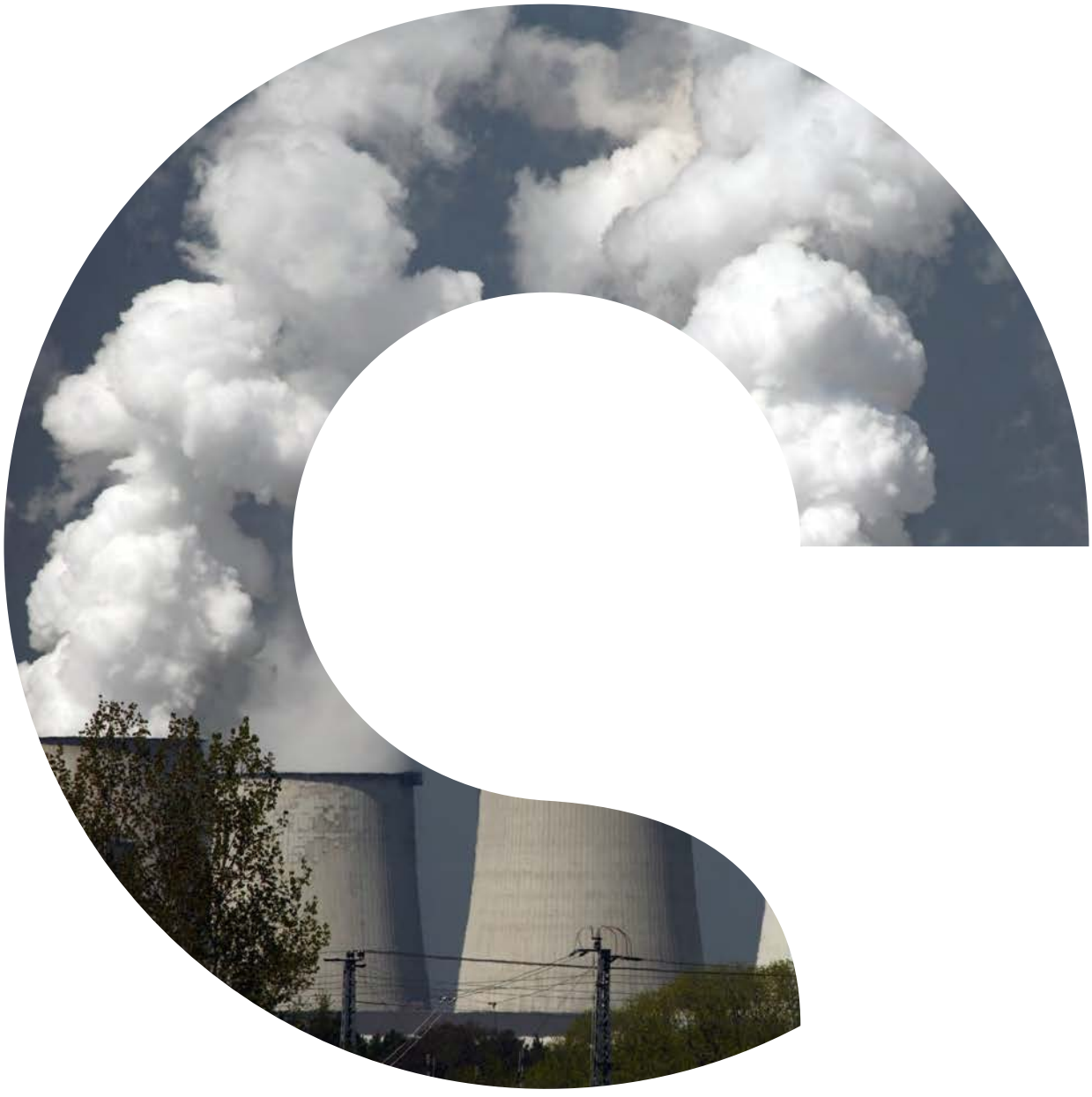
The Role of Emissions Trading in the Energy Transition

Perspectives and Limitations on Current Reform Proposals

BACKGROUND

Agora Energiewende



The Role of Emissions Trading in the Energy Transition

IMPRINT

BACKGROUND

The Role of Emissions Trading in the Energy Transition

Perspectives and Limitations on
Current Reform Proposals

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Foreword

Dear Readers,

Emissions trading is often seen as the flagship project of European climate policy. For some time, however, this flagship has been dangerously listing to one side. To keep it from capsizing, it has been repositioned several times – and is once again now in the dry dock.

Its repair hinges on ensuring that the basic principle of emissions trading once again functions as it should, i.e. to create a scarcity price for CO_2 by limiting the number of emissions allowances on the market, thereby incentivizing investment in low-carbon technologies. Because too many allowances have been allocated, scarcity has never existed. The large surplus of certificates is undermining this principle and rendering emissions trading ineffective as a tool for climate protection.

This background paper focuses on the following questions: How will the number of excess certificates develop in the coming years? And are the current proposals for reforming the emissions trading system enough to reduce surpluses and to achieve a scarcity price?

I hope it is an interesting read.

Dr. Patrick Graichen
Director Agora Energiewende

The Conclusions at a Glance

1. **Without a fast-acting reform, emissions trading as a tool for European climate policy is dead.** Currently, EU emissions trading has a structural surplus of 2.5 billion certificates, which will grow to 3.8 billion by 2020 and without reform will reach 3.4 billion by 2030. Without structural reform, the CO_2 price will remain permanently under 5 euros per tonne.

2. **Of crucial importance will be the design of the market stability reserve (MSR), on which the EU will decide in 2015.** The proposed development toward a flexible market-quantity mechanism for the emissions trading system (price-quantity control as opposed to pure ex-ante quantity control) offers an opportunity to save the system.

3. **Expanding emissions trading through national instruments is necessary, latest by 2020.** Even if an ambitious design for the MSR is chosen, it will have only limited effects on CO_2 by 2020. Therefore, an additional national measure, similar to the British Carbon Support Mechanism, will be needed in order to reach Germany's climate protection target of a 40 percent reduction in greenhouse gases by 2020 over 1990.

4. **A review mechanism is urgently needed for the MSR, which takes into consideration potential unforeseen developments.** While the EU Commission assumed continuous growth and rising electricity usage in their calculations for the MSR, this is currently not expected. Other trends could also evolve contrary to expectations

Introduction

Environmental economists hail emissions trading as the most efficient instrument for achieving a particular environmental objective. As a result, European Union (EU) member states in 2005 established an emissions trading system (ETS) as a central tool of Europe's climate protection policy. The emissions trading scheme has two main objectives:

→ 1. to reduce greenhouse gas emissions cost-efficiently by using a market mechanism to reach jointly agreed climate goals,

→ 2. to create an incentive effect for the continued use of existing CO_2-reducing technologies as well as an incentive to invest in new low carbon technologies.

The EUETS includes all power stations above a certain size and industrial plants in key energy-intensive industries (e.g. chemicals, steel, cement, paper) above a certain size in the EU[1]. The basic principle is to distribute a set number of emissions allowances, allowing a plant to emit a tonne of CO_2 only if it then gives up one of these certificates. As these allowances are transferrable, they are also tradable. This creates a market and a price for CO_2 permits, which in turn gives value to climate-protection measures for companies, and spurs them to cut emissions.

While emissions trading in theory sounds highly efficient, the reality of buying and selling CO_2-emissions allowances in the EU is very different: As the market is flooded by a huge surplus of certificates, the price for CO_2 permits is extremely low. As a result, the European Council (made up of the European Union's member governments) and the European Parliament are in talks to reform the emissions trading scheme.

This background paper aims to

→ outline the development of EU emissions trading from 2005 until today,
→ explain the reasons for and quantify the volume of surplus certificates,
→ give an overview of expected surpluses under various scenarios to 2030,
→ assess proposals for and effects of a so-called market stability reserve (MSR),
→ discuss the role of emissions trading for Germany's energy transition and the possible need for additional measures at national level.

