

**OXFAM AMERICA**  
RESEARCH BACKGROUNDER

# Climate change, equity, and stranded assets

Simon Caney

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## **OXFAM AMERICA'S RESEARCH BACKGROUNDEERS**

Series editor: Kimberly Pfeifer

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### **Citations of this paper**

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## **ACRONYMS AND ABBREVIATIONS**

HDI	Human Development Index
REDD	Reducing emissions from deforestation and forest degradation
UNFCCC	United Nations Framework Convention on Climate Change

## **BACKGROUND TO THE PAPER**

Oxfam's principal mission is to eradicate poverty and injustice. To this end the organization is engaged in programs working to address climate change, both by building resilience and by limiting the concentration of greenhouse gasses in the atmosphere with a target of limiting global temperature rise to no more than 1.5°C. At the same time Oxfam also has programming focused on ensuring countries with natural resources (including fossil fuel reserves) use those resources to address poverty and drive development.

These three program efforts together present conflicts as well as synergies. On the one hand it is clear that advocating for the exploitation of fossil fuel reserves as a means to fund development will, at some point, come into conflict with efforts to limit the emission of greenhouse gases. At the same time, the revenues available from the exploitation of fossil fuels could be used to fund both adaptation to climate change, as well as the shift towards renewables and a zero carbon economy.

Oxfam's unique set of priorities have caused it to reflect on how to resolve these contradictions and capitalize on the synergies. An outcome of this process was the realization that while international agreements on climate change placed a significant focus on ideas of equity and fairness (mainly through the notion of common but differentiated responsibilities), such a framing was almost completely lacking when considering the issue of which countries should bear the greatest burden of having their assets stranded.

In response, Oxfam America's Extractive Industries team decided to consult with a political philosopher to explore whether the equity concerns that dominate international climate change discussions might have relevance to the question of stranded assets. The result is this paper, which notes that equity concerns on stranded assets are relevant, yet they are not prominently discussed and there is little to no research on the topic.

When reading this paper, it should be noted that the intention in publishing it is not to advocate for a policy position, or motivate for a particular campaign strategy. Instead the hope is that this work could serve to initiate some conversation on how to address the challenging question of balancing meeting development imperatives, managing extractive industries, minimizing climate change, and adapting to its impacts.

## EXECUTIVE SUMMARY

The findings of the paper are as follows:

First, there are inescapable equity issues surrounding the stranding of fossil fuel assets. Such issues raise unavoidable questions, including:

- Whose fossil fuels are to be left in the ground?
- What criteria should we employ to decide who has the best case for using the fossil fuels that may be used?
- Is compensation owed to those who leave their fossil fuels in the ground? If so, who pays?

In addition, the equity issues that arise can be approached from within the framework that affirms the principle of Common but Differentiated Responsibility and Respective Capabilities. In short, this paper confirms the “hypothesis that there are equity concerns regarding stranded assets which are currently not accounted for in climate negotiations, but which could reasonably fall within the logic of common but differentiated responsibilities and respective capabilities.”<sup>1</sup>

Second, while there is an extensive literature on the equitable distribution of the burdens of combating climate change and the equitable transition to a low carbon world, these have focused overwhelmingly on consumption of fossil fuels and the emission of greenhouse gases (and not on the production and sale of those fossil fuels). Similarly, while there is a large literature on stranded fossil fuel assets this focuses more on the implications for investors and on the economic implications of stranded assets, and does not discuss the issues of equity and fairness that arise. Furthermore, while there is valuable work on extractive industries and natural resources, this is not primarily focused on the specific case of limiting the use of coal, oil, and gas because of their effects on the climate system and the ethical issues arising from that. Finally, while there are detailed analyses of decarbonization and development these also do not examine the equity issues.

In short, then, there has been little “work to date which has explored the proposed means to account for these equity issues around the stranding of assets.”<sup>2</sup>

That said, the literature on the equitable response to climate change does—in conjunction with the other literatures mentioned—provide a useful framework by which to analyse the equity issues surrounding the stranding of assets. So, even though ethical analyses have not thus far been applied to the stranding of

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<sup>1</sup>The ‘Research Scope of Work,’ p.2.

<sup>2</sup>The ‘Research Scope of Work,’ p.2.

fossil fuel assets it is possible to do so, and that is what this paper has sought to do.

Third, there has been little “commentary on the merits of different decarbonization tools in terms of their capacity to account for the potential equity implications of stranded assets.”

There has been considerable discussion of the Yasuní-ITT Initiative and the problems it encountered. Lessons can be learned from this on how to implement similar initiatives in the future (for example, ensuring that there is a reliable stream of revenue). However, the focus of that research has not been directly on the equity implications of the Initiative.

Fourth, the paper has examined the following question: What would likely be entailed in undertaking an assessment which sought to prioritize the order in which countries should have their assets stranded (HDI, historical emissions, carbon intensity of the economy, available resources, climate vulnerability, governance structures (for delivery of services), etc.)?

In reply: it has found that an assessment which sought to prioritize the order in which countries should have their assets stranded should be informed by:

- a) Its level of development as reflected in its HDI,
- b) Its historical responsibility defined in terms of past extraction and past benefits from extraction, and
- c) The availability of resources and forms of energy and sources of development.

Other considerations cited—carbon intensity, climate vulnerability, and governance structures—while important, do not in themselves determine an equitable distribution of claims to extract fossil fuels.<sup>3</sup>

Fifth, the paper has examined the following question: What would be the implications of an equity approach to stranding assets on the idea of common but differentiated responsibilities and respective capabilities? Of particular interest is whether such an approach to stranding assets further explodes the binary classification of developed vs. developing nations in common but differentiated responsibilities and respective capabilities.<sup>4</sup>

In doing so, it found that an equity approach to stranding assets would undermine the binary classification of countries as either developed or not developed and would call for a more nuanced framework in which countries would be placed on a continuum.

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<sup>3</sup>The ‘Research Scope of Work,’ p.2.

<sup>4</sup>The ‘Research Scope of Work,’ p.2.



Sixth and finally, the paper has addressed the question: Would raising questions around equity and stranded assets generate major political risks to the UNFCCC process?<sup>5</sup>

It found that raising questions about equity and stranded assets might encounter resistance from developed countries which have fossil fuel reserves; and that moving away from a binary classification and differentiating between different developing countries might encounter resistance from some developing countries. However, it also noted ways in which these obstacles can be addressed and that a process for stranding fossil fuel assets could be designed in ways that share some features with existing programs like REDD and the CDM. So the political feasibility problems are not insuperable.

