Reforming the European Emissions Trading Scheme with regard to the EU’s medium- and long-term climate targets
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1 INTRODUCTION

The EU ETS is currently being threatened with the loss of its role as the leading instrument of European climate policy because the price of emission allowances has currently collapsed to 3-4 EUR per tonne of CO$_2$ (or even less over the short term). This is due to an accumulated surplus of approximately 1.7 billion allowances in the second trading period. While the cap (the maximum quantity of emissions), including the permitted amounts of project credits, was set based on higher growth expectations, demand has decreased due, in particular, to production declines in industry. In addition, an availability of a large supply of low-priced project credits from CDM/JI projects has also lowered prices. Thus, the ETS has largely lost its function of increasing the competitiveness of low-carbon technologies and processes via the cap and the CO$_2$ price vis-à-vis emission-intensive technologies and processes. Thus it fails to provide incentives for low-carbon modes of production.

All in all, due to the large surplus within the system and the resulting low prices, the instrument has internationally lost its credibility because no major mitigation efforts by industries participating in the ETS sectors will be needed well into the third trading period (2013-2020).

Some NGOs are therefore already calling for the abolition of, in their opinion, a useless system. At the international level, the EU on the whole has questioned its role as a pioneer in climate policy because it has achieved its climate target for 2020 (20% reduction), chiefly due to an economic crisis and not through an ambitious climate policy. Insisting on the 20% reduction target would be tantamount to a „lost decade“ (WWF, Eurelectric) for climate protection. The incentive effect of CO$_2$ prices is currently insufficient to steer business decisions concerning modes of production and investment in emission-intensive fuels, technologies and processes towards low-carbon modes of production. Since the climate targets beyond 2020 are (still) not legally binding, this does not create a sound basis for investment in emission reduction. New reduction obligations for the period from 2020 will be agreed by 2015 at the earliest.

However, investments in climate-friendly and energy-efficient technologies must be made now to achieve the EU’s long-term climate targets and to avoid lock-in effects that either make it impossible to achieve the climate goals in later years or substantially increase abatement costs (because of „bad investments“ not yet written off). This in particular is true for the European energy sector where major replacement or new investments must be made over the next 10 years and where the investment cycles are long: Today’s planning and construction of fossil fuel power plants determine the extent of emissions in 2050 significantly.

By 2050, the EU aims to reduce its greenhouse gas emissions by 80-95% compared to 1990. In addition to this long-term goal, the March 2011 „Climate Roadmap“ (Roadmap for a Competitive Low Carbon Economy in 2050) also specifies intermediate objectives (2030: 40%, 2040: 60%), which were supported by all Member States except Poland. At the end of March 2013, the European Commission published a „Green Paper“ for the climate and energy policy framework up to 2030, which opened the discussion about the 40% reduction target in GHG emissions by 2030 compared to 1990. Many stakeholders, including the German Federal Environment Agency (UBA), have expressed their opinions, which are currently being evaluated by the European Commission.

On the other hand, the reduction targets and annual emission limits (caps) for the emissions trading sector (ETS) have already been set for the period up to 2020 by the Emissions Trading Directive (ET Directive) and for the non-emissions-trading sector (non-ETS) by the Effort Sharing Decision (ESD).

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1 „Scrap the ETS“ is a coalition of 114 environmental NGOs calling for the abolition of the EU ETS due to its ineffectiveness and lack of ability to function. [www.scrap-the-euets.makenoise.org](http://www.scrap-the-euets.makenoise.org)
2 According to the World Energy Outlook 2012 the current infrastructure already predetermines over 80% of the target emissions permitted by the 2-degree target.
3 cf. e.g. EU Energy Road Map until 2050
4 COM (2011) 112
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This results in a need for action through emissions trading as the cap’s reduction pathway or annual reduction factor of 1.74% as specified in the ET Directive is not sufficient to achieve these medium- and long-term reduction targets – at an approximately uniform distribution of the reduction effort (effort sharing) between ETS and non-ETS sector. In its special report „Towards a 100% renewable electricity supply“ of January 2011, the German Advisory Council on the Environment (SRU) highlighted the fact that the current reduction targets in the EU ETS are not sufficient to achieve the long-term target of a total reduction of 80-95%. They correspond neither to a sustainable development pathway, nor are they stringent enough to motivate enterprises to undertake drastic measures.

The present environment where climate policy decisions are being taken is currently unfavorable for an ambitious EU-wide climate policy: the economic development in some Member States has not yet recovered from economic and financial crisis and an international climate agreement that covers all major industrial and emerging countries from 2020 is still being negotiated. Therefore, there is some fear in business circles that a single-handed EU climate policy would put extra burdens on the European industry and may lead to carbon leakage, i.e. relocation of industrial production and the associated emissions from the EU to non-EU countries with lower environmental standards. This situation is exacerbated by the turmoil in the U.S. energy supply which has led to substantially lower energy prices in the U.S. through the exploitation of shale gas (and decreasing emissions through the replacement of coal by gas). Measures that directly or indirectly lead to an increase in European energy prices are therefore currently politically difficult to implement.

In this situation, policy makers should be aware of the advantages of a strong emissions trading: compared to other climate policy instruments, emissions trading offers companies a very high degree of flexibility and access to low-cost abatement potential. In addition, via the linking of emissions trading systems, it also offers the chance to include those countries which have not committed themselves to ambitious reduction targets for fear of loss of competitiveness and development prospects.
Therefore, the EU Commission and a large number of EU Member States see the need to take action to align the European climate policy to the long-term climate target for 2050 and to restore the incentive function and credibility of emissions trading as a guiding instrument of EU climate policy.

