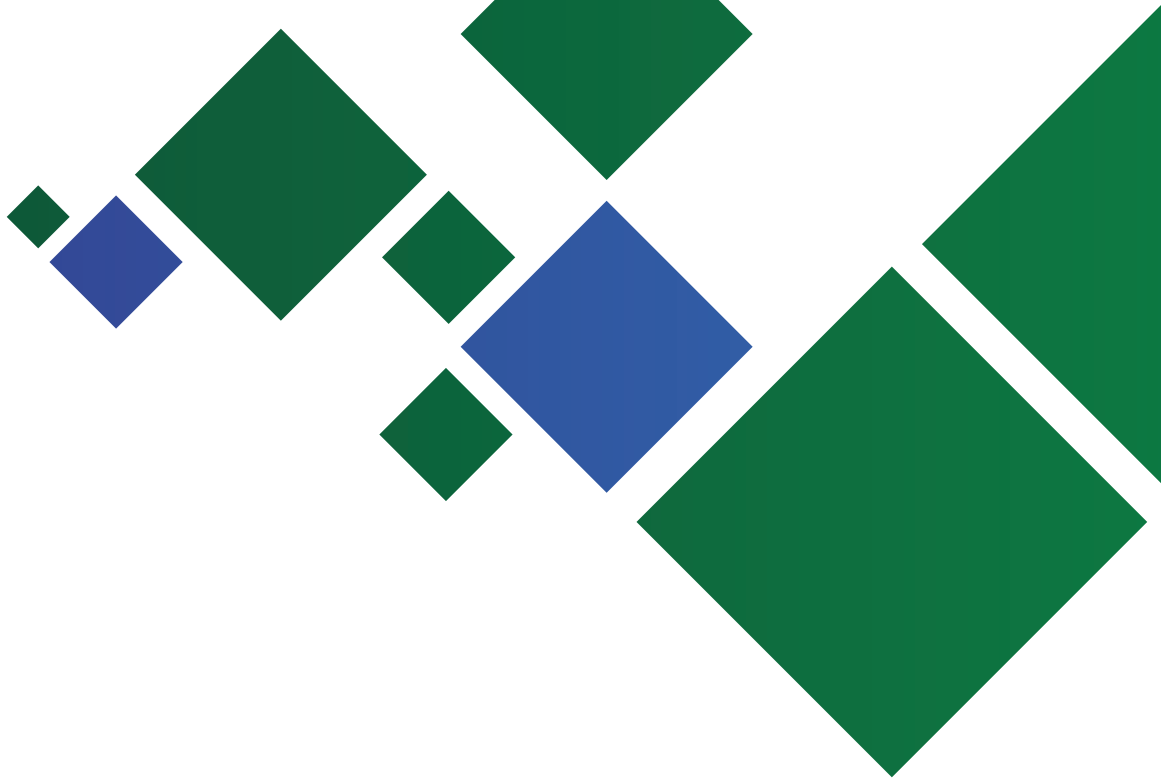




Market Based Instruments for Environmental Protection and Management



INTOSAI
Working Group
on Environmental
Auditing



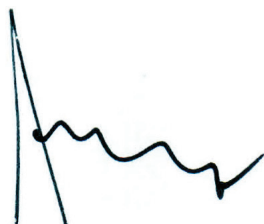
Foreword and Acknowledgements

This document, Market-based instruments for environmental protection and management, was prepared by the INTOSAI Working Group on Environmental Auditing (WGEA) under its remit to provide guidance materials and conduct research studies on emerging topics in environmental auditing to help Supreme Audit Institutions (SAIs) design and carry out environmental audit work.

The project topic is justified by the recommendations of international organisations like UNEP, OECD and others, also ISSAIs¹, which encourage the use of market-based tools in achieving sustainability and environmental objectives.

The research project was conducted under INTOSAI WGEA 2014–2016 work plan and approved by the Steering Committee.

The work to develop this paper was led by the National Audit Office of Estonia in cooperation with project subcommittee members from Bhutan, Brazil, Cameroon, Indonesia, New Zealand, the Netherlands, Senegal, and the United Kingdom. We would like to acknowledge the contribution made by INTOSAI WGEA and the members of Steering Committee and SAIs worldwide, especially those that gave us the cases to illustrate auditing of MBI in practice. Special thanks go to Dr Stefan Speck from the European Environmental Agency and Ms Jill Goldsmith for their contribution.



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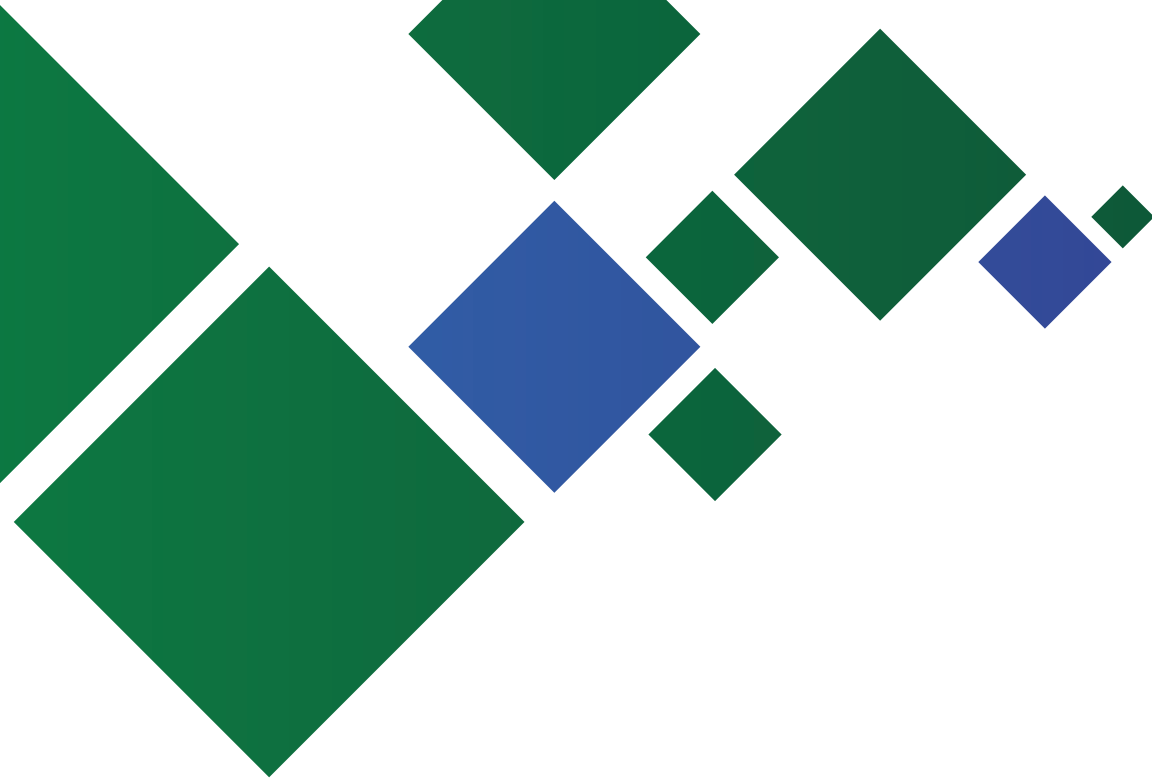
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¹ ISSAI 5130 – Sustainable Development: The Role of Supreme Audit Institutions (under revision).



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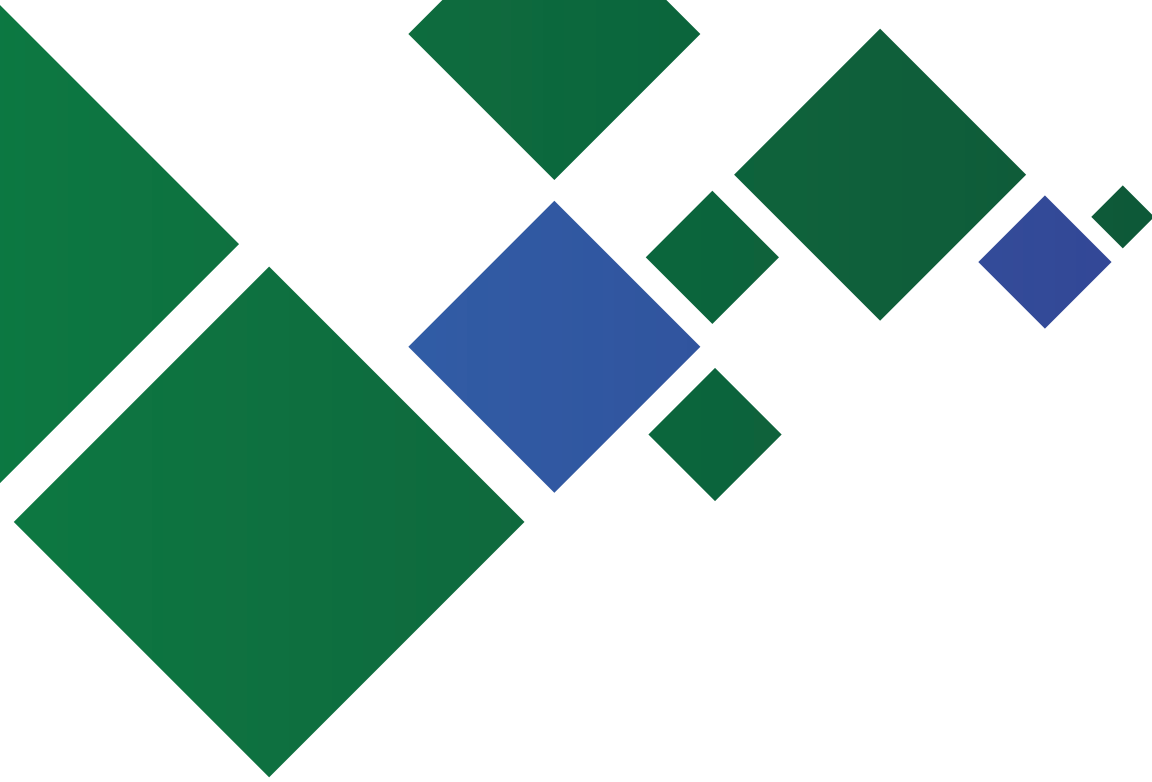


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Abbreviations and acronyms

BAT	Best Available Techniques
CBA	Cost-benefit Analysis
DRS	Deposit-refund System
EC	European Commission
ECA	European Court of Auditors
EEA	European Environmental Agency
EED	Energy Efficiency Directive
EHS	Environmentally Harmful Subsidies
EI	Economic Instrument
ET	Emissions Trading
ETR	Environmental Tax Reform
EU	European Union
EU ETS	European Union Emissions Trading System
EUROSAI	European Organisation of Supreme Audit Institutions
GDP	Gross Domestic Product
GMO	Genetically Modified Organism
GPP	Green Public Procurement
IEA	International Energy Agency
IEEP	Institute for European Environmental Policy



INTOSAI	International Organisation of Supreme Audit Institutions
INTOSAI WGEA	INTOSAI Working Group on Environmental Auditing
MBI	Market-based Instrument
NAO	National Audit Office
NOx	Mono-nitrogen Oxides
OECD	Organisation for Economic Co-operation and Development
PAYT	Pay-as-you-throw
PET	Polyethylene Terephthalate
RES	Renewable Energy Resources
SAI	Supreme Audit Institution
SOx	Sulphur Oxides
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WB	World Bank



Executive summary

PURPOSE OF THE PAPER

Governments need to choose policy instruments to implement their environmental policies and to achieve environmental goals. For that purpose they may use traditional command-and-control approaches, but they may also choose to use market-based instruments as a more efficient or more acceptable approach to meeting their objectives. In practice it is not about making a choice between regulatory and market-based instruments, but rather finding a good mix between these two approaches.

This paper gives a brief overview of market-based environmental policy instruments (MBIs) – what they are, why governments use them, and how they can help to achieve environmental objectives. The paper also discusses SAIs’ potential role in auditing MBIs and presents the experience of SAIs to date, providing an overview of opportunities and common risks and obstacles that auditors might need to consider in auditing MBIs.

This paper is not an exhaustive treatment of the subject. It is rather meant to serve as a useful source of information for SAIs who are unfamiliar with the concept of MBIs and their use in environmental protection and management. It is intended to provide useful information both for SAIs with less experience and for SAIs with more experience who want to extend their work in auditing MBIs.

It should be emphasised that MBIs as policy tools can be used in all environmental areas and are not dedicated to solve only certain environmental problem. The examples of using MBIs in different environmental areas are presented in this project paper, but also in other INTOSAI WGEA 2014–2016 work period project papers.²

² For example, “Research project on renewable energy” and “Guidance towards auditing waste management”.

SCOPE AND STRUCTURE

The term “market-based environmental policy instruments” (MBIs) is used to describe a very wide range of policy instruments. Their common characteristic is the use of market power and competition to achieve environmental objectives.

The introduction (chapter 1) discusses the need for governments to either directly or indirectly intervene in markets by explaining why they cannot rely on their economies to sufficiently address environmental priorities and risks. It lays out the reasons behind market failures and possibilities for governments to combat them.

Chapter 2 explains how the policy design circle works and what the policy tools available for combating market failures are. MBIs are positioned within the whole set of available policy instruments and the advantages and disadvantages of MBIs compared to regulatory instruments are explained.

In chapter 3, a closer insight into MBIs is given. The first part (sub-chapters 3.1-3.5) introduces in more detail the most commonly used MBIs: environmental taxes and charges, tradable permits, deposit refund systems, environmental subsidies and incentives and other market-based instruments, such as liability schemes, green public procurement and labelling schemes. This provides an overview of the situations in which these instruments can be used and the main concerns regarding each individual MBI. Chapter 3 also provides insights on instrument mixes, as individual instruments are seldom used separately, and elaborates ecological tax and fiscal reform which is not an instrument in itself but rather a broader approach to environmental taxation. Finally, an overview about MBIs which can be used in different environmental sectors/ areas is also provided in this chapter.

Chapter 4 focuses on auditing MBIs. First, recommendations are given for what to consider when auditing the use of MBIs. The recommendations are divided by the different stages– agenda setting, policy design, implementation and evaluation –in the policy circle in order to give auditors a better overview of what to look for in each concrete stage. The chapter also presents SAIs opinions on the opportunities and possible risks in auditing MBIs.

Finally, in order to illustrate the above-mentioned concerns that auditors might have when auditing MBIs, 11 cases are presented in appendix 2. They present how MBIs are used, what the main issues are and, most importantly, provide a guide as to how MBIs can be audited.

METHODOLOGY

This paper has been prepared following a wide-ranging literature review. It provides references in the text to the main sources used, in particular reports and articles produced by the OECD, United Nations Environmental Programme (UNEP), European Environmental Agency (EEA), World Bank (WB) and leading experts and scientists in this area. A bibliography is provided in appendix 3.

Chapter 4 is compiled mainly from information collected from SAs via an INTOSAI WGEA mini-survey, INTOSAI WGEA and EUROSAs WGEA meetings/seminars, questionnaires and direct contacts.

1. Introduction

Human impact can damage the environment and result in the overuse of natural resources, which market economies may not be able to prevent. Market economies are considered to operate efficiently but can fail to reflect all the values of their societies. Competitive markets can provide significant benefits for consumers and producers through greater choice, lower prices and better quality goods and services. Competition can provide strong incentives for firms to be more efficient and innovative, thereby helping raise productivity growth across the economy. However, markets on their own can fail to deliver the best outcomes for the environment and human health.

Governments' environmental policies focus on reducing negative impacts on things we value, such as good health or the 'clean and green' environment, and also on incentivising alternative actions which conserve or positively improve the environment, such as land management to improve water storage potential. Environmental policies aim to achieve their objectives by increasing costs to those who pollute or cause environmental damage, curbing polluting behaviour, supporting investments and inducing innovation in less environmentally harmful technologies and so forth.³

3 OECD (2014)

Market failure and externalities

There are two main reasons why governments need to make environmental policy and “intervene” in markets:⁴

- to achieve wider policy objectives (e.g. changing producer/consumer behaviour); and
- to overcome market failures (e.g. costs related to pollution, which are not covered by polluters).

Market failure is the failure to take into account external effects (externalities), the undersupply of public goods, non-competitive markets and imperfect information.⁵

Externalities refer to situations when the production or consumption of goods and services imposes costs or benefits on others which are not reflected in the prices charged for the goods and services being provided.⁶ Externalities can be positive (e.g. an individual or firm provides benefits for which it is not compensated) or negative (the costs arising for society which are not covered by the producer or consumer of a good or service).

