France's Climate Fair Share

Christian Holz, Tom Athanasiou, Sivan Kartha

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CLIMATE EQUITY REFERENCE PROJECT

réseau action climat france

France's Climate Fair Share

Version 1 (January 2022)

Christian Holz, Tom Athanasiou, and Sivan Kartha, Climate Equity Reference Project

Introduction

Climate change is a shared global problem and therefore requires global solidarity, cooperation, and justice. As a practical matter, no single country can solve its own climate crisis as the degree of the climate emergency is largely depending on the actions (or inaction) outside of its own borders. Thus, countries should ensure they are seen by others as doing their fair share toward the common goal, in order to entice other countries to reciprocal action. The global Covid-19 pandemic has taught us that we are only safe once everybody is safe. And that nationalist approaches (for example vis-à-vis vaccines) which ignore our profound interconnectedness are failing (e.g., because they allow new virus variants to emerge).

Regarding climate change, lack of ambitious and cooperative action on emissions reductions and on adaptation leads to an unsafe future for everybody. However, within this future, those affected first and worst will be those least responsible for causing the harm and least capable of adapting to the impacts, which is a profound injustice. This injustice further extends to future generations, as the failure of past and present generations to leave this planet to our descendants in a state that can support a human civilization similar to the one we're currently enjoying. This all suggests that justice and equity must be at the center of an effective response to the climate crisis. In addition to common sense, the IPCC is also making this point in their assertion that "the evidence suggests that outcomes seen as equitable can lead to more effective cooperation." (IPCC 2014) This is especially important as large swaths of the planet are still experiencing infuriating levels of poverty, suffering and hardship. A just and effective climate response must be cognizant of these circumstances as a climate response that's placing undue burdens on the poor, asking them to prioritize climate action over their own immediate basic needs is poised to fail.

International climate finance and support has long been recognized as a central way in which wealthier countries can help ensure substantial climate action in less wealthy countries, without asking those countries to divert some of their limited resources to climate action at the expense of other important development objectives. This also suggests that, to avoid this trade-off between climate action and other development objectives, climate finance would need to be in addition to, instead of partially replacing, finance provided by wealthier countries as Official Development Assistance. In fact, provision of climate finance for developing countries' climate action is a legal obligation of developed countries under the UNFCCC (UNFCCC 1992, Article 4.3). However, climate finance is also beset by myriad issues that prevent it from fulfilling this role. For example, the $100 billion collective finance goal for the developed countries is woefully insufficient compared to the climate finance needs of developing countries,[1] and contributor countries

1 As this report will show in a later section, the climate finance needs of developing countries are many times this amount. For example, for adaptation alone the UNEP Adaptation Gap Report reports that a figure of up to $300 billion annually by 2030 (while

are not even making sufficient contributions to provide that insufficient amount. And this is exacerbated by the fact that most of the amounts that do get raised flow into mitigation (instead of ensuring a balance with adaptation) activities and that too much of the total consists in loans (which have to be repaid, thus further indebting the recipient nations). With a commitment to reach €6 billion euros a year by 2025 in climate finance, France is far from contributing enough to reach the $100 billion collective goal and far from responding to the growing needs of impacted communities. The quality of France's climate finance is also falling behind: with only 15% of grants-based climate finance, it has one of the lowest proportions of grant-based finance among donors (France 2020). This reliance on loans to deliver climate finance is deeply problematic since it perpetuates poorer countries debt burden. It is also questionable whether the provision of finance through loans (which will have to be repaid) meets the moral and legal obligations to provide finance. Further, the share for adaptation is not reflecting the need for a balance between mitigation and adaptation. France's continuous denial of the need to address loss and damage finance, including at COP26, can also be seen as a way to try and escape the full scope of its responsibilities.

In this context, the purpose of this report is to establish France's fair share of a global climate action effort that is sufficiently ambitious to stave off the worst impacts of the worsening climate emergency. It will do so with a focus on mitigation and provision of finance (while leaving a discussion of France's adaptation actions for a later date) and is based on the universally accepted ethical principles of the United Nations Framework Convention on Climate Change. France's fair share will be expressed as a total mitigation contribution consistent with the temperature limitation objective of 1.5°C as per the Paris Agreement. Within this context, the report will also provide some guidance with regards to the amount of climate finance that France should be providing this year and for the rest of the decade.

Defining the Global Effort

Climate change impacts have far-reaching consequences. Efforts to address climate change require broad responses by societies beyond merely the reduction of greenhouse gas emissions, as important as that is for slowing and, eventually, halting and partly reversing climate change. Efforts also need to address critical adaptation to the level of climate change that cannot be avoided anymore and ways to deal with the impacts of changes that cannot be adapted to, also known as loss and damage. Efforts also need to ensure that during the transformative changes that are required to address the climate crisis the just transition needs of workers and communities at the front lines are properly considered.

Nonetheless, the reduction of greenhouse gas emissions is a very important component of efforts to address the climate crisis and is one of the main objectives of the Paris Agreement. Therefore, in this and the following sections, we will examine the global mitigation effort required to stave off the worst impacts of human-induced climate change. We will also determine France's fair share of this global effort, before, in subsequent sections, returning to questions of

also underlining that this is very likely an underestimate) (UNEP 2021), For mitigation, Pauw et al. (2019) find that over the decade to 2030, the implementation of the conditional portions of developing countries climate action pledges under the UNFCCC (or "NDC," for Nationally Determined Contributions) alone would require financing of an average of $279 billion per year – which would presumably be several times higher for NDCs containing mitigation measures at a level of ambition consistent with 1.5°C (the level of collective ambition contained in the NDCs examined by Pauw and colleagues is not 1.5°C-consistent). And with increasing frequency and severity of climate impacts, the issue of Loss and Damage finance is also paramount.

France's contributions to other important aspects of global climate action, including adaptation, finance, loss and damage finance, just transitions, and so on.

To establish a suitable global benchmark, the Paris Agreement is instructive as it defines the global goal as "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" (UNFCCC 2015, Article 2.1.a). Mandated by the Paris Climate Conference in 2015, the IPCC released a Special Report on the science of 1.5 °C in late 2018, which represents the best available science with regards to determining the global mitigation effort associated with the 1.5 °C Paris Agreement warming limitation goal.

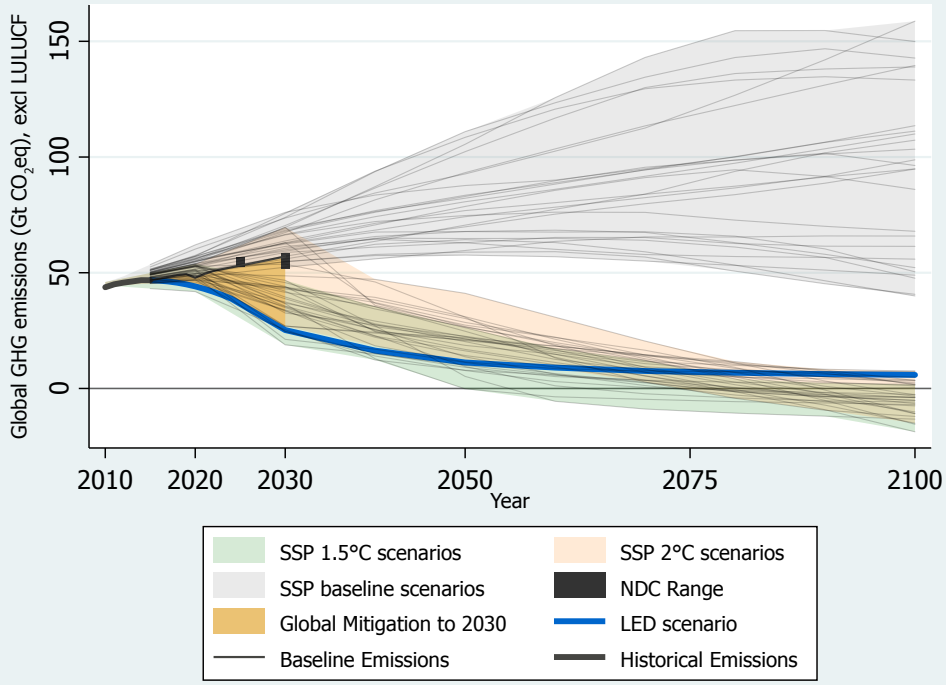


Figure 1. LED Pathway (blue), showing emissions rapidly peaking globally (by 2020), declining 80 % by 2050 and toward zero by the century's end; and the baseline emissions projections used in this study (black solid line to 2050), both in the context of the 1.5°C consistent scenarios (N=13, green area) of recent SSP studies (Rogelj et al. 2018), as well as 2 °C consistent pathways (N=19, pale red area) and baseline projections (N=26, grey area) of the mainstream SSP models (IIASA 2016). The figure also shows the possible range of emissions resulting from current climate action pledges (NDCs) under the Paris Agreement (black boxes) (UNFCCC 2021).

