Compatibility of the European Emissions Trading Scheme with interacting energy and climate policy instruments and measures

Creating scarcity through stringent targets and flexible control of the certificate supply

– UBA Position Paper –

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Content

1 Executive Summary

1.1 Background

The European Emissions Trading Scheme (EU ETS) accounts for more than 45 % of the European Union's total greenhouse gas emissions. At present, the EU ETS faces major challenges. It is currently unable to fulfil its central role as a leading climate policy instrument: surpluses in the market have pushed the price of emission allowances down over a long period of time and weakened incentives created by the EU ETS. Nevertheless, the decisions of the European Council of 24th October 2014 on the EU climate and energy policy up to 2030 confirmed that a functioning emissions trading system should be the core instrument to achieve the European greenhouse gas targets.

Insufficiently ambitious emission caps for the second and third trading period are the main reason for the current situation in the EU ETS. The structural surplus in the EU ETS – the balance between the cap plus project credits used and the verified emissions – totalled around 2.6 billion allowances by the end of 2015. In addition to the unambitious caps combined with an extensive use of project credits, a rigid and inflexible supply of emission allowances is the second major cause of the current situation. The decline in emissions as a result of the economic and financial crises indicates that the EU ETS in its current form has a considerable deficit with regard to its robustness against structural, strong and sustained changes in demand.

Given the weak price signal from the EU ETS, more and more EU Member States are currently planning to introduce – or have already implemented – additional national climate or energy policy instruments in order to achieve their national climate protection targets or to specifically promote the decarbonisation of their power generation. These additional emission mitigation measures however, can lead to a shift of emissions within the EU ETS and further weaken the price signal unless the allowance supply is reduced correspondingly.

The decision to introduce a European Market Stability Reserve (MSR) will for the first time, beginning 2019, provide the possibility for a rule-based re-adjustment of the supply volume within a trading period and beyond. This is a necessary first step towards the further structural development of the EU ETS. However, the MSR cannot solve the European energy and climate policy's lack of stringency. Nor can it solve the problem that the ETS cap (supply) and the actual emissions of energy and industrial plants (demand) are continuously, i.e. structurally, drifting apart. Therefore, approaches to significantly increase EU ETS compatibility with other energy and climate policy instruments[1] must be developed. The German Environment Agency believes that this is one of the European climate policy's most urgent tasks.

The European Commission (COM) proposals to amend the Emissions Trading Directive (ETS Directive) do not yet meet this requirement. However, both the European Parliament's (EP) economic (ITRE) and environmental committee (ENVI) have put forward initial considerations as to how to create a compensation for other energy and climate policies in the fourth trading period (2021-2030), in addition to MSR in EU ETS (see drafts of the ITRE and ENVI[2] rapporteurs).

In this paper the German Environment Agency deals with critical aspects of the European Emissions Trading Scheme's structural reform and provides impetus for the discussion about EU ETS compatibility with other climate and energy policy instruments which has not yet been actively pursued. This requires the EU to focus its climate and energy policies on achieving their climate targets. As in other environmental policy areas, Member States must also be able to adopt more ambitious national reduction targets and implement the necessary measures to achieve them. The EU must ensure the effectiveness of interacting national climate policies and establish mechanisms to ensure the functioning of the ETS.

1 In this paper, a measure is understood to be an action that is carried out to achieve a particular goal (e.g. reduction of lignite-based electricity production, expansion of renewable energies). The implementation of a measure can be encouraged or ensured by various instruments. The term "instrument" means the concrete form of a political action (e.g. climate tax, statutory decommissioning of lignite power plants, standby reserves). Under climate policy we understand the entirety of climate policy instruments.

2 cf. Draft ITRE report of 26.4.2016, Amendment 11. Draft ENVI Report of 26.5.2016, Amendment 24.

For the necessary national measures, Member States should resort to the clause for more stringent protective measures under Article 193 TFEU (Treaty on the Functioning of the European Union). This regulation allows for more stringent national protective measures if they are compatible with European treaties and have an optimising content. Recital 23 of the Emissions Trading Directive explicitly points out that additional national measures are admissible. That provision permits Member States to concretise the national reinforcement of protection permitted under Article 193 TFEU and as a matter of course, to take other measures designed to achieve the same objectives provided that they comply with the rules on state aid in Articles 107 and 108 TFEU. It should in particular be noted that additional savings due to other climate protection measures mentioned in the recital, always result in a greater surplus in the EU ETS. Additional national measures that interact with emissions trading should also be aimed at removing surpluses in order to ensure the highest possible consistency with EU ETS.

This paper does not focus on further aspects of the reform debate and questions on the level of medium- and long-term climate targets. The significance of these questions is clearly recognised. These are still to be pursued and reassessed in the context of the Paris Agreement and the agreed environmental quality objectives in order to significantly reduce the global temperature rise below 2 °C – possibly even 1.5 °C. The German Environment Agency will continue to work towards a 95 percent reduction in German greenhouse gas emissions by 2050 and to encourage the EU to largely decarbonise its entire economy during this period.

1.2 Recommendations for action

The German Environment Agency (UBA) has five key recommendations that should lead to more stringent cap-setting and improved compatibility between the EU ETS and interacting energy and climate policy instruments:

1. **Shortening the ETS cap-setting cycle to five years and aligning it with an ambitious long-term reduction path**
   The EU ETS cap period must be shortened to five years in line with the two planned allocation periods in the fourth trading period in order to maintain or increase the cap's stringency in the event of changes in the basic conditions. This is required by the Paris Agreement's[3] five-year review mechanism to increase ambition that is mandatory under international law. In addition, the cap must comply with the EU's long-term environmental targets to reduce greenhouse gas emissions by 80 to 95 percent by 2050 compared to 1990 levels and consequently significantly decarbonise the European economy. The 2.2-percent reduction path for the cap proposed by the Commission is not sufficient. UBA now recommends an increase in the linear reduction factor (LRF) to at least 2.6 percent for the 2021-2025 period. If this linear reduction factor is maintained until 2050, it will lead to a reduction of ETS emissions by around 96 percent compared to 2005 levels. However, the question is whether a linear reduction path for the ETS sectors is sufficient to almost completely decarbonise the entire industry. In addition, UBA recommends a thorough review and an assurance that the cap level is compatible with the energy and climate policy instruments (see recommendation 2). The five yearly adjustments of the cap should be rule- and parameter-based as far as possible so that a prolonged political negotiation and adjustment process of the ETS Directive can be avoided within a trading period.

3 The suggested proposal for a regulation to regulate non-ETS emissions already contains a review clause in accordance with the Paris Agreement, cf. Article 14 of Legislative Proposal COM (2016) 482 final.

