CLEAN AIR TASK FORCE

Response to a public consultation on the EU climate target for 2040

Recommendations for EU policy, with a view to 2040 and beyond

Clean Air Task Force (CATF) appreciates the opportunity to weigh in on the EU climate target for 2040 and the policies needed to achieve it.

As EU policymakers finalise Fit for 55 agreements and set their sights on the 2040 target, this is an opportune moment to take a step back and consider the lessons we have learnt so far in the implementation of the European Green Deal and beyond. While targets can be helpful for signposting the transition and tracking progress, the crucial question is how we can ultimately reach them. What will maximise our chance of success is a comprehensive strategy that will be resilient to multifaceted risk and centre Europe's energy security and economic growth.

Europe needs an options-based climate strategy

As the EU has already recognised, fighting climate change is imperative for the future of Europe and the world. Despite the commendable efforts made under the banner of the European Green Deal, particularly aiming to cut emissions by at least 55% by 2030, **we are not yet on track to achieve net zero emissions by 2050.** As such, climate action must remain a priority for policymakers and **the 2040 target must be ambitious enough to enable the ultimate goal – climate neutrality.**

Moreover, **climate ambitions must be nested within broader economic and social considerations**, including to secure and maintain public support. We need to find ways in which tackling climate change does not hinder European lives and livelihoods, but rather boosts innovation, promotes competitiveness, and generates wealth. Equally, we cannot hope for sustained economic prosperity without addressing the impacts of climate change.

Achieving climate neutrality and the intermediate targets leading up to it will require a thorough transformation of our industries and societies. To rise to the scale of the climate crisis while maintaining and expanding prosperity, **we need ample amounts of clean energy and adequate enabling infrastructure.** This is particularly challenging for Europe that has so far relied on imported fossil fuels, further complicated by an ever-changing geopolitical landscape and limitations in terms of raw material and land availability.

In this extremely challenging situation, the EU cannot rely on any one single pathway. We have recently been abruptly reminded of the negative consequences that can arise when a path dependency goes awry. **To increase the likelihood of reaching climate neutrality and the intermediate goals leading up to it, the EU urgently needs to diversify its portfolio** – that is, make use of a wide array of clean technology options. It is only with a diversified strategy that we can minimise the risk and protect our goals against any one pathway failing or not delivering to the extent expected.[1] In addition, different contexts, be it Member States or sectors of the economy, will likely require different solutions – one size does not fit all. In addition to widely deploying well popularised technologies like wind turbines and solar panels, the EU would be well advised to consider the technologies referenced below and develop bespoke strategies for their development and deployment.

Carbon capture and storage (CCS) technologies

Carbon capture and storage (CCS) technologies will be necessary for achieving climate neutrality by 2050, as shown by nearly all modelling scenarios,[2] both to rapidly reduce CO_2 emissions as well as to permanently remove CO_2 from the atmosphere. In all scenarios highlighted by the European Scientific Advisory Board on Climate Change (Advisory Board),[3] CCS provides carbon removals and plays a significant role in reducing emissions from industrial processes and fossil fuels. Their analysis finds that up to 490 million tonnes of CO_2 may need to be captured and stored by 2050.[4] The European Commission's own analysis[5] estimates that the EU could need to capture up to 600 million tonnes of CO_2 annually by 2050, which is in line with several other expert bodies.[2] In sum, there is no climate neutrality in Europe without CCS.