The European Commission has provided various proposals to the Member States to be highlighted and evaluated in detail in this paper:

- **May 2010 - Raising the 2020 climate target to 30%**: (Set-aside: rejected by the European Council, among others, by Poland in June 2011)
- **March 2011 - The Roadmap for a Competitive Low Carbon Economy in 2050 (Climate Roadmap)**: With the exception of Poland, all Member States in the European Council agreed in March 2012.
- **July/November 2012/July 2013 - Backloading** (postponement of auction amounts): The proposal was rejected by the European Parliament in its first reading on 16/04/2013 and delegated back to the committees. Germany had been unable to agree on a national position ahead of the decision, which was interpreted as relevant to the failure of the proposal. A modified proposal was finally adopted by the EU Parliament on 07/03/2013.; on 08/11/2013 member state officials agreed to a modified backloading proposal to amend the Emissions Trading Directive, which could be approved in regular Co-Decision in December 2013/early 2014.
- **November 2012 - Proposals for structural measures**: With its Carbon Market Report the European Commission proposed six measures for the permanent removal of the surplus in the ETS, whose advantages and disadvantages were discussed with participating stakeholders. (Stakeholder meeting on 1 March and 19 April 2013).
- **March 2013 - Presentation of a Green Paper on the framework of the climate and energy policies by 2030** (for consultation until June 2013)

While backloading is supposed to restore market confidence in emissions trading over the short term and to win time for further action, the other measures have a structural nature with long lasting effects and require more time for the investigation of detailed design, impact assessment, and for political opinion formation, negotiation and decision making. The structural measures to reform the ETS are likely to be negotiated and decided in 2015/2016 at the earliest when the new overall EU climate protection target has been stipulated.

Given the far less successful debate on changes in emissions trading at the European level, certain Member States will simultaneously start considering national measures to strengthen the incentive effect of emissions trading. However, as long as such measures remain single-handed and national actions are not taken into account in the EU ETS by appropriate cap adjustments, these measures do not contribute to climate protection nor do they restore international credibility of the European climate policy. Germany should therefore actively and constructively participate in the debate on the reform of the EU ETS.

This discussion paper is aimed at policy makers and the interested specialist public. It includes concrete recommendations on which measures are and are not generally suitable for strengthening and bringing European emissions trading onto the medium- and long-term climate target pathway. This paper is intended to serve as a basis for further discussion, within which detailed and more advanced policy proposals can and must be drawn up.
EU’S MEDIUM- AND LONG-TERM CLIMATE CHANGE TARGETS AND THEIR IMPLICATIONS FOR THE ETS

The EU’s medium- and long-term climate change mitigation targets are discussed to some extent independently from the issue of the ETS’s reactivation, but they are thematically closely linked and have immediate impact on the ETS.

The proposal to increase the climate target for 2020 from 20% to 30% compared to 1990 is becoming increasingly unrealistic from a political perspective. Although this possibility was included in the European Commission’s proposals on the ETS’s structural reform, the Green Paper now only marginally deals with this option. The debate at European level is therefore being shifted towards medium-term objectives by 2030, although UBA still recommends raising the 2020 target.

In addition to the target’s level (40% is proposed compared to 1990), two aspects are crucial for the ETS in determining the 2030 target:

- The distribution of the reduction effort between ETS and non-ETS sectors (effort sharing)
- The amount of permitted credits from compensatory mechanisms (offsets).

The Green Paper has no concrete proposals on these issues yet.

In the following part, interim goals for 2020/2030 will be examined against the backdrop of long-term climate change mitigation targets for 2050. Different scenarios for a possible distribution of the reduction performance between ETS and non-ETS sectors for the EU 27 will also be presented. The scenarios are based on our own calculations; therefore deviations from the Commission’s publications are possible.

EU CLIMATE ROADMAP FOR A LOW-CARBON ECONOMY BY 2050

In Climate Roadmap of March 2011, the European Commission has derived a cost-efficient reduction pathway for the EU under which the internal emissions in the EU must drop by 25% by 2020, 40% by 2030, 60% by 2040 and 80% by 2050 compared to 1990. Accordingly, the current EU GHG emissions reduction target of 20% by 2020 misses the long-term reduction pathway for 2050 (see Figure 2). Due to a lack of ambitious caps in the EU ETS and the resulting accumulated surpluses which may be transferred to the third trading period, the real emissions in the EU will continue to miss the long-term cost-efficient target pathway.

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5 Croatia is not included in the paper due to a lack of data availability.
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Figure 2 shows the current 2013-2020 EU 27 reduction pathway of emission limits for the ETS and non-ETS sectors (according to ESD) compared to the Climate Roadmap. In addition to the annual caps, the use of project credits still available from the Kyoto mechanisms is shown. The permitted offset ratios for emissions trading for the period 2013-2020 amount to an average of about 75 million (grey), the average amount for the non-ETS sector is about 97 million per year (light blue). The total cap of ETS will increase accordingly. In the third emissions trading period the surpluses (light green) accrued in the second trading period can also be used. This means that the actual emissions may be even farther from the long-term target pathway. The figure clearly shows that the EU 27 is currently well above the long-term target pathway of the Climate Roadmap by 2050.

As part of their impact assessments of various policy measures, the European Commission makes calculations for cost-effectively allocating the reduction targets to the ETS and non-ETS sectors. Unlike the roadmap targets and the second Commitment period of the Kyoto Protocol, for which 1990 is the reference year, the reduction targets for the ETS and non-ETS areas use 2005 as the base year. The reason being that 2005 was the first year in which reliable data for the GHG emissions from ETS installations were collected. In addition, 2005 serves as a more recent starting point for calculating the cost-effective allocation between the two sectors. For the macroeconomic analysis found in the impact assessment of the EU (Impact Assessment) decarbonisation, the European Commission mainly uses three energy market and greenhouse gas models (PRIMES, POLES, GAINS), in which different energy prices, technology and climate policy scenarios are modeled.

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6 Theoretically, approximately 600 million project credits can still be used in the ETS in 2013-2020. Due to the quotas for new installations, the exact amount, which is based on the verified emissions, cannot be quantified (internal calculation pursuing Directive 2003/87/EC, Article (11a)(8)(5), Decision 406/2009/EC Article (5)(4)).

7 For the graphic, the surpluses (1.7 billion EUA as estimated by the end of 2012) were uniformly distributed over the years 2013 to 2020. The fact that the surpluses may continue to rise in the course of the 3rd TP, has not been included here.
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The different scenarios are based on pre-defined assumptions about the availability and the cost of abatement technologies. As a result of the models, a uniform carbon price across all sectors emerges, which induces changes in technology choice and demand behavior. Based on the results, the respective (cost-effective) reduction contributions of the sectors are derived. For the 20% target by 2020, a reduction of 21% for the ETS and 10% for the non-ETS sectors compared to 2005 was seen as cost-efficient, and recorded in the climate package for 2020. In the Impact Assessment of the Climate Roadmap 2050, the European Commission assumes that after 2020, a greater reduction contribution of ETS is cost effective. Depending on the scenario, emissions in the ETS are to be reduced by an average of around 90% compared to 2005, emissions in non-ETS sectors by an average of approximately 69% (by 2030 the ratio would be - 45% / -30%).