2. **Not setting the ETS cap above the predicted emissions. Checking the ETS cap's stringency for the fourth trading period with regard to the energy and climate policy instruments.**
   The European Commission should in principle determine the cap for the fourth trading period based on a comprehensive stocktaking. To this end, the adequacy of the cap level must be checked against the background of the known energy and climate policy instruments and compared with current emission projections and then adjusted accordingly. In addition to being compatible with an ambitious EU long-term climate protection target, the cap must also create structural scarcity in the EU ETS. It should be borne in mind that in October 2014, the European Council explicitly provided for an overfulfillment of the overall reduction target (at least minus 40 percent by 2030 compared to the 1990 levels). A further reduction of the cap would therefore be justified. The necessary stocktaking however, has not yet been concluded and cannot be generated before completing the European negotiations for the ETS Directive. For this reason the amended ETS Directive must provide for later adjustments of the cap. A first adjustment can be expected after the "facilitative dialogue" of the Paris Agreement as planned for 2018 (see recommendation 1 above).
3. **Closer monitoring of the interaction of the energy and climate policy instruments with the EU ETS**
   The emission reducing effect of complementary climate and energy policies – at national and European level – needs to be recorded more carefully than previously and quantitatively taken into account for any determination of the ETS cap: the ETS cap shall not be higher than the expected (projected) emissions after implementing the complementary policies. For this purpose, the European Commission should regularly carry out a stocktaking of the instruments and their impact on the ETS. Member States should also regularly and transparently assess the impact of their additional national climate policies on the EU ETS and report it to the Commission and the Member States e.g. as part of the bi-annual projection reports. The European Commission should take into account the expected impact of national energy and climate policies on the EU ETS reported by the Member States in the course of the following cap review[4].
4. **Creating approaches to reduce supply in the EU ETS to compensate for interacting national instruments for greenhouse gas reductions**
   Emission and demand reductions in the EU ETS triggered by interacting national policy measures must be counterbalanced by the Member States in the form of reductions in supply in the EU ETS (preferably by reducing auction volumes) if not already accounted for in the cap. Irrespective of this, structural demand reductions should be taken into account within the regular cap adjustment. Reliable and methodologically sound standards must be developed to estimate the reduction effect of interacting national energy and climate policy instruments, i.e. the reduction in demand and thus the need for compensation in the EU ETS. This should preferably take place at European level. As a transitional measure, single or joint approaches developed by individual or several Member States should also be permitted.
5. **Permanently delete the overwhelming part of the second and third trading period surpluses**
   Surpluses in the EU ETS that have accumulated since 2008 and will continue to accumulate until 2020 (expected to be > 3 billion allowances) will be largely transferred to the MSR, but should be, to a great extent, permanently cancelled. This involves, as a minimum, the backloading quantities (900 million allowances) and the unallocated allowances (approx. 500-800 million allowances) of the third trading period. The exact amount of this one-time cancellation should be specified nearer to the fourth trading period and take into account the development of the market surplus. The beginning of the fourth trading period, i.e. 2021, seems an appropriate time for such a deletion. A final cancellation of surplus emission allowances from the MSR is also important for the credibility of the European climate policy in the context of the Paris Climate Agreement. If surplus allowances accumulated in the EU ETS before 2021 were transferred to a later period (2021-2030), this may dilute the nationally determined contribution of the EU in case future emissions in the EU ETS are above the cap due to the use of surplus allowances from the pre-2021 period.

At the same time, a small but sufficient surplus to be used as a liquidity buffer in the system makes sense. The 2021 review should check if the two thresholds of the MSR mechanism (400 and 833 million allowances) are suitable for this or whether they should be reduced.

4 The projection reports of the Member States are published in annual reports of the European Environment Agency (EEA). However, the quality of the projections and the underlying assumptions are very heterogeneous and the emissions tend to be overestimated (cf. EEA 2015a, p. 24). In addition, the results are currently not being used for a review of the adequacy of the cap level because the cap, once fixed, is no longer adjusted.

2 Consistent energy and climate policy as a prerequisite for scarcity in the EU ETS

Key conclusions:

The EU ETS has not yet been equipped with stringent caps. It cannot therefore sufficiently exercise its intended role as a leading instrument. However, emissions trading with a noticeable steering effect is important because, in contrast to complementary energy policy instruments (promoting renewable energies, increasing energy efficiency), emissions trading can generate reductions in all sectors and Member States covered by the EU ETS. In addition, the EU ETS helps organise abatement options in an economically efficient way via its price signals.

A prerequisite for this are stringent caps that can guarantee scarcity in the market. The cap has to fulfil two conditions:

(1) The cap must be consistent with the EU's long-term extensive decarbonisation goal to be achieved by 2050.

(2) The cap must not be higher than the volume of emissions that arises from the implementation of all energy and climate targets, measures and instruments at European and national levels. Scarcity prices can only arise if the cap is below the expected emissions. Neither the second nor the third trading period (with the exception of 2008) have fulfilled this condition.

The European Council has also adopted a cap for the fourth trading period before the impact of the parallel energy policy objectives (and related measures) was analysed in a transparent and comprehensive way. In addition, a number of Member States are now planning additional national instruments or have already introduced them in order to actively decarbonise their power generation. Additional emission reduction measures that were not taken into account by the time the cap was specified, leed to lower emission allowance prices and additionally weaken the incentive of emissions trading. This can lead to a shift of emissions (emission increase in other Member States or sectors), a decline in reduction efforts or in lower future reductions (in the event of saving and transferring unused emission allowances in the future and thus potentially, increased future emissions).

2.1 EU ETS caps are structurally too high

At present, the function of the EU ETS is primarily limited to guaranteeing the secure achievement of the politically determined reduction targets for European emissions in the sectors covered. In addition to effectively safeguarding the reduction targets, emissions trading as an instrument is basically designed to ensure that reductions in the sectors involved are implemented as efficiently as possible, i.e. at the lowest economic costs: emissions trading steers the deployment order (the so-called "merit order") of the existing power plant pool on the electricity market via its price signals. Given the persistently low price level on the carbon market, however, most market observers assume that a corresponding significant steering effect has not yet taken place. Questions are therefore being increasingly asked as to whether the EU ETS has had a significant impact on emission reductions.[5]

