Consequences of the European Policy Package on Climate and Energy

Initial assessment of the consequences for the Netherlands and other Member States

Netherlands Environmental Assessment Agency

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Rapport in het kort

Het Europese Klimaat- en Energiebeleidspakket van januari 2008: een verkennende analyse van de implicaties voor Nederland en andere lidstaten

Dit rapport geeft een overzicht van de belangrijkste onderdelen van het pakket met wetsvoorstellen over klimaat- en energiebeleid dat de Europese Commissie op 23 januari 2008 heeft gepubliceerd. Het pakket is gericht op de vermindering van de uitstoot van broeikasgassen en toename van het aandeel hernieuwbare energie met doelstellingen voor alle Europese lidstaten in 2020. Het omvat onder andere voorstellen om het huidige emissiehandelssysteem aan te passen, om de lasten van het reduceren van broeikasgassen die niet onder het emissiehandelssysteem vallen over de lidstaten te verdelen en om een grotere inzet van hernieuwbare energie te bevorderen. Dit rapport bekijkt de voorstellen in samenhang en geeft een inschatting van de bijdrage van het pakket aan het behalen van de doelen die Nederland zichzelf gesteld heeft in het beleidsprogramma ‘Schoon en Zuinig’. Het rapport geeft verder een indruk van de verdeling van de taakstellingen over de lidstaten en identificeert belangrijke onderwerpen voor verdere analyse.

Trefwoorden:
EU, klimaatbeleid, energiebeleid, emissiehandelssysteem, broeikasgassen, lastenverdeling, hernieuwbare energie

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Samenvatting

Hoofdconclusies

- Met het pakket voorstellen over het Klimaat en Energiebeleid geeft de Europese Commissie invulling aan het Raadsbesluit van maart 2007 om de uitstoot van broeikasgassen in 2020 met 20% te verminderen ten opzichte van 1990. De uitvoering van de maatregelen is een gedeelde verantwoordelijkheid van Commissie en EU-lidstaten. In de voorstellen komt de verantwoordelijkheid voor de implementatie van nieuw klimaatbeleid sterker dan voorheen op Europees niveau te liggen.
- De voorstellen geven flexibiliteit om de gestelde doelen te bereiken: nationale emissieplafonds voor broeikasgassen vervallen deels, het Europese emissiehandelssysteem (ETS) wordt uitgebreid en internationale handel in groencertificaten wordt mogelijk. Daarnaast blijft er handel in emissierechten van projecten buiten de EU (CDM/JI)[2] ook tussen EU-landen.
- Het Nederlandse *'Schoon en Zuinig'*-programma (met een doelstelling van 30% reductie van broeikasgasemissies door Nederland in 2020 ten opzichte van 1990) kan profiteren van het Klimaat- en Energiepakket, maar een nationale doelstelling voor emissies door de industrie en energiesector heeft zijn betekenis verloren. De regering kan overwegen het nationale doel voor totale broeikasgasemissies te herformuleren.
- De *'Schoon en Zuinig'*-doelen voor 2020 voor de sectoren die niet onder het Europese emissiehandelssysteem vallen en voor hernieuwbare energie blijven haalbaar met aankoop van emissierechten en groencertificaten. Voor het *'Schoon en Zuinig'*-doel voor energie-efficiëntie is aanvullend Europees bronbeleid nodig, zoals aangescherpte normen voor voertuigen en elektrische apparaten. Aanvullend Europees bronbeleid is ook nodig voor het halen van de Nederlandse *'Schoon en Zuinig'*-doelen in het geval de EU besluit tot een 30% reductie van de broeikasgasemissies.
- Bij een goed werkende markt voor emissierechten kan sprake zijn van een 'waterbedeffect' binnen de industrie en energiesector. Extra nationaal beleid is in die situatie voor de klimaatdoelstelling niet effectief, maar kan van belang zijn voor het bereiken van nationale doelen op het gebied van luchtkwaliteit, hernieuwbare energie, energie-efficiëntie of technologieontwikkeling.

Dit rapport geeft een overzicht van de belangrijkste onderdelen van het pakket met wetsvoorstellen over Klimaat- en Energiebeleid dat de Europese Commissie op 23 januari 2008 heeft gepubliceerd. Het pakket is gericht op de vermindering van de uitstoot van broeikasgassen en toename van het aandeel hernieuwbare energie met doelstellingen voor alle Europese lidstaten in 2020. De voorstellen vormen de praktische uitwerking van een besluit van de Europese Raad van maart 2007. De Raad besloot toen om een vermindering van de uitstoot van broeikasgassen van tenminste 20% te bereiken in 2020 ten opzichte van 1990. Tevens besloot de Raad zich te willen vastleggen op een 30% reductie in 2020, indien 'andere ontwikkelde landen zich tot vergelijkbare emissiereducties verbinden en dat economisch meer ontwikkelde ontwikkelingslanden zich ertoe verbinden een adequate bijdrage te leveren'. Het pakket omvat onder andere voorstellen om het huidige emissiehandelssysteem aan te passen, om de lasten van het reduceren van broeikasgassen die niet onder het emissiehandelssysteem vallen over de lidstaten te verdelen en om een grotere inzet van hernieuwbare energie te bevorderen. Over de voorstellen moeten binnen de EU definitieve besluiten worden genomen in de loop van 2008 of 2009.

Dit rapport analyseert de betekenis van de voorstellen voor Nederland en geeft een inschatting van de bijdrage van het pakket aan het behalen van de doelen die Nederland zichzelf heeft gesteld in het beleidsprogramma *'Schoon en Zuinig'*. Het rapport identificeert tevens onderwerpen die nadere analyse vergen.

De belangrijkste kenmerken van het pakket zijn:

1. De voorstellen van de Commissie proberen een balans te bereiken tussen een oplossing die de kosten voor de EU als geheel zoveel mogelijk beperkt en tegelijkertijd rechtvaardig is met het oog op de lidstaten die relatief achterliggen in economische ontwikkeling. De reductiedoelen zijn gebaseerd op een analyse van de kosteneffectiviteit van maatregelen op EU niveau, waarbij ervan uitgegaan is dat ontwikkelingen als energiebesparing en stimulering van hernieuwbare energie worden voortgezet. Voor de bedrijven die onder het Europese emissiehandelssysteem vallen (de ETS-sector)[1] wordt een emissiedoel voor de EU als geheel gesteld zonder nationale 'plafonds'. Voor de sectoren die niet onder het Europese emissiehandelssysteem vallen (de niet-ETS-sector: huishoudens, verkeer), hebben landen met het laagste nationaal inkomen per hoofd van de bevolking minder strikte nationale doelen. Ook de nationale doelen voor hernieuwbare energie zijn deels aan de hoogte van het nationaal inkomen gekoppeld.
2. De voorstellen geven flexibiliteit in de uitvoering van maatregelen. Voor de lidstaten is er de mogelijkheid om de doelen voor hernieuwbare energie en emissies uit de niet-ETS-sector te bereiken via nationale maatregelen of via onderlinge handel in groencertificaten voor hernieuwbare energie en emissierechten van zgn. CDM/JI-projecten in het buitenland uit de ruimte voor CDM/JI-credits die niet door de andere lidstaten gebruikt wordt[2]. Voor de bedrijven die onder het Europese emissiehandelssysteem vallen is er de keuze om eigen emissies terug te dringen dan wel emissierechten aan te kopen. Bovendien kunnen ook de ETS-bedrijven ongebruikte CDM/JI-emissierechten uit de periode 2008-2012 aankopen.

Over het behalen van de doelen die Nederland zichzelf heeft gesteld in het *'Schoon en Zuinig'*-programma, trekt het rapport de volgende conclusies:

- *Om te slagen kan het 'Schoon en Zuinig'-programma niet zonder EU-beleid*
  Het Klimaat- en Energiepakket bevat een aantal voorstellen dat het Nederlandse beleid ondersteunt. Dit geldt voor belangrijke onderdelen als hernieuwbare energie (vanwege de mogelijkheid om in groencertificaten te handelen en daarmee het nationale doel te halen), het wettelijke kader voor CO_2-afvang en -opslag (vanwege het hoge potentieel in Nederland) en ruimte voor staatsteun voor milieumaatregelen. Verder zijn belangrijke onderdelen van het voorstel voor het emissiehandelssysteem in lijn met het *'Schoon en Zuinig'*-programma, zoals de bijdrage aan een gelijk speelveld voor bedrijven die op de internationale markt concurreren, het veilen van een deel van de emissierechten en de EU-breed geharmoniseerde toedeling van overige emissierechten.

1) De ETS-sector omvat de energiebedrijven en de grotere industriële bedrijven, waarvan het aandeel in de totale emissies in 2005 circa 45% was voor de EU-27 en ook voor Nederland.
2) Het *Clean Development Mechanisme* (CDM) en *Joint Implementation* (JI) behoren tot de flexibele mechanismes die in het Kyoto Protocol zijn geïntroduceerd om projecten in andere landen te kunnen uitvoeren, waarbij de verminderde emissie aan het donorland wordt toegerekend. De niet-ETS-sector mag volgens de voorstellen jaarlijks tot maximaal 3% van de niet-ETS-emissies in 2005 van dit soort mechanismen gebruik maken (en tot maximaal 8% als de EU haar emissiereductiedoel verhoogt tot 30%).

– *Maar: geen nationale taakstelling meer*
Als de voorstellen worden aangenomen, komt er voor alle bedrijven in de EU die onder het Europese emissiehandelssysteem[1] vallen een emissieplafond dat moet leiden tot een reductie van broeikasgasemissies door deze sector van 21% in 2020 ten opzichte van 2005. Er zullen geen nationale plafonds meer zijn, zoals nu nog het geval is. De consequentie hiervan is dat de lidstaten niet langer grip hebben op de plaats waar de fysieke emissies plaatsvinden. Daarmee heeft een nationale doelstelling voor emissies door de ETS-sector zijn betekenis verloren. Een deel van de sturingsmogelijkheden naar nationale doelstellingen voor alle broeikasgasemissies is hiermee weggevallen. Voor de emissies van de overige sectoren (ca. 50% van de emissies) blijft de nationale taakstelling en de beleidsinstrumentering het huidige belang behouden.
Gegeven deze systeemverandering is het huidige nationale doel zoals geformuleerd in het werkprogramma *'Schoon en Zuinig'* niet meer eenduidig te interpreteren. Nederland heeft in principe drie opties voor haar klimaatdoelen: 1) vasthouden aan het huidige *'Schoon en Zuinig'*-doel voor de totale nationale broeikasgasemissies (inclusief emissiehandel-saldo en aangekochte CDM/JI-rechten), 2) alleen een doel voor de niet-ETS-sector behouden, 3) het nationale doel herformuleren ten behoeve van het Nederlandse klimaatbeleid.
Als Nederland vasthoudt aan een nationaal doel voor de reductie van de totale broeikasgasemissies na 2012 vergelijkbaar met de oorspronkelijke 30% reductie van *'Schoon en Zuinig'*, dan is aanvullend beleid nodig bovenop de maatregelen die in *'Schoon en Zuinig'* beschreven zijn. Dit kan bestaan uit aanvullende maatregelen in de ETS- en niet-ETS-sector en/of de aankoop van emissierechten van CDM/JI-projecten of uit de ETS-markt. Nederland kan ook besluiten om de emissiereducties in het buitenland als gevolg van besparing van elektriciteit of meer hernieuwbare elektriciteitsproductie binnen Nederland toe te rekenen aan de Nederlandse reductiedoelen.

– *Het 'Schoon en Zuinig'-doel voor de niet-ETS-sector (gebouwde omgeving, verkeer, landbouw, kleine bedrijven, afvalverwerking)*
De EU taakstelling voor Nederland voor de bedrijven die niet onder het emissiehandelssysteem vallen (16% vermindering van de uitstoot van broeikasgassen in 2020 vergeleken met 2005 of -22% vergeleken met 1990) kan Nederland bereiken met de maatregelen die in *'Schoon en Zuinig'* worden voorgesteld. Het doel van *'Schoon en Zuinig'* zelf, een reductie van 30% vergeleken met 1990, kan eveneens worden bereikt, maar alleen met aankoop van CDM/JI-emissierechten. Hoewel de Commissievoorstellen de ruimte voor de aankoop van CDM/JI-emissierechten beperken tot maximaal 3% van de niet-ETS-emissie in 2005[2], geldt deze beperking niet meer als landen verder gaan dan het EU-doel.
In het geval dat een mondiale klimaatovereenkomst wordt gesloten en de EU haar emissiereductietaakstelling aanscherpt tot 30%, verandert de situatie voor Nederland. Als de EU naast het nu voorgestelde pakket van maatregelen, eveneens ambitieuze flankerende maatregelen treft, zoals aanscherping van emissienormen voor voertuigen, dan kan Nederland zowel de EU-taakstelling van circa 32%[3] reductie in de niet-ETS-sector ten opzichte van 1990 als het *'Schoon en Zuinig'*-doel van 30% reductie halen door binnenlandse maatregelen aangevuld met maximaal toegestane hoeveelheid CDM/JI-emissierechten (8%). Indien echter aanvullende EU-maatregelen achterwege blijven, dan is de som van de binnen-

3) MNP-interpretatie van het Commissie-voorstel, dat beschrijft hoe nationale doelen worden aangepast wanneer de EU zijn doelstelling van 20% reductie ten opzichte van 1990 verder aanscherpt (zie hoofdstuk 5).

landse maatregelen zoals beschreven in *'Schoon en Zuinig'*, plus de toegestane hoeveelheid CDM/JI-emissierechten onvoldoende om de *'Schoon en Zuinig'*-doelen te halen. In dat geval kan Nederland proberen nog meer emissiebeperkende maatregelen in de niet-ETS-sector te nemen, of om CDM/JI-emissierechten van andere lidstaten te kopen uit de ruimte voor CDM/JI-rechten die niet door de andere lidstaten gebruikt wordt. Het is vooralsnog onduidelijk hoe groot het aanbod daarvan zal zijn.

- *Het 'Schoon en Zuinig'-doel voor hernieuwbare energie*
  Zowel de EU-taakstelling voor Nederland voor hernieuwbare energie (14% van het finale energiegebruik voor energietoepassingen in 2020) als het doel van *'Schoon en Zuinig'* (20% van primaire energie in 2020) kunnen in Nederland alleen worden bereikt met de aankoop van groencertificaten voor hernieuwbare energie van andere lidstaten. Alleen in het geval dat de EU strikt aanvullend beleid voert, bijvoorbeeld op het gebied van energieverbruiknormen voor elektrische apparaten, kan het EU doel bereikt worden zonder aankoop van groencertificaten. Het is echter vooralsnog niet duidelijk of er genoeg groencertificaten zullen worden aangeboden. Uit eerste analyses blijkt dat Nederland niet het enige land is dat moeilijk de doelstelling kan bereiken; meerdere landen kampen met dit probleem. Het is daarom twijfelachtig of een hoge vraag naar (en een mogelijk hoge prijs van) groencertificaten voor hernieuwbare energie kan worden beantwoord met voldoende aanbod, zeker ook gezien de tijd die in een aantal gevallen nodig is voor de uitbreiding van de elektriciteitsinfrastructuur. Daarnaast is de kans aanwezig dat lidstaten besluiten om niet in groencertificaten te gaan handelen, ter bescherming van bestaande nationale steunprogramma's voor hernieuwbare energie.

- *Het 'Schoon en Zuinig'-doel voor verbetering van energie-efficiëntie*
  Het pakket voorstellen van de Europese Commissie bevat geen specifieke nieuwe doelstelling voor de verbetering van energie-efficiëntie. *'Schoon en Zuinig'* stelt dat de energie-efficiëntie met 2% per jaar moet verbeteren in de periode 2011-2020. Een eerdere MNP/ECN-analyse van *'Schoon en Zuinig'* heeft laten zien dat het doel voor energie-efficiëntie-verbetering alleen kan worden bereikt als de EU een strikt beleid voert op een aantal gerelateerde gebieden, zoals normen voor voertuigemissies en elektrische apparaten. De huidige wetgeving en voorstellen voor bijvoorbeeld EU-normen voor de uitstoot van personenvoertuigen zijn onvoldoende om dit doel te halen. Om het Nederlandse energie-efficiëntie-doel te halen kan de overheid ofwel meer eigen beleid voeren in de ETS- en niet-ETS-sector, ofwel in Europa voor een strikter EU-beleid pleiten.

Naast de algemene conclusies wordt in dit rapport een aantal kenmerkende effecten beschreven die samenhangen met de mogelijke invoering van het de voorstellen.

- *Het 'waterbed effect'*
  Onder het emissiehandelssysteem zullen geleidelijk aan de emissies van de ETS-sector verminderen tot een niveau in 2020 dat 21% lager is dan de emissies in 2005. Omdat het plafond voor de emissies van de ETS-sector op EU-niveau is gedefinieerd, leiden extra inspanningen van een land om emissies in de nationale ETS-sector te verminderen, niet tot een vermindering van de Europese emissies[4]. Dit wordt het 'waterbed effect' genoemd. Ondanks het optreden van dit effect, zijn er verschillende redenen om toch extra nationaal beleid te voeren gericht op de ETS-sector: (1) maatregelen om het gebruik van fossiele brandstoffen te verminderen, reduceren tegelijkertijd de binnenlandse uitstoot van luchtverontreinigende stoffen zoals NO_x en fijn stof en leiden tot binnenlandse baten zoals vermeden schade aan de menselijke gezondheid; (2) extra beleid draagt bij aan het bereiken van nationale en

EU-doelen op het gebied van hernieuwbare energie en energie-efficiëntie; en (3) er gaat mogelijk een extra stimulans van uit ten gunste van nationale innovatie en technologieontwikkeling. Ook is een overweging dat voor het klimaatbeleid na 2020 nog verdergaande emissiereducties gewenst zijn, waarvoor nu investeringen in technologieontwikkeling nodig zijn. Keerzijde vormen uiteraard de extra kosten voor bedrijven en burgers, hetgeen om een zorgvuldige afweging vraagt.

– *Interactie tussen klimaat en luchtbeleid*
Aankoop van emissierechten voor broeikasgassen maakt lokale productiegroei in de ETS-sector mogelijk en kan daarmee tot een zodanig hogere nationale uitstoot van luchtverontreinigende stoffen leiden, dat de Europees geldende luchtkwaliteitswaarden of nationale emissieplafonds (National Emission Ceilings, NEC) worden overschreden. In dat geval zal een overheid ofwel geen vergunning afgeven voor uitbreiding ofwel extra maatregelen moeten nemen om emissies te beperken. Het is echter nog onduidelijk, in hoeverre het Europese luchtbeleid een beperking gaat vormen voor de broeikasgasemissies van de ETS-sector en dus ook voor de handel in emissierechten.

– *Grenseffecten tussen ETS- en niet-ETS-sectoren*
Zoals hierboven is aangegeven, geeft elke extra maatregel die een ETS-bedrijf neemt om emissies te verminderen andere ETS-bedrijven meer emissieruimte. In de niet-ETS-sector geldt een vast nationaal doel. Omdat centrale elektriciteitsopwekking onder het ETS valt en een groot deel van de elektriciteit door de niet-ETS-sector verbruikt wordt, spelen hier een aantal grenseffecten. Elektriciteitsbesparing in de niet-ETS-sector leidt tot minder vraag naar elektriciteit, maar niet tot minder emissies op EU-niveau door de ETS-sector[5]. Volgens hetzelfde principe zal het bevorderen van kleinschalige warmtekrachtkoppeling wel leiden tot extra emissies in de niet-ETS-sector, maar niet tot minder emissies van de ETS-sector. In theorie kunnen deze grenseffecten leiden tot inefficiënte prikkels voor huishoudelijke en industriële energiebesparing en zelfs het signaal afgeven dat meer gebruik van elektriciteit voordelig is[6]. Het vinden van een oplossing voor dit probleem is niet eenvoudig. Op de lange termijn, in 2020, wanneer er nieuwe doelen voor de ETS-sector worden vastgesteld, werpen deze maatregelen hun vruchten af, en uiteraard spelen ze een rol voor de kostenefficiënte invulling van de EU-doelstellingen. Maar voor de korte termijn onderstreept het mogelijk optreden van een verkeerde signaalwerking het belang van aanvullend beleid gericht op verbetering van de energie-efficiëntie.

4) Als namelijk de Nederlandse ETS-sector extra maatregelen zou nemen om emissies te verminderen, betekent dat minder vraag naar emissierechten. Ervan uitgaande dat de totale hoeveelheid emissierechten vastligt (die is immers gekoppeld aan het emissieplafond voor de ETS-sector) zal de verminderde vraag leiden tot een lagere prijs van de emissierechten. Bij een lagere koolstofprijs onder het ETS, zullen de ETS-sectoren in andere lidlanden minder maatregelen treffen dan ze anders zouden hebben gedaan, en nu meer emissierechten kopen om hun gestegen emissies te compenseren. De hoeveelheid emissierechten die ze aankopen is gelijk aan de extra emissiereductie die de Nederlandse ETS-sector heeft gerealiseerd. Extra maatregelen in een lidstaat worden, bij een perfect werkende markt, dus teniet gedaan door meer emissies in andere lidstaten.
5) Een daling in de vraag naar elektriciteit, ofwel in het land zelf of in buurlanden door verschuivingen in de import/export verhouding, leidt tot minder elektriciteitsproductie in de EU, en daarmee tot minder emissies van de energiebedrijven. Maar omdat de totale hoeveelheid emissierechten bepaald wordt door het emissieplafond van de hele ETS-sector, wordt dat gat gevuld met meer uitstoot van broeikasgassen door andere bedrijven. Deze kunnen meer emissierechten kopen en daarmee hun emissies vergroten (zie voetnoot 4).
6) Een hoger elektriciteitsverbruik door de niet-ETS sector (ten koste van het gebruik van gas, olie of kolen) vermindert de emissies door de niet-ETS sector en brengt het nationale doel gemakkelijker binnen bereik. Maar er is ook een compensatiemechanisme denkbaar: een hogere elektriciteitsvraag beïnvloedt de ETS-sector waarvan de emissies niet kunnen toenemen door het ETS-plafond. Om aan de toegenomen vraag tegemoet te komen, nemen de kosten van de ETS-sector toe, wat weer doorwerkt in de rentabiliteit van elektriciteitsbesparing in de niet-ETS sector.

Er is een veelheid van vragen die het Klimaat- en Energie-beleidspakket van de Europese Commissie oproept die niet in deze eerste verkenning zijn beantwoord, zoals de gevolgen van de voorstellen voor het veilen van emissierechten, de economische impacts in Nederland vergeleken met andere lidstaten of de precieze rol van de richtlijn over staatssteun. MNP is voornemens een aantal van deze vervolgvragen verder te onderzoeken. Over de effecten van de richtlijn voor een verplicht aandeel van biobrandstoffen voor het verkeer is recent een apart MNP-rapport uitgebracht (no. 500143001).

Executive Summary

Main conclusions

- The Commission's policy package on Climate and Energy delivers the framework for EU-wide implementation of the decision of the European Council in March 2007 to achieve at least a 20% reduction of GHG emissions by 2020 compared to 1990. The responsibility for the implementation is shared between the Commission and the Member States. The proposals move more of the responsibility for European climate policy to the European level.
- The proposals provide more flexibility to reach targets: national caps for GHG emissions disappear and there will be more trade in emission allowances under the European Union's Emission Trading System (EU ETS). In addition, there will be trade in emission allowances through CDM/JI and 'Guarantees of Origin' of renewable energy resources.
- The Netherlands *Schoon en Zuinig* policy plan (which includes a 30% reduction in GHG emissions in 2020 compared to 1990) will profit from the Climate and Energy package. However, the national target for the emissions from the industry and energy sectors has lost its significance. The Netherlands Government can consider reformulating the national target for total GHG emissions.
- The targets set in *Schoon en Zuinig* for 2020 for the sectors not covered by the EU-ETS and for renewable energy remain within reach with the purchase of emission credits and 'Guarantees of Origin' of renewable energy resources. For achieving the *Schoon en Zuinig* target for energy efficiency, strict EU policies in other areas, such as standards for vehicles and electric appliances, are necessary. Such additional EU policies are also necessary for achieving the Netherlands targets in event the EU decides on a 30% overall reduction of GHG emissions.
- In a perfect market for emission rights, there will be a waterbed effect. The market ensures that emissions will be more or less equal to the cap of the EU-ETS. Additional national policy measures are not effective for climate targets, but can be important in achieving national targets in air quality, renewable energy, energy efficiency or technology development.

This report outlines and presents an initial assessment of the Energy and Climate policy package launched by the European Commission on 23 January 2008. An initial estimate is also presented of the extent to which the Commission's proposals are sufficient to meet the GHG emission reduction targets and energy targets presented in the Netherlands *Schoon en Zuinig* policy plan (Clean and Efficient). Finally, outstanding issues for further analysis are identified.

The Commission's package delivers the framework for EU-wide implementation of the decision of the European Council in March 2007. Subsequently, the Council decided to achieve at least a 20% reduction of GHG emissions by 2020 compared to 1990, and expressed willingness to commit to a reduction of 30% of GHG emissions by 2020 compared to 1990, provided 'other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries adequately contribute according to their responsibilities and respective capabilities'.

The Council decisions reflect the ambitions of the United Nation's Framework Convention on Climate Change (UNFCCC) to stabilise GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, and are a first step

towards achieving necessary emission reductions. The European Community has stressed on many occasions that, to meet the objective of the Climate Convention, the global annual mean surface temperature increase should not exceed 2°C above pre-industrial levels. This implies that global GHG emissions should be reduced to at least 50% below 1990 levels by 2050. The current Commission proposals are an adequate step towards achieving such deep cuts in global emissions. With this legislation, the EU sets an example in the post-2012 mitigation discussion launched with the Bali action plan of UNFCCC.

The Commission's package includes proposals on:

a. the European Union's Emission Trading System (EU ETS) for greenhouse gases that applies to the energy sector, large industrial companies and after 2012 to aviation;
b. national targets on GHG emissions in sectors not covered by the EU ETS;
c. promotion of renewable energy including biofuels in the transport sector;
d. a legal framework and demonstration projects for Carbon Capture and Storage (CCS); and new guidelines for Environmental State Aid.

The essential characteristics of the policy package are:

1. The proposals aim to strike a balance between a cost-efficient solution at EU level and fairness with regard to the economic development of the Member States. Average emission reduction targets for both the ETS sector and non-ETS sector have been set based on EU-wide cost-effectiveness of emission reductions, assuming continuation of policies in energy efficiency and use of renewable energy. For the sectors covered by the EU ETS, an EU-wide cap is proposed, while for the non-ETS sector, Member States with the lowest GDP per capita have less stringent emission targets. Also, targets for renewable energy are partly determined on the basis of GDP.
2. The proposals include the flexibility for Member States to achieve renewable energy targets and emission targets for the non-ETS sectors by allowing trading between Member States of 'Guarantees of Origin' of renewable energy resources and CDM/JI credits of the limited amount of CDM/JI credits allowed per Member State but not used by them[7]. In the ETS sector, there is the inherent flexibility for companies either to mitigate their own emissions or to purchase emission allowances on the market. In addition, ETS companies may purchase CDM/JI credits not used in the 2008-2012 period, to the amount allowed.

Implications of the EC proposals for all countries

– *EU-wide cap on the ETS sector, no national caps*
For the ETS sector, which share in EU-27 greenhouse gas emissions is about 45%, there will be an EU-wide cap that will lead to a 21% reduction in GHG emissions in 2020 relative to 2005. Unlike under the current Kyoto Protocol, there are no caps at Member State level. Consequently, Member States will no longer have control over the location of emission reductions in the ETS sector. This implies that they also loose a mechanism for steering the achievement of national total GHG emission targets. There will be national targets for only the part of national total emissions originating from the non-ETS sector. This raises a number of issues for Member States that are elaborated in the discussion on the consequences for the Netherlands below.

7) The Clean Development Mechanism (CDM) and Joint Implementation (JI) are flexible mechanisms under the Kyoto Protocol to realise projects in other countries of which the decrease in GHG emissions may be accounted to the donor country. According to the proposals, the non-ETS sector may use these mechanisms for up to 3% of non-ETS emissions in 2005 (and up to 8% if the EU increases the emission reduction target to 30%).

– *'Waterbed effect'*
Because of the EU-wide cap, extra GHG emission reduction initiatives in a Member State will be offset by an equal amount of additional emissions in other Member States[8]. This implication is described as the 'waterbed effect'. Still, there are several reasons to take additional national measures targeted to reducing GHG emissions in the ETS sector:
  - reducing the use of fossil fuels has a substantial co-benefit in terms of reduction of domestic emissions of air pollutants such as NO_x and aerosols, and hence reduced national health damage;
  - introducing additional policies to support achievement of national or EU targets on renewable energy and energy efficiency;
  - promoting extra national innovation in technology development and infrastructure. For climate policies after 2020, further emission cuts are desirable for which investment in technology development would be needed now.

  However, purchasing emission allowances to allow for production growth in an ETS-covered industry may lead to emission increases of air pollutants and consequently to a possible exceedance of the national emission ceilings (NEC) set by the EU. In such cases, governments will need to impose additional abatement measures and hence would limit the benefits of ETS trading. However, the extent to which these additional policies effectively constitute limits to national GHG emissions of the ETS sector is at present unclear.

– *Wrong signals for electricity savings in households and industry*
Power plants are included in the ETS sector, while electricity is partly used by the non-ETS sector. The ETS and non-ETS sectors have different mechanisms to reach reduction targets. Thus, electricity conservation in non-ETS sectors does not lead to additional reduction of EU ETS sector emissions relative to the EU-wide ETS ceiling for the period 2013 to 2020[9]. Similarly, promoting small-scale cogeneration will lead to extra emissions in the non-ETS sector, but not to additional reductions. The fact that the proposals, at least in theory, remove the incentives for energy conservation by households and industry, or even provide a perverse incentive to use more electricity[10], is certainly unwanted. It is not easy to come up with policy solutions for these borderline effects. Certainly, in the long term after 2020 when new targets are set, these measures may reduce GHG emissions from electricity production and play a role in a cost-efficient solution on the EU level. But for the short term, the possible occurrence of wrong signals to actors in the market underlines the importance of additional policies on energy efficiency improvement.

8) When a national ETS sector implements extra measures, that sector has less demand for ETS and CDM/JI credits. Because the total number of available credits is fixed at a level equal to the European ETS cap, less demand will lead to a lower credit price. At a lower carbon price, ETS sectors in other Member States will take fewer domestic measures and will purchase more credits to cover the extra emissions. The extra credits they can purchase equal the additional emission reduction achieved by the country that took the extra measures. Assuming perfect market conditions, extra reductions in one Member State will be nullified by less reduction in other Member States.
9) A decrease in electricity demand, whether in the country or in neighbouring countries through changes in the import/export balance leads to less power production in the EU, and to less emissions from this sector. However, as the total emission credit is fixed by the ETS cap, other industries (see footnote 8) can purchase more emission credits and so increase their emissions.
10) The more electricity is used instead of gas, oil or coal, the easier it is to achieve the national target for the non-ETS sectors. This incentive is limited because the cap on the ETS sector prevents an increase in ETS emissions. The resulting higher costs in the power sector will be translated in higher electricity prices, which again provide incentive to save electricity.

Consequences of the Commission's package for the Netherlands and for *Schoon en Zuinig*

– *A general backing*
The Netherlands policy plan *Schoon en Zuinig* needs major backing by EU policies to succeed. The Commission's package supports Netherlands policy with major instruments, such as the potential to trade Guarantees of Origin of renewable energy between Member States (making achievement of the national target for renewable energy easier), a legal framework for CCS (which has a large potential for the Netherlands), and new Environmental State Aid rules. Also, the Commission's proposal for ETS has various supporting elements, such as providing a level playing field, auctioning of part of the credits, and EU-wide harmonised allocation of the rest of the credits.

– *Achievement of national greenhouse gas reduction targets*
The Netherlands Government may evaluate the consequences of the structural change proposed for the ETS system for its present climate policy targets, and has three options for its GHG targets when the Commission's proposal for the ETS sector will be approved by the European Council and European Parliament: 1) maintain the present target for total national emissions as formulated in *Schoon en Zuinig* (including the balance of traded ETS emission allowances and purchased CDM/JI credits), 2) retain a target for the non-ETS sector only, 3) redefine the national target for national policy purposes.
If the Netherlands Government maintains a national target for total GHG emissions in line with the 30% reduction in the *Schoon en Zuinig* policy plan, then the projected emission reductions are not sufficient. The remaining distance to the target (several tens of megatons) could be bridged by additional policies in the ETS and non-ETS sectors, and/or by purchasing emission credits from CDM/JI or from the ETS market. The Netherlands could also decide to add to its emission reductions those emission reductions in neighbouring countries resulting from savings in electricity use or increase in renewable energy production within the Netherlands.

– *Achievement of the non-ETS target for the Netherlands*
The EU target for the non-ETS sector in the Netherlands of 16% GHG reduction in 2020 relative to 2005 (or 22% relative to 1990) can be met with domestic measures alone. The Netherlands reduction target of 30% relative to 1990 can also be met, but with the use of CDM/JI credits. As the EU target will have been achieved at that time, there is no limitation on the use CDM/JI credits. The maximum limit of 3% CDM/JI (see footnote 7), which is indicated in the Commission's proposal, is only valid for the EU target.
If a comprehensive international agreement is reached and the EU goes for 30% reduction compared to 1990 by 2020, the situation for the Netherlands will change. When strict EU-policies are implemented in areas not covered by the Commission proposals, for instance emission standards, the emission reduction in the Netherlands plus the allowed CDM/JI credits (8%)[7] is sufficient to reach both the EU-30% target (for the Netherlands ETS-sector 32%[11] reduction relative to 1990) and the Netherlands target. However, if there are no strong EU policies in other areas, the emission reduction plus the allowed credits are not enough to meet the Commission's targets and Netherlands targets.

11) MNP interpretation of the Commission proposal, describing how Member State's targets are adjusted in the event that the EU will agree to a higher EU reduction target than 20% compared to 1990 (see Chapter 5).

In the last case, the Netherlands can aim for still higher domestic reductions in the non-ETS sector or can buy CDM/JI credits from other countries. However, the amount of credits that will be supplied is unclear.

- *Achievement of the renewable energy target*
  With the measures described in the Netherlands policy plan *Schoon en Zuinig*, the EU (14% of national final energy consumption by 2020) and the Netherlands (20% of primary energy consumption by 2020) targets for renewable energy cannot be met without the purchase of 'Guarantees of Origin' for renewable energy (GOs) from other Member States. Only if the EU implements strict policies in other areas could the EU target possibly be met without purchasing GOs.
  However, the availability of sufficient GOs for trading is not evident. Many countries may have difficulties in reaching their targets, let alone over-achieving them. Therefore, it is doubtful whether a high demand for GOs can be met in time. This is especially so when taking into consideration long planning and implementation times for expansion of the electricity grid infrastructure required for sources such as large volumes of wind turbines and distributed cogeneration. In addition, Member States may decide to limit the sales of GOs to other Member States if the production has been subsidised by national programmes.
  As stated above, the purchase of GO credits can reduce the co-benefits for the Netherlands from reduced emissions of pollutants and technology development.

- *Achievement of the Netherlands target for energy efficiency improvement*
  The Netherlands policy plan *Schoon en Zuinig* includes a target for improving energy efficiency by 2% per year over the period 2011-2020. Previous analysis of the *Schoon en Zuinig* plan demonstrated that the Netherlands energy efficiency targets could only be met if strict EU policy is in place and the EU definition of energy efficiency which includes feedstocks is used. The current regulations and recent EU proposals, including the proposal for a regulation on emission performance for new passenger vehicles, are not sufficient to achieve that goal. To achieve the energy efficiency target for the Netherlands, the Netherlands Government can either implement additional national policies in both the ETS and non-ETS sectors, or stimulate the adoption of more stringent EU policies such as for road transport, or both.

There is a multitude of follow-up issues arising from the Commission's proposals that have not been considered in this initial analysis, such as the impacts of the proposals on auctioning emission allowances in the ETS and the precise role of the Environmental State Aid Directive. These may be dealt with in future MNP reports. A separate report dealing with the issues on biofuels for transport has already been published (no. 500143001).

1 Introduction

This report presents a description and an initial assessment of the legislative proposals on energy and climate change that the European Commission (in short, Commission) launched in one package on 23 January 2008. These proposals follow the endorsement by the European Parliament and by EU leaders at the March 2007 European Council of a European Energy and Climate Change strategy[1]. That strategy implied:

- an independent EU commitment to achieve a reduction of at least 20% in the emission of greenhouse gases (GHG) by 2020 compared to 1990 levels and the objective of a 30% reduction by 2020, subject to the conclusion of a comprehensive international climate change agreement;
- a mandatory EU target of 20% renewable energy by 2020 including a 10% biofuel target.

The January 2008 package includes:
1. a proposal amending the European Union's GHG Emission Trading System (EU ETS: EC, 2008a);
2. a proposal on effort sharing to meet the EU's independent GHG reduction commitment in sectors not covered by the EU Emissions Trading System (such as buildings, services, smaller industrial installations, transport, agriculture and waste; EC, 2008b);
3. a proposal for a directive promoting renewable energy, including the use of biofuels in the transport sector (EC, 2008c).

Other proposals included in the package are a legal framework on Carbon Capture and Storage (CCS) of carbon dioxide (CO_2) (EC, 2008d) and new guidelines for environmental state aid (EC, 2008e). As required for large EU proposals, the package goes together with an impact assessment by the Commission (EC, 2008f to 2008i). The proposals will be subject to a co-decision procedure, meaning that the European Council and the European Parliament can amend the proposals.

In the package, the Commission has reformulated the overall target of an EU-wide 20% reduction compared to 1990 into GHG emission reductions compared to 2005, because more accurate emission data are available for that year than for 1990. The corresponding EU-wide 14% reduction by 2020 relative to 2005 is to be met by an EU-wide reduction within the ETS of 21% and in non-ETS sectors of 10% on average.

This report presents an assessment in broad terms of all elements in the package. The report also presents an initial estimate of the extent to which the European proposals are sufficient to achieve the Netherlands targets set in the *'Schoon en Zuinig'* plan (VROM, 2007). It should be stressed that this is an initial assessment and aims specifically to identify key issues for further analysis.

