Global Policies to Phase Out Fossil Fuels

Adrien Fabre*

May 8, 2025

Abstract

*CNRS, CIRED. E-mail: adrien.fabre@cnrs.fr.

1 Where do we stand? What do we need?

1.1 A critical assessment of the current regime

The international climate policy regime is laid down in the United Nations Framework Convention on Climate Change (UNFCCC), and its offshoot, the Paris Agreement. The consensus of the international community in favor this regime and its common temperature target is an immense success: the UNFCCC has been universally adopted, and

the Paris Agreement has been ratified by all countries but three (Iran, Libya, and Yemen), before the U.S. withdrawal. As the UNFCCC takes its decisions by consensus, this also results in major limitations: agreements rest on the lowst common denominator and fall short of achieving any substantial progress on international climate action. In this section, we review the current regime and its most likely developments.

1.1.1 Developed nations taking the lead

The UNFCCC introduces the distinction between developed and developing nations: the former shall provide financial resources to the latter to promote their sustainable development and climate action. While aimed at sharing fairly the costs of climate action, this classification dates from 1992 and is now outdated. For example, while Singapore, South Korea, Saudi Arabia and Slovenia are all richer than Greece, only the latter is considered by the UNFCCC to be a developed country with financial obligations. This outdated classification is stalling progress in critical negotiations, as newly high-income countries resist being considered developed, and historically developed countries are reluctant to increase their contributions unless all high-income countries do so.

While high-income countries should indeed provide resources for foster climate action in lower-income countries, the determination of required transfers should not rest on an outdated, binary classification; it should be defined using up-to-date, continuous indicators such as the GNI per capita. A simple yet fair rule would be that a country's contributions are to be made in proportion to GNI and entitlements in proportion to population.

1.1.2 CBDR

In its Article 1, the UNFCCC states what is now known as the *CBDR* principle: "Parties should protect the climate system (...) on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities." This Article is commendable in its objective to guide the allocation of the burden of climate action between countries and reconcile different burden-sharing principles: common action, equity, historical responsibility, ability to pay, etc. Unfortunately, the CBDR principle only offers vague and inconsistent guidance. For example, does equity refer to equal per capita emissions rights or to something else (equal cost of emissions reductions, equal access to development)? How should we balance rules that result in different allocations of emissions rights, such as common action, equal per capita, historical responsibilities and ability to pay? As the key question of the burden-sharing rule was left unresolved by the CBDR principle and its multiple possible interpretations, countries are not able to agree on binding targets of emissions reductions and financial transfers by country.

1.1.3 NDCs

This absence of consensus on burden-sharing led to the system of Nationally Determined Contributions (NDCs), where each country sets its own targets. Countries are not sanctioned if they fail their targets. Countries do not even have to define their target using a common indicator (such as their future cumulative emissions). As NDCs rarely specify a cumulative emissions target, researchers need to formulate hypotheses to assess whether NDCs are jointly consistent with the universally agreed temperature target.[1] Even in the most optimistic hypotheses, NDCs are insufficient to meet the temperature target. If all countries respect their NDCs, global GHG emissions should be 51 $GtCO_2e$ in 2030, while 41 Gt would be needed to meet the 2 °C target with a 66% chance.[4] According to the Climate Action Tracker, current policies and actions correspond to a global warming of +2.7 °C by 2100, a warming may continue to rise beyond that date.

1.1.4 ITMOs

The article 6.2 of the Paris Agreement allows Parties to exchange Internationally Transferred Mitigation Outcomes (ITMOs). This enables a country to nominally reduce its emissions (the emissions as counted to assess its NDC) by purchasing an ITMO to another country. The latter country will then be credited with the buyer's ITMO emissions. As any bilateral agreement on ITMO is permitted, the use of ITMOs risks reducing the buyers' domestic decarbonization efforts. Indeed, to the extent that the NDCs do not add up to the global emissions reductions objective, ITMOs would not reflect the required mitigation constraint, and their price of ITMOs will be too low. As a result, ITMOs may propagate a global lack of ambition to countries with otherwise ambitious NDCs, offering a cheap (and less effective) alternative to domestic decarbonization.