Examples of positive externalities include:

- Bees kept for their honey pollinate the surrounding crops, thus enabling fertilization and reproduction of the crops
- Land kept in agricultural use provides habitats for birds and other animals and scenic value.

Examples of negative externalities include:

- Air pollution from burning fossil fuels. Air pollution causes damage, e.g. to public health and buildings.
- Climate change as a consequence of greenhouse gas emissions from burning oil, gas, and coal. Climatic change affects weather patterns, affecting agriculture and requiring investment to adapt buildings and lifestyles.
- Water pollution by industries harms the natural resources for plants, animals and humans. Water pollution also affects the cost of providing clean drinking water.
- Health problems caused by toxic ingredients.

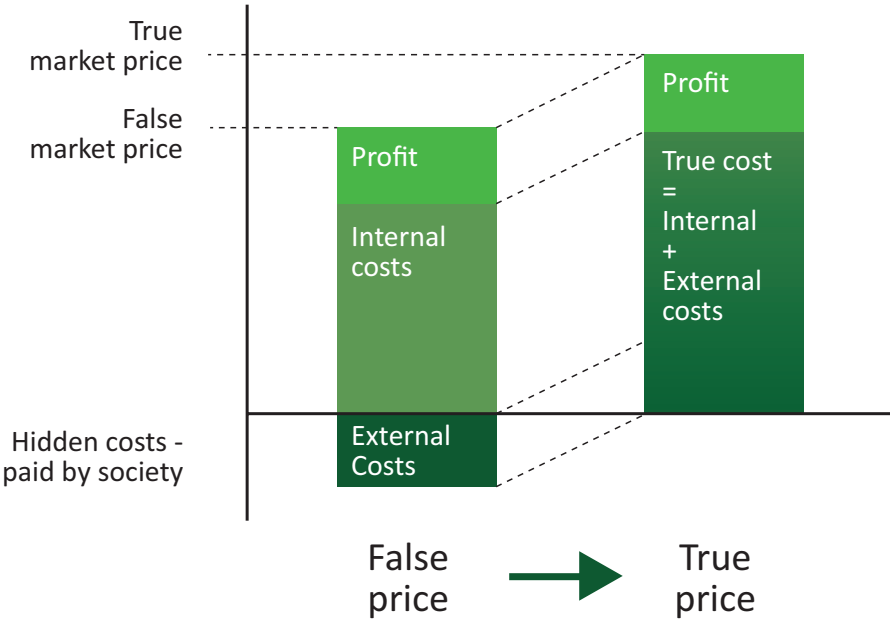
4 Sterner (2003)

5 Braathen (2015)

6 OECD Glossary of statistical terms. <https://stats.oecd.org/glossary/> (June 2015)

Externalities are a loss or gain in the welfare of one party resulting from an activity of another party, without there being any compensation for the losing party, i.e. where the polluter does not pay. Internalization of these “hidden costs” into the price of goods should provide true market price without imposing extra costs for the society (so called social costs). True market price or covering the social costs can be illustrated with the following formula and figure 1:

Figure 1. True market price formulation (externalities)



Social costs = private costs (internal costs: labour, raw materials, machinery, energy, etc.) + external (environmental) costs

“Climate change presents a unique challenge for economics: it is the greatest example of market failure we have ever seen.”
 Stern Review: The Economics of Climate Change⁷

⁷ Stern (2006)

Under-supply of public goods - Public goods are those that if made available to one person, automatically become available to others (e.g. clean air, flood control). The private market tends to undersupply these goods since it is difficult to charge people for benefitting from these goods or services once they are provided. Therefore government intervention is needed to secure these goods.

Non-competitive markets, monopolies or oligopolies are often obstacles to the optimal supply/consumption of goods. Monopolies can lead to under-production and higher prices than would exist under conditions of competition, causing consumer welfare to be damaged. Examples affecting environmental issues are the natural monopolies collecting and providing water; and the oligopoly power of large supermarkets which may impact negatively on their supply chain or act to keep smaller competitors out of the market and hence restrict the supply of goods and services and increase their price.

Imperfect information (also called asymmetric information) is the situation where there is a lack or unequal distribution of information which stops the market from operating perfectly. For example, if information is not available to consumers they cannot understand true lifetime costs of goods and services they cannot take that into account.

Overall, market failures, such as (negative) externalities, do not meet the polluter pays principle⁸ and may cause costs for the whole society. Therefore the intervention of governments into markets is generally accepted.

⁸ The polluter-pays principle is the principle according to which the polluter should bear the cost of measures to reduce pollution according to the extent of either the damage done to society or the exceeding of an acceptable level (standard) of pollution (UN 1997)

How governments intervene in markets?

Governments play an important role in setting up legal and institutional framework within which markets can operate and use their role to intervene in markets to overcome market failures and/or to achieve wider policy objectives, including environmental ones. Governments can influence markets through direct as well as indirect participation:⁹

Direct participation is where government acts as a provider or as a buyer (procurer) of goods and services. As a large buyer, a government can use its buyer power to encourage supply of new, environmentally friendly technologies. There can be a cost from the use of buying power to support the development of particular requirements for goods or services and the benefits need to be weighed against this cost compared to the cost from economies of scale across markets.

Indirect participation is where government introduces command-and-control regulations or market-based instruments, such as taxes, subsidies and trading schemes to influence producers and/or consumers in the market. Regulations to stipulate certain requirements or limit actions play an important role in helping markets function effectively, including supporting wider policy goals, but they can also distort competition. Market-based approaches can be an effective alternative to regulations (see chapter 2.3). Subsidies and taxes can influence the incentives and behaviour of private sector producers in existing markets, for example to act in more environmentally friendly way. However, they can also create entry barriers in a market or constitute state aid¹⁰. In this case, the government should make sure that the benefit of giving aid outweighs the potential costs of distorting competition.

Alternatively, governments can create an additional market, where the consumption or production of goods or services is encouraged or discouraged, for example, by using an emissions trading scheme. Rather than intervening through regulation or taxation of emissions, the policy aim of reducing the emissions' harm to society can be achieved by establishing a market for tradable permits. Tradable permits for emissions allow a competitive market to determine the price producers need to pay for the permits, and should ensure that the pollution is reduced in the most effective way.

⁹ OFT (2009)

¹⁰ State aid is defined as an advantage in any form whatsoever conferred on a selective basis to undertakings by national public authorities. Despite the general prohibition of state aid, in some circumstances government interventions is necessary for a well-functioning and equitable economy (European Commission, DG competition)

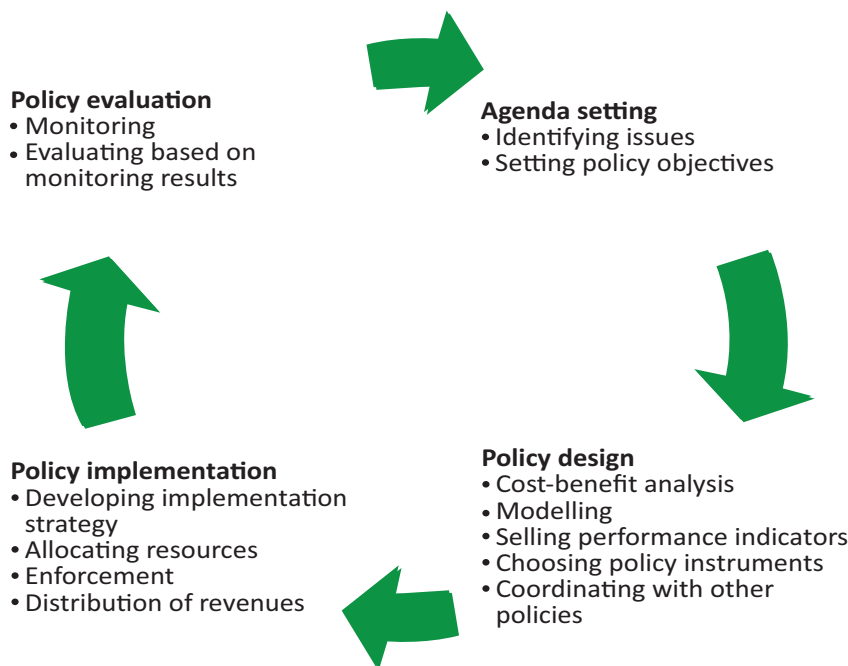


2. Environmental policy design and the instruments

As mentioned in the previous chapter, governments need to take action and find the ways to achieve environmental objectives and to overcome market failures. To do so, governments need to implement environmental policies and choose suitable instruments to achieve the policy objectives.

Governments can be expected to follow a policy design cycle (figure 2) to determine and review their best approach for securing their environmental objectives. The cycle starts by identifying the issues that need to be addressed, continues with policy design, implementation and enforcement, and is completed with policy evaluation. It is a good practice to involve different stakeholders and interest groups in this process, to ensure that policies are built on a strong understanding of the issue and related behaviours, and to gain acceptance for the adopted policy to secure the best results.

Figure 2. Policy design circle



2.1 ENVIRONMENTAL POLICY INSTRUMENTS

Governments can use a range of environmental policy instruments to implement their environmental policies and deliver their commitments to international environmental agreements. Environmental policy instruments can roughly be divided into three broad categories:¹¹

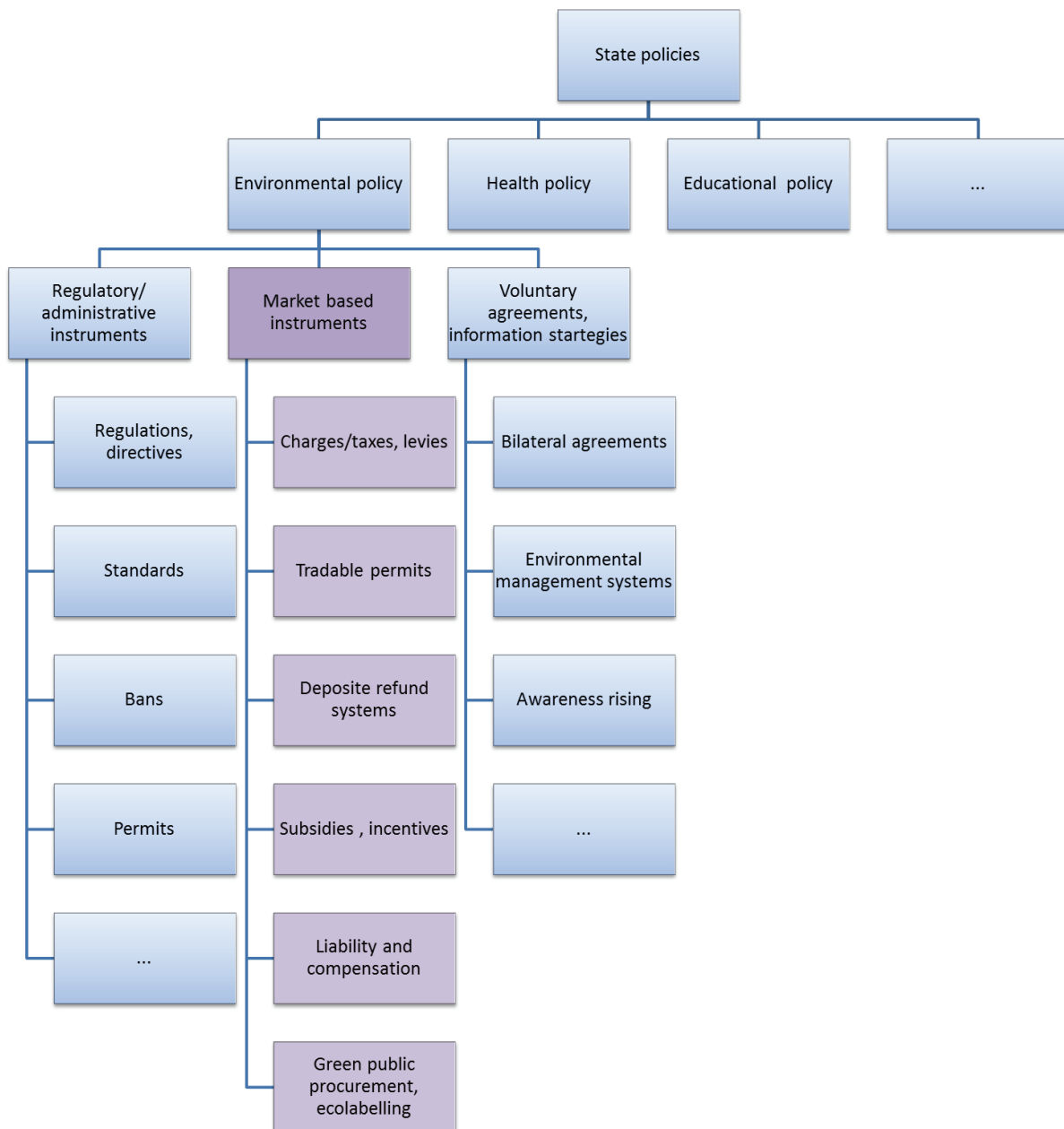
- 1. Regulatory/administrative instruments** (so called “command-and-control”). These are regulations, directives, bans, permits, etc., which are prescriptive and provide the private sector with relatively little flexibility in achieving their goals.
- 2. Market-based instruments** (MBIs) are taxes, charges, levies, tradable permit schemes, deposit refund systems, subsidies etc. These instruments can be used to provide producers and consumers with incentives to change their behaviour towards more efficient use of natural resources by reducing consumption, and to look for more effective ways of making environmental progress while giving them flexibility in how they do so (see chapter 3).

Market-based instruments can be implemented in a systematic manner, across an economy or region, across economic sectors, or by environmental medium (e.g. water).

¹¹ EEA (2006)

3. Voluntary agreements and information strategies/ moral suasion. These are voluntary environmental measures independent of government requirement, such as bilateral agreements between the government and private firms and voluntary commitments made by firms, e.g. implementation of environmental management systems, publishing environmental reports. Voluntary changes in behaviour could be accomplished also via education, transfer of knowledge, training, persuasion, etc.

Figure 3. Classification of environmental policy instruments (based on EEA 2005a)



2.2 WHAT ARE MARKET-BASED ENVIRONMENTAL POLICY INSTRUMENTS (MBIS)?

Market-based instruments (MBIs), also referred to as “market-based economic instruments” or “economic instruments” (EIs),¹² are tools for governments to implement environmental policy. These tools “affect estimates of the costs and benefits of alternative actions open to economic agents”.¹³ Or, to put it more simply, if a tool affects the cost or price of goods and services in the market, then it is a market-based economic instrument. This definition focuses on the economic signals and incentives the instrument provides. If it changes the cost or price of a good (e.g., plastic bag), service (e.g., waste collection), activity (e.g., waste dumping), input (e.g., materials), or output (e.g., pollution) then it is a market-based instrument.¹⁴

How do they work?

MBIs help to assign “the right price” to resources that are not otherwise appropriately valued in the market, such as water, clean air, ecosystem services, biodiversity, and marine resources.¹⁵ “Getting the price right” means that it properly reflects the resource cost or cost of the pollution impacts and reflects the principle of “full-cost recovery” or the “user pays principle.”¹⁶ This provides producers and consumers with incentives to **change their behaviours** and look for more effective ways of making environmental progress, while giving them flexibility in how they do so. Some MBIs through raising prices also result in **revenue-raising**.

Price based instruments (taxes/charges, subsidies, deposit refund systems, feed-in-tariffs, etc) are used to lever behavioural change by changing prices in existing markets. **Quantity based** instruments (tradable permits/emissions trading schemes) influence behavioural change by specifying the ‘amount’ of new rights/obligations and allowing the market to set their price.

Whether by influencing prices (through taxation or incentives), or setting absolute quantities (emissions trading), or quantities per unit of output (emission charges), MBIs implicitly acknowledge that firms differ from each other and therefore provide **flexibility** that can substantially reduce the costs of environmental improvements.¹⁷ In theory, if properly designed and implemented, market-based instruments will allow any desired level of pollution clean up to be realized at the lowest overall cost to society, by providing incentives for the greatest reductions in pollution by those firms that can achieve these reductions most cheaply.¹⁸

12 UNEP (2009)

13 OECD (1994)

14 UNEP (2009)

15 ECORYS (2011)

16 UNEP (2009)

17 EC (2000)

18 Stavins (1997)

Main principles in using MBIs

- Environmental effectiveness

The most important point to underline is that any environmentally related MBI should cause change in consumption or production pattern which will lead to reduce environmental burden. If an instrument fails to do that, it should be considered whether to change or even abandon the instrument.