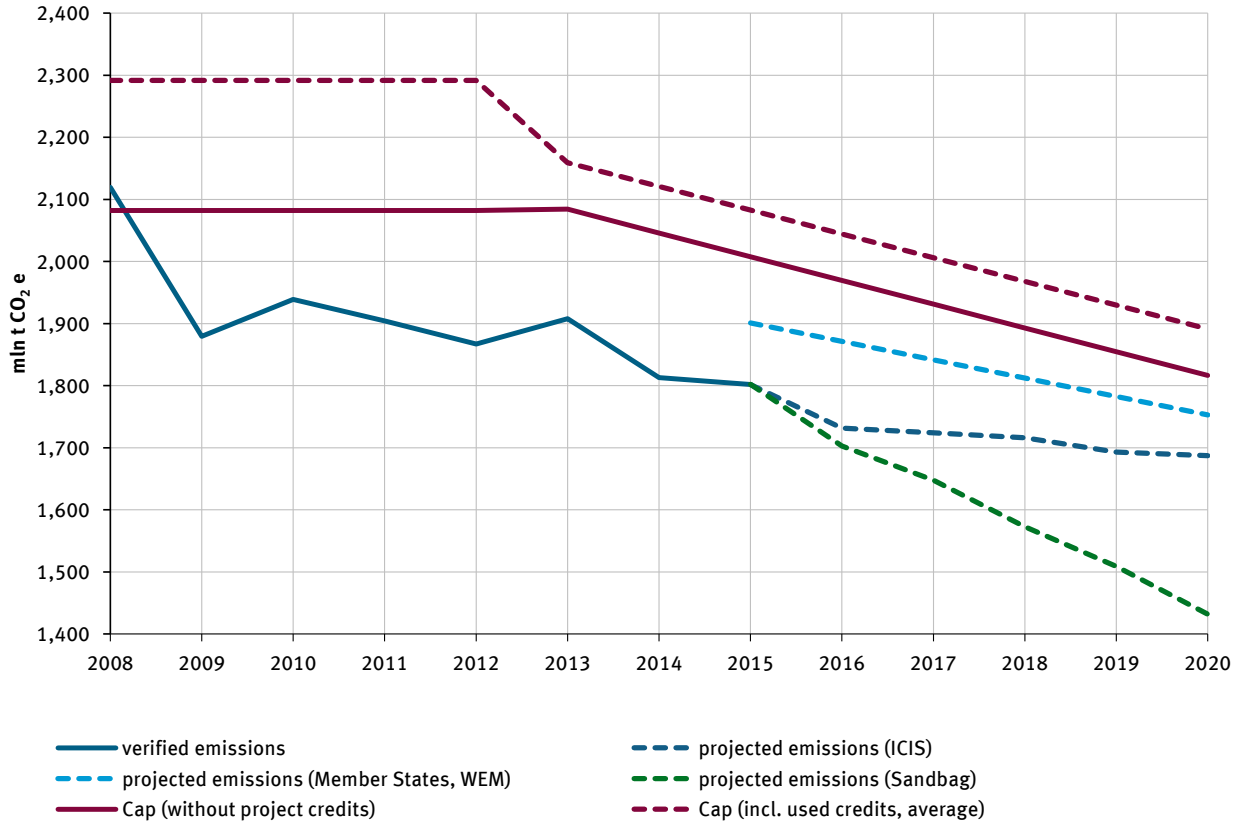
The reason for the lacking steering effect is the massive oversupply of emission allowances due to the caps being consistently above the emission levels of the sectors involved in the second and third trading period. Emissions are mainly influenced by the general economic conditions, technological progress, cost reductions for low-emission processes and, in particular, by the energy and climate policy instruments of the EU and its Member States. In the first three years of the current trading period, emissions were clearly below the cap value (see red line in Figure 1). In 2014 and 2015 emissions from the ETS sectors even fell short of the 2020 cap value. The 2020 European reduction targets in the ETS sectors were therefore actually reached six years earlier than intended by the cap.

5 cf. CEPS 2016

Surplus allowances from the second trading period and quotas for the use of project credits also exacerbate the structural mismatch between supply and demand (see dotted red line in Figure 1). By 2012, structural surpluses in the EU ETS – the balance between the then-national allocation volumes of the second trading period plus project credits used and verified emissions – totalled around 1.8 billion allowances. By 2015, this balance increased to around 2.6 billion allowances (area between the dotted red and blue lines in Figure 1). Existing emission projections indicate that caps will be systematically undercut in the foreseeable future and the structural surplus will continue to rise (see Figure 1).[6]

Based on the EU Member States' official projection reports (always in the "with existing measures" scenario), a structural total surplus of 3.4 billion allowances will be achieved for the second and third trading period. However, this does not include additional emission reduction measures which are being discussed in the Member States but have not yet been implemented or adopted such as the German "Climate Action Program". Also, there was a tendency to overestimate emissions in the past, as indicated by the jump between verified 2015 emissions and 2016 projections[7]. Against this background, a structural total surplus of the order of magnitude mentioned is a rather conservative estimate. Other estimates in Figure 1 forecast a far higher surplus of up to 4.6 billion allowances for the 2008-2020 period.

These circumstances are quite remarkable as they illustrate the fact that the caps in the EU ETS are structurally far too high under the given economic and basic energy and climate policy conditions in the overall 2008-2020 period.



Sources: verified emissions: EEA ETS Dataviewer, projections: EEA (2015), Sandbag (2016), ICIS (2016)

Figure 1: Actual and expected emissions relative to the cap of the second and third trading periods taking into account project credits (in millions of tonnes of carbon dioxide equivalents)

6 The figure shows national emission projections for the ETS sectors in the EU projection reports (always in the "existing measures" scenario) as well as emission projections by an environmental NGO (Sandbag) and an energy and carbon analyst (ICIS). The available quotas for project credits were equally allocated to the remaining period of the third trading period.

7 For the background and fundamentals of the projections see EEA 2015a, p. 24.

The so called amount in circulation concept, based on the actual emission allowances available on the market, must be separated from the structural surplus concept. For the amount in circulation, the verified emissions are only compared with the actual allowances issued by the state via free allocations or auctions and the actual project credits used, regardless of the theoretical cap values. The amount in circulation thus represents the market surplus whilst being the MSR mechanism's key factor. Therefore, the public debate about the EU ETS surplus situation is usually focused on the amount in circulation. However, this figure represents only a part of the structural surplus as since the third trading period, significant parts of the caps have been issued with a time lag or transferred to the MSR. The amount in circulation and the structural surplus drift apart in particular when the MSR grows.

According to the European Commission, the amount in circulation amounted to some 1.8 billion emission allowances at the end of 2015 (COM 2016). If the reductions in the 2014 and 2015 auctioning volumes of 700 million allowances (so-called "backloading") were added to this, the cumulative market surplus would be around 2.5 billion allowances by the end of 2015, which is very close to the above-mentioned structural surplus for this period.

2.2 Harmonising the EU ETS caps with the European energy and climate policy

A strong EU ETS that not only ensures the target achievement in the trading periods but also exerts a relevant steering effect is still important and necessary with ambitious complementary policies in place. The ETS price signal can incentivize abatement options with moderate abatement costs in a cost-efficient way. Emissions trading thus complements other energy and climate policy instruments that are either more focused on innovation and investment, addressing abatement options with significantly higher abatement costs such as the promotion of renewable energy sources, or sectors where a price signal does not work due to various market barriers.