To prevent ITMOs from weakening domestic action, countries that use them should commit to extra rules, beyond verifying the environmental integrity of the ITMO they buy. In case of linkages between domestic carbon markets, the same rules would be required to the cross-border (or rather, cross-market) purchase of emissions allowances. Let us call *sellers* the countries that are willing to sell ITMOs, and *buyers* the countries they agree to sell them to. The extra rules could be as follows:

- Sellers and buyers should include a cumulative emissions target (i.e. a national carbon budget) in their NDC, decomposed in yearly targets.
- The joint carbon budget of sellers and buyers should be compatible with the Paris temperature target. If the group sellers and buyers does not include all countries,

[1] Note that the temperature is itself vague. Article 2 of the Paris Agreement aims at "holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels." Yet, given the uncertainty around the climate system, this (double) target is not precisely defined: does it mean a 83% chance to limit global warming to 2 °C? A 67% chance? A 50% chance? Each probability is associated with a different carbon budget – respectively 900, 1,150, and 1,350 $GtCO_2$ starting in 2020, according to the IPCC (AR6, WGI, p. 39).

their joint carbon budget should correspond to their population share of the world's budget.

- The joint carbon budget (of sellers and buyers) in a given year should be lower than their preceding year's joint emissions, by at least (say) 2%.

If a group of sellers and buyers agrees to these rules, they would effectively impose the principle of an equal per capita allocation of emissions rights, at least to govern the allocation between their group and the rest of the world. While alternative allocation principles are possible, the operationalization of the cross-border trading of emissions allowances (or ITMOs) needs to rely on an allocation principle. The inadequacy of NDCs (taken jointly) proves that the global climate regime cannot rely on diverse and self-serving allocation rules to divide the global carbon budget into consistent national targets.

1.1.5 Climate finance

An equal per capita allocation of emissions rights corresponding to the remaining carbon budget would entail transfers approaching 1% of the world's GDP (or $1 trillion per year) from high to low emitters, that is from the Global North to the Global South. Taking into account historical responsibilities for emissions, an equal per capita allocation of cumulative (past and future) emissions rights would entail even more transfers (the carbon debt that the North owes to the South is estimated at $26 trillion[5]).

At COP29, the international community reached a compromise concerning the New Collective Quantified Goal (NCQG): Developed countries committed to mobilize $300 billion per year by 2035 for developing countries for climate action (and countries "call on all actors" to mobilize $1.3 trillion, which would be in line with experts' recommendations[10,13]). Although the quantum of $300 billion represents a tripling of the previous climate finance goal, it can be reached through loans (including from the private sector), and does not specify what share should be provided as grants (or grant-equivalent concessional loans). In fact, the current goal of $100 billion is met with only $26 billion provided in the form of grants. In theory, the NCQG could be met with the same amount of grants (i.e. North-to-South transfers), or even less.

In contrast, at COP29, "India specified that the NCQG should mobilize $1.3 trillion, of which at least $600 billion should come in the form of grants and equivalent resources."[3] India, voicing Global South concerns, stated it was "disappointed in the outcome which clearly brings out the unwillingness of the developed country parties to fulfill their responsibilities. We cannot accept it." Transfers aligned with Global South's demands would allow enormous progress towards the Sustainable Development Goals, including climate action but also the deployment of public services and poverty reduction programs. Conversely, an insufficient provision of climate finance does not only infringe on climate justice, it also jeopardizes decarbonization in the Global South, as many countries make their NDC conditional on the adequate provision of climate finance.