1 In addition to EU member states, Norway, Iceland and Liechtenstein have joined the emissions trading scheme.

1. Development of EU emissions trading from 2005 to 2015

The defining feature of any emissions trading market is the volume of allowances issued, because this determines their scarcity and the incentive for taking climate-protection measures. In Europe, the first trading period from 2005 to 2007 allowed participating EU member states to distribute emissions allowances to their industries through national allocation plans. As a result, each government distributed certificates generously, meaning there were more certificates put in circulation than CO_2 emissions actually produced by industry. This became evident in April 2006, following collection of emissions data for the scheme's first year, 2005. The CO_2 price tumbled by about half, from more than 25 euros per tonne of CO_2 to 15 euros per tonne of CO_2. In the course of the following year, the CO_2 price dropped to zero (see Figure 1).

To stop this problem recurring, the European Commission used the second phase of emissions trading (2008-2012) to monitor national allocation plans of CO_2 allowances. It approved them only after close examination, and the number of certificates distributed was in part significantly reduced. As a quid pro quo, however, the Commission allowed member states generous allocations of so-called JI/CDM credits, certificates for CO_2 emissions in projects outside the EU. As a result, Germany, for example, effectively was able to increase its national emissions allocation plan by 22 percent by adding emissions certificates for third countries.

Nevertheless, 2008 thus began much like 2005, with the CO_2 price rising from 20 euros to 27 euros per tonne. But it collapsed during the ensuing economic crisis that hit the EU, stabilising only mid-2011 at a level around 15 euros per tonne. When it subsequently became clear there would be an oversupply of CO_2 certificates even in the second phase of the emissions trading scheme, the CO_2 price fell to just over 7 euros per tonne in 2012.

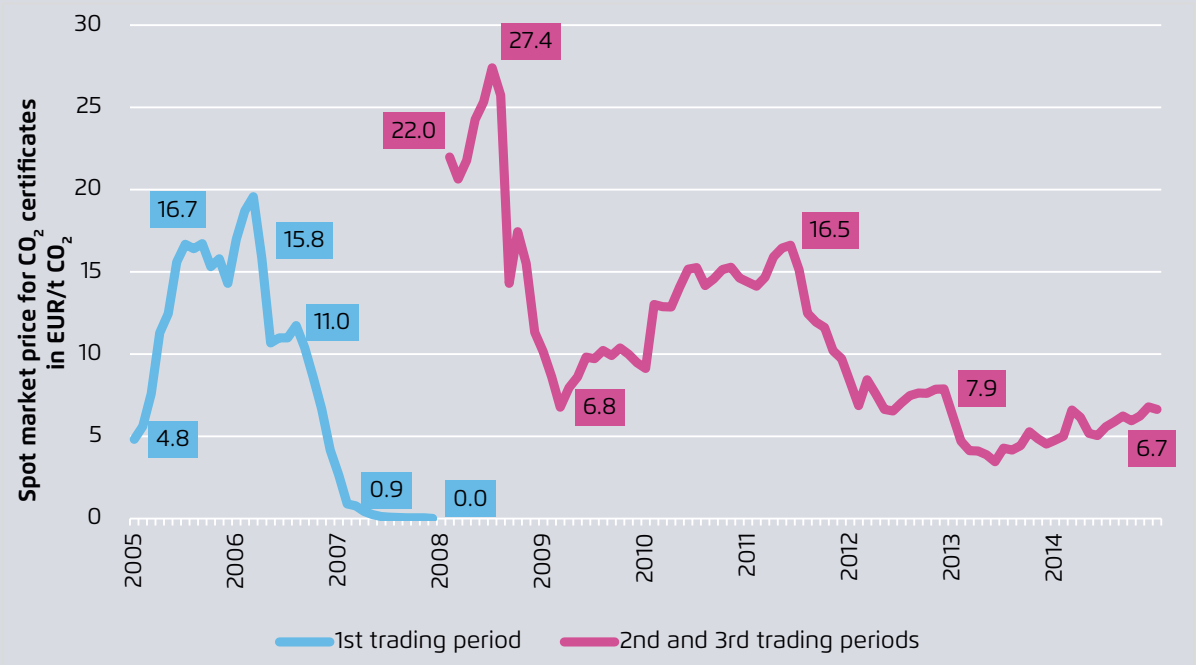
During the course of this second trading period, the European Council and the European Parliament decided in 2008 to reform the ETS before a third trading phase (2013-2020). This was done as part of their 2020 climate protection package. The reform introduced four key differences to the scheme's second phase:

- The volume of certificates issued was no longer set at national, member-state level, but on the basis of a fixed, pan-European mechanism: As part of the EU's overall emissions reduction target, the EU emissions trading sector is meant to produce 21 percent fewer emissions by 2020 than it did in 2005. The number of certificates distributed in 2013 was just over two billion and has been decreasing by 1.74 percent annually since.
- The certificates for the energy sector were no longer allocated for free, but sold at auction. Industrial enterprises continued to receive free allowances based on product-specific parameters („benchmarks"). In addition, EU member states were allowed to compensate energy-intensive sectors for any negative effects of emissions trading on electricity prices and thus competitiveness. Germany has always made full use of this option.
- The number of JI/CDM credits usable in Europe until the end of the decade was set at half the emissions savings pegged between 2008 and 2020 - equivalent to 1.6 billion JI/CDM credits. Since 2013, new projects have faced tougher scrutiny, although already-approved JI/CDM projects may largely continue to exercise emissions rights on the previous basis.
- Surplus emissions certificates from the second trading period 2008-2012 could be transferred into the third emissions trading period starting in 2013 („banking").

This transfer of surplus allowances from the second to the third trading period meant that the CO_2 prices in 2013 were similar to those seen in 2012, about 7 euros per tonne. In April 2013, it became clear that 2012 emissions had once again been lower than the volume permitted by allocated certificates. At the same time, large volumes of JI/CDM credits were pouring into the trading system. As a result,

prices at times tumbled to as little as 3 euros per tonne. Expectations that the system will be reformed again have seen CO_2 prices recover to levels of 5–7 euros per tonne since the beginning of 2014.

CO_2 emissions permit prices 2005-2014 (spot market) Figure 1



DEHSt, EEA, ICE, own calculations

2. The structural surplus of certificates in emissions trading: causes and current status

The EU emissions trading system is currently suffering from a large surplus of emissions permits. This is the result of the over-allocation of allowances in the past and the use of large numbers of JI/CDM credits from projects in third countries.

Cause 1: Over-allocation of CO_2 certificates

From the start of trading in 2005, the emissions produced by companies were almost always below the volume of emissions allowed by the allocated allowances. Indeed, there were in parts significant over-allocations of certificates in nine of the scheme's first ten years. Only in 2008 were emissions slightly higher than the volume allowed. Since introduction of the banking arrangement in 2008, these surpluses have not been cancelled at the end of the year, but remain in the system. Thus, the surplus has become increasingly larger. By the start of 2015, there were 1.3 billion surplus allowances in the system.

This over-allocation was driven by three assumptions about demand for allowances, made by the European Commission early in 2008, which have since proved wrong:

- → The Economic Crisis: The global economic crisis of 2009, which some parts of Europe have still not overcome, had a significant impact on demand. When the Commission presented its plans for emissions trading reform for the period 2008-2012, it projected that Europe's gross domestic product (GDP) would on average grow 2.2 percent per year. In reality, GDP in 2012 was lower than in 2008, the economy having shrunk on average 0.1 percent per year in that period. Less economic activity led to lower emissions, especially on the part of energy-intensive industries.
- → Less demand for electricity: Electricity demand has consistently come in lower than the European Commission expected. On the one hand, the economic crisis significantly reduced European demand for electricity in 2009, leading to lower CO_2 emissions from fossil-fuel power plants. Electricity demand rose again – to pre-crisis levels – in 2010, but has been falling again ever since, with 2014 in particular seeing a big decline. In that period, the Commission expected electricity demand to rise.
- → Slightly higher electricity production from renewable energy: Electricity production from renewable energies was slightly higher than projected. The European Commission used the PRIMES model to calculate that about 645 TWh of electricity would be produced in the EU from renewable energy sources in 2010. This proved 40 TWh too low, as 684 TWh were produced that year. For 2015, the model assumes 830 TWh from renewable sources, which also seems conservative given production of 757 TWh alone in 2012.[2] However, the impact of this on surplus permits is significantly lower than that of the first two factors.

