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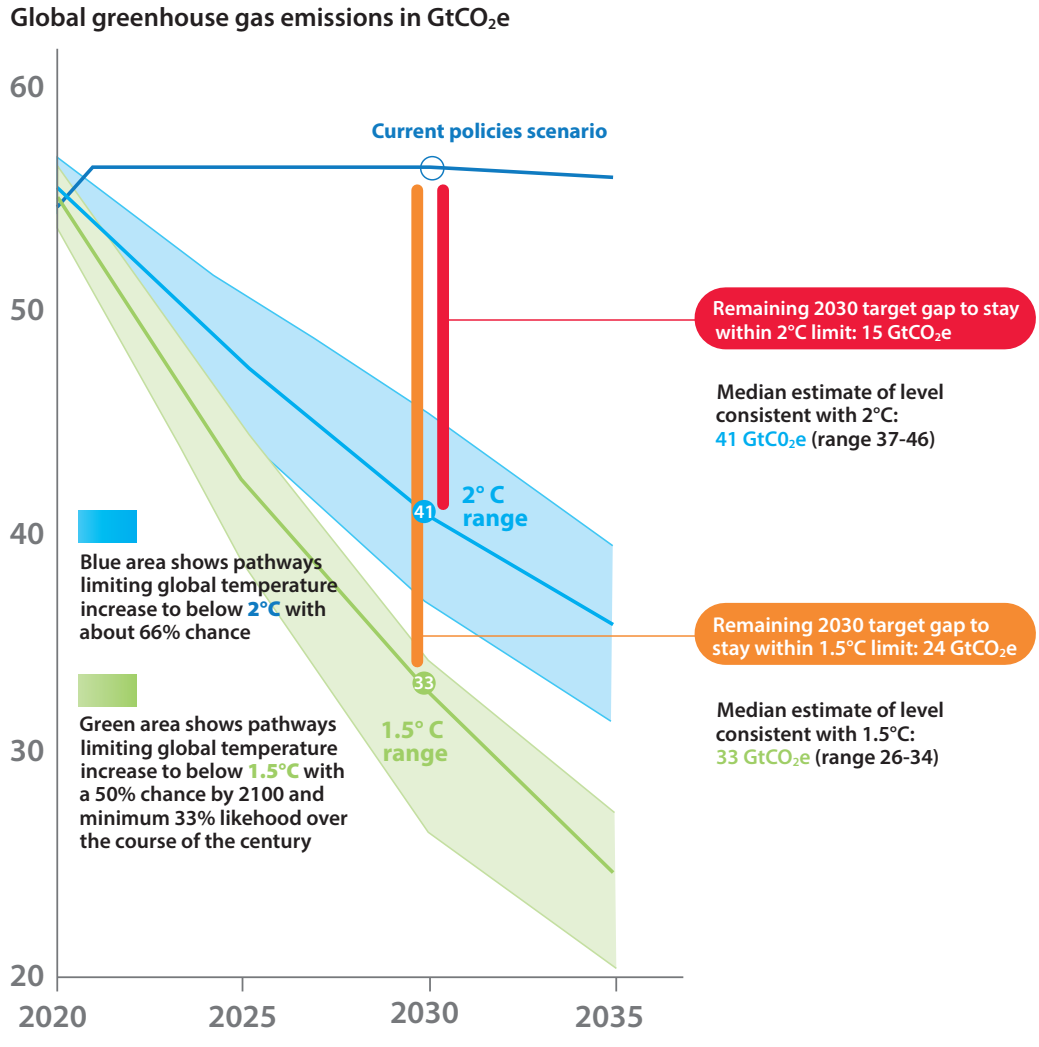
Getting back on track with new EU climate and energy targets for 2035 and 2040

Assessment reports from the United Nations Environment Programme (UNEP),[1] the UN Framework Convention on Climate Change (UNFCCC)[2] and the International Energy Agency (IEA)[3] all show that the world's governments are collectively failing to set and implement greenhouse gas emission reduction targets and policies in line with the Paris Agreement's objective to limit global average temperature rise to 1.5°C.