It is important to note that the IPCC report is a summary of scientific studies that have been produced by scientists and that reflect a large and diverse set of assumptions made by these researchers. In particular, the IPCC report includes many different future greenhouse gas emissions scenarios and summarizes and categorizes these scenarios, without making judgements with regards to the plausibility, or social, political, or ethical acceptability of the assumptions behind these scenarios, or their broader implications. Specifically, in many of the 1.5 °C scenarios, an "overshoot" occurs, where temperatures temporarily exceed 1.5 °C and are then brought back to 1.5 °C or below later in the 21st century. Such overshoots carry substantial additional risks of severe climate impacts as well as with regards to irreversible impacts during the overshoot period (e.g., species that went extinct, coral reefs that died off, or glaciers that melted during the overshoot period would not return after temperatures have been brought back down). Furthermore, many of the scenarios also envision the large-scale use of "negative emissions technologies" (NETs), also known as "carbon dioxide removal" (CDR), many of which are based on technology not yet proven to work at large scales, and which therefore might not become

available at the scale assumed and/or carry substantial risks and side effect that make them socially undesirable.[2]

For these reasons, this study utilizes the "Low Energy Demand" (LED) scenario (Grübler et al. 2018) as the relevant global mitigation pathway to determine the level of global mitigation effort required. This reflects the precautionary principle to the determination of the total global effort and follows the example of similar fair shares reports (e.g., CSO Equity Review 2018; Kartha et al. 2018; CAN-Rac Canada 2019; Christian Aid et al. 2020; Holz 2021). This choice is precautionary because the LED scenario avoids the use of NETs/CDR, has no overshoot,[3] and takes as a central scenario design criterion the universal attainment of a "decent living standard" and access to the associated energy services.[4]

Figure 1 shows the LED pathway in the context of other mitigation pathways as well as baseline scenarios modelled in the context of the Shared Socio-Economic Pathways (SSP) initiative[5] (green: 1.5 °C pathways, pale red: 2 °C pathways, grey: baseline scenarios). In contrast to most other scenarios shown, the LED has more stringent near-term greenhouse gas emissions reductions and relatively lower reduction rates later in the century, with low residual emissions remaining through to the end of the century, mainly from agriculture (e.g., methane emissions from rice cultivation and animal husbandry). It is important to note that all figures in this report exclude emissions and removals from Land Use, Land Use Change and Forestry (LULUCF).[6] With LULUCF emissions and removals included, the LED pathway's emissions do go net negative from the 2050s, just like many of the other 1.5 °C-consistent pathways shown. In Figure 1, the orange wedge shows the mitigation through 2030 required between the baseline scenario and the LED mitigation pathway.

2 See (Holz 2018) for more details on CDR (p. 7-8, 11-12) and overshoot (p 13-14).

3 Strictly speaking, it does have an overshoot and is thus officially considered a "low overshoot" scenario in the IPCC report, since its temperature increase peaks at 1.52 °C before going back to below 1.5 °C. However, it is questionable whether the models to estimate the warming impact of scenarios are precise enough to support two decimals of precision, which suggests that rounding to 1.5 °C is appropriate, making it a no-overshoot scenario.

4 See for example CSO Equity Review (2018, pp 5-6) for more details on the Low Energy Demand scenario.

5 The "Shared Socio-Economic Pathways" (SSPs) are a set of story lines that describe possible broad future developments globally, for example, a continued dependence on fossil fuels (SSP5), a world that is much less unequal and embraces planetary boundaries much more than the current one (SSP1), or one which is plagued by a resurgence in economic nationalism and large regional inequalities (SSP4), to name but a few (O'Neill et al. 2015). Those story lines are then used by different research teams (that's the sense in which they are "shared") to explore, for example, specific challenges to mitigation and adaptation the world would face if it went down a particular pathway. The green and orange shaded areas in Figure 1 contain emissions pathways that lead to 1.5°C or 2°C of warming in 2100, respectively. Given the vastly different story lines that the SSPs represent, and the fact that the emissions pathways were modelled by a number of different research groups, this group of results, taken together, is arguably much more robust than a single pathway and therefore presents a suitable context against which to compare single pathways like the one selected here.

6 LULUCF emissions are excluded here for a variety of reasons. First, LULUCF emissions data is subject to very large data uncertainties, especially at the national level. There is no authoritative source of national-level time series data on removals and emissions from the LULUCF sector that has a sufficient level of certainty for being suitable for global fair shares calculations. Furthermore, and relatedly, wealthy countries have negotiated accounting rules under the UNFCCC for accounting of LULUCF emissions that do not reflect the emissions and removals that are actually occurring and may allow countries to report carbon credits from the LULUCF sector even though substantial emissions occurred (Greenglass et al. 2010). Thus, the available data on LULUCF emissions does not lend itself for a robust framework of global fair shares calculations.
A second reason is that, even with accurate data and accounting, a strict fungibility between land-based carbon on one hand and fossil carbon on the other hand is deeply problematic, in that it falsely equates the scope for labile, limited, and multi-purpose stock of carbon on the land to substitute for the permanent and secure stock of fossil carbon deep underground. Third, the extremely close link between land use and other sustainability and human rights concerns suggests that land must be managed within a substantively different type of regime than the UNFCCC, one that focuses on indigenous rights, biodiversity, food security, human rights, watershed protection, etc. lest it risk seriously undermining these other objectives.
Importantly, this is not to suggest that action on land-related emissions is unimportant or does not warrant science- and equity-based assessment, but rather to argue that such actions should be placed in their own holistic context.

