



GREENPEACE

THE COST OF INACTION

Auctioning revenues under different climate ambition scenarios for the EU Emissions Trading Scheme

Report by Öko-Institut
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Executive Summary

Main findings

- Compared to the reference scenario auctioning revenues increase for all countries in all action scenarios, even in the backloading scenario.
- If the EU continues with its current 20% emission reduction target until 2020, the revenue losses for European Member States will be in the range of €₂₀₁₂ **62** billion (compared to revenues in the 25% domestic scenario) and €₂₀₁₂ **78** billion (compared to revenues in the 30% domestic scenario).
- Overall the impact of reduced auctioning quantities and higher climate targets on industrial competitiveness is very limited and will be compensated. The sectors concerned have enjoyed over allocation in the past. From 2013 onwards they will receive 100% free allocation (based on benchmarks). A compensation mechanism for higher electricity prices has also been established.
- The proposal by the Commission which includes the back-loading measure is a first step forward; however, the respective amount of allowances should be back-loaded for a period of a decade or more. It would be best to retire the back-loaded allowances at the earliest point in time. This first move should be complemented by the adoption of higher reduction targets since previous research has clearly shown that a stand-alone back-loading approach will not be sufficient to solve the surplus problem and restore a robust CO₂ price signal.
- Considering that the EU ETS Directive includes special provisions on redistribution designed to support Central and Eastern European countries, these Member States would benefit more (compared to other Member States) from an increase in auctioning revenues even without introducing additional redistribution mechanisms under the ETS.

Background

The European Union Emissions Trading Scheme (EU ETS) is the largest emissions trading scheme in the world; the stationary sector covers 41% of European emissions and approx. 13,000 installations. Since the beginning of 2012 the EU ETS also covers emissions from air transport. The EU ETS is a central pillar of the EU's climate policy mix and has served as a pioneering model for the design of trading schemes in other parts of the world. The EU ETS was created to incentivise emission reductions and the deployment of installations with low CO₂ emissions by putting a price on emissions in a cost-effective manner. Currently the EU ETS faces serious challenges as the massive surplus of emission allowances on the market has reduced the price signal substantially.

Since 2011, CO₂ prices have dropped to € 7 per ton of CO₂, which is too low to trigger investment decisions for most emission abatement options or to incentivise innovation. The surplus results from huge entitlements for the use of external emission reduction credits from the Clean Development Mechanism and Joint Implementation and the long-term impacts of the economic crisis on European emissions.

Although this could be seen as a timely opportunity to address the problem and resolve the debate on tougher emission reduction targets for 2020, Europe is faced with the immediate challenge of revitalising the EU ETS and putting it back on track to perform as one of the major policy tools for meeting the challenge of climate change.

The European Commission tabled a draft proposal in July 2012 on a new auction time profile which included back-loading, i.e. the reductions of auctioned volumes in the first three years of the third trading period and their re-introduction later in the third trading period. This is motivated by the Commission's desire to "improve the orderly functioning of the market" (CEC 2012c). However, previous research has shown that a stand-alone back-loading approach will not be sufficient in the longer term to solve the surplus problem and restore a robust CO₂ price signal that could boost investments in low-carbon technologies and production processes.

Beyond the implications of low carbon prices on investment, carbon lock-in, plant operation and innovation, the implications of low carbon prices on the revenues from allowance auctions are significant for the Member States. This is even more important when the key role of auctioning revenues for mobilising further investments in low-carbon technologies is considered. Since the share of auctions in total allocation will increase significantly from 2013 onwards, the cost of inaction must also reflect the impacts of low carbon prices on the auctioning revenues for the different Member States.

The numerical analysis of the interactions between different options to bring scarcity and a robust carbon price back to the EU ETS on the one hand and the numerical analysis of revenues from allowance auctions on the other hand are based on a scenario assessment for different developments:

- In the reference scenario it is assumed that no action is taken;
- In the back-loading scenario the auctioning of 1.2 billion European Union Allowances (EUAs) is postponed by 5 years, until 2017;
- In the long-term set-aside scenario 1.4 billion EUAs are removed from the market for at least 10 years by reducing the auctioning quantities;
- The 25% scenario leads to domestic greenhouse gas emission reductions of 25% below 1990 levels by 2020 through a long-term set-aside and a higher linear reduction factor of 2.6%; and
- The 30% scenario results in domestic emission reductions of 30% below 1990 levels by 2020 through a long-term set-aside and a tightened linear reduction factor of 3.9%.

The aim of the study is to show how these scenarios impact the auctioning revenues for the different Member States and the extent to which they affect industrial sectors covered by the EU ETS Directive.

Auctioning revenues increase in all scenarios for all countries

All analysed scenarios show that raising climate ambition would increase auctioning revenues for all countries (Table E1):

- Even in the back-loading scenario in which the CO₂ price reaches the same level in 2020 as in the reference scenario, auctioning revenues increase in all countries; overall these revenues increase by 8% compared to the reference scenario. This is due to the fact that the back-loaded amount of allowances in the back-loading scenario are reintroduced in the later years of the third trading period when the CO₂ price will be higher because the surplus will have significantly decreased. This should reassure Member States which still feel reluctant about the Commission's back-loading proposal.
- In the long-term set-aside scenario auctioning revenues increase by 14% compared to the reference scenario.
- Under the 25% domestic scenario auctioning revenues increase significantly: total revenues from 2013 to 2020 are €₂₀₁₂ 148 billion, i.e. €₂₀₁₂ 62 billion (or 73%) higher than in the reference scenario.
- In the scenario leading to domestic reductions of 30% below 1990 levels, auctioning revenues increase to €₂₀₁₂ 163 billion from 2013 to 2020 (or 91%) above the reference scenario.

Table E1 Auctioning revenues per Member State, 2013 - 2020

| | Auctioning revenues | | | | | Increase in auctioning revenues | | | |
|-----------------------|---------------------|------------------|-----------------------------|------------------|------------------|---------------------------------|-----------------------------|------------------|------------------|
| | Ref- erence | Back- loading | Long- term set- aside | 25 % domestic | 30 % domestic | Back- loading | Long- term set- aside | 25 % domestic | 30 % domestic |
| | billion € | | | | | | | | |
| Total | 85 | 92 | 97 | 148 | 163 | 6 | 12 | 62 | 78 |
| Austria | 1.2 | 1.3 | 1.4 | 2.2 | 2.4 | 0.1 | 0.2 | 0.9 | 1.2 |
| Belgium | 2.3 | 2.4 | 2.6 | 4.0 | 4.4 | 0.2 | 0.4 | 1.7 | 2.1 |
| Bulgaria | 1.9 | 2.1 | 2.1 | 3.2 | 3.5 | 0.2 | 0.2 | 1.3 | 1.6 |
| Cyprus | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.0 | 0.0 | 0.1 | 0.1 |
| Czech Republic | 3.1 | 3.4 | 3.4 | 5.1 | 5.6 | 0.3 | 0.2 | 2.0 | 2.5 |
| Denmark | 1.1 | 1.2 | 1.3 | 2.0 | 2.2 | 0.1 | 0.2 | 0.9 | 1.1 |
| Estonia | 0.6 | 0.7 | 0.6 | 1.0 | 1.1 | 0.1 | 0.0 | 0.4 | 0.5 |
| Finland | 1.5 | 1.6 | 1.7 | 2.6 | 2.9 | 0.1 | 0.2 | 1.1 | 1.4 |
| France | 5.1 | 5.5 | 6.0 | 9.1 | 10.1 | 0.3 | 0.9 | 3.9 | 5.0 |
| Germany | 17.8 | 19.1 | 20.7 | 31.3 | 34.7 | 1.3 | 2.8 | 13.4 | 16.9 |
| Greece | 3.1 | 3.3 | 3.6 | 5.4 | 6.0 | 0.2 | 0.5 | 2.3 | 2.9 |
| Hungary | 1.0 | 1.1 | 1.0 | 1.6 | 1.7 | 0.1 | 0.1 | 0.6 | 0.8 |
| Ireland | 0.9 | 0.9 | 1.0 | 1.5 | 1.7 | 0.1 | 0.1 | 0.7 | 0.8 |
| Italy | 8.6 | 9.2 | 9.9 | 15.0 | 16.7 | 0.6 | 1.4 | 6.4 | 8.1 |
| Latvia | 0.2 | 0.3 | 0.3 | 0.4 | 0.5 | 0.0 | 0.0 | 0.2 | 0.2 |
| Liechtenstein | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lithuania | 0.4 | 0.5 | 0.5 | 0.8 | 0.9 | 0.0 | 0.1 | 0.3 | 0.4 |
| Luxembourg | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.0 | 0.0 | 0.1 | 0.1 |
| Malta | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.0 | 0.0 | 0.1 | 0.1 |
| Netherlands | 3.1 | 3.3 | 3.6 | 5.5 | 6.1 | 0.2 | 0.5 | 2.4 | 3.0 |
| Norway | 0.5 | 0.6 | 0.6 | 1.0 | 1.1 | 0.0 | 0.1 | 0.4 | 0.5 |
| Poland | 7.0 | 7.8 | 7.2 | 10.9 | 11.6 | 0.8 | 0.2 | 3.9 | 4.6 |
| Portugal | 1.6 | 1.7 | 1.8 | 2.8 | 3.1 | 0.1 | 0.3 | 1.2 | 1.5 |
| Romania | 3.7 | 4.0 | 4.1 | 6.3 | 6.9 | 0.3 | 0.4 | 2.6 | 3.2 |
| Slovakia | 1.3 | 1.4 | 1.5 | 2.3 | 2.6 | 0.1 | 0.2 | 1.0 | 1.2 |
| Slovenia | 0.4 | 0.4 | 0.4 | 0.7 | 0.7 | 0.0 | 0.1 | 0.3 | 0.4 |
| Spain | 7.8 | 8.3 | 9.1 | 13.7 | 15.2 | 0.5 | 1.3 | 5.9 | 7.4 |
| Sweden | 0.8 | 0.9 | 1.0 | 1.4 | 1.6 | 0.1 | 0.1 | 0.6 | 0.8 |
| United Kingdom | 9.7 | 10.4 | 11.4 | 17.2 | 19.2 | 0.7 | 1.6 | 7.5 | 9.5 |

Source: Calculations by Öko-Institut

Negligible impact on industry and appropriate compensation mechanisms in place

A major concern since the introduction of the EU ETS has been the competitive situation of European industries compared to industrial installations in other parts of the world where climate policies might not be as stringent. To prevent carbon leakage the EU Commission carried out an assessment of the risk of carbon leakage in industrial sectors based on conservative assumptions (CEC 2011c); trade intensity was assessed as if no other countries were undertaking comparable efforts in climate policies and the analysis of induced carbon cost by the implementation of the directive was based on an EUA price of € 30, which is more than four times the current price. Sectors deemed at risk of carbon leakage receive 100% free allocation (based on benchmarks); a compensation mechanism was established for higher electricity prices resulting from the tighter cap. Furthermore, industrial sectors were overallocated in the second trading period, which means that the banking provision provides them with a buffer of allowances that can be used in the third trading period. The back-loading proposal does not have an effect on this surplus. Thus the question arises: How will the scenarios affect industrial competitiveness?

In the back-loading scenario there is no change for industrial sectors compared to the reference scenario since their free allocation remains unchanged. The only difference in the long-term set-aside scenario is slightly higher EUA prices (about € 18 in 2020 compared to € 14 in the reference scenario). As most industrial sectors are classified as being at risk of carbon leakage and receive 100% free allocation, the most efficient installations with production levels comparable to the base period are expected to receive almost all the EUAs needed to cover their emissions for free; in the case of lower production levels due to the current economic and financial crisis their free allocation is likely to exceed their emissions. When EUA prices increase, the value of free allocation grows accordingly. The same applies to remaining EUAs from the second trading period (2008-2012), which was largely characterised by over allocation especially to industrial sectors (Öko-Institut 2010).