In response, all governments, including the European Union have committed to revise and upgrade their 2030 climate targets at the last three Conferences of Parties (COP26 in Glasgow 2021 to COP28 in Dubai 2023), bringing together all governments that have signed the Paris Agreement. Governments have submitted their targets, contributing to achieving the Paris Agreement objectives, through so-called Nationally Determined Contributions (NDCs). The EU's third and latest NDC, submitted to the UN in October 2023, did not include a new target for 2030. There are, however, clear indications, such as in the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), that additional action prior to 2030 will be more decisive to achieve the 1.5°C target than what happens after 2030.

Figure 1: Comparing current policies with 1.5°C and 2°C aligned pathways



(source: UNEP Emissions Gap Report 2023)

HOW THE EU HAS SET ITS CLIMATE AND ENERGY TARGETS FOR 2030

The EU's current climate policies are guided by two top-line climate targets, as agreed by EU heads of state and governments at the European Council:

- **Reducing net domestic greenhouse gas emissions by at least 55% by 2030** (compared to 1990 emissions), as decided in December 2020.
- **Reducing them to net zero by 2050,** as decided in December 2019.

According to the European Environment Agency (EEA), the EU already achieved **31% net emission reductions in 2022**.[4] The 55% reduction target by 2030 replaces the initial 40% reduction target by 2030, submitted in March 2015.[5] It is important to note that the initial 40% reduction target in the EU's first NDC focused on reducing **gross emissions without taking into account land-based carbon removals,** while the revised **55% reduction target includes removals** from the Land Use, Land Use Change and Forestry (LULUCF) sector. The European Commission has assessed that the EU's revised net 55% reduction would aim for a gross emission reduction of approximately 52.8%.[6]

How the EU plans to achieve its climate and energy targets with the Fit for 55 package

The 2030 and 2050 targets, cemented into law in June 2021 via the **EU Climate Law**,[7] also form the basis for the **Fit for 55 legislative package**[8] under the European Green Deal, which consists of:

- The Emissions Trading Scheme Directive (ETS)[9] reducing industry and power sector emissions by 62% by 2030 (as compared to 2005 emission levels).
- The Effort Sharing Regulation (ESR)[10] reducing emissions from agriculture, buildings, transport and waste by 40% by 2030 (compared to 2005).
- The LULUCF Regulation[11] increasing land-based carbon removals to 310 $MtCO_2$-equivalent by 2030, of which a maximum of 225 Mt can be used to achieve the 55% reduction target.
- The Renewable Energy Directive (RED)[12] increasing the share of renewable energy in gross final energy consumption to (initially) 40% by 2030.
- The Energy Efficiency Directive (EED)[13] reducing final energy demand by (initially) 9%, as compared to 2020 projections of final energy demand in 2030.

The package further includes a whole range of legislative initiatives that focus on specific greenhouse gases or on specific sectors (e.g. cars or carbon removals).

It is assumed that if the EU fully implements these policies, it would reduce its emissions by 57%. This overachievement of the 55% reduction target would be possible through the overshoot enshrined in the LULUCF target.[14] However, Member States' environment ministers in October 2023 rejected the Commission's proposal to refer to this 57% reduction in the third EU 2030 NDC submission to the UNFCCC,[15] claiming the EU is 'strengthening' its NDC by including the latest information on how the bloc, through the Fit for 55 legislation, will ensure full implementation of its 2030 target.