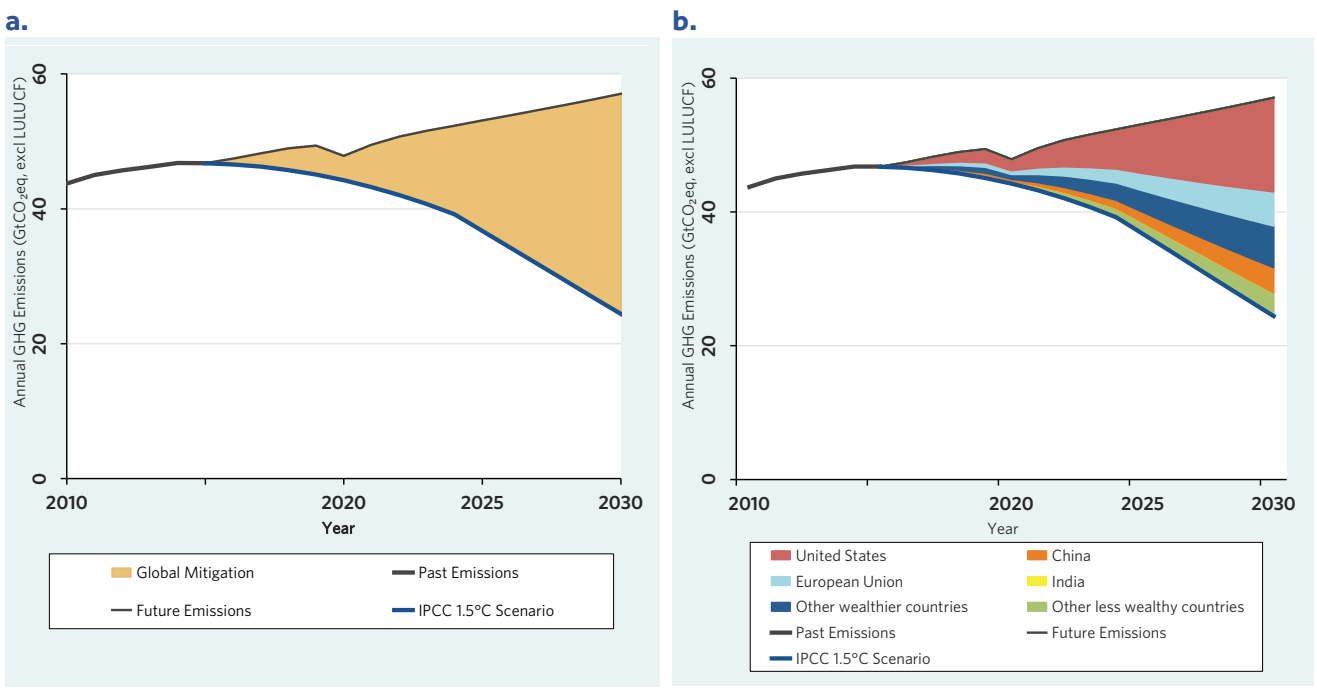


Figure 2. a. LED Pathway and baseline, showing necessary global mitigation (orange shading). **b.** LED Pathway and baseline, showing necessary global mitigation divided into illustrative national shares of the selected countries and groups.

In the LED scenario pathway, global emissions[7] fall to about 24.4 billion tons of carbon dioxide equivalents ($GtCO_2eq$) in 2030. Figure 1 and Figure 2a contrast this emissions level of 24.4 $GtCO_2eq$ in 2030 with current emission levels and with a baseline reference case, that projects future emissions if no mitigation were undertaken (orange wedge). These charts show that, in order to achieve the LED scenario, global emissions would need to be reduced by 32.6 $GtCO_2eq$ relative to the projected baseline emissions in 2030 (approx. 57 $GtCO_2eq$), which is a reduction of more than 50 % in that year.

Determining France's Fair Share of the Global Effort

Having thus established the global level of effort of reducing emissions – as displayed as the orange shading in Figure 1 and 2a, we can ask how much of this global effort would be fair for each country, or indeed, each person, to contribute. One way of answering this question is to divide the global effort among countries according to their responsibility (for causing the problem) and capacity (to help deal with it). Figure 2b shows an example of such an assignment of national fair shares of the global effort to nations (or groups of nations), corresponding to their fair share of the global mitigation effort that is required to achieve the LED pathway's trajectory.

The underlying principles of responsibility and capacity (or capability) are well-established in international environmental law and are, in fact, among the core equity principles in the United Nations Framework Convention on Climate

7 The implementation of the LED pathway in the Climate Equity Reference Calculator that is used here excludes emissions from international shipping and aviation (also known as "bunker emissions") as those are not included in any country's national emissions and are therefore not covered in the Calculator's historical emissions, baseline projections or mitigation pathways. In the case of the LED scenario pathway, those emissions amount to approximately 788 $MtCO_2eq$ in 2030.

Change (UNFCCC), where Article 3 states that countries should contribute to solving the climate crisis "in accordance with their common but differentiated responsibilities and respective capabilities." They were summed up nicely by Al Gore in a *New York Times* op-ed on climate change in the run-up to the Copenhagen climate negotiations in 2009 (Gore 2007):

> "*Countries will be asked to meet different requirements based upon their historical share or contribution to the problem and their relative ability to carry the burden of change. This precedent is well established in international law, and there is no other way to do it.*"

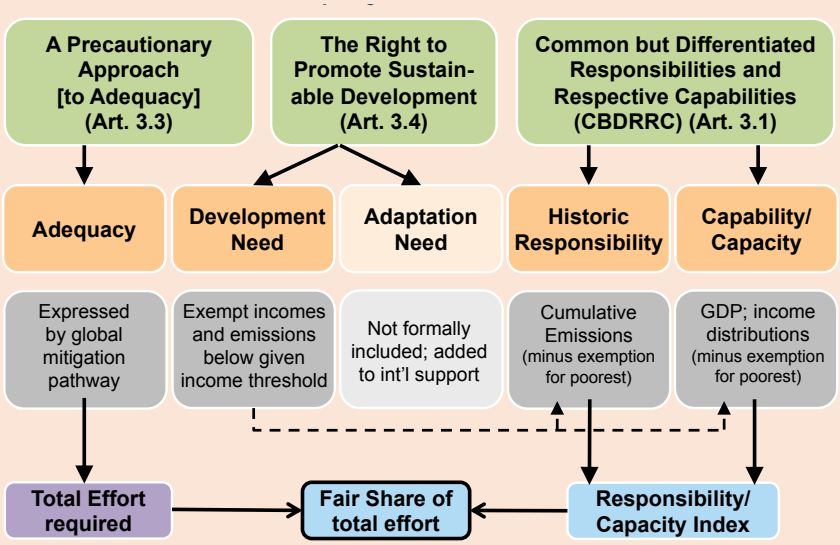
Here, we translate *capacity* and *responsibility* to benchmarks for GHG emissions pledges using a straight-forward approach developed for and applied by the Civil Society Equity Review (CSER) Coalition, which is a coalition of more than 300 groups spanning the global North and South and multiple political and moral perspectives within civil society (CSO Equity Review 2015, 2017, 2018, 2019, 2021). In this approach, *capacity* is based on countries' national income, and *responsibility* is represented by cumulative historic GHG emissions of each country. The CSER coalition defined both of these concepts in modestly progressive terms (akin to a progressive tax). The reasoning here is that, for example when thinking about how much financial resources a country could mobilize for climate action, it would not be fair to treat a poor person's first dollar of income (which would be spent on the means of survival) the same as a rich person's millionth dollar (which would be spent, if at all, on discretionary luxury consumption). While this approach does not propose to actually implement an additional tax on personal incomes, the concept of thinking about a country's capacity follows an approach similar to the one taken by most, if not all, income tax systems. The French income tax system, for example, leaves incomes up to €10,084 per year tax-free (recognizing that individuals earning below these levels have legitimately higher priorities than contributing to the expenses of shared public goods), while the highest incomes are subject to nearly 50% marginal income tax rate.

While, as mentioned, the CSER coalition defined capacity and responsibility in mildly progressive terms, the member organizations of Réseau Action Climat France discussed the specific values that the CSER coalition used in this regard and decided that those values do not well enough represent their collective view of fairness. Specifically, the French groups decided to use a value for the lower income threshold (below which incomes are not counted toward a country's capacity to address the climate crisis) that is meaningful in their French context. The *Institut national de la statistique et des études économiques* (INSEE), a department of the French Economy and Finance Ministry, reports the poverty rate in France in 2018 (the last year with results) as a monthly income level of €1,063 and indicates that 14.8% of the French population receives incomes at or below that level (Delmas and Guillaneuf 2020). Thus, the groups decided to utilize this level, i.e., the income below which 14.8% of the French population fell in 2018, as the level below which all income across the world would be excluded from the calculations.[8,9] Again, the

8 For the calculations with the Climate Equity Reference Calculator, this exemption threshold is expressed in "2005 PPP USD," where "PPP" stands for purchasing power parity. In other words, the level is set a level of "2005 PPP USD" that has the same purchasing power in France in 2018 as the income threshold for the 14.8% of the French population with the lowest incomes, specifically, $17,380 per person per year. Using a lower income threshold that's adjusted for purchasing power parity ensures that a roughly similar standard of living is exempted for each country, regardless of the relative purchasing power of their local currency.