As it stands, rates of CCS deployment are far below those in modelled pathways limiting global warming to 1.5°C or 2°C.[6] Crucially, there are no operational CO_2 storage sites in the EU.[7] Therefore, more must be done to design policy and financial incentives to advance CCS technologies to the scale needed to make an impact on total emissions.[8] This is particularly crucial in the 2030-2040 period, when the deployment should be at its fastest, as laid out in the International Energy Agency's pathway to net zero.[9]

As the Commission outlined in its proposal for a Net Zero Industry Act, a cross-border, single-market approach is needed to ensure CCS can be an effective solution for industries in all Member States. This will require a new regulatory framework for CO_2 transport infrastructure that can enable rational, long-term planning of networks and ensure open access to decarbonising industries. While the ETS carbon price is expected to be the key

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1 CATF – Europe needs an options-based climate strategy (2023)

2 Intergovernmental Panel on Climate Change, Working Group III's Contribution to the Sixth Assessment Report (2022); European Commission – In-depth analysis in support of the Commission Communication (2018/773) A Clean Planet for all: A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy (2018); International Energy Agency – CCUS in Clean Energy Transitions (2020); DNV – Pathway to Net Zero Emissions (2021)

3 European Scientific Advisory Board on Climate Change – Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030–2050 (2023)

4 Ibid., Table 15

5 European Commission – In-depth analysis in support of the Commission Communication (2018/773) A Clean Planet for all: A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy (2018)

6 Intergovernmental Panel on Climate Change, Working Group III's Contribution to the Sixth Assessment Report (2022)

7 It is encouraging to note, however, that over 54 projects are in varying stages of development across the Union. See CATF's Europe Carbon Capture Activity and Project Map

8 CATF – Why Europe needs a comprehensive carbon capture and storage strategy (2022)

9 International Energy Agency – An updated roadmap to Net Zero Emissions by 2050 (2022)

driver for industrial decarbonisation, the nature of CCS as a solution for hard-to-abate emissions means that it is frequently a high-cost option that exceeds carbon price trajectories over the lifetime of first-mover projects. Consequently, additional funding policies and regulatory drivers will be required to provide a business case for developments in the near term, ensuring the technology and its supporting infrastructure (particularly geological storage) is scaled up in time.

Carbon Dioxide Removal (CDR) technologies, particularly those which store CO_2 geologically, will also require dedicated incentives for deployment. However, developing these technologies presents its own set of challenges due to competing land and resource requirements, energy consumption and costs, among others. Developing CO_2 transport and storage infrastructure across the EU is a critical element which can contribute to both reducing emissions and carbon removals in the future.

Wider public understanding of CCS and CDR as climate mitigation technologies must also be fostered to ensure that their broader use is achieved with broad stakeholder support. This will require policymakers at the EU and Member State level to proactively communicate the need for the technology and engage early with communities close to facilities, while demonstrating that deployment policies are clearly grounded in climate ambition. CATF has published more information on this here.

Zero-carbon fuels

Zero-carbon fuels, such as hydrogen and ammonia, will be an essential tool for the decarbonisation of hard-to-electrify sectors like heavy industry and transport, including via the production of synthetic and biofuels like Sustainable Aviation Fuels. Hydrogen will also remain a critical feedstock for industrial purposes. However, due to its energy-intensive nature and challenging properties, its use should be limited to 'no-regrets' sectors. These are sectors of the economy where no other energy-efficient or cost-effective decarbonisation options are available: oil refining, steel and ammonia production, and petrochemical plants.[10] While renewable hydrogen is not available in sufficient quantities to meet the demand in Europe, EU Member States and their industries must be empowered to make use of a full array of clean hydrogen production pathways based on proven technologies (such as steam methane reforming or auto-thermal reforming with installed carbon capture and storage technology) to rapidly ramp up clean hydrogen production capacity. Nonetheless, as the Commission has noted in the REPowerEU plan, the EU will also likely need to import hydrogen. Transporting large quantities of hydrogen over long distances faces substantial cost and technology challenges. Therefore, the most cost- and energy-effective methods of hydrogen transportation must be deployed. Wherever possible, hydrogen should be produced close to demand centres or transported via pipeline. Additionally, importing and transporting hydrogen to its demand centres will require significant infrastructure build out and so the most efficient pathways must be assessed and chosen carefully before investments in such projects are made. Public policies and resources should be leveraged to prioritise the most promising and cost-effective technologies first, recognising that, while option value is important, so is avoiding expensive investments in infrastructure that is inherently inefficient or unlikely to be used. CATF has published more information on this here.

