

Why the EU needs an emission budget

20 November 2020, Nils Meyer-Ohlendorf

Key messages

What matters for the climate is the total amount of emissions and removals over time and corresponding levels of atmospheric greenhouse gas (GHG) concentration. The current focus on reductions achieved as of a specific moment in time disguises this. Emission budgets that quantify the total amount of permissible emissions would address this problem. Like a bank account, they can clearly communicate the amount of permissible and remaining emissions.

The EU should establish an emission budget within its Climate Law. This emission budget should include all GHG emissions, not only CO₂. This would make explicit what is already implicitly set by the EU ETS and Climate Action Regulation, enhancing transparency of EU climate policies significantly. Such emission budget would require the EU to justify the calculation of its share in remaining global emission. It would also facilitate public debate and political agreement on the criteria used for estimating emission budgets, such the probabilities that societies are ready to accept to reach specific temperature targets.

Around **412 ppm** – this was the CO₂ concentration measured in October 2020. This **figure is one of the single most important number of climate policy making** because of a simple equation: the higher the GHG concentration, the greater the likelihood of dangerous climate change. Staying below relatively safe atmospheric GHG concentrations requires that only a very small amount of GHG is emitted. Estimates for staying below 1.5°C with 50% probability range between 630 – 750 Gt CO₂eq, with the median of 680 Gt CO₂eq, for the period between 2018 and 2050.¹ Although estimates of remaining emission vary significantly, they make one thing clear: **what matters for the climate is the total amount of emissions and removals** over time, less so specific reductions at a certain moment in time expressed in reduction targets.

EU climate policies recognize the fundamental importance of total emission volumes for climate protection. Through its cap, the ETS establishes total amounts of permissible emissions for the sectors covered. Complementing the ETS, the Effort Sharing Decision (ESD) and the Climate Action Regulation (CAR) set the quantity of permissible emissions for the sectors outside

¹ IIASA (2019): IAMC 1.5°C scenario explorer

the ETS – until 2030.² Jointly ETS, ESD and the CAR quantify permissible emissions for each Member States and combined for the EU as a whole. This is called the emission budget, which can include – in principle – only CO₂ or all GHGs (see below). Along these lines, Article 15.2 of the Governance Regulation stipulates that the EU long- term strategy for greenhouse gas emissions reduction includes, among others, an analysis of the “remaining global and EU’s carbon budget”.

While providing this important function, none the less the current system has **important problems that reforms need to address:**

- **EU emission budget is only set until 2030:** The EU only has an emission budget until 2030 – when the CAR ends – but not until 2050, when the EU intends to become climate neutral. This is a serious shortcoming because the EU’s fair contribution to global mitigation efforts remains unquantified and – in consequence – in the dark.
- **EU’s existing emission budgets are obscure:** The EU emission budget is not derived from a clear political *ex-ante* decision introducing a quantified emission budget but only from a calculation of reduction of targets and trajectories. Although mathematically simple, this system does not state explicitly the overall amount of emissions permissible according to the ETS, ESD and CAR. This makes the system unclear and only accessible to experts. The various flexibilities in the ETS, the ESD and the CAR obscure the EU’s 2030 emission budget further. This is a major shortcoming because the lack of transparency hides the importance of total cumulative emissions and – crucially – the urgency for immediate action.
- **EU reduction trajectory will probably be weaker in the future:** The EU’s current emission budget is derived implicitly from reduction targets and legally binding trajectories, either set by the ETS or the CAR. As it is unclear whether legally binding trajectories will continue after 2030³, it will become more difficult to set reliably the overall amount of eligible EU emissions until 2050.
- **Putting EU climate policies clearly into the context of global climate action:** In order to define the EU contribution to global efforts to limit temperature increases to well below 2°C or even below 1,5 °C, it is necessary to establish the EU’s fair share of the remaining global emission budget. The current focus of EU climate policies on targets disguises the EU’s share in remaining global emissions. The current system also conceals the criteria applied for defining the amount of remaining global emissions (e.g. temperature goals and probabilities for meeting them) and for calculating the EU’s share (e.g. per capita

² According to Article 4.3 of the CAR, the Commission allocates the amount of AEAs in terms of tonnes of CO₂equivalent to Member States through an implementing act. The Commission calculates the AEA quantities on the basis of specific Member State targets and a linear reduction path. In the case of the ESD, the reduction trajectory is a linear pathways from the average emission of 2008-2010 to the respective 2020 targets (Article 2.2). The CAR applies the same principle but the linear reduction path starts at the average emissions 2016 - 2018 and ends at the respective 2030 target (Article 4.2 and 4.3). Member States’ emissions have to stay with the allocated AEA quantities – either by reducing their emission accordingly or by applying the regulation’s flexibilities.

³ Council is calling for indicative trajectories in the European Climate Law, and the Commission is considering to discontinue the CAR and – as a possible consequence – legally binding reduction targets and trajectories.

emissions and cost effectiveness). The EU is not required to justify publically its share in remaining global emission that it has quietly self-allocated through its reduction targets and trajectories.