Cause 2: High inflow of JI/CDM credits from Russia, Ukraine, China and India

The companies bound into emissions trading can cover their emissions with certificates allocated by the EU as well as JI/CDM credits generated in third countries. These are based on the so-called flexible mechanisms of the Kyoto Protocol, Joint Implementation (JI) and the Clean Development Mechanism (CDM). Within the framework of the international climate treaty, they are meant to encourage projects to reduce emissions in Eastern Europe, the former Soviet Union, and in developing countries further afield.

The premise of the project was that it was of no relevance to the earth's climate whether CO_2 emissions are reduced in Europe or in other parts of the world. Globally accepted accounting rules for CO_2 reductions, agreed by United Nations bodies, were used as a basis for this. When drawing up the 2008-2012 national allocation plans in 2006, a number of EU member states – including Germany – worried that CO_2

2 See the scenario „EC proposal with JI/CDM & RES trading" in Capros et al. (2008). The authors provide a model-based analysis of the 2008 EU policy package on climate change and renewables. Please refer to Appendix 1.

prices could be very high in that period. As a result, very generous national regulations came about allowing JI/CDM volumes to be added to national quotas. It the time, it was assumed that CO_2 emissions reduction in emerging countries and the successor states of the Soviet Union would be slightly – but not significantly – more cost effective than in EU member states.

In practice, however, considerable problems arose[3]:

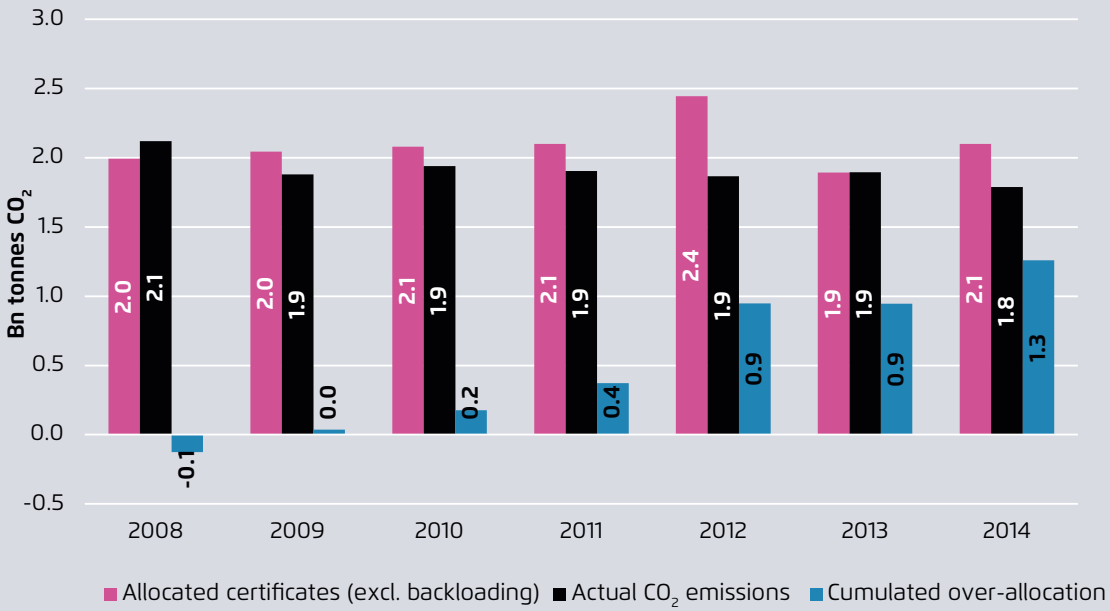
→ An option in the Kyoto Protocol allowed emissions reductions from JI projects – meaning projects in industrialised countries – to be deducted from Kyoto emissions budgets (JI Fast Track), rather than being measured and logged on a project basis. The problem was that Eastern European countries and the successor states of the Soviet Union had been granted a lot of so-called hot air in the Kyoto Protocol for the period 2008-2012. Russia and Ukraine in 2011 and 2012 turned parts of this hot air into JI credits and sold these into the EU emissions trading system. Nearly 450 million JI credits had flowed into the EU ETS by 2013, with 97 percent of these coming from JI First Track. This in effect allowed the EU to increase its emissions without having to balance this with reductions or paying CO_2 avoidance costs abroad.

→ CDM projects in developing and emerging countries did not result in construction of renewable energy and energy-efficient plants, as had been intended. Instead, many projects were realised to dispose of HFC 23 gases. These gases are about 11,700 times more harmful than carbon dioxide and can with minimal investment be

3 See Sandbag (2014): Slaying the Dragon. The Environmental Outlook for the EU Emissions Trading Scheme, pp 55-62

Number of permits allocated every year (without backloading in 2014) and actual emissions between 2008 and 2014

Figure 2



EEA, EEX, European Commission, Sandbag, own calculations; *Own projection for actual CO_2 emissions

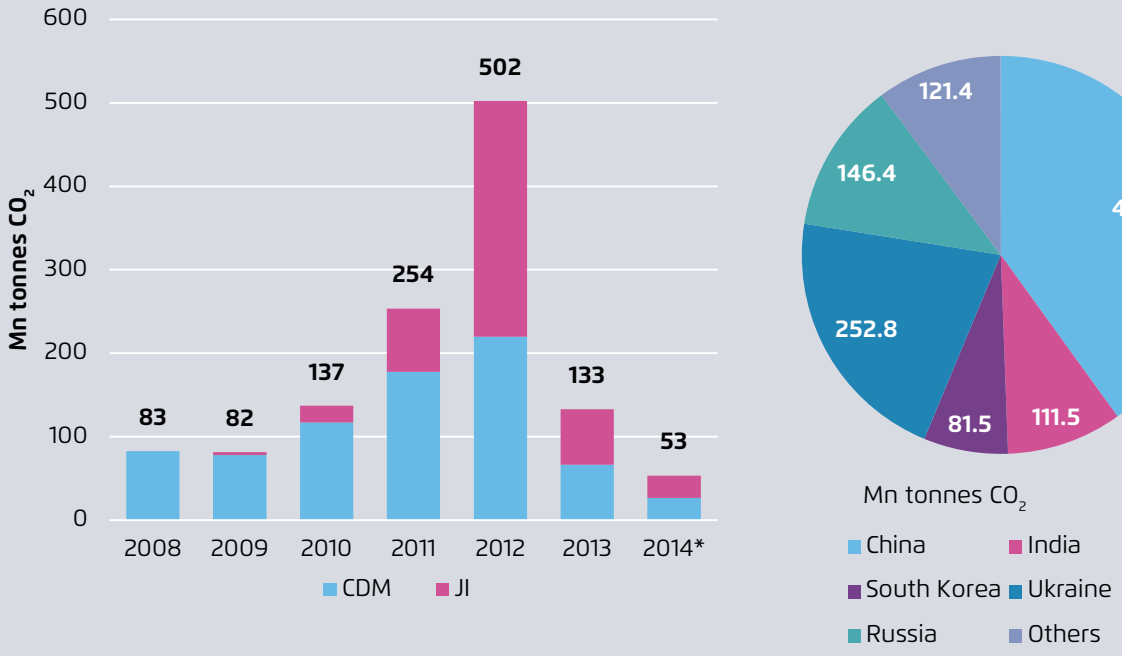
burned and turned into CO_2. While this method of HFC 23 disposal has long been mandatory in industrialised countries, emerging economies like China, India, South Korea and Mexicoused CDM to realise similar ends (see Figures 3 and 4). This also produced very controversial but also very cheap certificates (50 cents per tonne), which were banned by the EU in 2013 after making up the vast majority of projects before that. As a result, some 58 percent of CDM credits that flowed into the EU emissions trading system came from HFC projects, with a further 24 percent coming from N2O projects in emerging markets, which were driven by the same logic (avoidance costs about 1 euro per tonne of CO_2).

