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ÖSTERREICHISCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG

Assessment of Austrian Contribution toward EU 2020 Target Sharing

Responding to the Energy and Climate Package of the European Commission

Austrian Institute of Economic Research

University of Graz, Wegener Center for Climate and Global Change

Energy Economics Group – Technische Universität Wien, Institut für Elektrische Anlagen und Energiewirtschaft

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Abstract

The overarching implications of the EU 2020 targets for Austria call for a fundamental restructuring of the Austrian energy sector towards increased energy efficiency. Two guiding principles for this restructuring are required in order to be compatible with the targets for greenhouse gas emissions and renewables (RES) expected for Austria: final energy consumption needs to be stabilised at the levels of 2005; renewable energy sources need to be expanded at least by 40 percent.

For the final negotiations on phase 3 of the EU Emissions Trading System we propose contributions on three issues: 1. operational procedures for dealing with carbon leakage and competitiveness in all sectors that provide criteria for allocating free allowances: 2. empowering the carbon market by extending the task of the emissions allowances issuing carbon authority to control the liquidity of the carbon market in view of stabilising the carbon price; 3. designing the auctioning mechanism by considering timing and auctioning as a strategic instrument for enhancing the carbon market and considering unified auctioning with revenues split among EU countries.

Similarly we suggest for the final negotiations on the RES Directive improvements that overcome discrepancies between national RES targets and available resources for implementation. This requires in particular improved cooperation between EU countries for a better mapping of targets and potentials.

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This is document is part of the Synthesis Report ***Assessing Austria in the EU 2020 Target Sharing*** coordinated by Nebojsa Nakicenovic, Vienna University of Technology and IIASA, and Stefan P. Schleicher, University of Graz and Austrian Institute of Economic Research, Vienna.

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1 Executive Summary

The ambitious EU 2020 targets

The EU 20 + 20 targets for greenhouse gas emissions and energy from renewable resources put forward for 2020 will fundamentally change the European economies:

- Never before did the EU set such ambitious policy targets for such a long period.
- These targets will require a profound restructuring of the EU energy system.
- Momentous consequences of these targets can be expected on the rest of the world.

The ambitious energy and climate package presented by the Commission on 23 January 2008 has a twofold motivation: increasing the security of energy supply and combating climate change. These driving forces require a deliberate transition towards a low carbon economy.

The challenge for Austria

The overall 2020 EU targets call for a 20% reduction of greenhouse gases (extended to 30% in case of an international climate policy agreement) compared to 1990 and a share of 20% renewables (from 8.5% currently).

These targets translate into the following challenges for Austria compared to the situation in 2005:

- With the installations subject to the EU Emissions Trading Systems (ETS sector) contributing to the 21% reduction of greenhouse gas emissions.
- With the Non-ETS sector achieving a 16% reduction of greenhouse gas reductions.
- With the renewable energy sources (RES) increasing their share in gross final energy consumption from 23.3% to 34%.

Potential impacts for Austria

Austria is both heavily affected by the Commission energy and climate package and far from a path that moves towards these ambitious policy targets.

- Because of its high energy intensity the ETS sector is exceptionally exposed to carbon costs that impair competitiveness and create incentives for relocation outside of the EU ETS area.
- Current trends of energy use in buildings and transport are still far from the substantial reductions needed for approaching the reduction target for the Non-ETS sector.
- Although Austria ranks fourth among the EU-27 with its comparatively high share of renewables, because of the high increase of energy demand the renewables share is declining, in particular in electricity production.

Scope of this synthesis report

This synthesis report is aimed at making the main implications of the Commission energy and climate package visible and supporting the final negotiation process.

The key findings

The overarching implications of the EU 2020 targets for Austria call for a fundamental restructuring of the Austrian energy sector towards increased energy efficiency.

Two guiding principles for this restructuring are required in order to be compatible with the targets for greenhouse gas emissions and renewables expected for Austria:

- Final energy consumption needs to be stabilised at the levels of 2005.
- Renewable energy sources need to be expanded at least by 40%.

In accordance with these guiding principles we identify three areas of policy actions:

- Supporting domestic policy actions
- Extending the EU Emissions Trading System
- Improving flexibility for renewable energy sources target fulfilment

Supporting domestic policy actions

Because of the contingency of the EU 2020 targets on a fundamental restructuring of the energy system all over Europe, supporting domestic actions deserve the same priority as shaping the final decisions on the policy targets or accompanying EU-wide measures:

- *Advancing energy efficiency*
  by stimulating technological innovations in particular for transport, buildings and high-efficient cogeneration of heat and electricity.
- *Recycling of revenues from auctioning under the EU ETS*
  adds additional leverage to technological change triggered by carbon constraints and thus could create an Austrian Carbon Trust.
- *Additional incentive mechanisms*
  such as domestic emissions allowances.
- *Removal of non-economic barriers*
  as simplified permission processes, infrastructural prerequisites and adequate system integration for distributed generation to allow an accelerated deployment of renewable energy in all Member States.

Extending the EU ETS

For the final negotiations on phase three of the EU Emissions Trading System we propose contributions on three issues:

- *Operational procedures for dealing with carbon leakage and competitiveness in all sectors*
  that provide criteria for allocating free allowances for
  - export competition on Non-ETS markets,
  - import competition from Non-ETS markets,
  - relocation competition for additional production capacities,

  and integrate benchmarking procedures.
- *Empowering the carbon market*
  by extending the task of the emissions allowances issuing carbon authority to control the liquidity of the carbon market in view of stabilising the carbon price.
- *Designing the auctioning mechanism*
  by considering timing and auctioning as a strategic instrument for enhancing the carbon market and considering unified auctioning with revenues split among Member States.

Improving flexibility for RES target fulfilment

Similarly we suggest for the final negotiations on the RES Directive improvements that overcome discrepancies between national RES targets and available resources for implementation.

This requires in particular improved cooperation between Member States for a better mapping of targets and potentials. Of relevance in this respect are:

- *A transparent EU-wide platform*
  to support cooperative actions between Member States.
- *Guidance on simplified common rules for joint projects*
  to lower transaction costs.
- *A predetermined mechanism for target compliance*
  to stimulate RES deployment all over Europe.
- *The establishment of minimum design criteria for RES support*
  to assure efficient and effective RES deployment in all Member States.

2 The Commission energy and climate package of 23 January 2008

2.1 The overall design

Ambitious 2020 targets:
- minus 20% GHG
- 20% share of RES

The European Council committed itself in 2007 to an ambitious reduction of greenhouse gas (GHG) emissions and an increasing share of renewable energy sources (RES) in Europe.

The unilateral target for the EU27 is a reduction of 20% GHG emissions until 2020 compared to 1990. In case of an international climate policy agreement this target will be extended to a 30% reduction.

For renewable energy an increase of the share of RES in overall EU energy consumption from 8.5% today to 20% by 2020 was agreed. Moreover, the plan as endorsed by the European Heads of State in March 2007 has also foreseen to achieve at least a 10% biofuels component in vehicle fuel by 2020.

The motivation:
- energy security
- climate change
- restructuring

The motivation for this energy and climate package is threefold:

- *Energy security*
  In a business as usual development of energy demand the EU is facing a constantly increasing import share in energy resources making the EU economy vulnerable to interruptions in international energy markets.
- *Climate change*
  The irreversibility of climate change motivates the EU to take action in order to limit the risk of a temperature increase to less than 2 degrees by the end of this century (compared to pre-industrial levels).
- *Restructuring the economy towards a low carbon development path*
  The implementation of the energy and climate package is supposed to set incentives for innovative technologies in all sectors of the economy targeted at less energy demand and less fossil fuel use.

The key documents:

- Effort Sharing
- EU ETS
- RES

On 23 January 2008 the Commission published a climate and energy package comprising a number of policy proposals in order to reach the ambitious EU-wide targets.

The key documents of this package are:

- *A proposal for effort sharing among EU Member States,*
  COM(2008) 17, Proposal for a Decision of the European Parliament and of the Council on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020.
- *A proposal to revise the EU Emissions Trading System*,
  COM(2008) 16, Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community.

- *A proposal to promote renewable energy*, (COM(2008) 19, Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.

These key documents are accompanied by proposals on carbon capture and storage and guidelines for environmental state aid as well as by an impact assessment of the proposed policy package.

A commitment for leadership

This energy and climate package of the EC underlines the leadership role of the EU in combating climate change. Its long-term targets set the framework for a structural change of the EU economy with the most pronounced effects on the energy system.

The ambitious targets for reducing GHG emissions and increasing the share of renewables in final energy consumption can only be met if Member States are successful in improving energy efficiency substantially.

This in turn requires technological and behavioural changes in all economic sectors. The EU expects from these transformations sound economic development in the long term as well as securing and improving the competitiveness of Europe.

The aim is to bring the proposals into binding regulation until the end of 2008.

2.2 The GHG target

2.2.1 The overall GHG target for 2020

Commission proposals for GHG reduction target and reform of EU ETS

The European Council committed itself in 2007 to an ambitious reduction of GHG emissions.

For the design of the GHG policy up to 2020 the Commission presented in the energy and climate package a Proposal for a Decision of the European Parliament on the effort sharing (COM(2008) 17) and a Proposal for a Directive of the European Parliament on extending the EU ETS.

Both proposals outline a strategy how by 2020 a GHG reduction of 20% or even 30% compared to 1990 could be achieved.

2020 emissions reduction targets compared to 1990

The unilateral target for the EU-27 is a reduction of 20% until 2020 compared to 1990. In case of an international climate policy agreement this target will be extended to a 30% reduction.

The corresponding emissions to the 20% reduction target are listed in Table 1.

2020 emissions reduction targets compared to 2005

The overall EU unilateral target of a 20% reduction of GHG emissions until 2020 refers to the year 1990 and is equivalent to a reduction of 14% compared to GHG emissions in 2005. In case of an international climate policy agreement, the EU target becomes more stringent with a 30% reduction compared to 1990 emissions levels, corresponding to a GHG emissions reduction of 24% compared to 2005.

Table 1: Overall EU GHG target for 2020

	1990 Mt CO_2e	2020 Mt CO_2e	2020/1990 %-Change
EU Total	**5,616.5**	**4,493.2**	**-20.0%**

Source: European Commission and own calculations

2.2.2 Split of GHG target between Non-ETS and ETS sectors

ETS and Non-ETS reduction targets

The overall GHG reduction target is divided between the sectors subject to the European Emissions Trading Scheme, the ETS sectors, and the remaining Non-ETS sectors. This split also reflects shared responsibilities.

Approximately 40% of EU27 GHG emissions in 2005 originated from the ETS sectors, whereas the Non-ETS sectors were responsible for approximately 60%.

According to the Commission proposal ETS sectors are to contribute 60% toward the overall GHG reduction target while Member States have the responsibility for the remaining 40% share in the Non-ETS sectors.

Thus, for the ETS-sector the Commission proposes an overall reduction of 21% compared to 2005. Thereby, a single EU wide cap is proposed for the ETS sector from 2013 onwards contrary to former trading periods where the caps were set at the national level.

For the remaining Non-ETS sectors this means an overall reduction of 14% compared to 2005.

Table 2 indicates what the split of the overall target means for distribution of emissions allowances for the ETS and Non-ETS sector. In addition small differences in relation to the numbers in the Commission proposal become visible because of updates in the databases.

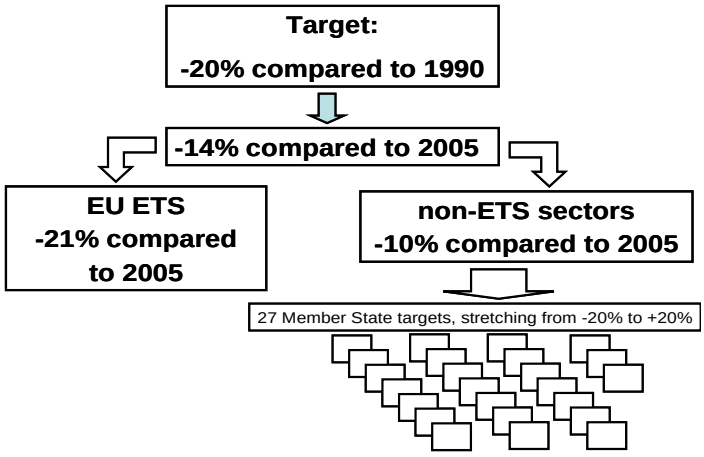
Figure 1 illustrates the split of the EU overall target between the ETS and Non-ETS sectors.

Table 2: ETS and Non-ETS sector targets for 2020

	2005 Mt CO_2e	2020 Mt CO_2e	2020/2005 %-Change	EC Proposal **2020/2005** %-Change
EU Total	**5,182.3**	**4,493.2**	**-13.3%**	**-14%**
EU ETS	2,119.3	1,713.8	-19.1%	-21%
EU Non-ETS	3,063.0	2,779.5	-9.3%	-10%

Source: European Commission and own calculations

Figure 1: Split of the overall GHG target to ETS and Non-ETS sectors



Source: European Commission

2.2.3 National targets for Non-ETS sectors

Non-ETS sector targets differ considerably among Member States for the overall 10 % reduction at EU-27 level

At EU-27 level a 10% reduction of GHG emissions compared to 2005 levels is proposed by the Commission for the Non-ETS sectors. The corresponding individual national targets differ considerably among Member States and range from a reduction of 20% (compared to 2005) for Denmark, Ireland and Luxembourg to an increase of 20% for Bulgaria The differences in the relative emission targets take into account income levels per head and are intended to enable higher growth in lower-income countries.

Table 3 lists the reduction targets referring to the Non-ETS sectors for all Member States.