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<sup>5</sup> The 'Research Scope of Work,' p.3.

## INTRODUCTION

Preventing dangerous climate change will require that many fossil fuels—oil, coal and gas—should not be used, and should instead be left in the ground.<sup>6</sup> The creation of such “stranded assets” raises questions of equity: Who may use the remaining fossil fuels? What would be the fairest allocation of the opportunity to extract these fossil fuels? What criteria should be employed to answer this question? And, what, if anything, is owed to those who are required to leave their fossil fuels unused?

The objective of this research is to identify and evaluate the ethical issues surrounding stranded fossil fuel assets. It works on the “hypothesis that there are equity concerns regarding stranded assets which are currently not accounted for in climate negotiations, but which could reasonably fall within the logic of common but differentiated responsibilities and respective capabilities.”<sup>7</sup> With this in mind, it provides an overview of the literatures on equity and climate change and their application to these issues.

The paper has the following structure. It is divided into two parts. Part 1 provides a necessary framework and sets out the questions to be examined and methods to be employed. This includes a necessary overview of the empirical background and the context; the setting out of the questions to be examined; and the outlining of the normative and conceptual framework that underpin the analysis. Finally, Part 1 closes by setting out the kinds of methods and literature to be employed.

Having defined the questions, concepts, and methods to be employed, Part 2 engages in the substantive analysis. It examines why, and to what extent, stranded carbon assets give rise to questions of equity. It further explores the criteria that might be used to determine who has the best claim to existing fossil fuel reserves, evaluating six criteria. The work then analyzes the implications of an equitable treatment of existing fossil fuel reserves, and closes by considering the political risks of focusing on the equitable distribution of fossil fuels.

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<sup>6</sup> Note this rests on the assumption that there will not be large-scale deployment of Carbon Capture and Storage (CCS), at least not in the immediate future. Were there to be extensive CCS then the case for leaving fossil fuels in the ground would be weakened. For a recent overview of the state of play with regards to CCS see the discussion in the Intergovernmental Panel on Climate Change’s *Fifth Assessment Report* by Thomas Bruckner and Igor Alexeyevich Bashmakov (2014, pp.517 & 532-533). See also McGlade and Ekins’ finding that “the reserves of coal that can be burned are only six percentage points higher when CCS is allowed, with the utilization of gas and oil increasing by an even smaller fraction (around two percentage points). Because of the expense of CCS, its relatively late date of introduction (2025), and the assumed maximum rate at which it can be built, CCS has a relatively modest effect on the overall levels of fossil fuel that can be produced before 2050 in a 2°C scenario” (McGlade and Ekins 2015, p.190).

<sup>7</sup> This is quoted from p.2 of the ‘Research Scope of Work’

## THE CONTEXT

To explore the equity implications of the use of remaining fossil fuels, it is essential to provide some context. This section thus sets out that context. The starting point of the analysis is that there is an imperative to prevent “dangerous anthropogenic interference with the climate system” (United Nations’ Framework Convention on Climate Change, Article 2).<sup>8</sup> This commitment to preventing dangerous climate change has often been defined in terms of ensuring that global mean temperatures do not rise by more than 2°C (3.6 Fahrenheit) over pre-industrial times (although see below for recent developments). Although this 2°C target has been widely endorsed by policymakers, and so estimates for allocating greenhouse gas emissions have often been based on this figure, it should be noted that Oxfam has endorsed a commitment to keeping any global average temperature rise below 1.5°C.

Meeting the 2°C target (and certainly meeting the 1.5°C target) requires a considerable reduction in the emission of greenhouse gases and the move to a less intensive carbon society. The magnitude of the challenge is evident from the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Chapter 12 of the Fifth Assessment Report reports that

“To limit the warming caused by anthropogenic CO<sub>2</sub> emissions alone to be likely less than 2°C relative to the period 1861-1880, total CO<sub>2</sub> emissions from all anthropogenic sources would need to be limited to a cumulative budget of about 1000 PgC since that period. About half [445 to 585 PgC] of this budget was already emitted by 2011” (Collins and Knutti 2013, p.1033).<sup>9</sup>

On current trajectories this means that humanity will emit the total “cumulative budget” by 2040, thereby committing us, within the next 25 years, to a more than 50% chance of a 2°C increase in global mean temperatures over pre-industrial times.<sup>10</sup>

It is salutary to observe that this projection focuses solely on carbon dioxide. If other greenhouse gases are included then the situation is even more serious. The passage from the Fifth Assessment Report quoted above continues: “Accounting for projected warming effect of non-CO<sub>2</sub> forcing, a possible release of GHGs from permafrost or methane hydrates, or requiring a higher likelihood of

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<sup>8</sup> See:

[http://unfccc.int/files/essential\\_background/background\\_publications\\_htmlpdf/application/pdf/conveng.pdf](http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf).

<sup>9</sup> For earlier research on the trillionth tonne see Myles R. Allen, David J. Frame, Chris Huntingford, Chris D. Jones, Jason A. Lowe, Malte Meinshausen and Nicolai Meinshausen (2009, pp.1163-1166). See also Malte Meinshausen, Nicolai Meinshausen, William Hare, Sarah C. B. Raper, Katja Frieler, Reto Knutti, David J. Frame & Myles R. Allen (2009, pp.1158-1162).

<sup>10</sup> See <http://trillionthtonne.org/>.

temperatures remaining below 2°C, all imply a lower budget” (Collins and Knutti 2013, p.1033).<sup>11</sup> In other words, if we include all greenhouse gases then the “cumulative budget” left available to humanity is even less than the roughly half a trillion tons, and the deadline even closer. Preventing dangerous climate change, thus, requires an aggressive commitment to mitigation.