The European Commission recognized these false incentives in EU emissions trading in 2008 and considerably tightened rules for use of JI/CDM in the third trading period starting 2013. For example, permits from old HFC projects can no longer be traded and new HFC projects face tough scrutiny. In addition, the number of JI/CDM credits for the period 2008-2012 was deducted from the allowed number for 2013-2020, so that hardly any JI/CDM credits have been flowing into the system since 2013. Nevertheless, by the end of 2014 some 1.2 billion JI/CDM credits - of 1.6 billion allowed until 2020 – had been funnelled into the emissions trading system, leading to a corresponding number of unused European emissions allowances. In consequence, the volume of redeemed JI/CDM credits must be added to the EU's over-allocation to determine the surplus of permits.

The sum of the surpluses

As a result of these two developments, a surplus in emissions certificates of some 2.5 billion piled up between 2008 and 2014. The EU's over-allocation and the glut of JI/CDM

Quantity of JI/CDM permits per year and their distribution by country of origin 2008-2014 Figures 3 and 4

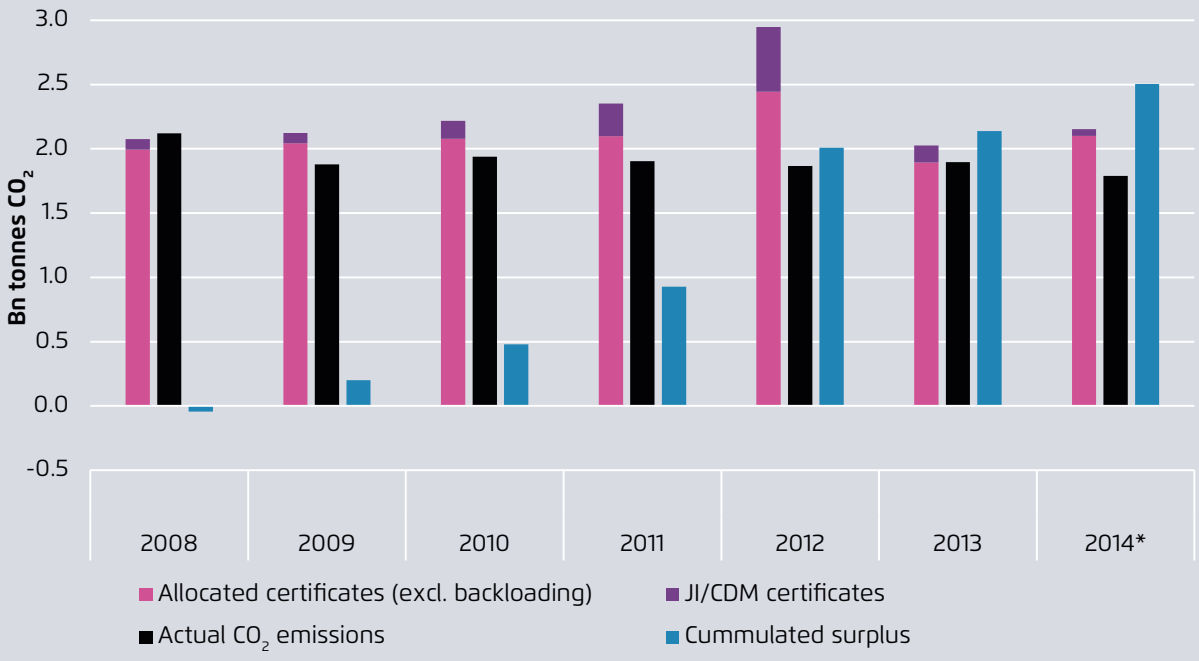


EUTL, Sandbag 2014n

permits between 2008 and 2012 each contributed about half of this total. The surplus is equivalent to 1.3 times the annual volume of the European emissions trading system and roughly three times Germany's annual CO_2 emissions (see Figure 5).

The result of this surplus is easy to describe: Where there is no scarcity, there can be no market with meaningful market pricing can develop. The original idea of emissions trading („cap-and-trade") was betrayed by issuing so many certificates that they had no limiting effect on emissions. The system played only a minor role in influencing companies' actions.

Development of emissions and permit surpluses 2008-2014 Figure 5



EEA, EEX, European Commission, Sandbag, own calculations

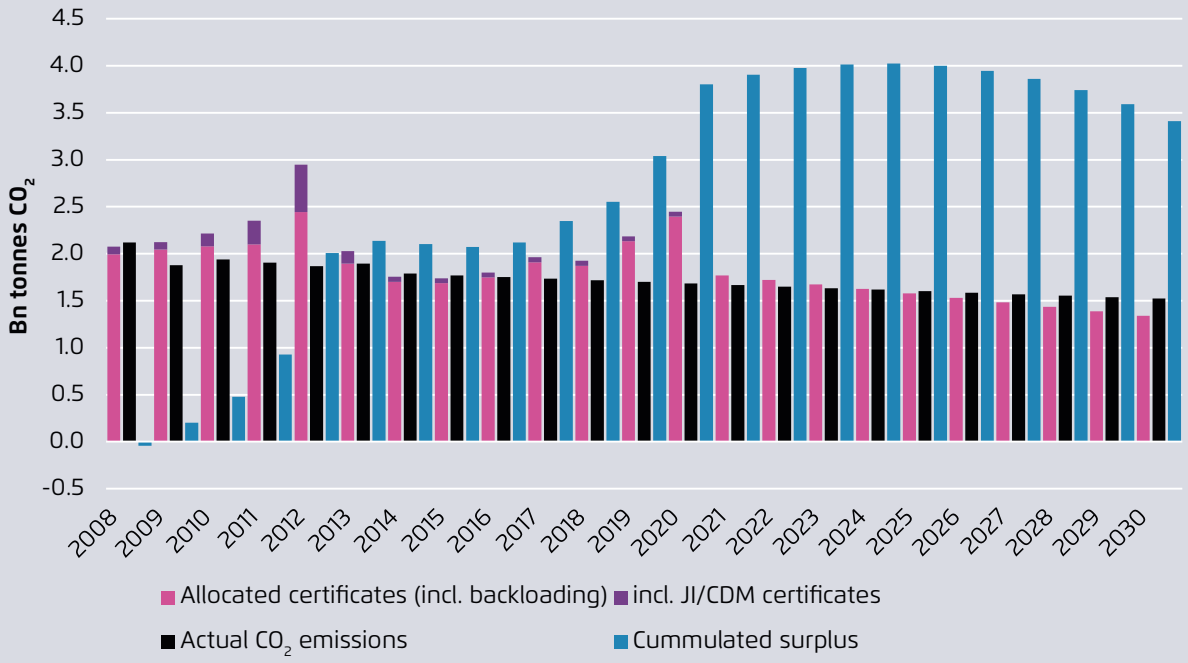
3. Outlook 2030: Structural surpluses as an ongoing problem

The European Commission has acknowledged the problem of surpluses and started a first reform initiative in 2012, aimed at achieving scarcity in the market. The goal was to create investment incentives for low-carbon technologies through a stable price level for CO_2 emissions. The result of this effort was so-called backloading, through which around 900 million certificates were temporarily removed from the market in the third trading period, but which according to current law are to be re-introduced in 2019 and 2020.

In the medium term, therefore, backloading does nothing to solve the surpluses. The Commission thus assumed in its report at the beginning of 2014 that, without a comprehensive reform of the emissions trading system, the surplus would remain until 2030. According to their estimates, the surplus would amount to around 2.6 billion certificates in 2020, shrinking slightly to around 2.3 billion certificates by 2028.[4] This prediction assumes that emissions from sectors included in EU emissions trading will sink by around 1 percent per year, as a result of renewable energy and energy efficiency measures already being implemented. This is a

4 European Commission 2014: Impact assessment accompanying the document 'Proposal for a Decision of the European Parliament and of the Council concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC', SWD(2014)17.

Historical and future developments of certificate surpluses — Figure 6



EEA, EEX, European Commission, Sandbag, own calculations

relatively conservative assumption, considering the actual emissions developments in recent years.