It is noteworthy that the 2050 target of 80% referred to in the Climate Roadmap, as well as the interim targets for 2030 and 2040 relate to internal emission reductions, meaning that the reductions must be achieved within the EU and cannot, for example, be offset by project credits from third countries. Although the Green Paper quotes the 40% target as an EU internal target, it does not mention additional reduction options via credits – it is merely noted that the admissibility of international credits must be evaluated.

In the following we will look at different scenarios for cap trends and for the allocation of the reduction effort between ETS and non-ETS sectors, which are currently being discussed, can be derived easily, and which represent a principally politically feasible range for the respective reduction contributions. Since the scenarios were developed from the European Commission Green Paper, in the context of the 2030 climate package discussion, the first three scenarios vary only in the period after 2020 (i.e., no change in the climate target for 2020). A fourth scenario will investigate the contribution emissions trading can make through higher reduction targets prior to 2020.

The overarching goal of all scenarios is to reduce the EU27’s greenhouse gas emissions by 80% by 2050 compared to 1990 (this is a minimum target). Scenario 1 describes the ETS status quo, and extrapolates a linear reduction factor of 1.74% until 2050, as it is current legal basis of ETS Directive. Scenario 2 examines the Cap trend if ETS and non-ETS each provide the same absolute annual reduction contribution from 2020 onward. Scenario 3 describes the cost-effective reduction allocation between ETS and non-ETS according to the Climate Roadmap. Finally, Scenario 4 examines how the EU could achieve a 30% reduction of their emissions by 2020, by raising the linear reduction factor in the ETS from 2016 onward.

For a discussion of EU objectives to be introduced into an international context, additional reduction efforts outside the EU would have to be considered, including the appropriate scenarios. In that respect, the following depictions are based only on an internal EU perspective and do not capture the entire context of possible reduction activities outside the EU. Therefore, the European Commission has also initiated a further participation process on international obligation, in addition to the Green Paper participation process. For further analysis, it would therefore be interesting to also look at:

- the inclusion of net transfers in linking different systems,
- offsetting credits and other reduction activities from regional emissions trading systems, new market mechanisms or other measures.

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8 The cost estimates are always based on a view from a specific point in time, in this case March 2011, which would have to be updated in the course of the 2030 climate package negotiations. The DIW (German Institute for Economic Research) also calls for an updated calculation of the 2030 Green Paper (Weekly Report No. 29/2013).

9 A retroactive increase of the reduction factor from 2013 on is unrealistic. Given the necessary political and legislative processes, we assume that 2016 is the earliest possible date for an adjustment.
2.2 SCENARIO 1: STATUS QUO

If the emissions trading reduction path is continued using the 1.74% annual cap decrease from 2013 onward, the EU’s long-term reduction goals can only be reached by having a greater proportion of non-ETS sectors engaged in the reduction effort. The annual reduction in the non-ETS sector emissions budget is 22 million from 2013 onward, compared to the annual ETS reduction of 37.4 million. If the ETS maintained a constant rate of reduction (37.4 million), then, beginning in 2020, the non-ETS sectors would have to annually reduce by 70 million, and then by 74 million beginning in 2030, in order to achieve a long-term reduction of GHG emissions of 80% by 2050. Around 60% of total GHG emissions in 2050 would be attributable to ETS and 40% to the non-ETS sectors (an almost inverse relationship to the 2005 allocation of emissions).

![Scenario 1 - continuous reduction factor of 1.74% in the ETS - non-ETS reduction increases according to the long-term targets - in millions of tons of CO$_2$e](image)

<table>
<thead>
<tr>
<th></th>
<th>ETS</th>
<th>Non-ETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>absolute</td>
<td>262</td>
<td>374</td>
</tr>
<tr>
<td>annually</td>
<td>37.4</td>
<td>37.4</td>
</tr>
<tr>
<td>Vis a vis 2005</td>
<td>21%</td>
<td>38%</td>
</tr>
<tr>
<td>Linear reduction factor</td>
<td>1.74%</td>
<td>1.74%</td>
</tr>
</tbody>
</table>

2.3 SCENARIO 2: EQUAL REDUCTION CONTRIBUTION OF ETS AND NON-ETS FROM 2020 ONWARD

Scenario 2 shows the distribution when reaching the 80% target with equal absolute annual reduction contributions from ETS and non-ETS from 2020 onward (i.e. equal absolute reduction of emissions budgets). From 2020 on, ETS and non-ETS would have to reduce emissions by 54 million per year respectively, and after 2030 by 56 million per year, in order to lower EU GHG emissions by 80% by 2050, compared to 1990. The average linear reduction factor of the ETS sectors would therefore be 2.39% for the 2013-2050 period, and 2.56% for 2020-2050. Compared to Scenario 1, emissions trading would have to drive a significantly greater reduction in this scenario. The share of total GHG emissions in 2050 would be at about 11% for the ETS and 89% for non-ETS.
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### Figure 4:

Scenario 2 - equal annual absolute reduction contribution of ETS and non-ETS from 2020, in millions of tons of CO₂e

<table>
<thead>
<tr>
<th></th>
<th>ETS</th>
<th>Non-ETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of the emissions budget</td>
<td></td>
<td></td>
</tr>
<tr>
<td>absolute annually</td>
<td>262 537 557 557</td>
<td>156 537 557 557</td>
</tr>
<tr>
<td>Vis a vis 2005</td>
<td>21% 45% 70% 94%</td>
<td>10% 28% 47% 66%</td>
</tr>
<tr>
<td>Linear reduction factor</td>
<td>1.74% 2.49% 2.59% 2.59%</td>
<td>2.40% 2.56%</td>
</tr>
</tbody>
</table>

### 2.4 SCENARIO 3: COST-EFFECTIVE ALLOCATION OF THE REDUCTION EFFORT ACCORDING TO THE CLIMATE ROADMAP

Scenario 3 is what the European Commission sees as the cost-effective allocation of reduction contributions between the ETS and non-ETS sectors. The European Commission assumes that a greater reduction contribution by the ETS compared to the contribution of the non-ETS will also be cost effective after 2020. The Roadmap model recommends a 45% reduction of ETS emissions by 2030, and 90% by 2050 (compared to 2005). In comparison, the emissions from non-ETS sectors up to 2030 would have to be reduced by about 30%, and by approximately 69% by 2050 (also compared to 2005). In this scenario, the ETS would in 2050 account for about 20% of total GHG emissions and the non-ETS would account for around 80%.