As noted above, most estimates have been defined in terms of meeting a 2°C target. It is thus very important to note that in the recent Paris Agreement that was agreed in December 2015, a lower target was also included.<sup>12</sup> Article 2.1(a) of the Paris Agreement specifies the goal as

“Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change”.<sup>13</sup>

Of course, this kind of target entails an even smaller greenhouse gas budget.<sup>14</sup>

One implication of a serious commitment to mitigation is that many fossil fuels (oil, coal) must remain unused or become stranded. As Christopher McGlade and Paul Ekins write in their recent article in *Nature*, “Although there have previously been fears over the scarcity of fossil fuels, in a climate-constrained world this is no longer a relevant concern: large portions of the reserve base and an even greater proportion of the resource base should not be produced if the temperature rise is to remain below 2°C” (McGlade and Ekins 2015, p.190).<sup>15</sup>

This raises an important question of equity. Who may exploit the fossil fuel reserves in their ownership and who may not? And, on what basis? Furthermore, if people are disallowed from exploiting their fossil fuels does this justify compensating them for the non-use? What would be an equitable response to the necessity of leaving some fossil fuels in the ground?

This has important implications for developing countries, some of which contain large reserves of fossil fuels. For example, Angola comes 149th out of 187 in a ranking of countries by their Human Development Index, and Nigeria comes 152nd (equal with Cameroon). Furthermore, both are in the United Nations Development Program’s “low human development” category (UNDP 2014, p.162). And both have extensive oil reserves. The International Energy Agency

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<sup>11</sup> For projections of what the budget would be if other greenhouse gases were included see Collins and Knutti (2013, p.1113: and pp.1107-113 more generally). They give three different projections depending on what level of likelihood decision-makers want to have of meeting the 2°C target.

<sup>12</sup> Some, such as the representatives of AOSIS, have campaigned for a 1.5°C target (Tschakert 2015).

<sup>13</sup> For the Paris Agreement see <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>.

<sup>14</sup> For pessimistic commentary on the capacity to meet the targets in the Paris Agreement and the techniques that might be employed to try to meet it see Anderson (2015).

<sup>15</sup> For data on the coal, oil, and gas reserves that remain see IEA (2014, chapter 3 (oil), chapter 4 (natural gas) and chapter 5 (coal)). It reports, for example, that there remain 1,699 billion barrels of oil in “proven reserves” (that is reserves that it is 90% likely that they can be extracted at a profit), and 6,010 billion barrels of conventional and unconventional oil reserves (IEA 2014, p.111).

reports in its most recent annual report, World Energy Outlook 2014, that “[s]ub-Saharan Africa as a whole has around 65 billion barrels of proven oil reserves, equivalent to around 5% of the world total. Three-quarters of these oil reserves are held in two countries (Nigeria and Angola)” (IEA 2014, p.464). In addition to this, “Africa is estimated to have 52 tcm of remaining recoverable conventional natural gas resources, of which 31 tcm are in sub-Saharan Africa” (IEA 2014, p.465).

As Gavin Bridge and Philippe Le Billon write, “Developing through oil is an aspiration for many oil-producing countries but the reality of everyday life for many in Angola, Iraq, Iran, Libya, Kazakhstan, Nigeria, Congo, and Saudi Arabia falls far short of this goal” (Bridge and Le Billon 2013, p.125). Other countries, such as Ecuador, rely heavily on their oil reserves. Ecuador comes much higher—at 98th—(UNDP 2014, p.161). It is, though, highly dependent on its oil. Writing 7 years ago, Larrea and Warnars write that “[p]etroleum, the single most important product of the economy, accounted for 54% of total exports in the last decade, and petroleum revenues made up on average 26% of government revenues between 2000 and 2007” (Larrea and Warnars 2009, p.219).

It is important not just that humanity avoid triggering dangerous climate change, but also that the burdens involved in combating climate change are shared justly. The dominant framework as to what constitutes equitable burden sharing adopts the doctrine of “Common but Differentiated Responsibility and Respective Capabilities.” This is explicitly affirmed in Article 3.1 of the United Nations Framework Convention on Climate Change, which states that

“The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.”<sup>16</sup>

This doctrine of Common but Differentiated Responsibilities and Respective Capabilities was also affirmed in Article 10 of the Kyoto Protocol.<sup>17</sup> Furthermore, it continues to inform all climate negotiations and is reiterated in the Paris

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<sup>16</sup> See:

[http://unfccc.int/files/essential\\_background/background\\_publications\\_htmlpdf/application/pdf/conveng.pdf](http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf).

Note the doctrine predates the UNFCCC. For an early statement see the ‘Report of the United Nations Conference on Environment and Development’ (the Rio Declaration) (1992). Principle 7 of this Report states “States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth’s ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.” (<http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>)

<sup>17</sup> See <http://unfccc.int/resource/docs/convkp/kpeng.pdf>.

Agreement—in the Preamble and Article 2.2 and Article 4.19.<sup>18</sup> On this approach, all states have a shared responsibility to prevent harmful climatic changes (so the responsibility is “common” to all), but some have greater responsibilities than others, depending on how much they emitted and also what ability they have to bear the burden (and so the responsibility is “differentiated”).<sup>19</sup>

The doctrine of “Common but Differentiated Responsibilities and Respective Capabilities” has, to a large extent, been applied to the emission of greenhouse gases. The focus has, thus, been largely on the “production process” and its emission of greenhouse gases,<sup>20</sup> and there has been much less focus on the extraction of fossil fuels. This paper explores the issues surrounding the latter.

There is a strong case for doing so. As Paul Collier and Anthony Venables point out, it is important to tackle the problem of climate change at root. Focusing exclusively on those who use fossil fuels in the productive process (or, to go one step further, to put one’s focus on consumers) multiplies problems because there are so many producers and users, and there is a high likelihood of “leakage” (Collier and Venables 2014, pp.493-494). For example, since many can burn fossil fuels throughout the world, focusing on the productive process requires widespread compliance by a very large proportion of these different actors. Given this, it makes sense to consider measures that focus on the point of extraction: for if one can do this successfully, one can reduce such leakage problems (Collier and Venables 2014, pp.493-494).<sup>21</sup> At this point it should be noted that some have sought to implement equitable policies concerning stranded fossil fuel assets. The most notable of these is the Yasuní-ITT Initiative.<sup>22</sup> The Initiative

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<sup>18</sup> See <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>.

<sup>19</sup> For an illuminating account of Common but Differentiated Responsibilities and Respective Capacities see Rajamani (2006).

<sup>20</sup> One exception to this is work on “consumption-based” accounting of greenhouse gas emissions rather than “production-based” accounting. Consumption-based approaches focus on the emissions associated by those consuming goods and services. Given the extent of emissions embodied in trade, consumption-based and production-based accounting can diverge quite dramatically. See Davis and Caldeira (2010).