The current proposals in the Energy and Climate Package are outlined in Chapter 2. Chapter 3 places the proposals in the Energy and Climate package in the wider policy context of

1) European Parliament resolution on climate change adopted on 14 February 2007 (P6_TA(2007)0038), adopting "An Energy policy for Europe, COM(2007) 1 final" and "Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond, COM(2007) 2 final"

the European Community and describes the relationship with other related proposals and recentlegislation. Chapter 4 examines the proposals at Member State level and describes the criteria used for effort sharing in the three main proposals on the Emission Trading Directive (ETS), non-ETS and renewable energy. This chapter also sets out the European Commission's rationale to base the criteria for effort sharing on Gross Domestic Product (GDP) and to weigh inequities between Member States in the three proposals. The chapter continues with an analysis of the flexibility and autonomy of Member States to achieve the targets and to implement measures. Furthermore, Member States with common positions are identified. The contribution of the proposals to the Dutch *Schoon en Zuinig* (S&Z) targets is discussed in Chapter 5. Finally, in Chapter 6, topics for further analysis are presented.

2 New proposals: policy package of January 2008

2.1 Introduction

In this chapter, the key elements of the five main climate and energy proposals of the European Commission released on 23 January 2008 are summarised and discussed. For the proposal on renewable energy, the sub-target for renewable energy (biofuel) in transport is described in more detail. A more detailed description of the individual proposals can be found in the Annexes I to V.

2.2 Directive amending EU greenhouse gas emission allowance trading system

Objective
According to the Commission, the main objective of the proposal is to establish a scheme for greenhouse gas (GHG) emission allowance trading within the European Community for the period 2013-2020 and beyond. This is necessary in order to fully exploit the potential of the EU ETS to contribute to the commitments to GHG reduction in an economically efficient way (EC, 2008a).

Target
The proposal aims to reduce GHG emissions from the ETS sectors in 2020 by 21% relative to 2005, corresponding to a reduction of 14% relative to 1990. The allowances will be decreased linearly between 2013 and 2020. The starting point is the average total allowances issued for the 2008-2012 period, adjusted for the larger number of participants in the third period (2013-2020). The annual amount will decrease by 1.74% per year.

Scope
More sectors are covered by the ETS system than in the first (2005-2007) and second (2008-2012) period. Main new sectors are specific non-combustion sources in the chemical industry (CO_2, N_2O) and in the aluminium industry (CO_2, PFCs), carbon capture and storage of GHG emissions, and CO_2 from aviation.

Allocation rules: auctioning versus free allocation
A new element is that there will be one instead of 27 EU-wide caps on the number of emission allowances. Further, the basic principle for allocation of allowances will be auctioning. Full auctioning will be applied from 2013 to sectors that can pass on the increased costs, such as the energy sector. However, sectors more exposed to international competition will receive free allocation in 2013 at 80% of their share in the total allowances to be issued. Thereafter, the free allocation will decrease annually, resulting in no free allocation in 2020. The auctions will be carried out by the Member States themselves and they will receive the proceeds. Member States with relatively lower income per head and higher growth prospects will receive higher allowances to be auctioned than based on their relative share of 2005 emissions in the EU ETS. The Commission proposes that 20% of the revenues should be used for programmes and projects for mitigation and adaptation of climate change.

Flexibility, CDM and JI

- Operators will have limited use of *Clean Development Mechanism* (CDM) and *Joint Implementation* (JI). However, companies will be able to use in the 2013-2020 period CDM and JI credits granted by their governments for the 2008-2012 period that have not already been used. Thus, surplus allowances from the second trading period (2008-2012) can be banked and used in the third period without restriction.
- Credits from new projects started after 2013 are allowed under certain conditions. If the EU decides to increase the emission reduction objective from 20% to 30%, additional use of CDM and JI credits will be permitted.
- The use of credits from carbon sinks such as forests is not permitted, but credits from projects in EU Member States that reduce GHG emissions not covered by the ETS might be permitted under certain conditions. Also, the Commission is proposing to extend the link between EU ETS and other cap-and-trade systems of any country or administrative entity (such as a state or group of states under a federal system) provided the environmental objectives of the EU ETS are not undermined.

2.3 Decision on effort sharing of non-ETS sectors

Objective and targets

The draft decision on effort sharing aims to reduce EU-wide GHG emissions to 10% below 2005 levels by 2020 in sectors not covered by the ETS, such as small industrial installations, buildings, transport, agriculture and waste. Each Member State has a specific target based on Gross Domestic Production (GDP) per capita[1]. Gases included are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfurhexaluoride (SF_6).

A linear reduction has to take place between 2013 and 2020 (each year, an equal amount of extra reductions) and the emissions in 2013 should not exceed current emissions[2]. There is some flexibility because emissions can be 'borrowed' from the next year and/or extra reductions can be banked in one year for the following year. However, borrowing is not unlimited but up to a maximum of 2% of the target level.

Actions by Member States

Member States can decide which instruments and options to use in order to achieve reductions such as traffic management, clean transport, taxation, promotion of public transport, urban planning, and promotion of insulation.

Use of CDM

Use can also be made of CO_2 credits from GHG reduction investments in other countries through the Clean Development Mechanism (CDM), issued from:

a. reductions made between 2008 and 2012;
b. projects registered and implemented in that period;

1) This means that efforts by Member States vary from a reduction of -20% to an increase of 20%. Poorer Member States (with a low GDP) are permitted to grow emissions. The reasoning is that countries with a low GDP will have relatively higher direct costs in the ETS sectors. This is compensated by less reduction or even an increase in emissions in non-ETS sectors.
2) Calculated as average emissions for 2008, 2009 and 2010.

c. projects starting after 2012 in Least Developed Countries (LDC).

This can be done for up to 3% per year of non-ETS emissions in 2005 in each Member State and credits can be transferred from one Member State to another.

Should a comprehensive international climate agreement be reached, the EU will increase its total emission reduction target from 20 to 30% by 2020 compared to 1990 levels. The reduction target for each Member State will be adapted proportionally and the amount of CDM credits used by Member States to meet their targets will increase to half of the total additional EU reduction effort required (that is up to 8% in case of a 30% reduction target).

2.4 Renewable energy directive

Aims and targets

This proposal aims to establish a common framework for the promotion of the use of energy from renewable sources, in three sectors: (1) electricity production, (2) heating and cooling and (3) transport. It establishes an overall binding target at EU level of a 20% share of renewable energy sources in total energy consumption by 2020. A10% binding minimum target for biofuels in transport is to be achieved by each Member State, as well as binding national targets per Member State by 2020 in line with the overall EU target of 20%. The target has been set for reasons of security of supply, environmental protection and competitiveness of the renewable sector.

The draft directive replaces current directives on the promotion of electricity from renewable energy sources and on the use of biofuels after 1 January 2012. There is no directive as yet to promote penetration of renewable energy sources in the heating and cooling sector.

In addition to setting legally binding national targets for the share of renewable energy, the directive defines rules for intra-EU trading with standardised *'Guarantees of Origin'* (GOs) and sets environmental sustainability criteria for biofuels.

Scope

The proposal distinguishes three sectors for use of renewable energy: (1) electricity, (2) heating and cooling and (3) transport. The share of renewables in the transport sector only refers to petrol and diesel fuel. Although mainly referring to biofuels in road transport, other modes of transport such as shipping, rail and aviation are also included.

Tradable Guarantees of Origin

Member States have the flexibility to implement the directive in line with their particular national circumstances. Imported electricity produced from renewable energy sources outside the EU may count towards Member State targets. However, only electricity generated by renewable energy installations that become operational after this Directive comes into force is eligible.

The creation of a tradable guarantee of origin regime allows Member States to achieve their targets in the most cost-effective way possible. In addition to developing local renewable energy sources, Member States will be able to buy guarantees of origin (GOs: certificates proving the renewable origin of energy) from other Member States where renewable energy is cheaper to produce. Member States can exclude GOs of already subsidised renewable energy and may

restrict transfer of GOs to other Member States if their own target and indicative trajectory would not otherwise be met.

2.4.1 Renewables Directive on Biofuels

Target and scope

As part of the proposal for a new Renewables Directive on Biofuels, the European Union has set the target for the share of energy from renewable sources for transport in 2020 at 10% at the least. This applies to energy consumption in transport in all Member States. This target is expected to be met mainly from use of biofuels, although other routes such as electricity (plug-in technology) may be applicable. The 10% target in 2020 replaces earlier directives on biofuels (Directive 2003/30/EC) and sets a mandatory target for the transport sector. Transport sector targets were also set in an earlier proposal of the Commission for a new Fuel Quality Directive. In this proposal, the European Commission proposed a minimal reduction of GHG emissions of 1% per year from fuels for road transport and non-road mobile machinery, starting in 2010.

Sustainability criteria

In the proposal for the Renewable Directive, the European Commission gives considerable attention to the sustainability criteria for biofuels and bioliquids, as a consequence of the debate whether biofuels can be considered to be sustainable. The proposed sustainability criteria refer to two areas: required GHG savings and protection of typical ecosystems. The GHG saving from the use of biofuels and other bioliquids should be at least 35%. This saving is applied to the mix of renewables and not to each raw material. On the contrary, biodiversity criteria are applicable for the raw materials produced. Biofuels and other bioliquids will not be made from raw materials obtained from forest undisturbed by significant human activity, from areas designated for nature protection or from highly biodiverse grasslands. These are grasslands that are species-rich, not fertilised and not degraded; the Commission will specify the areas. Moreover, biofuels and other bioliquids will not be made from raw material obtained from land with a high carbon stock, such as wetlands and continuously forested areas (the status of these areas was changed in January 2008).

The proposal gives a detailed overview on how GHG savings need to be calculated, although default GHG savings may be taken from the proposal. However, these default values are only applicable for biofuels from outside the EU and from areas within the EU assigned specifically by the Member States. These areas need to be assigned in 2010.

Biofuels and other bioliquids not fulfilling these environmental sustainability criteria will not be taken into account. Other criteria, such as for environmental pressures and impacts on food security, have not been set. These aspects may be covered in a first progress report of the Commission in 2012. The European Commission will base its report on reports from Member States (starting in 2011), on reports from other countries, intergovernmental organisations and other scientific and relevant work. In this report, the Commission *'shall, if appropriate, propose corrective action'*. On the issue whether sustainability criteria are needed for use of biomass other than biofuels and bioliquids, the Commission will report by 31 December 2010 at the latest.

2.5 Directive on the geological storage of carbon dioxide

Objective
This directive sets a regulatory framework for the removal of legal barriers and to bring environmentally safe geological storage of carbon dioxide (CCS) to deployment.

Target
Targets are not set for the amount of CO_2 to be stored underground by a certain year. CCS is not mandatory at this stage. Eventually (the Commission expects in 2020), the incentive for CCS will be the carbon price resulting from the European GHG emission trading system. Individual operators will need to decide whether to release emissions and pay ETS allowances to cover them, or use CCS to reduce emissions and ETS liabilities. CO_2 captured and safely stored according to the EU legal framework will be considered as not emitted under the ETS (no allowances have to be purchased). However, the Commission recognises that this will not happen without supporting early demonstration of CCS projects to reduce the CCS costs.

The Commission intends to stimulate construction and operation by 2015 of up to twelve CCS demonstration plants in commercial power generation (EC, 2008e). These plants will have substantial additional capital requirements and increased operating costs. The Commission will supply limited financial support (mainly within the framework of the FP7), but expects that the power companies will make their own financial commitments. However, under the revised rules on state aid, Member States are permitted to subsidise the high investment and operational costs of CCS demonstration projects, until CCS can compete commercially within the ETS system. The Member States must decide on the financial instruments to be used (feed-in tariffs or up-front investment grants), and how the support scheme can be financed. Use of revenues from auctioning under ETS could be appropriate.

Scope
Sectors involved are power generation from fossil fuels and CO_2 intensive industries such as cement, refineries, iron and steel, petrochemicals and oil and gas processing.

Flexibility
- As already stated, CCS is not mandatory at this stage. However, combustion plants for which the original construction or operating license is granted under this directive will be required to have suitable space on the installation site for equipment to capture and compress CO_2 and to assess the availability of storage sites and transport networks, as well as the technical feasibility of retrofitting for CO_2 capture.
- Member States have the right to determine the areas to be used for CO_2 storage. The draft permits may be reviewed by the Commission with the assistance of a scientific panel of technical experts, but the final permit decision rests with the national competent authority.

2.6 Directive on State Aid

Objective
The state aid proposal gives Member States the potential to provide incentives to industries to invest, for instance in cleaner technologies, by providing Environmental Aid Guidelines (EAG). State aid may also enable Member States to adopt regulations or standards that go beyond EU standards by reducing certain constraints on some companies. This can support

the move towards the EU's environmental targets. The State Aid guidelines (also referred to as Environmental Aid Guidelines or EAG) also apply to other environmental issues and are directed to replacing current less efficient processes of approving state aid.

Scope

These guidelines apply to state aid for environmental protection in all sectors governed by the Commission Treaty. They also apply to those sectors that are subject to specific EU rules on state aid (steel processing, shipbuilding, motor vehicles, synthetic fibres, transport, coal agriculture and fisheries) unless such specific rules provide otherwise. They also include Carbon Capture and Storage (CCS) projects.

Main changes

The main changes compared to the previous guidelines from 2001 (EC, 2001c) are:

- New provisions, for example, aid for early adaptation to standards, environmental studies, district heating, waste management and for tradable permit schemes;
- Increase of aid intensities;
- Tax reductions: the possibility of long term derogations from environmental taxes is maintained, but if companies do not pay at least the EU minimum, Member States must demonstrate that these derogations are necessary and proportionate;
- Criteria for standard and detailed economic assessments;
- Thresholds for notifying certain types of aid.

Activity-specific guidelines are defined for aid activities, including aid intensity and eligible costs:

- undertakings that go beyond EU standards or that increase the level of environmental protection in the absence of EU standards;
- acquisition of new transport vehicles that go beyond Community standards or that increase the level of environmental protection in the absence of EU standards;
- early adaptation to future EU standards;
- environmental studies;
- energy saving;
- renewable energy sources;
- cogeneration;
- energy-efficient district heating;
- waste management;
- remediation of contaminated sites;
- relocation of undertakings involved in tradable permit schemes.

3 Relationship between proposals and current regulations

3.1 Introduction

The Commission's Climate and Energy proposals described in Chapter 2 are interrelated and are supported by current or proposed EU regulations. The inter-linkages between the proposals in the package are highlighted in chapter 3 and the links with current regulations and other recent proposals in energy and climate policy in Europe are presented.

3.2 Relationship with other policy areas and ambitions

Although the primary motivation for the proposals is to support the Community's ambitions to prevent climate change, there are clear links with at least two other main policy ambitions: to secure energy supply and to improve ambient air quality.

According to the Commission's impact assessment, implementing the proposed climate and energy policy package will increase energy supply security by reducing oil and gas imports. This is due to increased energy efficiency and higher share of renewable energy, in particular where replacing oil or gas use.

As well as the impact of reduced physical imports, the reduced import value is estimated to be beneficial. If targets for GHG emissions, energy efficiency and renewables are met, oil and gas imports savings will be about €50 billion without CDM. According to the Commission's impact assessment, this is equal to 0.3% of Gross Domestic Product (GDP). These savings are based on a conservative estimate of an oil price of $60 per barrel. The Commission concludes that this would also mean that the EU economy would be less exposed to disruptions in supply and price shocks that might result from supply being concentrated in a limited number of countries. If the current high oil prices of almost $100 per barrel continue, these benefits will be considerably higher (EC, 2008g).

The 'reduced import value' can be a meaningful parameter on its own for direct impacts, but it has no direct relation with energy security. Energy security relates to the chance of disruption of supply (at a given fraction imported) for the energy system and its impact on society, for which other factors are also important. For instance, there are many suppliers of oil at present whereas the supply of natural gas is more vulnerable because it is limited by pipeline transport options.

The Climate and Energy proposals also support the improvement of air quality. Climate and air quality policies are interlinked: the same economic sectors are involved (such as transport, power generation and agriculture), partly the same gases are targeted and many emission reduction measures for greenhouse gases will lead to emission reductions of air pollutants. Some abatement measures require special attention such as increasing use of diesel oil and biomass burning. Both small-scale wood burning and the production of biodiesel would increase air pollution. Policy cases assessed in the Commission's impact assessment show an EU-wide 10 to 15% decrease in emissions of the air pollutants NO_x, SO_2 and $PM_{2.5}$ collectively. However, these

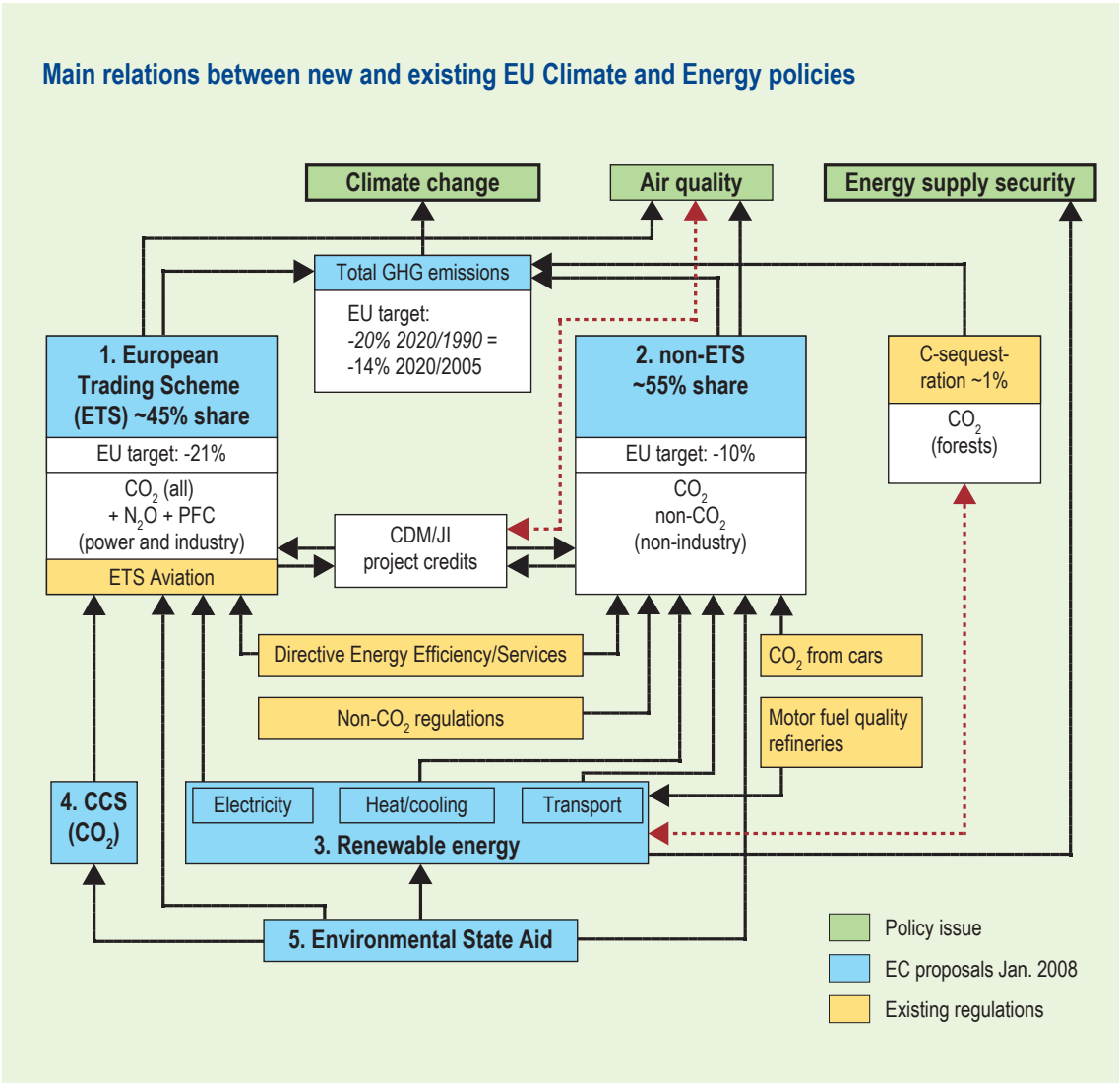


Figure 3.1: Relationships between new and current EU policies on climate and energy

percentages may vary significantly for individual substances and for specific countries according to the source mix.

3.3 Relations with other energy and climate proposals and legislation

With the Climate and Energy proposals, the Commission aims to provide a framework for and to complement existing legislation and proposals for reducing the GHG emissions. As shown in Figure 3.1, there is a complementarity in covering all sources and sinks of greenhouse gases according to the Kyoto protocol. The current proposals deal with the sources of emissions, while increasing carbon sinks is loosely addressed in the EU rural development policy (see below).

For the sectors covered by the European Trading Scheme (ETS), few additional policy measures will be needed because the reductions will be implemented through a market mechanism. However, the Climate and Energy proposals give two extra incentives because of other considerations.

To increase energy security, Member States will need to ensure the target for the share of renewables in final energy consumption, which will contribute to achieving GHG emission targets in the ETS sector, but might raise the overall costs (see Section 4.5). Carbon Capture and Storage has been identified as a technology with a large mitigation potential but is currently facing technological and legal barriers (IPCC, 2005). Support to 12 commercial demonstration plants is expected to bring this option within reach for the near future.

For the remaining sectors, the non-ETS sectors, Member States can decide on instruments and measures to be used. They are, however, supported by a number of EU policy initiatives designed to ensure a level playing field also in these sectors. The most important current supporting legislation and proposals are given in Figure 3.1 and listed below.

International transport: ETS aviation

Emissions from the aviation industry are proposed for inclusion in the new ETS. All flights arriving and departing from airports in the Member States (including international flights) are to be included in the system. In a separate proposal launched in December 2007, the Commission specified rules for attributing and monitoring emissions from aircraft operations (see Annex VII). Each aircraft operator will be administered by one Member State only. So far, the scheme only envisages inclusion of CO_2 emission allowances from aircraft. A proposal planned for 2008 will address nitrogen oxides and other emissions from the aviation industry. The proposed inclusion of international flights to and from countries outside the EU aims at mitigating international transport emissions, which are presently not allocated to countries in the Kyoto Protocol, but are reported separately.

The Commission has not proposed the inclusion of international shipping ('marine bunkers') under the ETS because of the different nature of these activities. The Commission concluded that shipping is largely an international industry, for instance shipping delivers 90% of European external trade. It would, thus, be more appropriate to address GHG emissions from ships within the framework of a global agreement rather than by a regional approach. The Commission is addressing emissions from international maritime transport as part of the post-2012 negotiations within the framework of the UNFCCC. However, as announced in the Sixth Environmental Action Plan, the Commission will take action if no progress towards a global agreement is made (EC, 2008g). More information on the contribution of international aviation and shipping to total GHG emissions and options including these emissions in a future GHG mitigation regime can be found in Den Elzen, et al. (2007b).

Transport policy

The proposal for a regulation on setting CO_2 emission performance standards for new passenger cars is part of a larger set of policies and measures in the transport sector aiming at reducing (fossil) energy use and CO_2 emissions. The Commission has proposed a target of 130g CO_2/km in 2012. This target is part of an integrated approach to further reduce CO_2 emissions from new cars to 120 g/km in 2012. Improvements in motor technology should lead to an average emission of 130 g/km. Other technical measures and increased use of biofuels should lead to a further reduction of 10g/km. A reduction in the GHG emissions from passenger cars to 120 g/km will result in a reduction of 634–638 Mton[1] CO_2-eq. in Europe over the 2006-2020 period (Annex VI).

1) 1 Mton = 1 megaton = 1 million metric tonne = 1 Tg = 1 teragramme

Other measures are car taxation rates based on CO_2 emissions (EC, 2005d) and shifting towards more rail and water transport (EC, 2001a) and improved quality of motor fuel.

A proposal for a directive to amend the present Fuel Quality Directive on the specification of petrol, diesel and gas-oil, (EC, 2007) is currently in the co-decision procedure and is interrelated in various ways with the current policy package (see Annex VI). The Fuel Quality Directive aims to reduce air pollution and GHG emissions from the use of fuels. To achieve these goals, the proposal sets targets to make fuels cleaner, to reduce life cycle GHG emissions from fuel, and to increase volumes of biofuels in petrol.

Life-cycle GHG emissions from fuel should be reduced by 10% between 2011 and 2020. To achieve this, fuel suppliers should make a minimum reduction of 1% per calendar year, starting from 2010. As a result, emissions in 2020 should be no higher than 90% of the level of emissions in 2010. This will lead to a reduction of approximately 500 Mton CO_2 in 2020, thus contributing to the overall EU emissions target.

The proposal also contains measures to support the use of biofuels for transport. In order to do so, a higher oxygenate content in fuel is permitted and the maximum vapour pressure for ethanol blends is temporarily increased. In this way, the proposal contributes to the renewables target for transport.

Energy efficiency/energy services policy

Key to meeting GHG emission targets is improving energy efficiency and expanding renewable energy production. The Energy Policy for Europe Action Plan includes a commitment to yield 20% savings in energy consumption by 2020 (compared to a baseline) by means of energy efficiency improvements (EC, 2005b). Various actions and measures in this respect are presented in the Energy efficiency and energy services directive (EC, 2006c: see Annex VIII) and other directives (references in Annex VIII). These directives include energy performance of buildings, energy labelling of domestic appliances, eco-design requirements for life cycle of energy-using products, energy efficiency requirements in permit systems for companies (Integrated Pollution Prevention and Control, IPPC).

Policies on non-CO_2 greenhouse gases

A variety of EU regulations address non-CO_2 emissions. These cover different sources, such as methane from landfills, nitrous oxide emissions from chemicals production processes, HFCs emissions from leakage and handling of refrigeration appliances, HFC-134a from air-conditioning in cars.

Carbon sequestration

The relatively small 'sinks' of carbon sequestration by storing carbon in trees are not part of the new proposals, but are addressed in the EU rural development policy that is part of the EU Common Agricultural Policy. The carbon sequestration potential of afforestation and reafforestation measures, forest management and natural forest expansion in the EU-15 Member States by 2010 is about 33 Mton CO_2-eq. (EC, 2006d). This is about 0.8% of the present emission reduction target of 8% of the EU-15 under the Kyoto Protocol. The Commission's role is to provide co-financing for investments in forests and to require Member States to spend at least 25% of the rural development funds (part of total funding under the Common Agricultural Policy) to improve the environment and the countryside (European Council, 2005).

4 Target setting, effort sharing and flexibility of Member States to achieve targets

4.1 Introduction

This chapter describes the rationale of the target setting in the Energy and Climate Package. The discussion focuses on how the Commission's proposals take into account country-specific circumstances in setting targets for each Member State and the flexibility for Member States to achieve these targets. Since these targets are interrelated, their connections are analysed across the proposals. The climate and energy package sets specific targets for 2020 as follows:

- *ETS sectors:* GHG target, EU-wide -21% compared to 2005;
- *non-ETS sectors:* GHG target, EU-average -10% compared to 2005, with country-specific targets ranging from -20% to +20%;
- *renewable energy:* two energy share targets, an EU average of 20% for total renewables, with country-specific targets ranging from 10 to 50%, and a binding minimum share of 10% for biofuels in transport in all Member States.

The European Commission has elaborated country-specific targets for non-ETS and total share of renewable energy for 2020 and the linear path from 2013 towards 2020. This has not been done for the ETS sector, instead a country-specific allocation of revenues from auctioning emission allowances is proposed. Member States with a low GDP per capita will get a larger share of allowances to be auctioned. In addition, the Commission's proposals offer considerable flexibility for Member States to incorporate country-specific circumstances in achieving targets, such as in determining sub-targets within the sectors, in the policy instruments to achieve them and in the extent to which targets are met by trading (GOs, CDM/JI).

First, the way in which the Commission determined the share of total reduction in the EU between ETS and non-ETS sectors is discussed. Then, the significance of mechanisms such as CDM and JI in achieving overall targets of the package as a whole is discussed. Subsequently, each target – ETS, non-ETS and renewables – is discussed in Sections 4.2, 4.3, and 4.4, respectively. In order to provide insight into how burden sharing and target setting rules interact with country specific circumstances (thus having different effects in different countries), the following aspects are discussed in each section:

- effort sharing between Member States ('burden sharing rules');
- flexibility of sectors and Member States to achieve targets;
- position of Member States in view of their country-specific circumstances.

Each section ends with the main conclusions. Issues still outstanding are listed in Chapter 6. In Section 4.5, key results of the Commission's impact assessment on costs, benefits and the cost-effectiveness of the package are presented with special attention to the estimated co-benefits for air quality and the potential role and contribution of CDM/JI credits in the package.

Target determination for EU ETS and non-ETS sectors

In the proposals, the Commission has set targets with as base year 2005 instead of 1990 (the latter is the base year in the Kyoto Protocol for most countries). This has resulted in a different set of EU-wide and country-specific targets than would have been the case had 1990 been the base year, if the same effort sharing methods were applied. This effect is especially significant

for countries with either large emission increases or decreases in the 1990-2005 period. This applies to the new Member States, many of which have seen large decreases in emissions since 1990 due to the major structural changes in their economies, and to some of the EU-15 countries. Germany has seen major economic reconstruction of the former East German Bundesländer and a switch from coal to oil and gas. The UK has seen the same fuel switch which have decreased emissions since 1990 considerably. However, the shift of the base year to 2005 has put these countries at a disadvantage compared to countries, such as Ireland and Spain where emissions have increased rapidly. The Netherlands, where emissions have remained more or less constant over time, has an intermediate position.

The Commission's rationale for calculating targets based on 2005 is to 'give a transparent and easily understandable picture of the changes needed, as it compares with the present situation'. The Commission proposes to compensate Member States which have 'eaten up' most of their low-cost reduction options with a combination of target setting using GDP per capita and an intra-EU trading mechanism for emissions and GOs.

The ETS sector comprises the larger industries, including electric power generation, heat production and refineries, and aviation related to the EU territory. The Commission used the PRIMES/GAINS model to define an EU-wide cost-effective division of GHG reduction commitment between the EU ETS and non-ETS sectors (EC, 2008g).

Closer examination shows that the share of ETS emissions in 2005 is 43% for the total EU-27, and ranges from 16% for Luxembourg to 62% for Estonia (see Figure 4.1). These are preliminary figures as the scope of gases and composition of the ETS sector in the proposal is wider than under the 'Kyoto commitment period' 2008-2012. As country-specific circumstances differ, the mix and shares of industrial subsectors (power generation, refineries, steel production, chemicals industry, pulp and paper, cement, food and drink industry) and the share of aviation also differ per Member State. Likewise, the share of non-ETS emissions in 2005 varies across the Member States, as well as the composition of subsectors (road transport, residential/services, agriculture, waste).

Significance of emission credits from projects in other countries

In both the ETS proposal and the non-ETS effort-sharing proposal, Member States may count as emission reductions GHG credits from CDM projects in developing countries or JI projects in other industrialised countries. The question then rises how substantial is the maximum allowed contribution of CDM/JI to the overall reduction effort.

The present emission trend 1990-2010 for the EU-15 and the EU-27 is presented in Figure 4.2. This figure also presents the proposed target of 20% for the EU-27 for 2020 and the possible lower target of 30% reduction in the event of a comprehensive international agreement on GHG emission reduction, including the part that could be covered by CDM/JI credits. The Commission expects that about one-third of the ETS and non-ETS reductions of 21% and 10% in 2020 compared to 2005 may be met by CDM/JI credits.

The EU-27 is excepted to achieve a domestic GHG emission reduction of about 11% by 2010 compared to 1990 (EEA, 2008a). As shown in Figure 4.2, the new 20% reduction target for 2020 for the EU-27 compared to 1990 builds on the Kyoto target for the EU-15 Member States of 8% reduction in 2010 (2008-2012 average) compared to 1990 and 30% overall emission reductions in 2010 compared to 1990 expected for the 12 new Member States (EEA, 2008a).

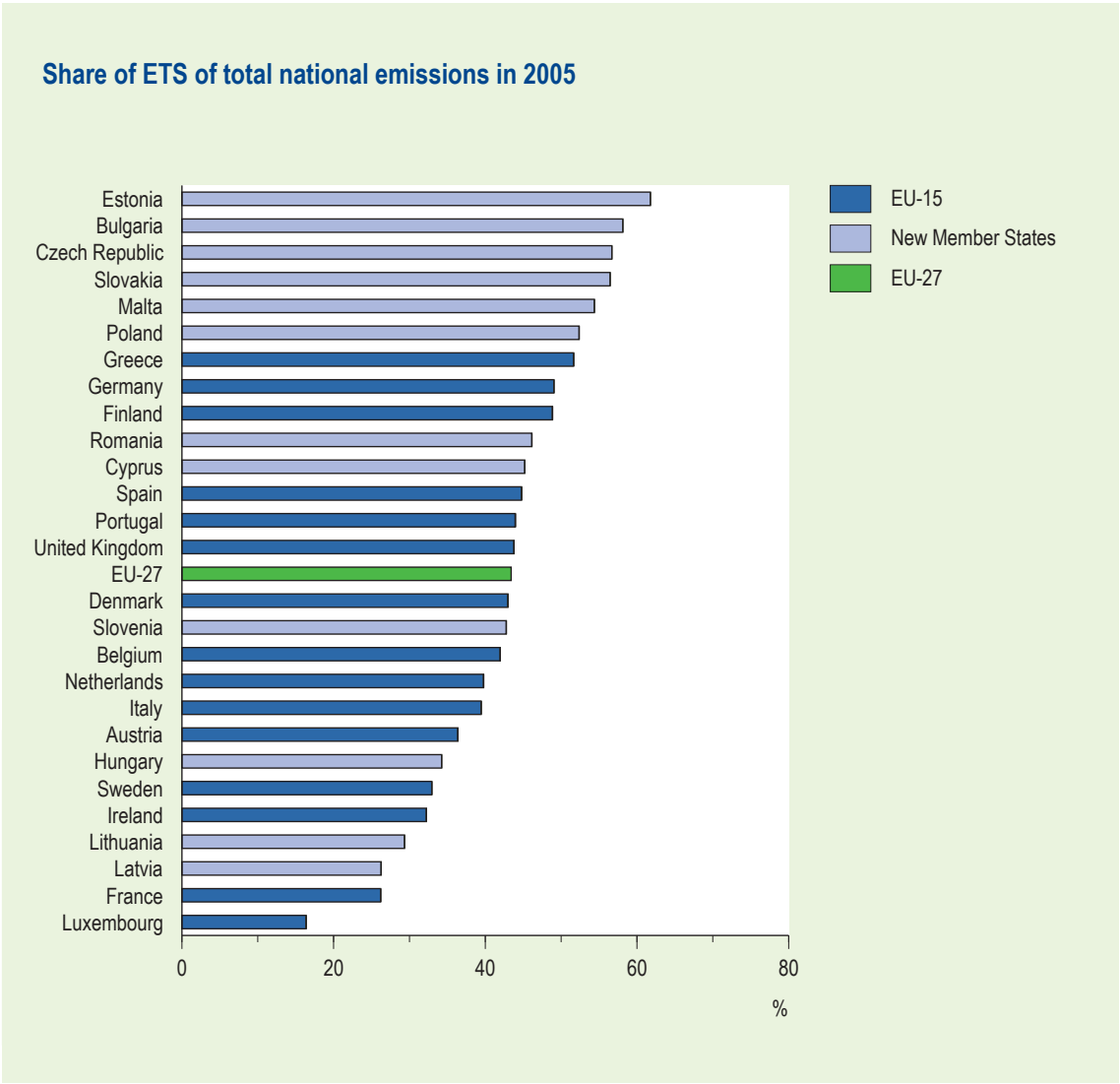


Figure 4.1 Shares of ETS sectors in Member States national emissions in 2005 (preliminary estimates, excluding aviation) (non-ETS emissions: EC, 2008b); total emissions: UNFCCC, 2008)

Total *domestic* EU-27 emissions would need to be reduced by about 4% in the 2010-2020 period in order to achieve the proposed 20% GHG reduction target. This can be done if, as proposed in the Commission's policy package, maximum use is made of CDM/JI credits by Member States (3% of the non-ETS sector emissions) and by companies in the ETS sector (7% contribution from banked surplus credits from the preceding 2008-2012 period).

The CDM/JI contribution is, therefore, significant for achieving the 20% target. It will be even more substantial if the target is a 30% reduction because the Commission proposes that about half of the additional reduction could be met by additional CDM/JI (about 5% points for a 30% reduction target). The figure also indicates that the domestic reductions from 2010 onwards required to meet the 2020 climate target are by no means evident, even when the maximum CDM/JI is included, as proposed. According to Wesselink et al. (2008), to achieve the 20% target, the impact of environmental policies, in addition to autonomous efficiency improvements, must increase by a factor of three in the 2005-2020 period compared to the 1990-2005 period.