Figure 5 clearly shows that the current ETS reduction factor of 1.74% is far from cost-effective and that in the decade from 2021 to 2030 clearly more needs to be reduced to get back on the cost-effective path: the linear reduction factor would have to increase to 2.51% per year by 2030, and decrease down to 2.35% from 2030 on.
For a uniform distribution of the reduction effort, the linear reduction factor would have to be an average of 2.28% per year (starting from 2013) or 2.4% (starting from 2020), in order to achieve the long-term cost-effective distribution of the reduction effort.

Figure 5: Scenario 3 - Cost-effective allocation of the reduction effort according to the Climate Roadmap (ETS - reduction by 90% by 2050 compared to 2005, non-ETS by 69%, ETS reduction by 2030 by 45%, non-ETS by 30% compared to 2005), in millions of tons of CO₂e

<table>
<thead>
<tr>
<th></th>
<th>ETS</th>
<th>Non-ETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of the emissions budget 2013-2020</td>
<td>1,814</td>
<td>1,887</td>
</tr>
<tr>
<td></td>
<td>2020-2030</td>
<td>540</td>
</tr>
<tr>
<td></td>
<td>2030-2040</td>
<td>506</td>
</tr>
<tr>
<td></td>
<td>2040-2050</td>
<td>51</td>
</tr>
<tr>
<td>Vis a vis 2005</td>
<td>21%</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>2013-2020</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>2020-2030</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>2030-2040</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>2040-2050</td>
<td>90%</td>
</tr>
<tr>
<td>Linear reduction factor average 2013-2050</td>
<td>2.28%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2020-2050</td>
<td>2.40%</td>
</tr>
</tbody>
</table>

2.5 IMPACT OF SCENARIO 3 ON THE REDUCTION OF SURPLUSES

Figure 6 shows the progression of the emissions trading cap in the European Commission scenario with an emission reduction of 45% by 2030, based on 2005. The 2013 VET emissions (verified emissions) were estimated using the average of 2005-2012, and the accumulated surpluses from 2008 to 2012 amount to 1.7 billion EUAs. If emissions were to be extrapolated without change, the surpluses would be annulled by 2022. However, assuming a reduction in emissions over the period, and assuming a constant decrease of 1% per annum, the surplus will only start to noticeably degrade after 2020 and disappear entirely from the market from 2025 on.
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The large differences between Scenario 1 (continuation of the 1.74% reduction factor) and Scenario 3 as proposed by the European Commission in the Climate Roadmap, suggest that a 40% target is not compatible with an unchanged reduction factor, because this would lead to a disproportionate (and not cost-effective according to the European Commission) strain on the non-ETS sectors.

When assuming the 40% target for 2030, a significantly higher reduction factor for the ETS would have to be expected after 2020 at the latest, independent of the final effort-sharing ratio. An early definition of this target would send a clear scarcity signal during the 3rd trading period, although the specification of the regulations, including setting the caps for ETS / non-ETS would not take place until the end of the trading period.

On the other hand, it also becomes clear that the increase of the reduction factor alone would indeed take the ETS on the long-term reduction path, but would only eliminate the surpluses from the market at a future date (depending on the assumption regarding the future development of emissions by 2022 or later). Because of lock-in effects, this may result in drastic increases in abatement costs, once the surplus has been eliminated.

2.6 SCENARIO 4: TAKING ADVANTAGE OF THE CRISIS: TAKING ACTION EARLY FOR ETS REDUCTIONS (BEFORE 2020)

The existing surplus in the system suggests that much more can be reduced in the ETS short term, i.e. until 2020, than provided for by current legislation. In addition, the current emissions of the ETS sectors clearly show that the 20% target has already almost been reached. Achieving the 30% target by 2020 is now possible at a lower cost than originally assumed. Even if the focus has shifted to 2030 with the publication of the Green Paper, a 4th scenario will investigate how the EU 27 could reduce their greenhouse gas emissions by 30% by 2020, if the ETS target (= cap) was adjusted accordingly without changing the non-ETS sector objectives set according to ESD.
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Two options are conceivable in principle. Either the cap is retroactively reduced from 2013-2020, or the cap reduction begins at a later date. In the first case, this would mean for the ETS that the linear reduction factor should be increased from 1.74% per annum to 4.14% per annum (effective for the period 2013-2020). However, it would have to be examined to what extent a retroactive change is even legally permissible. The political feasibility of such a scenario is also questionable.

In order to design a more realistic path towards reaching the 30% target, the following focuses on a scenario in which the reduction is increased only from 2016 on, i.e. from the middle of the third trading period. It illustrates that, via an early lift in ETS ambitions, which, because of the existing surplus would only mean minor additional burden on companies, the EU could achieve a 30% target, thereby regaining its role as a pioneer in international climate protection, and could get closer to the long-term reduction path of the Climate Roadmap.

Scenario 4 comes to the conclusion that the reduction in the EU ETS between 2013 and 2020 is significantly greater, i.e. 1.55 billion t CO$_2$e than in Scenario 1 (status quo).

The annual amount reduced in the years 2016 – 2020 with about 141 million would be almost four times as high as at present (37.4 million). Given the current surplus of nearly 2 billion and a quota for the use of project credits still available in the third trading period (about 75 million per year), this level of ambition appears to be achievable and adequate.

10 The 2013 cap would already be lower by 112 million EUAs than in the status quo.

11 The difference between available emission allowances and surrendered project credits (EUA-2nd TP plus CER/ERU) on the one side and verified emissions (VET) on the other is approx. 1.7 billion EUAs. In addition, nearly 300 million EUA-3rd TP were auctioned in 2012 (early auctions and auctions from the NER300) so that the surplus currently amounts to approx. 2 billion. This value is also communicated by the European Commission.
It is noteworthy that after 2020, in this scenario, the annual reduction effort to achieve the long-term objective decreases noticeably and would be at a similar to the current level (35 million per year, which would correspond to a linear reduction factor of 1.61%). A higher, but manageable level of ambition due to the accumulated surplus, would facilitate efforts accordingly after 2020.