<sup>21</sup> Collier and Venables discuss two kinds of leakage. The first (referred to in the text above) is what they term “international leakage”: this refers to a situation in which if one group of agents implements some demand-side policies (such as carbon taxes), consumers shift to another group of agents which does not employ such policies (Collier and Venables 2014, pp.493-494 & 497-499). The second kind is what they term “inter-temporal leakage”: this refers to a situation in which if one group of agents proposes to implement some demand-side policies in the future, then consumers seek to increase their consumption now before the policies are applied (Collier and Venables 2014, pp.494, 497 & 499-500). Their claim is that given this a focus on the extractive process (a supply-side approach) is desirable.

The first kind of leakage might be argued to have more force than the second. The reason for this is that the claim that the advance notification of a policy in the future might generate an increase in current consumption seems to apply with force whether the policy is a demand-side one that applies instruments such as carbon taxes or a supply-side one that seeks to reduce extraction at source. For a plan to implement such a supply-side policy in the future would also generate incentives to increase extraction now. The first argument, however, about the extent of leakage in the global economy where there is no effective regime ensuring compliance with demand-side policies is hard to dispute.

<sup>22</sup> What follows draws on the illuminating discussions of Ecuador’s Yasuní ITT Initiative by Matt Finer, Remi Moncel, and Clinton N. Jenkins (2010, pp.63-66); Carlos Larrea and Lavinia Warnars (2009, pp.219-223); Joan Martinez-Alier, Nnimmo Bassey, and Patrick Bond (2013); Laura Rival (2010, pp.358-365); María Cristina Vallejo, Rafael Burbano, Fander Falconí, and Carlos Larrea (2015, pp.175-185).

concerns the large oil reserves in the Ishpingo–Tambococha–Tiputini oil fields, located in the Yasuní National Park in Ecuador. The Yasuní-ITT Initiative was first developed in 2007. Put at its simplest, the Initiative involved Ecuador not using the oil reserves (and thereby not contributing to climate change), in exchange for which it would be paid, thereby enabling Ecuador to develop. The sum of oil at stake was considerable. A recent study reported that it involved “846 million barrels of heavy crude oil” (indeed possibly up to 921 billion barrels in reserve) and if it all remained in the ground it would result in a saving of 407 million metric tons of CO<sub>2</sub> (Vallejo, Burbano, Falconí, and Larrea (2015, p.175). A Trust Fund was set up in 2010 to fund it (Martinez-Alier 2013). Thus, in principle, this is an interesting case of stranding fossil fuel assets (thereby contributing to mitigating climate change, among other things) while at the same time compensating Ecuador, thereby contributing to its standard of living. Unfortunately, the Initiative faltered. In August 2013 President Rafael Correa declared that insufficient funds had been raised, and so drilling for oil recommenced (Martinez-Alier 2013). This does not mean that it is not possible to implement a scheme in which “not extracting fossil fuels” is compensated for (and indeed there are many policies in which “non-use” of a natural resource—or protection of environmental service—is paid for), but it does suggest that it needs to learn from the problems that the Yasuní-ITT Initiative has faced.

## THE QUESTIONS

Having provided the general background, this section turns to the core questions to be examined in the remainder of the paper. The central overarching question to be examined in this paper concerns the equitable treatment of those with fossil fuel reserves. In the course of examining different answers to this question, the analysis will be guided by six more specific questions to be examined. These are specified as follows<sup>23</sup>.

1. The overall focus of this research is reliant on a normative assumption regarding the equity implications of stranded assets. As such an initial question of this research pertains to the merits of the ethical arguments, both for and against the position that the issue of stranded assets should incorporate equity considerations. Of particular interest is whether these arguments are consonant or not with the notion of common but differentiated responsibilities and respective capabilities.
2. Has there been any work to date which has explored the proposed means to account for these equity issues around the stranding of assets?
3. Is there any commentary on the merits of different decarbonization tools in terms of their capacity to account for the potential equity implications of stranded assets?
4. What would likely be entailed in undertaking an assessment which sought to prioritize the order in which countries should have their assets stranded (HDI, historical emissions, carbon intensity of the economy, available resources, climate vulnerability, governance structures (for delivery of services), etc.)?
5. What would be the implications of an equity approach to stranding assets on the idea of common but differentiated responsibilities and respective capabilities? Of particular interest is whether such an approach to stranding assets further explodes the binary classification of developed vs. developing nations in common but differentiated responsibilities and respective capabilities.
6. Would raising questions around equity and stranded assets generate major political risks to the UNFCCC process?<sup>24</sup>

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<sup>23</sup> These questions were generated by a Scope of Work that was conceived of by Oxfam and which formed the basis of engagement with the consultant.

<sup>24</sup> This is quoted from pp.2-3 of the 'Research Scope of Work.'



## THE CONCEPTUAL FRAMEWORK

This section outlines the conceptual framework that will be employed.

Two concepts play a central role in the analysis. The first of these is **equity**. The paper employs the notion of “Equity” specified in the Scope of Work.<sup>25</sup> Equity refers to what is fair and just. It is a distinctive value and should not be equated with other traditional values like “charity” or “benevolence.” It refers to what is owed to individuals—what they can claim as a matter of right, and not just what is efficient. There are many different accounts of equity—ranging from egalitarian ones to libertarian ones—but what they have in common is a commitment to giving each person their due, and what they are entitled to.

A further point about equity: sometimes equity is used to refer to procedurally fair decision-making processes. The focus on this paper is on equity as a “substantive ideal”: that is, one that concerns the distribution of social, economic, and environmental burdens and benefits. The paper will be in line with the values expressed in Oxfam’s “Hang Together or Hang Separately” (2009).

Second, the paper seeks to develop principles and policies that are compatible with other goals and objectives, and as such, **policy consonance** is a central concept. For example, policies designed to prevent dangerous climate change will impact considerably on other kinds of policy—most notably attempts to develop and eradicate poverty. The aim then is to identify equitable principles concerning stranding fossil fuel assets that contribute to the mitigation of dangerous climate change but do so in ways that recognize rights to develop.

Finally, in terms of **scope** it should be noted that the research focuses exclusively on the fossil fuels—such as coal, oil, and natural gas. It does not discuss other extractive industries such as minerals.