- Economic efficiency

One of the advantages of MBIs is their effectiveness on every unit of pollution. Taxes encourage both static (abatement at the lowest-cost source) and dynamic (continuous reduction of pollution abatement costs and pollution levels) efficiency gains.

- Equity / income distribution

Policy makers need to consider the impact of such taxes also on sensitive groups such as low-income households or pollution-intensive, trade-exposed businesses. Lower tax rates or exemptions are sometimes put into place to limit impacts on such groups. Generally it is advised not to make exemptions into tax system itself, but rather use other policy instrument to overcome the distributional problems.

- Competitiveness

The aim of economic instruments (especially taxes) is to make activities with higher environmental impact less profitable in an economic sense. It means that, at the *enterprise* level, there are always companies that are better off than others – those who pollute less or are more efficient in their resource use. The competitiveness issue rises more sharply at a *sector* or *national* level, where taxes or tradable allowance schemes imposed may have a negative impact on international competitiveness (if the instrument is implemented only at local/national level).

- Acceptance, stakeholder involvement

The acceptance of environmental taxes is in good correlation with awareness about environmental problems in society. Opposition to environmental taxes may be caused by not enough information about the purpose of the tax, little trust of assurances in how the revenue is used, fear of loss of competitiveness or other reasons. Well-designed taxes are highly transparent in terms of their coverage and costs. It should be clear what is taxed, which polluters are exempt, and what the cost to polluters will be per unit of pollution generated.

An evaluation should take place to assess which groups are most powerful, and what their primary goal is. Allocation of rights in the baseline is also quite important: groups with existing rights, whether actual or implied, will often have more power/interest in fighting changes to existing policies. The factional analysis should also assess what options exist for buffering any social impacts that may occur from the policy reform, especially those that affect the poor.¹⁹

19 UNEP (2004), OECD (2011b)

2.3 HOW DO MBIS COMPARE WITH REGULATORY INSTRUMENTS?

As set out above, using MBIs to achieve environmental goals can be cost-efficient.²⁰ MBIs improve price signals so that producers and consumers can properly take them into account and are incentivised to reduce negative - and increase positive - environmental and other impacts. Regulatory instruments require **detailed information** on regulated industries and industrial technologies in order to set standards. Command-and-control tools often require sophisticated regulatory **compliance staff**. By comparison, with MBIs the government can avoid the need for detailed information if the market sets prices, for example for tradable permits. In some cases, MBIs can help substitute for weak institutions in circumstances where the parties who buy rights monitor cheating on a decentralized level - so long as sanctions can be taken against cheaters once detected.²¹ In short, compared to regulatory instruments, market-based instruments may offer the following advantages:

- They improve **price signals**, by giving a value to the external costs and benefits of economic activities, so that economic actors take them into account and change their behaviour to reduce negative – and increase positive - environmental and other impacts.²²
- They allow industries to have greater **flexibility** in meeting objectives and thus lower overall compliance costs.²³

Homogenous taxes encourage abatement at the lowest-cost source, helping to ensure that environmental goals are achieved at the **lowest social cost** (“static efficiency”). Different firms face different pollution abatement costs. By implementing a tax on emissions, for example, it will pay certain firms more than others to cut back on emissions. This lowest-cost solution is unlikely to be achieved if a uniform environmental standard was applied to every individual polluter.

In contrast to regulatory instruments, the use of MBIs gives polluters (firms) an incentive to go further and **reduce pollution more** than required by environmental authorities. In the longer term, polluters may pursue **technological innovation** to reduce further adverse impacts on the environment (“dynamic efficiency”).

MBIs generate revenues which could be used for different reasons, such as providing **support for innovation or reducing other taxes** to support employment, i.e. when used in the context of environmental tax or fiscal reform.²⁴

20 Fullerton et al (2010)

21 UNEP (2004)

22 This idea is often expressed by objectives such as “getting the prices right”, “internalisation of external costs”, “expanding the supply of non-marketed environmental services”.

23 Cf. EEA, Effectiveness of urban wastewater treatment policies in selected countries: an EEA pilot study, 2005. The study compares approaches between several MS and demonstrates how the use of market-based instruments will help meet environmental objectives at lower costs.

24 Cf. Commission Communication “European values in the globalised world” - COM(2005) 525, 20.10.2005. Have a look on chapter 3.7

Efficiency of MBIs

Empirical studies in the United States (US) show that the efficiency gains associated with using economic instruments rather than command-and-control have been substantial. Tietenberg suggests that approaches to regulate air pollution were as much as 22 times as expensive as the least-cost, market oriented alternative. For the eleven applications studied, command-and-control approaches were on average six times as expensive. Anderson et al. estimated that as of 1992, economic instruments for air, water, and land pollution within the US had saved more than US\$ 11 billion relative to a command-and-control baseline.²⁵

Main concerns about using MBIs

However, although there are many successful examples of using MBIs, there are studies indicating that MBIs are not always the best instruments for achieving change in behaviour.²⁶ There are various reasons or situations where MBIs may not succeed and regulatory and other instruments might be more successful in achieving the objectives:

Emergency conditions. When problems have severe implications, emergency conditions arise, and behaviour needs to stop immediately, direct bans may be more appropriate.

Excessive monitoring costs. When there are a large number of very small transactions (e.g., emissions trades) monitoring costs may be very high so regulations may be a better fit.

Fragmented authorities. Where authority to set and enforce regulations is highly fragmented across institutions, oversight of market-based instruments might become quite difficult.

Equity/distributional issues. Increasing prices to cover their full resource cost will impact on consumer groups where they cannot switch to alternative goods and services, and this may be of concern where they are sensitive groups such as low-income households.

Illegal activities. MBIs can encourage cost-avoiding damaging activities, such as illegal waste dumping.

Strong opposition. Where political power and interest group factions remain strong, policy makers need to judge the most prudent course.

High level of dislocation. Where large numbers of people will be displaced or unemployed as a result of MBIs, caution is required.

²⁵ UNEP (2004)

²⁶ UNEP (2004), Fullerton et al(2010)

No ability to make transitional payments to affected sectors.

From an economic perspective, it is more efficient to remove broad-based subsidies and replace them with direct payments to the poor. Examples include transitional subsidies to water, energy, and foodstuffs for the poor segment of society. However, in corrupt societies, the transfer payments to the poor are unlikely to actually occur. Thus, monitoring and enforcement are essential to avoid widespread hardship or social unrest.

International competitiveness. Taxes on industrial inputs increase the costs of production. If the domestic production competes with the foreign producers (without the tax) then it may harm the competitiveness of domestic firms.

The advantages and disadvantages of the individual types of MBIs are addressed further in chapter 3 below.



3. Main types of MBIs

MBIs can be classified in different ways, for example, according to their sector of implementation (e.g. transport, energy) or by environmental medium (e.g. water, air). Alternatively, the European Environmental Agency (EEA) has classified MBIs into five main types based on their aim and functioning:²⁷

1. Environmental taxes (also environmentally related taxes) that have been designed to change prices and thus the behaviour of producers and consumers, as well as raise revenues.
2. Environmental charges that have been designed to cover (in part or in full) the costs of environmental services and abatement measures such as waste water treatment and waste disposal.
3. Tradable permits that have been designed to achieve reductions in pollution (such as emissions of CO₂) or use of resources (such as fish quotas) in the most effective way through the provision of market incentives to trade.
4. Environmental subsidies and incentives that have been designed to stimulate development of new technologies, to help create new markets for environmental goods and services including technologies, to encourage changes in consumer behaviour, and to temporarily support achieving higher levels of environmental protection by companies.
5. Liability and compensation schemes that aim at ensuring adequate compensation for any damages resulting from dangerous activities to the environment and provide for means of prevention and reinstatement.

²⁷ EEA (2005a)

3.1 ENVIRONMENTAL TAXES AND CHARGES

The most common MBIs in use are environmental (or environmentally related, green) taxes and charges. *Taxes* are generally considered to be unrequited payments to (usually) national or regional governments with no individual counterpart service received in exchange for the payment. *Charges*, on the other hand, are typically payments made in exchange for a service, with the charges usually levied in proportion to the quantum of service received, and so the terms ‘user charges’, or ‘cost recovery charges’ are often used in this context.²⁸ Environmental taxes and charges can be based on emissions, inputs and outputs.²⁹

Environmental taxes include all environment-related taxes, excises and state fees which are recorded as taxes in national accounts. The base of an environmental tax is a physical unit (or a proxy of it) of something that has a proven specific negative impact on the environment – pollutants or on goods, the use of which produces such pollutants.³⁰ By seeking to reduce polluting behaviour, environmental taxes by definition are intended to alter production decisions and to have a disproportionate impact on polluters.³¹ Accordingly, environmental taxes can be either explicit (taxes directly on emissions) or implicit (taxes on inputs or related goods).

Economic theory suggests that direct taxes on polluting emissions will reduce environmental harm in the least costly manner, because they give polluters an incentive to reduce their pollution up to the point where further reduction would cost more than paying the tax, and to do so in the least costly way.³² It can provide incentives for innovation.

A market-based tax places no cap on pollution allowed - the amount by which producers reduce their pollution depends on the chosen tax rate.

Taxes present a good option to manage pollution from diffuse sources, where regulatory measures may be more complex to implement and enforce (e.g. taxes on fertilizers or car emissions). Taxes/charges raise revenues that may be used for other purposes, including environmental improvement schemes. This can increase the overall benefit from the tax and revenue policy package.

The acceptance of environmental taxes is in good correlation with awareness about environmental problems in society. Opposition to environmental taxes may be caused by not enough information about the purpose of the tax, little trust in assurances of how the revenue is used, fear of loss of competitiveness or other reasons. Well-designed taxes should be highly transparent in terms of their coverage and costs. It should be clear what is taxed, which polluters are exempt, and what the cost to polluters will be per unit of pollution generated.

28 Hogg et al (2014)

29 Eftec (2004)

30 OECD (1997)

31 OECD (2011a)

32 TPC (2007)

One instrument used in relation to natural resources is **royalty**. A royalty is a payment made by one party (e.g. private company) to another (e.g. the state) that owns a particular asset (mineral resources, oil) for the right to ongoing use of that asset. Royalty is based on either the *volume* or *value* of the production (often expressed as a percentage of the revenues obtained or a fixed price per unit sold).

Royalty is not considered to be an environmental policy instrument, because its aim is not to internalise the externalities, change the behaviour of producers or reduce the resource use. It is designed to compensate the owner for the asset's use. However, explicitly royalties may influence the use of natural resources.

Main concerns related to environmental taxes

Finding the **proper level of taxation** is critical to the effectiveness of the instrument because it is difficult to anticipate exactly how much pollution reduction will result from any given tax.³³ Policy makers can be expected to fully explore the factors that are likely to determine the effectiveness of the tax, and consider the potential need to be flexible and ready to make changes in the design of the tax, should the circumstances change. For example increasing commodity prices could result in reducing the case for taxes to raise the price.

Taxes and charges provide clear cost signals, but are less effective in guaranteeing a given environmental outcome and hence ensuring that **targets are met** or that an immediate reduction is secured to address a crisis situation.

Taxes, such as carbon pricing, are a clear illustration of the risk for MBIs to bring **competitive disadvantage**³⁴ and losing market shares against competitors that do not face a carbon price.³⁵ Industries that are subject to a climate policy have the potential to move their production to countries without such taxation, reducing the employment opportunities and the economic output within the acting country. Opposition to increased environmental taxes often focuses on concerns that firms **might relocate and/or people might lose their jobs**.

The introduction of some taxes (e.g. carbon tax) can have a **regressive impact**, as low-income households tend to spend a higher share of their income on energy bills and energy intensive goods. In the end, however, the final distributional impact of carbon pricing depends on the government's allocation of the revenues raised or expenditures saved through the carbon pricing mechanisms.³⁶

Introducing a tax establishes a conflict between objectives: **less pollution means less revenue**. This means that evaluation of the tax needs to be undertaken against its direct objectives but also in the context of the wider tax and spend policy as a whole, as part of **environmental tax reform**.

³³ Hatch (2005)

³⁴ There are many other factors influencing competitiveness, such as skills, infrastructure, proper functioning of institutions, etc.

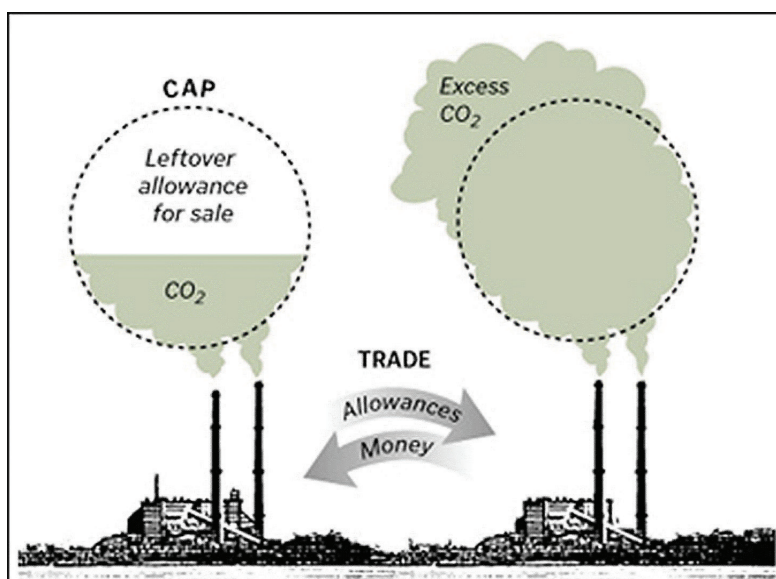
³⁵ Greene (2013)

³⁶ Greene (2013)

3.2 TRADABLE PERMITS

Market-based tradable (also transferable) permits or cap-and-trade schemes set a limit on access to a resource (the cap) and then allocate it among the users in the form of permits.³⁷ Under a tradable permit system, an allowable overall level of pollution or use of resource is established and allocated among firms in the form of permits. Firms that keep their emission levels or resource use below their allotted level may sell their surplus permits to other firms or use them to offset excess emissions in other parts of their business (figure 4).³⁸

Figure 4. Emissions trading



Tradable permits have been designed to achieve reduction in pollution or use of resources in the most effective way through the provision of market incentives to trade.³⁹ With tradable permits it is likely to achieve a maximum set level (a cap) at a lower cost than other means, and, importantly, may reduce below that level due to technological innovation.

The most common forms of tradable permits are: emissions trading on air pollutants (e.g. EU ETS), emissions trading on water quality (nutrients discharges to water courses), resource use allowances (e.g. fishing quotas, animal allowances), etc.

37 Tietenberg (2003)

38 Stavins (2001)

39 EEA (2005a)

In theory, different tradable permit systems are analogous. However, there may be important differences in practice between, for example, pollution permits markets and fishing quota markets. For instance, controlling and forecasting emissions from a power plant is arguably easier than predicting both the level of catch on any trip and its composition. This is especially true in multi-species fisheries where fish populations cannot be directly targeted without incidental catch of other stocks.⁴⁰

Where regulators have a good sense of the point at which emissions causing health problems or ecosystems begin to fray, tradable permits are often the best choice. Caps can be set in advance, either based on:

- **absolute values** (e.g., tons of salmon that can be caught or emissions emitted) or
- **relative values** (e.g., percent of total allowable catch or emission).⁴¹

Another important aspect of tradable permits is whether they are auctioned or allocated via free allocation/ grandfathering. There are three main modes of allocating allowances:

- competitive auctioning
- free allocation proportionate to sources' past emission levels
- free allocation subjected to regular update based on activity levels.

Full auctioning is the most economically efficient approach as it generates budget revenues that can, for example, be used to offset other distortionary taxes and assist with transitional costs. However, some level of free allocation is common practice when trading systems have been introduced. This is generally done to lower direct financial cost and alleviate concerns about international competitiveness. Within the same system, more than one allocation mechanism can be applied, sometimes differentiated across sectors.⁴²

Main concerns related to tradable permits

Emissions trading (ET) offers a dynamic incentive and can help ensure that a given target is met, if combined with appropriate allocation of emission allowances. The price of allowances is, however, **uncertain and determined by the market**. Therefore the costs of pollution abatement are uncertain, and excessive costs could be occurred.⁴³

ET can lead to significant **additional administrative** tasks and burdens and greater needs for monitoring, verification and enforcement, the costs of which need to be taken into account in any consideration of whether ET schemes are the sensible solution.