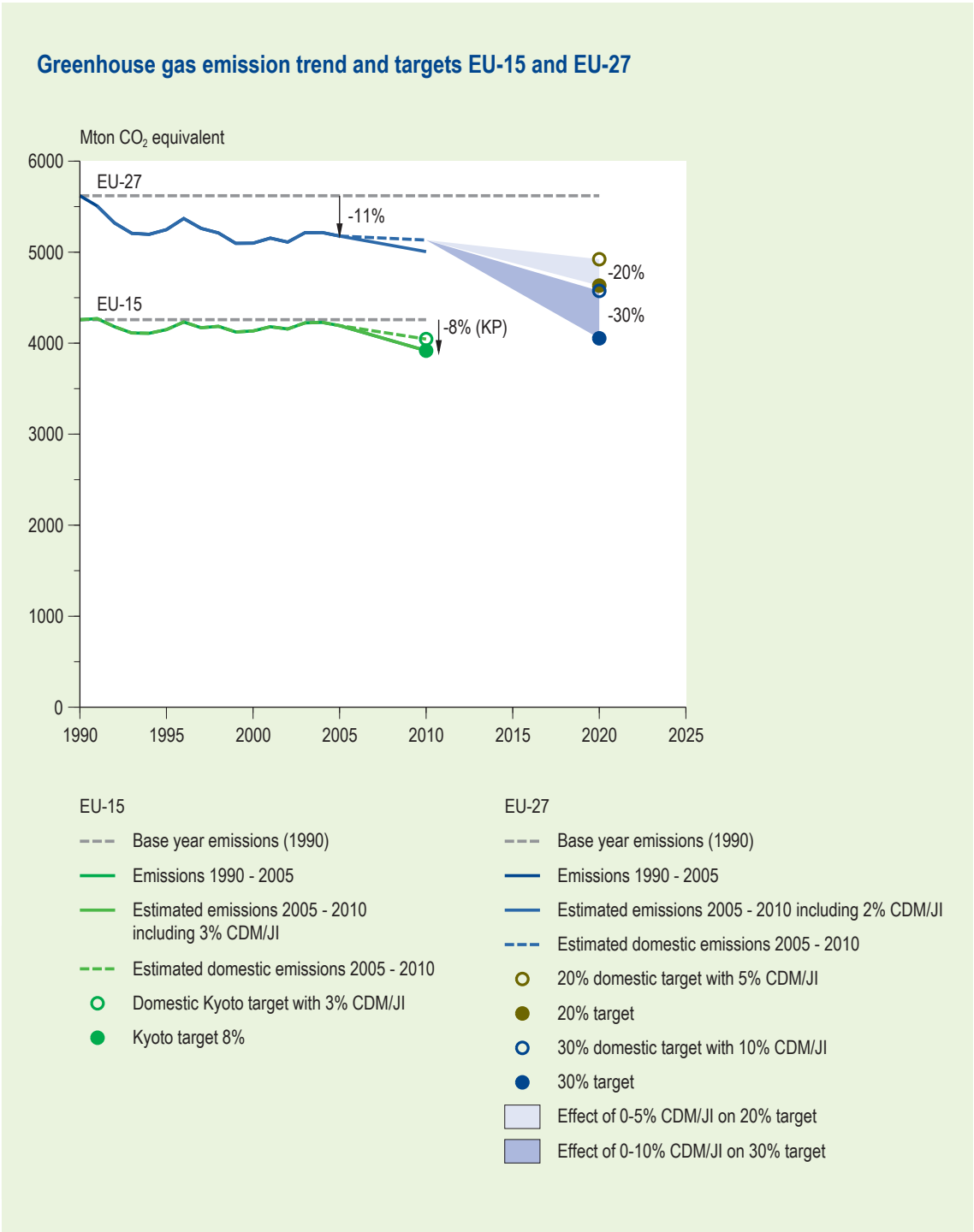


Figure 4.2 Comparison of emission trends for the EU-15 towards the Kyoto Protocol target for 2010 and new climate targets for EU-27 for 2020, with and without CDM/JI credits. All percentages refer to the base year 1990 (historical trends: UNFCCC, 2008; EEA, 2008; projections to 2010: EEA, 2008a)

4.2 Target setting: European Trading System

By setting an EU-wide cap of 21% reduction compared to 2005 emissions, instead of national cap-setting, the Commission aims to ensure 20% reduction on 1990 levels and to minimise the overall cost of emission reductions. Conceptually, the Commission's proposal of a EU-wide cap for the ETS sector differs from the ETS in the Kyoto Protocol. Consequently, no estimate can be

made of the impact of the Commission's new Energy and Climate package on total domestic emissions at Member State level in 2020. Responsibility of achieving the EU-wide ETS target will be transferred to EU level and achievement will require action by the ETS sector. Only the implementation of ETS rules is at Member State level.

The main reason for proposing an EU-wide cap rather than individual caps for each Member State – as presently done for the ETS under the Kyoto Protocol – is to guarantee a level playing field for companies across Member States. The Commission's proposal states that linear reduction of the cap in total annual allowances to 2020 will be continued as a reduction path beyond 2020. This provides the predictability required for long-term investments in efficient abatement.

For the ETS, the main allocation principle is *auctioning of emission allowances*. According to the Commission, this best ensures the efficiency, transparency and simplicity of the ETS and avoids undesirable effects on companies across Member States due to different methods in determining national caps and in national allocation to industries. Auctioning allowances also avoids discussion on objective and comparable national cap setting and allocation, as experienced in the first and second phases of the ETS under the Kyoto Protocol. Auctioning also complies with the polluter pays principle and rewards early action to reduce emissions.

The Commission distinguishes three subsectors in the ETS:
1. electricity production, for which 100% auctioning of allowances will start in 2013;
2. other sectors with a transitional scheme, for which free allocation in 2013 would be 80%, linearly decreasing to no free allocation in 2020;
3. certain energy-intensive subsectors subject to international competition may be allocated up to 100% free allowances.

The latter is an option foreseen in the event that other developed countries and major GHG emitting countries do not participate in a post-Kyoto agreement. Non-participation could lead to an increase in GHG emissions in other countries where industry would not be subject to comparable carbon constraints ('carbon leakage'). This could also put at an economic disadvantage energy-intensive sectors and subsectors in the EU that are subject to international competition. For the proportion of the allowances allocated free, the Commission will develop EU-wide sector-specific allocation rules.

The Commission's main principle in determining the distribution of *allowances auctioned by each Member State*, which will also collect the revenues, is each country's relative share of 2005 emissions in the sectors to be auctioned. However, 10% of allowances to Member States with a GDP per capita 20% or higher than the EU-27 average are redistributed to other Member States. The Commission uses the following rule: the lower the GDP per capita and the higher the expected overall GDP growth, the more auctioning rights a Member State receives.

All emission allowance auctions are open to all companies in the EU-27, thus also to industries located outside the country auctioning the allowances. Subsequently, allowances purchased can be traded again on the market. As a consequence, future GHG emissions of the ETS sector in a specific Member State will be difficult to estimate. GHG emissions of industries in some Member States may grow, even substantially, if they purchase sufficient allowances (at auctions anywhere in the EU-27) or CDM/JI credits. This could be the case if industries in other countries reduce their emissions accordingly, either by emission reduction measures or by less growth in production.

Box 4.1. Why does the ETS system perform as a 'waterbed'?

When more domestic measures are implemented in the ETS sector of a Member State, there is less demand for ETS credits (EAUs) or CDM/JI credits[1]. Because the total number of available ETS credits and CDM/JI credits is fixed at a level equal to the European ETS cap, less demand will lead to a lower credit price. Theoretically, a lower carbon price means that ETS sectors in other Member States will take fewer domestic measures than they would have done otherwise. Of course, more ETS credits or CDM/JI credits will have to be purchased to cover the extra emissions. The amount of extra credits they can buy equals the additional emission reduction that might be achieved by the Member State's ETS sector that implements more domestic measures. The conclusion is that extra reductions in one Member State will be nullified by less reductions in other Member States.

Conversely, additional national policy to reduce GHG emissions in the ETS sector will not effectively reduce EU-wide ETS emissions. Because of the EU-wide cap on the emission trading market, industries in other Member States will then be able to purchase more allowances. This is the *'waterbed effect'*: applying pressure in one place causes a rise over the rest of the surface, because the total volume is constant. Although this feature of the system is not new and also occurs in the present Kyoto Protocol period 2008-2012, full auctioning of allowances as proposed for the 2013-2020 period without specific company allocations has even greater similarity with the 'water bed' analogy.

Despite the waterbed effect, governments have environmental policies aimed at the ETS sector, for instance to promote more energy conservation and emission reductions beyond the level industries consider to be cost-effective. These policies do not affect the net contribution of the ETS sector to meeting the Kyoto targets, which is arithmetically fixed at the predefined national ceiling. Also, they do not affect the net EU-wide total emissions of the ETS sector ('waterbed effect').

Industrial energy use is subject to more environmental policy than climate policy, for example on reduction of air pollutants such as NO_x, SO_2 and aerosols (particulate matter). Member States and the EU will have to evaluate how this interferes with climate policy and which additional environmental policy aiming at industries is relevant from perspectives other than direct GHG emission reductions. It can be expected that governments will continue with environmental policies aiming at the ETS, because of national co-benefits to air quality of taking domestic measures instead of purchasing emission units from abroad.

No national target for ETS sector of Member States

In the Commission's proposal for the ETS sector, there is only an EU-wide cap and no specific national ceilings or caps (before trading). This implies that no national 'target' can be associated with this sector as is the case in the present phase 2 of the ETS under the Kyoto Protocol (see Box 4.3). Alternatives, such as application of the EU-wide reduction figure to emissions from a national ETS sector in 2005 to replicate a ceiling as included in the National Allocation Plan for the Kyoto period 2008-2012, cannot be justified. It is concluded, therefore, that under the new proposal for the ETS sector, no national target for total GHG emissions of a Member State can be defined. Thus, no estimate can be made of the impact of the Commission's new Energy and Climate package on total national domestic emissions in 2020. The responsibility for achieving the EU-wide ETS target is now at the EU level, thus with the Commission.

1) The use of CDM/JI credits allowed in the third phase of the ETS equals that used in the second phase minus the amount already used in the second phase. However, the total amount of credits – EUAs plus CDM/JI - remains at a level of 1720 Mton in 2020. The allowed use of CDM/JI credits in the second phase is 13% on EU average, and 10% in the Netherlands.

Box 4.2 How do national caps for the ETS sector work under the Kyoto Protocol?

To understand why the proposed EU-wide cap cannot be translated to a national cap, the national cap setting under the Kyoto Protocol can serve as an example.

Determination of national caps

In the ETS phase 2 of the Kyoto Protocol, a country's ETS emissions are counted as part of the target for total national emissions. By defining national caps for the domestic ETS sector, the contribution to the national total is the amount defined as the cap, since trading of EU allowances is, in effect, trading Assigned Amount Units (AAUs) as defined in the Protocol.

The Commission has tried to achieve consistency between Member State caps by assessing the proposals for national emission ceilings in the second National Allocation Plans by the Member States, consistently and transparently (EC, 2006f). This assessment focused on:

- consistency with the Member State's Kyoto target;
- emission trend;
- reduction potential;
- limit on CDM/JI project credits for national ETS companies.

How the national cap works under the Kyoto Protocol

The national cap allowed under the present European ETS is the ceiling of the annual domestic emissions of the ETS sector in the target period 2008-2012 of the Kyoto Protocol. The ETS emission units being traded are called national Assigned Amount Units (AAUs). The national total AAUs allowed by the Commission are distributed or auctioned by national governments to participating national companies (including provisions for new entries to the ETS). This is the total cap allowed for that part of the national emissions. Trading AAUs between companies in Member States is considered to be a 'flexible mechanism' of Emission Trading between countries

National caps for greenhouse gas emissions in 2008 - 2012 compared to 2005 emissions

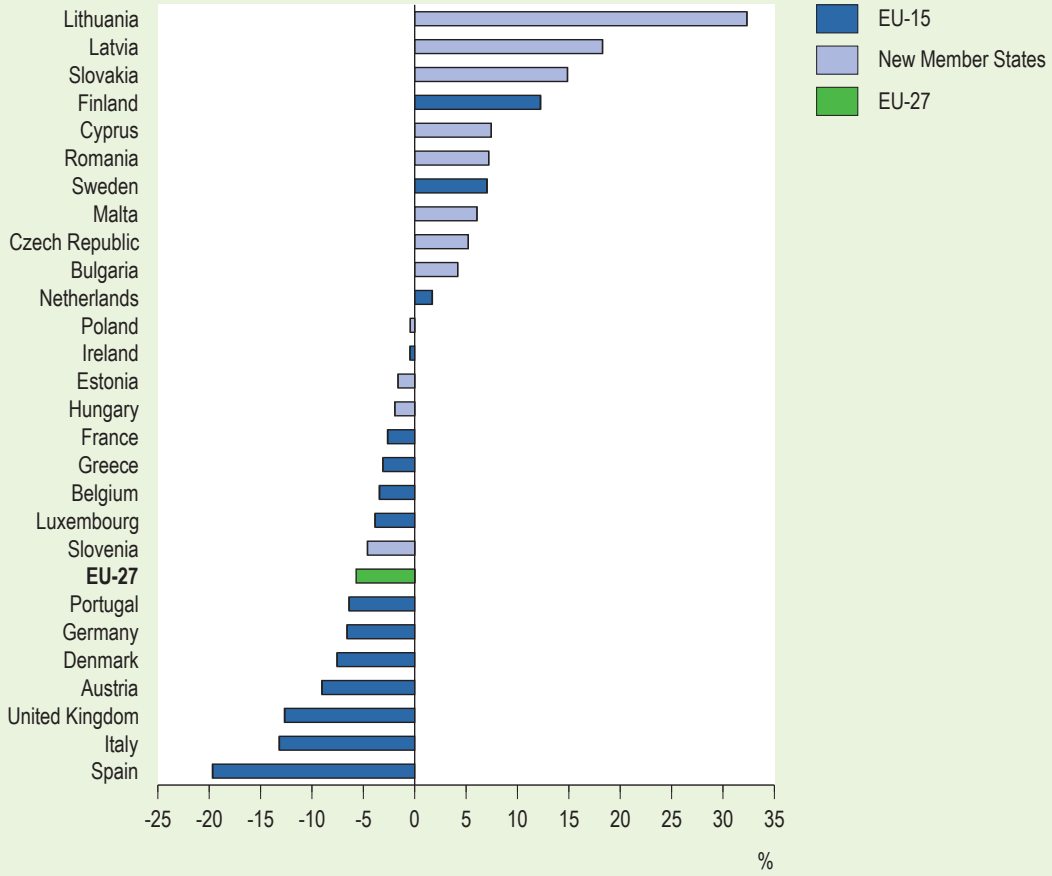


Figure B.4.1 National caps set in the EU-27 ETS system for the Kyoto Protocol period 2008-2012 expressed as percentage of domestic 2005 ETS emissions. The percentage for the EU-27 total cap is also shown, and clearly differs from many of the national caps (EEA, 2008b)

as defined in the Kyoto Protocol. In the the Protocol, the national Assigned Amount Units (AAUs) of the national ETS ceiling are traded. These are domestic emissions of the ETS sector in the target year(s) prior to trading.

Differences between proposed and approved caps and CDM/JI limits

The EU-27 collectively proposed overall ETS emissions in the Kyoto target years that appeared to be 5.4% higher than in the base year 2005 (for the EU-15, 4.6% higher). However, subjective criteria are used by governments in allocation methods, such as grandfathering (free allocation based on historical emissions) combined with assumptions on growth rates and technical and economic potential, that could lead to significant market distortions. The Commission has, therefore, decided to reduce the allowances by varying amounts, from 0.2% to almost 150%-points. The Commission accepted the proposed ceiling without modification for only Denmark, France, Slovenia and the United Kingdom. The total cap for the collective EU-27 in the Kyoto target years is now calculated as 5.7% *lower* than in the base year 2005 instead of 5.4% *higher* than in 2005 as proposed. Although the overall cap is -5.7%, the caps allowed to individual Member States expressed as percentage of 2005 emissions vary greatly, between -23% and +32% (see Figure B4.1) (for figures see Table XI.1 in Annex XI).

The Commission also evaluated the limit of CDM/JI units that national ETS companies may use to meet their obligations. This was related to the cap assessment and based on actual and expected growth rates, proportion of the ETS sector in total national emissions, technical and economic potential for emission reductions, and consistency with national and EU climate policies. The weighted average limit is about 13%, but also here the percentages allowed by the Commission vary considerably, between 7% (Slovakia) and 20% (Germany, Lithuania and Spain), except for Estonia (0%). For 13 Member States, the limit was set at 10% (EEA, 2008b) (see Table XI.1).

For better understanding of why the proposed EU-wide cap cannot be translated to a national cap, the national cap setting under the Kyoto Protocol can serve as an example (see Box 4.2). In Box 4.3, specific arguments are presented for proxy methods that could possibly be applied to a Member State, but are shown to be invalid. These lead to the conclusion that any cap setting for an individual Member State could be considered subjective without proven consistency with other Member States caps.

The ETS and non-ETS sectors have different mechanisms to reach reduction targets. Power plants are included in the ETS sector, while electricity is partly used by the non-ETS sector. A consequence of the EU-wide cap for the ETS sector is that electricity conservation in non-ETS sectors, or in manufacturing industry which is part of the ETS sector, does not lead to additional reduction of EU ETS sector emissions relative to the EU-wide ETS ceiling for the period 2013 to 2020. Similarly, promoting small-scale cogeneration, that co-produce electricity, will lead to extra emissions in the non-ETS sector, instead of additional reductions. Another 'borderline' effect is that mergers in small industries lead to larger combustion facilities, for example in greenhouse horticulture. If the new (aggregated) on-site capacity exceeds the threshold for small emitters excluded from the ETS sector, the change in industry structure would move these emission sources from the non-ETS sector to the ETS sector. The present proposals suggest that this would result in reduced non-ETS emissions, while the national targets were set in megaton and are fixed after the decision on effort sharing.

The fact that the proposals, at least in theory, remove the incentives for energy conservation by households and industry, or even provide a perverse incentive to use more electricity, is certainly unwanted. However, it is not easy to come up with policy solutions for these borderline effects. Certainly, in the long term after 2020 when new targets are set, these measures may reduce GHG emissions from electricity production and play a role in a cost-efficient solution on the EU level. But for the short term, the possible occurrence of wrong signals to actors in the market underlines the importance of additional policies on energy efficiency improvement.

Burden sharing

In principle, all companies under the ETS have to purchase allowances at auctions or on the CO_2 market (including a permitted proportion of CDM/JI credits). The linear increase in the fraction

Box 4.3. Why the proposed EU-wide cap cannot be translated to a national cap?

The Commission proposed a EU-wide cap for 2020 corresponding to a reduction of 21% on the 2005 emission level and did not define country-specific caps. Except for the current procedure described in Box 4.2, there is no method to relate the EU-wide cap to corresponding national caps.

The arguments for proxy methods to derive a national cap for a Member State lead to the conclusion that the EU-average cap for the Kyoto Protocol would not be a good proxy for any Member State. Further, any other cap setting for an individual Member State could be judged to be subjective without proven consistency with caps assumed for other Member States.

Argument 1: The EU-wide reduction target (21% in 2020 relative to 2005) can be attributed to the Member State's ETS sector. It is part of the EU-wide ETS system and the ETS sector in each Member state will have to make a effort comparable with ETS sectors in other Member States. The reason is that the CO2 price will be the same for all participants. In theory, this price will stimulate ETS sectors in all Member States to implement reduction measures to a cost-effectiveness equal to this carbon price. This will not lead to a corresponding decrease of 21% in actual national ETS emissions, but this is irrelevant because that is also the case in the second phase of the ETS system (2008-2012).

Refutation: The ETS sectors will – in theory – implement reduction measures to a cost-effectiveness equal to the carbon price. However, there will be more reduction measures to this level and therefore the total cost will be greater in Member States with a less energy efficient industry than in those with a more efficient industry. This means that the efforts of the ETS sectors will not be comparable across the Member States. In the second phase of the ETS system, the actual emissions of the ETS sector in a Member State can be higher than the national cap, but the participants have the obligation to buy credits to compensate for this. However, this is not the case in the third phase of the ETS system (2013-2020) because there is no national cap, and therefore no exceedance.

Argument 2: In the period 2013-2020, an increasing proportion of the credits needed by companies to cover their emissions will have to be purchased at auctions organised by the Member States. The remaining part is allocated free according to harmonised rules. It has been argued that the total credits that Member States will be allowed to auction and those allocated free can be used as an approximation for a national cap.

Refutation: Companies operating in one Member State are allowed to purchase credits in any Member State, which means that the amount is not limited to that 'their' Member State is allowed to auction. The same applies to companies not receiving enough free credits to cover their emissions, and having to purchase credits to make up for the deficit. Thus, the amount auctioned per Member State is not related to a national 'target emission level', but to the share of the national ETS sector's actual emissions in the reference year 2005, modified to redistribute the revenues towards the relatively poorer Member States.

of allowances auctioned from 20% in 2013 to 100% in 2020 for other sectors than for power production takes into account the international competitiveness within Europe but also with the rest of the world. This is particularly important for energy-intensive industries not exempted from auctioning, which will have some time to adjust to the ETS auctioning system. Otherwise the EU new climate policy would lead to more displacement of European industry.

For some subsectors, free allowances may be allocated using EU-wide allocation rules to be developed by the Commission. In theory, a perfect CO_2 market will ensure that the costs of emission allowances purchased and emission reductions per ton of CO_2 by companies are equal across the EU. This will create a 'level playing field' for all companies within the EU ETS sector regarding the costs of contributing to climate policy targets.

The revenues from the allowances auctioned – estimated to be about 60% of total allowances in 2013 and 100% on 2020 (EC, 2008g) – are in proportion to the ETS sector emissions in 2005 but modified by GDP per capita. Since the Member States with the lowest incomes have the highest expected economic growth trends (Figure 4.3), the modification tends to favour the Member States where the industry is expected to show highest growth trends. The Member States with a GDP per capita less than 1.2*average GDP/cap of the EU-27 and thus get an increased auction allowance are the 12 new Member States plus Greece, Portugal and Spain (see Figure 4.4 and Table X.2 in Annex X). Compared to allowance auctioning in proportion to ETS sector emissions, this solidarity mechanism increases revenues by up to 50% for Member States with

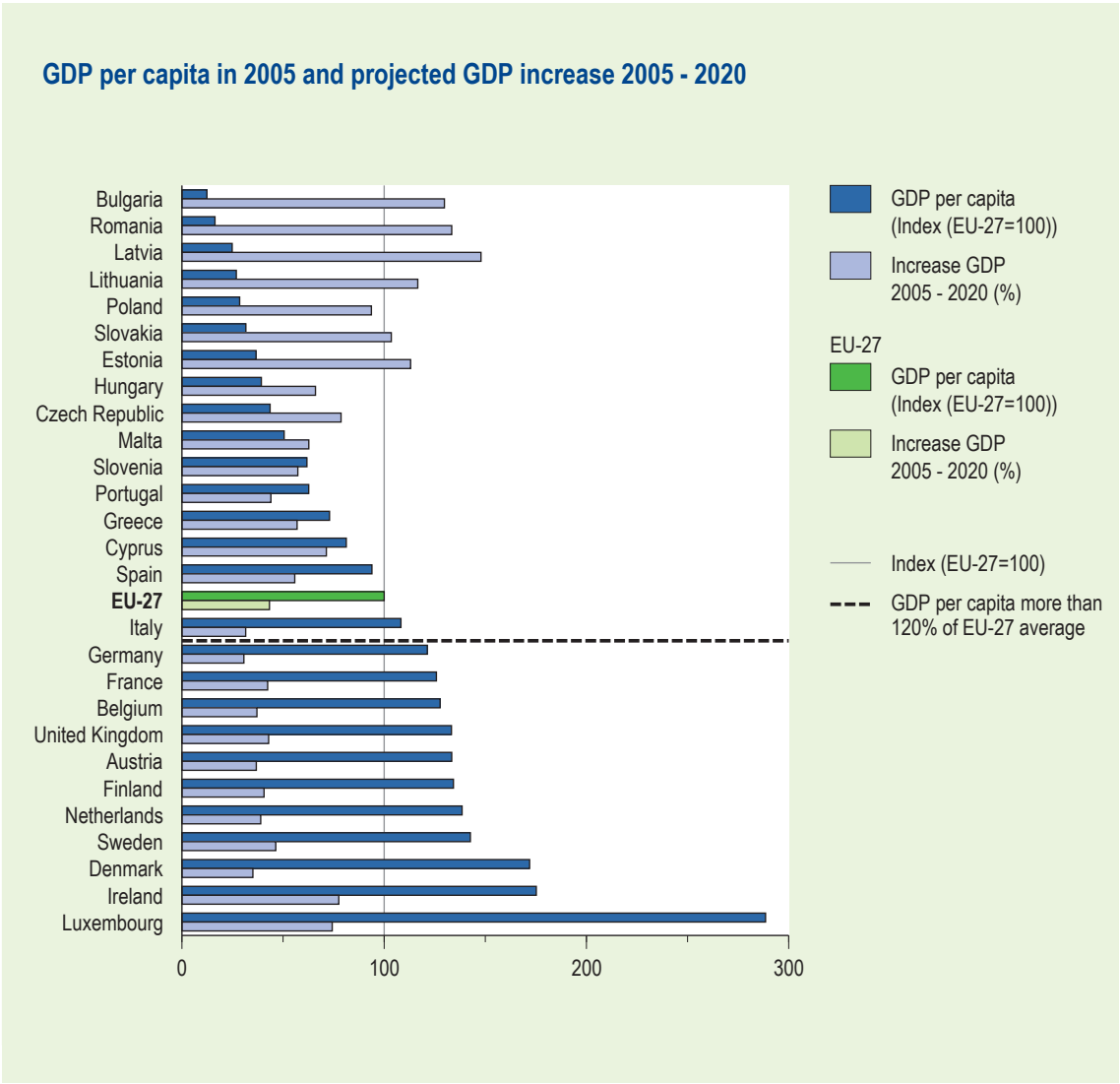


Figure 4.3. GDP/cap in 2005 (GDP/cap of EU-27 average = 100%) and projected economic growth 2005-2020 per Member State (PRIMES data in EC, 2008g)

relatively low income per head and high growth prospects. Revenues for the nine Member States with the highest GDP decrease up to about 10%.

Flexibility in the sectors

Emission trading as a market instrument gives companies the flexibility to decide either to take reduction measures in their installations or to purchase allowances. While the choice will depend on the price of the allowances and the costs of emission reduction measures, in principle it will lead to the most cost-effective measures across the EU-27.

The expanded scope of the ETS compared to the present ETS system for the Kyoto period 2008-2012 to include new sectors and gases will generally reduce overall costs because of additional abatement opportunities. However, high-cost sectors with high growth expectations, such as aviation, will push marginal abatement costs to a higher level. This will increase the average costs for the energy and manufacturing industries. Inclusion of carbon capture and storage (CCS) technology further expands the scope for significant and cost-effective reductions of more stringent reduction targets such as 30% reduction.

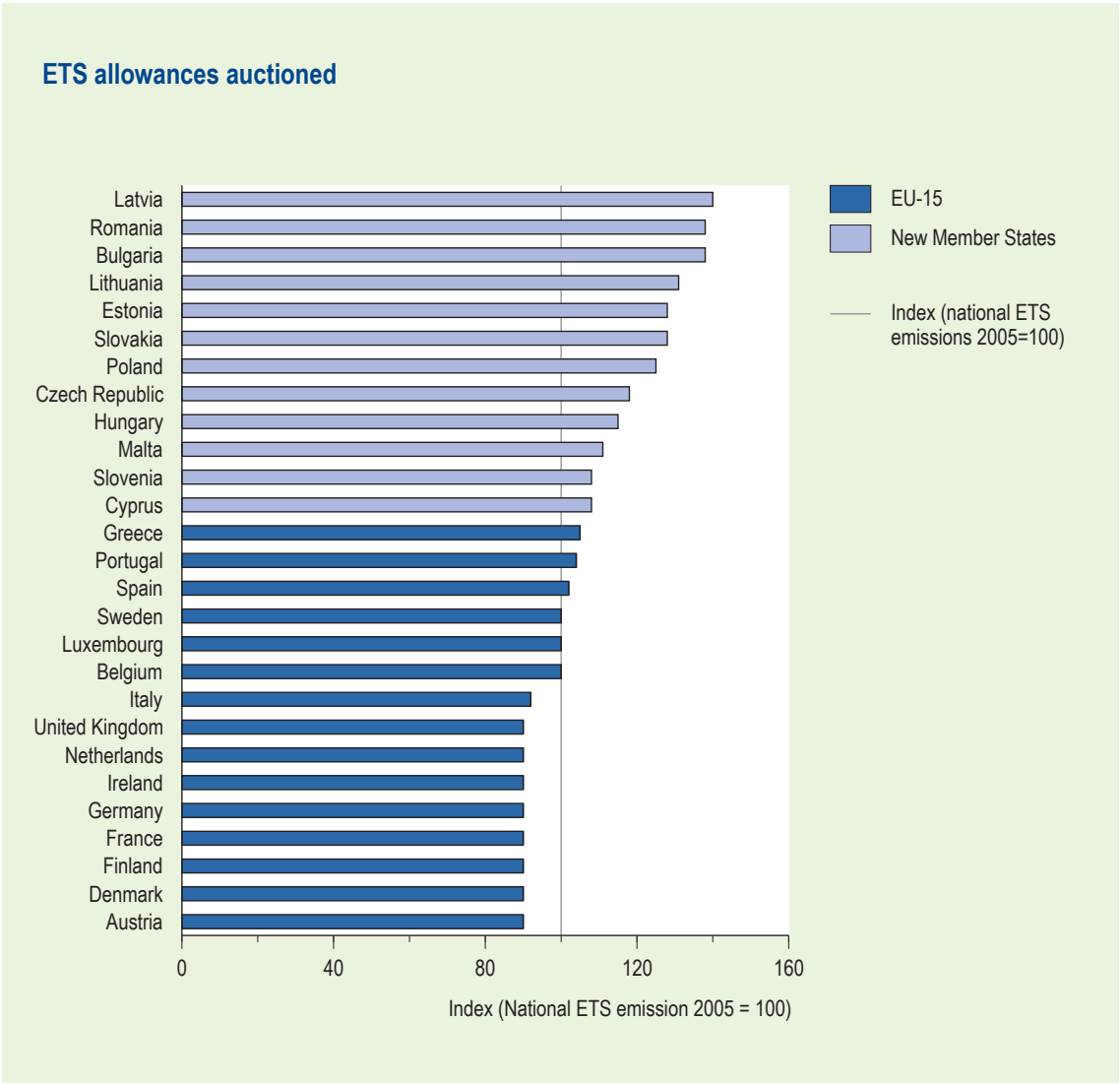


Figure 4.4. ETS allowances allocated to Member States for auctioning (100% = national 2005 emissions) (EC, 2008a)

The use of CDM and JI credits to meet obligations under the ETS by investing in projects to reduce emissions outside the EU decreases the costs of GHG emissions reduction. Companies can use the part of their limit not used in phase 2 of the ETS (2008-2012) to purchase CDM/JI credits in the next phase (2012-2020; see Box 4.2). The extent to which companies will use this surplus of 'banked' credits is not known. However, the Commission expects that maximum banking in the second phase (not using the CDM/JI allowed) will result in an average of 7% point reduction from transferred CDM/JI credits in the 2013-2020 period. This corresponds to one-third of the 21% overall reduction (see Section 4.1 and Figure 4.2). In the impact assessment (EC, 2008g), the carbon price estimated by the Commission is € 40 per ton CO_2 without CDM/JI (€ 50/ton CO_2 without renewable energy targets), around € 30 to 35 per ton CO_2 including CDM/JI, and about € 30 per ton CO_2 with unlimited access to CDM/JI.

The foreseen linkage with other emission trading schemes to any country or administrative entity (such as a state or group of states under a federal system) which has established a cap-and-trade system may further expand the range of cost-effective reduction options.

Flexibility of Member States

Auctioning allowances will generate significant revenues for Member States to implement climate and energy policies within the restrictions set by the ETS Directive and the State Aid Directive. Use of auction revenues is not restricted to the ETS sector, but may also be used, for example, in promoting emission reduction in non-ETS sectors and improving energy efficiency, and expanding production and use of renewable energy. Since auctioning ETS allowances will generate large budgets for governments, the harmonisation of auctions organised by Member States is essential for effective functioning of this market mechanism. The way the revenues are fed back into the economy (to households, industry and other businesses, emission reduction projects in other countries, or mixed) has a significant impact on the cost bearing by sectors in society and on the GDP growth rate. At present, it is difficult to assess the restrictions that the new rules for state aid on government subsidies for environmental protection pose to the proportion of the auction revenues that could fed back to the industry sector.

The EU ETS aims to let the emission allowance market achieve the EU-wide GHG emission target in the most cost-effective way. Additional policies to promote more domestic emission reductions by specific domestic companies instead of purchasing more allowances will not be successful in reducing EU-wide GHG emissions. The ETS market will adjust and other players will compensate by purchasing the non-used allowances and will thus have higher actual emissions. Because of the EU-wide cap, in a perfect market, extra ETS emission reduction in one Member State is compensated by extra emission in the other Member States ('waterbed effect').

However as mentioned above, there are other reasons for Member States to take additional national policy measures to reduce emissions of national ETS companies and thereby also mitigate GHG emissions. For instance, there could be significant co-benefits for air quality, achieving targets on renewable energy and energy efficiency and for promoting innovation in infrastructure and technology development. Thus, it is beneficial for Member States to use policy instruments to encourage national industries to implement more GHG emission reduction measures domestically instead of purchasing more allowances. Moreover in the longer term, this is also important in the ETS sector for further reducing GHG emissions after 2020. Further analysis of the relevance and impacts of this interaction is needed.

The benefits of the ETS in terms of lower cost of GHG reduction at plant level could be partly offset by the higher cost of meeting *National Emission Ceilings* (NEC) for SO_2, $PM_{2.5}$ and NO_x for a country as a whole. Currently, new EU national emissions ceilings are being prepared for air pollutants for 2020. Rigid national ceilings will limit the flexibility in the energy and climate action package. Theoretically, the ETS in the package offers the potential to increase the number or production level of industries, such as refineries and coal-fired power plants. This could lead to exceedance of the national emission ceilings for air pollutants. Governments responsible for meeting these ceilings will have to enforce additional measures to limit emissions. In the longer term, trading national emissions of air pollutants could add to the flexibility of both air quality policy and energy and climate policy in meeting emission targets for both greenhouse gases and air pollutants. This would also address the split responsibility for air quality, which is at the level of city government, and the responsibility in meeting NEC emission targets, which is at the level of the national government.

From the Commission proposal, it can be concluded that part of the auctioning revenues may also be used to compensate for reduced co-benefits in case of significant purchases of emission

Box 4.4. Positions of Member States in the ETS sector

Power plants:
- *low* shares (8-13%) in France, Luxembourg, Slovakia, Lithuania, Belgium, Austria, Sweden – due to high proportion of non-fossil shares (either nuclear or hydropower);
- *highest* shares (39-56%) in Estonia, Poland, Bulgaria, Czech Republic, Greece – due to high proportion of fossil fuel or coal-fired power plants;

Steel:
- *high* shares (12-14%) in Slovakia, Austria;
- *significant* shares (6-9%) in Finland, Belgium. Germany, Bulgaria, Czech Republic;

Chemicals: high shares (9-15%) in Lithuania, the Netherlands, Belgium, Hungary;

Refineries: high shares (5-13%) in Estonia, Lithuania, the Netherlands;

Cement:
- *highest* (4-5%) shares in Greece, Portugal, Spain;
- *high* shares (3%) in Luxemburg, Italy and Ireland;

Food: higher shares (2%) in Latvia, France, the Netherlands, Denmark, Czech Republic;

Pulp/paper: high shares (2-5%) in Finland, Sweden, Austria, Slovenia.

Aviation: not yet known because data are not available on distribution to Member States and the uncertainty whether the proposal for international flights will be accepted.

credits abroad (either through CDM/JI or by buying – as balance – rights from companies in other Member States).

Positions of Member States

Country-specific circumstances determine the amount of revenue national governments will get from auctioning allowances and the importance for the national industry of possible market distortions by foreign industries. The share of the ETS sector in national total GHG emissions (excluding international aviation) varies from 16% in Luxembourg and 26% in France to 62% in Estonia (see Figure 4.1). For the ETS sector, country-specific circumstances may be grouped as follows:

- relatively low GDP/capita;
- relatively high growth prospects;
- relatively high or low share of ETS sector or power plant emissions;
- relatively high share of industrial subsectors vulnerable for 'carbon leakage', such as energy-intensive industries.

The ranking and grouping of Member States on a threshold of GDP/cap of 20% above the EU average value and the growth assumed for the Commission's baseline analysis are presented in Figure 4.3. As well as the 12 new Member States, seven of the EU-15 countries are also in the lower income group.

The mix of industrial subsectors – power generation, refineries, steel production, chemicals, pulp and paper, cement, food and drink industry – differs per Member State as does the share of aviation allocated to the administering Member State. From Figure 4.5, which shows the composition of national ETS sectors for 2005, it can be concluded that the power sector contributes on average 60% of the ETS total, with large country differences (ranging from 17% for Luxembourg to 80% for Poland). This translates to the power sector contributing 24% to overall EU emissions and in the individual Member States contributing 3% to 56%. Generally, the steel industry, chemical industry and refineries contribute much less – on average 2% to 4% of total national emissions, with some notable exceptions contributing between 5% and 15%. The share of other subsectors is less than 5% of the national total. The country groups can be identified as listed in Box 4.4.

Box 4.5. Structure and international competition of the energy-intensive industry

The value added of the energy-intensive industry is only a limited proportion of value added of the total manufacturing industry in the EU-27; in total over 10% divided over various sectors. The largest sector is base chemical production (4%), iron and steel production (2%) and about 1% each for production of pulp and paper, glass and non-ferrous metals. However, the distribution of the energy intensive industry also varies across Member States. For most countries, the share in industrial turnover is around 2%, except for Romania (8%), Slovakia (5%), Latvia and Cyprus (4%) and Ireland and France at the low end (around 1%). Particularly non-ferrous metals, including aluminium manufacture, and base chemicals are relatively open to trade[2]. However, cement production stands out as being considerably less open to trade (EC, 2008g).

The Commission notes that assessment at sector level masks the large differentiation within these sectors. Production processes can be more or less energy-intensive such as dry or wet cement production, and primary or secondary production of steel and aluminium. In conclusion, country-specific and plant-specific circumstances determine whether activities of a specific industrial company faces significant competition on the international market.

For domestic and international aviation, the present share is about 3% of EU-27 total GHG emissions in 2005. This is equivalent to about 6% of the present ETS total. In Figure 4.5, this subcategory is added to the EU-27 bar only, because allocation to individual Member States has not yet been determined. If the increasing trend of this subsector continues (80% since 1990), its share in the 21% reduced ETS emissions in 2020 could increase from 6% to about 15%. This increase of about 10%-points in the share of ETS emissions is important for other industries in the ETS sector because actual CO_2 reduction options for the aviation industry in the short term are either limited (energy efficiency improvements) or very expensive (using biofuels; see Den Elzen et al., 2007b). Because of the 'waterbed effect', increasing aviation emissions lead to an equal reduction in the volume of emissions available for the other ETS sectors.