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<sup>25</sup> See p.3 of the ‘Research Scope of Work.’

## RESEARCH DESIGN

This research draws on the literatures on extractive industries, climate change, and development. More specifically, it draws on:

- Literature in ethics on the responsibilities to combat climate change and the doctrine of common but differentiated responsibilities and respective capabilities. This includes work by moral and political philosophers (Caney 2005, 2010a,b, 2012, 2014; Gardiner et al.; Shue 2014; Vanderheiden 2008), as well as work by Oxfam (2009) and EcoEquity's work on "Greenhouse Development Rights"<sup>26</sup>. As part of this, it also draws on the literature on the equity implications of a transition to a low carbon society where relevant (for example, Nuffield Council on Bioethics (2011, chapter 4); Newell et al. (2015)).
- Literature on stranded assets, and stranded fossil fuel assets in particular. This includes work such as Carbon Tracker (2013), Johnson et al. (2015, pp.89–102), Lecuyer and Vogt-Schilb (2014), and Rozenberg, Vogt-Schilb and Hallegatte (2014).
- Literature on Low Carbon Development. This includes research such as Marianne Fay et al. (2015) Decarbonizing Development, David Victor (2011), analyses of different energy sources (IEA 2014), and the assessment reports of the Intergovernmental Panel on Climate Change.
- Literature on natural resource management and development. This includes work by Michael Ross (2012, 2015), Leif Wenar (2016), Paul Collier (2007, pp.38-52), David Victor, David Hults, and Mark Thurber (2012). It also includes Natural Resource Governance Institute (2014), the policies of the Extractive Industries Transparency Initiative (EITI),<sup>27</sup> and Oxfam's work on "natural resources and rights."<sup>28</sup>

One important point should be stressed here. The above literatures are all relevant to the issues being explored in this paper. However, there is very little work that both discusses the stranding of fossil fuel assets and does so with a concern to determine what an equitable response would be. The second question posed on page 16 asks:

"Has there been any work to date which has explored the proposed means to account for these equity issues around the stranding of assets?"

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<sup>26</sup> See Paul Baer, Tom Athanasiou, Sivan Kartha, and Eric Kemp-Benedict (2008), The Greenhouse Development Rights Framework: The Right to Development in a Climate Constrained World. See more generally: <http://gdrights.org>.

<sup>27</sup> <https://eiti.org>.

<sup>28</sup> <http://www.oxfamamerica.org/take-action/campaign/natural-resources-and-rights/>.

The short answer to this is: no. There has been little work on the ways in which one might account for the equity issues surrounding the stranding of assets. There has been much work on the equitable response to climate change (see the philosophical literature listed above). There has also been a considerable amount of research on stranded assets, including stranded fossil fuel assets. There has also been considerable discussion of the Yasuní-ITT Initiative.<sup>29</sup> However, what has been absent is analysis of different ways to account for the equity issues surrounding the stranding of assets. The research on stranded fossil fuel assets has focused on the implications for investors and business.<sup>30</sup> The focus of work and policies on extractive industries has often not focused directly on the ecological limits of extraction.<sup>31</sup>

This paper thus draws on both the ethical and empirical literatures above to answer these questions.

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<sup>29</sup> See Finer, Moncel, and Jenkins (2010, pp.63-66); Larrea and Warnars (2009, pp.219-223); Martinez-Alier, Bassey, and Bond (2013); Rival (2010, pp.358-365); Vallejo, Burbano, Falconí, and Larrea (2015, pp.175-185).

<sup>30</sup> See, for example, Carbon Tracker Unburnable Carbon 2013: Wasted Capital and Stranded Assets (2013). See also the programme on stranded assets at the Smith School of Enterprise and the Environment (SSEE) at the University of Oxford: <http://www.smithschool.ox.ac.uk/research-programmes/stranded-assets/>.

<sup>31</sup> See, for example, the Extractive Industries Transparency Initiative (EITI). Its 12 Principles do not make reference to the limits on the extraction of fossil fuel that follow from a commitment to preventing dangerous climate change. See [https://eiti.org/files/English\\_EITI\\_STANDARD.pdf](https://eiti.org/files/English_EITI_STANDARD.pdf).

## THE EQUITY DIMENSIONS OF STRANDED ASSETS

Having set out the questions, conceptual framework, and research design, the paper turns to substantive analysis and to consider the remaining questions identified. The first question is whether (1) “the issue of stranded assets should incorporate equity considerations” and, if so, (2) “whether these arguments are consonant or not with the notion of common but differentiated responsibilities and respective capabilities” (p.15 above).<sup>32</sup> We can deal with the two parts of this question in turn.

### 1. *Should the Issue of Stranded Assets Incorporate Equity Considerations?*

First, the question of which fossil fuel assets should be stranded, on what basis, and whether there should be any compensation for those who have stranded assets inescapably raises questions of equity. Equity concerns the fair distribution of burdens and benefits. As John Rawls puts it in *A Theory of Justice*, “principles of social justice...define the appropriate distribution of the benefits and burdens of social cooperation” (Rawls 1999, p.4). Any decision about stranding (fossil fuel) assets unavoidably impacts on different people’s benefits (the opportunities available to some to use fossil fuels) and burdens (the opportunities denied to some to use fossil fuel reserves). For example, any policy that grants some developing countries privileged access to using fossil fuels like coal, gas, and oil thereby confers an advantage on them, and a corresponding disadvantage on members of other countries that are denied such access. As such it cannot but raise questions of equity.

More specifically, it raises the following questions:

- a) Who are the rights bearers? Do countries have moral rights to the coal, oil, and gas within their jurisdiction? Does this mean that governments are the legitimate moral owners of such natural resources? Or are the rights bearers in these cases individual men and women?
- b) What is the right principle of distributive justice? How should the benefits of hydrocarbons be distributed? Should their benefits be shared equally? Or primarily to some? Should the interests of the poor be prioritized? Or those who have used least fossil fuels historically? What is an equitable distribution?
- c) If a country’s use of certain hydrocarbons is limited, is it (or its members) entitled to compensation?
- d) If so, who should bear the burden of compensating those entitled to compensation?

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<sup>32</sup> This is quoted from p.2 of the ‘Research Scope of Work.’