9 A direct comparison with the CSER values (where incomes below $7,500 2005 PPP USD per person per year are exempted) is not straightforward, but according to the modelled income distributions of the Climate Equity Reference Calculator, virtually all

Box: The Quantitative Model of the Climate Equity Reference Framework



The fair shares calculations used here are based on the Climate Equity Reference Framework (CERf), a generalized effort-sharing framework that evolved from the earlier Greenhouse Development Rights (GDRs) framework (Baer, Athanasiou, et al. 2008; Baer et al. 2009; Baer, Fieldman, et al. 2008). The figure shows the general structure and implementation of the CERf.

Taking as a point of departure the equity principles of the United Nations Framework Convention on Climate Change (UNFCCC 1992) (green, indicating the relevant UNFCCC article in parenthesis) – (i) precautionary approach, (ii) right to promote sustainable development and (iii) common but differentiated responsibilities and respective capabilities (CBDRRC) – the CERf conceptualizes these principles via intermediate concepts (orange), namely, for (i) adequacy, for (ii) development and adaptation need and for (iii) historical responsibility for emissions and capability or capacity for implementing climate solutions. Those intermediary concepts, in turn, are represented by indicators (grey) quantified via authoritative data sources. Specifically, adequacy is quantified via mitigation pathways drawn from the IPCC's scenario database (Huppmann et al. 2018). Development need is quantified jointly with historical responsibility and capacity, via the different treatment of the incomes and emissions of individuals at different levels of income (and consumption) when calculating a country's national historical responsibility and national capacity. The overall philosophy behind this approach is that incomes below a certain, user-defined, threshold are most appropriately prioritized for development and poverty eradication and therefore not available to be mobilized for climate solutions. And that, likewise, the survival emissions associated with consumption at the same low level of income ought to be treated differently from other emissions (Shue 1993) and are therefore excluded from a nation's responsibility. For each of the world's countries, then, the total share of that entity of the total global responsibility and capacity is calculated (the Responsibility/Capacity Index), and used to calculate the entity's fair share of the total global mitigation effort as equal to its share of the global capacity and responsibility. More detail on the data sources used for the calculations is available (Holz et al. 2018c) and the formulas of the quantitative model are given and explained in Kemp-Benedict et al. (2018).

reasoning behind this is that people with incomes below this lower threshold must be allowed, because of their economic hardship, to prioritize other concerns than helping to address the shared global responsibility of addressing the climate crisis, especially since they also bear only a low level of responsibility for creating this crisis.

The Climate Equity Reference Framework also allows an "upper threshold" to separate between the incomes of the lower and middle classes and those of the upper income classes. Again, the purpose is to treat incomes below and above this threshold differently when determining a nation's capacity to help address the global climate emergency. Incomes above this upper threshold are fully counted toward the nation's capacity, while the degree to which incomes between the lower threshold and the upper threshold are counted slowly rises from fully exempted at the lower threshold to fully counted at the upper threshold. For the upper threshold, the groups decided to utilize the income level that corresponds to the minimum income that defined the highest 20% of the French income distribution

of France's population received incomes above the CSER threshold, thus making this threshold meaningless as a poverty threshold in the French context, as it would not result in any exemption in France.

in 2018.[10] Thus any individual's earnings belonging to the lower 80% of the income distribution have some exemption applied to every part of their income, but decreasingly so as they get closer to the top of this 80% group (Figure 3).

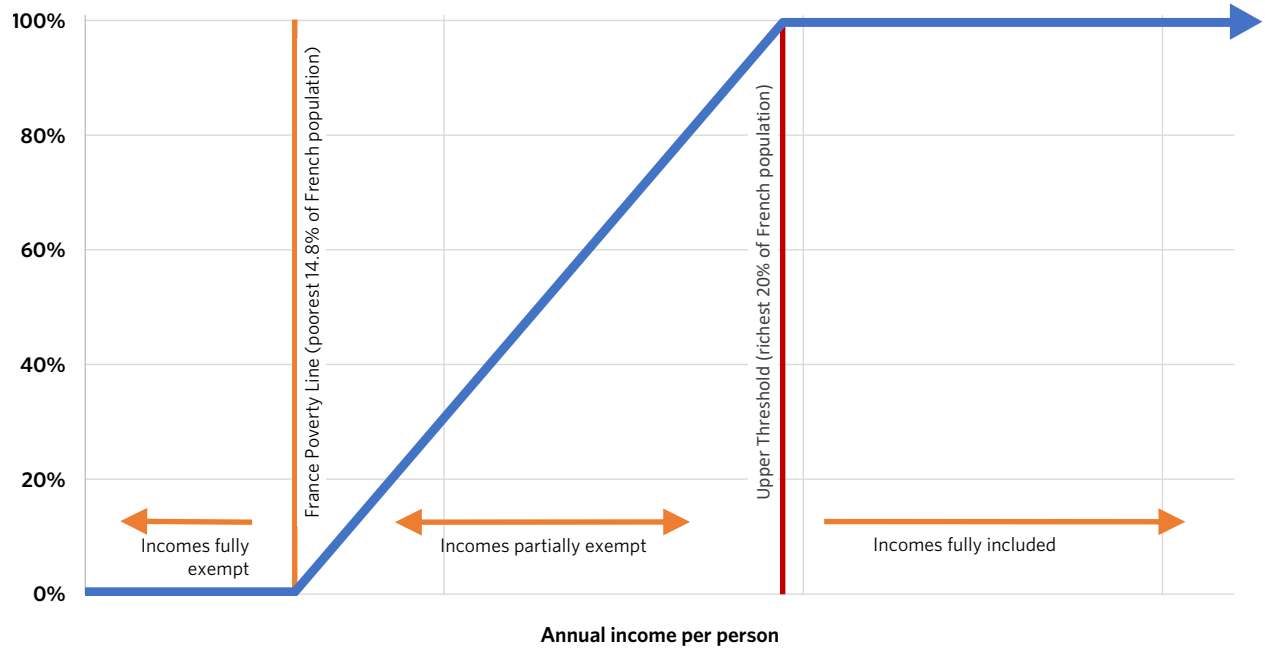


Figure 3. Progressivity of National Capacity Calculations: Percentage of income included in the calculations of national capacity at various income levels (blue), showing incomes below the French poverty line (orange vertical line) being fully exempt (0%), incomes above the upper threshold (red vertical line), corresponding to the threshold income of the French top 20% income-richest, fully included (100%), and incomes between the thresholds included at progressively larger fractions with higher income levels.

Additionally, when calculating countries' fair shares of the global effort to address the climate crisis, the Climate Equity Reference Framework allows different conceptualizations of how to think about a country's "responsibility." First, analogously to the way capacity is treated, the emissions associated with fulfilling basic needs (i.e., those emissions associated with consumption at a level at or below the lower income threshold) are exempted from counting towards the country's responsibility, while those above the upper threshold count full, with gradually increasing shares applied to the incomes between the thresholds. Second, the question arises how far back in time should historical emissions be considered. For this report, the historical start date is set to 1850 recognizing that most of the emissions since that date are driving current global heating and climate change and therefore the need to act swiftly now to stave off the worst impacts of this crisis. The 1850 start date is also particularly relevant for the case of France, where industrialization started early, compared to most other countries, and which has a long colonial history; both of which are associated with substantial greenhouse gas output and accumulation of large economic wealth. Finally, the Climate Equity Reference Calculator support both "territorial-based" and "consumption-based" emissions accounting,

10 For the calculations, the value of this upper threshold is $57,800 per person per year (in 2010 USD). Unlike the lower threshold, the upper threshold is not expressed in purchasing power parity in recognition that consumption above the upper threshold primarily consists of internationally traded goods and services, in contrast to the consumption below the lower threshold which mostly consists of locally traded goods and services of basic needs.

where the former is the standard approach used in climate governance and considers a country responsible for the emissions originating from its territory while the latter is considering the carbon emissions that were released in producing the goods and services that are consumed in country, regardless of where in the world they occurred. For this report, territorial emissions account is used, partly because it is the standard approach and partly because in the case of these fair share calculations for France the difference to consumption-based accounting is negligible, even though it is recognized that there are strong ethical grounds to prefer the consumption-based approach.[11,12]

Importantly, the general effort sharing approach used here takes the individual as its basic conceptual unit of analysis – which means that a rich person with a large personal carbon footprint living in a poor country with overall low emissions has the same personal fair share as another equally rich person with a similarly large personal footprint living in a wealthy country. Countries' fair shares are then conceptualized as the sum of the personal fair shares of their residents. Thus, countries with comparatively more income-rich people with larger carbon footprints will have larger national fair shares than those with more income-poorer people with lower emissions.