Together with more North-to-South transfers, reforms to the international financial systems are needed to reorient financial resources towards climate action. These reforms

are multifaceted and are more likely to be accepted by governments in the Global North than direct transfers, since that they rely on mostly painless, growth-enhancing accounting operations. The government of Barbados (supported by the UN Secretary-General) leads the movement in favor of these reforms. Their "Bridgetown Initiative" calls for debt relief for low-income countries, for a new issuance of at least $650 billion in Special Drawing Rights by the IMF to expand the loans of Multilateral Development Banks (MDBs) to at least $500 billion per year, and for public guarantees to lower interest rates on sustainable projects in the Global South.[2] Note that although the Bridgetown Initiative is most famous for its climate finance proposals, it also calls for other reforms, such as a universal carbon price and international taxes on the super-rich funding global public goods.

While a scaling up of climate finance is crucial, it is not sufficient to decarbonize the world as it does not cap (or directly reduce) emissions. In the worst case scenario, the expansion of low-emissions projects would mostly add up low-carbon infrastructures on top of fossil ones, failing to meaningfully reduce emissions.

1.1.6 JETPs

The last piece of the climate regime worth mentioning is the Just Energy Transition Partnerships (JETPs). JETPs are mechanisms where one developing country essentially commits to emissions reductions through the deployment of renewable energy in exchange for concessional terms on the required loans by a group of developed countries. Four JETPs have been signed so far, involving Indonesia, Vietnam, South Africa, and Senegal.[8] In existing JETPs, the groups of developed countries pledged to offer loans ranging from $2.5 billion (for Senegal) to $20 billion (for Indonesia).

While JETPs offer a promising way to deliver climate finance in a way that guarantees emissions reductions, they currently suffer from several shortcomings. First, their coverage is limited (in terms of sectors and countries). To improve the sectoral coverage and efficiency of JETPs, researchers have proposed to design them as a financial transfer in exchange for a national carbon price. Second, as they focus on emissions reductions rather than sustainable development, JETPs do not contribute to poverty reduction. This concern could be mitigated by JETPs with a higher reliance on grants.[1] However, a higher provision of grants is difficult to achieve absent a dedicated source of revenue (such as an international tax).

Lastly, even if JETPs were improved along the previous lines, they would still fail to guarantee that the decarbonization of big emitters like China or the European Union is consistent with required global efforts.

1.2 Objectives for a truly sustainable regime

Now that we have a critical understanding of the current international climate regime, let us sketch the properties we desire for a new (or improved) regime. We will then be able to assess different proposals in light of these objectives. Here they are:

- **Temperature**. An effective climate regime should achieve the Paris Agreement's temperature target. It should do so by a stabilization of the concentration of each GHG in the atmosphere, and abstain from climate engineering risky bets such as Solar Radiation Managements. This objective would translate into a global carbon budget. For example, the carbon budget could be set at 1,000 $GtCO_2$ starting in 2025, which corresponds to most likely warming of +1.8°C a 67% chance to keep global warming below +2°C.

- **SDGs**. A holistic approach requires solving all humanity's greatest challenges, not just climate change. As explained above, climate justice requires sufficient North-to-South transfers to fund sustainable development (not just climate action). Even though the Sustainable Development Goals (SDGs) and the planetary boundaries would require additional policies and transfers, one important feature of the climate regime is how much climate finance it delivers in the form of transfers to the poorest and improved market conditions. This can be measured through SDGs indicators or GDP per capita in low- and lower-middle-income countries.

- **Efficiency**. As stated by the UNFCCC since 1992,[12] "measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost." Economists have shown that ensuring cost-effectiveness require an economy-wide carbon price, uniform across sectors and countries. This fundamentally results from the fact the social cost of emissions are independent from their source or location, therefore they should be priced uniformly. Note that this argument in favor of carbon pricing does not preclude other, complementary policies: these have also been shown to be optimal by economic analysis.[11]

- **Acceptability**. An interesting international agreement is one that has good chances to be accepted by most countries. To measure the success of a proposal, we can use the share of global emissions that are covered by participating jurisdictions. Different elements contribute to acceptability:

  - *Progressivity at the top*. If costs are concentrated on the richest households, the regime can benefit the majority in each country while addressing the excessive level of inequality.
  - *No loss in middle-income countries*. Countries whose population is not rich should not lose from an international climate policy. To assess whether a country loses or not, we should compare its situation in the new regime compared to the status quo. If we synthesize a country's situation by the carbon budget it is granted, a country would lose if its carbon budget is lower than their unconditional NDC completed by the ambitious emissions trajectory that the country currently envisions.
  - *Win-win*. While (per the SDG objective) transfers would be required from high-income countries, this does not necessarily mean that these countries' population would lose out. First, because (as stated above), redistributive policies can

concentrate the costs on the richest households in their country. Second, everyone would benefit from a stabilized climate and from a world where SDGs are met. For example, sustainable development would spur global demand, including for advanced technology and low-carbon exports from industrialized economies. Third, while transfers imply a loss compared to the situation with the same worldwide decarbonization efforts and without international transfers, the latter situation is unlikely (as transfers are necessary to promote decarbonization in the Global South). As above, the situation that should be used as a point of comparison is the status quo where the country's carbon budget corresponds to its unilaterally planned emissions trajectory and where there is no international trade in emissions allowances. To the extent that transfers are the counterpart of the purchase of emissions allowances, a new climate regime could be a *win-win* for all participating countries, as they would all reap the efficiency gains of an optimal location of emissions reductions.

Coalition of the willing . International negotiations have shown that it is illusory to seek universal agreement for an ambitious agreement. Therefore, political realism requires pushing for proposal that do not get accepted by all countries, and thus, that may also fail to deliver on the climate target, as countries outside the coalition would not fulfill their part of the temperature objective. If oil exporting countries, representing 25% of current emissions, do not join the coalition, temperature in 2100 would be about 0.3°C higher than with a universal participation to decarbonization efforts. While this outcome would be a partial renouncement to some objectives (full acceptability, temperature target), it is probably the only type of outcomes that is accessible given the political balance of power.

2 A Fossil-Free Union

Having in mind the shortcomings of the current regime as well as the objectives of a new regime, we are now equipped to propose an international agreement to phase out fossil fuels in way that is cost-effective, promotes sustainable development, and acceptable to most countries.

2.1 The principles for a Fossil-Free Union

The Union would be open to any country, as well as subnational entities (such as U.S. states).

Emissions Trading System The Union would put in place an international Emissions Trading System (ETS), that would add up to existing ones. All sectors except agriculture and land-use (LULUCF) would be covered. In particular, the ETS would cover (domestic and international) aviation. International shipping could also be covered, replacing the

system established by the International Maritime Organisation. The ETS would cover all gases emitted in industrial or energy processes, as in the Korean ETS. Namely, the ETS would cover CO_2, N_2O, PFCs, SF_6, HFCs, as well as methane emissions from industrial processes, fossil fuel extraction, and waste management (but not methane emissions from agriculture).

Complementary policies such as the Tropical Forest Forever Fund would be needed to cover LULUCF sectors. This is important to avoid carbon leakage that would substitute fossil fuels by biomass obtained through deforestation.

Emissions allowances would be fully auctioned by an ad hoc international authority to polluting companies upstream of the supply chain. Carbon pricing revenues would be returned to countries based on their yearly carbon budget.

National carbon budgets Each country would be granted a carbon budget between the starting year (say 2030) and net-zero (say in 2080).

Each country would then describe how they would divide their carbon budget intertemporally. As such, the yearly trajectory of the Union's emissions over the next fifty years would be known at the starting year. Each country would be relatively free on the intertemporal breakdown of their carbon budget, though this choice would have to respect some constraints, developed in Section 2.6, and related to the rules to avoid hot hair proposed in Section 1.1.4.