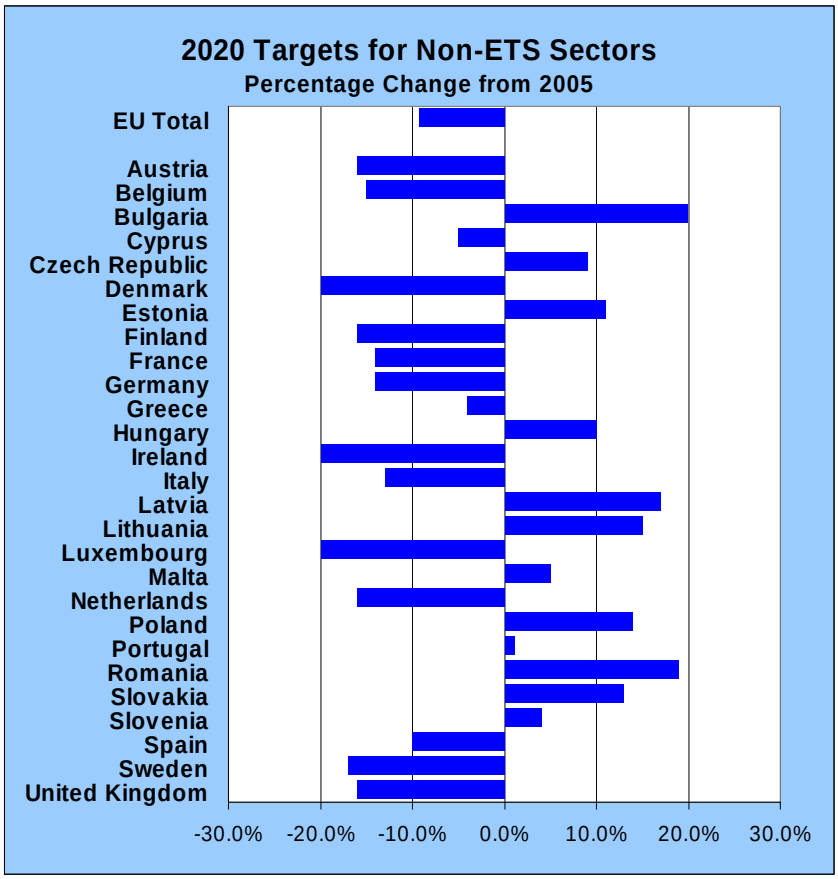
Responsibilities of Member States

The responsibility to achieve the proposed targets in the Non-ETS sectors lies with the individual Member States. For Austria the Commission proposal states a reduction requirement of 16% resulting in allowed emissions for the Non-ETS sectors of 49.8 Mill. t CO_2e in 2020.

The emission path in the Non-ETS sectors (as well as the ETS-sectors) is assumed to follow a linear path in order to reach the proposed targets in 2020.

Member states are allowed to use Clean Development Mechanism (CDM) credits up to a limit of 3% of 2005 emissions of the Non-ETS sectors. Emissions data and the use of credits must be reported each year.

Figure 2: Non-ETS sectors target for 2020



Source: European Commission and own calculations

Table 3: Non-ETS sectors target for 2020

	2005	2020	
	Mt CO_2e	Mt CO_2e	%-Change
EU Total	**3,063.0**	**2,779.5**	**-9.3%**
Austria	59.9	50.3	-16.0%
Belgium	87.0	73.9	-15.0%
Bulgaria	29.9	35.9	20.0%
Cyprus	4.8	4.6	-5.0%
Czech Republic	63.2	68.9	9.0%
Denmark	37.8	30.2	-20.0%
Estonia	6.7	7.4	11.0%
Finland	35.9	30.2	-16.0%
France	429.1	369.0	-14.0%
Germany	530.0	455.8	-14.0%
Greece	62.6	60.1	-4.0%
Hungary	54.0	59.4	10.0%
Ireland	48.0	38.4	-20.0%
Italy	352.0	306.2	-13.0%
Latvia	8.3	9.7	17.0%
Lithuania	16.1	18.5	15.0%
Luxembourg	10.7	8.5	-20.0%
Malta	1.5	1.5	5.0%
Netherlands	131.4	110.4	-16.0%
Poland	199.7	227.7	14.0%
Portugal	50.8	51.3	1.0%
Romania	81.2	96.6	19.0%
Slovakia	24.1	27.2	13.0%
Slovenia	11.7	12.2	4.0%
Spain	258.0	232.2	-10.0%
Sweden	47.5	39.4	-17.0%
United Kingdom	421.3	353.9	-16.0%

Source: European Commission and own calculations

2.2.4 The overall ETS emissions reduction target

A key element of the Commission energy and climate package is the proposal for a revision of the EU Emission Trading System that has been in operation since January 2005. This revision accounts for lessons learnt in the first trading phase 2005-2007.

21% reductions in 2020 compared to 2005

The overall emission reduction target for the ETS sectors amounts to 21% in 2020 compared to 2005 emissions in the trading sector. A major change compared to the first trading period 2005-2007 and the second trading period 2008-2012 is the proposed EU-wide cap from 2013 on instead of national caps.

Emission caps for the third trading period 2013-2020 are calculated by starting from average allocated allowances in the period 2008-2012. From this amount 1.74% is subtracted, determining the available allowances for

2013. The reduction factor of 1.74% is applied each year until 2020 ensuring a linearly decreasing number of available allowances each year and resulting in a 21% reduction of emissions equalling approximately 1,715 Mill t CO_2e in 2020 in the ETS sector compared to 2.120 Mill t in 2005.

For new entrants a reserve of 5% of the yearly amount of allowances is provided.

Emissions cap for 2013

Thus the number of allowances to be distributed e.g. in the year 2013 is calculated by

- starting with the average of allocated allowances in the period 2008-2012,
- subtracting 1.74% (linear reduction factor) and
- subtracting 5% reserve for new entrants,
- which yields the number of allowances to be distributed in 2013.

Adjustments to this number of allowances available in 2013 are to be made for installations that were not included in the trading system in the first and/or second trading but will be covered from 2013 on. These adjustments would also need to be made for new sectors and new gases to be included in the trading system.

ETS emissions path for phase 3

Table 4 indicates the adjustment path of the overall ETS emissions cap over the third trading period.

Table 4: ETS cap 2012-2030

Year	ETS Cap Mt CO_2e
2008-2012	2,011
2013	1,970
2014	1,931
2015	1,892
2016	1,854
2017	1,816
2018	1,780
2019	1,744
2020	1,714

Source: European Commission and own calculations

Allocation and use of allowances

By 30 June 2010 the quantity of allowances for 2013 shall be published based on the Commission decisions on the national allocation plans for the second trading period 2008-2012. The installations will receive the allowances on a yearly basis by the end of February for the respective year. Installations have to surrender allowances for emissions of a certain year until 30 April of the following year.

In this respect there are no changes to previous trading periods. Non-used allowances are valid throughout the trading period and may also be banked for future trading periods. Likewise may non-used allowances of the second trading period be used in the third period from 2013 on.

2.2.5 Allocation of ETS allowances to sectors

The Directive proposal stresses that auctioning should be the dominating allocation method. Sectoral differences in particular with regards to the potential of carbon leakage are taken into account, however, by allocating to them free allowances.

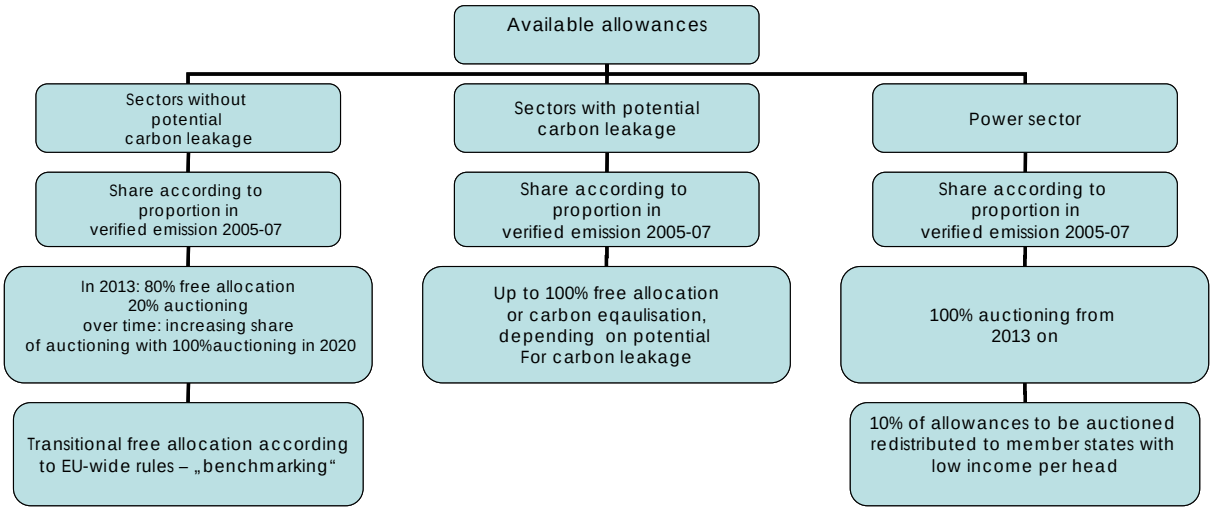
The current Directive proposal differentiates between three groups of sectors:

- *Power sector*
  with full auctioning from the beginning.
- *"Normal" sectors*
  without potential carbon leakage and 80% free allocation at the beginning reduced to zero in 2020.
- *"Exposed" sectors"*
  with potential carbon leakage and up to 100% free allocation.

The difference in allocation methods between sectors mirrors competitiveness concerns of the Commission as well as well as preventing unwanted GHG shifts to countries outside the emission trading system.

Figure 3 depicts the proposed allocation procedure to these sectors.

Figure 3: ETS sector allocations



Source: Based on Commission proposal

Carbon leakage and competitiveness

The analysis and identification of sectors or sub-sectors prone to carbon leakage or adverse competitiveness effects should be completed by 30 June 2011. Those sectors or sub-sectors may receive up to 100% free

allowances or would be prevented from negative competitiveness effects through a carbon equalisation system. This carbon equalization system referred to in the Directive proposal however is not yet specified.

The underlying measure for competitiveness disadvantages is seen in an increase in costs due to allowance prices that cannot be passed on in prices and that will lead to a significant loss in market shares. Carbon leakage will be discussed in more detail in the subsequent section 3.2.

No free allocations for power and heat

The power sector is the only sector subject to full auctioning from 2013 on as it is assumed that any cost increases due to emissions trading can be passed on in prices. Exceptions are foreseen for electricity producers that also produce heat with efficient cogeneration technologies.

Transitional free allocations for other sectors

Transitional free allocation as well as free allocation for sectors or subsectors with the risk of adverse competitiveness effects should follow community-wide harmonized rules. This should guarantee a level playing field for all installations within the ETS.

2.2.6 ETS auctioning procedures

Auctioning rules

Although the Directive proposal does not specify the rules for the auctioning procedure it refers to a community regulation to be adopted by 31 December 2010 on timing, administration and other aspects of auctioning.

Auctioning revenues

The Directive proposal states that auctioning revenues will accrue to Member States and that at least 20% shall be used for measures to reduce GHG emissions, adaptation measures in developing and least developed countries or for social aspects for low and middle income households.

Redistribution of auctioning rights

90% of the total quantity of allowances to be auctioned is going to be distributed among the Member States according to their share in verified emissions of the EU ETS in 2005. The remaining 10% of auctioning rights are redistributed to consider solidarity and growth: Member States with an average level of GDP per capita of more than 120% of the EU average will contribute to this distribution, when direct costs of the overall energy and climate package in these countries do not exceed 0.7% of GDP.

Table 5 informs how Member States are affected by the redistribution of the auctioning rights.

Table 5: Redistribution of auctioning rights

	Auctioning rights	
	redistributed share of 90% of 2005 emissions	**effective share** of 2005 emissions
Austria	0%	90%
Belgium	10%	99%
Bulgaria	53%	138%
Cyprus	20%	108%
Czech Republic	31%	118%
Denmark	0%	90%
Estonia	42%	128%
Finland	0%	90%
France	0%	90%
Germany	0%	90%
Greece	17%	105%
Hungary	28%	115%
Ireland	0%	90%
Italy	2%	92%
Latvia	56%	140%
Lithuania	46%	131%
Luxembourg	10%	99%
Malta	23%	111%
Netherlands	0%	90%
Poland	39%	125%
Portugal	16%	104%
Romania	53%	138%
Slovakia	41%	127%
Slovenia	20%	108%
Spain	13%	102%
Sweden	10%	99%
United Kingdom	0%	90%

Source: European Commission and own calculations

Small installations

Experience from the first trading period shows that a large number of small installations is included in the ETS that account only for a small share on total GHG emissions. Member States are allowed to exclude small installations from the ETS if measures are in place to monitor those emissions and to ensure that equivalent emissions reductions will take place.

An installation is considered small if it has a rated thermal input of less than 25 MW and emissions of less than 10.000 t of CO_2e. On the one hand the exclusion of small installations could reduce transaction costs from trading for these installations. On the other hand Member States would be responsible for regulatory measures that would result in emission reductions in line with the emission path of the EU ETS.

2.3 The RES target

Commission proposal for a RES Directive

To achieve the renewable energy policy goals, the Commission has proposed a Directive on the promotion of the use of energy from *renewable sources (RES)* (COM(2008) 19) as integral part of the climate and energy package of 23 January 2008. This aims to establish binding national renewable energy targets that result in an overall EU-wide target of a 20% RES share in energy consumption in 2020 and a binding 10% minimum target for RES in transport to be achieved by each Member State.

Target definition and calculation of national targets

The overall target of achieving a share of 20% RES by 2020 refers to "final" energy consumption, which in contrast to the commonly applied statistical definition includes electricity and heat distribution and transmission losses as well as own consumption of the energy branch.

Following the Directive proposal the EU target is allocated to differentiated national targets based on a flat rate approach (same additional share for each country) modulated by the Member State's GDP.

For an explanation and discussion of both we refer to the subsequent sections 2.3.1 (target definition) and 2.3.2 (calculation of national targets), respectively.

Flexibility for Member States to implement the RES Directive

All three energy sectors are implicated by RES: electricity, heating & cooling and transport. The decision on the mix of contributions from these sectors to reach their binding national targets is left to the Member States.