40 Newell et al(2002)

41 UNEP (2004)

42 OECD (2013)

43 Fullerton et al(2010)

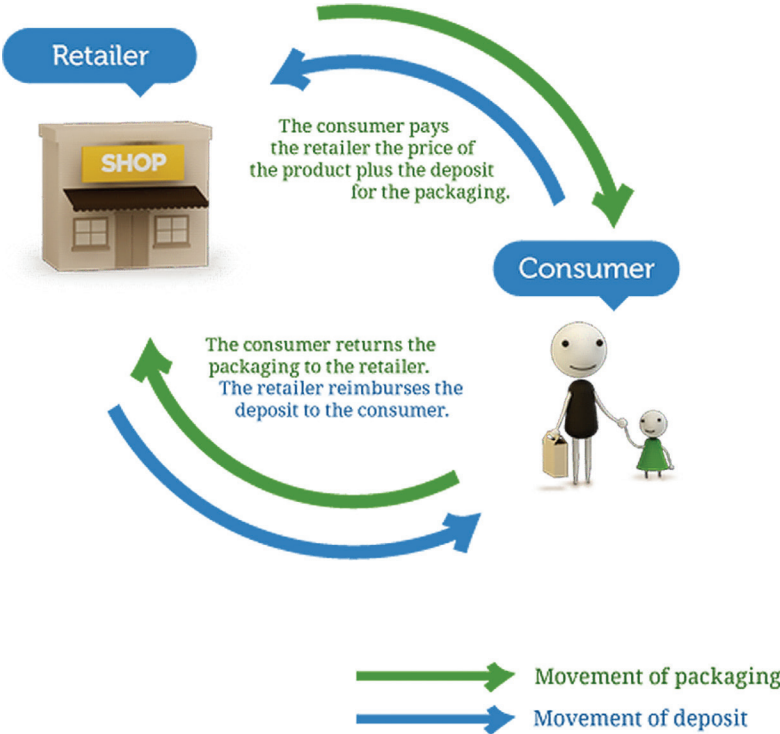
An argument against permits is that formalising emission rights is effectively giving people a **license to pollute**, and this can be considered to be **socially unacceptable**.

When using a transferable-permit system, it is very important to accurately measure the initial problem and also how it changes over time. This is because **it can be expensive to make adjustments** (either in terms of compensation or through undermining the property rights of the permits).⁴⁴

3.3 DEPOSIT REFUND SYSTEMS

A deposit-refund system (DRS), or advance deposit fee, is a surcharge on a product when purchased and a rebate when it is returned. Deposit-refund schemes require paying a deposit on the purchase of potentially polluting products, which is refunded when the products or their residues are returned for recycling or disposal (see figure 5). While most commonly used with beverage containers (packaging) it can be used on other materials including liquid and gaseous wastes. Deposit-refund systems are used on products such as batteries, tires, automotive oil, consumer electronics, shipping pallets etc.

Figure 5. Deposit refund system for packaging (from consumer’s perspective)



Source: Eesti Pandipakend

44 OECD (2008)

Deposit-refund systems aim to give a financial incentive for consumers to return the product or the waste back to retailers or producers for reuse, recycling or disposal. Deposit-refund systems can be voluntary or mandated by legislation.

The deposit refund system can have particular design features to increase the incentive effect or adjust the cost burden. For example if the refund is lower than the deposit, the difference can be a “handling fee” which is passed to the recycler to make the recycling more economic (as in the Swedish return system for aluminium cans and PET bottles). If the deposit return is higher than the deposit this can increase the incentive to return the item and reduce consumer resistance to the scheme where there is a long period between paying the deposit and receiving the refund (as in the earlier deposit-refund scheme for car hulks in Sweden).⁴⁵

Main concerns related to deposit refund systems

Deposit-refund systems are considered to be more cost-effective than other methods of reducing waste disposal (such as regulations, subsidies), but the relatively **high administrative costs** of a deposit system could outweigh these cost savings.⁴⁶

If the DRS is implemented in one region or country and the product is subject to export (e.g. beverages) then domestic producers might have a **competitive disadvantage** compared to foreign producers.⁴⁷

3.4 ENVIRONMENTAL SUBSIDIES

The OECD broadly defines a subsidy as “any measure that keeps prices for consumers below market levels, or for producers above market levels, or that reduces costs for consumers and producers”.⁴⁸ Subsidies can come in the form of:

- direct grants, transfers of funds that are clearly visible in some countries’ budgets (i.e. **on-budget** subsidies);
- tax exemptions (which are generally less visible on government accounts, but can be calculated, so called **off-budget**);
- other types that are less evident as subsidies: for example accelerated depreciation of environmentally preferable capital assets;⁴⁹ and less than full-cost recovery pricing with resources costs/the costs of externalities not borne by the producer and not covered by the price of their goods or services.

Beyond this there are other subsidies that are not always recognised as such: for instance, where prices for goods and services, such as water supply, do not reflect the full costs of provision (i.e. not full cost recovery pricing), or do not reflect the resource costs. A

45 EEA (2005a)

46 Palmer&Walls (1997)

47 Hogg et al(2010)

48 OECD (1998)

49 IEEP (2007), OECD (2014)

further important category is where there is no internalisation of externalities such as environmental damage (i.e. not following the polluter pays principle).

Subsidies have traditionally been used for economic or social reasons, for example to support ailing industries, to help develop vital infrastructure or to protect domestic producers from overseas competition. They can be seen as a way of protecting jobs, either generally or in specific regions, for example support for fishermen to protect coastal fishing communities. The use of subsidies for environmental purposes, however, is more recent, but they are nowadays widely used by government to achieve environmental objectives to **encourage more environmentally beneficial behaviour** (e.g. introduction of better technologies).

Some subsidies are **environmentally harmful**. These are the subsidies/tax exemptions etc. which confer an advantage on certain consumers, users or producers, in order to supplement their income or lower their costs, but in doing so, discriminate against sound environmental practice.⁵⁰

Subsidies are present in all sectors of the economy. The most common areas where subsidies exist include energy and transport.⁵¹

Main concerns related to subsidies

Some subsidies are inefficient use of government resources – notably where the original rationale for the subsidy is no longer applicable.

Some subsidies create environmental burdens – e.g. pollution and climate effect; excessive resource use; or other impacts such as on fisheries stock viability, biodiversity, etc.

Environmentally harmful subsidies (EHS) lead to inefficient working of the internal market, and overall impacts on competitiveness.

EHS can hinder innovation by locking in old technologies and locking out new ones and hence undermining the needed innovation developments for a competitive and environmentally-sustainable economy.

Important targets will not be met or be difficult to meet without reforming subsidies – notably meeting CO₂ reduction targets.⁵²

“Costs” of environmentally harmful subsidies

The scale of subsidies with potential negative impact on the environment, notably in the areas of fossil fuels, transport and water, are estimated to be worth a global total of USD 1 trillion. These subsidies lead to higher levels of waste, emissions, resource extraction, or negative impact on biodiversity.⁵³

50 OECD (2005)

51 EEA (2005a; 101-103)

52 IEEP (2007)

53 EC (2011)

3.5 OTHER INSTRUMENTS

Liability and compensation schemes

Liability and compensation have not typically been regarded as market-based instruments. However, they do have some potentials to produce a number of economic impacts and to affect the market, and they can therefore be classed as economic or market-based instruments.

In the context of damage to the environment, the development and enforcement of liability legislation inherently recognise the rights of the public to environmental goods, specifically placing responsibility on the polluter for restoring the environment or compensating for environmental damage.⁵⁴ Most commonly known examples of such damages include marine oil spills, nuclear damage, groundwater contamination and impairment of ecosystems and landscapes. In addition, countries such as Denmark⁵⁵ and Germany⁵⁶, for example, have also enforced liability laws for non-genetically modified crops being contaminated by genetically modified organisms (GMO).

Green public procurement

Green public procurement (GPP) is “a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured”.⁵⁷

Implementing green criteria in purchasing is one direct way for governments to influence the market to provide more environmentally friendly goods. GPP can avoid unnecessary purchases by involving a review of the need for the product or service and the range of solutions that best fit that need. Through setting required criteria for goods or services GPP can lead to direct environmental gains through the purchase of greener products (e.g. less CO₂ emission by purchasing electricity from renewable energy sources). It can also help create a critical mass of demand to support the development of a wider market for ecological products.⁵⁸

54 EEA (2005a)

55 Koch (2007)

56 Law Library of Congress: <http://www.loc.gov/law/help/restrictions-on-gmos/germany.php#Liability>

57 EC (2008)

58 European Environmental Bureau: <http://www.eeb.org/index.cfm/activities/sustainability/green-public-procurement/>

Possible savings by implementing GPP:





Three million tonnes of CO₂ would be saved in the Netherlands alone if all Dutch public authorities applied the national Sustainable Public Procurement criteria, which include green criteria. Public sector energy consumption would be reduced by 10%.⁵⁹

CO₂ emissions would be cut by 15 million tonnes per year if the whole European Union adopted the same environmental criteria for lighting and office equipment as the City of Turku, Finland – reducing electricity consumption by 50%.⁶⁰

Labelling schemes

As set out in the introduction, lack of information may also lead to market failure. In these circumstances governments can take action to mandate or encourage the market to provide consumers with better information. For example, the government can create labelling schemes to provide information on products and their environmental and health impacts from their production and their use (e.g. organic farming labelling, eco-labels). Such labels can help consumers to choose more environmentally friendly products and services and can lead to consumption shift. Labelling schemes can cover different product/service groups and regions (have a look on examples in table 1).

Table 1. Examples of labels

Name	European Union eco-label	Energy Star	Forest Stewardship Council	Indonesian eco-label
Country/region	regional (European Union)	US, Australia, Canada, Japan, New Zealand, Taiwan, European Union	global	national
Visual				
Items covered	more than 30 product groups (e.g. chemicals, paper, electronics, coverings etc)	energy using products	forestry (mainly wood) products	forestry products, paper, furniture

59 De impact van het programmadoelzaaminkopen anno 2011 (Dutch Ministry of Infrastructure and Environment, 2011)

60 Nordic Council of Ministries (2009)

3.6 INSTRUMENT MIXES

MBIs are seldom used individually and are often used as part of a package of a number of MBIs or they are combined with regulatory (command-and-control measures). The main reason for using an instrument mix is that in most cases environmental problems are of multi-aspect nature and no one single policy instrument can achieve the goals set alone.⁶¹ For example, in order to achieve the goal of reducing CO₂ emissions, governments may use explicit and implicit carbon pricing as well as create energy efficiency standards for housing and vehicles. Using complementary MBIs can also reinforce their incentive effects. For example, ETS can be complemented with energy taxation.⁶² Supplementing ETS with CO₂ taxes can help limit compliance-cost uncertainty by giving polluters the opportunity to pay the pre-determined tax instead of buying a tradable permit, the price of which can be rather volatile at times.⁶³

In most cases policy mixes are not initially designed as such but rather individual instruments are created separately and over time new instruments are added to address the inefficiencies of the existing policies. For example, explicit pricing mechanisms can be complemented by research and technology support policies to address knowledge and diffusion failures of specific emission-reduction technologies, energy labelling to reduce information barriers, energy efficiency building codes to address split incentives between landlords and tenants, and active competition and regulations to limit market power.

3.7 ENVIRONMENTAL TAX/ FISCAL REFORM

Environmental (also called “ecological”, “green”) tax or fiscal reform is not an instrument by itself but rather a wider approach to change taxing or fiscal system in a way which is beneficial both for the environment and socio-economic development.

Environmental tax reform (ETR) is defined as “reform of the national tax system where there is a shift of the burden of taxes, for example from labour to environmentally damaging activities, such as unsustainable resource use or pollution”.⁶⁴ Under ETR, the tax burden is shifted from ‘good’ things such as income and employment and on to “bad” things such as pollution and resource use.⁶⁵ *Environmental fiscal reform* extends beyond ETR by including subsidy reforms, which entail phasing out subsidies on environmentally harmful activities and products, such as fossil fuels or pesticides, and redirecting public spending towards more

61 OECD (2007)

62 OECD (2011a)

63 OECD (2007)

64 <http://www.eea.europa.eu/>

65 IEEP (2007)

socially and environmentally beneficial activities.⁶⁶

There are at least four possible types of effects of ETR:⁶⁷

- it makes various goods or activities more expensive
- the direct or indirect distribution of this extra revenue
- job creation and eco-innovation
- effective ETR will also result in environmental benefits, for example by reducing pollution.

One of the challenges of ETR is ensuring that the costs and benefits are appropriately distributed across society, and do not negatively impact the poorest people. Instruments also need to balance the right mix of environmental and economic incentives. Ultimately, ETR mechanisms can only be implemented if they are acceptable to the public and policy makers.⁶⁸

Environmental tax reform in Germany

Between 1999 and 2003 the German government followed a policy of ecological tax reform. It raised taxes on consumption of environmentally damaging fossil fuel energy in small foreseeable stages, through increased taxes on engine fuels, electricity, light fuel oil and gas. This created incentives for energy conservation, innovative energy-efficient technologies and the use of renewable energies. In this way, emissions of greenhouse gases and air pollutants have been reduced and oil dependence eased.

The tax revenue collected is mainly used for a direct reduction of non-wage labour costs by lowering employers' and employees' contributions to the pension fund. A smaller part is used as support for renewable energy and for the renovation of buildings for energy saving purposes; and tax reductions and exemptions are used to support energy-efficient power plants and public transport amongst other things.

The ecological tax reform thus helps to support and strengthen climate protection while labour becomes cheaper and more attractive.

Source: <https://sustainabledevelopment.un.org/index.php?page=view&type=99&nr=92&menu=1449>

66 Many papers do not make difference between „tax“ and „fiscal“ reform, though the later one is seen in wider perspective than just making changes in taxing system. Environmental fiscal reform is linked to phasing out environmental harmful subsidies, and tax shift (have a look on chapter 3.4).

67 <http://www.eea.europa.eu/>

68 <http://www.eea.europa.eu/>

3.8 MARKET-BASED INSTRUMENTS USED IN DIFFERENT ENVIRONMENTAL AREAS

Different market-based instruments can be used in different environmental areas/sectors and countries/regions. Table 2 below provides some examples on environmental taxes/charges, tradable permits used in the area of water, energy, biodiversity, air pollution etc.