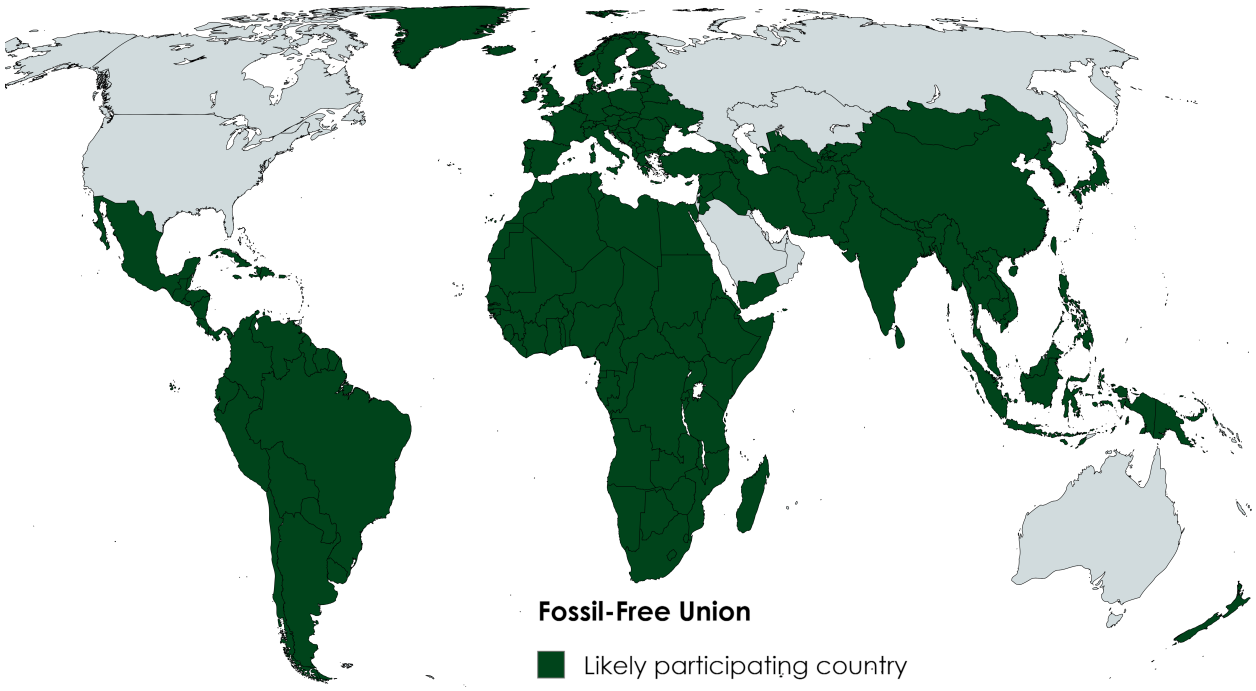
Adjusted per capita allocation By default, each country would be granted a carbon budget corresponding to an equal per capita share of the remaining global carbon budget. This allocation can be understood as an equal right to pollute for each human, irrespective of their country. Such an allocation would induce international transfers from agents (people or countries) with a carbon footprint higher than the world average, to agents with a lower carbon footprint.

As future population is unknown (and can be affected by policy choices), the benchmark per capita carbon budget would be based on the population share taken at the starting year. Then, some departures from the benchmark would allow adjusting to special circumstances.

To prevent transfers flowing from lower-income countries to high-income countries, high-income countries would be granted a carbon budget corresponding to their ambitious decarbonization pathway. In particular, the European Union would be granted emissions allowances in line with its NDC, with 90% emissions reductions in 2040 (compared to 1990), and net-zero in 2050. This represents less than half of EU's benchmark equal per capita share.

To prevent middle-income countries from being net contributors of international transfers, countries would be allowed to propose further departures from the benchmark allocation, to the extent that the Union's carbon budget is respected. These departures from the benchmark need to be agreed by a qualified majority of participating countries, i.e. countries representing a majority of emissions within the Union.

Figure 1: Countries likely to participate in the Fossil-Free Union.



In particular, middle-income countries with emissions per capita above the world average, such as China, Iran, or South Africa, could be granted a carbon budget equal to the cumulative carbon footprint corresponding to their own ambitious decarbonization pathway.

Universal cash transfer The Union would encourage countries to return the ETS revenue to the population through an equal cash transfer. In particular, the Union would develop standard and provide technological resources to distribute the cash transfer.