International competition of the energy intensive industry

The European industry could be faced with significant additional costs in meeting ETS requirements and thus face a competitive disadvantage with similar industry sectors outside the EU. To analyse which sectors would be most vulnerable to market distortion, the Commission has assessed the proportion of products imported from and exported to countries outside the EU by the most energy intensive industry sectors in each Member State (EC, 2008g). For the Netherlands, the chemical industry, food processing industry and refineries stand out for their high share in the ETS sector.

On average, the power sector contributes about 60% to the ETS total, with country differences ranging from 17% to 80%, which is equivalent to about 25% (3-56%) as shares in EU/national total emissions. The steel industry, chemical industry and refineries contribute only a few percent on average, with some exceptions in specific countries (see Box 4.5). Discussions on possible exemptions from auctioning are particularly important for Member States with a high share of these subsectors because of potential economic disadvantage due to distortion in international market competition. Member States with a relatively high share of these subsectors as listed in Box 4.4.

Conclusions

- The Commission's new proposal for ETS sources introduces one EU-wide cap and there are no specific national caps (emission ceilings before trading) as presently under the Kyoto Protocol. This implies that no national 'target' can be associated with this sector as has been

2) The Commission uses openness to trade expressed as indicator of the degree of international competitive pressure that industries face.

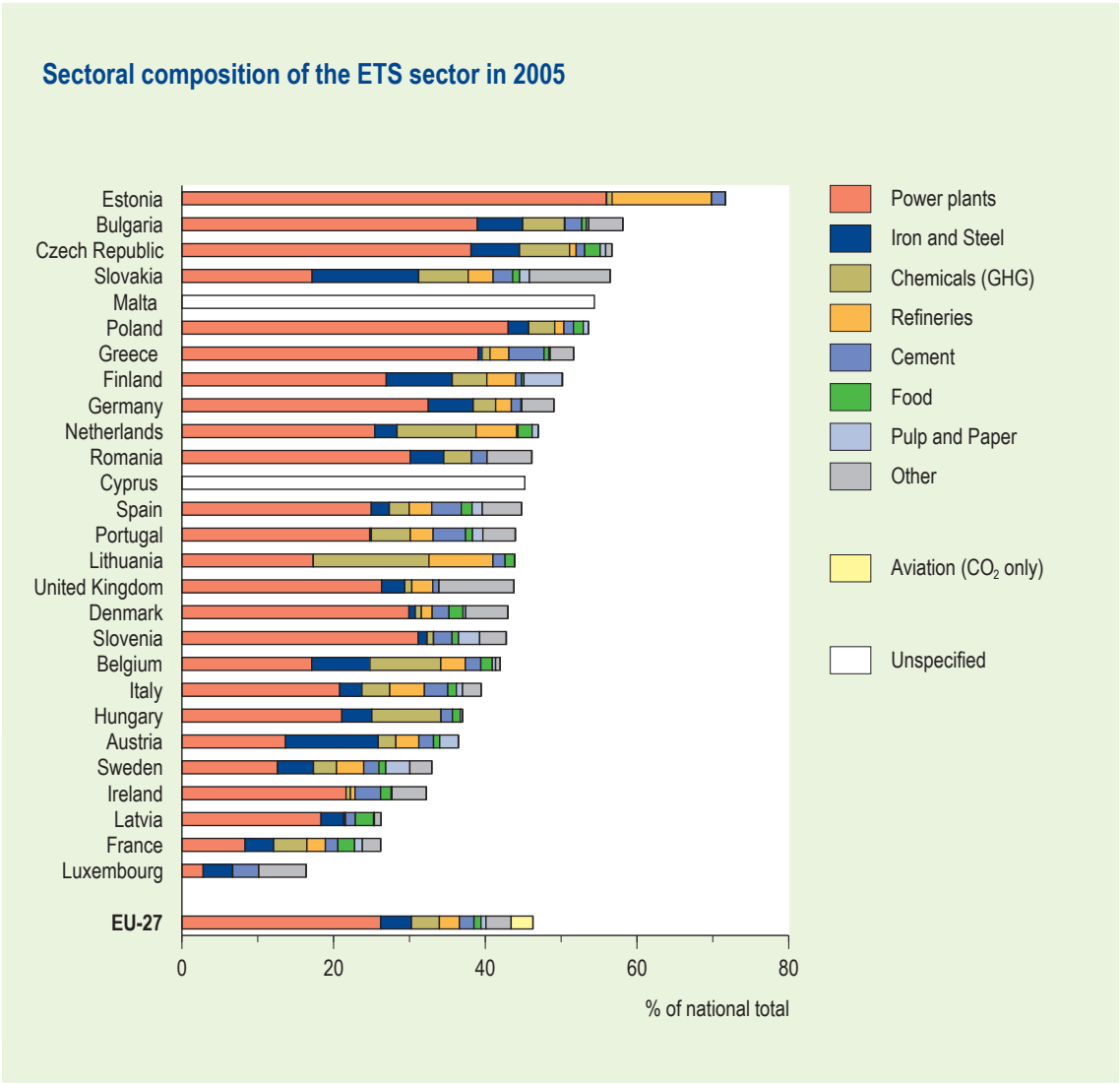


Figure 4.5. Composition of the ETS sector in 2005. No data were available for Malta and Cyprus and data for Greece were extrapolated from 2004 (UNFCCC, 2008)

the case in the present phase 2 of the ETS under the Kyoto Protocol. It also implies that no national target for total GHG emissions of a Member State can be defined.

- The ETS is a flexible market instrument resulting, in principle, in the lowest overall reduction costs *within the sector* to meet the *specific ETS target*. However, emission reductions required by the ETS sector in the 2013-2020 period are uncertain up to one-third of the 21% reduction on the 2005 level. A maximum of 7%-point reduction could be met if all CDM/JI credits allowed in the Kyoto period are banked and purchased after 2012. But this could lead to fewer incentives for innovation in clean technologies in the European Union.
- Expanding the scope of the ETS with low-cost sectors (N_2O) and high-cost high growth sectors (aviation) adds uncertainty to the CO_2 price that can be expected from the proposed cap of 21%.
- A feature of the ETS as cap-and-trade system is that additional national policies to reduce GHG emissions in a national ETS sector will not effectively reduce EU-wide ETS emissions. This is also the case in the present system for the Kyoto Protocol period 2008-2012. The emission trading market has an EU-wide cap, ensuring that industries in other Member States will be able to buy more allowances (the 'waterbed effect'). Governments can be expected to continue environmental policies aiming at the ETS sector, because of national energy targets

or because of the co-benefits such as for air quality from domestic measures instead of purchasing emission units from other countries.

- The main principle for CO_2 allowance allocation proposed is through national auctions of emission allowances of volumes set by the Commission, which are open to industries EU-wide. For the allocation of free allowances, the Commission will develop EU-wide rules for each subsector. The question remains to what extent free allocations for specific subsectors may lead to undesirable effects on the CO_2 market.
- Since auctioning of ETS allowances will generate large revenues, harmonisation of the auctioning process by Member States is essential if this market mechanism is to function adequately. How revenues are fed back into the economy (to households, industry and other businesses, emission reduction projects in other countries, or mixed) will have a significant impact on the cost borne by specific sectors such as industry, services and households and on GDP growth rate. Auction revenues could also be used to compensate for reduced co-benefits when domestic companies make significant purchases of emission credits outside the country (either through CDM/JI or by purchasing – as balance – rights from companies in other Member States).
- Within the framework of the *Environmental Aid Guidelines*, governments can promote and subsidise energy conservation and other environmentally friendly measures taken by domestic companies to enhance benefits to the national environment, society and economy. Further analysis is required to assess the restrictions that the new rules for state aid on government subsidies for environmental protection may pose on the proportion of auction revenues that could be fed back to the industry sector.

4.3 Target setting: burden sharing non-ETS sector

The Commission's proposal for the non-ETS sectors includes emission targets for each of the Member States.

Burden sharing

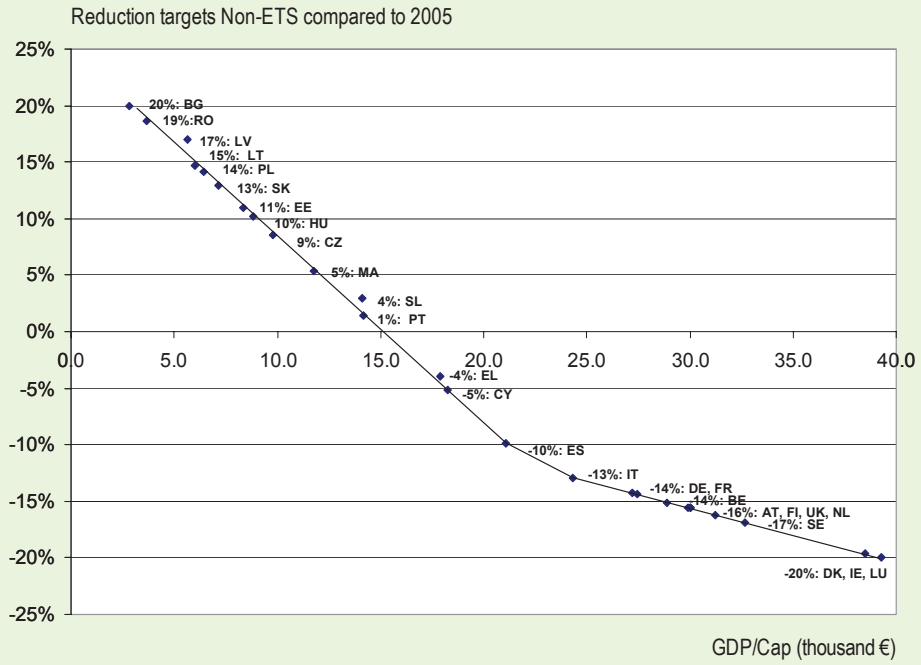
The Commission used the following method to express targets for Member States as a percentage of 2005 emissions. These result in the collective reduction of 10% on the 2005 level required for the EU-27.

- The Commission set maximum reduction targets of 20% for the two Member States with the highest GDP per capita - Luxembourg and Ireland. An increase of 20% was allowed for the Member States with the lowest GDP per capita in 2005[3]. The reduction at the EU-27 average GDP/cap level was set at 12% (using market prices).
- The Commission determined targets for Member States with other levels of GDP per capita by linear extrapolation between the 12% reduction point and the end points with 20% reduction and 20% increase (see Figure 4.6).

The resulting country targets are presented in decreasing order in Figure 4.7. An overview of the key variables fused by the Commission to determine the proposed national targets for each Member state and key results from the impact assessment reported by the Commission are presented in Tables X.1.a and X.1.b in Annex X.

3) The Commission determined these targets using the 'Business-As-Usual' (BAU) economic growth forecasts of the Member States from a set of models (PRIMES, GAINS, GEMS E3, POLES and PACE; EC, 2008g).

Country-specific targets for the non-ETS sector modulated on the basis of GDP per capita



Taken from: The Impact Assessment: document accompanying the Package of Implementation measures for the EU's objectives on climate change and renewable energy for 2020

Figure 4.6. Member State targets for non-ETS sectors related to GDP per capita (EC, 2008b)

The Commission states that the use of GDP per capita ensures that the efforts and associated costs are distributed fairly and equitably. This allows for further accelerated growth in those Member States where economic development needs to catch up with other Member States. The limits of -20% and +20% should ensure that specific national targets remain technically and economically feasible and reasonable in each country, and that there is no unreasonable increase in overall costs (EC, 2008).

Flexibility for the Member States

- Member States may decide on sub-targets for specific subsectors and on implementation of policies and measures such as building insulation and introduction of energy efficiency standards for construction, taxation or subsidies and promotion of clean transport. Measures at EU level will also contribute to emission reductions, such as energy efficiency standards, CO_2 standards for cars, and waste handling.
- Part of the reduction target may be achieved through reductions outside the country, although the contribution of CDM/JI projects is limited to 3% (or to 8% if the EU target is increased to 30% reduction).

Positions of Member States

The size of the non-ETS sector is determined by activities such as fossil fuel production, agriculture particularly cattle breeding and horticulture, fossil fuel for space heating – which

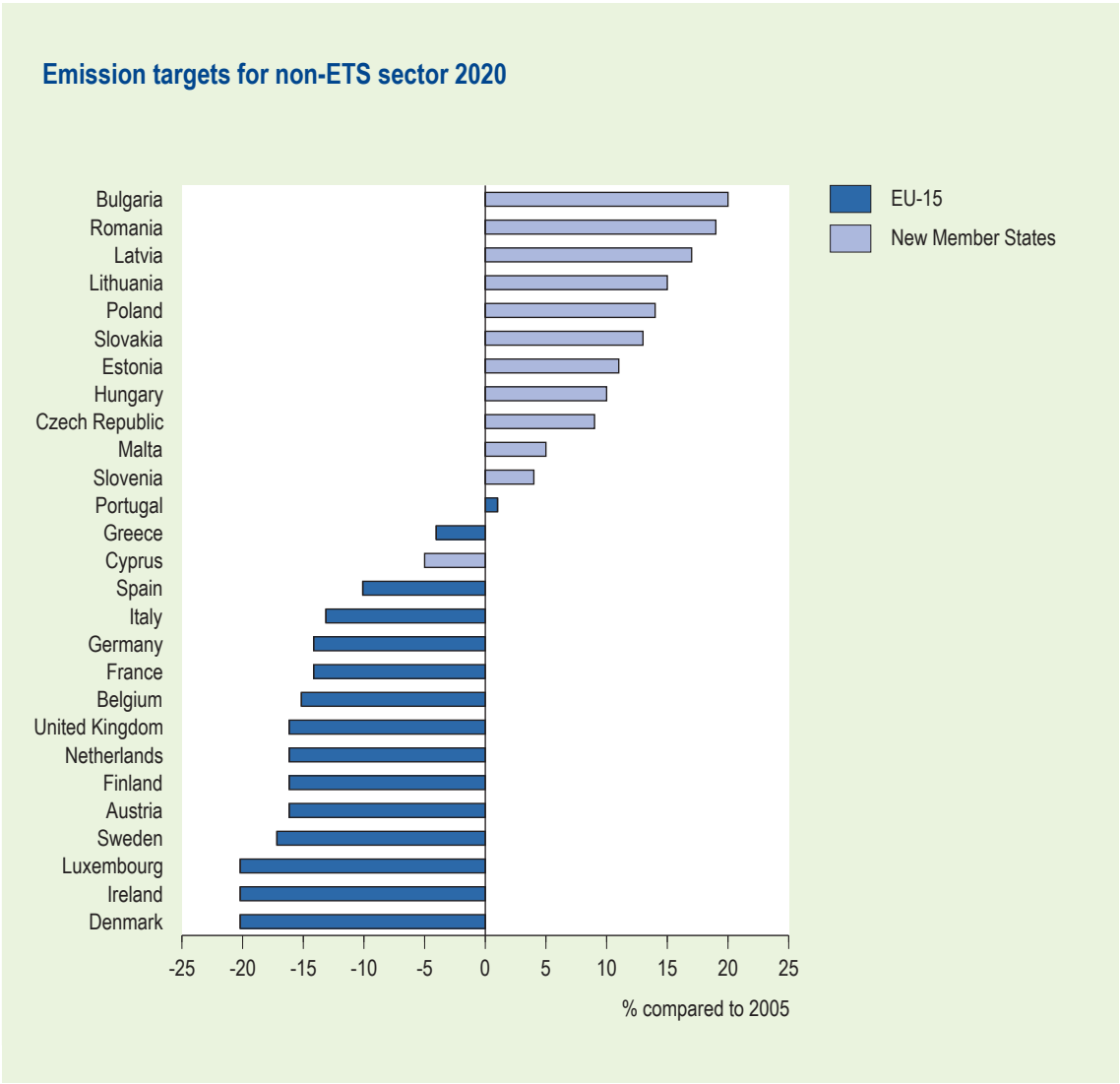


Figure 4.7. Targets for non-ETS sectors for 2020 compared to 2005 (in %) (EC, 2008b)

is related to the climate zone and the amount of electricity used for that purpose – and national practices in solid waste treatment such as landfill, recycling and incineration.

Many short-term emission reduction options have limited potential because of the time lag before they are implemented for a large part of the sources. Examples are slow market penetration of new vehicles or more energy-efficient appliances such as boilers for space heating; insulation standards for new buildings; animal numbers; and nitrogen application to soils. Faster, short-term options may be found in non-CO_2 reductions where still possible (CH_4 recovery, HFC-23 by-product, HFCs in refrigeration), and in promoting biofuel in road transport, more efficient lease fleets, and renewables for heating, combining heat and power production and retrofitting buildings.

The economic GHG reduction potential in the ETS sector depends on the country-specific circumstances, which can be grouped as follows:

- relative size of the non-ETS sector;
- relative share of road transport, of which the efficiency is largely determined at EU level;

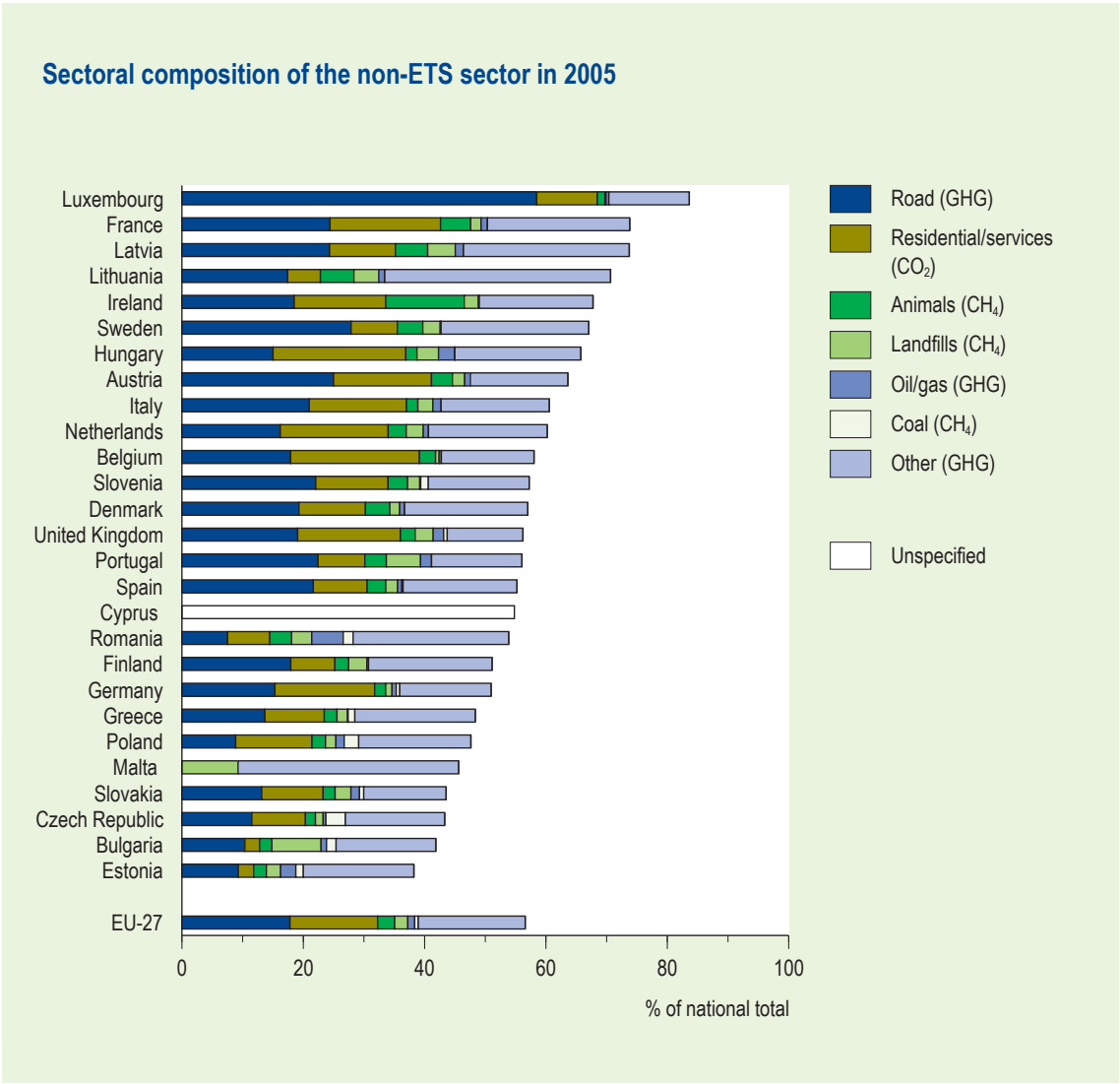


Figure 4.8. Sectoral composition of the non-ETS sector in 2005. No data are available for Malta and Cyprus. In many countries a large fraction of 'unspecified' is N_2O from agriculture (UNFCCC, 2008)

- share of emissions from coal production and landfills, where methane recovery is a significant reduction option;
- share of the livestock emissions, where the EU Common Agricultural Policy can have a large impact on the trend in animal numbers;
- share of emissions from oil/gas production, where reduction of emissions from venting and flaring of associated gas from oil and gas production can reduce GHG emissions significantly;
- share of CO_2 emissions from the residential and service sectors, which is related to the climate (e.g., space heating in cold winters).

The latter may also be relevant for Member States with a high share of these emissions in case the reference year for the linear path towards the national 2020 target has a relatively mild winter. This would cause unusual low CO_2 emissions from space heating, which may not be repeated in the following year.

Box 4.6. Positions of Member States in non-ETS sectors

Road: very high share (58%) in Luxembourg – due to passing transport and relatively low fuel prices; low shares in Romania, Poland (8-10%) and some other new Member States;
Buildings:
- *higher* share (17-22%) in Hungary, Belgium, the Netherlands, France and the UK;
- *low* share (5-9%) in Lithuania, Sweden, Finland; Romania, Bulgaria and Estonia – due to *high* share of non-fossil heating;
- *low* share (8-9%) in Portugal and Spain – due to *low* space heating demand;

Animals: very high share (13%) in Ireland; *high* shares (5-6%) in France, Latvia and Lithuania;
Landfills:
- *higher* shares (4-9%) in Malta, Bulgaria, Portugal, Latvia, Lithuania, Hungary;
- *very low* shares (0-1%) in Belgium, Romania, Luxembourg;

Oil/gas: higher shares (2-5%) in Romania, Hungary, UK, Portugal, Estonia;
Coal: higher shares (2-3%) in Czech Republic, Poland, Bulgaria, Romania.

Timely implementation of additional policies at EU and Member State level for options with long lead times and having a portfolio of other short-term options may important to be able to achieve substantial short-term emission reductions. However, the first reports of Member States on energy efficiency improvements achieved and planned are not very promising (EC, 2008k). In addition, present Commission initiatives to improve standards for CO_2 emissions from passenger cars and light duty vehicles and improved energy efficiency standards are important for the Member States in achieving large emission reductions.

From Figure 4.8 it can be concluded that road transport and residential and service sector buildings contribute about one-third and one-quarter of the non-ETS total, respectively. There are large country variations, ranging for road transport from 8% for Romania to 70% for Luxembourg; and for the building sector, from 6% for Bulgaria to 37% for Belgium. This translates to average shares in EU total emissions to 18% for road transport and 14% for the residential and service buildings, respectively, ranging from 58% to 22% for individual Member States. The share of other subsectors identified is 5% or less than the national total. There are a few notable exceptions with a share in national total emissions between 8% and 13%. In general, the country groups can be identified as listed in Box 4.6.

Member States with relatively high emission shares from road transport, animals and the residential and service building sector, depend on the stringency of additional EU or national policies to achieve their national targets. This is illustrated for the non-ETS sector emissions in the Netherlands in Chapter 5.

For the other subsectors (landfills, oil/gas production and coal production), relatively high shares indicate that a large reduction potential may still exist. Relatively low shares indicate either little or no activity, or that high reduction policy (e.g., methane recovery) is already in place. In both cases, significant additional reductions are not likely. In these countries, any significant reduction in emissions should aim at the road and building sectors or the agricultural sector (including agricultural N2O emissions, not shown separately in Figure 4.8).

Domestic reductions without additional EU policies: limited unused CDM/JI trade
Domestic policy options to provide sufficient reductions in the non-ETS sector are limited in the absence of more stringent additional EU policies for large subsectors, such as CO_2 standards for cars and light duty vehicles. Moreover, assuming that the cost of CDM credits are less than domestic reduction, it is cost-efficient for Member States to use their 3% CDM/JI reserve to

meet their target instead of selling them. Therefore, many countries may wish to keep them as a 'reserve' until it is clear whether domestic reductions are sufficient to meet the target.

In conclusion, it is questionable whether Member States will be inclined to trade part of their CDM/JI credits to other Member States that may need them more urgently. This would reduce the flexibility foreseen by the Commission for Member States to use CDM/JI credits to achieve national targets. In addition, if CDM/JI credits are not partly reallocated among Member States by intra-EU trading, overall cost-effectiveness of achieving the EU target for the non-ETS sectors is reduced.

Reduction potential in new Member States

It is likely that the new Member States will have more relatively low-cost reduction options than the other Member States, as the latter will have made more use of these options during the Kyoto Protocol period. However, the Commission's assessment of the cost of the reduction potential for each Member State are rather weak as the cost data were partly based on extrapolation of data compiled for the EU-15. Consequently, opportunities for low-cost reductions could be higher than shown in the impact assessments. A priority for the new Member States may, therefore, be to survey and update the national reduction potential and associated costs before defining new emission reduction policies.

Flexibility within the non-ETS sector: no incentive for electricity conservation

The EU has approved the Energy Efficiency Action Plan (EC, 2006e), with a target to achieve energy savings of 20% by 2020 in the non-ETS sectors. However, the Commission's first evaluation report on the progress reported by the Member States (EC, 2008k) showed that only five Member States have adopted national targets that go beyond the minimum indicative target of 9% energy savings by 2016 (EEB, 2008). The new Energy and Climate package with the separation and definition of ETS and non-ETS targets does not include incentives for electricity savings in end-use sectors. Other than the increase in electricity prices due to the purchase of allowances by the utilities, there is no incentive for end-users in ETS and non-ETS sectors for electricity saving. Even more, any electricity saving that reduces the CO_2 emissions from power plants will be compensated by other industries in the ETS sector ('waterbed effect'). Also, Member States do not have an incentive for promoting higher energy efficiency improvement in electrical appliances, other than their commitment to national energy efficiency targets and to the EU Energy Efficiency Action Plan.

In conclusion, electricity savings do not contribute to emission reductions in the non-ETS sectors nor do they have an impact on the ETS sector emissions because of the compensating effect of the GHG market described above. In fact, apart from energy efficiency targets and the increase in electricity price due to the cost for purchasing CO_2 allowances, the incentives for Member State's climate policy for the non-ETS sector could be just the opposite. Promoting electrical heating instead of using fossil fuels will reduce national GHG emissions while putting the burden of extra emission elsewhere in the ETS system. Only additional impacts, such as higher levels of air pollutant emissions, provide sound arguments for conservation of electricity. It is not possible to determine whether Member States and companies will also make ambitious efforts on energy conservation, particularly electricity. In this regard, the Commission's first evaluation report was not very positive. More action from the Commission and Member States to increase the rate of energy efficiency improvements may be warranted.

Conclusions

- The proposed effort-sharing of setting national targets related to GDP/cap within maximum and minimum target values of +20% and -20% appears more objective and transparent than the burden sharing setting for implementing the Kyoto Protocol. However, the method does not consider national circumstances (e.g., share of road transport, space heating, and agriculture) that determine physical growth and emission reduction potentials. To compensate for this limitation, the proposal includes the flexibility to use a limited amount of CDM/JI credits to meet national targets. The maximum is 3% of total 2005 non-ETS emissions plus the option to purchase unused CDM/JI allowances from other Member States.
- In practice, trading of unused CDM/JI between Member States may be limited because of limited cost-effective reduction potential to meet domestic targets in the absence of more stringent EU energy efficiency and GHG policies. This will lead to many Member States using their full 3% CDM/JI credits to meet their own national targets. Apart from compromising the foreseen efficiency, achieving their target by purchasing unused CDM/JI credits from other Member States may work. In addition, very limited CDM/JI trading between Member States would reduce the overall cost-effectiveness of achieving the EU target for the non-ETS sectors. However, new Member States may have more relatively low-cost reduction options than the other Member States and a priority may, therefore, be to survey and update the national reduction potential and associated costs.
- The trading system for the electricity sector does not provide strong incentives for electricity saving in end-use sectors other than through the increased electricity price. Nevertheless, more action from the Commission and Member States to increase the rate of energy efficiency improvement may be warranted as this pivotal element of CO_2 reduction policy has large co-benefits for other environmental and energy issues.
- A particular issue is introduced with the separate responsibilities for meeting targets for the ETS sector and non-ETS sectors of the Commission and Member States, respectively. Since both sectors have separate emission targets, electricity conservation does not result in reduced ETS GHG emissions EU-wide. However in the long-term, it helps reduce GHG emissions from electricity production by mitigating demand. Promoting small-scale cogeneration and heat pumps in non-ETS sectors can help reduce overall national GHG emissions, but has an adverse effect on achieving the national non-ETS emission targets. Addressing these 'border effects' may be required in climate policy plans.
- Member States could adopt stricter standards in some sectors, such as energy efficient buildings. In other sectors, options that national governments have for GHG reductions are more limited because intrinsic efficiencies are determined elsewhere (e.g., of passenger cars and imported heating appliances). It is likely that more stringent EU policies are important for Member States with relatively high shares of emissions from road transport. Also, those Member States with high shares of emissions from residential and service buildings and animals would benefit in the long term from additional EU policies.

4.4 Target setting: renewable energy shares

At present, almost all renewable energy is used for the production of electricity, with largest contribution from hydropower. On-shore wind power and biomass cover most of the remainder. Renewable energy is virtually absent in heating and cooling applications and only recently, have biofuels gained some significance in transport. The present share in energy consumption is on average 8.5%, but varies widely between Member States between 0% and about 40%.

The *Renewable Energy Roadmap* (EC, 2006a) demonstrated that a 20% target for the share of renewable energy sources in overall energy consumption and a 10% target in transport are feasible objectives, considering the technical and economical potential (EC, 2006b). The Commission also concluded that a framework with legally binding targets is desirable, since the present directives promoting renewable energy and biofuels in transport with indicative targets have proven not to be very effective.

The Roadmap states that the increasing use of renewable energy in the European Union is mainly due to consistent policies in some of the Member States. But in most other countries, policies have changed too frequently, leading to uncertainty for investors in renewable energy. In March 2007, the European Council endorsed the targets. In a resolution of 14 December 2006, the European Parliament even called for a 25% target for renewables in overall energy consumption.

The Commission's new proposal presents two targets for renewable energy:

- An EU target of 20% for the *overall share of renewable energy sources in energy consumption* for energy purposes by 2020 (coal, oil, gas, electricity, heat, biomass fuels). This has been translated into individual targets for each Member State (see Figure 4.9 and Table X.1.a in Annex X). Member States are free to determine the mix of the three sectors (electricity, heating/cooling, transport) in achieving their national target.
- For transport, a mandatory 10% minimum target is proposed for the *share of renewable energy in petrol and diesel consumption* by 2020, for all Member States. This separate target for transport is motivated by the Commission because of the precarious security of supply of oil products and because biofuels for transport are currently more expensive to produce than other forms of renewable energy. Therefore, there is little incentive to develop biofuels for the transport sector without a specific requirement.

Burden sharing

The targets for the overall share of renewable energy per Member State proposed by the Commission are based on effort sharing of the 11% EU-wide share increase. The increase per Member State is the sum of two terms: a fixed increase of 5.5% for all Member States plus an increase weighed on the basis of national GDP per capita to reflect different levels of wealth. (see Annex IIIa). This means that the Member State target for the total share in 2020 is the sum of:

- the Member State's share in 2005;
- a fixed 5.5% increase per Member State;
- another 5.5% increase differentiated per Member State based on population and GDP per capita.

The Commission considered calculating country-specific targets based on the remaining potential per Member State, but concluded that these figures were not robust enough and thus open to dispute. The alternative of a flat rate increase of 11%-points in the shares of all Member States was considered not to be appropriate, since the potential and costs vary widely across countries. Therefore, the Commission considers the proposed 50-50 approach for target setting provides a fair distribution of efforts across the Member States. As can be observed from Figure 4.7, the increases proposed per Member State are relatively high for those with a low share at present and even higher for countries with a high GDP per capita, such as the Netherlands, UK, Ireland, Germany and Denmark.

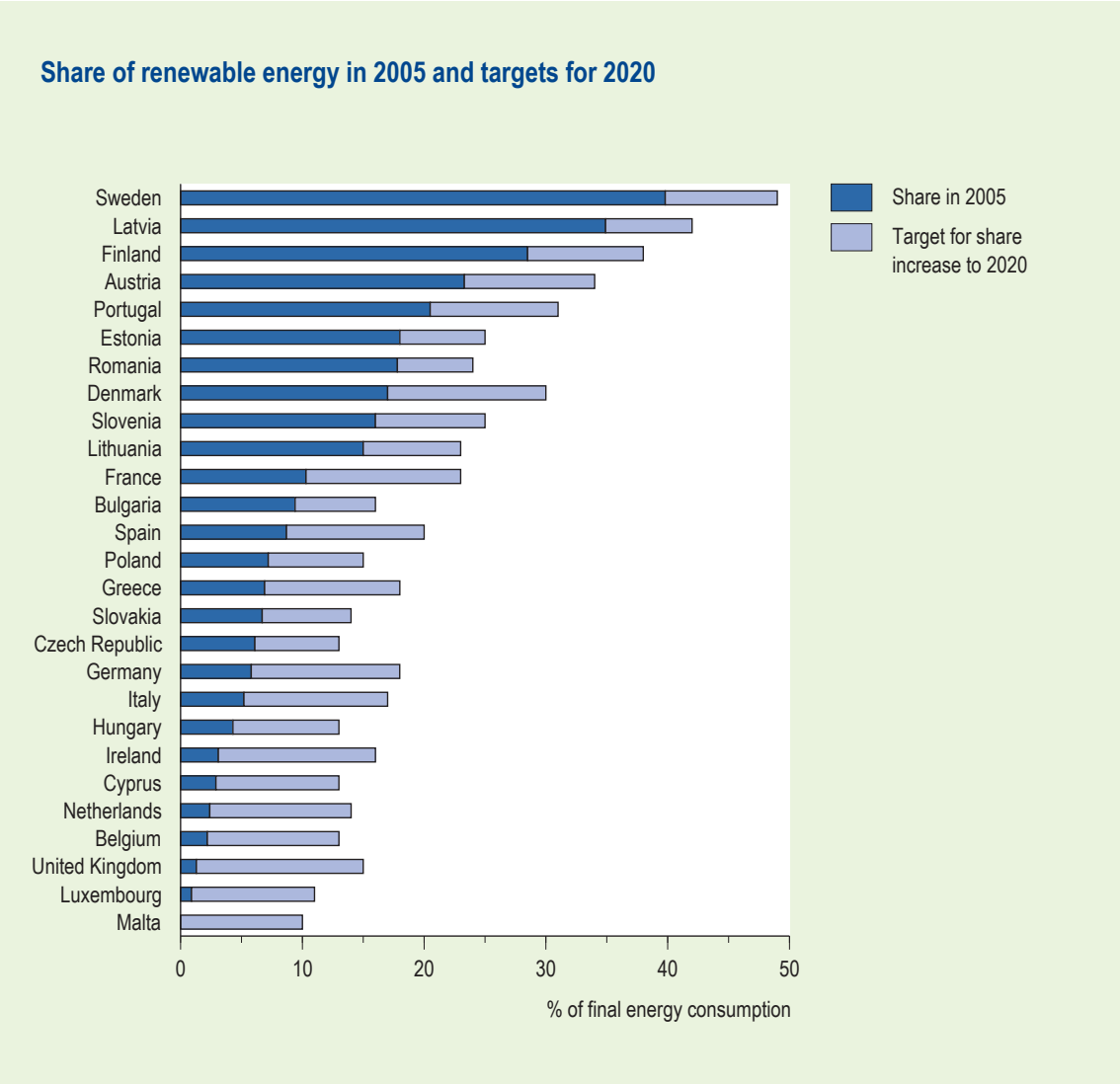


Figure 4.9 Member State targets for total renewable energy (EC, 2008c)

Flexibility for the Member States

The overall target for the share of renewable energy is calculated from the sum of renewable energy in the three sectors - electricity production, heating/cooling and transport. However, the Member States may decide the mix most appropriate to national circumstances to meet their national target, with an exception of transport.

A trading regime with 'Guarantees of Origin' (GOs) gives Member States the flexibility to reach their targets more cost-effectively. Instead of developing local renewable energy sources, GOs can be purchased from other Member States where renewable energy is cheaper to produce. GOs are certificates proving the origin of renewable energy.

The viability of national support schemes can be safeguarded. Member States may impose limits on the transfer of GOs to or from other Member States, to avoid interference with support schemes granted to existing installations and to prevent overcompensation of renewable energy producers. Hence, the proposal contains the flexibility of leaving each Member State the choice of whether to have a national-based support scheme, or to trade on the basis of 'virtual' GOs.

Imported electricity produced from renewable energy sources outside the EU may be counted towards a Member State's targets. There is the condition, however, that only electricity generated by renewable energy installations that become operational after this directive comes into force, is eligible.

The Commission envisages that GO trading will create new investment streams for Member States with a high potential for renewable energy. Member States will face the choice of either producing energy at home (which could generate new jobs) or subsidising production in other Member States where it would be cheaper. Targets are generally considered by most Member States to be 'ambitious' or in other words, difficult to achieve. This could imply that only limited amounts could be traded because few Member States can over-achieve. This could be a crucial factor for Member States with limited potential to meet their target. Also, it is not clear from the proposal whether timely grid access will be substantially improved for renewable electricity sources. This is not evident as the proposed requirements for access to the electricity grid are the same as in the Directive of 2001 to promote renewable electricity.

