultural Policy. The policy filters are not considered to be effective in mitigating the environmental impacts caused by the subsidy as they have minimum or no effect on water consumption, and in certain cases they even lead to increased farming of water intensive crops. More benign alternatives including more efficient and targeted irrigation systems (e.g. drip irrigation) associated with less waste of water and pollution by fertilizers are currently available; however, it is crucial that any alternative measures are supported by adequate monitoring and that the adoption of less water-intensive crops is sufficiently stimulated in order to ensure reduced environmental impacts. Irrigation water subsidies affect the choice of crops, leading to the farming of more profitable crops with higher irrigation needs. This in turn leads to a higher consumption of water.

**Example in the transport sector - Fuel tax differentiation in the UK, Austria and the Netherlands**

There are a number of environmental policies in place that seek to minimise the harmful environmental effects from diesel, including fuel-quality standards, technology

2 For more hints from the author on the reasoning behind this step, see sections 1.5 and 2 in Chapter 2 OECD 2005. Note: 'It is difficult to assess lock-in effects quantitatively, since it would require comparing a "with-situation" to a counterfactual "without-situation" (what technologies would have gained market access in absence of the subsidy?). But subsidies that are maintained over a long period are much more likely to have strong lock-in effects, especially when they also directly influence the choice of materials and energy.' Taken from OECD 2005, p. 77.

requirements, efficiency standards and emission standards. The policy filter does not effectively limit environmental damage to the degree necessary to address climate change. Diesel still emits a significant amount of pollutants into the atmosphere and petrol is currently more cost-effective than diesel for reducing oil use and lowering global warming pollution. Alternative technologies including biofuels and electric vehicles could replace petrol and diesel to a significant extent in the future. While the environmental credentials of using biofuels for transport are currently the subject of significant debate, if plug-in cars use electricity generated by renewable energy sources, they would greatly reduce the impact of transport on the environment. Thus, more benign alternatives include existing market-ready technologies and services that are currently hampered by price competitiveness issues. The subsidy leads to higher production of diesel fuel and higher rates of exploitation of natural resources by stimulating demand for diesel (at the expense of petrol). If the subsidy were removed, the price of diesel would increase and create a more level competitive playing field with petrol vehicles and help increase the market opportunities for other types of fuels and other types of transportation (e.g. plug-in vehicles) to enter the market as well as a more efficient use of diesel, thus diminishing lock-in effects.

**Example in the energy sector - Reduced VAT for domestic energy use in the UK**
Restrictions to production, pollution or resource depletion levels that result from the policy filter include a cap on $CO_2$ emissions for the electricity (and heat) industry under the EU ETS, building regulations, and energy efficiency standards for heating equipment and household appliances. There are, however, no direct restrictions on energy use by households. The policy filter is partially effective in the sense that residential energy use without the filter would probably be (much) higher. However, this does not mean that removing the subsidy would have no environmental benefits, since most of the filter is likely to remain effective after removal of the subsidy. There is significant unused potential for further improvements in residential energy efficiency, for example through the adoption of energy efficient household appliances. The subsidy is conditional on the consumption of energy by households and by organisations that are not obliged to charge VAT on the products and services that they sell. By reducing the price of domestic energy, the subsidy encourages increased energy usage.

*See Box 11 for a short summary of results of the application of the Integrated Assessment to these case studies.*

The checklist was tested on several case studies by the OECD (2003). Wilfred Legg (OECD) presented some of the pros and cons of the tool in his presentation to the expert workshop:

- It establishes a common organising framework that can be applied in a systematic way in different contexts.
- It helps set priorities for action and highlights areas requiring more detailed empirical analysis.
- It is intuitive and easily understood.
- It can be easily applied in a cost-effective manner and is more versatile than traditional cost-benefit analysis.
- However, it could be viewed as being so flexible and all-encompassing that it ceases to be a useful tool for rigorous analysis. Just a personal note, not necessarily for inclusion in the report. A rigorous analysis will never ever provide the (final) answer to whatever subsidy question, since even the definition of the subsidy is prone to subjective value judgments and is of a political nature. The checklist however provides a framework for deciding

what rigorous analysis should and could be conducted, if politically unavoidable.

The checklist does not include an analysis of social impacts or the implications of subsidy removal in social terms. The model also excludes considerations of the political economy of subsidies (such as exogenous factors; the lobbying of interests groups; leadership and communication). In order to address these concerns, the OECD (2006a) advocated a more integrated approach, which integrates the social, economic and environmental dimensions of subsidy removal. These aspects were explored in more recent work by the OECD (2007a) (Tool 3).

### 3.3 Tool 3 - The integrated assessment framework

The integrated assessment framework (OECD, 2007a) is the most recent of the OECD tools and is meant to represent an 'advancement' in the methodology that builds on the belief that considering social and environmental aspects separately leads to trade-offs and fails to highlight synergies.

The aims of the integrated assessment are:

- To highlight the costs and benefits, winners and losers, intended and unintended effects of a subsidy in the environmental, economic and social spheres, and any associated trade-offs; and
- To provide information that is understandable to the general public, as broader communication is considered essential for successful reform.

The framework is intended to be broad enough to be applied to subsidies of any type (excluding uncompensated externalities) and to be applicable to both *ex ante* and *ex post* analyses.

The framework works as a checklist of information that a policy maker needs to gather in order to make an informed assessment of the impacts of subsidies on the three pillars of sustainable development (see Box 10).

The OECD (2007a) provides guidance on the reasoning behind the integrated assessment framework. It generally does not suggest methods for its application. Various evaluation techniques can be used, building on, for example, the Impact Assessment Guidelines (EC, 2009). These include the use of cost-benefits analyses and cost-effectiveness analyses were necessary. Similar to the application of the other tools, in this study the tool was applied using qualitative analysis and data that were readily available. Its fitness to be used as a 'quick screening' and to respond to its aims was tested.

**Box 10: Integrated assessment framework**

**1. Features scan**

***Objectives:*** What are the objectives of the subsidy with respect to its environmental, economic and social impacts?
***Design:*** Does the policy design avoid problems inherent in long-term existence of

subsidies?

- *Adaptive design:* Does it have a sunset clause or an adaptive review process?
- *Are the conditionalities right?* Are they based on outcomes, rather than specific technologies (avoiding lock-in effect); on inputs and outputs rather than on capital stock?

***Effectiveness analysis:*** Does the subsidy, or will the subsidy, achieve its objectives?

- *Economic*: correct a market failure; increase the supply of a public good.
- *Social:* improve income distribution generally, or reach a target group with intended benefits; induce socially desirable behaviour.
- *Environmental:* reduce pollution; preserve habitat; encourage the use of an environmentally preferable product; speed up the development of more-efficient or clean technologies.

***Cost-effectiveness:*** What alternatives exist for meeting those objectives that might be more cost-effective?

**2. Incidental impacts**

What incidental impacts (impacts other than those intended) have been or can be expected from the subsidy? The stress here is on long-term, dynamic and international impacts:

- ***Economic:*** unintended economic impacts such as impacts on the prices of factors of production and intermediate inputs used by non-target industries; economic impacts of environmental improvement.
- ***Social:*** socially undesirable distributional impacts (*e.g.*, on low-income consumers, on non-target population generally, on developing country exporters); negative dynamic responses to the subsidy.
- ***Environmental****:* linked mainly to primary economic impacts – changes in the levels of inputs and wastes *e.g*. degradation of ecosystem services; loss of biodiversity, synergistic effects.

**3. Long-term effectiveness**

Is the subsidy designed so as to eventually address the underlying problems that gave rise to its creation?

- ***Economic****:* Does the subsidy address the underlying problem, *e.g.*, by spurring innovation, increasing resource or labour productivity or increasing the supply of a public good?
- ***Social:*** If it is aimed at a soluble problem, rather than a structural market failure, does the subsidy decrease dependence eventually making itself obsolete?
- ***Environmental****:* Is the subsidy designed to directly address the problems facing infant environmental industries?

**4. Policy reform**

- What would be the environmental, economic and social impacts of various scenarios for reform of the subsidy, including outright elimination, phased elimination, and change in policy design?
- Would they differ from a simple reversal of the incidental impacts discussed above?
- Where negative impacts are predicted (even in the context of positive net impacts), what sorts of flanking measures might be helpful in addressing them?

Source: Adapted from OECD 2007a

A step-by-step template was produced to ease the application to the six case studies (see Table below). For the OECD own guidance on the use of this tool, see OECD (2007a). It is summarised in its main features in the following points.

**Table 5: Applying the integrated assessment framework**

| Steps in the analysis | Definitions and guidelines from OECD |
|---|---|
| **Features scan** | This section of the analysis examines the impacts of the subsidy in relation to its stated objectives. |
| **Step 1: Subsidy Objectives** | What are the objectives of the subsidy, with respect to its environmental, economic and social impacts? The objectives may be expressed in terms of environmental economic or social outcomes or some combination of the three.<br><br>Official objectives may be surmised from the legislative history or statements by officials. However, officially stated objectives may not always reflect reality. This is partly because of the political basis for public policy, and the tendency to try to accomplish several goal with a single initiative. If the subsidy fails at achieving even those objectives for which it aims, then it is in need of reform regardless of its incidental impacts. |
| **Step 2: Subsidy design**<br><br>− *Sunset clause / built in review process*<br><br>− *Conditionalities* | Does the subsidy design avoid problems inherent in the long-term existence of subsidies?<br><br>− A specified *sunset clause* gives the subsidy an expiry date at the outset. A built in *review mechanism* assesses on a periodic basis whether the subsidy is still necessary. A specified sunset clause may help to avoid problems associated with rigidity in subsidy design and implementation. A built in review mechanism will assess on a periodic basis whether the subsidy is still necessary.<br><br>− Are the *conditions* imposed on subsidy recipients appropriate? Are the conditions based on outcomes, rather than specific technologies (avoiding lock-in effect); on inputs and outputs rather than on capital stock? Incentives tied to outcomes rather than to specific technologies, will generally reduce the risk of technological lock-in and leave firms involved to find the most efficient ways to achieve those outcomes. |
| **Step 3: Effectiveness analysis**<br><br>− Does the subsidy achieve the *economic impacts* that it is expected to achieve?<br><br>− What effect does the subsidy have on the *public budget and on welfare*?<br><br>− Does the subsidy achieve the social impacts expected and | Does the subsidy achieve its objectives? One of the most difficult aspects is to actually articulate the objectives in such a way that they can be used as an objective standard for assessment.<br><br>− *Economic impacts* - for example, does the subsidy correct a market failure; increase the supply of a public good<br><br>− There are two parts to the *welfare equation*. One is the revenue-financing effect, which is the welfare cost of financing a subsidy through taxation versus the tax-interaction effect, which is the welfare gain from the increase in labour supply, induced by the increase in the real household wage when the price of a subsidized consumption good falls.<br><br>− *Social impacts* - for example improving income distribution |

| | |
|---|---|
| reach its *intended recipients*?<br><br>− Does the subsidy achieve its *environmental objectives*?<br><br>− *Cost effectiveness* | generally, reaching a target group with intended benefits; inducing socially desirable behaviour<br><br>− *Environmental objectives* - normally expressed as a desire to promote environmental improvements, e.g. reducing pollution; preserving habitat; encouraging the use of an environmentally preferable product, speeding the development of more-efficient or clean technologies<br><br>− Could the objectives of the subsidy be achieved by other, more *cost effective* policies? Although collecting new, detailed information on the cost effectiveness of alternative policies can be time consuming and costly, the analyst should at least consider and describe alternative policies. This step helps set the stage for analysis of the impacts of policy reform |
| **Incidental impacts** | This section of the analysis examines what impacts have occurred, or might occur, in areas not foreseen or targeted in the original subsidy design. The focus is on long-term, dynamic and international impacts. This sort of analysis forms the classic environmental approach to subsidy analysis, which concerns itself with un-internalized environmental externalities created by the subsidy's economic incentives. In this instance, it is applied to all three types of impacts. |
| **Step 4: Unintended impacts**<br><br>− Unintended *economic impacts*<br><br>− Unintended *social impacts*<br><br>− Unintended *environmental impacts* | What incidental impacts (impacts other than those intended) have been the result of, or can be expected from the subsidy?<br><br>− Incidental *economic impacts* are those not foreseen or targeted in the original subsidy design, for example impacts on the prices of factors of production and intermediate inputs used by non-target industries; or economic impacts of environmental improvement<br><br>− Subsidies usually involve a transfer from one segment of the population to another. Ideally the transfer effects of any subsidy should be neutral or in the direction of a more-equal distribution of wealth or income (and distribution of non-income public goods), and should work to the benefit (or at least not the detriment) of socially marginalized populations. The incidental *social effects* of a subsidy will primarily reside in its distributive effects, with the most fundamental question being who gains and who loses, for example socially undesirable distributional impacts such as on low-income consumers, on non-target population generally, on developing country exporters.<br><br>− Incidental *environmental impacts* arise primarily from economic impacts, and will tend to be negative given that subsidies are primarily designed to increase production or consumption, with attendant scale effects on the environment, such as increased resource use, or increased emissions e.g. degradation of ecosystem services; loss of biodiversity, synergistic effects. |

| | |
|---|---|
| **Long-term effectiveness** | Too often, a subsidy designed to solve a short term problem may easily become the cause of problems in the longer term. In this section, the analyst needs to ask whether the subsidy is merely treating the symptoms of a larger problem or whether it actually addresses underlying causes. The assumption is that, if the former, the subsidy may in fact be delaying necessary structural change. |
| **Step 5: Long-term effectiveness**<br><br>− Is the subsidy designed so as to eventually address the *underlying economic problems* that gave rise to its creation?<br><br>− Is the subsidy aimed at addressing *underlying social problems* or to treat symptoms therefore perpetuating a social 'lock-in'?<br><br>− Is the subsidy designed to directly address the *environmental problems*? | Ideally a subsidy would be a time-limited measure designed to correct an underlying problem such as low productivity, or the need to accelerate the pace of the uptake of new technology. If, on the other hand, the subsidy is aimed at symptoms rather than causes, the long-term dynamic impacts will be merely to prolong a bad situation, and will be negative.<br><br>− Is the subsidy designed to address *underlying economic problems*, for example by spurring innovation, increasing resource or labour productivity or increasing the supply of a public good?<br><br>− Is the subsidy designed to address underlying problems, in which case it may lead to long term positive *social impacts*, or is it designed to treat symptoms, and thus perhaps to merely perpetuate an unsustainable state?<br><br>− Subsidies with *environmental objectives* have a limited set of underlying problems to be addressed. This includes the problems of a fledgling "green" industry or sector, i.e. the need for costly and risky R&D, lack of infrastructure for the take-up of new technologies, the need to achieve economies of scale, lack of public knowledge on new technologies etc. |
| **Policy reform** | The final stage of the analysis aims to highlight the costs and benefits of various reform options and examines the sorts of flanking measures that might be considered as a palliative complement to these reform options. The more important issue for those considering policy reform is the transition from business as usual to the reformed state. Thus it is critical to distinguish between the long-run and transitional effects of policy reform. |
| **Step 6: Impacts of reform** | What would be the environmental, economic and social impacts of various scenarios for reform of the subsidy, including outright elimination, phased elimination, and change in policy design?<br><br>It is important to note that the benefits and costs of removing or reducing an existing subsidy will not necessarily be the inverse of the benefits and costs generated when the subsidy was first created. |
| **Step 7: Flanking measures for expected negative impacts** | Where negative impacts are predicted? And what sort of flanking measures might be helpful in addressing them? In the short run the effects of removing a given subsidy can vary markedly from simply reversing the negative impacts caused by maintaining the subsidy. |

The results of the application of the integrated assessment to the case studies is included in the Annexes. In Box 11 below very brief examples of these results are summarised.

**Box 11: Testing the integrated assessment tool on case studies**

**Example in the water sector - Irrigation Subsidies in Spain**

The original objective of the subsidy was to make irrigated agriculture more profitable. This rationale is no longer entirely valid as low charges eventually translate into poorly maintained water infrastructures, which in turn reduce irrigators' competitiveness and capacity to pay, and influence the selection of crops leading to unsustainable patterns and low-value subsidised cultures. While the subsidy may be justified in certain cases as a means of supporting farmers' income in deprived areas, there are alternative ways to address this concern, for example better targeted subsidies linked to compliance with environmental rules and practices and complementary rural development measures.

There have been successful attempts in the past to remove the subsidy. For instance, in the Genil Cabra and Fuente Palmera irrigation co-operatives in the Guadalquivir river basin, a new water charging structure was implemented to replace the old area-based charge. The new scheme included both a fixed and variable charge linked to water use, with farmers paying, on average, significantly more than under the original area-based approach. This new approach resulted in a 30 per cent reduction in water consumption. Possible compensation measures that could be used to palliate the impact of subsidy removal include supplementing CAP cross-compliance measures with national funds targeted at supporting crops diversification and technological innovation; and raising block (volumetric) tariffs to ensure low prices for low consumers, and increasingly higher water prices for higher water consumption.

**Example in the transport sector - Fuel tax differentiation in the UK, Austria and the Netherlands**

The non-commercial subsidy does not actually encourage fuel savings and does not correct for a market failure (as diesel is not an environmentally preferable fuel from a lifecycle perspective). Although the commercial subsidy is justified by some to keep living costs down, this does not address a market failure. Due to the subsidy, people are not paying the "true cost" for goods. More cost-effective policy alternatives include changes to registration and circulation taxes that offset the subsidy to diesel via excise tax rates, encouraging the use of particulate filters; social transfers to low-income groups; $CO_2$ emission reductions from non-diesel sectors and activities; and setting tougher emissions standards for diesel vehicles.

Past attempts at reform have been carried out in the UK, where the Government equalised taxes on non-commercial petrol and diesel, thus eliminating the subsidy for diesel for non-commercial purposes. Excise taxes on commercial diesel are however still significantly lower than non-commercial rates. In the Netherlands, the Government slowly increased the excise duty on diesel while keeping petrol rates unchanged, thus lessening the size of the subsidy. In order to palliate the impact of removal, the elimination of the subsidy should be a gradual process, sending a signal that would inform near-term purchases of new technology and thus reduce buyers' future fuel costs as the subsidy reform progresses.

**Example in the energy sector - Reduced VAT for domestic energy use in the UK**

The traditional argument to tax 'necessities' at a reduced VAT rate (or not to tax them at all) is that low-income households tend to spend a relatively large part of their income on these goods and services, so that taxing them at the standard rate would have a regressive distributional impact. In reality however, only a small part of the subsidy reaches the intended recipients (low-income households). High-income households receive most of the

benefits, as the income elasticity of demand for energy is positive. The original social motive for the subsidy has largely disappeared, as the share of energy in household expenditure has decreased dramatically, also among low-income households. A more cost effective alternative would be to provide direct income support or tax relief for low-income households.
There have been previous attempts to remove this subsidy including an attempt in 1995 which failed because of the expected distributional impact. In particular the fact that it would hit elderly people the hardest, led to the abandonment of the proposed increase of VAT to the standard level. A possible compensation measure that could be used to palliate the impact of removal would be to reinforce existing schemes to assist low-income households with investments in energy saving.

## 3.4 Summary

This Chapter presents the OECD tools. Their aims and main features have been examined and the step-by-step guidance used for their application to case studies is included. Some of the crucial elements (e.g. policy filters, subsidies conditionalities, role of price elasticities) were examined in some detail. In the following Chapter, the methodology used for testing the tools is explained in more detail.

# 4 TESTING THE OECD TOOLS

**Summary:** The OECD tools were tested in a practical application involving six case studies. This Chapter illustrates the methodology of the test, the target audiences and the sources. It also describes the selection process employed for choosing the case studies for the analysis.

## 4.1 Methodology of the test

The OECD tools (quick scan, checklist and integrated assessment framework) were tested in a practical application involving six case studies.

### 4.1.1 Target audiences

The appraisal was performed from the perspective of an application by policy makers and in particular by those less well-versed to subsidy analysis. Since the aim of the tools is to provide a clear and accessible means to identify and assess EHS, the methodological recommendations for their improvement and guidelines were mainly focused to ensure their accessibility to policy makers and particularly to those who are confronted to environmentally harmful subsidies reform for the first time.

Those who are familiar with the subject will find benefit in finding in this study a streamlining of the extensive body of work developed by the OECD on the subject over the last two decades.

Thus, the main users of the tools were considered to be policy makers, including mainly governmental staff, such as civil servants and politicians. The tools are however also useful for members of civil society interested in EHS reform, such as NGOs, trade unions, political parties, business associations. The focus of the appraisal and of the guidelines was to ensure accessibility of the tool by these different users.

The aim of the test was to assess the extent to which the tools could be employed in a policy making context. Policy makers who embark in the process of EHS identification and assessment act in the following circumstances:

- Often they lack resources (i.e. time and expertise) for an extensive analysis;
- They need clear guidance on how to prioritise their efforts; and
- They need to understand the political process that subsidy reform involves.

Often the complexity of the process discourages reform. Thus the rationale behind the OECD tools is to make the topic accessible and promote the use of the tools to enable the prioritisation of EHS that are more harmful to the environment in the reform process.

### 4.1.2 Aims of the test

The test undertaken has been instrumental to assess: the effectiveness of the tools in achieving their aims, their user friendliness, data intensity, their comparability and the identification of gaps and links. In particular:

- How policy makers could use the OECD tools as 'quick assessment' tools;
- Using data readily available;
- Without the use of modelling or resource intensive tools (e.g. cost benefits analysis); and
- To understand to what extent the tools are effective in enabling decision making on the EHS reform.

The test enabled an informed assessment of the OECD tools which is presented in Chapter 5

In order to facilitate the test and with a view to producing operational guidance on the use of the tools, systematic guidance on the use of each of the tools has was developed. A literature review of the OECD literature was undertaken and in particular:

- OECD 1998 – for an understanding of the quick scan tool;
- OECD 2005 – for an understanding of the checklist;
- OECD 2007a – for an understanding of the integrated assessment framework.

On the basis of the literature review, guidance was produced on the use of the tools (see Chapter 3 for the aims of each tool; description of each tool; step-by-step guidance for the use of the tool and Chapter 6 for operational guidelines on their use).

### 4.1.3 Sources

The application of the tools was supported by an analysis of the economic, social, environmental dimensions, the underlying political economy, and technological knowledge and research.

Resources and data used were gathered using the existing literature and readily available databases. Some economic thinking and calculations was required but no econometric tools (such as partial or general equilibrium models) were applied. In general, it was considered that quantitative estimates of first-order impacts were sufficient for this type of analysis.

The individual OECD tools were applied as follows:

- **Quick scan**: this tool was applied with the support of existing studies (mainly micro and macroeconomics studies on the subject, as well as impact assessments) and estimating first order impacts. The analysis was carried out following the indications provided by the OECD (1998). The 'recipe book' developed by the team on calculating the subsidy levels was used to calculate the size of subsidies.

- **Checklist**: the checklist was used to complement the quick scan, as a framework to facilitate the decision on whether subsidy reform would be beneficial to the environment. In addition to the sources used for the quick scan, it involved looking at studies on the environmental profiles of available and emerging technologies. It followed the indications for its use as developed by Pieters (2003 and 2004); OECD (2005).
- **Integrated assessment framework**: this tool mainly incorporates additional issues. Here a wider set of literature was used, that explored the social aspects of an activity as well as alternative policies available. This assessment was conducted qualitatively and using readily available literature. The application followed the indications developed in OECD 2007a.

Expert judgement, gauged also through expert interviews, completed the analysis where necessary.

## 4.2 Case studies selection

Task 1 was aimed at the identification of six case studies of 'existing national subsidy schemes, in Europe, with notorious *potential* harmful impacts on the environment' to be used to test the identification and assessment tools produced by the OECD (Task 2) and to develop indicators on the level of subsidisation of the industry in question (Task 3).

### 4.2.1 The selection criteria employed

A set of criteria were developed to identify which case studies could be employed for the purposes of this study. The case studies were chosen on the basis of their relevance to the European political situation and on the basis of their suitability for the analysis within a limited time scale and limited resources. The following selection criteria were used to support the selection:

1) **Relevance**
   - Degree of suspected harmfulness to the environment (what is the environmental harm done by the subsidy at the local, national, European *or* global level?);
   - Economic and social relevance (what was or is the economic and or social rationale of the subsidy; is the rationale still valid?; what are the economic and social impacts of the subsidy?);
   - Policy relevance, notably at the EU level (is the subsidy consistent with EU legislation, policy goals and objectives?; is it relevant to EU policies and how?); and
   - Existing calls for removal by the public or stakeholders (is there existing support and/or opposition to the reform of the subsidy?).

2) **Suitability for the purposes of the analysis**
   - Data availability (the data and literature available need to be sufficient to support the test of the tools and to allow the calculation of the size of the subsidy);

- Sufficient elements for the analysis (on the basis of the data availability, is it possible to apply the OECD tools and develop the level of subsidisation indicators?);
- Diversity in subsidy types (direct/explicit/on-budget; indirect/implicit/off-budget; tax exemptions; lack of full cost recovery; lack of internalisation of external costs); and
- Country coverage (to show diversity of approaches).

### 4.2.2 The selection process

The selection criteria were applied to a **long list of case studies** and were used to narrow the list down to a **subset of cases** (medium list) that proved to be the most relevant in terms of environmental harm, socio-economic impacts, and their significance in an EU policy context. A shortlist of six case studies was then agreed on in discussion with the European Commission. The table below summarises the results of the selection process. The application of the selection criteria to each case study is available in the Annexes.

**Table 6: List of case studies proposed and selected**

| | Sector | Criteria application results | Final selection |
|---|---|---|---|
| | **Transport** | | |
| 1 | Company car subsidies | Criteria application allows selection | **X** |
| 2 | Commuter subsidies | Criteria application allows selection | |
| 3 | Aviation fuel tax exemption | Criteria application allows selection | |
| 4 | Fuel taxes differentiation (diesel versus petrol) | Criteria application allows selection | **X** |
| 5 | Reduced VAT for passenger transport | Criteria application allows selection | |
| 6 | Road infrastructure cost recovery (lack of) | Criteria application reveals low relevance / difficulties | |
| 7 | Tax exemptions for (inland and marine) shipping | Criteria application reveals low relevance / difficulties | |
| 8 | Use of private cars for business purposes | Criteria application hinders selection | |
| | **Energy** | | |
| 1 | Biofuels for transport (fuel tax exemptions) | Criteria application allows selection | **X** |
| 2 | Reduced VAT for domestic energy | Criteria application allows selection | **X** |
| 3 | Subsidies for the use of peat for power generation | Criteria application allows selection | |
| 4 | Coal subsidies | Criteria application allows selection | |
| 5 | Partial liability for oil spills | Criteria application reveals low relevance / difficulties | |
| 6 | Exemption to taxes to energy intensive industry | Criteria application reveals low relevance / difficulties | |
| 7 | Oil/gas exploration preferential treatment | Criteria application hinders | |

| | | | |
|---|---|---|---|
| | | selection | |
| 8 | Nuclear power | Criteria application hinders selection | **X** |
| | **Water** | | |
| 1 | Irrigation water subsidies – non payment of full cost recovery | Criteria application allows selection | **X** |
| 2 | Reduced VAT for Drinking Water | Criteria application allows selection | |
| 3 | Water subsidies – non payment of resource costs | Criteria application allows selection | |
| 4 | Non payment of pollution of water resources | Criteria application hinders selection | |

| **Legend** |
|---|
| Criteria application hinders selection |
| Criteria application reveals low relevance / difficulties |
| Criteria application allows selection |

Following the selection process, the case studies used for testing the tools are:

| | |
|---|---|
| **Transport** | |
| 1 | Company car taxation in the Netherlands |
| 2 | Fuel taxes: diesel vs. petrol in Austria, the Netherlands and the UK |
| **Energy** | |
| 3 | VAT reduction for domestic energy consumption in the UK |
| 4 | Nuclear energy: decommissioning subsidies in Germany |
| 5 | Fuel tax exemptions for biofuels in Germany |
| **Water** | |
| 6 | Irrigation water subsidies in Spain |

### 4.3 Case studies results

The application of the OECD tools to the case studies provided the following types of information and insights:

- Identification of the subsidy on the basis of a counterfactual;
- Estimation of the size of the subsidy (both indicators of subsidy levels and marginal social cost);
- Information on the levels of damage related to the EHS, where possible;
- An analysis of the validity of the rationale of the subsidy;
- Alternative policies to address the rationale of the subsidy;
- Arguments for the removal or non-removal of the subsidy;
- Recommendations on possible compensation measures that could be used to palliate the impact of removal and be part of important flanking measures to help in the transition.

*It is important to note that the analysis undertaken does not have the ambition of providing an exhaustive review of the cases in themselves, but was mainly instrumental to the appraisal of the tools.*

**Box 12: The role of case studies in EHS assessment**

At the experts' workshop, there was an agreement that case studies are important in policy making as they provide useful pointers for action. In cases where data is lacking, such as for EHS, they are precious tools. However, it was noted that policy recommendations depend on the context and it was cautioned that case study findings should not be widely extrapolated.

### 4.3.1 Summary of case studies in the transport sector

In this section summaries of the selection process and the main results of the case studies are included. The detailed results of the test on case studies are presented in the Annexes.

**Case study 1: Differentiation of fuel taxes – lower taxation of diesel compared to unleaded gasoline**

| **Brief description of reasons for selection** | |
|---|---|
| Partner responsible | Ecologic |
| Sector | Transport |
| Country | Three country case studies were selected (representing low, medium and high subsidisation levels). |
| Type of subsidy | Off-budget, implicit subsidy. In EU Member States, diesel is frequently taxed at a lower rate than the equivalent energy product (i.e. unleaded petrol). |
| Reasons for selection | The issue is widespread in the EU and data availability is good. There have been a number of studies on this topic. Attempts to amend the policy have been made by the European Commission. Many reviews, including an Impact Assessment for the European Commission, and studies have been carried out. |
| **Summary assessment** | |
| Short description | Many EU Member States tax diesel fuel at lower rates than petrol, providing a subsidy for users of diesel fuel (households and firms). In this case, we examine non-commercial diesel subsidies in the UK (no subsidy), Austria (EU average subsidy), and the Netherlands (EU high subsidy). We also examined some issues related to the subsidisation of commercial diesel (e.g. for freight and the agriculture industry) as producer subsidies raise different economic and social effects but this was not the focus of the case study. |
| Key environmental effects | Diesel gives rise to $CO_2$, CO and NOx emissions that cause climate change; it requires larger amount of oil for production; emits fine particles; lower fuel cost increases travel. On a per-litre basis, $CO_2$ emissions are higher for diesel than for petrol. |
| Is subsidy removal likely to benefit environment? | Yes: By eliminating the non-commercial subsidy, there will be decreased demand for diesel; Particulate filters do not effectively limit environmental damage; More benign alternatives are available now and/or are emerging (hybrid and plug-in technology, biofuels, and increased efficiency). Complementary policy measures (circulation and registration taxes) could be implemented that account for the differing $CO_2$ emissions of various vehicles on a *per-kilometre* basis (a metric on which diesel outperforms petrol). |

| Objectives and justification | |
|---|---|
| Subsidy objectives (original rationale) | Some governments state that the subsidy encourages fuel savings; however, $CO_2$ emissions per litre are higher for diesel than petrol on a life-cycle basis and diesel generates significantly higher levels of other pollutants (e.g. particulate matter) per litre than petrol. Original objectives for the *commercial* subsidy were economic (lower costs for transporting goods) and social (lower living costs as a result). |
| Is the original rationale still valid? | No, the non-commercial subsidy does not reflect the higher $CO_2$ emissions from diesel and other policy measures (e.g. circulation taxes) would be better at reflecting comparative engine performance. |
| Key problems with subsidy design | There is no sunset clause; no evaluation process; the subisdy "locks-in" diesel technology and slows adoption of new environmentally friendly technology. |
| **Economic aspects** | |
| On- or off-budget | Off budget (tax expenditure) |
| Conditional on what activity? | Non-commercial diesel subsidy: final consumption (households). Commercial diesel subsidy: production inputs (firms). |
| Point(s) of impact | Demand (for private users, final demand for motor fuel is the point of impact); Input ( when diesel motor fuel is an input for *commercial* use, the subsidy has effects on the input costs, with secondary effects on income and profits) |
| Subsidy size/value | Non-commercial diesel subsidy: UK - no difference between diesel and petrol excise duty; Austria – diesel is taxed 21% less than petrol; Netherlands – diesel is taxed 40% less than petrol. *Commercial* diesel subsidy: lower in all three countries. Subsidies to non-commercial use is zero in the UK; in Austria = €128 million; in the Netherlands = € 570 million.<br>Including external costs of $CO_2$: in Austria = €129 - €138 million; in the Netherlands = €574 - €611 million. (Note does not include effects of cross-price elasticity with petrol) |
| Elasticity effects | Elasticity of demand for non-commercial transport: 0.25 in a year, 0.6 in the longer run due to changes in travel behaviour and vehicle/modal/fuel choice (Goodwin et. al, 2004). Cross-price elasticity of demand for petrol will cause some offsetting increase in petrol consumption (level unknown). |
| Importance of trade issues | Somewhat: EU dependence on fossil-fuel imports is a key energy security issue. |
| Availability of economic data | Good availability. |
| **Social aspects** | |
| Does it reach the intended recipients? | Yes (as a way to reduce transport costs and the cost of goods). |
| Winners and losers | Benefits of the subsidy accrue to owners of private diesel-fueled vehicles, which tend to be wealthier than owners of petrol vehicles (though energy excise taxes generally are regressive). The diesel subsidy disadvantages firms producing petrol-related |

| | |
|---|---|
| | technologies (e.g. engines) and benefits firms producing diesel technology. Increased travel causes negative social externalities (traffic noise; pollution effects). |
| Equity issues? | Negative externalities (e.g. emissions, particulates, increased traffic) |
| **Reform issues** | |
| Past attempts to remove subsidy? | UK has equalised its excise duty rates of non-commercial fuels. No evidence has been found of Austrian reform efforts; Netherlands increased excise duty on diesel by 3 cents a litre in July 2008 and an additional 1 cent per litre in January. 2009, leaving petrol rates unchanged. |
| Existing calls for removal? | Diesel-tax subsidies are frequently mentioned as environmentally harmful subsidies by environmental groups. |
| Key reform challenges | Industry lobbies can be expected to oppose reform. Reform will not be popular among households owning diesel vehicles. |
| Are there alternative policies to achieve the same objectives? | Increased use of particulate filters; Social transfers to low-income groups (replacing transfers through cheaper diesel); $CO_2$ emission reductions from non-diesel sectors and activities; tougher emissions standards for diesel vehicles. Circulation or registration taxes specific to each vehicle's efficiency. |
| Possible compensation measures to palliate impact of removal | Reducing taxes on activities not harmful to the environment. Government programmes aimed at lowering costs of fuel-efficient and low-carbon technologies. |

## Case study 2: Subsidies to the private use of company cars

| **Brief description of reasons for selection** | |
|---|---|
| Partner | IEEP and IVM |
| Sector | Transport |
| Country | The Netherlands. |
| Type of subsidy | Off-budget: preferential tax treatment |
| Reasons for selection | Company cars are particularly important drivers of the whole fleet – although only a few percent of total fleet on the road, half of new cars are bought by companies. While demand for private cars has been recently declining, company cars purchases are increasing. The preferential fiscal treatment is also extremely common. The provision of company cars has become in the EU by far the most important category of fringe benefits. The Netherlands was chosen as a case study for the good data availability and as it has a system similar to many other European countries. |
| **Summary assessment** | |

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| Short description | An implicit subsidy on the provision of company cars. The percentage of company car value that is added to taxable income (25%) is well below the percentage that would reflect the employee's actual private benefit. |
| Key environmental effects | Climate change, air pollution and all other effects of car ownership and use. |
| Is subsidy removal likely to benefit environment? | Yes: it would lead to lower levels of car ownership and use, and probably also to smaller and 'cleaner' cars. The overall impact will depend on the specific design of the reform, including flanking measures. |
| **Objectives and justification** | |
| Subsidy objectives (original rationale) | Mainly economic (enhancing productivity; increasing labour supply; keeping wages lower than they would be otherwise; promoting consumption) and social (promoting employment in rural areas). |
| Is the original rationale still valid | Yes, to a large extent. |
| Key problems with subsidy design | The nature of the company car taxation system encourages car use as the marginal cost to the employee of driving a company car becomes often close to zero. |
| **Economic aspects** | |
| On- or off-budget | On-budget (it leads to lower tax income for the government). |
| Conditional on what activity? | Possession of a company car (regardless of its use for business or private purposes). |
| Point(s) of impact | Demand (car ownership and use). |
| Subsidy size/value | Estimated at € 2.2 to 2.6 billion for the Netherlands alone. |
| Elasticity effects | Main impact is an increase in the number (and value) of cars; to a lesser extent also increase in mileage traveled. |
| Importance of trade issues | N.a. |
| Availability of economic data | Data on car ownership are publicly available; data on car use by purpose (business or private) may be harder to obtain. |
| **Social aspects** | |
| Does it reach the intended recipients? | Yes. |

