Umwelt Bundesamt

Für Mensch und Umwelt

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Raising the EU 2030 GHG Emission Reduction Target

Implications for ETS and non-ETS sectoral targets

German-language Summary

Vorwort

Der im Dezember 2019 von der EU-Kommission initiierte Europäische „Green Deal" ist der Fahrplan für die Europäische Union (EU) zur Erreichung der Klimaneutralität bis 2050. Im September und Oktober 2020 haben nun die EU-Kommission (KOM) und das Europäische Parlament (EuP) ihre Vorschläge und Beschlüsse zum EU-Klimagesetz und einem ambitionierteren EU-2030-Klimaziel als Meilensteine auf dem Weg zur Klimaneutralität vorgelegt bzw. getroffen[1,2,3,4]. Die Fachöffentlichkeit diskutiert beide 2030-Klimaziel-Vorschläge – KOM: minus 55 Prozent gegenüber 1990; EuP: minus 60 Prozent - sowohl kritisch als auch konstruktiv. Erst zuletzt haben der Europäische Rat der Staats- und Regierungschefs[5] und der Umweltministerrat[6] den Rahmen für ein neues EU-2030-Klimaschutzziel weiter konkretisiert. Im Rahmen des Übereinkommens von Paris sollen die Vertragsparteien noch im Jahr 2020 ein überarbeitetes Klimaschutzziel für 2030 vorlegen.

Dieser Diskussionsbeitrag des Umweltbundesamtes begründet die Notwendigkeit eines höheren Klimaschutzziels der EU, identifiziert Faktoren zur Entscheidung, wie ein stärkeres Klimaschutzziel auf den EU-Emissionshandel (ETS) und auf andere Bereiche (Sektoren außerhalb des ETS/nicht-ETS) aufgeteilt werden sollte und legt verschiedene Optionen dar, wie ein stärkeres Ziel im EU-ETS und außerhalb des EU-ETS umgesetzt werden könnte.

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[1] EU-KOM (2020): Vorschlag für eine VERORDNUNG DES EUROPÄISCHEN PARLAMENTS UND DES RATES zur Schaffung des Rahmens für die Verwirklichung der Klimaneutralität und zur Änderung der Verordnung (EU) 2018/1999 (Europäisches Klimagesetz). Dokument COM(2020) 80 final vom 04.03.2020

[2] EU-KOM (2020): Geänderter Vorschlag für eine VERORDNUNG DES EUROPÄISCHEN PARLAMENTS UND DES RATES zur Schaffung des Rahmens für die Verwirklichung der Klimaneutralität und zur Änderung der Verordnung (EU) 2018/1999 (Europäisches Klimagesetz). Dokument COM(2020) 563 final vom 17.09.2020.

[3] EU-KOM (2020): MITTEILUNG DER KOMMISSION AN DAS EUROPÄISCHE PARLAMENT, DEN RAT, DEN EUROPÄISCHEN WIRTSCHAFTS- UND SOZIALAUSSCHUSS UND DEN AUSSCHUSS DER REGIONEN: Mehr Ehrgeiz für das Klimaziel Europas bis 2030 - In eine klimaneutrale Zukunft zum Wohl der Menschen investieren. Dokument COM(2020) 562 final vom 17.9.2020

[4] EuP (2020): Beschluss 08.10.2020. Europäisches Klimagesetz. Abänderungen des Europäischen Parlaments vom 8. Oktober 2020 zu dem Vorschlag für eine Verordnung des Europäischen Parlaments und des Rates zur Schaffung des Rahmens für die Verwirklichung der Klimaneutralität und zur Änderung der Verordnung (EU) 2018/1999 (Europäisches Klimagesetz)

[5] Europäischer Rat (2020): Schlussfolgerungen des ER vom 15./16. Oktober 2020. Dokument https://data.consilium.europa.eu/doc/document/ST-15-2020-INIT/de/pdf

[6] Vergleiche Tagungsankündigung des Umweltrats am 23. Oktober 2020 unter https://www.consilium.europa.eu/de/meetings/env/2020/10/23. Letzter Aufruf 20.10.2020

Kernbotschaften

Klimaschutzziel für 2030 noch in diesem Jahr beschließen

Das bisherige Ziel der Europäischen Union, ihre Treibhausgasemissionen um mindestens 40 Prozent unter das Niveau von 1990 zu senken, ist nicht ausreichend, die Ziele des Übereinkommens von Paris angemessen zu unterstützen.

In Anbetracht der wirtschaftlichen Auswirkungen der COVID-19-Pandemie, der Dringlichkeit von Klimaschutz und der global beanspruchten Führungsrolle der EU sollte ein angemessenes Ziel für die Reduzierung der Treibhausgasemissionen der EU im Jahr 2030 mindestens 60 Prozent unter dem Niveau von 1990 betragen, wie die Auswertung von aktuellen Studien zeigt..

Eine Festlegung auf ein ambitionierteres Klimaziel ist die Schlüsselvoraussetzung für die notwendige Revision der zentralen europäischen Klimaschutz-Rechtsakte im ersten Halbjahr 2021. Dazu zählen EU-Emissionshandels-Richtlinie, die Klimaschutz- und die Landnutzungs-verordnung. Eine zeitnahe Festlegung – in jedem Fall noch in diesem Jahr - ist ein wichtiges Signal für europäische und internationale Partner und erhält das politische Momentum trotz der Pandemie-Beschränkungen. Nur so lässt sich auch eine weitere Verzögerung notwendiger Schritte für die klimapolitisch erforderliche Transformation der EU, z.B. aufgrund entstehender Rechtsunsicherheiten, vermeiden.

Klare Vorgaben für EU-Emissionshandel und nationale Anstrengungen essentiell

Ein stärkeres EU-Gesamtziel für 2030 sollte umgehend mit spezifischen Zielen für den ETS und die Nicht-ETS-Sektoren unterlegt werden[7]. Damit haben Mitgliedstaaten und Wirtschaftsakteure eine klare Richtschnur und einen verlässlicheren Rahmen für weitere Schritte an der Hand.

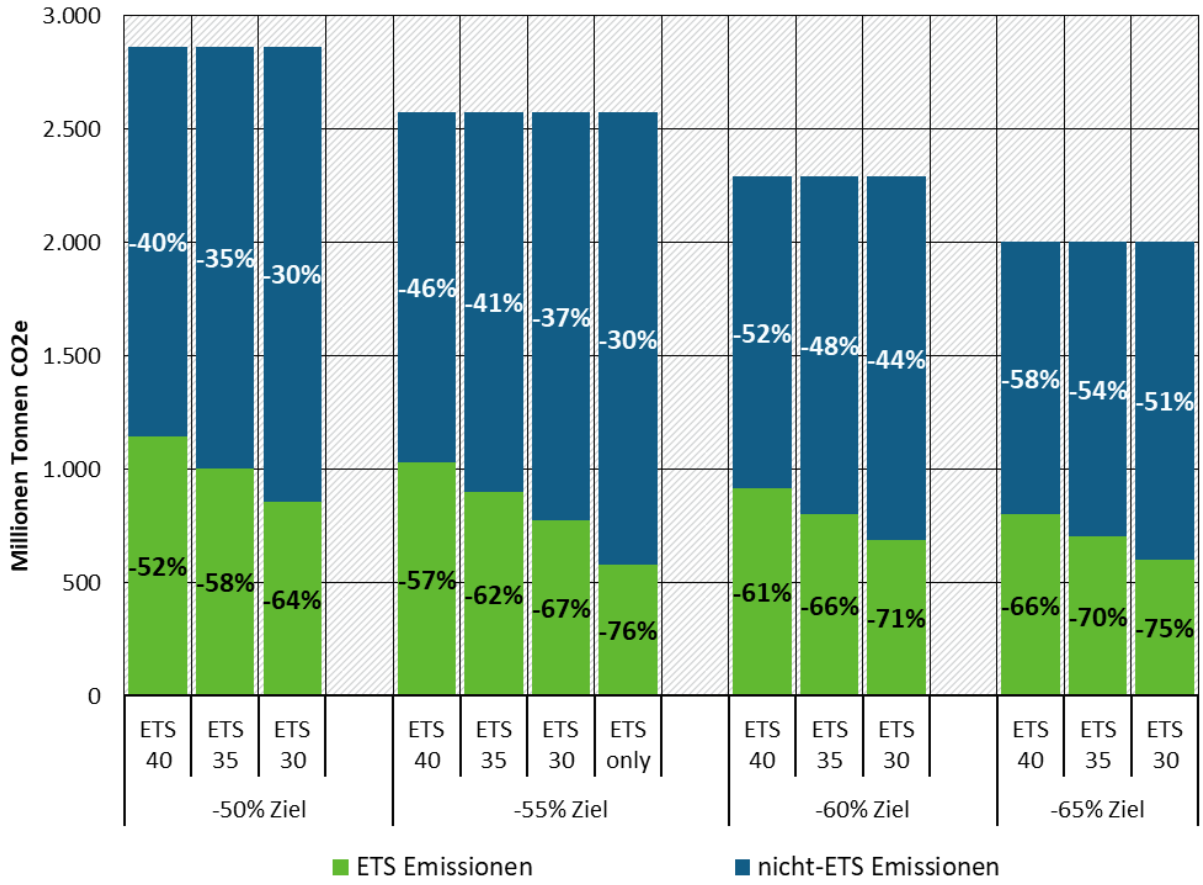
Die Erhöhung des Emissionsreduktionsziels auf 60 Prozent gegenüber 1990 und höher, erfordert sofortige und konsequente politische Maßnahmen und Investitionen in allen Mitgliedstaaten und Sektoren. Dies ist nötig, um die Entwicklung und den Einsatz innovativer, kohlenstoffarmer Technologien und nachhaltiger Geschäftsmodelle zu fördern, insbesondere in Sektoren, die noch am Beginn der Transformation stehen (z.B. Industrie, Verkehr, Gebäude).

Emissionshandel kann frühzeitig und überproportional Emissionen senken

Die Emissionen in den vom EU-Emissionshandel erfassten Sektoren können insbesondere wegen der Fortschritte beim Ausbau der erneuerbaren Energien und dem Rückgang der fossilen Stromerzeugung auch bis 2030 schneller sinken als in den anderen Sektoren. Daher wird sich der Anteil dieser Sektoren an den Gesamtemissionen verringern (aktuell rund 40 Prozent). Wir gehen davon aus, dass der Anteil der ETS-Sektoren an den Gesamtemissionen auf etwa 30 bis 35 Prozent sinken kann[8]. Bei einem Gesamtziel von minus 60 Prozent (im Vergleich zu 1990) würden die Emissionen im Emissionshandel demzufolge um rund 66 bis 71 Prozent (im Vergleich zu 2005) zurückgehen (vgl. Abbildung 1).

[7] Die UBA-Analyse geht davon aus, dass die LULUCF-Verordnung vorerst nicht angepasst wird.
[8] Eine ähnliche Größenordnung ergibt die Folgenabschätzung der EU-KOM: bei einer gesamt-wirtschaftlichen Emissionsminderung um 55% (im Vergleich zu 1990) sinken die Emissionen im ETS um 65 Prozent (im Vergleich zu 2005), im Nicht-ETS um 39 bis minus 40 Prozent (im Vergleich zu 2005).

Abbildung 1: Indikativer Korridor für Emissionsreduktionen im ETS und nicht-ETS in 2030 bei EU-Klimazielen zwischen 50% und 65% gegenüber 1990



*Relative Reduktionen in den Säulen gegenüber 2005

Quelle: Eigene Berechnungen auf Grundlage des EEA-ETS-Dataviewers

Im EU-Emissionshandel besteht zudem dringender Handlungsbedarf, denn die tatsächlichen Emissionen liegen seit vielen Jahren deutlich unterhalb der erlaubten Obergrenze (Cap). Das Cap sollte daher so schnell wie möglich an das ambitioniertere Klimaschutzziel für 2030 angepasst werden. So könnte die Menge der von den Mitgliedstaaten versteigerten Zertifikate bereits ab 2021 oder spätestens 2022 entsprechend reduziert werden, während die kostenlose Zuteilung an Unternehmen aus Gründen der Rechtssicherheit erst später angepasst wird.