Experience with the present directive has shown that incentives are insufficient for transmission operators to guarantee that large-scale and distributed small-scale electricity from renewable sources can be connected to the grid. This poses questions regarding the implementation of, for instance wind energy, as can be observed from Figure 4.10 which shows that in the BAU scenario it gets a significant share in some countries. Also, it is unknown what effect the proposal will have on the current labelling systems and promotion of production of renewable energy. Several countries are evaluating the effects of the Commission's proposal on the present systems.

10% Target of biofuels in transport

The target set for the transport sector (a mandatory share of energy from renewable sources in transport in 2020 of at least 10%) is expected to be met mainly from biofuels. Other options could be considered, such as use of electricity (plug-in technology). A 10% share of renewable energy in the transport sector in 2020 will contribute about one-tenth to the 20% overall target for the share of renewable energy in final energy consumption in the BAU scenario. Compared to the EU-average increase of the overall share of 11%-points renewables in transport will make up for about one-fifth of the increase.

In the proposal for the Directive, the Commission gives attention to sustainability criteria for biofuels and bioliquids, as a consequence of the debate on whether biofuels can be considered to be sustainable. However, there are a number of issues related to these sustainability criteria which require additional attention, such as displacement effects and trade offs between GHG saving and biodiversity, as discussed below. The criteria effectively exclude use of several land types with valuable biodiversity. However, lack of clarity in the definition of some ecosystems (especially highly biodiverse grasslands) makes the consequences of the push for biofuels uncertain with regard to biodiversity. Moreover, displacement effects of agricultural products other than biofuels are not controlled and thus, global biodiversity is not likely to benefit from this proposal (Eickhout et al., 2008).

The required GHG savings of 35% can be calculated using fixed values given by the Commission. However, using a fixed saving rate does not address the link between GHG savings and global loss of biodiversity. To prevent loss of biodiversity through increased land use, a push for more intensive crop production is very likely, but this cannot occur without additional fertilizer use throughout the agricultural system. Fertilizer use will lead to more energy use and

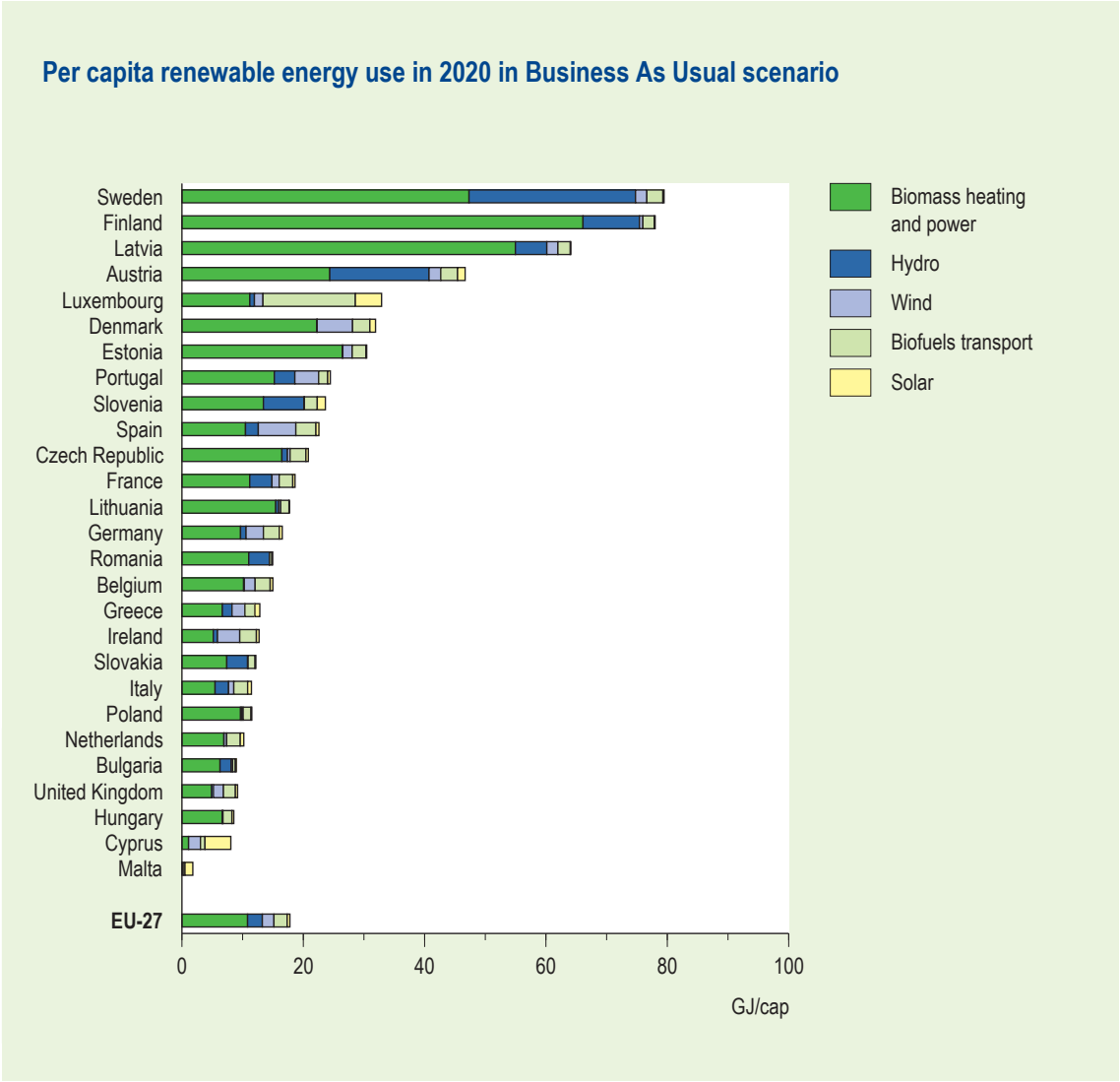


Figure 4.10 Per capita use of renewable energy in 2020 by type in the BAU scenario (PRIMES)

to increased N_2O emissions (a very powerful greenhouse gas). Therefore, the optimal strategy for GHG saving of biofuels (low nitrogen use, thus low yields) is not the same as optimal land use for biodiversity concerns (higher nitrogen use, high yields). This trade-off between GHG savings and biodiversity is not addressed adequately in the Commission proposal (Eickhout et al., 2008).

Eickhout et al. (2008) concluded that the current mandatory target of 10% in 2020 is not likely to contribute to sustainable use of renewables in the transport sector. A flexible target in 2020 or incentives for other renewable energy sources in the transport sector (through electricity) should be considered more explicitly to improve sustainable use of renewables in this sector. These alternatives can also be more cost-effective and effective in reducing dependence on oil/gas in national economies, such as using non-fossil electricity in transport, while using biomass directly for heating or for electricity production.

Box 4.3. Positions of Member States in targets for total renewable energy

Using as indicator for the potential per Member State the renewable energy consumption per capita in 2020 in the Business-As-Usual (BAU) scenario (EC, 2008f), the following groups emerge:
Hydropower: high share (> 3 GJ/cap) in Austria, Finland, Slovenia, Latvia, France, Slovakia, Romania and Portugal;
Biomass use for electricity and heat production: very high share (> 20 GJ/cap) in Latvia, Sweden, Estonia, Austria and Denmark;
Biofuel production for transport:
– *low* share (< 1 GJ/cap) in Malta, Romania, Bulgaria and Cyprus;
– *high* contribution to total (> 20%) in Luxembourg, Ireland, Italy, the Netherlands and the United Kingdom;
Wind energy: high share (> 2.5 GJ/cap) in Spain, Denmark, Portugal, Ireland and Germany;
Solar energy: high share (> 1GJ/cap) in Luxembourg, Cyprus, Slovenia, Malta and Austria.
The proposed EU-wide increase of 11% in the share of renewables is equivalent to about 13.4 GJ per person in the EU.

Positions of Member States

Due to the method chosen for target setting, the increases in the share of total renewable energy proposed per Member State are relatively high for those countries with low shares at present (see Figure 4.9). Without further assessment of the technical and economic potential, it is not possible to evaluate the fairness and cost-effectiveness of the proposal.

However, using renewable energy consumption per capita in 2020 in the Business-As-Usual (BAU) scenario presented in Figure 4.10 as indicator, its appears that a high the cost-effective potential for hydropower, wind energy and solar energy is limited to a few countries. Biofuel use in road transport makes a limited contribution to total renewable energy use in most Member States, except for Ireland, Italy, Luxembourg, the Netherlands and the United Kingdom, where their contribution is significant. However, this figure also indicates that the biomass potential for electricity and heat production – excluding biofuel production for transport – is very high for most Member States. On average, biomass alone could contribute in the BAU case about 60% to total renewable energy, with per country contributions ranging mostly between 40% and 85%. In general, the country groups can be observed as listed in Box 4.3.

A very rough initial assessment shows that if the BAU amounts per capita are indicative of the unused potential in the BAU scenario, then the Member States listed above will have the largest technically and economically feasible capacity to increase renewable energy production and use. In addition, Member States with a high amount per capita have gained much experience and know-how that they may wish to use for further expansion of their significant renewable energy sources. For an assessment of the production potential for biofuel crops see Eickhout et al. (2008).

Conclusions

- To avoid debate on subjective potentials, the Commission did not take national circumstances and potentials into consideration when setting targets to increase the national shares of total renewable energy sources in total final energy consumption. The combined use of a flat rate and GDP/cap to define the increases in total renewable energy use proposed per Member State are relatively high for those countries with a low present share and even higher for those with a high GDP per capita. This is irrespective of the national cost-effective potential for renewable energy production and use. The Commission's impact assessment did not evaluate the ability of Member States to achieve the proposed targets without GO purchases.
- Types of renewable energy and thus the potential differ between Member States: hydropower, wind energy, unexploited biomass from agriculture and from forests, and area available for biofuel crops. The flat rate will, therefore, be a relatively large hurdle for Member States with

small present shares, limited potential or already largely exploited potential; this is further increased for the richest Member States. Since the proposed overall target is the sum of (a) renewable energy use in the electricity sector, (b) for heating and cooling appliances and (c) in transport, instead of separate targets for the electricity and transport sectors only, the scope is now substantially expanded by the addition of the largely unexploited potential in the buildings sector. However, the Commission's impact assessment did into evaluate the potential for Member States of renewable energy use for heating and cooling appliances, for instance in buildings.

- The proposals include flexibility for trading between countries as a cost-effective method to overcome discrepancies between targets and potential. For the renewable energy targets, this is trading of 'Guarantees of Origin' of renewable energy resources and for the non-ETS sector, trading of unused CDM/JI credits. However, if demand is greater than supply, this flexibility could diminish. Trading may be inhibited because of lack of incentives for countries to meet or over-achieve their domestic targets.
- If very few countries over-achieve their targets, it is questionable whether many GOs would become available for trading. In that case, cost-effective distribution of production of renewable energy would be seriously hampered, as are some of the national targets for the overall share of renewable energy. Renewable energy targets are, indeed, generally considered to be ambitious. The relatively short time period available to meet the target is in contrast with the time needed to substantially expand capacity for renewable energy production. Moreover, long-term planning is required to extend the electricity grid infrastructure, necessary to increase the share of renewable electricity.
- Moreover for biofuels in transport, the 10% target is questioned in view of the sustainability criteria proposed by the Commission. These criteria focus on net overall GHG savings and land use change and biodiversity. However, the criteria do not take into account displacement of existing agricultural practices due to biofuel production, which may in turn result in deforestation to meet the demand for land for traditional agricultural purposes. If much stricter criteria are applied, the 10% target may not be feasible. However, other renewable routes in the transport sector could provide long-term solutions, such as using renewable electricity for road transport. Therefore, the current focus on biofuels could be replaced by a focus on developing new technologies to keep open multiple long-term options for energy supply for transport, while using biomass directly for heating or electricity production.

4.5 Costs, benefits and cost-effectiveness of the package

This section briefly discusses the costs and cost-effectiveness of the Energy and Climate package based on data provided by the Commission. To illustrate the costs per Member State that are key to assessing the equity of the package, selected results are presented that the Commission considers representative of the economic impacts of the proposed package. To underline the significant co-benefits for air quality improvement, the estimated cost reductions related to the co-benefits are put into context with the costs of the package.

The potential role and contribution of CDM/JI in the package and as part of a more global agreement is clarified by summarising the volume of CDM/JI credits that may be purchased by EU companies and Member States under the present proposals in relation to the present CDM/JI market under the Kyoto Protocol. Other issues related to economic growth and cost-effectiveness are relevant for a more detailed assessment and may be dealt with in subsequent reports by MNP and other Dutch research institutes.

Different methods are used in environmental assessments to estimate the costs and benefits of a policy package:
- as perceived by the government;
- as perceived by economic sectors;
- for the country as a whole.

The Commission's impact assessment reports on costs related to changes in (a) direct energy system and abatement in non-CO_2 greenhouse gases, (b) the purchase of CDM/JI credits, (c) air pollution control costs, and (d) cost impact on oil and gas imports (EC, 2008f). In addition, the macro-economic impact on GDP per Member State is estimated for various cases but these analyses are limited to CO_2 impacts. Thus, the impact on GDP does not include the impact of non-CO_2 and renewable energy policies and co-benefits for air quality. For an appreciation of the relative costs, the direct costs and benefits can also be expressed as a proportion of GDP. This is not a loss in GDP, which is usually reported as an indication of the macro-economic impact.

Macro-economic impacts

In the impact assessment, the Commission analysed results of various policy cases for 2020, with respect to:
- most cost-efficient implementation of the package;
- auction revenues and how they can be recycled in the economy;
- CO_2 prices resulting from ETS and non-ETS targets;
- CDM/JI usage;
- trading of CDM/JI and of GOs between Member States.

Macro-economic consequences are reported as macro-economic effects on GDP, private consumption and employment (EC, 2008f) . According to the Commission's impact assessment, the macro-economic impact on GDP in 2020 would be a reduction of some 0.35 to 0.5% (EC, 2008g, Table 38). In other words, GDP growth would be reduced by 0.04 to 0.06% each year between 2013 and 2020 (EC, 2008f).

The macro-economic impact on GDP for a typical case is presented in Figure 4.11, where the average impact for the EU-27 is estimated at about 0.45% in 2020. In this case, the impact is between 0% and 1% for most of the Member States with the exception of Estonia, Romania and the Czech Republic with impacts at about 1.5% to 2.5%.

This case refers to a cost-efficient allocation of GHG reduction targets and renewable energy targets to Member States with auctioning in the ETS and redistribution of auctioning rights and GHG reduction targets for non-ETS (e.g., through trade of CDM/JI). These figures calculated in the impact assessment with the GEM-E3 model do not include specific non-CO_2 GHG policies, renewable energy policies other than through CO_2 pricing, and health benefits. However, as discussed in Section 4.2 and illustrated in the Commission's impact assessment, how auctioning revenues are fed back into the economy has a significant impact on the GDP growth rate.

Direct cost estimates

The Commission has also estimated the direct cost of mitigating emissions in the energy system and non-CO_2 emissions in all sectors at approximately €90 billion in 2020. This is if the EU

4) The Commission's key assumptions for the baseline scenario and some results are presented in Annex X.

achieves the required emission reductions internally, which corresponds to about 0.6% of GDP for the EU-27 as a whole. According to the impact assessment, CO_2 credits acquired through the Kyoto Protocol's flexible mechanisms will reduce this further to 0.45% of GDP (EC, 2008g, Table 37). For most of the Member States, the direct costs are between 0.1% and 0.7%, with the exception of Bulgaria, Lithuania, Estonia, Hungary, the Czech Republic and Latvia that show negative costs (net benefits) between 0.4% and 1.2%.

Co-benefits for air quality of the climate and energy policy package

According to the Commission's impact assessment, the costs of air pollution abatement will be reduced by €11 billion per year by 2020. Related to GDP in 2020, these costs are equivalent to 0.1% of GDP. The health benefits due to reduced emissions of particles would reduce the number of life years lost by some 10 million (from around 150 to 140 million) by 2020, depending on the scenario adopted (EC, 2008g). According to the Commission's impact assessment, indirect benefits are seen in reduced health damage impacts due to sickness (hospitalization, etc.), the costs of which would be reduced by €12 to 28 billion/year (EC, 2008g). Related to GDP, this is equivalent to 0.1% to 0.2% of GDP with is equivalent to roughly one-third of the direct costs of achieving the mitigation targets for GHG emissions.

Premature deaths due to ozone would be reduced by 800 cases (from 19,400 to 18,600 cases per year): efficient case versus a Business-As-Usual Scenario. If the mortality impacts are monetised using standard methods (Pye et al., 2007), the benefits of the 20% GHG and 20% renewable policy would be between €550 and 1350 billion/year (depending on the valuation and the policy option). The policy options would also reduce ecosystem risks due to exposure of excessive loads of acidification and nitrogen loads (EC, 2008g). Related to GDP, benefits associated with the mortality impacts are equivalent to 3 to 8% of GDP.

In conclusion, even without monetising indirect impacts on mortality and nature, the total direct co-benefits for the EU-27 of improved air quality due to the climate and energy package would be about 0.2 to 0.3% of GDP. These figures include the proportion of reduced health impacts associated with avoided air pollution abatement related to GHG mitigation presented above. This is roughly half of total direct costs estimated for the package. This percentage could vary significantly between Member States due to differences in national circumstances. The figures mentioned refer to the case in which only limited use is made of CDM and JI credits.

Estimating costs and benefits for EU-27

Although not concluded in the Commission's impact analysis, the figures presented above show that at EU level, the direct cost of about 0.45 to 0.6% of GDP would be more or less balanced by the direct benefits for energy security and air quality of about 0.5% to 0.8% of GDP. However, the cost and benefit figures will differ because the Commission's conclusion is based on the most cost-effective case and using the specific cost dataset underlying the models with its inherent uncertainty. Nevertheless, these cost assessments suggest that in the short-term the overall net direct cost of the package would be limited in the most cost-effective implementation of the package. Even somewhat less cost efficient implementation of the policies would likely result in relatively small net costs for the EU as a whole.

Reduced oil and gas imports

If all targets (for GHG, energy efficiency and renewables) are met, according to the Commission's impact assessment, oil and gas import savings will be about €50 billion without CDM, which is equal to 0.3% of GDP. These savings are based on a conservative estimate of an oil

price of $60 per barrel. The Commission concludes that this would also mean that the EU economy would be less exposed to disruptions in supply and price shocks that might result from supply being concentrated in a limited number of countries. If the current high oil prices of almost $100 per barrel continue, these benefits will be considerably higher (EC, 2008g). However, as mentioned elsewhere, the reduced import value of oil is a meaningful parameter as a direct impact, but is not directly related to energy security.

Limited use of new CDM/JI credits

In the present package with a 20% reduction target, CDM/JI credits can be used to achieve a maximum of 3% reduction in the non-ETS sector. This 3% of 57% share in total EU emissions is equivalent to 1.7% of total EU-27 emissions in 2005. As explained in Section 4.1, in the ETS sector only unused credits ('banked') in the Kyoto period may be used by companies in the 2013-2020 period. Compared to the 3% CDM/JI credits that the EU-15 is expected to use to meet its 8% reduction target under the Kyoto Protocol, this is 45% less volume of CDM/JI credits than presently used.. The volume of CDM/JI demand from the EU would be substantially higher (with 5%-points maximum), if an appropriate comprehensive international climate agreement would be negotiated. With the present proposals and including the USA in a future climate agreement on a comparable basis, the volume of new CDM credits will probably be similar or somewhat higher than the present CDM/JI market under the Kyoto Protocol[5]. Currently, only limited use is made of CDM and JI credits because the USA is not participating in the Kyoto Protocol. In the event of a comprehensive international agreement[6], in which the EU may increase its target to a maximum of 30% reduction, the CDM/JI market can be expected to grow to more than twice the present volume in credits. In monetary units the CDM/JI volume could be higher due to price increasing effects.

In search of a balance between an efficient and fair solution and certainty

The Commission's proposals aim to achieve a balance between an efficient and fair solution, also at Member State level. Targets are set taking into account the economic situation in individual Member States while optimising costs for Member States by providing flexibility in meeting targets, partly by trading between Member States. Whether the current package will achieve this aim is presently difficult to assess because information on cost estimates is not available for this specific package and on country-specific conditions to determine the scope for cost-effective implementation of Member State policies.

Limited flexibility in trading CDM/JI credits and GOs between Member States may strongly affect the costs borne by Member States in achieving national targets and thus compromise the foreseen efficiency of the system. Also, the indicated direct and macroeconomic cost ranges would increase accordingly.

5) GHG emissions of the USA were about 30% higher than those of the EU-27 in 2005.
6) An agreement in which 'other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries adequately contribute according to their responsibilities and respective capabilities'.

5 Relating the Commission's package to the Netherlands' Climate and Energy Plan *Schoon en Zuinig*

5.1 Introduction

In 2007, the Netherlands' Government formulated ambitious climate and energy targets for the year 2020. The ambitions were specified in terms of a greenhouse gas (GHG) emission reduction of 30% in 2020 of the 1990 level, a 20% share of renewable energy, and energy efficiency improvement of 2% per year. To achieve these targets, the Government presented the Netherlands' climate and energy plan entitled *Schoon en Zuinig* (Clean and Efficient) in September 2007.

The Energy research Centre of the Netherlands (ECN) and the Netherlands Environmental Assessment Agency (MNP) have assessed the potential effect of *Schoon en Zuinig* and concluded that its success depends largely on the design and stringency of European climate and energy policy (ECN/MNP, 2007b). Important assumptions used in the assessment (in line with the Netherlands' policy plan) were:

- In the third phase (2013-2020) of the EU Emission Trading Scheme (ETS) a national emission ceiling would be imposed on ETS sectors (as in the current second phase). The Netherlands' policy plan assumed the ceiling in 2020 to be 30% below the ETS emissions in 1990[1]. The consequence of this assumption is that the ETS sector would meet this target in any case, either by taking reduction measures or by purchasing CO_2 credits.
- Unlimited use of CDM/JI credits would be allowed, so that the distance between the emission target for the non-ETS sector (30% reduction in 2020 relative to 1990) and the non-ETS emissions remaining after the policy induced measures are implemented could be bridged by purchasing these credits.
- Because the EU climate and energy policy was not known, two cases for the stringency of this policy were used: one with a low stringency (in short: EU-low policy case), and the other with high stringency (in short: EU-high policy case). In the EU-low policy case, a carbon price of € 20 per ton CO_2 was assumed, while in the EU-high policy case this was € 50 per ton CO_2. In addition, lower CO2 and energy performance standards for passenger vehicles, office and residential buildings and electric equipment are assumed in the EU-low policy case than in the EU-high policy case (Table 5.1).

Based on these assumptions, the ECN/MNP assessment report concluded that with the measures proposed in *Schoon en Zuinig*, the reduction target of 30% (2020 relative to 1990) for total national GHG emissions could be met, but large amounts of CO_2 credits (EUAs and CDM/JI project credits)[2] would need to be purchased by the participants in the ETS system and by the

1) However, the Dutch Climate Plan also states that the Netherlands aims at an EU-wide cap and harmonized allocation of emission rights under the ETS. The Dutch climate plan does not specify how a Dutch ceiling can be defined in such a situation.
2) EUAs are the EU Allowances (credits) used in the EU ETS system. CDM/JI credits are emission reductions realized in Clean Development Mechanism (CDM) projects in developing countries and Joint Implementation (JI) projects in Economies-In- Transition, i.e. Eastern European countries and countries of the former Soviet Union. Examples are landfill gas collection in Brazil, construction of wind energy parks in China, upgrading the energy efficiency of power plants in Poland, etc.

Tabel 5.1. Assumptions about European energy and climate policy: two policy cases (ECN/MNP, 2007b).

	EU-low policy case	EU-high policy case
CO_2 price in 2020 ($€_{2007}$/ton)	20	50
New rules for CO_2 and energy performance standards for passenger vehicles, buildings and electric equipment	weak	strong
Significant marginal reduction options	CDM/JI, energy saving	CCS, fuel switch

Netherlands' Government. Reductions by domestic measures alone would not be sufficient. The *Schoon en Zuinig* target for renewable energy (20% share in 2020) would not be met with the proposed measures in either EU policy case. The Netherlands' energy efficiency improvement target would be met in the EU-high policy case, but only when the EU definition is used (excluding feedstocks), and not when the current national definition (including feedstocks) is applied[3]. In the EU-low policy case the target will not be met, even when the EU definition is used.

The main questions that will be addressed in this chapter are how the proposed EU climate and energy package will affect the conclusions drawn in the MNP/ECN assessment report of *Schoon en Zuinig* and whether the *Schoon en Zuinig* policy plan will meet the EU targets for the Netherlands.

The Netherlands' policy plan can benefit from the Energy and Climate package on major issues such as:

- Allowing the trade of Guarantees of Origin between Member States. This can make it easier to achieve targets for renewable energy.
- Setting a legal framework for Carbon Capture and Storage (CCS) and including CCS in the ETS directive. CCS is a new technology with a large reduction potential in the Netherlands due to the geology of the country.
- Reforming the rules for Environmental State Aid in the State Aid Action Plan. As a consequence, Member States will have more opportunity to subsidize investment in cleaner technologies.
- Creating a European level playing field for the industry and power sector, by auctioning the largest part of the emission credits and setting harmonised rules for the free allocation of the remaining part.

However, the fact that the Commission proposes only an EU-wide emission ceiling for 2020 (without defining related country-specific caps) implies that the assumption in the ECN/MNP assessment report on the existence of a national emission ceiling for the Dutch ETS sector in 2020 is no longer valid. The consequences of this fact for the Netherlands' emission reduction targets, both for the total national emissions and that of the ETS sector, are elaborated in Section 5.2. Whether the Netherlands can meet its own target for the non-ETS sector and the EU target set in the effort sharing proposal with the allowed purchase of CDM/JI credits is also discussed.

Then, the impact of the Commission's Energy and Climate package on achieving the Netherlands' own targets for renewable energy and energy efficiency improvement is analysed in

3) When feedstocks are not included in the calculation, energy efficiency improvement rates are generally higher than when they are included because energy efficiency improvement on feedstocks is difficult to achieve.

Sections 5.3 and 5.4. Whether the EU target for the Netherlands set in the Commission package for renewable energy can be met is also discussed in Section 5.3.

Section 5.5 reviews the economic impacts of the Commission's proposals, and Section 5.6 presents the main conclusions. However, it must be noted that the conclusions apply to the Commission's current proposals, which are subject to a co-decision procedure. This means that the European Council and the European Parliament can amend the proposals.

For easy reference many of the emission reduction and renewable energy targets and figures mentioned in the text are summarised in Tables 5.2 and 5.3 at the end of the chapter. These include the estimated conversions from GHG reduction and renewable energy targets in the Commission's proposals, which are expressed relative to 2005, to targets relative to 1990. This is done for reasons of comparability with the targets in the Netherlands' policy plan *Schoon en Zuinig*, which are also expressed relative to 1990.

5.2 Relating the Commission's package to the Netherlands' GHG target

5.2.1 Overview of GHG reduction targets in the Netherlands' plan *Schoon en Zuinig* and in the Commission's package

The GHG reduction targets according to the Netherlands' plan *Schoon en Zuinig* and the Commission's package are presented in Figure 5.1. Emissions in 1990 and 2005 are shown because they are base years for the reduction targets (in %) in *Schoon en Zuinig* (1990) and in the Commission's package (2005). Comparison of ETS and non-ETS emission targets of the Netherlands' Government and the Commission's targets for 2020 with the 2020 emissions in the Business-As-Usual (BAU) case gives the actual reduction effort required to meet the 2020 targets[4]. According to *Schoon en Zuinig*, in 2020 the domestic BAU emissions of the ETS sector are 129 Mton CO_2-equivalents while the target level is 60 Mton[5]. This means a reduction effort of 69 Mton compared to the baseline. In 2020, BAU emissions of the non-ETS sector are 117 Mton and the target level is 90 Mton[6], so the reduction effort is 27 Mton. The total reduction effort according to the Netherlands' policy plan amounts to 95 Mton compared to 246 Mton baseline emissions in 2020.

It is evident that the reduction effort for the ETS sector, which share in GHG emissions in 2005 is about 45%, is much larger than that for the non-ETS sector. This is mainly due to the strong increase of BAU emissions of the ETS sector in the period 1990-2020, while BAU emissions of the non-ETS sector decrease in this period.

The national emission levels corresponding with the target from the Commission's effort-sharing proposal for the Dutch non-ETS sector are presented by the last two columns in Figure 5.1. Two cases are distinguished: EU-20% and EU-30%. The EU-20% case represents the present proposal aiming at a total GHG emission reduction for the EU-27 of 20% relative to 1990.

4) All emission figures and targets for ETS and non-ETS sectors are approximations since there is some uncertainty in the exact scope of the ETS sector (e.g. the threshold for small combustion facilities is still open for discussion).
5) 60 Mton is 70% (or 30% reduction) of the emission level in 1990 (85 Mton).
6) 90 Mton is 70% (or 30% reduction) of the emission level in 1990 (128 Mton).

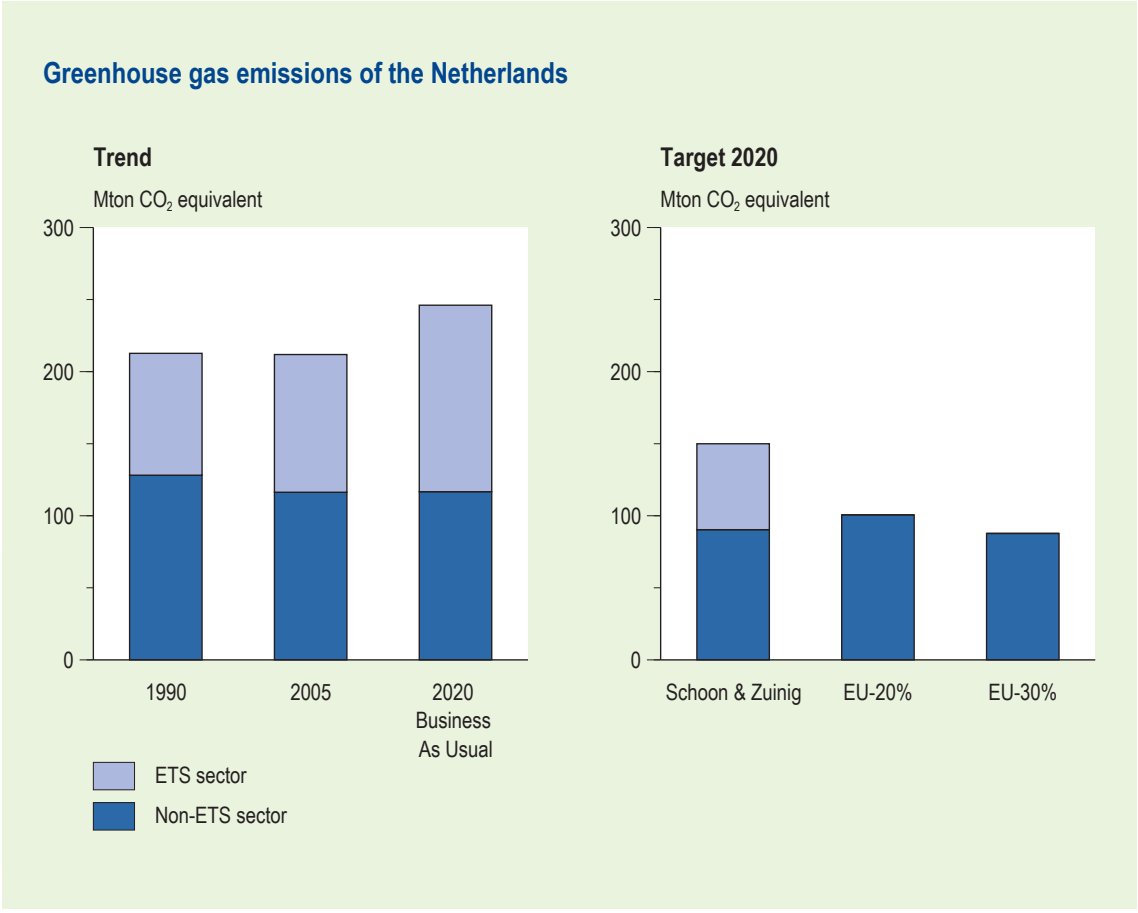


Figure 5.1 The Netherlands' ETS en non-ETS emissions in 1990, 2005 and in 2020 in the Business As Usual case (BAU), and reduction targets according to Schoon en Zuinig (30% reduction relative to 1990) and the effort-sharing proposal for the non-ETS sector for EU-20% and EU-30%. No national emission targets for the ETS sector exist or can be defined in the Commission's proposal

This will be implemented unilaterally by the EU should negotiations on a new, comprehensive international agreement on climate change mitigation fail. The EU-30% case refers to a possible future situation in which such an agreement has been concluded. In that case the EU will increase its target for total GHG emissions to a maximum of 30% reduction relative to 1990.

For the Dutch non-ETS sector, a 16% reduction target for 2020 relative to 2005 is set in the effort-sharing proposal in the EU-20% case. This corresponds to a target of 22% reduction relative to 1990, which is 8% lower than the Netherlands' own policy target. The target emission level for the non-ETS sector – as shown in Figure 5.1 – is 101 Mton. MNP estimates that in the EU-30% case the EU reduction target for the Dutch non-ETS sector will be 32% relative to 1990 at the most (2% higher than the Netherlands' own target), which corresponds to a target level of about 88 Mton[7].

7) The Commission's effort-sharing proposal does not specify as percentage or in Mton what the Member State targets for non-ETS sectors will be in the EU-30% case. However, it gives a proportionality principle on the basis of which the target can be estimated. Using the method described in Article 6.2 and 6.3 of the draft directive, MNP estimates that the reduction target for the non-ETS sector will be increased by approximately 10% (from 22% to 32%).

No national emission target for the ETS sector is shown in the last two columns of Figure 5.1. Unlike the second phase of the ETS system under the Kyoto Protocol, the Commission does not proposes 27 separate caps for each of the Member States, but only an EU-wide cap[8]. Therefore no 'national targets' can be associated with this sector. This has been explained in more detail in Section 4.2.

5.2.2 Projected emission reduction and comparison with targets

Non-ETS sector

As stated in the previous section, the Netherlands' reduction target for the non-ETS sector is 30% in 2020 relative to 1990. The proposed EU target for the Netherlands for 2020 corresponds to 22% reduction relative to 1990 in EU-20% and corresponds to 32% reduction relative to 1990 in EU-30%.

The ECN/MNP assessment (ECN/MNP, 2007b) has estimated the domestic emission reductions for the non-ETS sector. As stated in Section 5.1, two cases for the stringency of EU climate and energy policy were used: EU-low policy and EU-high policy. For the non-ETS sector the policy cases relate mainly to policy instruments such as CO_2 and energy standards for passenger vehicles, office and residential buildings. Because the EU climate and energy package does not supply additional information about the stringency of these standards[9], the assumptions made in the ECN/MNP assessment (see Section 5.1) have been used in this assessment. However, the results of the 2007 assessment have been updated for the fact that the division between ETS and non-ETS (based on the Commission's proposals) is different from that assumed in the ECN/MNP assessment (Daniëls et al., 2008).

The updated emission reductions are 14 to 22 Mton in the EU-low policy case, and 18 to 26 Mton in the EU-high policy case. Figure 5.2 presents the mean values of these projected emission reductions (with an uncertainty range of ± 4 Mton), as well as the Netherlands' own target and the EU target for EU-20%. Figure 5.3 presents the emission reductions, the Netherlands' own target and the EU target for EU-30%. Projected emission reductions and targets are all relative to the Business-As-Usual emissions in 2020 and expressed in Mton[10].

The conclusions that are drawn below about achievement of the targets are based on the mean values of the projected emission reductions that are shown in Figure 5.2 and 5.3. Because of the substantial uncertainty range around these values, the conclusions are indicative and can even be different when the more extreme values of the uncertainty range are used[11].

Figure 5.2 indicates that the emission reduction based on domestic measures in both the EU-low and EU-high policy cases is sufficient to meet the EU-20% target, but insufficient to meet the Netherlands' own reduction target of 30% reduction. In the EU-low policy case, the remaining distance to the Netherlands' target is 9 ± 4 Mton, while in the EU-high policy case, it is

8) Of 21% reduction in 2020 relative to 2005.
9) The Commission is still in the process of defining these standards.
10) The reduction targets are calculated as follows: 22% reduction (EU-20%) of the emission in 1990 (128 Mton) corresponds to a remaining emission level of 101 Mton, meaning that the reduction effort relative to the BAU emission level in 2020 (117 Mton) is 16 Mton. The 32% reduction target (in case of EU-30%) corresponds to a reduction effort of 29 Mton relative to BAU, and the Netherlands target of 30% corresponds to an effort of 27 Mton relative to BAU.
11) It was not possible to make a full uncertainty analysis because the probability distributions are not known.