Further increasing the level of ambition with the REPowerEU package

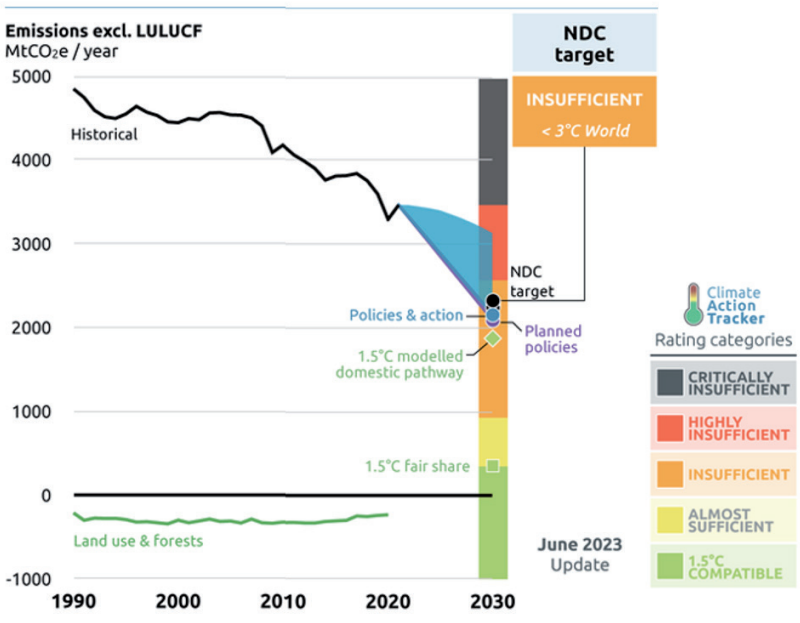
As a reaction to the fossil gas price crisis and the Russian invasion of Ukraine, the EU decided to accelerate its transition from fossil fuel imports to renewable energy with its so-called **REPowerEU package**[16] of May 2022. The Commission suggested a further strengthening of the 2030 renewable energy target (from a share of 40% to 45%) and energy savings target (from a reduction of 9% to 13%). This could have led to a further reduction of greenhouse gas emissions by at least 3% on top of the 57% reduction. Negotiations between Member States and the European Parliament have settled on a **42.5% renewable energy target** (compared to a **renewable energy share of 22.5% in 2022**) and an **11.7% energy savings target**, which will potentially increase the overshoot beyond 57% emission reductions.

ARE EU CLIMATE AND ENERGY TARGETS FOR 2030 AMBITIOUS ENOUGH?

Assessing individual countries' and regions' contributions to the collective target of the Paris Agreement is challenging and depends on how to apply the concept of equity. This implies that countries' contributions are assessed based on their (historical) responsibility and capacity to act (see the box on **fair shares** below).

The Climate Action Tracker consortium, in its June 2023 assessment, rates the EU's 2030 target as insufficient: *'When measured against a fair share emissions allocation, we rate the EU's NDC target as "Insufficient". The "Insufficient" rating indicates that the EU's NDC target in 2030 needs substantial improvement to be consistent with limiting warming to 1.5°C. Some of these improvements should be made to the domestic emissions target itself, others could come in the form of additional support for emissions reductions achieved in developing countries. If all countries were to follow the EU's approach, warming would reach up to 3°C.'*[17]

Figure 2: Assessment of the EU's NDC based on fair share approaches



(source: Climate Action Tracker, Climate Analytics, New Climate Institute)

Fit for 55 is not yet on track to 1.5°C

Environmental non-governmental organisations (NGOs),[18] independent researchers[19] and Members of the European Parliament[20] have also highlighted that the Fit for 55 package is not fit for respecting the 1.5°C limit. Scenarios show that an emission reduction trajectory on track with the 1.5°C limit requires the EU to achieve **a net reduction of at least 66% to 77% by 2030**, instead of just 55%. The EU would have to reach **net-zero emissions around 2040**, 10 years earlier than the officially endorsed EU target of 2050. These scenarios also substantiate that respecting the 1.5°C limit is only possible with a much faster phase-out of fossil fuels and a multiplication of renewable energy capacities in the EU. Under the condition that the EU roughly halves its current level of energy consumption, the **EU's share of renewables would reach 48% to 54% by 2030.**[21]

Current policies will not lead to sufficient emission reductions

Endorsing more or less ambitious climate and energy targets is one thing; implementing those targets through solid policies and measures at the national level is another. The EEA has made an inventory of all the laws and programmes currently in force or announced by the governments of EU Member States. It found an important ambition gap between current policies and targets. If Member States implemented all these current policies correctly, the EU would still achieve a **reduction of only 48%** compared to 1990.[22] That means that even for achieving an emission reduction of 55% in 2030, the EU and national governments will have to roll out additional policies for more energy savings and renewables.

HOW THE EU WILL SET ITS CLIMATE AND ENERGY TARGETS BEYOND 2030

The EU committed at COP26 (and subsequently at COP28) to submit, at the latest by March 2025,[23] a new 2035 NDC climate target, while the EU Climate Law focuses on adopting a 2040 climate target. The European Commission aims to combine both efforts in one exercise, thereby suggesting adapting the 2035 NDC target from what it will propose for 2040. Such an approach would contradict the spirit of the international agreement on common time frames, which calls for 5-year time frames and, thus, for the EU to set a fully autonomous 2035 target first, and then (by 2030) a 2040 target.[24]

EU climate and energy policies need milestones beyond 2030

The question is now how the EU will plan its climate and energy pathway after 2030. The 2050 objective of net-zero emissions is rather far away. For the decades from now until 2050, more detailed guidance is indispensable. Clearly defined objectives for 5-year time frames would serve as benchmarks to monitor the EU's progress. Otherwise, it will be difficult to steer the fundamental transition of the EU's economies towards climate neutrality effectively.