Hierfür müsste die EU-Kommission rasch einen Legislativvorschlag zur entsprechenden Anpassung der Auktionsmengen vorlegen, ähnlich dem sogenannten „Backloading“ in den Jahren 2014 bis 2016. Spätestens Mitte der 2020er Jahre müssen dann die Höhe und die jährliche Kürzungsrate des Caps in Einklang mit dem 2030-Ziel gebracht werden.

Tabelle 1 zeigt, wie der lineare Kürzungsfaktor, der das Cap jedes Jahr verringert, bei einem gesamtwirtschaftlichen Minderungsziel von 55 oder 60 Prozent angehoben werden müsste: von aktuell 2,2 Prozent auf 4,2 Prozent (55 Prozent - Ziel) oder auf 4,6 Prozent (60 Prozent – Ziel). Wenn man mit der Anhebung des linearen Kürzungsfaktors bis 2026 wartet, müsste der Faktor sogar auf 6,1 bzw. 7 Prozent steigen.

Tabelle 1: Indikative Übersetzung eines EU-Gesamtziels in ETS- und nicht-ETS-Ziele und notwendige jährliche Cap-Anpassung mit dem Linearen Kürzungsfaktor (LKF)

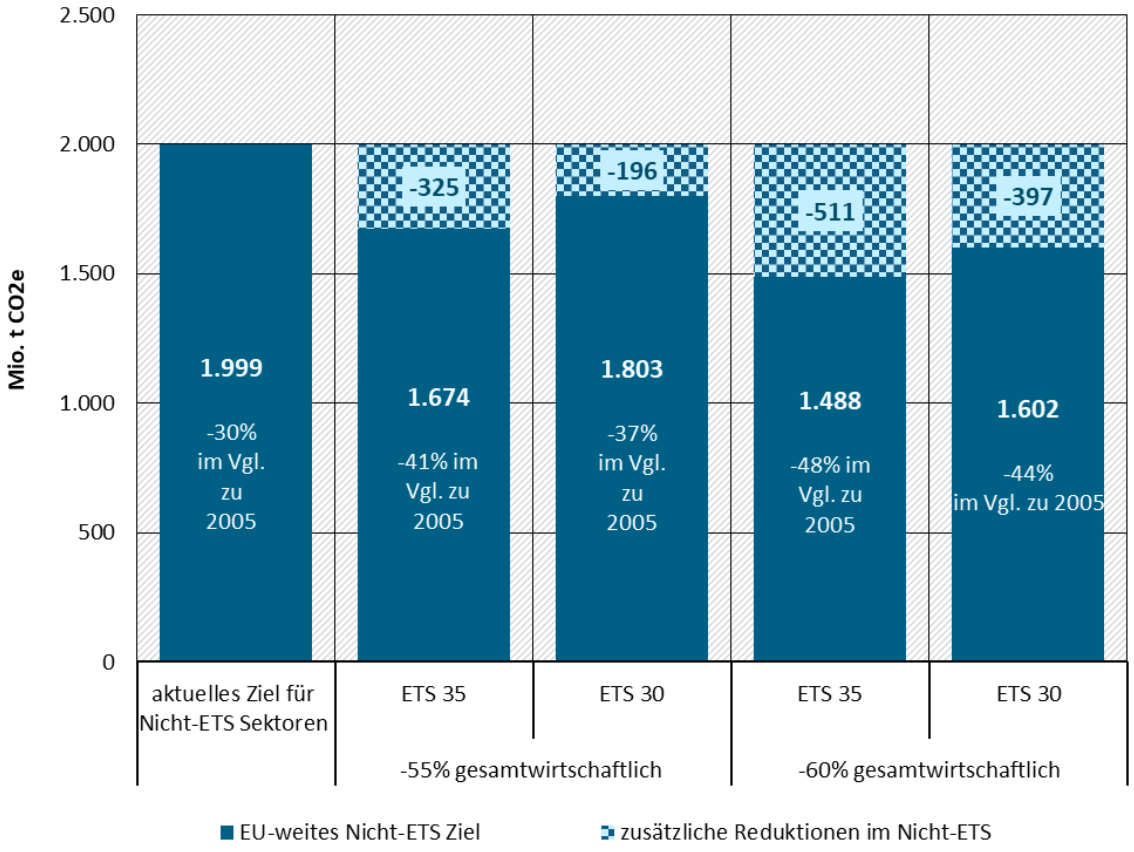
EU-Ziel 2030*	ETS-Ziel**	LKF ab 2021 mit Kürzung von Aktionsmengen vor 2026	LKF ab 2026 ohne Anpassung der Auktionsmengen vor 2026	Nicht-ETS-Ziel***
-40%	-43%	2,2%****		-30%
-50%	-58%	3,7%	5,2%	-35%
-55%	**-62%**	**4,2%**	**6,1%**	**-41%**
-60%	**-66%**	**4,6%**	**7,0%**	**-48%**
-65%	-70%	5,1%	7,9%	-54%

* im Vergleich zu 1990; ** im Vergleich zu 2005, mit einem angenommenen Anteil der ETS-Emissionen an den EU-Gesamtemissionen von 35%; *** im Vergleich zu 2005, mit einem angenommenen Anteil der Nicht-ETS-Emissionen an den EU-Gesamtemissionen von 65%; ****2021-2030.

Chancen und Herausforderungen beim Klimaschutz außerhalb des Emissionshandels

Mehr Klimaschutz ist auch jenseits des EU-Emissionshandels im Rahmen der europäischen Lastenteilungsverordnung geboten, insbesondere wenn das Klimaziel auf minus 55 Prozent oder 60 Prozent angehoben wird. Abbildung 2 zeigt die notwendigen Emissionsreduktionen jenseits des Emissionshandels im Vergleich zum Status Quo (linke Säule).

Abbildung 2: Notwendige Emissionsreduktionen (indikativ) in den Nicht-ETS-Sektoren bei einem gesamtwirtschaftlichen Klimaziel von minus 55% bzw. 60%



Quelle: Eigene Berechnungen

Außerhalb des EU-Emissionshandels bestehen vier grundlegende Optionen, die Chancen bieten, aber auch mit spezifischen Herausforderungen verbunden sind:

1. Anpassung der nationalen Emissionsbudgets der Mitgliedstaaten: Das neue EU-Klimaziel wird auf die Mitgliedstaaten aufgeteilt und führt zu neuen Minderungsverpflichtungen.
2. Stärkung der europäischen Klimaschutzinstrumente: Die EU verschärft ihre klimapolitischen Instrumente, insbesondere im Verkehrs- und Gebäudebereich.
3. Gap-Filling-Mechanismus (Mechanismus zur Schließung der Lücke zum Klimaziel): Die Mitgliedstaaten erbringen über ihre derzeitigen nationalen Minderungsverpflichtungen hinaus zusätzliche Emissionsreduktionen und erhalten eine finanzielle Gegenleistung.
4. EU-weiter Emissionshandel für Brennstoffe, die derzeit nicht unter den EU-Emissionshandel fallen: Denkbar ist hierbei eine Ausdehnung des EU-ETS oder ein separater Emissionshandel für Brennstoffe.

Die Option 1 wäre effektiv, weil bindend für die Mitgliedstaaten, die Aushandlung neuer Minderungsverpflichtungen für die Mitgliedstaaten könnte aber ein politisch langwieriger Prozess werden und schlimmstenfalls sogar scheitern. Sich allein auf eine Stärkung der europäischen Klimaschutzinstrumente zu verlassen (Option 2), ohne die nationalen Minderungsverpflichtungen anzupassen, birgt hingegen ein hohes Risiko, dass das Gesamtziel verpasst wird. Die europäischen Klimaschutzinstrumente für mehr erneuerbare Energien, mehr Energieeffizienz und das Ende der Nutzung fossiler Brennstoffe müssen in jedem Fall gestärkt werden. Das legen die Analysen der nationalen Energie- und Klimapläne der Mitgliedstaaten offen, die die EU Kommission durchführte[9]. Auch ein Mechanismus zur Lückenschließung, der den Mitgliedstaaten einen ökonomischen Anreiz gibt, freiwillig mehr für den Klimaschutz zu tun, käme in Frage, sofern eine ausreichende Finanzierung und die Vermeidung von Fehlanreizen sichergestellt sind. Schließlich könnte ein EU-weiter Emissionshandel für Brennstoffe eingeführt werden, deren Nutzung derzeit nicht unter den EU-Emissionshandel fällt. Das Umweltbundesamt favorisiert einen separaten Emissionshandel für Brennstoffe, ähnlich wie er in Deutschland ab Januar 2021 umgesetzt wird. Damit lassen sich Anreize im Verkehrs- und Gebäudebereich gezielter setzen und unerwünschte Wechselwirkungen mit dem bestehenden EU-Emissionshandel vermeiden.

[9] EU-KOM (2020): MITTEILUNG DER KOMMISSION AN DAS EUROPÄISCHE PARLAMENT, DEN RAT, DEN EUROPÄISCHEN WIRTSCHAFTS- UND SOZIALAUSSCHUSS UND DEN AUSSCHUSS DER REGIONEN Eine EU-weite Bewertung der nationalen Energie- und Klimapläne. Dokument COM(2020) 564final vom 17.09.2020

Preamble

The political debate on raising EU's greenhouse gas (GHG) emission reduction target for 2030 from at least 40 percent up to 55 percent or even higher is in full swing. While the European Commission has proposed to reduce emissions by at least 55 percent below 1990 levels, the European Parliament went a step further and adopted a target of 60 percent emissions reductions. The position of EU Member States is not yet decided at the moment of writing this paper. Important milestones for the decision making process were the meetings of the European Council (15th and 16th October) and the Environment Council (23rd October), where a general approach on the 2030 target has been adopted. This paper intends to enrich ongoing debates on the "how" the EU could commit to a 2030 mitigation objective, with the highest ambition possible as committed to the Paris Agreement. Therefor we focus on:

- a narrative for a strong 2030 climate ambition of the European Union
- identifying relevant factors for the decision on sharing the target between ETS and non-ETS sectors, and showing quantitatively a reasonable solution space for the sector split
- discussing possible options for implementing a higher GHG emission reduction target considering the specific requirements in EU-ETS and Effort Sharing sectors.

Key considerations

- In its recent communication "Stepping up Europe's 2030 climate ambition" and the proposed amendment to the European Climate Law, the European Commission laid out a plan to raise the 2030 target to at least 55 percent GHG emission reductions below 1990 levels.
- With a view to the upcoming climate negotiations under UNFCCC and the comprehensive legislative package the Commission has announced for mid-2021, the political decision to raise the economy wide emission reduction target must be taken by the end of 2020. Herewith the EU would undoubtedly signal its seriousness about its commitment to responsible global climate action in the coming decade and maintain political momentum despite the restrictions of the current pandemic context. Secondly, this is a key requirement to start the revision of the central legal acts for implementing the new targets: the ETS Directive, the Effort Sharing Regulation and the LULUCF Regulation. A delayed decision might severely hamper steps to the envisaged transformation of the EU and impose legal uncertainties.
- Considering the economic implications of the COVID-19 pandemic, the urgency of meaningful climate action and the EU's global leadership role, **a reasonable GHG emission reduction target for the EU in 2030 should be at least 60 percent below 1990**. Therefore, we recommend that the EU should create as soon as possible the internal enabling conditions to facilitate emission reductions of 60 percent or even more below 1990 levels by 2030.
- In order to provide essential guidance and a reliable framework to market participants and Member States, **the decision on the sectoral split of the updated 2030-climate target between ETS (current scope) and non-ETS sectors** as well as the contribution of the

LULUCF sector to the economy-wide target **should be taken as soon as possible**. For the time being, we assume that the ETS share in total emissions will decline to below 40 percent by 2030, but will probably account for more than 30 percent in 2030. By 2050, the ETS share in total emissions declines to 25-28 percent or even lower according to the Commission's "Long-Term Vision".