The equal cash transfer would compensate people for the rise in fossil fuel prices. The transfer would reflect each person's equal right to pollute, as it would work as if the person would have sold this right to polluting companies at the carbon price.

Countries that choose not to distribute all revenue through a cash transfer would have to prove that they spend it in a way that leaves no one behind.

2.2 Likely participating countries

Countries that would not lose from the policy are expected to join: these include all low- and middle-income countries, as well as high-income countries with an ambitious decarbonization plan. The map in Figure 1 shows which countries are likely to join the Union. These countries represent 74% of current emissions.

2.3 Allocation of emissions rights

Policies currently implemented in the prospective Union would imply emissions of 792 $GtCO_2$ over 2030–2080, while current NDCs (without accounting for long-term targets) would imply 708 $GtCO_2$. In both cases, emissions are expected to continue after that date.[2] In contrast, enforcing an equal per capita share of the remaining carbon budget would limit Union's emissions to 653 $GtCO_2$ over the period and would achieve net-zero emissions by 2080.

To determine the "non-losing" carbon budget, below which a country could be considered losing, we proceed as follows. For countries with emissions per capita lower than the world average, we use a Contraction & Convergence benchmark, whre emissions rights per capita start at their value in 2030 for current policies and linearly converge to the equal per capita share in 2050. This benchmark implicitly assumes that countries with relatively low emissions would consider as beneficial to their development the pathway that starts with current policies, gradually grants them extra resources for sustainable development (by rights converging to an equal per capita share of the global sum), and then make them to follow the world decarbonization trend. For high-income countries and for China, we use the cumulative emissions implied by their NDCs and long-term targets.[3] Doing so implicitly assume that these countries have the domestic capacity to deliver their long-term targets on their own. These carbon budgets imply slightly more rights than the equal per capita share for China, and less for high-income countries.

Table 1 present the cumulative emissions implied by current policies, *non-losing* budgets, equal per capita ones, and the proposed allocation. The proposed allocation departs from the equal per capita one for China and Western Europe only, which are both allocated a carbon budget corresponding to their NDCs and long-term targets. It is worth noting that the proposed allocation grants Eastern Europe, Japan, and South Korea with their equal per capita share. Indeed, these countries are less rich or have significantly higher emissions per capita than the world average (contrary to Western Europe). Therefore, there is few concern that these countries would turn net recipient from international transfers and no need to apply to them the same exception as for Western Europe.

Table 1 shows that the sum of the Union's proposed carbon budget is 13 $GtCO_2$ (or 2%) lower than its equal per capita share of the world's carbon budget. The unallocated emissions allowances could be used to grant additional countries some extra carbon budget. For the moment, we have only modelled such a departure for China, but a similar one should be granted to other fossil-dependent middle-income countries with relatively high emissions: Algeria, Kazakhstan, Iraq, Iran, Libya, Mongolia, South Africa, and/or Turkmenistan. These countries currently represent 5.6% of global emissions and 3.4% of global population, translating into an equal per capita carbon budget of 22 $GtCO_2$; so the

[2] The data on emissions by region from current policies and NDCs (with and without long-term targets) is given by van de Ven et al. (2023)[14]. Post-2030 action is modelled by extending the average rate of change in emissions intensity of GDP from 2020 to 2030. The global carbon budget (and associated equal per capita rights) follows the scenario SSP226MESGB of Gütschow et al. (2021).[7]

[3] For China, the value is in line with the domestic 2°C target scenario developed at Tsinghua University.[9]

Table 1: Carbon budgets over 2030–2080 for a 1.8°C trajectory (in $GtCO_2$).

	Africa	China	Latin America	India	Europe	Japan & South Korea	Other Asia	*Fossil-Free Union*	*World*
Current policies	88	226	80	143	31	46	179	*792*	*1,214*
Non-losing	124	147	57	115	22	11	104	*589*	*786*
Equal p.c.	144	**134**	62	135	**49**	16	113	*653*	*754*
Proposal	144	**147**	62	135	**23**	16	113	*640*	*754*

extra allowances would cover their needs.