Furthermore, emissions trading as the most comprehensive European policy instrument for climate change, can stimulate emission reductions in all sectors and Member States that are covered by the EU ETS. In the EU, emissions trading currently covers around 12,000 installations and thus around 45 % of total greenhouse gas emissions, while in Germany it is around 50 %. An overall economic decarbonisation in the EU by the middle of the century, according to the 2015 G7 decision, requires the conversion of the energy and industrial sectors in all Member States. This becomes even more important because no binding national renewable energy targets are to be specified for the triad of targets according to the 2030 EU Climate and Energy Package of October 2014. The regional distribution for fulfilling the European target will therefore no longer be clearly determined. A strong emissions trading system can at least help mitigate imbalances in the EU, i.e. a situation where only a few Member States will initiate decarbonisation. This is also essential for securing comparable competition conditions within the European internal market.

However, if the EU ETS wants to have a significant steering effect, caps must be set in such a way that there is scarcity on the market with the EU's energy and climate policy targets, in particular renewable energies and energy efficiency, in place. This means that the ETS cap must not be above the projected emissions that will occur if the complementary energy and climate policy instruments are implemented. In such a situation, scarcity prices cannot emerge on the carbon market. This requires a robust and, above all, transparent planning and coordination of the climate and energy policy targets at the European level including the necessary tools and the option to implement corrections in the event of deviations from the planned schedule.

There is reasonable doubt that this was satisfactorily implemented when the cap for the third trading period was set. According to a recent study, the failure to take into account the measures and instruments adopted in the European Energy Efficiency Directive when setting the ETS caps for the third trading period increases the surplus in the EU ETS by a total of 500 million emission allowances by 2020. Furthermore, over-fulfilling the Renewable Energies Development Objective may increase the surplus by another 120 million.[8]

8 Jalard, M., Alberola, Emilie, Afriat, Marion et al. (2015). Binding measures to reduce energy consumption have been set in the Energy Efficiency Directive (in force since 4/12/2012) to achieve the goal of reducing primary energy consumption by 20 percent by 2020. These measures were not taken into account when the 2020 reduction target and the emissions trading cap derived from it were adopted in 2007.

Compared to the unanticipated effects of the use of project credits (1.5 billion) and the decline in emissions as a result of the economic and financial crisis (1.9 billion), this is comparatively low but almost equals the total annual emissions of all German and British ETS installations.

There is also considerable evidence for the fourth trading period that the cap has been set without sufficiently transparent and traceable analysis of the concrete implications of the energy policy targets adopted in parallel. In October 2014, European heads of state and government have specified the overall emission reduction target (at least 40 percent compared to the 1990 levels), the linear reduction factor (LRF: 2.2 percent from 2021) and thus the reduction in EU ETS by 2030 (minus 43 percent compared to 2005) as well as the targets for renewable energies (share of renewable energies: at least 27 percent) and energy efficiency (savings compared to reference: at least 27 percent)[9]. The underlying impact assessment of the 2030 Climate and Energy Package White Paper does not, however, represent these concrete target triads[10].

In its impact assessment, the Commission derives the 2.2 % Linear Reduction Factor (LRF) and thus the ETS Cap for the 2021-2030 period from a scenario that does not contain any firm targets and only moderate instruments[11] for renewable energies or energy efficiency (GHG40). The targets for renewable energies and energy efficiency adopted by the European Council would not be achieved in this scenario. Another scenario with a 30 % growth target for renewable energy sources leads to higher surpluses in the EU ETS at an unchanged LRF – a scenario with a firm energy efficiency target does not exist in the impact assessment. It can therefore be questioned whether the target triad agreed on the basis of the ex-ante planning of the energy and climate package can guarantee scarcity in the EU ETS.[12]

An increase in the energy efficiency target to between 30 and 40 percent is also being discussed in the current Energy Efficiency Directive talks but this is not reflected in the parallel negotiations on the Emissions Trading Directive.[13] If the energy efficiency target is increased, the stringency of the ETS cap would further decrease as it can be assumed that more ambitious efficiency measures will have a significant impact on the future demand for emission allowances.

2.3 National energy and climate policy in the context of EU ETS

In addition to the European emission reduction targets, some Member States, including the United Kingdom, Denmark, France and Germany, have set national climate change mitigation targets which are much more ambitious than the common European target and, as a rule, are not consistent with these overall targets or caps within the EU ETS. Other countries such as Portugal and Sweden have set sector-specific targets, e.g. targeting energy efficiency or the share of renewable energies, which also have implications for the emission trends in the EU ETS. Furthermore, there are Member States that have not specified their own reduction targets but are targeting low-emission power generation (cf. Table 1).

The EU ETS does not currently provide the necessary incentives for abandoning coal-fired power generation which is imperative for long-term decarbonisation. The emission allowance price increases the marginal costs of emission-intensive coal-fired power plants per MWh compared to lower-emission natural gas power plants. At the current emission allowance price level (5-8 euros), however, this does not lead to a relevant shift within the merit order. Analysts are assuming that if the current fuel prices continue, shifts in the deployment order will only occur at around a 12-25 euro CO_2 price level. In Germany, however, a targeted or accelerated reduction of lignite-fired power generation would not be expected even at these prices.[14]

9 Council (2014)

10 SWD (2014) 15 final, Description of the scenarios studied, p. 39 et seqq.

11 According to the scenario description, there are no additional instruments for renewable energies and energy efficiency in this scenario compared to the reference scenario.

12 This is in line with the results of Jalar, Alberola, Afriat 2015, who have modelled the effects of the Council decisions on the (long-term) CO_2 price. In this scenario, the expected 2030 CO_2 price is just € 10/t CO_2 (in terms of 2010 prices), which is € 60 lower than in a pure greenhouse gas reduction scenario (without complementary policies). Capros et al. (2014) have modelled a scenario commissioned by the Federal Ministry for Economic Affairs and Technology (BMWi) that represents the agreed target triads and the MSR. However, their conclusion that ambitious renewable energy and energy efficiency targets are compatible with a reformed EU ETS and provide market stability in the EU ETS is contrary to the result that the surpluses will not reach the tolerance range of the MSR thresholds until 2029 (p. 5). Despite MSR, the market would therefore be characterised by high surpluses until the end of the fourth trading period.

13 The European Commission had proposed an energy efficiency target of 30 % (COM (2014) 520 final). A number of targets, including 30 % and even 40 %, are to be modelled for the proposed amendment to the Energy Efficiency Directive which is still expected in 2016. The Commission is expected to stick to its proposed value of 30 %. See ENDS of 16.3.2016.

14 UBA (2016).

Due to the lack of steering effect, some Member States are forcing faster and stronger reductions through national measures and instruments, primarily for restructuring the energy sector (cf. Table 1): in the **UK** there has already been an additional climate tax that has been paid by power generators (the so-called carbon price floor or climate change levy[15]) since 2013. The British government has also announced that it will completely abandon coal-fired power generation by the mid-2020s. In **the Netherlands**, the majority of Parliament voted for a phased decommissioning of all eleven coal-fired power plants[16] in November 2015 and the closure of five coal-fired power plants (3,500 MW in total) has already been decided. In **Belgium**, the last coal-fired power plant was closed down in April 2016.