Table 1: Translating economy wide climate targets into ETS and ESR sectoral targets with an assumed share of 35 percent for ETS in total emissions

Economy wide emission target 2030*	ETS target **	LRF from 2021 on with auction reductions prior to 2026	LRF from 2026 on without adjustments prior to 2026	ESR target***
-40%	-43%	2.2%****		-30%
-50%	-58%	3.7%	5.2%	-35%
-55%	-62%	4.2%	6.1%	-41%
-60%	-66%	4.6%	7.0%	-48%
-65%	-70%	5.1%	7.9%	-54%

* relative to 1990; ** relative to 2005, assumed share of ETS in total emissions: 35%; ***relative to 2005, assumed share of ESR in total emissions: 65%; ****2021-2030.

- A 50 percent reduction target would basically only follow suit emission reductions already expected through the implementation of today's climate and energy policies (full implementation of the "Clean Energy Package" and coal phase-outs planned by Member states).
- **Increasing the economy wide emission reduction target further, up to 55 percent** compared to 1990, as proposed by the Commission or **up to 60 percent,** as endorsed by the European Parliament, **or 65 percent,** as proposed by some environmental organisations, is more challenging and requires immediate and consequent action in all Member States and sectors. **Sufficient policy action and investment must be provided in the coming years to boost the development and deployment of innovative, low-carbon technologies and sustainable business models**, especially in sectors which are just about to start transformation (e.g. industry, transport, buildings).
- **In the EU ETS, there is an urgent need** to address the structural imbalance between verified emissions and the cap and restore market scarcity. While leaving free allocation to companies untouched for reasons of legal certainty, auction amounts could be adjusted starting already in 2021 or 2022 at the latest. **The European Commission should as soon as possible bring forward a proposal to reduce auction amounts from 2021/2022 on as a measure to align EU ETS with a higher 2030 climate target.**
- In the **Effort sharing sectors**, increasing national emission targets and aligning them with a higher GHG reduction target could become challenging. The European Commission has proposed to further expand emissions trading, which could result in a reduction of the scope of the ESR. Also energy taxation and sectoral policies and measures are considered as important elements of future climate policy.

We see principally **four options** for ambition raising in the current Effort sharing sectors, each providing some opportunities and some risks:

- **Option 1: Adjusting national ESR budgets based on current effort sharing criteria** appears – at first glance – to be the easiest way from an administrative perspective. Gaining political acceptance for and agreeing on Effort Sharing criteria, however, could become a challenge and might turn into failure after long and tedious negotiations. In order to make it easier for Member States to achieve the more ambitious national emission reduction targets, and with respect to cost effectiveness option 1 should be accompanied by a common policy framework e.g. with respect to carbon pricing, energy efficiency policies and phasing out fossil technologies.

- **Option 2: Relying on additional European climate policy instruments and their expected mitigation outcome** without adjusting national climate obligations under the ESR risks missing the target. This option faces enormously challenging incentive problems that arise from the division of responsibilities between the EU and its Member States. Shifting responsibility for additional climate ambition to the EU level, this approach could prove counterproductive if Member States free-ride instead of adopting scheduled (and necessary) national climate policies and measures to meet their current obligations. To overcome this problem, it needs to be settled in advance that members states agree on an accounting mechanism that designates emission reductions either to members states efforts or to additional EU efforts. Without such an accounting mechanism the EU could fail to achieve the higher reduction target.

- **Option 3: A gap-filling mechanism** could be introduced into the ESR: Instead of adjusting national targets according to a predefined distribution mechanism (option 1), Member States could voluntarily offer additional emission reductions beyond their current national abatement obligations and "sell" these to the European Commission. This could be a strong incentive for more ambitious climate policy in the Member States. This approach could possibly also be implemented in a relatively short time frame. But questions on funding sources, price finding, avoiding possible windfall effects have to be carefully analysed. Besides, achieving a higher GHG emission reduction target is not guaranteed, as the mechanism would be voluntary. Thus, a fall-back mechanism would be required.

- **Option 4: EU wide emissions trading** could be implemented for **fuels** currently not covered by EU ETS. In the short term a separate ETS for fuels is clearly more appropriate here than an expansion of the EU ETS. With a uniform carbon price, the necessary transformation towards climate neutrality might be delayed in sectors with higher abatement costs (e.g. transport and buildings) as abatement incentives would be shifted to the energy and industry sectors. A separate ETS for fuels would provide more targeted reduction incentives in the transport and building sectors. An EU wide fuel emissions trading system would avoid lengthy negotiations on effort sharing between Member States and raise large volumes of revenues that could be invested in climate technologies and infrastructure. The distribution of revenues should be based on solidarity considerations as a uniform CO_2-price for fuels in the EU would probably raise distributional concerns between higher and lower income Member States. However,

establishing an EU wide fuel emissions trading system could probably not start before mid of the 2020s, which would delay initializing the necessary transformative measures in sectors where urgent action is needed. To achieve full decarbonization by 2050, every sector needs to cut emissions as soon as possible, going beyond low-cost abatement options already in the next decade. Therefore, carbon pricing needs to be complemented by ambitious sector specific policy instruments as the short-term incentive effect of a carbon pricing in the transport and building sectors is limited.

1 Why it is necessary and overdue to increase the 2030 target

When endorsing the European Green Deal (EGD) as one out of its six political guidelines in December 2019, the new European Commission (EC) raised high expectations to maintaining European climate leadership. During the initial phase of the COVID19-pandemic the EGD even gained increasing attention as there was a broad consent that any economic recovery programme should deliver a sustainability guardrail and support the ecological transformation of European economies (i.e. EC 2020a; BMU, 2020). Since spring 2020, the European Commission and the European Parliament (EuP) have responded by presenting and adopting their proposals and decisions on EU climate change legislation (EC, 2020b; EC 2020c) and a more ambitious EU 2030 climate target (EC 2020d; EuP 2020), respectively, to the climate neutrality debate. These contributions have so far attracted wide attention and the expert public discusses both 2030 climate target proposals - COM: minus 55 percent compared to 1990; EuP: minus 60 percent – as well critically and constructively. Only recently the European Council of Heads of State and Government has further specified the framework for setting a new EU 2030 climate protection target (EUCO, 2020) addressing the Commission and the Council to take work on this agenda forward.

With the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) and the respective decisions at COP21 of UNFCCC, Parties were requested to communicate or update by 2020 their nationally determined contributions (NDC) for the 2030 horizon[10]. By that time (in 2015), where Parties agreed on a long-term objective of ensuring that the increase in global average temperature does not exceed 2°C above pre-industrial levels, aiming to limit the increase to no more than 1.5°C, it was already clear, that estimated aggregate GHG emission levels in 2030 resulting from the intended nationally determined contributions (INDC), including the EU's INDC of at least 40 percent below 1990 levels[11], would not even fall within least-cost-2˚C-scenarios, let alone 1.5°C scenarios[12]. Meanwhile, scientific efforts, amongst the United Nations Environment Programme (UNEP) Emissions Gap Report 2019 (UNEP-EGR 2019) repeatedly revealed apparent and significant shortcomings of current global climate action in regard to achieving the objective of the Paris Agreement and clearly described the dire consequences of inaction (IPCC 2018). Thus, to make the stringent global mitigation pathways possible, emissions in all countries have to be reduced as fast as possible. It is therefore fundamental that all countries explore their full mitigation potential (Höhne and

[10] United Nations (2016): Document FCCC/CP/2015/10/Add.1: Decision 1/CP. para 24
[11] see Submission of Latvia and the European Commission on Behalf of the European Union and its Member States, as of March 6th 2015: https://www4.unfccc.int/sites/NDCstaging/Pages/All.aspx
[12] United Nations (2016): Document FCCC/CP/2015/10/Add.1: Decision 1/CP. para 17

Wachsmuth, 2020). In the near past these findings were backed impressively by record temperatures worldwide along with enhanced extreme weather events (i.e. EC 2020e).

This backdrop underlines the necessity to kickstart a forward-looking, inclusive process among the EU institutions and Member States within the Climate Target Plan enabling the EU to reach a commitment on an increased, reasonable EU 2030 climate target, delivering the highest possible ambition[13]. It is complemented by further considerations, including beneficial constraints:

As the EU's GHG emissions are expected to decrease approximately by 45 percent until 2030 compared to 1990 levels the Climate Target Plan was grounded on a promising starting point. Whereas the Commission itself (EC 2020c) as well as Environment and Climate Ministers of eight Member States[14] have already shown support for a minus (minimum) 55 percent target, the European Parliament (EuP, 2020) went a step further and supports a minus 60 percent target.

Certainly, an increased EU 2030 climate target would pose a great challenge to EU Member States, in particular to those with an emission-intensive structure of the economy, especially in the power sector, and to those lacking resources to finance the transition. In return, provided commitments by wealthier Member States, this opens options for further cooperation within the EU, thereby tightening European solidarity and even strengthening acceptance for a stronger 2030 climate ambition[15].

Further, as claims arise, that solving the COVID-19 crisis cannot come at the expense of solving other global challenges, i.e. the climate challenge, intergenerational justice, relevant institutions, stakeholders and civil society, including the *Fridays-for-Future* movement[16], called for immediate, substantial and fair 2030 climate action contributions in particular of wealthier economies, such as the EU (Umweltbundesamt, 2020; Réseau Action Climat France et al. 2020).

With a view to the upcoming climate negotiations under UNFCCC and the comprehensive legislative package the Commission has announced for mid-2021, **the political decision to raise the economy wide emission reduction target must be taken by the end of 2020.** Herewith the EU undoubtedly both signals globally its seriousness about its commitment to responsible global climate action in the coming decade but also maintains the political momentum given the restrictions of the pandemic context. The Commission's publication of the Climate Target Plan together with a comprehensive Impact Assessment was therefore timely communicated (EC 2020c, EC 2020f). A delayed decision by EU's legislative bodies – Council, Parliament and Commission - might jeopardize the review of existing EU key climate and energy legislation in light of an updated 2030 climate target as scheduled for the first half of 2021. As a consequence, legal uncertainties might severely hamper required further steps to the envisaged overall transformation of the EU.

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[13] United Nations (2015): Paris Agreement. Art. 4 para 3

[14] Letter to the Commission, signed by Ministers of Denmark, France, Latvia, Luxembourg, Netherlands, Portugal, Spain and Sweden. Download: https://www.euractiv.com/wp-content/uploads/sites/2/2019/10/201910-joint-letter-governments-to-Timmermans-and-EC-on-climate-action.pdf

[15] See: https://www.euractiv.com/section/energy-environment/news/in-political-u-turn-czechs-back-eus-green-recovery-plan/

[16] Fridays-for-Future – our demands: https://fridaysforfuture.org/what-we-do/our-demands/

In this light, the German Environment Agency (UBA) warmly welcomes the efforts of the EU Commission so far. However, as climate science indicates repeatedly significant shortcomings of current global and European climate action, we strongly point out to the remaining time span for transforming the European economy and to the exposed role of European climate policy in international frameworks. **Based on recent analysis** (i.e. DIW, 2020; Wachsmuth et al., 2019[17]; Cornet et al. 2018) **and considering the economic implications of the COVID-19 pandemic, the urgency of meaningful climate action and the EU's global leadership role, a reasonable GHG emission reduction target for the EU in 2030 should be at least minus 60 percent**. Therefore, we recommend that the EU should create as soon as possible the internal enabling conditions to facilitate emission reductions of minus 60 percent or even more below 1990 levels by 2030.