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| Winners and losers | The winners are employees with a company car (mainly male employees in the medium to high income brackets). Losers are the taxpayers in general. |
| Equity issues? | See above. |
| **Reform issues** | |
| Past attempts to remove subsidy? | No reform in the sense of increasing taxable income from company car possession to the 'optimal' level. Only minor reforms (environmentally motivated differentiation). |
| Existing calls for removal? | No; only discussion on design and details. |
| Key reform challenges | Strong vested interests and lobbies; lack of awareness of implied welfare loss. |
| Are there alternative policies to achieve the same objectives? | Yes (e.g. various measures to promote labour productivity and labour market participation; higher untaxed reimbursment of employees using their private car for business purposes; higher untaxed relocation benefits). |
| Possible compensation measures to palliate impact of removal | Compensation to business does not seem to be necessary, although the impacts on small business should be assessed. Possible compensation measures to employees who opt out of company cars include offering alternative forms of remuneration, such as cash, other non-cash benefits, and relocation benefits for those who are commuting long distances . |

## 4.4 Summary of case studies in the energy sector

### Case study 3: Subsidies to nuclear power

| **Brief description of reasons for selection** | |
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| Partner | Ecologic |
| Sector | Energy |
| Country | Germany |
| Type of subsidy | Several subsidy types were investigated. There are both direct and indirect subsidies for nuclear power in the EU.<br>**Direct subsidies:** the EU and several Member States provide funding for R&D programs. Some countries provide government support for power plant decommissioning. Direct support also takes the form of debt write-offs, provision of site security, and safety oversight.<br>**Indirect subsidies:** International treaties also limit full commercial and/or state liability, meaning that energy companies do not pay for full liability insurance and do not pay for all of the externalities associated with fuel use and disposal. Other subsidy types include: preferential tax treatment for decommissioning funds (e.g. Germany) and guaranteed supply contracts (e.g. Finland). Should decommissioning funds prove inadequate, it is likely that governments would have to subsidise this activity. |

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| Reasons for selection | Subsidies for nuclear power are highly relevant from a policy perspective. In light of climate change, there is growing pressure to consider expansion of the industry. At the EU level, competence over nuclear policy is contested, with much resistance from MS to EU attempts to regulate nuclear activities.<br>Based on a preliminary feasibility assessment, it was concluded that the decommissioning and waste disposal subsidies, though a fairly small portion of the overall subsidisation levels, are more straightforward to analyse in an EHS context. Moreover, given the completeness of the recent Diekmann and Horn (2007) study, it was considered not to be much added value to quantifying the German nuclear case in Task 3. |
| **Summary assessment** | |
| Short description | The key subsidy specific to the decommissioning of nuclear-power facilities in Germany is a reduction in tax liabilities stemming from collection of decommissioning funds. Operators of nuclear facilities also benefit from the unrestricted potential of using decommissioning funds. Operators of nuclear facilities are required to set aside reserves (accruals) for the future disposal of nuclear waste and plant components. The Federal Ministry of Finance considers these requirements as tax-reducing. Though German law requires that adequate decommissioning funds be available at the time of decommissioning, the accumulated (tax-advantaged) funds can be used to finance business activities in the interim, thereby offering an advantage over competing businesses and industries. |
| Key environmental effects | The subsidy's environmental effects are ambiguous. On the one hand, nuclear power has significant potentially catastrophic environmental risks related to nuclear accidents. On the other hand, the climate impacts of nuclear power are smaller than those of coal-fired plants--the key competing source of baseload power. The overall policy environment has a deciding influence on whether renewables or coal would replace nuclear power. |
| Is subsidy removal likely to benefit environment? | As long as Germany's phase-out policy is in effect, reforming the subsidy will have little impact on nuclear power production. Requiring segregated funds might ensure it is plant owners that pay for decommissioning (rather than taxpayers) but it is safe to assume that full decommissioning will take place regardless of who pays for it. Many other subsidies for nuclear power exist making the nuclear industry one that is far-removed from competitive market conditions. |
| Subsidy objectives (original rationale) | The intent of collecting decommissioning funds is to ensure adequate financing for decommissioning. |
| is the original rationale still valid | The fact that the nuclear power generators' activities are subsidised by the decommissioning funds is an unintended side effect but one that has resisted reform. |
| Key problems with subsidy design | Through the decommissioning-fund subsidy, nuclear plant owners enjoy a competitive advantage that stems directly from the environmentally risky nature of nuclear power. |
| **Economic aspects** | |
| On- or off- | Off budget (tax expenditure; distortion of competition in the private sector) |

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| budget | |
| Conditional on what activity? | Conditional on collection of decommissioning funds |
| Point(s) of impact | As a subsidy to fixed costs, the subsidy increases profits. |
| Subsidy size/value | Estimates vary. A recent study for the German government estimates the total size of this tax benefit at 5.6 billion EUR per year or 175 million EUR per nuclear power plant (Diekmann & Horn, 2007, p. 39). |
| Elasticity effects | Demand for nuclear power is inelastic over the relevant price range established by the marginal price for electricity, which is set by the highest-cost producer at any time (rarely nuclear). Supply of nuclear is also inelastic over the short term (and restricted over the long term by political, legal and technical factors). |
| Importance of trade issues | Due to the planned nuclear phase-out, the effects of this particular subsidy can be expected to have little effect on trade. In the absence of the phase-out, it would be relevant to analyse the effects of subsidy removal on imports of nuclear-power generated electricity from neighbouring countries as well as uranium imports. |
| Availability of economic data | Estimates can be made but do vary. The proprietary nature of some of the data complicates the analysis. |
| **Social aspects** | |
| Does it reach the intended recipients? | The intent of collecting decommissioning funds is to ensure adequate financing for decommissioning. The fact that the nuclear power generators' activities in Germany are subsidised by the decommissioning funds is an unintended side effect but one that has resisted reform. |
| Winners and losers | Benefits from the subsidy accrue to owners of nuclear power facilities. |
| Equity issues? | The populace faces negative externalities related to the use of nuclear power |
| **Reform issues** | |
| Past attempts to remove subsidy? | There have been legal attempts to challenge the lack of a segregated decommissioning fund. These legal challenges failed in EU courts. Part of the political agreement in Germany related to the nuclear phase-out policy was to ensure that additional taxes would not be selectively imposed on the nuclear industry. |
| Existing calls for removal? | A removal of this particular subsidy is not in active discussion, although environment Minister Sigmar Gabriel has called for a tax on nuclear fuel equivalent to one cent per kWh as recently as summer 2009, making the argument that due to the significant profitability benefits the nuclear industry has enjoyed due to the advent of carbon emissions trading, such a tax would not violate the 2000 political agreement related to the phase-out policy of not discriminately taxing nuclear power. |
| Key reform challenges | Reform would be vehemently challenged by the nuclear power industry. |

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| Are there alternative policies to achieve the same objectives? | The nuclear phase-out reduces reliance on German nuclear power plants much more rapidly than would reform of this subsidy. |
| Possible compensation measures to palliate impact of removal | The requirement to collect funds in a segregated account could apply to only the future funds collected, but this is unlikely in the context of the political agreement related to the phase-out policy. |

### Case study 4: Reduced VAT for domestic energy

| **Brief description of reasons for selection** | |
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| Partner | IVM |
| Sector | Energy |
| Country | UK |
| Type of subsidy | Off-budget: Reduced VAT for domestic energy (gas and electricity) |
| Reasons for selection | Reduced VAT rates have a primarily social objective (protecting low-income households). They are a direct and unconditional subsidy to (energy) consumption. These typical features made them a suitable object for analysis under the OECD methodology. The case of reduced VAT rates for domestic energy in the UK was chosen as it is one of the most obvious and substantial examples of an EHS of this type in the EU. It is expected that the results of the case study may be relevant for other cases of reduced VAT rates as well. |
| **Summary assessment** | |
| Short description | The UK applies a reduced VAT rate on energy products (electricity, natural gas, heating oil and coal), thus providing a subsidy to the final consumers of these products. |
| Key environmental effects | Climate change; acidification; depletion of non-renewable energy resources. |
| Is subsidy removal likely to benefit environment? | Yes: alternative technologies (e.g. energy saving) are available; subsidy is only conditional on consumption. |
| **Objectives and justification** | |
| Subsidy objectives (original rationale) | Original objective was social (protecting low-income households). |
| Is the original rationale still valid | No: share of energy costs in budget of households has decreased considerably. Other, less distortionary ways of providing support to the targeted households are available. |

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| Key problems with subsidy design | No sunset clause; no evaluation of effectiveness; no reason to have a generalised subsidy. |
| **Economic aspects** | |
| On- or off-budget | On-budget in terms of OECD 1998; off-budget in terms of EEA 2004 (type 3.2). |
| Conditional on what activity? | Consumption subsidy. |
| Point(s) of impact | Demand (final consumption of energy by consumers and VAT-exempted entities). |
| Subsidy size/value | In UK currently 10% of product price; total value about EUR 4.5 billion. |
| Elasticity effects | Short term demand elasticity is about -0.3 to -0.35, so the subsidy increases demand by 3 to 3.5%. |
| Importance of trade issues | The subsidy adds to the import dependence in energy, but does not affect the international competitiveness of the commercial sector. |
| Availability of economic data | Data on energy consumption are available on different levels of aggregation. |
| **Social aspects** | |
| Does it reach the intended recipients? | Yes (as well as a much larger number of unintended recipients). |
| Winners and losers | The winners are the households (and other eligible entities) with the highest energy consumption. |
| Equity issues? | Overall average impact is progressive (low-income households benefit most, assuming that the counterfactual would be lower income taxes). |
| **Reform issues** | |
| Past attempts to remove subsidy? | Yes. Attempt at reform in 1995 failed for political reasons. |
| Existing calls for removal? | Yes (e.g. in OECD JEGET Committee (Environment & Taxation)). |
| Key reform challenges | Sense of urgency seems to be lacking, as there are no signs of recent calls for reform. |
| Are there alternative policies to achieve the same objectives? | Yes (e.g. fiscal policy; direct subsidies for energy saving etc.); however, not really necessary as original objectives do not hold anymore. |

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| Possible compensation measures to palliate impact of removal | See above. |

## Case study 5: Tax exemptions to Biofuels

| Brief description of reasons for selection | |
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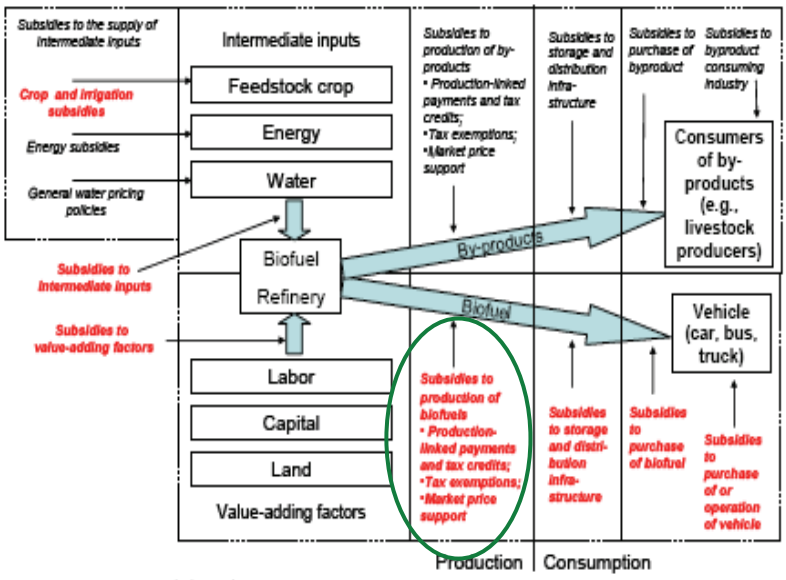
| Partner | IEEP |
| Sector | Energy |
| Country | Germany was proposed as a case study for the analysis. Germany is currently the world's leading producer of biodiesel and Europe's leading producer of ethanol. Germany also has a relatively long history of political support for biofuels. |
| Type of subsidy | Support for the production and consumption of biofuels is provided at many points in the supply chain (see Figure 1).<br><br>**Figure 1: Subsidies provided at different points in the biofuel supply chain**<br>  <br><br>Source: Global Subsidies Initiative. Steenblik and Simón (2007).<br><br>This study focuses on **fuel tax exemptions** provided to the production of biofuels as they are reported to account for the largest share of public support granted to biofuels in the EU and are particularly widespread, with 21 Member States granting some form of tax exemption to biofuels (Kutas et al, 2007). Fuel tax exemptions are an off-budget, output linked subsidy, and it is recognised that 'policies that directly bear on the level of production are considered to have the greatest level of distortion on production decisions' (Doornbosch and Steenblick, 2007). Before the adoption of Directive 2009/28/EC on the promotion of the use of energy from renewable sources in April 2009, the majority of these tax exemptions did not distinguish between biofuels according to the type of feedstocks used or production methods employed – factors which have significant implications for the environmental costs and benefits of biofuels. |

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| Reasons for selection | This is a historical case study that focuses on Germany's 2004 fuel tax exemption for pure and blended biofuels and the subsequent reform of this instrument over the years. While recognising that much has changed since this time and that Member States now operate in a different context where the unintended adverse consequences of biofuels are increasingly recognised and to some extent addressed, it was considered that an analysis of this case would be useful in the current context as Member States begin the process of revising/developing policies to meet new biofuels targets and sustainability criteria.<br><br>**Context**<br>At the time that the 2004 tax exemption was introduced in Germany, Member States were required under the biofuels Directive (2003/30/EC) to ensure that a 'minimum proportion' of biofuels and other renewable fuels are placed on their markets. The Directive stipulated 'reference values' for national indicative targets of 2% by the end of 2005 and 5.75% by the end of 2010. A variety of measures were subsequently introduced by Member States to meet these non-binding targets, including preferential tax treatments. A legal provision for this was made in Directive 2003/96/EC on the taxation of energy products and electricity which allows Member States to apply reduced excise duty and exemptions for products from biomass sources.<br><br>Since this time, the EU has developed robust legislation encouraging the use of biofuels in the transport sector which integrate some sustainability criteria that aim to prevent, or at least mitigate, the adverse impacts associated with increased demand for biofuels. Under Directive 2009/28/EC only those biofuels that fulfil minimum sustainability criteria will count towards the EU and Member State targets and renewable energy obligations, and be eligible for certain forms of financial support. While it is still far from clear that these provisions will effectively account for the sustainability of any given batch of biofuels (with a number of outstanding concerns related to indirect land use change, implementation, etc), they arguably provide some general positive pressure / incentives for improving environmental and social standards in producer countries and as such are an important environmental policy filter.<br><br>In the coming months EU Member States are expected to begin the process of revising existing policies / introducing new measures to promote biofuels so as to comply with the provisions of the new EU Directive. In this context, an examination of the German case is valid given the size of the domestic market, the strong history of political support for biofuels, the impacts of this support, and its reform since 2006 to date. An analysis of the German experience in reforming its own biofuels support measures is expected to provide some interesting insights which may be useful for the policy reform process underway in other EU Member States.<br><br>**Caveat**<br>Given the complexities related to the issue of biofuels it is worth keeping in mind certain caveats when reading the results below. In particular, it is important to note that tax exemptions are one instrument used in pursuit of biofuels policy objectives (see Figure 1). In this context, it is difficult to extrapolate the specific environmental, social and economic impacts of the tax exemption from the impacts of other instruments that also seek to meet biofuels policy objectives per se. Tax exemptions are not a stand-alone subsidy, and interactions with other instruments, as well as wider biofuels policy objectives and agreed targets need to be borne in mind. |

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| | However, tax exemptions for biofuels are often introduced as a means of achieving certain (environmental) objectives, e.g. a reduction in fossil fuel consumption. Thus if unintended adverse impacts on the environment result when the instrument is implemented, this needs to be addressed and the design of the instrument needs to be re-evaluated - as has been the case in Germany. |
| **Summary assessment** | |
| Short description | The 2004 fuel tax exemption for pure and blended biofuels is an output linked off-budget support mechanism that grants preferential tax treatment for producers of biofuels relative to producers of fossil fuels. |
| Key environmental effects | As noted above, it is difficult to extrapolate the environmental impact of the 2004 tax exemption from the impacts of other biofuels support measures in place. However, general conclusions can be drawn regarding the impact of the increased production and consumption of biofuels in Germany since 2004.<br><br>The increased use of biofuels in Germany resulted in a reduction of GHG emissions due to the substitution of biofuels for fossil fuels for use in transport and stationary plants. It also resulted in an increase in cultivation and processing of rapeseed oil crops in Germany with some negative impacts in terms of land use, in particular to the extent that biofuels crops were grown on previously uncultivated land (ie set aside land). The net environmental impact is uncertain and varies according to different methodologies used / assumptions made. The assessment is further complicated by the need to include indirect land use changes due to the displacement of food crop cultivation to previously undisturbed areas as existing areas are used for the cultivation of energy crops both domestically and in third countries. |
| Is subsidy removal likely to benefit the environment? | Removal of the tax exemption will increase the price of biofuels, thus making biofuels less attractive compared to conventional fossil fuels. Coupled with falling fuel prices (which reduce the price differential) and high feedstock prices, this will reduce the incentive for production of biofuels and therefore reduce impacts on the environment from the cultivation and processing of biofuels. It will also however increase GHG emissions to the extent that reduced consumption of biofuels will increase the use of fossil fuels (given their substitutability). |
| **Objectives and justification** | |
| Subsidy objectives (original rationale) | Environmental objectives of the tax exemption was to promote the production and use of renewable fuels thus reducing GHG emissions, and to reduce dependency on oil imports, thus increasing security of supply.<br><br>In terms of economic objectives, the tax exemption sought to compensate biofuels producers for the higher production costs of biofuels compared to conventional fossil fuels. This would in turn enable biofuels to enter the fuel market at a competitive price thus achieving the underlying environmental objectives. |
| Is the original rationale still valid | While the objective of promoting production and use of renewable fuels is still valid, the 2004 tax exemption did not distinguish between biofuels according to any environmental criteria, thus there was no incentive for producers to ensure GHG emission reductions or avoid environmental damage.<br><br>The economic objectives are no longer valid given the maturity of the biofuels industry and the detected overcompensation provided to biofuel producers which |

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| | enabled them to enjoy windfall-profits. |
| Key problems with subsidy design | The tax exemption was valid for a limited period (from 1/01/2004 until 31/12/2009) and was subject to an annual review of any overcompensation by a report by the Federal Government to the Bundestag. A key problem with the design of the tax exemption was the failure to distinguish between biofuels according to their GHG emission savings which meant that producers had no incentive to ensure GHG emission reductions or avoid environmental damage. |
| **Economic aspects** | |
| On- or off-budget | Off-budget subsidy |
| Conditional on what activity? | Production (output) |
| Point(s) of impact | The main point of impact is on market prices, leading to revenue increases proportional to the volume of production (output) |
| Subsidy size/value | The excise tax exemption for biodiesel led to a reduced tax revenue of approximately €559 million in 2004 (Federal Ministry of Finance, 2005). According to estimates by the Ministry of Finance, the revenue losses would increase to €1.5 billion. Kutas et al (2007) estimate that the loss of fiscal revenues from tax exemptions for ethanol, biodiesel and pure plant oil was €1.21 billion in 2005 and €1.98 billion in 2006. This is relative to what would have been earned if biofuels had been taxed at the full mineral oil tax rate applied to fossil fuels.<br><br>Total revenue forgone in 2004:<br>= €618 million<br><br>Source: Federal Government (2005) |
| Elasticity effects | **Demand for fuel is inelastic** given that it is considered a necessity good. A short term (1 year) elasticity estimate for vehicle fuel consumption is -0.25**,** while in the long term (5 years) elasticity is estimated to be -0.64 (using time series data from a number of countries - Goodwin et al, 2004).<br><br>Due to a lack of available data, estimates of **elasticity of demand and supply for biofuels** are based on calculations of supply and demand elasticities in the US ethanol market (Luchansky and Monks, 2009). In terms of supply, price elasticity is estimated to be between 0.22 and 0.26. Thus ethanol production is very price inelastic at least in the short term. In terms of demand, price elasticity is estimated to be between -1.61 and -2.92. Thus ethanol demand is very price elastic.<br><br>Despite differences in the US and EU biofuels markets, a general conclusion that can be drawn from these results is that demand for biofuels is relatively elastic given its substitutability with fossil fuels. Consumers are influenced by price considerations and availability (more so than environmental concerns) and the final consumption of biofuels is heavily dependent on the corresponding price of fossil fuels. Thus if the price of biofuels was to increase significantly, it is likely that consumers will switch |

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| | to other relatively cheaper (fossil) fuels. In the supply market, production is less sensitive to price changes, at least in the short term, given capacity limitations. |
| Importance of trade issues | Trade issues are very important given linkages between the demand for biofuel feedstocks and commodity markets, as well as the importance of trade in biofuel products and the impacts of tariff barriers on availability of feedstocks and biofuel products from more cost-efficient producers in third countries. |
| Availability of economic data | A significant amount of data is available on Germany and at the EU level. Information on price elasticities was only found for US market for ethanol. It should be noted that the US bioethanol market is very different from the European one, with significant price protection aimed at supporting the corn industry, and a higher dependency on petrol rather than diesel compared to Europe. These market characteristics will inevitably affect the estimates of elasticity presented above. |
| **Social aspects** | |
| Does it reach the intended recipients? | The intended recipients (biofuel producers and blenders) benefited significantly from the tax exemption. |
| Winners and losers | Winners: Biofuels producers (primarily large agro-industrial companies capable of producing large quantities of biofuels or petroleum companies using cheaper non-domestic production for their blends) and consumers of by-products such as rapeseed cake sold as livestock feed.<br>Losers: To some extent consumers of other goods based on grain and oil seeds given price increases. |
| Equity issues? | Benefits of the tax exemption are largely captured by large, agro-industrial companies rather than farm labourers or small farmers. Increasing demand for feedstocks for biofuel crowds out the use of these feedstocks for food purposes and is one factor that contributed to volatile commodity prices in world markets. |
| **Reform issues** | |
| Past attempts to remove subsidy? | In August 2006, the Government introduced the **Energy Tax Act** (*Energiesteuergesetz)* which established a system of gradually increasing taxes on biofuels between August 2006 (€0.09/l for pure biodiesel and €0.15/l for blended biodiesel) and 2012 when taxes would reach €0.45/l (almost matching the full tax rate for diesel fuel of €0.47/l). This measure aimed to take into account the overcompensation detected relative to fossil fuels.<br><br>In 2007 the Government adopted the **Biofuel Quota Act** (*Biokraftstoffquotengesetz)* which sought to reduce the impact of the introduction of taxes on biofuels. From 2007, firms that market fuels were obliged to market a legally prescribed minimum percentage (quota) in the form of biofuels. From 1/1/2007, the level of the quota in relation to energy content was 4.4% for diesel and 1.2% for petrol. The quota for petrol rose to 2.0% in 2008, 2.8% in 2009 and 3.6% in 2010. From 2009, a combined quota of 6.25% will be introduced for both fuels, which will gradually increase to 8% in 2015. The minimum rates for petrol and diesel will continue to apply. Biofuels required to fulfil the quota will be subject to full taxation (€0.47/l for blended biodiesel). A degressive tax exemption is retained for a transitional period until the |

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| | end of 2011 for pure vegetable oil (rising from €0.09/l in 2008 to €0.45/l from 2012) and pure biodiesel (rising from €0.14/l in 2008 to €0.45/l from 2012) outside the quota. Second-generation biofuels, biogas and pure bioethanol (E85) are granted a higher but also degressive tax incentive until 2015 (whereas before no tax was levied on these fuels). The Biofuel Quota Act couples support for biofuels with compliance of fuel standards (DIN EN 14214 for biodiesel, DIN EN 15376 for bioethanol and DIN EN 51605 for vegetable oil).<br><br>In June 2009, the Parliament adopted an amendment to the Federal Emission Control and Energy Tax Law (**law on the promotion of biofuels**) which reduced the combined quota applicable in 2009 to 5.25% and keeps it fixed at 6.25% for the period 2010 to 2014. The quota for petrol is also kept at 2.8% for the 2010 to 2014 period. From 2015 the calculation basis for the biofuels mandate will change from energy content to GHG emission savings. The amendment also reduced the increase in tax for pure biodiesel (which will be €0.18/l in 2009 rising to €0.45/l from 2013) and on vegetable oil (which will be €0.18/l in 2009, rising to €0.45/l in 2012). In the future, bio methane from biogas will also be considered in the total and the petrol quotas.<br><br>In light of obligations arising under Directive 2009/28/EC, the Bundestag adopted the **Biomass-electricity-sustainability-ordinance** in July 2009. The ordinance entails sustainability requirements for liquid biomass used for the generation of electricity and falls under the Renewable Energy Sources Act (Erneuerbare Energien Gesetz, EEG). In line with the sustainability requirements of EU Directive, the ordinance includes the protection of certain areas of high natural values, GHG savings and reporting obligations of progress in alleviating impacts on soil, water and air. Compliance with sustainability requirements should mostly be proven by certification schemes. Agricultural practice has to meet the cross compliance regulations. Certification and product documentation will be required from January 2010 onwards. A draft of a corresponding **ordinance for liquid biomass used in the transport sector is expected by the end of 2009**. |
| Existing calls for removal? | As noted above, the 2004 tax exemption has undergone successive reforms despite industry opposition. |
| Key reform challenges | The 2004 tax exemption has been reformed as noted above. Given the large and unsustainable budgetary implications of the tax exemption, there was significant political support for these reforms which pushed them through in 2006 despite domestic industry opposition. The 2007 quota system which was introduced to offset the impact of increasing tax rates on biofuels sales was said to be over-ambitious and technically not compatible with the existing car fleet given the failure to introduce E10 gasoline blend following protests from car importers, issues relating to car technology and standardisation issues, and the slow development of second generation biofuels. Thus in 2009 the Government approved a reduction in the biofuels quota and a change to the calculation basis for the biofuels mandate from energy content to net GHG reductions from 2015. While there has also been some opposition to the new calculation basis for the biofuels mandate from biofuels trade associations, the shift to such a calculation base is supported politically within Germany and across the EU and will be needed to ensure the measure is in line with new EU law. |

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| Are there alternative policies to achieve the same objectives? | While recognising that EU biofuels policy has evolved since the time of the 2004 tax exemption in Germany, and that there are now new targets for Member States to achieve with regard to the use of renewables in transport fuels and new sustainability criteria in be met; there remain alternative, more cost-effective policies to achieve GHG emission reduction objectives including:<br>- Using biomass for stationary heat generation or for combined heat and power generation (CHP);<br>- Enhancing the efficiency of conventional power plants;<br>- Encouraging the development of second generation biofuels;<br>- Reducing emissions in the transport sector through fuel-saving approaches such as speed limits and fuel economy standards;<br>- Taxes related to the carbon content of fuels, including biofuels; and<br>- Developing transport demand management strategies. |
| Possible compensation measures to palliate impact of removal | In order to offset the impact of a reduction in the tax incentives on biofuels sales; the mandatory quota was established as a regulatory support measure to oblige companies bringing fuels onto the market to comply with increasing minimum quotas for biofuels. While mandatory blending quotas were considered an important 'safety net', they were often not sufficient and with a limit to the amount of biodiesel that could be sold to the mineral oil industry given the 5% blending requirement of the European Diesel fuel Standard EN 590, there were significant concerns regarding overcapacity in the domestic biofuels industry. There were calls for a change to the European standard for diesel fuels to allow a 10 % admixture of biodiesel.<br><br>In order to address the environmental concerns related to biofuels production, the Biofuels Quota Act included provisions for the development of sustainability ordinances which would ensure that only biofuels produced from biomass cultivated in compliance with the sustainable management of agricultural areas or certain requirements for the conservation of natural habitats are taken into account for the purposes of meeting the quota requirement or supported through tax measures. Setting sustainability requirements not only for biofuels, but for all energetic uses of biomass and also for other sectors of biomass use ensures that non-sustainable production is not merely relocated to other areas as production of biomass for biofuels becomes sustainable. Thus the recently adopted Biomass-electricity-sustainability-ordinance and the soon to be agreed ordinance for liquid biomass used in the transport sector are positive steps in this direction. However it is important to note that certification can only influence the supply chain in that it can be used to modify farming and biomass harvesting methods to limit the environmental impacts of cultivation. However certification (as it is currently conceived) cannot be used to control indirect impacts that arise from biofuels production, most notably the displacement of existing farming activities by an expansion of biofuel production and associated land-use change outside the area cultivated for biofuel.<br><br>The removal of the tax exemption may lead to possible employment gains from the use of public money elsewhere. The net effect on employment depends on relative labour intensities. A possible compensatory measure for workers in the biofuels industry that have lost their jobs is the provision of support for transition to new jobs such as through various retraining programmes etc. |

## 4.5 Summary of case study in the water sector

### Case study 6: Subsidies to irrigation water

| Brief description of selection process | |
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| Partner | IEEP |
| Sector | Water |
| Country | This is an issue in many Member States, especially in southern Europe, where the scale and importance of irrigation is much greater (up to 60% of water use) than in the rest of the EU (in northern Member States it varies from almost zero in a few countries to over 30 per cent in others). Significant cases are in particular Spain, Italy and Portugal. The team chose to study the case of Spain.<br><br>The economic data used in the present analysis build substantially on the information available for a specific irrigated area, the Community of irrigators of the Pisuerga Channel, in northern Spain. It is a relatively small area (about 10,000 ha) which can be regarded as fairly homogeneous in terms of soil quality and climate, crops and technology. It should be noted that the Spanish territory is very heterogeneous in terms of climate conditions, water availability and agriculture practices. The water cost and tariffs applied also can vary substantially from region to region. Therefore economic estimates do not aim to represent the situation of the whole country. Nevertheless they offer interesting lessons and insights that can be valid not only at local level, but also at regional and national level. When possible, some general considerations hence have been made for the whole Spain. Others should be taken as specific to the case example. |
| Type of subsidy | Off-budget: lack of full cost recovery |
| Reasons for selection | The case is interesting as it is environmentally and economically relevant. Subsidies to irrigation are significant in size, and water scarcity is a serious threat especially in southern Europe. According to the World Bank (2002)[3] irrigation subsidies are fiscally unsustainable (eg water tariffs are too low to cover O&M costs), environmentally harmful and have an equity dimension. They can represent an incentive for growing water-inefficient crops in inappropriate regions, resulting in pollution and depletion of water bodies. They can also lead to water overuse, cultivation of water-inefficient crops and use of inefficient technologies. |
| **Summary assessment** | |
| Short description | In Spain, water pricing is usually based on area size rather than on the actual volume of water used, and therefore does not provide incentives to farmers to improve water use efficiency, and has historically lead to a relatively high level of consumption. In the area under analysis, the Community of irrigators of the Pisuerga Channel, water pricing is based on a fixed sum per unit of irrigated surface. The price is relatively small (0.01€/$m^3$ in 2003) and it is considered to be insufficient to cover supply full costs and externality costs. |
| Key environmental effects | Impact on the amount of water extracted/used for irrigation; wastage; groundwater depletion; pollution (especially due to increased concentration of nitrates); soil salination; biodiversity loss. |

[3] Mona Sur, Dina Umali-Deininger & Ariel Dinar, World Bank (2002) Water Related Subsidies in Agriculture: Environmental and Equity Consequences. Paper presented at the OECD workshop on Environmentally Harmful Subsidies- Paris, Nov.7-8, 2002.

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| Is subsidy removal likely to benefit environment? | Potentially YES, depending on the area and type of farmer (elasticity of demand). Existing environmental policies have not been substantially successful in limiting environmental damages so far. More benign alternatives (e.g. more efficient irrigation techniques) are available and should be adopted. |
| **Objectives and justification** | |
| Subsidy objectives (original rationale) | A subsidised water price makes irrigated agriculture more profitable. Traditionally irrigation has been used to increase productivity and enable people to settle in rural areas, and as an instrument for combating desertification. |
| Is the original rationale still valid | NO - not entirely. Low charges eventually translate into poorly maintained water infrastructures, which in turn reduce irrigators' competitiveness and capacity to pay, and influences the selection of crops leading to unsustainable patterns and low-value subsidised cultures. Furthermore, from a social perspective, subsidies benefit all farmers, not only those with low rents. |
| Key problems with subsidy design | Absence of sunset clause and adaptive review process. The point of impact of the subsidy (conditionality) targets the variable cost of water, leading to excessive water use and reducing the incentive to modernise irrigation practices and infrastructures. |
| **Economic aspects** | |
| On- or off-budget | Off-budget, price paid for water below full economic cost . |
| Conditional on what activity? | Production subsidy. |
| Point(s) of impact | Input (water). |
| Subsidy size/value | The size of water subsidy for irrigation in the Pisuerga Channel ranges between 2.1 M€/year (if we use, as a benchmark, a 'real' price of water of 0.04€/$m^3$ based on financial cost of supply) and M€3.5/year considering Full Cost Recovery (FCR) price of 0.06€/ha (ie including the price of externalities) (these are the prices used in Gómez-Limón and Riesgo (2004)).<br>Considering an average water price of 0.05€/ha for the whole Spain, and comparing it to the FCR price of 0.06€/ha, the overall size of subsidies in Spain can be estimated to be about 165 M€/year. |
| Elasticity effects | Elasticity of water demand is generally relatively low, but it largely depends upon the local conditions of climate, soil and technical environment, the type of farmers (their risk aversion) and the water price level. In general, demand is inelastic when the water price is low (ranging from 0 to 0.08 €/$m^3$ according to local conditions), elastic at medium prices (between 0.04 - 0.16 €/$m^3$) and inelastic again when the price is high (above 0.11 - 0.16 €/$m^3$). (Berbel and Gómez-Limón, 2000) |
| Importance of trade issues | Somewhat. Subsidies tend to distort imports and exports of irrigated crops, as water intensive products in some cases are produced at rather competitive cost even in water poor areas, given the low cost of water. By removing the subsidy the production cost of water intensive crops might rise significantly in water scarce areas. This can potentially lead to a change in production patterns. |

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| Availability of economic data | Literature exists on specific geographic areas. Sufficient economic data hence are available for some areas, which are often specific to the local conditions. In some cases, however, some broad assumptions and calculations can be made to assess the impacts to the whole country. |
| **Social aspects** | |
| Does it reach the intended recipients? | Yes – farmers. |
| Winners and losers | Winners: farmers (of any income). Losers: society at large (reduced water availability) and farmers in some cases (worsened environmental conditions, increased pollution, reduced water availability). |
| Equity issues? | No specific equity issue - but the subsidy is beneficial not only to low income farmers but to all farmers, including those with high revenues - arguably not in need of economic support. |
| **Reform issues** | |
| Past attempts to remove subsidy? | Yes, some have been successful. E.g. in the Genil Cabra and Fuente Palmera irrigation co-operatives, in the Guadalquivir river basin, a new water charging structure included both a fixed and variable charge linked to water use, with farmers paying significantly more than under the original area-based approach. This has resulted in a 30 per cent reduction in water consumption. |
| Existing calls for removal? | Recognised as priority for reform from IEEP et al. 2007. Berber et al. (2000) recommend the introduction of a price signal to make farmers aware of the scarcity of water resources, and to induce them to adopt water-saving technologies without affecting crop distribution. The issue of elasticity however has been stressed – ie under certain conditions price increases can have little effect on water consumption, and the impact on farmers' income can be significant<br>The OECD has been calling for removal of this subsidy *(OECD JEGET Committee (Environment & Taxation)).* |
| Key reform challenges | Social and economic concerns: possible significant reduction of farmer's income. Possible increase of water-intense crops if irrigation techniques are improved without sufficient signals to reduce water consumption. Possible ineffectiveness of measures if no sufficient monitoring. Potential political opposition if strong lobbying from farmers. |
| Are there alternative policies to achieve the same objectives? | Alternative policies include:<br>• Support to more effective and targeted irrigation techniques.<br>• Introduction of an appropriate monitoring system.<br>• Replacing flat rates with volumetric rates.<br>• Use quantitative controls.<br>• Further consideration of compulsory water use practices in the code of Good Practices of the Rural Development Plan RDP and the cross-compliance scheme of CAP. |

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| Possible compensation measures to palliate impact of removal | Divert national and regional funds now used to finance irrigation equipment and water prices to supplement CAP cross-compliance measures and implement crop diversification, drip irrigation techniques accompanied by quantitative controls as well as complementary measures of rural development that will ensure the maintenance of rural livelihoods in the area.<br>Flanking measures (compensation) to low income farmers.<br>Rising block tariffs (according to volume consumed). |

# 5 CRITICAL APPRAISAL OF THE OECD TOOLS

**Summary:** The main aim of the project was to test the OECD tools for the identification and assessment of EHS and to provide methodological recommendations for their future use in policy making. This Chapter illustrates the results of the test, a critical appraisal of the OECD tools and recommendations for 'improvements/adaptations' to make the methods 'operational for practical use' in a policy making context.