Without sufficient milestones, the EU cannot take stock of its achievements or gaps concerning targets. They are also needed to prevent stakeholders from taking today decisions that would lock in the EU to high-emission pathways during the next decades. For instance, energy infrastructure planning, as well as investments in the EU's most emitting big industries, are taken many years in advance and require long-term reliability. The urgency of the climate crisis and the fact that the EU is still lagging behind in terms of its climate and energy targets underscores the need for a new EU strategy beyond 2030.

How to define an appropriate EU climate target for 2040

The European Commission's new proposal for a 2040 climate target, published in February 2024, is based on its Climate Law, where the EU agreed to set *'a Union-wide climate target for 2040'* on the basis of a proposal from the Commission that should be submitted latest by June 2024.

Timeline: Next steps towards a new EU climate target

6 February 2024	Commission Communication on 2040 climate target
6-9 June 2024	European Parliament elections
13 June 2024	Climate Law deadline for the Commission's legislative proposal on 2040 target
14-15 December 2024	European Council potentially agrees on 2035 and 2040 targets
11 February 2025	(Soft) deadline for the EU's submission of its 2035 NDC
24-25 October 2025	European Council potentially agrees on 2035 and 2040 targets
10-21 November 2025	COP30 (hard deadline for the EU's submission of its 2035 NDC)

The European Commission can make use of the advice from the European Scientific Advisory Board on Climate Change (ESABCC), which proposed a **90% to 95% net emission reduction target for 2040**. The ESABCC is a group of independent scientists established under the Climate Law. It has been tasked to provide guidance on these questions to the EU institutions. The newly appointed Climate Commissioner Wopke Hoekstra repeatedly stated that he would be supportive to (at least) the lower end of the ESABCC advice.

Furthermore, the Climate Law also calls upon the Commission to *'publish in a separate report the projected indicative Union greenhouse gas budget for the 2030-2050 period, defined as the indicative total volume of net greenhouse gas emissions (expressed as CO_2 equivalent and providing separate information on emissions and removals) that are expected to be emitted in that period without putting at risk the Union's commitments under the Paris Agreement.'* With this reference, the Climate Law supports the concept that, given the long lifetime of many greenhouse gases, it is the cumulative amount of emissions that matters, rather than a specific end-year target.

WHAT ARE CARBON BUDGETS?

The basis for developing an EU greenhouse gas budget lies in the concept of the carbon budget. As scientists have indicated that there is a direct relationship between the total amount of CO_2 in the atmosphere and rising temperature, the carbon budget refers to the total amount of cumulative CO_2 emissions that can be released before reaching a certain temperature limit. The last IPCC report (AR6) indicated that the total carbon budget for limiting temperature rise to 1.5°C (with a 67% likelihood) would be 2,790 $GtCO_2$, of which 85% (2,390 $GtCO_2$) has already been used from 1850 to 2019. The remaining carbon budget for respecting the 1.5°C limit (with a 67% likelihood) for the period 2020 to 2050 would then be 400 $GtCO_2$.

Table 1: Remaining global carbon budget

Global Warming Between 1850-1900 and 2010-2019 (°C)		**Historical Cumulative CO_2 Emissions from 1850 to 2019 ($GtCO_2$)**					
1.07 (0.8–1.3; likely range)		2390 (± 240; likely range)					
Approximate global warming relative to 1850-1900 until temperature limit (°C)[a]	Additional global warming relative to 2010-2019 until temperature limit (°C)	Estimated remaining carbon budgets from the beginning of 2020 ($GtCO_2$) *Likelihood of limiting global warming to temperature limit*[b]					Variations in reductions in non-CO_2 emissionsc
		17%	*33%*	*50%*	*67%*	*83%*	
1.5	0.43	900	650	500	400	300	Higher or lower reductions in accompanying non-CO_2 emissions can increase or decrease the values on the left by 220 $GtCO_2$ or more
1.7	0.63	1450	1050	850	700	550	
2.0	0.93	2300	1700	1350	1150	900	