Based on these benchmarks, the Climate Equity Reference Calculator (Holz et al. 2019; Kemp-Benedict et al. 2017)[13] is used here to calculate

Table 1. Key equity settings used in this report.

The key equity settings used in this report	
CAPACITY	
Lower income threshold ("development" threshold, below which per capita income does not count toward national capacity)	USD 17,380/year (PPP) (equivalent to bottom 14.8% of French income distribution)
Upper income threshold ("luxury" threshold, above which income counts fully toward national capacity)	USD 57,800/year (equivalent to top 20% of French income distribution)
RESPONSIBILITY	
Historic responsibility starting year	1850
Emissions accounting approach	territorial emissions
RELATIVE WEIGHTING OF CAPACITY AND RESPONSIBILITY	equal (50%-50%)

11 The Climate Equity Reference calculator allows consumption-based emissions accounting to be used for the calculation of responsibility. Recall that the calculations in this report here use a start date of 1850 for the calculations of historical responsibility. Given that the major divergence between territorial and consumption-based emissions accounting, mostly in developed countries is a relatively recent phenomenon (associated with the widespread "outsourcing" of industrial production to other countries), these differences are far smaller over the 1850-2030 period than they are currently. One source, for example (Eora MRIO 2019), has consumption-based emissions in France 36% higher than territorial emissions in 2015 - a substantial difference – while the difference over the 1850-2030 period is only 12% higher. Given further that the fair share is determined by the combination of measures of responsibility and measures of capability (with the latter having a stronger impact on France's results than the former), shifting to consumption-based accounting would only cause a 6% increase in France's Fair Share.

12 To test the sensitivity of the fair shares results to the equity benchmark assumptions used, France's fair share has also been calculated for three additional cases. For all of these cases, the same progressivity settings were used as for the main results (bottom 14.8% for lower and top 20% for upper threshold), but a later start date for historical responsibility (1990) and the use of consumption-based instead of territorial emissions accounting were considered. When shifting the historical responsibility start date from 1850 to 1990 (but keeping all other settings constant), the result for France's fair share of the global mitigation effort in 2030 shrinks from an equivalent of a 168% reduction below 1990 levels to a 154% reduction. Conversely, when utilizing consumption-based instead of territorial emissions accounting, the fair share increases: from 168% to 174% when done in combination with the 1850 start date and from 154% to 162% when using 1990.

13 The interactive calculator can be accessed at https://calculator.climateequityreference.org. The calculations in this report have been done with calculator database version 7.3.2, which features an update of projected GDP and greenhouse gas emissions

responsibility and capacity for each country over time, and each country's fair share of the global mitigation effort in each year is determined by its share of global responsibility and capacity (averaged together). For France, given the specifications described above, that share comes to 2.6% of the total global mitigation effort in 2030, even though France is the home of only 0.7% of the global population. Applying this 2.6% fair share to the globally required mitigation effort in 2030 yields a French fair share of the effort of 847 $MtCO_2eq$ reductions (or 182%) below projected baseline emissions in 2030. Given the convention in Europe to express emissions reductions not relative to baselines but relative to 1990 emissions levels, this fair share is equivalent to a reduction of 938 $MtCO_2eq$ (or 168%) below 1990 levels by 2030. The current emissions reductions target adopted by the French government, based on the EU effort sharing agreement pursuant to the former EU 2030 emissions reductions target, on the other hand, is only a 40% reduction relative to 1990 levels by 2030.

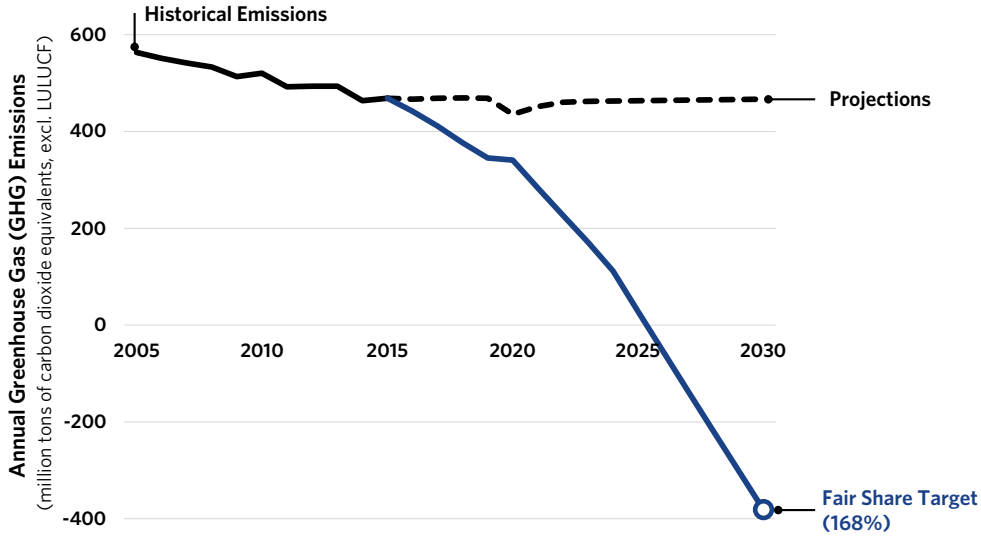


Figure 4. Fair Shares benchmark emissions trajectory for France. Historical emissions, baseline projections.

The Dual Nature of France's Fair Share – Domestic Reductions and International Cooperation

Domestic Reductions

While 847 $MtCO_2eq$ of emission reduction in 2030 below baseline is France's fair share of the global effort, it could not all practically be undertaken within France, as it exceeds total domestic emissions in France, which are projected to be about 467 $MtCO_2eq$ in 2030, in absence of mitigation action. In contrast, under the current emissions reductions target, this level would be 310 $MtCO_2eq$. It is not surprising that France's fair share of the necessary global mitigation is greater than its current share of global emissions. After all,

baseline projects following the economic downturn (and associated temporary reduction in GHGs) due to the Covid-19 pandemic.

France has been substantially contributing GHGs for well more than a century, and – not unrelatedly – is among the wealthiest economies of the world.

France's fair share of the required global mitigation is pictured in Figure 4 as if it was carried out domestically, which would require French emissions to plummet to zero around 2025 and continue to rapidly become increasingly negative thereafter. Clearly, it would be wholly unrealistic for France to achieve this fair share through domestic reductions alone. However, *even if* France were to completely eliminate domestic emissions (i.e., reduce emissions to zero), the additional effort required to fulfill France's fair share amounts to *nearly half* of France's fair share by 2030. Therefore, this additional effort cannot be neglected if France is to be seen as carrying its weight in the global effort to combat climate change.