Scenario 4 shows that the 30% reduction target by 2020 can be met within the ETS sectors as the additional reduction corresponds to less than the current surplus. In addition, this scenario would bring the ETS closer to the long-term Climate Roadmap reduction pathway. Raising the levels of ambition is possible at lower costs than initially expected, and averts drastic reductions from being made in later years. Moreover, when action is taken early, the cumulative reduction over the 2013-2050 period is significantly greater than when the reduction amount has been subsequently increased.

3 PROPOSALS TO REFORM ETS PRIOR TO 2020

The backloading proposal (shifting the auctioning of 900 million EUAs to the end of the third trading period) presented in November 2012 is intended as a measure and it also aims to give a political signal to restore confidence in the ETS over the short term and to distribute the large amounts of certificates introduced into the market in 2012/2013 more evenly over the period. The effects of a purely time-related shift of auction volumes on the price without a permanent cancellation of the certificates are likely to be rather moderate since the certificates will have already been placed on the market within the 3rd trading period.

The discussion about the reactivation of the ETS will therefore be focused on the structural measures. These can be distinguished as:

- Measures to reduce the accumulated surplus which are, in principle, still possible in the course of the 3rd trading period
- Measures to permanently stabilise the system (avoiding the build-up of surplus) – which are only possible from the 4th trading period.

The former measures include set-aside (permanent closure of certificates), tightening the climate target to 30% by 2020 and an early adaptation of the linear reduction factor.

A set-aside would reduce the surplus on the market or remove parts thereof fastest and would certainly be an appropriate measure. Whereas the modified backloading proposal of July and November 2013 excludes a final cancellation of the backloading amount, this would principally still be possible if the member states agree. The backloading decision can therefore be understood as a first step to initiate further structural measures. The reform measures adopted in February 2013 in RGGI (see Section 4.4) present an example of how such a set-aside can be implemented in practice or how surplus accrued can be removed from the market.

Although tightening the climate target by 2020 is currently rather unlikely12, it may become important during the review of the Kyoto reduction commitments by mid-2014 and, as shown above in Scenario 4 in Section 2, may be affordable within the ETS sectors because the surplus from the second trading period would mitigate the additional burden. A sole tightening of the climate target with a corresponding reduction of the cap in emissions trading would, however, eliminate the surplus only after 2020 (see Figure 6 and Öko-Institut 2012).

In addition, the linear reduction factor for the ETS could in principle be increased to e.g. 2.35% as early as from 2016 in the context of negotiations on the 2030 climate package. This would, at an early stage, bring the ETS onto the medium- and long-term reduction pathway and avoid large jumps in the reduction pathway and technological lock-in effects (see Scenario 3, Section 2).

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12 According to a Point Carbon Report of 19.04.2013, director general Jos Delbeke ruled out a tightening of the climate target for 2020 and an extension of the ETS to other sectors prior to 2020.
4 PROPOSALS TO REFORM ETS FROM 2020

The European Commission’s proposals in the Carbon Market Report are primarily aimed at measures that show their effects within the third trading period, i.e., prior to 2020. Proposals that can realistically only be implemented in the fourth trading period are therefore explained only in general terms. The proposals are associated with far-reaching and fundamental interventions in the ETS, their shape and effects are still quite unclear and should be further investigated.

4.1 EXTENSION OF THE EU ETS TO OTHER SECTORS

The European Commission’s proposal to extend the ETS to other sectors is very vague and does not mention, for example, which sectors should be included, e.g. transport, building sector, commerce or agriculture. However, the proposal refers to energy- and fuel-related emissions, so that in all probability, the transport and building sector will be considered primarily. Also, questions regarding the design, such as whether downstream emissions (facility-related) or upstream emissions (occurring at fuel vendors) should be included, remain open.

Various reasons speak for the inclusion of other sectors in the emissions trading:

- Sectors such as transport, the building sector and agriculture are less dependent on economic fluctuations than the ETS sectors of energy and industry. The inclusion of these less cyclical sectors would therefore make the ETS altogether less vulnerable to economic fluctuations.
- Theoretically, a larger scope leads to a higher overall efficiency, since, in principle, the most cost-effective preventive measures are carried out first.
- At least the transport and building sectors are less exposed to carbon leakage than the current ETS sectors.
- The transport and building sectors are major emitters, and the significance of transport is increasing.
- In addition to aviation, rail transport is already included in emissions trading and is thus disadvantaged in a modal split over non-electrically-powered transport.
- Other emissions trading systems also involve other sectors so that first-hand experience is available. In the past, some Member States such as Poland have thrown their weight behind the inclusion of the transport sector in the ETS.

UBA is currently rather critical towards including other sectors in the ETS. The paper “Klimaschutz und Emissionshandel in der Landwirtschaft” (2013, in German only) provides at most a long-term option for the inclusion of agriculture in the emissions trading. However, other instruments seem to be more suitable to reduce greenhouse gas emissions in agriculture for the foreseeable future.

A running UFOPLAN project “Extension of emissions trading to new sectors and small emitters” (FKZ 3710 41 129) currently rather critically considers the integration of transport and building sectors via an upstream system since abatement costs are high in these sectors and price elasticity is relatively low. This means that even high CO₂ prices would lead to minor reductions only in these sectors. For the “classic” ETS sectors, this would result in higher allowance prices and, correspondingly, higher reduction costs. This could lead to discussions on the fairness of distribution among the sectors. Also, prevention efforts would possibly be thwarted in other sectors because the reductions targets could be met with cheaper ETS allowances (PBL Netherlands Environmental Agency, 2013).