In the 25% domestic reduction scenario the price development is expected to be comparable to the assumptions in the impact assessment of the EU ETS Directive and free allocation to industrial sectors will be only slightly lower than in the reference scenario (-3%). Even in the 30% domestic reduction scenario free allocation will be reduced by a moderate 8% only.

Overall the impact of reduced auctioning quantities and higher climate targets on industrial sectors is deemed to be small, and still significantly smaller than that accepted during the revision of the EU ETS Directive. Moreover, the stabilisation of CO₂ prices would enhance the planning security for industries, reduce the risk of stranded assets due to carbon lock-in and reward operators who carried out emission-saving measures based on CO₂ price levels at the start of the second trading period.

Redistribution effects under the four scenarios

The EU ETS Directive sets the following rules on the distribution of the auctioning quantities:

- 88% of the auctioning quantities are distributed proportional to the share of verified emissions;
- 10% of the auctioning quantities are redistributed for the purpose of ‘solidarity and growth’ in order to reduce emissions and adapt to the effects of climate change. Latvia, Bulgaria, Romania, Lithuania, Estonia, Slovakia and Poland are benefiting the most from this provision.
- 2% of the auctioning quantities are redistributed for early action under the Kyoto Protocol. Romania, Poland and Bulgaria are benefiting the most from this provision.

With a higher CO₂ price the 10% and 2% provisions automatically create more redistribution, especially to the new Member States in Central and Eastern Europe. The study analyses two additional scenarios:

- A redistribution option based on the share in industrial emissions: Member States with a higher share in emissions from industrial sectors carry a higher share of the effort. This is beneficial to Central and Eastern European countries as well as countries like Germany.
- A redistribution option where “only higher income” countries carry the effort. This is also beneficial to Central and Eastern European countries.

Considering that the directive already includes special provisions on redistribution which were specifically designed to compensate for the weaker economic development of Central and Eastern European countries, the implementation of additional redistributive elements does not seem to be an appropriate approach. Overall it can be concluded that the introduction of more ambitious targets to the EU ETS has higher impacts on auctioning revenues than redistribution. Therefore, EU policy makers should invest time and energy in negotiating higher targets, rather than redistribution keys.

Deutsche Zusammenfassung

Kernergebnisse

Insgesamt können aus den Analysen die folgenden Kernergebnisse festgehalten werden:

- Im Vergleich zum Referenzszenario nehmen die Versteigerungserlöse in allen vier Szenarien für alle Mitgliedsländer zu, auch im Szenario „Kurzfristige Herausnahme“ (back-loading).
- Blicke die EU beim derzeitigen Klimaschutzziel einer Reduzierung der Treibhausgasemissionen um 20% bis 2020, beliefen sich die Verluste der EU-Mitgliedsländer bei den Versteigerungserlösen auf **62 Mrd. €** (ggü. dem 25%-Ziel) bis **78 Mrd. €** (ggü. dem 30%-Ziel).
- Der Einfluss reduzierter Zertifikatsmengen und ambitionierter Klimaschutzziele auf die europäische Industrie ist bei einer Gesamtbetrachtung der Regelungen im EU ETS minimal. Ab 2013 werden die Industriesektoren 100% ihrer mit Benchmarks berechneten Zuteilungsmengen kostenlos erhalten. Für höhere Strompreise wurde in der Richtlinie ein Kompensationsmechanismus geschaffen.
- Der Kommissionsvorschlag zur „Kurzfristigen Herausnahme“ der Zertifikate aus dem EU ETS (back-loading) ist ein sinnvoller erster Schritt. Jedoch sollten die zurückgehaltenen Zertifikate mindestens für eine Dekade aus dem Markt genommen werden. Am besten sollten die zurückgehaltenen Zertifikate so schnell wie möglich stillgelegt werden. Dieser erste Schritt muss darüber hinaus durch einen Übergang zu ambitionierteren Klimaschutzzielen ergänzt werden. Die „kurzfristige Herausnahme“ als isolierte Lösung wird nicht ausreichen, um die Wiederherstellung eines robusten CO₂-Preissignals und den Abbau des Überschusses an Zertifikaten im europäischen CO₂-Markt zu gewährleisten.
- In Anbetracht der Tatsache, dass die bestehende Emissionshandelsrichtlinie bereits spezielle Vorschriften für eine Kompensation Länder Zentral- und Osteuropas enthält, profitieren diese Länder (im Vergleich zu anderen Ländern) von einem Anstieg der Auktionseinnahmen ohne die Einführung zusätzlicher Umverteilungsmechanismen.

Hintergrund

Das Europäische Emissionshandelssystem (EU ETS) ist das größte Emissionshandelssystem der Welt. Das System erfasst etwa 13.000 stationäre Anlagen, die einen Anteil von etwa 41% der gesamten Treibhausgasemissionen in der Europäischen Union repräsentieren. Seit Anfang 2012 ist auch der Luftverkehr in dieses Emissionshandelssystem einbezogen. Das Emissionshandelssystem der EU ist eine tragende Säule der EU-Klimapolitik und fungiert mittlerweile auch als Modell für ähnliche Systeme in der ganzen Welt. Durch die Bepreisung von Treibhausgasemissionen wurde erstmals ein Mechanismus geschaffen, der kosteneffiziente Anreize zur Emissionsreduktion setzt. Derzeit steht das Europäische Emissionshandelssystem jedoch vor großen Herausforderungen: ein massiver Überschuss im Zertifikatemarkt hat die Zertifikatspreise massiv gesenkt. Damit ist die Wirksamkeit des CO₂-Preissignals deutlich reduziert worden. Seit 2011 ist der CO₂-Preis auf ein Niveau von ca. 7 Euro je Tonne CO₂ gefallen und bietet nicht genügend Anreize für Investitionen und Innovation.

Der Überschuss am Zertifikatemarkt wird ausgelöst durch große Mengen an Emissionsrechten, die aus der Nutzung des sogenannten Clean Development Mechanism (CDM) und der Joint Implementation (JI) stammen – über diese Mechanismen dürfen außerhalb von Europa erbrachte Emissionsreduktionen im EU-Emissionshandelssystem angerechnet werden. Darüber hinaus sind im Zuge der Wirtschaftskrise die Emissionen innerhalb der EU deutlich gesunken, dies hat ebenfalls erheblich zum Überschuss an Emissionsberechtigungen beigetragen.

Ambitioniertere Ziele für die Reduktion der Treibhausgasemissionen könnten den Emissionshandel wieder zu einem wirksamen Instrument für den Klimaschutz machen. Die Europäische Kommission hat im Juli 2012 einen neuen Vorschlag vorgelegt, nach dem im Rahmen der Auktionsverordnung eine sogenannte „Kurzfristige Herausnahme“ (back-loading) von Zertifikaten erfolgen soll. Der Vorschlag sieht vor, dass in den ersten drei Jahren der dritten Handelsperiode weniger Zertifikate als ursprünglich vorgesehen versteigert werden. Diese Zertifikate sollen zunächst zurückgehalten und dann später in der Handelsperiode wieder in den Markt gebracht werden. Damit würde laut Europäischer Kommission „die ordnungsgemäße Funktion des Zertifikatemarktes verbessert“ (CEC 2012c). Demgegenüber stehen Analysen, die zeigen, dass eine solche „kurzfristige Herausnahme“ als Insellösung langfristig nicht ausreichen wird, um den Überschuss zu reduzieren und ein wirksames Preissignal wiederherzustellen.

Jenseits der Auswirkungen des niedrigen CO₂-Preises auf Investitionen, Lock-in-Effekte, Betriebsführung und Innovation sind die Verluste bei den Versteigerungserlösen für die Mitgliedsländer in der aktuellen Krise des EU ETS zu berücksichtigen. Das ist umso wichtiger, da die Erlöse für die Mobilisierung weiterer Investitionen in Klimaschutzmaßnahmen eine entscheidende Rolle spielen.

Der Anteil der versteigerten Emissionsberechtigungen wird ab 2013 deutlich ansteigen. Deshalb ergibt sich aus den Folgen eines niedrigen CO₂-Preises für die Versteigerungserlöse der Mitgliedsländer eine besondere Brisanz.

Die vorliegende Studie analysiert das Zusammenspiel unterschiedlicher Optionen zur Wiederherstellung von Knappheit und robusten Preissignalen im Markt ebenso wie die Auswirkungen auf die Versteigerungserlöse der Mitgliedsstaaten. Folgende Szenarien werden den Analysen zugrunde gelegt:

- Im Referenzszenario wird angenommen, dass im Vergleich zum heutigen Rahmen des EU ETS keinerlei weitere Maßnahmen eingeleitet werden;
- Im Szenario „Kurzfristige Herausnahme“ (back-loading scenario) wird die Versteigerung von 1,2 Milliarden (Mrd.) Zertifikaten um 5 Jahre auf die Jahre 2017-2020 verschoben;
- Im Szenario „Langfristige Herausnahme“ (long-term set-aside scenario) werden 1,4 Mrd. Zertifikate für mindestens 10 Jahre aus dem Markt genommen;
- Das 25%-Ziel-Szenario führt bis 2020 zu einer EU-internen Minderung der Treibhausgasemissionen um 25% gegenüber 1990. Für den Beitrag der vom EU ETS erfassten Anlagen wird dies durch eine langfristige Herausnahme der Zertifikate aus dem Markt und die Erhöhung des linearen Reduktionsfaktors für die jährliche Anpassung des Cap auf einen Wert von 2,6% erreicht.
- Das 30%-Ziel-Szenario führt bis 2020 zu einer EU-internen Minderung der Treibhausgasemissionen um 30% gegenüber 1990. Dies wird für den Bereich des EU ETS durch die Kombination einer langfristigen Herausnahme von Emissionsberechtigungen aus dem Markt und einem auf 3,9% erhöhten linearen Reduktionsfaktor erreicht.

Ziel der Studie ist es, den Einfluss dieser Szenarien auf die Versteigerungserlöse der Mitgliedsstaaten einerseits und die Auswirkungen auf die in den Emissionshandel einbezogenen Industriesektoren andererseits zu analysieren.

Versteigerungserlöse steigen in allen Szenarien für alle Mitgliedsstaaten

Alle analysierten Szenarien zeigen, dass ambitioniertere Klimaschutzziele und entsprechend ambitioniertere Caps zu höheren Versteigerungserlösen für alle Mitgliedsstaaten führen (Tabelle Z1).

- Schon im Szenario „Kurzfristige Herausnahme“ (back-loading), das für 2020 denselben CO₂-Preis annimmt wie das Referenzszenario, steigen die Versteigerungserlöse um 8% gegenüber dem Referenzszenario. Dies ist darauf zurückzuführen, dass die zurückgehaltenen Zertifikate erst nach 2017 wieder in den Markt gebracht werden. Zu diesem Zeitpunkt wird der Überschuss stark abgebaut und in Folge der CO₂-Preis höher sein. Dieses Ergebnis sollte auch denjenigen Mitgliedsstaaten zu denken geben, die diesem Vorschlag bislang skeptisch gegenüber stehen.
- Im Szenario „Langfristige Herausnahme“ (long-term set-aside scenario) steigen die Versteigerungserlöse um 14% gegenüber dem Referenzszenario.

- Im „25%-Ziel-Szenario“ steigen die Erlöse signifikant: Der Gesamterlös von 2013 bis 2020 betragen 148 Mrd. €, also 62 Mrd. € (73%) mehr als im Referenzszenario.
- Im „30%-Ziel-Szenario“ steigen die Erlöse auf 163 Mrd. €, also 78 Mrd. € (91%) mehr als im Referenzszenario.