Additionally, sufficient flexibility is intended to be ensured for Member States to implement the Directive in the way that suits their particular national circumstances best. Consequently, this comprises that Member States are free to decide on appropriate domestic RES support, choosing the means that best suits their national circumstances. Moreover, as national targets are defined in a way that does not explicitly reflect the national resource availability, the proposal aims to provide an option for Member States of achieving their targets by supporting the development of renewable energy in other Member States as well as third countries. The proposed flexibility measures to better map targets and potentials have been heavily debated and the current status of this discussion is summarized in section 2.3.3.

10% share of biofuel (renewable transport)

According to the Commission proposal, the minimum 10% share of biofuels or, more precisely, renewable energies in transport is applicable in all Member States. In order to tackle the oil dependence of the transport sector, which is one of the most serious issues affecting security of energy supply that the EU faces, an accelerated biofuel deployment is seen as appropriate tool.

The 10% target for renewable energies in transport has been set at the same level for each Member State in order to ensure consistency in transport fuel specifications and availability. It is expected that Member States which do not have the relevant resources to produce biofuels will be able to obtain renewable transport fuels from elsewhere. While it would technically be possible for the European Union to meet its biofuel needs solely from domestic production, it is both likely and desirable that these

needs will in fact be met through a combination of domestic EU production and imports from third countries.

Concerns have been raised about whether biofuel production is sustainable. The Directive therefore defines environmental sustainability criteria to ensure that biofuels that are to count towards the European targets are sustainable and that they are not in conflict with our overall environmental goals. This means that accounted biofuels must achieve at least a minimum level of GHG savings and respect a number of requirements related to biodiversity. This aims to prevent the use of land with high biodiversity value, such as natural forests and protected areas, being used for the production of raw materials for biofuels.

The negotiation process of the RES Directive is overshadowed by a debate whether this 10% target is too ambitious or not. Criticism was raised on the (non-)sustainability of an accelerated biofuel deployment taking into accounted observable or expectable side-effects (e.g. increasing food prices, land use changes and correspondingly low or even negative GHG savings for biofuels).

Removal of barriers for an accelerated RES deployment

The RES Directive also aims to remove unnecessary barriers for an accelerated RES deployment – for example by simplifying administrative procedures, by improving grid access and by fostering the development of infrastructural prerequisites for new RES projects.

2.3.1 Target definition

Target definition used

Target definition – 20% RES in terms of (gross) final energy

The RES Directive establishes a novel definition with regard to the overall RES target. The targeted share of 20% RES by 2020 refers to “gross final” energy consumption, which in contrast to the commonly applied statistical definition of final energy includes for electricity and heat distribution and transmission losses as well as own consumption of the energy branch. As such, the definition is closer to the concept of “secondary” energy.

The exact formula for the overall national shares for renewable energy is defined as follows:

$$\frac{\textit{Gross production of RES electricity} + \textit{RES heat} + \textit{RES transport}}{\textit{Gross final energy consumption}}$$

The national RES targets using the above way of calculation would also include any imported renewable energy, which would be considered equivalent to domestic production when accredited e.g. by a Guarantee of Origin (GO).

Normalisation of hydropower generation

In order to avoid distortions due to hydrology variations, the contribution of hydropower to RES has to be normalised, whereby the normalised hydro production is calculated on the basis of the installed capacity (excluding capacity for pumping) and the average load factor over the last 15 years.

Calculation of the Austrian RES target

Table 6 indicates the steps needed for calculating the RES targets and demonstrates how this target is obtained for Austria.

Table 6: Calculation of the RES target for Austria

Austria	2005 ktoe	PJ	TWh
Renewables Heat Target			
Industry			
Total Final Energy Consumption in Industry	**8,825**	**369**	**103**
Electricity Consumption in Industry	*2,082*	*87*	*24*
Heat Consumption in Industry	*6,743*	*282*	*78*
Final Energy Consumption of RE in industry	*701*	*29*	*8*
Share of RE for Heat in Industry	*10.4%*	*10.4%*	*10.4%*
Other Sectors			
Total Final Energy Consumption in Households, Serv	**10,489**	**439**	**122**
Electricity Consumption in Households, Services, etc.	*2,536*	*106*	*29*
Heat Consumption in Households, Services, etc.	*7,953*	*333*	*92*
Final Energy Consumption of RE in Households, Service	*1,982*	*83*	*23*
Share of RE for Heating in Households, Services, etc.	*24.9%*	*24.9%*	*24.9%*
Industry and Other Sectors			
Total Final Energy Consumption	**19,314**	**809**	**225**
Total Electricity Consumption	*4,618*	*193*	*54*
Heat Consumption in Industry and Other Sectors	*14,696*	*615*	*171*
Total RE input for heat in industry and Other Sectors	*2,683*	*112*	*31*
Derived heat consumption of RE origin (CHP and Heat pl	*321*	*13*	*4*
Share of renewables to total final heat needs	*20.4%*	*20.4%*	*20.4%*
Renewables Electricity Target			
Hydro installed capacity in MW	11,811	11,811	11,811
Hydro installed capacity excluding pumping in MW	8,231	8,231	8,231
Actual hydro generation (excl. pumping)	3,085	129	36
Normalised hydro generation (excluding pumping)	3,190	134	37
Total gross electricity consumption	5,880	246	68
Electricity generation from RE with actual hydro generatic	3,403	142	40
Electricity generation from RE with normalised hydro gen	3,509	147	41
Electricity generation from RE without hydro generation	318	13	4
RE-e to total gross electricity consumption	**57.9%**	**57.9%**	**57.9%**
RE-e with normalised hydro (15 year average load fac	**59.7%**	**59.7%**	**59.7%**
Biofuels Target			
Total final consumption of petrol and diesel for transport	6,995	293	81
Consumption of biofuels for transport	85	4	1
Share of biofuels in petrol and diesel consumption fo	**1.2%**	**1.2%**	**1.2%**
Overall Target			
Total Final Energy Consumption	**27,308**	**1,143**	**318**
Distribution losses for electricity	295	12	3
Distribution losses for heat	110	5	1
Consumption of electricity in the electricity/heat generatio	307	13	4
Consumption of heat in the electricity/heat generation se	0	0	0
RE Heat	3,004	126	35
RE Electricity actual hydro	3,403	142	40
RE Electricity normalized hydro	3,509	147	41
RE Transport	85	4	1
RE with actual hydro	**6,492**	**272**	**76**
RE with normalized hydro	**6,598**	**276**	**77**
Excluding Losses and Own Consumption			
Share of RE to Final Energy Consumption	**23.8%**	**23.8%**	**23.8%**
Share of RE to FEC with normalised for hydro	**24.2%**	**24.2%**	**24.2%**
Including Losses and Own Consumption			
Share of RE to Final Energy Consumption	**23.2%**	**23.2%**	**23.2%**
Share of RE to FEC with normalised for hydro	**23.5%**	**23.5%**	**23.5%**

Source: Eurostat and own calculations

Target definition assessed

Assessed options for target definition

As stated in the Annex to the Impact Assessment (SEC(2008) 85, Vol. II) of the energy and climate package, besides the selected approach several alternative options for target accounting have been investigated. The assessed options comprise:

- *Primary energy consumption according to the Eurostat method:*
  A RES target could be defined in terms of primary energy following the Eurostat method. In general, primary energy is defined as the first commodity or raw material for which multiple energy uses are practical. Thus, primary energy measures energy inputs to conversion processes such as electricity generation. According to this statistical accounting approach for non-thermal renewable energy sources such as wind energy, hydropower or photovoltaic power the arbitrary assumption is made that the energy input is equal to the energy output, whilst in case of nuclear power a hypothetical conversion efficiency of 33% is preconditioned. The current 12% target for the share of renewable energy in 2010 is based on this definition.
- *Primary energy consumption following the substitution principle:*
  Under the substitution method, non-thermal electricity (hydro, wind, tide/wave, photovoltaic) is valued in terms of the fuel input required by a hypothetical conventional thermal power plant. The other energy sources are valued in the same way as in the Eurostat method.
- *Final energy consumption:*
  In general, final energy consumption is defined as the energy commodities delivered to final consumers for energy purposes. Obviously, it is lower than primary energy because it is measured after "losses" in producing derived energy commodities (transformation losses in heat and power stations); but as gross final energy consumption, it is measured before losses in transmission and distribution and includes self-consumption of the electricity and heat
  ndustry.
  Directive 2001/77/EC defines national objectives for the RES share in electricity consumption in 2010. These are defined as the national production/import of electricity from renewable energy sources divided by the gross national electricity consumption (i.e. the final consumption before transmission and distribution losses and the self-consumption of the energy sector).

Concluding remarks

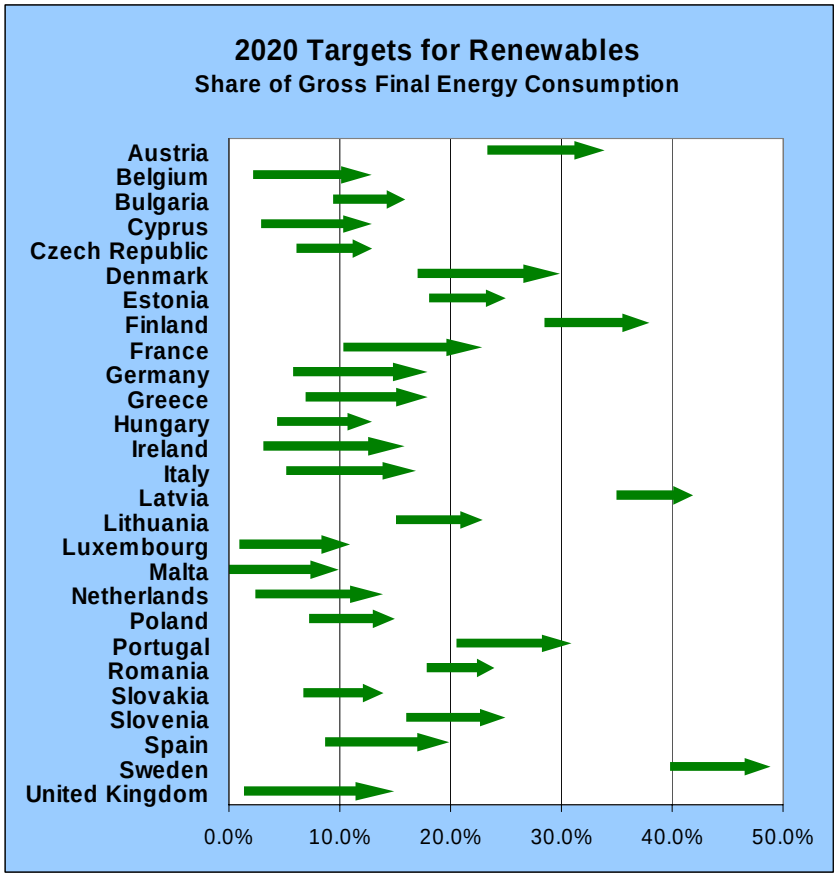
Accounting based on (gross) final energy consumption as preferable option

The conclusions on the assessment of different target accounting approaches as drawn in the Annex to the Impact Assessment (SEC(2008) 85, Vol. II) offer a sound depiction: Summing up, a pure final energy consumption method overcomes the main disadvantages of accounting variants based on primary energy consumption, where the Eurostat method would lead to a discrimination between different types of renewable energy (i.e. biomass would account more than wind, solar or hydro) and cause an increase of the weighting of thermal and nuclear energy, whilst the substitution method puts reliance on a hypothetical reference case.

Additionally, with the proposed adapted definition of final energy, the main

disadvantage of a pure definition based on final energy consumption – i.e. the fact that energy efficiency improvements in energy transformation would not be taken into account – is overcome, and consistency is maintained with the accounting methods used under existing legislation (Directives 2001/77 and 2003/30).

Figure 4: RES targets for 2020 compared to 2005



Source: Based on European Commission (COM(2008) 19)

2.3.2 Calculation of national RES targets

The Commission faced a tough challenge when drafting the proposed RES Directive in early 2008 by ensuring efficient use of the RES resources available across Europe; and by allocating the burden in a fair manner across Member States.

Applied calculation

The applied calculation of national RES targets

The Commission decided to put forward a simple five-step approach for the latter part:

- The share of renewable energy in 2005, forming the base year for all calculations in the package, is modulated to reflect national starting points and efforts already made by Member States achieving an in-

crease of above 2% between 2001 and 2005 (Following this definition, early actions were acknowledged by one third of the overall achieved progress for several Member States, namely the Czech Republic, Denmark, Estonia, Romania and Sweden).

- 5.5% is added to the modulated 2005 share of renewable energy for each Member State.
- The remaining effort (i.e. 0.16 toe for each person in the EU) is weighted by a GDP/capita index to reflect different levels of economic wealth across Member States, then multiplied by each Member State's population.
- These two elements are added together to derive the full renewable energy share of total final energy consumption in 2020.
- Lastly, the targets were capped to ensure that no Member State has a renewable energy share of 50% or more and rounded down from half a percentage point. (The introduction of the 50% cap affected solely Sweden, which otherwise would have been facing a target of 50% instead of 49%).

The resulting RES targets are listed in Table 7 which offers also a comparison with current RES shares (as of 2005). Additionally, Figure 4 offers a graphical illustration of the required increase of RES deployment.

Such an approach of target allocation does not reflect the resource availability of the countries and therefore does not allow for a least cost exploitation of the European RES potentials. Therefore several flexibility measures to better map targets and potentials have been heavily discussed. The subsequent section aims to summarize this debate, whilst chapter 4 of this report offers a concise assessment of the resulting key options.

Assessed options

Assessed options for national target allocation

In 2007 the Council of the European Union requested that the national RES targets should be set "with a view to sharing efforts and benefits fairly and equitably among all Member States, taking into account different national circumstances, starting points and potentials".

According to the Annex to the Impact Assessment (SEC(2008) 85, Vol. II) of the energy and climate package two options for the national allocation of the overall target of 20% RES by 2020 have been assessed: The selected flat-rate/GDP approach and, alternatively, a sharing on the basis of Member States' national resource potential and the corresponding cost.