Finally, any globally mean emission reduction less than 7.6 percent per year from 2020 onwards in the coming decade may lead to emissions that are higher than mean global reduction efforts required under stringent 1.5°C pathways[18]. In addition, a reduction target of 50-55 percent of the EU would probably not be sufficient to stay within a Paris compatible budget, as suggested by the German Environment Council, in its latest report (SRU 2020). Thus, the EU needs to develop a smart strategy for supporting stronger global climate ambition beyond its own territory in order to safeguard the 1.5°C target, as suggested earlier (UBA, 2018).

2 Translating a higher GHG emission reduction target into sectoral targets for EU ETS and sectors currently not covered by the ETS

2.1 General considerations

While the overall EU Energy Union and Climate Action is generally ruled by the Governance Regulation (EC, 2019), the particular European climate architecture consists of three separate obligatory emission reduction regimes: 1) the EU Emissions Trading Scheme (EU ETS) for energy, emissions-intensive industry and intra-EU aviation, 2) annual binding emission budgets for Member States in sectors governed by the Climate Action (or Effort Sharing) Regulation (ESR), and 3) the Regulation on the inclusion of GHG emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework (LULUCF-Regulation[19]). EU ETS and the Effort Sharing Regulation follow a budget-approach: not only the emission reduction in a certain target year, but emissions in all years between a certain start and a target year are relevant and a trajectory has to be defined. The increased overall GHG emission reduction target for 2030 thus has to be translated into two sectoral reduction trajectories: one for the ETS sectors and one for the ESR-sectors.

[17] This analysis considers the EU-28 including the United Kingdom, as the relationship between the UK and the EU-27 after Brexit at that point in time was still very open. The share of UK's GHG emissions is assumed to around 2 percent of the overall EU emissions.
[18] See EGR2019 (UNEP, 2019), indicating that a mean emissions level of 25 Gt CO2e globally for limiting temperature increase to 1.5°C, which translates into a global mean reduction of around 65% for EU in 2030 compared to 1990 levels.
[19] The LULUCF-Regulation (EU) 2018/841) remains out of the focus of these considerations.

In order to provide essential guidance and a reliable framework to market participants and Member States, the decision on the **specific targets for the sectors currently covered by the ETS and those, that are not, should be taken as soon as possible**[20]. As the impact assessment to the 2030 Climate Target Plan (EC 2020f), does not analyze the implications of different sector splits in detail, we only qualitatively discuss the possible range of different sector shares and factors that influence the sector split for the time being. In our calculations, we assume that the scope of EU ETS and the ESR will not be changed, although the discussion on extending the EU ETS to other sectors is ongoing.[21] Also, we focus on the stationary sector in EU ETS, aviation and international shipping will not be considered here. In addition, GHG emissions and removals from land use, land use change and forestry – as regulated under the EU LULUCF Regulation[13] - are kept outside of our considerations. Although the UK has left the EU and might no longer be part of the European climate policy framework in the next decade, our analysis is based on EU(28) or EU(31) in the case of ETS for data availability reasons.

Historically, emissions in ETS sectors have decreased faster than in non-ETS sectors thanks to lower abatement costs and available renewable energy technologies. This has led to a drop in the share of ETS emissions in total emissions[22] from 45 percent in 2005 to 40 percent in 2018. In the current legal framework, however, the share of the ETS stationary cap in the total EU's emission budget[23] is quite constant and would decrease from approx. 41 percent in 2020 to 40 percent in 2030. There are some indications, though, that emissions in ETS sectors, especially in the power sector, can and should be reduced quicker and that a constant share of 40 percent for the ETS sectors in the 2030-climate target might be not plausible.

According to the scenarios of the Commission's long-term strategic vision "A Clean Planet for All", achieving climate neutrality by 2050 at the latest could be associated with a reduction of ETS emissions share to well below 30 percent. Depending on the scenario, the share of ETS emissions drops to only 25-28 percent or even to a negative value in 2050[24]. We therefore assume that the share of ETS emissions (40 percent) must be reduced when the overall GHG emission reduction target for 2030 is increased. On the other hand, it does not seem realistic from today's perspective that the share of ETS emissions will already by 2030 be reduced to below 30 percent.

The ambition level of the overall emission reduction target might have an impact on the cost-efficient sector share: A climate target of minus 50 percent emission reductions could possibly be realized through more ambition in ETS sectors only (e.g. accelerated decarbonization of the power sector), i.e. would be associated with a lower share of ETS in overall emissions. A climate target of minus 55 percent or more would probably require more sector-coupling and abatement in sectors currently not covered by the ETS, thus requiring more (renewable)

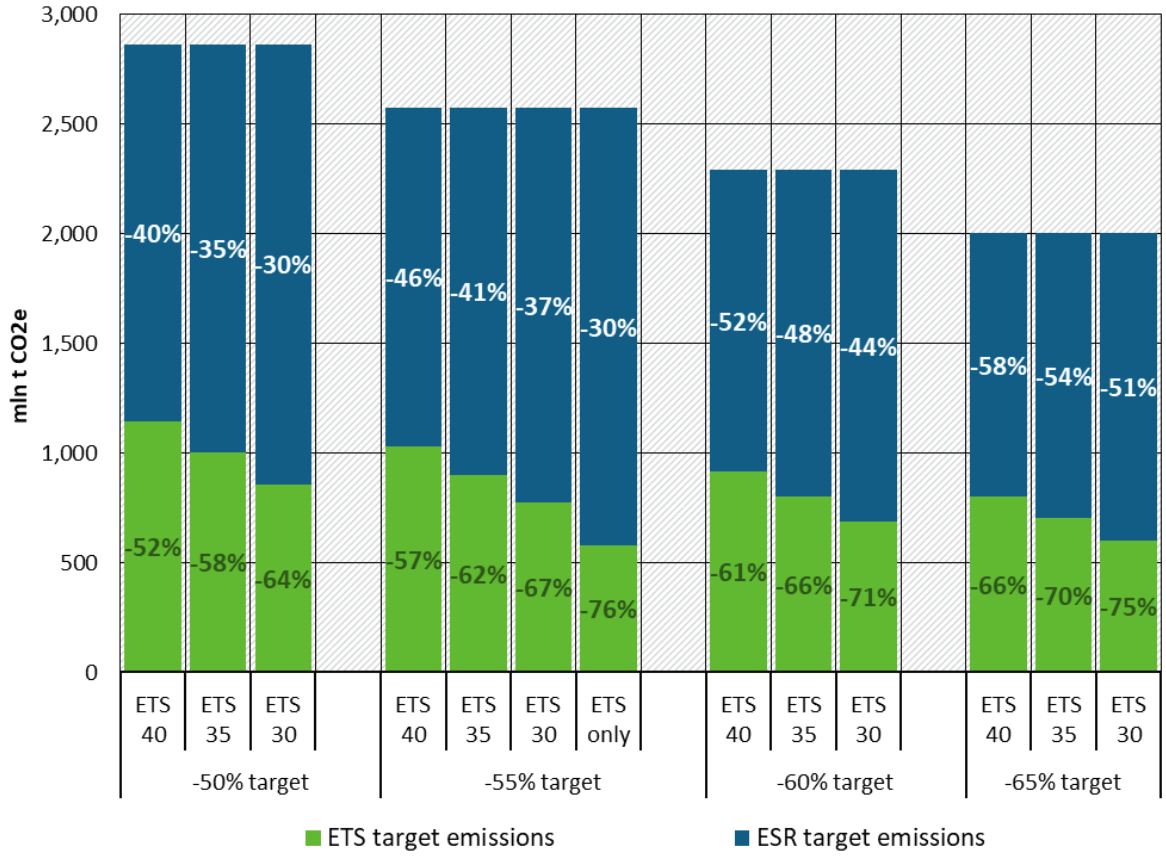
[20] In 2014, the Council agreed on the whole climate and energy framework including the overall emission reduction target, the sectoral targets for ETS and non-ETS sectors and the targets for renewable energy and efficiency (the latter two were revised in 2018 within the "Clean Energy Package").
[21] The Commission has announced her intention to propose the introduction of emissions trading (as part of EU ETS or separate system) not only for intra-EU navigation, but also in the road transport and buildings sector, possibly covering all emissions of fossil fuel combustion. In our view, this discussion should not delay the translation of the economy-wide target into the necessary EU ETS cap reduction path, though.
[22] Share of verified ETS emissions in sum of ETS and proxy ESD emissions.
[23] ETS stationary cap plus sum of national AEA budgets
[24] The share of ETS emissions is -15% in the 1.5 TECH scenario that relies on CCS to a large extent, whereas the 1.5LIFE and 1.5LIFE-LB scenarios do not differ substantially regarding the sector shares.

electricity production and increasing pressure on carbon prices in the EU ETS. Consequently, the drivers and the degree of uncertainty in the optimal sector share in 2030 must be analyzed in more detail than we can do here.

2.2 Range of possible sectoral targets associated with GHG emission reduction targets of between 50 percent and 65 percent by 2030

In this section, we aim to illustrate the potential implications of a higher climate target for the EU ETS cap- and the ESR-trajectories in its current scope. We look at four different emission reduction targets: 50 percent, 55 percent, 60 percent and 65 percent economy wide emission reduction, each compared to 1990 levels. For each of these targets, we calculate different shares of ETS and non-ETS sectors. We assume that the share of the ETS cap in the economy wide reduction target for 2030 will be a value between 30 percent and 40 percent and correspondingly the share of non-ETS emissions between 70 percent and 60 percent. For simplification, we calculate only 3 different values for each target scenario (ETS share in total emissions: 30 percent, 35 percent and 40 percent). The resulting possible range of sector shares in the economy wide emission target 2030 is shown in figure 1. We then compare the resulting sectoral emission target levels for ETS and non-ETS sectors to the level of 2005 emissions, the first year for which verified data of ETS installations is available (relative emission reductions compared to 2005 are displayed as percentages in the columns).

Figure 1: Possible range of ETS and non-ETS GHG emission reduction targets 2030 with economy wide reduction targets of between 50 % and 65 % below 1990



* Percentages on the columns display the relative reduction compared to 2005

Source: Own calculations based on EEA ETS Dataviewer

With a 50 percent economy wide emission reduction target, ETS emissions would have to decrease by 52 percent compared to 2005 if the current share of ETS in total emissions of 40 percent is kept constant. If the ETS share declines to 35 percent or 30 percent, ETS emissions would have to be reduced by 58 percent or 64 percent compared to 2005. The 2030 ETS cap would be 188 million allowances lower than in the base case (current ETS and ESR-targets) if the ETS share in total emissions was maintained at 40 percent, or 474 million allowances lower if the ETS share declines to 30 percent.

Non-ETS emissions would have to be reduced by 40 percent, 35 percent or 30 percent compared to 2005. That means, only if the ETS share in total emissions is kept constant at 40 percent, emissions in non-ETS sectors would have to be reduced substantially more than to be expected from today (minus 40 percent compared to 2005). With a lower ETS share of 35 percent (equal to emission reductions of 58 percent compared to 2005), emissions in the non-ETS sectors would have to be reduced by 35 percent, which more or less corresponds to the emission reductions achieved in the EUCO32/32.5 scenario i.e. it would correspond to what the European Commission expects to be achieved anyway by implementing the "Clean Energy Package". If ETS emissions are reduced faster (ETS share decreasing to 30 percent in 2030), no additional abatement in the non-ETS sectors would be required compared to the base case.

We conclude that the minus 50 percent-scenario would basically only follow suit emission reductions already expected through the implementation of today's climate and energy policies[25]:

- A 34 percent emission reduction compared to 2005 in the Effort sharing sectors would be achieved anyway if the "Clean Energy Package" is fully implemented according to the EUCO32/32.5 scenario modelled by the European Commission.
- A 58 percent emission reduction in the ETS is within sight, too: if by the phase out of coal already ongoing or planned in several Member States coal-electricity is fully substituted with renewable energy, emissions could be reduced by about 57 percent compared to 2005 (Zaklan et al. 2020). This would likely imply an increase of renewables targets and improved energy efficiency compared to the "Clean Energy Package", though.