In short: imposing limits on the use of fossil fuels inevitably poses questions of distributive justice about who is entitled to the benefits of hydrocarbons; which ones may be used and which ones not, and on what basis; who, if anyone should be compensated; and by whom?

Three further points should be noted.

#### A. An Analogy with REDD

First, a comparison with Reducing Emissions from Deforestation and forest Degradation (REDD) may be instructive. REDD starts from the recognition that forests play a vital role in absorbing CO<sub>2</sub> and thus the mitigation of climate change. In light of this, activities conducted under the heading of REDD seek to protect forests and to reduce deforestation by paying those who would otherwise engage in these activities not to do so.<sup>33</sup>

Although “preventing deforestation and protecting forests,” on the one hand, and “not using fossil fuel reserves,” on the other, are not identical they are structurally similar in morally relevant ways. In both cases there is an activity (using fossil fuels/engaging in deforestation) that can have harmful effects on the climate system (both increase the concentration of greenhouse gases in the atmosphere). Furthermore, in both cases desisting from this activity (leaving fossil fuels in the ground/not engaging in deforestation) imposes a cost on some; and, thus, in both cases, there is a question of who should pay this cost.

Now, REDD is widely recognized to involve questions of justice.<sup>34</sup> Given this, and given the similarities between REDD and stranded fossil fuel assets, there is a strong case for applying standards of equity to decisions concerning stranded fossil fuel assets.

Indeed, there is perhaps an even stronger case for a proposal analogous to paying people not to extract fossil fuels, namely that it is easier to quantify the volume of fossil fuels not extracted than the absorption of carbon of the kind required by REDD.<sup>35</sup>

#### B. States’ Rights

A second point: it might be said that the fossil fuels in question are located in specific countries—such as Libya or Nigeria or Iran—and, on this basis, some might say the ethical issues are rather straightforward. Individual countries own the natural resources in their territory and, therefore, there are no complex questions of equity. States—on this view—have the rights either to utilize the

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<sup>33</sup> For further information see <http://www.un-redd.org>.

<sup>34</sup> See Schroeder and McDermott (2014).

<sup>35</sup> I owe this point to an anonymous referee of the first draft of this paper.

resources for domestic consumption or to benefit by selling the resources that they own as they see fit.<sup>36</sup>

In reply: this is not plausible on either moral or legal grounds. First, on moral grounds, it is not self-evident that countries own all the natural resources within their territory. Furthermore, even if we take states or countries to own the fossil fuels contained in their jurisdiction, the question of ownership is not straightforward and raises issues of equity. For example, who exactly owns the resources in this situation? If fossil fuels are not stranded within a country who may extract them and who has a claim to their benefits? If they are stranded and a system of compensation is also put in place who are the rightful recipients?

One answer is that the government is the owner. However, is this plausible if the government is run by, and in the interest of, an unaccountable political élite? In light of this, some suggest that the citizens of a state own the resources located within its jurisdiction. By this they mean that the people own the resources contained in a state's territory and thus are entitled to some of the proceeds (Wenar 2016). Drawing on this idea some propose a system of basic income derived from the country's natural resources, and they draw inspiration from systems like the Alaska Permanent Fund.<sup>37</sup> We then face the questions of equity concerning the fairest distribution of resources among citizens.

Some, however, might dispute whether the "government" or "the people" necessarily owns the resources, arguing that the natural resources belong to whoever owns the property in which the resources are located, which might belong to a private individual or a group of individuals or a firm.

These views are not exhaustive of the options. Some adopt a "cosmopolitan" perspective and would argue that natural resources are owned by all humanity, and not the government or citizens of the state in which they are located or individuals or firms. In defense of this proposition it is argued that whether a country has a rich stock of resources in its territory or not is simply a matter of luck: their location there is not something for which the people can claim credit. They cannot be said to deserve these resources (Beitz 1999, pp.136-143). On

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<sup>36</sup> In his *Blood Oil: Tyrants, Violence, and the Rules That Run the World* (2016), Leif Wenar operates with the assumption that the people who live in a state with natural resources are the rightful owners of those natural resources (2016, chapter 11).

<sup>37</sup> Article IX section 15 of the Alaska State Constitution specifies that a proportion of the revenues raised from a number of sources (most notably from the sale of oil) should be collected by the state and then each citizen of Alaska should receive an annual dividend. For information see <http://www.apfc.org/home/Content/home/index.cfm> and <https://www.pfd.state.ak.us/>. The content of the Article IX section 15 can be found at <http://www.apfc.org/home/Content/aboutAPFC/constAndLaw.cfm>. For discussion of the Alaska Permanent Fund and for analyses of the argument that the revenues from such natural resources can, and should, be used to fund a basic income see Widerquist and Howard (2012).

this basis, some argue that some portion of the proceeds from the world's natural resources should be shared globally (Pogge 2008, chapter 8).<sup>38</sup>

The central point here is that questions of justice and ethics are inescapable and that questions of ownership rest on normative principles that stand in need of justification.

In addition to this, it is widely recognized that there are moral limits on what states may do with the natural resources in their jurisdiction. For example, they have responsibilities to future generations, including future members of their own society as well as members of other societies, and may not engage in actions that fail to respect the legitimate interests of future generations (Brown Weiss 1989). In the context of climate change, this entails duties not to exceed a fair share of emissions. Climate change undermines the rights of future generations to life, health, food, and water (Caney 2010b). It also entails duties to act as a good steward or trustee of the resources (Caney 2012b).

Finally, these moral points about the limits on a current government's rights to use natural resources like coal, oil, and gas are reflected in domestic and international law. As Richard Barnes notes in *Property Rights and Natural Resources* there are limits on the use of natural resources (Barnes 2009, p.232ff) including limits under international environmental law (2009, pp.234-249). As he further notes, there are also duties of stewardship—duties to conserve and preserve land and natural resources for the benefit of future generations (Barnes 2009, pp.155-162). Many legal systems employ the concept of “public trust,” and this has been interpreted as entailing fiduciary duties to protect renewable and nonrenewable resources, and has led to “public trust litigation” to protect the environment.<sup>39</sup>

For these reasons, the fact that coal, oil, and gas are located within the jurisdiction of states does not entail that these are not subject to legal and ethical principles.