The three OECD tools (quick scan, checklist, integrated assessment framework outlined in Chapter 3 were tested in a practical application involving six case studies. The results of this application are summarised in the Annexes. This Chapter provides a critical assessment of the OECD tools based on the application of the tools on the six case studies.

The aim of the test was aimed at addressing the following main points:

- To assess to what extent are the tools effective in enabling decision making on the EHS reform.
- To determine how policy makers could use them as 'quick scans'.
- To identify the strengths and weaknesses of each tool;
- To provide lessons learned from the application of each tool – recommendations for their future use in a policy making context;
- To identify 'improvements/adaptations' to make the methods 'operational for practical use' in a policy making context;
- To provide insights on information requirements for the application of the tool;
- To provide insights on how to make the tools easier to use.

Ultimately the aim of the test was to provide:

- Recommendations on the use of the OECD tools; and
- Methodological improvements to make the tools operational in a policy making context

The scope of the evaluation was mainly confined to the following main points (addressed in more detail in this Chapter):

- Effectiveness;
- User friendliness;
- Data intensity; and
- Comparison: gaps and links.

The assessment was based on the methodology outlined in Chapter 4 which entailed the following main activities:

- Developing step-by-step guidelines on the use of the tools;
- Appling them using case studies;

- Analysing one subsidy at the time;
- Using readily available data and literature; and
- No models - some economic thinking and quantification of first order effect.

## 5.1 The strengths and weaknesses of the tools

In summary, the main strengths of the OECD tools were the following, i.e. they:

- Are effective initial screening tools;
- Avoid the resource intensiveness / rigidities of general equilibrium models or CBA;
- Can be applied at different levels of detail;
- Identify and un-bundle linkages;
- Highlight areas where further detailed empirical analysis is required;
- Prioritise EHS reform on the basis of benefits of removal;
- Are applicable to all sectors and to all subsidy types.

For each tool:

- The quick scan is useful for the identification of subsidies following the classification provided and allows an understanding of their impacts on the environment, however it requires modelling.
- The checklist is an efficient approach to identify whether subsidy removal is likely to benefit the environment and could be applied on its own, however it ignores potential synergies between impacts in the social and economic areas.
- The integrated assessment provides a wealth of additional information and takes the assessment further into considering alternative policies, cost-effectiveness and possible scenarios of reform, thereby creating a stronger basis for embarking on any reform process.

The following lessons were learned from their application:

- When there are large subsidies with significant indirect impacts there is a need for the use of models;
- They need the availability of micro/macroeconomic studies;
- They require some expert judgement;
- They need further guidance;
- There are missing links: counterfactual; synergies with other subsidies/policies; trade issues; competitiveness; SMEs; public health;
- There are overlaps between the tools: especially the quick scan and checklist.

A more detailed summary of the strengths and weaknesses of each OECD tool, as identified by the project team, in terms of addressing their respective objectives and their fitness in assisting policy makers in the decision making process toward EHS reform/removal is provided in Table 7.

**Table 7: Strengths and weaknesses of OECD tools**

| Tool | Strengths | Weaknesses |
|---|---|---|
| **Quick Scan** | • Useful to obtain a first impression of the subsidy and an overview of the subsidised sector.<br>• Useful for identification of subsidies and links between the existence of a subsidy and the impacts on the environment.<br>• Clear and in-depth methodology.<br>• Useful in terms of gathering key data such as the size of the subsidy and the scale of the environmental impact, which are useful to communicate the need for reform. | • Not so easy to apply (e.g. assessing links requires modelling or availability of studies, estimating the size of the environmental impact requires environmental impact evaluation techniques and can be resource intensive).<br>• Lacks consideration of a clear 'baseline' or 'counterfactual scenario' that would enable a comparison between the 'with' and 'without subsidy' situation.<br>• Only suitable for assessment of direct producer subsidies.<br>• Does not explore the feasibility of removing the subsidy, the cost/benefit of doing so, or the potential uptake of alternative policies/technologies.<br>• Assessment of the assimilative capacity of the environment can be quite difficult (in terms of how to calculate/estimate it).<br>• Important elements, such as trade and social issues, are not considered. |
| **Checklist** | • Can be applied to a wide range of subsidies.<br>• Systematic and logical approach which guides the policy maker in the decision making process.<br>• Allows the policy maker to make a quick first assessment: of the more obvious EHS that require urgent reform and whether the subsidy reform is likely to bring environmental benefits.<br>• Provides policy relevant information such as the availability of alternative options and the effectiveness of environmental policy. | • Assumes that the identification of subsidies and their economic impacts have already been understood.<br>• Lacks consideration of a clear 'baseline' or 'counterfactual scenario' that would enable a comparison between the 'with' and 'without subsidy' situations.<br>• YES / NO approach should not be too narrowly considered; the analysis requires some judgement and should not be applied rigidly.<br>• No consideration of the cost-effectiveness of the policy filter.<br>• No consideration of the cost-effectiveness of alternative products/technologies (including promotion of emerging cleaner technologies).<br>• Assumes that the size of environmental impacts has been already evaluated.<br>• Focuses on subsidies removal. In certain cases subsidies reform would be a better option (eg agriculture). |

| | | |
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| **Integrated Assessment** | • Systematic approach.<br>• Encourages thinking in terms of policy coherence.<br>• Includes an analysis of the objective(s) of the subsidy and its effectiveness, including the social and economic impacts.<br>• Considers the cost-effectiveness of policy alternatives.<br>• Includes steps for the analysis of policy reform and compensation measures. | • Assumes that the subsidy has already been identified, and information on the size of the subsidy and its environmental harm have already been developed.<br>• Analysing options for policy reform may prove quite difficult and require political insight and judgement.<br>• The tool could benefit from providing guidance on how the information gathered makes a better case for reform and how to use the information gathered in the decision-making process. |

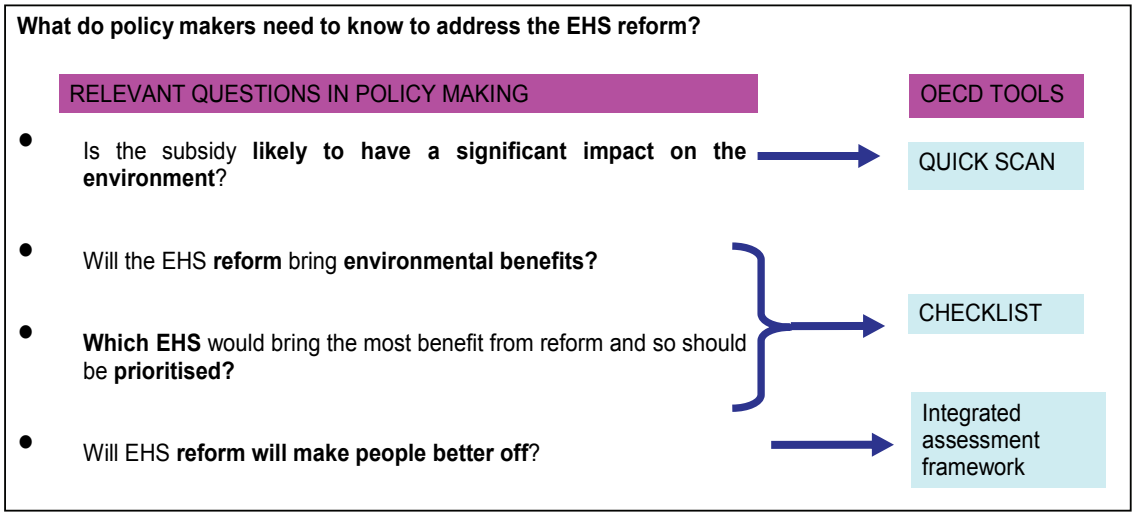
Importantly, the tools do not provide guidance on how to calculate the size of the environmental impacts. It is assumed that the environmental impacts are estimated following the analysis using dedicated partial analysis tools, such as following an Environmental Impact Assessment framework.

## 5.2 Effectiveness

The tools were felt to be effective in achieving their aims:

- The quick scan to assess whether the support is likely to have an environmental impact and leak away from the intended recipient;
- The checklist to assess whether removal or reform is likely to benefit the environment; and
- The integrated assessment framework to provide an in depth analysis of the social and economic impacts of the subsidy and an analysis of the policy reform options.

Each of them can be applied separately. Each one is intended to take the analyst further in the decision making process on whether to remove or reform an EHS (see figure below).



It was found that the tools overlap in several ways, but in other respects the tools complement each other. Therefore the tools could be streamlined into one single method to maximise individual strengths and eliminate duplication (see also point 5.4 on comparison of the three tools).

## 5.3 User friendliness

The guidance accompanying the tools in the three OECD reports was considered to be clear and exhaustive; however it would be beneficial to streamline the guidance; to develop more guidance on the practical use of the tools; and to provide further explanation of some of the definitions used. To enable the application of the tools to the six case studies, the project team developed a step-by-step approach to facilitate their use (see Chapter 3).

Overall, it was felt that the tools can be effectively used by policy makers given that they are not necessarily complex. The tools do not prescribe any specific type of analysis and each tool allows analyses at different levels, depending on data availability and the resources available, simple or more complex approaches can be applied depending on the case at hand. Regarding the data intensiveness of the tools, parts of the analysis is clearly data and resource intensive and can be difficult to assess. For example, Linkage 3 of the quick scan on the assimilative capacity of the environment is difficult to assess accurately. Also determining whether the conditionality of the subsidy under the checklist leads to higher production volumes is complicated by the need to develop a counterfactual situation and by the difficulties in establishing causality between the subsidy and an outcome in the presence of various influencing factors.

The degree of data intensiveness of the tools depends on the availability of previous studies and research on the economics of the industry being assessed. Data availability could prove challenging or insufficient with respect to certain kinds of information (e.g. elasticities, welfare effects, original objectives, indicators on the state of the environment). However, the analysis should not be hindered too seriously by a lack of data, as it is possible to answer most questions at least in a qualitative manner. In general, when calculations are too complex or time-consuming, qualitative responses should be encouraged. It is important to keep in mind that the main aim of the tools is to gather available information and highlight where further scrutiny is needed. The strength of the tools should be based on the fact that, even with low data intensity, it is possible to complete some form of analysis.

## 5.4 Comparison of the three tools

Each of the tools can be applied separately and are intended to take the analyst further in the decision making process on whether to remove or reform an EHS. The application of the tools to the case studies revealed that in certain respects the tools overlap, while in other respects the tools complement each other.

The quick scan provides a good overview of the general features of a subsidy, the checklist introduces the question on the availability of alternative policies/technologies, and the integrated assessment includes an analysis of the effectiveness of the subsidy in reaching it objectives, incorporates consideration of economic and social aspects in the analysis, and examines options for policy reform.

The main overlaps were found to be between the quick scan and the checklist. The following **overlaps** between the tools were identified as:

- Linkage 1 of the Quick Scan and Step 3 of the Checklist;
- Linkage 2 of the Quick Scan and Step 1 of the Checklist;
- Linkage 3 of the Quick Scan partially overlaps with Step 3 of the Checklist;
- The assessment of alternative policies in the Integrated Assessment has some similarities with alternative technologies in the Checklist;
- The assessment of effectiveness in reaching intended recipients in the Integrated Assessment and Linkage 1 of the Quick Scan;
- The assessment of environmental impacts of the Integrated Assessment and Linkage 3 of the Quick Scan.

The integrated assessment mainly explores additional issues. It is therefore particularly desirable that the quick scan and the checklist are integrated. The integrated assessment could then be used as a further step, to broaden the analysis, as it entails an analysis of the effectiveness of the subsidy in reaching its objectives, includes social and economic impacts and provides a more detailed assessment of policy reform.

With regard to the **applicability of the tools to different subsidy types**, the quick scan tool was considered to be mainly useful when considering (direct) producer subsidies, whereas the two other tools were considered to be applicable to all subsidy types in principle.

Regarding the **value added of each tool**, the following observations were made:

- **Quick scan**: Provides a general overview of a subsidy and guidance to subsidy identification. It requires the calculation of the size of the subsidy and environmental damage which is useful to policy makers. The tool could benefit from more guidance on how to use the outcomes of the analysis.
- **Checklist:** Adopts a practical approach that priorities options for reform. The tool includes an assessment of technological alternatives and provides a useful quick assessment. The focused approach of the tool could be useful but in general has been considered too narrow. As such it would benefit from integration with other tools.
- **Integrated assessment:** Provides the policy context and includes consideration of the original objectives of the subsidy. The tool provides a broader perspective of the impacts of a subsidy including social and economic aspects. However, it is considered weak in terms of guidance on how to effectively use the results of the analysis in decision making.

## 5.5 Definition of the baseline (i.e. the world without the subsidy)

The application of the tools to the six case studies revealed that all three tools require more guidance on how to specify a counterfactual scenario (i.e. what would the world look like without the subsidy). Subsidies must be measured against some baseline of a counterfactual situation. The definition of the counterfactual is not only relevant to quantify the size of the subsidy, but also to determine whether the subsidy can be considered as being 'environmentally harmful', and even whether a certain policy measure/instrument can be seen as a subsidy in the first place.

Steenblik (in OECD, 2003) notes that many renderings of the 'counterfactual environment in which subsidies do not exist' can be constructed. Quantitative assessments of subsidy removal may differ strongly due to the choice of the counterfactual 'what if no subsidy were deployed' scenarios that serve as a benchmark. Once subsidies are removed, a differing pattern of production and consumption will emerge (Pieters in OECD, 2005).

This concept can be illustrated by some examples:

- The Netherlands has a substantial tax on the final consumption of energy. Tax rates for small users (including households) are much higher than for large users (including energy intensive industry). If one takes the tax rates for small users as a benchmark, and applies this rate to all energy users in the counterfactual, this implies a substantial subsidy to large energy users (over € 1.5 billion per year; see EEA, 2004). However, if another benchmark were used, for instance the minimum energy tax rates as required by Directive 2003/96/EC, there would be no subsidy at all.
- In the EEA (2007) report on transport subsidies, the public expenditure on infrastructure is considered to be a subsidy. This results in substantial subsidy estimates (e.g. € 110 billion for road infrastructure in the EU-15). Obviously, however, much of this expenditure is covered by taxes on cars and fuels, even though there may be no direct link.

The choice of the counterfactual includes a number of normative elements, including considerations of distributional equity and interpretations of policy principles such as the 'polluter pays' principle. It is impossible to provide 'objective' guidance on this choice. However, transparency can be postulated as a basic requirement. This means that the analyst should explicitly describe the counterfactual situation/scenario that has been used. Clearly, arguments supporting the choices may make them more convincing and increase acceptance. 'Objective' benchmarks, such as EU state aid guidelines and minimum tax rates may be helpful in defining counterfactuals. Measures that have been taken to mitigate or compensate certain unwanted effects of the subsidy will probably not be part of the counterfactual.

One might also consider using a number of different counterfactuals in the analysis (unless there is only a single, uncontroversial counterfactual). In practice, this would probably mean that a wide range of outcomes could emerge. For example, one policy

measure/instrument could be assessed, depending on the counterfactual, as being at the same time:

- not a subsidy at all;
- a subsidy, but not an environmentally harmful one;
- a small EHS, with modest environmental impact; and
- a large EHS, with substantial environmental impact.

From a scientific point of view, this approach has advantages. For policy makers, however, it may be unsatisfactory, as it does not provide unequivocal guidance on the desirability of subsidy removal and leaves interest groups the opportunity to defend their predetermined positions. This gap might possibly be bridged by defining a single counterfactual for the main analysis, and a number of other counterfactuals for sensitivity analysis.

The counterfactual should be defined at the very beginning of the analysis as many of the steps in the quick scan, checklist and integrated assessment depend on it.

### 5.6 The subsidy's policy filter

The description of the counterfactual should contain a specification of those policy measures/instruments that are supposed to remain in place after subsidy reform/removal and those that are supposed to be removed or reformed along with the subsidy. The latter are a policy (or a set of policies) put in place together with the subsidy which will be removed with it; these are therefore not part of the counterfactual scenario. These 'policy filters' can be, however, identified when defining the counterfactual and are the policy filters of a subsidy.

### 5.7 The level of subsidisation

Another element that is implicit in the use of the three tools is the calculation of the size of the subsidy (absolute, and relative, total and unit). The level of the subsidy is important to understand its impact on marginal costs or on variable costs. The former, together with price elasticities of supply and demand of the subsidised activity, determine the impact on the levels of production or consumption by the recipient sector. These in turn determine how much of the subsidy leaks away from the recipient sector to activities downstream or upstream. While the role of elasticities is described in detail in the OECD reports (1998; 2005) in relation to the quick scan and the checklist, the guidance on how to calculate the size of subsidies is developed in separate manuals.

An operational methodology on the use of the tools would benefit from the development of a step-by-step procedure for calculating the size of the environmentally harmful subsidy. This was developed by the team (see Chapter 7) and will accompany the guidelines developed by the team on the use of the tools.

### 5.8 Missing links

The quick scan and the checklist are intended to enumerate economic characteristics of subsidies that may serve as predictors for their first order effects and the impacts of subsidy removal. It is beyond the scope of these tools to estimate the effects of subsidy

removal using general or, at least, partial equilibrium models, taking the responses of other sectors into account. For example, trade impacts are excluded, as the tools are based on a closed economy.

The integrated assessment includes elements which assess some second order effects. All of the three tools allow for such impacts, but do not give guidance on how to deal with them. It might therefore be useful to complete the assessment by describing these impacts, giving examples on the kind of impacts that one might think of, and also suggestions on how to decide if these impacts are likely to be significant or not and how to analyse them if they are likely to be significant. In addition to trade, other specific impacts could be explored such as the impacts on competition, SMEs and public health.

### 5.8.1 Impacts on trade

The application of the OECD tools to some case studies (e.g. biofuels, fuel taxes), highlighted that trade impacts need be taken into account to provide a more comprehensive assessment of the impact of a subsidy and the impacts of possible options for reform. Whereas trade impacts can be difficult to assess in detail, we consider that qualitative broad conclusions can be made.

In a simple analysis, assumptions will have to be made on the impacts of subsidy reform on trade (e.g. without the subsidy, 50% of the formerly subsidized activity would relocate to country B and 50% would remain in country A). If from a qualitative analysis it is established that the trade impacts are likely to be significant, an in depth analysis of the impacts would need to be done using an economic (general equilibrium) model incorporating international trade.

### 5.8.2 Impacts on competitiveness

Subsidies are often provided to improve an industry's competitiveness. The tools could identify and describe the potential environmental impacts of issues related to competitiveness (for example, the analysis could highlight whether subsidies are granted to industries that would not be able to compete otherwise, therefore locking-in inefficient technologies). These impacts could emerge from the analysis of some aspects of the subsidy (e.g. point of impact of the subsidy, description of the sector and distribution of market power, intended recipients of the subsidy, availability of more environmentally friendly technologies or products) and need to be further highlighted in the process. Issues relating to competitiveness are often used as a justification for not removing a subsidy. An assessment of the potential impacts of reform on competitiveness could be described qualitatively. This issue has been discussed at length in IEEP at al. (2007). It should be noted however that the impacts of subsidy removal on competiveness could only be assessed realistically through the use of models. Competitiveness effects should also look not just at short term impacts but also longer term impacts. The latter being generally more difficult than the former, but important in helping clarify the true benefits of subsidy reform (see IEEP et al. (2007) and TEEB for Policy Makers ch6 (2009 forthcoming)).

### 5.8.3 Impacts on operating costs and conduct of SMEs

Due to their size and limited resources SMEs can be affected by the existence of a subsidy in the market in which they operate, positively or negatively, and can be particularly affected by their removal. The EU and Member States devote substantial resources to the development and the greening of SMEs. It is therefore important to take into consideration impacts on SMEs both in the assessment and when considering reform options. The analysis should assess whether SMEs are disproportionately affected by the existence of a subsidy and whether the subsidy removal/reform requires specific compensatory measures for these businesses. For example, subsidies could disadvantage SMEs competitiveness, or could affect the choice of inputs (raw materials, energy etc), or products and technologies which might have adverse impacts on SMEs in the demand/supply chain.

### 5.8.4 Impacts on public health

Finally, the impacts of subsidies on public health are often implicit of the environmental impacts. These should be made more explicit, where relevant, with the inclusion of some dedicated questions in the analysis.

## 5.9 Summary of methodological recommendations

The set of tools developed by the OECD would benefit from the following improvements:

- The tools as presented to date could be further developed in a step-by-step methodology for their practical use by policy makers.
- The effectiveness of the tools would be enhanced if the three tools were integrated into a single methodology.
- The methodology would benefit from the addition of a step for the definition of the counterfactual (i.e. the 'policy-off' situation) against which to measure the size of the subsidy and of the environmental harm.
- Some specific impacts, such as the impacts on trade, competitiveness, SMEs and public health, could be explored at least qualitatively in the methodology.
- The methodology would benefit from the development of a step-by-step procedure for calculating the size of the EHS.

# 6 PROPOSAL FOR AN EHS REFORM TOOL

**Summary:** The methodology outlined in this section builds on the analysis of the OECD methods via the trial application on the six case studies and on a review of the literature commenting on the methods. The expected outputs of this part of the project include the development of methodological recommendations for policy makers on the use of the tools, accompanied by a set of pragmatic/practical and operational guidelines for their application in the process of EHS reform.

## 6.1 Introduction

One of the main findings of the critical assessment was that the tools could be streamlined into one single method to maximise individual strengths and eliminate duplication. Drawing on the results of the application of the OECD tools to the case studies, we have outlined a methodology that builds on the strengths of the OECD tools and tries to address the weaknesses identified. The methodology, named the 'EHS reform tool', is outlined in this Chapter. It incorporates operational guidelines for facilitating its practical use.

### 6.1.1 Approach

The proposed methodology outlined in this Chapter is based on the application of the OECD tools to the case studies, our critical assessment of the OECD tools (see Chapter 5), a review of the literature commenting on the methods and on insights gathered at the experts workshop.

The proposed 'EHS reform tool' applies the concepts behind the checklist (OECD, 2005) in a wider policy evaluation framework, incorporating in the approach the main steps of the integrated assessment framework tool (OECD, 2007a).

The following approach characterises the EHS reform tool outlined in this Chapter:

- A four phase approach built on the checklist (OECD, 2005) and on the integrated assessment framework (OECD, 2007a) aimed at policy makers;
- Each phase is developed into a step-by-step operational approach;
- Each step including guidelines;
- It is employable at different levels of detail depending on resources available;
- It is accompanied by a recipe book for the calculation of the size of subsidy (see Chapter 7).

The main target audience of the tool are policy makers and in particular those less well-versed in subsidy analysis yet with an interest in EHS reform. Since the aim of the OECD tools is to provide a clear and accessible means to identify and assess EHS, the methodological recommendations for their improvement and guidelines were developed to enhance their accessibility to policy makers.

**Box 13: Discussions on the approach taken**

At the project workshop, there was agreement on the need for a method for the identification and assessment of EHS that is accessible to policy makers.

Participants highlighted that EHS can be assessed at a 'high level' (the principle of the OECD checklist) where certain characteristics of a subsidy can reveal their potentially environmentally harmful nature and the benefits of their reform can be gauged without a complex analysis. This 'quick scan' approach was considered an essential step to improve the accessibility of the issue of EHS to policy makers and facilitate EHS reform. The integrated tool developed in this Chapter builds on this concept of accessibility, which was considered a strength by participants at the workshop. It was considered however that it might still be necessary to employ econometric tools or CBAs once the quick scan had highlighted important potential impacts (the latter is beyond the mandate of our work), as the complexity of a subsidy's impacts usually can only be exposed with the use of general equilibrium models.

### 6.1.2 Scope and level of detail

One of the strengths of the OECD tools is that they are based on common elements to different sectors and they can be applied across sectors. Therefore, the methodology here outlined can also be applied across economic sectors.

The analyst can apply these tools to different sectors, giving focus to some aspects more than others depending on sectoral characteristics. For a comprehensive discussion on the characteristics of the single sectors, we refer the reader to the Chapter developed by Porter in OECD (2003). It provides invaluable guidance on the definitions of subisdies, quantification methods, data sources and environmental impacts by sector. This guidance is tailored for the economist that wishes to take up an in depth analysis. A shorter version for policy makers is included in OECD 2005 (Chapter 1). Other sectoral studies which provide relevant information to the analysis are: for the transport sector (OECD, 2008a); for the energy sector (OECD, 2003); for the water sector (OECD (2002b); IISD (2009)).

It should be noted that in all sectors subsidies interact with other policies, market conditions, competing products/ modes of production which need to be taken into consideration in order to get to a clear picture of a subsidy's impacts. These are not considered in detail, but reference to these in the analysis is mentioned where necessary**.** To measure these effects and understand clearly the impacts on a subsidy and its removal on the economy, partial and in some cases only general equilibrium models will provide clarity (albeit at the cost of relying on large numbers of assumptions).

The methodology outlined here is meant to be used as a 'quick scan' (although it can also be used as a reference for more complex evaluations). The majority of the steps are meant to be performed usually in a qualitative way, although some quantitative analysis is helpful to the extent this is required (i.e. size of subsidy).

Once the assessment is completed it will be clearer to the policy maker whether more comprehensive evaluation is required (see Box 14). This tool streamlines the process and highlights the important elements that are needed to prepare for a informed policy

reform process. Most importantly it enables the process to be more focused and cost-effective.

**Box 14: Level of detail of the analysis and the reality of political process**

The level of detail and the required 'proof' that society will benefit from removing the subsidy under consideration will differ from case to case, and with it the level of thoroughness of the analysis will differ significantly. In some cases, interest groups and the wider public may demand detailed and convincing evidence, before agreeing to EHS reform. Sometimes instead, it may be sufficient to suggest likely undesirable effects.

The more fierce the opposition to subsidy removal, the more proof of its impacts will be demanded by interest groups. If that is the case the chances of subsidy removal maybe small. Any study on subsidies with a view to its removal will be severely challenged by those who feel attacked. They will come up with their own analysis.
Therefore the level of detail and depth required in the assessment heavily depends on public perceptions and the distribution of political power. Interestingly, the level of detail of the analysis (whether one chooses a quick scan or an econometric model) does not, in practice, change political power and seldom has a noticeable effect on public perception. This underlines the need to embark on an open process, right from the start.
If one party can demonstrate convincingly the counterpart is wrong, that may have a noticeable impact on policy decision making. Therefore, the use of elaborate analysis demonstrating the magnitude of the likely positive environmental impacts of subsidy removal is essential. If environmental benefits of a subsidy reform are claimed this needs to be carefully substantiated.
On the other hand, if a subsidy fails in terms of equity, from a political perspective only little additional proof usually will be required in terms of adverse environmental benefits. The latter argument, while reconfirming the need for in depth assessments of the impacts of a subsidy and its removal, underlines the importance of tools such the checklist, which enables the early identification in the process of the significance of the impacts (including the social impacts) and the elements of the analysis to be prioritised. However, ultimately, it remains to be acknowledged that even though detailed analyses are too complex for ministers to get fully engaged with them and fail to address power issues, it does not mean that the political process can do without them.

*Source: we thank Jan Pieters' for drafting these comments following the experts' workshop organised for the project.*

## 6.2 Procedural aspects

When conducting the assessment, one first needs an overview of the procedural and organisational steps to be taken. As Rave (2005) states, a reform process must be well-prepared in order to be effective.

There are several key elements to aiding the successful identification, assessment and reform of EHS:

- Good preparation, following procedural steps in a logical order.
- Often, finding a champion of reform to provoke and maintain momentum.
- Ideally a whole-of-government approach, to be implemented through an inter-ministerial working group.

- The true, representative and appropriate involvement of stakeholders in the process.

Although the specific process to be followed should be decided on a case-by-case basis, the policy maker that embarks on the process of subsidy identification, assessment and reform should consider the following questions:

**Summary of the steps involved:**

1) What are the financial and human resources available?
2) Who should be involved in the process?
3) Which stakeholders should participate and at what stages?

The steps in detail:

***1) Step 1: What are the financial and human resources available?***

The availability of financial and human resources will significantly influence the shape of the subsequent process. It is important to know what resources are available for an initial prioritisation analysis and for a more in depth assessment and to be realistic about what can be achieved based on this.

***2) Step 2: Who should be involved in the process?***

In particular:

- Who will conduct and oversee the assessment?
- What decision-makers need to be engaged?
- What specialists and expertise could usefully be involved?

For subsidy reform to be successful strong leadership and a broad coalition of support is needed. A strong political advocate, or 'champion' (e.g. a dedicated civil servant) of reform will aid the communication of a clear message and support the development of measures to limit or compensate for any negative effects of reform (IEEP, 2007).
Such a champion cannot work in isolation. The involvement of supportive stakeholders in civil society (e.g. progressive elements of industry, progressive business associations, trade unions, NGOs) is also crucial (see point below on stakeholders' engagement) and across governmental ministries and departments is crucial. On the latter, a 'whole-of-government' approach is recommended. Indeed, as emphasised by the OECD (2007a), single government ministries or departments do not necessarily have the capacity, the convening power or the access to resources to effectively achieve EHS reform by themselves. Therefore, co-operation and horizontal analysis between government ministries or departments is required, namely those whose mandates or policies come into contact with the subsidised sector(s) in question. Beginning the reform process with the intention of taking a whole-of-government approach, and of considering policy coherence and the links between institutional actors, is advised in order for the analysis to follow a sustainable development path.

In this vein it is suggested that an inter-ministerial working group for EHS reform be established. This allows coordination across sectors, makes more information available for the purpose and enables synergies between the work of different ministries/departments/sectors to be identified. Additionally, the problem of bias, dubious incentives and conflicts of interest can, to some extent, be alleviated (Rave, 2005). For example, according to the UBA (2009), a centralised approach has the potential to threaten transparency as, if the body/department undertaking the reform is traditionally opposed to subsidies in principle, it may exploit the assessment in order to pursue its own agenda.

It is recommended that an independent professional facilitator be brought in to lead working group sessions, in order to retain impartiality and keep discussions productive. Where sensitive issues are encountered, independent policy consultants make good mediators (Rave, 2005).

With regard to the working group's make-up, experienced researchers are an essential part as procedures such as environmental impact assessment require considerable expertise if they are to be conducted thoroughly. Also, the involvement of academics would provide some independence to the process.

### *3) Step 3: Which stakeholders should participate and at what stages?*

For an EHS reform to be successful it should be characterised by openness, transparency and participation by a wide range of stakeholders (OECD, 2008c). In general, the stakeholder groups which should be called into the process include relevant agencies, politicians and civil servants, as well as business, trade unions, academia and non-governmental organisations (NGOs). The composition and representation of these stakeholder groups should be decided in advance.

The 'EHS reform tool' developed in this Chapter consists of four main phases, in which the degree of involvement of different stakeholders will vary, as explained here, by phase. It has been broken down for the purposes of stakeholders engagement in the following three main parts:

a) Phase 1: Screening
b) Phase 2 and 3: Application of the checklist and broader assessment
c) Phase 4: analysis of reform options.

In detail:

#### *d) Phase 1: Screening*

The involvement of non-governmental stakeholders during screening will be more limited than during subsequent phases, in order to retain objectivity. That said, a broad stakeholder analysis is a useful way to discover the interests and influence that will likely surface during the course of the reform (Rave, 2005). This also ensures that stakeholders are not neglected at the outset of a reform, which builds confidence instead of evoking mistrust. It is important to have a balanced representation of different interests in order to prevent bias in the analysis.

Practically speaking, stakeholder engagement during screening is useful as a method of gathering information, which could take the form of focus groups and calls for evidence.

*e) Phase 2 and 3: Application of the checklist and broader assessment*

As recommended in OECD (2008c), the assessment process should be fully accessible – from the assumptions on which it is based, to the clear explanation of its outcomes. Assumptions and assessments should be checked from the spectrum of involved parties' viewpoints to make sure they are balanced and justified. This will ultimately increase the credibility of results, so it is in the best interests of the reform working group not to overlook this.

The representation of stakeholder groups during the broader assessment should be decided in advance and should include a range of environmental, social and economic interests from the business and industry sectors, NGOs and trade unions. The level of involvement of each should also be considered, as this will vary according to resources, depth of knowledge of the subject and the logistics of their involvement. On this last point, some concrete suggestions to explore include: technology-based tools such as online discussion forums or video conferencing and in-real-life approaches like polling and surveys, focus groups, structured interviews and consensus conferences. The European project Sustainability A-Test is an important source of tools available for this purpose (see http://www.sustainabilitya-test.net/). Table 8, below, outlines such options.

**Table 8: Tools for Involving Stakeholders in Sustainability Assessments**

| Method | ICT | | Goal | | | Outcomes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Support | Process | Consult | Partner | Deliberate | Map of options | Shared visions | New ideas | Recomm-endations | Empowerm-ent |
| **IT Based** | | | | | | | | | | |
| Electronic focus groups | | ⚑ | ⚑ | ⚑ | | ⚑ | | ⚑ | | ⚑ |
| Tools to inform debates, dialogues & deliberations | ⚑ | | ⚑ | ⚑ | ⚑ | ⚑ | ⚑ | | | |
| **Conventional** | | | | | | | | | | |
| Consensus conference | | | ⚑ | ⚑ | ⚑ | ⚑ | ⚑ | | ⚑ | ⚑ |
| Repertory grid technique | | ⚑ | ⚑ | ⚑ | | ⚑ | ⚑ | | ⚑ | |
| Interactive backcasting | | | ⚑ | ⚑ | | ⚑ | ⚑ | ⚑ | ⚑ | |
| Focus group | | | ⚑ | ⚑ | ⚑ | ⚑ | | ⚑ | | |
| Delphi Survey | | | ⚑ | ⚑ | | ⚑ | | | | |
| In-depth interviews | | | ⚑ | | | ⚑ | | | | |
| Citizen`s Jury | | | ⚑ | ⚑ | ⚑ | | | | ⚑ | ⚑ |

Source: available online at http://www.sustainabilitya-test.net/

*f) Phase 4: Analysis of reform options*

Studies on the political economy of policy reform show that 'open' decision-making, through the involvement of stakeholders, is more effective and efficient in achieving policy results and enhances their democratic legitimacy (OECD, 2008c; Rave, 2005). Their engagement generally has the benefit of increased acceptance and credibility of the reform's results.

Stakeholders to involve at this point are all those that might be affected by the reform in a relevant way (relevance being assessed in terms of either quantity of effects and/or intensity of effects). The level of detail in the information provided to each of the stakeholders involved in the process should be adapted to their needs. For instance, politicians might need the overall perspective whilst trade unions might need detailed information on economic and social impacts of the reform.

As Rave (2005) explains, subsidy reform can provoke emotions to run high among those who stand to lose out in a real way – for example, consumers who may struggle with an increase in petrol price as a result of fuel tax reform, or farmers whose water bills will rise after reform of irrigation water subsidies. The working group must be aware of, and sensitive to, such possibilities and should consider how to counteract this risk through appropriate methods of stakeholder inclusion. These will likely not be the same for all the groups. For instance, whilst groups benefiting from the reform or less negatively affected by it can be called to a consensus conference, the main losers could get involved through in-depth interviews or workshops.