Increasing the economy wide emission reduction target further, up to 55 percent compared to 1990, as proposed by the Commission, or even further, is more challenging:

In the 55 percent-scenario, ETS emissions would have to be reduced by 57 up to 67 percent (compared to 2005), in absolute terms down to a level of roughly 1 billion or 780 million t CO_{2e} in 2030 or minus 32 up to minus 49 percent compared to 2019 levels. **Emissions in the Effort sharing sectors would have to be reduced by 37 up to 46 percent** (down to a level of 1.8 or 1.5 bln t CO_{2e} in 2030): [26]

- Figure 1 also shows an option, where additional abatement in line with a 55 percent target is realized in the ETS sectors only ("ETS only"), while abatement requirements in the Effort sharing sectors are not changed. In this case, ETS emissions would have to be reduced by 76

[25] See also Sandbag (2019).
[26] The recent findings of Öko-Institut/ Agora Energiewende (2020) are within this range too: the authors assume that economy wide emission reductions of approx. 55 to 57% are feasible (compared to 1990), with ETS emissions decreasing by 59% up to 63% compared to 2005 and ESR emissions decreasing by 45% up to 49% (compared to 2005).

percent, down to a level of about 580 mln t CO_{2e} in 2030. This could be challenging as emissions would have to fall by more than 60 percent compared to 2019 and does not seem realistic from today's perspective.

- **In the 60 percent-scenario ETS emissions would have to be reduced by 61 up to 71 percent** (down to about 920 or 690 mln t CO_{2e} or minus 40 percent up to minus 55 percent compared to 2019 levels), in the **Effort sharing sectors by 44 up to 52 percent** (down to about 1.6 or 1.4 bln t CO_{2e} in 2030).
- **A 65 percent-scenario would require emissions reductions in ETS sectors by 66 up to 75 percent** (compared to 2005, to a level of 600 mln or 800 mln t CO_{2e} in 2030), and minus 51 up to minus 58 percent in the Effort sharing sectors (down to a level between 1.2 up to 1.4 bln t CO_{2e} in 2030).

A recent analysis assumes a emission reduction of 57% economy-wide is feasible for EU(27) compared to 1990 (Öko-Institut and Agora Energiewende 2020). Earlier analysis, Cornet et al. (2018), have already suggested that EU could achieve a 55 up to 62 percent emission reduction below 1990 by 2030 if best practice policies are applied across all Member States. **Sufficient policy action and investment must be provided now and in the coming years, to boost the development and deployment of innovative, low-carbon technologies and sustainable business models**, especially in sectors which are just about to start transformation (e.g. industry, transport, buildings).

2030 is still 10 years ahead. Increasing the 2030 emission reduction target in 2020 does therefore not abolish the need to review and preferably increase the target again in 2025 in the context of the Paris ambition raising cycle. Of course, this has to be embedded in a comprehensive set of sectoral strategies and policy instruments that provide the foundation for establishing viable business models for emission free technologies including new mechanisms to account for CO_2-emissions imported through products (e.g. through a carbon border adjustment mechanism or a levy on the consumption of emission-intensive goods).

3 Aligning EU-ETS and Effort Sharing sectors with a higher GHG emission reduction target

EU ETS and sectors covered by the Effort Sharing Regulation (ESR) have very different pre-conditions and challenges with regard to implementing a higher emission reduction target. Climate and energy modelling indicates that the energy sector, as part of the EU ETS, has rather large medium-term reduction potentials, whereas other (ESR-) sectors have relatively less medium-term reduction potentials and respond rather inelastic to carbon prices. However, scenario analysis shows that full decarbonization until 2050 (or even earlier) is possible for the whole economy if e.g. ambitious reduction measures begin as soon as possible and investment in new fossil technologies is avoided (i.e. IPCC, 2018[27]).

In the EU ETS, the cap can be simply aligned with a more ambitious target, a tighter cap will lead to a higher allowance price, covered entities will adapt to the higher allowance price and emissions will be reduced consequently. The cap should be urgently adjusted anyway, since

[27] see IPCC SR1,5° Chapter 2, Figure 2.5

verified emissions have been much lower and decrease faster than the cap throughout the third trading period. In section 3.1 we look at three options how EU ETS could be aligned with a higher GHG reduction target already from 2021/2022 on.

In the Effort Sharing sectors, Member States are responsible for fulfilling their national emission reduction obligations. National emission reduction targets for the period 2021-2030 have been agreed in a complex negotiation process, applying a mix of socio-economic criteria (GDP per capita and cost-effectiveness). Besides, some Member States face already difficulties in fulfilling their current emission reduction obligations for 2030 targets.[28] Increasing national emission targets and aligning them with a higher GHG reduction target could therefore become challenging. In section 3.2 we assess four options, how a higher GHG reduction target could be implemented in the Effort Sharing sectors.

The Effort Sharing sectors, or major parts of them, could also be incorporated into the EU ETS, e.g. through extending the EU ETS to road transportation and buildings. The inclusion of new sectors to EU ETS is a very complex matter requiring a thorough assessment of climate, economic and social impacts. Whereas the inclusion of international shipping has perhaps less impact on EU ETS due to its moderate size, a possible inclusion of land transport and buildings would lead to a complete change of the climate policy architecture. In the short term a separate ETS for fuels is clearly more appropriate here than an expansion of the EU ETS. This differentiated approach would provide more targeted reduction incentives in the transport and building sectors (section 3.2, option 4).

The following table provides an overview about the options to align EU ETS and Effort Sharing sectors with a higher GHG Emission reduction target:

Table 2: Options to align EU ETS and Effort Sharing sectors with a higher GHG Emission reduction target

EU ETS *(see section 3.1)*	**Effort Sharing Sectors** *(see section 3.2)*
Option 1: Implement higher LRF through reducing auction amounts from 2021/2022 on	Option 1: Adjust national emission budgets according to ESR
Option 2: Rebase the cap to correct for structural imbalance between emissions and the cap	Option 2: Complement ESR with additional European policies and measures in the transport and building sector
Option 3: Lift MSR withdrawal rate temporarily	Option 3: Introduce a gap-filling mechanism
	Option 4: a) Introduce a separate emissions trading system for fuels, or b) Include road transportation and buildings into the EU ETS

[28] According to the EEA (April 2020), the annual rate of emission reductions would have to double from 2018 onwards.

3.1 EU ETS: Reducing auction amounts ("Backloading 2.0")

The legislative processes for revising the ETS-Directive and the ESR is scheduled to start only in 2021[29] (with the finalization of all details possibly delayed even to 2022 or 2023). This time schedule would make it challenging to adjust the cap already from 2021 as it would have to be adjusted retroactively. Some observers, therefore, assume that the adjustments can be implemented only from 2026 on[30], in line with the provision in the ETS Directive to increase ambition from 2026 on after the global stock-take in 2023.

In our opinion, there are several options to increase ambition before 2026 and align EU ETS with a higher economy-wide target, preferably minus 60 percent. The adjustments to the ETS budgets should and need not be delayed to the second half of the decade.

In the EU ETS, there is an urgent need for action anyway: verified emissions decrease much faster than the cap (even before the Covid-19-pandemic and the subsequent decrease of emissions). Planned and ongoing closures of coal power plants combined with an increasing share of renewable energy in the power sector indicate that this will most probably continue to happen in the coming years. The Covid-19-pandemic has increased the pressure on the economic viability of coal power plants[31] and will also decrease industry and aviation emissions in the short and mid-term. The Market Stability Reserve (MSR) in its current constitution alone will not be able to prevent a growing surplus due to the deep reductions in economic activity and emissions following the Covid-19-lockdown measures in 2020. The supply side in the EU ETS therefore has to be reduced anyway in order to ensure scarcity on the allowance market and to maintain the ETS as a meaningful climate policy instrument[32].

The options presented here serve as examples for how to increase ambition in EU ETS before 2026. They are based on the assumption, that free allocation cannot be changed realistically before the start of the of the second allocation period in 2026, for reasons of legal certainty for installation and aircraft operators. Auction amounts, however, can principally be adjusted immediately if the political will is there. While adopting the new emission reduction target, legislators can at the same time decide to reduce auction amounts in line with a more ambitious ETS target and transfer them to the MSR and invalidate them. The reduction of auction amounts could be done through a separate decision, as it was done in the case of Backloading in 2014[33], without adjusting the whole architecture of ETS Directive. The linear reduction factor and all other "details" (such as free allocation) could be determined later while negotiating the ETS Directive. The reduction in auction amounts should allow for a solidarity mechanism that benefits Member States with lower income in order to gain acceptance from those Member States. **The European Commission should therefore as soon as possible bring forward a proposal to reduce auction amounts from 2021 onwards as a measure to de facto align EU ETS with a higher 2030 climate target, before the LRF is formally revised in 2026.**

[29] According to the Commission's workplan, the COM will present legislative proposals for ETS, Renewable Energy and Energy Efficiency Directives and the Effort Sharing Regulation in summer 2021.
[30] ERCST (2020): State of the EU ETS. Öko-Institut/ Agora Energiewende (2020) assume that the LRF could be adjusted from 2023 or 2025 on.
[31] www.euractiv.de/section/energie-und-umwelt/news/die-kohleindustrie-wird-sich-von-covid-19-nie-wieder-erholen/
[32] Gibis et al. (2019).
[33] COMMISSION Regulation (EU) No 176/2014

Reducing auction amounts already from 2021/2022 on, would require an immediate decision by European legislative bodies. Auction calendars would have to be adjusted accordingly. Adjustments to the auction calendars can realistically start in June 2021 at the earliest (auction amounts between September and December 2021 will be adjusted anyway as part of the MSR mechanism). The political process might take longer, though: Backloading took 15 months from the first legislative proposal by the Commission until the amendment of the auctioning regulation became effective. Although immediate action is highly desirable, political processes could delay adjustments of auction amounts to 2022.

- **Option 1: Implement a higher LRF through adjusting auction amounts from 2021/2022 on**

The following Table 2 provides an overview of four economy wide reduction targets, the corresponding ETS targets (assuming an ETS share in total emissions of 35 percent) and the corresponding linear reduction factor (LRF). In this option, free allocation and budgets for innovation and modernization funds are untouched until 2025, only Member State auction amounts are reduced. A higher LRF would formally apply from 2026 on to the cap and in general to all sub budgets. The nominal cap in 2026 needs to be reduced as if the higher LRF was applied from 2021 on, though, in order to ensure the cap reduction path is consistent with an ETS target between minus 58 percent and 66 percent. This means in essence that even if the LRF is formally unchanged until 2025, the ETS budget is de facto reduced by an amount that corresponds to the higher LRF which shall apply from 2026 onwards. The column at the right shows the corresponding average annual reduction of auction amounts in the period 2021 up to 2025 compared to auction amounts in the base case (with an LRF of 2.2 percent) if free allocation is not changed in that period.

Table 3: ETS targets, corresponding linear reduction factors and corresponding reduction in auction amounts (annual average)

Economy wide reduction target*	ETS target**	Linear reduction factor (LRF)	Average annual reduction of auction amounts (2021-2025) compared to the baseline
50%	-58%	3.7% (81 mln/a)	99 mln (10%)
55%	-62%	4.2% (91 mln/a)	129 mln (14%)
60%	-66%	4.6% (102 mln/a)	159 mln (17%)
65%	-70%	5.1% (112 mln/a)	189 mln (20%)

*relative to 1990, ** relative to 2005, assumed share of ETS in total emissions: 35%

It is important to note that the reductions in auction amounts compared to the baseline (with a an LRF of 2.2 percent) start small and grow over time:

- An LRF of 3.7 percent would reduce auction amounts by 33 mln or only 3 percent in 2021 up to 165 mln allowances or 18 percent in 2025.
- An LRF of 4.2 percent would reduce auction amounts by 43 mln or 4 percent in 2021 up to 216 mln allowances or 24 percent in 2025.
- An LRF of 4.6 percent would reduce auction amounts by 53 mln or 5 percent in 2021 up to 266 mln allowances or 30 percent in 2025.

