

New Coal Power Generation in South Africa in Light of South Africa's Climate Fair Share

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Executive Summary

This report provides evidence that the building of 1500MW of new coal power generating capacity – as specified in the *2019 Integrated Resource Plan for Electricity* update (IPR 2019) – is inconsistent with South Africa's efforts to undertake its fair share of the global mitigation required to adhere to the Paris Agreement temperature goal. (This goal is, as specified in Article 2.1.a, "*holding the increase in the global average temperature to well below 2°C [...] and pursuing efforts to limit the temperature increase to 1.5°C*".)

The Intergovernmental Panel on Climate Change clearly established in its *Special Report on Global Warming of 1.5°C* that limiting warming to 1.5°C is critical for southern Africa. If warming were to rise above 1.5°C, "risks associated with increases in drought frequency and magnitude are projected to be substantially larger at 2°C than at 1.5°C in ... southern Africa," and "exposure to multiple and compound climate-related risks is projected to increase between 1.5°C and 2°C of global warming with greater proportions of people both exposed and susceptible to poverty in Africa" (IPCC, 2018)

We draw on results obtained from the Climate Equity Reference Framework, a fair share analysis framework supported by a wide range of civil society groups, including several in South Africa. This civil society coalition released its NDC analysis in the run-up to the Paris climate negotiations at an inaugural event featuring a keynote address by South Africa's Head of Delegation Ambassador Diseko. Subsequently, the South African government used this climate Equity Reference Framework to justify the ambition and fairness of its recently updated NDC (RSA 2021).

This framework presents an ethically coherent method by which one can dynamically calculate national fair shares for all countries, whatever their development status. It defines a country's fair share of the global effort in proportion to its share of global capacity for addressing the problem and historic responsibility for causing it. These are the two foundational ethical principles of the Rio Declaration and the United Nations Framework Convention on Climate Change.

This analysis concludes that while South Africa has a strong claim to international financial, technological, and institutional support to undertake mitigation, it is also obliged to invest the necessary policy attention and material resources in reducing domestic emissions such that they fall below the 274 – 376 MtCO₂eq range in 2030. (This range reflects different specific interpretations of the Paris Agreement's temperature limitation objective, namely via a 1.5°C-consistent and a 1.8°C-consistent global mitigation pathway. The choice of a 1.8°C level is only one possible interpretation of the phrase "well below 2°C" quoted above, however, and illustrating here follows the example of the UN Environment Programme's Emission Gap Reports.)

In contrast, as shown in accompanying analysis (Merven et al, 2021), forcing 1500 MW of new coal capacity into an otherwise least-cost power sector future raises emissions to 455 MtCO₂eq in 2030, which is 103 to 180 MtCO₂eq above the emission range implied by South Africa's fair share of a global 1.5°C mitigation trajectory and 78 to 144 MtCO₂eq above its fair share of a 1.8°C global trajectory. Thus, this report concludes that forcing in 1500 MW of new coal runs counter to efforts to achieve South Africa's fair share, introducing unnecessary emissions and raising energy costs. Indeed, it would increase by R109 billion the cost of efforts to reduce emissions to a level (350 MtCO₂eq) consistent with South Africa's fair share of global emission reductions consistent with the Paris Agreement's temperature limitation objective.

1 Background

1.1 The fair shares concept and its relevance and necessity for dealing with climate change

This report is based upon the fair shares approach to international climate mobilization. The South African government has been a strong champion of a fair shares approach, and, more specifically, in justifying the ambition and fairness of the recently updated NDC (RSA 2021), it utilized the same Climate Equity Reference Framework that is used in this report. The core motivator of this approach is the understanding that it will not be possible to stabilize the planetary climate system in time to avoid extremely damaging impacts unless the relative contributions to the stabilization process by countries and groups within them is very widely seen as fair, both within countries and between them.

There are two primary reasons why this is the case. The first is that climate stabilization is what has been called a "global commons" problem (e.g. Ostrom 1999). The second is that climate change implies several kinds of distributive justice problems, many of which arise due to actions necessary to reduce or avoid greenhouse gas emissions. On the first point, it is important to recall the fact that no country can stabilize its own climate system, for the simple reason that no country has its "own" climate system and that the health of the climate system within its territory is overwhelmingly determined by the actions or inactions of other countries. Therefore, if it truly wishes to stabilize the *global* climate system, a country must act in a way that evokes ambitious reciprocation from others, which generally implies that it must be seen as doing its fair share in the global effort. As expressed clearly by the IPCC in the Summary for Policy Makers of its Fifth Assessment Report: "outcomes seen as equitable can lead to more effective cooperation" (IPCC 2014).