[10] Petrochemical plants produce essential products such as transport and cooking fuels, margarine, lubricants, plastics, detergents, fertilizers, pesticides, dyes, paint, fabrics, fibres, adhesives, construction materials, pharmaceuticals and more.

Advanced biofuels

Advanced biofuels will be an important means of displacing conventional fuels in aviation, along with hydrogen, hydrogen-based synthetic fuels, and low-carbon electricity. If biofuels alone were used to meet the growing aviation energy demand, it would require quadrupling current global biofuel production by 2030, and almost quintupling it by 2040.[11] Ramping up biofuel production to this level is a worrisome prospect given that bioenergy already faces several sustainability and supply chain challenges. Harvesting, processing, transporting, and storing the required quantity of biomass feedstock cost-effectively would introduce new supply chain challenges that have yet to be addressed in real world scenarios. It could also have detrimental land use and water use implications, contribute to the displacement of existing agriculture, harm biodiversity, exacerbate food insecurity, and disrupt existing natural carbon sequestration processes. Given the constraints on scaling up biofuels and the urgent need to decarbonise the aviation sector, the EU needs to pursue a wider range of energy options that meet stringent low-carbon intensity standards. All these options (e.g., low-net-carbon synthetic drop-in fuels, waste-derived hydrotreated biofuels, and hydrogen) will require increased access to hydrogen that is produced with very low lifecycle greenhouse gas emissions.

Nuclear fission

Nuclear fission can make a significant contribution to the EU's climate, energy security and clean tech leadership objectives, including in the 2040 timeframe. As a zero-carbon firm energy source, with a number of other advantages,[12] it can supplement weather-dependent renewable energy sources in guaranteeing a reliable provision of large amounts of low-carbon electricity that will be required. Beyond electricity generation, nuclear energy lends itself well to other applications such as district heating, and other process heat industries. Advanced reactors raise the prospects for the role of nuclear fission even higher: their enhanced flexibility and operating characteristics promises nuclear plants to be deployed quickly and cost-effectively, enable a faster ramping up and down to meet electricity demand and further expand application possibilities. To be able to unlock the full potential of nuclear fission, and help commercialise next gen tech, the EU needs to put in place conducive policies that will, inter alia, facilitate access to funding, speed up licensing and permitting for nuclear projects, harmonise licensing across the Union and incentivise the development of advanced reactors and their regional supply chains. CATF has published more information on this here.

Fusion

Fusion is a promising potential future zero-carbon energy source that the EU can potentially leverage in boosting its energy security and reaching its climate targets for 2040 and beyond. By replicating the process that powers the Sun, we could unlock abundant supplies of energy for clean electricity generation and fuels production. Fusion technology has seen a number of scientific and technical breakthroughs in recent years, as well as an influx of private capital. However, further public support is needed to stimulate more investment, particularly in the EU where it is lower, and develop and commercialise the technology as fast as possible. This will require stakeholder collaboration at the EU level and beyond, and strong Public-Private Partnerships. In addition, a suitable regulatory framework needs to be set up at the EU level.

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11 CATF – Decarbonizing Aviation: Challenges and Opportunities for Emerging Fuels (2022)

12 CATF – Why Nuclear Energy

Superhot rock energy

Superhot rock energy is a visionary geothermal energy technology that aims to harness heat from superhot rocks (exceeding 400°C) deep beneath the Earth's surface. Currently in the pilot demonstration stage, the technology is deserving of public investment as it could tap into a zero-carbon, energy-dense, renewable energy source, available everywhere. With significant public investment leading to successful in proof of concept, superhot rock energy could become a competitive clean firm energy production at gigawatt-scale that could be sited across Europe in the 2040s. Early research into superhot rock energy was enabled by the EU's Horizon programme, but further public investment is needed to mature the tools, equipment and methods required. In addition, a public education effort would be beneficial, ideally including a technoeconomic assessment of the potential of superhot rock energy to be competitive. Furthermore, a regulatory review should be undertaken to ensure that adequate protections are in place to guarantee environmental integrity. CATF has published more information on this here.