In general, it was observed that a setting of national targets based on resource potential leads to lower costs, whilst the approach based on a flat rate/GDP weighting could cause a fairer distribution of the costs, and, hence, appeared as the more feasible approach. Thus, for mitigating the higher costs of the flat rate/GDP approach flexibility mechanisms for RES target fulfilment would be required to stimulate cooperation between Member States.

Table 7: RES target for 2020

	Share of RES in Gross Final Consumption of energy	
	Actual 2005	Target 2020
Austria	23.3%	34%
Belgium	2.2%	13%
Bulgaria	9.4%	16%
Cyprus	2.9%	13%
Czech Republic	6.1%	13%
Denmark	17.0%	30%
Estonia	18.0%	25%
Finland	28.5%	38%
France	10.3%	23%
Germany	5.8%	18%
Greece	6.9%	18%
Hungary	4.3%	13%
Ireland	3.1%	16%
Italy	5.2%	17%
Latvia	34.9%	42%
Lithuania	15.0%	23%
Luxembourg	0.9%	11%
Malta	0.0%	10%
Netherlands	2.4%	14%
Poland	7.2%	15%
Portugal	20.5%	31%
Romania	17.8%	24%
Slovakia	6.7%	14%
Slovenia	16.0%	25%
Spain	8.7%	20%
Sweden	39.8%	49%
United Kingdom	1.3%	15%

Source: European Commission (COM(2008) 19)

Concluding remarks

– A challenging goal for Austria which puts emphasis also on energy efficiency

As illustrated in Table 7, Austria faces a RES target of 34% for 2020, which corresponds to an increase by 11 percentage points compared to the 2005 RES share of 23% which is in line with that of other Member States. Obviously, strong efforts are needed to achieve this ambitious target. This refers to both the supply side – i.e. a stable policy framework that defines effective and efficient RES support to achieve the accelerated RES deployment – and the demand side – i.e. the central role of energy efficiency to slow down or even inverse in the long term the past trend of growing energy demand.

The importance of an effective energy efficiency policy is especially emphasized also by Austria's high current RES share: The historic record has shown a rapid decline of the RES share on Austria's electricity demand, although deployment in absolute terms increased in recent years.

This was caused by a continuous demand growth in recent years. Consequently, if this trend would continue, a national fulfilment of Austria's RES target for 2020 would require major efforts to be taken and possibly go beyond practical realisation constraints.

As discussed in (Nakicenovic, Schleicher et al., 2007) Austria's realisable RES potential for 2020 is in range of 437 to 513 PJ, compared to 311 PJ RES as of today. These figures as expressed in terms of primary energy are derived from a comparison of eight different studies assessing in detail Austria's renewable resources, whereby the lower value appears more likely to be realised considering current economic and institutional constraints. Consequently, this illustrates that an increase by about half of current RES exploitation would allow for meeting Austria's 2020 RES target only if also energy demand would be stabilised.

2.3.3 Discussion on flexibility mechanism for RES target fulfilment

The Commission proposal: Trade between Member States and private parties

In principle, the proposed RES directive would allow for two approaches, aiming simultaneously to achieve both an efficient use of resources and a fair burden-sharing. The Directive proposal intends that Member States can:

- trade their surplus or deficit of renewable generation at a government level; and/or
- allow market participants to use a certain share of renewables, but can also give market participants the flexibility to trade with other Member States (and it is made explicit that a virtual trade may take place independently of physical trade of the produced energy).

The basic unit defined by the proposed directive is a Guarantee of Origin (GO). This unit would be generated for every MWh of electricity and heat produced from a renewable generator, whereby the inclusion of heating (and cooling) into the GO-scheme is limited to plants with a capacity of at least 5 MW_{th}.

The proposed two main approaches available for dealing with these GOs as sketched above are:

- *Trade between Member States*
  To enable governments to trade with each other, they first have to be the 'owner' of the tradable value of the renewable energy delivered within their country. This is ensured by Article 8(1)(a) of the proposed Directive, which requires that the "guarantee of origin … shall be submitted for cancellation" in the Member State where it "receives support in the form of feed-in tariff payments, premium payments, tax reductions or payments resulting from calls for tenders".
- *Trade between private parties*
  The proposed Directive also offers a framework which would enable private parties to trade at installation level. According to its Article 8(1)(b), GOs "shall be submitted for cancellation … [in the Member State where it] … is taken into account for the purposes of assessing an entity's compliance with a renewable energy obligation". Thus, an RES producer could produce renewable energy in one Member State and transfer the GO to a second Member State, provided that the installation became operational after the Directive had entered into force (Article 9(3)).

Concern with respect to trade between private parties: Undermining domestic RES support

In prior to the release of the RES Directive proposal Member States have voiced concern that domestic policies designed to support RES could be undermined by the possibility that private parties could trade such GOs at the project level (see e.g. (Johnson et al., 2008)). For example, most feed-in tariff systems offer funding which is differentiated according to technology and sometimes also according to the resource availability at a specific site. On account of this lower-cost RES technology options or RES plants with better available resources would receive less support under their domestic scheme. The investors might instead avoid all domestic support schemes and directly sell the GOs in another Member State that offers a higher price. This possibility would undermine the ability of Member States to implement technology and resource-differentiated RES support schemes, which are intended to support a technology portfolio and avoid

high(er) consumer costs.

"Prior authorisation" for the transfer of GOs to insulate domestic RES support

As briefly argued in (Johnson et al., 2008), to address these concerns, under the proposed Directive "Member States may provide for a system of prior authorisation of the transfer of guarantees of origin to persons in other Member States if [otherwise] it is likely to impair their ability to comply with [their renewable target or the] indicative trajectory" (Article 9(2)). A further justification for the imposition by a Member State of such prior authorisation for imports and exports of GOs is "if [otherwise] it is likely to impair their ability to ensure a secure and balanced energy supply … [or] the achievement of the environmental objectives underlying their support scheme" (Article 9(2)).

Consequently, the proposed Directive would allow Member States to implement and insulate their domestic RES support scheme, and instead to pursue the trading of GOs at the government level. However, it is also clear that the proposals would require Member States to justify exactly why and how far such 'insulation' of their domestic scheme was required, on the basis of the specific criteria laid down in Article 9(2). Thus, it remains an open question whether the measures given in Article 9(2) are sufficient effectively to protect the domestic support system against private trade of GOs.

Joint proposal by Germany, Poland and the United Kingdom on an alternative renewable flexibility mechanism as accepted basis for further negotiations

Since the release of the RES Directive proposal the debate on potential unintended consequences of the proposed flexibility regime based on Guarantee of Origin trading continued. Concerns as raised by Member States in prior to the release and discussed above were not sufficiently allayed with the Directive proposal. As stated in the explanatory note for the Germany/Poland/ UK (DE/PL/UK, 2008b) flexibility proposal these concerns comprise:

- Legal robustness of the 'prior-authorisation' clause with a risk that Member States may not be able to retain control of the trade in GOs, which may consequently undermine the integrity of national support systems.
- Uncontrolled flow of GOs from one Member State to another might undermine its effort to fulfil its national RES target.
- The administrative costs of the Guarantee of Origin scheme.
- Guarantee of Origins would have three distinct functions – for disclosure, for target compliance, and for proving entitlement to support. Such an administratively complex system may lead to confusion.
- Member States cannot transfer GOs unless they have exceeded their interim trajectory. This means that Member States cannot trade early on in the compliance period, which makes it hard for Member States to plan effectively how they will meet their targets.

Intending to solve the problems addressed above, Germany, Poland and the UK proposed a new flexibility scheme, which does not rely on GO-trading (DE/PL/UK, 2008a). The key features of this flexibility system are:

- No use of certificates for target compliance purposes.
- All flexibility would be directly under Member State control.
- Flexibility could take the form of:
  - statistical transfers between Member States
  - project-based agreements between two or more Member State

governments for an operator to build a renewable installation in one Member State, and for the renewable energy generated by this project to count towards another Member State's share of the target

- two or more Member States combining their targets or support schemes

This joint proposal was welcomed by Member States as well as by the European Commission and, as agreed on the informal meetings of EU's environment and energy ministers in early July 2008, this currently forms the basis for further negotiations.

2.4 The interdependencies of both targets

2.4.1 The joint dependency of the targets on energy efficiency

Two important features of the GHG and the RES 2020 targets that make them intimately dependent need to be taken account:

- Their joint dependencies via the underlying energy flows and
- the particular definition of the RES target via its link to gross final energy consumption.

The amount of energy flows in the energy system obviously has an impact on the amount of GHG emissions and the amount of renewables needed to fulfil a certain share. Lower energy flows because of higher energy efficiency will both make it easier to fulfil the GHG and the RES target.

This leverage effect is even more pronounced for the RES target since it is defined as the share of renewable energy in gross final energy consumption.

Thus energy efficiency is in all stages of the energy system the key driver for meeting the EU 2020 targets, put differently, the two 2020 targets implicitly create incentives for improving energy efficiency.

2.4.2 Evidence of this dependency for Austria

A model based analysis for Austria

In a model based analysis this joint dependency of the GHG and the RES target from gross final energy consumption can be analysed in more detail. The basic findings for Austria are summarized in Figure 5 which reports two reference scenarios developed with the GAIN modelling framework.

Starting with 2005 we normalize energy flows such that gross final energy consumption in that year is an index with value 100. Then the corresponding amounts for fossil energy are 77 and for renewables 23, identical with their shares in gross final energy consumption.

We make now the assumption, that the amount of renewable energy sources can be increased by 45% in 2020 which brings renewables to the index value 34.

A Business-as-Usual scenario

One scenario for 2020 could be a Business-as-Usual (2020 BaU) perspective that mainly extrapolates current trends. We could then easily face an increase of gross final energy consumption to 125, identical to a 25% increase over 2020.

For the 2020 targets this would mean an increase of GHG emissions by 18% and a share of RES of 27%, both far from the proposed targets for Austria.

An EU 20 scenario

A scenario for 2020 that would be compatible with the overall 20% EU reduction target (2020 EU 20) would keep gross final energy consumption at the same level as in 2005, i.e. at index value 100.

Given the assumed amount of renewables of 34 this would require a reduction of GHG emissions by 15% which is within the range of expected reduction targets for Austria. The amount of renewables would match exactly the share of 34%.

Modification of the reference scenarios

We coin these scenarios deliberately reference scenarios since they can serve as a basis for additional adjustments depending on the additional assumptions made.

Higher levels of gross final energy consumption would not only require a higher volume of renewables but could soon become incompatible with GHG target.

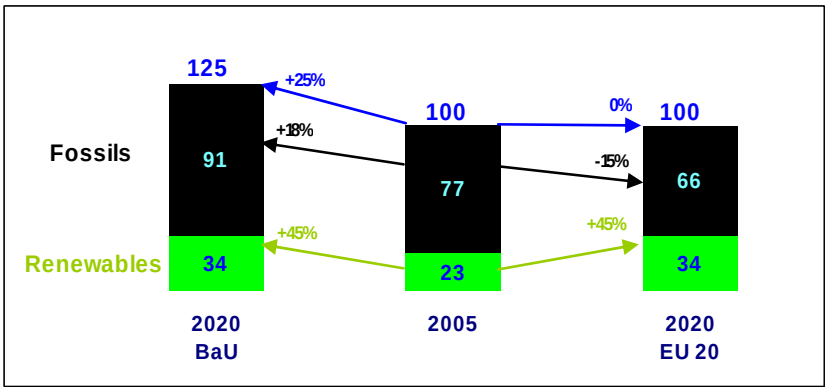
Additional compensating measures could be used for energy supply by lowering the use of fossil energy the corresponding transformation and distribution losses and switching to fossils with lower carbon content.

Strategies for the transition to a low energy and low carbon economy

Summarising we realise that meeting both the GHG and the RES target requires a fundamental transition of the current energy system toward a low energy and a low carbon economy. This is a list of relevant strategies:

- Reduction of redundant energy services
  e.g. heating of unused rooms.
- Increase of energy productivity in application technologies
  e.g. buildings with low energy or passive house standards.
- Increase of transformation and distribution efficiency
  e.g. switching to high-efficiency cogeneration.
- Switching to low and zero carbon energy sources
  e.g. renewable energy sources.

Figure 5: 2020 reference scenarios for Austria for gross final energy consumption



Source: Own calculations based on GAIN model

2.4.3 Evidence of this dependency at EU-level

The Commission's assessment of the relationship between GHG and RES objective

An analysis of the interactions of the two target at EU-level has been conducted within the Commission's Impact Assessment of the energy and climate package and is documented in the corresponding Annex to this (SEC(2008) 85, Vol. II).

Stand-alone vs. combined GHG and RES policies

For this purpose a model-based assessment was conducted using the PRIMES/GAINS model. Thereby, besides a baseline projection three different cases were subject of investigation:

- *20% RES achieved:*
  It was assumed that the RES target is achieved in a cost-effective manner but without any specific policies for achieving the GHG commitment.
- *20% GHG achieved:*
  The GHG commitment of 20% is achieved in a cost effective manner but without any specific policies to achieve the RES target.
- *20% RES and GHG achieved:*
  Both the RES and the GHG commitment are achieved in a cost effective manner.

Comparing the results of these scenarios aims to allow for the assessment of the impact of both targets and policy instruments to achieve them as well as the impacts on each other.

Impact on RES deployment and GHG emissions

Table 8 lists the resulting RES deployment and CO_2 as well as total GHG emission reduction according to this assessment.

According to this analysis stand alone RES policies have a significant impact on the reduction of GHG emissions. Conversely, stand-alone GHG policies do increase the RES deployment, even though the effect is less pronounced. RES policies alone will not be sufficient to meet GHG commitments even if emissions are reduced by 10% compared to baseline. In a similar way, GHG reduction policies alone will not lead to an achievement of the RES targets.

Obviously, only a combination of both GHG and RES policies is sufficient

for reaching both targets. It can be expected that combining these two policies is likely to cause a shift towards more energy-related CO_2 reductions, compared to achieving the GHG target only. RES policies in combination with GHG policies will give additional incentives to deploy significantly more RES on top of what would be done in a 'GHG policy only' case, and thus this leads to a higher reduction of CO_2 emissions in the energy sector.