13 But other fluctuations such as weather would affect the amount of emissions.
14 Examples are: California also includes gas and oil suppliers in the ETS via an upstream approach from 2015, so potentially the building and transport sectors. Australia integrates gas suppliers, and includes oil suppliers on a voluntary basis (as an alternative to paying the fuel tax). In Tokyo, the building sector is included.
15 Thus, in an unpublished discussion paper “Future of the ETS up to 2030” of April 2012.
4.2 FURTHER LIMITATION OF PERMITTED OFFSETS

The proportion\textsuperscript{16} of permitted project credits from the Kyoto mechanisms in the 2008-2012 period was high compared to younger emissions trading schemes and there was a large supply of offset projects. Consequently, the prices for allowances from CDM and JI projects were very low (1 CER cost less than 0.4 € in 2013, 1 ERU less than 0.2 €) which has significantly contributed to the use of project credits within the EU ETS in the second trading period. However, very little additional potential offset amounts have been permitted for the 2013-2020 period, thus for the 2008-2020 period, there is a maximum possible offset ratio of approx. 6.6% EU-wide based on the total cap\textsuperscript{17}. Some authors view the use of project credits as a major source of surplus in the ETS (e.g. Matthes/Herrmann 2012). The European Commission also attributes a significant role to these Kyoto mechanisms in the build-up of surplus. However, the surplus is in particular ultimately due to the lack of an ambitious cap and the following, still ongoing economic and financial crisis. While flexibility was indeed desired via a generous permission of project credits, the effect of the credits as a de facto extension of the cap has not adequately been checked. The European Commission proposes, among others, not permitting international project credits from the 4th trading period onwards, or only to a limited extent. Thus, incentives for reductions within the EU should be strengthened. This should be weighed against the role of market-based mechanisms for the international climate regime (in particular market-based financing contributions to climate protection as well as so-called co-benefits such as sustainable development, technology transfer, and capacity building).

The European Commission also recommends that the permission of offsets is linked to price development or a supply control mechanism. Thus the price-absorbing function of offsets is provided when emission allowance demand is high, but no surplus is generated when demand is low.

In this case, the European Commission also establishes a connection to climate negotiations: under favourable conditions, e.g. after the conclusion of an international agreement with reduction commitments for all major emitters, the cap in the ETS could be lowered and simultaneously reopened so as to damp the price therefore allowing offsets to be used. The UK has proposed such an approach in the context of the discussion on the 2030 energy and climate package Green Paper: the EU’s 40% target for internal reductions by 2030 should be increased to 50% if an ambitious global climate agreement has been reached.\textsuperscript{18}

The permission for offsets must also be viewed in terms of the definition and achievement of targets: the 80% reduction target by 2050 compared to 1990 is an internal target, i.e. the reductions must be made within the EU (c.f. Low Carbon Roadmap). The same applies to the 40% interim target announced by 2030. The permission of external credits should therefore be associated with a stricter aim in order not to miss again the target pathway of the Climate Roadmap: 80% internal reduction compared to 1990.

Basically, the European Commission’s proposal for re-structuring the use of compensation mechanisms from the 4th trading period is worth considering.

However, a complete waiver of compensation mechanisms, also in conjunction with net reductions, as currently required under the new market mechanism, seems to make little sense. For emerging and developing countries bind their own climate protection commitments to the commitment of financial transfers for investment in mitigation technologies that (chiefly) should come from the private sector.

\textsuperscript{16} The use of project credits is generally limited by the ET Directive (Emissions Trading Directive) in 50% of the 2008-2012 reduction amount. For installation operators, different rates apply: operators of existing installations can use project credits in the range of 11-22% of their 2008-2012 allocation amount in the 2008-2020 period (national rates differ, as of 2013 at least 11%, average 15%). For new installations, a rate of 4.5% of their annual emissions applies. However, Australia has also provided a rather generous rate of 50% with respect to the emission quantities (which is reduced to 12.5% when linked with the EU).

\textsuperscript{17} In the 2008-2020 period, the offset ratio is based on the total cap, on average about 6.6% (max. approx. 1.7 billion based on a 25.7 billion ETS cap (about 10.4 billion during the second trading period plus approx. 15.3 billion in the third trading period).

On the other hand the European participants in emissions trading seek compensation through more cost-effective mitigation measures in third countries in order to reduce any distortion of competition in terms of the CO₂ cost.

However, it is expected that after 2020, a number of emerging countries will have established emissions trading schemes (probably limited to specific sectors), so that today’s project-based compensation mechanisms or the discussed sectoral market mechanisms can be replaced with a complete or partial linking of emissions trading systems in industrialised and emerging countries such as China, South Korea or South American „pioneers“ (Brazil? Chile?). Then, at least in these countries, offsetting would be an aspect of a carbon market growing together with various independent but interrelated emissions trading schemes.

Therefore, the challenge for the 4th trading period will be to preserve the flexibility mechanisms of the EU ETS and the linking possibility for other ET systems and to ensure that the EU will internally achieve a minimum reduction of 40% by 2030. Correspondingly, stricter internal quantity targets must be set for the cap and the budgets for the non-ETS sector.

In addition, it must be guaranteed that the use of offsets (or emission allowances from other systems) neither erodes the internal targets nor the incentive effect required, but leads to one’s own ambitious targets.

4.3 PRICE-BASED SUPPLY MANAGEMENT

In the discussion around structural measures to reform the ETS, the European Commission’s proposals for introducing a price management mechanism to reduce price fluctuations and to avoid price crashes, have received special attention (see also the discussion in the context of stakeholder participation of the European Commission 1 March 2013). The discussion was about a minimum price for auctions and a price management reserve which, as soon as prices fall below a yet to be determined limit, a certain amount will be transferred to a reserve - this amount is then released when a yet to be specified price limit is exceeded. Such mechanisms already exist in emissions trading in California / Quebec as well as in the North American RGGI system.

One argument for the introduction of a minimum price or a price management mechanism is the fact that a minimum price would reduce the certificate price uncertainty and would thereby help establish the planning certainty necessary for investments in climate-friendly technologies (see also PBL 2013). In periods of unexpected shortfall in demand, a minimum price would take effect immediately, whereas ex-post adjustment of the cap or volume based supply management (see 4.4) would have a delayed effect.

However, the introduction of a price management mechanism would fundamentally change the nature of the ETS as a volume-based management instrument, and a new method for determining price limits would have to be developed (Diekmann 2012). It is likely that the minimum price would be determined as a result of a political negotiation process, which, because Member States are economically very differently developed, would likely lead to an agreement on the lowest common denominator and, from the perspective of ambitious countries, would perhaps not provide the desired investment incentive. In addition, procedures and deadlines for price adjustment would have to be negotiated and determined as is it is safe to assume that the understanding of „correct“ minimum or maximum prices will change over the years. The introduction of such a price management mechanism would significantly increase the complexity of emissions trading, as well as the risk of political interference in the market. Also, such a pricing mechanism cannot mitigate a longer lasting disturbance of the balance between supply and demand in emissions trading or replace a stringent cap, but merely serve as a complement to reduce the volatility in the market and to increase the reliability of the emissions trading system.