Tabelle Z1 Versteigerungserlöse der EU-Mitgliedstaaten, 2013 - 2020

| | Auktionseinnahmen | | | | | Anstieg der Auktionseinnahmen | | | |
|----------------|-------------------|--------------------------|--------------------------|--------------------|--------------------|-------------------------------|--------------------------|--------------------|--------------------|
| | Referenz | Kurzfristige Herausnahme | Langfristige Herausnahme | 25%-Ziel EU-intern | 30%-Ziel EU-intern | Kurzfristige Herausnahme | Langfristige Herausnahme | 25%-Ziel EU-intern | 30%-Ziel EU-intern |
| | Mrd. € | | | | | | | | |
| Summe | 85 | 92 | 97 | 148 | 163 | 6 | 12 | 62 | 78 |
| Österreich | 1,2 | 1,3 | 1,4 | 2,2 | 2,4 | 0,1 | 0,2 | 0,9 | 1,2 |
| Belgien | 2,3 | 2,4 | 2,6 | 4,0 | 4,4 | 0,2 | 0,4 | 1,7 | 2,1 |
| Bulgarien | 1,9 | 2,1 | 2,1 | 3,2 | 3,5 | 0,2 | 0,2 | 1,3 | 1,6 |
| Zypern | 0,1 | 0,2 | 0,1 | 0,2 | 0,2 | 0,0 | 0,0 | 0,1 | 0,1 |
| Tschechien | 3,1 | 3,4 | 3,4 | 5,1 | 5,6 | 0,3 | 0,2 | 2,0 | 2,5 |
| Dänemark | 1,1 | 1,2 | 1,3 | 2,0 | 2,2 | 0,1 | 0,2 | 0,9 | 1,1 |
| Estland | 0,6 | 0,7 | 0,6 | 1,0 | 1,1 | 0,1 | 0,0 | 0,4 | 0,5 |
| Finnland | 1,5 | 1,6 | 1,7 | 2,6 | 2,9 | 0,1 | 0,2 | 1,1 | 1,4 |
| Frankreich | 5,1 | 5,5 | 6,0 | 9,1 | 10,1 | 0,3 | 0,9 | 3,9 | 5,0 |
| Deutschland | 17,8 | 19,1 | 20,7 | 31,3 | 34,7 | 1,3 | 2,8 | 13,4 | 16,9 |
| Griechenland | 3,1 | 3,3 | 3,6 | 5,4 | 6,0 | 0,2 | 0,5 | 2,3 | 2,9 |
| Ungarn | 1,0 | 1,1 | 1,0 | 1,6 | 1,7 | 0,1 | 0,1 | 0,6 | 0,8 |
| Irland | 0,9 | 0,9 | 1,0 | 1,5 | 1,7 | 0,1 | 0,1 | 0,7 | 0,8 |
| Italien | 8,6 | 9,2 | 9,9 | 15,0 | 16,7 | 0,6 | 1,4 | 6,4 | 8,1 |
| Lettland | 0,2 | 0,3 | 0,3 | 0,4 | 0,5 | 0,0 | 0,0 | 0,2 | 0,2 |
| Lichtenstein | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| Litauen | 0,4 | 0,5 | 0,5 | 0,8 | 0,9 | 0,0 | 0,1 | 0,3 | 0,4 |
| Luxemburg | 0,1 | 0,1 | 0,2 | 0,2 | 0,3 | 0,0 | 0,0 | 0,1 | 0,1 |
| Malta | 0,1 | 0,1 | 0,1 | 0,2 | 0,2 | 0,0 | 0,0 | 0,1 | 0,1 |
| Niederlande | 3,1 | 3,3 | 3,6 | 5,5 | 6,1 | 0,2 | 0,5 | 2,4 | 3,0 |
| Norwegen | 0,5 | 0,6 | 0,6 | 1,0 | 1,1 | 0,0 | 0,1 | 0,4 | 0,5 |
| Polen | 7,0 | 7,8 | 7,2 | 10,9 | 11,6 | 0,8 | 0,2 | 3,9 | 4,6 |
| Portugal | 1,6 | 1,7 | 1,8 | 2,8 | 3,1 | 0,1 | 0,3 | 1,2 | 1,5 |
| Rumänien | 3,7 | 4,0 | 4,1 | 6,3 | 6,9 | 0,3 | 0,4 | 2,6 | 3,2 |
| Slovakei | 1,3 | 1,4 | 1,5 | 2,3 | 2,6 | 0,1 | 0,2 | 1,0 | 1,2 |
| Slovenien | 0,4 | 0,4 | 0,4 | 0,7 | 0,7 | 0,0 | 0,1 | 0,3 | 0,4 |
| Spanien | 7,8 | 8,3 | 9,1 | 13,7 | 15,2 | 0,5 | 1,3 | 5,9 | 7,4 |
| Schweden | 0,8 | 0,9 | 1,0 | 1,4 | 1,6 | 0,1 | 0,1 | 0,6 | 0,8 |
| Großbritannien | 9,7 | 10,4 | 11,4 | 17,2 | 19,2 | 0,7 | 1,6 | 7,5 | 9,5 |

Quelle: Berechnungen Öko-Institut

Vernachlässigbare Auswirkungen auf die Industrie

Eines der großen Bedenken bei der Einführung des Europäischen Emissionshandels (EU ETS) war die Wettbewerbsfähigkeit der europäischen Industrie im Vergleich zu den Industrieanlagen in anderen Teilen der Welt, in denen die Klimapolitik möglicherweise nicht von so hoher Bedeutung ist. Um der durch den CO₂-Preis möglicherweise induzierte Produktionsverlagerung („Carbon Leakage“) vorzubeugen, hat die Europäische Kommission auf der Basis von konservativen Annahmen eine Bewertung des Carbon Leakage-Risikos für die verschiedenen Sektoren der Industrie vorgenommen und die Ergebnisse dieser Bewertung in einem entsprechenden Rechtsdokument dokumentiert. Die Bewertung des Carbon Leakage-Risikos stellt auf die Handelsintensität

der jeweiligen Branchen ab ohne zu berücksichtigen, dass andere Länder ebenfalls vergleichbare Klimaschutzmaßnahmen implementiert haben. Bei der Berechnung der durch den CO₂-Preis entstehenden zusätzlichen Kosten wurden Zertifikatspreise von 30 € / EUA unterstellt. Dieser Preis ist viermal höher als der aktuelle CO₂-Preis. Sektoren mit Carbon Leakage-Risiko erhalten eine 100% kostenlose Zuteilung von Emissionsberechtigungen auf Grundlage der für das EU ETS entwickelten Benchmarks. Darüber hinaus wurde ein Kompensationsmechanismus eingeführt, mit dem energieintensive Industrien für den durch den CO₂-Preis verursachten Strompreisanstieg kompensiert werden können. Dies gilt naturgemäß auch für die Situation eines höheren CO₂-Preises, der als Folge der Stabilisierungsmaßnahmen für das EU ETS zu erwarten ist.

Darüber hinaus hat sich in der zweiten Handelsperiode des EU ETS eine Überallokation für viele Industrieunternehmen ergeben. Die Übertragung von Emissionsrechten, das sogenannte „Banking“, ermöglicht es den Unternehmen, diesen Puffer von Zertifikaten auch in der dritten Handelsperiode zu nutzen.

Für die unterschiedlichen Szenarien ergibt sich für die Industrie die folgende Situation:

- In dem Szenario „Kurzfristige Herausnahme“ (back-loading) wird es für den Industriesektor nur sehr geringe Unterschiede im Vergleich zum Referenzszenario geben, da die kostenlose Zuteilung unverändert bleibt und die Strompreiskompensationen dynamisch auf die CO₂-Preise reagiert.
- Im Szenario „Langfristige Herausnahme“ (long-term set-aside) sind die Zertifikatspreise etwas höher (ca. 18 € in 2020) als im Referenzszenario (ca. 14 € in 2020).
- Da die meisten industriellen Sektoren als „Carbon Leakage“-Sektoren eingestuft werden, erhalten sie die Benchmarking-Zuteilung vollständig kostenlos zugeteilt. Bei effizienten Anlagen mit einem Produktionsniveau vergleichbar zur Basisperiode kann so erwartet werden, dass sie nahezu ausreichend kostenlose Zertifikate erhalten, um ihre Emissionen damit abzudecken. In dem Fall, dass sich infolge der Finanzkrise ein geringeres Produktionsniveau eingestellt hat, ist es sehr wahrscheinlich, dass die kostenlos zugeteilten Emissionsrechte die tatsächlichen Emissionen erreichen oder übersteigen. Banking aus der zweiten Handelsperiode wird diese Situation weiter entspannen.

Wenn die Zertifikatspreise steigen, wächst dementsprechend auch der Wert der kostenlos zugeteilten Zertifikate. Das Gleiche gilt für die verbleibenden Zertifikate der zweiten Handelsperiode (2008-2012), die von einer sehr weitgehenden Überallokation insbesondere für den Industriesektor geprägt war (Öko-Institut 2010).

Im „25%-Ziel-Szenario“ wird erwartet, dass die CO₂-Preisentwicklung mit den Annahmen für das Impact Assessment der Emissionshandelsrichtlinie vergleichbar ist. Die kostenlose Zuteilung für die Industrie ist nur 3% niedriger als im Referenzszenario. Im „30%-Ziel-Szenario“ ist die kostenlose Zuteilung 8% moderat niedriger als im Referenzszenario.

Im Großen und Ganzen sind die Auswirkungen der reduzierten Versteigerungsmenge und eines höheren Klimaziels auf den Industriesektor als sehr gering einzuordnen. Die Auswirkungen sind geringer als bei der Überarbeitung der Emissionshandelsrichtlinie erwartet wurde.

Nachdrücklich muss darauf hingewiesen werden, dass die Stabilisierung der CO₂-Preise die Planungssicherheit der Industrie erhöht, das Risiko für Fehlinvestitionen reduziert und die Betreiber honorieren wird, die aufgrund des CO₂-Preisniveaus am Anfang der zweiten Handelsperiode in emissionsmindernde Maßnahmen investiert haben.

Umverteilungswirkungen in den vier Szenarien

Mit der Emissionshandelsrichtlinie sind die folgenden Regelungen hinsichtlich der Verteilung der Versteigerungserlöse festgelegt worden:

- 88% der Versteigerungsmenge werden proportional zum Anteil der verifizierten Emissionen verteilt;
- 10% der Versteigerungsmenge werden im Rahmen eines „Solidaritäts- und Wachstums-Mechanismus“ umverteilt. Ziel dieser Umverteilung ist es, zusätzliche Mittel für Emissionsreduktionen und Anpassungsmaßnahmen an die Auswirkungen des Klimawandels in Ländern mit niedrigerer Wirtschaftskraft bereitzustellen. Die Länder Lettland, Estland, Slowakei und Polen profitieren am meisten von dieser Maßnahme.
- 2% der Versteigerungsmenge werden an Länder umverteilt, die ihre Kyoto-Ziele um mehr als 20% übererfüllen. Rumänien, Polen und Bulgarien profitieren von dieser Maßnahme am stärksten.

Mit einem höheren CO₂-Preis und ohne Änderung des Umverteilungsmechanismus erzeugen die oben beschriebenen Maßnahmen automatisch höhere Umverteilungserlöse, insbesondere zugunsten der neuen Mitgliedstaaten in Zentral- und Osteuropa. In einem weiteren Analysegang werden zusätzlich noch zwei weitere Optionen untersucht:

- Eine Umverteilungs-Option, die den Anteil der industriellen Emissionen berücksichtigt: Mitgliedsstaaten mit einem höheren Emissionsanteil im Industriesektor (und einem entsprechend höheren Anteil kostenloser Zuteilung von Emissionsberechtigungen) übernehmen den größten Teil der Belastung. Dies ist besonders vorteilhaft sowohl für die osteuropäischen Länder als auch für Länder mit einem hohen Anteil von Emissionen aus der Stromerzeugung, wie z.B. Deutschland.
- Eine Umverteilungs-Option, in der nur die Länder „mit höheren Einkommen“ die zusätzliche Belastung der ausfallenden Auktionierungsmengen zu tragen haben. Dies ist selbstverständlich vorteilhaft für die Länder Zentral- und Osteuropas.