Table 2. Examples of market-based instruments by environmental area/sector

Area/sector	MBIs	Explanation	Country examples
Water management	Water resources taxes/charges	Water abstraction levies — a natural resource tax rather than a charge to recoup infrastructure costs — on tap water are generally used in combination with licensing and permit systems. In general, water abstraction taxes are designed either as taxes on the amount of water abstracted or on the quantity for which an abstraction permit has been given. ⁶⁹	Denmark, France, Germany, Netherlands, Estonia, India, Ethiopia, Egypt
	Water effluent charges	Water effluent charges are a common instrument used for regulating discharges of effluents into natural waters. Charges usually include chemical and biological oxygen demand, heavy metals, suspended solids, nutrients (nitrogen and phosphorus) and the total volume.	Belgium, France, the Netherlands, Estonia, Colombia, the Philippines, Nigeria, Mexico, Poland, Germany, Japan, Canada, Ireland
	Water quality trading schemes	Water quality trading refers to the application of emissions trading to water pollution control.	Australia, Canada, New Zealand, United States

⁶⁹ EEA (2005a)

Area/sector	MBIs	Explanation	Country examples
Sustainable agriculture/ soil protection	Taxes (excise) on pesticides and fertilisers, mineral surpluses	Environmental taxes might be an effective instrument in reducing nitrogen emissions from agriculture. However, taxing nitrate itself is not an efficient solution since the problem is related to the application of nitrate in rather complex ways. The method of cultivation, the crop being cultivated (and the timing thereof), the type of soil and the weather will all influence these emissions. Therefore, policy makers might want to opt for taxing the cause of the pollution, e.g. the (over)use of pesticides and fertilisers in agriculture.	Sweden, Norway, UK, the Netherlands, Italy, France, Denmark, Belgium, Canada, USA
	Agricultural quotas	The use of agricultural quota systems usually refers to measures designed to bring the rise of production of a certain agricultural product under control by imposing a cap on the amount that the farmers can sell without paying a levy.	Milk and sugar quotas in the EU countries ⁷⁰
Biodiversity and protected areas	Watershed protection charges/taxes	Watershed protection charge aim to improve the water quality of streams in, local waterways and water bodies. Typically property owners are charged a charge based on the size of their property or the amount of impervious area on their property and the collected money is then used to improve the water quality.	US, the Philippines, India (Kerala), Jamaica
	Resource tax (forestry, hunting)	Most countries require some kind of authorization for hunting, and in some cases different kinds of hunting licenses are set out in the legislation. Categories are not uniform. Similarly, most countries collect resources taxes on timber.	Wood taxes in Brazil, Columbia; most countries require some kind of authorization for hunting
	Tradable development permits	Developers wishing to turn land to economic purposes, thereby destroying valuable habitat, may only do so if they submit a permit to the conservation agency showing that habitat of at least the equivalent ecological value is restored elsewhere. ⁷¹	Canada, Cyprus, India

70 EU (European Union) countries are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom

71 OECD (2014)

Area/sector	MBIs	Explanation	Country examples
Fishing	Fishing licence fees	Fishing licences refer to a governance system that assigns rights to shares of a fishery. Shares can be an amount of catch, units of fishing effort (such as days of fishing) or an exclusive geographical area and time period when fishing is allowed. In order to be effective, the sum of all of the shares must not result in overfishing or in the degradation of critical fish habitat. There may be a need for additional rules, such as fish size limits, that apply to all holders of the rights in the fishery.	US, Canada, most EU countries, South-Africa
	Fishing quotas	In theory, ITQ (individual transferable quota) programs for fishing are analogous to other cap and trade programs - the regulator sets a species-specific total allowable catch (TAC), typically by weight and for a given time period. A dedicated portion of the TAC, called quota shares, is then allocated to individuals. Quotas can typically be bought, sold and leased.	EU countries, Iceland, Canada, United States, New Zealand, Australia, Peru, Namibia
Marine protection (littering, oil spills)	Port reception, berthing	Port reception or ship-berthing fees are a general fee that typically could have a portion of the revenues allocated for waste management infrastructure.	UK port reception fee for waste; berthing fees in most EU countries, Dubai, Singapore – most marinas have some kind of fees
	Liability schemes	Liability for pollution/marine littering, linked to the cost of clean-up, and linked to a compensation scheme for those whose livelihoods were compromised by marine litter.	IMO member states under the International Convention on Civil Liability for Oil Pollution Damage; US Oil Spill Liability Trust Fund

Area/sector	MBIs	Explanation	Country examples
Waste	Landfill tax/waste disposal, landfill closure fund	Waste disposal charges are designed to support a waste management priority hierarchy (prevention, preparation for re-use, recycling, recovery, and disposal) by fostering economic agents to reduce the overall amount of waste generated and by making waste recovery activities more profitable.	Most EU countries, New Zealand, US, Japan. Most countries have some sort of waste disposal tax
	Incineration tax	Incineration taxes can be imposed to attempt to stop waste simply being diverted from landfill to incineration.	Austria, Belgium, Denmark, France, the Netherlands, Spain, Norway
	Taxes on products (tires, batteries, motor oil, packaging, etc.)	Taxes or charges can be imposed at the point of sale of potentially polluting products. Such taxes increase the price of the product, providing incentives for consumers to buy substitutes that are friendlier towards the environment. ⁷²	Most EU countries, Japan, South Africa, New Zealand
	Deposit/refund systems (cans, bottles, car hulks)	Deposit refund systems require paying a deposit upon the purchase of potentially polluting products (e.g., bottles and cans, home electronic appliances, tires). This deposit is refunded if the product or its residues are returned for disposal and recycling, thereby avoiding a loss of materials and resulting in environmental pollution if the containers are not handled properly. Deposit refund systems aim to reduce the amount of waste going to landfills, encourage recycling, and prevent the incorrect handling of waste.	Most EU countries, Switzerland, Colombia, Ecuador, Jamaica, South Korea, Mexico, Sri Lanka, Taiwan, Venezuela
	“Pay-as-you-throw” (PAYT) charges	PAYT is a usage-pricing model for disposing of municipal solid waste. Users are charged a rate based on how much waste they present for collection to the municipality or local authority. Waste is measured by weight or size while units are identified by using different types of bags, tags, containers, etc.	In 17 EU countries for municipal waste, US, Canada, Korea, Thailand, Vietnam, China, Taiwan

72 UNEP (2009)

Area/sector	MBIs	Explanation	Country examples
Air pollution / climate change (energy and transport sector)	Emission charges on different substances (NO _x , SO _x , carbon, ozone, etc.)	An environmental tax generally should be levied as directly as possible on the pollutant or action causing the environmental damage. Using the tax to increase the market cost of the polluting activity helps to incentivise the full range of potential abatement options: cleaner production processes; end-of-pipe abatement (i.e., measures to capture and neutralise emissions before they enter the environment); adoption of existing products which cause less pollution; development of new, less-polluting products; reducing output or consumption, etc. ⁷³	Most EU countries, Norway, Costa Rica, Australia until 2014, South Africa (from 2016), Switzerland, Chile
	Taxes/excise on fuel, congestion charge, taxes on vehicle, road taxes, toll roads etc.	Many countries impose significant taxes on motor fuels, roads usage, etc because the resulting increase in the cost of driving a vehicle is an incentive to reduce emissions. ⁷⁴ Taxes in the transport category are often aimed at addressing a broad range of externalities (e.g. congestion, traffic accidents and noise), rather than greenhouse gases specifically. Fuel consumption is used as a proxy for addressing these externalities. Road fuel taxes are also often used to fund road construction and maintenance. ⁷⁵	China, India, all EU countries, Russia, Canada, US, Australia, New Zealand, Turkey
	Emissions trading schemes (national, regional, global)	Emissions trading, as set out in Article 17 of the Kyoto Protocol, allows countries that have emission units to spare - emissions permitted them but not “used” - to sell this excess capacity to countries that are over their targets. The system works on the ‘cap and trade’ principle. A ‘cap’, or limit, is set on the total amount of certain greenhouse gases that can be emitted by the factories, power plants and other installations in the system. The cap is reduced over time so that total emissions fall. Thus, a new commodity was created in the form of emission reductions or removals.	Local emissions trading schemes: New Zealand; China, Japan, Australian, USA, Canada; EU ETS in EU countries 191 States and 1 regional economic integration organization are parties to the Kyoto Protocol
	Feed-in tariffs for renewable energy sources	Feed-in tariffs are a policy mechanism designed to accelerate investment in renewable energy technologies by providing them a fee (a “tariff”) above the retail rate of electricity. The mechanism provides long-term security to renewable energy producers, typically based on the cost of generation of each technology.	Most EU countries, Algeria, Australia, Brazil, Canada, China, Iran, Israel, Kenya, Republic of Korea, South Africa, Tanzania, Thailand, Turkey

73 OECD (2011b)

74 OECD (2011b)

75 OECD (2013)

Area/sector	MBIs	Explanation	Country examples
Natural (mineral) resources	Resource tax (mining charge)	Natural resources are crucial inputs to production and to sustain our lifestyles, but many natural resources are finite. As a result, and due to increasing perceptions and experience of scarcity, it is important to sustainably manage the extraction of these resources, use them efficiently and re-use and recycle them as far as possible. For this end most countries have implemented taxes on resources in order to limit their use.	Most countries have resource taxes
	Land rent/use permits and licences	Land rent or economic rent is the cost of permits and licenses that are politically controlled by their number – usually only a certain amount of permits or licences are allocated. Typically owners of those licences might still need to pay resource tax for extraction, since land rent permits only give them access to the land and not the right to extract the resources.	US, all EU countries, Australia

More information about OECD countries is available in OECD database on instruments used for environmental policy: <http://www2.oecd.org/ecoinst/queries/>



4. Auditing MBIs

Chapters 2 and 3 set out how governments may use market-based instruments to deliver environmental objectives, including through correcting market failures, and illustrate the potential advantages of market-based instruments and the potential risks from their use. This part addresses how SAIs may audit their governments' success in using MBIs. Drawing from SAIs' experiences to date, it sets out how SAIs may be able to review MBIs at various stages of the policy cycle, from agenda setting and policy design to evaluating their operation and effectiveness following their implementation.

4.1 WHAT SHOULD BE CONSIDERED WHEN AUDITING MBIS?

Depending on the SAI's mandate, and also their competence and experience, SAIs can audit different aspects and phases of implementation of MBIs. There can be audits which are implicitly focused on efficiency and effectiveness of an instrument (see cases A, B and C in appendix 2). However, auditing the MBI is often not the main goal of the audit but just one part of the audit. For example, while auditing the effectiveness of packaging waste management collection and recycling system, auditing the deposit refund system applied for collecting beverage bottles can be just a topic covered within the audit.

The information below provides hints for auditors on what it is important to look at and which questions to ask while auditing the agenda setting, design, implementation and enforcement, supervision or impact evaluation of MBIs.

Setting the agenda

When auditing the possible implementation of MBIs for conducting environmental policy, the first step is to look at how the agenda was set. Before deciding on the best suitable environmental policy and selecting the best policy instruments, policy makers should gather information about the problems to be addressed (e.g. need to reduce emissions, need to adapt to climatic changes), their scale and impact. It is helpful at the outset to identify why the current markets for goods and services are failing to address the problem – whether it is a problem of the market not providing for the polluter to pay or for public goods or externalities; or potential barriers to new entry to the market for new goods or services. For example there may be price barriers to the introduction of new drought-resistant crops; or finance failures limiting the opportunities relating to investment in energy infrastructure. The nature of the problem to be addressed and the type of market failure will inform the way the environmental objective is framed – for example whether an absolute limit is required or a policy delivering a steady reduction in environmental harm.

Possible questions to ask in the agenda setting phase:

- What is the problem the government has identified?
- Has the government studied the problem and identified how it impacts the environment and stakeholders?
- Has government analysed the reasons for failure of existing policy?
- Is there a need for (separate) policy?
- Is the environmental burden/harm identified and quantified where possible (e.g. maximum bearable emission limit)?
- Has the government articulated fully its objective(s) for intervening?

Have a look at audit case G in appendix 2 where the United States' Government Accountability Office assesses the need for a national carbon trading program. The audit mapped the existing market for carbon-related products and the issues concerning the creation of a national system.

Policy design phase

The most important phase in policy making is the selection of suitable instruments to achieve the objectives. In this phase policy makers should analyse the possibilities for achieving the objectives identified in the agenda setting stage and assess the alternative options by using **cost benefit analysis**.⁷⁶ Modelling can be used to inform the cost benefit analysis (e.g. forecasting the behaviour of consumers when different charge levels are applied on electricity) and assess the interaction of the proposed new policy with existing policies. The policy evaluation which is conducted before actual implementation (so called **ex-ante** analysis or impact assessment) should ensure that the best choices of policy and instruments are made to achieve the objectives.

Auditors can review whether policy makers have identified the **magnitude** of the externalities, and properly put an **economic value** on them in order to set the best “dosage” for their proposed public policy. They can review the government’s modelling: the evidence base for the inputs; the internal logic within the model and any limitations; and the sensitivity of the outcome to changes in the inputs and modelling assumptions.

In this phase auditors may also review whether indicators have been set to allow measurement of the efficiency and effectiveness of the operation of the selected policies and instruments and of performance against the policy objectives. For example, for emissions trading systems indicators of trading volumes show how the market is operating; and indicators of emissions by sector before and after the policy change help to evaluate the policy’s performance and the rate of progress to the desired goals.

EEA suggests that MBIs, where they have been applied, work better if:

- they are **well-designed** in themselves and as part of a wider package of instruments
- the reasons for having them and how revenues will be used are clearly **communicated**
- the levels at which ‘prices’ are set reflect both an incentive to producers and consumers to **change behaviour** and a realistic analysis of **affordability**.⁷⁷

See also OECD policy design recommendations for policy makers in appendix 1.

⁷⁶ Braathen (2015)

⁷⁷ EEA (2005a)

Possible questions to ask in the policy design phase:

- Were all the most suitable instruments to achieve the goals subject to proper appraisal?
- Were the costs and benefits of alternative options properly analysed before selecting the proposed MBI?
- Did the appraisal fully address the commercial and financial cases for the proposed instrument, including the practicality and costs of implementation as well as of its ongoing operation?
- How did the government select from the potentially most suitable instruments? Was this selection consistent with the underlying analysis?
- Were the relevant interest groups involved and did they accept the selection of the instrument? What were the arguments for/against the instrument by main interest groups?
- Did the design of the instrument take account of potential interactions with other existing policy instruments?
- For price based MBIs: how were the externalities calculated and internalized into prices?
- For emissions trading: how was the “cap” selected and allocation of allowances decided?
- How was it decided to distribute the revenues?
- Were the potential side-effects of the instrument analysed?
- What analysis was undertaken of the instrument’s impact on consumers and in particular on the lower income groups?
- How have impacts on competitiveness been considered and taken into account?
- What flexibilities have been included within the design of the MBI and have they addressed the key sensitivities in the appraisal where adjustments may be needed?
- Have performance indicators been selected to assess the operational costs of the instruments, its success and any potentials of wider impacts?

Have a look at audit case B in appendix 2 where NAO of Estonia audited the design of air emission charges. The audit found that, though the aim of the policy instruments was to incentivise investments into greener technologies, the instruments chosen did not produce this result and other instruments might have been far more efficient.

This topic is also featured in the NAO of Columbia’s audit on effluent charges (Case A); NAO of Czech Republic’s audit on industrial pollution and environmental risks (Case D); NAO of Sweden’s audits on green public procurement (Case F) and climate change related taxes (Case H); United States’ Government Accountability Office’s audit on the national carbon trading system (Case G); the Netherlands Court of Audit’s report on tradable allowances (Case J).

Policy implementation

Implementing MBIs involves translating their design into relevant procedure and then administering and enforcing it. In particular, institutional and administrative structures need to be put in place (for the MBI and any associated mitigations or revenue allocation systems); control and monitoring mechanisms selected; and resources allocated. In this phase auditors should make sure that the baseline conditions for implementing any MBIs – basic rules of law, well-functioning sets of political institutions – are in place and functioning. Both MBIs and command-and-control approaches require that the institutions and legal system identify non-compliance and penalise violators. Weak institutions would quickly render MBIs worthless as firms discover that they can continue operating without paying taxes or buying permits. Where institutions are weak and corruption risks are high this can undermine the MBI and its effectiveness in addressing environmental impacts.⁷⁸

Possible questions to ask in the implementation phase:

- Are the processes and institutions properly in place for the MBIs?
- Are allocations or auctions subject to good internal control and their outcomes transparently reported, and exemptions properly administered?
- Are the taxes collected?
- Has the state introduced appropriate inspection regimes for the companies involved, to ensure it has a complete picture of those subject to the MBI and that they have compliance systems in place and so are fully complying/paying the right amount of tax?
- Has the state assessed fraud and corruption risk and put in place a suitable prevention plan, including monitoring and whistle-blowing arrangements?
- Does the state control the use of resources and pollution level based on the amount of paid taxes or traded allowances?
- Is the state ensuring that performance indicators are being collected and routinely reported?
- How are the revenues used? In particular, are the pollution taxes used for the development of environment-friendly technologies and more economical utilization/use of resources?
- What are the costs for administrating and controlling the implementation of MBIs?

Have a look at audit case A in appendix 2 where the NAO of Columbia has audited effluent taxes. This audit found that, although regional environmental authorities had developed administrative actions related to the invoicing process, it didn't result in an increase in revenue or in actual impacts on the control of effluent discharges and the quality of water resources.

78 UNEP (2004)

This topic is also featured in NAO of Estonia’s audit on pollution charges (Case B); NAO of Finland’s audit on vehicle taxation (Case C); NAO of Czech Republic’s audit on industrial pollution and environmental risks (Case D); NAO of Tanzania’s audit on audits the management of wildlife (Case E); NAO of Sweden’s audits on green public procurement (Case F) and climate change related taxes(Case H); ECA’s audit on EU ETS (Case I); Netherlands Court of Audit’s report on tradable allowances (Case J) and Slovenian Court of Audit’s report on water fees (Case K).

Policy evaluation

Auditors can make sure that policy evaluation is conducted after the policy or project has been implemented (so-called **ex-post** evaluation). This will help to improve the administration of current policy, and contribute to a process of policy modification and improvement. It will also help to improve the choice of instruments in future policies and contribute to better communication with stakeholders and the public about the purpose, operation and effects of policy. In policy evaluation the monitored data and selected performance indicators should be used.

After the evaluation, it should be decided whether the policy needs to be changed and adaptations made. If needed, the policy should be revised and the policy circle started again.⁷⁹

How soon after implementation should a policy or project be assessed?⁸⁰

There are a number of factors which need to be taken into account:

- Some of the behavioural responses may take time to appear.
- However, evaluation too long after the implementation of a new project or policy is likely to mean that some of the relevant economic actors are no longer available to survey or interview.
- Also, with the passage of time, the “counterfactual” may become increasingly imprecise.
- There is the possibility that the behavioural response to a new policy instrument may partly anticipate its introduction.