Impact on costs

The policy instruments to achieve the GHG and RES commitments do have an impact on each other. Putting a RES policy in place lowers the carbon price necessary to deliver the GHG reduction commitment.

The assessed scenarios as illustrated in Table 8 require a carbon price of 49 €/t CO_2 to achieve the 20% GHG reduction commitment if no RES policies are put in place. If RES policies are introduced to achieve the RES target, a carbon price at 39 €/ t CO_2 would lead to achieving the same GHG reduction target.

Similarly, the RES incentive to achieve the 20% RES target lowers from 56 €/MWh to 45 €/MWh with the application of GHG policies to achieve the GHG reduction commitment.

Table 8: Impact of stand alone and combined GHG and RES policies at EU-level

Results on RES deplyoment and GHG reduction in 2020	RES share in gross final energy consumption	Compared to 1990	
		Energy-related CO_2 emissions	Total GHG emissions
Baseline projections	12.5%	5.1%	-1.5%
20% RES achieved	20.0%	-5.8%	-9.3%
20% GHG achieved	15.8%	-15.8%	-20.0%
20% RES and GHG achieved	20.0%	-16.7%	-20.0%

Box 1: Cap and trade – the conceptual foundations

	"The aim of the EU Emissions Trading System (EU ETS) is to help EU Member States achieve their commitments to limit or reduce greenhouse gas emissions in a cost-effective way. Allowing participating companies to buy or sell emission allowances means that emission cuts can be achieved at least cost." (Memo/08/35)
Cap on emissions allowances creates incentives for abatement and trade	The EU ETS is designed as a cap and trade system, i.e. a quantified GHG emissions target is defined and translated into an amount of emissions allowances that is allocated to the participating sectors and installations via the National Allocation Plans. One allowance gives the holder the right to emit one ton of CO_2e. Participants to the system are allowed to buy and sell these allowances according to their requirements (if their emissions exceed their allocation of allowances they can buy, if they hold excess allowances they can sell). The cap on the total number of allowances is supposed to create scarcity in the market and thus assign a price to GHG emissions. This price signal determines the polluters' decision whether to implement measures to reduce their emissions or to buy allowances when needed in order to minimize their costs. Thus, the system gives an incentive to search for the cheapest abatement solution – providing for temporal and spatial flexibility – while maintaining the installations ability to pursue their activities.
Equivalence with emissions tax	As the cap and trade system leads to the formation of a market price for GHG emissions it is comparable to the instrument of emission taxation. Both economic instruments use the price signal to affect the agents' behaviour. With a tax the administration makes an adjustment to market prices, which leads to an altered level of emissions. In contrast, with emissions trading a quantitative limit to emissions is set that leads to the formation of a market and a market price that reflects the stringency of the cap imposed. Thus, in the case of trading the environmental target is assured (as long as the price cap introduced via the penalty for non-fulfilment is not reached) but the resulting market price is insecure, while with taxes the price is fixed, but the resulting environmental effect cannot be predicted ex ante. In both cases, however, the regulated agents' decision is between maintaining emissions and paying for them or to reduce emissions through various measures (e.g. fuel switching, improved use of equipment, new investments, reduced production) depending on which option is more cost efficient given current prices.
The crucial role of information	In order to assure a proper functioning of the system it is necessary that agents provide reliable and precise information. This includes the monitoring and recording of the emitted GHG for all regulated installations on the one hand and the registration of allowance allocations and transfers on the other hand. The regulating authority in turn has to decide when or how often to publish information on verified aggregate emission levels and target compliance. As has become obvious from the experiences from the first trading period of the EU ETS this information is highly relevant for the operation of the market and the formation of the respective price.

Mechanism for stabilising emissions price	A pronounced volatility of the price of emissions allowances reduces predictability and planning security (e.g. investment decisions) for the regulated agents. Prices that are too high pose a risk to economic competitiveness for firms especially if they are exposed to competition from outside the EU ETS. On the other hand, if the price is too low the incentive for abatement is reduced or even removed, thus compromising the credibility and effectiveness of the system. Therefore, a mechanism to stabilise the emissions price would increase security, avoid excessive compliance costs while preserving the abatement incentive. A so-called safety valve could be introduced to the system, i.e. an offer from the regulatory authority to sell allowances at the demanded quantity when the market price reaches a predetermined level (ceiling price or price cap). If, in contrast, the price drops beneath a certain level (floor price) the authority could buy allowances. This design option in addition to the emission cap would thus deal with problems related to price-spikes (e.g. due to dramatic, temporary changes in circumstances) and highly volatile emissions prices.

Box 2: Linkage to other trading schemes

Overview	There are currently only a few links between different emissions trading schemes (ETS) and markets and they are mainly unilateral links. Linkage of the EU ETS with other comparable schemes is a strategic goal of European climate policy, but also the emerging schemes explicitly emphasize the aim of linking up to other schemes.
Current and planned emissions trading schemes	Current and planned ETSs vary significantly in size, the design characteristics and geographical scopes. The EU ETS is by far the largest of the existing or planned schemes. Some emissions trading schemes are voluntary, while others are mandatory. Some ETSs are designed to be used for compliance with the Kyoto Protocol, while others are planned or in use in non-Kyoto Parties. Some of the existing or planned schemes cover direct emission sources, while others include electricity retailers or users. Also the compliance provisions show significant differences between the different schemes. Differences also lie in the time period over which the system extends, as well as the time period over which emissions targets are set. Furthermore, there are also differences in the type and amounts of "offset" credits that are allowed.
Economic implications	Establishing an operational link between such schemes would create a greater diversity of sources and abatement options, leading to improved market liquidity and more efficient allocation of resources. In addition, linking reduces price volatility. Furthermore, the inclusion of more participants might also prevent distortions of competition and counteract the threat of leakage by preventing entities from relocating their emissions to countries with less stringent or no emission reduction policies.
Types of links: direct or indirect; unilateral or bilateral	A link between various ETSs can be established in different ways: • Directly, by making the allowances from the different ETSs fully fungible and valid for compliance in each ETS. Direct link can be unilateral or bilateral. The Lieberman-Warner bill for example allows under certain conditions the use of EU carbon units (EU Amounts - EUA) up to a certain percentage. • Indirectly, by governments acting as mediators that receive allowances from market actors wishing to make a transfer, convert them into Kyoto carbon units (Assigned Amount units – AAU), and transfer them to another government, which then converts them into their respective system's allowances or • Indirectly, by acceptance of common project mechanisms.
Existing and emerging links	A link of the EU ETS to the market for offset credits already exists via the linking directive (EC 2004). Also emerging ETSs aim at linkages to domestic and international offset credits. Linking to offset credits may lower the cost of reducing GHGs and will help speed the deployment of clean technologies worldwide. Linking to or via offset markets can be an option where formal linkage between systems is not possible due either to substantive differences in design or political constraints
Linking and Post-Kyoto	Linking could help make emissions targets and trading more attractive for countries that currently have no Kyoto targets, or have refused to ratify the

	Kyoto Protocol. Furthermore linking domestic and regional schemes may have a catalytic effect on international negotiations geared toward the future of the international climate regime Given the state of international negotiations, linking may be the most feasible way of achieving a truly global carbon market. This may be of great importance for the development of the future international climate regime, which can be based on a global carbon market as one of the main drivers.
To whom will the EU link up?	Bilateral linking of the EU-ETS with other schemes will not occur before 2013 as the EU is busy with internal expansion and harmonization. The EU will want to observe test periods of others with respect to • magnitude of allowance price difference, • comparability of stringency of caps and • similarity of the ambition level of climate change targets. Any differences in these criteria create a potential for conflicts. Only a few schemes, therefore, remain candidates for direct bilateral linking: California, New Zealand and possibly Australia. Much will depend however on the outcome of the Copenhagen agreement, and how stringent targets the different countries will agree on. Unilateral and indirect links, however, will emerge much earlier, well before 2012.

Box 3: Emissions trading schemes and price stabilisation

Overview	This is a brief survey of the emerging emissions trading schemes. In contrast to the current EU ETS and its proposed revision after 2012 almost all schemes include some kind of mechanism to stabilize the CO_2 price.
The New Zealand ETS	New Zealand is in the process of implementing a domestic ETS. The plan is to bring in all sectors of the economy over a six-year period, starting with deforestation in 2008 and ending with agriculture in 2013. A New Zealand Unit (NZU) will be the primary domestic unit of trade. The scheme allows also the unlimited use of international Kyoto credits, with the exception of lCERs and tCER. NZUs are backed by AAUs. They are proposed to be auctioned in some sectors, such as the stationary energy sector and a proportion provided for free other sectors, such as for deforestation. *Price stability* As New Zealand plans to allow the unlimited use of international Kyoto credits, (CERs, ERUs and AAUs), the price of these credits will be a price cap for the NZ scheme.
The US Regional Greenhouse Gas Initiative (RGGI)	The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort by ten US Northeast and Mid-Atlantic states to implement a regional cap-and-trade system. RGGI represents the first mandatory GHG emissions trading scheme in the US. The system will begin operations in 2009. Emissions from fossil-fuel electricity generators larger than 25 MW are restricted under the cap with a goal of stabilising these emissions from 2009 to 2014 and reducing them by 10% by 2019. *Price stability* Offsets thus serve as a safety valve to limit the costs of the scheme. Offsets are restricted to 3.3% of a generation unit's emissions during an initial control period. If the12-month rolling average of allowance prices exceeds US $7 per ton, units may offset up to 5% of their emissions; if the 12-month rolling average exceeds US$10 plants may offset up to 10% of emissions. In the event that up to 10% of emissions can be offset, participants may use credits from the EU ETS and from the flexible mechanisms under the Kyoto Protocol. *Auctioning* RGGI has set a reserve price, the minimum that a company can bid for an allowance, at $1.86.
The Lieberman-Warner Climate Security Act	Last year witnessed a dynamic increase in the number and viability of cap-and-trade bills introduced in the US senate. The Lieberman-Warner Climate Security Act is the most important of current proposals. The Act has the goal of capping 2012 US GHG emissions at or below current levels and then declining annually through 2050. In the current configuration of the Act, 87% of U.S. GHG emissions would be covered by the cap. *Price stability* The bill would establish a *Carbon Market Efficiency Board*, which would be allowed to carry price stability measures, such as raising the limit on borrowing and expanding the limits on offsets. The scheme administrator would conduct a *cost-containment auction*. For 2012 the price would be limited to the range between $22 and $30. In each subsequent year, the price would be increased by 5% plus the rate of inflation. The bill also es-

	tablishes a floor price for auctions at $10. It would be increased annually at the same rate as the cost-containment price.
Australia	The Australian government published in July a proposal for a 2010 emissions trading scheme that would cover most sectors of the economy. It proposes to introduce a cap-and-trade scheme for all six greenhouse gases covered by the Kyoto protocol from 1 July 2010. Covered sectors will be stationary energy, transport, fugitive emissions, industrial processes, waste and forestry – the latter on a voluntary basis. *Price stability* In the first years the Australian scheme will also operate with a cap on the price of carbon, but this would be set well above the expected market price.

3 Design options for the ETS target

3.1 Dealing with competitiveness and carbon leakage

3.1.1 Concerns and causes

The concern for carbon leakage

Carbon leakage is a major issue in the design of phase three of the EU ETS. The current Commission proposal emphasizes the relevance of this issue by proposing to group the sectors most vulnerable to carbon leakage into a separate group with different rules for free allocations. Details are still left open and the Commission proposal suggests agreeing upon them by the end of June 2011.

We attempt to contribute to the issue of competitiveness and carbon leakage by proposing an extension of the Commission proposal that fills this gap.

Carbon leakage and competitiveness

Starting point for our extended proposal is the understanding of carbon leakage as unwanted shifts of GHG emissions from ETS to Non-ETS countries. It needs to be investigated whether these shifts result from changes in the competitive position of installations caused by different exposures to carbon restrictions.

3.1.2 Indicators for carbon leakage

Conventional indicators for carbon leakage

Conventional indicators for carbon leakage can be classified into the following groups of evidence:

- *Energy intensity*
  Indicators based on the energy intensity of an installation or a sector may be defined either in physical units (energy per unit of output) or monetary units (energy costs per unit of output, share of energy cost in gross production value or production costs of a unit of output).
- *Cost impact of emissions allowances*
  The cost impact of emissions allowances may be measured as a percentage increase of production costs caused by a one percent increase of the price of emissions allowances (cost elasticity).
- *Demand impact of emissions allowances*
  The impact of the carbon price on demand may be measured as the percentage change of product demand caused by a one percent increase of the price of emissions allowances (demand elasticity).
- *Profit impact of emissions allowances*
  The impact of the carbon price on profits takes into account in addition the ability of installations to pass through cost increases caused by the carbon price.

Deficiencies of conventional indicators for carbon leakage

The conventional indicators defined above suffer from a number of deficiencies, above all limited relevance and applicability. For example indicators based on energy intensity and costs do not capture market reactions and indicators measuring demand and profit impacts need a complex market analysis that is just not available for most products.

This motivates a search for more operational indicators which are simple to collect and monitor and available both for sectors and installations.

Indicators focusing on the competitive position

We suggest therefore a set of indicators that describe the competitive position both as to existing installations and as to the investment decision of new production capacities. This motivates the following three types of indicators:

(1) Indicator for export competition to Non-ETS markets

Export competition

Existing installations are exposed to Non-ETS markets depending on their share of production that is exported to those markets.

Example: An Austrian steel producer sells to Russia.

- The share of exports to Non-ETS markets in total production is proposed as an indicator for export competition.

(2) Indicator for import competition on the ETS market

Import competition

Existing installations are exposed to import competition on the ETS market from competitors outside of the ETS area.

Example: A steel producer from India sells to the ETS market.

- The share of imports from Non-ETS countries on the ETS market is proposed as an indicator for import competition.