As for the distributional justice implications of mitigation action, the key point is that extreme inequality within and between countries cannot be treated as an unrelated issue. If the challenge of climate stabilization – driving *global* carbon dioxide emissions to net zero by 2050 – is to be achieved, the effort to achieve it must proceed by creating just, inclusive and very low carbon development pathways. While all countries and people can be expected to contribute earnestly to the global effort, those contributions must be fairly distributed. They certainly cannot be distributed in a way that would impose demands for climate action that are too large to be met without undue cost and hardship by poorer countries and people contending with other immediately pressing developmental objectives.

In practice, the fair shares approach emphasizes the evaluation of national climate mobilization efforts. As the pressure on all countries to increase their ambition rises, it is important to be able to assess which countries are making climate action pledges that are consistent with their fair share of the necessary global effort. Ultimately, the question is whether a country is contributing to the global effort in proper proportion to its national capacity and responsibility – as per the United Nations Framework Convention on Climate Change's central principle of "*common but differentiated responsibilities and respective capabilities.*"

The fair shares framing has increased in importance as the climate policy discussion increasingly references national "net zero" 2050 emissions targets, and 2030 targets that, as per the IPCC, should take us halfway there. While these are suitable as global targets, they do not map evenly to countries at different levels of development. Ours is a world in which some countries, and people, are fantastically rich, while others are not, in which some have emitted huge amounts of greenhouse

gases, while others have not. In this context of vast disparities, it would make no sense if all countries, rich and poor alike, had identical ethical obligations – to reduce their emissions to zero by 2050.

The equity evaluation of national actions is not a purely academic exercise. It matters a great deal if South Africa, for example, is seen as doing its fair share because it impacts the negotiation environment of the Global Stock Take of the Paris Agreement, in which countries assess each other's contributions and present their own revised action plans, or Nationally Determined Contributions, every five years. As a country demonstrates its willingness to undertake its fair share of a common effort, it reassures and pressures other countries to respond in kind.

It must be emphasized that South Africa does indeed have a fair share of the global mitigation effort. While wealthy and high-emitting countries have the largest fair shares, every country does have a fair share, however small, grounded in fundamental principles of equity and justice. Countries often rationalize their modest mitigation efforts on flimsy grounds. In fact, Winkler et al (2018) observed that well more than half (101 out of 163) of the countries submitting Intended Nationally Determined Contributions in preparation for the Paris Agreement, ranging from Cameroon to Canada, rationalized their modest efforts on the grounds that they are merely small contributors to the total global emissions. If the efforts of countries that collectively are responsible for one-quarter of global emissions is treated as irrelevant, then global emissions can never approach zero, and the Paris temperature objective is out of reach.

Moreover, South Africa holds an important position in the African and global economies, and has a correspondingly large emission footprint, placing it in the top 15 countries in terms of annual emissions. Consequently, it plays a similarly important role in establishing a global norm that each country must do its fair share.

Indeed, limiting warming to 1.5°C is particularly important for South Africa. The Intergovernmental Panel on Climate Change clearly established in its *Special Report on Global Warming of 1.5°C* that as warming rises above 1.5°C, climate change impacts worsen substantially for southern Africa. It explicitly catalogs various risks if warming were to rise above 1.5°C. For example, quoting the IPCC report:

- Climate models project robust differences in regional climate between present-day and global warming up to 1.5°C, and between 1.5°C and 2°C (high confidence). Large, robust and widespread differences are expected for temperature extremes (high confidence). [The regions in which] the strongest warming of hot extremes is projected to occur [include] southern Africa...
- Limiting global warming to 1.5°C is expected to substantially reduce the probability of extreme drought, precipitation deficits, and risks associated with water availability (i.e., water stress) in some regions... In particular, risks associated with increases in drought frequency and magnitude are projected to be substantially larger at 2°C than at 1.5°C in the Mediterranean region (including southern Europe, northern Africa and the Near East) and southern Africa...
- Exposure to multiple and compound climate-related risks is projected to increase between 1.5°C and 2°C of global warming with greater proportions of people both exposed and susceptible to poverty in Africa and Asia (high confidence). For global warming from 1.5°C to 2°C, risks across energy, food, and water sectors could overlap spatially and temporally,

creating new – and exacerbating current – hazards, exposures, and vulnerabilities that could affect increasing numbers of people and regions (medium confidence).