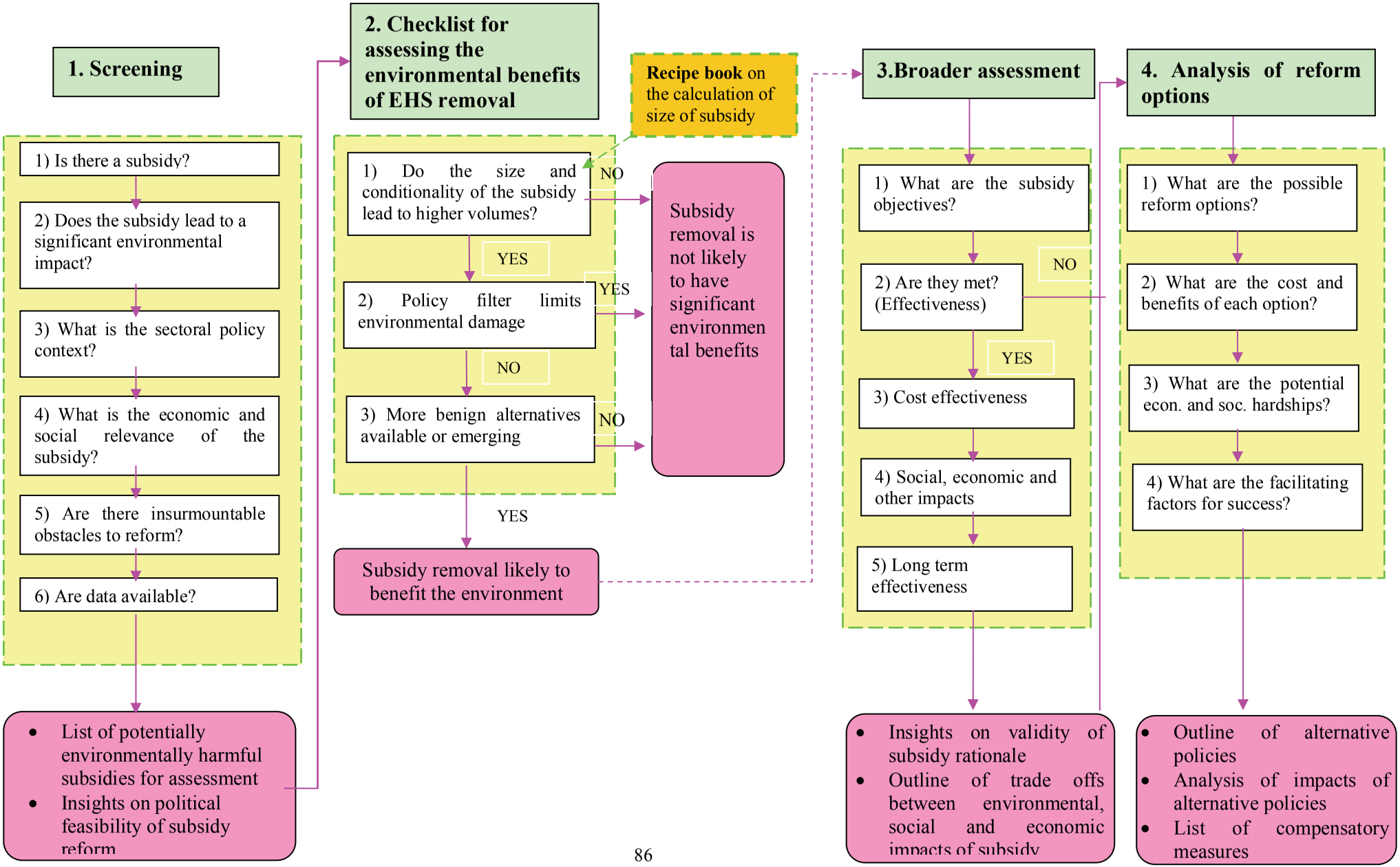
## 6.3 The proposed tool

*Short description of steps*

The 'EHS reform tool' comprises four phases:

1. **Screening of subsidies**: This screening phase serves to identify and prioritise those subsidies that have clear potential environmental harm and are politically more viable for reform.
2. **Application of the checklist**: this phase entails the application of the checklist (OECD, 2005). The objective of this phase is to assess whether the subsidy reform/removal is likely to bring significant environmental benefits. If so, the assessment should be carried forward, looking at the trade offs with social and economic impacts explored in the next phase.
3. **Broader assessment of subsidies:** this phase builds on the application of the integrated assessment framework tool (OECD, 2007a). The potentially harmful subsidies will be analysed in more detail with regard to their social and economic impacts and to determine whether they actually achieve the targets for which they were introduced.
4. **Analysis of reform options:** here, concrete policy reform options for environmentally harmful subsidies are developed. This phase should help to prepare the political decision making for the reform/ removal of environmentally harmful subsidies. This analytical steps build on the integrated assessment framework tool (OECD, 2007a).

**Flowchart: the proposed 'EHS reform tool'**



*Prefatory note to the 'EHS reform tool'*

The tool is presented as a consequential process for presentational reasons and ease of understanding, but the analyst can apply the different phases in parallel. For example, step 1 of the 'Broader assessment' on the validity of the subsidy objectives is an immediate question. Clearly if the policy objective is outdated, the subsidy is likely to represent a waste of resources, and should be considered for reform. Nonetheless, even if the policy objective is still valid (note that this is ultimately a political judgement), it is the subsidy's impacts that determine whether the subsidy should be considered for reform or removal.

The focus of this study is on environmentally harmful subsidies so we have given particular prominence to the environment in this tool. Hence, the choice of focusing the first two phases of the tool on the identification of environmentally harmful subsidies and on the prioritisation for reform (and further assessment) of subsidies whose removal are likely to benefit the environment. This enables the user to draw a priority list of environmentally harmful subsidies that require reform. In practice, there will be other political and economic concerns as well to consider when considering subsidy reform. With this in mind, a broader assessment of other impacts of the subsidies (i.e. social, on competitiveness, trade etc) is outlined in the third set of questions. Finally, the fourth set of questions on the analysis of reform options is aimed at preparing a successful reform process.

***Steps in detail***

## 6.4 Phase I: Screening: Prioritise the analysis

This screening phase serves to identify and prioritise those subsidies that have clear environmental harm and are politically more viable for reform.

All potential EHS have to be identified, not only the explicit and obvious subsidies, but also the implicit hidden subsidies (e.g. tax exemptions in the energy sector). As noted by UBA (2009), all subsidies should be assessed in relation to their potential negative environmental impact at regular intervals, in order to make sure that changing framework conditions and political objectives are part of efficient and effective governmental public spending.

While subsidies that need priority in the reform process should be established on a case-by-case basis, experts at the project workshop called for the development of a 'priority list' of subsidies that need reform on environmental grounds. A priority list was drawn in 2007 in IEEP et al (2007). Most of its recommendations are still valid, see Box 15.

**Box 15: Priorities for reform in the energy, transport and water sectors**

From the literature, expert opinion and from the contributions given by experts and stakeholders who attended the High Level Group on Energy, Competitiveness and the Environment, ad hoc group on EHS, on 7 December 2006, it was clear that there should

be immediate action to reform EHS. It is not a matter of doing more research but more a matter of engaging the political commitment and practical commitment to action. In particular, there are certain subsidies for which attention is needed; these are (though non inclusion here does not suggest that an item is not important):

- Subsidies for fossil fuel-based electricity production and use in some countries;
- Subsidies to aviation and road transport in most countries;
- Subsidies to nuclear energy – liabilities and waste – with the current climate change concerns it is important that any progress on nuclear is done with full understanding and full account of its true costs over the whole life cycle;
- Subsidies to energy intensive industries – in selective countries;
- Subsidies to company cars – in selective countries;
- Subsidies for natural resources through non full cost recovery and where resource costs are not taken into account properly (notably water);
- Ensuring that, in conformity with the polluter pays principle, future changes to the Eurovignette system maximise the possibilities to charge for external costs.

Regarding other subsidies which need to be properly designed, the working group highlighted the following:

- Biofuels – inter alia, to avoid making the mistake of choosing the wrong fuels and source of fuels ;
- Grandfathering (free allocation) of emissions credits, as opposed to auctioning, within the EU Emissions trading scheme (ETS);
- Carbon capture and storage (ensure that risks and liabilities are fully factored in).

This is not an exhaustive list. As regards what to do, this will have to be assessed on a case-by-case basis. However, one immediate potential action is for Member States to develop full subsidy assessments and develop and present regular transparent reports about EHS in their countries – covering the full range of subsidies as set out above.

Source: IEEP et al, 2007.

Policy makers could prioritise the 'screening' of environmentally harmful subsidies based on present and future environmental policy priorities, set out in strategic environmental planning documents, national or European.

The economic sectors that contribute to the environmental impacts concerned should be assessed to establish the significance of their environmental impact. Some examples of the environmental profiles of sectors and sectors' segments and an indication of whether subsidy removal is likely to benefit the environment, are provided in Box 16 below.

**Box 16: Sectoral characteristics and environmental impacts**

**Transport sector:** public passenger transport and rail freight are relatively less environmentally polluting than road and air transport. In terms of emissions, the removal of subsidies to public transport is likely to promote a shift to more environmentally harmful transport modes. These subsidies are also likely to have an important social dimension (market failure) that needs to be considered. Removing subsidies to the use of

the car, road haulage or air transport is likely to have positive environmental impacts.

**Energy:** fossil fuels, particularly coal and oil, are widely recognised as being the most environmentally harmful energy sources. especially in relation to climate change. Removing subsidies to these sources will bring significant environmental benefits. Subsidies to renewables are widely considered to be environmentally beneficial, but this should not preclude them from an analysis, as they may have unintended negative impacts on the environment, eg certain biofuels. At the same time, there are often significant social objectives that need to be considered when assessing energy policy, together with the general equilibrium effects of altered patterns of energy production and consumption that may be generated by subsidy reform.

**Water:** the damage to the environment from water sector activities is likely to be greater at the early stages of the water cycle, such as water abstraction (impacts on use). However, in the water sector there are important social and public health considerations to be taken into account. Adverse environmental effects may result from removal of subsidies to waste water collection and treatment.

Source: Adapted from OECD 2005

It is important to bear in mind that the screening phase is intended to be short, not time consuming, based on readily available information, and to be largely qualitative.

The individual steps to be addressed are summarised in the box below.

**Summary of the steps involved:**

1) Is there a subsidy?
2) Does the subsidy lead to a significant environmental impact?
3) What is the sectoral policy context?
4) What is the economic and social relevance of the subsidy?
5) Are there insurmountable obstacles to subsidy reform/removal?
6) Are data available?

***The steps in detail***

***1) Step 1: Is there a subsidy?***

In this step, the analyst will need to establish whether there is a subsidy. First of all, what is a subsidy? The definition that is most widely used in the policy context is that of the OECD (2005), which defines subsidies as:

> *'A result of a government action that confers an advantage on consumers or producers, in order to supplement their income or lower their costs.'*

This definition allows several government support measures to be considered as subsidies, but does not include implicit subsidies that result from non-internalisation

of externalities or lack of full cost pricing. As discussed in Chapter 2 (where the reader is referred for a discussion on subsidy definition), the *definition* of subsidies as 'deviations from full costing' is clearly normative and difficult to measure; similarly for externalities.

What in practice 'defines' (for definition we mean in this context the quantification not the mere identification) a subsidy is what one chooses as the baseline (or counterfactual) and whether it is considered to be the market price/cost or the social cost (i.e. including externalities, which need to be defined). In practice, this varies from sector to sector (e.g. the baseline is widely considered to be equal to market prices or costs in the energy sector, while it is widely considered to be the difference between prices and marginal social cost in the transport sector, see Box 2 in Chapter 2).

Whether or not a particular policy (measure/instrument) should be considered a subsidy is not always self-evident. The definition of the counterfactual (the baseline, or the 'world-without-subsidy') is a crucial element in this respect.

The choice of the counterfactual includes a number of normative elements, including considerations of distributional equity and interpretations of policy principles such as the 'polluter pays' principle. It is impossible to provide 'objective' guidance on this choice. However, transparency can be postulated as a basic requirement. This means that the analyst should explicitly describe the counterfactual situation/scenario that has been used. Clearly, arguments supporting the choices may make them more convincing and increase acceptance. 'Objective' benchmarks, such as EU state aid guidelines and standard tax rates may be helpful in defining counterfactuals. Measures that have been taken to mitigate or compensate certain unwanted effects of the subsidy will probably not be part of the counterfactual.

For example, environmental policy objectives influence the definition of the counterfactual for the identification of environmentally harmful subsidies. Some examples are provided in Box 17 below, by sector.

**Box 17: Influence of policy objectives on the selection and definition of subsidies considered for removal**

In the case of *water*, the issue is often how to optimally price water as a common pool reserve. Such an optimal price not only depends on the relative abundance of the common pool, but also on societal preferences with respect to preserving the reserve for future generations. This benchmark determines what actual prices are deemed as being too low or too high and thus gives rise to what has to be defined as a 'subsidy' (the deviation from the 'optimal' price). A number of policy measures may lead to deviations of this 'optimal price'. Ideally all of them would be analysed.

In the *transport* sector, the most common policy objective appears to be optimal pricing of the various (competing, but also complementing) alternative modes of transport, taking into account the aim of minimising the private and social costs of the entire transport system. Social costs, just because of their size, play an important role in determining the optimal price structure. Deviations from the optimal price structure call for policy actions that may involve changing relative prices by government measures. Again, this may imply

that various policy measures (such as subsidies on parking space, provision of infrastructure at below costs, subsidies to public transport and so on) should be scrutinised.

In the case of *energy*, the main concern seems to be increasing the efficiency of energy production and use, taking externalities into account. Since important externalities (*e.g.* SOx, NOx, $CO_2$ and other emissions or (nuclear) waste) are, as yet, seldom fully internalised into energy prices. Sectoral energy policies, aimed at efficient energy policies may involve sizeable government interventions in energy prices. Again, it is the deviations from the optimal price structure that constitute the 'subsidy'. Remedying these deviations will generally include policy packages that affect the relative prices of the various types of energy production and use rather than singular measures that stimulate or penalise one type of energy production or use.

Source: OECD, 2005.

The analyst should address the following step:

- What is the counterfactual? (see also section 5.5. for more on this). Describe the counterfactual, i.e. the situation that would exist without the subsidy (or after removal of the subsidy). In particular, specify all other policy measures/instruments that are likely to be changed or removed simultaneously with the subsidy removal. If there is no single obvious counterfactual, then describe a number of potential counterfactuals and analyse the subsidy for each of them separately.
- Once the counterfactual has been established, is there a subsidy?

The description of the counterfactual should contain a specification of those policy measures/instruments that are supposed to remain in place after subsidy reform/removal and those that are supposed to be removed or reformed along with the subsidy. The latter ones are put in place together with the subsidy and will be removed with it; these are therefore not part of the counterfactual scenario. They should be however identified when defining the counterfactual. These include the subsidy-related policy filters (see step 3).

**In this step,** a list of potentially environmentally harmful subsides provided to one or more sectors will have been identified.

### *2) Step 2: Does the subsidy lead to a significant environmental impact?*

In order to understand whether a subsidy should be placed on the priority list of subsidies to be assessed for reform on environmental grounds, it is useful to determine, even just on a superficial level, the significance of the environmental impact of a subsidy.

The analyst needs to look at both the environmental profile of the recipient sector and at the characteristics of a particular subsidy.

#### *a) Environmental profile of the recipient sector*

As noted in OECD (1998), many subsidies of environmental concern provide support to a particular sector or form of production. It is likely that a large benefit for the

environment will derive from the removal of the subsidies that support production process that is relatively highly polluting (or is complementary to other highly polluting practices). Hence:

- Does the sector use or produce inputs or substances the subtraction of which from, or release into, the environment might threaten cherished environmental values? (Compare against previously set out environmental government objectives in relation to the sector in question).
- Does the sectoral analysis reveal strong links with other sectors (including in the supply chain or demand chain of the industry with the subsidy) that handle environmentally harmful inputs or substances? If the forward (demand chain) and backward (supply chain) linkages are strong, the subsidy might have considerable environmental impacts as a consequences of its impacts on those linkages. If the linkages are subsidised, other subsidies should be taken into account, and the checklist should be used for each and every subsidy related to these forward and backward linkages.

The nature and degree of environmental harmfulness will depend on the characteristics of the economic activity (i.e. the scale of the activity, the use of natural resources, the production of waste, pollution levels, the risk of accidents) and the areas likely to be affected (i.e. the absorption capacity of the environment). In practice, policy makers might already have access to the results of environmental impact assessments or more broad impact assessments about an activity. Alternatively, expert judgement can help to reach a decision about the likely significance of the environmental effects of the recipient activity (see also Box 18).

**Box 18**: **Significant environmental impact of the economic activity**

The significance of the environmental impact of an economic activity can be determined using this checklist. Questions are designed so that a 'Yes' answer will generally point towards potential significant environmental impact and a 'No' answer to potentially not significant environmental impacts.

The questions to be considered are the following:

1. Is there a large change in environmental conditions due to the production/consumption patterns of the economic activity?
1. Are there features out-of-scale with the existing environment?
2. Are there effects that are unusual in the area or particularly complex?
3. Do the effects extend over a large area?
4. Is there any transfrontier impact?
5. Are many people affected?
6. Are many receptors of other types (fauna and flora, businesses, facilities) affected?
7. Are valuable or scarce features or resources affected?
8. Are environmental standards breached?
9. Are protected sites, areas, features affected?
10. Is there a high probability of the above effects occurring?
11. Will the effect continue for a long time?
12. Will the effect be permanent rather than temporary?
13. Will the impact be continuous rather than intermittent?
14. If it is intermittent will it be frequent rather than rare?
15. Will the impact be irreversible?
16. Will it be difficult to avoid, or reduce or repair or compensate for the effect?

Source: Adapted from ERM (2001).

In making a quick assessment of the environmental impacts of an economic activity, the analyst can use the table provided below. For each environmental dimension, the expected impact (positive or negative) could be ranked depending on its significance (i.e. extent, magnitude, probability, duration and reversibility), assigning a score for the degree of negative impacts (--- high; -- medium; - low) and for positive impacts (+++ high; ++ medium; + low).

| **Indicator** | **Degree of expected impact** |
|---|---|
| • Areas of natural importance / biodiversity | |
| • Renewable resources | |
| • Non renewable resources | |
| • Water | |
| • Soil | |
| • Air | |
| • Climate | |
| • Environmental disasters/ risk | |

Source: adapted from ARE (2004), *Sustainability assessment: conceptual framework and basic methodology*.

*b) The characteristics of the subsidy*

The environmental impact of a subsidy is also likely to be determined by some key characteristics of the subsidy it self. One can understand the significance of the environmental impacts by addressing the following points:

- What is the size of the subsidy? Where available provide quantitative figures or estimates. Alternatively provide a qualitative description of the dimensions of the subsidy. A calculation of the size of the subsidy will be done in Phase II of the analysis. To understand the significance of the environmental impact of a subsidy, it is however important to have a rough idea of the size of the subsidy. The larger the size of the subsidy the larger the impact on marginal costs and revenues of the subsidised sector and hence on production and consumption patterns.
- What is the duration of the subsidy? Subsidies that have been in place for a long time are much more likely to have created a technological 'lock-in' and hinder structural change within the sector. This has an impact on economic efficiency and on the environment. Moreover, technological lock-in can reduce the effectiveness of environmental policies, which often rely on technological solutions for a better resource use.
- Does the subsidy have a direct impact on the environment? For example, if the subsidy is provided to the use of specific inputs or materials (e.g. energy, water or raw materials) or to technologies that lock-in the use of particularly harmful inputs, thereby stifling technological development, its removal is likely to provide large benefits for the environment.
- Does the subsidy provide for longer term structural impacts? For example, subsidies to one-off decisions such as starting an operation or investing in capital equipment with a long life-span, for example energy producing machinery and infrastructure. These decisions can have large environmental effects, but whether they are detrimental or beneficial to the environment depends partly on the alternatives that may come to the market after the subsidy has been granted. Such subsidies may lock in technologies that are not so 'clean' after all (OECD, 2005).
- What is the nature and degree of the suspected harmfulness to the environment (what is the environmental harm done by the subsidy at the local, national, European *or* global level?). Where possible provide quantitative estimates. If not provide a description of the likely significance of the impacts on the environment of the subsidy.

**This step** enables the analyst to reduce the initial list of subsides to those that are likely to have *significant* environmental impacts and that therefore need to be prioritised in the assessment.

### *3) Step 3: What is the sectoral policy context?*

Subsidies do not operate in isolation. Subsidies are often provided as part of a wider sectoral policy package, aimed for example at maintaining production or employment

levels, or redressing market failures. It is important to consider whether there are other policies or measures in place that might mitigate, or worsen, the impact of the subsidy in this matrix of intervention.

The 'quick scan' and mostly qualitative nature of the OECD tools and of the process here presented mean that synergies with other policies and measures aren't captured. It is important however that these are considered as they could influence on the environmental impact of a subsidy.

*Existence of policy filters*

- Are there 'policy' filters that mitigate the environmental effects of a subsidy? The existence of environmental or other policies in place (e.g. emission standards, fixed tradable quota for the relevant product; a clear regulatory standard; production limits or standards; a cap on total emissions etc) which mitigate or remove the effects of a subsidy on the environment need to be investigated. If these policies are effective, the removal of the subsidies will bring no or little environmental benefit. It is therefore essential to consider an entire 'policy package' rather than an individual subsidy, and to compare it with the 'counterfactual' policy package (or baseline situation – see step 1 for the definition of the counterfactual). The mitigating policies (also known as 'policy filters') may have been introduced as complementary instruments, specifically intended to mitigate the subsidy's environmental impact, but this is not necessarily the case. They may either act as a constraint on the level or volume of the environmentally harmful activity, or as a constraint on the emissions or environmental damage of that activity.

The mitigating effect of environmental policy filters will be assessed in detail in Phase II.

**Examples:** Policy filters identified in the case study on fuel tax differentiation included: fuel-quality standards; technology requirements; and efficiency standards and emission standards for vehicles. Policy filters identified in the case study on reduced VAT for domestic energy use included: the emission trading system (ETS); policies aimed at reducing residential energy demand; improving energy efficiency; and stimulating the use of renewable energy. Policy filters identified in the case study on irrigation subsidies included: a Water Management Regime (Water Abstraction Plan); the subsidisation of drip irrigation technologies; provision of finance to modernization projects; and the cross-compliance policy of the CAP. In all the case studies analysed, the policy filters in place were not adequately mitigate or remove the negative effects of the subsidy on the environment (see the Annexes for further details on the policy filters in each case).

*Synergies with other subsidies*

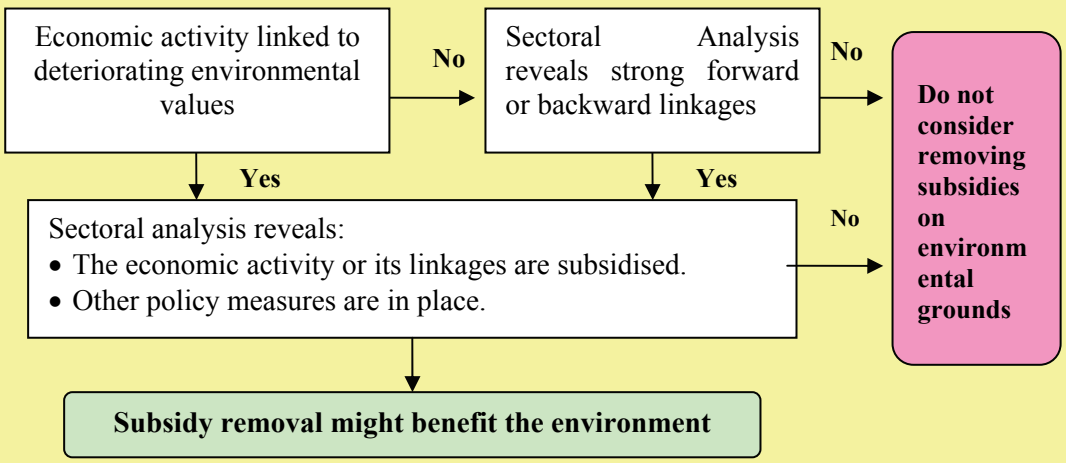
- What other subsidies are provided to the sector/economic activity? A subsidy to a sector is often provided in combination with other subsidies. It is important to assess how various subsidies to an economic activity interact. A classic case is a subsidy to reduce capacity in a potentially environmentally harmful industry (e.g. nuclear energy plants, fishing). In isolation, if it is a one-off, it could be

environmentally helpful. Provided as an on-going policy, it could be doing harm, or at best be a waste of money, because the industry will build on the expectation of a on going nuclear decommissioning subsidy when they invest, making them less risk-adverse to invest in new capacity. Combined for example with a subsidy for new plants or new vessel construction, or 'modernization', it would definitely be environmentally harmful, because it would be lowering the cost of producing electricity, or fishing, accelerating the speed at which capital cycles through the industry. In the nuclear energy decommissioning subsidy, investigated in this study, the subsidy analysed was just one of a complex system of subsidies to nuclear power; testing the OECD tools it became clear that removing that particular subsidy would have substantial effects on the environmental impacts of that activity only if several were reformed.

*Synergies with prevailing taxation regime*

- Does the taxation regime counterbalance the impacts of a subsidy? In some cases subsidies are provided as part of a policy package including taxes. Taxes can counterbalance the impact of a subsidy as they impact on the marginal costs or revenues of an activity (e.g. high excise duties on fuels could counterbalance the existence of low VAT rates, or viceversa). As reported in OECD (2005), for example, the same level of fuel excise duties applied at the EU level have different impacts on haulage companies depending on the taxation regime applied in different countries.

**The above steps (1-3)** enable the analyst to identify subsidies that are potentially environmentally harmful. This will entail the identification of whether a sector (or its supply and demand chains, i.e. backward and forward linkages) are linked to a (significant) environmental impact. Also, other policies will be identified, such as policy filters or other subsidies and taxes that might counterbalance or aggravate the impact of the subsidy. The process should lead to the identification of subsidies that have potentially significant environmental impact and that therefore should be placed on a priority list for assessment.




Source: OECD, 2005.

### *4) Step 4: What is the economic and social relevance of the subsidy?*

It is particularly important to highlight the economic and social relevance of a subsidy. Establishing this early in the process will help in planning the level of detail required in the assessment of the economic and social dimensions (in particular in Phase 3 'Broader Assessment'). In addition, it will help determine the likely trade offs, conflicts and controversial issues relating to the subsidy and adequately planning the stakeholder engagement process.

Unpicking these elements will help in enhancing the success of the assessment and reform processes.

This step, as the ones above, is intended to be short and not time consuming and it should be done in a qualitative way. This step should establish the following:

- Does the subsidy have significant economic and social impacts?
- Who wins and who loses?

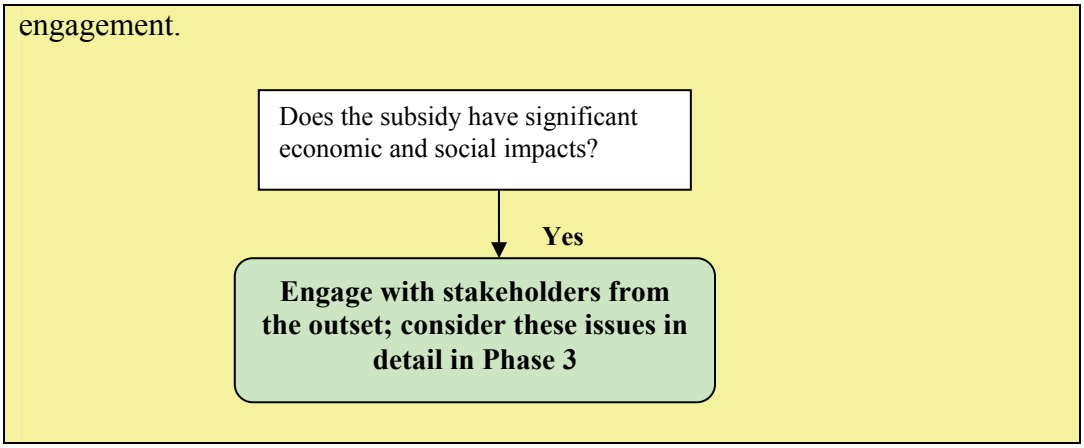
A criteria matrix can be used to set out the degree of expected economic and social impacts qualitatively. For each dimension, the expected impact (positive or negative) could be ranked according to its significance, for example assigning a score for negative impacts (--- high; -- medium; - low) and for positive impacts (+++ high; ++ medium; + low). Expert judgement can help to reach a decision about the likely significance of these impacts.

| **Indicator** | **Degree of expected impact** |
|---|---|
| **Economy** | |
| • Income / employment | |
| • Productive capital | |
| • Competition /innovation | |
| • Market mechanisms | |
| • Public sector enterprise | |
| **Social** | |
| • Health /security | |
| • Education, identity | |
| • Culture, values | |
| • Legal security, equality | |
| • Solidarity | |

Source: adapted from ARE (2004), *Sustainability assessment: conceptual framework and basic methodology*

**This step** will help in establishing early in the process the potential trade offs between the economic and social impacts of a subsidy. It will help in planning the level of detail required in the assessment of the economic and social dimension (in particular in Phase 3 'Broader Assessment') and stakeholders'

engagement.



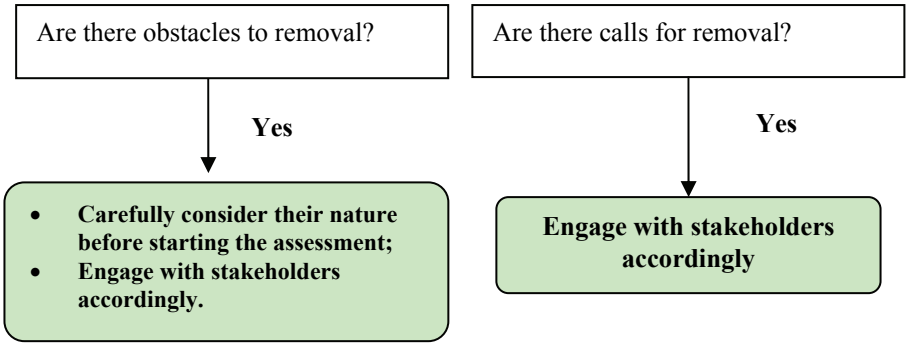

### *5) Step 5: Are there insurmountable obstacles to subsidy reform/removal?*

Finally, it is important to consider the feasibility of reform to ensure priority is given to the assessment of subsidies for which removal/reform is feasible. The likelihood of success depends on the reform being practical and enforceable.

Member States will need to assess whether it falls under their formal national competence. For example, there are international air transportation treaties that hinder a comprehensive introduction of unilateral kerosene taxation by a single country, or European frameworks such as the Common Agricultural Policy that determine the rules and conditions of subsidisation at the EU level.

Moreover, learning about possible obstacles to subsidy reform, or conversely, possible windows of opportunity is important, so as to determine the viability of the reform and the likely success of the assessment and reform process.
Elements to address include:

- How politically important/sensitive is the initiative? Consider both the national and EU levels. Depending on this, the policy maker would involve actors and stakeholders at different levels; a discussion on procedural aspects and stakeholders engagement is provided in section 6.2.
- Is there a window of opportunity for subsidy removal or reform (e.g. policy review process, evaluation, public demand)? Proposing subsidy removal/reform as part of a review process, for example, will provide greater probability of success. The current economic and fiscal crisis may provide an opportunity for reform to take place.
- Are there existing calls for the subsidy removal/reform? And if so, is there a possibility to link to members of civil society (e.g. NGOs, trade unions, industry associations, etc) that support reform?
- Have there been attempts to reform a subsidy in the past and why have they failed (what were the barriers and the obstacles at that time, which could be still be an obstacles if reform/removal was going to be proposed again?)




### *6) Step 6: Are data available?*

It is recommended to identify whether data are available. Clearly, this also depends on the level of detail one wishes to give to the analysis and, vice versa, the level of detail could be determined by the availability of data. This will vary on a case-by-case basis and according to the significance of the impacts involved. The methodology outlined here is meant to be used as a 'quick scan' (although it can also be used as a reference for more complex evaluations). The majority of the steps are meant to be performed usually in a qualitative way, although some quantitative analysis is warranted to the extent this is required (i.e. size of subsidy). Some points that should be addressed when looking at the issue of data availability are:

- What data sources and information are available and who holds it?
- Which methods will serve the purpose of the assessment?
- Which set of tools should be considered?
- Who will monitor, evaluate and review the assessment?

Information required will include information on the subsidy levels (depending on whether these can be found in national accounts, or other sources should be used – see more guidance on this in the 'Recipe book' in Chapter 7). To determine the impacts of the subsidy various sources will be needed: such as impact assessments; micro and macro economic studies of a sector; studies on the environmental impact of a sector; technological studies; examinations of social impacts of an economic activity. The type of sources will vary from grey literature and scientific articles; to ex post and ex ante valuations; and readily available datasets. It could be helpful to engage to stakeholders to collect evidence and data. Numbers are often lacking and the necessary information may be available only to stakeholders, in these cases, involving stakeholders in early stages may be essential. Also, as discussed in Box 14, if there is no agreement on the numbers, reducing or removing the subsidy may be very difficult. For stakeholders' engagement techniques identified in this study see section 6.2.

**Results of the screening process**

This initial screening is intended to provide:

- A first understanding of environmental policy priorities and policy objectives which allow the policy maker to narrow the list of

potentially EHS to be considered for removal.

- If the sectoral analysis reveals that the subsidised sector, or its supply or demand chain (backward or forward linkages), have significant environmental impacts, then subsidy removal in these sectors might benefit the environment.
- A first understanding of the nature and degree of the environmental harmfulness of the subsidy will allow to narrow down the list of subsidies that need priority in the assessment.
- The early identification of issues relating to the economic and social impacts of a subsidy and its political relevance enables the policy maker to ensure that these impacts are given appropriate attention during the analysis and stakeholder groups are engaged accordingly.
- Learning about possible obstacles to subsidy reform, or conversely, possible windows of opportunity is important, so as to determine the viability of the reform and the likely success of the assessment and reform process.

## 6.5 Phase II: Checklist for assessing the environmental benefits of subsidy removal

In this phase, it will be established whether a subsidy increases the volumes of production/consumption of an activity, whether the policy filters are effective in mitigating the environmental impact of the subsidy, whether there are environmentally more benign alternatives to the products and modes of production subsidies. Ultimately, the outcome of this phase will be an understanding of whether subsidy *removal* is likely to bring benefits to the environment.

Once a list of potentially harmful subsidies has been drawn up in Phase I, this phase entails the application of the reasoning behind OECD checklist (OECD 2005) to each subsidy. This analysis will help to identify those subsidies whose removal would bring about the largest benefit for the environment, therefore helping to prioritise them in the assessment and in the reform process. This phase enables the policy maker to use the available time and financial resources efficiently.

Importantly, to facilitate the analysis the checklist focuses on the environmental effects of subsidy removal. The checklist helps to pinpoint subsidy elements that should be removed on environmental grounds. Subsidy reform is seen as a combination of removing elements of a subsidy package and replacing those elements with other that have a more favourable environmental profile. A broader assessment that allows to take further the analysis of subsidy reform options is outlined in Phase 3 and 4 of this tool.

Drawing on the results of Phase I (screening) and to set the background to this phase of the analysis one should first provide:

- **A concise description of the sector** or industry receiving the subsidy and of the demand and supply linkages (i.e. describe the subsidised industry, what are the supply markets and demand and how are these linked to the levels of input and output of the recipient sector).
- **A list of subsidies provided to the recipient sector** and to its upstream (i.e. supply) and downstream (i.e. demand) linkages (only if they handle environmentally harmful inputs or substances and if the linkages are strong - see results of step 2 in Phase I). As anticipated in the screening if these linkages are strong and likely to have environmentally significant impacts then subsidies provided to these activities should also be scanned using this checklist. Subsidies will be assessed one at the time using the tool provided here. Synergies/counterbalances among these subsidies will need to be established and assessed once the analysis has been completed (see also step 2 in screening).
- **Insights on the level of openness of the market of the recipient sector** (i.e. is it a liberalised market? Is it an oligopoly? Is it a monopoly?). The more a market is liberalised the more it is likely that removal will have an impact on the environment, as other actors will rapidly enter the market following the price signal. One should also refer to important exogenous factors of relevance such as trade, to consider whether removing a subsidy will encourage imports that are more environmentally harmful.

The methodology outlined rests on the idea that the policy maker has access to information on the environmental impacts of the industry in question (i.e. the environmental impacts and natural resources use of an activity and the characteristics of the local environment in which these impacts are felt) (see step 2 of Phase 1). This might involve the application of environmental impact assessments techniques, developed previously to this analysis, or in parallel. These techniques are well documented and will not be explained here.

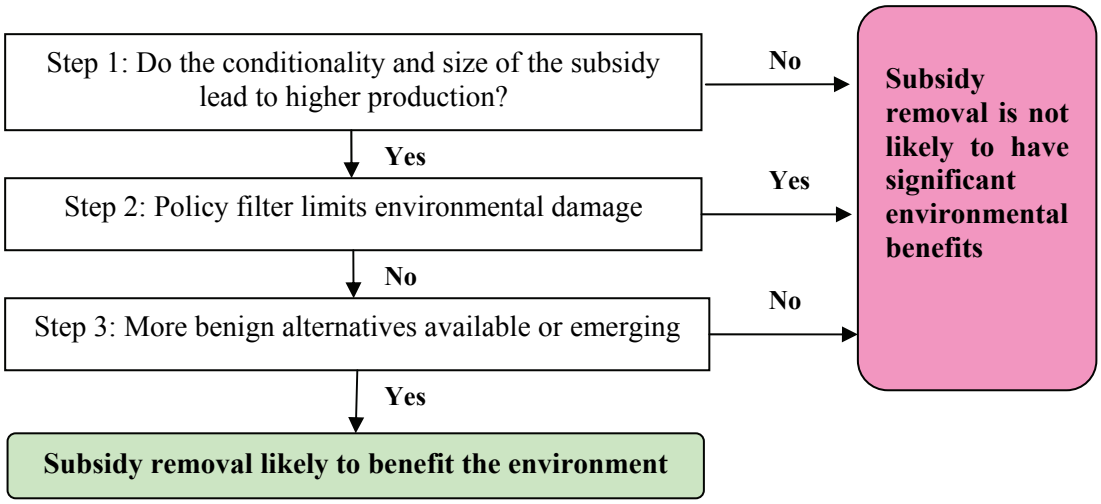
The checklist is developed in a step-by-step approach involving three steps.