- An LRF of 5.1 percent would reduce auction amounts by 63 mln or 6 percent in 2021 up to 316 mln allowances or 35 percent in 2025.

This provides Member States and market participants time to adapt to the new conditions, in particular in 2021 and 2022 when reductions are rather small. More substantial reductions would occur from 2023/2024 on due to the cumulation effect of the higher LRF.

- **Option 2: Rebase the cap from 2021/2022 on to correct for the structural imbalance between verified emissions and the cap**

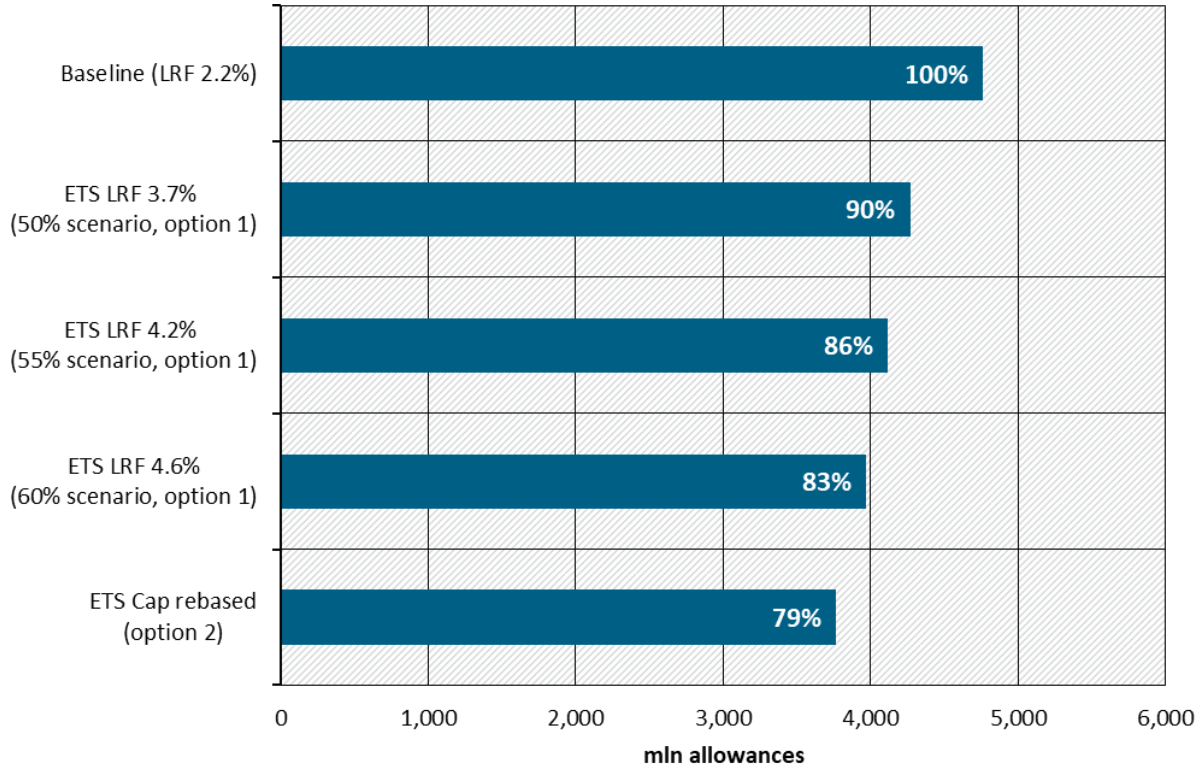
An alternative approach could be a rebasing of the cap in 2021/2022 (Graichen et al. 2019), again by adjusting auction amounts and keeping free allocation and budgets for innovation and modernization funds untouched up to 2025. As in Option 1, a formal adjustment of the LRF would apply under this option from 2026 onwards. However, the LRF would be subtracted then from a rebased 2025 value. The cap might probably have to be rebased anyway in 2021 to account for the UK leaving EU ETS: simply withholding British auction amounts and free allocation from the market as it was done in 2019 would weaken the environmental integrity of the EU ETS because British auction and free allocation amounts are smaller than the British share of the cap according to Article 9 of the ETS-Directive[34]. Rebasing the cap provides an opportunity to take into account that verified emissions were on average about 220 million allowances lower than the nominal cap in all years between 2013 and 2019. In addition to the correction for UK leaving EU ETS, an extra 200 million allowances would be deducted from the nominal cap starting in 2021/22.

Reducing auction amounts by 200 million allowances per year would be a greater average reduction than aligning ETS budgets with different 2030 targets as described above in the first option. Figure 2 shows the size of necessary reductions of gross auction amounts (before MSR reduction) in option 1 and 2 between 2021 and 2025 compared to the baseline (LRF 2.2 percent) in order to align ETS budgets with different 2030 targets.

Option 2 could help to faster withdraw the surplus from the market that is expected to accumulate following the Covid-19-crisis. The MSR in its current constitution will only partly and with a time-delay be able to reestablish the balance of supply and demand. Option 2 would already in 2021/2022 create scarcity on the primary market.

[34] Whereas the share of UK in the cap according to Article 9 is approx. 11% according to our calculations (11.6% according to Sandbag 2017), the share of UK auctions and free allocation amounts to only 8%. This is mainly related to the solidarity mechanism in the auctioning regulation which shifts 10% of Member States' auctioning amounts to poorer Member States.

Figure 2: Auction amounts* between 2021 and 2025 in options 1 and 2 compared to baseline



* Auction amounts here are equal to 57 percent of the nominal cap (not accounting for any sub-budgets e.g. innovation and modernization fund or the buffer to prevent application of a cross-sectoral reduction factor for free allocation).
Source: Own calculations

Rebasing the cap by 200 mln allowances (in addition to accounting for the UK possibly leaving EU ETS) would lead to a cap level of 1,375 mln allowances in 2025, somewhat lower than in a scenario with an LRF of 4.2 percent. It would not only help to restore scarcity in EU ETS at the beginning of TP4, but also lead towards a cap reduction path possibly consistent with a climate target of minus 55 percent. The LRF of 4.2 percent would be applied from 2026 on.

► Option 3: Lift MSR withdrawal rate temporarily

The MSR is scheduled to be reviewed three years after the start of its operation. According to the the Commission's work programme, it seems plausible to review the MSR as part of reviewing the ETS Directive which is scheduled to start in summer 2021. The MSR review itself is a complex matter, several parameters have to be looked at (withdrawal rate, thresholds, etc.), interactions with a deeper cap reduction path and implications on the carbon-leakage risk have to be investigated. It is therefore not realistic that an ambitious MSR reform could be agreed upon in 2021 already. As a quick fix for balancing supply and demand in the EU ETS, the MSR withdrawal rate could be lifted temporarily from 24 percent to 36 percent from 2021 on. A stronger MSR could thus help to bridge the time between 2021 and 2026, when a higher LRF kicks in.

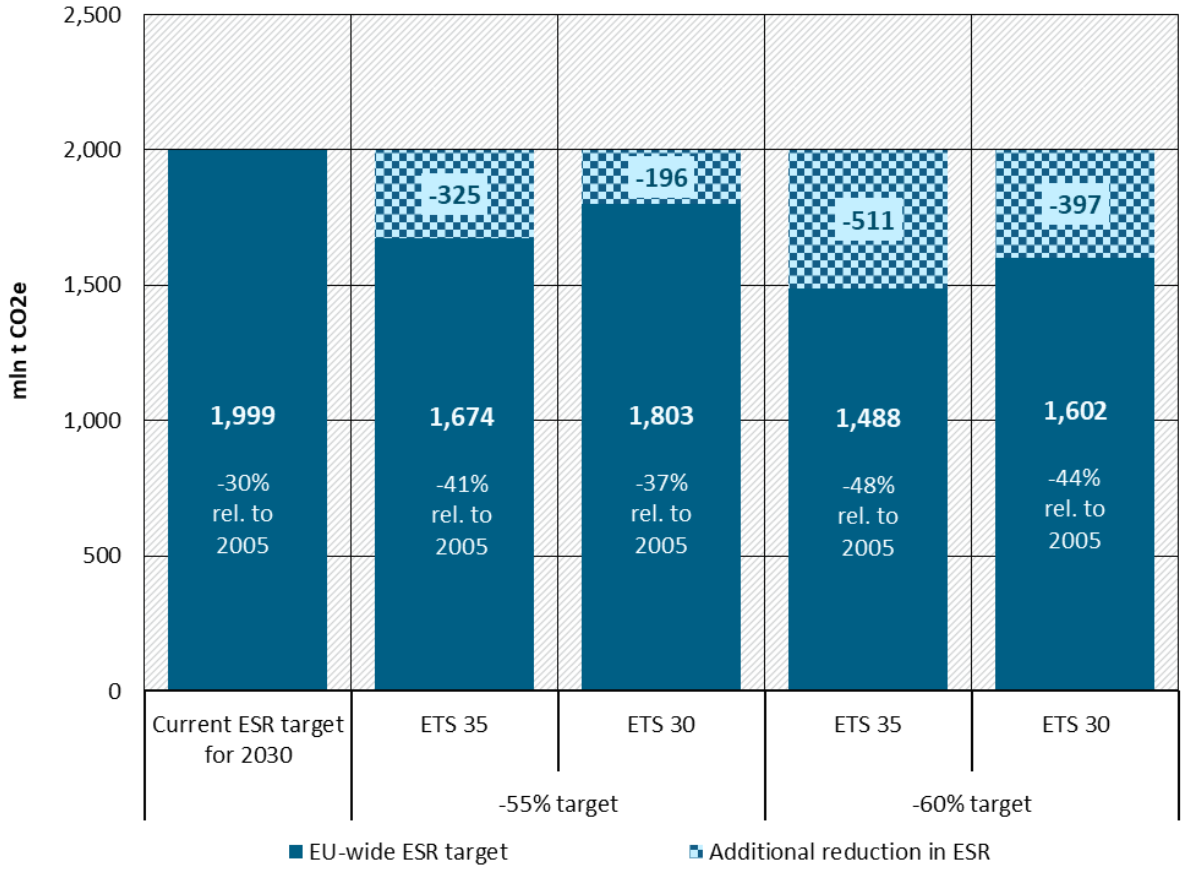
This seems to be an easy option from an administrative perspective as it uses an existing mechanism. However, the effect on the budgets of a stronger MSR depends on emission developments and is therefore quite uncertain. If the relevant surplus indicator (the total number of allowances in circulation – TNAC) drops below the upper threshold of 833 mln allowances in 2025 or earlier, the MSR would no longer withdraw auction amounts from the

market. As in option 1, it would need to be combined with a re-basement of the cap in 2026 in order to ensure the cap reduction path is consistent with the 2030 ETS emission reduction target. Nevertheless, a stronger MSR is a no-regret option and the MSR reform can and preferably should be combined with one of the other options.

3.2 Effort sharing (non-ETS) sectors

As shown above, emissions in Effort Sharing sectors must be reduced beyond the current Effort Sharing target of minus 30 percent compared to 2005 levels, especially if the economy wide target is increased to minus 55 percent, 60 percent or 65 percent. Figure 3 shows the necessary additional emission reductions for a 55 percent and a 60 percent economy wide target, if the current national emission reduction obligations are not changed compared to the status quo.