79 OECD (2006)

80 Braathen (2015)

Possible questions to ask in the policy evaluation phase:⁸¹

Environmental effectiveness

- Does the state evaluate the policy performance indicators?
- Has the MBI encouraged companies or citizens to change their behaviour?
- Does the MBI help to achieve the goals set (e.g. are the emissions levels or resource depletion rates falling? Are ambient concentrations in the surrounding environment declining?)?
- Is the system changed if MBIs do not have impact?
- What are the environmental performance indicators showing? Are factors other than the MBIs affecting the environmental performance?

Economic efficiency

- Are the costs of emissions rights stable or declining?
- Are they less expensive than projected in advance by government or industry?
- Are new abatement technologies entering the market?
- Are trades being actively used?

Administration and compliance costs

- Has the public sector implemented an effective administrative oversight programme for the policies?
- How expensive is this to run relative to the value of trades occurring and emissions reductions realized, and how does it compare to what was expected from the policy appraisal? What would be estimated to be the cost of alternative command-and-control programmes?
- How expensive are the administrative costs to the private sector and how do they compare to what was expected from the policy appraisal? What would be estimated to be the cost of an alternative command-and-control approach?
- Are institutions cooperating to achieve the policy objective, or are efforts being blocked?

Revenues

- Are the user charges sufficient to cover the full costs of providing particular public services?
- Are the charges/fees appropriately levied on different user groups?
- Are the environmental taxes high enough to trigger appropriate price increases in the products/production processes of concern?
- Are the revenues used as intended either to support additional environmental protection efforts or to support the general Treasury and potentially part of a wider Environmental Tax Reform agenda?

Wider economic and social effects

- Are there noticeable (positive or negative) effects on employment, poverty, trade, competitiveness, growth, or rates of innovation that can be reasonably attributed to the environmental policies being evaluated?
- Where these impacts are negative, are they transitory or permanent?
- Does the MBI influence the competitiveness of companies?

Have a look on audit case E in appendix 2 where the NAO of Tanzania audits the management of wildlife. This audit finds that, there was no in-depth analysis done at the third year of the hunting term based on criteria set.

This topic is also featured in NAO of Czech Republic's audit on industrial pollution and environmental risks (Case D); NAO of Sweden's audits on green public procurement (Case F) and climate change related taxes (Case H); ECA's audit on EU ETS (Case I); the Netherlands Court of Audit's report on tradable allowances (Case J) and Slovenian Court of Audit's report on water fees (Case K).

4.2 MAIN RISKS AND OPPORTUNITIES

SAIs may confront several risks and obstacles while auditing MBIs. These risks can be related to the complexity of the topic, but also the SAIs' institutional capacity and mandate. At the same time, SAIs have many opportunities to contribute to improving the use of MBIs. SAIs should keep in mind that MBIs are like other tools to achieve environmental policy objectives and are used in many environmental areas, therefore auditing them should be considered, if possible.

Risks and opportunities described in this chapter table 3 are provided by the MBI project partners, and by other SAIs during the INTOSAI WGEA and EUROSAI WGEA meetings in 2014–2015.

Table 3. Risks and obstacles, opportunities and solutions for auditing MBIs

Risks and obstacles	Opportunities and solution
<p>Complex and complicated systems</p> <p>An important risk is the misunderstanding of the instrument(s). For example, it seems rather difficult for auditors as well as for policy makers to get a real understanding of the tradable permit system. E.g. emissions trading schemes may cover many sectors of the economy.</p> <p>The design and enforcement of (environmental) taxes can be complicated. There are a lot of exceptions and differentiated tariffs, which makes it difficult to audit.</p>	<p>Audit can increase awareness of the instrument among decision makers, politicians, and public.</p> <p>If the audit is well-planned and executable, its findings and recommendations can help government to correct any flaws in policy design and implementation in order to achieve better results, as well to improve public acceptance of SAI's report. SAIs can assess the reasoning behind policy measures and whether the measures taken are proportionate and do not hinder competitiveness of market players more than necessary.</p> <p>It can be audited whether the used MBI system is simple and unambiguously understandable which ensures the receipt of taxes and prevents tax avoidance.</p> <p>Auditing complex appraisal or evaluation models and the resulting evaluations is likely to require specific expertise in these areas, in particular staff with economic expertise.</p>
<p>Evidence based policy design and selection of MBIs</p> <p>It is not always clear what's the reasoning behind the imposed tax or set of different policy tools.</p> <p>The impact of the MBI to other sectors (than environment) or interest groups is not considered. For example, taxes may have regressive impact (impose greater tax burden on the poor relative to the rich) and may rise social costs.</p> <p>Polluter pays principle is not followed (polluters do not pay the "right price" for using natural resources).</p> <p>Identification and evaluation of externalities (giving them a monetary value) is complicated.</p>	<p>SAIs can ask for reasoning of imposing taxes or allowances systems. For example, if the reasoning for imposing the tax has been to cover the external costs, then these external costs must be properly evaluated (externalities identified and analysed) before setting the tax rate.</p> <p>While SAIs may not wish to second-guess the basis on which institutions conduct policy appraisals and evaluations, they can carry out an important role in critically assessing the methodology and assumptions on which an institution has conducted such assessments both at the policy development stage and when evaluating impacts retrospectively.</p>

Risks and obstacles	Opportunities and solution
<p>Multiplicity of policies and policy objectives</p> <p>There can be other policy objectives than the environmental ones (e.g. social, cultural, economic) and these should be considered while designing, and also auditing the instrument. For example, water tariffs should cover the private costs (operational, investments into water infrastructure – economic objective) and environmental external costs (environmental objective), but the water service should also be affordable for everybody (social objective). It can be difficult to balance environmental, economic/business and social interests.</p> <p>Concern over competitiveness is often a major argument against the introduction of environmental taxes. It is difficult to assess what is more important for the society and for the economic development – environmental objectives or competition in the market.</p>	<p>One way of dealing with contradictory objectives could be summoning a focus group of experts and opinion leaders and search for balanced solutions.</p> <p>If there are evident problems between different policy sectors, the audit is likely to bring more clarity and the actions following audit recommendations can lead to significant change.</p>
<p>Uncertainties and forecasting future liabilities</p> <p>It is hard to predict 100% how markets, companies and consumers will react to MBIs. Forecasting future liabilities is a challenge for companies, as well as creates uncertainty about the budget for the government. Some instruments may cause opposite reactions. E.g. tax on municipal waste which aims to change citizens' behaviour (to sort waste) may cause illegal dumping instead.</p> <p>The uncertainty associated with MBIs can impact on revenue and cost reporting within government accounts. E.g. within the EU, feed-in tariffs (long-term pricing ensured by the government) are the primary mechanism for promoting the deployment of low-carbon electricity generation technologies. In the UK, a new type of feed-in tariff (known as "Contract for difference") has created derivative liabilities whose value is dependent on future electricity prices and the amount of power generated under the contracts. The Government has reported the fair value of these liabilities in its financial accounts, and has been transparent about its approach to estimating their value.</p>	<p>As part of audit SAI's can analyse whether government has studied the uncertainties and future liabilities before introducing the MBI.</p> <p>SAIs' audits can provide fresh evidence from stakeholders or analyse administrative data in different ways that can help politicians and the government understand better the instruments and their impact and any potential market distortions.</p> <p>E.g. the NAO UK has had the challenge of reviewing this approach as part of its financial audit to reach its own opinion on whether this approach represents true and fair reporting of the liability.</p>
<p>Complex administration (administrative burden, shared responsibilities)</p> <p>Implementation of MBIs can cause considerable administrative burden (e.g. collection of taxes; tax exceptions; setting up the trading scheme).</p> <p>Shared responsibilities (local, regional, state) reduce the commitment.</p>	<p>An audit can determine whether the implementation of MBI has caused extra administrative costs compared to alternative/ command-and-control approach (in longer term) and what are the possible costs related to alternative solutions.</p>

Risks and obstacles	Opportunities and solution
<p>Ambiguous legislation, control over enforcement</p> <p>Ambiguous legislation hinders enforcement of MBIs e.g. difficulties to collect fees due to unclear provisions.</p> <p>Not all enterprises perform their obligations of paying fees for exploitation of environment. There are deficiencies in controlling measuring and reporting by operators who are obliged to pay environmental charges/levies.</p>	<p>SAls can recommend making changes in legislation and drawing attention to deficiencies in supervision procedures.</p>
<p>Use of revenues</p> <p>Revenues of MBIs may not contribute to environmental policy.</p>	<p>It should be made clear whether the objective of the MBI is to use generated revenues for environmental purposes. If they are, then SAI can point out the misuse of revenues.</p>
<p>Evaluation of impacts or added value of MBIs</p> <p>The multiplicity of factors which can affect environmental quality and multiplicity of policy instruments operating alongside each other further complicates evaluating the added value from an individual MBI. MBIs are usually combined with other instruments, especially with regulatory ones (laws, standards, etc). It is difficult to evaluate the extent to which an individual MBI – as opposed to other drivers – contributed to reducing negative environmental impacts. In particular it is difficult to determine what may have caused behavioural changes among producers and consumers.</p> <p>It is not wise to draw direct links between tax revenues and environmental improvements. For example, if the revenues from waste disposal have decreased, then it can mean that companies have changed their behaviour and so are producing less waste and/or recycling more, or it might mean that companies are avoiding paying the tax through dumping the waste illegally.</p> <p>A lack of clear and measurable objectives for the environmental policy underpinning an MBI is a problem for the evaluation of the effectiveness of the policy instrument.</p> <p>It is difficult to distinguish whether the policy or policy instrument was inappropriate, or there were problems with implementation.</p>	<p>SAls are well positioned to assess progress against policy objectives. By comparing data from different sources and/or collecting original data auditors may succeed to demonstrate the contribution of MBI to the change of behaviour.</p> <p>Assessment of added-value of an individual policy instrument may include modelling the counterfactual or conducting stakeholder surveys. However, modelling is inherently complex and uncertain. Stakeholders may not wish to provide some of the information you want for reasons of commercial sensitivity.</p> <p>Impact of the instrument can be analysed by asking the target group (consumers, producers, polluters etc) how do they perceive the instrument (does it influence their behaviour).</p>

Risks and obstacles	Opportunities and solution
<p>Detecting fraud (supra-national, national level)</p> <p>Insufficient transparency may encourage illegal activities with instrument.</p> <p>The primary example of fraud is the “carousel” fraud prevalent in the EU ETS in 2009 and 2010 (whereby companies bought EU ETS allowances without paying VAT in some countries then sold them including VAT in other countries, but without actually paying the VAT element to the government); together with other forms of EU ETS fraud including the direct theft of allowances (e.g. through the illegal transference of allowances through a trading terminal during a fake fire alarm).</p> <p>Fraud can take place also at national level. The companies are motivated to lower their operational/everyday costs to be more effective and to make more profit out of every production unit. Therefore they are make efforts to reduce their environmentally related costs, including paying environmental taxes. Usually the environmental costs should be reduced via investments into new technologies and solutions, but can happen that the companies do not report correct data on their activities (e.g. data about pollution) and thus avoid paying the taxes.</p>	<p>At international level the fraud issues may not be adequately covered by individual audit institutions in each different country, there international cooperation among SAIs might be needed.</p> <p>SAIs can cooperate to identify the problems in supranational level.</p> <p>At national level the possible fraud can be prevented by inspecting the companies and controlling the credibility of data reported. SAIs can audit whether the governmental institutions carry on such activities.</p> <p>The risks of fraud (“red flags”) should be and handed over to relevant institutions (depending on mandate of SAI).</p>
<p>Political volatility</p> <p>Political constraints and short political electoral cycles make MBIs volatile and can make it difficult to assess the right time for an audit. There have been cases where use of an environmental tax is abandoned during the audit and it makes no sense to audit it any more.</p> <p>Emissions trading schemes and the like are often politically contested, meaning political parties can have strong views about their effectiveness. An audit would run the risk of being seen to favour one political view over another, depending on the outcome.</p> <p>The decision makers – e.g. government and parliament – are involved in the design phase of the instrument. Thereafter politicians need to be courageous enough not to interfere, because companies’ responses to market signals will only be efficient if they have some certainty over the shape of the market in the longer-term. Only when the instrument doesn’t work, or when unwanted side effects occur and are clearly not short-term problems, should decision makers consider interventions. In the best case the MBI will have been designed to include flexibility to anticipated changes in the market so that the MBI can be adapted to varying circumstances.</p>	<p>SAIs can audit whether the selection of MBIs is evidence based, efficiently implemented, effective and adjustable (if conditions are changing). It gives credits to MBIs, and the whole system is less dependent on political decisions.</p>

Risks and obstacles	Opportunities and solution
<p>Competence</p> <p>Technically challenging subject may create the risk to misunderstand the instrument. As a consequence the audit might be focused on peripheral or even irrelevant aspects.</p> <p>SAIs might not have the competence and experience to audit MBIs.</p>	<p>When designing or conducting an audit external experts can be involved to ensure its quality. E.g. in Sweden the leading scientists in economics were involved to quality assure the SAI's report on emissions trading.</p> <p>Auditing complex appraisal or evaluation models and the resulting evaluations is likely to require specific expertise in these areas, in particular staff with economic expertise. SAIs may be able to contract expertise from outside specialist consultancy firms (particularly for modelling) in the event that in-house resources are considered insufficient.</p> <p>In case of difficulty to find unbiased expert, it might be possible organise an expert panel. Involving external expertise increases the impact of an audit and serves partly as external quality assurance.</p>
<p>Mandate issues</p> <p>Sometimes a SAI's mandate does not cover all stakeholders affected by MBIs. Not all SAIs may audit and so have access to the private sector in order to understand their compliance with the MBI and its impact. Some SAIs may have restricted audit mandates with respect to some market institutions or local authorities.</p>	<p>One solution could be to cooperate with institutions who have access to data. If raw data is not released, it might be possible to reach aggregated data.</p> <p>Audit can focus on enforcement, not on policy design issues</p>
<p>Quality and lack of data</p> <p>Lack of data, such as incomplete register of companies subject to environmental charges or environmental quality indicators, can compromise the evaluation of the instrument impacts. The State may not have established appropriate data collection and monitoring systems. Also it is not easy to find data and indicators to evaluate the behavioural changes of companies or citizens.</p> <p>If the data is not correct, then the conclusions might be misleading.</p>	<p>The audit report may contribute to improve policy transparency by disclosing data on the instrument impacts.</p> <p>SAIs can make useful recommendations for data collection and improved enforcement of the policy instrument.</p>

4.3 SAIS EXPERIENCE IN AUDITING MBIS

In 2014 INTOSAI WGEA Secretariat carried out the mini-survey among the INTOSAI WGEA member SAIs, which included the questions related to SAIs experience in auditing MBIs. Among the 59 replies there were 39 SAIs who reported the auditing of MBIs.

In these 39 reported, the most frequently audited instruments were environmental taxes and charges and emissions trading systems, followed by environmental subsidies and incentives, tradable allowances, green public procurement, deposit refund systems, and eco-labelling instruments. In addition, there were audits on comparing regulatory instruments and MBIs. The most common audited environmental areas were: climate change/air pollution followed by waste management, energy issues, water management, agriculture, sustainable development and fisheries.

Among those SAIs who reported the auditing of MBIs the selection was made to collect audit cases. Please see appendix 2 that presents the audit cases.



Appendixes

APPENDIX 1. RECOMMENDATIONS FOR POLICY MAKERS IN DESIGNING ENVIRONMENTAL TAXES AND EMISSIONS TRADING SYSTEMS

Recommendations for designing environmental taxes (OECD 2011)

- Environmental tax bases should be targeted to the pollutant or polluting behaviour, with few (if any) exceptions.
- The scope of an environmental tax should ideally be as broad as the scope of the environmental damage.
- The tax rate should be equal with the environmental damage.
- The tax must be credible and its rate predictable in order to motivate environmental improvements.
- Environmental tax revenues can assist fiscal consolidation or help to reduce other taxes.
- Distributional impacts can, and generally should, be addressed through other policy instruments.
- Competitiveness concerns need to be carefully assessed; coordination and transitional relief can be effective responses.
- Clear communication is critical to public acceptance of environmental taxation.
- Environmental taxes may need to be combined with other policy instruments to address certain issues.

