

**INTERACTION OF THE EU EMISSIONS TRADING  
DIRECTIVE WITH CLIMATE POLICY INSTRUMENTS  
IN THE NETHERLANDS**

**Policy Brief**

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## Acknowledgement/Preface

The present policy brief is part of the Dutch contribution to the research project *Interaction in EU Climate Policy* (INTERACT). This project explores the potential interactions between the operation of the proposed EU Emissions Trading Scheme (EU ETS) and other, related energy and climate policy instruments in EU Member States. The Interact project is supported by the European Commission under its Fifth Framework Programme 'Energy, Environment & Sustainable Development' (Project no. EVK2-CT-2000-0067). It is co-ordinated by SPRU at the University of Sussex (UK), and involves four other research institutes in France (CIRED), Germany (ISI), Greece (EPG) and the Netherlands (ECN). More details about the Interact project, including a list of publications delivered by the research partners, can be found at <http://www.sussex.ac.uk/spru/environment/research/interact.html>.

The Interact project is registered at ECN under number 7.7358. For information on the ECN contribution to the project you can contact Jos Sijm by email ([sijm@ecn.nl](mailto:sijm@ecn.nl)) or by telephone (+31.224.568255).

## Abstract

This policy brief presents an overview of the implications of the proposed EU Emissions Trading Scheme (EU ETS) for some selected energy and climate policy instruments in the Netherlands. It summarises the results of research that has been conducted by the Energy research Centre of the Netherlands (ECN) as part of the EU-funded project *Interaction in EU Climate Policy*.

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## 1. INTRODUCTION

### 1.1 Objective

This policy brief presents an overview of the implications of the proposed EU Emissions Trading Scheme (EU ETS) for some selected energy and climate policy instruments in the Netherlands. It summarises the results of research that has been conducted by the Energy research Centre of the Netherlands (ECN) as part of the EU-funded project *Interaction in EU Climate Policy* (see Chapter 6 - Further Reading).

### 1.2 Climate policy context

The Netherlands signed the Kyoto protocol along with the other Member States of the EU in 1998. It was agreed that the Dutch contribution to realising the EU commitment under the Protocol would be to reduce emissions of greenhouse gases by an average of 6 percent per year in the period 2008-2012, relative to 1990.

In order to meet its Kyoto target, the Dutch government launched the so-called 'Climate Policy Implementation Plan (CPIP), consisting of two parts. Part I (1999) deals with domestic measures to mitigate GHG emissions, while Part II (2000) presents the initiatives that the Netherlands will be taking abroad by means of the Kyoto mechanisms. It was agreed that half of the required emissions reductions would be realised abroad. The other 50 percent will be achieved at home, of which about two-thirds will be realised by reducing CO<sub>2</sub> emissions and one-third by reducing other GHGs.

According to the most recent projections, total GHG emissions in the Netherlands without implementation the policy measures of the CPIP would amount to about 239 MtCO<sub>2</sub> equivalents in 2010, while the Kyoto target corresponds to a limit of, on average, 199 Mt per year over the period 2008-2012. This implies that the total reduction assignment for the year 2010 is about 40 MtCO<sub>2</sub> equivalents. Following the CPIP principles mentioned above, this means that the domestic reduction target amounts to 20 Mt CO<sub>2</sub> equivalents per year (of which about 13-14 Mt will be achieved through CO<sub>2</sub> reductions).

Besides the division between CO<sub>2</sub> versus other GHG reductions, Part I of the PCIP specified some other criteria with regard to the selection of policy instruments to reach the domestic GHG mitigation target. These criteria included that policy measures should be cost-effective, spread the effort in a balanced way across target groups, encourage structural changes, which reduce CO<sub>2</sub>, and allow target groups flexibility in what actions they take while assuring that results are achieved. These criteria have led to emphasis on negotiated agreements with target groups and market-oriented instruments such as fiscal incentives, subsidies and information programs.

### 1.3 Selected climate policy instruments in the Netherlands

A total of four policy instruments were selected for an exploration of their potential interactions with the EU ETS. These were chosen on the basis of their relative importance and their coverage of different target groups. The instruments include:

- The *Benchmarking Covenant* (BC): a negotiated agreement with energy-intensive industries in order to improve their energy efficiency.
- The *Regulatory Energy Tax* (REB): an ecotax on the consumption of gas and electricity, including the partial exemption of this ecotax on renewable electricity.