The discussion about a gradual abandoning of coal-fired power generation – mainly from lignite – is underway in **Germany** too, since the national climate change mitigation targets – 40 percent reduction by 2020 and 55 percent by 2030 – can only be achieved if coal-fired power generation is substantially reduced.[17] Firstly, eight lignite blocks are to be moved into a security reserve by 2020 and then shut down permanently.

Some utilities such as EVN[18] and DONG Energy[19], the largest **Austrian** and **Danish utilities**, have also announced the intention to abandon coal-fired power generation in the next few years. **France** planned to introduce a CO_2 tax for power generators similar to the British model as from 1 January 2017, but has put these plans on hold in the meantime.

Table 1: Overview of climate and energy policy targets and instruments of European Member States (selection)

	National emission reduction target	Instruments and measures to reduce fossil power generation (without promoting renewable energies)
Belgium	Unknown	Last coal-fired power plant decommissioned in April 2016
Denmark	Minus 34 % by 2020	Energy supplier DONG Energy plans to convert all coal-fired power plants to biomass in DK (biomass share 30 % in 2015)
Germany	Minus 40 % by 2020 Minus 55 % by 2030 Minus 70 % by 2040 Minus 80 to 95 % by 2050 In each case compared to 1990	Gradual transfer of 8 lignite blocks (2.7 GW) into security reserve between 2016 and 2020, final decommissioning after 4 years
France	Minus 20 % by 2020 Minus 40 % by 2030	Carbon price floor for power generators (additional charge for CO_2 emissions): 30 € minus EUA price was scheduled for 2017, but has been put on hold.
The Netherlands	According to a civil court decision (1st instance), the government intends to reduce emissions by 25 % by 2020[20].	Parliament‘s decision on coal phase-out from November 2015
Austria	Unknown	The two utilities EVN and Energie in Upper Austria have announced that they will completely abandon coal-fired power generation over the medium term (by 2020 and 2025, respectively).

15 Since April 2015, there is a carbon price support rate of £ 18.08 (€ 21.5, as of 25.07.16) per t CO_2, which is fixed until 2020.

16 http://www.energynewsmagazine.at/de/niederlande+wollen+kohlekraftwerke+schlie%c3%9fen_n7532

17 UBA (2016).

18 The last Austrian coal-fired power plant, Dünrohr, is to be closed in 2025. The provider Energie in Upper Austria does not want to generate electricity from coal from 2016 onwards either. In the medium term, the Alpine Republic would completely dispense with power generation from coal. Only one coal-fired power plant near Graz will be operated until 2020. See http://noe.orf.at/news/stories/2740495/.

19 Dong Energy Annual Report 2015

20 Peeters (2016).

UK	Minus 29 % by 2017 Minus 35 % by 2020 Minus 50 % by 2027 Minus min. 80 % by 2050 In each case compared to 1990	Carbon price floor or climate change levy: additional charge for CO_2 content of fuels: £ 18.08 (currently approx. € 21.5)

Quellen: UK Climate Change Act (2008), German Energy Concept (2010), Dong Energy Annual Report 2015, press reports

However, these favourable and very positive developments from the climate change mitigation perspective can adversely affect market scarcity in the EU ETS: additional emission reductions that have not been planned in the cap, intensify the indicated structural imbalance in supply and demand. Currently, the EU ETS is not designed to counteract additional reductions triggered by other climate or energy policy instruments and to guarantee scarcity because the supply side is relatively rigid. Additional emission reduction instruments thus lead to lower or decreasing emission allowance prices and weaken the incentive of emissions trading under the current basic EU ETS conditions. This can lead to a shift of emissions (emission increase in other Member States or sectors), a decline in reduction efforts or lower future reductions (in the event of saving and transferring unused emission allowances in the future and thus potentially increased future emissions).[21] These effects are also used as a political argument against additional climate policy instruments so that they potentially act as a brake for an ambitious climate policy.

Neither the EU ETS nor the Member States have so far provided a satisfactory solution to this dilemma. European and national energy and climate policies should be coordinated in such a way that the European climate instruments guarantee that the European climate targets are achieved while ensuring the efficacy of interacting national climate policy instruments at the same time. Thus the European climate policy instruments – in particular the EU ETS – can be prevented from neutralising national climate policy measures.

21 For a general description of potential shift of emissions ("the waterbed effect") due to national measures, in particular in the context of decommissioning five Dutch coal-fired power plants, see Ecofys (2016a).

3 Adjusting EU ETS to the development of Member States' energy and climate policy in a more flexible way

Key conclusions:

The cap period should be shortened to five years in order to implement the ambition-enhancing mechanism of Paris and to be able to better react to structural changes. The current planning periods for setting the cap are clearly too long. The adjustment between two five-year cap periods should be based as far as possible, on rules and parameters. In addition, the cap must be consistent with the long-term EU objective of an extensive decarbonisation by 2050. The currently proposed reduction of 2.2 percent per year is not sufficient to achieve this goal. According to the EU Commission, a reduction factor of at least 2.4 percent is necessary to achieve an 80 percent overall-economy reduction by 2050 compared to 1990, while a 95 percent overall-economy reduction would require as least 2.6 percent, according to the German Environmental Agency's estimate. The question is however, whether a linear reduction path for the ETS sectors is sufficient for an almost complete decarbonisation (cf. Section 2.1).

To guarantee the long-term EU decarbonisation, the 2021-2025 linear reduction factor should be increased to at least 2.6 %. The European Commission should carry out an updated analysis on the EU ETS's interactions with other energy and climate policy instruments in order to guarantee that this increase actually creates structural scarcity in the EU ETS. This impact assessment is currently still pending. Therefore, the amended ETS Directive must provide for a later cap adjustment option. The interval after the "Facilitative Dialogue" foreseen by the Paris Agreement for 2018 seems suitable for this.

As long as the cap does not satisfactorily take into account the entire European and national energy and climate policy instruments, other approaches need to be developed to guarantee that the national climate policy instruments are ETS-compatible. The Market Stability Reserve (MSR) alone cannot ensure this. Member States should therefore be given the opportunity, within clear and transparent set up, to compensate for demand decreases in the EU ETS that may arise due to national climate policy by corresponding supply reductions. This can help to prevent the ETS from neutralising interacting national climate policies. Climate policies at various government levels should lead in total to more climate change mitigation. This would also take account of increasing or overfulfilling the 2030 reduction target envisaged by the European Council.