**Summary of the steps involved:**

1) Do the conditionality and size of the subsidy lead to higher production?
2) Are the policy filters effective in mitigating the environmental impacts?
3) Are there more benign alternatives available now or emerging?

**The checklist should be applied to one subsidy at a time.** The checklist is illustrated in Figure 2.

**Figure 2: The Checklist**




Source: adapted from OECD, 2005.

### *1) Step 1: Do the conditionality and size of the subsidy lead to higher production?*

In this step, the analyst should collect information on the key elements of the subsidy that determine the impacts on the levels of production and consumption of the recipient sector. This in turn is what creates pressure on the environment.

The environmental impact of a subsidy is determined by the link between: a) the type of subsidy; b) its point of impact (input, output, profit or income); c) the size of the subsidy; and d) the price elasticity of demand and supply associated with the activity subsidised. These elements will be described for a subsidy in the next points.

*a) What is the type of the subsidy?*

Following the identification of the subsidy (done in Step 1 in Phase I), the subsidy should be described according to the following list of '*types'* of subsidy. Classifications used in previous work (IEEP, et al, 2007), should be used to determine the type of subsidy.

| **On budget** |
|---|
| • Direct transfer of funds to producers and consumers (e.g. capital grants, income support, low interest loans) |
| • Below-cost fees for government-provided infrastructure and services (non-general infrastructure and services) |
| • Potential direct transfers of funds (e.g. covering accident liabilities) |
| • R&D support |
| • Government directs other bodies to do any of the above |
| **Off-budget** |

| |
|---|
| • Government revenues due are foregone or not collected |
| • Tax concessions (exemptions, allowances, credits, rate relief, tax deferral) |
| • Debt concessions (write-offs and rescheduling) |
| • Market-price guarantees (e.g. fixed prices, premiums or bonuses) |
| • Regulatory support mechanisms (e.g. energy-mix requirements) |
| • Price support (e.g. production quotas, feed-in tariffs) |
| • Preferential market access (e.g. preferential planning consent; controls over access to resources and other market access restrictions) |
| • Below-market interest rates |
| • Price paid for resource use below full economic rent |
| • Lack of charging for external costs of activity or resource use |
| • Selective exemptions from government standards |

*b) What is the size of the subsidy?*

In order to understand the significant of any of the impacts of a subsidy one should first establish the size of the subsidy. The size of a subsidy determines the subsidy's distortionary impacts on the marginal costs or revenues of the recipient sectors, which in turn influence the behaviour, such as an increase in production or consumption, of the receiving sector.

The impacts of a subsidy on the amounts of production and consumption and therefore on the environment depend on its relative size (i.e. its proportion of the total costs or price of an activity or commodity). Furthermore, the absolute amounts involved in a subsidy scheme represent public money that could be used for other purposes if the subsidy would not exist.

The question to address is:

- What is the size of the subsidy (i.e. monetary value of the financial subsidy; its proportion of the total costs; its proportion relatively to the price of an activity or commodity)?

It will be possible to calculate the size of the subsidy *on the basis of the type of subsidy chosen in point a),* using the methodological guidance for calculating subsidy levels developed in Chapter 7 (**'Recipe Book' for the calculation of the level of subsidisation**). The analyst will be guided to choose the methodology that is relevant to the type of subsidy considered, in Chapter 7.2. There is also guidance to calculate the marginal external cost of subsidies (i.e. to express the subsidy's environmental impact in monetary terms).

Price elasticity of demand and price elasticity of supply of the subsidised activity ultimately determine the magnitude of volume responses to price changes and thus environmental impact (as explained in Box 19).

**Box 19: The role of price elasticities**

The largest effects on volumes occur if both demand and supply elasticities are large. Medium effects would result if one elasticity is large and the other is small (OECD, 1998). If price elasticities are small, the impacts of the subsidy are likely to leak to upstream or downstream in the production/consumption chain.

As noted in OECD (1998), 'the crucial role price elasticities of supply and demand play in determining both leakage and volume effects makes it possible that support measures can be scanned using these characteristics to determine those support measures that are unlikely to reach the intended recipient sector effectively, but are likely to have strong adverse effects on the environment'. Priority should be given to the following subsides:

- subsidies aimed at recipient sectors that operate on markets for their finished products that are characterised by either:
    - a relatively small price elasticity of demand and a relatively large price elasticity of supply, since these support measures tend to be ineffective in transferring income to the intended sector; or
    - a relatively large price elasticity for both demand and supply, since these support measures are only moderately effective in transferring income to the intended recipient sector, while at the same time will have potentially large adverse effects on the environment.
- subsidies aimed at recipient sectors that 'are relatively material- or energy-intensive'.

However, data on elasticities are not always available. In some cases, elasticity values that have been developed for similar circumstances to the ones investigated could be found in the literature, however they should be applied with caution. In some cases they are too site-specific in others they may be too broad to apply to a specific case. It is generally regarded very resource intensive to extrapolate elasticity values on a case-by-case basis, as they require dedicated microeconomic modelling.

Thus, when these are not readily available, it is preferable to simply explain qualitatively the likely effects of subsidies on the levels of production and consumption and thus on the environment. The analyst should in practice:

- Provide a description of responses of the sector and its supply and demand markets to changes in price of the subsidised product or activity. This should be based on previously observed patterns or, where not available, from readily available economic studies. A reasoned qualitative explanation of such effects should be provided.

For example, the German Federal Environment Agency (UBA), uses an approach that is 'pragmatic'. In their methodology (similarly based on the OECD checklist) there is no requirement to provide price elasticities. The only quantitative request is to give the size of the subsidy, but there is no attempt to quantify the environmental harm caused by the subsidy, thus no request for understanding the precise impacts on volumes determined by elasticities. They consider *sufficient to provide a good qualitative description of the possible environmental impacts.*

The methodology developed by the UBA for the identification and assessment of EHS is now available only in the German language. It will be translated in English by the end of 2009. Frauke Eckermann, from the UBA, presented the methodology for the identification and assessment of EHS at the project workshop.

For the OECD own guide on the role of elasticities see OECD 1998 Chapter 3, pp.39 – 48.

*c) What is the point of impact of the subsidy?*

This step focuses on the relationship between the point of impact (or conditionality) of the subsidy, its impact on economic agents' behaviour and the resulting environmental effects. The understanding of the link between the point of impact of a subsidy and economic agents' behaviour enabled the OECD (1998) to develop a classification of subsidies that enables an understanding of their impacts on behaviour, simply on analytical grounds.

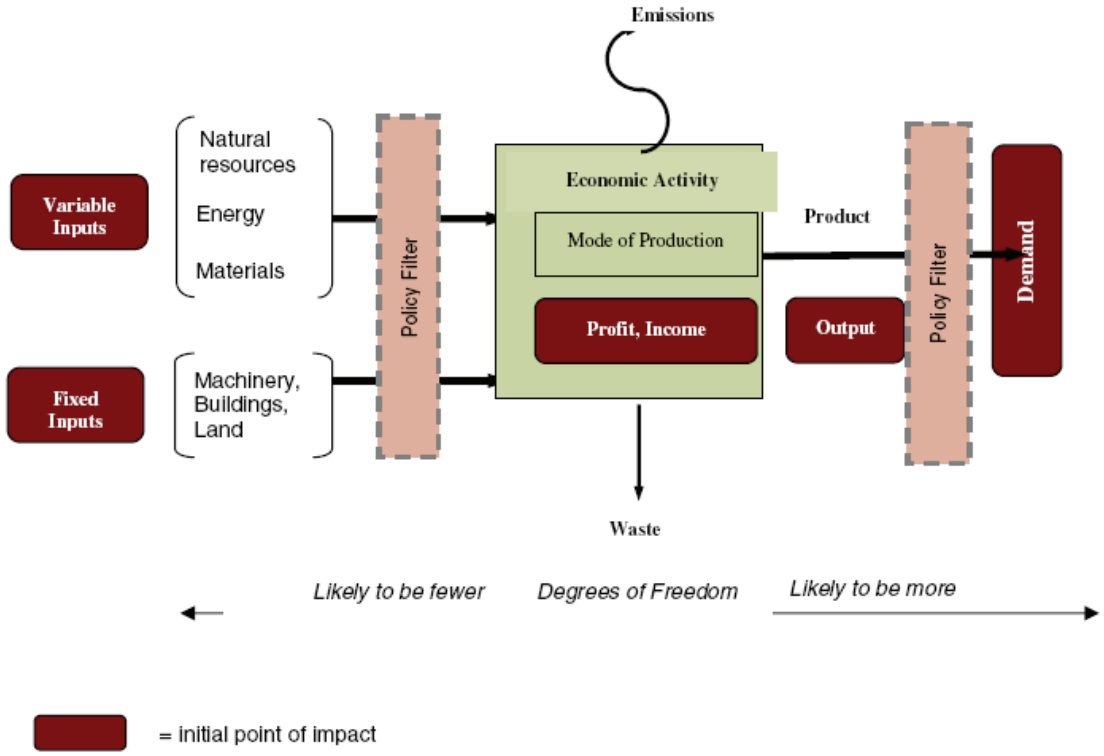
The basic principle behind this classification is that: *all subsidies translate into either revenue increases or cost reductions.* An analysis of subsidies by their point of impact highlights some important differences:

- When the subsidy is conditional on **input use** (i.e. input use is subsidised), production costs are reduced;
- When a subsidy is conditional **on output** (i.e. output is subsidised), revenue increases of the recipient depend on the volume of production; and
- When the subsidy is conditional on **profit and income** (i.e. profit or income are subsidised), revenue increases are independent of the volumes produced.

Hence, given their different impact on revenues and costs, subsidies may lead to different responses from producers and consumers, in terms of the modes of production, production or consumption levels.

If the point of impact of the subsidy is 'within the firm', it affects the individual firm's own cost and revenue structure directly; if the subsidy's point of impact is 'outside the firm' it affects demand, and so only indirectly the revenues of a firm. If the subsidy affects the choices 'within the firm', it is likely to have more impact on the modes of production and the production levels, than when it affects the 'choices outside the firm' (i.e. the case when the subsidy impacts on demand – which benefits the industry collectively and so gives the firm less influence on the volume of the subsidised product to be produced), as the figure reproduced below shows (OECD, 2005).

**Figure 3: Types of subsidy's initial points of impacts and degrees of freedom**




Source: OECD, 2005

The analyst should identify the point of impact (i.e. conditionality) of the subsidy scrutinised by addressing the following points:

- Identify the point of impact (conditionality) of the subsidy using the classification provided in Table 9. Is it a support conditional on the income and profits of the recipient sector; support conditional on the purchase of a product or the use of a production process (i.e. conditional on output); or support conditional on the use of an input or technology (i.e. conditional on input)?
- Specify who are the intended recipients of the subsidy (i.e. input producer, finished product producer/input consumer, or finished product consumer). It is useful to determine at this stage the intended recipients. This point will enable to understand (later in the analysis) whether the subsidy reaches the intended recipients or whether the subsidy leaks to non intended recipients (e.g. the OECD (1998) notes that support conditional on output and input levels tends to accrue primarily to the relatively large, and often more wealthy, input producers).

**Table 9: Main initial point of impact of the subsidy**

| Main point of impact | Conditionality and types of support |
|---|---|
| ***Point of impact: within the firm*** | |
| **INPUT** | • Materials (including (irrigation) water and energy) |
| | • Short lived equipment |
| | • Particular types of fixed capital equipment |

| | |
|---|---|
| | • Access to natural resources below opportunity costs (e.g. exploitation concessions) |
| | • Low interest loans (i.e. subsidies to capital) |
| | • Research and Development (R&D) |
| **OUTPUT** | • Market price support (incl. border protections, market access restrictions, government brokered contracts) |
| | • Deficiency payments/sales premiums |
| **PROFIT AND INCOME** | • Historical entitlements |
| | • Preferential low rates of income or capital taxation |
| | • Debt write offs |
| | • Allowing insufficient provisions for future environmental liabilities |
| | • Exemptions from (environmental) standards |
| | • Start of an operation (e.g. lump sum) |
| | • Low rate of return requirements (e.g. typically for state owned utilities) |
| ***Point of impact: outside the firm*** | |
| **DEMAND** | • Preferential low VAT rates |
| | • Marketing and promotion provided by government below costs (e.g. marketing and product promotion). |
| | • Provisions of government produced infrastructure below cost |

Thus, on the basis of the results collected in this Step, the analyst is in the position to understand the relationship between the subsidy conditionality and the effects on sales, costs and revenues. Table 10 allows the analyst to determine the likely environmental impacts of a subsidy on a purely analytical basis.

**Table 10: Main subsidy point of impact, economic and environmental impacts**

| | Main initial point of impact of the subsidy | Effects on sales, costs and rent of the subsidy | (Likely) environmental impacts of subsidy |
|---|---|---|---|
| ***Point of impact: within the firm*** | | | |
| **Point of impact: INPUT USE** | **Materials (including (irrigation) water and energy)** | Reduces variable costs. | Increases use of materials or inputs. Locks in technologies that use these inputs, blocking developments towards resource productivity. Increases energy production, material production levels and extraction of resources. |
| | **Short lived equipment** | Reduces variable costs. | The effects on resource efficiency will depend on the degree to which the equipment is linked to specific materials or energy uses. |
| | **Particular types of fixed capital equipment** | Reduces variable or fixed costs. | The effects on resource efficiency will depend on the degree to which the equipment is linked to specific materials or energy uses. It will depend also on capital equipment costs in relation to production costs. |
| | **Access to natural resources below opportunity costs** | Reduces variable or fixed costs. | Increases resource exploitation levels. It has decisive effects on the continuation of such economic activity. |

| | Main initial point of impact of the subsidy | Effects on sales, costs and rent of the subsidy | (Likely) environmental impacts of subsidy |
|---|---|---|---|
| | **(e.g. exploitation concessions)** | | |
| | **Low interest loans (i.e. subsidies to capital)** | Reduces variable or fixed costs, or both. | Depends on the environmental profile of the capital good subsidised. |
| | **Research and Development (R&D)** | If large, they act as operation costs, and reduce variable or fixed costs, or both. | It might postpone the adoption of a cleaner technology or advance it.<br>If large, it can have serious lock-in effects. |
| **Point of impact: OUTPUT** | **Market price support (incl. border protections, market access restrictions, government brokered contracts)** | Create revenues proportional to actual production volumes. | Increases production levels and resource exploitation associated with the economic activity (including of the supplying industries) - unless the production is already limited by production limitations (e.g. production quotas, planning and zoning requirements, pollution limits) see step 4 of this checklist on the role of 'policy filters'. |
| | **Deficiency payments/sales premiums** | Create revenues proportional to actual production volumes. | Same as above. |
| **Point of impact: PROFITS AND INCOME** | **Historical entitlements** | Creates revenues irrespective of actual production volumes. | Increases profits.<br>Subsides are independent from production levels, but are capitalised in the prices of factors of production (e.g. land) where there is inelastic demand, so having an impact on production modes and production levels (need detailed analysis of production levels). |
| | **Preferential low rates of income or capital taxation** | Creates revenues irrespective of actual production volumes. | Improves profitability of a firm (unless also conditional on the use of inputs and specific technologies). Extends life-span of firms that are not economically viable without subsidies (i.e. inefficient). |
| | **Debt write offs** | Creates revenues irrespective of actual production volumes. | Same as above. |
| | **Allowing insufficient provisions for future environmental liabilities** | Creates revenues irrespective of actual production volumes. | Guarantees the profitability of certain industries that otherwise would not have been economically viable. |
| | **Exemptions from (environmental) standards** | Creates revenues irrespective of actual production volumes. | Same as above. |

| | Main initial point of impact of the subsidy | Effects on sales, costs and rent of the subsidy | (Likely) environmental impacts of subsidy |
|---|---|---|---|
| | **Start of an operation (e.g. lump sum)** | Creates revenues irrespective of actual production volumes. | Effects on the environment depend on the local environment, the nature and scale of the operation subsidised. |
| | **Low rate of return requirements (e.g. typically for state owned utilities)** | Reduces fixed costs and revenues. | Forces producers to reduce their prices, often in conjunction with low interest loans. Stimulates demand. Lowers the discount rate of operations (or break even price) encouraging use of capital intensive technologies. Environmental impacts depend on the environmental profile of these technologies. |
| **Point of impact: outside the firm** | | | |
| **Point of impact: DEMAND** | **Preferential low VAT rates** | Stimulates demand. | Stimulates demand, only indirectly affects production - environmental impacts depend on the environmental profile of the technologies. |
| | **Marketing and promotion provided by government below costs (e.g. marketing and product promotion).** | Stimulates demand. | Same as above. |
| | **Provisions of government produced infrastructure below cost** | Stimulates demand. | Same as above. |

Source: adapted from OECD, 2005.

Using Table 10, the analyst should address the following points:

- What are the effects of the subsidy on sales/costs/rent of the subsidised activity?
- What is the nature and scale of the activity subsidised?
- What is the environmental profile of the technologies used by the recipient sector?
- Does the subsidy lead to higher production volumes and therefore rates of exploitation of natural resources?

In the light of the above points, does the subsidy lead to higher production volumes and therefore rates of exploitation of natural resources?

- YES – if it leads to higher volumes, subsidy removal is likely to have significant environmental benefits. However further steps need be undertaken to assess whether policy filters effectively mitigate the environmental impacts of the subsidy (Step 2) and whether there are more environmentally benign technologies or modes of production available (Step 3). These two steps will ultimately determine if subsidy removal will benefit the environment.

- NO – if there the production volumes are not likely to change, the subsidy's removal is not likely to have a significant environmental benefits.

### *2) Step 2: Are there policy filters?*

*a) Are the identified policies effective in mitigating the environmental impacts of the subsidy?*

In order to understand whether subsidy removal would bring benefits to the environment the checklists asks whether the existing environmental measures or other policies in place (e.g. fixed tradable quota for the relevant product; a clear regulatory standard; production limits; a cap on total emissions etc) mitigate or annihilate the effects of a subsidy on the environment. If these policies are effective, the removal of the subsidies will bring no or little environmental benefit. It is therefore essential to consider an entire 'policy package' rather than an individual subsidy, and to compare it with the 'counterfactual' policy package as defined in step 1 of the screening process (Phase I).

The mitigating policies (also known as 'policy filters') may have been introduced as complementary instruments, specifically intended to mitigate the subsidy's environmental impact, but this is not necessarily the case. They may either act as a constraint on the level or volume of the environmentally harmful activity, or as a constraint on the emissions or environmental damage of that activity.

This step thus assesses the emissions or environmental impacts that result from a subsidized activity, taking into account the mitigating effect of other policies. Because of the complexity and data requirement difficulties associated with establishing this step, drawing qualitative conclusions rather than quantitative ones will be sufficient, normally.

Key questions include:

- Are there any environmental or other policies in place that mitigate the impacts of the support?
- What are the impacts of the relevant policies in place - i.e. on emissions or environmental impacts that result from the subsidized activity? Here it is relevant to consider the specific features of the policies. An *absolute* limit on emissions or damage effectively neutralizes the subsidy's potential harmful impact, whereas a *relative* limit does not. For example, an increase in electricity consumption does not lead to higher $CO_2$ emissions if there is a cap on the total emissions from electricity production (e.g. under an emissions trading system). On the other hand, an increase in natural gas consumption does lead to higher $CO_2$ emissions, even if there are standards for building insulation or the efficiency of central heating boilers (which are relative limits).
- What will happen to these policies once the subsidies are removed? For example, if these environmental policies are removed together with the subsidy, the subsidy removal will not necessarily benefit the environment. However, it is not

self-evident that this will happen. A country may, for instance, have tough regulations on $SO_2$ emissions, introduced as a 'policy filter' to reduce the impact of its coal subsidies. But it seems unlikely that these stringent standards will be relaxed again when the country decides to phase out its coal subsidies.

In the light of the above answers: are the identified policies effective in mitigating the environmental impacts of the subsidy?

- YES – the policies are effective in limiting environmental damage. Then the subsidy's removal is not likely to have significant environmental benefits. The reform of this subsidy should not be prioritised on environmental grounds.
- NO – if the policies are found to be not effective in limiting the environmental damage, then the following step should be undertaken.

*b) What is the assimilative capacity of the affected environment?*

In some cases where there are negative impacts, it may be useful to ask this question. The assimilative capacity of the environment is one factor to consider where regulations or standards relating to emissions or products don't apply. This might be a highly site-specific factor, particularly when the emissions have predominantly local or regional effects, therefore will be evaluated through dedicated studies. However, in the case of pollutants that have global effects (like $CO_2$ emissions or CFCs) effects are not site specific and the assimilative capacity is irrelevant.

Because of the complexity and data requirement involved with this step, it is acceptable to draw qualitative conclusions:

- Provide insights on the assimilative capacity of the environment with respect to these impacts.

In the light of the answer provided, is the assimilative capacity of the environment effective in mitigating the environmental impacts caused by the subsidy?

***3) Step 3: Are there more benign alternatives available now or emerging?***

This step entails the comparison of the environmental profile of the subsidised product in comparison to possible alternatives. The main concept behind this step is that if the technologies and products likely to replace the previously subsidised products and modes of production are equally or more damaging to the environment, the subsidy's removal is not likely to bring significant environmental benefits. It should be noted that this usually will require some judgement from the analyst (Pieters, 2003).

Questions to be addressed include:

- Are there technologies and products likely to replace the previously subsidised products and modes of production?
- How do the environmental profiles of these competing products and modes of production compare with those of the previously subsidised ones?
- Is the implementation of these alternatives hampered by the subsidy under scrutiny?
- What is the likelihood of these technologies and products replacing the previously subsidised ones?

In the light of the above, are there more benign alternatives available now or emerging?

- YES - if technologies and products likely to replace the previously subsidised products and modes of production are available now or emerging, subsidy removal is likely to bring significant environmental benefits.
- NO - if the technologies and products likely to replace the previously subsidised products and modes of production are equally or more damaging to the environment, the subsidy's removal is not likely to bring significant environmental benefits.

***4) Will subsidy removal benefit the environment?***

To support the final assessment of whether subsidy removal would bring likely environmental benefits, Pieters (OECD, 2005) developed a Table (see Annex 1) that enables to assess on analytical grounds the impacts of subsidy removal on the environment given their point of impact and the economic effects of subsidy removal. The Table distinguishes between short-term environmental impacts (e.g. removing subsidies whose removal would influence day-to-day decisions) and long-term environmental impacts (e.g. removing subsidies whose removal would affect decisions that would only gradually affect the environment). This distinction is important in a policy making process.

**Result of the application of the checklist**

If once all these steps have been addressed, it is established that substantial environmental harm from removal of a subsidy can be minimised, then the policy maker should consider policy reform. The policy maker needs to identify the broader impacts of a subsidy (e.g. social, competitiveness) to identify the most effective alternative policies. It is thus recommended that in order to prepare policy reform, the policy maker undertake a broader assessment, as suggested in the next phases.

## 6.6 Phase III: Broader Assessment

A partial assessment (such as that carried forward in Phase II) looking only at the environmental dimension of subsidies has the advantage of allowing a simple and strong message that may be necessary to start the political debate in the first place. The focus of this study is on environmentally harmful subsidies so we have given

particular prominence to the environment in this assessment tool. In practice, there will be other political and economic concerns as well.

Broadening the assessment to include the key social and economic impacts, is likely to be essential if policy makers want to persuade decision makers to act on reforming EHS. At the experts workshop, Member States delegates stressed the importance of the provision of information on the equity and competitiveness dimensions to support the reform process. Also, better alternative policies can be developed from an integrated assessment than from a partial one. A summary of discussions on a partial vs integrated assessment is reported in Box 20.

**Box 20: Discussions at the project workshop on a sustainability assessment**

The presentation of the 'EHS reform tool' at the project workshop prompted discussions on whether to confine the analysis to the assessment of the environmental impacts of EHS or whether to also analyse impacts on social and economic dimensions.

There was a general consensus that looking at subsidies with an integrated approach i.e. including the social and economic impacts, is paramount if policy makers want to persuade decision makers to act on reforming EHS.

To start with, the discussion dwelled on whether an integrated tool should be used to identify all impacts (social economic and environmental) in equal measure. While this was considered to be a desirable development, it was noted that the tool would then become an evaluation tool for all subsidies, not only environmentally harmful ones, therefore beyond the mandate of this study. In the 'EHS reform tool' here presented, the assessment of the social and economic dimensions is provided for once it has been established that the subsidy is environmentally harmful. This is here envisaged as a qualitative process.

As noted by Pieters, quantitative integrated assessment would need to ensure that all methodologies deployed for assessing the various aspects must be comparable, since their results must be added and subtracted e.g. equity, competitiveness, health, and so on. Each of these topical assessments should have a methodology that allows their results to be used in the integrated assessment framework. For example the methodology of the assessment of the economics behind the analysis of the environmental effects should be identical to the methodology of the economic assessment that underpins the analysis of the equity issues. It is as yet uncertain how the OECD tools would behave in that respect.

*We thank Jan Pieters for providing insights and comments following the workshop, some of which are here included.*

It was not in the mandate of this study to develop a new methodology for providing for a 'sustainability' checklist for the assessment of the subsidies. This phase of the EHS reform tool builds on the Integrated Assessment framework (OECD, 2007a). The aims of this phase are the following:

- To highlight the costs and benefits, winners and losers, intended and unintended effects of a subsidy in the environmental, economic and social spheres, and their trade offs in the context of multiple sectors;
- To provide information which is understandable to the general public, as broader communication is essential for reform.

The assessment here outlined is intended to be broad enough to be applied to subsidies of any type (excluding uncompensated externalities). The framework should

be applicable both to *ex ante* and *ex post* analyses. In this study, it was tested on case studies qualitatively. The application of this phase requires an examination of sources on the social economic and environmental impacts of a subsidy. Because collecting new information to quantify these impacts can be time consuming and costly, the analyst should at least provide a qualitative description for each step (for examples of how to do this and the results it leads to, see application of the integrated assessment tool to the case studies in the Annexes).

**Summary of the steps involved:**

1) What are the subsidy objectives? Are they still valid?
2) Effectiveness: are the subsidy's objectives achieved?
3) Cost effectiveness: What is the cost-effectiveness of the subsidies and alternative policies
4) What are the incidental impacts of the subsidy?
5) What is the long term effectiveness of the subsidy?

***Steps in detail***

***1) Step 1: What are the subsidy objectives?***

First of all it is important to establish the actual or expected impacts of a subsidy in relation to its original objectives. In a first step it has to be clarified whether the subsidy's objectives are achieved or not and whether they are still valid. Timescale can be an important aspect of an objective – policy makers may be seeking a particular effect for a specific period, e.g. during a time of adjustment or transition. However, many subsidies have no time limit. Hence, there are subsidies which are granted even though the economic or political target has already been achieved or it has been confirmed that the target is actually not achievable. A good example is the tax exemption on agricultural machines (tax exemption from motor vehicle tax) in Germany. This exemption was introduced in 1922 with the goal of motorising the agricultural sector. This goal is long achieved but the instrument still exists.

- What are the objectives of the subsidy, with respect to its environmental, economic and social impacts? The official objectives may be surmised from the legislative history or statements by officials if not clearly set out by the authorities. The objectives may be expressed in terms of environmental, economic or social outcomes or some combination of the three.
- Are the subsidy objectives still justified in relation to the needs? This questions relates to the validity of a subsidy in relation to the objective sought.
- Does the policy design avoid problems inherent in the long-term maintenance of subsidies? In particular, does it have a sunset clause or an adaptive review process (i.e. does it have a built-in review process and are subsidies tied to outcomes not technologies)?

***2) Step 2: Effectiveness analysis***

The effectiveness analysis (i.e. does the subsidy achieve its objectives?) should be based on the stated objectives of the policy. Where such goals are not explicitly stated or cannot be inferred, skip this section. Any negative environmental or social impacts would be considered to be unintended and would be addressed in the incidental impacts scan below. In order to address this step it is suggested to use studies on macro-economic impacts or studies on micro-economic impacts of the subsidy.

- Does the subsidy achieve the economic impacts that it is expected to achieve? (e.g. correct a market failure; increase the supply of a public good).
- What effect does the subsidy have on the (public) budget and on welfare? The information produced in quantifying the subsidy (using the Recipe Book in Chapter 7) may be a useful input for answering this question.
- Does the subsidy reach the intended recipients? (e.g. improving income distribution generally, reaching a target group with intended benefits; inducing socially desirable behaviour). To answer this question, look at studies that empirically trace the flow of money/ distribution of support to the sector in general. Note that if a subsidy is targeted at a particular group, but this segment does not receive all or most of the benefits, then the subsidy fails at a basic level. So this is a powerful argument for reform.
- Does the subsidy achieve its environmental objectives? *(e.g.* reducing pollution; preserving habitat; encouraging the use of an environmentally preferable product, speeding the development of more-efficient or clean technologies). It is suggested to look at studies on pollution from the use of the resource/subsidised sector.

This test should be considered as a sort of basic 'threshold criterion': if the subsidy fails at achieving those objectives for which it aims then it is in need of improvement regardless of its incidental impacts.

However, if the economic or political justifications are still valid, then the efficiency and effectiveness of the subsidy have to be evaluated against the unintended impacts.

### *3) Step 3: Cost-effectiveness*

If the economic or political justifications are still valid, the analysis should focus on whether subsidies are the appropriate instrument or whether there are preferable alternatives, e.g. regulatory instruments. If the subsidy turns out to be the most appropriate instrument, it is necessary to investigate which kind of subsidy with which operational rules is most appropriate. If one type of subsidy is considered appropriate, then it is necessary to investigate its efficiency and effectiveness, i.e. the extent to which the desired objectives can be achieved by the subsidy and the costs of doing so relative to other policy instruments. This step entails the following questions:

- What alternatives exist for meeting those objectives?
- Could the objectives of the subsidy be achieved by other, more cost effective policies?

Note that this step helps set the stage for the analysis of the impacts of policy reform. While collecting new, detailed information on the cost effectiveness of alternative policies, if not readily at hand, can be time consuming and costly, the analyst should at least consider and describe alternative policies.

### *4) Step 4: What are the social, economic and other impacts of the subsidy?*

The analysis of incidental impacts asks what impacts have occurred, or might occur, in areas (environmental/economic/social) not foreseen or targeted in the original subsidy design. The stress here is on long-term, dynamic and international impacts (e.g. this includes any impact of the subsidy on foreign producers – which should be noted in the analysis).

- What are the unintended economic impacts of the subsidy? (e.g. unintended economic impacts such as impacts on the prices of factors of production and intermediate inputs used by non-target industries; or economic impacts of social and environmental changes brought about by the subsidy).
- What are the unintended social impacts of the subsidy? (e.g. socially undesirable distributional impacts on low-income consumers, on the general non-target population, on developing country exporters). In order to answer this question the OECD (2007a) suggest describing the characteristics of the various social groups.
- What are the unintended environmental impacts of the subsidy? These are mainly linked to primary economic impacts – changes in the levels of inputs and wastes e.g. degradation of ecosystem services; loss of biodiversity, synergistic effects. Note: these impacts should already be known from previous analysis using this tool (see also Phase I and II of this tool).

As illustrated in the Chapter on the critical appraisal of the OECD tools there are additional incidental impacts to consider in relation to subsidies, including impacts on trade, competitiveness, SMEs and public health. To ensure consistency with European guidelines, we used as a basis for the evaluation of these aspects the EC Impact Assessment Guidelines (SEC(2009)92). In the analysis, these impacts could be identified and a qualitative assessment of the more significant impacts should be undertaken. For each area, the analyst could:

- Describe the impacts;
- Identify the benefits or costs associated with each area; and
- Assess the magnitude of the impacts. Where a quantitative assessment is not possible, describe it qualitatively.

Both intended and unintended impacts could be considered. The issues to address are included in Box 21.

**Box 21: Additional incidental impacts**

**Trade**

- Does the subsidy (directly) affect trade patterns, and thus the location of the subsidised activity (or the location of production of the subsidised commodity)?
- Are there important differences in environmental impact of the subsidised activity (or

the production of the subsidised commodity) depending on the location (domestic or abroad)? To answer this question, one would need information on environmental parameters such as emissions or energy use per unit of production of the relevant activity in different countries

- If the subsidy is likely to reduce international trade, is the negative environmental impact of this trade reduction possibly compensated by the positive impact of less international transport?
- Does the subsidy affect the opportunities for international diffusion of cleaner technology?

**Competitiveness**

- Are some products or businesses treated differently from others in a comparable situation? As a consequence of this are environmental products/activities penalised?
- Does the subsidy exempt a market/sector from competition rules, thus creating/strengthening a monopoly? As a consequence of this are environmental products/activities penalised?
- Does the subsidy interfere with the way firms market or price their products/services, limit or reserve distribution for certain channels/ intermediaries, thus reducing consumer choice or creating barriers for newcomers? As a consequence of this are environmental products/activities penalised?
- Does the subsidy favour access/ restrict access to resources (such as raw materials, land, IPRs, know-how or process technology) in concentrated markets, thus excluding or delaying market entry of alternative products/services?
- Does the subsidy favour incumbents at the expense of new entrants thus mitigating the innovation potential and the beneficial effects of liberalisation?

**SMEs**

- Does the subsidy entail that some products or businesses are treated differently from others in a comparable situation?
- Does the subsidy entail the withdrawal of certain products from the market?
- Does the subsidy lead to the closing down of businesses?
- How does the option affect the cost or availability of essential inputs (raw materials, machinery, labour, energy, etc.)?
- Does the subsidy affect access to finance? And if so, does it privilege certain businesses compared to others in the sector?
- Does it impact on the investment cycle? And if so, does it privilege certain businesses compared to others in the sector?

**Public health**

- Does the subsidy affect the health and safety of individuals/populations, including life expectancy, mortality and morbidity?
- Does the subsidy increase or decrease the likelihood of health risks due to the handling of substances harmful to the natural environment?
- Does it affect health due to changes in the amount of noise, air, water or soil quality?
- Does it affect health due to changes in energy use and/or waste disposal?

Source: adapted from EC Impact Assessment Guidelines (SEC(2009)92).

### *5) Step 5: Long-Term Effectiveness*

As the OECD (2007a) reminds us, too often, a subsidy designed to solve a short term problem may easily become the cause of problems in the longer term. In this section,

the analyst needs to ask whether the subsidy is merely treating the symptoms of a larger problem, or whether it actually addresses underlying causes. If the former is true, the subsidy may be delaying necessary structural change.

- Is the subsidy designed so as to eventually address the underlying economic problems that gave rise to its creation (e.g. by spurring innovation, increasing resource or labour productivity or increasing the supply of a public good)?
- Is the subsidy aimed at addressing underlying social problems or to treat symptoms therefore perpetuating a social 'lock-in'?
- Is the subsidy designed to directly address the environmental problems e.g. problems facing infant environmental industries?

**Results of the broader assessment**

This phase will have resulted in gathering information about the subsidy's costs and benefits, winners and losers, intended and unintended effects of a subsidy in the environmental, economic and social spheres, as well as the trade offs between the environmental, economic and social impacts. In the next phase policy reform scenarios will be developed.

## 6.7 Phase IV: Analysis of the policy reform options

After the EHS problem has been framed, it is necessary to scope solutions, identify their potential policy impacts and ease the way towards reform.

**Box 22: Political economy and EHS reform**

In her intervention at the project workshop, Candice Stevens (former OECD Sustainable Development Advisor) stressed that subsidy reform is a political process. A successful approach to subsidy reform should tackle/consider the following points:

- Power = Understand where the power lies. Vested interests and strong lobbies can be obstacles to reform.
- Politics = Politicians do not want to risk alienating voters by making unpopular decisions.
- Parity = Income inequality is growing, and this can constitute a significant block to reform.
- People = People's wellbeing is the objective of public policies and thus should be taken into account in all reform efforts (e.g. employees wellbeing needs to be taken into consideration, not only the environment).

As subsidy reform is a political process, the inclusion of all stakeholders in this process is key – policy makers, NGOs, trade unions, academics. This can also aid implementation of the policy reform options.

This is the final stage in the analytical framework. It includes four main steps, namely:

- Identifying various options for reform;

- Highlighting the costs and benefits associated to each option for reform;
- Highlighting the potential economic and social impacts of reform; and
- Providing suggestions to facilitate the reform.

**Degree of insight in the analysis of the policy reform options**

These aspects can be addressed at different levels. A quick scan can help to develop the overall picture, but more detailed analysis is needed to clarify the details, to help identify what should be the exact nature of the reform and to support the call for subsidy reform. Both levels of insight should be developed since the most adequate one depends on the level of application of this tool and on stakeholders to be addressed. Fore example, at political level (e.g. politicians) an overall picture might be preferred, whilst at technical level (e.g. civil servants) further detail is necessary.