- The *Environmental Quality of Electricity Production* (MEP): a feed-in subsidy system for the producers of renewable electricity.
- The system of *Tradable Green Certificates* (TGCs): a system of guarantees of origin to promote renewable electricity, based on the partial exemption of the REB.

As the MEP, the TGCs and the exemption of the REB all serve the same purpose, i.e. encouraging renewable energy, they have been grouped together as ‘renewable energy support policies’ when exploring the potential interactions with the EU ETS. Table 1.1 lists the selected instruments and indicates the nature of their interaction with the EU ETS.

Table 1.1 *The nature of the potential interaction between the EU ETS and selected policy instruments in the Netherlands*

| Category               | Instrument  | Acronym | Direct | Indirect | Trading |
|------------------------|---|---------|--------|----------|---------|
| Negotiated agreements  | Benchmarking Covenant   | BC      | ✓      | ✓        |         |
| Carbon/energy taxes    | Regulatory Energy Tax (levy on gas and electricity use)           | REB     |        | ✓        |         |
| Support for renewables | Environmental Quality of Electricity Production (feed-in subsidy) | MEP     |        | ✓        |         |
| Support for renewables | Regulatory Energy Tax (reduced levy for green power)              | REB     |        | ✓        |         |
| Support for renewables | Tradable Green Certificates                                       | TGC     |        | ✓        | ✓       |

A comprehensive analysis of the potential interactions between each of the above instruments and the EU ETS has been conducted as part of the Dutch contribution to the Interact project. The following three sections provide a summary of this analysis. In each case the scope, objectives, and operation of the instruments are compared, policy options are identified and specific policy recommendations are provided. The final section deals with some general policy implications of the EU ETS for national climate policies.

## 2. INTERACTION BETWEEN THE EU ETS AND THE BENCHMARKING COVENANT

The Benchmarking Covenant is one of the key instruments of current climate policy in the Netherlands. The Covenant is a voluntary agreement, signed in July 1999 by the Dutch government and the energy-intensive industry, including the electricity production sector. The central goal of the Benchmarking Covenant (BC) is to reduce greenhouse gas emissions from energy-intensive industries by improving their energy efficiency without compromising the international competitiveness of these industries. According to the BC, participating industries are required to become part of the top-of-the world in terms of energy efficiency as soon as possible, but no later than 2012. In return, the government will refrain from implementing additional specific national measures aimed at further reducing energy use or CO<sub>2</sub> emissions by these industries.

### 2.1 The scope of the instruments

In terms of sectoral coverage (notably of companies involved) there is a high degree of overlap between the major target groups of the EU ETS and the BC. Nevertheless, there are a few companies (with a relatively large amount of installations) that have joined the BC but which are not covered by the EU ETS. On the other hand, there are several companies which are subject to the EU ETS but which do not participate in the BC (although most of these companies have signed alternative Long-Term Agreements on energy efficiency).

### 2.2 The objectives of the instruments

There is a high degree of overlap and synergy between the primary objectives of the two instruments, i.e. improving energy efficiency (BC) versus mitigating CO<sub>2</sub> emissions cost effectively (EU ETS). Although improving energy efficiency and reducing CO<sub>2</sub> emissions usually converge in the same direction, there are some cases in which these objectives may diverge or even conflict. In addition to a situation of growing output (in which energy efficiency per unit of production may improve while CO<sub>2</sub> emissions may increase), these cases refer particularly to changes in fuel mix as well as to those situations in which the coverage of the emissions/energy sources differ between the BC and the EU ETS. These differences in coverage of emissions/energy sources include especially the coverage of (i) direct versus indirect emissions, (ii) energetic versus non-energetic emissions and (iii) energy/emissions from waste, biomass or non-fossil sources. In all these cases, the objectives of improving energy efficiency (BC) and reducing CO<sub>2</sub> emissions (EU ETS) may not only move in different tempi but also in different directions.

### 2.3 The operation of the instruments

The interaction between the EU ETS and the BC raises a variety of issues, such as (i) the impact of the EU ETS on electricity prices, (ii) the impact of the EU ETS on generating heat/power, or (iii) the question whether the BC could be used as a basis for the allocation of EU ETS allowances. These issues will be briefly summarised below.