### C. Other Values

At this point a third important point should, however, be noted. This is that while the phenomenon of stranded assets does raise questions of equity this does not mean that this is the only relevant consideration. It is compatible with recognizing that there are also other relevant considerations, ones that go beyond the equitable distribution of fossil fuel use, and that these might, in some circumstances, take priority.

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<sup>38</sup> See also Schroeder and Pogge (2009, pp.267-280), which argues that in a world characterized by poverty and inequality benefits from natural resources contained in developing countries can, and should, be retained by those countries in order to enable development.

<sup>39</sup> For a discussion of “public trust” as a source of environmental responsibilities see Mary Wood's *Nature's Trust* (2014, esp Part II).

For example, efficiency matters as well. This can have at least two distinct implications. First: as was noted at the start, there is a very tight limit on the volume of greenhouse gases that can be emitted if humanity is to enjoy a 50% chance of meeting the 2°C target (Collins and Knutti 2013, p.1033) and this becomes tighter still if we make the aim “to limit the temperature increase to 1.5°C above pre-industrial levels” (Paris Agreement Article 2.1(a)). Meeting this target will be hard, given increasing per capita consumption, and given an increasing global population which “is projected to increase by more than one billion people within the next 15 years, reaching 8.5 billion in 2030, and to increase further to 9.7 billion in 2050 and 11.2 billion by 2100” (United Nations Department of Economic and Social Affairs Population Division 2015, p.2).

With this in mind, there is reason to prioritize extracting fossil fuels with the least warming potential (such as gas) over those which make a larger contribution to climate change (such as coal). Given the imperative to prevent dangerous climate change, and given these differences in their impact on the remaining greenhouse budget, there is a very strong case for favoring extraction of the energy sources with the least harmful greenhouse gases and for stranding fossil fuel reserves that are more harmful.

Second, it is vitally important that fossil fuels are extracted in an efficient manner. Governments and the international community have efficiency-based reasons for prioritizing projects for extracting fossil fuels that have the most efficient and least wasteful extraction process.

A concern for efficiency thus requires (other things being equal) both (i) extracting fossil fuels with the least global warming potential and (ii) for maximally cost-effective extraction processes.

It is important to recognize that recognizing the importance of efficiency does not in itself entail that justice does not matter. On most accounts of justice what is required, among other things, is the efficient protection of vital resources so as to ensure the highest standard of living possible, and so efficiency (and getting the most benefit per unit of cost from the remaining stock of fossil fuels that can be extracted) matters for the realization of justice. It is also crucial to note that stranding a fossil fuel asset (such as coal) because of its harmful effects and thus inefficient use of the remaining greenhouse gas budget, might be accompanied with compensation to such countries for the benefit forgone. So an efficiency-based reason for keeping a fossil fuel in the ground can be combined with compensation packages (if, pending the arguments to be considered below, such compensation is required by justice).

In addition to efficiency, it is vitally important not simply that access to limited fossil fuels is shared equitably but also that there is an effective policy in place that can prevent dangerous anthropogenic interference. The final section of this paper considers the point that focusing on distributive questions has various risks



attached to it such as, for example, making an effective international climate treaty less attainable (Caney 2014).

The upshot here, then, is that the decision to strand some fossil fuel assets and not others and the decision whether to compensate those with stranded assets or not does inescapably raise questions of justice and equity. However, there are other important considerations—most notably the need to prevent dangerous climate change as well as the need for an efficient use of remaining permissible fossil fuels. Furthermore, given political realities and the difficulty of persuading leading countries to engage in the necessary mitigation projects, it cannot be assumed that we can realize both (i) an effective regime that prevents dangerous climate change and (ii) does so in a way that shares burdens equitably and treats those with fossil fuel assets equitably. It may, for example, be the case that political leaders will commit to sufficiently ambitious climate targets but only in ways that impose unjust burdens on others, such as adopting mitigation policies with harmful side effects (Caney 2016).

2. *Are these arguments consonant or not with the notion of common but differentiated responsibilities and respective capabilities?*

Having established that there are important equity questions surrounding stranding fossil fuel assets, the next question is whether these can be addressed from within a framework that calls for a system of common but differentiated responsibilities and respective capabilities.

A complete answer will emerge in the following section. However, it is possible to say, in advance of that, that there is no reason to think that the burdens involved in not extracting fossil fuels (or paying compensation to those required to abstain from using their fossil fuels) cannot be allocated in accordance with the doctrine of common but differentiated responsibilities. The doctrine of common but differentiated responsibilities and respective capabilities requires, roughly, that everyone bears some responsibility but that some should bear a greater burden. More specifically, the greatest burdens should be borne by the developed countries; those who have emitted least and who have least ability to pay should shoulder a lesser burden. Given this, one can realize the doctrine of common but differentiated responsibilities and respective capabilities, by granting the poorest members of the world and those who have emitted the least (often an overlapping group) with *either* the greatest access to fossil fuel reserves (or alternatively compensation for not extracting them).

This addresses Question 1 as specified on page 15. This asked for “the arguments, both for and against the position that the issue of stranded assets should incorporate equity considerations” and “whether these arguments

are consonant or not with the notion of common but differentiated responsibilities and respective capabilities.”<sup>40</sup>

The finding above is that the issue of stranded assets should include equity considerations, but not only these, and that these arguments are consonant with the notion of common but differentiated responsibilities and respective capabilities.

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<sup>40</sup>See p.2 of the ‘Research Scope of Work.’

## CRITERIA FOR DETERMINING WHICH ASSETS SHOULD BE STRANDED

Having assessed whether the stranding of fossil fuel assets raises questions of equity, this section turns to the issue of what criteria should be employed to determine which assets should be stranded and on what basis. What are the relevant criteria for deciding what is an equitable response to the stranding of fossil fuel assets? It thus addresses the fourth question posed on page 15, namely:

“What would likely be entailed in undertaking an assessment which sought to prioritize the order in which countries should have their assets stranded?”<sup>41</sup>

To do so, it considers arguments for and against the following criteria: (a) level of development, (b) historical responsibility, (c) the extent to which other resources are available, arguing that each of these is relevant. It then considers the ways in which (d) the carbon intensity of the economy, (e) climate vulnerability, and (f) governance structures (for delivery of services) are relevant. More generally, these criteria are employed here because they are commonly invoked in academic analyses of climate change policies, and constitute a reasonably exhaustive set of considerations that might be invoked.<sup>42</sup>

Each question will be considered in turn, but we can note, up front, that the central finding is that an equitable response to the stranding of fossil fuel assets (one that is informed by the principle of Common but Differentiated Responsibilities and Respective Capabilities) would be informed primarily by the state’s (a) level of development as measured by the Human Development Index, (b) its historical record, and (c) the availability of other resources. The other criteria mentioned clearly matter, but they should not necessarily guide which assets should be stranded.