(source: IPCC AR6 WG I Summary for policymakers 2021)

In reality, the remaining carbon budget is much lower. The Indicators for Global Climate Change (IGCC) initiative[25] has calculated that a large part of the identified remaining carbon budget in the last IPCC report has already been used in the last three years after its publication. The IGCC estimates the remaining budget from 2023 onwards to be, respectively, 150 $GtCO_2$ (for a 67% likelihood) and 250 $GtCO_2$ (for a 50% likelihood). Translated into linear pathways, IGCC authors, including a member of the ESABCC, indicate that for ensuring a high probability to limit temperature rise to 1.5°C, global CO_2 emissions would need to be net zero by 2035.[26]

WHAT ARE FAIR SHARES?

There are many different ways of sharing the remaining global carbon budget across countries. Both the UNFCCC (Article 3.1) and the Paris Agreement refer to fair shares or equity in the form of 'common but differentiated responsibility and related capability' (CBRDRC). However, this equity concept can also be interpreted in many ways, based around three elements:

- **Equality, which divides the budget according to the size of the population.**
- **Responsibility, which on top of equality takes into account countries' historical use of the carbon budget.**
- **Capacity, which further takes into account a country's economic strength.**

Taking into account historical responsibility and capacity to act can lead to very small, or even net negative, budgets for the EU. Many scientists,[27] including those at the ESABCC, call for tackling the equity issue by a combination of domestic efforts and financial support for efforts in developing countries. NGOs have suggested[28] using the equal per capita approach to define the domestic carbon budget, while further using responsibility and capacity indicators to identify the EU's financial responsibilities. Taking this approach, and based on the EU's average size of the world's population between 2020 and 2050, which is 5.07%, while also converting the 400 Gt CO_2 emissions budget into a greenhouse gas budget,[29] the **EU's fair share of the remaining domestic 1.5°C compatible greenhouse gas budget** for the period 2020 to 2050 is estimated at 27.5 $GtCO_{2\text{-}e}$.[30]

A GLOBALLY FAIR AND APPROPRIATE EU CLIMATE TARGET MUST AIM AT NET-ZERO EMISSIONS BY 2040

The ESABCC, in June 2023, recommended for the EU to adopt a 2040 net greenhouse gas emission reduction target of 90% to 95%. However, the ESABCC, in its advice, also recognised that none of its proposals fully align with the equity principles enshrined in the UNFCCC. The ESABCC further stated that *'[a]dditional efforts to increase the ambition beyond 55% (up to 70% or more by 2030) would considerably decrease the EU's cumulative emissions until 2050, and thus increase the fairness of the EU's contribution to global mitigation.'*[31] This is because the ESABCC had to work within the framework of the existing targets (55% by 2030 and net zero by 2050).

An accompanying study[32] clarifies that the more ambitious scenarios by independent researchers, NGOs and Members of the European Parliament (see section **Fit for 55 is not yet on track to 1.5°C** above at page 3) would align with the per capita fair share approach.

> *'Leaders of developed countries must commit to reaching net-zero as close as possible to 2040, the limit they should all aim to respect.'*
>
> United Nations Secretary General Antonio Guterres
> March 2023