In Anbetracht der Tatsache, dass die bestehende Emissionshandelsrichtlinie bereits spezielle Vorschriften für eine Kompensation für die schwächer entwickelten Länder Zentral- und Osteuropas enthält, scheint die Einführung von zusätzlichen Umverteilungsmaßnahmen kein sinnvoller Ansatz. Insgesamt muss aber festgehalten werden, dass ambitioniertere Klimaschutzziele deutlich größere Effekte auf die Versteigerungserlöse zeigen als die Umverteilungsmechanismen. Deshalb sollten Entscheidungsträger in der Politik ihre Zeit und Energie in die Aushandlung anspruchsvollerer Klimaschutzziele investieren und nicht in die Diskussion von Umverteilungsmechanismen.

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1 Introduction

The European Union Emissions Trading Scheme (EU ETS) is the largest emissions trading scheme in the world; the stationary sector covers 41% of European emissions and approx. 13,000 installations. Since the beginning of 2012 the EU ETS also covers emissions from air transport. The EU ETS is a central pillar of the EU's climate policy mix and has served as a pioneering model for the design of trading schemes in other parts of the world. The EU ETS was created to incentivise emission reductions and the deployment of installations with low CO₂ emissions by putting a price on emissions in a cost-effective manner. Currently the EU ETS faces serious challenges as the massive surplus of emission allowances on the market has reduced the price signal substantially. Furthermore, a low carbon price allows high-emitting infrastructure to be built today that continues to emit CO₂ over the next decades, undermining cost-effectiveness of the instrument.

Since 2011, CO₂ prices have dropped to € 7 per ton of CO₂, which is too low to trigger investment decisions for most emission abatement options or to incentivise innovation. The surplus results from huge entitlements for the use of external emission reduction credits from the Clean Development Mechanism and Joint Implementation and the long-term impacts of the economic crisis on European emissions.

Although this could be seen as a timely opportunity to address the problem and resolve the debate on tougher emission reduction targets for 2020, Europe is faced with the immediate challenge of revitalising the EU ETS and putting it back on track to perform as one of the major policy tools to meet the challenge of climate change.

The European Commission tabled a draft proposal in July 2012 on a new auction time profile which included back-loading, i.e. the reductions of auctioned volumes in the first three years of the third trading period and their re-introduction later in the third trading period. This is motivated by the Commission's desire to "improve the orderly functioning of the market" (CEC 2012c). However, previous research (Öko-Institut 2012) has shown that a stand-alone back-loading approach will not be sufficient in the longer term to solve the surplus problem and restore a robust CO₂ price signal that could boost investments in low-carbon technologies and production processes.

Beyond the implications of low carbon prices on investment, carbon lock-in, plant operation and innovation, the implications of low carbon prices on the revenues from allowance auctions are significant for the Member States. This is even more important when the key role of auctioning revenues for mobilising further investments in low-carbon technologies is considered. Since the share of auctions in total allocation will increase significantly from 2013 onwards, the cost of inaction must also reflect the impacts of low carbon prices on the auctioning revenues for the different Member States.

The numerical analysis of the interactions between different options to bring scarcity and a robust carbon price back to the EU ETS on the one hand and the numerical analysis of revenues from allowance auctions on the other hand are based on a scenario assessment for different developments:

- In the reference scenario it is assumed that no action is taken;
- In the back-loading scenario the auctioning of 1.2 billion European Union Allowances (EUAs) is postponed by 5 years, until 2017;
- In the long-term set-aside scenario 1.4 billion EUAs are removed from the market for at least 10 years by reducing the auctioning quantities;
- The 25% scenario leads to domestic greenhouse gas emission reductions of 25% below 1990 levels by 2020 through a long-term set-aside and a higher linear reduction factor of 2.6%; and
- The 30% scenario results in domestic emission reductions of 30% below 1990 levels by 2020 through a long-term set-aside and a tightened linear reduction factor of 3.9%.

The aim of the study is to show how these scenarios impact the auctioning revenues for the different Member States and the extent to which they affect industrial sectors covered by the EU ETS Directive. The analysis presented in this study is structured as follows:

Chapter 2 summarises the methodological approach. This includes CO₂ prices, the total amount of auctioning quantities in the EU ETS and their distribution to Member States. It is explained how auctioning quantities are reduced in the different scenarios and how different Member States are assumed to contribute to the reduction in auctioning quantities.

In Chapter 3 auctioning revenues per Member State are calculated for the different action scenarios based on the data explained in the previous chapter.

Chapter 4 presents different options for redistribution. Beside the main option with no new redistribution already analysed in Chapter 3 two additional redistribution options are compared. This includes a redistribution based on the “share in industrial emissions” and a redistribution in which only “high income states” contribute to the reduced amount of allowances.

In Chapter 5 the impact of the different action scenarios on industrial sectors is assessed.

Chapter 6 summarises the findings of the study and provides conclusions.

2 Methodological approach

2.1 Introduction, scope and structure of the analysis

The total auctioning revenues in the scenarios are calculated as a function of yearly auctioning quantities in 2013 to 2020 per Member State and expected CO₂ prices in the respective years. Both the available auctioning quantities and the expected CO₂ prices depend on the scenario chosen, resulting in 5 different sets of numbers. The study builds upon previous works carried out by Öko-Institut for WWF and Greenpeace in which the key data is documented in more detail (Öko-Institut 2012).

The EU ETS Directive defines how the total amount of auctioning quantities is distributed to Member States. As a basic principle the auctioning quantities are distributed to Member States according to their share in emissions in the base period. For 12% of the amount there is a different redistribution key. It takes several factors such as Kyoto achievements and solidarity and growth criteria into account.

The base case assumes that this redistribution is maintained also in the action scenarios; these results are included in Chapter 3. Of course the redistribution can be altered, too. Thus a sensitivity analysis was carried out for one of the scenarios (25% domestic reductions) using two alternative options for redistribution (see Chapter 4).

2.2 Auctioning quantities

2.2.1 Quantities available for auctioning in the reference scenario

In order to be able to assess the revenues from auctioning for the individual Member States, the exact amount of allowances available for auctioning needs to be determined. To calculate the amount of auctions from 2013 onwards the free allocation and the new entrant reserve is deducted from the cap. Of the new entrant reserve – equaling 5 % of the cap – 300 million EUAs will be auctioned or sold to finance CCS and innovative renewable energy projects via the NER300 financing instrument.¹

Table 1 Quantities available for auctioning in the reference scenario

| | 3rd trading period | | | | | | | | Total 2013-2020 |
|--------------------------------------|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------------|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
| | mln EUA | | | | | | | | |
| Stationary ETS II scope | 1,064 | 1,050 | 1,036 | 1,022 | 1,010 | 1,008 | 1,006 | 1,003 | 8,199 |
| Stationary ETS III scope | 24 | 22 | 20 | 18 | 16 | 16 | 16 | 16 | 147 |
| Aviation | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 252 |
| Total | 1,119 | 1,103 | 1,088 | 1,071 | 1,058 | 1,056 | 1,053 | 1,050 | 8,599 |
| Power generators 10c | -155 | -138 | -122 | -104 | -85 | -65 | -43 | 0 | -711 |
| Total corrected for power gen. EU-10 | 964 | 965 | 966 | 968 | 973 | 991 | 1,010 | 1,050 | 7,887 |

Source: Öko-Institut (2012)

Table 1 summarises the total cap of allowances available in the EU ETS in the third trading period. This includes aviation and those installations that will enter the EU ETS from 2013 (e.g. N₂O from industrial activities).

¹ A first tranche of 200 million EUAs will already be auctioned or sold by October 2012 (CEC/EIB 2010). However, as these allowances can only be used from 2013 onwards they are attributed to the auctions and sales in 2013.

According to Article 10c of the EU ETS Directive (EU 2009a) some (mainly Central and Eastern European) Member States can allocate free allowances for electricity generators. The total maximum quantity of allowances has been published by CEC (2012b) and is included in Table 2. It is important to note that the numbers included in Table 2 represent upper boundaries. According to Article 6.3 (CEC 2011a) Member States have to submit annual reports on investments made in modernising electricity generation. In case investments are not implemented as planned, the amount of free allocation will be reduced.

Table 2 Free allocation for electricity generators

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2013 to 2020 |
|----------------|---------|------|------|------|------|------|------|------|--------------------|
| | mIn EUA | | | | | | | | |
| Bulgaria | 14 | 12 | 10 | 8 | 6 | 4 | 2 | 0 | 54 |
| Cyprus | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 11 |
| Czech Republic | 27 | 23 | 19 | 15 | 12 | 8 | 4 | 0 | 108 |
| Estonia | 5 | 5 | 4 | 3 | 2 | 2 | 1 | 0 | 21 |
| Hungary | 10 | 9 | 7 | 6 | 4 | 3 | 1 | 0 | 39 |
| Lithuania | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Poland | 78 | 72 | 67 | 60 | 52 | 43 | 32 | 0 | 405 |
| Romania | 18 | 15 | 13 | 10 | 8 | 5 | 3 | 0 | 71 |
| Total | 155 | 138 | 122 | 104 | 85 | 65 | 43 | 0 | 711 |

Source: CEC (2012b), data for Hungary was not yet available and has been estimated by Öko-Institut

The basic principle is that the auctioning quantities are distributed to Member States according to the share in emissions in 2005 or according to the share in emissions in the years 2005 to 2007, whichever one is the highest.² In the EU Climate and Energy Package additional redistribution elements have been agreed. In total 12% of the auctioning quantities are redistributed. The effects of this redistribution are illustrated in Table 3:

- 10% of the auctioning quantities are redistributed for the purpose of ‘solidarity and growth’ in order to reduce emissions and adapt to the effects of climate change; and
- 2% of the auctioning quantities are redistributed for countries having achieved early action under the Kyoto Protocol.

Table 3 also summarises the final auctioning shares of the EU Member States. For comparison the amount of free allocation to electricity generators is also expressed as a share of total auctioning quantities.

² Article 10 2 a) of the EU ETS Directive.