The finding that the fair shares reduction target as derived from ethical principles is in excess of 100% is a typical result for principle-based fair shares calculations for wealthy economies with a large per-capita share of the historical emissions like France.[14]

Obviously, it is *physically* impossible to implement this fair-shares reduction within France, even though France can be said to be *morally* responsible for all of these reductions. This is because this fair share obligation exceeds any plausible interpretation of the total mitigation potential within France. However, the reverse is the case for most developing countries: those countries' mitigation potential exceeds, often very substantially, the amount of mitigation that can be fairly expected to be implemented by those countries. Nonetheless (and this is one of the fundamental, yet unavoidable, injustices of the climate crisis), most of the mitigation potential of those countries needs to be implemented in order to avoid exceeding the 1.5°C warming limitation objective. Since it would not be fair to expect those countries to implement that potential with their own, limited, resources, it is appropriate for wealthy entities like France to engage in international mitigation cooperation and support, e.g., via financing, capacity building or transfer of technologies, to ensure the availability of resources required to implement that fraction of the mitigation potential of developing countries that exceeds those countries' own fair share obligation. It is through this international support that France and other wealthy nations can discharge that fraction of their total fair shares contribution that exceeds their own domestic mitigation potential.

In order to be able to determine which fraction of the total fair-shares reduction target, as derived from ethical principles, should be implemented through domestic mitigation and which fraction through international cooperation and support, an estimate of the domestic mitigation potential is required. Figure 5 shows an indicative division of France's fair share into domestic reductions and international cooperation portions. This is approximate and illustrative; a precise division would require a detailed analysis of the distribution of cost-effective mitigation options within all countries based on detailed assessments of each country's mitigation potential. This would need assessments for each country of potential for energy efficiency improvements, of unmet energy needs, of potential for renewables resources, and

14 Studies similar to the present one have been conducted in other countries with similar results, even though the civil society groups in these countries defined equitable benchmarks in different ways as the French groups involved here. For example, the United States Climate Action Network stated that it "believes that the US fair share of the global mitigation effort in 2030 is equivalent to a reduction of 195% below its 2005 emissions levels, reflecting a fair share range of 173-229%" (USCAN 2020); while Climate Action Network Canada – Réseau action climat Canada calculated Canada's total mitigation fair share to be equivalent to a reduction of 140% below 2005 levels by 2030 (CAN-Rac Canada 2019); and a consortium of Norwegian groups determined their country's fair share of global mitigation to amount to an equivalent of a 430% reduction below 1990 levels by 2030 (Kartha et al. 2018), which is much larger than France's as calculated here because of Norway's substantially larger per capita GDP.

detailed information on structural economic trends, techno-economic performance of mitigation technologies and so on. Perhaps even more challenging, it would require addressing important ethical questions surrounding mitigation, for example with regards to need for shifts in consumption via changes in lifestyles and behaviours, as well as a better understanding of the myriad transitional challenges confronting developing countries as they aim to swiftly shift developmental courses, including issues surrounding just transitions in all countries. Unfortunately, no such definitive analysis exists.In the absence of this analysis, we provide here a very rough estimate that can be considered a useful benchmark for the general scale of domestic reductions that should be anticipated in France, if France is to carry out mitigation at a level consistent with the global mitigation pathway considered here, the LED pathway. This estimate is based on the simple idea that national emissions in all countries should decline below national business-as-usual baselines at a rate no slower than the aggregate global emissions, determined by the LED pathway. To meet the LED pathway's mitigation trajectory, global emissions would have to fall by 32.6 $GtCO_2eq$ relative to the global baseline in 2030 (which we estimate to be 57.1 $GtCO_2eq$), a reduction of 57%. Clearly, any claim that France (or any other wealthy country, for that matter) should be allowed to reduce emissions at a slower pace than this global average would require a very strong justification, given that this would also mean that all other countries, including those with fewer resources and less responsibility for creating the climate crisis, would have to reduce faster than the average rate. In the absence of such justification, this report uses the simplified approach described above: that France reduces at roughly the same rate, expressed in reductions below baseline, as the global average. Applying this approach by calculating a reduction of 57% from France's baseline in 2030, yields a reduction of 266 $MtCO_2eq$, i.e., requiring France to emit no more than 201 $MtCO_2eq$ in 2030. Following the European convention to express emissions reductions relative to historical levels in 1990, this converts to a reduction of 64% below 1990 levels; for simplicity, we use 65% here, also acknowledging that an ever-so-slightly faster reduction rate than the global average is appropriate for France. It bears repeating that absent any effective claim that it is appropriate for other countries to reduce even faster than global average, this rate is the absolute minimum reduction that must happen within France to be consistent with the 1.5°C goal, as per the LED pathway. Clearly, in comparison to even this minimalist benchmark, the French government's current 40% reduction target is extremely weak

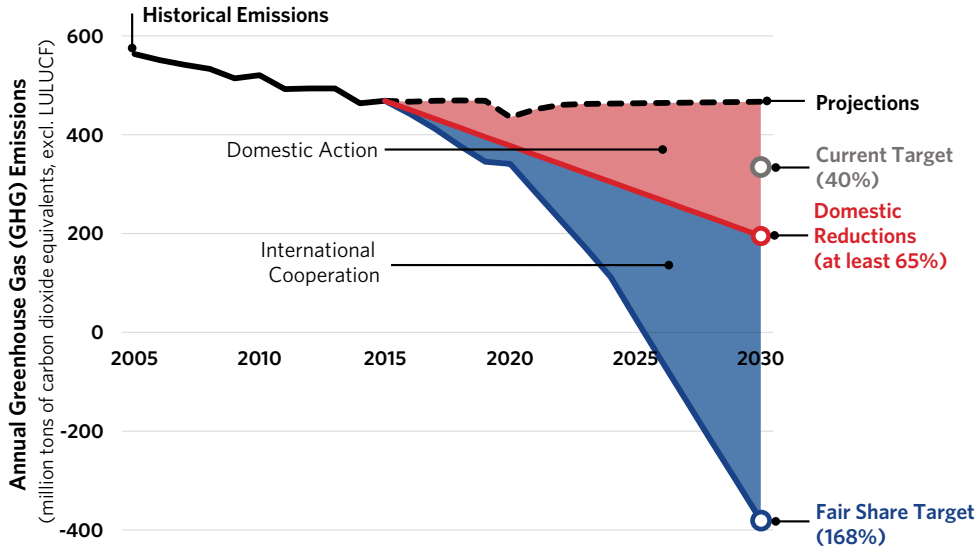


Figure 5. Fair Shares benchmark emissions trajectory for France, with France's total mitigation fair share split into a domestically achieved portion (red) and a portion to be achieved through international support and cooperation, and climate finance for mitigation. Also showing current French government target for reference (grey). Percentage values shown are emissions reductions below 1990 levels.

and need to be further strengthened lest substantial additional mitigation burden be shifted onto developing countries – and it is self-evidentially a very problematic position to require developing countries to mitigate at a faster rate than global average only so that developed countries can be permitted to reduce at a slower rate.

International Support and Contribution to Climate Finance

Either way, when compared with the mitigation fair share, this scale of domestic reduction leaves a large fraction of France's overall fair share to be met through international cooperation. Recalling that reducing emissions by 65% below 1990 levels amounts to a reduction of 272 $MtCO_2eq$ below baseline projections in 2030, leaving a substantial portion, equal to 575 $MtCO_2eq$, of the total fair share (847 $MtCO_2eq$ below baseline) to be achieved through international cooperation. This is more than twice as much as the domestic reduction amount. Therefore, clearly, international support is an integral part of France's overall fair share contribution to addressing the global climate crisis and cannot be treated as an after-thought, or ignored, side-lined, or postponed, but must be treated with at least the same level of attention and seriousness as domestic reductions.

Expressing the international support component of a fair share in tons of reduction is helpfully concrete to illustrate the scale of reductions that need to be sought to be implemented in cooperation with developing countries whose mitigation potential exceeds their fair share. It is also helpfully concrete in thinking about the number and scale of such cooperative activities that a country like France needs to engage in to meet its overall fair share. But it is also helpful to get a sense of the required scale of finance required to do so. A precise "conversion" of the international cooperation component of developed countries' fair shares is, however, impossible. Like the precise establishment of domestic mitigation targets, it would require a detailed, bottom-up analysis of mitigation opportunities and barriers for each country, with a differentiated assessment of the costs (and potentially: savings) associated with implementing or overcoming them, differentiated between measures that developing countries would implement on their own and those that would be subject to international cooperation. Such an assessment would also assess non-financial barriers to mitigation, such as those related to lifestyle changes, transition barriers, capacity building and technology needs, and broader socio-political contexts. Unfortunately, such a study does not exist and costing the international cooperation components of developed countries fair shares is fraught with uncertainties.