Updating the EU Commission data to include already published 2013 ETS emissions[5] and an initial estimate for 2014, this picture becomes even clearer (compare Figure 6). Without a comprehensive reform, there would be a surplus of 3.8 billion certificates by 2020 and 3.4 billion by 2030.

This demonstrates the central problem of the emissions trading system: Such a surplus of certificates leads not only to CO_2 prices of under 5 euros/tonne of CO_2, it also creates the right to emissions in the future. If these were redeemed, emissions under a trading system would be just as high as if the system were simply done away with. Reforming the ETS is therefore imperative.

5 European Commission 2014: EU ETS emissions estimated down at least 3 percent in 2013

4. The design of the market stability reserve will determine the future of emissions trading

In view of this situation, the European Council agreed to a comprehensive structural reform of the ETS in October 2014, as part of the 2030 climate protection pact. Part of this resolution calls for a reduction in the number of certificates as of 2021 by 2.2 percent annually and the introduction of a market stability mechanism. In addition, exemptions for industrial sectors will continue.

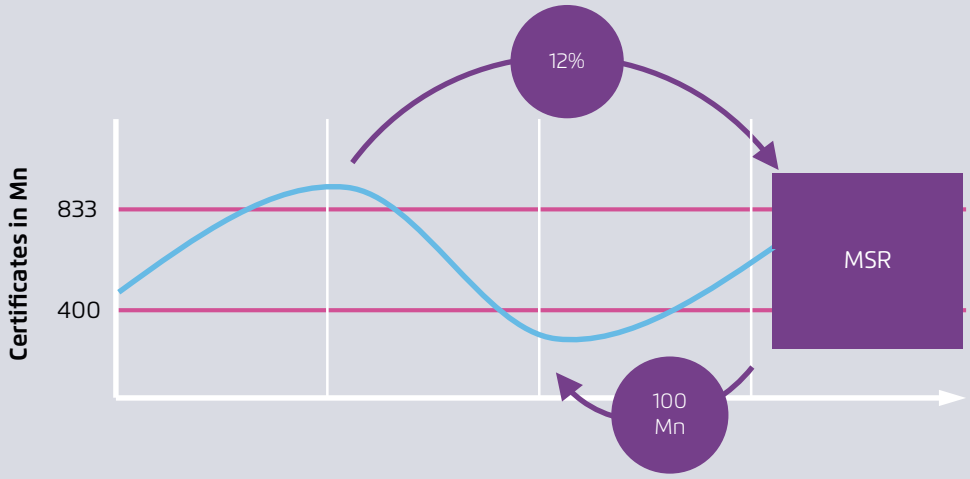
The goals of the MSR as defined by the Commission are:

→ to reduce large structural surpluses in the short term, and to

→ stabilise CO_2 prices in phases of fluctuating demand over the medium- to long-term.

Whether the Council can eliminate the problem of surpluses with these resolutions depends on the design of the MSR, which will be decided in a legislative process in 2015. The Commission's proposal for a stability reserve was put forward in January 2014. It envisages moving the trading system from a current fixed-volume mechanism, which due to the "banking" arrangement leads to the pile-up of surpluses, to a flexible price-volume mechanism. The latter would steer certificate surpluses using a reserve, thereby stabilising the price.

Schematic presentation of the market stability reserve — Figure 7



Own presentation according to DEHSt 2014a

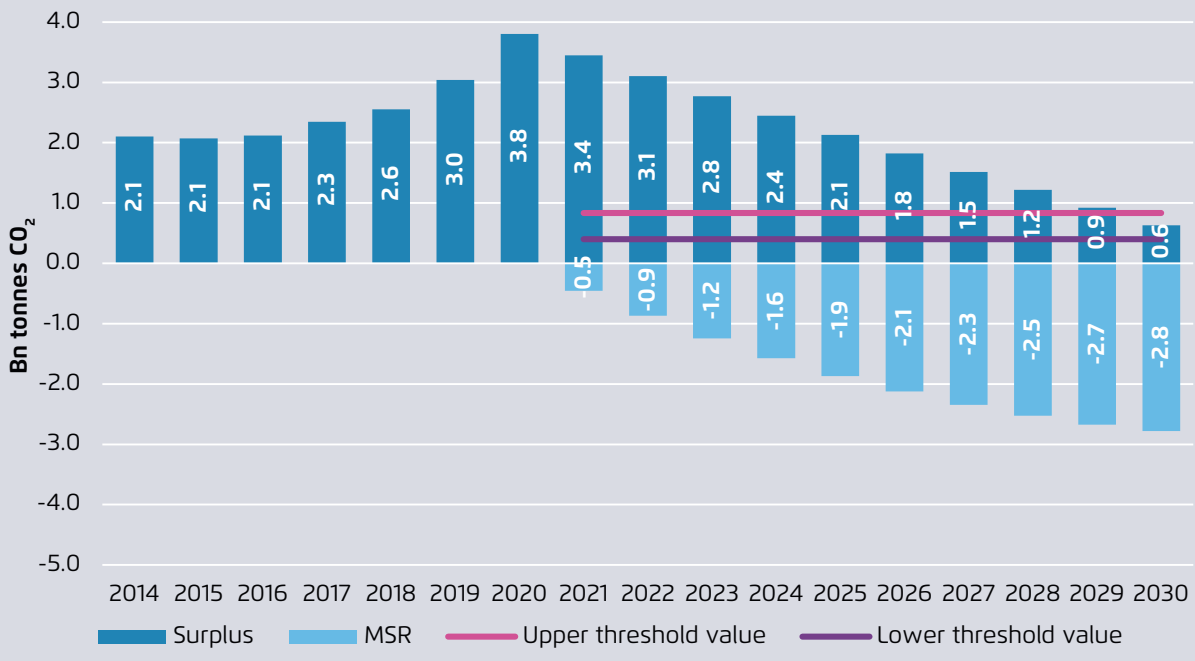
The EU Commission's original proposal for a market stability reserve

According to the Commission's original proposal, the MSR would be introduced in 2021. It functions by steering the volume of certificates in circulation. This circulation volume is defined as the surpluses, or more precisely, the difference between all certificates issued and emissions verified since 2008. The following mechanism is meant to regulate this volume: If the surplus at any point exceeds an upper threshold (Commission proposal: 833 million tonnes of CO_2), then the volume of emissions allowances auctioned will shrink by 12 percent of the volume in circulation in the year x-1 (at least 100 million tonnes of CO_2). The certificates not emitted would be placed in the market stability reserve. In the reverse case, if the surplus falls below the lower threshold of 400 million tonnes of CO_2, the volume auctioned in the next year would be increased by 100 million certificates. Figure 7 demonstrates how this works.

Behind the concept of the MSR is the idea that the emissions trading market functions even when there is a certain volume of surplus and at scarcity prices – and not just when the surplus has been depleted. Because power producers sell a large amount of their power around one to two years ahead of its production ("forward contracts"), the assumption is that demand exists as a result for CO_2 certificates ("hedging") and therefore scarcity prices can also exist to a certain extent alongside surpluses.

Figure 8 shows the development of the surplus volume according to the Commission proposal. At first, the number of certificates rises to 3.8 billion – due mostly to the backloaded certificates that have been returned to the market.

Surplus development according to the original EU Commission proposal — Figure 8



EEA, EEX, European Commission, Sandbag, own calculations

Afterwards, this number falls steadily until it reaches a level inside the defined corridor around the year 2030. In this scenario, the price is not expected to rise significantly above today's level before 2025.