**Summary of the steps involved:**

1) What are the possible options of reform?
2) What are the costs and benefits associated to each option for reform?
3) What are the potential economic and social hardships resulting from reform?
4) What are the facilitating factors for success?

Each of these steps is addressed below with some more detail.

***1) Step 1: What are the possible options of reform?***

Different options could be explored:

- Elimination of the subsidy:
  - outright elimination; and
  - phased elimination.
- Change of the subsidy policy design:
  - with the sole alteration of the subsidy design (changes can be introduced to the subsidy amount, recipients, timeframe and conditionality); and
  - (also) with adoption of alternative measures/instruments.

***2) Step 2: What are the costs and benefits associated to each option for reform?***

The benefits and costs of reforming an existing subsidy will not necessarily be the inverse of the benefits and costs generated when the subsidy was first created. It is necessary to assess whether they would differ from a simple reversal of the incidental impacts.

Three kinds of impacts should be addressed for each of the scenarios considered for reform of the subsidy, namely the environmental, economic and social impacts. These should be assessed in equal measure. And these assessments should follow the same

methodology or approach as much as possible in order to allow comparing economic, environmental and social impacts and weigh them against each other.

- What are the environmental impacts associated with each scenario? It is necessary to address what the impacts on balance on the global environment would be, taking into account the differences in environmental impact of the same activity in different countries and different environmental media (water, air, soil).

- What are the economic impacts associated with each scenario? The following should be considered:

    - In public accounts: for national exchequers and economic performance (tax, GDP, etc).
    - In the economy: for the sector as a whole, for winners and losers within the sector (including new entrants/future industry), for consumers/citizens, for competitiveness and innovation.

- Some consideration should be given to trade impacts of subsidy reform. In particular, consider the following:

    - Will subsidy removal/reform have spill-over effects, i.e. favour production overseas, relocation of polluting industry abroad and/or substitution of imported resources and products for domestic ones?
    - Will subsidy removal/reform have any other significant social, economic and/or environmental implications for other countries through international trade relations (e.g. as a result of competition for land and other scarce resources and/or major market disturbances etc.)?

- What are the social impacts associated with each scenario? And in particular:
    - Distributional and social impacts in jobs, skills, availability of goods/services, health, etc.
    - Ethical impacts (e.g. as regard fairness of income, appropriateness of support and implications for future generations) are especially relevant for the feasibility of the reform.

*Methodological notes:*
Quantitative estimates should be used whenever possible (even if only a rough order of magnitude quantitative estimate). Tools that assess financial and economic parameters in comparing costs and benefits (e.g. cost-benefit analysis, cost-effectiveness analysis) facilitate comparison between different alternatives. When such kind of analysis is not possible, qualitative tools such as multi-criteria analysis could be used, i.e., tools that allow joint consideration of criteria based on different measurement units (e.g. analytic hierarchy process, preference rankings, weighted sum .

The analyst should address where possible not only the expected direct effects of each reform scenario, but also second-order effects (addressed according to their order of relevance). Also, not only the effects due to take place in the country where the

subsidy is provided, but also the ones expected in other countries. Also here the criterion to extend the analysis should be the order of relevance – for instance:

- whilst for water issues the relevant geographic scope might be neighbouring countries, in air pollution issues the planet might be the reference;
- whilst for some goods (e.g. services) the relevant market will constrain the assessment of economic impacts to a region, for others (e.g. energy products) the analysis will need to address a broader geographical scope.

As noted in OECD (2007a), a key issue for those considering policy reform is the transition from business as usual to the reformed state. It is critical to distinguish between the long-run and transitional effects of policy reform.

When making these assessments, short-term perspectives, medium-term perspectives and long-term perspectives as well as effects on future generations should be taken into account. This broad time approach is especially relevant when some benefits of the reform take a long time to arise, which is often the case as far as environmental impacts are concerned.

### *3) Step 3: What are the potential economic and social hardships resulting from reform?*

Even if the cost/benefit analysis suggests a welfare improvement associated with the reform of the subsidy, policy makers might not be willing to risk a change if they foresee economic, social or political hardship. Therefore, following the assessment of the options available and the costs and benefits associated with each of them, it is useful to provide policy makers with guidance to facilitate the reform.

In the short run the effects of removing a given subsidy can vary markedly from simply reversing the negative impacts caused by maintaining the subsidy. Any economic, social and political impacts following from the reform need to be addressed both in the short-term and the long-term. The amount of effort put into addressing them should be proportional to the weight they bare in opposing the reform and the relevance policy makers assign to them in terms of public welfare.

#### *a) What economic hardship would result from subsidy reform?*

When considering subsidy removal/reform, it is important to assess:

- What are the sectors most affected by the change and their respective weight in the economy (e.g. in relation to employment and national product)?
- Are SMEs likely to be negatively affected (e.g. does the subsidy removal/reform lead to the closing down of such businesses? Will it entail the withdrawal of certain products from the market?)?

#### *b) What social hardship would result from subsidy reform?*

Conditions necessary for successful transition taking into consideration social hardship deriving from subsidy reform have been analysed by Cox in OECD (2007a) and some examples of compensation measures have been included in IEEP et al. (2007).

Transition support is often needed for those who will initially lose out from reform. Also vested interests and strong lobbies can be obstacles to reform. If politically relevant groups are negatively affected by the reform, there will be political hardship and not only flanking measures but also communication measures need to be considered.

Income inequality is growing, and this can be a huge block to reform. However, it can also be used to stimulate the reform depending on the kind of subsidies addressed. For instance, subsidies to private transportation tend to enhance income inequalities.

*c) Are flanking measures necessary?*

If potential economic, social and/or political hardship is identified, flanking measures should be made available.
Mitigation or compensation mechanisms should be identified to diminish negative effects and maximise the overall positive impacts of policies.
These can take the form of either dynamic support (i.e., measures that support the change in the present and sustain/enhance it in the future) or static support (i.e., compensation for losers). The first should be favoured over the latter. For extensive review of compensatory measures accompanying subsidy reform refer to OECD (2007).

**Box 23: Compensatory measures**

If it is decided that a support measure should be reformed or removed, compensation can be offered to those who would lose from the support reduction through mechanisms such as:

- *temporary compensatory payments*: compensatory payments which are decoupled from output levels can be paid on a temporary basis to ease the transition of the workers towards new employment opportunities, such as t through job retraining schemes, or to restructure the industry so that it can compete successfully without the support;
- *other adjustments*: adjustments can be made to the existing social security, fiscal or other systems — depending on national policies and priorities — to counter any potentially inequitable effects of support removal. However, since these adjustments tend to be permanent rather than temporary, they are often not suitable for compensation that is intended to ease the economic hardship of previously supported workers over a transitional period.

Where required, these compensatory mechanisms can sometimes be funded through a partial recycling of the funds previously used to maintain the support.

Source: Taken from OECD 1998

***4) Step 4: What are the political factors that could facilitate success?***

There are several points to explore in order to increase the likelihood of success of a reform initiative:

- *Communication*: A very relevant factor for the likelihood of success is communication. It is important to make the reform 'understandable' for policy makers and the public (see also Chapter 8 in this study for communication tools).

- *Broad inclusion:* Inclusion and engagement of all stakeholders in this process is key. To ensure high level political support for the assessment process, the full participation of relevant agencies, transparency and public participation is required. Input into reform should be broadened from politicians and civil servants to stakeholders and civil society.
- *Identification of losers and winners*: It is as important to identify the losers from the reform as to point out the winners, since the latter might provide the political support necessary to face the losers.
- *Assessment of co-benefits from the reform:* Highlighting the co-benefits of the reform helps to gather support to implement it, helping to overcome objections to reform from sectoral lobbies.

**Box 24: Highlighting the co-benefits from the reform**

Highlighting the co-benefits from the reform should help reduce the opposition to it as well as gather further support for it. Stakeholders that would otherwise oppose or be indifferent to the reform might gain an interest in supporting it. This is so because the reform of EHS might have associated other gains apart from the environmental ones. It is therefore important to assess these potential benefits and use an effective communication strategy to bring them into the public debate whilst discussing the EHS reform. Two kinds of benefits can be envisaged here, namely co-benefits and the so called 'triple dividend'.

***Co-benefits***

Co-benefits can have a social, economic or/and environmental nature and can occur simultaneously or with a time lag between them. For instance, in the transport sector, removal of diesel or commuter subsidies might reduce congestion, leading to lower congestion costs and hence improving sectoral competitiveness. Co-benefits will follow directly from the reduction or elimination of the EHS when they accrue from the reduction of the activity or the consumption of the good previously subsidised. This will be the case when:

1) The subsidised behaviour/activity has associated several kinds of negative impacts, these impacts might follow with different degrees of causality from such behaviour/activity;
2) They all derive from its level; and
3) This level of behaviour/activity is reduced following the reduction or elimination of the EHS.

***The 'triple dividend'***

The expression 'triple dividend', used for the first time in Pearce (1991), explains how eliminating or reducing a subsidy that has a negative impact on the environment might have three kinds of associated gains:

1) Eliminating or reducing such a subsidy would result in environmental gains (first dividend);
2) Following the consequent reduction in the amount of public resources associated with the subsidy, the distortion in the tax system is also expected to decrease. This should generate a welfare improvement (second dividend);
3) The tax cut so achieved would bring further welfare gains in the future by allowing a better allocation of resources in the economy (third dividend).

**Results of the analysis of policy reform options**

This last phase enables the policy maker to examine policy options for reform, their social, economic and environmental impacts and to consider possible compensatory and flanking measures, when required.

With this phase the tool is completed. At this stage, the policy maker will have all the information needed to proceed with the preparation of more complex and detailed evaluation procedures (using modelling), where warranted, and to embark in an informed way in the political process of subsidy reform.

## 6.8 Summary and conclusions

One of the main findings of the critical assessment of the OECD tools was that the tools could be streamlined into one single method to maximise individual strengths and eliminate duplication.

The methodology, here developed is called the 'EHS reform tool', integrates the three OECD tools in one single process. The tool proposed comprises four phases:

1. **Screening of subsidies**: This screening phase serves to identify and prioritise those subsidies that have clear environmental harm and are politically more viable for reform.
2. **Application of the checklist**: this phase entails the application of the checklist (OECD, 2005). The objective of this phase is to assess whether the subsidy reform/removal is likely to bring significant environmental benefits. If so, the assessment should be carried forward to phase 3, looking at the trade offs with social and economic objectives explored in the next phase.
3. **Broader assessment of subsidies:** this phase builds on the application of the integrated assessment framework tool (OECD, 2007a). The potentially harmful subsidies will be analysed in more detail with regard to their social and economic impacts and to determine whether they actually achieve the targets for which they were introduced.
4. **Analysis of reform options:** here, concrete policy reform options for environmentally harmful subsidies are developed. This phase should help to prepare the political decision making for the reform/ removal of environmentally harmful subsidies. This analytical steps build on the integrated assessment framework tool (OECD, 2007a).

The methodology outlined in this Chapter is meant to be used as a 'quick scan' (although it can also be used as a reference for more complex evaluations). The majority of the steps are meant to be performed usually in a qualitative way, although some quantitative analysis is warranted to the extent this is required (i.e. size of subsidy).

Once the assessment is completed it will be clearer to the policy maker whether more comprehensive evaluation is required. This tool streamlines the process and highlights the important elements that are needed to prepare an informed policy reform process. Most importantly it enables the process to be more focused and cost-effective.

Communication tools have also been developed to present and disseminate the results of the application of the tool. These are illustrated in Chapter 8.

# 7 RECIPE BOOK ON THE CALCULATION OF SUBSIDIES SIZE

**Summary:** The aim of task 3 was to provide policy makers with indicators of subsidy size. As a result, we developed a 'Recipe Book' to apply these indicators. The indicators here included build on five OECD subsidy quantification methodologies and on a methodology to calculate the marginal social cost of subsidies. The Recipe Book provides step-by-step guidance on the use of the OECD methodologies. These should be considered 'starter recipes' because additional methodological development may be required based on aspects unique to each case.

## 7.1 Overview of quantification methodologies

As described in the project's description of work, the indicators of subsidy level (or size) build on five quantification methods for identifying the level of economic and financial significance (OECD, 2005):

- **Programme aggregation:** adds up the budgetary transfers of relevant government programmes; in most cases data are at the national, rather than the sub-national, level. ***Well-known example****: on-budget transport subsidies.*
- **Price-gap:** measures the difference between domestic market prices of the product in question and those on the world market or in countries where the product is not subsidised. ***Well-known examples:*** *'free' drinking water for domestic users in Ireland; artificially low rents in social housing; low public transport fares.*
- **Producer/consumer support estimate:** measures the budgetary transfers and price gaps under relevant government programmes affecting production and consumption alike. ***Well-known example:*** *OECD indicators on agricultural subsidies.*
- **Resource rent:** measures the resource rent foregone for natural resources. ***Well-known example****: low timber royalties on public lands (i.e. royalties below full economic rent)*
- **Marginal social cost:** assesses the monetary value of non-internalised external (environmental and possibly other social) costs, using recognised international databases (e.g. EVRI, EnValue, ValueBase, RED) and results from research projects (such as the EU-sponsored ExternE, NewExt, MethodEx and AquaMoney). ***Well-known example****: congestion, air pollution and accidents due to transport.*

Table 11 summarises the key strengths and weaknesses identified by the OECD for each methodology. Generally, the most comprehensive methods are quite data-intensive. The use of assumptions plays an important role in price-gap, resource-rent and marginal-social-cost methods.

**Table 11: Strengths and weaknesses of quantification methodologies**

| Approach/ Description | Strengths | Limitations |
|---|---|---|
| **Programme-aggregation:** Quantifies financial transfers associated with various government programmes. Aggregates programmes into overall level of support. | Captures transfers whether or not they affect end-market prices. Can capture intermediation value (which is higher than the direct cost) of government lending and insurance. | Does not address questions of ultimate incidence of pricing distortions. Sensitive to decisions regarding inclusion of programmes. Requires programme-level data. |
| **Price-gap**: Evaluates positive or negative "gaps" between the domestic price and the world price. Also known as Market Price Support. | Can be estimated with relatively little data. Useful for multi-country studies. Good indicator of pricing and trade distortions. | Sensitive to assumptions regarding "free market" and transport prices. Understates full value of support by ignoring transfers that do not affect end-market prices. |
| **Resource rent:** Estimates the difference between the full economic rent and the price paid for exploiting a natural resource. | Relevant for natural resource sectors such as forest and water. | Data intensive. Sensitive to assumptions. |
| **Marginal social cost:** Estimates the difference between the marginal social cost (that internalises all externalities) and the price paid. | Most comprehensive approach. Used for transport. | Data intensive. Requires a significant amount of modelling. Sensitive to assumptions and has a wide range of uncertainty. |
| **Producer/consumer support estimate**: Systematic method to aggregate budgetary transfers and consumer transfers (through market price support calculation) to specific industries. | Integrates budgetary transfers with market price support into holistic measurement of support. Distinguishes between support to producers and consumers. | Data intensive. Currently calculated for agriculture and coal production, but not for other sectors. |

Source: Reproduced from OECD (2005, p. 19)

The programme-aggregation method can be combined with additional tools to assess off-budget items associated with government programmes. For example, below-market loans and insurance provided by governments do not cost the taxpayer directly, but create an intermediation value for firms (i.e. the difference between the below-market and market-rate costs of the loan or insurance). Tax exemptions can also be assessed using a modified programme-aggregation method. The producer support estimate (PSE) method and related methods are detailed programme-aggregation methodologies developed by the OECD primarily used to assess agricultural subsidies.

While the programme aggregation method is typically used for direct subsidies paid from government budgets, it is possible to use an adapted version of the method to identify subsidy levels stemming from tax exemption and rebate programmes (also known as tax expenditure). Three basic methods are used to quantify tax exemptions: 1) the revenue-foregone method; 2) the revenue-gain method; and 3) the outlay-equivalent method. The first method, which assesses the amount by which government revenue is reduced, is the most widely adopted and is standard practice within the OECD. The shortcoming of the revenue-foregone method, however, is that it does not take into account changes in taxpayer behaviour in the absence of the tax

exemptions (OECD, 2002a, p. 12). A change in subsidy levels will affect the quantity of a good or service that will be purchased requiring that an ex ante estimate of elasticities be made for the good or service in question. These factors are considered in the revenue-gain method, which measures the revenue that would be gained by repeal of the tax expenditure. The outlay-equivalent method (which has been used in the U.S.) assesses how much it would cost the government to provide an equivalent monetary benefit through direct spending (OECD, 2002a, p. 12). The latter two methods are not widely used in comparison with the revenue-foregone method.

Any subsidy will generate additional demand for the subsidised activity. Externalities stemming from this additional demand can be assessed with the marginal social cost method.

Further details on each of the methodologies in the table are provided in the next section.

## 7.2 Mapping the methodologies to subsidy types

Level indicators have been mapped for their suitability to analyse all the types of subsidies defined in previous work (IEEP, et al, 2007), with the most-preferred methodology being identified for each of the following:

| |
|---|
| **On budget** |
| • Direct transfer of funds to producers and consumers (e.g. capital grants, income support, low interest loans) |
| • Below-cost fees for government-provided infrastructure and services (non-general infrastructure and services) |
| • Potential direct transfers of funds (e.g. covering accident liabilities) |
| • R&D support |
| • Government directs other bodies to do any of the above |
| **Off-budget** |
| • Government revenues due are foregone or not collected |
| • Tax concessions (exemptions, allowances, credits, rate relief, tax deferral) |
| • Debt concessions (write-offs and rescheduling) |
| • Market-price guarantees (e.g. fixed prices, premiums or bonuses) |
| • Regulatory support mechanisms (e.g. energy-mix requirements) |
| • Price support (e.g. production quotas, feed-in tariffs) |
| • Preferential market access (e.g. preferential planning consent; controls over access to resources and other market access restrictions) |
| • Below-market interest rates |
| • Price paid for resource use below full economic rent |
| • Lack of charging for external costs of activity or resource use |
| • Selective exemptions from government standards |

The following Table provides an overview of which methodologies can be employed for the various subsidy types.

**Table 12: Mapping subsidy types to quantification methodologies**

| Budget status | Type of Subsidy | Methodology | Issues/Notes |
|---|---|---|---|
| On-budget | Direct transfer of funds to producers and consumers | Programme aggregation; Producer support estimate | |
| On-budget | Debt concessions (write-offs and rescheduling) | Debt-concession methodologies | Rescheduling: equal to payment-terms differential applied to the principal owed. Write-offs: equal to debt written off (write-off value should be allocated over multiple years).See p. 97 of PSE Manual. |
| On-budget | Below-cost fees for government-provided infrastructure and services (non-general infrastructure and services) | Price gap; Programme aggregation (revenue-foregone or revenue-gain method) | |
| On-budget | Potential direct transfers of funds (covering accident liabilities) | Marginal social cost | |
| On-budget | R&D support | Programme aggregation | |
| On-budget | Government directs other bodies to do any of the above | Programme aggregation | Programme aggregation methods applied to appropriate bodies' budgets. |
| Off-budget | Government revenues due are foregone or not collected | Programme aggregation (revenue-foregone or revenue-gain method) | |
| Off-budget | Tax concessions (exemptions, allowances, credits, rate relief, tax deferral) | Tax-concession methodologies | Presumes a counterfactual (based on some definition of standards rates and rules that in the absence of the subsidy would apply). See p. 94 of PSE Manual. |
| Off-budget | Market-price guarantees | Price gap | |
| Off-budget | Regulatory support mechanisms (e.g. energy-mix requirements) | Price gap | |
| Off-budget | Price support (e.g. production quotas, feed in tariffs) | Price gap | |
| Off-budget | Preferential market access | Price gap | Lower-cost producers excluded from market. Calculate the price gap is difficult, however, as one must determine the price that would have prevailed in a free market situation. |
| Off-budget | Below-market interest rates | Price gap (applied to interest rates) | Equal to the interest-rate differential (unsubsidised minus subsidised rate) multiplied by the amount of credit. See p. 95 of PSE Manual. |
| Off-budget | Price paid for resource use is below full economic rent | Resource rent | |

| | | | |
|---|---|---|---|
| Off-budget | Lack of charging for external costs of activity or resource use | Marginal social cost | |
| Off-budget | Selective exemptions from government standards | Marginal social cost | |

## 7.3 Methodological guidance on how to assess the value of subsidies

This section provides guidance on how to employ the various methodologies used to estimate the value of subsidies. This 'Recipe Book' includes a description of each valuation methodology; step-by-step guidance on the use of each methodology; and boxes for each valuation methodology including formulas and brief technical details.

**Technical notes:** This subsection of the report (Subsection 7.3) contains technical guidance for economists and policy analysts working in the area of subsidy quantification. Technical guidance has been put in shaded boxes to distinguish it from the main text, which is aimed at a broader audience of policymakers interested in the quantification issue.

It should be noted that the methodologies calculate subsidies only, leaving out considerations of deadweight losses stemming from the policies (tax policies, trade policies, production quotas, etc.) driving the subsidies.

While much of the existing literature on methodologies for subsidy valuation is geared to assessing subsidies within particular sectors, the aim of the Recipe Book is to provide generalised guidance that can be adapted for use in a wide variety of sectors. In tune with its role as broad-ranging guidance, the Recipe Book does not cover every analytical detail associated with each methodology. Where helpful, references to existing, more-detailed guidance on particular issues is provided in order to help those looking for answers to particular technical issues.

### 7.3.1 Programme aggregation and related methods

#### Brief description of the method

This method quantifies financial transfers associated with various government subsidy programmes, aggregating programmes into overall level of support. For example, direct subsidy payments to farmers would be included under this method.

Modified versions of the programme-aggregation method can be used to track tax expenditures. Two methods are described here: 1) the revenue-foregone method (OECD standard method); and 2) the revenue-gain method (more complete but difficult and reliant on assumptions). Tax expenditures may take any of the following forms:

- Exemptions: amounts excluded from the tax base.

- Allowances: amounts deducted from the benchmark to arrive at the tax base.
- Credits: amounts deducted from tax liability.
- Rate relief: a reduced rate of tax applied to a class of taxpayers or taxable transactions.
- Tax deferral[s] (bulleted list reproduced from OECD, 2008d, p. 95).

Box 25 provides information for analysts interested in the OECD's approach to programme aggregation.

**Box 25: Overview of OECD guidance on programme aggregation**

For detailed information on how the OECD uses the programme-aggregation method for calculating budgetary transfers in the case of agricultural subsidies, see the OECD's The PSE Manual (OECD, 2008d, pp. 91-97). The description of the methodology also covers tax expenditures (referred to as tax concessions in The PSE Manual). The bulleted lists show the types of budgetary transfers included in the method as well as the types of foregone revenue included.

**Budgetary transfers**

- Complete coverage of institutions, administrative levels and financing instruments
- Accounting of effectively disbursed funds
- Treatment of policy administration costs
- Avoiding double-counting of support: an example of outlays on price regulation
- Attribution of budgetary allocations to calendar years
- Classification of budgetary spending

**Support based on revenue foregone**

- Tax concessions
- Preferential lending
- Agricultural debt concessions
- Administered input prices

*Source: Reproduced from* The PSE Manual*, p. 6.*

The process is a relatively straightforward accounting task but can require extensive research. A literature search may reveal that the work has already been undertaken to a certain degree.

**Key steps for the programme aggregation method:**

1. **Define the subsidy** – Clearly define the key attributes of the subsidy investigated. Typically, only direct payments and direct government services are included (not general administrative overhead costs in the responsible agencies).
2. **Identify the subsidy programmes** – Identify relevant subsidy programmes in government budgets (including all government levels (national and subnational levels), ministries and financing instruments. This can be

challenging when expenditure headings in budgets are unclear, sometimes warranting follow-up research with budget staff.

3. **Find the expenditure amounts** – Find actual expenditure amounts (typically for the most recent calendar year, but can be for multiple years; where fiscal years do not coincide with the calendar year, appropriate adjustments/assumptions must be made). Actual expenditures made are preferred to budgeted amounts and budget forecasts.
4. **Calculate the total subsidy** – Convert currency into standardised terms using exchange rates and correcting for inflation, as appropriate.
5. **Document the evidence** – Label subsidies completely and ensure reports adequately communicate the definitions/boundaries of subsidies. Address issues such as uncertainty, assumptions made, coverage, and possible double counting. A double-counting problem occurs when the programme aggregation method is used to tally public spending that has a price effect captured with the price-gap method. Cite sources thoroughly and provide evidence of the underlying data and calculations.

**Key steps for tax expenditures (using the revenue-foregone method):**

1. **Define the subsidy** – Clearly define the key attributes of the subsidy investigated.
2. **Identify the tax expenditure programmes** – Identify relevant subsidy programmes (including all government levels (national and subnational levels), ministries and financing instruments. The following steps must be carried out for each tax expenditure item being evaluated.
3. **Identify the baseline tax rate** – Identify the relevant baseline tax rate (e.g. standard VAT) on comparable activities.
4. **Identify the reduced tax rate** – Identify the tax rate for the subsidised activity of interest (e.g. reduced VAT).
5. **Identify the value of subsidised activity** – Identify the total value of the subsidised activity (e.g. total value of energy consumed that is subject to reduced VAT.
6. **Calculate the revenue foregone** – Multiply the total value of the subsidised activity times the tax differential (e.g. standard VAT minus reduced VAT)— this is the so-called "revenue foregone".
7. Follow steps 4 and 5 of the standard programme aggregation method (see the preceding list).

**Key steps for tax expenditure (using the revenue-gain method):**

Follow steps 1, 2, 3 and 4 of the revenue-foregone method (see preceding list).

5. **Identify the elasticity of supply/demand** – appropriate elasticity figures should be obtained from the available literature. Short- and long-term elasticities may both be available.
6. **Identify the percent change in price with removal of the subsidy** – Formula: (new price – old price) / (old price)
7. **Calculate the change in quantity demanded/supplied** – Using the elasticity figure(s), calculate the change in demand and supply. Formula: [(% change in price) * elasticity]. Note that demand elasticities are always negative and supply elasticities are positive.

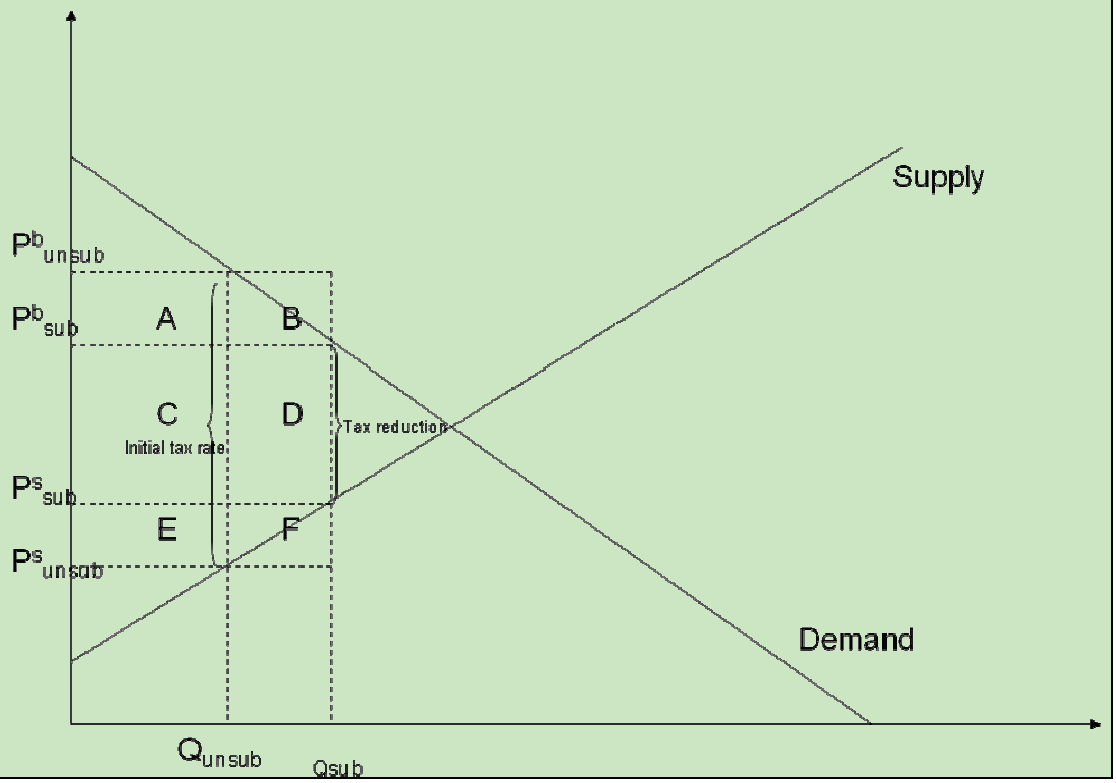
8. **Calculate the revenue gain** – Multiply the total quantity of the activity **without** the subsidy times the tax differential (e.g. standard VAT minus reduced VAT)—this is the potential "revenue gain".
9. Follow steps 4 and 5 of the standard programme aggregation method (see above).

**Box 26: Technical guidance on programme aggregation**

The following figure shows how the revenue-foregone and revenue-gain methods differ in how they calculate a subsidy to consumption. The revenue-foregone method takes the observed quantity demanded (Qsub) and multiplies this by the level of the subsidy ($P_{unsub}$ minus $P_{sub}$). In contrast, the revenue-gain method uses elasticity figures to estimate the quantity demanded in absence of the subsidy ($Q_{unsub}$) and multiplies that figures by the level of the subsidy ($P_{unsub}$ minus $P_{sub}$). The revenue gain method is thus a more accurate conjecture (assuming elasticity figures are accurate), but due to its reliance on uncertain estimates and its greater complexity, the revenue-foregone method is the standard among governments.

In presence of a tax such as VAT, it is important to stress that there are two prices that matter: the price paid by buyers ($P^b_{sub}$ and $P^b_{unsub}$) and the price received by sellers ($P^s_{sub}$ and $P^s_{unsub}$). In the figure below, the revenue-foregone method calculates the subsidy to consumption as equal to A+B+E+F. The revenue-gain method would give A+E. The true value for the subsidy is A+E-D, which can potentially be negative, depending on the elasticities, meaning that a decrease in VAT could potentially increase tax revenues.

**Figure 4: Tax expenditure subsidies**



As can be seen in the above figure, the slope of the supply and demand curves (i.e. the elasticities) each have an effect on the value of the quantity demanded should the subsidy be removed ($Q_{unsub}$ ).

### 7.3.2 Price gap

**Brief description of the method**

This method evaluates positive or negative "gaps" between the domestic price and the world price. It can be estimated with relatively little data, but requires assumptions regarding free-market prices and market prices of key production factors.

Price gaps can stem from a number of government measures, including import measures (e.g. tariffs or quotas), export measures (e.g. measures to enhance or limit exports), and domestic measures (e.g. production quotas) (For a more complete list of measures see OECD, 2008d, p. 61).

*For detailed information on how the OECD uses the price-gap method for calculating agricultural subsidies, see the OECD's The PSE Manual (OECD, 2008d, pp. 62-76). The situation of imports and exports is discussed in detail on pages 54-57.*

**Key steps for calculating the size of a subsidy using the price gap method:**

1. **Define the subsidy** – Clearly define the key attributes of the subsidy investigated.
2. **Reference market** – Determine the reference-point market(s) wherein the good in question is not subsidised (e.g. similar country with no subsidy, or average price in the EU), identifying the point in the production chain where the price comparison is being made (e.g. farm-gate level for agricultural subsidies; wholesale biofuel prices for biofuel quotas).
3. **Correct for market-price differences** – Correct for known market-price differences in production factors between the unsubsidised and subsidised goods (e.g. transport costs).
4. **Calculate the price gap** – Assess the remaining price difference between the unsubsidised and subsidised goods. This is the price gap.
5. **Calculate the total subsidy** – Multiply the price gap times the quantity of the subsidised goods. This yields the total price-gap subsidy.
6. **Document the evidence** – Cite sources thoroughly and provide evidence of the underlying data and calculations. Address issues such as uncertainty, assumptions made, coverage, and possible double counting.

Note that the full value of support is likely understated because the method ignores transfers that do not affect end-market prices.[4] These transfers can perhaps be

[4] For example, a producer subsidy could lower costs for some producers but not raise end prices due to the significant number of non-subsidised producers that set the marginal price (i.e. the market price).

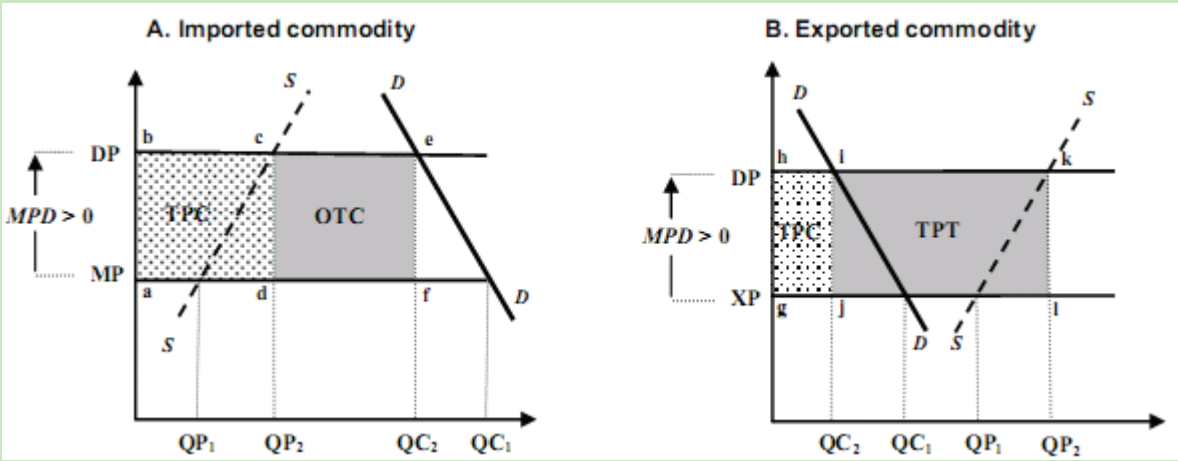
captured with the other methods, though these typically require a greater amount of data and a risk of double-counting exists. The elasticities of supply and demand affect to what extent subsidies are incorporated in the market price.

**Box 27: Technical guidance: Price-gap method**

The following figures illustrate the logic behind the price-gap method in two contexts: (1) where the subsidy measure causes prices to rise above the market price; and (2) where the subsidy measure causes prices to fall below the market price.

Figures A and B show situations where a measure (for example an import tariff in the case of A, or an export subsidy in the case of B) raises the domestic price above the world market price thereby creating a positive price gap.

**Figures A and B. Positive price-gap subsidies (increase from market price)**




Source: Reproduced from OECD (2008d, p. 55, fig. 4.1)

Where:

Quantity imported = QC (Quantity Consumed domestically) – QP (Quantity Produced domestically)

MPD (Market Price Differential) = DP (Domestic Market Price) – MP (Import Price)
TPC = Transfers to (domestic) Producers from Consumers
OTC = Other Transfers from Consumers

And for an exported commodity:
MPD = DP – XP (Export Price)
TPT = Transfers to Producers from Taxpayers

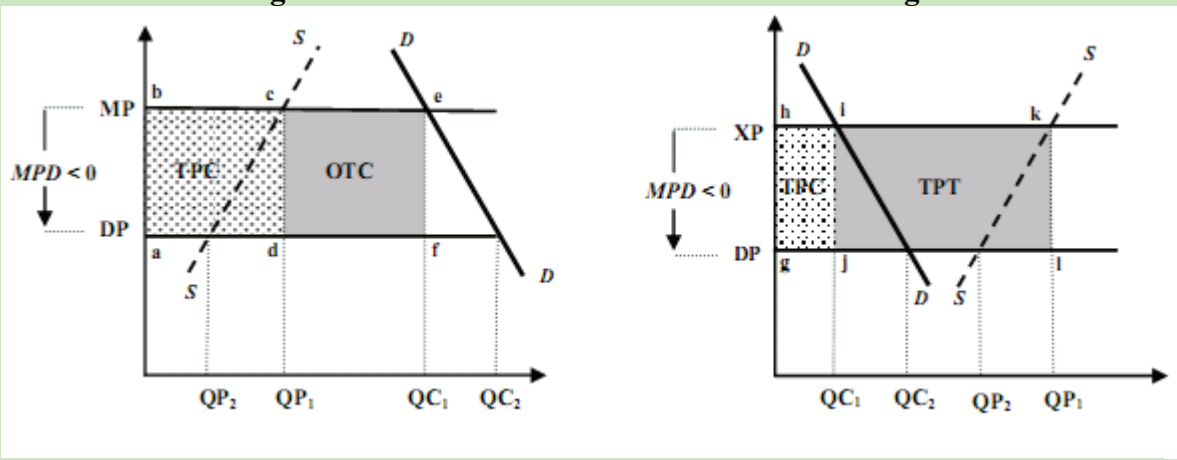
To calculate the subsidy using the price-gap method for an imported commodity, the price gap MPD (i.e. the difference between the subsidised price and the unsubsidised price) is multiplied by the quantity consumed with the subsidy in place (i.e. $QC_2$ in Figure A). To calculate the subsidy using the price-gap method for an exported commodity, the price gap is multiplied by the quantity produced with the subsidy in place (i.e. $QP_2$ in Figure B).