#### *The impact of the EU ETS on electricity prices*

The EU ETS may have a significant impact on the price of electricity, which, in turn, may have a significant, although opposing impact on the two major sectors covered by the Benchmarking Covenant, i.e. the power producers versus the energy-intensive industries (which are the main

consumers of electricity). By means of a numerical example, it is shown that emissions trading at an allowance price of €10/tCO<sub>2</sub> may lead to an increase of the electricity price in 2010 by 0.42 cent/kWh. Based on a commodity or producer cost price of 2.7 cent/kWh before emissions trading, this implies an increase of that price of some 15 percent due to the EU ETS.

If the EU ETS will indeed result in an increase of the average electricity price by 0.42 cent/kWh, it will have a significant impact on the two major sectors covered by the Benchmarking Covenant. In case of free allocation of allowances, a large amount of economic rent - more than €400 million - will accrue to the power sector, while industries that compete on global markets cannot pass on an increase in the electricity price to their customers. As a result, the supply of these industries declines when the electricity price is raised.

The impact of higher electricity prices on energy-intensive industries could, in theory, be relieved by auctioning allowances to the power sector and channelling a part of the auction revenues to the (large-scale) consumers of electricity. Another option to compensate energy-intensive industries for higher electricity prices is to allocate free allowances for the generation of power to these end-users rather than directly to the electricity producers, while these producers remain responsible for surrendering allowances according to their emissions. Hence, this option includes the separation of the *allocation* of allowances - i.e. indirectly to (large-scale) electricity consumers - from the *compliance obligations* for emissions, i.e. direct to power producers. As a result, the end-users of electricity can sell these allowances (to the power producers) as they do not really need them, thereby compensating these end-users for the higher electricity prices. In addition, in both options accruing large amounts of economic rent to power producers would be avoided.

A major disadvantage of both options is that, when implemented only in one Member State such as the Netherlands, it will affect the competitive position of both its electricity producers and (industrial) end-users compared to those of other Member States. Moreover, another disadvantage - notably of the option to allocate allowances indirectly to industrial end-users of electricity - is that it may significantly increase the administrative complications and, hence, the administrative demands of the EU ETS. Therefore, unless these options are implemented in all EU Member States together and their administrative demands have been adequately settled, they may not be acceptable for individual Member States from a socio-political point of view.

#### *The impact of the EU ETS on generating heat/power*

An interesting interaction issue between the EU ETS and the Benchmarking Covenant concerns the treatment of energy use and concomitant emissions due to the generation of (off-site) heat and power, including combined heat and power (CHP). In a direct (downstream) emissions trading system such as the EU ETS, emissions due to the generation of heat/power are attributed to heat/power producers. The Benchmarking Covenant, on the contrary, is based on an indirect approach of energy use and concomitant emissions, in which the emissions of power/heat are attributed to the end-users.

Whereas the indirect approach of the Covenant encourages energy efficiency, the direct approach of the EU ETS may lead to sub-optimal shifts in energy use in cases where electricity or heat can be substituted for fuel. For industry, replacing direct fuel consumption by purchased heat or electricity might be an attractive way to retain allowances for selling on the market. This would occur particularly if electricity and heat prices do not adequately reflect emission costs, e.g. because of fierce competition and ample allocation of free allowances in the energy sector.

#### *The Benchmarking Covenant as a basis for allocating EU ETS allowances*

A major interaction issue concerns the question whether the BC could be used as a basis for allocating EU ETS allowances. The major advantage of such an approach would be that it fits well within existing climate policies in the Netherlands, that it would meet several allocation

criteria specified in Annex III of the EU ETS Directive, and that it would increase the political acceptability of the EU ETS among the participating companies of the BC.

However, allocation of allowances based on the Benchmarking Covenant is likely to imply that the socio-economic benefits of emissions trading in the Netherlands will be relatively low. Moreover, the conversion of energy efficiency benchmarks into CO<sub>2</sub> emission quotas raises a variety of practical implementation issues, which may lead to high information and transaction costs. Overall, in a multi-criteria assessment, the coexistence of the EU ETS and the BC, notably when the allocation of the emission allowances is based on the BC, scores relatively high in terms of industrial competitiveness and political acceptability, but relatively low in terms of economic efficiency and administrative simplicity.