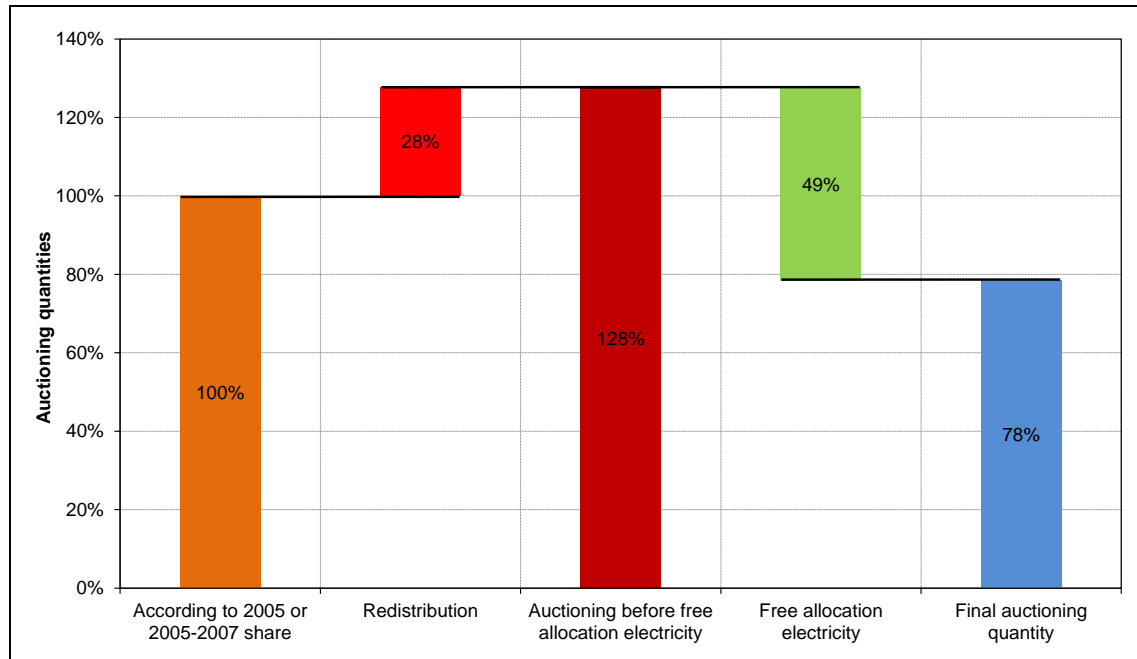
Table 3 Member State auctioning shares agreed in the EU ETS Directive

| | 88% according to share of emissions in 2005 / 2005-2007 | 10% according to solidarity and growth | 2% according to Kyoto achievements | Member State auctioning share | Free allocation for electricity | Without free allocation for electricity |
|---|---|--|------------------------------------|-------------------------------|---------------------------------|---|
| Expressed as % of the total auctioning quantity | | | | | | |
| EU-15 | 68.3% | 2.2% | | 70.4% | | 70.4% |
| EU-12 | 19.7% | 7.8% | 2.0% | 29.6% | 8.5% | 21.0% |
| EU-27 | 88.0% | 10.0% | 2.0% | 100.0% | 8.5% | 91.5% |
| AT | 1.3% | | | 1.3% | | 1.3% |
| BE | 2.4% | 0.2% | | 2.6% | | 2.6% |
| BG | 1.6% | 0.8% | 0.3% | 2.7% | 0.6% | 2.1% |
| CY | 0.2% | 0.0% | | 0.2% | 0.1% | 0.1% |
| CZ | 3.3% | 1.0% | 0.1% | 4.4% | 1.3% | 3.1% |
| DE | 19.3% | | | 19.3% | | 19.3% |
| DK | 1.2% | | | 1.2% | 0.3% | 0.9% |
| EE | 0.5% | 0.2% | 0.1% | 0.9% | | 0.9% |
| ES | 7.5% | 1.0% | 0.0% | 8.4% | | 8.4% |
| FI | 1.6% | | | 1.6% | | 1.6% |
| FR | 5.4% | | | 5.4% | | 5.4% |
| GB | 11.4% | | | 11.4% | 0.5% | 10.9% |
| GR | 2.8% | 0.5% | | 3.3% | | 3.3% |
| HU | 1.1% | 0.3% | 0.1% | 1.5% | | 1.5% |
| IE | 0.9% | | | 0.9% | | 0.9% |
| IT | 8.9% | 0.2% | 0.0% | 9.1% | | 9.1% |
| LT | 0.3% | 0.1% | 0.1% | 0.5% | 0.0% | 0.5% |
| LU | 0.1% | 0.0% | | 0.1% | | 0.1% |
| LV | 0.1% | 0.1% | 0.1% | 0.3% | | 0.3% |
| MT | 0.1% | 0.0% | 0.0% | 0.1% | | 0.1% |
| NL | 3.3% | | | 3.3% | | 3.3% |
| PL | 8.4% | 3.3% | 0.5% | 12.2% | 4.8% | 7.3% |
| PT | 1.5% | 0.2% | | 1.7% | | 1.7% |
| RO | 2.7% | 1.4% | 0.6% | 4.8% | 0.9% | 3.9% |
| SE | 0.8% | 0.1% | | 0.9% | | 0.9% |
| SI | 0.3% | 0.1% | 0.1% | 0.5% | | 0.5% |
| SK | 1.1% | 0.4% | | 1.5% | | 1.5% |

Source: EU (2009), CEC (2012b), calculations by Öko-Institut

Figure 1 illustrates the effects of redistribution and free allocation to electricity generators on the auctioning quantities in Poland for the period from 2013 to 2020. Due to redistribution auctioning quantities increase by 28% compared to a situation in which auctioning quantities would have been distributed purely based on Article 10 2 a) of the ETS Directive (i.e. the share in emissions in the year 2005 or in the years 2005 to 2007, whichever one is the highest). Due to the allowed free allocation to electricity generators, auctioning quantities decrease by 49% of the initial quantity. As a result of redistribution and transitional free allocation to electricity, the remaining auctioning quantity in Poland is only 78% of the initial quantity based on the 2005 or the 2005 to 2007 share. Without free allocation to electricity generation the auctioning quantities of Poland would have been considerably higher.

Figure 1 Effects of redistribution and free allocation to electricity generators on auctioning quantities in Poland, 2013-2020



Source: EU (2009), CEC (2012b), calculations by Öko-Institut

2.2.2 Quantities available for auctioning in the action scenarios

In the four action scenarios the total amount of available EUAs in a given year differs to the reference scenario, as does the amount of EUAs available for auctioning (Table 4). In the back-loading scenario the total amount of EUAs throughout the third trading period remains unchanged, but some allowances are auctioned at a later stage. In the long-term set-aside scenario the amount to be auctioned during the third trading period of the ETS (2013-2020) is reduced by 1,400 million EUAs while the total free allocation remains unchanged. In the two domestic reduction scenarios the reduced cap impacts both the auctioning quantity and the free allocation.

The 25% domestic scenario is calculated based on a long-term set-aside of 1,400 million EUAs and an increase of the linear factor to 2.6% from 2014 onwards. Applying the increased linear factor to the cap for stationary sources from 2014 onwards reduces the cap in the period from 2014 to 2020 by 531 million EUAs. A part of this amount would have been free allocation to the stationary sector; their free allocation is reduced by 209 million EUAs.³ Adding the long-term set-aside results in a reduction of the cap by 1,931 million EUAs from 2013 to 2020 (Table 4).

³ The increased linear factor reduces the free allocation in two ways. Firstly, from 2013 onwards the linear factor is directly multiplied to allocations in sectors that are not covered by the cross-sectoral correction factor (e.g. free allocation for heat generation by electricity gen-

Table 4 *Change in auctioning quantities and free allocation in the analysed action scenarios*

| | 3rd trading period | | | | | | | | Total 2013-2020 |
|---------------------------------|--------------------|------|------|------|------|------|------|------|--------------------|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
| | mIn EUA | | | | | | | | |
| Back-loading | -400 | -400 | -400 | 0 | 0 | 400 | 400 | 400 | 0 |
| Long-term set-aside | -350 | -350 | -350 | -350 | 0 | 0 | 0 | 0 | -1,400 |
| 25% domestic reductions | -350 | -369 | -388 | -407 | -76 | -95 | -114 | -133 | -1,931 |
| Change in auctioning quantities | -350 | -367 | -385 | -392 | -40 | -51 | -63 | -74 | -1,722 |
| Change in free allocation | 0 | -2 | -3 | -15 | -36 | -44 | -51 | -58 | -209 |
| 30% domestic reductions | -350 | -398 | -445 | -493 | -190 | -238 | -286 | -333 | -2,733 |
| Change in auctioning quantities | -350 | -393 | -426 | -436 | -101 | -129 | -157 | -186 | -2,179 |
| Change in free allocation | 0 | -4 | -19 | -56 | -89 | -109 | -129 | -147 | -554 |

Source: *Öko-Institut (2012), calculations by Öko-Institut*

In the 30% domestic scenario the cap is reduced by 2,733 million EUAs from 2013 to 2020. The auctioning quantity is reduced by 2,179 million EUAs. About one fifth of the cap decrease is generated through a reduction of free allocation of 554 million EUAs.⁴

The level of ambition of the benchmarks, the carbon leakage status, the free allocation for electricity generation and the auctioning quantities from the aviation sector are constant in all scenarios.

Table 5 summarises the total auctioning quantities in the scenarios analysed per country. These are calculated based on the available auctioning quantities (Table 1) in the reference scenario and the reduction in auctioning quantities in the scenarios under consideration (Table 4). The (reduced) auctioning quantities in the action scenarios are distributed to Member States according to the shares documented in Table 3.

erators). Secondly, an increased linear factor also lowers the sub-cap for free allocation that is reached with the help of the cross-sectoral correction factor. The reason for this is that – in the model used here – the sup-cap for free allocation is only reached from 2016 onwards. This means that the cross-sectoral correction factor is not applied before 2016.

⁴ In this scenario the cross-sectoral correction factor is applied from 2015 onwards.

Table 5 Total auctioning quantities from aviation, stationary sectors in the scenarios analysed and free allocation for electricity generation, 2013 - 2020

| | Auctioning quantities aviation | Auctioning quantities stationary sectors | | | | | Free allocation electricity generation |
|-----------------------|--------------------------------|--|--------------|---------------------|---------------|---------------|--|
| | | Reference | Back-loading | Long-term set-aside | 25 % domestic | 30 % domestic | |
| mln EUA | | | | | | | |
| Total | 252 | 8,346 | 8,346 | 6,946 | 6,625 | 6,167 | -711 |
| Austria | 3 | 113 | 113 | 94 | 90 | 84 | 0 |
| Belgium | 6 | 206 | 206 | 171 | 163 | 152 | 0 |
| Bulgaria | 1 | 227 | 227 | 189 | 180 | 168 | -54 |
| Cyprus | 1 | 21 | 21 | 18 | 17 | 16 | -11 |
| Czech Republic | 2 | 381 | 381 | 317 | 302 | 281 | -108 |
| Denmark | 5 | 102 | 102 | 85 | 81 | 75 | 0 |
| Estonia | 0 | 74 | 74 | 62 | 59 | 55 | -21 |
| Finland | 3 | 136 | 136 | 113 | 108 | 100 | 0 |
| France | 34 | 445 | 445 | 370 | 353 | 328 | 0 |
| Germany | 42 | 1,626 | 1,626 | 1,353 | 1,290 | 1,201 | 0 |
| Greece | 6 | 282 | 282 | 235 | 224 | 208 | 0 |
| Hungary | 1 | 122 | 122 | 101 | 97 | 90 | -39 |
| Ireland | 4 | 76 | 76 | 63 | 60 | 56 | 0 |
| Italy | 19 | 783 | 783 | 651 | 621 | 578 | 0 |
| Latvia | 0 | 22 | 22 | 18 | 17 | 16 | 0 |
| Liechtenstein | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lithuania | 0 | 44 | 44 | 37 | 35 | 33 | -3 |
| Luxembourg | 2 | 10 | 10 | 8 | 8 | 7 | 0 |
| Malta | 0 | 8 | 8 | 7 | 7 | 6 | 0 |
| Netherlands | 18 | 272 | 272 | 226 | 216 | 201 | 0 |
| Norway | 3 | 48 | 48 | 40 | 38 | 36 | 0 |
| Poland | 2 | 1,018 | 1,018 | 847 | 808 | 752 | -405 |
| Portugal | 4 | 143 | 143 | 119 | 113 | 106 | 0 |
| Romania | 1 | 407 | 407 | 339 | 323 | 301 | -71 |
| Slovakia | 0 | 125 | 125 | 104 | 99 | 92 | 0 |
| Slovenia | 0 | 36 | 36 | 30 | 29 | 27 | 0 |
| Spain | 27 | 702 | 702 | 584 | 557 | 518 | 0 |
| Sweden | 4 | 72 | 72 | 60 | 57 | 53 | 0 |
| United Kingdom | 63 | 847 | 847 | 705 | 672 | 626 | 0 |

Source: Calculations by Öko-Institut

2.3 CO₂ price projection

The fundamental reason for the current price trend is the massive supply of EU emission allowances (EUAs) and external emission reduction credits (CERs and ERUs) which exceeds the demand significantly. This surplus was 950 million EUAs at the end of 2011, will reach approx. 2 billion EUAs in 2013 and will still amount to 1.4 billion EUAs in 2020 (Öko-Institut 2012). It results from huge entitlements for the use of external emission reduction credits from CDM and JI and the long-term impacts of the economic crisis.