- Limiting global warming to 1.5°C, compared with 2°C, is projected to result in smaller net reductions in yields of maize, rice, wheat, and potentially other cereal crops, particularly in sub-Saharan Africa, Southeast Asia, and Central and South America;
- Reductions in projected food availability are larger at 2°C than at 1.5°C of global warming in the Sahel, southern Africa, the Mediterranean, central Europe and the Amazon (medium confidence). This suggests a transition from medium to high risk of regionally differentiated impacts on food security between 1.5°C and 2°C.

These examples clearly illustrate that the failure of the multilateral effort to address climate change to limit warming to 1.5°C would have severe consequences for South Africa and its economy, ecosystems, and population. It is therefore in South Africa's interest to contribute to this multilateral effort in a manner that encourages other states to do the same, i.e. by implementing what can be widely seen to be South Africa's fair share of the global effort.

1.2 Objective: Determine whether 1500 MW new coal power generating capacity is consistent with South Africa's efforts to undertake its fair share of the global mitigation to hold warming well below 2°C

The purpose of this report is to determine whether building 1500 MW of new coal power generating capacity – as specified in the 2019 IRP update and Ministerial determination of 2020 – is consistent with South Africa's efforts to undertake its fair share of the global mitigation required to adhere to the Paris Agreement temperature goal of "*holding the increase in the global average temperature to well below 2°C [...] and pursuing efforts to limit the temperature increase to 1.5°C.*"¹

This report draws on the fair share framework of the Climate Equity Reference Project. This framework for understanding countries' fair share of the global climate effort has been used in South Africa's recently adopted updated NDC (RSA 2021) as a basis for gauging the fairness of countries' contributions. The framework is rooted in the equity principles of the United Nations Framework Convention on Climate Change and its Paris Agreement, and is capable of accommodating a wide range of specific ethical perspectives. The report will reference the analyses regularly released by the broad, global Civil Society Equity Review Coalition, encompassing a similarly broad range of perspectives, that was initially launched in the run-up to the Paris climate negotiations at an inaugural event featuring a keynote address by South Africa's Head of Delegation Ambassador Diseko.

1 Specifically, the report provides results and conclusions from calculations using a 1.5°C and a 1.8°C-consistent global mitigation pathway, and provides additional results for a 2°C consistent mitigation pathway for information only.

2 Defining South Africa's fair share

2.1 The Climate Equity Reference Framework

The fair shares framework we apply in this report is known as the Climate Equity Reference Framework.² This framework presents an ethically coherent method by which the user can dynamically calculate national fair shares for all countries, whatever their development status. It defines a country's fair share of the global effort in proportion to its share of global capacity for addressing the problem and historic responsibility for causing it. (These are the two foundational ethical principles of the Rio Declaration and the United Nations Framework Convention on Climate Change.)

This result of this analysis is a national "responsibility and capacity index" (RCI), which represents what fraction of the combined global responsibility and capacity is held by a given country at a given point in time. This RCI can then be used to calculate national fair shares of the global mitigation effort relative to any global mitigation pathway. However, as discussed in the following section, the Climate Equity Reference Framework provides the user with considerable flexibility in how this RCI is defined, so as to accommodate a broad range of ethical perspectives.

A historically high-emitting country's fair share of the global effort to adhere to the Paris Agreement's temperature goal will typically require reductions that exceed its domestic emissions. This is an important implication of defining a country's fair share of the global effort in proportion to its share of global capacity and responsibility. For example, the recent US fair share study (ActionAid USA *et al.* 2020) calculated the US fair share to be equivalent to a 195% reduction below its 2005 emissions in 2030. The converse is also the case. Developing countries typically have fair shares that are smaller than their projected domestic emissions. This is the case even though all countries must approach zero emissions. A critical consequence of this result is that international support is not a secondary issue – wealthy nations such as the US can only fully deliver their fair share of the global effort by supporting a substantial amount of additional climate action in other countries. This is a key feature of the approach, and one of the reasons it is widely considered to accurately capture the ethical core of the climate problem.