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19 The minimum price for auctions discussed here must not be confused with a tax-like CO₂ levy, as was introduced in April 2013 in the UK, see Section 5. While an auction reserve price serves to create scarcity in supply when the price drops below the price limit, such a levy does not affect the supply, but rather the demand for emission allowances.

20 It makes sense to set a minimum price dynamically – the California auction reserve price increases annually by 5% plus the inflation rate.
Another argument against the introduction of a price management mechanism in the EU ETS is the prospect of future linking with other emissions trading schemes: in such a linking, existing price limits in the two systems would have to be identical or at least similar otherwise a minimum price could be evaded via the other system (see DEHSt 2013). Price management mechanisms can therefore make it more difficult to link with other systems that do not provide a price mechanism or other price limits.

4.4 VOLUME-BASED SUPPLY MANAGEMENT

In view of the aforementioned reasons against the imposition of a price management mechanism, the alternative of a volume-based regulation of the supply of emission allowances deserves an in-depth examination. Though it was not proposed in the carbon market report of the European Commission, it is also currently being discussed among policy makers.21 There are several ways a quantity-based supply management could work:

One possibility is a rolling Cap, as in the Australian ETS. Here, the cap is always set in advance for the next five years, thereby maintaining the ex-ante principle, but with the concurrent option of readjustment. In that regards there is a question about vulnerability to political influence and to what extent that might lead to uncertainty in planning and ongoing pressure to justify the reduction targets.

Another, more restrictive form of volume control would be a rule-based mechanism for cap adjustment in the event of external shocks such as extraordinary decline in demand due to a recession – as proposed by Diekmann (2012). This would be closely linked to a yet to be defined protracted decline in the economic development and would therefore only apply under exceptional circumstances. Declines in demand that are not caused by an economic decline, but would rather be triggered by other developments such as the switch in fuel from coal to shale gas in the U.S., would not be covered by such a mechanism so that surpluses could still accumulate in the emissions trading system in such cases.

Also useful, especially for very long trading periods such as in the EU ETS, could be a regular review process (see Diekmann 2012) - for example, a regular review of the ex-ante set cap and the underlying assumptions could be stipulated for the middle of a trading period.

Such a review process was provided for in the RGGI system, which culminated in a comprehensive package of measures for the subsequent adjustment of the cap and the reduction of surpluses in February 2013, (reduction of the cap by 45% in 2014). The measures are expected to be completed by early 2014. In recent years RGGI was regularly characterised by large surpluses of emission allowances and very low prices (and often not all volumes were bought at the applicable minimum price in the auctions). One reason for the consistently lower actual emissions was the increasing substitution of coal by shale gas for power generation. As a result of the review process, not only a one-time reduction of the cap (based on the actual current emissions) by 45% for 2014 was suggested, but also a mechanism for the reduction of the historic surpluses.

The surpluses that accrued in the 2009-2011 period (defined as emission allowances minus actual emissions) are deducted from the cap over the 2014-2020 period, and the surpluses accrued in the 2012-2013 period are deducted from the cap over the 2015-2020 period.

Both the review process in RGGI and the Australian emissions trading scheme show how ways of ex-ante cap-setting and the associated planning security for companies can be combined with greater system flexibility, and how re-adjustment works in cases of unanticipated decline in demand.

21 For instance during an expert meeting organized by the European Commission on 2/10/2013.
5 NATIONAL MEASURES AS A SUBSTITUTE FOR INEFFECTIVE EMISSIONS TRADING?

Emissions trading ensures that the prescribed reduction targets are achieved via the binding emissions cap. Due to the high surpluses from the 2nd trading period and the insufficiently ambitious target, it turns out that there is no adequate scarcity signal in the market. The result is a low price for emission allowances and therefore a low incentive for low-carbon modes of production and investment in low carbon technologies.

In this situation, some Member States are discussing national measures to increase the price of CO$_2$ in order to nationally support the structural transformation to a low carbon economy, and to correct any unwanted signals emanating from a very low CO$_2$ price. However, this leads to a further fragmentation of European energy and climate policy.

In the UK, starting from April 2013, there is already a national minimum price for CO$_2$ (Carbon Price Floor, CPF) for electricity producers, which increases from an initial £16 per t CO$_2$ to £30 in 2020. The minimum price is to be achieved by a levy (Climate Change Levy, CCL), which is calculated from the carbon content of fuels and the price of emission allowances (EUAs). This provides a stronger incentive to electricity generation companies to reduce emissions and to use of low emission fuels or processes.

With an unchanged European emissions trading budget, this tends to lead to decreased total demand for emission allowances in the EU ETS. However, without corresponding removal or decommissioning of certificates by the UK government emissions will not be reduced because emissions prevented in the UK will be discharged elsewhere or more surpluses will be accumulated. Thereby this national measure potentially leads to a further decline in the EUA price and aggravates the surplus problem (if it was not considered in the setting of the cap). National measures such as the Carbon Price Floor are thus not suitable for solving the crisis of the European ETS.

Conceivable in principle but legally difficult to implement would also be national initiatives by ambitious EU Member States to remove surpluses from the market. Since a reduction of the auctioned volume (or a complete abandonment of auctions) is not provided for in the Auction Regulation, only national programs for the purchase and decommissioning of certificates remain as an option (national set-aside). In order to be quantitatively relevant and to have an effect on the price, the quantity would however have to have an order of magnitude approximately equal to the surplus amount – currently about 1.7 billion EUA. Even if several Member States were to join together as pioneers for such an initiative, it would mean substantial fiscal burdens for those Member States. In addition, there are technical questions, such as whether the purchase should take place on the secondary market or on the primary market, linked to the question of who buys the quantities and who gets the benefit from the resulting revenues. National measures to stabilise the EUA price will therefore hardly find political acceptance. Apart from measures that are directly linked to the EU ETS, there are already other national tax or regulatory policies with a direct impact on emissions trading: these are often fuel-specific - such as the „emission performance standard“ in the UK which allows the building of new coal-fired power plants only in conjunction with CCS. Denmark and Finland have announced a phasing out of the use of coal.