Building a zero-emissions, energy-rich system

Public policy has a role to play in moving these and other innovative clean technologies along the tech development line to maturity and deployment. Most importantly, it must enact measures that support a strong business case, de-risk and attract private investment.[13] This requires a share of public funding, too. Given the existing EU budget limitations, policymakers working at the EU level should first ensure that available funds are accessible and efficiently allocated. A complex, fragmented landscape of funding schemes and bureaucratic application and allocation procedures undermine the growth of decarbonisation projects and slow down the trajectory of decarbonisation overall. Facilitating access to existing public funding for clean technologies can have far-reaching positive impacts on climate targets and energy security. Nonetheless, more funding will likely be required to fill the gaps. A larger pot of EU funds, dedicated to clean technology development, would be beneficial to ensure that Member States with different fiscal capacities can evenly participate in clean tech development and that the EU Single Market is preserved.

The EU would also benefit from devising a broader set of policies for tech development, ideally tailored to different Technology Readiness Levels. Instruments like Carbon Contracts for Difference can be useful in bridging the cost gap between existing and emerging technologies, while promoting efficiency in public funding allocation.

Championing innovative clean technologies will not only adequately equip us for fighting climate change, but also enhance Europe's energy security and position the bloc as a technology leader.

A crucial task for EU policymakers is then to pull the pieces together in an efficient zero-emissions, energy-rich system. This will require proactive, long-term planning, informed by an in-depth understanding of current and future sectoral needs, in terms of energy, infrastructure and skills demand. EU policymakers must also be equipped with comprehensive Member State National Energy and Climate Plans (NECPs),[14] so they can identify the gaps, enhance the synergies, and generally support a coordinated implementation.

A decarbonised electricity grid is the foundation of a clean energy system. **To decarbonise the grid, the EU needs to secure 24/7 carbon-free energy.** This means that every kilowatt hour of electricity consumption is met with carbon-free electricity sources, every hour of every day, everywhere. As it stands, wind and solar power remain insufficient to meet the demand. To be able to supply 24/7 clean power to the many sectors that will need it in the

[13] CATF – Designing a business case for climate technology in Europe (2023)

future, the EU and its Member States need to make use of a wide portfolio of carbon-free technologies and apply granular carbon accounting to prevent greenwashing.

A key enabler of an efficient and cost-effective clean energy system is a shared cross-border infrastructure network – of CO_2 and hydrogen pipelines, other clean modes of CO_2 transport, CO_2 storage and electric power transmission lines, to name a few. This infrastructure needs to be planned well in advance in a strategic manner, coordinated among the Member States and other key partners, including the United Kingdom and Norway. Existing energy infrastructure also has to be regularly inspected and maintained in order to minimise methane leaks.

Looking beyond the Union borders, **the EU must also ensure collaboration with key international partners, including the UK and Norway, to achieve climate targets**. Sharing knowledge and lessons learnt regarding policies to support and deploy clean technologies should be the cornerstone of such collaboration.

The role of carbon removals

Importantly, **removing significant amounts of CO_2 from the atmosphere will be necessary to achieve net zero emissions** – to balance residual emissions from sectors like agriculture, aviation, and shipping – **and to drive net-negative emissions thereafter.**[15] All scenarios modelled by the Advisory Board require large-scale deployment of carbon removals leading up to 2050.[16] Carbon removals can play a role complimentary to emissions reductions, helping to reduce net emissions in the short-term, provide negative emissions and balance for any overshoot.