Key design features of emission trading system (OECD 2013):

- **Setting emission caps.** Emission cap should be set at the level which is lower than the level expected under “business as usual” condition – it should lead to emission reduction. Over-allocation will result in low allowance prices, which weakens the incentive for technology change and investments.
- **Coverage of emission sources.** In principle all emission sources of certain pollutant should be covered by its emissions trading scheme. Still, the exceptions in coverage may be made if there is a (political) motivation to protect certain sectors (e.g. due to international competition) or if other policies and measures are already in place for certain sectors.
- **Allocation of allowances.** Choice of allowance allocation (whether it is full auctioning or free allocation proportionate to past emission levels or subject to regular update) should be made. Full auctioning is the most efficient, but free allocation is common when there are concerns related to competition. More than one allocation system can be applied as well.
- **Banking and borrowing (flexibility).** Enterprises covered with the emissions trading can be allowed to use allowances today for compliance in the future (“banking”) or to use allowances from a future period for compliance today (“borrowing”). It enables enterprises with long time horizon to plan ahead.

APPENDIX 2. AUDIT CASES

A. Analysis and evaluation of the economic, financial and tax instruments for environmental management in Colombia 2008–2012

Contraloría General de la República Colombia, 2013

1. Objective of the audit

Evaluate the design and the efficiency of effluent charges and their impacts in improving water quality.

2. Audited market-based environmental policy instrument

Effluent charge is one of the main regulation instruments in Colombia that aims to avoid high levels of water pollution, as well as an important source of funding for state institutions that are responsible for environmental management in watershed level.

3. Audited stages of implementing the instrument

- Policy design, selection of the instruments.
- Enforcement.
- Impact assessment of policy/instrument.
- Adaption/ changes in the system.

4. Methodology used to audit the instrument

Descriptive analysis (structure and evolution of economic instruments), normative analysis (compliance with legislation) and impact analysis (relationship between corporate management and the state of natural resources and the environment) were used. Based on that, questionnaires were directed to the Ministry of Environment and Sustainable Development, the National Authority for Environmental Licenses, National Natural Parks of Colombia, and 33 regional autonomous corporations.

The responses were consolidated and contrasted with previous analysis developed by SAI-Colombia. The analysis and evaluation of the effluent charges took into account the following elements:

- Design of the instrument and its consistency with the conceptual framework.
- Implementation level.
- Income level.
- Instrument’s impact in improving water quality.

5. Main findings and recommendations

Findings:

- The analysis found many inconsistencies between data used for invoicing and discharges data self-reported by regulated agents.
- The Ministry, most of the autonomous corporations and some environmental authorities in large urban centres have made progress in implementing an information system to monitor the evolution of economic instruments.

Recommendations:

- It is necessary that both regional and national environmental authorities pay special and urgent priority to evaluate whether effluent charges are being implemented effectively, tracking pollutant concentrations on water bodies.
- The use of the abovementioned information system should be widespread by all entities and gaps and inconsistencies that still occur in several cases must be corrected.

6. Additional information

Regional environmental authorities have developed administrative actions related to the invoicing process, although that didn't result in revenue increase nor in actual impacts on the control of effluent discharges and the quality of water resources.

B. Effect of pollution charges on the reduction of environmental pollution

National Audit Office of Estonia, 2008

1. Objective of the audit

The aim of the audit performed by the State Audit Office was to establish whether the pollution charges imposed by the state have been able to influence companies to invest in the reduction of ambient air pollution and waste generation.

2. Audited market-based environmental policy instrument

The **pollution charge** is in essence an economic instrument of environmental protection (similar to natural resource charges, taxes, excise taxes, subsidies, etc) to influence actors in the open economy to take into account their burden on the environment. The pollution charge and the natural resource charge together constitute a system of environmental charges which is regulated by the Environmental Charges Act.

3. Audited stages of implementing the instrument

- Policy design.
- Enforcement.
- Impact assessment of policy/instrument.

4. Methodology used to audit the environmental policy instrument

Analysis: Legislative acts, policy documents, reference documents on best available techniques and the practice of other countries in the application of pollution charges were analysed. Information on pollution charge calculations, ambient air pollution, effect of pollution charges on the reduction of environmental pollution surveillance reports; information received from the Environmental Inspectorate and county environmental departments on cases of pollution exceeding the limit values or without a permit (fines and payment of an increased pollution charge); integrated environmental permits issued to existing large incineration plants; contracts on pollution charge substitution and materials related to their conclusion and surveillance.

Interviews and explanations were requested from all related authorities.

Survey of the biggest polluters (40 companies - the biggest air polluters included also the biggest waste generators). To compile the sample, companies with the biggest emissions of SO₂, particulate matter, VOC and NO_x in 2001–2006 were ranked, adding also the biggest polluters of 2003 and 2006.

5. Main findings and recommendations

Findings:

- Pollution charges have not always been imposed according to the polluter pays principle.
- Companies have invested in environmental protection above all if – in addition to the pollution charges – legislation also requires the introduction of new technology.
- Companies which have ignored restrictions to pollution of the environment have mostly eluded the payment of pollution charges.
- Replacement contracts of pollution charges and project-based financing by the Environmental Investment Centre has not induced polluters to implement more environment-friendly technologies.

Recommendations:

- Commission research for proposing amendments to pollution charges and to the Environmental Charges Act, in order to identify optimal rates of pollution charges that would induce companies to invest in the reduction of pollution.
- Increase the rates of charges for pollutants which can be reduced through the application of BAT. To differentiate between the rates of charges of VOC and heavy metals within the same group, considering the hazardousness of substances.
- Decide to which indicators the increasing of pollution charges will be bound to in the long term up to 2030.
- Improve the effectiveness of communication between the Environmental Inspectorate and the county environmental departments in order to implement pollution charges at an increased rate.

6. Additional information

Report in English: <http://www.riigikontroll.ee/tabid/206/Audit/2071/Area/15/language/et-EE/Default.aspx>

C. Vehicle taxation

National Audit Office of Finland, 2009

1. Objectives of the audit

The objective of the audit was to assess whether the vehicle taxation of used cars was carried out cost-effectively and according to good governance, in order to give decisions-makers and overview of the outcome and potential needed changes to the system. The import and taxation of used vehicles has increased considerably since 2003, and this takes up most of Customs' work input involving vehicle taxation, even though, used vehicles' share of total vehicle tax revenues is relatively small. Administrative efficiency with regard to the taxation of used vehicles is therefore poor, especially if it is compared to the taxation of new vehicles, which is administered quite efficiently.

2. Audited market-based environmental policy instrument

The **vehicle tax** aims at steering consumers toward car models with lower emissions. Since 2008 the level of the tax has been set primarily on the basis of a vehicle's specific carbon dioxide emissions.

3. Audited stages of implementing the instrument

- Enforcement.
- Adaption/ changes in the system.

4. Methodology used to audit the instrument

For the purpose of conducting this audit, interviews within the Ministry of Finance, different offices of the Board of Customs, as well as, the Administrative Court of Helsinki were carried out. Furthermore, statistics from various databases, legal documents, as well as, written reports were analysed.

The audit was limited to car taxation, management and implementation between 2003 and 2008. However, the changes in the law that came into force in 2009 were taken into account.

5. Main findings and recommendations

Findings:

- The taxation of used cars has been more than 3 times less cost-effective than the average cost-effectiveness of taxes (the costs of implementing taxation divided by net tax revenue).
- The development of car taxation laws by the Ministry of Finance is lacking a clear strategic vision, even though the parliament has on several occasions expressed hope for an overall reform of car taxation.
- Changes in the car taxation legislation in 1995-2007, particularly those required by EU law, have been indecisive and reluctant.
- Adjusting vehicle taxation to EU legislation has largely been left up to individual citizens' activeness, since in order to receive the due tax returns from the Ministry of Finance taxpayers need to bring suit in the Court of Justice.
- Some citizens have felt that the taxation of used vehicles in particular is unfair and contrary to EU principles. Combined with the delay in developing legislation, this has led to an unusually large number of appeals. The result has been the need for considerable additional resources and sizable costs.

Recommendations:

- Over the decades many tax breaks or exemptions for special groups have been appended to the vehicle tax system. Replacing these tax subsidy-type solutions with administratively more appropriate subsidy systems should be investigated in connection with the next broader reform of vehicle taxation legislation.
- The current Vehicle Tax Act, which has been amended several times, could be rewritten and put into a more understandable form.

6. Additional information

There have been some improvements in the administration of vehicle taxation since audit.

Abstract in English: http://www.vtv.fi/en/publications/performance_audit_reports/2009/vehicle_taxation.4339.xhtml

D. Funds earmarked for the limitation of industrial pollution and environmental risks

Supreme Audit Office of Czech Republic, 2012

1. Objective of the audit

The aim of the audit was to scrutinise the provision, drawdown and use of funds earmarked for the limitation of industrial pollution and environmental risks. The audit focused on finances under the Operational Programme Environment, specifically priority axis 5 – Limiting Industrial Pollution and Environmental Risks.

2. Audited market-based environmental policy instrument

The departmental **grant programme (subsidies)** by the Ministry of Environment - priority axis 5 ('PA5') - concentrated solely on limiting industrial pollution and reducing the risks of serious industrial accidents impacting on the environment.

3. Audited stages of implementing the instrument

- Policy design (selection of the instruments).
- Supervision/control.
- Impact assessment of policy/instrument.
- Adaption/ changes in the system.
- Use of revenues/distribution.

4. Methodology used to audit the instrument

The main auditees were Ministry of the Environment (MoE) and State Environmental Fund of the Czech Republic, which are responsible for grants/funds earmarked in this field. Other auditees were final beneficiaries of these funds.

Analysis conducted at the providers of subsidies:

- Whether the relevant programmes/projects/measures are being elaborated in compliance with applicable regulations (compliance audit); and
- Whether the programmes/projects/measures have been adjusted, managed, and implemented in an economical, effective, and efficient manner (performance audits).

Analysis conducted at the beneficiaries of subsidies:

- Whether the beneficiary of a subsidy while implementing a given project has proceeded in compliance with applicable legislation and with the provider's terms and conditions (compliance audit); and
- Whether it has implemented the project under scrutiny in an economical, effective, and efficient manner and has met the pre-set targets and indicators (performance audits).

5. Main findings and recommendations

Findings:

- In the case of PA5 the binding documentation of OP Environment envisages the identification of goals and direct benefits, whereby the direct benefits should not be identical to the goals. The MoE defined goals that were the same as benefits and, as of August 2012 it had not taken any steps to eliminate this problem.
- The MoE designed PA5 to ensure that supported projects were linked to fulfilling the requirements of transnational concepts, international programmes and European regulations. However, the indicators set out in the decisions on the provision of a grant make it difficult to quantify the benefit of the supported projects.
- The indicators for projects designed to limit pollution or reduce environmental risks are set up in a way that makes it impossible to quantitatively assess how pollution or a risk caused by a relevant substance was reduced in consequence of the programme's implementation. The indicators give no information about the actual effectiveness of the use of finances earmarked for reducing the volume of pollutants in the Czech Republic.
- No PA5 project has to date been judged to be revenue-generating.

Recommendations:

- The SAO proposes changing the current practice by which projects are initiated and designed, though for state and local government agencies, by private entities. Projects should be awarded grants according to the actual needs and requirements of the relevant competent authorities. Projects not yet completed must be modified in collaboration with these authorities.

E. Management of Wildlife in Game Reserves and Game Controlled Areas

National Audit Office of Tanzania, 2013

1. Objective of the audit

The overall objective of the audit was to determine whether the Ministry of Natural Resources and Tourism (MNRT) appropriately manages and monitors wildlife hunting activities and revenue generated in the Game Reserves and Game Controlled Areas.

Specifically, the audit aimed at examining the enforcement of wildlife hunting regulation by responsible authorities; the efficiency of the MNRT in monitoring wildlife hunting in game reserves and game controlled areas; and management of the collected revenue and allocation of the funds to the required LGAs by the MNRT.

2. Audited market-based environmental policy instrument

Fines, user charges and tradable permits were assessed in the wider context of the Wildlife Act of 2009 which governs wildlife hunting in Tanzania. The objective of the Act is to enhance the protection and conservation of wildlife resources and its habitats.

3. Audited stages of implementing the instrument

- Enforcement.
- Supervision/control.
- Use of revenues/distribution.

4. Methodology used to audit the instrument

The methodology used is combination of methods used in performance audits:

- Reviewing of different documents related to wildlife hunting enforcement, monitoring and revenue collection in the ministry of natural resources.
- Interviews with wildlife officials responsible for wildlife utilization, anti-poaching and legal officers.
- The information gathered was compiled, analysed and presented in various formats.

The audit scope covered the period of three years starting from 1st July, 2009 – 31st March, 2012. Data was collected from 6 out of 27 game reserves and 4 out of 39 game controlled areas in Tanzania along with 4 LGAs which manage respective GCAs. Also, three out of eight anti-poaching units based in Dar es Salaam, Arusha, and Tabora were visited.

5. Main findings and recommendations

Findings

- Annual assessment of hunting companies was based on 40% utilization of quota and omitted other performance measures. There were no records showing actions taken by the MNRT against hunting companies that came out with substandard (e.g. undersized elephant tusks) trophies. 49% of the 108 hunting permit forms were not filled at all to indicate the habitat or ecology where the animals were hunted. A total of 366 wild animals in 2009 and 2011 were killed without quota allocation.
- The MNRT had never conducted an in-depth analysis of the hunting companies for the period of 2009-2012. There were no evidences at the MNRT that reported on the extent of the hunting companies' performance and their contributions to the community development as well as support to environmental protection.
- Revenues estimation was based on previous performance. There was no scientific assessment done to be used as a basis for estimation. 36 companies did not pay the government bills for photographic tourism on time. Consequently the ministry lost a total amount of USD 1.7 million which is equivalent to TZS. USD 2.7 billion as at 11/12/2012.

Recommendations:

- The MNRT should ensure that rates of fines and penalties charged help to reach the intended deterrent effect;
- Trophy and habitat quality assessment is carried out;
- The review of payment of USD 5,000 annually by hunting companies is done to see if it saves the intended purpose, and if not change accordingly;
- Hunting safari data and data from ant-poaching are properly collected, documented and analysed and used in planning and decision making;
- Tourist hunting database on hunting companies, contribution to community development by hunting companies, or support to improve infrastructure, protection of the environment and contribution towards ant-poaching is developed;
- Controls set for revenue collection are reviewed and full collection is done;
- LGAs with wildlife resources use the amount allocated by the Ministry to protect wildlife resources within their jurisdictions and in turn account for the disbursed funds to the Ministry.

F. Green public procurement - is management effectively helping to achieve the climate objective?

The Swedish National Audit Office, 2011

1. Objectives of the audit

The aim of the audit was primarily to determine whether the work relating to green public procurement carried out by the Government, the relevant agencies and the Swedish Environmental Management Council has been focused on reducing emissions in line with the Swedish milestone target for 2020 and whether their management has been effective.

2. Audited market-based environmental policy instrument

Green public procurement (GPP) is one of the instruments in the climate bill adopted in 2009 in order to reach the milestone target for 2020 for the national climate objective. For this the greenhouse gas emissions must be 20 million tonnes lower than 1990 levels for the non-trading sector.

3. Audited stages of implementing the instrument

- Policy design (selection of the instruments).
- Enforcement.
- Supervision/control.
- Impact assessment of policy/instrument.

4. Methodology used to audit the instrument

Reading and analysing various documents, interviews with relevant parties (Ministries, agencies, organizations), 3 in-depth group interviews with procurement officers working in public sector.

In addition estimates of carbon dioxide emissions from the holding of green cars in the public sector as well as transaction costs for purchasing these cars were calculated in order to provide a basis for a discussion on how the policy instrument can be used more effectively and efficiently.

5. Main findings and recommendations

Findings:

- The objectives in the Government's National Action Plan for green public procurement are process-orientated and are not focused on the national milestone climate target for 2020. Thus, monitoring also fails to provide a basis for assessing the climate impact or the impact on other environmental objectives.
- Tasks in the Government's National Action Plan for green public procurement for the years 2007-2009 need to be updated. It is unclear what tasks in the action plan still apply to the Swedish Environmental Protection Agency, the Swedish Environmental Management Council and the Swedish Competition Authority.
- The new "should" rule in the LOU means that agencies should take account of environmental considerations in public procurement if such is justified by the nature of the procurement. According to several of the procurement officers interviewed by the Swedish National Audit Office, the "should" rule has no impact on procurement work in practice.
- The audit shows how important it is for procuring agencies to take account of life-cycle costs when procuring because the purchase price of a product is only part of the total cost. Operating costs can also be substantial.