2.4 A win-win deal

Each country colored in Figure 1 would have an interest to join the Union:

- Every country would benefit from a stabilized climate, and from the guarantee that all countries in the Union decarbonize.
- Most countries (including all countries likely to join) would be granted a carbon budget sufficient to avoid a loss from the status quo. Exceptions include Russia, Saudi Arabia and other high-income countries from the Gulf with low climate ambition. Even the U.S., Australia and Canada would enjoy a non-losing carbon budget.
- Lower-income countries would receive transfers from the rest of the world, spurring their sustainable development.
- Countries with an important low-carbon industry, such as East Asian countries, would gain from the stronger demand for these goods.
- High-income countries would benefit from the efficiency gains allowed by international carbon trading.
- Large representative surveys show strong public support in favor of the Fossil-Free Union, even in high-income countries when transfers are presented as a loss and the amount of transfers is specified. For example, there is 54% support in the U.S. and 76% in Western Europe.[6] Moreover, academic research shows that political programs containing the Fossil-Free Union are preferred to similar programs without it by 58% to 60% of citizens in Western countries, suggesting that candidates at an election may win vote intentions by campaigning on the proposal.[6]

2.5 A ratcheted-up ambition

Global temperature reduced by more than half a degree Current policies correspond to a temperature trajectory reaching +2.7°C in 2100 (see Section 1.1.3).

While the carbon budgets proposed in Section 2.3 are based on a +1.8°C trajectory, to the extent that the Union is not universal, they would imply a higher temperature trajectory. The higher temperature achieved is not only due to countries outside the Union exceeding their equal per capita share of the +1.8°C carbon budget. It is also due to higher emissions within the Union that would be efficient in case of universal participation. Indeed, as non-participating countries are those with the largest emissions per capita, their absence from the Union decreases the Union's carbon price below its cost-effective level to achieve +1.8°C. In other words, the non-participation of the largest emitters (in per capita terms) prevents the efficiency gains that would occur should they participate: in this case, they would buy emissions allowances to the rest of the world, raising the demand for allowances and hence the carbon price, and the rest of the world would decarbonize faster (in exchange for transfers).

If the whole world decarbonized at the same rate as the Union, the temperature would reach +1.95°C in 2100. Assuming that emissions in non-participating countries would follow the trend from current policies, the temperature increase expected in 2100 is +2.15°C.

Therefore, the Fossil-Free Union studied here would bring a reduction of global temperature in 2100 of half a degree. Of course, a lower temperature target could be reached by choosing a smaller carbon budget: the Union's decarbonization trajectory is a policy choice.

A sufficiently high carbon price It is important that the Union's carbon price be sufficiently high, for different reasons. First, as transfers are proportional to the carbon price, a substantial carbon price is required to deliver meaningful transfers, finance sustainable development, and convince lower-income countries to join. Second, a low carbon price would entail few decarbonization incentives and indicate that the carbon budget is too high, i.e. the ambition is low. Third, a low price could result in a price hike if a large emitter (like the U.S.) decides to join the Union. This, in turn, would hinder the interest that high-income countries would have in favor of an expansion of the Union to new countries, as their contributions would increase along with the price.

To make sure that the price is sufficiently high, the Union could implement a (steadily increasing) carbon price floor. However, this is not our favorite option. Indeed, adding a price floor would redefine and obscure the distributive effects implied by the carbon budgets. By inducing a price higher than the equilibrium market price, the price floor would entail emissions lower than the yearly allowances and be equivalent to a reduction of each country's emissions allowances. While countries recipient of transfers would be cushioned against these lower allowances through larger transfers, contributing countries would lose out compared to the situation without a binding price floor. This could jeopardize an agreement on the proposed allocation, that has been designed so that industrialized countries neither gain nor lose from the policy. Furthermore, given that we can hardly predict whether the price floor would be binding or whether the equilibrium price would be higher, we can hardly redefine the proposed allocation to mitigate the effects of the price floor.