All types of carbon removal pathways have distinct advantages and disadvantages, limitations and risks.[17] Hence, **a portfolio approach, i.e., making use of both nature-based and industrial removals, and different removal technologies, will likely deliver the highest impact.** This would ensure that we do not overly rely on one method, maintaining optionality and allowing for removal approaches to be suited to regional, national and local contexts. The EU will need both nature-based and industrial removals to achieve climate neutrality target by 2050. Decisive action is needed to reverse the trend of the land sink in Europe decreasing. However, there are limits to how much the sink can possibly grow over the coming decades, and uncertainties exist regarding the durability and permanence of carbon stored in this way — due to risks of reversal as a result of human activities or the worsening effects of climate change.[18] As such, the EU will need industrial removals that durably remove carbon from the atmosphere as well, particularly between 2040 and 2050.

Due to fundamental differences between emissions reductions and removals, and therein between nature-based and industrial removals, **it would be preferable to set separate targets for (1) GHG emissions reduction, (2) nature-based carbon removals and (3) industrial removals with permanent storage.** This approach will ensure that we maintain focused on immediate and deep emissions reductions while supporting the scale-up of both nature-based and industrial removals. Nature-based and industrial carbon removals differ fundamentally in their operations, timelines, and required support. Nature-based removals are available more immediately, and

14 CATF – NECPs Fit for the Net-Zero Age (2023)

15 Intergovernmental Panel on Climate Change, Working Group III's Contribution to the Sixth Assessment Report (2022)

16 European Scientific Advisory Board on Climate Change – Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030–2050 (2023), page 81

17 The State of Carbon Dioxide Removal Report (2023)

18 Chiquier, Solene, et al. "The Efficiency, Timing and Permanence of CDR Pathways: A Comparative Analysis." *SSRN Electronic Journal*, 2022, https://doi.org/10.2139/ssrn.4298436

industrial carbon removals, which will need to scale up towards 2050, necessitate distinct tracking mechanisms to accurately gauge their respective contributions. Furthermore, these categories store carbon in fundamentally different storage medium; the former in the more vulnerable biosphere, while some industrial carbon removals isolate carbon permanently in the geosphere.[19] Recognising that fossil emissions originate from the geosphere and can remain active in the atmosphere for thousands of years, it is essential that we remove as much carbon from the biosphere and the short-carbon cycle as possible. This distinction underlines the necessity of individual targets for these categories, ensuring we adequately track and support their unique contributions to the EU's 2040 climate target. It is also important that residual emissions be clearly defined, ideally in the context of the 2040 climate target to then inform other policy initiatives.

A range of carbon removal methods are under development, including Enhanced Weathering, Biochar and various Ocean-based approaches such as Ocean alkalinisation and fertilisation. While these methods may be able to contribute to negative emissions targets, and can add optionality, they will require in-depth research into their respective mitigation potentials, durability of carbon stored, land, water, and energy uses, costs as well as other impacts, before being deployed at scale. Direct Air Carbon Capture and Storage (DACCS) and Bioenergy Carbon Capture and Storage (BECCS) have emerged as leading carbon removal technologies. **Both DACCS and BECSS will likely be needed in the range of billions of tonnes globally over the course of this century to curtail global warming**.[20] Successful deployment at large scale will require a clear EU vision, accompanied by a set of dedicated policies and financing tools, and a concerted effort to address significant challenges and uncertainties present. The Communication on the 2040 climate target is a critical opportunity for the Commission to outline the unique respective contributions DACCS and BECCS can make, and so inform the necessary scale of these technologies in 2040.