However, for illustrative purposes we present a general estimate of the costs of implementing additional mitigation at the scale of the fraction of France's fair share that would not be implemented domestically. This additional mitigation beyond the 65% domestic reduction represents the moral obligation for France to support other countries as they have to mitigate in excess of their own fair share to ensure that the global temperature limitation objective remains within reach. The estimate presented here makes use of 1.5°C-consistent mitigation scenarios summarized in the IPCC Special Report on 1.5°C ("SR1.5") (IPCC 2018) and contained in the scenario database for that report (Huppmann et al. 2018). Not all of these scenarios offer data on the costs of implementing the mitigation they envision and not all of the scenarios offer their data in a regionally disaggregated format. Regional data is important here, because we are interested in the mitigation costs outside of developed countries.

Of the 53 "no or low overshoot" scenarios in the SR1.5 database, only 20 reported mitigation cost estimates with regional breakdown (unfortunately, the LED pathway that is used in this report is not

among them). One of these was excluded as an outlier because it suggested mitigation costs over three times higher than the next highest scenario.

The IPCC scenario database supports reporting data for five broad world regions. For the purpose of this analysis, the region "OECD90," which includes the countries that were members of the Organization for Economic Co-operation and Development (OECD) in 1990 as well as the remaining current member states of the EU, is considered to constitute the "developed countries." Here, we are interested in an estimate of how much it might cost France to implement the "international support" component of its fair share by supporting mitigation in *developing* countries. That's why we are only reporting mitigation costs outside of the OECD90 region. Table 2 shows the average mitigation costs per ton of mitigation for the non-OECD90 regions in 2030 for the 19 no or low overshoot scenarios mentioned.

Table 2. Average mitigation costs outside OECD90 in 2030 in 1.5°C mitigation scenarios, in dollars per ton

	minimum	first quartile	median	third quartile	maximum	N
$/ton	46.36	69.73	92.58	109.58	243.57	19

These cost figures could now be used to get a sense of how much finance might be required to implement the international cooperation portion of France's fair share. However, as these mitigation costs change substantially over time, simply using the figures from 2030 can lead to misleading results. Unfortunately, only 8 of the 19 scenarios that report regionally disaggregated information about mitigation costs also offer data for 2020 and 2025. Table 3 shows the results for these 8 scenarios. Comparing the 2030 data from table 3 with the results for the larger set of scenarios in table 2 suggests that the smaller set of table 3 is clustered around the center of the distribution of costs across the larger set: the median value is virtually identical and the entire set (min-max) of scenarios in table 3 "fits" between the first and third quartile of the set in table 2. Therefore, arguable, the data in table 3 is a reasonable expression of the central tendency of the larger set.

Table 3. Average mitigation costs outside OECD90 in 2020, 2025 and 2030, in dollars per ton

	minimum	first quartile	median	third quartile	maximum	N
2020	18.61	19.90	20.57	21.56	21.73	8
2025	46.42	51.66	53.99	55.50	56.69	8
2030	82.03	91.64	92.95	94.34	99.24	8

Utilizing this time series data, we can now combine illustrative cost values for each year with the amount of international mitigation that would remain after France implements in each year domestic emissions reduction consistent with 65% below 1990 levels in 2030, given its fair share for that same year under the fair share benchmark described above. Table 4 shows the results of this step. The first section of the table simply repeats the information from table 3 (though in this case, the average costs are weighted by the amount of mitigation that has to occur in each year across each five- or ten-year period) and the second section shows the results of the fair share analysis combined with a linear domestic trajectory to a 65% domestic emissions reduction in 2030. The

Table 4. France Mitigation Fair Share, Domestic and International Obligations, and Costing International Support

Average Mitigation Costs outside OECD ($/ton, weighted average)	***2021-2025***	***2026-2030***	***2021-2030***
Minimum	38.40	69.80	61.62
First Quartile	42.51	77.90	68.68
Median	44.36	79.56	70.39
Third Quartile	45.72	81.00	71.81
Maximum	46.61	84.62	74.72

France Fair Share and its Decomposition ($MtCO_2eq$)	***2021-2025***	***2026-2030***	***2021-2030***
Fair Share Reduction below baseline, of which	1,478	3,417	4,894
France Domestic Mitigation (65% below 1990)	686	1,170	1,856
France International Obligation (remainder)	791	2,247	3,038

France International Mitigation Obligation (billion Euros)	***2021-2025***	***2026-2030***	***2021-2030***
Minimum	25.8	132.9	158.6
First Quartile	28.5	148.3	176.8
Median	29.7	151.5	181.2
Third Quartile	30.7	154.2	184.9
Total	31.3	161.1	192.4

last section combines the first two and shows the range of the total amount in billion Euros for the five-year periods 2021-2025 and 2026-2030 as well as for the decade from 2021 to 2030.

Again, this is an illustrative value only to provide a sense of the scale of finance required from France in the context of its fair share in order to make a global transition to a 1.5°C consistent mitigation pathway possible. There are reasons to believe that these figures could in reality be much larger. This is for example, because these cost estimates ignore important, and potentially costly, aspects of the disruptive transitions now required. This includes just transitions for workers, their families and communities that are economically dependent on greenhouse gas intensive industries, or the costs potentially associated with "grand political bargains," such as the Green New Deal that has been proposed in the USA, that might need to be struck in order to make disruptive transitions palatable for populations.

However, for the sake of this illustration, we can use the median above (third line in third section of table 4) to see that, *for mitigation only*, the international support and finance component of France's fair share rises from about 30 billion Euros for the five-year period from 2021-2025 (i.e., on average €6 billion per year) to just over 150 billion Euros for the five-year period from 2026 to 2030 (€30 billion per year on average).

However, the international support and finance that France must provide is not limited to mitigation finance. Financing and support for adaptation on the one hand and loss and damage on the other hand are equally important. Here, too, France must contribute at least its fair share of the funding and support needed. Cost estimates for adaptation finance needs are less well developed as mitigation estimates, but some high quality and widely accepted sources exist (this issue is even more pronounced in the case of and loss and damage finance need, but there, too, are some emerging sources that can shed some light on the approximate level of finance needs). Specifically, the UNEP Adaptation Gap Report 2020 (UNEP 2021) is arguably the most comprehensive survey of relevant information now available, and it estimates that current adaptation finance needs in developing countries are about $70 billion per year, and that developing countries will need

$140–$300 billion in adaptation financing annually by 2030.

Just like with the mitigation figures, this is likely an underestimate. The UNEP Adaptation Gap Report itself notes that the sources that it draws upon tend to lead to notoriously low estimates. For example, this is because they tend to assume that a large portion of adaptation action will be "autonomously" covered by private citizens who can either afford them or have no choice but to implement them even in the absence of other sources of funding, lest they endure the consequences of maladaptation. Additionally, the studies tend to focus on "technological adaptation" costs and tend to exclude certain sectors and even within covered sectors exclude certain adaptive practices.[15] The UNEP Adaptation Gap Report highlights that the true adaptation finance need may be many times higher than the indicative figures it provides. In fact, the report provides uncertainty multipliers for some of its limitations, noting that due to the limited coverage of impacts and sectors the report might have underestimated costs by a "factor of two-to-three," while the question of how to define the very objective of adaption leads to an uncertainty equivalent to a "factor of two-to-four." Additionally, uncertainties between studies for the same countries can vary by a "factor of two-to-five" (UNEP 2016, 2021). Putting these uncertainties together, suggest that the total finance need may be several times higher than the figures cited above.