Developing countries like South Africa generally have fair shares smaller than the emissions reductions that should occur within their territories under ambitious global mitigation pathways that are consistent with the Paris Agreement's temperature limitation objectives. All of these emissions reductions must be implemented to achieve the Paris temperature goals, but they cannot be expected without sufficient international support. That said, all countries should fulfill their fair shares, and moreover should plan for complete national decarbonization, even though developing countries may in practice need further international support to pursue such complete decarbonization at the necessary speed, or at least may have a strong moral claim to such support.

2.2 The Civil Society Equity Review initiative, and its equity settings

During the run up to the 2015 Paris climate summit, a large international coalition formed to carry out a Civil Society Equity Review of the first generation of nationally determined contributions (NDCs) under the agreement. This coalition, consisting of diverse organizations presenting a wide

² See Holz, Kartha, Athanasiou (2018), which builds on our earlier Greenhouse Development Rights Framework (Baer *et al.* 2008).

range of ethical perspectives, has continued to collaborate over the ensuing years and issue annual fair share assessments of the countries' NDCs. The group came together to debate and reach consensus on the ethical basis that would govern the NDC fair share assessment, and adopted the Climate Equity Reference Framework because of the wide range of ethical perspectives it could accommodate.

It does this by allowing the user to decide the exact definition of "capacity" and the "responsibility" in the calculation of the RCI. Countries' capacity is defined in a manner that distinguishes between the financial resources of a rich person and those of a poor person, and provides flexibility as to how this is done. For example, it excludes the "survival" or "development incomes" of the poor in a manner defined relative to an income threshold that the user can select from a wide range. Similarly, it allows historic responsibility for emissions to be defined with respect to a specific year that can also be selected by the user from a wide range, reflecting different perspectives on the meaning and importance of historic responsibility.

The available range of perspectives includes those that would be difficult to justify as fair reflections of the ethical principles of the Climate Convention. For example, the framework allows one to calculate historical responsibility for emissions starting from 2015, the year that the Paris Agreement was adopted, even though this choice would be difficult to justify as an ethically grounded reflection of the notion of *historical* responsibility.

Ultimately, while the CSO coalition could not converge on one specific equity position, it did converge toward a *range of equity settings* that it judged to be acceptably fair. That range is bracketed by two fair share benchmarks³:

- The first defines responsibility as *cumulative national emissions since 1950* (a relatively recent date that marks the start of global acceleration of fossil fuel-based development) and relative to a *moderately progressive definition of capacity*. The capacity calculation is sensitive to national income distribution, which allows capacity to be defined in a manner that varies with income levels. In this benchmark, *all income (per person, per year) below a development threshold of \$7,500 purchasing power parity (PPP) is excluded*, removing poor people's income from the calculation of national capacity but including all the income above this threshold.
- The second defines responsibility as *cumulative national emissions since 1850* (approximately the start of the industrial revolution), and relative to a highly progressive definition of capacity. In this benchmark, as in the benchmark above, all income below \$7,500 PPP is excluded from the calculation of national capacity. Similarly, *all income above a 'luxury threshold' of \$50,000 is included in this calculation*. Between the two thresholds, a *steadily rising weighting* (analogous to successive tax brackets) that begins at 0% and rises to 100% includes gradually more of the income in the calculation of capacity.

In accordance with each of the above equity settings in turn, South Africa's capacity and responsibility can be calculated as a percentage of the global total and averaged, based on standard publicly available data sources for income, income distributions, and emissions (see footnote 1). The result, South Africa's RCI, is calculated to be 0.46% (for the first set of equity settings, corresponding to the lower end of the CSO range) and 0.70% (for the second, or upper end of the range).