DACCS is a process that captures CO_2 directly from the atmosphere, concentrating it for storage in geological formations. It boasts considerable operational advantages, such as flexibility, scalability, modularity, and relatively low-land use, when compared to other carbon removal methods. Negative emissions from DACCS can also be more easily verified and monitored, and geological formations store carbon for millennia, providing immediate and permanent carbon removal. However, as the process is energy-intensive (as well as water-intensive), it requires significant amounts of low-carbon electricity and heat.[21] As such, it does not always lead to negative emissions.[22] Therefore, siting DACCS near grids with low carbon intensity is crucial, which will mean certain regions globally and within the EU are better suited for deployment than others, in order to maximise the climate benefit.[23]

BECCS combines bioenergy production with CCS, which can result in negative emissions as biomass absorbs CO_2 during growth. As such, it could deliver immediate, relatively affordable, and permanent carbon removal. To properly quantify if the process has delivered negative emissions, the entire value chain must be evaluated by a comprehensive lifecycle analysis.[24] One of the key benefits of BECCS is that the biomass can provide additional

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19 Alcalde, J., Flude, S., Wilkinson, M. et al. Estimating geological CO2 storage security to deliver on climate mitigation. *Nat Commun* 9, 2201 (2018). https://doi.org/10.1038/s41467-018-04423-1

20 Intergovernmental Panel on Climate Change, Working Group III's Contribution to the Sixth Assessment Report (2022)

21 Sabatino et. Al, 'A comparative energy and costs assessment and optimization for direct air capture technologies' *Joule* 2021, 5, www.sciencedirect.com/science/article/pii/S2542435121002580
Erans et al., 'Direct air capture: Process technology, techno-economic and socio-political challenges' *Energy Environ. Sci.* 2022, 15, https://pubs.rsc.org/en/content/articlelanding/2022/ee/d1ee03523a
Keith et al., A Process for Capturing CO_2 from the Atmosphere. *Joule* 2018, 2, www.sciencedirect.com/science/article/pii/S2542435118302253

22 Tanzer and Ramirez, 'When are negative emissions negative emissions?' *Energy Environ. Sci.*, 2019,12, https://pubs.rsc.org/en/content/articlelanding/2019/ee/c8ee03338b

23 Gonzalez Sanchez et al, 'The Role of Direct Air Capture in EU's Decarbonisation and Associated Carbon Intensity for Synthetic Fuels Production' *Energies 2023*, 16, https://www.mdpi.com/1996-1073/16/9/3881

24 Fajardy, M., & Mac Dowell, N. (2017). Can BECCS deliver sustainable and resource efficient negative emissions? *Energy & Environmental Science*, 10(6). https://pubs.rsc.org/en/content/articlehtml/2017/ee/c7ee00465f

uses, such as heat, electricity, biofuels, or paper. However, it requires a substantial land area for the cultivation of biomass, which can present potential conflicts with food production and biodiversity preservation.[25] It is also highly dependent on the availability of sustainable biomass, of which there is a limited amount available globally, particularly in Europe. These concerns can, to an extent, be mitigated when waste biomass is used and siting biomass facilities within industrial clusters can help leverage economies of scale and aggregation.[26] Nonetheless, deployment of BECCS at scale will require coordinated development of each component of the supply chain, from biomass sourcing to CO_2 transport and storage, as well as a thorough analysis of the effects of any direct and indirect land use change.

Addressing these challenges for both sets of technologies will require substantial policy support and financial incentives to spur deployment and reduce costs. As these technologies transition from the pilot stage to commercial deployment, they could experience a "valley of death" where securing capital becomes challenging. Providing the demand for industrial carbon removals will be crucial to de-risk projects. Project-specific supports will also be required on the supply side to drive the at-scale deployment of these technologies. Infrastructure development can pose significant financial and time barriers due to complex permitting and construction processes, so these should be streamlined where possible. However, ensuring sufficient clean, reliable and affordable energy and access to CO_2 storage will be critical to scaling industrial removals to commercial scale, particularly DACCS.

It should also be noted that EU Member States have different capabilities for fostering carbon removal projects. This is influenced by a variety of factors including geography, geology, CO_2 transport infrastructure potential and planning, forest coverage, waste incineration, and low-carbon energy capacity. Therefore, carbon removal targets, ideally separated for nature-based and industrial removals, should be EU-wide to leverage the differing carbon removal potentials across Member States.