The German government's proposal for a market stability reserve

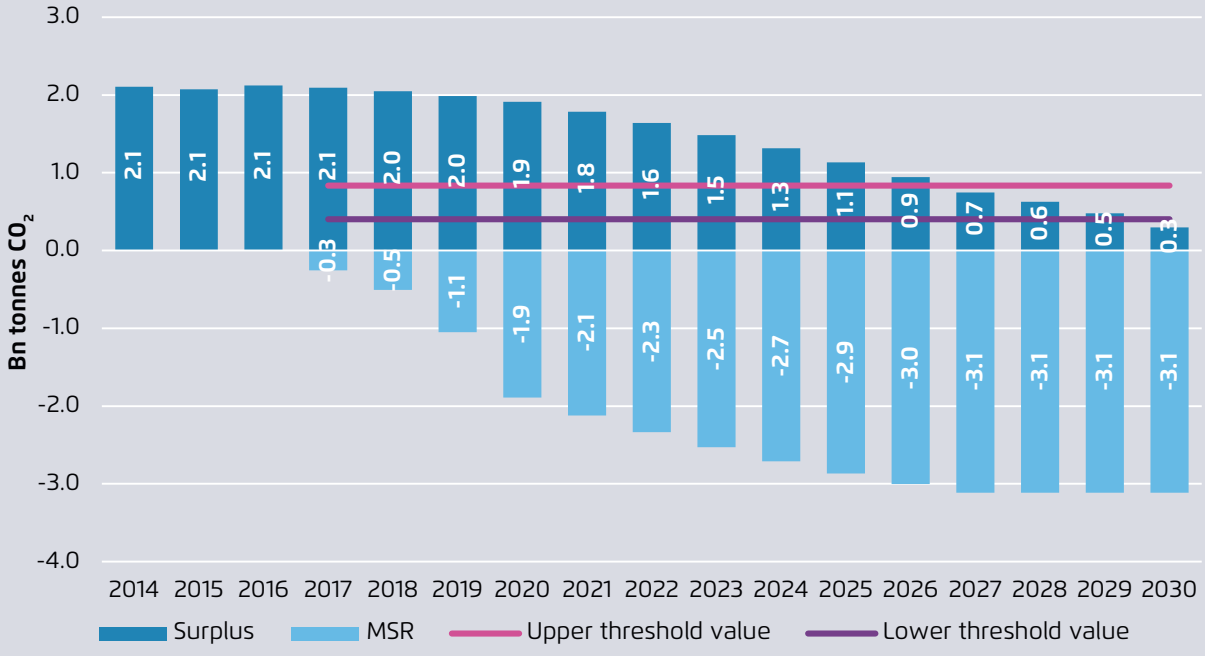
The EU Commission's original proposal would therefore mean that more than ten years must pass before the ETS again generates significantly rising prices. Thus, different proposals have been introduced in the legislative process. The German government has also participated and has put forward two main demands:

→ the introduction of an MSR already in 2017 (instead of 2021);

→ the transfer of the backloaded certificates directly into the MSR instead of re-injecting them into the market in 2019 and 2020.

Assuming a new scenario that incorporates both of these two points, the surpluses would develop as shown in Figure 9. The surpluses begin to decline immediately in the basis scenario – induced by backloading –and in the year 2027 reach the upper threshold of the corridor. In 2030, they would for the first time be below the lowest threshold value at around 300 million certificates. Accordingly, after around 2022, future scarcities could be expected with a slight recovery of the CO_2 price.

Surplus development according to the German government proposal — Figure 9



EEA EEX, European Commission, Sandbag, own calculations

The market stability reserve with weak economic growth, lower demand for electricity and/or strong growth of renewable energies

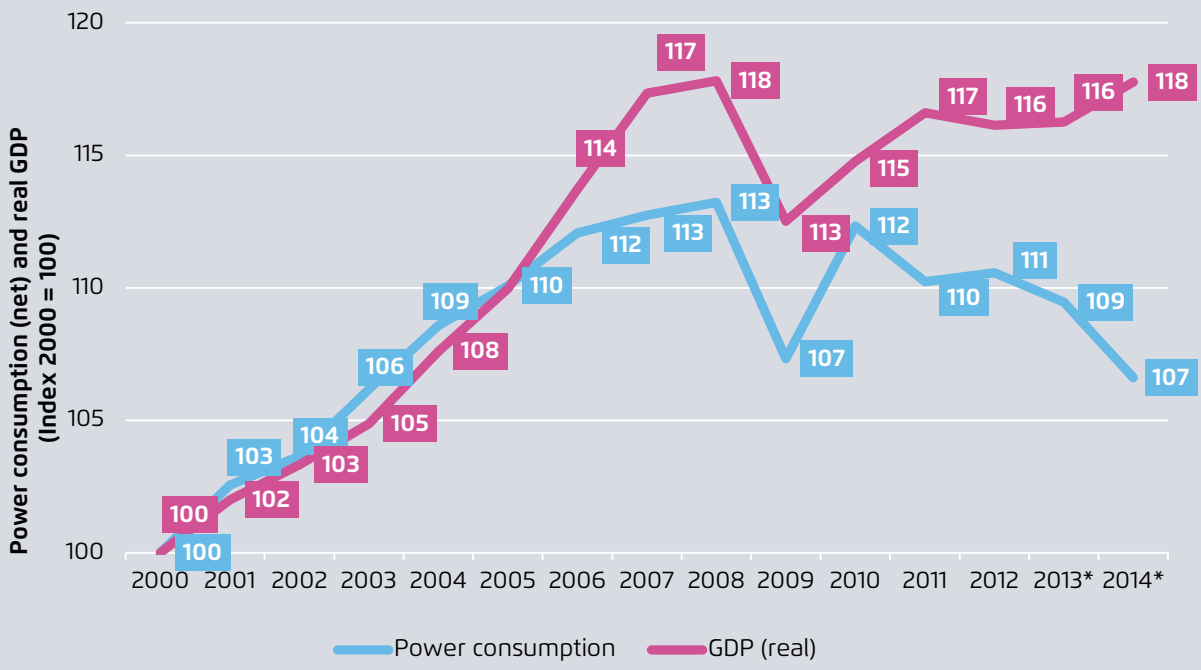
The scenarios illustrated above for developing the MSR were based on the EU Commission's assumption that emissions within the trading sector would decline by around an average of 1 percent annually from 2013 until 2030. But there is reason to believe that actual surpluses could be much higher than the Commission projects. That is because the Commission bases its scenarios on assumptions that are questionable from today's perspective.[6] They anticipate European GDP growth of around 1.5 percent per year and slightly rising power usage (around 0.2 percent per year). Both assumptions are not plausible from today's perspective: The stagnant economy in Europe since 2011 shows that the crisis is still far from overcome and a return to previous growth prognoses is unlikely in the short run. In addition, European power usage has been clearly shrinking since 2010 – among other things due to economic developments, but also due to rising energy efficiency.

It is therefore highly possible in the next years that there will not only be no rise in power demand, but it is even likely to continue shrinking.[7] In view of the considerably lower cost of wind and solar installations, it is also probable that the trend toward a higher-than-expected share of renewables in the power sector will gain momentum. This

6 The assumption underpinning the Commission analysis are based on the energy trend scenario for 2013: EU Energy, Transport and GHG Emissions. Trends to 2050. Reference Scenario 2013.

7 For a detailed discussion of the different efficiency effects, see Sandbag 2014: Forecasting the EU ETS until 2020.

Development of gross domestic product and power usage in the EU28 2000-2014 Figure 10



Eurostat, Sandbag 2014; *preliminary values

is because EU member states are realising their renewable energy goals for 2020 more often through measures in the power sector than in the heating and transport sectors. Even if it is hard to precisely quantify these three effects – weaker economic growth, lower power usage and higher power production from renewables – it appears not unrealistic, in view of recent years' data, that the need for emissions certificates could be significantly lower than the Commission has predicted.