Figures C and D show the case where policies decrease the domestic price, creating a

negative price gap (.e.g. through setting maximum prices and subsidising imports). The calculation is similar to that described for Figures A and B.

**Figures C and D. Price transfers associated with policies that decrease the domestic market price**

**Figure C** **Figure D**




Source: Reproduced from OECD (2008d, p. 56, Fig. 4.2).

In the following figure (Figure E) represents a situation where prices rise due to a limit on production (e.g. production quotas). This causes an increase in prices and a price-gap subsidy that can be measured using the following formula:

$(P_{sub} - P_{unsub}) * Q_{sub}$.

This is equivalent to the area of rectangle A in the figure.

**Figure E. A positive price gap due to a limit on production**

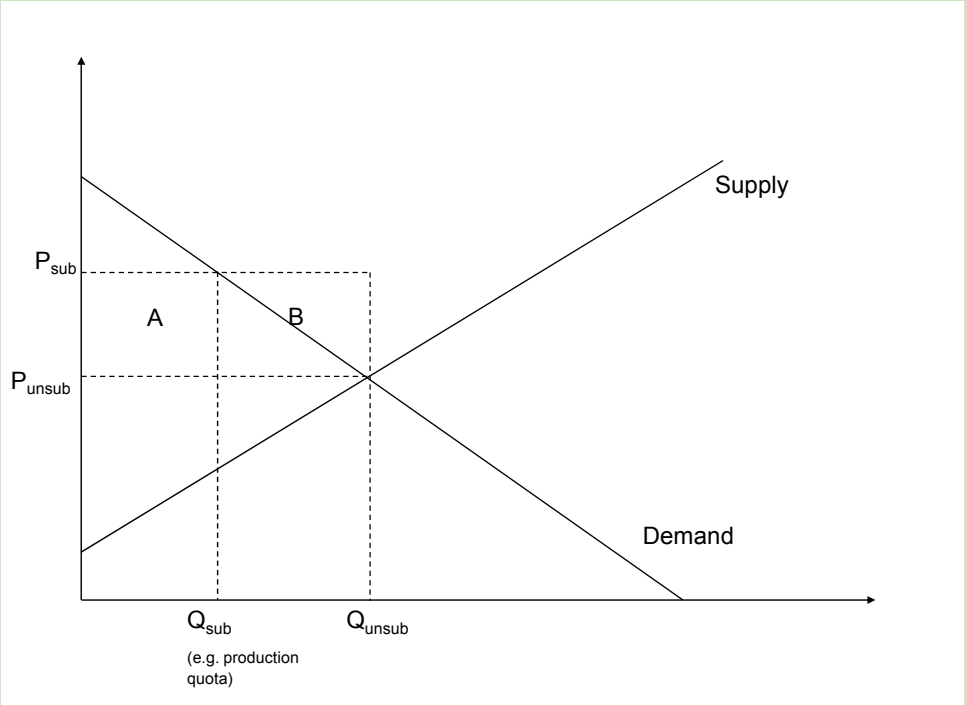
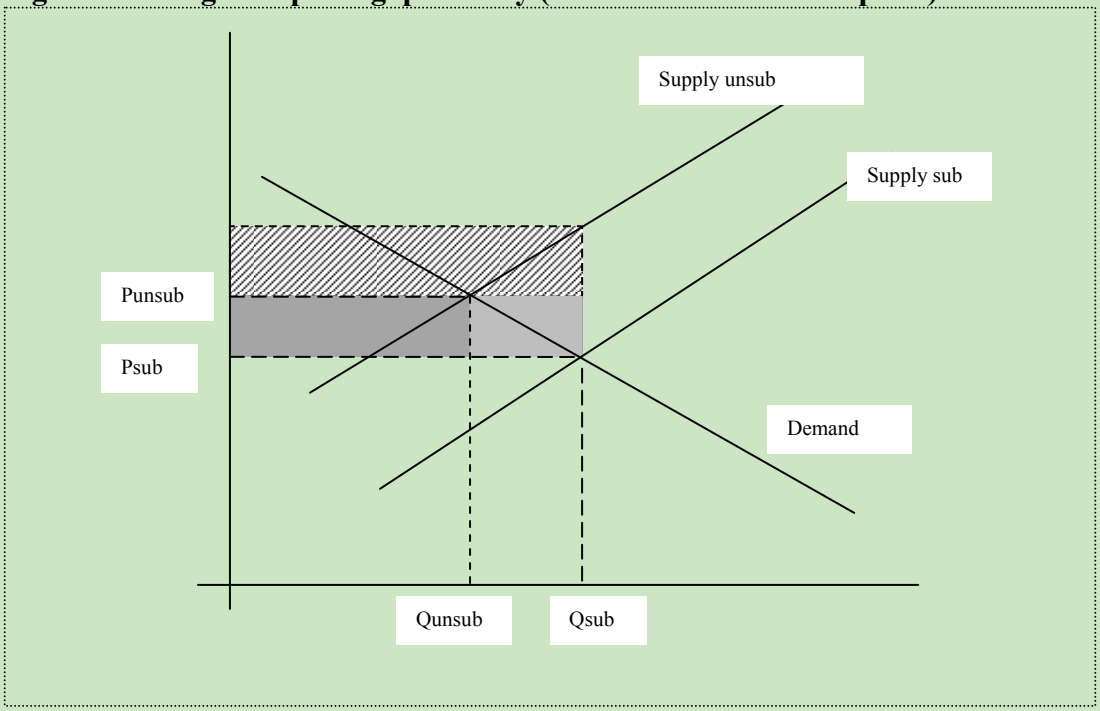


Figure F shows the example of a negative price-gap subsidy in a domestic market (for example, where subsidies to a component of a product cause an increase in production of a final product (e.g. subsidies to inclusion of biofuels in the fuel mix). Such a policy would result in a shift of the supply curve from $Supply_{unsub}$ to $Supply_{sub}$.

**Figure F. A negative price-gap subsidy (decrease from market price)**




The entire shaded (non-striped) area in the above figure is the price-gap subsidy. The darker shaded area represents the subsidisation of production that would have occurred anyway, while the lighter shaded area represents the subsidy necessary to increase production from $Q_{unsub}$ to $Q_{sub}$. The unsubsidised price level ($P_{unsub}$) is identified by evaluating an unsubsidised reference market and adjusting for known differences in the market price of production between the subsidised and unsubsidised markets. Information about the quantity demanded at the unsubsidised level ($Q_{unsub}$) is not needed, so the method does not require estimating the elasticities of supply and demand. Notice that the shaded area underestimates the total value of the subsidy. The full subsidy (represented by all the shaded and striped areas) is not estimated; doing so would require elasticity estimates. Note that to the extent the negative price gap stems from a policy of government payments or tax expenditures, this type of subsidy might be better calculated using the programme-aggregation method, which would capture some of the striped area also.

For all the above situations, the price gap could be used to identify the change in consumption that would stem from a removal of the subsidy. To calculate this consumption change requires combining the percentage change in prices (price gap / reference price) with the demand elasticity (von Moltke et al, 2004, p. 26). Percent change in quantity demanded = (Price elasticity of demand) * (% change in price).

### 7.3.3 Resource rent

**Brief description of the method**

This method measures the resource rent foregone for natural resources. Writing on environmentally harmful subsidies for the OECD, Ronald Steenblik stated that "resource rent accrues to an industry when its net revenues from exploiting the resource exceed the normal returns to factors of production (…). Unrecovered resource rent is mainly relevant to primary industries, which use natural resources as factors of production, and then only where those resources are considered to be within the public domain" (OECD, 2002a, p. 14).

There are two methods for calculating resource-rent subsidies: 1) the cost-recovery method, and 2) the less-than-commercial-value method.

**Cost-recovery method:** Calculating the resource-rent subsidy requires subtracting the total cost of bringing the resource to market from the price at which the resource was sold (OECD, 2003, p. 61). On-budget and off-budget subsidies can all be included in the concept of total cost. For renewable resources like timber, the cost of establishing the regeneration process (e.g. timber re-planting) could be considered as either part of the preceding or subsequent harvests (opinions differ on which accounting is more appropriate). If implicit subsidies (e.g. non-internalised externalities) are included, this method has some overlaps with the marginal-social-cost (MSC) method.

*The Global Subsidies Initiative of the IISD has undertaken an effort to standardise the calculation of irrigation subsidies. In their report "The GSI's method for quantifying irrigation subsidies", they provide a detailed methodology on the Net Cost to Supplier approach".[5] (IISD, 2009).*

**Key steps for calculating the size of a subsidy using the cost recovery method:**

1. Clearly define the key attributes of the subsidy investigated.
2. Identify the total cost of bringing the resource to market:
    a. on-budget subsidies (e.g. publicly provided irrigation infrastructure and operations and maintenance)
    b. opportunity costs (e.g. cost of not using water for hydroelectricity generation)
    c. uninternalised environmental and resource costs (following the MSC approach)
3. Identify the total revenue from sale of the resource.
4. Determine subsidy value by subtracting total revenue from total costs.

[5] The IISD report "The GSI's method for quantifying irrigation subsidies" (IISD, 2009) is available online at http://www.iisd.org/publications/pub.aspx?pno=1050

5. Cite sources thoroughly and provide evidence of the underlying data and calculations. Address issues such as uncertainty, assumptions made, coverage, and possible double counting.

Though simple at a conceptual level, original attempts to identify costs and revenues requires extensive research and that important judgments be made (e.g. apportioning to irrigation a suitable portion of the costs of multi-purpose projects designed to provide irrigation, recreation and hydroelectricity). By way of example, Box 28 shows the key components of the Net Cost to Supplier approach. Further details on the elements that need to be examined are provided in IISD (2009).

**Box 28: Technical Guidance: Key components of the Net Cost to Supplier approach for estimating irrigation subsidies**

The report "The GSI's method for quantifying irrigation subsidies" (IISD, 2009) is a working paper that provides detailed documentation and guidance on the Net Cost to Supplier approach for quantifying irrigation subsidies.

The methodological approach builds on the well-known Net Cost to Government approach, which measures the difference between the public cost of funding a programme and the public revenue generated by that same programme over the same time period. The name was modified to reflect the fact that some provision of water is via the private sector.

The Net Cost to the Supplier (S) of making irrigation water available is calculated by subtracting the revenue from beneficiaries' payments (R) from the gross cost to the government (C) of making the irrigation water available. In algebraic terms,

$$S = C - R$$

The Net Cost to the Supplier Approach thus depends upon the identification and measurement of three key components—cost, beneficiaries and revenues. A rigorous and standardised definition of these three components is required to ensure the accuracy and comparability of the resulting subsidy. The following cost and revenue components are detailed in the IISD's manual on the Net Cost to Supplier Approach for agricultural subsidies.

**Cost components**

Cost of water provision

- Valuation of capital expenditure of irrigation infrastructure
    - Allocation of joint capital costs
    - Bringing capital costs to a current value: an appropriate inflation index
    - Capital cost determination
    - Over-capitalization of projects
- Operation and maintenance costs
- Cost of providing irrigation water through groundwater-based systems
- Cost of supplying discounted electricity
- Cost of environmental externalities

**Government or supplier revenue components**

Sources of revenue to the government-supplier for providing irrigated water

- Revenue realized on sales of water
- Revenue realized from the sale of hydro-power
- Revenue realized from the sale of fishing rights
- Revenue realized on account of the sale of electricity for irrigation pumping
- Revenue from the imposition of pollution taxes

**Data needs**

Where possible, the following data should be collected as part of creating an inventory of the programs for support to the irrigation sector (list reproduced from IISD, 2009, p. 14):

- total water uses;
- share of irrigation water in water use;
- irrigated and agricultural area, broken down regionally or by crop if available;
- irrigation water application rates;
- total agricultural and irrigation groundwater use or abstractions;
- groundwater abstractions related to recharge rates, particularly at a local, basin, aquifer or regional level where there are problems of over-abstraction or other environmental issues;
- prices, charges, fees, etc. for irrigation water and other water uses. Specify any detail, for example, where irrigation water may not be available during times of water shortage and whether prices for water of similar quality and characteristics are available or could be calculated;
- the reliability and nature of services should be assessed – that is within an adopted scheme is water supply insufficient for the total scheme as it is constructed;
- the quality of the irrigation water should be assessed – against factors such as salinity, biological and chemical content; and
- it should be specified whether water use data are in terms of total use or consumptive use given the differences between some countries in reporting water use data.

As irrigation subsidies may take a wide variety of forms, information collection could include the following (list reproduced from IISD, 2009, pp. 14-15):

- interest rates—for example, administered rates may be set below market rates;
- repayments may be delayed;
- discount period;
- grant programmes;
- low interest loans;
- whether non-payment is enforced or penalties levied;
- capital charges;
- maximum payment levels;
- input subsidies, for example, diesel or electricity provided at a lower cost for agricultural or irrigation-specific uses; and
- cross-subsidization—flag where certain classes of users might be paying the costs of other users, for example from household and industrial users for

farming, from rich to poorer, large to small farms, etc.

**Less-than-commercial value method:** For markets where both subsidised and non-subsidised markets exists (e.g. timber sales on private versus public lands), a comparison of the market price and subsidised price can be used to generate the resource-rent subsidy. Though the method is conceptually straightforward, ensuring "like with like" comparison can be difficult in practice, as the heterogeneity between commercial and public sales that is not solely attributable to subsidies must be controlled for.

In calculating irrigation subsidies, a related method is used to try to determine the shadow price for irrigation water. This value is based on the marginal value product (MVP) of the water, which is the value of the incremental yield stemming from additional irrigation. Where dry land and irrigated crops are grown in the same area, the MVP can be calculated based on the differing value of these two crop types per hectare. Where water rights are traded (as in the Siurana-Riudecanyes irrigation district in Spain), the MVP is already incorporated in the higher market price of the land with associated water rights (OECD, 2003, pp 46-7).

**Key steps for calculating the size of a subsidy using the less-than-commercial value method:**

1. Clearly define the key attributes of the subsidy investigated,
2. Identify the marginal value product (MVP) of the resource in the region
3. Identify the total revenue from sales of the resource
4. Determine subsidy value by subtracting total revenue from total MVP.
5. Cite sources thoroughly and provide evidence of the underlying data and calculations. Address issues such as uncertainty, assumptions made, coverage, and possible double counting.

In the case of irrigation, it is possible to find in the literature an approximation of the price of water in some regions, with a lower price covering the full production and distribution costs, and also a higher price taking into account externalities (full cost recovery). Quantities of water extracted may also be estimated for each of this prices (Gomez-Limon, 2004).[6] This could simplify the analytical work quite substantially.

### 7.3.4 Marginal social cost

**Brief description of the method**

This indicator is meant to show the magnitude of the additional uninternalised external costs that can be attributed to environmentally harmful subsidies. Quantifying these costs requires (1) an estimate of the additional amount of physical damage (or harmful activities) caused by the EHS and (2) the monetary valuation of

[6] Gomez-Limon, A.J. and L. Riesgo 2004. Irrigation water pricing: Differential impacts on irrigated farms, Agricultural Economics. 31: 47 – 66.

the associated external costs. Presumably, step (1) is already included in the 'EHS reform tool' (see Chapter 6). The focus here is therefore on valuation.

The proposed methodology will build on existing databases and recent research results that can be considered as authoritative, due to their scientifically sound foundations as well as their wide acceptance (see Box 29). Depending on the type of subsidy, the area of application and the associated environmental impacts (and other external effects), the most appropriate sources for valuation will have to be selected on a case-by-case basis. If different equivalent sources are available, the ranges resulting from each of them can be reported. In addition, the main assumptions and uncertainties should be mentioned.

**Key steps for calculating the size of a subsidy using the marginal social cost method:**

1. Determining and quantifying the main environmental impacts related to the additional subsidy-induced production or consumption.
2. Identifying available sources for monetary estimates of these externalities and checking their relevance. Examples of possible sources are mentioned in Box 29 below.
3. Selecting, from the identified sources, the appropriate coefficients for the impacts, if available. This step requires a substantial amount of discretion from the analyst/policy maker. He/she has to determine if the use of a certain (range of) value(s) is justifiable for the specific case, taking into account the validity of the original source(s) and its transferability to the present case.[7]
4. Specifying the assumptions that have to be made to apply the selected coefficients.
5. Calculating the estimated additional social costs (including a sensitivity analysis for different parameter assumptions).
6. Reflecting on the results, paying attention to issues such as uncertainty, assumptions made, coverage (e.g. are there environmental aspects that could not be valued in monetary terms), possible double counting (e.g. if part of the externalities is already internalised through taxation).

**Box 29: Technical guidance – marginal social cost method**

A simple or a more complex formula can be used, depending (among others) on data availability.

The 'simple' formula is relevant when only general information is available on the subsidy-induced change in a certain productive or consumptive activity. As a general principle, the following formula can then be used to calculate the social cost:

[7] If no appropriate coefficients are available, the impact will have to be reported in non-monetary terms, either quantitatively (e.g. 'an additional load of approximately X tonnes of nitrogen per year to soil and water in a particular watershed') or qualitatively (e.g. 'a significant loss of species-rich aquatic ecosystems'). The analysis will then end after this step.

$$C_s = \sum_{i=1}^{n} e_{Y,i} \cdot \left(Y_s - Y_0\right)$$

in which:
$C_s$ = the additional social cost due to the subsidy;
$e_{Y,i}$ = the coefficient of the marginal social cost related to environmental[8] issue *i* per unit of production or consumption of Y;
$Y_S$ = the amount of production or consumption in the presence of the subsidy;
$Y_0$ = the amount of production or consumption in the absence of the subsidy.

Sometimes aggregated external cost coefficients are available for all (quantifiable) environmental issues. In that case, the formula will be even simpler:

$$C_s = e_Y \cdot \left(Y_s - Y_0\right)$$

in which $e_Y$ is the aggregated coefficient.

Additional assumptions may be necessary in this approach. For example, the IMPACT study on the external costs of transport (see below) gives average external cost figures for passenger car transport per vehiclekilometre. These figures differ by a factor 10 depending on time and place (peak hours, urban *versus* off-peak, interurban). If no information on the temporal and spatial distribution of the subsidy-induced transport is available, assumptions will have to be made in order to arrive at a (weighted) average value.

If more detailed information on the subsidy's impact is available, more complex formulas can be used, provided of course that coefficients are available that match the level of detail. For example, if spatially and temporally differentiated estimates are available of the increase in passenger car traffic, the formula may become:

$$C_s = e_Y^{p,u} \cdot \left(Y_S^{p,u} - Y_0^{p,u}\right) + e_Y^{p,i} \cdot \left(Y_S^{p,i} - Y_0^{p,i}\right) + e_Y^{o,u} \cdot \left(Y_S^{o,u} - Y_0^{o,u}\right) + e_Y^{o,i} \cdot \left(Y_S^{o,i} - Y_0^{o,i}\right)$$

in which the superscripts p, o, u en i stand for peak, off-peak, urban and interurban, respectively.

[8] Or other externality.

Further complexity can be added if, for example, information is available on the car types or fuels used. The specific formula to be applied will depend on the particular match that in a concrete case can be made between data and coefficients.

**Availability of valuation sources**

The exact application of the proposed methodology will, on the one hand, depend on the level of detail of information that is available on the (physical) impact of the EHS, and on the other hand on the source of valuation data. In general, the more specific and precise the information on impacts is, the smaller the uncertainty margins of the value estimates will be.

The table below summarizes the recommended sources for valuation in the three areas of interest to this study:

| Sector | Sources |
|---|---|
| Transport | IMPACT Handbook |
| Energy | ExternE (EcoSense software or table on electricity production technology by Member State) |
| Water | No general guidelines available; case-by-case approach |

**Transport:** Externalities from road transport vary widely depending on factors such as type of car/truck, fuel, emission characteristics of the vehicle, driving behaviour, time and place. For example, point estimates for the external costs of a passenger car in Germany range from € 0.03 per vehicle-km (off-peak, inter-urban) to € 0.37 per vehicle-km (peak, urban) (IMPACT Handbook, Table 48). For the purpose of the present study, the figures in Table 52 of the IMPACT Handbook may be suitable (see below). These differentiate between petrol and diesel cars. Assumptions will have to be made regarding the split between urban and intra-urban as well as between day and night traffic.

Source: Maibach, M., *et al.* (2008), *Handbook on estimation of external costs in the transport Sector.* CE, Delft.

**Energy:** For the application of the ExternE approach, a software tool (EcoSense) has been developed.[9] It can be used if data are available on the size and location of emissions. Alternatively, $CO_2$ emissions, the damage of which is not dependent on their source location, can be valued at a unit rate, e.g. the EUR 10 per tonne as suggested above. With data on electricity production technologies and Member State, one can also use the ExternE table presented below.

[9] See http://www.externe.info/tools.html.

*EXTERNAL COST FIGURES FOR ELECTRICITY PRODUCTION IN THE EU FOR EXISTING TECHNOLOGIES[1] (IN € CENT PER KWH*)*

| Country | Coal & lignite | Peat | Oil | Gas | Nuclear | Biomass | Hydro | PV | Wind |
|---|---|---|---|---|---|---|---|---|---|
| AT | | | | 1-3 | | 2-3 | 0.1 | | |
| BE | 4-15 | | | 1-2 | 0.5 | | | | |
| DE | 3-6 | | 5-8 | 1-2 | 0.2 | 3 | | 0.6 | 0.05 |
| DK | 4-7 | | | 2-3 | | 1 | | | 0.1 |
| ES | 5-8 | | | 1-2 | | 3-5** | | | 0.2 |
| FI | 2-4 | 2-5 | | | | 1 | | | |
| FR | 7-10 | | 8-11 | 2-4 | 0.3 | 1 | 1 | | |
| GR | 5-8 | | 3-5 | 1 | | 0-0.8 | 1 | | 0.25 |
| IE | 6-8 | 3-4 | | | | | | | |
| IT | | | 3-6 | 2-3 | | | 0.3 | | |
| NL | 3-4 | | | 1-2 | 0.7 | 0.5 | | | |
| NO | | | | 1-2 | | 0.2 | 0.2 | | 0-0.25 |
| PT | 4-7 | | | 1-2 | | 1-2 | 0.03 | | |
| SE | 2-4 | | | | | 0.3 | 0-0.7 | | |
| UK | 4-7 | | 3-5 | 1-2 | 0.25 | 1 | | | 0.15 |

* *sub-total of quantifiable externalities (such as global warming, public health, occupational health, material damage)*
** *biomass co-fired with lignites*

Source: European Commission (2003), *External Costs. Research results on socio-environmental damages due to electricity and transport.* Luxembourg.

**Water:** The external costs of excess water demand due to water subsidies are likely to be very site dependent. Any attempt to attach a monetary value to them will need to take the specific (hydrological and other) circumstances of the area at stake into account. If results from comparable situations are available, 'benefit transfer' techniques may be used to get a reasonable estimate, but this requires a very careful procedure.[10]

At this moment, any attempt at giving general guidelines for valuing the external costs of water abstraction and pollution seems premature. A (qualitative and quantitative) description of potential impacts is probably preferable. In some cases specific sources may be used to obtain a rough estimate.

[10] Brouwer, R. (2000), Environmental value transfer: state of the art and future prospects. *Ecological Economics* 32 (1), pp. 137-152.

### 7.3.5 Producer Support Estimate

**Brief description of the method**

The Producer Support Estimate is a well-developed methodology developed by OECD that is used to create internationally comparable statistics on subsidies to agricultural producers. The method has also been adopted for use in other areas, notably coal subsidies.

It is important to note that the PSE is an indicator of transfers to *individual* producers. In addition to PSE, OECD has developed a set of related subsidy indicators such as the General Service Support Estimate (GSSE) indicator, which captures subsidies that benefit producers *collectively* (e.g. irrigation infrastructure provision). Transfers to consumers of agricultural commodities are captured in the Consumer Support Estimate (CSE) indicator.[11]

Box 30 provides the OECD's brief definition of the PSE indicator.

**Box 30: Producer Support Estimate**

***Definition:***
The Producer Support Estimate (PSE) is an indicator of the annual monetary value of gross transfers from consumers and taxpayers to support agricultural producers, measured at farm gate level, arising from policy measures, regardless of their nature, objectives or impacts on farm production or income.

***Context:***
The PSE measures support arising from policies targeted to agriculture relative to a situation without such policies — i.e., when producers are subject only to general policies (including economic, social, environmental and tax policies) of the country.

The PSE is a gross notion implying that any costs associated with those policies and incurred by individual producers are not deducted. It is also a nominal assistance notion meaning that increased costs associated with import duties on inputs are not deducted. However, it is an indicator net of producer contributions to help finance the policy measure (e.g. producer levies) providing a given transfer to producers. The PSE includes implicit and explicit transfers.

The percentage PSE is the ratio of the PSE to the value of total gross farm receipts, measured by the value of total farm production (at farm gate prices), plus budgetary support.

Source: Reproduced from OECD Glossary of Statistical Terms (2009). *Producer Support Estimate*. http://stats.oecd.org/glossary/detail.asp?ID=2150

[11] The PSE Manual is available online at http://www.oecd.org/dataoecd/18/31/41121738.pdf (OECD, 2008b). OECD has also an explanatory note that includes discussion of GSSE (General Services Support Estimate): http://www.oecd.org/dataoecd/58/10/41001021.pdf; OECD, 2008a).

**Key steps:**

The OECD has produced the document "OECD's Producer Support Estimate and Related Indicators of Agricultural Support: Concepts, Calculations, Interpretation and Use" referred to in shorthand as the PSE Manual. The manual provides extensive instructions on how to calculate the PSE indicator from its constituent categories.

As a means of providing a brief overview of the key steps here, Box 31 provides the OECD definitions for each category of support type included in the PSE calculations. The Box illustrates the great variety of agricultural subsidies and hints at the level of detail and complexity involved in fully employing the PSE method in a rigorous way.

**Box 31: Names and definitions of the PSE categories and sub-categories**

**A. Support based on commodity output**

> ***A.1. Market price support (MPS)*** - transfers from consumers and taxpayers to agricultural producers arising from policy measures that create a gap between domestic market prices and border prices of a specific agricultural commodity, measured at the farm gate level.
>
> ***A.2. Payments based on output*** - transfers from taxpayers to agricultural producers from policy measures based on current output of a specific agricultural commodity.

**B. Payments based on input use:** transfers from taxpayers to agricultural producers arising from policy measures based on on-farm use of inputs:

> ***B.1. Variable input use*** – transfers reducing the on-farm cost of a specific variable input or a mix of variable inputs.
>
> ***B.2. Fixed capital formation*** - transfers reducing the on-farm investment cost of farm buildings, equipment, plantations, irrigation, drainage and soil improvements.
>
> ***B.3. On-farm services*** - transfers reducing the cost of technical, accounting, commercial, sanitary and phyto-sanitary assistance, and training provided to individual farmers.

**C. Payments based on current A/An/R/I1, production required**: transfers from taxpayers to agricultural producers arising from policy measures based on current area, animal numbers, receipts or income, and requiring production. Category C is further Broken down to two sub-categories:

> ***C.1. Based on current receipts/income*** – including transfers through policy measures based on receipts or income
>
> ***C.2. Based on current area/animal numbers*** – including transfers through policy measures based area/animal numbers

**D. Payments based on non-current A/An/R/I, production required**: transfers from taxpayers to agricultural producers arising from policy measures based on non-current (*i.e.* historical or fixed) area, animal numbers, receipts or income, with current production of any commodity required.

**E. Payments based on non-current A/An/R/I, production not required**: transfers from taxpayers to agricultural producers arising from policy measures based on non-current (*i.e.* historical or fixed) area, animal numbers, receipts or income, with current production of any commodity not required but optional. Category E is further divided in two sub-categories according to the nature of payment rates used:

> ***E.1. Variable rates*** - transfers using payment rates which vary with respect to levels of current output or input prices, or production/yields and/or area.
>
> ***E.2. Fixed rates*** - transfers using payment rates which do not vary with respect to these parameters.

**F. Payments based on non-commodity criteria**: transfers from taxpayers to agricultural producers arising from policy measures based on:

> ***F.1. Long-term resource retirement*** - transfers for the long-term retirement of factors of production from commodity production. The payments in this subcategory are distinguished from those requiring short-term resource retirement, which are based on commodity production criteria.
>
> ***F.2. A specific non-commodity output*** - transfers for the use of farm resources to produce specific non-commodity outputs of goods and services, which are not required by regulations.
>
> ***F.3. Other non-commodity criteria*** - transfers provided equally to all farmers, such as a flat-rate or lump-sum payment.

**G. Miscellaneous payments**: transfers from taxpayers to farmers for which there is insufficient information to allocate them to the appropriate categories.

1. The abbreviations represent: A – Area; An – Animal numbers; R – Receipts; and I – Income

Source: Reproduced from OECD (2008d). PSE Manual. July. p. 34.
http://www.oecd.org/dataoecd/18/31/41121738.pdf

Due to the complexity of the PSE methodology and the completeness of the methodological documentation within the PSE Manual, no detailed technical guidance is provided here. Box 32 provides an overview on what the guidance included in the PSE Manual itself.

**Box 32: Technical Guidance—Using the PSE Manual**

The PSE Manual provides detailed instructions on the use of the PSE methodology for agricultural indicators and describes the economic principles behind the methodology. In addition to showing the practical application of the PSE methodology, the manual explains how the PSE family of indicators can be used for policy evaluation and modelling.

The Manual is designed to be used in conjunction with other OECD documentation on agricultural policies in OECD countries as well as the database "Producer and Consumer Support Estimates, OECD Database 1986-2008", which provides country-level calculations of PSE and related indicators for OECD countries.

At 186 pages in length, the Manual provides all the required formulas and instructions for the calculation and interpretation of the components of PSE and PSE-related indicators.

Further technical guidance should be obtained from the PSE Manual itself, available online at http://www.oecd.org/dataoecd/18/31/41121738.pdf

## 7.4 Mapping the methodologies to the project case studies

The methodologies described in section 7.2. were tested in practical examples using case studies. The results of the application of the methodologies to the case studies are included in the Annexes. In this section, the method used to identify the appropriate methodology for each case study is illustrated.

To enable evaluation of subsidy levels for the case studies, it was first necessary to identify what methodologies were appropriate by 1) identifying the type or types of subsidy included in each case, and then 2) identifying the methodology appropriate to evaluate each subsidy type.

Because of the above mapping exercise, three of the five subsidy methodologies are relevant to the case-study analyses:

1. Programme aggregation
2. Resource rent
3. Marginal social cost *(calculated for all the case studies)*

The results of this mapping exercise can be found in Table 13.

**Table 13: Mapping of case studies to quantification methodologies**

| Selected Cases | Type of Subsidy | Methodology | Issues |
|---|---|---|---|
| **Transport** | | | |
| Preferential tax treatment for company cars (The Netherlands) | Off-budget, tax exemptions and rebates | Programme aggregation | Marginal social cost to assess indirect effects of additional driving. |

| | | | |
|---|---|---|---|
| Fuel tax differentiation (diesel versus petrol) in UK-low, AT-med, NL-high. | Off-budget, tax exemptions and rebates | Programme aggregation | Marginal social cost to assess indirect effects of additional driving and net effects of diesel over petrol. |
| **Water** | | | |
| Subsidies to irrigation | On-budget, government-provided infrastructure and services) | Programme aggregation | Overlaps with "resource rent" issue |
| | Off-budget, price paid for water below full economic rent | Resource rent | Overlaps with government-provided infrastructure and services |
| | Off-budget and implicit, lack of charging for external costs of water use for irrigation | Marginal social cost | Overlaps with "resource rent" issue |
| | On-budget, direct transfer of funds to producers (yields an indirect subsidy to irrigation) | Producer support estimate (irrigation portion) | |
| **Energy** | | | |
| Reduced VAT for domestic energy use (UK) | Off-budget, government revenues due are foregone or not collected | Programme aggregation | Marginal social cost to assess indirect effects of additional energy use. |
| Biofuels (Germany, fuel-tax exemption) | Off-budget, regulatory support mechanisms (energy-mix requirements) | Price-gap | |
| | Off-budget, tax exemptions and rebates | Programme aggregation | We assume standard agricultural subsidies are NOT included. |
| Nuclear energy (Germany) | Tax-deductions for decommissioning funds | Programme aggregation | |

Moreover, for the application of the **marginal social cost** method to the six case studies, the following specific guidance was drafted:

***a) Preferential tax treatment for company cars:*** The uninternalised external effects of this EHS are likely to be mainly transport externalities. It is proposed to use the results of the recent IMPACT[12] research project to value these externalities. This project was done for the European Commission by INFRAS, CE Delft, Fraunhofer Institut (ISI) and the University of Gdansk. It aimed at providing a comprehensive overview of approaches for estimation and internalisation of external cost and to recommend a set of methods and default values for estimating external costs when conceiving and implementing transport pricing policy and schemes.

The IMPACT study resulted, among others, in a Handbook on estimation of external costs in the transport sector[13]. This Handbook covers all environmental, accident and congestion costs and considers all transport modes. It is based on a wide range of existing studies and has been reviewed by a large number of experts across the EU.

***b) Fuel tax differentiation (petrol vs diesel):*** For this case study, the IMPACT study can be used as well.

*c)* ***Nuclear energy:*** For the externalities of electricity production, the ExternE[14] methodology has become widely accepted as a basis for cost-benefit analysis and policy making in the EU. ExternE uses an 'Impact Pathway Approach', which includes monetary valuation as its final step. Various valuation methods are used.
For nuclear energy, the ExternE methodology has been used to develop estimates for the external costs in five EU countries. These estimates vary from € 0.002 per kWh in Germany to € 0.007 in the Netherlands[15]. The figures date from 1999. In 2005, an update report on ExternE noted: "Since then no further work has been done on the damage costs of nuclear power. That is most regrettable because the methodology could and should be improved, and it should be applied to current and future technologies which are safer and cleaner than the ones of the mid 1990s that have been considered until now."[16] This would imply that the mentioned figures could be seen as relatively high estimates. Meanwhile, the NEEDS project[17] is addressing the consequences of (among others) new technological developments for the externalities of nuclear power.

***d) Reduced VAT for domestic energy:*** For electricity, the external cost estimates of ExternE can be used. National figures for the UK are available for electricity from coal, oil, gas, nuclear, biomass and wind.
For natural gas, the main external cost is related to $CO_2$ emissions. These can be valued using existing estimates, which differ widely. According to Tol (2005) they are unlikely to exceed USD 50 per tonne C (and probably much smaller), which is equal to EUR 10 per tonne of $CO_2$ (given an exchange rate of USD 1.35 per EUR; and given that 1 tonne C equals 0.27 tonnes of $CO_2$). Using an emission factor of 1.96 kg $CO_2$ per $m^3$ gas, this means a maximum marginal social cost of EUR 0.02 per $m^3$ gas.

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12 Internalisation Measures and Policies for All external Costs of Transport.

13 Downloadable from http://www.ce.nl/art/uploads/file/07_4288_57.pdf.

14 See www.externe.info.

15 See European Commission (2003), *External Costs. Research results on socio-environmental damages due to electricity and transport.* DG Research, Brussels, EUR 20198.

16 European Commission (2005), *ExternE, Externalities of Energy, Methodology 2005 Update.* DG Research, Brussels, EUR 21951.

17 See www.needs-project.org.

***e) Biofuels:*** There are no readily available estimates or valuation tools for the external costs of biofuels. These costs will largely depend on assumptions regarding, for instance, the type of crops used as a raw material, the production and distribution processes of the fuels, and the type of engine in which they are used. To the extent that impact estimates are available in physical terms (e.g. emissions of specific pollutants), these can be valued using figures from existing studies such as ExternE. For the valuation of ecosystems and biodiversity loss, the ongoing TEEB project[18] may provide clues. The existing OECD[19] and World Bank[20] publications in this area do not contain readily usable guidelines.
A simple approach to biofuels could be to estimate the value of the expected reduction in greenhouse gas emissions (leaving aside all other environmental impacts). But even in this case the range of available estimates is very wide, including some that entail an *increase* in GHG emissions due to biofuel use (see Table below).