The need for sufficient CO_2 storage

Large-scale, open-access CO_2 storage is a crucial element of a functioning CO_2 system that can support EU climate targets. A lack of developed geological CO_2 storage remains the principal bottleneck for development of the CCS value chain, as no storage sites in the EU are operational. The proposed storage capacity target (50 million tonnes of CO_2 per year) under the Net Zero Industry Act and associated obligation on oil and gas producers should help alleviate this bottleneck. But greater efforts will be required to characterise the large areas of promising storage geology for which little accessible data exists, as well as to build up relevant capacity and expertise within Member State governments.

Estimates from the aforementioned climate modelling scenarios show that between 300-500 million tons of CO_2 will need to be stored within the EU each year in 2050, representing up to a 10-fold increase in just under 20 years from the proposed 2030 target. Under the latest global pathway to net zero laid out by the International Energy Agency,[27] the most rapid phase of CCS deployment takes place between 2030 and 2040, in which the global annual storage capacity increases from 1.2 Gt/year to 4.4 Gt/year (finally reaching 6.2 Gt/year in 2050). This critical nature of this decade for ramping up the CO_2 abatement potential of CCS can be attributed to

[25] Akimoto, K., Sano, F., Oda, J., Kanaboshi, H., & Nakano, Y. (2021). Climate change mitigation measures for global net-zero emissions and the roles of CO_2 capture and utilization and direct air capture. *Energy and Climate Change*, 2 https://www.sciencedirect.com/science/article/abs/pii/S2666278721000349

[26] International Energy Agency – Bioenergy with carbon capture and storage (2022)

[27] International Energy Agency – An updated roadmap to Net Zero Emissions by 2050 (2022)

several factors. First, it is more cost-effective to cut CO_2 emissions early on, than to let facilities continue to emit CO_2 which must later be removed from the atmosphere. Even as many fossil-based sectors are phased out towards 2050, they will remain significant emitters through the 2030s, while at the same time, large-scale CO_2 removal technologies will need to be ramped up to meet the expected demand at net zero. Second, there will be a limit to how rapidly society can deploy CCS – in particular geological storage capacity – so it will be vital to avoid leaving too much to do in the final decade to 2050. We cannot know exactly how much CCS will ultimately need to be deployed to reach net zero, but we should ensure that the EU is in a strong position to achieve the higher end of modelled estimates for 2050 (500-600 Mt/year), should such levels be required. This will likely require a geological storage capacity in the region (including the EEA) of at least 300 Mt/year by 2040.

Enabling climate targets with fit-for-purpose policies

The 2040 horizon also gives a renewed impetus to considering the design of key EU climate policy mechanisms, such as the EU Emissions Trading System (EU ETS) and the Effort-Sharing Regulation (ESR). CATF would principally like to highlight the following considerations:

Methane emissions should not be included in the EU ETS. Given that the system is primarily designed to incentivise CO_2 reductions, incorporating other pollutants can lead to unintended effects – it can potentially disincentivise CO_2 mitigation and slow down methane abatement in the near term. Namely, including methane in the EU ETS would mean adding it to the "single basket" of pollutants covered by the system. This would necessitate applying a global warming potential (GWP) value to consider methane emissions in terms of their CO_2 equivalence, which has complex and far-reaching implications.

First, applying a GWP value for methane within the EU ETS would result in much higher credits for methane reduction compared to CO_2 reduction. More precisely, reducing one tonne of methane emissions would be deemed equivalent to reducing 34 tonnes of CO_2 if GWP-100 is used, or 86 tonnes of CO_2 if GWP-20 is used.[28] In the latter case, the polluter will have effectively avoided reducing 52 tonnes of CO_2 emissions. In this scenario, many polluters may pursue low-cost methane emission reductions at the expense of making CO_2 reductions needed to address climate change in the long term. Second, it would increase the total CO_2 equivalent emissions in the baseline year, which can allow polluters to reduce smaller volumes of methane to comply with the overall emissions reduction obligation, particularly in the initial years.