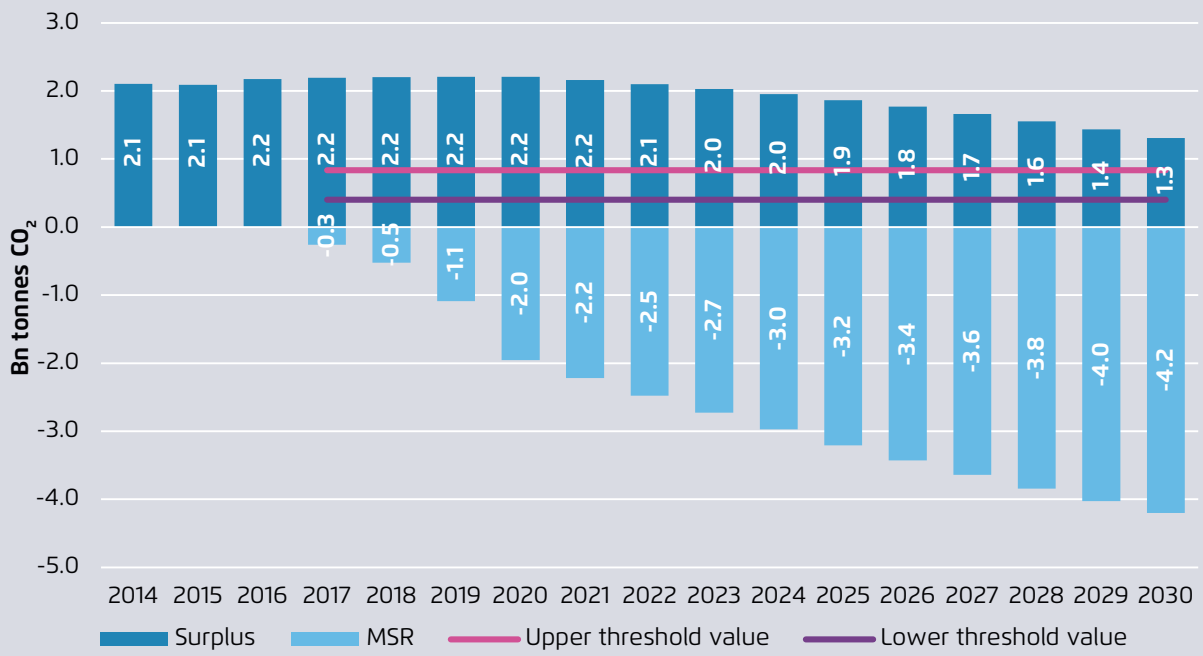
Assuming that CO_2 emissions in the trading system fall not by 1 percent per year, as the Commission's scenario foresees, but by 2 percent per year, the surplus situation would be fundamentally changed.[8] Figure 11 makes clearer such a development, in which emissions in Europe decline by 2 percent and the MSR is implemented according to the proposal of the German government.

It is evident that in such a scenario, even a 2017 start and the introduction of all backloaded certificates into the MSR are not enough to reduce the surpluses and to drive them into the the corridor in the foreseeable future. The MSR's goal, which is to reduce the structural surplus of CO_2 certificates, is therefore largely dependent on whether the Commission's assumptions are on the mark. This is especially true for power demand, because declining usage will in-

8 Such a CO_2 decline of 2 percent per year is the equivalent of the emissions decline on average of all plants in the EU emissions trading system (new scope) in the years 2008-2014. It would also take nearly the same trajectory as EU emissions trading if emissions developed following the emissions-reducing factors (1.74 percent per year until 2020, 2.2 percent 2021-2030).

Surplus development according to the German government proposal, with strongly falling emissions (2 percent per year)

Figure 11



EEA, EEX, Europäische Kommission, Sandbag, own calculations

creasingly require emissions-intensive coal-fired plants to cut their power production.

Smaller-than-planned hedging needs

According to current proposals, the MSR should remain constant (upper threshold value: 833 million tonnes, lower threshold value: 400 million tonnes. These thresholds are based on the theory that actors in the power market need a certain volume of certificates to secure their forward power purchases (hedging)[9] and were derived on the basis of today's emissions levels.

This hedging need will shrink over the course of time for two reasons:

- → As emissions decline, the share of CO_2-intensive energy sources will contract over the course of time. This means that fewer CO_2 certificates will be needed to hedge sales of power from coal- and gas-fired plants.
- → The increasing share of wind and solar power production will cause power markets to become more short-term and less power will be sold ahead of production, reducing the need for hedging. This is because the exact needs for fossil-fuel power (and with that CO_2 certificates) will only be determined at short notice, due to the weather-dependency of wind and solar power, which is sold on the spot market.

In view of this, it would make sense to reduce the threshold values over time or to evaluate them in regular intervals. Otherwise, the desired effect on the CO_2 price will become ever-smaller over the course of time.

9 As a counterargument, it is frequently asserted that financial products could serve this purpose and therefore no CO_2 certificates are necessary. Thus, already clearly ahead of the first and second trading periods trading with CO_2 futures already existed, even though the certificates were first offered on the market in April 2005 and again in April 2008.

5. The role of EU emissions trading and national measures in the energy transition

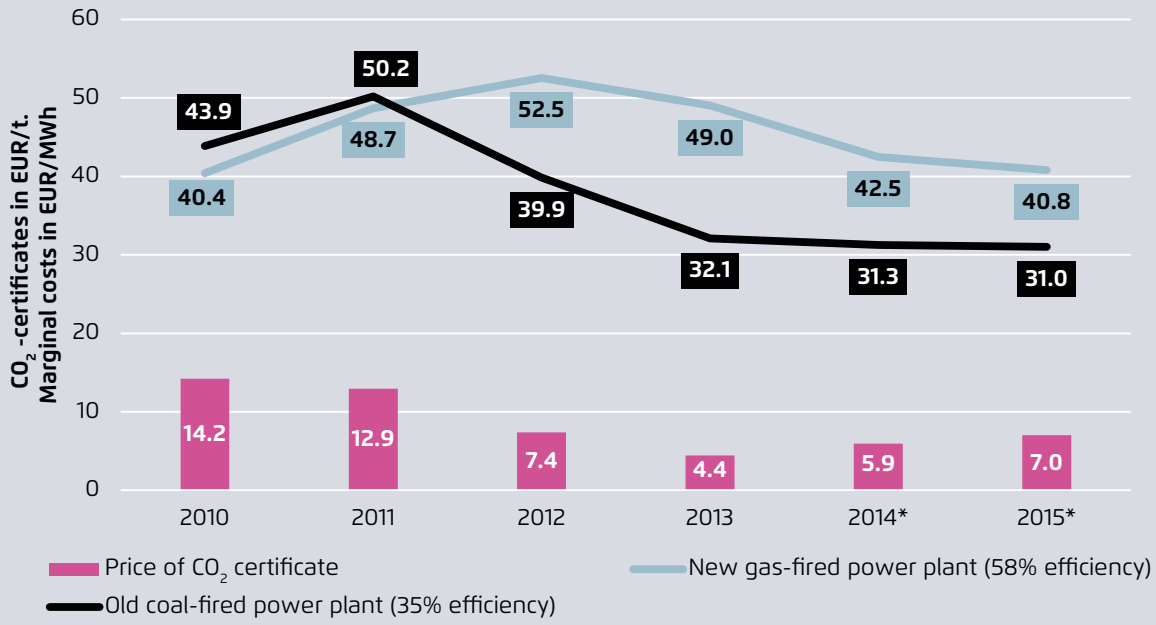
The EU emissions trading scheme and its role in Germany's energy transition

Despite the large surplus of CO_2 certificates, the EU's emissions trading scheme looks set to reach its main goal of reducing greenhouse gas emissions by 21 percent between 2005 and 2020. However, emissions trading will only have a subordinate role in this success. Other factors will in all probability be able to claim a much more important role – economic crisis, improved energy efficiency, more renewable energy sources. That is because for most of the time since European emissions trading was launched, the CO_2 price has not provided companies with any incentive to reduce their emissions.

However, the emissions trading scheme will entirely miss its second key goal of having an incentive effect on usage of existing industrial plants or on investments in new ones. The current price of CO_2 stands in stark contrast to the expectations of the European Commission, published in 2008 in the course of a first round of discussions about reform. The Commission's impact assessment, presented together with its proposals for legislative changes, projected

Short-term marginal costs of old coal and new gas-fired power plants and the development of CO_2 permit prices in Germany from 2010 to 2015

Figure 12



BAFA, EEX, UBA, own calculations; * Based on preliminary data and own projections

CO_2 prices of 39 euros per tonne in 2020.[10] Instead, as outlined above, the price currently hovers around 5-7 euros and looks unlikely to rise to much above 10-13 euros by 2020, even if the German government's ambitious reforms are adopted.