3 For technical documentation, see *About the Climate Equity Reference Calculator*, <https://climateequityreference.org/calculator-about/>

2.3 Results for South Africa – South Africa’s Fair Share

The results of the fair share analysis described above, as applied to South Africa, are shown below in Table 1. Results are given for pathways corresponding to 1.5°C and 1.8°C warming above pre-industrial levels. These two pathways are chosen to represent possible interpretations of the temperature limitation objectives in Article 2.1.a of the Paris Agreement,⁴ which references both “well below” 2°C and 1.5°C. The choice of a 1.8°C is only one possible interpretations, and follows the example of the UN Environment Programme’s *Emission Gap Reports*. (Additionally, the tables and charts below show results for a 2°C pathway, although with the caution that this is arguably not consistent with the Paris Agreement.)

The CERP framework proceeds as follows:

- For each pathway, first the total amount of the mitigation effort that is required globally is calculated (table 1, row 2).
- Next, each country’s percentage share of the global responsibility and capacity (its RCI) is calculated, depending on the choice of equity benchmark, which also represents the country’s percentage share of the global mitigation effort required (table 1, row 3).
- Then, the product of the global mitigation and each country’s RCI yields its fair share of the global mitigation effort (in MtCO₂eq, table 1, row 4).
- To express this as each country’s fair allocation (or target), this fair share of global mitigation is subtracted from its projected emissions without mitigation (table 1, row 5).

Global mitigation under these three pathways varies from 26,595 MtCO₂eq (1.8°C) to 31,707 MtCO₂eq (1.5°C) in 2030 below a global no-efforts baseline (Table 1, row 2). Results are also calculated for both the upper and lower end of the CSO fair share range, as defined by the two benchmarks outlined above, giving South Africa an RCI of 0.46% and 0.70%, respectively, of the total global capacity and responsibility (Table 1, row 3), and thus of the total obligation to act. Multiplying South Africa’s RCI by the total mitigation required globally yields its fair share of the global mitigation effort, which varies (depending on the equity benchmark) from 146 to 223 MtCO₂eq (for a 1.5°C temperature objective), or 121 to 187 MtCO₂eq (for a more risky 1.8°C temperature objective) of mitigation below baseline⁵ emissions (Table 1, row 4).

4 “Holding the increase in the global average temperature to well below 2 °C ... and pursuing efforts to limit the temperature increase to 1.5 °C.” In particular, the phrase “well below 2°C” is ambiguous. Results for a 2°C pathways are given acknowledging that results for “well below 2°C” would have to be more ambitious than those for 2°C. Results for a 1.8°C pathway are given to provide further detail on results between the 1.5°C and 2°C cases. In the report text, only results for the 1.5°C and 1.8°C pathways are discussed, results for the 2°C pathway are given in the tables and charts for as an additional reference case.

5 The Climate Equity Reference Framework conceptualizes mitigation effort relative to a “no-effort baseline” which is a reference case in which no climate action is taken. No-effort baselines for each country are derived from third party (IMF) GDP projections and the country’s historical greenhouse gas intensity improvements. For this report, new baselines that take into account the economic downturn associated with the Covid-19 pandemic have been produced. For reference, these new baselines are in the calculator database version v7.3, which, at the time of this writing, is in pre-release status. An interactive version of the Climate Equity Reference Calculator (Holz et al. 2019) running database v7.3 is available at <https://calculator-update.climateequityreference.org>. For general background and technical documentation of the baseline methodology used here, see *Definition, sourcing, and updating of the emissions baselines* at <https://climateequityreference.org/calculator-information/gdp-and-emissions-baselines/>

Table 1. Key metrics for calculating South Africa's fair share ranges for 1.5°C, 1.8°C and 2°C global pathways

			Fair Share Scenarios					
			1.5°C	1.5°C	1.8°C	1.8°C	2.0°C	2.0°C
			lower	upper	lower	upper	lower	upper
1	South Africa baseline emissions, projected to 2030, in MtCO ₂ eq	A	509	509	509	509	509	509
2	Global Mitigation requirement below baseline in 2030, in MtCO ₂ eq	B	31,707	31,707	26,595	26,595	21,003	21,003
3	South Africa share of Global Responsibility and Capacity, to 2030	RCI	0.70%	0.46%	0.70%	0.46%	0.70%	0.46%
4	South Africa mitigation fair share, projected to 2030, in MtCO ₂ eq below baseline	$C = B \times RCI$	223	146	187	121	148	96
5	South Africa Fair Share Allocation, in 2030, in MtCO ₂ eq	$D = A - C$	286	364	323	388	362	413

* all figures *excluding* Land Use, Land Use Change, and Forestry (LULUCF). See Table 2 and accompanying note.