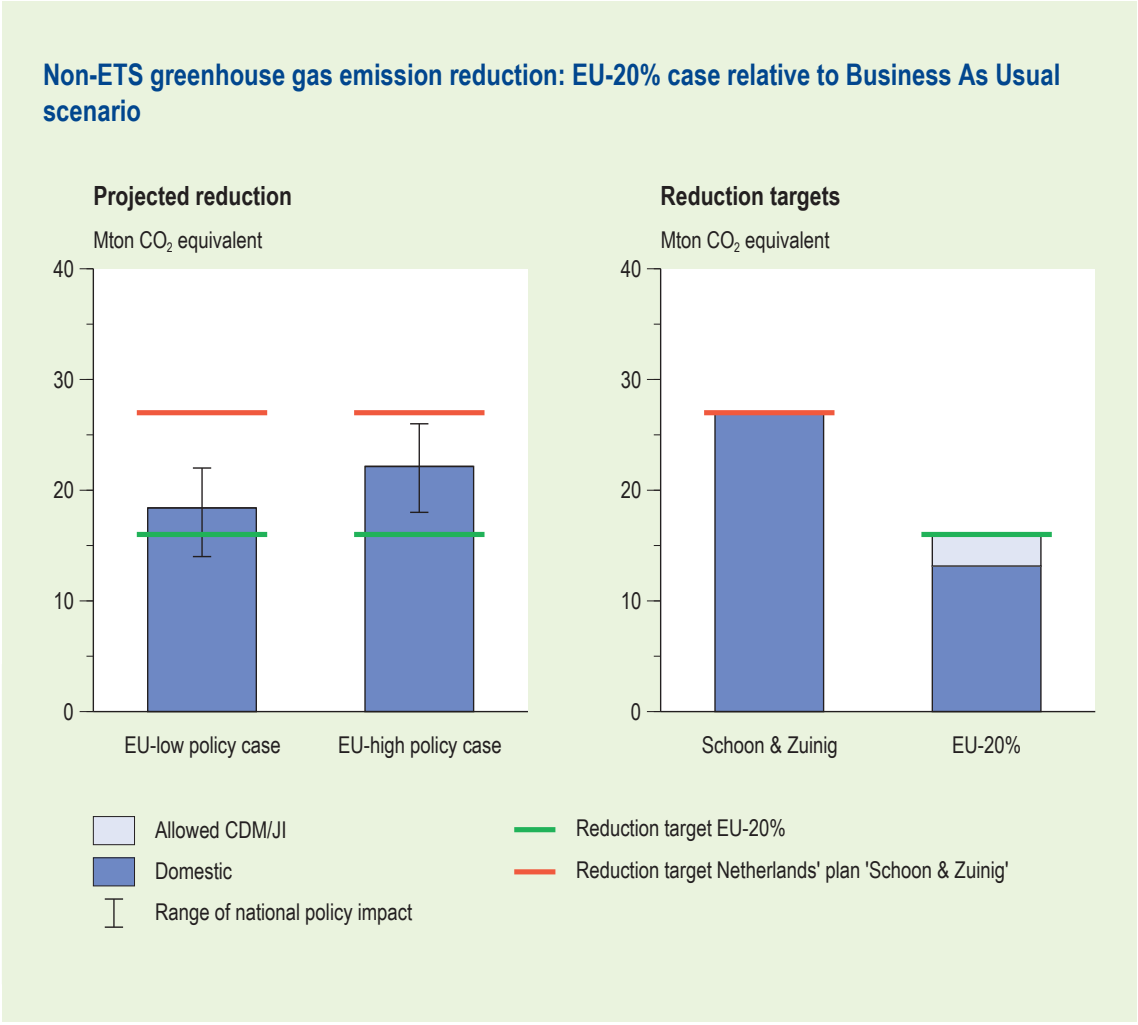


Figure 5.2 Projected emission reduction based on domestic measures in the EU-low policy and the EU-high policy case (ECN/MNP, 2007b) and reduction targets for the Dutch non-ETS sector according to Schoon en Zuinig and the effort-sharing proposal for the EU-20% case. Projected emission reductions and targets are relative to the BAU case. The EU and Schoon en Zuinig targets correspond with 22% and 30% reduction relative to 1990, respectively. The projected domestic reductions (including a decrease of 11 Mton between 1990 and 2020 in BAU, see Figure 5.1) correspond with reductions of 23% (EU-low policy case) and 26% (EU-high policy case) relative to 1990 (ECN/MNP, 2007b; Daniëls et al., 2008)

5 ± 4 Mton. The Netherlands can choose to bridge this distance by purchasing CDM/JI credits. Although the effort-sharing proposal limits the annual use of CDM/JI credits to a maximum of 3% of the non-ETS emissions[12] (corresponding to 3 Mton), it has been confirmed by an official of the Commission that this limitation only applies to the target set in the effort-sharing proposal. On condition that this target is met (which is the case in EU-20%), Member States that aim at a higher national target than set in the effort-sharing proposal are allowed to purchase additional CDM/JI credits. Alternatively, the Netherlands can aim for a higher domestic reduction than projected in the ECN/MNP assessment by imposing additional policy for the non-ETS sector.

12) In case of the EU-20% target.

Non-ETS greenhouse gas emission reduction: EU-30% case relative to Business As Usual scenario

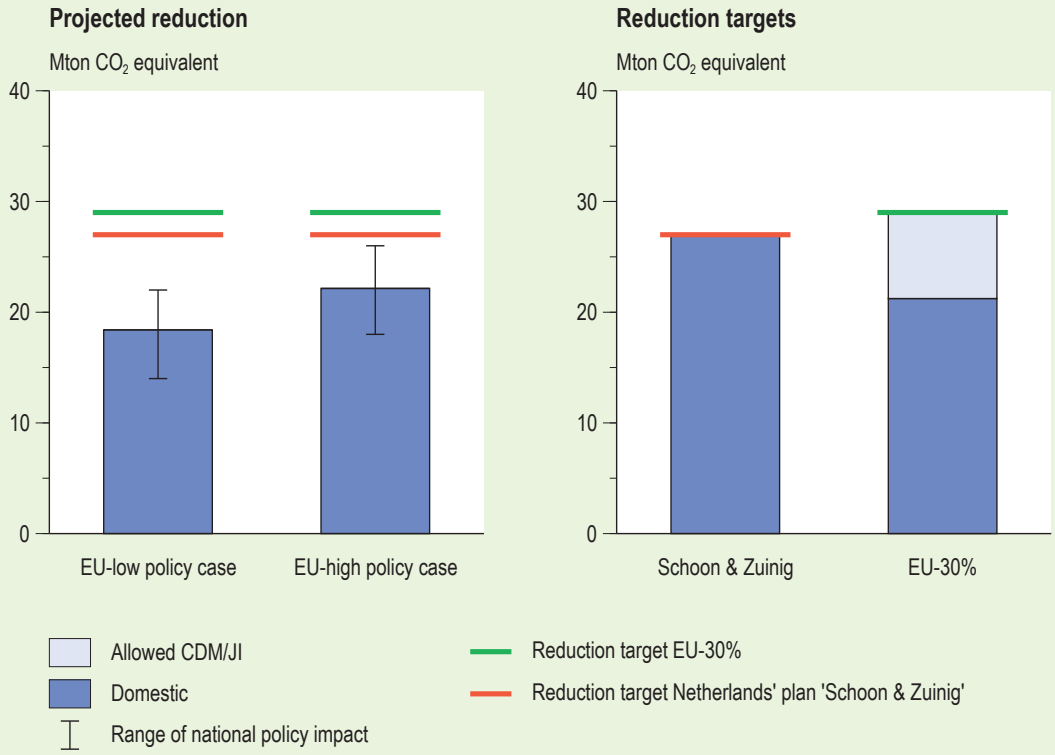


Figure 5.3 Projected emission reduction based on domestic measures in the EU-low and the EU-high policy cases (ECN/MNP, 2007b) and reduction targets for the Dutch non-ETS sector according to Schoon en Zuinig and the effort-sharing proposal in case of EU-30%. Projected emission reductions and targets are relative to the BAU case. The EU and Schoon en Zuinig targets correspond with 32% and 30% reduction relative to 1990, respectively. The projected domestic reductions (including a decrease of 11 Mton between 1990 and 2020 in BAU, see Figure 5.1) correspond with reductions of 23% (EU-low policy case) and 26% (EU-high policy case) relative to 1990 (ECN/MNP, 2007b; Daniëls et al., 2008)

In the EU-30% case, the outcome is different for the EU-low policy and the EU-high policy case (Figure 5.3). In the EU-high policy case, the projected emission reduction plus the allowed CDM/JI credits (8% or almost 8 Mton)[13] add up to 30 ± 4 Mton. Therefore, it is likely[14] that in this case both the EU-30% target (29 Mton) and the Netherlands' own target (27 Mton) can be met. In the EU-low policy case, however, the emission reduction plus the allowed 8 Mton CDM/JI credits add up to 26 ± 4 Mton, which is 3 ± 4 Mton short of meeting the EU target. If indeed

13) According to the effort-sharing proposal, half of the extra reduction effort in the EU-30% case (which is 10%) may be fulfilled with CDM/JI credits. This means that the limit on CDM/JI increases from 3% to 8%.
14) Given the uncertainty range, there is a change that the EU-target will not be met.
15) Given the uncertainty range, there is a change that the EU-target will be met.

the EU target is not met[15], the Netherlands is not permitted to purchase more than 8 Mton CDM/JI credits, which makes it uncertain if the Netherlands can meet its own policy target (27 Mton). Again, the Netherlands could aim for higher domestic emission reductions by imposing additional policy for the non-ETS sector. Alternatively, the Netherlands could purchase additional unused CDM/JI credits from other Member States, but it is uncertain whether the supply of unused credits will meet the demand.

ETS sector

As stated in Section 5.1, the ECN/MNP assessment of the policy plan *Schoon en Zuinig* (ECN/MNP, 2007b) assumed that, as in the second phase of the ETS system, a national cap would be set for the Dutch ETS sector, and that the 2020 cap would be set at 70% of the ETS emission in 1990 (i.e. 30% reduction). The consequence of this assumption was that the ETS sector would meet this target in any case, either by taking reduction measures or by purchasing CO_2 units. The ECN/MNP assessment showed that reductions by domestic measures alone would indeed not be sufficient, and that large amounts of CO_2 credits would need to be purchased by the participants in the ETS system.

However, the Commission proposes an EU-wide cap for 2020 corresponding to a reduction of 21% relative to the 2005 emission level, without defining related country-specific caps. There is no method to relate the EU-wide cap to corresponding national caps. Arguments for approximation methods that could possibly be applied to individual Member States have been found to be invalid. These are discussed in Box 4.2 in Section 4.2, leading to the conclusion that the EU-average cap of 21% can not be translated to a national cap for any Member State, and that any other approximation method for cap setting for an individual Member State could be judged as subjective.

Since there will be no national emission cap for the ETS sector, ETS participants will not have an obligation to purchase credits to compensate for emissions that exceed a certain level[16]. The question is then how large the domestic emission reductions will be under the CO_2 price that results from the EU-wide cap[17], and how large the distance between the remaining emission level and the target level in the *Schoon en Zuinig* plan will be. Since the future CO_2 price is uncertain, this will be explored on the basis of the two EU-policy cases that were used in the ECN/MNP assessment (ECN/MNP, 2007b). In that report, projections were made of the emission reductions and the remaining emission levels for a carbon price of € 20 per ton CO_2 (EU-low policy case) and for a carbon price of € 50 per ton CO_2 (EU-high policy case)[18]. The projections include reduction measures such as energy efficiency improvement, renewable energy and CCS. The results of the 2007 assessment have been updated to include the change in division between ETS and non-ETS sectors (based on the Commission's proposals) compared to the assumption made in the ECN/MNP assessment, and to include recent developments in the power sector, like plans for new power plants and decommissioning of old power plants. (Daniëls et al., 2008).

16) Simply because this level (or cap) does not exist. This does not mean that the ETS participants do not have to buy credits. Actually, the ETS sector has to buy even more credits in the new ETS system (2013 – 2020) than in the current system, because in 2020, in principle all credits that companies need to cover their emissions will be auctioned. However, these purchases do not lower the national emissions, as was the case in the Kyoto commitment period (2008-2012).
17) In theory, companies will implement reduction measures with a cost effectiveness up to this CO_2 price.
18) According to the Commission's Impact Assessment (EC, 2008g), a carbon price of circa € 30 per ton CO_2 is anticipated. This is between the € 20 and € 50 per ton CO_2 of the two policy cases, so that the effect will also be somewhere in between.

Box 5.1 Decreased demand for electricity and increased production of renewable electricity lead to emission reduction in the Netherlands, but also in neighbouring countries

The emission reduction by the ETS sector would have been greater if the decrease in national demand for electricity and the increase in production of renewable electricity would lead to a corresponding decrease of production by (or closure of) fossil power plants in the Netherlands. It is expected, however, that this will not be the case: the decrease in fossil power production (and thus reduction of CO_2 emissions) will take place partly in the Netherlands, and partly in neighbouring countries. The reason for this is that the power sector in the Netherlands is expected to be relatively more efficient and therefore more competitive than the power sectors in neighbouring countries, especially if the carbon price is high (ECN/MNP, 2007b). It is, therefore, expected that there will be a 'surplus' of electricity in the Netherlands (production minus domestic demand), which will be exported to neighbouring countries. This will lead to less emissions in the neighbouring countries. These emission reductions are beneficial for achieving the EU reduction targets, but will not contribute to the Netherlands achieving its national reduction target.

The updated assessment shows that in the EU-low policy case, the domestic emission reduction based on measures implemented by industries in the Netherlands will be 2 to 5 Mton, and the remaining emission level 124 to 127 Mton. If this is compared to the target level in the *Schoon en Zuinig* plan (60 Mton, see Figure 5.1), the distance-to-target is 64 to 67 Mton. In the EU-high policy case, the emission reduction is projected to be 11 to 26 Mton, which leaves a distance-to-target of 42 to 58 Mton. The distance-to-target of the Netherlands' policy plan can be smaller if the carbon price is higher than € 50 per ton CO_2. This could be the case if scarcity of ETS credits is (far) greater than now projected[19]. The future demand for ETS credits and the CO_2 price are – as stated before - uncertain.

5.2.3 Consequences of the new design for the ETS sector for the Netherlands' reduction target for total GHG emissions

The Netherlands' policy plan *Schoon en Zuinig* has set a reduction target of 30% in 2020 relative to 1990 for total national GHG emissions. However, if the proposed EU-wide cap for the ETS sector is implemented – instead of 27 national caps for the ETS sector, such as in the Kyoto period – an important pillar for target setting on total national GHG emissions is no longer available. Effectively, climate policy for a large part of the emissions has shifted to EU level. As a consequence, Member States do not have an obligation to aim for a target for total national emissions in the period 2013-2020, at least not coming form the European Commission. The Netherlands' Government may maintain the 30% reduction target for total national GHG emissions as set in the national policy plan *Schoon en Zuinig*, or redefine its national policy target on total GHG emissions. Alternatively, the Government may confine its reduction target to the non-ETS sector.

If the Government maintains the original target for total GHG emissions, without accounting for the net 'national' purchase of ETS allowances (national ceiling) as under the Kyoto Protocol, it is evident that the projected domestic emission reductions in the ETS and non-ETS sector are not sufficient to meet this target. As shown in Figure 5.1, the 30% reduction target in *Schoon en Zuinig* of total national GHG emissions corresponds to a reduction effort of 95 Mton compared to Business-As-Usual (BAU) emissions in 2020. Figure 5.4 shows that the projected reduction (also compared to BAU) based on domestic measures in the ETS and non-ETS sectors ranges from 17

19) For instance, because the growth of production of the ETS sector is higher than estimated in the PRIMES model, or because companies do not implement reduction measures that are cost effective under the projected carbon price. Both cases will lead to scarcity of credits and rising carbon prices.

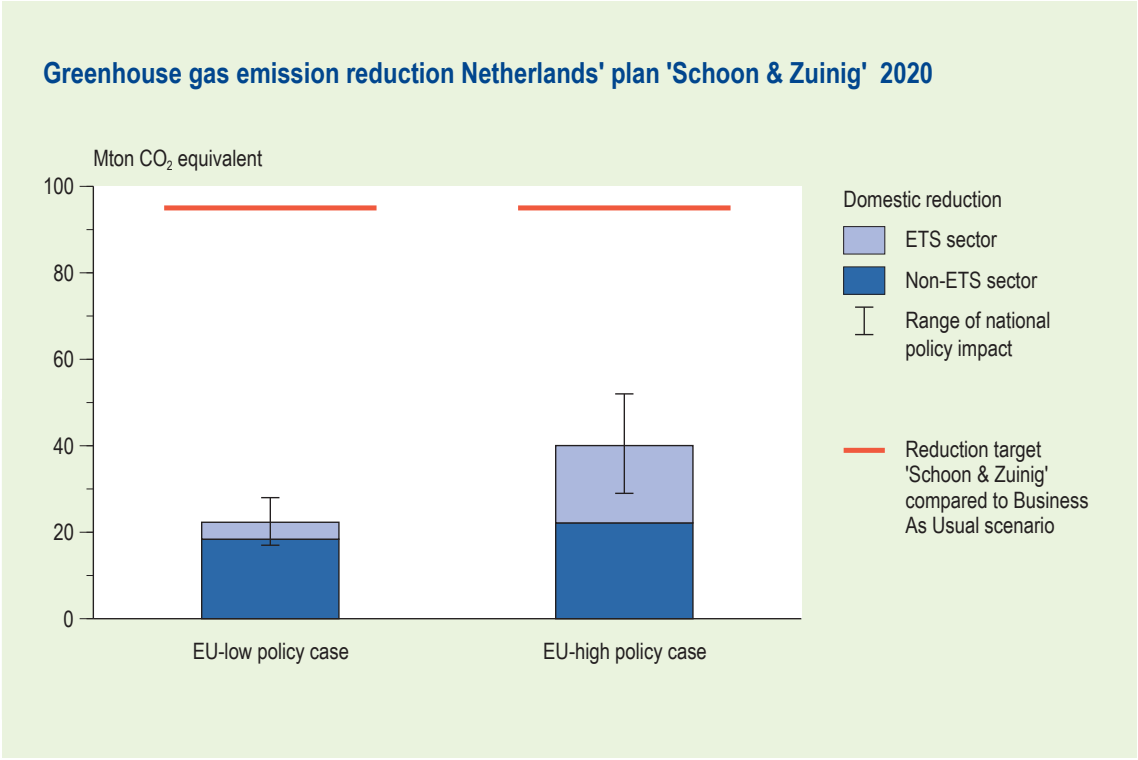


Figure 5.4 Reductions in 2020 based on domestic measures by the ETS and non-ETS sectors relative to BAU emissions and comparison with the national policy target of the Schoon en Zuinig plan for total GHG emissions (ECN/MNP, 2007b; Daniëls et al., 2008)

to 28 Mton in the EU-low policy case and from 29 to 52 Mton in the EU-high policy case. This means that the remaining distance to the target for total GHG emissions in the *Schoon en Zuinig* plan will be 68 to 79 Mton in the EU-low policy case and 43 to 66 Mton in the EU-high policy case.

Not shown in Figure 5.4 is that the Netherlands may purchase 5 to 9 Mton CDM/JI credits (EU-high/low policy case) in the EU-20% case in order to comply with its own reduction target for the non-ETS sector. In the EU-30% case the amount of CDM/JI credits that may be purchased in order to comply with its own target and the even higher EU target is 7 Mton (EU-high policy case) to 8 Mton (EU-low policy case)[20]. These purchases make the distance to the *Schoon en Zuinig* target smaller, but even then, the remaining distance will be substantial.

5.2.4 Policy options for additional reductions for the Netherlands' Government

There are a number of policy options for the Netherlands' Government to reduce the remaining distance to the target, should the Netherlands' Government still want to strive for the 30% reduction target for total GHG emissions that was set in the *Schoon en Zuinig* policy plan, as discussed below. Again, it should be stressed that the Netherlands' Government has no obligation to do so, since the European Commission will not set reduction targets for total GHG emissions for individual Member States after 2012.

20) 8 Mton is the limit on CDM/JI in EU-30%. As shown in the discussion of Figure 5.3, in the EU-low policy case the EU target and the Netherlands target for the non-ETS sector may not be fully met with this limit.

Options for additional emission reductions accounted to the Netherlands can be found in additional national policy measures aiming at (a) domestic reduction in the ETS sector; (b) domestic reduction in the non-ETS sector; (c) purchasing more CDM/JI credits, or CO_2 units from the ETS market. The Netherlands' Government could also decide to include emission reductions in neighbouring countries resulting from savings in the Netherlands on electricity end-use and increased renewable electricity production. Finally, the Government could advocate at EU level for more stringent EU climate and energy policies. These options are elaborated in further detail below.

Implement additional national policy in the ETS sector

The Netherlands' Government could decide to implement additional national policy measures, such as CO_2 performance standards for the production of electricity, materials and goods, a national tax system on energy use, and subsidies for more environmentally friendly processes and technologies. These measures will result in a further reduction of ETS sector emissions in the Netherlands compared to the BAU case, so decreasing the remaining distance to the 30% reduction target for total national emissions. Additional domestic emission reductions in the Dutch ETS sector can also be favourable from other perspectives:

- various studies show significant cobenefits for air quality (Daniëls et al., 2008; Pye et al., 2007);
- targets on renewable energy and energy efficiency are easier to meet;
- development of infrastructure and technology such as CCS and wind power in the Netherlands may be stimulated.

A less favourable effect of additional policy measures such as standards and taxes is that Dutch companies would initially be disadvantaged compared to companies in other Member States (because of higher costs). Subsidies would not have such adverse effects but could lead to higher government expenditure.

However, more domestic reductions in the ETS sector will not lead to additional GHG emission reductions relative to the EU-wide emission ceiling for the European ETS sector proposed by the Commission, because the ETS system functions as a 'waterbed'. This means that any additional emission reduction in the Netherlands will be nullified at EU level by extra emissions in other Member States (see Box 4.1 in Section 4.2), unless all Member States will implement comparable additional policy measures for 'their' ETS sectors.

Implement additional national policy for the non-ETS sector

In addition to the policy measures described in *Schoon en Zuinig*, more or stronger policies can be envisaged, such as tightening energy performance standards or raising energy taxes for buildings and domestic housing. For the transport sector, national policy measures could be implemented (such as road pricing) that lead to a decrease in the use of passenger vehicles and trucks.

Because the reduction measures in the non-ETS sector as a result of *Schoon en Zuinig* are already quite expensive, substantial additional reduction efforts by the non-ETS sector will lead to a significant increase in national costs. However, as for the ETS sector, there are also favourable side-effects, for instance for air quality, energy efficiency improvement and increased use of renewable energy.

Incorporate reductions from power plants in neighbouring countries resulting from electricity savings and increased renewable electricity production in the Netherlands
In Box 5.1, it was shown that emission reduction by the Dutch ETS sector would have been greater if the decrease of national demand for electricity and the increase in production of renewable electricity would lead to a corresponding decrease in production by (or closure of) fossil power plants in the Netherlands. It is expected, however, that the decrease of fossil power production (and thus the reduction of CO_2 emissions) will partly take place in the Netherlands and partly in neighbouring countries, and that the resulting electricity surplus will be exported to neighbouring countries. A rough estimation of the emission reduction in neighbouring countries due to electricity savings and increased use of renewable energy in the Netherlands ranges from 10 to 30 Mton CO_2 (Daniëls et al., 2008).

Since the 30% reduction target on total GHG emissions is not a target that is set by the European Commission, the Netherlands' Government can set its own accounting rules with respect to this target. Therefore, the Government could decide to incorporate the emission reductions in neighbouring countries resulting from the Netherlands' efforts on electricity savings and increased use of renewable energy in order to reduce the distance to this target.

Propose a stricter EU policy for the non-ETS and the ETS sector
In the non-ETS sector, stricter EU policies with respect to energy and emission standards for passenger vehicles and trucks, office and residential buildings could lead to additional emission reductions. However, the EU-high policy case already assumes stringent EU policies, so in that case there is little room for even more stringent policies. For the ETS sector, the Netherlands' Government could advocate a lower cap than currently proposed by the Commission, which would lead to higher CO_2 prices. The CO_2 price should be higher than € 50/ton CO_2 in order to attain additional emission reductions relative to the EU-high policy case.

Purchase CDM/JI credits or buy CO_2 units from the ETS market
Possibly the policy options mentioned here can have an effect that is sufficient to fully bridge the remaining distance to the national policy plan's 30% reduction target for total GHG emissions. ECN and MNP estimate the technical potential of domestic reduction measures at around 75 Mton (ECN/MNP, 2007a). However, full implementation of this potential will lead to high national costs. Another, possibly less expensive, policy option is that the Netherlands' Government purchases CDM/JI credits or EU allowances from the ETS market and not resell them[21]. Alternatively, the Government could decide to cancel part of the allowances from auctioning. As shown for the non-ETS sector, the EU target for EU-20% can be met in both the EU-low and EU-high policy case, and the target for EU-30% can be met in the EU-high policy case, so in those cases there will be no limitation on purchasing additional CDM/JI credits. Only in the EU-low policy case there is some uncertainty that the EU target for EU-30% can be fully met, and that the Netherlands will be allowed to buy additional CDM/JI credits.

Although the national costs for purchasing CDM/JI credits may be lower than those for domestic emission reductions, it is evident that this option will lead to high government expenditure. Moreover, all favourable side-effects of domestic emission reductions that are mentioned before will be missed. However, the amount of credits that has to be purchased in order to meet the

21) Any person or organisation can purchase EU allowances from the ETS market. However, this is not the intention of the EU ETS system.

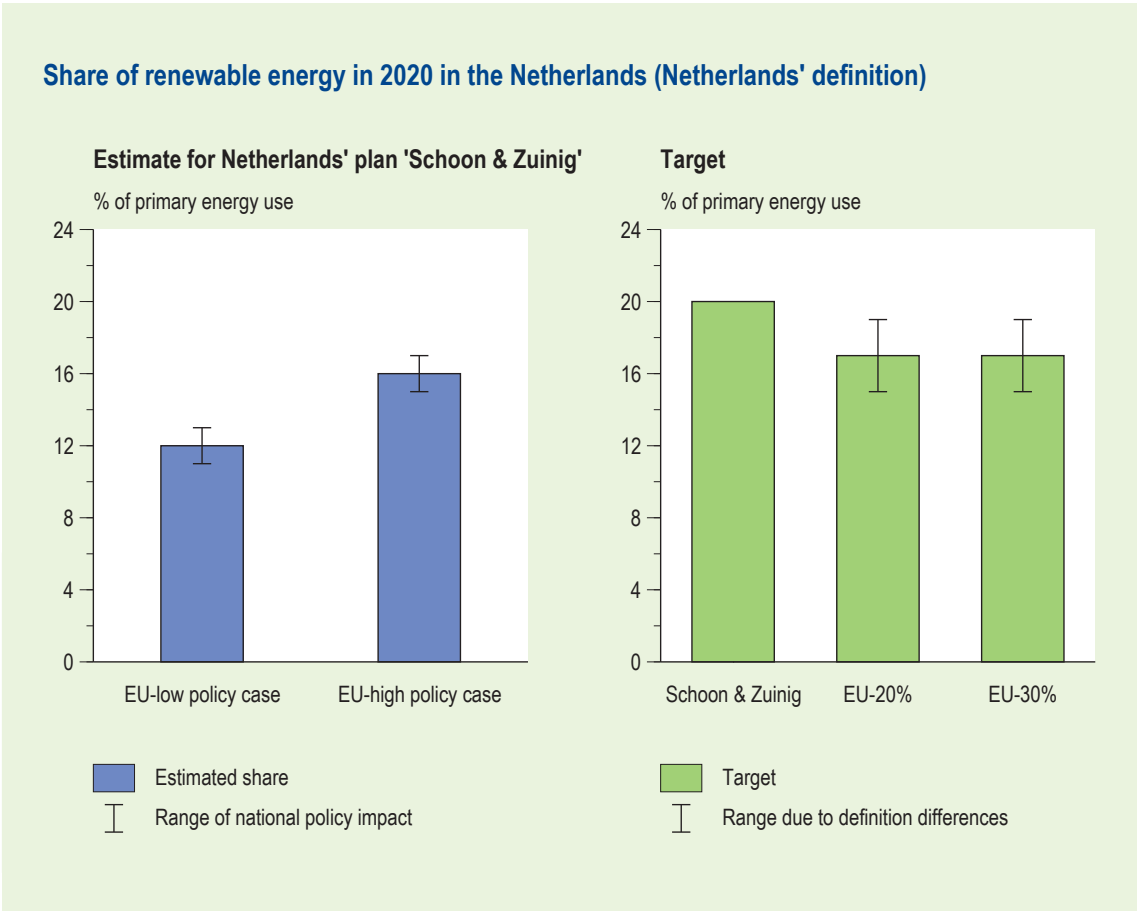


Figure 5.5 EU and Netherlands' targets for renewable energy, and expected share according to the ECN/MNP assessment of the Schoon en Zuinig plan according to the Netherlands' definitions as percentage of primary energy consumption. Ranges in the EU-targets result from the conversion to the Netherlands' definition for the share of renewable energy, as explained in footnote 23 (ECN/MNP, 2007b)

30% reduction target for total GHG emissions does not differ substantially from that taken into account in the ECN/MNP assessment report (ECN/MNP, 2007b)[22]. The difference is that with a national ceiling for the ETS sector, a large part of the credits would have to be purchased by the companies that participate in the ETS sector, while with one EU-wide ETS cap, the Government would be responsible for these purchases.

5.3 Relating the Commission's package to the Netherlands' target for renewable energy

The Commission proposes a lower target for the renewable energy share in the total energy consumption for the Netherlands (15 to 19% share in 2020)[23] than that proposed in the

22) If no additional national policies are implemented.
23) Actually, the Commission proposes a share of 14%. However, the Commission uses a definition based on final energy, while the national definition is based on primary energy. For reasons of comparability, the 14% share that is proposed by the Commission is 'converted' to the Netherlands definition. The reason that the translation results in a range (15 to 19%) is that the contribution of the power sector (the sector with the biggest difference between primary and final energy) to the total amount of renewable energy is not known.

Netherlands' plan *Schoon en Zuinig* (20% share in 2020). The ECN/MNP assessment (ECN/MNP, 2007b) shows that the share of renewable energy in primary energy use will probably be 11 to 13% in 2020 in the EU-low policy case, and 15 to 17% in the EU-high policy case (Figure 5.5). This means that the EU target can only be met in the EU-high policy case, and not in the EU-low policy case. The target of the Netherlands' plan is not met in either policy case. The Commission's climate and energy package does not affect the renewable energy share based on domestic measures that was estimated in the ECN/MNP assessment. The reason is that the package does not propose additional policy aimed specifically at the stimulation of renewable energy; only targets are set. The carbon price - another important driver for investments in renewable energy - estimated by the Commission (€ 30/ton to € 40/ton CO_2), is between the values used in the ECN/MNP assessment (€ 20 to € 50/ton CO_2).

Policy options for the Netherlands' Government
The Commission's package provides the Member States the opportunity to purchase Guarantees of Origin (certificates proving the origin of renewable energy) from other Member States. The Netherlands can decide to make use of this option in order to meet the EU target and the higher *Schoon en Zuinig* target. However, the supply of these certificates may be limited, because it is expected that most Member States will not be able to overachieve their EU target, which is a precondition that must be met before they are allowed to sell Guarantees of Origin to other Member States (see Section 4.4).

5.4 Relating the Commission's package to Netherlands' energy efficiency improvement target

The target for energy efficiency improvement set in the Netherlands' plan *Schoon en Zuinig* is 2% per year in the period 2011-2020. According to the ECN/MNP assessment (ECN/MNP, 2007b), the rate will depend substantially on EU policy: 1.4 to 1.6% per year in the EU-low policy case and 1.7 to 1.9% per year in the EU-high policy case (Figure 5.6). These estimates are calculated in accordance with the national Protocol for monitoring energy efficiency improvement (Boonekamp et al., 2001). This Protocol includes energy carriers used as feedstock (for instance, for plastics and fertilisers). When feedstocks are excluded (in line with the European definition) the rate is higher: 1.6 to 1.9% in the EU-low policy case and 2.0 to 2.3% in the EU-high policy case[24]. In this case, the target is almost met in the EU-low policy case, and fully met in the EU-high policy case.

The EU aims at 20% savings in energy consumption by 2020 compared to a baseline for the EU-27 as a whole, but no national targets have been set by the EU or proposed by the Commission. Current regulations and recent EU proposals on energy efficiency are in line with the EU-low policy case, including the proposal for regulation on emission performance standards for new passenger vehicles.

Policy options for the Netherlands' Government
To increase the national energy efficiency improvement rate, the Netherlands' Government has several policy options:

24) When feedstocks are not included in the calculation, energy efficiency improvement rates are generally higher than when they are included because energy efficiency improvement on feedstocks is difficult to achieve.

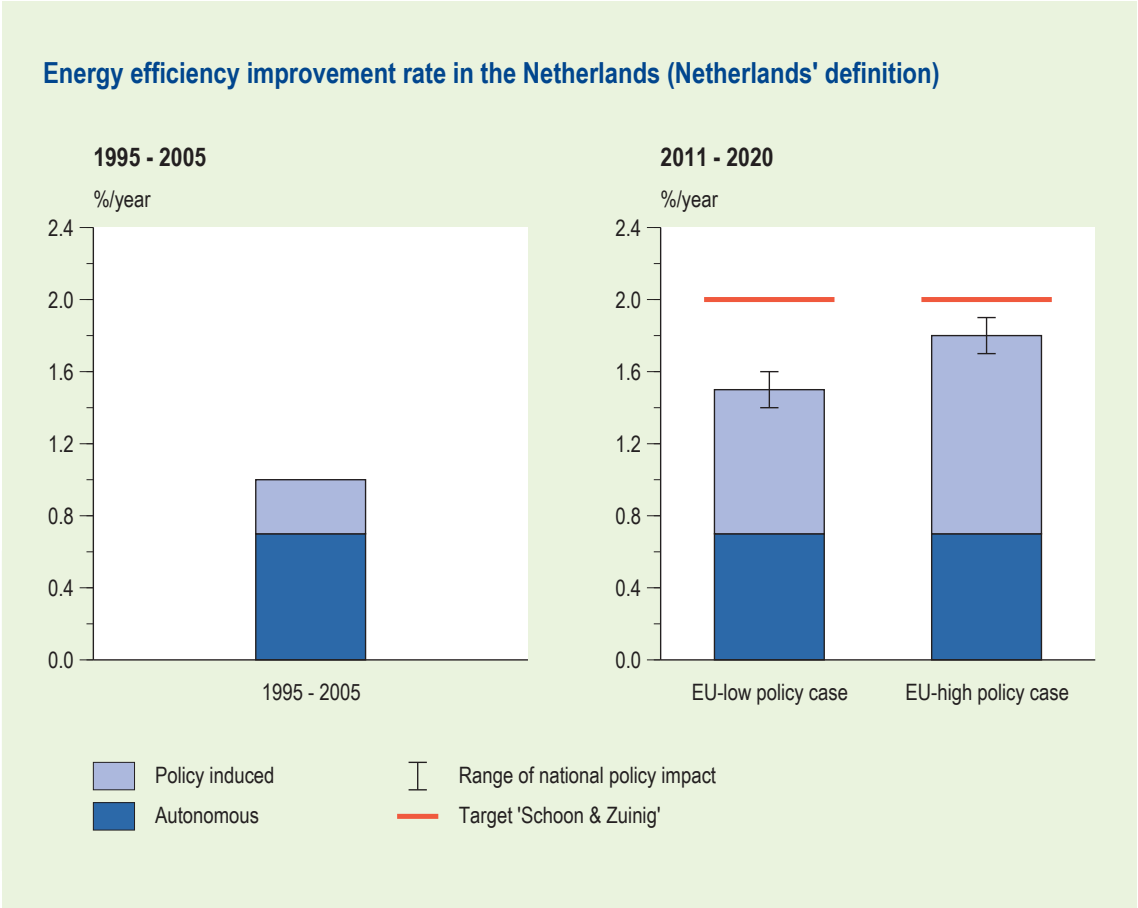


Figure 5.6 Expected energy efficiency improvement rate according to the ECN/MNP assessment compared to the present rate according to the Netherlands' definition of energy efficiency improvement (ECN/MNP, 2007b)

- Implementation of additional national policies on energy efficiency in ETS and non-ETS sectors such as subsidies for energy-efficient production processes and cogeneration (CHP), energy labels and standards for office and domestic buildings, congestion charging and financial support for energy efficient transport.
- Stimulation of more stringent EU policy on energy efficiency such as higher energy efficiency performance standards for new passenger vehicles and electric equipment.

5.5 Economic impacts

Costs

The Commission estimates the direct costs for the Netherlands of the EU-20% proposals for effort-sharing, ETS and renewables at 0.32% of GDP, or € 2.2 billions in 2020 (EC, 2008g). These costs are measured in terms of change in direct energy system cost, abatement cost in non-CO_2 greenhouse gases and costs to acquire CDM credits. This is not a loss in GDP. Macroeconomic impacts are discussed below.

This cost estimate is lower than that estimated by ECN/MNP for achieving *Schoon en Zuinig* targets (ECN/MNP, 2007a). If the GHG reduction target (-30% relative to 1990) as well as the targets for energy efficiency improvement (2% a year) and renewable energy (a share of 20%)

are met, the national costs would be € 8 to 9 billion. If only the GHG reduction target is met, the cost amounts to € 3 to 5 billion. In this case, the rate of energy efficiency improvement is 1.8% a year, and the share of renewable energy is 16%.

The lower costs for the EU-20% proposal may be explained by the fact that the EU-20% targets for emission reduction and renewable energy are lower that those in *Schoon en Zuinig* (see Figures 5.1 and 5.5), and that this proposal does not set a target for energy efficiency improvement. However, direct costs (as used by the Commission) and national costs (as used by ECN/MNP) are difficult to compare because different scenario assumptions, energy prices and discount rates have been used.

Macroeconomic effects

According to the Commission's impact assessment (EC, 2008g), the EU-20% proposal will lead to a change in national GDP (market prices) of -0.5% in 2020. GDP will be € 3.5 billion lower than it would have been without the policy package (estimated to be € 703 billion)[25]. This is based on a cost-effective allocation with full auctioning in the EU ETS but with a redistribution of both auctioning rights and reduction commitments in sectors not covered by the EU ETS across the Member States. When the revenues from auctioning are recycled through transfers to households, private consumption will increase by 0.2% and employment will decrease by 0.1%. If revenues are recycled by other means, for instance labour taxes or taxes on profits, this would have a positive effect on employment.

Macroeconomic impact studies for the Netherlands' policy plan *Schoon en Zuinig* are not yet available.

Revenues from auctioning emission credits

ECN and MNP estimate the national revenues from auctioning emission credits at € 1 to 3 billion in 2020. The revenues in the entire period (2013-2020) will be € 10 to 25 billion. These estimates are based on the following assumptions:

- The EU ETS ceiling decreases from 1974 Mton CO_2 in 2013 to 1720 Mton CO_2 in 2020. Sixty percent of this amount is allocated to the power sector, and the rest to other ETS sectors.
- All credits for the power sector will be auctioned from 2013 onwards. The other sectors will receive 80% of their credits free in 2013. This amount decreases every year thereafter by 11.3%, until complete auctioning is reached in 2020.
- The Netherlands receives auctioning rights based on the proportion of its ETS sector in the total emissions of European ETS sectors in 2005 (4.5%), and the reallocation of 10% of this amount to Member States with low GDP per capita.
- The assumed carbon price ranges from € 20 to 50 per ton CO_2.