The cap definition for the EU ETS from 2013 onwards was based on an integrated analysis for the 2008 Climate and Energy Package of the European Union (Capros et al. 2008), which reflected both the overarching greenhouse gas emission reduction targets for the EU as well as the plans to increase the share of renewable energy sources in the energy mix and particularly in the power sector. However, some of the assumptions for the integrated modelling exercise carried out in 2008 no longer reflect the real trends for some key determinants of the baseline scenario.

First of all, the short-, medium- and long-term economic outlook for the EU-27 has changed significantly since 2008. Looking at the projections for the development of the gross domestic product (GDP), the key indicator for economic activities in a country or region, the total economic activity represented by GDP will be 14% to 17% lower by 2020 and 13% to 19% lower by 2030 than assumed in the analysis for the 2008 EU Climate and Energy Package and thus for the cap of the EU ETS. Such changes for one of the major driving forces for the baseline emission trend must result in a major change of the emission reduction effort built into the cap of the EU ETS (Öko-Institut 2012). Only a minor contribution to the surplus results from the support for renewable energy sources (RES) with complementary policies to the EU ETS because the recent growth plans for RES tally quite well with the assumptions made for cap-setting in 2008.

Based on projections by Öko-Institut (2012) CO₂ price effects for different options of intervention are available in €₂₀₁₂.

In a situation without banking the current surplus of allowances would lead to a CO₂ price of zero. The actual CO₂ price which is higher than zero can be explained by the fact that investors believe in scarcity in the future. Therefore CO₂ prices have been calculated based on a simple model where the main input parameters are the discount rate and the time point when the surplus of allowances turns to scarcity. CO₂ prices in the scenarios were calculated by discounting future scarcity-based CO₂ prices depending on the number of years until the surplus of allowances turns to scarcity:

- For the reference scenario, 2013 prices are projected to stagnate at a level of 7 €₂₀₁₂/EUA. Prices are projected to increase to 15 €₂₀₁₂/EUA in 2020. The same price assumptions are applied in the back-loading scenario.
- For the long-term set-aside scenario prices are projected to increase to 10.5 €₂₀₁₂/EUA till 2013 and to 18.4 €₂₀₁₂/EUA by 2020.

- In the 25% domestic reduction scenario prices in 2013 are projected to recover to 13.4 €₂₀₁₂/EUA. For 2020 prices are expected to rise to 32 €₂₀₁₂/EUA.
- In the 30% domestic reduction scenario prices in 2013 are projected to reach 14.3 €₂₀₁₂/EUA. For 2020 prices are expected to increase to 40 €₂₀₁₂/EUA.

Table 6 Projected CO₂ prices in the different scenarios, 2013 to 2020

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-------------------------|-------------------------|------|------|------|------|------|------|------|
| | € ₂₀₁₂ / EUA | | | | | | | |
| Reference | 7.0 | 8.1 | 9.1 | 10.2 | 11.3 | 12.4 | 13.4 | 14.5 |
| Back-loading | 7.0 | 8.1 | 9.1 | 10.2 | 11.3 | 12.4 | 13.4 | 14.5 |
| Long-term set-aside | 10.5 | 11.6 | 12.8 | 13.9 | 15.0 | 16.1 | 17.3 | 18.4 |
| 25% domestic reductions | 13.4 | 16.1 | 18.7 | 21.4 | 24.0 | 26.7 | 29.3 | 32.0 |
| 30% domestic reductions | 14.3 | 18.0 | 21.6 | 25.3 | 29.0 | 32.7 | 36.3 | 40.0 |

Source: *Öko-Institut (2012)*

However, these prices are only valid if targets are not inflated through the increased use of CDM emission reduction projects overseas. As an increased use of CDM credits would reduce the carbon price a substantial increase in auctioning revenues can only be achieved if no additional CDM imports are allowed compared to the existing legislation.

3 Auctioning revenues in the scenarios

All analysed scenarios show that raising climate ambition would increase auctioning revenues for all countries (Table 7). Revenues are presented in €₂₀₁₂ in this chapter. Total auctioning revenues for the EU ETS are only € 85 billion for the time period from 2013 to 2020 if no action is taken. Even in the back-loading scenario in which the CO₂ price reaches the same level in 2020 as in the reference scenario, auctioning revenues increase in all countries; overall these revenues increase by 8% compared to the reference scenario. This is due to the fact that the back-loaded amount of allowances in the back-loading scenario are reintroduced in the later years of the third trading period when the CO₂ price will be higher because the surplus will have significantly decreased. In the long-term set-aside scenario auctioning revenues increase by 14% compared to the reference. Only if a long-term set-aside is combined with an increase of the linear reduction factor to 2.6% will auctioning revenues increase significantly (25% domestic emission reductions). In this case total revenues from 2013 to 2020 would be € 148 billion. This is more than € 62 billion (or 73%) above the reference scenario. In the scenario leading to domestic reductions of 30% below 1990 levels, auctioning revenues would nearly double (total revenue is € 163 billion from 2013 to 2020 which is 91% above the reference scenario).

In the long-term set-aside scenario the total revenues (Table 7) from auctions increase by the following compared to the reference scenario:

- € 2.8 billion for Germany,
- € 1.6 billion for the UK,
- € 1.3 billion for Spain,
- € 1.4 billion for Italy,
- € 0.2 billion for Poland,
- € 0.9 billion for France,
- € 0.4 billion for Romania and
- € 0.5 billion for Greece.

In the 25% domestic scenario the auctioning revenues increase by the following compared to the reference scenario:

- € 13 billion for Germany,
- € 7 billion for the UK,
- € 6 billion for Spain,
- € 6 billion for Italy,
- € 4 billion for Poland,
- € 4 billion for France,

- € 3 billion for Romania and
- € 2 billion for Greece.

It is worth noting that some of the new Member States in Central and Eastern Europe receive some free allocation even for their electricity generators to create revenues which shall be used for the modernisation of the power sector. Poland receives the largest amount of these free allocations; the value of free allocation to electricity generators in Poland increases by € 4 billion in the 25% domestic scenario.

Table 7 Auctioning revenues per Member State, 2013 - 2020

| | Auctioning revenues | | | | | Increase in auctioning revenues | | | |
|----------------|---------------------|------------------|-----------------------------|------------------|------------------|---------------------------------|-----------------------------|------------------|------------------|
| | Ref- erence | Back- loading | Long- term set- aside | 25 % domestic | 30 % domestic | Back- loading | Long- term set- aside | 25 % domestic | 30 % domestic |
| | billion € | | | | | | | | |
| Total | 85 | 92 | 97 | 148 | 163 | 6 | 12 | 62 | 78 |
| Austria | 1.2 | 1.3 | 1.4 | 2.2 | 2.4 | 0.1 | 0.2 | 0.9 | 1.2 |
| Belgium | 2.3 | 2.4 | 2.6 | 4.0 | 4.4 | 0.2 | 0.4 | 1.7 | 2.1 |
| Bulgaria | 1.9 | 2.1 | 2.1 | 3.2 | 3.5 | 0.2 | 0.2 | 1.3 | 1.6 |
| Cyprus | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.0 | 0.0 | 0.1 | 0.1 |
| Czech Republic | 3.1 | 3.4 | 3.4 | 5.1 | 5.6 | 0.3 | 0.2 | 2.0 | 2.5 |
| Denmark | 1.1 | 1.2 | 1.3 | 2.0 | 2.2 | 0.1 | 0.2 | 0.9 | 1.1 |
| Estonia | 0.6 | 0.7 | 0.6 | 1.0 | 1.1 | 0.1 | 0.0 | 0.4 | 0.5 |
| Finland | 1.5 | 1.6 | 1.7 | 2.6 | 2.9 | 0.1 | 0.2 | 1.1 | 1.4 |
| France | 5.1 | 5.5 | 6.0 | 9.1 | 10.1 | 0.3 | 0.9 | 3.9 | 5.0 |
| Germany | 17.8 | 19.1 | 20.7 | 31.3 | 34.7 | 1.3 | 2.8 | 13.4 | 16.9 |
| Greece | 3.1 | 3.3 | 3.6 | 5.4 | 6.0 | 0.2 | 0.5 | 2.3 | 2.9 |
| Hungary | 1.0 | 1.1 | 1.0 | 1.6 | 1.7 | 0.1 | 0.1 | 0.6 | 0.8 |
| Ireland | 0.9 | 0.9 | 1.0 | 1.5 | 1.7 | 0.1 | 0.1 | 0.7 | 0.8 |
| Italy | 8.6 | 9.2 | 9.9 | 15.0 | 16.7 | 0.6 | 1.4 | 6.4 | 8.1 |
| Latvia | 0.2 | 0.3 | 0.3 | 0.4 | 0.5 | 0.0 | 0.0 | 0.2 | 0.2 |
| Liechtenstein | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lithuania | 0.4 | 0.5 | 0.5 | 0.8 | 0.9 | 0.0 | 0.1 | 0.3 | 0.4 |
| Luxembourg | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.0 | 0.0 | 0.1 | 0.1 |
| Malta | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.0 | 0.0 | 0.1 | 0.1 |
| Netherlands | 3.1 | 3.3 | 3.6 | 5.5 | 6.1 | 0.2 | 0.5 | 2.4 | 3.0 |
| Norway | 0.5 | 0.6 | 0.6 | 1.0 | 1.1 | 0.0 | 0.1 | 0.4 | 0.5 |
| Poland | 7.0 | 7.8 | 7.2 | 10.9 | 11.6 | 0.8 | 0.2 | 3.9 | 4.6 |
| Portugal | 1.6 | 1.7 | 1.8 | 2.8 | 3.1 | 0.1 | 0.3 | 1.2 | 1.5 |
| Romania | 3.7 | 4.0 | 4.1 | 6.3 | 6.9 | 0.3 | 0.4 | 2.6 | 3.2 |
| Slovakia | 1.3 | 1.4 | 1.5 | 2.3 | 2.6 | 0.1 | 0.2 | 1.0 | 1.2 |
| Slovenia | 0.4 | 0.4 | 0.4 | 0.7 | 0.7 | 0.0 | 0.1 | 0.3 | 0.4 |
| Spain | 7.8 | 8.3 | 9.1 | 13.7 | 15.2 | 0.5 | 1.3 | 5.9 | 7.4 |
| Sweden | 0.8 | 0.9 | 1.0 | 1.4 | 1.6 | 0.1 | 0.1 | 0.6 | 0.8 |
| United Kingdom | 9.7 | 10.4 | 11.4 | 17.2 | 19.2 | 0.7 | 1.6 | 7.5 | 9.5 |

Source: Calculations by Öko-Institut

In the 30% domestic scenario the auctioning revenues increase by the following compared to the reference scenario:

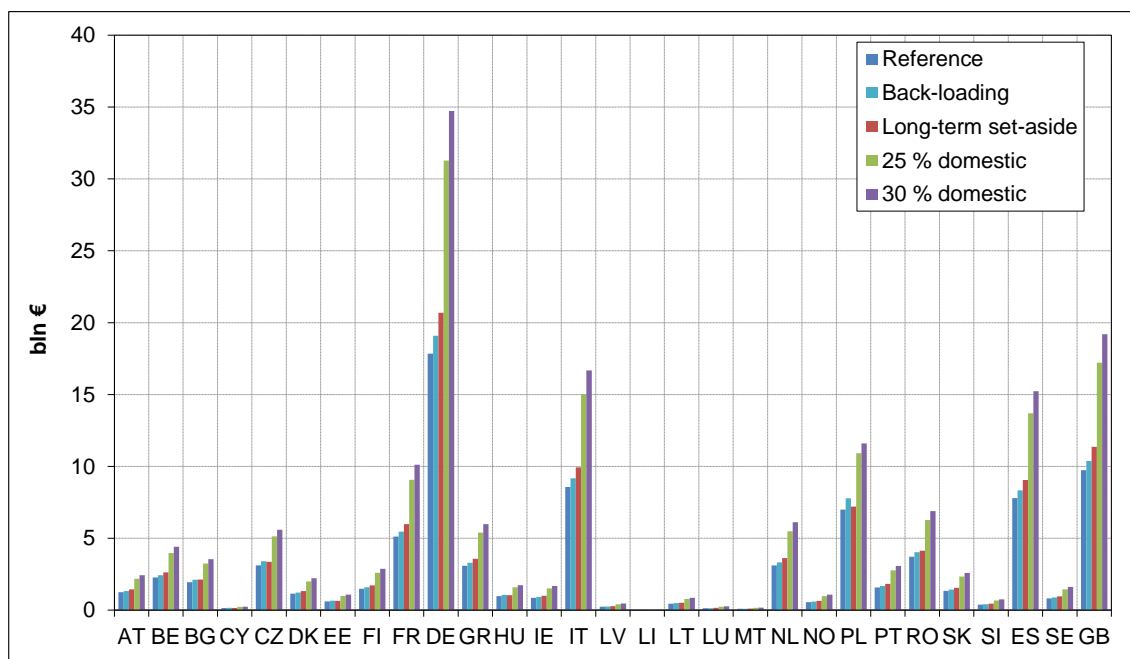
- € 17 billion for Germany,
- € 10 billion for the UK,
- € 7 billion for Spain,
- € 8 billion for Italy,

- € 5 billion for Poland,
- € 5 billion for France,
- € 3 billion for Romania and
- € 3 billion for Greece.

In this scenario the value of free allocation to electricity generators in Poland increases by € 5.5 billion.

When assessing the results at Member State level it can be seen that for all countries the auctioning revenues increase if action is taken (Table 7 and Figure 2). The impact is most prominent for those Member States which are already entitled to auction significant amounts, but follows the same pattern for all states. The one exception to the rule is countries with significant free allocation to electricity generators. The free allocation to electricity generators is subtracted from the auctioning amount of the respective Member State and thus reduces their revenues.

Figure 2 Auctioning revenues per Member State, total for 2013 - 2020

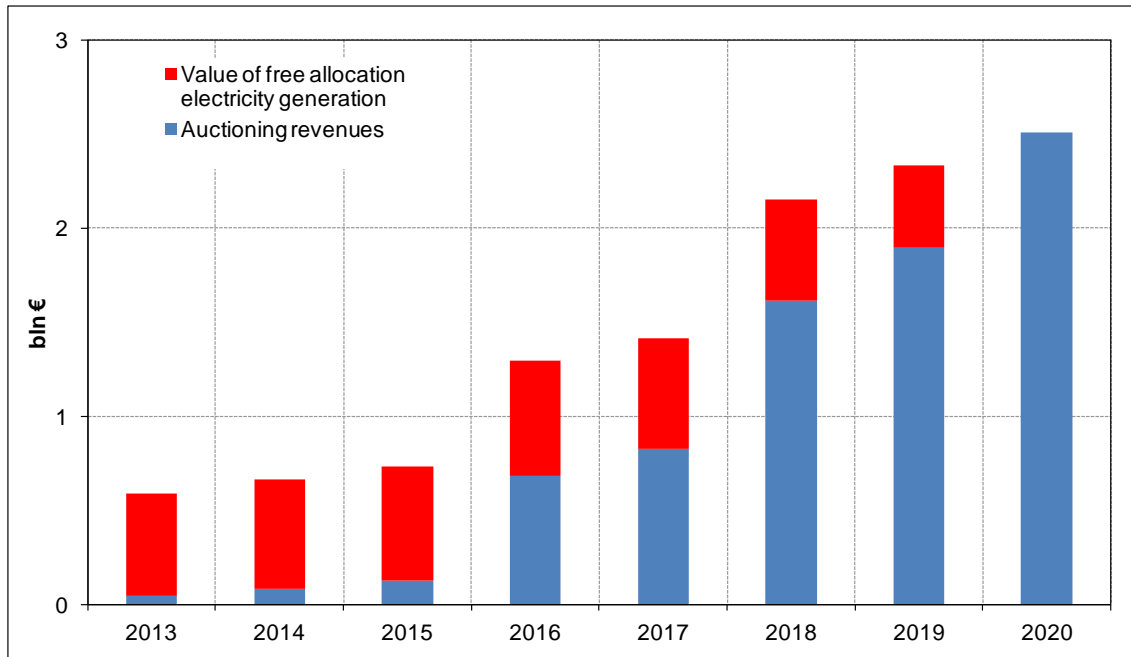


Source: Calculations by Öko-Institut

It is worth examining the situation in countries with a high free allocation to electricity generators (this includes Cyprus, Czech Republic, Romania, Bulgaria and Poland). For the back-loading scenario the Polish example is presented in Figure 3. It illustrates that auctioning revenues and the value of free allocation to electricity generators have to be analysed together. It becomes clear that due to the high free allocation to electricity generators the back-loading of allowances reduces auctioning quantities in 2013 to 2015 to almost zero. From 2016 to 2020 auctioning revenues are higher than the value of free allocation to electricity generators. The reason for this is that auctioning quanti-

ties and CO₂ prices increase over time. The free allocation to electricity generators is phased out and reaches zero in 2020. The situation is documented for other countries with free allocation to electricity generators in Table 8.

Figure 3 Annual auctioning revenues and value of free allocation for electricity generation in the back-loading scenario in Poland, 2013 - 2020



Source: Calculations by Öko-Institut

Table 8 Comparison of auctioning revenues and value of free allocation for electricity generation in the back-loading scenario, 2013 - 2020

| | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2013-2020 |
|----------------|-----------------|-------|------|------|-------|-------|-------|-------|-------|-----------|
| | | mln € | | | | | | | | |
| Bulgaria | Total | 132 | 149 | 164 | 290 | 317 | 480 | 521 | 561 | 2,614 |
| | Free allocation | 95 | 94 | 88 | 79 | 65 | 48 | 26 | 0 | 495 |
| | Auctioning | 37 | 55 | 76 | 211 | 251 | 433 | 495 | 561 | 2,119 |
| Cyprus | Total | 14 | 15 | 17 | 29 | 32 | 47 | 51 | 55 | 260 |
| | Free allocation | 18 | 18 | 17 | 16 | 14 | 12 | 8 | 0 | 102 |
| | Auctioning | -4 | -2 | 0 | 13 | 17 | 36 | 43 | 55 | 157 |
| Czech Republic | Total | 221 | 249 | 276 | 487 | 531 | 806 | 874 | 942 | 4,385 |
| | Free allocation | 188 | 186 | 176 | 157 | 130 | 95 | 52 | 0 | 984 |
| | Auctioning | 33 | 63 | 100 | 330 | 401 | 711 | 822 | 942 | 3,401 |
| Estonia | Total | 43 | 48 | 53 | 94 | 103 | 156 | 170 | 183 | 851 |
| | Free allocation | 37 | 37 | 35 | 31 | 26 | 19 | 10 | 0 | 193 |
| | Auctioning | 6 | 12 | 19 | 64 | 77 | 138 | 159 | 183 | 657 |
| Hungary | Total | 71 | 80 | 89 | 157 | 171 | 259 | 281 | 302 | 1,410 |
| | Free allocation | 70 | 69 | 64 | 56 | 45 | 31 | 13 | 0 | 348 |
| | Auctioning | 1 | 12 | 25 | 100 | 126 | 228 | 267 | 302 | 1,062 |
| Lithuania | Total | 26 | 29 | 32 | 57 | 62 | 94 | 101 | 109 | 509 |
| | Free allocation | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 0 | 27 |
| | Auctioning | 22 | 25 | 28 | 52 | 58 | 90 | 99 | 109 | 482 |
| Poland | Total | 588 | 663 | 733 | 1,297 | 1,415 | 2,149 | 2,331 | 2,510 | 11,686 |
| | Free allocation | 545 | 583 | 610 | 613 | 590 | 536 | 433 | 0 | 3,909 |
| | Auctioning | 43 | 80 | 123 | 684 | 825 | 1,613 | 1,898 | 2,510 | 7,776 |
| Romania | Total | 235 | 265 | 293 | 519 | 566 | 860 | 933 | 1,005 | 4,677 |
| | Free allocation | 125 | 124 | 117 | 104 | 86 | 63 | 34 | 0 | 653 |
| | Auctioning | 110 | 142 | 177 | 415 | 480 | 797 | 899 | 1,005 | 4,025 |

Source: Calculations by Öko-Institut

4 Sensitivity analysis: Different options for redistribution

The EU ETS Directive sets the following rules on the distribution of the auctioning quantities:

- 88% of the auctioning quantities are distributed proportional to the share of verified emissions;
- 10% of the auctioning quantities are redistributed for the purpose of ‘solidarity and growth’ in order to reduce emissions and adapt to the effects of climate change.
- 2% of the auctioning quantities are redistributed for early action under the Kyoto Protocol.

With a higher CO₂ price the 10% and 2% provisions automatically create more redistribution, especially to the new Member States in Central and Eastern Europe. The study analyses two additional options:

- The redistribution option “share in industrial emissions”: Member States with a higher share in emissions from industrial sectors carry a higher share of the effort. The motivation for this redistribution option is that the share of emissions from power generation and from industrial sectors differs significantly between countries, e.g. the share of emissions from power generation is high in Poland and low in France. To a certain extent the current ETS Directive is beneficial in terms of auctioning revenues for countries with a low share of emissions from power generation since auctioning quantities are distributed according to the share in total emissions and not according to the share in emissions that are actually subject to auctioning. As a substantial share of power generation in most Eastern European countries is coal-fired, this redistribution option is quite beneficial for these countries.
- A redistribution option where “only higher income” countries carry the effort. Only Member States from the higher income group (AT, BE, CY, DK, FI, FR, DE, EL, IE, IT, LU, NL, ES, SE, UK) contribute to the reduced auctioning quantities (as proposed by CEC 2012a). Each Member State from the higher income group contributes the same share of their auctioning quantities (e.g. each Member State from the high income group contributes 30% of their auctioning quantities in the 25% domestic scenario). Member States from the lower income group are defined as BG, RO, LV, LT, PL, SK, EE, HU, CZ, MT, SI, PT.
- These options are compared to the “no new redistribution” option: All Member States contribute the same share of their auctioning quantities (before the subtraction of free allocation for electricity generators). This option is identical to the scenarios analysed in chapter 3.

As an example the results for the 25% domestic reduction scenario are shown in Table 9. The different redistribution options lead to a different distribution of auctioning revenues. The following groups of countries can be identified:

- For most countries from Eastern Europe the distribution of the reduced auctioning quantities based on the share in industrial emissions increases auctioning revenues compared to the option with no new redistribution (Slovakia and the Czech Republic are exceptions). In general auctioning revenues are highest for countries from Eastern Europe when the reduced auctioning quantities are completely absorbed by the “higher income group” only.
- For countries from the higher income group with a low share of emissions in power generation (e.g. Austria, Belgium, France and Sweden) the distribution of the reduced auctioning quantities based on the share in industrial emissions results in the greatest reduction in auctioning revenues.
- For countries from the higher income group with a high share of emissions in power generation (e.g. Germany, Greece and Denmark) the redistribution option “higher income group” reduces auctioning revenues the most. With the redistribution option based on industrial emissions auctioning revenues can even increase compared to the option with no new redistribution.