The fair share results of the two pathways and two ends of the CSO equity range (Table 1) differ quite significantly, nearly by a factor of 2, but in all cases South Africa's fair share results are similar to other developing countries in a critical respect. That is, they imply a fair share of the global mitigation effort that is smaller than would be required to actually make South Africa's national emissions pathway consistent with a globally ambitious pathway. With regard to the additional mitigation effort that would be necessary to close this gap, South Africa has a strong ethical and political claim for international support from developed countries (as explained above). This is true for the 1.5°C or the 1.8°C global pathway, and over the entire equity range bracketed by the two CSO benchmarks.

Nonetheless, South Africa's fair share still implies that it is obliged to undertake, as its own direct effort, a portion of the total required mitigation depending on fair share benchmark and temperature objective chosen. Specifically, for implementing its fair share under a 1.5°C-consistent global pathway, South Africa would need to reduce its 2030 emissions by 146 to 223 MtCO₂eq below baseline to reach a 286 to 364 MtCO₂eq target range (depending on the fair share benchmark chosen), while under a 1.8°C-consistent pathway fair-share reductions below baseline would be 121 to 187 MtCO₂eq, for a target range of 323 to 388 MtCO₂eq.

For the purposes of this report, this latter point is the relevant one. The fair shares analysis clearly concludes that South Africa has no excess emissions allocation that would allow its emissions to rise above the level that it would emit without any mitigation efforts (the "baseline"), and indeed must reduce emissions by between 121 and 187 MtCO₂eq below that level as its fair share of holding warming below 1.8°C, and between 146 and 223 MtCO₂eq below that level as its fair share of limiting warming to 1.5°C (Table 1, row 4). Rather, it must devote policy attention and national resources to ensuring that significant fair-shares mitigation efforts are indeed undertaken, and to making the corresponding investments.

In addition to Table 1 above, which presents the results of the fair share analysis for the year 2030 specifically, Figure 1 shows the same results as a set of time series charts indicating the fair share target range (blue line) for each of the six possible combinations of temperature limitation objectives (1.5°C, 1.8°C and 2°C) and lower vs. upper end of the equity range. The charts in Figure 1 also show, as an additional dotted green line, an illustrative domestic emissions trajectory that is consistent with the respective global rate of decarbonization under the temperature target, but which exceeds South Africa's fair share. This illustrative domestic emissions trajectory should be considered indicative only since it is based on a heuristic algorithm that applies the same rate of emissions reductions (relative to baseline) to each country.