3.1 Recommendations for setting stringent caps

The lengthy cycle for setting the cap causes a fundamental problem for stringency. In the past, trading periods have been progressively extended: the duration of a trading period increased from three (2005-2007) then five (2008-2012) to eight years (2013-2020). The fourth trading period is even supposed to last for ten years (2021-2030). In view of the uncertainties described while setting the cap, this period is clearly far too long to reflect structural changes in the basic conditions, e.g. unexpected macroeconomic developments or additional national climate policies, even if an optimised ex-ante planning is used. In addition, there are long negotiation periods prior to the trading periods. As described above, the 2030 cap was already adopted by the energy and climate package decisions in 2014 – de facto 17 years ahead. The impact assessment that forms the basis for the energy and climate package is based on 2010 data and the extrapolation of then existing economic trends and developments.[22]

22 cf. DIW (2014).

Therefore, the cap period should be shortened to five years. If the 10-year trading period was split into two 5-year cap periods then it would fit consistently and without any major additional effort, into the overarching architecture of the EU ETS and the international Paris Agreement. The proposal to amend the Emissions Trading Directive provides for a subdivision of the trading period into two five-year allocation periods (2021-2025 and 2026-2030) with separate allocation procedures and data collection. In addition, a mechanism for reviewing and adjusting the mitigation contributions (NDCs) at 5-year intervals was agreed in the Paris Agreement in 2015. The compatibility of mitigation contributions with the goal of limiting global warming to well below 2 °C is to be reviewed every five years in a global stocktake thus leading to more ambitious intermediate targets (Article 4). The specification of the overarching cap architecture (for example auction and free allocation shares or provisions for the EU Innovation and Modernisation Fund) may nevertheless continue to apply throughout the whole trading period. It should be clearly agreed that the cap must be steadily lowered and the linear reduction factor cannot be reduced.[23] The adjustment of the cap between two 5-year cap periods should, as far as possible, be based on rules and parameters in order to avoid a time-consuming and politically complex negotiation process during the trading period (as for example the MSR-mechanism is). For example, an adjustment of the EU NDC and structural changes in ETS emissions should be immediately reflected in the cap.

The basic requirement from UBA's point of view is that the cap should be in line with the EU's long-term emission reduction target. A 2.2 percent linear reduction factor (LRF) (48 million tonnes p.a. cap reduction) does not suffice. At least a 2.4 percent LRF would be needed for an 80 percent overall-economy reduction by 2050 according to the EU Commission[24]. However, to achieve an extensive decarbonisation in the EU by 2050, emissions in the EU ETS should be reduced even more. UBA therefore advocates at least a 2.6 % annual cap reduction, corresponding to around 57 million tonnes per year over the 2021-2025 period. Assuming a linear updating until 2050, this would lead to around a 96 percent reduction in the ETS sectors compared to 2005. However, the question is whether a linear reduction path for the ETS sectors is sufficient to achieve an almost complete decarbonisation. Current findings indicate that emissions from the energy industry must be reduced significantly earlier and more strongly than in the other sectors (IPCC, 2014, UBA 2016).

In addition, UBA recommends a well-founded and up-to-date review and adjustment of cap level compatibility to the energy and climate policy instruments. Not only is the cap supposed to serve the formal safeguarding of the long-term reduction targets but it should also trigger investment and transformation processes necessary for decarbonisation through a CO_2 price scarcity signal. The impacts of other energy and climate policies, whether at a national or European level, must be better taken into account when specifying the cap in order to guarantee a structural scarcity in the EU ETS, even in the case of ambitious energy and climate policies. This should be completed before specifying the starting value for the fourth trading period cap.[25]

Therefore, the European Commission should perform an up-to-date stocktake of cap level adequacy against the background of the entire energy and climate policy instruments for the period up to 2030. As this is not likely to be accomplished in the short term until the adoption of the ETS Directive, the amended ETS Directive needs to provide for future cap adjustments. The period after the "Facilitative Dialogue" within the UN climate negotiations planned for 2018 seems a suitable time to do this.

Conclusion:

The initial review of the cap level before the start of the fourth trading period and the future periodic reviews should be based on the following criteria:

- **Cap reduction compatibility with the EU's long-term climate protection strategy:** the COM has announced a new low-emission strategy (climate roadmap) for 2019 that should provide the basis for a distribution of mitigation efforts among the sectors and the 2050 reduction path, including necessary intermediate targets. The cap's ambition level should correspond at least to this path and should by no means be less.

23 The Paris Agreement also includes a prohibition of deterioration in the mitigation contributions (Article 4 (3)).

24 Not only did the 2011 COM climate road map provide a disproportionate reduction for the ETS sectors over the long term (minus 90 % for the ETS at an 80 % overall-economy reduction by 2050), but also more ambitious intermediate steps (minus 45 % for the ETS by 2030 at a 40 % overall-economy reduction), cf. COM (2011), p. 54. In the Impact Assessment of the 2030 Energy and Climate Package, the Commission also notes in several footnotes that a 2.2 percent reduction factor is not compatible with the long-term objective of a 90 percent reduction in ETS, but the reduction factor must be at least 2.4 percent.

25 If the use of international project credits were also enabled in the EU ETS for the fourth or later trading periods, such an import of credits should also be made cap-neutral.

- **Compatibility with international climate change mitigation commitments:** The cap should, in particular, be consistent with the outcome of the 2018 "Facilitative Dialogue" (with the "Global Stocktake" from 2023 onwards).
- **Structural scarcity and safeguarding the effectiveness of interacting national climate instruments:** In addition to safeguarding the EU's long-term climate strategy, the cap should guarantee a structural scarcity in the EU ETS, taking into account an updated analysis of basic climate and energy policy conditions. Emission reducing effects of EU complementary climate and energy policies or individual Member States in particular, must be carefully quantified and taken into account in the ETS cap (cf. Section 2.3, below).
- **Rule-based cap adjustments:** The adjustment of the cap after five years within a trading period should take place based as far as possible on rules and parameters so that a politically complicated and time-consuming negotiation and adaptation process of the ETS Directive can be avoided within the trading period.

3.2 Role and limitations of the Market Stability Reserve (MSR)

Planning is always subject to uncertainties, irrespective of the questions whether and how exactly the instruments' interaction is taken into account in the ex-ante planning of the ETS cap. The basic conditions and requirements are likely to deviate from the assumptions made over the course of time, even if an optimised ex-ante analysis and estimation of the complementary energy and climate policies' possible interactions and a shortening of the planning cycle have taken place. This primarily applies to new developments in the Member States' energy and climate policies that do not hold sufficient weight with European planning or instrument coordination because they are largely determined by national political conditions and not primarily by European planning cycles.

The introduction of the Market Stability Reserve (MSR) has provided a rule-based re-adjustment option within a cap period from 2019 onwards. Unexpected emission reductions, i.e. reductions in demand in the EU ETS due to external shocks and complementary policies no longer have a one-to-one impact on the EU ETS because the auction supply can be reduced according to the amount of surplus („amount in circulation", see Section 1.2). The German Environment Agency therefore believes that the introduction of MSR is a major step towards the further development of the European emissions trading structure.