## 2.4 Policy options

In order to improve the interaction between the BC and the EU ETS, several policy options have been considered, including:

1. relieving BC restrictions on EU ETS,
2. using alternative allocation rules,
3. auctioning of EU ETS allowances,
4. allocating allowances to electricity end-users,
5. tightening the EU ETS cap to participating sectors,
6. abolishing the BC when the EU ETS is introduced,
7. mixing the previous options.

Based on a multi-criteria assessment, it turns out that each option separately - except Option 4 - scores higher than the baseline option (i.e. the coexistence scenario of the EU ETS and BC alongside each other, with allocation based on the BC). Option 7, i.e. a mixture of Options 2-6 (except Option 4), shows the best policy performance.

## 2.5 Policy recommendations

- The costs of emissions trading should be reflected in the price of electricity and heat. This could be achieved by either auctioning (a part of) the allowances or granting a limited amount of free allowances to the energy sector (so that additional allowances have to be bought at an auction or market). Auctioning would offer the opportunity to compensate industrial en-users for the higher energy prices due to emissions trading, thereby protecting their competitive position.
- Regardless the method of allocating allowances, the Benchmarking Covenant could be considered to be abolished once the EU ETS becomes operational, since there are no convincing reasons to continue the existence of the BC alongside the EU ETS.

### 3. INTERACTION BETWEEN THE EU ETS AND THE REGULATORY ENERGY TAX

The Regulatory Energy Tax (REB, after its Dutch acronym) was introduced in 1996, mainly as a levy on the use of gas and electricity by households and small-scale industry. The revenues from the REB have been mainly used to reduce other taxes and social premiums imposed largely on households and small firms (i.e. the so-called ‘greening of the fiscal system’).

#### 3.1 The scope of the instruments

There is hardly any overlap or interaction between the direct target groups of the EU ETS and the REB. The groups directly affected by the EU ETS consist exclusively of large energy users, while the REB is imposed predominantly on the consumption of fossil electricity and gas by small- and medium-scale energy users (including households and firms). However, there are some major interactions between the indirect target groups of these instruments. For instance, the group of small- and medium-scale fossil energy users is affected directly by the REB (through taxation of conventional energy use) and indirectly by the EU ETS (through higher prices resulting from CO<sub>2</sub> abatement costs). Hence, this group will be subject to double regulation and may be charged double, depending on whether and to which extent the EU ETS will result in higher consumer prices for fossil electricity.

#### 3.2 The objectives of the instruments

Although the EU ETS and the Dutch ecotax are predominantly focused on different direct target groups, there is a major overlap or synergy between the objectives of these instruments. The EU ETS is primarily aimed at reducing CO<sub>2</sub> emissions, thereby indirectly encouraging the saving of fossil fuel use in general and the switch to renewable energy in particular. On the other hand, both the primary objective of the REB to encourage the saving of fossil energy use in general and its additional objective to promote the switch to renewable energy consumption in particular contribute to the objective of reducing CO<sub>2</sub> emissions.

#### 3.3 The operation of the instruments

The interaction between the operation of the EU ETS and REB concerns particularly the consumption of one commodity, i.e. electricity generated from fossil resources. Due to this interaction small-scale electricity consumers are subject to ‘double regulation’ or ‘double charging’ in the sense that, on the one hand, they have to pay a relatively high REB tariff (including some carbon taxation) and, on the other hand, they pay higher electricity prices due to the EU ETS (including some internalised costs of carbon reduction).

#### 3.4 Policy options

A multi-criteria assessment of the coexistence of the EU ETS and an unchanged REB scores relatively low with regard to the criteria economic efficiency, social equity and political acceptability (particularly when the price of an emission allowance becomes high). This assessment provides the starting point for considering two alternative policy options that might improve the overall performance of the interaction between the EU ETS and the REB.

These options include:

1. Reducing the double regulation of the EU ETS and the REB on electricity use, either by reducing the REB on electricity (Option 1a) or by abolishing it completely (Option 1b).
2. Improving the social equity of the REB by expanding its sectoral coverage.