Figure 3: Necessary additional emission reductions 2030 in non-ETS (Effort Sharing) sectors for a 55% and 60% economy wide target



Source: Own calculation

Depending on the size of emission reductions in ETS sectors – reducing the share of ETS in total emissions to 35 percent or even to 30 percent – additional emission reductions in the Effort sharing sectors are required to enable the respective deeper overall emission reductions i.e. 55 percent or 60 percent (see Figure 3, blue and white checkered). Additional reductions would amount to 325 mln t CO_{2e} or 196 mln t CO_{2e} in the case of an economy wide target of minus 55 percent or 511 mln t CO_{2e} (ETS share: 35 percent) or 397 mln t CO_{2e} (ETS share: 30 percent) in the case of an economy wide target of minus 60 percent.

So far, some Member States are hesitant to increase their national targets under the ESR as they have just recently adopted national energy and climate plans (NECP) – according to the EU Governance Regulation (EC, 2019) – including policies and measures to reduce emissions in the

non-ETS sectors. Adjusting the national emission budgets would mean that all Member States would have to update these plans and adopt new or more ambitious policies and measures. Some Member States face already difficulties in fulfilling their current emission reduction obligations for 2030 targets.[35] Negotiations could become further complex if some Member States want to use the opportunity to renegotiate the current effort sharing principles, a combination of GDP per capita (2013) and cost-effectiveness. Therefore, it could be helpful to investigate alternative policy options away from national Effort Sharing targets while still raising ambition in the non-ETS sectors. In the following we look at four different options to enable ambition raising in the non-ETS sectors (see table 1).

- **Option 1: Adjust national emission budgets according to ESR**

A higher sectoral target for the non-ETS or Effort sharing sectors could simply be implemented by adjusting binding national Effort Sharing targets to a higher reduction level, where Member States would remain responsible for achieving national emission reduction targets. According to the current effort sharing criterion (GDP per capita 2013 plus adjustments for cost-effectiveness), national targets vary between 0 (BG) and minus 40 percent (compared to 2005, Luxembourg and Sweden). Applying this distribution mechanism (GPD/capita plus spread of 40 percentage points) could lead to lock-in effects and high per-capita emissions in poorer Member States, thus making the transformation after 2030 even more challenging. Öko-Institut and Agora Energiewende (2020) therefore propose a more balanced approach (to narrow the spread of national targets to 30 percentage points), resulting in a respective range from at least minus 20 percent (for Bulgaria) to minus 53 percent (Luxembourg) for the national non-ETS targets. But, as some Member States face already difficulties in fulfilling their current emission reduction obligations for 2030, it seems likely that governments will be hesitant to further increase ambition and to commit to even stricter obligations. In addition, Member States with a higher than average GDP per capita might require to renegotiate the Effort Sharing mechanism and / or increase the flexibility options. A renegotiation of the Effort Sharing criteria would add complexity to decision making and be challenging from a political perspective having in mind the negotiations necessary for implementing the current target level.

Broadening the current flexibility options in the ESR e.g. by further opening the use of credits from the land use sector (or offsets from abroad) might be taken as an approach to gain stronger political commitment. However, as this would weaken the required overall emission reduction (Geden/ Schenuit 2020)[36], enhancing flexibility should not be considered appropriate. Likewise increasing the possibility to use allowances from the EU ETS budget would be equal to a further shortening of the ETS budget which would be challenging as we have assumed above that emissions in ETS sectors would have to decrease much faster than non-ETS emissions anyway.

Option 1 leaves Member States accountable for achieving additional emission reductions. Thus, they would need to strengthen their national climate and energy policies. However, with respect to cost effectiveness this approach would require a re-aligned policy framework grounded on i.e. stringent carbon pricing, energy efficiency policies, policies to phase out fossil technologies, and extension of renewable energies, respectively.

Principally, option 1 could be implemented within a comparatively short time frame, political acceptance provided. National targets could perhaps be adjusted already from 2023 on if

[35] According to the EEA (March 2020), the annual rate of emission reductions would have to double from 2018 onwards (compared to the period 2005-2018).
[36] To achieve climate neutrality by 2050 at the latest, not only emissions have to be reduced to close to zero, but sinks or negative emissions are needed to compensate for the remaining emissions.

Member States can quickly agree on the Effort Sharing criteria. However, gaining political acceptance for and agreeing on Effort Sharing criteria could become a challenge and even poses the risk that climate action is delayed within the political process.

Opportunities

- Increasing ambition can be done within the existing legal framework.
- Provided the political will, increasing ambition and implementing additional climate policies and measures can be done rather fast.

Risks

- If political support is lacking this option might turn into failure after long and tedious negotiations. In case of failure, there might be negative side effects on EU climate policies and measures.
- Not optimal with respect to cost-effectiveness, if no common policy framework with respect to carbon pricing, energy efficiency policies and phasing out fossil technologies will be established.

► Option 2: Complement ESR with additional European measures and policies, e.g. in the transport and building sectors

In addition to current Effort sharing targets, the EU could introduce additional and more ambitious measures and policies on the European level, e.g. for the transport and building sector such as minimum standards for carbon pricing on fuels, enhanced fuel efficiency standards for cars or vans, a "renovation wave" for buildings, enhanced building directive. The Commission intends to present a comprehensive package of legislative proposals in the first half of 2021.

Box: Overview on EU sectoral climate related regulations in the ESR-sector

EU Energy Efficiency Directive (EED)

Essential elements of the Energy efficiency Directive are the energy saving targets, minus 20 percent for 2020 and minus 32,5 percent for 2030. Targets are indicative and not binding. Member States are obliged to report on progress towards improving energy efficiency and on policies and measures (Art. 7). So far reported energy savings fall short of expected values. The EED has been updated in 2018 for the last time. New amendments are in discussion and foreseeable in 2021. They could bring more stringent targets (40 percent energy savings compared to currently 32,5 percent), increased liabilities of Members States, and stricter enforcement mechanisms.

Energy Performance of Buildings Directive (EPBD)

The EPBD aims to improve the energy performance of buildings and – as a long-term target – to reduce GHG emissions of European buildings by 2050 by 80-95 percent. As national standards for new buildings and for major renovations especially contribute to long-term GHG savings, the general level of GHG reduction could be raised to full decarbonization. The main parameter for the overall energy performance is primary energy that does necessarily correlate to the GHG emissions of the energy carrier. Instead, it would be more promising to use GHG emissions as the central parameter for the overall energy performance. Short-term savings could come from the optimization of heating, ventilation and cooling systems – however, in 2018 the scope of energy inspections of these systems was limited to major buildings. In order to tackle these savings more

comprehensive, automatic solutions are necessary which are cheaper to carry out. Further GHG savings are expected from the "EU renovation wave" that is supposed to be presented during autumn 2020.

Ecodesign Directive and Energy Label Regulation

As most regulated product groups of the Ecodesign Directive are operated by electricity, the energy savings contribute primarily to the ETS budget. This facilitates the decarbonization of the electricity sector as fewer renewable energies are needed. However, there are savings from gas and oil space and water heaters as well which account for the ESR sector. In principle, Ecodesign requirements and energy labelling should be as ambitious as the regulatory framework allows (cf. Top-Runner-Approach[37]).

CO_2 emission performance standards for cars and light commercial vehicles

EU Directive 2019/631 brings binding CO_2 emission standards for new passenger cars as well as new light commercial vehicles (vans) that are implemented as fleet wide targets. E.g. for cars a reduction of 37,5 percent is required in 2030 compared to the starting point in 2021. In addition, the directive gives incentives towards zero- and low-emission vehicles, as manufactures can benefit from a credit system in favor for such vehicles. Raising ambition in the transport sector could be done by tightening emission performance standards and increasing incentives for low emission cars. However, tightening legislation would take time and the last amendment is just starting to become effective. Since fleet wide targets are only binding for new vehicles, it does not address phasing out (existing) conventional cars nor does it give incentives to cut emission by using cars less.

Energy taxation directive (ETD) and carbon pricing

The energy taxation directive sets minimum tax rates for heating fuels, motor fuels, aviation fuels as well as electricity. In most Member States actual tax rates significantly exceed minimum rates of the directive. The current directive was introduced in 2004 after years of negotiation between Member States, who had to approve unanimously. Its basic goal for the time being was to harmonize energy taxation in Europe by minimum standards. For years there was a debate to make energy taxation more sustainable by setting tax rates according to energy content as well as CO2 emissions. So far, no decision could be reached. However, with the European Green Deal the debate on the energy taxation directive gained momentum. Energy taxation would be one possibility to introduce systematic carbon pricing in the non-ETS sector. Since some Member States traditionally oppose reforms in energy taxation it remains to be seen if this approach can bring CO2-pricing on track to reach more ambitious reduction targets.

Additional European policies and measures may help Member States to achieve their current national emission reduction targets and to reduce their emissions even more as required by the ESR. Surplus allowances – generated by overachieving national targets - can either be sold to other Member States which need to buy allowances for meeting their current obligations under the ESR or they could be cancelled in order to enable raising ambition on the European level. **It is therefore unclear if and to what extent additional European policies and measures lead to additional emission reductions relative to the current ESR target.** Shifting responsibility for additional climate ambition to the EU level could also prove counterproductive if Member States free-ride instead of adopting scheduled (and necessary) national climate policies and measures to meet their current obligations. Therefore, this option faces enormously challenging

[37] BMWi and BMU, 2013, Joint concept paper from the Federal Economics Ministry (BMWi) and the Federal Environment Ministry (BMU), https://www.bmu.de/en/download/concept-paper-by-bmu-und-bmwi-on-further-development-of-the-top-runner-approach/

incentive problems that arise from the division of responsibilities between the EU and its Member States.

For achieving additional emission reductions beyond current ESR objectives, this policy approach would need to account for the expected and realized impact of additional policies and measures, preferably through a reduction of national emission reduction obligations. It is therefore crucial to monitor additional emission reductions ex ante as well as ex post. From an ex ante perspective, the European Commission would need to assess if EU emissions trends are on track to reach the more ambitious 2030 reduction target. If not, adequate European policies and measures need to be implemented as soon as possible.

Existing enforcement mechanisms e.g. of the EED, the vehicle regulation, the building directive seem to be insufficient to safeguard a more ambitious economy wide reduction target in the ESR sector 2030 – even if each regulation would be designed more stringently. Most of these instruments address sector specific targets and indicators, e.g. minimum standards for new buildings and vehicles, but not emission reductions. Therefore, existing EU policies and measures do not provide (yet) a sufficient enforcement mechanism with respect to an economy wide reduction target.

Further, the suitability of particular EU climate policy instruments within ESR sector would need to be evaluated carefully. Existing regulations are not designed to implement short to medium term mitigation options. Instead they focus strongly on technological minimum standards to influence long term market developments and on setting targets with respect to energy efficiency and renewable deployment. However, energy policy as well as carbon pricing as an economic instrument and other policy instruments and measures are currently mostly up to the Member States. [38]

In an optimistic case, option 2 could strengthen cost effectiveness in climate policy if the EU manages to strengthen a common policy framework e.g. with respect to carbon pricing, energy efficiency policies and phasing out fossil technologies. However, if option 2 does not generate more climate ambition also cost effectiveness of climate policy is very questionable.

To sum up, the EU would risk missing the GHG emission reduction target as long as EU policies are not sufficiently suitable for additional emission reductions. Accounting of emissions reductions needs to ensure that current obligations of Member States are met (no free-riding of Member States) and additional emission reductions are accurately designated to additional EU efforts. An enforcement mechanism to safeguard the economy wide reduction target in the ESR sector needs to be developed and put in place. It needs to be self-binding and operational on EU-level. In addition, new EU sectoral policies are required that can address short to medium term mitigation options in the ESR-sectors.

Opportunity:

- Such an approach would (further) strengthen the EU-level in climate policy as the EU would become responsible for achieving additional emission reductions and adopting necessary legislative instruments.

[38] For options policy options with respect to climate policy instruments see Öko-Institut and Agora Energiewende (2020), ch 7.3. For a more general assessment of EU climate policy see Jordan et al (2012).