Assessing different scenarios beyond 2030

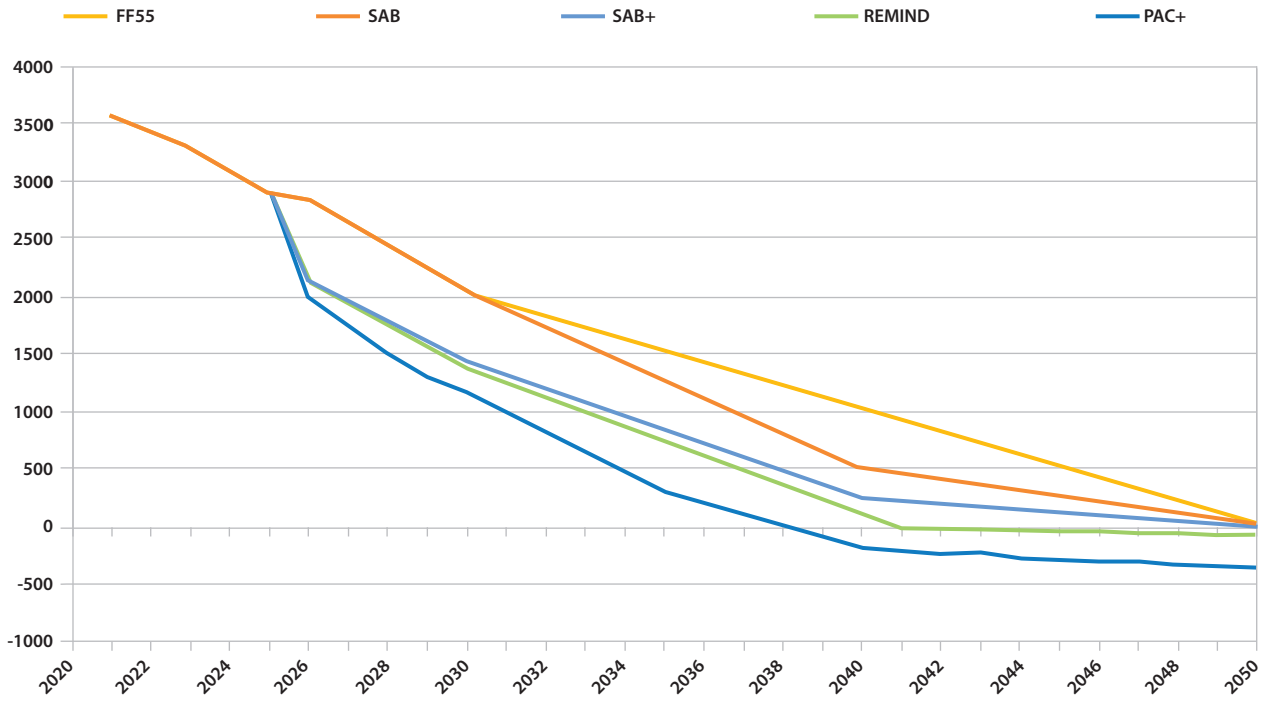
Figure 3 (below) compares the European Commission's official Fit for 55 pathway[33] with two scenarios suggested by the ESABCC (SAB and SAB+)[34] and more ambitious scenarios from independent researchers (REMIND)[35] and from civil society (PAC+).[36]

All these scenarios assume that before 2025, no changes will be made to the existing policy framework. Under this assumption, total cumulative emissions for the period 2020 to 2025 will be 19.55 $GtCO_{2\text{-}e}$ (representing 71% of the 1.5°C compatible per capita EU budget for 2020 to 2050).

These scenarios can be summarised as follows:

- Fit for 55 scenario (FF55): based on existing EU ETS/ESR/LULUCF policies, as well as the EU's Long Term Strategy (Clean Planet for All), a 55% reduction by 2030 and net zero by 2050.
- ESABCC scenario (SAB): based on the low end of the proposal made by the European Scientific Advisory Board on Climate Change, a 55% reduction by 2030, 90% by 2040 and net zero by 2050.
- ESABCC High Ambition scenario (SAB+): based on the most ambitious elements mentioned in the advice of the ESABCC, including 70% net emission reductions by 2030 and 95% by 2040.
- Remind scenario (REMIND): based on the most ambitious scenario assessed by Climate Analytics, including a 66% gross emission reduction by 2030 and reaching net zero by 2041.
- Paris Agreement Compatible (PAC+) scenario: based on 76% reduction by 2030 and net zero by 2040 as indicated in the second iteration of the PAC scenario combined with CAN Europe's position regarding land-based carbon removal potentials (-600 Mt by 2030).[37]

Figure 3: Pathways of different EU27 net greenhouse gas emissions scenarios



(own source)

Table 2 provides the results for each scenario (all GHG targets in percentages as compared to 1990 emissions and/or removals). Total gross emissions include international shipping and aviation emissions. The share of renewables (as percentages of gross final energy consumption) is based on our own calculations, using simplified linear trajectories based on sometimes limited information on renewable energy shares in the different scenarios.