Whereas the overall performance of Option 1a is higher than the baseline option of the coexistence scenario, it is lower for both Options 1b and 2. Notably the performance of Option 2 is quite poor. The major reason for this poor performance is that the effectiveness of an energy or carbon tax on reducing CO<sub>2</sub> emission levels by the participating sectors will be zero as these levels are fixed by the emission cap (although it may affect the replacement and, hence, the trading of emissions among these sectors). This finding is also relevant to the dragging discussion on implementing a carbon or energy tax throughout the EU. Although the ultimate judgement over such an ecotax depends on its specific purposes and characteristics (including its sectoral coverage), such a tax cannot be recommended on grounds of cost-effectiveness if it is mainly aimed at reducing CO<sub>2</sub> emissions by sectors participating in the EU ETS.

### 3.5 Policy recommendations

- If the EU ETS results in higher electricity prices, it could be considered to reduce the REB on electricity consumption by small-scale end-users proportionally in order to avoid double taxation of these end-users.
- Energy users should pay for carbon emissions, whether through taxation or emissions trading. For each target group, only a single instrument should be used for carbon pricing. Therefore, sectors participating in the EU ETS should not be subject to national or EU carbon/energy taxation.

## 4. INTERACTION BETWEEN THE EU ETS AND RENEWABLE ENERGY SUPPORT POLICIES

Recently, the Dutch system of supporting renewable electricity has been drastically reformed. Starting from mid-2003, the major elements of the new system of supporting renewable electricity includes:

- *The MEP feed-in subsidy.* The essence of the MEP is to stimulate the environmental quality of generating electricity, notably by granting a subsidy to domestic producers of renewable electricity for each kWh fed into the grid.
- *The ecotax benefit.* Starting from mid-2003, the REB tariff on renewable electricity will be set at 3.49 cent per kWh, compared to 6.39 €/kWh for grey electricity, implying that the support due to the differentiation of REB rates on grey versus green electricity will amount to 2.9 €/kWh.
- *The green certificate system.* In the Netherlands, the green certificate system serves to facilitate the operation of a renewable electricity market based primarily on the promotion of a voluntary demand for green power. This demand is encouraged through the ecotax reduction on renewable electricity. The energy supplier, however, can only claim the tax reduction, if he surrenders to the tax authority an amount of green certificates corresponding to the amount of renewable electricity delivered to a green power consumer. Hence, in the Dutch system, there is a close link between the green certificate scheme and the ecotax incentive for renewable electricity.

### 4.1 The scope of the instruments

There is no overlap or interaction between the *direct* target groups of the EU ETS and the Dutch renewable support system. The EU ETS directly targets large fossil fuel users, including electricity generators, while the direct target groups of the Dutch renewable support system comprise, on the one hand, renewable electricity producers (through both the MEP and TGCs) and, on the other hand, renewable electricity consumers (through the ecotax benefit). However, the *indirect* interactions between the target groups of the EU ETS and the Dutch renewable support system are manifold, significant and complex.

### 4.2 The objectives of the instruments

Although the EU ETS and the Dutch support system for renewable electricity are focused on different target groups, there is a major overlap or synergy between the objectives of these instruments. The EU ETS is primarily aimed at reducing CO<sub>2</sub> emissions, thereby indirectly encouraging the saving of fossil fuel use in general and the switch to renewable energy in particular. On the other hand, the Dutch support system for renewable electricity is primarily aimed at promoting the use of renewable electricity.

Nevertheless, once the EU ETS becomes operational, renewable energy policies could, in principle, be abolished from a static CO<sub>2</sub> efficiency point of view as the EU ETS will realise the CO<sub>2</sub> target of the participating sectors at the lowest costs. However, there are other reasons to justify renewable energy policies within the context of the EU ETS. Perhaps the most important argument for supporting renewable technologies within the context of CO<sub>2</sub> mitigation is that a widespread diffusion of these technologies may result in a substantial fall in the costs of renewable energy and, hence, in meeting major cutbacks in CO<sub>2</sub> emissions at affordable costs (i.e. the so-called dynamic CO<sub>2</sub> efficiency argument).