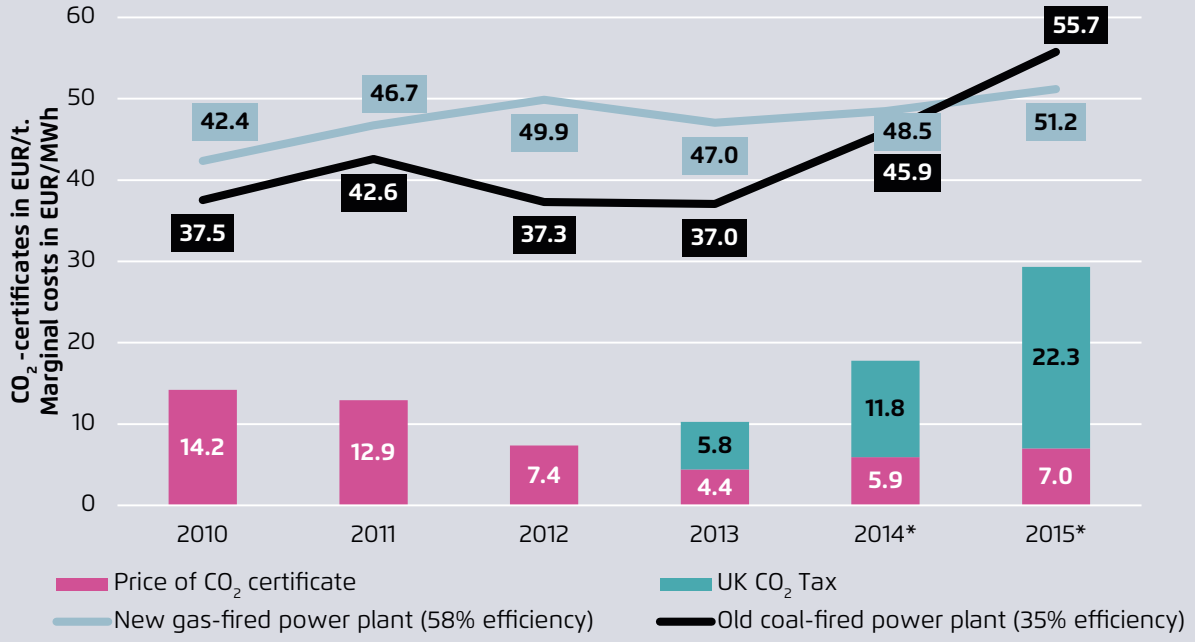
This situation has a significant impact on Germany's energy transition, especially on the ratio of coal- to natural gas-power plants in the country. This relation is of crucial importance if Germany wants to reach its national climate targets – a reduction of greenhouse gas emissions of 40 percent by 2020 compared with 1990, 55 percent by 2030, 70 percent by 2040, and 80-95 percent by 2050. As gas-powered plants have higher fuel costs and thus higher operating costs than coal-fired plants, the CO_2 price is vital to compensate their cost disadvantage. But the low CO_2 price meant this compensatory effect was absent over the last few years. Indeed, as Figure 12 shows, the cost advantage of coal relative to natural gas only continued increasing in this period.

Another reason for this trend is the considerable decline in coal prices in recent years. Natural gas prices, on the other hand, continued rising until 2012 and fell only slightly thereafter. The cost of CO_2 emissions would normally favour low-emission natural gas power plants. But emissions certificates are currently so cheap that they cannot compensate for the difference in fuel costs. As a result, Germany's coal-fired power plants have a significant cost advantage

10 European Commission 2008: Impact assessment. The document was published alongside a package of implementation measures for the EU's objectives on climate change and renewable energy up to 2020.

Short-term marginal costs of old coal-fired power plants and new gas-fired plants; CO_2 permit prices and the UK's new CO_2 tax 2010-2015

Figure 13



BAFA, EEX, UBA, own calculations; * Based on preliminary data and own projections

over gas-fired plants and are increasingly displacing these from the country's electricity market.

National measures to complement emissions trading

The low CO_2 price and the resulting lack of incentives to alter the ratio of coal to gas-fired power plants prompted the British government to implement national measures in addition to the ETS. In 2013, the UK introduced a "carbon support mechanism" to complement the EU emissions trading scheme. The mechanism supports the CO_2 price through a supplemental CO_2 tax. Due to the low world market price, coal enjoys a significant cost advantage over natural gas in the UK as well as Germany. The CO_2 tax is meant to balance this out to the benefit of natural gas-fired power plants. From 1 April 2015, the CO_2 tax will be increased from the current GBP9.97 to GBP18.08 per tonne of CO_2. As a result, a UK power plant will have to pay about 30 euros per tonne of emitted CO_2 (CO_2 tax plus CO_2 permit price), while plants in Germany will continue to pay only the certificate price of 5-7 euros per tonne. The UK's CO_2 tax will invert the cost advantages seen recently and again make modern gas-fired plants more competitive than old coal-fired ones. Figure 13 shows how costs curves will intersect in 2015.

Just like the UK, Germany has to answer the question of how it will achieve its national climate protection goals in 2020. That is because even an ambitiously designed market stability reserve will not drive CO_2 permit prices up sufficiently by 2020 to change the current ratio of coal- to gas-fired plants in Germany. As a result, the German government's call to flank EU emissions trading with national measures is of supreme importance. The pledge, made in December 2014 with the publication of Germany's Climate Action Programme 2020, has to be backed up with action if Germany wants to hit its climate target of reducing greenhouse gas emissions by 40 percent by 2020.

Supplementing the ETS with national measures was criticised in the past as experts feared this would only shift CO_2 emissions from one country to the next and not reduce EU emissions overall. But the surplus of CO_2 certificates made this argument redundant as national measures were only increasing the surplus.

A well-designed market stability reserve would put an end to this: Additional national measures would no longer run the risk of increasing emissions elsewhere in Europe, but actually help the climate as excess allowances would be funnelled to the MSR. Would certificates above a certain size of the MSR be deleted, like sometimes proposed, the climate protection effect would certainly be given. National measures and European emissions trading could in future truly complement each other.

6. Conclusion

The current problems with emissions trading and the likely effect of the various reform proposals lead to the following conclusions:

→ **Without speedy reform, emissions trading is dead as a instrument of European climate policy.** EU emissions trading currently has a structural surplus of 2.5 billion certificates, which will grow to 3.8 billion by 2020. Without countermeasures, this overhang would still number 3.4 billion in 2030. Without structural reform, the CO_2 price will remain permanently under €5 per tonne of CO_2. In such a scenario, CO_2 emissions would be just as high under an emissions trading scheme as they would be without any system in place at all. The trading scheme would thus prove its own irrelevance.

→ **When decisions on the market stability reserve are taken in the EU in 2015, the design of the mechanism is of utmost importance.** The aim of steering the emissions trading system away from ex-ante quantity control to a more flexible market quantity mechanism (price-quantity control) is an opportunity to save the system. If the stability reserve can start in 2017 and if backloaded certificates are directly transferred into it, the MSR could reduce the surplus sufficiently by 2027 and help prices recover from 2022.

→ **But that means national measures will be needed until at least 2020 to supplement emissions trading.** Even if the market stability reserve is given an ambitious mandate, it will have only a limited influence on permit prices before the end of the decade. In order to reach its climate protection target of cutting greenhouse gas emissions by 40 percent from 1990 to 2020, Germany will need to adopt supplementary national measures akin to the UK's carbon support mechanism. A welcome side-effect of a market stability reserve would be to stop national measures leading to emissions increases in other countries - only the volume of the reserve would increase instead.

→ **A review mechanism of the market stability reserve is urgently needed.** It would look out for unforeseen developments – for example relating to electricity demand. Already a number of the European Commission's assumptions in sketching the market stability reserve have become questionable – for example, its projection of steady economic growth and rising electricity consumption. Other trends could change as well – like developments in the renewable energy sector, or a declining need for hedging, which could leave the MSR's thresholds too high. As a result, it would be crucial to evaluate the MSR's performance in 2018 already and make changes if necessary.

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