However, the MSR cannot take up this function until after the mid-2020s. The existing surpluses accumulated during the second trading period and the first years of the third trading period (see Section 1.1) must be removed post 2019. The amount in circulation will come close to the upper threshold (833 million allowances) – thus corresponding to a level that decision-makers in the Commission, European Parliament and Member States found appropriate for devising the MSR – probably not before the mid-2020s. Therefore, the MSR cannot compensate for any additional instruments that the Member States introduce beforehand, and definitely not in a timely manner.

Beyond the time-based aspect, in its current form, the MSR is not properly suited to driving supply adjustments within the EU ETS responding to structural changes in emissions development. This is because the MSR always removes a relatively small part from the market surplus only and it does this with a significant time delay. The supply is reduced by 12 percent of the amount in circulation from the two previous years. However, if the emissions are permanently below the cap or if they fall quicker than the cap does over several years, as was the case in the second and third trading periods, the MSR can mitigate but not completely offset this structural drop in demand. Rather, the MSR is designed as a means to mitigate temporary demand fluctuations in the EU ETS by increasing the supply's flexibility so it cannot replace consistent planning and coordination of the climate and energy policy instruments.

In addition, the MSR currently is cap-neutral and therefore has no influence on the fundamental budget available in the EU ETS but only on the timing of the supply. The MSR can therefore only allow a sustainable correction of structural surpluses from the second and third trading periods when emission allowances transferred from this period to the MSR are permanently deleted. A final deletion of these surplus emission allowances from the MSR is also important for the credibility of the European climate policy, in line with the Paris Climate Agreement. Surpluses accumulated in the EU ETS in the past, which are transferred to the period of the EU nationally determined contribution (2021-2030), can dilute this mitigation contribution if emissions exceed the EU ETS cap due to the use of these structural surpluses from the pre-2021 time.

The MSR review planned from 2020 onwards is of specific importance. It is, in particular, necessary to check whether and how the MSR can guarantee the EU ETS's compatibility with complementary European and national policies within the cap periods. This includes new rules for the deletion of emission allowances such as a limit to the maximum emission allowances in the MSR or an expiration date for such allowances but also a review and, where appropriate, an adjustment of the supply reduction rules.[26]

Structural emission reductions should be compensated for by a rigorous cap adjustment and shortened cap cycles. As long as the cap setting in the EU ETS is not improved and the MSR can only compensate for the anticipated drop in demand to a limited extent, new solutions will have to be found to increase compatibility of EU ETS and other energy and climate policies over the short and medium term (cf. Section 2.3).

3.3 Recommendations for an ETS-neutral scheme for national energy and climate policies

Interacting national and European climate and energy policies must be "ETS-neutral" to guarantee a real climate change mitigation effect and to avoid a shift of emissions in the ETS. This means that demand reductions in the EU ETS triggered by additional policy measures will be compensated for by corresponding reductions in supply.

One could imagine:

(1) National approaches or those pursued or coordinated jointly by one or more Member States in the form of voluntary waiver of auctions[27] or programmes to purchase emission allowances.

In principle, demand-related compensation measures are also possible such as:

(2) Additional surrender of emission allowances for particularly emission-intensive ETS facilities.

The climate levy that was debated but ultimately not adopted in Germany in 2015 envisaged that older lignite power plants would have been obliged to surrender more emission allowances in addition to their existing surrender obligation in emissions trading.[28] This meant that the climate levy was basically designed in an "ETS neutral" way.

Options that can be used to compensate for drops in demand in the EU ETS differ with regard to the associated political implications. While changing the ETS Directive is a prerequisite for a waiver of auctions, climate political purchasing programmes aimed at compensating for state-triggered drops in demand might be accomplished without any change in European legislation. As far as legislation is concerned, however, a national legal regulation would also be necessary. Purchasing programmes, on the other hand, could lead to greater problems in domestic acceptance since the problem is not "only" that they inflict losses to planned state revenues, but that they also cause actual additional burdens to the federal budget. An income from auctioning emission allowances may theoretically counterbalance these burdens and thus have the same effect as a waiver of auctions but such null-sum transactions lead to unnecessary bureaucracy costs and may be difficult to convey in political discussion.[29]

26 We suggested in an earlier discussion paper that the removal rules from the MSR should not be based on the total amount in circulation, rather on the difference between the amount in circulation and the upper threshold, cf. DEHSt (2014).

27 The amendment to the draft ITRE report of 26.4.2016 suggests this, see Amendment 11. The draft ENVI report proposes that every other year the Member States report the emission reductions resulting from the decommissioning of fossil power generation capacities and do not auction the corresponding amount of emission allowances but transfer them to the MSR, see Amendment 24.

28 cf. e.g. DEHSt (2015)

29 Ecofys (2016b) has proposed to levy an additional CO_2 tax on the power industry and to use the proceeds for a purchasing programme.

Moreover, expenditure items are in principle competing with other uses in annual budgetary negotiations and face the risk of being affected by blanket budget cuts or being cut in favour of other expenditure items. In addition, emission allowance purchasing programmes are accompanied by transaction costs for the state, unlike waiver of auctions.

On the other hand, a national waiver of auctions as proposed by the two responsible European Parliament committees (ENVI and ITRE)[30] could be implemented in a „market-friendly" manner as opposed to purchasing programmes or an additional surrender obligation for particularly emission-intensive facilities. In the case of a purchasing programme, the state would act directly as an independent player on the secondary market and compete with other market players on the demand side. Market performance would then be influenced more strongly than by an ex-ante reduction of auctioning amounts which is published transparently in the auction calendar. In the case of an additional surrender obligation for certain facilities, the compensation volume would depend on operator behaviour and the individual profitability of the facilities charged with the additional levy and thus could not be determined in advance. Weighing up these advantages and disadvantages, a waiver of auctions seems more advantageous than a purchasing programme.

In addition to the aspects mentioned, the implications of national compensation measures for MSR should also be taken into account. The key issue is whether allowances retained or purchased by the state are deleted or simply moved to a set-aside account. Deleted allowances act as components of demand and reduce the amount in circulation according to the MSR decision. This would lessen the MSR-related auctioning volume reduction. Retention of allowances on the other hand, would have no effect on the amount in circulation so MSR reduction and compensation measures would therefore have a combined effect. This does not appear to be correct because compensation de facto leads to a shortage in the market, even if this is not reflected by the calculated amount in circulation. Therefore, unauctioned or purchased allowances should be deleted to guarantee consistency with the MSR. The proposal by Ian Duncan, rapporteur of the ENVI environmental committee in the European Parliament, which suggests transferring emission allowances to the MSR when Member States are decommissioning fossil-fuel power plants, goes in the right direction since it reduces the volumes to be auctioned. However, since it does not envisage deleting these emission allowances, they may actually be returned to the market at a later point in time[31].