### 4.3 The operation of the instruments

Although renewable energy policies should be accounted for when setting national quota under the EU ETS, the Directive opts for a formal separation between the markets for green certificates and emission allowances, i.e. green certificates cannot be converted to emission allowances (or vice versa) and, subsequently, traded among each other. Nevertheless, despite this formal separation between the markets for green certificates and emission allowances, in practice there will be all kinds of linkages and interactions between these markets, running through the power market. Based on a detailed analysis of the Dutch situation, it is concluded that the operational linkages and interactions between emissions trading and renewable energy policies in general, and between the markets for power, green certificates and emission allowances in particular, are quite intricate and sometimes complicated. Overall, however, there seem to be no major problems or conflicts between the operation of the EU ETS and the Dutch support policies for renewable electricity. On the contrary, the operation of the instruments seems to be mutually reinforcing in the sense that obtaining the operational target of one instrument enforces the achievement of the target of the other. The only problem might be the double or overstimulation of existing MEP-subsidy receiving producers due to the interaction of the EU ETS and the Dutch system for supporting renewable electricity.

### 4.4 Policy options

Nevertheless, the recently introduced renewables support system in the Netherlands is still subject to both political discussion at home and the need to harmonise it with ongoing developments of similar policies elsewhere in the EU. Therefore, four alternative policy options have been considered with regard to the question whether these options result in an improved interaction between the EU ETS and the Dutch policies of supporting renewable electricity. These options include:

1. reducing the double regulation of existing MEP producers,
2. abolishing the REB support while raising the MEP support proportionally,
3. introducing an obligatory quota system for renewable electricity,
4. encouraging one-way trading between green certificates and emission allowances.

The overall performance of Options 1-3 do not deviate significantly from the multi-criteria assessment of the coexistence scenario (i.e. the baseline option of the EU ETS and the Dutch renewable electricity support system in their present form). The performance of Option 4, however, is quite poor. Allowing one-way trading between green certificates and emission allowances does not serve any real purpose that could be achieved better by other, more sensible means, while it creates a variety of problems, notably double crediting, which undermines the environmental effectiveness and integrity of the EU ETS. Moreover, the present study has shown that there will already be a positive, mutually reinforcing interaction between the objectives of the EU ETS and renewable energy policies in general and between the operation of the markets for emission allowances and green certificates in particular, despite (or perhaps, owing to) the formal separation of these markets proposed by the Directive on the EU ETS. Therefore, the option of allowing one-way trading should be rejected, while the option of the EU ETS Directive to introduce a formal separation between the markets for green certificates and emission allowances should be supported.

### 4.5 Policy recommendations

- When determining the MEP feed-in subsidies to renewable electricity producers for a period of 10 years, the potential impact of the EU ETS on electricity prices should be explicitly considered.
- The market for green certificates and emission allowances should be formally separated.

## 5. POLICY IMPLICATIONS

Within the context of the EU ETS, it is important to distinguish energy policies that affect fossil fuel use (and, hence, CO<sub>2</sub> emissions) by the participating sectors versus the non-participating sectors because the effectiveness and the justification of these two sets of policies change once the EU ETS becomes operational. If a country joining the EU ETS has set a certain reduction target for its non-participating sectors, then national policies affecting fossil fuel use by these sectors are both necessary, effective and justified in order to control the emissions of these sectors and, hence, to meet the Kyoto commitments. On the other hand, in the absence of market failures and once a cap is set, national policies affecting the fossil fuel use of its participating sectors are neither necessary, neither effective, nor justified to control the CO<sub>2</sub> emissions of these sectors in the most efficient way.

The latter statement with regard to energy policies affecting the participating sectors is based on the following two considerations:

- Policies affecting fossil fuel use of participating sectors do influence the domestic CO<sub>2</sub> emissions of these sectors, but not the national emissions accounts of these sectors or the country as a whole as the national quota of emission allowances allocated to these sectors is fixed. Hence, any change in the domestic emissions by these sectors is compensated by a similar change in emissions traded by these sectors.
- The operation of the EU ETS results in a situation in which the primary environmental objective of the scheme (i.e. the emissions cap) is achieved at the lowest costs by the participants themselves as it encourages these participants to adjust their abatement options and emissions trading opportunities until the marginal abatement costs throughout the scheme are equal to the international clearing price of an emission allowance.