Instead of a carbon price floor, we propose rules to ensure that there is no excess allowances and that the carbon price increases sufficiently overtime. These rules correspond to the rules sketched in Section 1.1.4 and apply to the intertemporal allocation of national budgets. These rules are that the Union's allowances should not exceed its joint emissions at the starting year, and that they have to decrease every year at a minimum rate of, say, 2%.

If countries cannot agree on an intertemporal allocation of their emissions allowances that respect these rules, the Union's scientific council would propose how to allocate allowances intertemporally in a way that maximizes welfare, thereby preserving the interests of each country. In case the Union rejects the proposal of the scientific council, a price floor would be implemented (say, starting at \$10/tCO_2 and increasing by \$10 each year). The threat of a strong price floor should help countries find an agreement.

2.6 Implementation and governance

2.7 Limitations of the proposal

2.8 Variants of the proposal

3 A Sustainable Union

A The draft treaty

B Discussion

Bibliography

[1] P. Bolton, O. Edenhofer, A. Kleinnijenhuis, J. Rockström, & J. Zettelmeyer. Why coalitions of wealthy nations should fund others to decarbonize. *Nature*, 2025. Link. 6

[2] Bridgetown. Bridgetown Initiative on the Reform of the International Development and Climate Finance Architecture. 2025. 6

[3] E. N. Bulletin. Daily report for 21 November 2024. Technical report, 2024. Link. 5

[4] M. G. J. den Elzen, I. Dafnomilis, N. Forsell, P. Fragkos, K. Fragkiadakis, N. Höhne, T. Kuramochi, L. Nascimento, M. Roelfsema, H. van Soest, & F. Sperling. Updated nationally determined contributions collectively raise ambition levels but need strengthening further to keep Paris goals within reach. *Mitigation and Adaptation Strategies for Global Change*, 2022. Link. 4

[5] A. Fabre. The Global Climate Plan: A Global Plan to End Climate Change and Extreme Poverty, 2024. Link. 5

[6] A. Fabre, T. Douenne, & L. Mattauch. International Attitudes Toward Global Policies. *FAERE Working Paper*, 2023. Link. 12

[7] J. Gütschow, M. L. Jeffery, A. Günther, & M. Meinshausen. Country-resolved combined emission and socio-economic pathways based on the Representative Concentration Pathway (RCP) and Shared Socio-Economic Pathway (SSP) scenarios. *Earth System Science Data*, 2021. Link. 11

[8] M. Ha-Duong & C. Cassen. Just Energy Transition Partnerships at two: Doctrine, executions and way forward. 2023. Link. 6

[9] J. He, Z. Li, X. Zhang, H. Wang, W. Dong, E. Du, S. Chang, X. Ou, S. Guo, Z. Tian, A. Gu, F. Teng, B. Hu, X. Yang, S. Chen, M. Yao, Z. Yuan, L. Zhou, X. Zhao, Y. Li, & D. Zhang. Towards carbon neutrality: A study on China's long-term low-carbon transition pathways and strategies. *Environmental Science and Ecotechnology*, 2022. Link. 11

[10] V. Songwe, N. Stern, & A. Battacharya. Raising ambition and accelerating delivery of climate finance. Technical report, 2024. Link. 5

[11] J. E. Stiglitz. Addressing climate change through price and non-price interventions. *European Economic Review*, 2019. Link. 7

[12] UNFCCC. United Nations Framework Convention on Climate Change. Technical report, 1992. Link. 7

[13] UNFCCC. New collective quantified goal on climate finance. 2024. Link. 5

[14] D.-J. van de Ven, S. Mittal, A. Gambhir, R. D. Lamboll, H. Doukas, S. Giarola, A. Hawkes, K. Koasidis, A. C. Köberle, H. McJeon, S. Perdana, G. P. Peters, J. Rogelj, I. Sognnaes, M. Vielle, & A. Nikas. A multimodel analysis of post-Glasgow climate targets and feasibility challenges. *Nature Climate Change*, 2023. Link. 11

List of Tables

List of Figures

A Appendix

A.1 Additional tables