Irrespective of the method of compensation, methodological standards are necessary to determine the amount and duration of emission reductions additionally induced. To this end, an approach coordinated and harmonised across the EU should be sought. This refers to assumptions about key factors of influence (e.g. fuel prices, growth assumptions). However, the necessary methods may also be developed jointly from the bottom-up by individual, or preferably several, Member States. Compensation measures would in any case need to be based on a transparent, robust and, as far as possible, model-based impact assessment of the interacting climate protection instruments.

For this purpose "additionality" of the instruments should be defined. This may concern all interacting national climate policy instruments which were not known, required or in force at the time when the cap was set. This, in particular, includes instruments (emission limits, taxes and levies, legally regulated decommissioning or similar) introduced by individual Member States which additionally and directly encourage the sectors covered by the ETS to reduce power generation from lignite and hard coal.

The reduction effect of additional national climate policies should be estimated in fixed, coordinated cycles. If possible existing European reporting formats should be used, for example the projection reports about emission development, which must be submitted by the Member States within the framework of the Monitoring Mechanism Regulation (MMR) every two years (e. g. by comparing a "with existing measures" scenario with an "with additional measures" scenario). If possible, coordinated, robust and transparent methods should be used. At present, the very heterogeneous projection reports do not satisfactorily meet this requirement. In the past, projection reports often estimated future emissions conservatively. Real emissions were then well below the previous estimate (see Figure 1).

30 See FN 26. Contrary to the proposals discussed in European Parliament, we would not restrict the waiver of auctions option to decommissioning power generation capacities by national measures but would also enable other emission reductions triggered by additional national climate protection measures.

31 The ENVI Compromise Amendments of December 14th 2016 foresee a cancellation of allowances (see compromise amendment 7).

Effort must be made therefore, to see how emission projections at a European level can be improved in the future. An ad hoc impact assessment of a new instrument or instrument bundle is in principle also feasible, however not comparable with regular projections because of potential deviations in the assumptions about key influencing factors.[32]

To ensure climate efficacy of interacting national energy and climate policy instruments, the Member States concerned should, in their own interest, be obliged to compensate for drops in demand in the EU ETS. However, a binding regulation may be considerably diluted in the negotiations. This could be an argument for letting the Member States decide whether and to what extent drops in demand should be compensated for in the EU ETS. However, an effective reduction effect would not be guaranteed if drops in demand are compensated for on a voluntary basis. It appears reasonable in terms of a coordinated approach that not only does the European Commission set the framework for the calculation of the drop in demand, but also at least sets an upper limit for the respective compensation volume in order to avoid influencing ETS beyond the claim of "ETS neutrality". This should also eliminate fears of other Member States that some ambitious Member States may shape the ETS cap more rigorously and in an uncoordinated way.

Conclusion:

In addition to a more stringent ETS cap setting, UBA recommends the following elements for an ETS-neutral scheme for interacting national climate and energy policy instruments:

- **ETS-neutral compensation of interacting climate and energy policies:** Drops in demand triggered by interacting national instruments in the EU ETS must be compensated for by corresponding reductions in supply. In the short term, this should preferably be done through a national waiver of auctions (alternatively, but second best, through purchasing programmes). Structural emission reductions should be reflected over the medium term via a cap adjustment.
- **Establishing standards for impact assessment of national climate policies:** For an ETS-compatible scheme of interacting energy and climate policy instruments, reliable and methodically sound standards are needed to estimate drops in demand, i.e. the need for compensation in the EU ETS. This should preferably be done at a European level.
- **Strengthening the monitoring of interacting national instruments:** Member States should, where possible, regularly and transparently estimate the impact of their national energy and climate policies on ETS emissions based on existing reporting formats and report to the European Commission, as part of the bi-annual projection reports. On this basis the European Commission should estimate the possible impact of national energy or climate policy instruments on the EU ETS. The carbon market report seems suitable for this purpose. This consolidated estimate by the Commission will then be considered when setting the subsequent ETS cap.

32 If a new policy measure is adopted between the reporting periods, the compensatory cut in supply in the ETS does not have to wait until the next regular report. The emission reduction and the compensation volume derived from it could also be estimated retrospectively.

4 Literature

Capros P., A. de Vita, D. Papadopoulos, M. Zampara (2014): Development and evaluation of long-term scenarios for a balanced European climate and energy policy until 2030. Summary for policymakers.

CEPS (2016): A. Marcu et al: 2016 State of the EU ETS Report, Februar 2016

Council (2014): European Council: Conclusions on 2030 Climate and Energy Policy Framework, 23.10.2014 (SN 79/14)

DEHSt (2014): Stärkung des Emissionshandels: Diskussionsbeitrag zur Ausgestaltung der Marktstabilitätsreserve (MSR).

DEHSt (2015): Rechtliche Bewertung des Klimaschutzbeitrages

DIW (2014): Kemfert, Claudia; von Hirschhausen, Christian; Lorenz, Casimir: Europäische Energie- und Klimapolitik braucht ambitioniertere Ziele für 2030. DIW Wochenbericht No. 10.2014

Ecofys (2016a): The waterbed effect and the EU ETS: An explanation using the potential phase out of Dutch coal fired power plants as example, Februar 2016.

Ecofys (2016b): Impact of a CO_2 levy in the power sector: proposal for an instrument that would strengthen the EU ETS and the price signal for clean technology. February 2016

EEA (2015): European Environmental Agency: Trends and projections in Europe 2015.

EEA (2015a): European Environmental Agency: Trends and projections in the EU ETS in 2015.

ENVI (2016): Committee on the Environment, Public Health and Food Safety des Europäischen Parlaments: DRAFT REPORT on the proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments (COM(2015)0337 – C8-0190/2015 – 2015/0148(COD))

ICIS (2016): EU ETS Data Update, zuletzt abgerufen am 02.06.2016

IPCC (2014): Summary for Policymakers. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

ITRE (2016): Committee on Industry, Research and Energy: DRAFT OPINION of the Committee on Industry, Research and Energy for the Committee on the Environment, Public Health and Food Safety on the proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments (COM(2015)0337 – C8-0190/2015 – 2015/0148(COD))

Jalard, M., Alberola, Emilie, Afriat, Marion et al. (2015): Exploring the EU ETS Beyond 2020. A first assessment of the EU Commission's proposal for Phase IV of the EU ETS (2021-2030), November 2015

KOM (2011): Impact Assessment. A Roadmap for moving to a competitive low carbon economy in 2050. SEC(2011) 288 final

KOM (2014): European Commission: SWD(2014) 15 final

KOM (2016): http://ec.europa.eu/clima/news/articles/news_2016052001_en.htm

Peeters, Marjan (2016): Case Note Urgenda Foundation and 886 Individuals v. The State of the Netherlands: The Dilemma of More Ambitious Greenhouse Gas Reduction Action by EU Member States, Review of European Community & International Environmental Law (RECIEL) 25 (1) 2016

Sandbag (2016): Review of European Power Sector in 2015

UBA (2016): Klimaschutz im Kraftwerkspark

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