As a result, once the EU ETS becomes operational and the cap has been fixed, policies affecting fossil fuel use by participating sectors will lead to (i) less CO<sub>2</sub> efficiency, i.e. raising abatement costs without enhancing overall CO<sub>2</sub> reductions, and (ii) less optimal market operations within the EU ETS, i.e. less demand for emission allowances and/or more supply of these allowances, resulting in a declining price of an allowance. This process may continue until the scarcity on the market for emission allowances evaporates fully and the allowance price becomes zero. Therefore, from the perspective of CO<sub>2</sub> efficiency, the coexistence of the EU ETS and policies affecting fossil fuel use by participating sectors is hard to justify and, hence, these policies could be considered to be redundant and ready to be abolished.

However, there are basically three reasons that may justify the coexistence of the EU ETS and other policies affecting the fossil fuel use of participating sectors. Firstly, a major reason is improving the static and dynamic efficiency of emissions trading by overcoming market failures. The findings above on the CO<sub>2</sub> efficiency of the EU ETS are based on the assumption of a perfect economy with no (policy) distortions or other market failures. In practice, however, there are a variety of cases in which market failures lead to a loss in energy/CO<sub>2</sub> efficiency, either in a static or a dynamic sense. In such cases, the EU ETS may be jointly used by other policy instruments - such as subsidies on energy savings, awareness campaigns, or support to renewables - in order to overcome these market failures. If these other policies are well designed, i.e. pass a cost-benefit test, they may result in an overall improvement in static or dynamic efficiency.

A second reason to justify the coexistence of the EU ETS and other policies affecting the fuel use and CO<sub>2</sub> emissions of participating sectors is that these policies may serve to meet a variety of other policy objectives besides achieving CO<sub>2</sub> efficiency such as (i) raising fiscal resources, (ii) serving equity purposes, (iii) preventing other environmental effects besides CO<sub>2</sub> emissions, or (iv) improving security of supply.

A final justification for the coexistence of the EU ETS and related policies is that using, incorporating or accounting for these other policies may improve the design and implementation of the EU ETS and, hence, may lead to an improvement of its operation or political acceptability. An example is the coexistence of the EU ETS and a carbon or energy tax in order to mitigate the price uncertainty of an EU allowance by offering the opportunity to pay a tax should the allowance price exceed the tax level.

However, policies complementary to the EU ETS may at best improve the efficiency of CO<sub>2</sub> abatement (in case of market failures), but not the effectiveness of CO<sub>2</sub> mitigation (as the amount of CO<sub>2</sub> reductions is fixed by the cap on CO<sub>2</sub> emissions). Or, to put it more bluntly, *once the EU ETS becomes operational, the effectiveness of all other policies to reduce CO<sub>2</sub> emissions of the participating sectors becomes zero.*

Moreover, the socio-political acceptability of meeting other objectives besides CO<sub>2</sub> mitigation may change once it is realised that the relatively high costs of some of these policies can no longer be justified by CO<sub>2</sub> objectives but only by other considerations such as less NO<sub>x</sub> emissions, more rural employment or an improved energy supply security. Therefore, whatever these other considerations might be, it will be obvious that the evaluation of the costs and benefits of national policies affecting fossil fuel use by participating sectors will change once the EU ETS becomes operational. This may have far-reaching implications for these policies, including a major reform or, in some cases, even an abolition of these policies.

Finally, in practice, there are likely a variety of sound and less sound reasons why most of the existing policies affecting the fossil fuel use of participating sectors will be continued even after the EU ETS becomes operational, notably in the short term. As noted, some of these policies, if well designed, may lead to an improvement of the operation or political acceptability of the EU ETS, or even to an improvement of its CO<sub>2</sub> efficiency in cases of correcting market failures adequately. However, except these latter cases, all other policies affecting the fossil fuel use of participating sectors will reduce the efficiency gains, or assumed cost benefits, of the EU ETS. The supposed cost benefits of emissions trading, by both policy makers and policy analysts, are usually based on studies or models that implicitly assume the absence of using joint, complementary policies. In practice, however, a variety of other, complementary policies besides emissions trading will be used, for both sound and less sound reasons. This implies, however, that actual cost benefits of emissions trading will be less as, in general, you can not have simultaneously the full (assumed) benefits of both emissions trading and other policies affecting the fossil fuel use of participating sectors.

## LITERATURE

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