Co-benefits to air quality

The emission reduction measures for GHG will lead to co-benefits in the form of emission reductions of air pollutants (especially NO_x and SO_2). According to the Commission's impact assessment (EC, 2008g) reduction of air pollution control costs for SO_2, NO_x and $PM_{2.5}$ in the EU-20%

25) The cost figures used to calculate macroeconomic impacts do not include the mitigation costs for the non-CO_2 emissions and the additional costs to achieve the 20% target for renewable energy.
26) In this case, a limited use (3%) of CDM credits is allowed. Without the use of CDM credits, the cost reduction would be €11 billion.

proposal will be € 8 billion by 2020 in the EU[26]. For the Netherlands the EU-20% proposal will lead to a cost reduction of approximately € 0.4 billion by 2020. Calculations of cost reduction by the co-benefits from implementing the policy programme of *Schoon en Zuinig* are not yet available.

5.6 Conclusions

This EU policy package supports the Netherlands' ambitions with respect to GHG reduction and renewable energy on major issues, by allowing the trade of Guarantees of Origin between Member States, setting a legal framework for CCS and including CCS in the ETS directive, reforming the rules for Environmental State Aid, and creating a level playing field for the ETS sector.

Greenhouse gases
One of the main conclusions is that as a consequence of the proposed EU-wide cap for the ETS sector (without defining national caps as in the Kyoto period), national reduction targets for total GHG emissions will no longer be set by the Commission after 2012. Effectively, climate policy for this part of the emissions has shifted to EU level. Reduction targets at Member State level will only be set for the non-ETS sectors. This is a major change in the implementation of climate policy in the EU.

The reduction target set by the Commission for the GHG emissions of the non-ETS sector can be met with domestic measures alone, both in the EU-low policy case and the EU-high policy case. If indeed the EU target is met, the Netherlands will be allowed to buy more CDM/JI credits than the limit of 3% for the EC target in order to meet its own (higher) reduction target for the non-ETS sector. With a EU-30% policy, the outcome is different for the EU-low policy case and the EU-high policy case. It is likely that in the EU-high policy case, the emission reductions plus the allowed amount of CDM/JI credits (8%) will be sufficient to meet both the EU-30% target and the Netherlands' own target. In the EU-low policy case, however, it is likely that the emission reductions plus the allowed CDM/JI credits are not sufficient to meet the EU target. In that case the Netherlands will not be allowed to purchase more than 8% CDM/JI credits, which makes it uncertain if the Netherlands can meet its own policy target. To ascertain meeting the targets, the Netherlands could aim for higher domestic emission reductions by imposing additional policy for the non-ETS sector. Alternatively, the Netherlands could buy additional unused CDM/JI credits from other Member States, but it is uncertain whether the supply of unused credits will meet the demand.

The Netherlands' Government may evaluate the consequences of the structural change proposed for the ETS system for its present climate policy targets, and has three options for its climate targets when the Commission's proposal for the ETS sector will be approved by the European Council and European Parliament:
- maintain the 30% reduction target for total national GHG emissions (including the balance of traded ETS emission allowances and purchased CDM/JI credits) as set in the national policy plan *Schoon en Zuinig*;
- confine the national GHG reduction target to the non-ETS sector; or
- redefine the national policy target on total GHG emissions.

If the Government decides to maintain the original target for total GHG emissions, the projected domestic emission reductions in the ETS and non-ETS sectors resulting from the current

Netherlands' policy plan are not sufficient to meet this target. The remaining distance to the total national emission target depends on the EU-policy case (high or low), but is in both cases substantial (tens of megatons).The Netherlands' Government has several policy options to reduce the distance to this target:

- Implement additional national policy in the ETS sector. National emissions in the Netherlands will decrease, but for the EU as a whole this will be offset by extra emissions in other Member States. Favourable side-effects are co-benefits for air quality, easier achievement of targets for renewable energy and energy efficiency, and stimulation of infrastructure and technology development. Less favourable effects are higher expenditure for companies (in case of standards or taxes) or the Government (in case of subsidies). Further analysis of the cost effectiveness of additional national policy would be needed to identify appropriate policy initiatives.
- Implement additional national policy for the non-ETS sector. Substantial additional reduction efforts by the non-ETS sector will lead to a significant increase in costs, but will also have favourable side-effects on air quality, energy efficiency improvement and possibly renewable energy. As for the ETS sector, further analysis can identify appropriate policy initiatives.
- Incorporate the emission reduction in power plants in neighbouring countries that result from savings on electricity use and increases renewable electricity production in the Netherlands. This emission reduction is estimated at 10 to 30 Mton. When the Netherlands' Government includes these emission reductions, the distance to the reduction target for total GHG emissions will decrease.
- Propose a stricter EU policy for the non-ETS sector and the ETS sector. The EU-high policy case already assumes stringent measures for the non-ETS sector, so in that case there is little room for even more stringent measures. For the ETS sector, the Netherlands' Government could advocate a lower cap than currently proposed by the Commission, which would lead to higher CO_2 prices. The CO_2 price should be higher than € 50/ton CO_2 in order to attain additional emission reductions relative to the EU-high policy case.
- Purchase CDM/JI credits or CO_2-equivalent units from the ETS market (or cancelling them from auctioning). The national costs for purchasing CDM/JI credits may be lower than those for domestic emission reductions. Nevertheless, this option will be expensive for the Government. Moreover, all favourable side effects of domestic emission reductions will be missed.

Renewable energy

The target for renewable energy proposed by the Commission is almost met in the EU-high policy case, but not in the EU-low policy case. The *Schoon en Zuinig* target for renewable energy (20% share in 2020) will not be met with either of the EU policy cases.

To reduce the distance to the Netherlands' target for renewable energy, the Netherlands' Government can purchase Guarantees of Origin from other Member States. However, the supply of these certificates may be limited, because it is expected that most Member States will not be able to overachieve their EU target, which is a precondition that must be met before they are allowed to sell Guarantees of Origin to other Member States.

Energy efficiency improvement

The Netherlands' energy efficiency improvement target is met in the EU-high policy case, but only when the EU definition is used (excluding feedstocks), and not when the current national definition (including feedstocks) is applied. In the EU-low policy case the target will not be met, even when the EU definition is used.

To increase the energy efficiency improvement rate, the Netherlands' Government can implement additional national policies on driving behaviour and energy efficiency of (power) production processes, office and domestic buildings, and/or stimulate more stringent EU policy on energy efficiency for new passenger vehicles and electric equipment.

Table 5.2. GHG emission and emission reduction of the Netherlands, realized in 1990 en 2005 and estimated in the BAU scenario and with the policy induced effects of the Netherlands' plan Schoon en Zuinig in 2020. Unit: Mton CO_2-eq.

	Past trend		Projection	Policy induced effect *Schoon en Zuinig* in 2020 (including autonomous replacement of old power plants by new power plants)		Resulting GHG emissions *Schoon en Zuinig* in 2020	
	1990	2005	2020 BAU	EU-low policy case	EU-high policy case	EU-low policy case	EU-high policy case
ETS	85	96	129	-2 to -6	-11 to -26	127 to 124	119 to 103
Non-ETS	128	116	117	-14 to -22	-18 to -26	102 to 94	98 to 91
Total	**213**	**212**	**246**	**-17 to -28**	**-29 to -52**	**229 to 218**	**217 to 194**
Remaining distance to the 30% reduction target for total GHG emissions in *Schoon en Zuinig*				-79 to -68	-66 to -43	-79 to -68	-66 to -43
Reduction target *Schoon en Zuinig* relative to BAU scenario				-95	-95		
Emission target *Schoon en Zuinig*						151	151

The numbers in the table are different from those in (ECN/MNP, 2007a,b), because updates were made for (a) a different division of the national GHG emissions between ETS and non-ETS in 1990, 2005 and 2020, and (b) recent developments in the power sector, like planning of new power plants and decommissioning of old power plants.

Table 5.3. Comparison and conversion of EU and Netherlands' targets for GHG emission reduction, renewable energy and energy efficiency improvement and comparison with ECN/MNP evaluation of the evaluation of the Schoon en Zuinig plan for 2020.

Target / external credits	Unit	Proposal European Commission				Policy plan Schoon en Zuinig		
		Europe EU-20%	Europe EU-30%	Netherlands EU-20%	Netherlands EU-30%	Netherlands' Target	Netherlands' Projection EU-low policy case	Netherlands' Projection EU-high policy case
Emission targets								
GHG reduction relative to 1990	Mton	**-20%**	**-30%**			**-30%**		
GHG reduction relative to 2005	Mton	-14%	-25%				domestic	domestic
ETS reduction relative to 1990	Mton	?	?			-30% ceiling	+46 to +50%	+22 to +40%
ETS reduction relative to 2005	Mton	-21%	-31%					
Non-ETS reduction relative to 1990	Mton	?	?	-22%	-32%	**-30%**	-20 to -26%	-23 to -29%
Non-ETS reduction relative to 2005	Mton	**-10%**	-21%	**-16%**	-27%		-12 to -19%	-15 to -22%
Renewable energy targets								
Renewable energy definition EU (share in 2020)	share	**20%**	20%	**14%**	**14%**		8-10%	12-14%
Renewable energy definition NL (share in 2020)	share			15-19%	15-19%	**20%**	11-13%	15-17%
Renewable energy in transport (share in 2020)	share	**10%**	**10%**	**10%**	**10%**	**10 to 20%**	10 to 20%	10 to 20%
Energy targets								
Energy conservation definition EU	%	**20%**	**20%**					
Energy conservation definition NL	%/year					**2%/yr**	1.4-1.6%/yr	1.7-1.9%/yr
Energy conservation definition NL excluding non-energy use	%/year					**in 2011-2020**	1.6-1.9%/yr	2.0-2.3%/yr
Allowed contribution of JI/CDM project credits								
ETS sector (banked/new)	Fraction	8%	13%	7%	12%			
Non ETS sector, relative to 2005	Fraction	3%	8%	3%	8%			

Bold values = figures from Commission proposals and Netherlands' plan *'Schoon and Zuinig'*. Other figures have been converted to correspond with other definitions used (of base year and of total energy consumption and of limit of external credits)

6 Outstanding issues

This report presents an initial assessment of the Commission's Energy and Climate policy package. The focus is on understanding the general implications of the proposals and providing an initial assessment of the interactions with the Dutch targets for greenhouse gas emissions, renewable energy and energy efficiency. Specific conclusions are presented in Chapters 4 and 5 and in the summary.

There are, however, a number of outstanding issues that can be characterised as:

- topics related to the subject matter of this report but requiring more quantitative assessment for which more time is needed;
- consequences of the proposals not dealt with in this report, but which are important for Dutch and other national policy makers, such as the proposals for ETS auctioning. The list below does not cover implementation issues;
- an integrated analysis of the overall impacts of the proposals for the Dutch economy and economic sectors.

The cross-cutting and specific issues in each of the proposals still to be addressed are presented in Box 6.1

Box 6.1 Outstanding issues on the ETS, non-ETS and renewal energy proposals

Cross-cutting issues

- To what extent is the combination of proposed instruments effective, efficient and fair.
  This includes:
  - the scale of leakage and displacement effects;
  - impact of auction revenues on government budgets;
  - impact of choices on the use of auction revenues for the level playing field for industries;
  - impacts of expected increases in electricity prices;
  - an analysis of national circumstances that enhance target achievement in specific Member States;
  - scope for solutions other than free allocation of allowances for protecting exposed industries.
- What factors introduced in the proposals have a major impact on the carbon price, and how will future carbon prices affect the balance between measures taken domestically (with domestic co-benefits) and elsewhere.
- What are the total costs and expected impacts of the Commission's package for the Netherlands (a second opinion on the Commission's Impact Assessment).
- How does the package contribute to the long-term transition to a low-carbon society.

ETS

- What is the precise scope of the ETS and non-ETS sector.
  - How will the threshold for small combustion installations be modified.
  - To what extent will aviation activities be included in the ETS as proposed, not only from intra-EU flights but also from flights arriving and departing to and from destinations outside the European Union.
- What is the scope for policies in addition to ETS in achieving policy objectives in, for instance, air quality and energy security.
  - What is the overall cost-effectiveness of reduction measures for climate, air quality and energy security compared to the effectiveness from GHG emission reduction only under various carbon prices.
  - What is the potential for using Environmental State Aid in this respect.
  - What are the mechanisms to ensure that, if extra national measures are taken, these can be translated into more allowances under the ETS, and how do such mechanisms relate to the trading in Guarantees of Origin (GOs).
- What are the impacts of the proposals for auctioning and free allocation of allowances.
  - What proportion of the auctioning revenues can be used within the new rules for state aid to support industry in implementing more efficient and low carbon production processes.
  - What method will be used to determine the amounts of free allocations per industry.
  - What is the impact of partial free allocation of allowances on allowances that are auctioned.
  - Which subsectors will be exempt from auctioning if there is no international level playing field.
- How much of the remaining CDM/JI credits from phase 2 will industries use to meet their targets for 2020. The Commission has estimated that companies could use a maximum of 7% of the 21% reduction required, met by CDM/JI credit purchased and banked in the second ETS phase.

CO_2 price in the ETS

- What is the impact of the use of CDM/JI credits left from 2008-2012 on the CO_2 price within the ETS after 2012. What is the impact of possible restricted use of CDM/JI on the carbon price.
- What is the impact of possible expansion of ETS with other countries on the CO_2 price.
- What is the impact of possible further restrictions in the sustainability criteria for biofuels on the CO_2 price within the ETS after 2012.

Non-ETS sector

- What role could current EU regulations and proposals with regard to clean transport, energy efficiency play in addition to expected national efforts to reduce emissions from non-ETS sectors.
- To what extent are countries likely to rely on CDM to meet their national target.
- The reduction cost for the new Member States used in the Commission's impact assessment are mainly extrapolated from data for the old Member States, thus introducing significant uncertainty. Comparison with Member States' own estimates, where available, may provide insight into the robustness of the Commission's cost-benefit assessments for the new Member States.

Renewable energy

- What is the expected balance of supply and demand of GOs. What are the incentives for Member States to overshoot the renewable targets.
- What is the most effective policy, given trade in GOs, to simultaneously achieve other national policy objectives, such as energy security, air pollution, or technological development in renewable energy. This issue relates to a similar question above on the ETS and other policy objectives.
- How can Member States implement effective policies that ensure that electricity transmission system and distribution system operators take timely measures (for instance, improved grid connections also between countries, and reinforcements) to ensure that in their territory electricity produced from renewable energy sources can be transmitted and distributed.
- How will the strictness of the sustainability criteria for biofuels affect the opportunities of Member States to fulfil their renewable energy targets.
- What proportion of biomass for energy production will have to be imported from outside the EU.

Some of these issues allow for further analysis in advance, but the effects of other issues can only be analysed after implementation of the proposals. To support the decision-making process on the Commission's Energy and Climate package, MNP will shortly decide on the topics to be studied, either by MNP or in cooperation with partner institutes. However, some of the issues on biofuels for transport have already been assessed in more detail (Eickhout et al., 2008).

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Annex I Emission Trading System (ETS)

Short title	Amendment ETS Directive 2003/87/EC
Title	**Proposal for a Directive of the European Parliament and the Council, amending Directive 2003/87/EC to improve and extend the EU greenhouse gas (GHG) emission allowance trading system**
Objective	– Establishing a scheme for GHG emission allowance trading within the EU for the period 2013-2020 and beyond, in order to fully exploit the potential of the EU ETS to contribute to the EU's overall GHG reduction commitments in an economically efficient way; – Refining and improving the EU ETS in the light of experience gathered. – Contributing to transforming Europe into a low GHG-emitting economy and creating incentives for forward looking low carbon investment decisions by reinforcing a clear, undistorted and long-term carbon price signal.
Scope	**Sectors (see table in explanatory text for details):** – Power supply – Refineries and coke ovens – Metal production and processing – Mineral industry – Chemical industry – Capture, transport and storage of GHG emissions (CCS) – Pulp and paper – Aviation (see Annex VIII) **Gases:** – in most sectors: CO_2 (now including many non-combustion processes) – some non-combustion processes in chemical industry: N_2O – aluminium production: PFCs (and non-combustion CO_2) – in CCS: all greenhouse gases in Annex II of the Directive on CCS
Target	**At EU level:** in 2020 a reduction of 21% relative to 2005, corresponding to 1720 Mton allowances in 2020. The amount of 1720 Mton does not take account of aviation and other sectors to be added in phase 3. It is estimated that the proposed extension of the scope, together with the possible exclusion of small installations, will lead to a net increase in coverage of around 6% (120 to 130 Mton CO_2-equivalent). The allowances will decrease linearly (1.74% per year) between 2013 and 2020 in order to gain predictability in allocating allowances. The reduction rate of 1.74% will also be used for the period 2021 to 2028 and beyond.
Obligations	**EU:** – set the total available allowances for each year between 2013 and 2020; – determine for each sector, the ratio of allowances to be auctioned and to be allocated for free for each sector; – determine the EU-wide rules for allocation of free allowances; – harmonise the method and organisation of auctioning across Member States; – install and operate the Community Registry. **Member States:** – Will carry out auctions and will receive the proceeds a certain percentage of which should be used for climate and energy related issues (20% is now proposed). – Starting in 2013 all allowances for the electricity sector will be auctioned and 20% of allowances for other sectors (increasing linearly to 100% in 2020). The Commission may decide to exclude some energy-intensive sectors fully or partly from auctioning. However, 5% of total allowances will be put in a reserve for new installations or airlines entering the system after 2013. – Of the total allowances to be auctioned, 90% is allocated to Member States according to the relative shares of 2005 emissions of sectors to be auctioned. – However, 10% of allowances will be redistributed from Member States with a GDP per capita of 20% or higher than the EU-27 average to the relatively low-income Member States on the principle that the lower the GDP per capita and the higher the expected overall GDP growth, the more auctioning rights the Member State will receive.

Scope: sector/gases after amending Directive 2003/87/EC

Activities [IPCC subcategory]	Greenhouse gases
Supply of power and heat *[1A1, 1A2]*	
– **Combustion installations** with a rated thermal input exceeding 20 MW (except hazardous or municipal waste installations)*	Carbon dioxide
Other Energy activities *[1B1b,1B2a]*	
– Mineral oil **refineries**	Carbon dioxide
– **Coke ovens**	Carbon dioxide
Production and processing of metals *[2C]*	
– **Metal ore** (including sulphide ore) roasting or sintering installations	Carbon dioxide
– Installations for the production of **pig iron or steel** (primary or secondary production) including continuous casting, with a capacity exceeding 2.5 tonnes per hour	Carbon dioxide
– Production and processing of **ferrous metals** (including ferro-alloys) where combustion installations have a rated thermal input exceeding 20 MW, including rolling mills, re-heaters, annealing furnaces, smitheries, foundries, coating and pickling [new]	Carbon dioxide
– Production of **aluminium** (primary and secondary production) where combustion installations have a rated thermal input exceeding 20 MW [new]	Perfluorocarbons, Carbon dioxide
– Production and processing of **non-ferrous metals**, including production of alloys, refining and foundry casting, where combustion installations have a rated thermal input exceeding 20 MW [new]	Carbon dioxide
Mineral industry *[2A]*	
– Installations for the production of **cement clinker** in rotary kilns with a production capacity exceeding 500 tonnes per day or lime including the calcination of dolomite and magnesite in rotary kilns or in other furnaces with a production capacity exceeding 50 tonnes per day	Carbon dioxide
– Installations for the manufacture of **glass** including glass fibre with a melting capacity exceeding 20 tonnes per day	Carbon dioxide
– Installations for the manufacture of **ceramic products** by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a production capacity exceeding 75 tonnes per day	Carbon dioxide
– Installations for the manufacture of **rock wool or stone wool** with a capacity exceeding 20 tonnes per day [new]	Carbon dioxide
– Installations for the drying or calcination of **gypsum** or for the production of plaster boards and other gypsum products, where combustion installations have a rated thermal input exceeding 20 MW [new]	Carbon dioxide
Chemical industry *[2B, 2A4] [new, except nitric acid and adipic acid]*	
– Production of **carbon black** involving the carbonisation of organic substances such as oils, tars, cracker and distillation residues, where combustion installations have a rated thermal input exceeding 20 MW	Carbon dioxide
– Production of **nitric acid** [added in phase 2]	Nitrous oxide
– Production of **adipic acid** [added in phase 2]	Nitrous oxide
– Production of **glyoxal and glyoxylic acid**	Nitrous oxide
– Production of **ammonia**	Carbon dioxide
– Production of **basic organic chemicals** by cracking, reforming, partial or full oxidation or by similar processes, with a production capacity exceeding 100 tonnes per day	Carbon dioxide
– Production of **hydrogen (H2) and synthesis gas** by reforming or partial oxidation with a production capacity exceeding 25 tonnes per day	Carbon dioxide
– Production of **soda ash** (Na_2CO_3) and **sodium bicarbonate** ($NaHCO_3$)	Carbon dioxide
Capture, transport and geological storage of greenhouse gas emissions *[1A, 1B] [new]*	
– Installations to **capture** greenhouse gases for transport and geological storage in a site permitted under the CCS Directive	All GHGs listed in Annex II of the Directive on CSS
– **Pipelines** for GHG, transport for geological storage in a storage site permitted under CCS Directive	Ditto
– **Storage** sites for the geological storage of GHGs permitted under the CCS derective until responsibility for the site is transferred to the competent authority pursuant to that Directive	Ditto
Other activities *[2D1]*	
– Industrial plants for the production of (a) **pulp** from timber or other fibrous materials	Carbon dioxide
(b) **paper and board** with a production capacity exceeding 20 tonnes per day	Carbon dioxide

* When calculating the total capacity of combustion installations, units with a rated thermal input under 3 mw will not be included. Combustion installations exclusively using biomass are not covered by this Directive.

Even though the aviation sector is not listed in Annex I of the Directive, it will be included in the EU ETS system of 2012. The proposal is to expand then the scope from intra-EU flights only to include all flights arriving to and departing from the EU territory (i.e. including international flights to and from destinations outside the EU).

Instruments: at EU, Member State and sector level

- Instead of 27 national caps, there will be **one EU-wide cap** on emission allowances. Allocation of credits will be based on fully harmonised conditions in order to eliminate distortions of competition in the internal market inherent in the current system.
- Member States will be permitted to **exclude small installations** from the scope of the system, provided they are subject to equivalent emission reduction measures. The installations have a rated thermal input below 25 MW with reported emissions lower than 10,000 tonnes of CO_2 equivalent in each of the three years preceding the year of application[1].
- **Auctioning will be the basic principle for allocation** because this is the simplest and most economically efficient system. This will also eliminate windfall profits and put new entrants and economies growing faster than average on the same competitive footing as current producers. Full auctioning should be the rule from 2013 onwards for sectors that can pass on the increased cost of CO_2, such as the power sector (including CCS)[2].
- For other sectors covered by the EU ETS[3], a transitional system is foreseen, starting in 2013 with **free allocation** at a level of 80% of their share in the total allowances to be issued. Thereafter, the free allocation will decrease each year by equal amounts and will result in no free allocation in 2020.
- Energy-intensive industries that are determined to be exposed to significant **risk of carbon leakage**[4] could receive a higher amount of free allocation. Alternatively, effective carbon equalisation system could be introduced with a view to putting EU and non-EU producers on a comparable footing. Such a system could require the surrender of allowances from importers of goods.
- **Aviation** will be treated like other industries that receive transitional free allocation rather than like electricity generators. This means that from 2013 onwards, 80% of allowances will be allocated free in 2013. Thereafter the free allocation to aviation should decrease each year by equal amounts to resultin no free allocation in 2020.
- The auctions will be carried out by the Member States, and will generate significant revenues. A percentage of the **proceeds from the allowance auctioning** should be used for research and development, mitigation and adaptation, to develop renewable energies, for CCS, to contribute to the Global Energy Efficiency and Renewable Energy Fund, for measures to prevent deforestation and facilitate adaptation in developing countries, and for addressing social aspects such as increases in electricity prices to lower and middle income groups.
- **The use of CDM (CERs) and JI (ERUs) by operators** will be restricted as long as there is no international agreement on climate change. This will be an incentive for countries outside the EU to join the agreement. The use of CERs and ERUs should be consistent with (not hinder) the EU goal to generate 20% of energy from renewable sources by 2020, and to promote energy efficiency, innovation and technological development. Operators will

1) Accounting collectively for 0.7% of total ETS emissions.
2) Electricity generators could receive free allowances for heat delivered to district heating or industrial installations.
3) By 2010, the Commission will determine which sectors, taking into account the cost of allowances in relation to production costs and the extent to which the sector can pass on the cost of the required allowances in product prices without significant loss of market share to less carbon efficient installations outside the eu.
4) These industries could be forced by international competitive pressures to relocate production to countries outside the eu that have not imposed comparable constraints on emissions.

be able to use credits given to them by their governments for the period 2008-2012 that they have not already used up. Operators will be able to achieve more than one-third of the emission reductions required between 2013 and 2020 through their use. Only credits from project types which were accepted by all Member States during the 2008-2012 period will be eligible for use. To create greater flexibility, credits from new energy efficiency or renewable energy projects that promote sustainable development could be used in accordance with agreements concluded with other countries, provided these new credits do not increase the overall number of credits available. Subject to the same restriction, CERs from new projects started after 2013 would be allowed from Least Developed Countries without the need to conclude an agreement with these countries.

- Once a comprehensive international agreement is reached, **additional use of CERs and ERUs (equal to half of the additional reduction effort) will be possible**, from countries which have concluded (ratified) that agreement or from additional types of project approved by the Commission. The total additional reduction effort will correspond to the increase in the level of reduction commitments.
- Use of credits from **carbon sinks** such as forests is not permitted but credits from **projects in EU Member States** that reduce GHG emissions not covered by the ETS may be permitted under certain conditions. The Commission is also proposing to extend the linking of the EU ETS to other cap-and-trade systems provided do not undermine the environmental integrity of the EU ETS.
- **Surplus allowances** from the second trading period (2008-2012) can be **banked** and purchased and used in the third period without restriction. Allowances also remain valid throughout the third trading period and any surplus can be banked for use in subsequent trading periods (after 2020).
- From 2013 onwards, the **capture, transport and geological storage (CCS)** of greenhouse gases will be covered by this Directive in a harmonised way across the EU. Incentives for geological storage result from allowances not being required to be surrendered for stored emissions
- **New entrants** will be allocated through EU-wide rules in the same way as for other industrial sectors. Five percent of the total allowances will be put into a reserve for new installations or airlines entering the system after 2013. Any allowances remaining in the reserve will be distributed to Member States for auctioning.

Criteria for distribution of allowances

In order to support Member States with relatively lower income per head and higher growth prospects, those Member States will receive higher allowances to be auctioned than based on their relative share of 2005 emissions in the EU ETS[5]. The proposal foresees that 90% of the total allowances to be auctioned will be distributed according to the relative share of 2005 emissions in the EU ETS, and that 10% should be redistributed from Member States with an average level of income per head, that is more than 20% above the EU average. The auctioning will be open to any potential buyer under non-discriminatory conditions.

Reporting: type/year

The last date for operators to surrender allowances is 30 April of the year following that in which the emissions took place.

5) The proposal foresees that 90% of the total allowances to be auctioned is distributed according to the relative share of 2005 emissions in the EU ETS.

Annex II Effort sharing non-ETS sectors

Short Title	Decision on efforts sharing non-ETS
Title	**Proposal for a Decision of the European Parliament and of the Council on the effort of Member States to reduce GHG emissions to meet the Community's reduction commitments up to 2020 (2008/0014(COD))**
Objective	To determine the contribution of Member States meet the EU commitment on greenhouse gas emission reduction between 2013 and 2020 for non-ETS GHGs.
Scope	**Non-ETS sectors:** cars, trucks, buildings (heating), small industrial installations (< 10,000 ton CO_2), agriculture, waste. **Gases:** CO_2, CH_4, N_2O, HFCs, PFCs, SF_6
Target	**Target:** – **EU:** -10% non-ETS GHG in 2020 compared to 2005 – **Member States:** between -20% and +20% – **Netherlands:** -16% non-ETS GHG in 2020 compared to 2005 **Interim targets per Member State:** – Emissions 2013 < average emissions of 2008, 2009 and 2010 – Reduction to increase linearly between 2013 and 2020 When there is a comprehensive international agreement on climate change, the total CO_2 eq reduction target will be 30% reduction in 2020 compared to 1990. Contribution to this target of non-ETS will be proportional to current contribution.
Obligations	**EU:** supporting regulation, such as renewables/biofuels directive, CO_2 and cars directive, and labelling systems **Member States:** may decide to implement options, for example, promotion of clean transport, insulation, taxation and standards for construction.

Criteria

The effort sharing in reductions between Member States is based on GDP per capita.
The reduction obligations of Member States varies from -20% to +20%. See Table II.1 for details.

There is some flexibility achieving interim targets which are based on a linear reduction between 2013 and 2020. Member States may borrow emissions from the next year or bank them. Borrowing should not amount more than 2% of the emission limit in 2020.

Instruments

Member States may count CDM and JI credits as contribution to their reduction. The annual use of GHG emissions should not be more than 3% of GHG emissions in 2005 in each Member State. Non-used credits may be transferred to other Member States and this amount may increase in the event of an appropriate comprehensive international agreement.

Reporting

Reporting will take place under the Monitoring Mechanism (280/2004/EC).

Table II.1 EU greenhouse gas (GHG) emission reduction targets

	GHG emission target 2008-12 relative to 1990 (%)	GHG emission target by 2020 relative to 2005 (%)	GHG emission cap in 2020 for non-ETS (Mton CO_2-eq.)
Belgium	-7.5	-15	70.9
Bulgaria	-8	+20	35.2
Czech Republic	-8	+9	68.7
Denmark	-21	-20	29.9
Germany	-21	-14	438.9
Estonia	-8	+11	8.9
Ireland	+13	-20	37.9
Spain	+15	-10	219.1
Greece	+25	-4	64.1
France	0	-14	354.4
Italy	-6.5	-13	305.3
Cyprus	NA	-5	4.6
Latvia	-8	+17	9.4
Lithuania	-8	+15	18.4
Luxembourg	-28	-20	8.5
Hungary	-6	+10	58.0
Malta	NA	+5	1.5
Netherlands	-6	-16	107.3
Austria	-13	-16	49.8
Poland	-6	+14	216.6
Portugal	+27	+1	48.4
Romania	-8	+19	98.5
Slovenia	-8	+4	12.1
Slovakia	-8	+13	23.5
Finland	0	-16	29.7
Sweden	+4	-17	37.3
United Kingdom	-12.5	-15	310.4

Source: EC (2008c)
NA = Not Available

Annex IIIa Renewable energy

Short title	Directive on renewable energy
Title	**Proposal for a Directive, replacing current Directives - Directive 2001/77/EC on the promotion of electricity from renewable energy sources and Directive 2003/30/EC on the promotion of the use of biofuels from 1 January 2012.**
Objective	To establish a common framework for the use of energy from renewable sources for reasons of security of supply, environmental protection and competitiveness of the renewable sector. Transport is considered separately because it has the most rapid increase in GHG emissions; biofuels tackle the oil dependence of the transport sector. Biofuels would hardly be developed without a specific requirement because they are currently more expensive than other forms of renewable energy.
Scope	**Sectors:** (1) electricity, (2) heating and cooling and (3) transport. In transport, the renewable energy share refers only to petrol and diesel fuel. Transport includes other modes of transport such as shipping, rail and aviation. Heating and cooling, heat pumps should fulfil minimum requirements; passive solar energy systems in buildings are excluded. Issuance of *'Guarantees of Origin'* are limited to plants with capacity > 5 MW_{th}. **Gases:** mainly CO_2
Target	**Year:** 2020 **Share in overall energy use:** – **EU:** 20% in overall final energy consumption (presently 8.5% [2005]) – **Member States:** between 10% and 49% (presently 0 to 40%). For details, see Table III.1. **Share in transport:** – **EU and Member States:** 10% minimum target is set for the share of biofuels in transport petrol and diesel consumption (presently 2% [2006])
Obligations	**EU:** – provides means to support the development of renewable energy, such as administrative procedures, planning, construction and information and training. **Member States:** – take steps to guarantee access to the electricity grid for electricity from renewable energy sources and to provide priority access to the grid for renewable electricity. – issue and ensure that *'Guarantees of Origin'* (GO) comply with the requirements of the Directive. – designate a single body to maintain a national register of guarantees of origin, that issues, records, transfers and cancels guarantees of origin; and which reports annually. **Sectors:** – Electricity production: increase generation by renewables – Electricity transmission and distribution: network operators to provide and develop infrastructure to guarantee access of renewable electricity and to give them priority – Refineries: blending of biofuels in petrol and diesel – Building sector: architects, spatial planners, builders – Services: equipment and system installers Target for overall and transport share for 2020 and increase of the overall share 2013-2020 in two-year steps following an indicative trajectory.

Criteria for burden sharing in determining national targets

At EU level, in 2020 the target is a share of renewable energy sources of 20% in overall final consumption of energy delivered for energy purposes (coal, oil, gas, electricity, heat, biomass fuels). This has been translated into individual targets for each Member State (see Table 1). Member States have the freedom to determine the mix of the three sectors (electricity, heating/cooling, transport) in reaching their national target. Targets vary between 10-13% (in 2005: 0-6%) and 49% (Sweden; in 2005: 40%).

Targets for Member States for the overall share in final energy consumption were derived using the following approach:

1. Starting point is the 2005 share of renewable energy, modified for Member State that had a growth since 2001 was > 2% to reflect national starting points and efforts already made. In those cases, one-third is deducted from national growth of the share in the 2001-2005 period;

2. 5.5%-points are added to the modulated 2005 share of renewable energy for each Member State (5.5% is half of average EU 2005-2020 difference);
3. The remaining effort of 5.5% is equivalent to 6.7 GJ (0.16 toe) per person in the EU and is weighted by GDP per capita index to reflect different levels of wealth across Member States, then multiplied by the population for each Member State.
4. The latter two elements are added together to derive the full renewable energy share of total final energy consumption in 2020;
5. For individual Member States an overall cap of 50% maximum on the target share for renewable energy in 2020 is applied.

The Commission considers this method of target setting, 50% a fixed increase per Member State and 50% more country-specific based on population size and GDP/cap to provide a fair distribution of effort across the Member States.

Table III.1. National overall targets for the share of energy from renewable sources in final consumption of energy in 2020

	Share of energy from renewable sources in final consumption of energy, 2005	Target for share of enrgy from renewable sources in final consumption of energy, 2020
Belgium	2.2%	13%
Bulgaria	9.4%	16%
Czech Republic	6.1%	13%
Denmark	17.0%	30%
Germany	5.8%	18%
Estonia	18.0%	25%
Ireland	3.1%	16%
Greece	6.9%	18%
Spain	8.7%	20%
France	10.3%	23%
Italy	5.2%	17%
Cyprus	2.9%	13%
Latvia	34.9%	42%
Lithuania	15.0%	23%
Luxembourg	0.9%	11%
Hungary	4.3%	13%
Malta	0.0%	10%
Netherlands	2.4%	14%
Austria	23.3%	34%
Poland	7.2%	15%
Portugal	20.5%	31%
Romania	17.8%	24%
Slovenia	16.0%	25%
Slovak Republic	6.7%	14%
Finland	28.5%	38%
Sweden	39.8%	49%
United Kingdom	1.3%	15%
EU-27 average	**8.5%**	**20%**

Source: EC (2008c) (Annex I)

Flexibility
Member States are free to develop the renewable energy sector to correspond best with their national circumstances and potential. This includes the option of achieving their targets by supporting the development of renewable energy in other Member States, provided they collectively reach the 20% target.

Imported electricity produced from renewable energy sources outside the EU may count towards the Member States' targets. However, only electricity generated by renewable energy installations that become operational after this Directive comes into force is eligible.

The creation of a tradable guarantee of origin regime allows Member States to reach their targets in the most cost-effective way possible. Instead of developing local renewable energy sources, Member States will be able to buy guarantees of origin (certificates proving the renewable origin of energy) from other Member States where the development of renewable energy is cheaper to produce.

Reporting
Member States have to prepare a national action plan to be presented to the Commission by 31 March 2010, and a progress report by 30 June 2011 at the latest and every two years thereafter.

The Commission reports biannually on the basis of the Monitoring Mechanism reports on monitoring and analysis of origin of biofuels consumed in the EU. This will include the impact on land use and commodity price changes due to biofuel use to European Parliament and Council every two years, starting in 2012. The EC may propose corrective action.

Annex: Definitions
Energy from renewable sources refers to the following energy sources: wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases. Biofuels have to meet specific environmental sustainability criteria to be accounted for in the target.

Final consumption of energy refers to deliveries of energy commodities to end-use sectors for energy purposes: manufacturing industry, transport, households, services, agriculture, forestry and fisheries (i.e. excluding energy transformation such as electricity production, refineries). It includes the consumption of electricity and heat for own use by the energy sector for electricity and heat production as well as losses of electricity and heat in distribution. The definition excludes delivery of energy commodities as chemical feedstock, such as naphtha for petrochemicals production and gas for ammonia production,or for other non-energy purposes (such as lubrication).

Final consumption of energy from renewable sources in each Member State is calculated as the sum of: (a) final consumption of electricity from renewable energy sources; (b) final consumption of energy from renewable sources for heating and cooling; and (c) final energy from renewable sources consumed in transport.

Hydropower: to avoid large interannual changes due to varying levels of water supply, a normalisation for the average load factor applied to the installed capacity is used. The load factor used is the average of the factors for past 15 years relative to and including the year of calculation.