A quantified emission budget for the EU would solve these problems. Possibly set by the Commission, this budget should represent EU's fair share of the remaining global emissions. Like a bank account, it would clearly communicate the amount of remaining emissions. It would end the problematic focus on achieving reduction targets at a specific moment in time, when it is actually the overall amounts of emissions that are relevant for climate protection. The emission budget should guide EU climate policies, in particular for setting trajectories and targets.

Regardless of these benefits, emission budgets have raised a number of **concerns but all of them can be addressed, strengthening the case for emission budgets further:**

- **There is no GHG emission budget but only a carbon budget?** The IPCC has estimated carbon budgets but no GHG emission budgets.⁴ The IPCC assessed that CO₂ emissions are projected to reach net zero well before non-CO₂ emissions but it is silent on GHG emission budgets. This complicates estimating global GHG emission budgets but it does not render it impossible. Although it is scientifically more challenging to estimate the world's GHG emission budgets than its carbon budgets – different greenhouse gases have different global warming potentials –, it is possible as it is possible to calculate CO₂ equivalents, the standard method to compare GHG emissions on the basis of their global-warming potential. In addition, it is the cumulative amount of GHG emissions – not only CO₂ emissions – that contribute to climate change, underlining the need for a political agreement on the permissible amount of GHG emissions. GHG emission budgets would also help draw necessary attention to non-CO₂ mitigation.
- **Are global emission budgets too uncertain?** Estimates of emission budgets differ considerably. The remaining carbon budget consistent with limiting warming to 1.5 °C allows 20 more years of current emissions according to one study, but is already exhausted according to another.⁵ Even the same budget estimates, including the IPCC assessment reports, can change over time. This is because estimates use different temperature goals, different probabilities for reaching them, different overshooting scenarios, or different Earth feedback projections. In consequence, uncertainties appear so large that emission budgets lack policy utility.⁶

It is true that there is no magic number quantifying emission budgets once and for all. At the same time, this is not an argument against emission budgets, but an argument for reviewing them regularly. These uncertainties are also a powerful argument for public debate and to take political decisions on underlying assumptions: which probabilities is the

⁴ IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C.

⁵ Glen Peters: Beyond carbon budgets: https://www.nature.com/articles/s41561-018-0142-4.epdf?shared_access_token=3wibX529e9_t6lr7L9qMrtRgN0jAjWel9jnR3ZoTv0N_KhMjhNgCl_1iWCl_f50OWLRRUrwH4niafQnrXR7x1FuczoM00Ss-MJhk8YHoyvULoRhxE9iWeYDr3r4XI0j_oVMJB4iuzNI94vAQ7OF7_sxVlfbJay6DOQz-A-QvnZU%3D

⁶ Glen Peters: Beyond carbon budgets, above

world ready to accept to reach or miss a specific temperature target, and which overshoot scenarios and Earth feedbacks are acceptable for societies? It should also be noted that reduction targets and trajectories face exactly the same uncertainties that emission budgets have but only in an obscure way – as they implicitly result in an overall amount of permissible emission and effectively in an emission budget they are confronted with the same uncertainties and need to be reviewed and revised regularly.

- **Is it impossible to define emission budgets for regions or countries?** There are various criteria that help inform the distribution of the remaining emission budgets between regions and countries. Criteria include cost-effectiveness (global mitigation costs) and equitable considerations (historic emissions, national capacities, per capita emissions or GDP). Depending on the criteria, the EU's emission budget varies considerably. This makes setting EU emission budgets complicated, but – like target setting – this complexity needs to be solved by a political decision weighing the various criteria for defining emissions budgets. This political decision also has the potential benefit of making the criteria for setting regional emission budget transparent to citizens and the world.
- **Are there emission budgets left?** Emission budgets for the EU (or other regions) are occasionally confronted with the allegation that the EU has already exhausted its fair share in remaining global emissions. Because there is no emission budget left establishing one is futile or even counterproductive. This argument is not correct for two reasons: First, depending on the criteria and assumptions chosen the EU has an emission budget remaining. The Commission, for example, indicates that a 1,5 °C EU-28 carbon budget compatible for 2018-2050 would amount to 48 Gt CO₂.⁷ Second, if the EU had no emission budget, it would be equally unfounded to set reduction targets and trajectories because in combination both constitute – implicitly – nothing else but an emission budget.
- **Does an emission budget disempower politics?** Emission budgets have been criticized for sidelining democratic processes because they set quasi automatically remaining emissions through defining global emission budgets exclusively on the basis of science, and distribute this global budget to regions according to specific mathematical formula. This argument is not correct because setting the emission budget for the EU remains a political decision which is based on a normative weighing of specific criteria (see above).

⁷ In its in-depth analysis in support of the Commission Communication of 28 November 2018