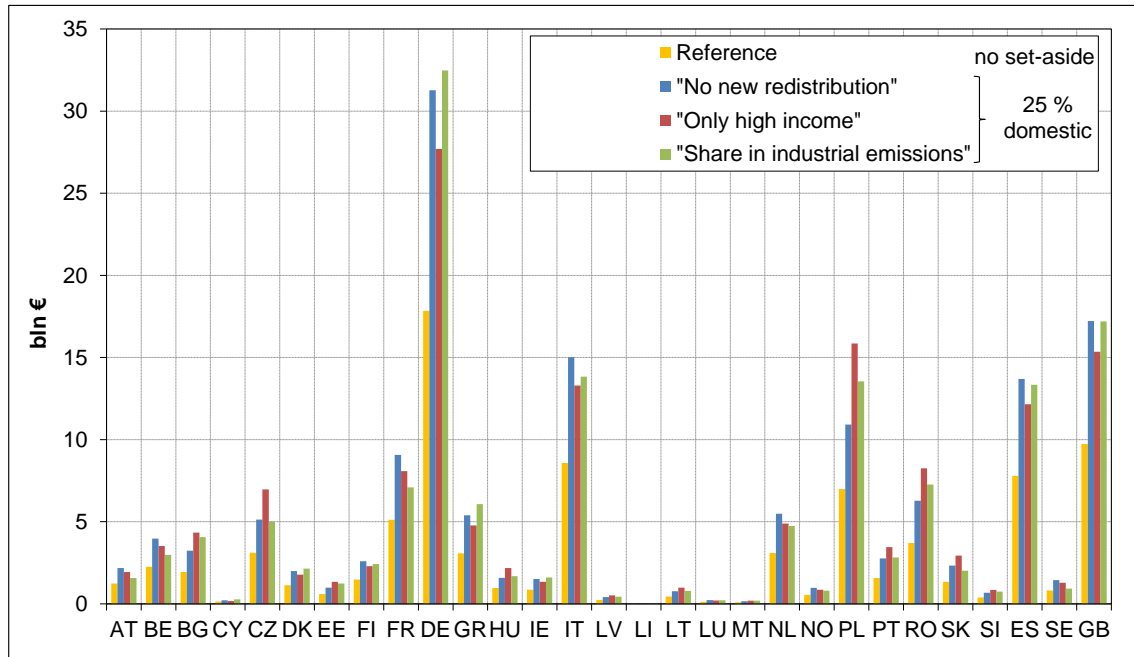
Table 9 illustrates the change in revenues that results from the two different options for redistribution. The redistribution option “only high income” reduces auctioning revenues by 11% for all Member States from the high income group compared to the option without new redistribution. Poland (+44%), Czech Republic (+36%) and Bulgaria (+34%) see the highest increase in auctioning revenues from this redistribution option. The redistribution option “share in industrial emissions” reduces auctioning revenues between -36% for Sweden and -3% for Spain. Malta (+26%), Estonia (+25%), Bulgaria (+25%), Poland (+23%) and Cyprus (+23%) see the highest increase in auctioning revenues from this redistribution option.

Table 9 *Impact of different redistribution options on auctioning revenues per Member State in the 25% domestic scenario, 2013 - 2020*

| | Redistribution option | | | Increase in auctioning revenues | | Change in revenues | |
|----------------|--------------------------|--------------------|---------------------------------|---------------------------------|---------------------------------|--------------------|---------------------------------|
| | "No new re-distribution" | "Only high income" | "Share in industrial emissions" | "Only high income" | "Share in industrial emissions" | "Only high income" | "Share in industrial emissions" |
| | billion € | | | | | % | |
| Total | 148 | 148 | 148 | | | | |
| Austria | 2 | 2 | 2 | -0.2 | -0.6 | -11% | -28% |
| Belgium | 4 | 4 | 3 | -0.5 | -1.0 | -11% | -25% |
| Bulgaria | 3 | 4 | 4 | 1.1 | 0.8 | 34% | 25% |
| Cyprus | 0 | 0 | 0 | 0.0 | 0.1 | -21% | 24% |
| Czech Republic | 5 | 7 | 5 | 1.8 | -0.1 | 36% | -2% |
| Denmark | 2 | 2 | 2 | -0.2 | 0.1 | -11% | 7% |
| Estonia | 1 | 1 | 1 | 0.4 | 0.3 | 36% | 26% |
| Finland | 3 | 2 | 2 | -0.3 | -0.2 | -12% | -6% |
| France | 9 | 8 | 7 | -1.0 | -2.0 | -11% | -22% |
| Germany | 31 | 28 | 32 | -3.6 | 1.2 | -11% | 4% |
| Greece | 5 | 5 | 6 | -0.6 | 0.7 | -12% | 13% |
| Hungary | 2 | 2 | 2 | 0.6 | 0.1 | 37% | 7% |
| Ireland | 2 | 1 | 2 | -0.2 | 0.1 | -11% | 6% |
| Italy | 15 | 13 | 14 | -1.7 | -1.2 | -11% | -8% |
| Latvia | 0 | 1 | 0 | 0.1 | 0.0 | 26% | 5% |
| Liechtenstein | 0 | 0 | 0 | 0.0 | 0.0 | -12% | -11% |
| Lithuania | 1 | 1 | 1 | 0.2 | 0.0 | 28% | 3% |
| Luxembourg | 0 | 0 | 0 | 0.0 | 0.0 | -9% | -4% |
| Malta | 0 | 0 | 0 | 0.0 | 0.0 | 26% | 26% |
| Netherlands | 5 | 5 | 5 | -0.6 | -0.7 | -11% | -14% |
| Norway | 1 | 1 | 1 | -0.1 | -0.2 | -11% | -17% |
| Poland | 11 | 16 | 14 | 4.9 | 2.6 | 45% | 24% |
| Portugal | 3 | 3 | 3 | 0.7 | 0.1 | 25% | 2% |
| Romania | 6 | 8 | 7 | 2.0 | 1.0 | 31% | 16% |
| Slovakia | 2 | 3 | 2 | 0.6 | -0.3 | 26% | -13% |
| Slovenia | 1 | 1 | 1 | 0.2 | 0.1 | 26% | 10% |
| Spain | 14 | 12 | 13 | -1.5 | -0.4 | -11% | -3% |
| Sweden | 1 | 1 | 1 | -0.2 | -0.5 | -11% | -36% |
| United Kingdom | 17 | 15 | 17 | -1.9 | 0.0 | -11% | 0% |

Source: *Calculations by Öko-Institut*

Figure 4 Increase in auctioning revenues in the 25% domestic scenario according to different redistribution options compared to the reference scenario, 2013 - 2020



Source: Calculations by Öko-Institut

In Figure 4 the auctioning revenues in the redistribution options are compared to the auctioning revenues in the reference scenario. The central result is that auctioning revenues increase for all countries for all redistribution options compared to the reference scenario. Overall it can be concluded that the introduction of more ambitious targets to the EU ETS has higher impacts on auctioning revenues than redistribution. Considering that the directive already includes special provisions on redistribution which were specifically designed to compensate for the weaker economic development of Eastern European countries, the implementation of additional redistributive elements does not seem to be an appropriate approach.

5 Carbon leakage and potential impacts on industry

A major concern expressed since the introduction of the EU ETS has been the competitive situation of European industries compared to industrial facilities in other parts of the world where climate policies might not be as stringent. To prevent carbon leakage the EU Commission carried out an assessment of the risk of carbon leakage in industrial sectors based on the trade intensity and the carbon cost induced by implementation of the directive (CEC 2011c).

In fact the current assessment of the risk of carbon leakage is based on conservative assumptions for both indicators:

- All countries outside of the EU were treated in the trade intensity assessment as if they had no comparable climate policies in place. This is obviously not the case for countries that are already linked with the EU ETS (Norway, Iceland, Liechtenstein) or will be linked in the coming years (Switzerland and Australia). Also several emerging economies, e.g. Mexico and South Korea, are currently putting a great emphasis on policies for GHG reduction in industrial sectors.
- An EUA price of € 30 was used when assessing the additional cost induced by the directive. This price was expected to be reached by 2020 but was already applied to the carbon leakage list valid in 2013 and 2014. Currently prices stand at € 7, which is less than a quarter of the price used in the assessment. In none of the scenarios assessed in this report are carbon prices expected to reach this price level in 2013 and 2014. In three of the five scenarios the prices are expected to be lower even in 2020.

Sectors deemed at risk of carbon leakage receive 100% free allocation (based on benchmarks) and a compensation mechanism was established for higher electricity prices resulting from the implementation of the EU ETS Directive. In addition, the amount of available credits (EUAs, CERs, ERUs) in the ETS is currently substantially higher than expected. Already at the end of 2011 a surplus of 0.95 billion EUAs had cumulated from the years 2008-2011 and is expected to increase further in 2012 (Öko-Institut 2012). This surplus is also largely held by industrial sectors. Thus the question is: How will the four action scenarios – back-loading, long-term set-aside, 25% and 30% domestic reduction – affect industrial competitiveness?

In the back-loading scenario there will be no change for industrial sectors. Their free allocation will remain unchanged. The only difference in the long-term set-aside scenario to the reference scenario are slightly higher EUA prices of about € 18 in 2020 (compared to € 14 in the reference scenario). As most industrial sectors are classified as being of risk of carbon leakage and receive 100% free allocation, efficient installations with production levels comparable to the base period are expected to receive almost all the EUAs needed to cover their emissions for free; in the case of lower production levels due to the current economic and financial crisis their free allocation could exceed their emissions. When EUA prices increase, the value of free allocation will increase accordingly. The same applies to remaining EUAs from the second trading

period (2008-2012), which was largely characterised by over allocation to industrial sectors (Öko-Institut 2010).

In the 25% domestic reduction scenario the price development is expected to be comparable to the assumptions in the impact assessment of the EU ETS Directive, assuming an EUA price of € 30 in 2020. Free allocation to industrial sectors will be only slightly lower than in the reference scenario (see Table 4); the overall free allocation to stationary installations will be reduced by 3%. In the 30% domestic reduction scenario free allocation will be reduced by a moderate 8% only.

Overall the impact of reduced auctioning quantities and higher climate ambitions on industrial sectors is deemed to be small, and still significantly smaller than that accepted during the revision of the EU ETS Directive. Moreover, the stabilisation of CO₂ prices would even enhance the planning security for industries, reduce the risk of stranded assets due to carbon lock-in and reward operators who carried out emission-saving measures based on CO₂ price levels at the start of the second trading period of the EU ETS.

6 Conclusions

- Compared to the reference scenario auctioning revenues increase for all countries in all action scenarios, even in the backloading scenario.
- If the EU continues with its current 20% emission reduction target until 2020, the revenue losses for European Member States will be in the range of €₂₀₁₂ **62** billion (compared to revenues in the 25% domestic scenario) and €₂₀₁₂ **78** billion (compared to revenues in the 30% domestic scenario).
- Overall the impact of reduced auctioning quantities and higher climate targets on industrial competitiveness is deemed to be very limited and will be compensated. From 2013 onwards industrial sectors will receive 100% free allocation (based on benchmarks). A compensation mechanism for higher electricity prices has also been established.
- The proposal by the Commission which includes the back-loading measure is a first step forward; however, the respective amount of allowances should be back-loaded for a period of a decade or more. It would be best to retire the back-loaded allowances at the earliest point in time. This first move should be complemented by the adoption of higher reduction targets since previous research has clearly shown that a stand-alone back-loading approach will not be sufficient to solve the surplus problem and restore a robust CO₂ price signal.
- Considering that the EU ETS Directive includes special provisions on redistribution designed to support Central and Eastern European countries, these Member States would benefit more (compared to other Member States) from an increase in auctioning revenues even without introducing additional redistribution mechanisms under the ETS.

7 References

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