Risks:

- It needs to be settled in advance that members states agree on an accounting mechanism that designates emission reductions either to members states efforts or to additional EU. efforts. Without such an accounting mechanism the EU could fail to achieve the higher reduction target.
- Even if additional or more ambitious EU policies and measures would prove successful, there are very limited possibilities that emission reductions are distributed in an acceptable way between member states and sectors.

► **Option 3: Introduce a gap-filling mechanism under the Effort Sharing Regulation**

Option 3 is a European approach to raise ambition in the ESR sector. Additional emission reductions are initiated by a new EU mechanism that aims to address the overall emission gap between current emission reduction targets and more ambitious targets ("*gap-filling mechanism*"). The gap-filling mechanism could be designed as a tender, set up by the European Commission, and open to all Member States. Member states commit to emission reductions that go beyond their obligations under the ESR. This would require reliable emission projections to calculate and assess additional emission reductions. These additional emission reductions from the gap-filling mechanism would be automatically deducted from the national annual emission allocation (AEAs) budget under the ESR. In return Member Sates receive funding from EU funds.

The gap-filling mechanism would have to be designed in a way that ensures a substantial contribution to the 2030 target and does not create windfall effects or finance pull-forward effects in the first half of the decade (e.g. for policies and measures that would be necessary anyway to achieve the 2030 target). Emission reductions initiated by the gap-filling mechanism should cover not only the target year 2030 but a period up to 2030. The mechanism can be split up into several tenders, with a new round starting each year and all tenders covering the period up to the target year 2030.

It remains the responsibility of the Member States how these additional emission reductions will be achieved and what climate policies and measures will be implemented. The gap-filling mechanism is not a project-based approach and strictly bound to the effective emission reductions that are realized. The mechanism could therefore be a strong incentive for more ambitious climate policy. If additional emission reductions are not proven Member States do not receive funding. Additional mechanisms for sanctions in the case of non-compliance under the ESR might be necessary. Despite a large degree of flexibility, the gap-filling mechanism should be implemented by policies and measures that are in accordance with the European Green Deal and do not impose significant harm to other environmental objectives.

The gap-filling mechanism would establish as a temporary funding possibility for Member States. Funding could start before 2025 and should be phased out by 2030.[39] Funding of the gap-filling mechanism would require substantial resources. The introduction of a carbon price within the ESR sectors (e.g in form of minimum standards for carbon pricing as mentioned under option 2) could be a possible source of revenues. Carbon pricing would not only generate financial means but also create efficient incentives for emissions reductions on a European scale – which would be a critical advantage compared to other financing sources. Price finding as part

[39] The following example can be explanatory: With an emission gap of 500 mln t CO_{2e} in 2030, cumulated additional emission reductions of 1.500 mln CO_{2e} from 2026 to 2030 and a carbon price under the tender of 50 (100) Euro t CO_{2e} the overall financial budget up to 2030 would be 75 (150) billion Euro.

of the European tender-approach for additional emission reductions could be challenging, though, as the price needs to both provide sufficient incentives for Member States to offer additional emission reductions and to be justified from the perspective of those who have to provide the funding. So far, there is no reference price for AEAs and transparent information on national mitigation options and costs is lacking (Öko-Institut and Agora Energiewende 2020).

Option 3 could strengthen cost effectiveness in climate policy if the EU manages to strengthen a common policy framework e.g. with respect to carbon pricing, energy efficiency policies and phasing out fossil technologies. However, cost effectiveness would need to be an integral part of policy assessment (short and long term) to activate low cost mitigation potentials as well as innovative technologies to reach full decarbonization in the long term.

Opportunities:

- Implementation of the higher economy-wide GHG reduction target possible without changing the overarching climate policy landscape as the scope of ESR and EU ETS would stay as it is.
- Could be attractive for Member States, as no renegotiation and adjustment of national emission reduction obligations is necessary.

Risks:

- Member States might not offer sufficient additional emission reductions – as the mechanism would be voluntary. Thus, a fall-back mechanism would be required that would deliver missing emission reductions, e.g. through policies and measures on the European level or by Member States.
- Sufficient finance has to be provided, for example from carbon pricing revenues (e.g. from minimum carbon pricing standards).

► **Option 4: Introduce emissions trading for fuels either as separate scheme or as part of EU ETS**

A renegotiation of national obligations under the ESR could be circumvented by the implementation of an EU wide emission trading scheme which would cover significant parts of the current ESR scope and pool these sector emissions into a common, EU wide emissions reduction target implemented by a binding cap. This would be in line with the Commission's intention to pursuit an integrated approach and submit a legislative proposal covering a broad range of fuel emissions by emissions trading (EC 2020x).

Emissions trading for fuels could be introduced:

- as separate scheme (option 4a), or
- as part of an extended EU ETS (option 4b).

Due to the characteristics of the sectors currently covered by the ESR, e.g. land transport, buildings and agriculture, it is not reasonable under both options to cover all emitting entities. Instead, one could focus on the use of fuels for heating and cooling and for transport since they can be addressed through an upstream system. Introducing emissions trading for these sectors would cover the major share, but not all emissions of these sectors (e.g. not the remaining industrial process emissions or CH_4 or N_2O emissions from agriculture). The remaining

emissions would continue to be governed by the ESR and national emission reduction obligations, however, this would require to calculate the specific share of these remaining emissions in all Member States as they could vary according to the economic structure of individual Member States (e.g. Member States with a large agricultural sector could have a comparatively higher share of remaining emissions).

Both options need complex preparations and an EU wide start before 2025 or 2026 is not likely. However, a separate EU fuel ETS (option 4a) can draw upon experience with the German fuel emissions trading scheme that starts operation at the beginning of 2021. The European Commission has announced she will pursuit an integrated approach and submit a legislative proposal covering a broad range of fuel emissions by emissions trading (EC 2020c). Also, energy taxation and sectoral policies and measures are important elements of the Climate Target Plan – making the policy approach of the European Commission much broader than exclusively extending emission trading.

Expanding the scope of the EU ETS to fuel emissions (Option 4b) would realize a cross-sectoral uniform carbon price, a solution favoured by many economists as the most efficient way to achieve emission reduction targets. However, this does not seem to be a reasonable approach in the short term: **A uniform carbon price would provide no sector specific price signals to incentivize fast decarbonisation in every sector and ensure full decarbonisation until 2050.** In addition, a uniform carbon price would shift abatement incentives from sectors with high abatement costs to sectors with relatively lower abatement costs. Due to the relatively higher abatement costs in the transport and buildings sectors (compared to the energy sector), the relatively low level of carbon prices in EU ETS of currently 25 €, would not provide considerable abatement incentives. Abatement requirements in the short and medium term would be simply shifted to other sectors with lower abatement costs (e.g. electricity) or evading options for example through offshoring production (e.g. industry). On the other side, a price level that would incentivize sufficient abatement in the transport and building sector[40], could become a major challenge for the emissions intensive industry exposed to international competition and potentially facing a carbon leakage risk (Stenning et al. (2020)).

Consequently, at least for the beginning of fuel emissions trading, a separate ETS approach seems therefore favourable and less risky. Towards the end of the 2020s or after 2030, the two schemes could be linked if the mentioned risks can be averted, in particular by sector specific instruments and measures that align sectoral abatement cost and measures to protect the industry from the carbon leakage risk are in place.

A crucial prerequisite for any EU wide fuel emissions trading system is the adoption of a binding cap on fuel emissions, directly drawn from the economy wide emission reduction target. This is absolutely necessary to guarantee the environmental integrity of the scheme and provide a clear commitment to stakeholders and market participants. In the case of a 55 percent or 60 percent reduction target, the cap would have to be aligned with a sectoral reduction target in the range of 37 percent up to 52 percent compared to 2005 levels (see Figure 1).

Political acceptance provided, a fuel emissions trading scheme could probably start in the second half of the decade only, while it is possible to start a few years earlier, for example in 2023 or 2024, with a partial scheme and a fixed price as it was done in Germany.[41] Member

[40] UBA has assessed the carbon price needed to incentivize substantial abatement in the transport sector in line with the German 2030 sectoral target for the sector at approx. 200 EUR, UBA (2019). Other studies suggest even higher marginal abatement costs of between 145 and 245 € for the buildings sector, and 250 € for the transport sector (Öko-Institut/ Agora Energiewende 2020)

[41] The German fuel emissions trading scheme starts in 2021 with an annually rising fixed price and covers only liquid and gaseous fuels in the first two years. Solid fuels will be included later to improve availability of data.

States that have already implemented a (substantial) carbon tax in the relevant sectors (e.g. Sweden, Finland) with potentially higher tax rates than the carbon price in the European fuel emissions trading scheme should be allowed to supplement the European scheme as it was done e.g. by the UK Carbon Floor price in the context of the EU ETS.

A European fuel emissions trading scheme would not only ensure achieving European climate targets without having to renegotiate national emission reduction obligations. It would also create large volumes of revenues as all allowances should be auctioned. Just to give an example: Assuming approx. 70 percent of 2018 ESD emissions[42] were covered by a fuel emissions trading scheme and the carbon price were between 50 € and 100 €, the scheme could generate between 89 up to 179 bln EUR per year. Even when emissions decrease, for instance to approx. 1.5 or 1.7 bln t CO2e in 2030 as it is assumed under a 60 percent or 55 percent emission reduction target, revenues would still amount to between approx. 52 bln and 117 bln € assuming prices between 50 and 100 €. These significant funds could be partly invested in climate technologies and infrastructure, partly to balance negative impacts on lower-income households or vulnerable businesses. Auction revenues could be distributed among Member States based on a solidarity mechanism similarly to the one used in EU ETS in favour of lower-income Member States.

As the incentive effect of a carbon price in the transport and building sector is limited, an effective substitute of ambitious sector specific instruments such as fuel efficiency standards for cars and vans or standards for the buildings sector seems rather unlikely. Ambitious sector specific instruments can also ease the costs to be borne by fuel consumers (Öko-Institut/Agora Energiewende 2020).

Thus, a European fuel emissions trading scheme could become a new important building block in EU's climate architecture, avoiding discussions on how to share abatement requirements among Member States, embedded in a set of sector specific companion policies.

Following opportunities and risks focus on a European fuel emissions trading approach (option 4a) unless indicated differently.

Opportunities:

- A stringent cap setting would guarantee that emission targets for the included sectors can be achieved.
- No negotiation on sharing abatement efforts between Member States necessary.
- Large volumes of revenues to be expected as all allowances of a fuel emissions trading should be auctioned: revenues should be invested in climate technologies and necessary infrastructure and be distributed among Member States based on solidarity considerations.
- Can be easily transposed in the medium or long run into a community wide and cross-sectoral EU ETS.

Risks:

- Complex preparations, can probably start mid of the 2020s only.

[42] Emissions in sectors covered by the Effort Sharing Decision amounted to 2,562 mln t CO2 in 2018 according to EEA (2020)

- A fully integrated emissions trading system (option 4b), with a uniform cross-sectoral carbon price being established already by mid of 2020s, might fail to provide substantial abatement incentives in sectors with higher abatement costs (e.g. transport and buildings). The necessary transformation of these sectors would be delayed. At the same time, a uniform carbon price would speed up cutting down emissions in sectors with lower abatement costs (e.g. electricity) or sectors exposed to international competition, thereby facing a Carbon Leakage risk (e.g. industry). Little opportunities would remain to proactively manage transformation and structural change policies.

- A separate European fuel emissions trading system could lead to rather high carbon prices. From a political view, this comes with the risk that carbon prices are capped by maximum levels in order to protect low-income households and vulnerable industries. This would be comparable to introducing a carbon tax instead and would pose a serious threat on reaching emission reduction targets since incentives to curb emissions in the transport and building sector are limited.

- In addition, fuel emissions trading cannot replace ambitious sector specific instruments to ensure meeting sectoral reduction targets in member states (e.g. in Germany) and to safeguard long term decarbonization in each sector. There is a risk that such instruments are not introduced or weakened by reference to an emissions trading system being in place.

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