Instead, in the short-term, the EU should aim to reduce methane emissions through separate initiatives, such as an EU Import Standard for oil and gas, which would include independent financial incentives. This could be envisioned as a flat fee system that sets a price for methane emissions above a certain threshold. A flat fee system could also be used across the waste sector, and potentially be introduced through the revisions of the Waste and Landfill Directives.

The current interplay between the EU ETS and the ESR is fit for purpose. More specifically, the ESR covering emissions not covered by the EU ETS as well as emissions from fuels used in road transport and buildings covered by the EU ETS II, allows for meaningful country-level targets. Removing the EU ETS II sectors would leave only a relatively small percentage of EU emissions under the scope of the ESR. This would take away the flexibility that Member States currently have in deciding where and how to best reduce their emissions to reach ambitious targets. The new ETS for road transport and buildings can be considered an additional tool for Member States in meeting their targets, reinforced by other national policies for emissions reduction in these sectors.

[28] GWP-20 and GWP-100 are determined for a 20- and 100-year timeframe, respectively. GWP values from IPCC Fifth Assessment Report are used here.

Linking the EU ETS with other compliance markets can be a challenging and lengthy endeavour, as has proven to be the case in the only existing example – linking the EU ETS with the Swiss ETS took a decade from the start of negotiations to the realisation of a link. In that case, the two systems were very similar, which suggests the process was as fast and straightforward as it can possibly be. Linking with systems that have different design elements will likely take more time. For instance, the UK ETS, the most obvious possibility, is much larger than the Swiss, and considering potential significant changes to the system (like the inclusion of carbon removals), it is improbable that straightforward linking would be possible in a meaningful timeframe. Nonetheless, **linking the EU ETS with the UK ETS would allow EU industrial emitters to make use of the UK's vast geological storage capacity, and is as such a worthwhile pursuit.** Linking the EU ETS with other compliance markets globally is less likely to be viable in practice. **Instead, allowing (certain) international credits in the EU ETS could be a way forward.** This should only be considered if the EU 2040 target is not domestic and allows the use of high-quality international credits.

On Member State level, National Energy and Climate Plans (NECPs) have so far proven to be an underutilised tool[29] that could and should be better employed to lay the groundwork for the path to net zero. Ideally, Member States would design NECPs as detailed, actionable plans, outlining how the technologies, infrastructure, funding, and skills needed to accomplish the clean transition will be fostered. Informed by thorough risk assessments and extensive public consultations, these plans should inspire investor confidence and draw public attention to key clean technologies, enable an effective implementation, and build on synergies with other countries, both within and outside the Union.[30] Only such fit-for-purpose NECPs can usefully inform the 2040 EU policy framework. On the other hand, **the new 2040 climate targets will be crucial in guiding national action and connecting short-term planning mechanisms (NECPs) to long-term ones (national Long-Term Strategies)**. However, a strengthened governance framework is needed to improve coordination and accountability. The Commission should make use of the upcoming Governance Regulation revision to:

- Enhance requirements for consistency between NECPs and Long-Term Strategies;
- Support Member States in developing and deploying key clean technologies;
- Strengthen reporting requirements for Member States;
- Improve accountability mechanisms, so that the Commission can effectively hold Member States to account, while ensuring timeliness, transparency, accuracy, consistency, comparability, and completeness of the plans and of the related reporting.

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29 European Commission – An EU-wide assessment of National Energy and Climate Plans (2020)

30 CATF – NECPs Fit for the Net-Zero Age (2023)

About Clean Air Task Force

Clean Air Task Force (CATF) is a global non-profit organisation working to safeguard against the worst impacts of climate change by catalysing the rapid development and deployment of low-carbon energy and other climate-protecting technologies. With 25 years of internationally recognized expertise on climate policy and a fierce commitment to exploring all potential solutions, CATF is a pragmatic, non-ideological advocacy group with the bold ideas needed to address climate change. Visit cleanairtaskforce.org and follow @cleanaircatf