Annex IIIb Renewable Energy in the Transport Sector

Short title	Directive on Renewable Energy (replacing Directive 2003/30/EC on the use of biofuels)
Objective	The broader intention of the Directive is to set a binding target to increase the level of renewable energy in the EU energy mix at 20% by 2020. The Commission claims that biofuels are the only available large-scale substitute for petrol and diesel in transport. Given the precarious security of oil supply (and thus for the transport sector), specific targets for biofuels are needed. To prevent biofuels having adverse effects, sustainability criteria are included in the proposal.
Scope	**Sector:** transport. **Renewable energy share:** only refers to petrol and diesel fuel used.
Target	**EC and Member States:** a share of at least 10% by 2020 of petrol and diesel consumption in transport. Biofuels and other bioliquids that do not fulfil the environmental sustainability criteria will not be taken into account.
Obligations	**EC:** - define criteria and geographic ranges for grasslands with high biodiversity excluded for growing of biofuel crops; - monitors and analyses the origin of biofuels consumed in the EU and their impact on landuse and commodity price changes due to biofuel use to EP and Council and may propose corrective action where appropriate. **Member State:** – will require economic operators to show that the environmental sustainability criteria have been fulfilled. These economic operators will use a mass balance system in which the sustainability criteria are met for each consignment; – will ensure that information is given to the public on the availability of biofuels and other renewable transport fuels.

Sustainability Criteria

The proposal suggests clear sustainability criteria on two issues: required GHG emission savings and protection of biodiversity.

The GHG saving from the use of biofuels and other bioliquids will be at least 35%. This saving is applied to the mix of renewables and not to each raw material.

On the contrary, the biodiversity criteria are applicable for the raw materials produced. Biofuels and other bioliquids will not be made from raw material obtained from forest undisturbed by significant human activity, from areas designated for nature protection and from highly biodiverse grassland. These are grasslands that are species-rich, not fertilised and not degraded. The Commission will specify later which areas. Moreover, biofuels and other bioliquids will not be made from raw material obtained from land with a high carbon stock, being wetlands and continuously forested areas. The status of these areas has changed since January 2008.

Biofuels and other bioliquids that do not fulfil these environmental sustainability criteria will not be taken into account. Other criteria, such as mentioned in the Cramer criteria are not set at this stage. Even more important, 'Member States shall not refuse to take into account biofuel and other bioliquids obtained in compliance with this Article, on other grounds of sustainability'.

Reporting

Member States will submit a report to the EC on progress in the promotion and use of energy from renewable sources by 30 June 2011 at the latest, and every two years thereafter. These reports will contain commodity price and land use changes within the Member State associated with its increased use of biomass and other forms of energy from renewable sources; the development and share of biofuels made from waste, residues, non-food cellulosic material,

and ligno-cellulosic material; the estimated impact of biofuel production on biodiversity, water resources, water quality and soil quality.

On the basis of the reports submitted by Member States, the Commission will report every two years to the European Parliament and the Council. The first report will be submitted in 2012 and, if appropriate, will propose corrective action regarding issues such as the relative environmental benefits and costs of different biofuels, the impact of increased demand for biofuel on sustainability in the Member States and in other countries, and the impact of EU biofuel policy on the availability of foodstuffs in exporting countries, the ability of people in developing countries to afford these foodstuffs, and wider development issues.

Annex IV Carbon Capture and Storage (CCS)

Short title	CCS Directive
Title	**Proposal for a Directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006**
Objective	To set a regulatory framework to remove legal barriers and to deploy environmentally safe geological storage of carbon dioxide (CCS). CCS should contribute to the mitigation of CO_2 emissions from the power sector, refineries and industrial sectors.
Scope	**Sectors:** power generation from fossil fuels and CO_2 intensive industries such as cement, refineries, iron and steel, petrochemicals and oil and gas processing. **Gases:** CO_2
Target	There is no target on the amount of CO_2 to be stored underground in a certain year. In fact, CCS is not mandatory at this stage. The incentive for CCS will be the carbon price that will follow from the European GHG emission trading system. CO_2 captured and safely stored according to the EU legal framework will be considered to be not emitted under the ETS. Individual operators will decide whether to release emissions and pay ETS allowances to cover them, or to use CCS to reduce emissions and ETS liabilities.
Obligations	– Member States have the right to determine which areas of their territory can be used for CO_2 storage. The draft permits may be reviewed by the Commission with the assistance of a scientific panel of technical experts, but the final permitting decision remains with the national competent authority. – A monitoring plan must be set up to verify that the injected CO_2 is behaving as expected. Corrective measures must be taken in the event of leakage. Environmental damage must be repaired and Emission Trading Allowances must be surrendered to compensate for the leaked amount. – The competent authority in the Member State must ensure that inspections are carried out to verify that the provisions of the proposed directive are observed. – The proposal provides for sites to be transferred to Member State control in the long term. However, the operator retains responsibility for a site that presents a significant risk of leakage. – Financial provision should be made so that obligations for instance in the case of leakage can be met. – The competent authority should establish and maintain a register of all closed storage sites and surrounding storage complexes. – Member States set rules on penalties for infringements to national provisions adopted in line with this Directive. – Large combustion plants for which the original construction license or the original operating licence is granted after this Directive comes in to force should have suitable space on the installation site for equipment to capture and compress CO_2 and should have assess to suitable storage sites and transport networks, as well as the technical feasibility of retrofitting for CO_2 capture.

Instruments

Eventually - the Commission anticipates in 2020 - the incentive for CCS will be the carbon price which will follow from the European GHG emission trading system. However, the Commission recognises that this will not happen without support to early demonstration of CCS projects to reduce the cost of CCS. In a Communication published on January 23 2008[6], the Commission expresses the intention to stimulate the construction and operation by 2015 of up to 12 CCS demonstration plants in commercial power generation. These plants will have substantial additional capital requirements and increased operating costs. The Commission will supply limited financial support (mainly within the framework of the FP7), but expects that power companies will make their own financial commitments. However, under the revised rules on state aid, Member States are permitted to subsidise the high investment and operational costs of CCS demonstration projects, until CCS can compete on a commercial basis within the ETS system. The Member States will select the instruments (feed-in tariffs or up-front investment grants), and decide how the support scheme can be financed. Use of some revenues from auctioning under the ETS could be appropriate.

6) COM(2008) 13 final.

Reporting

The operator should report the monitoring results to the competent authority at least once a year. In addition, Member States should establish a system of inspections to ensure that storage sites are operated in accordance with the requirements of this Directive.

Member States should submit reports on the implementation of this Directive on the basis of questionnaires drawn up by the Commission.

Annex V Environmental State Aid

Short Title	Environmental Aid Guidelines
Full Title	Community Guidelines on State Aid for Environmental Protection (2008/C 82/01)
Objective	To support Member States by announcing in advance measures considered compatible with the common market by setting the conditions for authorising the granting of State aid to address market failures that lead to sub-optimal environmental protection, thus speeding up their authorisation. Member States may decide to pursue a higher level of environmental protection than EU standards and, in addition to regulation, they may use state aid as a positive incentive to achieve higher levels of environmental protection. The objectives of the guidelines are further summarised in Box V.1.
Scope	These guidelines apply to state aid for environmental protection in all sectors governed by the EC Treaty. They also apply to those sectors subject to specific EU rules on state aid (steel processing, shipbuilding, motor vehicles, synthetic fibres, transport, coal agriculture and fisheries) unless otherwise specified. Carbon Capture and Storage (CCS) projects are also included. Exceptions are the financing of environmental protection measures relating to air, road, railway, inland waterway and maritime transport infrastructure, including any project of common interest as identified in the EU guidelines for the development of the trans-European transport network, which is not covered by these guidelines.
Internet	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:082:0001:0033:EN:PDF

Main changes

The main changes compared to the previous guidelines from 2001 (EC, 2001c) are:

- **New provisions**, for instance aid for early adaptation to standards, environmental studies, district heating, waste management and for tradable permit schemes.
- **Aid intensities have increased considerably**: for large enterprises from 30%-40% to 50%-60%; for small enterprises from 50%-60% to 70%-80%. A further 10% aid bonus may be granted where an investment involves eco-innovation. It is now possible to grant 100% following a competitive procedure.
- **Tax reductions**: the possibility of long-term derogations from environmental taxes is maintained, but when companies do not pay at least the EU minimum, Member States must demonstrate that these derogations are necessary and proportionate.
- **Criteria for standard and detailed economic assessments**. A detailed assessment method for large aid amounts to individual enterprises to scrutinise individual cases that have the greatest potential to distort competition and trade. Schemes involving tax exemptions and reductions will only be assessed at the level of the scheme, and individual enterprises will not be subject to a detailed assessment (see below).
- **Thresholds for notifying certain types of aid**: thresholds for detailed assessment of individual cases, such as a block exemption on the obligation to notify certain aid measures to the Commission and thus reduce the administrative burden. Some types of environmental aid under a certain amount do not have to be notified to the Commission. In addition, under the block exemption, a simplified method can be used to calculate the aid amount.

Eligible cost calculations have been changed and new and additional reporting and monitoring requirements are introduced (EC, 2008e).

Activity-specific requirements

For the following activity-specific guidelines are provided, including aid intensity and eligible costs:

- aid for undertakings that go beyond EU standards or increase the level of environmental protection in the absence of EU standards;

Box V.1 Why issue state aid guidelines for environmental protection

Environmental protection is an important objective of the European Union. The level of environmental protection is not considered sufficient and more needs to be done. This is due notably to the fact that companies do not fully account for the cost of pollution for societies. To address this market failure and promote a higher level of environmental protection, governments may use regulation to ensure that companies pay for their pollution (for instance, through taxes or emission trading systems) or meet certain environmental standards. In some cases, state aid may be justified to give private companies an incentive to invest more in environmental protection, or to relieve some companies of the relatively high financial burden in order to enforce stricter overall environmental policy.

State aid must fulfil certain criteria and be authorised by the European Commission. The Commission issues guidelines to help Member States by announcing in advance which measures are considered compatible with the common market, thus speeding up their authorisation. The guidelines are a safeguard to prevent the granting of poorly targeted or excessive state aid that not only distorts competition but also frustrates the objective of meeting environmental targets.

The Energy and Climate Change Package introduces market mechanisms, which should secure that polluters pay for their pollution and that more environmentally friendly technologies are supported. The new Environmental Aid Guidelines are an important part of the package to provide the right incentives for Member States and for industry to increase their efforts for the environment.

Source: EC (2008j)

- aid for the acquisition of new transport vehicles that go beyond EU standards or which increase the level of environmental protection in the absence of EU standards;
- aid for early adaptation to future EU standards;
- aid for environmental studies;
- aid for energy saving;
- aid for renewable energy sources;
- aid for cogeneration;
- aid for energy-efficient district heating;
- aid for waste management;
- aid for the remediation of contaminated sites;
- aid for the relocation of undertakings;
- aid involved in tradable permit schemes.

Criteria for a detailed assessment

The following aid awards must be notified individually to the Commission for detailed assessment:

- *investment aid:* where the aid amount exceeds € 7.5 million for one undertaking;
- operating aid for energy saving: where the aid exceeds € 5 million per undertaking for five years;
- *operating aid for the production of renewable electricity and/or combined production of renewable heat:* when the aid is granted to renewable electricity installations in sites where the resulting renewable electricity generation capacity exceeds 125 MW;
- *operating aid for the production of biofuel:* when the aid is granted to a biofuel production installation in sites where the resulting production exceeds 150,000 t per year;
- *operating aid for cogeneration:* where aid is granted to a cogeneration installation with the resulting cogeneration electricity capacity exceeding 200 MW. Aid for the production of heat from cogeneration will be assessed in the context of notification based on electricity capacity.

The detailed assessment does not mean that the envisaged state aid will be prohibited. It only means that the Commission will check carefully whether the aid is necessary and will contribute to environmental protection without creating undue distortions of competition (EC, 2008e).

Relationship with other elements in the Energy and Climate Package

The new Environmental Aid Guidelines are an important part of the package to provide the right incentives for Member States and for industry to increase their efforts for the environment. The guidelines support the market-based instruments introduced by the package. If polluters do not pay enough and avoid making sufficient environmental investments because they receive state aid, competition is distorted and the objective of meeting the EU's ambitious targets for the environment is frustrated.

In addition, the guidelines provide a series of measures that complement and support the achievement of greater environmental protection. In situations where the polluter pays principle cannot be properly implemented by Member States, state aid can be an option to respond to the market failure linked with environmental negative externalities. State aid may enable individual undertakings to change their behaviour and adopt more environmentally friendly processes or invest in greener technologies. State aid may also enable Member States to adopt regulation or standards that go beyond EU standards by reducing unbearable constraints on some companies (EC, 2008j).

The primary objectives of control on state aid for environmental protection are to ensure firstly that measures result in a higher level of environmental protection than would occur without the aid. Secondly the control aims to ensure that the positive effects of the aid outweigh any negative effects in terms of competition distortion, taking account of the 'polluter pays principle' in the EC Treaty (EC, 2008e).

In the State Aid Action Plan, the Commission states that state aid can sometimes be an effective tool for achieving objectives of common interest. Under some conditions, state aid can correct market failures, thereby improving the functioning of markets and enhancing competitiveness. It can also help to promote sustainable development, irrespective of the correction of market failures. The State Aid Action Plan also stressed that environmental protection can provide opportunities for innovation, create new markets and increase competitiveness through resource efficiency and new investment opportunities. Under some conditions, state aid can be conducive to these objectives, thus contributing to the core Lisbon strategy objectives of more sustainable growth and jobs (EC, 2008e).

Annex VI CO_2 and passenger cars

Short title	CO_2 and passenger cars
Full title	**Proposal for a regulation of the European Parliament and of the Council: Setting emission performance standards for new passenger cars as part of the EU's integrated approach to reduce CO_2 emissions from light duty vehicles**
Objective	The objective is to reduce the CO_2 emissions from the new car fleet (passenger cars and light duty vehicles) to an average 130 g/km by 2012 and to assure the operation of the internal market by setting harmonised rules. The objective is part of an integrated approach to further reduce the CO_2 emissions from new cars to the EU objective of 120 g/km. Other technical measures should lead to an additional reduction of 10g/km.
Scope	**Sector:** – manufacturers of passenger cars and light duty vehicles. **Gas:** – CO_2.
Target	To achieve an average CO_2 emissions from new passenger cars of 120 g/km in 2012. Resulting in a reduction of 634 – 638 Mton CO_2-eq. Improvements in motor technology should reduce emissions to an average of 130 g/km. The remaining 10 g/km should be reduced by other technological improvements and by an increased use of biofuels.
Obligations	**Sector:** – manufacturers should meet a (pooled) average CO_2 emission of 130 g/km in 2012. In advertisements, and in labelling, manufacturers should state the CO_2 emissions of the vehicle in relation to the objective. **Member States:** – Record details on new passenger car registered within its borders and the CO_2 emissions. **EU:** – sets up an EU code of good practice on car marketing and advertising to promote more sustainable consumption patterns. Monitors CO_2 emissions and imposes a penalty premium when the limit value is not met.

Annex VII Fuel Quality Directive

Short title	Fuel Quality Directive
Full title	**Proposal for a directive amending Directive 98/70/EC on the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce GHG emissions from road transport fuels and amending Council Directive 1999/32/EC on the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC**
Objective	The Directive calls for specifications of fuel used by road and non-road transport and inland waterway vessels. The proposal aims: – to address the problem of GHG emissions; – to achieve current and future EU biofuel targets.
Scope	Primary, fuel suppliers (oil industry). \Secondary, manufacturers of vehicles, non-road mobile machinery and fuel and exhaust system components. The directive calls for a maximum content of sulphur and poly aromatic hydrocarbon (PAH), that will lead to a reduction in PM emissions. The proposal calls for a reduction of 1% per calendar year of life cycle GHG emissions of fuels and measures to stimulate the development of biofuels.
Target	A minimal reduction of 1% per calendar year of the life-cycle GHG emissions from fuel for road transport and non-road mobile machinery, starting from 2010. Emissions in 2020 should not be higher than 90% of the emission levels in 2010. This will lead to a reduction of about 500 Mton CO_2 in 2020.
Obligations	**Sector:** – maximum of 10 mg/kg of sulphur in all diesel fuels, by 2009 for road transport; – maximum of10 mg/kg of sulphur non-road gas-oil for land-based use and 300 mg/kg for inland waterway vessels in 2010 and 10 mg/kg from 2012; – maximum of polyaromatic hydrocarbons (PAHs)in diesel to be reduced from 11 to 8% by 2009. **EU:** – higher oxygenate content in fuel will be permitted (including up to 10% ethanol) in order to enable the biofuel market to develop without damaging cars; – temporary change to the maximum vapour pressure for ethanol blends to stimulate the development of biofuels in Europe. **Member States:** – mandatory monitoring of life cycle GHG emissions from fuel from 2009; reduction of 1% per year by 2011.

Annex VIII Aviation in ETS

Short title	Amendment ETS Directive on aviation
Title	**Proposal for the Directive of the European Parliament and Council on amendment to Directive 2003/87/ES to include aviation in the Community GHG emissions trading scheme. COM (2006) 818 final.**
Objective	Reduce the growing effect of climate change resulting from air traffic and include aviation in the Community emissions trading scheme.
Scope	**Air craft:** – Aircraft operators with activities registered in one of the Member States. – From 1 January 2012: all flights arriving and departing from airports in the EU, including domestic flights within the EU Excluded are flights by Member State aircraft, flights under Visual Flights Rules, circular flights, flights for testing navigation equipment or for training purposes, rescue flights and flights by aircraft with a maximum take-off weight of less than 5,700 kg Also excluded are flights from outside the EU where an ETS system in place **Gases included:** CO_2 At the end of 2008, the Commission will make a proposal to include NO_2 and other GHG emission from aviation
Target	Total allowances allocated to aircraft operator – from 1 January 2012 to December 2012: 100% of the average emissions 2004/2005/2006; – from 1 January 2013, for each period: 100% of the average emissions 2004/2005/2006 multiplied by the number of years in that period.
Obligations	**Member States:** For each period calculate and publish: – total allocation of allowances to each aircraft operator – allocation of allowances to each aircraft operator per year **EC:** – several administrative and publishing obligations including lists of aircraft operators.

Instruments

Auctioning: 10% in 2012, 20% in 2013, after that increasing by an equal amount to 100% in 2020 (comparable to other industries which receive transitional free allocation).

Reporting

Comparable to other ETS sectors. Aircraft operators report emissions, tonne kilometre data according to guidelines to Member State. Member States report to the Commission.

Criteria

Formula to calculate emissions: fuel consumption * emission factor
Formula to calculate tonne-kilometre data: distance * payload

Administering Member State

The 'administering Member State' is responsible for administering the ETS in respect of an aircraft operator. This is either the Member State which granted a valid operating licence (in accordance with the provisions of Council Regulation (EEC) No 2407/92 of 23 July 1992 on licensing of air carriers), or in all other cases, the Member State with the greatest estimated attributed aviation emissions from flights performed by that aircraft operator in the base year.

Annex IX Energy Efficiency and Energy Services Directive

Short title	**Energy efficiency and energy services Directive**
Full title	**Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EECon energy end-use efficiency and energy services.**
Objective	To enhance the cost-effective improvement of energy end-use efficiency by: – providing indicative targets as well as mechanisms, incentives and institutional, financial and legal frameworks to remove market barriers and imperfections that impede the efficient end use of energy; – creating conditions for the development and promotion of a market for energy services and for the delivery of other energy efficiency improvement measures to final consumers.
Scope	This directive aims the following sectors dealing with energy: – **providers** of energy efficiency improvement measures, energy distributors, distribution system operators and retail energy sales companies. However, Member States may exclude small distributors, small distribution system operators and small retail energy sales companies from the application of Articles 6 and 13; – **final customers**, excluding companies which are part of the the Emission Trading Scheme sector for GHG emission allowances. – **armed forces**, excluding material used exclusively for military purposes.
Target	– **General**: overall national indicative energy savings target of 9% for the ninth year of application of this Directive (1% per year). – **In first Energy Efficiency Action Plan** (EEAP): an intermediate national indicative energy savings target for the third year of application, including specific targets for the public sector. – **Action Plan for Energy Efficiency**: 20% savings in energy consumption by 2020 (COM (2006) 54).
Obligations	**Member States:** – take cost-effective, practicable and reasonable measures on energy services and other energy efficiency improvement measures designed to contribute towards achieving this target; – establish first Energy Efficiency Action Plan (EEAP) with an intermediate national indicative energy savings target for the third year of application of this Directive; – provide an overview of its strategy for the achievement of the intermediate and overall targets. Member States shall gradually integrate the indicators and benchmarks developed by the Commission into the statistical data included in their EEAPs and use them as a tool in deciding future priority areas in the EEAPs. **EU:** The Commission will review and report on the first three years of application of this Directive. Based on this, the Commission will examine whether to present a proposal for a directive to further develop the market approach in energy efficiency improvement by means of white certificates. The Commission will develop a set of harmonised energy efficiency indicators and benchmarks, taking into account available data or data that can be collected cost-effectively for each Member State.

In the six Annexes to the Directive, the following are described:

- methodology for calculating national indicative energy savings target;
- default energy content of selected fuels for end use;
- indicative list of examples of eligible energy efficiency improvement measures in (a) residential and tertiary sectors (b) industry sector; (c) transport sector; (d) cross-sectoral measures; (e) horizontal measures;
- general framework for measurement and verification of energy savings;
- indicative list of energy conversion markets and sub-markets for which benchmarks can be worked out;
- list of eligible energy efficient public procurement measures.

Instruments

Key to meeting GHG emission targets is improving energy efficiency and expanding renewable energy production. The Energy Policy for Europe Action Plan includes a commitment to yield 20% savings in energy consumption by 2020 (compared to a baseline) by means of energy

efficiency improvements. For energy efficiency, this directive aims at stationary fuel combustion. Together with several other directives, these instruments comprise various actions and measures aimed at cost-effective energy savings by 2020 of 20% on present EU energy consumption (Green Paper on Energy Efficiency; EC, 2005b). Apart from this generic directive, other directives address specific areas of energy efficiency improvement.

Directives on the energy labelling of appliances:
- Council Directive 92/75/EEC on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances;
- Commission Directive 95/12/EC implementing Council Directive 92/75/EEC with regard to energy labelling of household washing machines;
- Directive 96/60/EC implementing Council Directive 92/75/EEC with regard to energy labelling of household combined washer-dryers;
- Directive 96/89 amending Directive 95/12/EC implementing Council Directive 92/75/EEC on energy labelling of household washing machines;
- Directive 97/17/EC implementing Council Directive 92/75/EEC on energy labelling of household dishwashers as amended by Commission Directive 1999/9/EC amending Directive 97/17/EC implementing Council Directive 92/75/EEC with regard to energy labelling of household dishwashers;
- Directive 96/89 amending Directive 95/12/EC implementing Council Directive 92/75/EEC on energy labelling of household washing machines;
- Directive 2002/40/EC implementing Council Directive 92/75/EEC on energy labelling of household electric ovens;
- Directive 2003/66/EC implementing Council Directive 92/75/EEC on energy labelling of household electric refrigerators, freezers and combinations.

Other directives:
- Directive 2002/91/EC on the energy performance of buildings;
- Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity;
- Directive 2004/8/EC on the promotion of cogeneration;
- Directive 1999/94/EC relating to the availability of consumer information on fuel economy and CO_2 emissions in respect of the marketing of new passenger cars.

Reporting

Member States will submit to the Commission the following Energy Efficiency Action Plans (EEAPs):
- a first EEAP not later than 30 June 2007;
- a second EEAP not later than 30 June 2011;
- a third EEAP not later than 30 June 2014.

EEAPs describe the energy efficiency improvement measures planned to achieve the targets, as well as to comply with the provisions on the exemplary role of the public sector and provision of information and advice to final customers. Contents of the second and third EEAP include the following:
- detailed analysis and evaluation of the preceding EEAP;
- final results on fulfilment of the energy saving targets;
- plans for and information on the anticipated effects of additional measures to address existing or expected shortfall regarding the target;

- use and gradually increase in the use of harmonised efficiency indicators and benchmarks for evaluation of past measures and estimated effects of planned future measures;

The reports must be based on available data, supplemented with estimates.

The European Commission will publish not later than 17 May 2008, a cost/benefit impact assessment examining the linkages between EU standards, regulations, policies and measures on end-use energy efficiency, Based on the EEAPs, the Commission will assess the progress made by Member States towards achieving national indicative energy savings targets and will publish the conclusions:

- on the first EEAPs, before 1 January 2008;
- on the second EEAPs, before 1 January 2012;
- on the third EEAPs, before 1 January 2015.

These reports will include information on related action at EU level, including legislation currently in force and future legislation. The reports will take into account the benchmarking system described in the Directive, identify best practices, identify cases where Member States and/or the Commission are not making sufficient progress, and may contain recommendations.

Not later than 30 June 2008, the Commission will develop a set of harmonised energy efficiency indicators and benchmarks, using as a reference guide an indicative list of the Directive. Not later than 17 May 2011, the Commission will present to the European Parliament and the Council a report on the progress in setting indicators and benchmarks.

Evaluations

If appropriate and necessary, the second report will be followed by proposals to the European Parliament and to the Council for additional measures including a possible extension of the period of application of targets. If the report concludes that insufficient progress has been made towards achieving the national indicative targets, these proposals will address the level and nature of the targets.

In the Commission's first communication to the Council and the European Parliament on a first assessment of EEAPs (EC, 2008j), various actions for 2008-2009 were listed including:

- Regulation No 2422/2001 on a EU energy efficiency labelling programme for office equipment;
- proposal for recast of the Directive on the Energy Performance of Buildings (Directive 2002/91/EC);
- proposal for revision of the framework Energy Labelling Directive (92/75/EEC);
- eco-design implementing measures (Commission Regulations) setting minimum energy performance requirements for six product groups, including a horizontal measure on the standby and off-mode consumption of electrical appliances (Directive 2005/32/EC);
- to improve energy efficiency in industrial installations, a Reference document on Best Available Techniques for Energy Efficiency will be adopted in 2008 under the IPPC Directive (Council Directive 96/61/EC on Integrated Pollution Prevention and Control);
- Commission Decision on detailed guidelines for and Commission Communication on the implementation of Directive 2004/08/EC on the promotion of cogeneration;
- proposal aiming at the reduction of CO_2 emission from light-duty vehicles;
- review of the Energy Taxation Directive to facilitate more targeted and coherent use of energy taxation by integrating notably energy efficiency considerations and environmental aspects.

Annex X: Input variables and results of scenarios explored

This Annex summarises values used for key input variables for the impact assessment made by the Commission, burden sharing targets and selected results of impacts of the costs of the package for a representative case.

Table X.1. Population, GDP/cap, economic growth, targets and costs assumed per Member State, ranked according to GDP per capita in 2005.

	Key input variables in 2005						Burden sharing of EU targets C&E in 2020				Cost impact	
							ETS	non-ETS	Renew-ables	Renew-ables	Direct costs C&E [2]	Macro-economic costs C&E [3]
	Pop [1]	GDP [1]	Renew-ables	GDP/cap	GDP/cap	GDP increase	Resulting auctioning allowances	Target %	Target share	Share increase	Frac. of GDP	Frac. of GDP
	mln	billion €	(% share)	1000 €/cap	(EU-27 = 100)	2020/2005	(100%= 2005 em.)	(rel. to 2005)	(% share)	excl. fixed 5.5%-pnt	(%)	(%)
Bulgaria	7.8	21.4	9.4	2.8	12%	130%	138%	20%	16.0	1.1	-1.25%	-0.9%
Romania	21.7	79.3	17.8	3.7	16%	133%	138%	19%	24.0	0.7	0.04%	-1.6%
Latvia	2.3	12.8	34.9	5.6	25%	148%	140%	17%	42.0	1.6	-0.18%	-0.4%
Lithuania	3.4	20.6	15	6.0	27%	117%	131%	15%	23.0	2.5	-0.72%	-0.3%
Poland	38.2	243.8	7.2	6.4	29%	94%	125%	14%	15.0	2.3	0.02%	-1.0%
Slovakia	5.4	38.1	6.7	7.1	32%	104%	128%	13%	14.0	1.8	0.26%	-1.0%
Estonia	1.3	11.1	18	8.2	37%	113%	128%	11%	25.0	1.5	-0.53%	-2.6%
Hungary	10.1	88.8	4.3	8.8	39%	66%	115%	10%	13.0	3.2	-0.40%	-0.8%
Czech Republic	10.2	99.7	6.1	9.8	44%	79%	118%	9%	13.0	1.4	-0.51%	-1.6%
Malta	0.4	4.6	0	11.3	51%	63%	111%	5%	10.0	4.5	0.00%	ND
Slovenia	2.0	27.6	16	13.8	62%	57%	108%	4%	25.0	3.5	0.53%	-0.9%
Portugal	10.5	147.8	20.5	14.0	63%	44%	104%	1%	31.0	5.0	0.51%	-0.3%
Greece	11.1	181.1	6.9	16.3	73%	57%	105%	-4%	18.0	5.6	0.59%	-0.6%
Cyprus	0.7	13.6	2.9	18.2	81%	71%	108%	-5%	13.0	4.6	0.07%	ND
Spain	43.0	905.5	8.7	21.0	94%	56%	102%	-10%	20.0	5.8	0.42%	-0.1%
EU-27	**489**	**10949**	**8.5**	**22.4**	**100%**	**43%**	**100%**	**-10%**	**20%**	**6.0**	**0.45%**	**-0.45%**
Italy	58.5	1417.2	5.2	24.2	108%	32%	92%	-13%	17.0	6.3	0.66%	-0.1%
Germany	82.5	2241.0	5.8	27.2	121%	31%	90%	-14%	18.0	6.7	0.57%	-0.4%
France	60.7	1710.0	10.3	28.2	126%	42%	90%	-14%	23.0	7.2	0.47%	-0.8%
Belgium	10.4	298.5	2.2	28.6	128%	37%	100%	-15%	13.0	5.3	0.70%	-0.7%
United Kingdom	60.1	1792.0	1.3	29.8	133%	43%	90%	-16%	15.0	8.2	0.41%	-0.4%
Austria	8.2	245.1	23.3	29.9	133%	37%	90%	-16%	34.0	5.2	0.34%	-0.1%
Finland	5.2	157.4	28.5	30.1	134%	41%	90%	-16%	38.0	4.0	0.22%	-0.8%
Netherlands	16.3	505.6	2.4	31.0	139%	39%	90%	-16%	14.0	6.1	0.32%	-0.5%
Sweden	9.0	287.7	39.8	31.9	143%	46%	100%	-17%	49.0	3.7	0.78%	-0.6%
Denmark	5.4	208.3	17	38.5	172%	35%	90%	-20%	30.0	7.5	0.11%	-0.5%
Ireland	4.1	161.2	3.1	39.2	175%	78%	90%	-20%	16.0	7.4	0.45%	-0.2%
Luxembourg	0.5	29.4	0.9	64.6	289%	74%	100%	-20%	11.0	4.6	0.70%	ND

Source: EC Impact Assessment (EC, 2008g). ND = No Data.

1) Source: PRIMES.

2) Data from Table 37, case 'targets RES+GHG in EU ETS': cost-efficient achievement for whole EU (excluding cobenefits) of targets for renewable energy and GHG emissions in the ETS sector. With redistribution of the targets in the Non- EU ETS according to GDP/cap, redistribution of the auctioning rights, with JI/CDM at a carbon price of 30, and with redistribution of the renewable energy targets together with full GO trade (source: PRIMES/GAINS).

3) Data from Table 38, case 'targets RES+GHG in EU ETS': cost-efficient achievement for whole EU (excluding cobenefits) of targets for renewable energy and GHG emissions in the ETS sector. With auctioning in the EU ETS and no revenue generation in the sectors not covered by the EU ETS, with redistribution auctioning rights in the EU ETS, and with redistribution GHG reduction targets in the sectors not covered by the EU ETS (source: GEMS-E3 Europe).

Table X.2. Increases proposed in the percentage of ETS allowances to be auctioned by Member States for the purpose of EU solidarity and growth

Member State	Increase beyond 90% flat rate	Result (100% = domestic 2005 ETS emissions)
Belgium	10%	100%
Bulgaria	53%	138%
Czech Republic	31%	118%
Estonia	42%	128%
Greece	17%	105%
Spain	13%	102%
Italy	2%	92%
Cyprus	20%	108%
Latvia	56%	140%
Lithuania	46%	131%
Luxembourg	10%	100%
Hungary	28%	115%
Malta	23%	111%
Poland	39%	125%
Portugal	16%	104%
Romania	53%	138%
Slovenia	20%	108%
Slovakia	41%	128%
Sweden	10%	100%

Source: ETS proposal (Annex II), 23 January 2008, COM(2008) 16 final; 2008/0013 (COD) (EC,2008a).
Note: The percentage for the other eight Member States not listed here are those that contributed to the increases listed in this table and have 90% as corresponding resulting percentage (see Figure 4.4).

Annex XI: National caps and allowed CDM/JI under the ETS phase 2

Under the Kyoto Protocol, there are three flexible mechanisms: (1) CDM projects in developing countries; (2) JI projects in other industrialised countries with a GHG emission target; and (3) Emission Trading between countries. In the Kyoto Protocol, sectoral emission trading schemes, such as the European Emission Trading Scheme (ETS) phase 2 (2008-2012), are identified as an implementation of emission trading between countries. Essentially, this means that participating countries agree to use the balance of traded emission units as the total net amount traded with other countries. This net amount ensures that irrespective of a country's actual domestic emissions of the ETS sector, the net total after trading is equal to the ceiling agreed upon in the ETS system:

> National ETS emissions (after trading) = actual domestic emissions of ETS sector + net balance of ETS trading (including CDM/JI units purchased by companies)

For the national total of GHG emissions, calculation of emission compliance to the Kyoto Protocol is based on the national inventory of domestic GHG emissions and sinks reported in the National Inventory Report according to the IPCC guidelines plus the net balance of the use to the three flexible mechanisms. For the use of an ETS system, this implies the following:

> National total emissions (including flexible mechanisms) for Kyoto Protocol = total domestic emissions + C storage ('Kyoto forests') + net balance of ETS trading (including CDM/JI) + net balance of JI traded + amount of CDM units purchased + net balance of other national Emission Trading (if applicable)

Table XI.1 presents the CDM/JI limits per Member State that companies are permitted to use in the second period 2008-2012, and that, according to the Commission proposals, they are allowed to bank for the third period (2013-2020). In addition, the national caps proposed in the second National Allocation Plans and approved by the Commission are also presented in Table XI.1.

Table XI.1. ETS phase 2 (2008-2012): National caps and CDM/JI limits proposed in the second National Allocation Plans and Commission decision. Unit: Mton CO_2-eq.

Member State	2005 verified emissions	Additional emissions in 2008-2012 [1]	Proposed cap 2008-2012	Cap allowed 2008-2012 (% of proposed cap)	Cap 2008-2012 (% of 2005 emissions) [3]	JI/CDM limit 2008-2012 in %
Austria	33.4	0.35	32.8	30.7 (93.6%)	-9.0%	10
Belgium	55.58	5	63.3	58.5 (92.4%)	-3.4%	8.4
Bulgaria	40.6	NA	67.6	42.3 (62.6%)	4.2%	12.55
Cyprus	5.1	NA	7.12	5.48 (77%)	7.5%	10
Czech Republic	82.5	NA	101.9	86.8 (85.2%)	5.2%	10
Denmark	26.5	0	24.5	24.5 (100%)	-7.5%	17.01
Estonia	12.62	0.31	24.38	12.72 (52.2%)	-1.6%	0
Finland	33.1	0.4	39.6	37.6 (94.8%)	12.2%	10
France	131.3	5.1	132.8	132.8 (100%)	-2.6%	13.5
Germany	474	11	482	453.1 (94%)	-6.6%	20
Greece	71.3	NA	75.5	69.1 (91.5%)	-3.1%	9
Hungary	26	1.43	30.7	26.9 (87.6%)	-1.9%	10
Ireland	22.4	NA	22.6	22.3 (98.6%)	-0.4%	10
Italy	225.5	NA	209	195.8 (93.7%)	-13.2%	14.99
Latvia	2.9	NA	7.7	3.43 (44.5%)	18.3%	10
Lithuania	6.6	0.05	16.6	8.8 (53%)	32.3%	20
Luxembourg	2.6	NA	3.95	2.5 (63%)	-3.8%	10
Malta	1.98	NA	2.96	2.1 (71%)	6.1%	Tbd
Netherlands	80.35	4	90.4	85.8 (94.9%)	1.7%	10
Poland	203.1	6.3	284.6	208.5 (73.3%)	-0.4%	10
Portugal	36.4	0.77	35.9	34.8 (96.9%)	-6.4%	10
Romania	70.8	NA	95.7	75.9 (79.3%)	7.2%	10
Slovakia	25.2	1.7	41.3	30.9 (74.8%)	14.9%	7
Slovenia	8.7	NA	8.3	8.3 (100%)	-4.6%	15.76
Spain	182.9	6.7	152.7	152.3 (99.7%)	-19.7%	ca. 20
Sweden	19.3	2	25.2	22.8 (90.5%)	7.0%	10
United Kingdom [2]	242.4	39.5	246.2	246.2 (100%)	-12.7%	8
Total EU-27	**2122.16**	**84.61**	**2325.34**	**2080.93 (89.5%)**	**-5.7% (average)**	**13.4 (average)**

Source: EC (2007b); EEA (2008b) [Table 7.3].

1) Emissions from installations that are included in phase 2 (2008-2012) of the ETS due to an extended scope applied by the Member State. Not included are new installations entering the ETS in sectors already covered in phase 1 (2005-2007).

2) Additional emissions in 2008-20012 include 30 Mton CO_2-eq. which the UK opted to exclude in phase 1 of the ETS and are covered in phase 2.

3) Allowed cap 2008-2012 as percentage of total 2005 emissions of the ETS sector (sum of column 2005 verified emissions and the column additional emissions in 2008-2012).

NA = Not Applicable/Not Available

Tbd = To be determined

EU Energy and Climate Package: consequences for the Netherlands and other Member States

This report presents a description and an initial assessment of the legislative proposals on Energy and Climate Change launched by the European Commission as a policy package on 23 January 2008. This package includes proposals to amend the EU Emissions Trading Directive (ETS), to share the effort of reducing greenhouse gas emissions not covered by the ETS, and to promote renewable energy.

The report assesses the proposals in relation to one another. An initial estimation is presented of the extent to which the Commission's proposals are sufficient to achieve the Netherlands targets for greenhouse gas emission reduction and energy targets set out in the Dutch *Schoon en Zuinig* policy plan (*Clean and Efficient*). Finally, a number of follow-up issues are identified which require further analysis.

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