(3) Indicator for relocation competition of new production capacities

Relocation competition

New production capacities face relocation from ETS countries to Non-ETS countries if cost impacts from buying emissions allowances become relevant.

Example: A new installation or a capacity expansion for cement production is considered both in Italy and North Africa.

- Production cost differences for new installations between ETS and Non-ETS locations caused by carbon allowances are proposed as an indicator for relocation competition.

3.2 Extending the Commission proposal for competitiveness and carbon leakage

3.2.1 Starting from the Commission proposal

Dealing with three groups of sectors

The current Commission proposal aims at an allocation mechanism based on auctioning. Potential competition and leakage problems are taken care of by allocating free allowances to sectors. Within this allocation procedure three groups of sectors are distinguished:

- The power sector obtains no free allocations since this sector is expected to fully pass through the additional carbon costs, thus creating deliberately a price signal that provides incentives for higher energy efficiency in the use of electricity.
- "Normal" sectors will obtain 80% free allowances in 2013; this percentage of free allowances declines over time and reaches zero in 2020.
- "Exposed" sectors may receive up to 100% free allowances.

Open issues

These design elements of the Commission proposal have opened discussions about criteria that enable the classification of sectors into "normal" or "exposed " and how to decide upon the amount of free allowances for the latter. Another issue is the timing of this decision since many stakeholders prefer an earlier finalization compared to the Commission plan.

Operational procedures for competitiveness and carbon leakage

We want to overcome the highly controversial distinction between "normal" and "exposed" sectors by extending the current Commission proposal with additional allocation elements that avoid this either/or classification.

The additional allocation elements are based on our suggested indicators for export and import competition and relocation competition.

The extended allocation procedure is fully in line with the Commission proposal but attempts to fill the gaps for taking into account competitiveness and carbon leakage with a few additional elements in the allocation procedure that can be fairly easily implemented.

3.2.2 Step 1: Overall ETS cap

Path to a 21% reduction by 2020

The overall ETS cap is determined for each year in trading phase 3 according to the Commission proposal.

The overall emission reduction target for the ETS sector amounts to 21% in 2020 compared to 2005 emissions.

This is the procedure for the suggested allocation path from 2013 to 2020:

- The overall cap for 2013 is determined by starting from average allocated allowances in the period 2008 to 2012.
- By subtracting 1.74% we obtain the available allowances for 2013.
- This reduction factor of 1.74% is applied each year until 2020 ensuring a linearly decreasing number of available allowances each year and resulting in the targeted 21% reduction of emissions in 2020.
- For new entrants a reserve of 5% of the yearly amount of allowances is provided.

3.2.3 Step 2: Free allowances

We suggest allocating free allocations to installations and sectors on three grounds:

- compensating for export competition on Non-ETS markets

- compensating for import competition from Non-ETS countries on the ETS market
- compensating for relocation competition for new installations

We use a set of corresponding indicators to determine the amount of free allocations.

(1) Free allowances for export competition on Non-ETS markets

Export competition on Non-ETS markets

Installations may opt-in for free allowances if their share of exports to Non-ETS markets of their production is beyond a certain threshold (e.g. 3%). The amount of this share may be based on historical emissions and may be reduced gradually by a certain factor in order to provide an incentive for technological innovation.

Alternatively this share of free allowances can be determined just by national export shares instead of exports of individual installations.

Member States report the amount of free allowances granted for export competition to the ETS Carbon Authority.

(2) Free allowances for import competition on ETS market

Import competition on ETS markets

The ETS Carbon Authority determines the share of imports stemming from Non-ETS countries for the various sectors and allocates a corresponding number of free allowances to the sectors. A dynamic devaluation factor may be applied.

The total of free allowances for import competition is allocated to installations according to their share of historical emissions.

(3) Free allowances for relocation competition

Relocation competition

For each sector free allowances may be issued because of cost differences for new production capacities between ETS and Non-ETS locations caused by the price for carbon allowances. Again a dynamic devaluation factor may be applied.

The total of free allowances for relocation competition is allocated to installations according to their share of historical emissions.

New entrants

New entrants are eligible for free allocations out of the new entrants' reserve. Basically the same principle for allocating free allowances should be applied as for existing installations to make sure that there is no discrimination against incumbents.

3.2.4 Step 3: Auctioned allowances

By subtracting from the overall ETS cap determined in Step 1 the amount of free allowances determined in Step 2 we obtain the amount of allowances to be auctioned.

Based on the share of historical emissions the overall volume of allowances to be auctioned are allocated to Member States. This partition also serves for distributing the auctioning revenues.

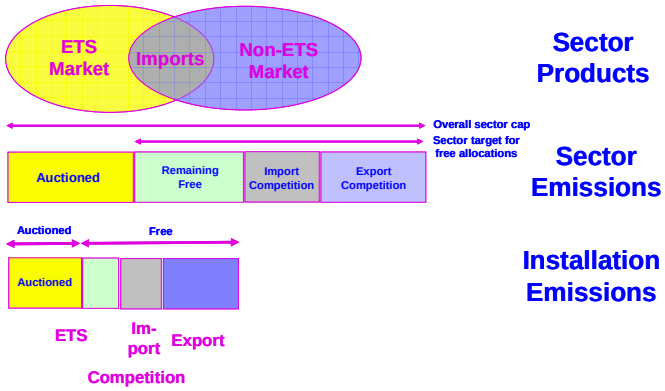
The auctioning procedure may be performed either by a coordinated ac-

tion of the Member States or by an EU Carbon Authority.

3.2.5 Evaluating the extended allocation procedure

Figure 6 depicts the key elements of the extended allocation mechanism which mirrors competition on Non-ETS and ETS markets and competition for relocation of new installations.

Figure 6: Extending the allocation for carbon leakage and competition



Source: Proposed extended allocation mechanism

Benefits of the extensions

By filling the gaps in the Directive proposal with the suggested extensions the gaps in the Directive proposal with the extensions proposed we obtain a fully operational allocation mechanism that exhibits the following advantages:

- All sectors are dealt with symmetrically (power sector obtains no free allowances, no need to classify “exposed” and “normal” sectors).
- Differences in export competition can be handled on installation level.
- Modest additional information is required that can be fairly easily obtained both for installations and sectors.
- All allocation elements contained in the Directive proposal remain unchanged as reducing the share of free allowances over time.

4 Design options for the RES target

4.1 Assessment of alternative designs for flexibility mechanisms

Flexibility mechanisms for national RES target fulfilment

With the Commission proposal for a Directive on the promotion of the use of renewable energy sources (COM (2008) 19) a new, more flexible policy design is being discussed by EU policy makers against the background of setting Member State targets for the year 2020. Following the Directive proposal the EU target is allocated to differentiated national targets based on a flat rate approach (same additional share for each country) modulated by Member States' GDP.

As discussed in section 2.3.3 such an approach of target allocation does not reflect the resource availability of the countries and therefore does not allow for a least cost exploitation of the European potentials. Therefore several flexibility measures to better map targets and potentials are currently discussed. The subsequent section aims to offer an assessment of the key options in the current debate aiming to assure flexibility for target compliance via intensified cooperation between Member States. Consequently, it takes the joint proposal of Germany, Poland and the United Kingdom on alternative flexibility mechanisms (DE/PL/UK, 2008a) as basis for further investigation.

4.2 Statistical transfer between Member States

4.2.1 Design

Design

Under a flexibility regime that builds on statistical transfer between Member States, the state itself is in charge of trading. Any surplus of RES generation which is not needed for own target compliance could be qualified for such trade. The trading responsibility can be commissioned to accredited agents, e.g. the support scheme operator, the transmission system operator, or – for GO purchase within a quota system – the quota obliged parties. The RES producers do not directly sell their production to another country for target compliance (they will continue to do so for the voluntary market and disclosure purposes, as in the current situation). They are solely supported by the domestic support scheme.

4.2.2 Evaluation

Pros

These are the advantages of such a cooperation mechanism:

- Exporting Member State maintains control of its target achievement.

- National RES support schemes are not directly affected by statistical transfer between Member States and can be tailored for meeting national RES policy objectives, e.g. the support of both low-cost and innovative technologies.
- As advantage for Member States that act as seller appears that they can recover costs for supporting their domestic RES production and, besides, they may also benefit financially.
- No technology specific regulation is needed as the Member State sells the RES technology mix it produced.
- Large windfall profits (as expected in a technology-neutral private GO trade scheme or in a speculative market), which lead to high costs to consumers will be avoided. Obviously, this represents an advantage for possible importers, but also exporting countries may benefit due to lower support cost as needed otherwise (i.e. as competition between national RES policies is avoided).
- For an exporting Member State it appears beneficial that the arising costs for system integration and secondary support can be reflected in the offer price.

Cons

These may be considered as disadvantages of such a flexible mechanism:

- Potentially less market dynamic than under a private trade regime (as private RES producers have a less active role compared to private-based trade)
- Private project developers do not have an explicit incentive to look for the lowest-cost RES projects all over Europe since potentially projects with highest returns are not necessarily those with lowest-cost because of different regulatory environments in Member States.
- RES development depends substantially on the national support scheme in place. Therefore, in countries offering low or ineffective support, comparatively cost-effective RES potentials would remain untapped, which could limit the overall cost-efficiency of RES support from the European perspective.

4.2.3 Recommendations

Most of the recommended actions points are of general nature, but with impact on statistical transfer between Member States – aiming to facilitate its functionality and to ensure a certain RES supply on a Member State market.

Introduction of measures for target compliance

Enforcing compliance

In order to stimulate RES development in all Member States and to facilitate the achievement of given RES targets, it appears beneficial to introduce a transparent compliance mechanism at an early stage well before 2020. Effective predetermined measures in the case of non-compliance – e.g. the establishment of a financial penalty (similar to the EU ETS compliance mechanism) – would underline the mandatory character of the agreed targets and therefore support their implementation by attracting the necessary volume of private sector investment in technologies and projects. On the one hand, this would act as a safety valve for countries

that consider it very difficult to reach their targets purely domestically by establishing a price ceiling for possible imports. On the other hand, this provides a clear price signal for possible exporting Member States (rich of RES potentials) to tap RES potentials not needed for own target compliance.

EU-wide platform for statistical transfer between Member States

Enhancing market mechanisms

In line with the Austrian proposal submitted to the Council working party on the RES Directive in July 2008 (BMWA/E-Control, 2008) an EU-wide trading platform, established by the European Commission or any other neutral EU institution would increase transparency and reduce transaction costs as arising in case of pure bilateral agreements between Member States. Besides, this would stimulate market dynamics – as all Member States are aware of demand and supply on the RES trading market.

Removal of non-economic barriers

Overcoming non-economic barriers

Of key relevance for achieving an accelerated RES deployment as needed for target compliance is the removal of non-economic barriers.

The Commission should take an active role to overcome non-economic hindrances for an accelerated RES deployment as observable in several Member States at present. Consequently, the RES directive needs to include several measures assisting in this respect. Accordingly, the following issues should be addressed:

- Fair grid access for RES producers based on transparent rules.
- Simplified, shortened permission processes with clear and binding deadlines.
- Accelerated development of infrastructural prerequisites (i.e. required investments in transmission grid and interconnectors between Member States are an important prerequisite for the integration of EU-wide large-scale RES deployment).
- In addition it should be considered that RES by definition need adequate system integration for reaping future benefits arising from distributed generation.

Removal of hindrances from other EU legislation

Interacting with other EU legislation

Potentially adverse interactions arise from interactions with other EU legislation, e.g. water framework directive with impact on hydropower development. Transparent and commonly applied rules for state aid are needed in order to avoid distortions in competition.

Definition of minimum design criteria for RES support

Minimum design criteria for RES support

Policy action is required in all Member States to achieve the ambitious RES targets and to form a level playing field in the EU energy market in the long term. To contribute to this, the RES Directive should contain adequate minimum design criteria for RES support schemes which need to be met by all Member States.

The following criteria, independent of the support instrument applied in a certain country, are recommended:

- The RES policy framework needs to respect the full basket of RES

technologies as allowed for target compliance.

- An adequate level of financial support level should be provided – i.e. slightly higher than the marginal generation costs (in the case of a quota system the level of penalty is relevant).
- Financial support for the operation of a RES plant needs to be guaranteed but clearly restricted to a certain time frame.
- Any adaptation or change of the policy framework should be targeted to assure deployment of new RES capacities.

4.3 Project based mechanisms (Joint Projects)

4.3.1 Design

Design

Under the project based investment mechanism, a Member State that is not able to fulfil its RES target solely on a domestic basis would be allowed to financially support RES plants in another Member State and receive Guarantees of Origin in exchange for target compliance (the same basic mechanism as recently discussed for Guarantees of Origin trade between private actors). Such project-based investments could offer the possibility to access additional RES potentials in countries not interested (and not obliged) to develop these potentials themselves, e.g. – as often argued – some New Member States. It would also allow for a more active involvement of private RES project developers.

There are different options how to organize such joint projects. Importing countries can purchase the produced Guarantees of Origin through a government authority or allow the use of the support scheme of the importing country to financially support the RES plant. Regarding the export side, there are different alternatives for the exporting country to recover its costs: by retaining a certain Guarantees of Origin share for own target compliance, by adding export premiums on top of Guarantees of Origin, or by auctioning export rights, etc.

4.3.2 Evaluation

Pros

Advantages of a project based mechanism comprise:

- Joint projects increase the requested flexibility for Member States in achieving their national RES targets.
- The mechanisms allow for technology specification of the RES support. However, it can be expected that they would mainly be used for low-cost technologies.
- From the European perspective, an improved exploitation of the RES potentials could be achieved (where e.g. potentials, which are not needed by the host Member State to achieve its own target, would be tapped by importing Member State as long as they are more competitive than their own.

Cons

In contrast to above, project based mechanism might suffer from the following disadvantages:

- Domestic support schemes might get under pressure due to possibly higher support offered abroad (creation of a “two class” support system for RES projects).
- Higher transaction costs occur compared to trade between Member States.
- A delay of required investments in innovative RES technologies with higher costs may occur. Innovative RES options would most likely not be attractive for joint projects. They would still need to be supported by national support schemes, or might be delayed.