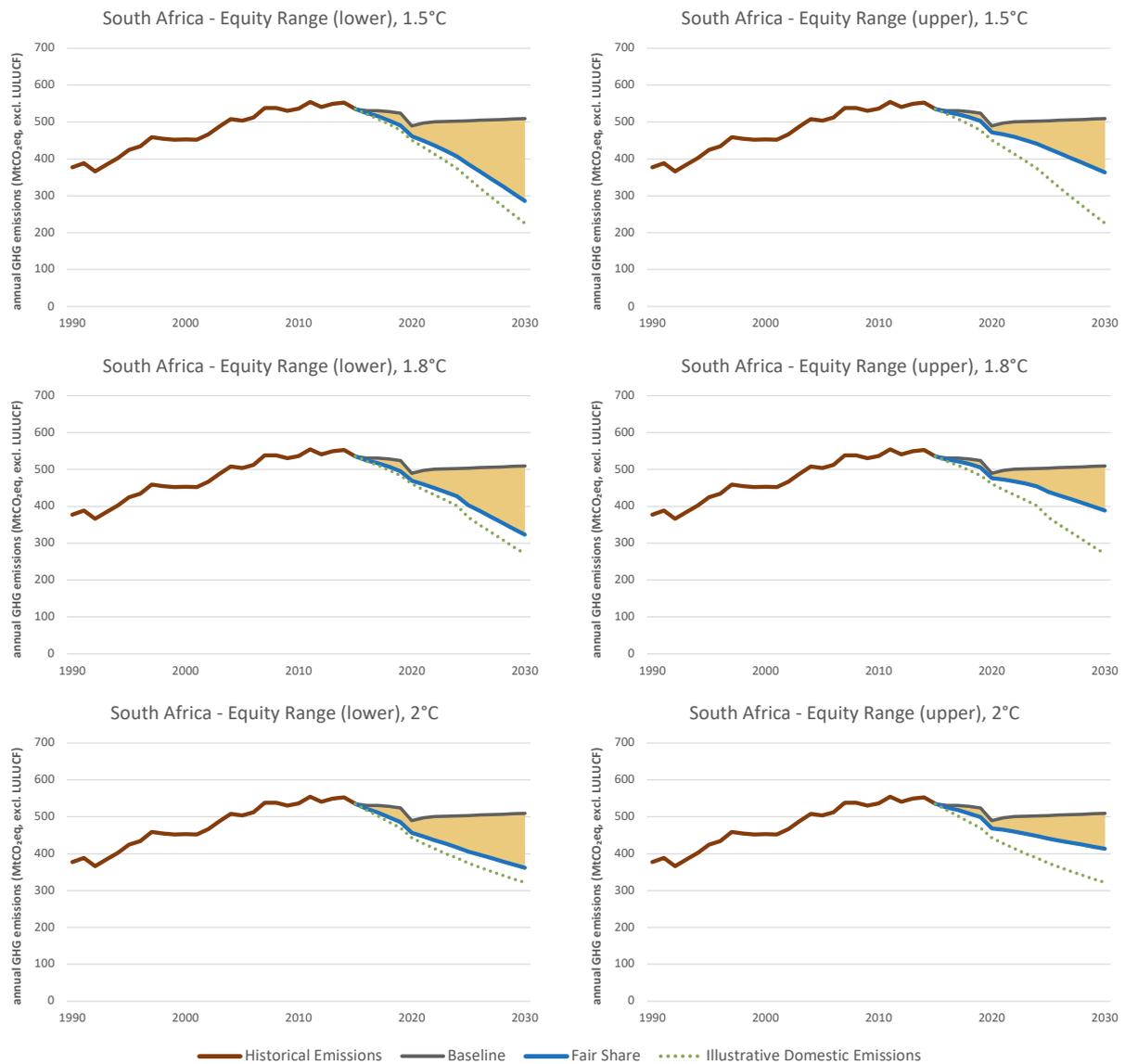
Furthermore, a Table 2 is provided below, in which the results for the fair share target range (Table 1, row 5) are adjusted to include LULUCF, for comparability with the figures in South Africa's NDC, where targets are expressed inclusive of LULUCF.

Table 2. South Africa fair share emissions allocation under global mitigation pathways for 1.5°C, 1.8°C and 2°C

	Fair Share Emissions Allocation (2030)		
	1.5°C (MtCO ₂ eq)	1.8°C (MtCO ₂ eq)	2.0°C (MtCO ₂ eq)
	<i>including LULUCF*</i>		
CSO equity range (lower)	274	311	350
CSO equity range (upper)	352	376	401
illustrative domestic emissions consistent with global goal, including international support	214	259	309

* The numbers in this table have been adjusted, relative to those in Table 1, to include land-use to express emissions in terms comparable to South Africa's NDC, whereas the charts below generated by the Climate Equity Reference Calculator (and the figures in Table 1) exclude LULUCF in their calculations. For the purpose of calculating the "including LULUCF" figures above, LULUCF sector removals of 12 MtCO₂ in 2030 have been assumed. "Illustrative domestic emissions" in each of the three mitigation cases gives domestic emissions level for South Africa that reflects an overall rate of decarbonization consistent with the global rate of decarbonization, which would be achieved by means of South Africa fulfilling its own fair share, plus additional mitigation enabled through international financial and technological support.

Figure 1. South Africa's Fair Share Ranges of 1.5°C, 1.8°C and 2.0°C consistent global mitigation



"Illustrative domestic emissions" in each of the three mitigation cases gives domestic emissions level for South Africa that reflects an overall rate of decarbonization consistent with the global rate of decarbonization, which would be achieved by means of South Africa fulfilling its own fair share, plus additional mitigation enabled through international financial and technological support.