**Table 5.2.1: Reduction of greenhouse gas (GHG) emissions for biofuels from different European feedstocks as compared with fossil fuel emissions**

| source | bioethanol from sugar crops | bioethanol from grain | biodiesel from rape |
|---|---|---|---|
| VIEWLS – today[15] | 20–73% | minus 21% to plus 32% | 18–64% |
| VIEWLS – for 2010[16] | 35–72% | 16–64% | 7–74% |
| Sheffield Hallam[17] | 47–54% | 62–67% | 51–55% |
| Imperial College[18] | minus 11% to plus 63% | 5–68% | 48–80% |
| Concawe/Eucar/JRC[19] | 37–44% | minus 6% to plus 43% | 16–62% |
| PWC[20] | 40–60% | 40–70% | 50–70% |
| IEA[21] | 34–55% | 18–46% | 43–63% |
| ADEME[22] | 75% | 75% | 74% |

Source: Impact Assessment on the EU Strategy for Biofuels (SEC(2006) 142).

***f) Subsidies to irrigation:*** Within the AQUAMONEY project[21], a review of existing guidelines and manuals for environmental valuation (especially in the area of water) has been prepared.[22] Most of the publications reviewed do not contain readily usable guidelines for practical application to irrigation issues. The best source for the present purpose might be a study by RFF[23]. This gives a comprehensive overview of

[18] The Economics of Ecosystems and Biodiversity. See http://ec.europa.eu/environment/nature/biodiversity/economics.

[19] D. Pearce, D. Moran, and D. Biller (2002), *Handbook of Biodiversity Valuation, a Guide for Policy Makers*. OECD Publications, Paris.

[20] World Bank (2004), *Assessing the Economic Value of Ecosystem conservation.* Washington, DC.

[21] See http://www.aquamoney.ecologic-events.de/.

[22] M. Schaafsma and R. Brouwer (2006), *Overview of existing guidelines and manuals for the economic valuation of environmental and resource costs and benefits.*

[23] R. Young (2005), *Determining the economic value of water: concepts and methods*. Resources for the Future Press, Washington, D.C.

approaches, value types and methods for water valuation. However, the AQUAMONEY reviewers state that the description of methods is "not enough to guide implementation".
In specific cases, rough estimates can be obtained by using existing literature. For example, if the area of wetlands lost due to irrigation is known, the average benefit estimate for wetlands as used in Kuik *et al.* (2006) (around € 5,000 per hectare per year) could be used.[24]

## 7.5 Communicating levels of subsidisation

Another important component of Task 3 was to identify a method of defining and communicating the level of environmentally harmful subsidies. Table 14 below lists indicators for indicating the size of subsidies, applied to the case studies (see Annex 5). Two categories of indicators are listed: 1) total-value indicators; and 2) percentage-value indicators. The last column in has sample narrative text suggesting how the subsidy level for each case study might be described.

The following categories of value indicators emerge:

**Total-value indicators** (annual; in constant currency units in cases of time and country comparisons):

1. Value of specified subsidy (e.g. tax expenditure)
2. Value of marginal social costs (i.e. uninternalised externalities)
3. Total subsidy value (explicit and implicit subsidies)
4. Range estimates of the above where uncertainty exists (e.g. elasticity assumptions)

Percentage-value indicators allow for comparison of subsidy levels to other relevant economic measures. The following categories of percentage-value indicators are relevant to the cases:

**Percentage-value indicator**s (based on the above)

1. Subsidy as average % of total annual value of production or consumption;
2. Subsidy as % of relevant tax collections;

The percentage-value indicators capture the two key areas of concern regarding subsides: 1) the extent to which the activity is subsidised; and 2) the extent to which this contributes to a shortfall in government revenue.

Total-value and percentage-value indicators can be developed in a similar way for any subsidy. There is a wide degree of heterogeneity in the types of indicators that might be meaningful (e.g. for some transport subsidies, total subsidy value per passenger-kilometre could be a useful metric). For this reason, we do not develop special-case indicators for every subsidy type.

[24] O.J. Kuik, L. Brander and M. Schaafsma (2006), *Globale Batenraming van Natura 2000 gebieden.* IVM, Vrije Universiteit Amsterdam, May 2006.

**Table 14: Level indicators and suggested narrative text for the case studies**

| Subsidy case | Value | Percentage | Possible narrative text |
|---|---|---|---|
| **1. Preferential tax treatment for company cars in the Netherlands** | Annual value of foregone taxes and marginal social cost (separate and as total sum; in constant currency units for annual comparisons); Range estimate based on elasticity assumptions. | Subsidy as average % of total annual cost of car ownership;<br>Subsidy as % of relevant tax collections on cars. | Annual subsidies for company cars totals X EUR. Of this, X EUR is due to foregone tax revenue and X EUR is due to externalities associated with external costs due to subsidy-induced driving behaviour. Without the subsidy, owning a company car in the Netherlands would be X% higher and government tax revenue would increase by X%. |
| **2. Fuel-tax differentiation (petrol versus diesel excise taxes; UK-low, Austria-med, Netherlands-high)** | Annual value of foregone taxes and marginal social cost (separate and as total sum; in constant currency units for annual comparisons); Range estimate based on elasticity assumptions. | Subsidy as average % of total annual fuel cost;<br>Total subsidy as % of total fuel-tax collections. | Annual subsidies to drivers of diesel vehicles totals X EUR. Of this, X EUR is due to foregone tax revenue and X EUR is due to externalities associated with external costs due to subsidy-induced driving behaviour. Removing the subsidy would on average increase the cost of driving a diesel vehicle in [country X] by X% and increase tax revenue by X%. |
| **3. Subsidies to irrigation (Spain)** | Annual value of foregone taxes and marginal social cost (separate and as total sum; in constant currency units for annual comparisons); Range estimate based on elasticity assumptions. | Subsidy as average % of total annual value of production of agriculture industry. | Annual subsidies for irrigation totals X EUR. Of this, X EUR is due to foregone public revenue to cover financial cost of water production and distribution, and X EUR is due to externalities associated to the subsidy, related to water overuse. Without the subsidy, the price of water for irrigation in Spain would be X% higher and government tax revenue would increase by X%. |

| | | | |
|---|---|---|---|
| **4. Reduced VAT for domestic energy use (UK)** | Annual value of foregone taxes and marginal social cost (separate and as total sum; in constant currency units for annual comparisons); Range estimate based on elasticity assumptions. | Subsidy as average % of total annual energy cost;<br>Total subsidy as % of total VAT collections on energy. | Annual subsidies to domestic energy users totals X EUR. Of this, X EUR is due to foregone tax revenue and X EUR is due to externalities associated with external costs due to subsidy-induced energy consumption. Removing the subsidy would on average increase the cost of energy consumption in the UK by X% and increase tax revenue by X%. |
| **5. Biofuels (Germany, fuel tax exemptions for biofuels)** | Annual value of foregone taxes and marginal social cost (separate and as total sum; in constant currency units for annual comparisons). | Subsidy as average % of total annual production;<br>Subsidy as % of total fuel tax collections. | Annual subsidies to biofuels total X EUR. Of this, X EUR is due to foregone tax revenue and X EUR is due to externalities associated with the production of biofuels. Removing the subsidy would on average increase the cost of biofuels in [country X] by X% and increase tax revenue by X%. |
| **6. Nuclear energy (Germany; tax-deductions for decommissioning funds)** | Annual value of foregone taxes (in constant currency units for annual comparisons); Range estimate based on elasticity assumptions. | Subsidy as average % of consumer price of nuclear-generated electricity;<br>Total subsidy as % of total tax collections on nuclear-generated energy. | Annual decommissioning-fund subsidies to nuclear operators in Germany totals X EUR. Of this, X EUR is due to foregone tax revenue. Removing the subsidy would on average increase the cost of nuclear-produced energy by X% and increase tax revenue by X%. |

The version including the case studies results is included in the Annexes.

# 8 COMMUNICATION TOOL: THE 'SUBSIDY IDENTITY CARD'

**Summary**: in this Chapter, two communication tools are presented: a Summary Assessment Table, created to provide a synopsis of the main features of a subsidy, including technical aspects, as identified using the OECD assessment tools; and a shorter version of the table, the Subsidy Identity Card, to communicate non-technical results to policymakers and stakeholders.

## 8.1 Summary Assessment Table

A Summary Assessment Table was created to provide a synopsis of the main features of a subsidy, including technical aspects, as identified using the OECD assessment tools. In addition, a shorter version of the Table—the Subsidy Identity Card is suggested as a means of communicating non-technical results to policymakers and stakeholders. This includes the use of icons and colours to communicate assessment results in an accessible manner.

The Summary Assessment Table builds on the categories covered in the OECD assessment tools tested in the first phase of the study. The issues summarised in the table are intended to offer an accessible means of describing key aspects of subsidies, including technical issues, in a highly abbreviated way suitable for tabular summaries and use in schematic figures.

The list of issues in the table incorporate what the project team considers to be the most important features that emerged from the assessment process. An annotated version of the Summary Assessment Table is shown in Table 15 below. The Table was completed for each case study (see Chapter 4).

**Table 15: Summary Assessment Table**

| **Summary assessment** | |
|---|---|
| **Short description of subsidy** | [short summary text: 1-2 sentences] |
| **Key environmental effects** | [list types of environmental damage or resource depletion (separated by semi-colons) and any benefits] |
| **Is subsidy removal likely to benefit environment?** | Yes/No [explain, taking key reasons from the Checklist logic diagram, i.e. extent to which: other environmental policies do [not] effectively limit environmental damage; more benign (technological) alternatives are [not] available now or emerging; Conditionality does [not] lead to higher production rates] |
| **Objectives and justification** | |
| **Subsidy objectives (original rationale)** | [list environmental, economic and social objectives]) |
| **Is the original rationale still valid?** | Yes/No [explain] |

| | |
|---|---|
| **Key problems with subsidy design** | [list features, e.g. sunset clause, adaptive review process] |
| **Economic aspects** | |
| **On- or off-budget** | On-budget ([type detail]); Off-budget ([type detail]) |
| **Conditional on what activity?** | Production subsidy; Consumption subsidy; Non-conditional support |
| **Point(s) of impact** | Input ([detail]); Output ([detail]); Income ([detail]); Profit ([detail]), Demand ([detail]) |
| **Subsidy size/value** | [Value in EUR (or range of values); Share relative to turnover or product price]; Unknown [explain why] |
| **Elasticity effects** | Elasticity of demand/supply: [Value or range]; Relatively [elastic/inelastic], causing [effects] |
| **Importance of trade issues** | Yes/Somewhat/No ([explain]) |
| **Availability of economic data** | [geographical distribution; economic value] |
| **Social aspects** | |
| **Does it reach the intended recipients?** | [Summarise knowledge and list key past and existing calls for removal] |
| **Winners and losers** | [identify key winners and losers from the subsidy] |
| **Equity issues?** | [identify key impacts on low-income groups or non-target populations] |
| **Reform issues** | |
| **Are there alternative policies to achieve the same objectives?** | Yes/No [list] |
| **Past attempts to remove subsidy?** | Yes/No [explain successes/failures] |
| **Existing calls for removal?** | Yes/No [describe] |
| **Key reform challenges** | List key obstacles to successful reform |
| **Possible compensation measures to palliate impact of removal** | [list measures] |

## 8.2 Subsidy Identity Card

The evaluation of environmentally harmful subsidies is highly complex and requires specialist knowledge. The decision to reform such subsidies, however, is often a decision taken by non-specialists and motivated by heightened awareness and concern on the part of the media and general public. For this reason, it is critical to find a way to present the results of the evaluations undertaken in this project in an accessible, impactful and concise way. This is the rationale behind the development of the Subsidy Identity Card.

The issues covered by the identity card primarily take the form of brief textual descriptions. The project team also developed additional symbols and colouring mechanisms to indicate the severity of key issues as well as the implications for subsidy reform.

Table 16 provides an annotated version of the Subsidy Identity Card that shows the categories included as well as the indicator options (colouring or smiley faces) for each category as well as the meaning of each indicator. A spider diagram has been developed, as a figurative alternative to Table 16, which illustrates the relative importance of the three dimensions of sustainable development in the need for subsidy reform.

# Table 16: The Subsidy Identity Card, with annotations

**Subsidy Identity Card: [name of subsidy]**

| | Indicator | Assessment |
|---|---|---|
| | **Short description** | Provide a brief narrative description (i.e. short paragraph). Please incorporate the following technical aspects:<br>Budget type: On-budget ([type detail]); Off-budget ([type detail])<br>Conditionality: Production subsidy; Consumption subsidy; Non-conditional support<br>Point(s) of impact: Input ([detail]); Output ([detail]); Income ([detail]); Profit ([detail]), Demand ([detail]) |
| | *Objectives and design* | |
| | **Subsidy objectives (original rationale). Is the original rationale still valid?** | [list environmental, economic and social objectives]) |
| | **Key problems with subsidy design** | [max 1 sentence description] |
| | *Key social impacts* | |
| | **Who are the intended recipients of the subsidy? Does it reach them?** | |
| | **What are the unintended social effects, if any?** | |
| | *Key environmental impacts* | |
| | **Nature and degree of environmental harm, including climate impacts** | None/Small/Medium/Significant; AND when quantification is possible insert value/range |
| | *Key economic impacts (e.g. size, impact on budget, trade, competition)* | |
| | **What are the intended economic outcomes? Are they achieved?** | |
| | **What are the unintended economic impacts (e.g. secondary indirect impacts?)** | |
| | **Estimated size of subsidy** | [unknown OR estimated value /range in EUR] |
| | *Reform scenarios* | |
| | **Is subsidy reform/removal likely to benefit the environment? To what degree?** | |
| | **Is subsidy reform/removal likely to generate social or economic co-benefits? To what degree?** | |
| | **Are there available alternative policies and/or alternative technologies to achieve the same objective in an environmentally sustainable way?** | |
| | **Are there possible compensatory measures available to mitigate hardship on social groups due to subsidy reform?** | |
| | **Are there calls for reform/removal?** | |

**Legend**

| | |
|---|---|
| | Not problematic -- not a reason for reform. |
| | Somewhat problematic -- reform would yield net positive results on this issue. |
| | Problematic -- reform would yield significant improvements on this issue. |
| | Highly problematic -- compelling reason for reform. |

**Suggested symbology for black-and-white presentation.**

| 0 | - | -- | ! |
|---|---|---|---|

**Legend**

| | |
|---|---|
| | Positive implications for successful reform |
| | Reform implications unclear |
| | Negative implications for successful reform. |

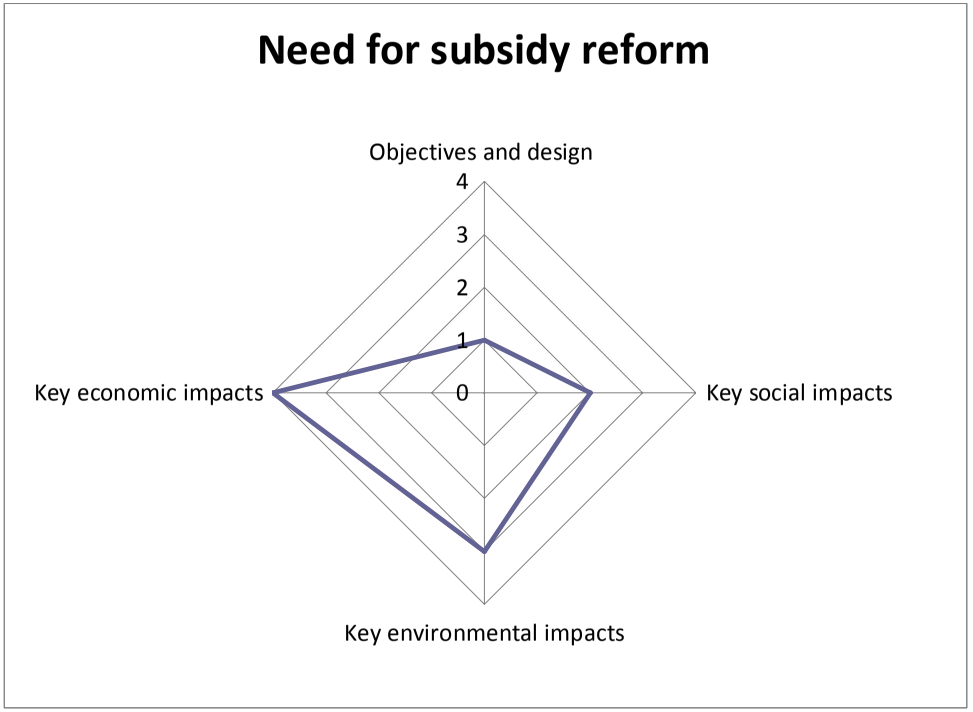
Note 1: the number speaks for itself (difficult to develop any sort of size indicator)
Source of smiley icons: Public Domain Clip Art, http://www.pdclipart.org/thumbnails.php?album=108

**Figure 5: The Subsidy Identity Card, spider diagram (alternative to the tabular representation of the Subsidy Identity Card)**

**Spider diagram**

**Overall scores by key area**

| | Need for subsidy reform |
|---|---|
| Objectives and design | 1 |
| Key social impacts | 2 |
| Key environmental impacts | 3 |
| Key economic impacts | 4 |



# 9 SUMMARY AND CONCLUSIONS

The EU has a long-standing commitment to removing environmentally harmful subsidies (EHS), which it has reiterated in several key strategies. Removing EHS is a particularly contentious issue and complex process, and while progress has been slow, recent environmental and economic challenges are providing renewed motivation to address the issue.

In this context, the European Commission is keen to continue to work on mainstreaming the review of EHS into the sectoral policies. This study is a contribution to the Commission's efforts in this area. It is mostly based on the scientific work carried out by the OECD over the past decade, with the specific aim of applying it in a European context. The application in this project of the tools developed by the OECD is aimed to:

- Test in practice the methodology proposed by the OECD for identification of EHS and their impacts and the impacts of their removal. This implies using the 'quick scan' and 'checklist' tools as well as the principle of 'integrated assessment'.
- Identify shortcomings of the OECD method and possible improvements / adaptations needed to make it operational for practical use in a context of policy making.
- Identify good practice for use by policy makers both at EU and Member State level.
- Provide baseline information and indicators that could be useful for potential future measurements, benchmarking or efficiency target setting (see Chapter 7 for more details).

This is the first study carried out so far for the European Commission to be focused in particular on these aspects.

## 9.1 Project results

The main aim of the project was to test the OECD tools for the identification and assessment of EHS (the quick scan, the checklist and the integrated assessment framework) and to provide methodological recommendations for their future use in policy making. The testing of the tools formed the basis for the development of detailed and pragmatic operational guidelines for EHS reform.

### *Critical appraisal of the OECD tools*

The OECD tools for identifying and assessing EHS were tested in the context of six case studies. The case studies analysed include: VAT reduction for domestic energy consumption in the UK; fuel tax exemptions for biofuels in Germany; nuclear energy decommissioning subsidies in Germany; fuel taxes: diesel vs petrol in Austria, the Netherlands and the UK; company car taxation in the Netherlands; and irrigation water subsidies in Spain. The detailed results of the test are summarised in Annexes.

The key findings of the test and some methodological recommendations for the improvement of the OECD tools, are outlined in Chapter 5. It was found that the tools overlap in several ways, and complement each other in others. Therefore, it seems desirable that elements of all three tools should be integrated in to one single methodology (as outlined in Chapter 6).

The guidance accompanying the tools in the three OECD reports is considered clear and exhaustive. However, with respect to their practical application, it was considered beneficial to streamline the guidance and to develop more guidance on their practical.

The tools are not particularly hindered by data availability, nor are they applicable only in the context of certain types of analysis. Each tool allows analyses at different levels, depending on data availability and the resources available. In this study, guidance has been provided to use the analysis for the most part qualitatively to providing insights on the subsidy and enabling policy makers to prioritise the analysis of those subsidies that are harmful and for which reform is politically feasible.

There were a few main elements which are missing from the methodology. All three tools require more guidance on how to specify a counterfactual scenario (i.e. what would the world look like without the subsidy). It was considered therefore necessary to develop guidance on how to set the baseline, or to at least require a level of transparency in undertaking this step.

Another element that is implicit in the use of the three tools is the calculation of the size of the subsidy. A step-by-step 'recipe book' for calculating the size of the environmentally harmful subsidy was developed by the team (see Chapter 7) and will accompany the guidelines developed by the team on the use of the tools.

The tools do not consider some crucial elements of subsidy impacts, such as on trade, competition, SMEs and public health. While it would be difficult to do so without the use of models, it was considered useful to at least complete the assessment by describing them, while providing examples of potential impacts.

***Integrating the recommendations into the tools***

One of the main findings of the critical assessment was that the tools could be streamlined into one single method to maximise individual strengths and eliminate duplication. Drawing on the results of the application of the OECD tools to the case studies, we have outlined a methodology that builds on the strengths of the OECD tools and tries to address the weaknesses identified. The methodology named the 'EHS reform tool' is outlined in Chapter 6. It comprises four phases:

1. **Screening of subsidies**: This screening phase serves at identifying and prioritising those subsidies that have potentially significant environmental harm and are politically more viable for reform.
2. **Application of the checklist**: this phase entails the application of the checklist (OECD, 2005). The objective of this phase is to assess whether the subsidy reform/removal is likely to bring significant environmental benefits. If so, the assessment should be carried forward, looking at the trade offs with social and economic objectives explored in the next phase.

3. **Broader assessment of subsidies:** this phase builds on the application of the integrated assessment framework tool (OECD, 2007a). The potentially harmful subsidies will be analysed in more detail with regard to their social and economic impacts and to determine whether they actually achieve the targets for which they were introduced.
4. **Analysis of reform options:** here, concrete policy reform options for environmentally harmful subsidies are developed. This phase should help to prepare the political decision making for the reform/removal of the subsidies. This analytical step builds on the integrated assessment framework tool (OECD, 2007a).

The 'EHS reform tool' is developed as a concrete step-by-step process including guidelines to be used by policy makers in the identification and selection of subsidies to be proposed for reform. It is accompanied by a 'recipe book' for calculating the size of subsidies.

***Recipe book for calculating the size of subsidies***

In order to provide simple guidance on how to calculate the size of subsidies, this study includes a 'recipe book' to apply indicators on the level of subsidisation. The indicators included build on five OECD subsidy quantification methodologies and on a methodology to calculate the marginal social cost of subsidies. The recipe book provides step-by-step guidance on the use of the OECD methodologies. These should be considered 'starter recipes' since additional methodological development may be required based on aspects unique to each case. They are presented in Chapter 7.

***Communication tool***

Issues relating to data availability and consistency should not prevent the development of more qualitative indicators that convey the character and severity of subsidies. We have therefore developed a set of indicators that characterise subsidies according to a number of critical economic, social and environmental issues. Issues for reform in the context of the corresponding subsidy level have also been considered. These are summarised in a 'subsidy identity card' which is presented in Chapter 8.

***The workshop***

A one-day workshop, held on 16 September 2009, was organised to gather feedback and comments from Member State representatives and EHS experts on the methodology needed to identify and assess EHS and on the political economy of EHS reform. The results of the workshop are worked out in the text of the study.

At the workshop it clearly emerged that there is evidence of a renewed interest in EHS reform in Europe, prompted by the need to secure increased revenues to tackle the fiscal crisis and the desire for greater transparency in public finances. Some countries, one example being France, are already identifying EHS to remove or reform for the better.

## 9.2 Windows of opportunity for EHS reform

The current fiscal crisis presents an opportunity for governments to revise their budgets and increase revenues. In this context, the removal of EHS would create revenues, cut $CO_2$ emissions and reduce other environmental impacts. In many cases, it would also create opportunities to increase social equity.

*Opportunities to remove EHS and tackle the 'debt crisis'*

The recent recovery plans (and the exit strategies to be developed by ministries in the coming months) offer an unprecedented opportunity for fundamentally restructuring the economy on a more sustainable basis and stimulating appropriate investment that would facilitate the transition to a low carbon economy.

Unfortunately, the short-term, rather haphazard context within which recovery plans were proposed did not allow for a fundamental re-think of current public spending patterns and how these may be reformed to reduce the burden on public budgets. It appears that, so far, the focus of the economic recovery plans has been on ensuring timely, new, (or repackaged existing) spending, rather than reforming or removing existing subsidies. This was a missed opportunity.

In the coming months, countries need to plan the phase out of temporary measures, finance Ministries are planning exit strategies, while in the next few years, Member States will need to cut spending and refill their national accounts, strained by the debt crisis. Hence, there will be growing pressure to reduce spending in all areas. In this context, environmental departments could prepare a list of environmentally harmful subsidies that need reform or removal to provide their contribution to solving the crisis. The guidelines developed as part of this study offer a practical means to enable policy makers to draw up a priority list.

*Opportunities for including EHS reform among policy priorities*

The Commission is currently preparing for the next phase of the Lisbon Strategy and a strategic approach to the future strategy is expected to be agreed by EU leaders at the spring Summit in 2010.

The recent conclusions adopted by Environment Ministers have invited the Commission to work towards the removal of EHS: in their conclusions 'Toward an eco-efficient economy' they have called the Commission to 'review, as a matter of urgency, sector by sector, of subsidies that have considerable negative effects on the environment and are incompatible with sustainable development, *with a view to gradually eliminating them*, in line with the EU SDS and the recent G20 call in that regard'.

There is therefore growing momentum on the need to review EHS. Opportunities to raise this in the EU include the discussions on the post-2010 Lisbon Strategy for growth and jobs and the EU Sustainable Development Strategy, in particular:

- A revision of the Integrated Guidelines under the Lisbon Strategy and review of the Lisbon Strategy are expected to be published by the Commission by the end

of 2009 or early 2010. The European Council will adopt Conclusions on the Commission's review in March 2010 and more detailed Conclusions on operational guidelines will be adopted in June 2010.

- Review of the renewed EU Sustainable Development Strategy by the European Council in December 2009 based on Commission's second implementation report published in July.

There are also prospects for action at the international level, following the G20 meeting in September, where Heads of State approved a US-backed proposal to phase out fossil fuel subsidies in the mid-term. Their statement called on their energy and finance ministers to report on strategies and timelines for implementing this 'critical commitment' by 2010.

Thus, it is crucial that policy makers have improved access to tools to identify and assess EHS. This project led by IEEP together with Ecologic, IVM and external expert Claudia Dias Soares for the European Commission's DG Environment is an initiative with this purpose in mind.

## Annex 1: Crucial factors to consider in determining environmental impacts of subsidy removal

**Table 17: Main subsidy point of impact and environmental benefits of subsidy removal**

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| ***Point of impact: within the firm*** | | | | | | |
| **Point of impact: INPUT USE** | **Materials (including water and energy)** | • The quantitative effect of the subsidy removal on variable cost.<br>• Substitution elasticities between alternative energy supplies and materials.<br>• Environmental profiles of the actual supplying industries.<br>• Environmental profiles of the energy and materials. | Removing energy and materials subsidies shifts the industries supply curve upward and therefore immediately reduces supply at all levels of demand of the (finished) product. It will also reduce entries and eliminate lock-in effects.<br>The environmentally beneficial effects of the reduction in production of the (finished) good may be diminished if other suppliers step in at prices only slightly above the (previously) subsidised supplies, especially if their environmental profiles are less benign. | Higher marginal costs of all subsidised firms.<br>Immediate discontinuation of some production activities.<br>Exit of the least efficient production units. | Disappearance of the lock-in effect, which frees the way to substitution and savings on inputs. If accompanied by effective environmental policies this creates a window of opportunities for environmental improvement. | Effects are immediate and continuous.<br>Remove lock-in effects.<br>Induces resource efficiency. |
| | **Short lived equipment** | • The quantitative effects of the subsidy removal on variable costs.<br>• Effects on the environment of the | Removing these subsidies has the same effect as removing subsidies to energy supplies and materials. If, however, they have been conditional on energy- or materials-saving | Increases variable costs. | Disappearance of the lock-in effect, which frees the way to substitution and savings on inputs. If | Resource efficiency depends on how closely linked they are to specific materials or energy use. |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| | | deployment of alternative types of short-lived equipment. | characteristics, the effect will be ambiguous. | | accompanied by effective environmental policies this creates a window of opportunities for environmental improvement. | |
| Point of impact: INPUT USE | **Particular types of fixed capital equipment** | • The quantitative effect of the subsidy removal on fixed costs on variable costs (where applicable).<br>• The negative effect of subsidy removal on entries. | Removing subsidies to fixed capital reduces the profitability of the subsidised sector and will discourage entries. However, if the profitability of the subsidised sector remained low while subsidised, the effect of the subsidy removal on entries would be minor or negligible. Often the choice for a particular type of fixed capital also implies the use of certain inputs. In some cases capital subsidies may allow cheaper inputs to be used, thereby changing variable costs. Removing such subsidies (to fixed costs) eliminates potentially strong lock-in effects. | Exit of the least efficient production units, if marginal revenues drop below marginal costs. | Disappearance of the lock-in effect, depending on the specificity and duration of the conditionality. | The effects on resource efficiency will depend on the degree to which the equipment is linked to specific materials or energy uses. |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| | **Access to natural resources below opportunity costs (e.g. exploitation concession)** | • The quantitative effect of the subsidy removal on fixed costs on variable costs (where applicable).<br>• Environmental profiles of the subsidised activities and their alternatives. | Adjusting royalty concessions to their market value will reduce future demand for these royalties.<br>When adjusting royalties to their market price involves concessions for extraction, a strong effect may be expected on rates of depletion.<br>Since this removal may result in higher prices for inputs for downstream activities, variable costs of these downstream activities may be lowered with strong volume effects. | Increase of costs for firms for acquiring concessions or access to resources. | Higher barrier to entry or disappearance of the least efficient production units, or both. | Decreases the rates of exploitation of a natural resource. |
| | **Low interest loans (i.e. subsidies to capital)** | • The quantitative effect of the subsidy removal on fixed costs and on variable costs (where applicable).<br>• Environmental profiles of the subsidised activities and their alternatives. | If low interest loans are used to reduce the costs of fixed capital, removing such subsidies will have the same effect as removing other subsidies to fixed costs.<br>If granted to incumbents as well as newcomers, no barriers to entry will be created. Dependent on the relative profitability of the sector, this may lead to effects on production volumes. | Minor or none if production level does not depend on that capital good.<br><br>Very high, if capital good closely linked to input. | Higher barrier to entry or disappearance of the least efficient production units, or both. | Requires more detailed analysis. Depends on the previous assumptions. |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| | **Research and Development (R&D)** | • The size of the subsidy relevant to total operating costs. Effects of the removal of the R&D subsidy on fixed costs and on variable costs.<br>• Effects of the removal of the subsidy on diminishing the environmental profile of the subsidised activity. | If the removed subsidy was large compared to operating costs, it would have been a subsidy to operating costs in disguise.<br>If the subsidy removal would imply less technical progress towards more environmentally benign technologies, the ultimate environmental effects of subsidy removal is ambiguous. | | Deployment of environmentally more benign technologies, if accompanied with effective environmental targets. | Requires more detailed analysis.<br><br>Environmental effects difficult to assess. |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| **Point of impact: OUTPUT** | **Market price support (incl. border protections, market access restrictions, government brokered contracts)** | • Price elasticities of demand and supply.<br>• Environmental profile of the products that will substitute the previously subsidised ones.<br>• Existence of production quotas. | Consumer prices will drop, in spite of lower production levels. Production may shift to areas of low cost production, leading to a possible displacement of the environmental burden. | Lower production levels. | Lower production levels. | Less input requirements may lead to strong environmental effects in the production of materials and energy phase. Production may shift to areas of low cost production, leading to a possible displacement of the environmental burden. |
| | **Deficiency payments/sales premiums** | • Same as above. | Same as above. | Lower production levels. | Lower production levels. | Same as above. Detailed analysis required. |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| Point of impact: PROFITS AND INCOME | **Historical entitlements** | • The effect of the subsidy removal on profitability.<br>• The profitability of the sector. | Subsides are independent from production levels, but are capitalised in the prices of factors of production (e.g. land) where there is inelastic demand, so having an impact on production modes and production levels (need detailed analysis of production levels). | Might change production modes and levels. | | |
| | **Preferential low rates of income or capital taxation** | • Same as above. | Decreased profitability due to the subsidy removal will discourage entries, but if entries had already been discouraged because of low profitability of the sector while subsidised, the effects on entries will be minor, if not negligible. When the sector produces energy and materials, downstream effects of removing the subsidy may be strong, dependent on the offer prices of competitors. | Inefficient firms leave the sector. | Higher barrier to entry.<br>Higher prices reduce demand. | Detailed research needed. |
| | **Debt write offs** | • Same as above. | Same as above. | Production levels of the sector decrease. | The same as above, unless it is a one-off write-off. | Environmental impact will depend on the available alternative (dirtier or cleaner). |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| | | | | | | |
| | **Allowing insufficient provisions for future enviromnetal liabilities** | • The nature of environmental liabilities.<br>• The effect of imposing sufficient provision of future liabilities on variable and fixed costs by means of changing modes of production, or adequate insurance.<br>• The environmental profiles of upstream and downstream economic activities.<br>• The environmental profile of the (previously) subsidised sector and its competing alternatives. | Imposing sufficient provision for liabilities can render entire industries unprofitable. The environmental effects of the subsidy removal depend on the environmental profiles of the alternatives that will replace the previously subsidised sector. Strong effects on downstream sectors may be expected if the previously subsidised sector supplies energy or materials, dependent on the offer prices of competing energy supplies and materials. | Exit of the least efficient production units, if marginal revenues drop below marginal costs. | Higher consumer prices and more environmentally benign modes of production. | Strong beneficial impact on the environment. |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| Point of impact: PROFITS AND NCOME | **Exemptions from (environmental) standards** | • The quantitative effect of removing the subsidy on profitability and variable and fixed costs.<br>• The effect of reduced profitability on the production volume of the sector.<br>• The environmental profiles of upstream and downstream economic activities. | Removing these exemptions obviously benefits the environment immediately by reducing the emissions or input use of the previously subsidised industries.<br>Moreover, the volume effects on production volumes in upstream and downstream industries will benefit the environment. | The same as above. | Higher consumer prices and more environmentally benign modes of production. | Same as above. |
| | **Start of an operation (e.g. lump sum)** | • The impact of subsidy removal on the opportunity cost of starting a new business.<br>• The environmental profiles of the activity and environmental conditions on site. | Reduce investment in that industry. | | | Effects on the environment depend on the local environment, the nature and scale of the operation subsidised. |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| | **Low rate of return requirements (e.g. typically for state owned utilities)** | • The effect of removing the low rates of return requirements on the internal discount rate of the firms. | Higher internal discount rates favour shorter-lived investments. As a result, new technologies will be deployed more rapidly (and reduce the lock-in effect). If environmental policy ensures that those new technologies are more environmentally benign, reducing the lock-in effect will benefit the environment. | Shift to less capital intensive (more flexible) technologies with higher rates of return. | Higher consumer prices and higher internal discount rates. The latter shortens the planning horizon of the "firm" and thereby the lock-in effect. | Depends on the environmental characteristics of alternative production processes available. |
| **Point of impact: Outside the firm** | | | | | | |
| **Point of impact: DEMAND** | **Preferential low VAT rates** | • The tax differential relative to sales prices.<br>• The effects of marketing promotion on sales volumes.<br>• The price elasticities of demand and supply. | Demand will decrease because of subsidy removal. Its effect on production and input volumes depend on the relevant price elasticities.<br>In the long run, the supply curve of the entire industry will be influenced by the occurrence of external effects and barriers to entry. | Decrease the demand of a product. | Undetermined, since dependent on externalities. | Some upstream effects might be expected. Depends on the supply curve elasticity. |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| | **Marketing and promotion provided by government below costs (e.g. marketing and product promotion)** | • Same as above. | Same as above. | Same as above. | Same as above. | Same as above. |
| | **Provisions of government produced infrastructure below cost** | • The quantitative effect of internalising the cost of infrastructure on demand.<br>• The price elasticity of supply.<br>• Geographical "hot spots" where infrastructure fall short or the use of infrastructure cause high emission levels or congestion or both. | In the long run, the supply curves of the industries that have benefited from the provision of infrastructure below costs (e.g., transport firms and those industries whose products are shipped) will be influenced by the occurrence of external effects and barriers to entry. Introducing full payment for infrastructure can increase exits from the industry. Possibly, the decrease in demand will not be sufficient to eliminate congestion or other signs of infrastructure shortfall, thereby reducing the environmental | Same as above. | More decentralised production close to the place of consumption; different technologies. | Depends also on site specific environmental conditions. |

| | Main initial point of impact | Crucial factors in determining environmental impacts of subsidy removal | Economic impacts of subsidy removal | Short term reduction in emissions or exploration rates due to: | Long term reduction in emissions or exploration rates due to: | Crucial factors |
|---|---|---|---|---|---|---|
| | | | benefits. | | | |

Source: Adapted from OECD 2005.

**ANNEXES 2-7**

- **Annex 2** includes case studies on the energy sector;
- **Annex 3** includes case studies on the transport sector;
- **Annex 4** contains the case study on the water sector;
- **Annex 5** contains calculations of the size of subsidies for the case studies;
- **Annex 6** includes the experts workshop proceedings; and
- **Annex 7** provides the long list of case studies assessed during the selection process.

Due to their size, these are presented as separate files.

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