4.3.3 Recommendations

The design of a project based mechanism should be motivated both by the overall objective aimed for and an incentive for Member States to pool the necessary administrative procedures.

Overall objectives

Relevant objectives

When elaborating on the details on joint projects, the overall objective should be to define a system that

- offers incentives for cooperation in reaching the RES targets,
- reduces transaction costs or problems to make the RES projects bankable,
- allows for benefits for both participating countries.

(EU-wide) Pool for joint projects

Pool for joint projects

Following the Austrian proposal submitted to the Council working party on the RES Directive in July 2008 (BMWA/E-Control, 2008) the forming of an EU-wide pool for joint projects appears beneficial. The Commission should provide assistance in negotiating on commonly acceptable rules for joint projects. If several Member States jointly agree on them this would simplify the administrative procedures and lower transaction costs. Besides, transparency would also be increased.

4.4 Joint target compliance

4.4.1 Design

Design

On a voluntary basis, two or more Member States may decide to combine their RES targets and pursue their target fulfilment jointly through joint support schemes.

4.4.2 Evaluation

Pros

Advantages of a joint target compliance include:

- Member States combining their support schemes may benefit from the broader RES market and the resulting cost-effective resource allocation.

Cons

Possible disadvantages of a joint target compliance comprise:

- Achieving a (fair) sharing of the resulting costs and benefits represents possibly the most challenging act.
- As long as RES target fulfilment remains in the responsibility of individual Member States, achieving an agreement on how to account RES deployment may cause large administrative efforts.

4.4.3 Recommendations

Concise recommendations on the novel cooperation mechanism joint target compliance conclude this section on design options for the RES target

An 'abstract' option worth to establish with the RES Directive

An 'abstract' option worth to establish

This cooperation option appears 'abstract' for the time being. However, intensifying cooperation activities between Member States may let this option become important in the future. Consequently, it is recommended to keep this virtual mechanism included in the RES Directive.

Clear rules for joint target compliance

Rules for joint target compliance

The fact that RES target fulfilment remains in the responsibility of individual Member States may cause high administrative efforts in case two or more countries are willing to combine their RES support scheme. The definition of, or at least the guidance on clear rules for a sharing of responsibilities between involved countries with respect to the target compliance appears beneficial.

5 Positions for the negotiations

Based on the analysis we have presented above, we suggest considering the following positions for the final negotiations of the energy and climate package.

We separate these suggestions into three areas:

- Supporting domestic policy actions,
- Extending the EU Emissions Trading System, and
- Amending flexibility mechanism for national RES target fulfilment.

5.1 Supporting domestic policy actions

5.1.1 Advancing energy efficiency

Comprehensive actions for advancing energy efficiency

A major finding from investigating the impact of the targets for GHG emissions and for renewables is the insight, that only a major increase of energy efficiency in all sectors and at all stages of the energy system is compatible with the 2020 targets for GHG emissions and renewables.

A compatible – although given the current trends – unlikely scenario for 2020 is the stabilization of final energy consumption at 2005 levels. This target could serve as a starting point for developing transition paths from the current status of the energy system to the 2020 target in so-called back-casting scenarios.

5.1.2 Recycling auctioning revenues under the ETS

Recycling of auctioning revenues into an Austrian Carbon Trust

Considerable revenues will become available to Member States from auctioning of tradable emissions allowances. Instead of adding these revenues just to the general federal budget, additional leverage could be given to these financial flows by using them for stimulating technological innovations both in the ETS and Non-ETS sectors.

There are a number of international examples for designing institutions that serve the development and diffusion of advanced technologies. An outstanding success for stimulating technological change in the context of energy and climate policy is the UK Carbon Trust which might serve as a role model for an Austrian Carbon Trust (ACT).

5.1.3 Tradable emission allowances from domestic projects

Allowances issued by Member States

Article 24 of the EU ETS Directive contains guidelines for implementing measures for issuing allowances in respect of projects administered by Member States.

Given the urgent need to provide incentives for improving energy and emissions indicators in all sectors, this instrument should be considered as an additional tool where appropriate, e.g. for opening the market for energy service companies that specialize in commercial buildings (offices, shopping centres) and public sector buildings (hospitals, schools).

5.1.4 Removal of non-economic barriers for the RES deployment

Non-economic barriers

The removal of non-economic barriers is of key relevance for achieving an accelerated RES deployment (as needed for target compliance).

The Commission has to play a pro-active role to overcome non-economic deficits for an (accelerated) RES deployment as observable in several Member States at present. Consequently, the RES Directive needs to include several binding measures to address:

- Fair grid access for RES producers based on transparent rules.
- Simplified, shortened permission processes with clear and binding deadlines
- Accelerated development of infrastructural prerequisites
- Adequate system integration for distributed generation
- Removal of hindrances arising from interactions with other EU legislation

5.1.5 Definition of minimum design criteria for RES support

Minimum design criteria for RES support

Policy action is required in all Member States to achieve the ambitious RES targets and to form a level playing field in the EU's energy market in the long term. To contribute to this, the RES Directive should contain adequate minimum design criteria for RES support schemes which need to be met by all Member States.

In this respect we recommend the following criteria, independent of the support instrument applied in a certain country:

- The RES policy framework needs to respect the full basket of RES technologies as allowed for target compliance
- An adequate level of financial support level should be provided – i.e. slightly higher than the marginal generation costs (in the case of a quota system the level of penalty is relevant)
- Financial support needs to be guaranteed but clearly restricted to a certain time frame (for the operation of a RES plant)
- Any adaptation or change of the policy framework should be targeted to assure deployment of new RES capacities.

5.2 Extending the EU Emissions Trading System

5.2.1 Implementing provisions for carbon leakage and competitiveness

Operational procedure for dealing with carbon leakage

As soon as possible provisions should be implemented that prevent carbon leakage and distortions in competition with non carbon-constraint countries. This will enable companies to prepare for phase three of EU ETS in time.

We suggest an operational procedure how carbon leakage could be handled in line with the current Commission proposal by considering readily available trade and cost indicators. These indicators are used for determining the amount of free allowances.

Instead of dividing ETS sectors into three groups, as suggested in the current Commission proposal, we consider a unified approach that can be applied to all sectors, but is flexible enough for taking into account differences among sectors and even installations.

An extended EC proposal that takes into account carbon leakage

Our suggestion for dealing with carbon leakage is based on the proposition that the EU ETS carbon price should not change the competitive position of sectors or installations which may result in the relocation of production activities.

As an implementation of this proposition we suggest granting free allowances to sectors and installations based on three grounds:

- *Compensating for export competition on Non-ETS countries*
  based on exports of installations (or sectors) to these markets.
- *Compensating for import competition from Non-ETS countries to the market of ETS countries*
  based on the corresponding imports.
- *Compensating for relocation competition for new production capacities*
  based on the impact of carbon price on the choice of location for new installations

These guidelines for granting free allocations are flexible enough for allowing them to be applied to all sectors and installations. Similar reduction factors for free allowances can be applied over time as in the current Commission proposal.

Simulation of this extended allocation procedure

We demonstrate in the appendix the applicability of this procedure for determining the amount of free allowances and the implementation of the full allocation procedure by presenting simulations for the EU ETS disaggregated into eight sectors.

5.2.2 Empowering the carbon market

Upper and lower limits

We suggest empowering the carbon market, which is exposed to a wide

for carbon price movements

range of market failures that might result in volatile price movements.

A key element for strengthening the credibility of the carbon market is a liquidity mechanism that limits price movements within a predefined range. This extension of the design of the cap and trade market would be fully compatible with most other emerging carbon markets.

Extending the tasks of the Carbon Authority

We denote as Carbon Authority the institutional setup that controls the supply side of the carbon market. In the current proposal this Carbon Authority is the joint responsibility of the Commission and the Member States, both acting on relevant EU legislation.

We suggest extending the tasks of the Carbon Authority by adding responsibility for maintaining the carbon price within the targeted price range. This is done by supplying the carbon market with adequate liquidity by

- controlling amount and timing of supply of allowances via auctioning,
- acting in the market as a buyer and seller of allowances, and
- using the links to other carbon markets.

Decoupling the Carbon Authority from policy interventions

The Carbon Authority could be given even more credibility by framing an institutional environment that is less prone to policy interventions.

It should be considered, therefore, to give the Carbon Authority the status of an agency that acts similar to a central bank.

5.2.3 Designing the auctioning mechanism

Together with the allocation of free allowances the auctioning mechanism determines the supply of allowances on the carbon market.

Auctions on EU level with revenues distributed to Member States

Although revenues from auctioning remain under the authority of Member States it is not evident for them to organize also the auctioning procedure.

We suggest, therefore, organizing auctions on EU level as a task of the Carbon Authority.

This lowers transaction costs and makes auctions serve as an instrument for controlling the liquidity of the carbon market.

Revenues from auctioning are to be distributed among Member States according to the current Commission proposal.

5.2.4 Other allocation issues

Small installations

Different treatment of small installations

71%of the smallest installations in the EU ETS account for not more than 5% of the emissions cap. This reveals the large amount of small installations in the system.

We support suggestions for small installations that offer an opt-out for an energy tax.

Emissions from industrial processes

Compensating for emissions from processes

Emissions from industrial processes as in the production of steel or cement can by definition not be avoided. Costs from carbon allowances provide at least for current installations no technological incentives.

Together with the guidelines of the ETS Directive that the ETS must not impose additional burdens for competition, we conclude that emissions from industrial processes should be considered for free allocations.

5.3 Amending flexibility mechanism for national RES target fulfilment

5.3.1 Improving statistical transfer between Member States

Mechanism for target compliance

Enforcement mechanism

In order to stimulate RES development in all Member States and to facilitate the achievement of given RES targets, it appears beneficial to introduce a transparent compliance mechanism at an early stage well before 2020. An effective predetermined measure in the case of non-compliance – e.g. the establishment of a financial penalty (similar to the EU ETS compliance mechanism) appears beneficial in several ways:

- It underlines the mandatory character of the agreed targets and therefore supports their implementation by attracting the necessary volume of private sector investment in technologies and projects.
- It acts as a safety valve for Member States that consider it very difficult to reach their targets purely domestically by establishing a price ceiling for possible imports.
- It provides a clear price signal for possible exporting Member States (rich of RES potentials) to tap RES potentials not needed for own target compliance.

EU-wide platform for statistical transfer between Member States

Trading platform

In line with (BMWA/E-Control, 2008) we recommend the establishment of an EU-wide trading platform to facilitate cooperation at Member States level. This would increase transparency, reduce transaction costs (as arising in case of pure bilateral agreements) and stimulate market dynamics.

5.3.2 Improving project based mechanisms (Joint Projects)

Overall objective

Relevant objectives

The overall objective should be to define a system that

- offers incentives for cooperation in reaching the RES targets,
- reduces transaction costs or problems to make the RES projects

bankable,

- allows for benefits for both participating countries.

EU-wide pool for joint projects

Pool for joint projects

Following the Austrian proposal submitted to the Council working party on the RES Directive in July 2008 (BMWA/E-Control, 2008) the forming of an EU-wide pool for joint projects appears beneficial. The Commission should provide assistance in negotiating on commonly acceptable rules for joint projects. If several Member States jointly agree on them this would simplify the corresponding administrative procedures, lower transaction costs and increase transparency,

5.3.3 Enhancing a joint target compliance

An 'abstract' option worth to establish with the RES Directive

An 'abstract' option worth to establish

Member States combining their support schemes may benefit from the broader RES market and the resulting cost-effective resource allocation. This cooperation option appears 'abstract' for the time being. However, intensifying cooperation activities between Member States may make this option become important in the future. Consequently, it is recommended to keep this mechanism included in the RES Directive.

Clear rules for joint target compliance

Rules for joint target compliance

The fact that RES target fulfilment remains in the responsibility of individual Member States may cause high administrative efforts in case two or more countries are willing to combine their RES support scheme. The definition of, or at least the guidance on clear rules for a sharing of responsibilities between involved countries with respect to the target compliance appears beneficial.

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DE/PL/UK (2008b)
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Green-X
Modelling tool for the assessment of the future deployment of RES in Europe, developed by TU Wien, EEG – comprising also a database on RES potentials and costs. Web link: www.green-x.at.

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Modelling tools

GAIN
Modelling framework for analysing structural changes in the energy system based on the technology wedges approach.

GAINS
A model that allows assessing the impact of reducing non-CO2 GHGs taking into account the developments in the energy system.

Green-X
Modelling tool for the assessment of the future deployment of RES in Europe, developed by TU Wien, EEG – comprising also a database on

RES potentials and costs. Web link: www.green-x.at.

PRIMES
A detailed partial equilibrium energy model dealing with all sectors and fuel types including their transformation in a technology rich way. It is detailed at Member States level, which allows for comparisons and aggregations on the basis of a harmonised approach.

APPENDIX

Remembering and reconsidering carbon leakage

7 The seemingly elimination and potential re-emergence of carbon leakage in the energy and climate package

Substantial innovations in the EU ETS

The energy and climate package presented by the Commission on 23 January 2008 contains a number of substantial innovations for the EU Emissions Trading Scheme, above all

- an EU-wide emissions cap and
- a reliance on auctioning as the main mechanism for allocating allowances.

The issue of carbon leakage

Major controversies until the approval of the package by the European Council on 12 December 2008 centred around the issue of carbon leakage, the potential adverse impacts of the EU ETS on energy intensive industries and the related issue of allocating free allowances for compensation.

Compared to the Commission proposal, the final version of the package maintained the overall emissions cap, the 21 % reduction of emissions by 2020 over 2005.

However, the Council decision cut the volume of allowances that needs to undergo auctioning by approximately one third. In addition to derogations for the electricity sector in a few new Member States, according to estimates by the Commission almost the whole industry sector will obtain free but capped allowances. This is motivated above all as a protection against carbon leakage.

The shift from auctioning to free allowances

It is this shift from full auctioning in the Commission proposal to almost complete free allowances for industry that has caused controversies about the efficiency and the effectiveness of the final version of the reformed EU ETS design.