Finally, it is important to recognize that due to the lack of sufficient action on emissions reductions and on adaptation over many decades, there is now unavoidable loss and damage befalling communities around the world. Wealthy countries like France have a moral, as well as legal, obligation to provide finance and other support to help remedy some of these losses and damages and pay their climate debt to climate vulnerable countries. Again, reliable cost estimates are not only hard to come by; future levels of loss and damage also depends on the amount of mitigation and adaptation that gets implemented: less mitigation leads to more global heating, and the less adaptation, the more will this climate change lead loss and damage. Furthermore, many aspects of loss and damage are simply unquantifiable in economic terms: what is the value of a species gone extinct, of a culture lost, or of human lives destroyed? The 2019 Civil Society Equity Review on Loss and Damage (CSO Equity Review 2019) points out that in the face of such losses not only financial restitution is required but also rehabilitation and guarantees of non-repetition. As such, adequately addressing loss and damage exceeds the provision of the necessary finances but much also include good faith efforts to build the required institutions and mechanisms to accomplish these goals. The 2019 CSO Equity Review, in an attempt to put forward an illustrative figure, suggests that as a first minimum floor, $50 billion per year by 2022 should be provided to developing countries as loss and damage financing, increasing to $150 billion annually by 2025 and $300 billion per year by 2030, recognizing that these numbers are no reflection of actual finance need,[16] but of an absolute minimum amount that ought to be raised for loss and damage finance.

To derive some guidance for what the minimum total French climate finance fair share might be, we can now put these elements together. The mitigation component has been estimated above as €30bn for 2021-2025 and €150bn for 2026-2030. Considering the discussion of adaptation costs above, and especially the large amount of

15 For more details on these limitations, see the climate finance appendix of the "US Fair Shares NDC" civil society document (FoE US et al. 2021).

16 Considering even just a single extreme weather event can show costly and profound the impacts of such events can be. For example, the impact of Hurricane Maria in 2017 on the Caribbean Island of Dominica (which only has about 70,000 inhabitants) caused loss and damage in the region of $1.4 billion or wiped out 226% of the GDP of the country.

uncertainty of the estimates from the UNEP Adaptation Gap Report, we observe the France's fair share (using its fair share of the lowest possible number given in that report, and the same 2.6% fair share of global effort used above) would amount to at least about €10 billion for 2021-2025 and about €14 billion for 2026-2030. However, since the uncertainties discussed above make it likely that the real amount will be several times higher, and given the long-standing view that mitigation and adaptation finance should be equal, we use for adaptation finance the same amount that we calculated for mitigation finance. Finally, we add France's fair share (again using the 2.6%) of the minimal global loss and damage finance provisions suggested by the CSO Equity Report, highlighting once more that this number is almost certainly too low and will necessitate revision in the future as better data become available. Table 5 below shows the results of this calculation.

Table 5. France's Total Climate Finance Contribution

France's International Climate Finance (billion Euros)	***2021-2025***	***2026-2030***	***2021-2030***
Mitigation (median value)	29.7	151.5	181.2
Adaptation	29.7	151.5	181.2
Loss and Damage	10.1	26.6	36.7
Total	69.5	329.6	399.1

These results suggest that France should make climate finance contributions of at least €70 billion in the 2021-2025 period, or €14 billion per year on average during that period, and steadily increasing – as both France's fair share and the global finance need rises over time – to at least about €330 billion in the 2026-2030 period (on average €66 billion annually). Again, this should be considered a low number owing to the current lack of suitable estimates, but this fact should not be used as an excuse against contributing funds at least at the level indicated and to help build the mechanisms and institutions that can rapidly, effectively and equitably deploy these resources and, in the process, establish better estimates of the real need. It is also instructive to contrast these numbers with the French government's current climate finance pledges of €30 billion over 5 years (2021-2025). It is clear that the pledge is severely out of step with the required level of climate finance contribution that could potentially be consistent with France's fair share.[17]

Conclusion

Strong domestic climate action combined with deep and enduring international cooperation, which, crucially, must include provision of substantial amounts of climate finance, is the only way that the international climate emergency can be solved. The Covid-19 pandemic has taught us that any one of us is only safe if we all are safe and that large amounts of money can be redirected

17 To contrast, once again, similar reports, based on the same fair share methodology, have been issued by civil society groups in other countries with broadly similar results: Groups in the US, for example, concluded that while the current data uncertainty with regards to climate finance needs does not allow them to calculate their country's fair share of global climate finance, the US should nonetheless provide at least a $800 billion "good faith down payment" over the 2021-2030 period for mitigation, adaptation and loss and damage finance. The groups expect that the actual climate finance fair share will be well in excess of $1.6 trillion for the same period (FoE US et al. 2021). Likewise, in the case of Norway (a country with only one twelfth as large a population as France), the Norwegian civil society groups estimated a climate finance fair share of about $15 billion for mitigation and adaptation alone, only for the single year of 2030 (Kartha et al. 2018),

when facing an existential threat against humanity. Just like no country can completely solve the pandemic by itself for itself, no country can solve its own climate crisis. Just like vaccine apartheid is not only a deplorably selfish approach to a pandemic that only gives rise to virus variants that jeopardize the safety of everybody everywhere, refusal to engage in deep domestic action and international cooperation on climate change will make climate impacts worse for everybody everywhere.

Such international cooperation is only imaginable if done equitably, where each country is seen by the others as doing at least roughly its fair share toward the shared goal. This in turn means embracing the ethical principles of capacity, responsibility, and the right to sustainable development that are central to the UN Framework Convention on Climate Change. As a country with substantial wealth that it owes in not insubstantial parts to a long history of industrialization and colonization, and that has emitted substantial amounts of greenhouse gases in the process, France has a sizable role to play in bringing about the transformational international cooperation required to limit warming to 1.5°C and to limit the adverse impacts of the climate change now unavoidable.

This report illuminated how France's Fair Share toward these goals can be understood. For that purpose, it utilizes the Climate Equity Reference Framework and calculator using an approach developed by the Civil Society Equity Review and based on ethical choices made by the groups that commissioned this report. We find that France's total fair share in 2030 of a global mitigation effort consistent with limiting warming to 1.5°C is 2.6%, based on its share of the world's capacity and responsibility, which translates to a reduction of 847 $MtCO_2eq$ below baseline projections in 2030, or a 168% reduction below 1990 levels.

A crucial part of implementing this overall climate fair share is, of course, the reduction of emissions carried out within France. Considering the emission pathway of the LED 1.5°C scenario, and further considering that, at the very least, wealthy countries like France ought to mitigate at a rate at least equivalent to the global average rate, we found that being consistent with this global 1.5°C trajectory would mean an emissions reduction in France of 65% below 1990 levels by 2030. Any less would mean to expect all other countries to reduce at a faster rate than France, to give up on the 1.5°C objective, or both.

Given this level of domestic emissions reductions effort, a large (and growing) portion of France's fair share would be left disregarded if France were to only engage in domestic action. Thus, this portion must instead be implemented through France's support for and cooperation with developing countries seeking to implement climate action beyond their own fair share. Specifically, a fraction of the total 168% fair share that is equivalent to more than all of France's 1990 emissions levels must be implemented in this manner. This scale highlights that climate finance and cooperation must cease to be the afterthought in the French climate debate that it often is at present. Expressing this international cooperation target in financial terms suggests that starting from an average annual climate finance obligation of €14 billion during the 2021-2025 period (with about an average of €6 billion per year each to mitigation and adaptation, the remainder to loss and damage finance), that value quickly increases to an average of €66 billion for the 2025-2030 period (with an average of €30 billion per year each to mitigation and adaption, and the remainder to loss and damage finance). France's role in this context must also include helping to setup the mechanisms and institutions that not only will generate better knowledge about the true scale of the global climate finance need, but are also capable to effectively, equitably, and promptly delivering these resources.

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