Recommendations:

- The National Action Plan for green public procurement should be clearly linked to the climate objective and the other prioritised environmental objectives so as to make clear that the purpose of green public procurement is to reduce adverse environmental impact.
- Clear responsibility for coordinating the work on green public procurement should be designated in order to allow focus on common objectives in the area.
- The tasks in the National Action Plan for green public procurement should be updated to clarify what tasks apply to the agencies concerned and the Swedish Environmental Management Council.
- The information on green public procurement to procuring parties should coincide, to avoid uncertainty among procuring parties.
- The ability to designate prioritised product areas in an ordinance should be investigated.

6. Additional information

It is difficult to audit the effects of the GPP instrument because of the lack of statistics in the area. This is a common problem for the instrument throughout Europe and not only a problem in Sweden. Statistics was available on only one product group - the green cars in public sector. With the help of this statistics it was possible for the audit team to estimate how large the reduction in emissions could be when procuring green cars instead of conventional cars.

Full audit report in English:

<http://www.riksrevisionen.se/en/Start/publications/Reports/EFF/2011/Green-public-procurement--is-management-effectively-helping-to-achieve-the-climate-objective/>

G. Carbon Trading: Current Situation and Oversight Considerations for Policymakers (GAO-10-851R)

United States' Government Accountability Office, 2010

1. Objectives of the audit

In an effort to reduce carbon, some have suggested capping emissions and allowing them to be traded in secondary markets just as other commodities are traded. This report provided information on:

- carbon-related products currently traded in the United States and the extent of trading;
- risks and challenges posed by these products;
- the extent to which and how these products are regulated; and
- issues that market observers identified for policymaker consideration as part of creating a national cap-and-trade carbon market.

2. Audited market-based environmental policy instrument

A possible national **carbon trading program** that would price carbon emissions and trade them to assist producers with complying with emissions caps was reviewed during the course of this audit.

3. Audited stages of implementing the instrument

- Policy design (selection of the instruments).
- Supervision/control.

4. Methodology used to audit the instrument

We reviewed

- Congressional testimonies and federal laws;
- Studies and reports from GAO, other Congressional offices, from professional associations, academics, and the World Bank; and
- Data and opinions from
 - U.S. and foreign futures market regulators,
 - U.S. and foreign futures markets,
 - Financial industry associations,
 - Academic experts on carbon trading, and
 - Representatives from a carbon emitter and a financial institution.

5. Main findings and recommendations of the report

- In 2009, a variety of carbon products traded in the United States, but trading volumes were small, and most trades took place on organized exchanges rather than in over-the-counter (OTC) markets, which meant that the U.S. futures market regulator generally had jurisdiction over this activity.
- Carbon products traded in the U.S. carbon markets had risks similar to those posed by other commodity products and had experienced problems (including fraud) domestically and internationally.
- The risk that political or regulatory changes could affect the carbon markets was a concern, but market observers noted it could be mitigated in the program's design.

Recommendations:

- Policymakers should consider that the level at which emissions caps are set in primary markets can affect secondary markets' liquidity (the ability to buy or sell without causing large price movements);
- allowing participants to hold or "bank" allowances or having the allowances expire after a certain time period could also affect secondary market trading, with allowance banking encouraging longer-term financial products;
- ensuring that adequate and timely requirements are in place to register allowances also could help maintain the integrity of the secondary market for carbon products;
- market participants and observers supported allowing carbon products to be traded in OTC markets as well as exchanges;
- additional mechanisms to better ensure effective oversight and interagency coordination could be important to the success of U.S. carbon markets, including that the U.S. futures regulator has full authority over carbon trading and sufficient resources to oversee this trading;
- U.S. regulators must interact and cooperate with other domestic and international bodies, including using formal memorandums of understanding with these organizations that specify how such interactions occur.

6. Additional information

Lessons learned from the audit:

- Speak with a range of market participants, regulators, and experts.
- Uncertainty over design of markets and applicable national policies and regulations can limit conclusions about activities.
- Adequacy of the resources available to regulators is important.

H. Climate-related taxes – Who pays?

The Swedish National Audit Office, 2012

1. Audit objectives

The purpose of the audit was to assess whether agency and Government reporting of household and trade and industry expenditure for climate-related taxes was transparent and sustainable.

The audit proceeded from the following audit questions:

1. Are there significant distribution effects, that is, differences in how much different polluters have to pay for their emissions?
2. Do Government and agencies report the substantial distribution effects that may exist?
3. Does the Government provide sufficient information to the Riksdag (Swedish Parliament) on measures and effects in relation to binding and optional objectives with different time horizons?

2. Audited market-based environmental policy instruments

Climate-related taxes should contribute to cost-effective reductions in emissions, partly with reference to the competitiveness of trade and industry. Furthermore, the taxes should be coordinated with other policy instruments – such as trade in emission allowances. The polluter pays principle should also apply.

3. Audited stages of implementing the instrument

- Policy design (selection of the instruments).
- Impact assessment of policy/instrument.
- Adaption/ changes in the system.
- Use of revenues/distribution.

4. Methodology used to audit the instrument

The foundation of the audit's points of departure included the Riksdag's decisions on Government Bills relating to climate and energy and the Riksdag's guidelines for tax policy. Besides studying documents, the Swedish National Audit Office assessed how much trade and industry in general and the industrial and energy sectors in particular pay in climate-related taxes and, where applicable, for emission allowances in the EU ETS.

As regards the trading sector's expenditures for emission allowances, the Swedish National Audit Office used historical data and projections for future prices of emission allowances (EUA) within the EU ETS. The data was purchased from Thomson Reuters Point Carbon.

5. Main findings and recommendations

Findings:

- Climate-related taxes lead to distribution effects, both between households and trade and industry, between different types of households, between the trading and the non-trading sectors and between various trade and industry sectors.
- The polluter pays principle is one of the Riksdag's points of reference for tax policy, but it is not applied to its full extent.
- There are major differences with respect to how much different polluters pay for emissions. Climate-related taxes and the EU Emissions Trading System are not the same type of policy instrument, but in practice their combined effect has been to increase these differences.
- Both the EU Emissions Trading System and the carbon dioxide tax mean that there is a price on carbon dioxide emissions, but companies in the trading sector have in practice paid very little, in some cases nothing, for emissions. This is due to reductions in and exemptions from climate-related taxes and the allocation of free emission allowances. In addition, every year from the start of the Emissions Trading System in 2005 (*until the point of time the audit report was published*), the trading sector in Sweden has been allocated far more emission allowances than it has required.

Recommendations

- The Government should report comprehensively on how great the polluters' costs for climate-related taxes and emission allowances are in relation to the volume of emissions.
- The Government should guarantee that the agencies provide information to the Government to facilitate such reporting.
- The Government should designate a clear responsibility for the coordination of continuous data collection, analyses and comprehensive reporting of the costs for and effects of the climate-related taxes, the Emissions Trading System and the interaction between these policy instruments in relation to the development of emissions. Coordination responsibility should be designated as soon as possible so that the work on specifying and assembling the necessary statistical basis and relevant analysis tools is secured in good time for the in-depth reporting in Checkpoint 2015.

6. Additional information

NAO of Sweden hired two of Sweden's leading scientists in economics as quality assurers of the audit report, from an economic perspective. These two experts are professors of two different Swedish Universities. In our opinion such external quality assurance is necessary due to the complexity of the area, and in order to increase the impact of an audit.

Full audit report in English:

<http://www.riksrevisionen.se/en/Start/publications/Reports/EFF/2012/Climate-related-taxes--Who-pays/>

I. The integrity and implementation of the EU Emissions Trading Scheme

European Court of Auditors (ECA), 2015

1. Objectives of the audit

The main audit question: Is the European Union Emissions Trading Scheme managed adequately by the Commission and the Member States?

Sub-questions:

1. Is there an appropriate framework for protecting the integrity of the EU ETS?
2. Is the EU ETS correctly implemented?

2. Audited market-based environmental policy instrument

The EU ETS is the world's biggest **cap and trade system** for greenhouse gas emissions. Its goal is to reduce greenhouse gas emissions, and the higher the price of carbon, the greater the incentive. The scheme works by putting an overall limit (decreasing over time) on the emissions of greenhouse gases. Allowances are distributed to installations (more and more by means of auctions), which must respect their caps, and if they do not have enough allowances to cover emissions, must acquire more on the carbon market, or reduce emissions.

3. Audited stages of implementing the instrument

- Enforcement (including market supervision and oversight, and penalties).
- Supervision/control (including ETS registry system, reporting requirements, monitoring and control framework, coordination, and guidance).
- Adaption/ changes in the system (referring to adaptations / changes in the control and supervisory framework, rather than changes targeting the impact of the ETS).
- The audit also considered legal status of allowances .

4. Methodology used to audit the instrument

For the purpose of this audit interviews and documentary reviews at relevant European Commission services were conducted, as well as, visits to five Member States, where the authorities responsible for implementing the ETS were interviewed, and relevant documentation examined. Desk reviews of documentation for two other Member States were also conducted. Furthermore, substantive testing of relevant ETS documentation relating to 150 installations in those seven Member States and consultations with interested NGO's were made. Also, expert assistance was used.

5. Main findings and recommendations

Findings:

- The management of the EU ETS by the Commission and Member States was not adequate in all respects. It was hindered by certain issues related to the robustness of the framework for protecting its integrity, and by significant weaknesses in the implementation of phase II of the EU ETS both in the Commission's guidance and monitoring of Member States'.
- There is no EU level oversight of the emissions market, and there is insufficient regulatory cooperation.
- Member State procedures to control the opening of EU ETS accounts, monitor transactions, and cooperate with regulatory authorities had significant shortcomings and the Commission cannot adequately monitor transactions due to data protection considerations.
- Systems for monitoring, reporting and verification of emissions were not sufficiently well implemented or harmonised.
- Some Member States did not provide all the required reports on the operation of the EU ETS, and the Commission did not publish the annual implementation report required under the EU ETS Directive.
- The Court could not assess the effectiveness of the Member States' diverse sanction systems due to a lack of consolidated information at Member State and European level. There were divergent practices concerning specific rules for the surrendering of international project credits between the Member States.

Recommendations:

- Remaining issues in emission market regulation and oversight should be addressed by the Commission in order to improve market integrity.
- The legal status of allowances should be further clarified in order to contribute to stability and confidence.
- Certain aspects of the systems for processing fundamental EU ETS information (the EU Union Registry and related procedures) should be further improved.
- The control framework at the level of the Member States should be better applied to ensure that the weaknesses identified are taken into account for the implementation of phase III.
- During phase III, the level of guidance and information about the implementation of the EU ETS should be improved.
- The implementation of sanctions in relation to the EU ETS should be made more transparent.

6. Additional information

Appendixes

The report got quite a good coverage in the professional press. Timing of the release was also close to the date when the European Parliament passed the most recent reform of the EU ETS.

Full audit report in English (the report is available in all of the EU languages):

<http://www.eca.europa.eu/en/Pages/DocItem.aspx?did=31989>

J. Tradable allowances and the environment

Netherlands Court of Audit, 2013

1. Objectives of the audit

In 2013 systems of tradable allowances (e.g. CO₂ emission allowances, NO_x emission allowances, animal allowances (for pigs and poultry), milk quota and fishing quota) were under review or in the process of being wound up. The objective of this audit was to give members of the Dutch House of Representatives more insight in the dos and don'ts of the instrument concerning its application in environmental matters. The Netherlands Court of Audit tried to produce an accessible reference work for the members of parliament and other interested parties who are not familiar with this complex subject matter.

2. Audited market-based environmental policy instrument

Tradable allowances aim to influence entrepreneurs to reduce environmental pollution through investment in environment-friendly technologies.

3. Audited stages of implementing the instrument

- Policy design (selection of the instruments).
- Enforcement.
- Impact assessment of policy/instrument.
- Supervision/control.

4. Methodology used to audit the instrument

This audit was based on material in the public domain, including audit reports previously published by the NCA done in the previous years concerning CO₂, fish quotas and animal allowances. However, these audits do not directly evaluate the instrument of the tradable rights itself, but focus more on topics like measurable objectives, supervision and sanctions and the like – the topics the NCA is known for. Because of the usually general approach of policies the audits don't dig into the instrument itself.

Besides we consulted some economists in the Netherlands specialized in tradable permits. We asked them for instance to give their comments of the concepts of the report.

5. Main findings and recommendations

There were no main findings. The report as a whole is more or less just a set of recommendations for the Dutch House of Representatives.

K. Implementation of Waters Act (Deciding on the use of water)

Stress on the section: Efficiency of implementing and enforcing of water fees

Slovenian Court of Audit, 2013

1. Objectives of the audit

The audit objective was to express an opinion on the efficiency of operations of the Ministry of Environment in the implementation of the Water Act and of the regulations issued on the basis thereof, as regards water use and water fees, in the period from 2009 to 2012. The Court of Audit assessed the efficiency of operations of the Ministry in that it sought answers to the questions of whether the Ministry was efficient in deciding about the water use and whether it was efficient in managing the collected water use fee. The Court audited the effectiveness of introduction and enforcement of water fees as a part (app.50 %) of a broader audit "*Deciding on the use of water*".

2. Audited market-based environmental policy instrument

Water fees are defined by the Waters Act accordingly to water rights obtained and should be paid by those who use water for different purposes pursuant to the principles of the Waters Act, a water fee should be collected to compensate costs of preventing and remedying costs of environmental damage and other costs caused by extracting water from the nature.

3. Audited stages of implementing the instrument

- Policy design (selection of the instruments).
- Enforcement.
- Supervision/control.
- Impact assessment of policy/instrument.
- Adaption/changes in the system.
- Use of revenues/distribution.
- Other.

4. Methodology used to audit the instrument

For the purpose of this audit national regulations and the EU legislative background were compared to estimate whether the water pricing in Slovenia was determined in accordance to the principles set by the Water Framework Directive and whether water fees for all kinds of water use were determined with regard to the “polluter pays principle”.

Audit evidence collection methods included a review of legislature, studies and documentation, as well as, interviews with key employees of the ministry were held throughout the audit. Furthermore, questionnaires were sent to the ministry to collect data and to the public water companies to assess the comprehensiveness of calculation methods and availability of data to accomplish calculations as they are prescribed.

5. Main findings and recommendations

Findings:

- There was no proper mechanism in place to determine water fees for particular water-uses, considering the environmental and resource costs and priorities of use for different purposes to assure sustainable water-use.
- For some kinds of water-uses the fee-payers were not defined properly and unambiguously, therefore their obligations were shifted to the fee-payers of other water- uses or not charged at all.
- Water fees for the extracted cubic meter of water for any kind of water use in Slovenia were much lower than the average water fees for extracted cubic meter of water for the same use in OECD countries and compared to the estimated budgetary requirements for investments in water infrastructure and other costs of public services connected to the water supply.
- In the period from 2010 to 2013 government raised water fees for some water uses, although there was no study on actual environmental and source costs upon which to argue those raises.
- The water book (the record of water rights holders) was not complete and reliable, and therefore it was not possible to identify all water right holders to whom the water fee should be charged.
- The companies which owned the marinas and used belonging marine water land didn't obtain water rights although they were obliged by the Waters Act. Consequently, they were not listed in the water book, and not recognized as water fee payers.

Recommendations:

- A new act on water fee should be prepared in which the method of its assessment would clearly consider estimation of environmental and source costs.
- It was recommended to the ministry to change the definition of the base upon which the water fees are assessed to assure that water fee would be paid for all water extracted.
- It was recommended to the ministry to conduct a study in which to elaborate water pricing policy in all sectors, elaborate methodology to estimate environmental and source costs and prepare an estimation of these costs for each water use.
- It was recommended to the ministry to complete the database of granted water rights, link all relevant data sources needed to calculate the water fee and introduce regular updates of the record.
- The ministry should conduct all required procedures to grant the water rights to all beneficiaries.

6. Additional information

The government responded that there are no proper rules or guidance adopted by the European Commission how to assess compensation costs and that many EU countries are not doing it. So, therefore there is no need to do it because it might not be in accordance with the possible future EU rules. Nevertheless, the ministry started to prepare the methodology for the compensation costs estimations and to collect data to be able to evaluate the costs.

The ministry compiled compensation costs for different uses of water and prepared the methodology how to assess the water fees. It also started to prepare the new regulation on water fees assessment.

APPENDIX 3. BIBLIOGRAPHY AND RECOMMENDED LITERATURE

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