We call for a differentiated evaluation of the final version of the energy and climate package and summarize our findings in the following statements:

- The overall reduction target for installations that are subject to the EU ETS remains unchanged, i.e. emissions in the ETS sector need to be reduced by 21% in 2020 compared to 2005. This is in line with the 20 % overall reduction target of all sectors and Member States for 2020 compared to 1990.
- The almost full free allocation of allowances to industry obviously eliminates the carbon leakage issue. Other, more sophisticated procedures for tackling this issue would have been available for protecting the competitive position of industry with a lower need for free allowances but these procedures have not become politically acceptable.
- The major impact of the reduction of the volume of allowances to be auctioned is on the revenues from auctioning but not on the carbon price. This statement rests on the assumption that the perception of abatement opportunities by participants in the carbon market is not changed by more generous free allocations.

- Increasing the volume of free allocations means that fewer installations will be exposed to the price signal of the carbon market and thus probably will obtain fewer incentives for technological change. This is definitely a drawback of a free allocations procedure.
- The vast volume of free allowances for industry generates the need for sound procedures to allocate these allowances to installations on an EU-wide level. It is this stage of the allocation mechanism of the reformed EU ETS where additional incentives for technological change can be introduced by benchmarking procedures. Surprisingly, information that was relevant for evaluating the exposure to carbon leakage returns again for creating benchmarking rules that are able to substitute price signals.

8 Key elements of the final outcome

We summarize in this section briefly the key elements of the final outcome of the negotiations about the energy and climate package as to the reform the EU ETS.

8.1 Shares of auctioning

As in the Commission proposal three sectors are distinguished for the shares of allowances to be auctioned:

Electricity sector

For the electricity sector the full auctioning rate of 100 % starts with 2013 as suggested by the Commission.

Exemptions, however, are added for Member States with a high share of coal and gas (Poland and Hungary). The auctioning rate for these countries starts at 30 % in 2013 and increases to 100 % in 2020.

Industrial sectors not exposed to carbon leakage

For the industrial sectors that are considered not exposed to carbon leakage the auctioning rate starts at 20 % in 2013 and reaches 70 % in 2020.

In contrast the Commission proposed full auctioning already for 2020. According to preliminary estimates by the Commission not more than 4% of industrial sectors could remain in this category.

Industrial sectors exposed to carbon leakage

Industrial sectors that are exposed to the risk of carbon leakage now dominate by far in the classification of industries that finally determine the shares of auctioning.

Installations in sectors or sub-sectors which belong to this category will receive 100 % of allowances free of charge at the benchmark level of the best technology available.

By the end of 2009 the Commission will decide on sectors and subsectors that qualify as being exposed to the risk of carbon leakage according to the following indicators:

- The sum of direct and indirect additional costs induced by costs for allowances would lead to an increase in production costs exceeding

5 % of Gross Value Added
and
the total value of exports and imports divided by the total value of its turnover and imports exceeds 10 %.

- Alternatively, the sum of direct and indirect additional costs induced by costs for allowances would lead to an increase in production costs exceeding 30 % of Gross Value Added
or
the total value of exports and imports divided by the total value of its turnover and imports exceeds 30 %.

The level of disaggregation for calculating these indicators will be level 3 NACE code or, where appropriate and where the relevant data are available, at level 4.

The currently available documents do not indicate the assumptions made for the carbon price when cost impacts are calculated. This leaves considerable uncertainty about the procedure for calculating the indicators for carbon leakage.

8.2 Other provisions

Allocation of revenues from auctioning

The revenues from auctioning will be divided up as follows:

- 88 % will be allocated between Member States in proportions identical to the verified emissions in 2005.
- 10 % will be allocated to certain Member States in the interest of solidarity and growth.
- 2 % will be allocated to Member States which had achieved in 2005 at least a reduction of 20 % in greenhouse gas emissions compared with the reference year of the Kyoto Protocol.

Funding for CCS technologies and renewable energy sources

300 millions of emission allowances will be made available for innovative carbon capture and storage technologies and renewable energy sources.

Clean Development Mechanism and Joint Implementation

3 % of verified 2005 emissions are the limit of the quantity of credits each Member State may use from the Clean Development Mechanism and Joint Implementation.

Certain Member States, including Austria, will be able to use an additional 1 % of verified 2005 emissions for credits from projects in least developed and small island developing states.

Political statement concerning the use of revenues from auctioning

In a political statement the European Council tied the use of revenues from auctioning to EU efforts for providing finance for actions to mitigate and adapt to climate change in the context of international agreements.

9 The evolution of the carbon leakage issue

Since the publication of the Commission documents for the energy and climate package the issue and understanding of carbon leakage has undergone substantial changes.

9.1 The search for operational indicators

The temptation of the "exposed" sector

The option in the Commission proposal for considering besides electricity and "normal" industries also an "exposed" sector created incentives for sub-sectors and installations to qualify for this sector since up to 100 % of free allowances were promised.

Qualitative assessments of the risk of carbon leakage

The Commission proposal stimulated a number of notes and papers notably the most important ones produced by Commission services.

At a first stage the following qualitative assessments emerged as being relevant for considering a sector or sub-sector being exposed to negative impacts from a price for allowances:

- the change in production costs,
- the ability to pass-through these costs and
- the trade intensity with Non-ETS countries with regard to both exports and imports.

The total impact of participating in the EU ETS finally should show up in the change of profits.

Non-operational indicators

A number of difficulties have become visible when attempts were made to convert the proposed qualitative assessments into quantitative indicators.

Rather soon it was realised that impacts of the carbon market on profits cannot be identified due to several other factors that make profits very volatile.

Similarly path-through indicators turned out to be non operational because of the comprehensive market analysis that would be required.

A number of additional qualitative indicators were identified as being worth considering but were also dismissed because of their limited quantitative applicability as, e.g.

- the abatement potential of a sector or sub-sector,
- transportation costs,
- barriers to trade,
- market structure and
- price elasticities.

Two operational measures

Finally only two indicators emerged as being able of becoming operational measures for carbon leakage:

- carbon cost intensity and
- international trade intensity.

9.2 Measuring carbon cost intensity

Two types of indicators for measuring the carbon cost intensity can be defined.

Value indicators of carbon cost intensity

A value indicator relates the increase in carbon costs triggered by a given carbon price (e.g. € 20 per ton of CO_2) to Gross Value Added (GVA).

In addition a distinction can be made between the direct carbon costs caused by the amount of carbon attributed to the production activity and the indirect carbon cost attributed to the increase in electricity prices.

This is the carbon cost indicator agreed upon in the energy and climate package for identifying sectors and sub-sectors exposed to the risk of carbon leakage. Surprisingly in the documents no carbon price is visible for calculating the carbon cost impacts.

Quantity indicators of carbon cost intensity

A quantity indicator relates the amount of carbon to a unit of Gross Value Added (GVA).

This indicator was proposed by Germany in the final negotiations of the package but was not accepted.

Table A.1: Carbon cost intensities for steel

	Relative carbon cost impact	
	CITL	UNFCCC
	%	%
Austria	12%	13%
Belgium	8%	10%
Bulgaria	91%	94%
Czech Republic	10%	23%
Denmark		
Estonia		
Finland	9%	9%
France	17%	13%
Germany	7%	14%
Greece	4%	4%
Hungary	15%	28%
Ireland		
Italy	8%	6%
Latvia		
Lithuania		
Luxembourg		
Netherlands		
Poland	11%	22%
Portugal	5%	5%
Romania	58%	37%
Slovakia		
Slovenia	3%	4%
Spain	6%	8%
Sweden	5%	4%
United Kingdom	29%	31%

Source: Own calculations based on CITL, UNFCCC and NACE.

Problems and deficiencies

Table A.1 reveals substantial problems emerging from an international comparison. Obviously the fluctuations of this indicator among Member States highly question the usability of the numerical results obtained.

This limited usability can be linked to different causes. One is the volatility of Gross Value Added with respect to product prices, profit margins and different accounting rules for capital costs. Another is the inhomogenity of the product that calls for further disaggregation.

9.3 Measuring trade intensity

Trade intensity as defined in the package

In the energy and climate package the indicator for measuring trade intensity is defined as the total value of exports and imports divided by the total value of turnover and imports at sub-sectoral level.

A more specific trade intensity

A more specific indicator for trade intensity would take into account only export flows to and import flows from Non-ETS countries.

It also makes sense to calculate separate trade intensities for exports and imports in order to get a better understanding of the relative importance of export and import competition.

10 A set of indicators for the EU ETS

Indicators for the EU ETS

The Austrian Institute for Economic Research (WIFO) maintains a comprehensive database of the EU ETS. Based on these data we present a set of trade and carbon cost intensity indicators for a breakdown of seven sectors we could identify in the EU ETS Community Independent Transaction Log (CITL).

Cost intensity indicator

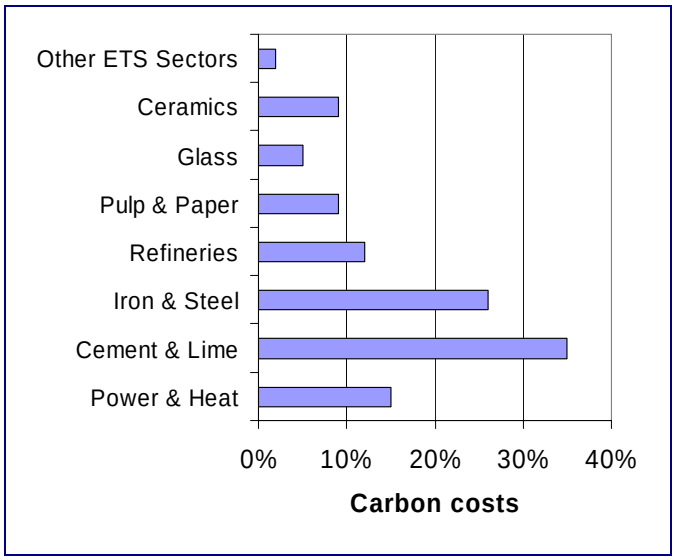
For the carbon cost intensity indicator we rely on direct and indirect cost estimates for UK as presented in Hourcade et al. (2007). The cost effects are based on a € 20 per ton of CO_2 carbon price. Figure A.1 depicts these carbon cost intensities with cement leading, followed by iron and steel. On this level of disaggregation almost all sectors have cost intensity indicators beyond 5 % of Gross Value Added.

Trade intensity indicators

Figure A.2 indicates the amount of import and export competition with Non-ETS countries for each sector defined as trade flows over the value of production.

In addition the cost indicator is marked by colouring the marks of the trade indicators.

Figure A.1: Carbon cost intensities



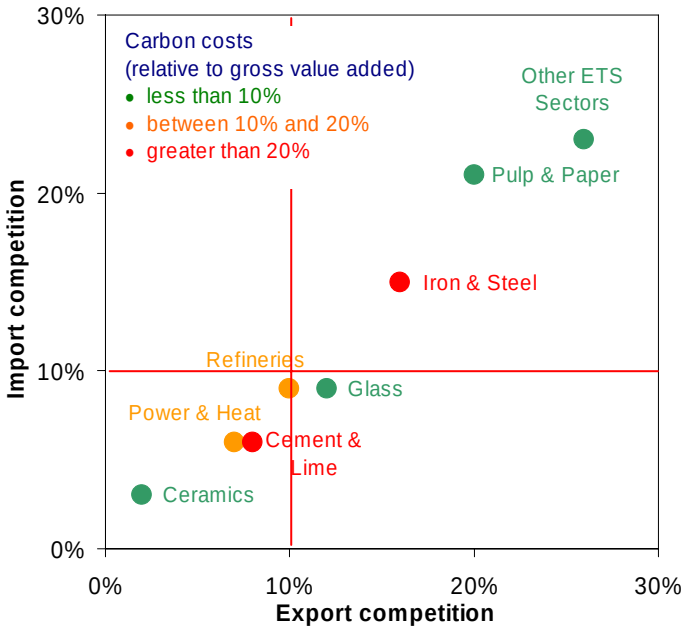
Source: Own calculations based on Hourcade et al. (2007)

Relating these indicators to the indicators in the package

Figure A.2 enables a first judgement about the thresholds defined in the energy and climate package. Almost all sectors – at least on the level of disaggregation used – will pass both the carbon cost and trade intensity criterion.

In addition we can identify sectors that show either an excessive carbon cost intensity, as cement, or an excessive trade intensity, as pulp and paper.

Figure A.2: Trade and Carbon cost intensities in the EU ETS



Source: Own calculations based on WIFO databases

11 Conclusions and suggestions

After having followed the discussion of carbon leakage since the publication of the Commission proposal for the energy and climate package until the final decision of the European Council we want to draw a few conclusions and to make some suggestions.

Reducing the risk of carbon leakage by free allowances

The risk of carbon leakage can be managed by allocating free allowances proportional to their risk of exposure. The following issues, however, should be considered:

- Two indicators for identifying the risk of carbon leakage are essential, one taking into account the carbon cost intensity, the other the trade intensity.
- A single indicator is not sufficient, since sectors or sub-sectors are vulnerable with respect to carbon leakage both because of increases of production cost and/or exposure in international trade.
- International comparisons of the carbon cost intensity are rather difficult because of different accounting principles and inhomogeneous product categories.
- A static analysis of carbon leakage based on one or a few years may not be valid for future judgments because of changes in the carbon markets and in the trade flows.

Suggestions for a Carbon Market Monitoring procedure

We suggest putting the issue of carbon leakage in the context of a comprehensive Carbon Market Monitoring (CMM) procedure which would take care of the following tasks:

- Auctioning of allowances could be arranged by the Carbon Market Monitoring procedure on EU level and auctioning revenues distributed to Member States according to the agreed upon shares.
- If necessary the Carbon Market Monitoring procedure may use the timing and the amount of allowances supplied for auctioning as instrument for stabilizing the carbon price.
- In addition the Carbon Market Monitoring procedure could be responsible for allocating the free allowances to installations based on benchmarking criteria.

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