Table 2: Overview of carbon budgets, targets and renewable energy shares under different scenarios

	FF55		SAB		SAB+		REMIND		PAC+	
2020-2050 GHG budget (Gt)	51.5		46.2		37.6		35.0		27.7	
2031-2050 GHG budget (Gt)	21.8		16.4		10.5		8.0		1.6	
Date of achieving net zero	2050		2050		2050		2041		2038	
2030 net emissions (% of 1990)	-57%		-57%		-70%		-71%		-76%	
2030 emissions/removals (% of 1990)	-53%	+48%	-53%	+48%	-65%	+48%	-66%	+52%	-65%	+187%
2035 net emissions (% of 1990)	-68%		-74%		-83%		-84%		-94%	
2035 emissions/removals (% of 1990)	-62%	+67%	-68%	+67%	-76%	+67%	-78%	+70%	-82%	+187%
2040 net emissions (% of 1990)	-78%		-90%		-95%		-97%		-104%	
2040 emissions/removals (% of 1990)	-72%	+85%	-82%	+85%	-88%	+85%	-90%	+88%	-92%	+187%
2030 share of renewables in gross final energy consumption (%)	42.5%		42.5%		58%		55%		58%	
2035 share of renewables in gross final energy consumption (%)	54%		64%		74%		68.5%		74%	
2040 share of renewables in gross final energy consumption (%)	66%		85%		90%		82%		100%	

(own source)

It is clear that only one of the five above scenarios would fit with a per capita fair share of the remaining global carbon budget with a 67% likelihood to limit temperature rise to 1.5°C, which is the PAC scenario. The PAC scenario assumes for emissions to be net zero before 2040 and includes a 2035 net emissions reduction target of 94%. Furthermore, the PAC scenario has a very high reliance on land-based carbon removals and achieving the net targets might include even greater efforts in emission reductions if these high removal targets are not achieved.

All other scenarios, including those from the Scientific Advisory Board, **fail to stay within the minimal fair share of the remaining carbon budget.** They align with: a 50% likelihood of staying below the 1.5°C limit (REMIND); a 83% likelihood of staying below 2°C (SAB+); a 67% likelihood of staying below 2°C (SAB); and a 50% likelihood of staying below the 2°C limit (FF55).

'Despite the accelerating climate disasters, insufficient mitigation efforts mean the world is on track for a temperature rise far beyond agreed climate goals during this century.'

UNEP Emissions Gap Report 2023

CONCLUSION

It is very clear that if the EU wants to make a fair contribution to the effort to limit temperature rise to 1.5°C, it will need to follow the recommendation of UN Secretary General Antonio Guterres and aim for achieving net-zero GHG emissions by 2040 rather than by 2050. This means **the new EU 2040 target should become a net-zero target.** It makes sense for the EU to set a very ambitious **2035 target of around 95% net GHG emission reductions at the same time.**

To achieve such ambitious targets, the EU should implement at home what it agreed as part of the **First Global Stocktake** under the Paris Agreement: tripling renewables; doubling energy efficiency; phasing out fossil fuel subsidies and transitioning away from fossil fuel use; reducing methane (from all sectors); halting and reversing of deforestation and forest degradation; and transitioning to sustainable lifestyles and sustainable patterns of consumption and production.

The new European Commission should work, together with the European Parliament and the EU Member States, on the following four recommendations:

1. Only by substantially **reducing its demand for energy, materials and resources** will the EU be able to achieve 95% emission reductions by 2035 and net zero by 2040. Consequently, the European Commission needs to develop sustainable material policies and an action plan to tackle lifestyle challenges, particularly in relation to transport, housing and diets, to cut **energy demand by over 45% by 2040**.

2. Reducing energy demand should be complemented by action to phase out the production and consumption of fossil fuels. On an even shorter timeframe, the EU should end all forms of support, through subsidies and otherwise, for fossil fuels. The EU should set clear deadlines for all EU Member States to **phase out coal use by 2030, fossil gas use by 2035 and oil use by 2040**, in parallel to ambitious and binding renewable energy targets that **increase the share of renewable energy to 75% in 2035 and 100% in 2040**.

3. New EU policies must ensure that those who stand to lose out economically from the transition away from fossil fuels get **access to the benefits of the energy transition** – be they countries, regions, industries, communities, workers or consumers. Hence, the EU must provide legislation to ensure social and ecological change benchmarks, deliver dedicated funding streams, support retraining, and promote social dialogue.

4. Besides its energy transition, the EU also needs stronger policies that increase its **land-based carbon removal capacity** in ways that support biodiversity, as well as the rights of indigenous peoples and local communities. Agricultural policies need to align with the net-zero target and ensure they contribute to **radical emission reductions from agriculture and livestock**.

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