After the price signal which resulted from the back-loading-decision of the European Parliament was – as expected – rather negligible, the political pressure in favour of national measures to strengthen the EUA price is rising, also in Germany, because the low EUA price leads to high EEG differential costs (additional costs caused by the German Feed-in-tariff EEG) on the one hand, and, because of lower electricity prices, also endangers the profitability of flexible gas power plants, which are an important building block for the energy turnaround. Therefore, in its most recent report, the Advisory Council on the Environment (SRU) of the Federal Government recommends the introduction of a CO$_2$ minimum tax if the rapid reform of the European emissions trading scheme should not succeed.

22 Unlike a price mechanism with minimum prices at the auctions (see Section 4.3) the CO$_2$ levy does not affect the supply of emission allowances, but the demand.

23 SRU (2013): Designing the electricity market of the future.
In the event of a failure of the ETS reform, the E.ON Chairman of the Board, Mr. Johannes Teyssen, has called for the introduction of a carbon tax.

While the motivation for solely national initiatives in the face of a lack of agreement at the European level is clear, the climate protection effect of such measures is questionable, since the emissions reduced in one state can be discharged in other sectors and other Member States as long as the overall European cap is not adjusted accordingly. In addition, such measures entail severe losses in efficiency compared to a functioning emissions trading scheme. **An agreement at a European level is therefore strongly preferable to further national measures which are aimed at strengthening the incentive effect of the CO\textsubscript{2} price.**
6  POLITICAL SCHEDULE

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7  CONCLUSION AND OPEN QUESTIONS

Emissions trading was introduced in 2005 as a leading instrument of the EU’s climate policy in order to achieve the reduction targets in the most cost efficient manner. The world’s first and still largest emissions trading system has found international attention and now has a number of imitators. As a volume control instrument, emissions trading guarantees the accurate fulfilment of reduction targets. This is its big advantage over fiscal or regulatory measures because their impact on real emission development is uncertain. Generally, emissions trading also finds wide acceptance in industry because it allows companies a high degree of flexibility and is less costly compared to tax and regulatory measures since it focuses initially on tapping the least expensive prevention potential. Emissions trading also provides access to the usually much cheaper prevention measures abroad via the option of using credits from the Kyoto Protocol’s flexible mechanisms or through future linking to other emissions trading systems. Even if emissions trading alone cannot drive the structural transformation to a low carbon economy and stimulate the necessary technological innovations, it is still the only instrument that ensures the EU-wide compliance with the European reduction targets in a cost-effective manner and with a high degree of flexibility.

Although emissions trading completely fulfils its main goal of achieving reduction targets, its credibility and effectiveness is currently at risk due to persistently low prices. Without rapid and sustained action to restore the incentive effect, a major achievement of European climate protection policy is under threat of being paralysed into insignificance.
From UBA’s perspective, measures on three levels are therefore required to restore the role of the ETS as the leading instrument of climate policy of the EU:

1. Adoption of ambitious reduction targets, preferably before 2020:

The surpluses in the ETS can be used to raise the ambition of reduction targets now - before 2020 - and to position the EU once again as a pioneer in climate protection. The EU could reduce its emissions by 30% by 2020 if the reduction path of the ETS were to be intensified accordingly, for example, via a temporary increase in the annual reduction factor (2016-2020) to 6.5%. For that, the ETS sectors would have to achieve additional reductions of approximately 1.55 billion tonnes of CO\textsubscript{2} from 2016-2020 compared to the status quo, but could master this challenge with the help of the ETS surpluses from the second trading period (1.7 billion EUA), without a large additional burden. After 2020, the annual reduction effort could subside again. By doing this, the EU would not only regain its leading international role in climate policy, but also send important signals inside the EU to avoid technological lock-in effects and to launch a genuine transformation to a low carbon economy.

In addition, the greenhouse gas reduction targets for 2030 must be adopted rapidly and bindingly. The Commission’s proposed target of 40% (internal emission reductions) by 2030 should be a minimum, but of more use would be the requirement of a more ambitious goal in order to really achieve the long-term emissions reduction of at least 80% by 2050. The second half of the emission reductions by 2050 is likely to not only be more expensive, but also technologically more difficult than the first half. It is therefore reasonable to set up more ambitious reduction targets for the first 20 years than for the next 20 years in order to drive technological progress right now. For this reason, the target should be for internal reduction, i.e. reductions within the EU. The admissibility of credits (either project-based or sector-based) should be used as an additional facility to make it easier to be more ambitious and to allow developing countries the benefits and co-benefits. Adopting this target would send an important signal for the EU ETS in the 3rd trading period because it would very likely happen in conjunction with a significant tightening of the linear reduction factor. The early adoption of the 2030 target is therefore important to provide planning certainty for market participants.

2. Permanent cancellation of the surplus in the ETS (set-aside):

The current surplus of 1.7 billion EUAs from the second trading period or at least substantial parts of it must be permanently cancelled. Though raising the annual reduction factor before 2020 is indeed useful, by itself it is not suited to remove the surplus from the market in the short term, by 2020. Without eliminating the surplus, the reduction targets for 2020 and 2030 can only be achieved on paper, not in reality, and the long-term reduction path cannot be fulfilled. The American RGGI can serve as a model for how surpluses can be eliminated over several years. If ambitions are raised even before 2020 a (via a more aggressive goal or an increase of the linear reduction factor), the amount of the required set-aside may turn out to be lower.

3. Structural reform of the ETS:

The EU ETS must be designed such that no structural surpluses can accumulate in the future. This requires a mechanism to regulate the supply, which - within the framework of a fixed Cap of course - reacts quickly to a strong lack of demand. Such a mechanism may be based on price as proposed by the European Commission and in other systems, such as in the U.S., but volume-based mechanisms are also an option. Linking the admission of international credits to such a mechanism must also be discussed. In addition, the general reform of project credits is already on the international agenda - any changes there will also affect the usability in the EU ETS. The inclusion of other sectors such as agriculture, buildings or transport is difficult, economically inconclusive, and therefore not suitable for solving the plant demand problem.

If, in future, the European member states want to continue to drive climate protection at the lowest possible macroeconomic cost, they should continue to bank on emissions trading as the lead instrument and strengthen it accordingly. For this purpose, an agreement at a European level is essential and Germany should constructively involve itself in the process. A fragmentation of the national climate and energy policies is neither efficient nor effective from an economic and climate policy perspective.
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