3 Consistency of 1500 MW of additional coal-fired power with South Africa's fair share of the global emission reduction effort

We can now determine whether building 1500MW of new coal capacity as specified in the updated 2019 IRP is consistent with South Africa's efforts to undertake its fair share of the global mitigation required to adhere to the Paris Agreement temperature limitation objective, based on the fair share analysis detailed above.

We reference the accompanying the expert analysis (Merven, Burton, and Lehmann-Grube, 2021), which assesses South Africa's economy-wide GHG emissions that would result from forcing the addition of 1500 MW of new coal capacity, as specified in the updated 2019 IRP, into an otherwise least-cost electricity supply mix. That report concludes that South Africa's GHG emissions would amount to 455 MtCO₂eq in 2030 if that plan were to be implemented. Table 3 compares this emission level with the fair share range for South Africa, for all three global temperature pathways (1.5°C, 1.8°C, and 2.0°C), and for both the upper and lower end of the Civil Society Equity Review range.

Table 3. South Africa fair share emissions allocation under global mitigation pathways for 1.5°C, 1.8°C and 2°C, and the upper and lower ends of the CSO equity range, compared to the estimated range of economy-wide emissions resulting from forcing 1500 MW of new coal capacity into the electricity system, 2030.

	Fair Share Emissions Allocation (2030)			1500 MW of forced new coal capacity
	MtCO ₂ eq, including LULUCF*			
	1.5°C	1.8°C	2.0°C	
CSO equity range (lower)	274	311	350	455
CSO equity range (upper)	352	376	401	455

The foregoing results make clear that South Africa must undertake substantial emission reductions, bringing emissions to a level in the range of 274-352 MtCO₂eq to achieve its fair share of emissions reductions consistent with limiting warming to 1.5°C, and to 311-376 MtCO₂eq for its fair share of emissions reductions to holding warming below 1.8°C (including LULUCF). The implication of this fair share analysis, combined with the referenced expert analyses (also provided in Table 3, last column, derived by subtracting the extremes of the fair share range from the extremes of the Merven et al. emissions analyses), is that the addition of 1500 MW of coal-fired capacity as specified in the IRP increases emissions of an otherwise least-cost electricity supply mix to well above South Africa's fair share reduction range, by at least 78 to 144 MtCO₂eq annually (in the 1.8°C case) or as much as 103 to 181 MtCO₂eq annually (in the 1.5°C case), while also increasing costs of future power sector development.

Consequently, forcing 1500 MW of new coal capacity significantly raises costs of reducing emissions to within South Africa's 1.5°C fair share range. Specifically, the analysis by Merven *et al* also finds that forcing in 1500 MW of new coal capacity would raise the costs of an ambitious climate policy scenario that limits emissions to 350 MtCO₂eq by R109 billion.

4 Conclusion

This report provides evidence that the building of 1500 MW of new coal capacity – as specified in the 2019 IRP update – is inconsistent with South Africa's efforts to undertake its fair share of the global mitigation needed to adhere to the Paris Agreement temperature goal of "*holding the increase in the global average temperature to well below 2°C [...] and pursuing efforts to limit the temperature increase to 1.5°C.*"

We draw on the results of a fair share analysis framework supported by a wide range of civil society groups, including several in South Africa. This analysis concludes that while South Africa has a strong claim to international financial, technological, and institutional support to undertake mitigation, it is also obliged to reduce its emissions to the range 274-352 MtCO₂eq to limit warming to 1.5°C, and 311-376 MtCO₂eq to hold warming below the more risky 1.8°C (including LULUCF), and to invest the necessary policy attention and material resources in doing so.

However, the accompanying power sector analyses by Merven *et al*, concludes that the addition of 1500 MW of new coal capacity would lead to considerably higher emissions. This report thus concludes that the addition of 1500 MW of new coal capacity, as specified in the IRP 2019, is not consistent with South African efforts to undertake its fair share of global emission reductions.

Finally, South Africa is the leading economy in Africa and an important member of the global community that stands among the top 15 greenhouse gas emitters. Given that trust in a global cooperative solution to the climate challenge depends fundamentally on countries making equitable contributions, South Africa would be contributing to undermining that trust, and diminishing the global resolve to address climate change, if it were not to fulfil its fair share. This, in turn, threatens the climate, safety, and livelihoods of South Africa's own citizens.

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