### A: HDI and Development

First, one natural criterion to employ when determining who has rights to extract fossil fuels, and, by how much, is the level of development. The relevance of this consideration is recognized in the recent Sustainable Development Goals: the first goal of which calls for the eradication of poverty.<sup>43</sup> It is also firmly recognized in the climate regime. For example, the preamble to the United Nations Framework Convention on Climate Change (1992) affirms “the legitimate priority needs of developing countries for the achievement of sustained economic growth

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<sup>41</sup> See p.2 of the ‘Research Scope of Work.’

<sup>42</sup> An examination of the literature on justice, resource use and climate change, for example, does not yield any additional criteria. See Gardiner et al (2010).

<sup>43</sup> <https://sustainabledevelopment.un.org/?menu=1300>.

and the eradication of poverty.”<sup>44</sup> Crucially, if a policy on stranded fossil fuel assets is to be in line with the doctrine of Common but Differentiated Responsibilities and Respective Capabilities, it is essential that excessive burdens are not placed on the world’s poorest, and that their right to develop in a sustainable way is recognized. Stranding assets needed for development without compensation would be in violation of the values and principles affirmed by the principle of Common but Differentiated Responsibilities and Respective Capabilities.

In light of this pressing goal, it can be argued that the least advantaged have a strong claim to extract such remaining fossil fuels that can be used without triggering a 2°C increase in global mean temperatures. Granting them rights to extract such fossil fuel reserves can both (i) provide a source of energy for domestic consumption, but also, crucially, (ii) can generate revenues through exports.

To this one might add that there are rich fossil fuel reserves in many of the poor regions of the world. For example, the IEA’s World Energy Outlook 2014 reports of sub-Saharan Africa that “[t]he region is rich in energy resources, but they are largely undeveloped. Almost 30% of global oil and gas discoveries made over the last five years were in the region” (IEA 2014, p.28). There have been “large gas discoveries in Mozambique (mainly in the offshore Rovuma Basin) and in Tanzania” which have been “complemented by pre-salt oil and gas discoveries in the Kwanza Basin in Angola” (IEA 2014, p.462). The IEA adds that in 2013 there have been “oil finds in the Keta-Togo-Benin Basin in Nigeria and further natural gas finds in Mozambique” (IEA 2014, p.462).

In short, one might state the argument as follows:

- Many live in severe poverty; and any equitable response to existing fossil fuel resources needs to acknowledge the importance of enabling the poor to develop [the developmental imperative].
- Granting developing countries extraction rights would facilitate development for two reasons. First, development requires energy (for agriculture, transportation, health, education, and industry). Coal, oil, and gas are sources of energy.<sup>45</sup> Second, however, and perhaps more crucially, they can provide a valuable stream of revenue if they are exported [the role of fossil fuels].

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[http://unfccc.int/files/essential\\_background/background\\_publications\\_htmlpdf/application/pdf/conveng.pdf](http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf)

<sup>45</sup> These can, of course, be used in ways that have harmful effects on human health. It is worth noting here that other forms of energy that are very heavily used by the poor – including burning biomass – also have harmful effects on health. Paul Wilkinson, Kirk Smith, Michael Joffe, Andrew Haines write that “2.4 billion of the world’s population, disadvantaged by lack of access to clean energy, are exposed to high levels of indoor air pollutants from the inefficient burning of biomass fuels” (2007, p.965). On the harmful health effects of current fossil fuel use see Wilkinson et al. (2007, p.967).

- Therefore, the least advantaged have a special claim to extract existing fossil fuel reserves (with an upper limit specific by limits imposed by the 2°C target).

The upshot of this argument, then, is that the remaining fossil fuel reserves should be distributed so as to allow the global poor to extract fossil fuels in their countries. The proposal would be to allocate rights to extract fossil fuels in proportion to levels of underdevelopment.

Clearly to put this into practice one would need to have to be able to operationalize a conception of development. One plausible possibility (mentioned briefly above) is the Human Development Index. This builds on the “capabilities” approach developed by Amartya Sen and is employed by the United Nations Development Program in its “Human Development Reports.”<sup>46</sup> The HDI provides a useful measure of development and as the UNDP’s Human Development Reports attest, it can be operationalized.

**Analysis.** Having set out the consideration, we may now consider its strengths and limitations. One core strength of this approach is its recognition of the paramount importance of addressing global poverty, and its compatibility with the doctrine of Common but Differentiated Responsibilities and Respective Capabilities.

Some aspects of the argument as it stands are vulnerable to criticism and stand in need of further argument. Four points should be borne in mind.

**First:** Two reasons were given as to why granting extraction rights to the world’s least advantaged further development. It is worth noting that the first of these—the claim that they could benefit from extraction rights by using them for domestic consumption—is open to question. Energy is crucial for development but this does not, in itself, necessarily require the use of coal, oil, or gas (Hayward 2007: Caney 2012a). Other kinds of energy are available—including most notably renewables—and it would thus be a mistake to infer from the need for energy that this should be met by fossil fuels. For example, the IEA’s World Energy Outlook 2014 also reports that sub-Saharan Africa is “endowed with huge renewable energy resources, especially solar and hydro, as well as wind and geothermal” (IEA 2014, p.28).<sup>47</sup> In addition to this, some countries such as Kenya

<sup>46</sup> <http://hdr.undp.org/en/content/human-development-index-hdi>. For the intellectual origins of the concept, its development by Mahbub Ul Haq, and its grounding in the work of Amartya Sen see <http://hdr.undp.org/en/humandev>.

<sup>47</sup> The IEA’s findings on hydroelectric power are instructive. It writes: “The technical hydropower potential in Africa is estimated at 283 GW ... and is able to generate close to 1,200 TWh per year – 8% of the global technical potential. This amount of electricity is more than three-times the current electricity consumption in sub-Saharan Africa. Less than 10% of the technical potential has so far been tapped. More than half of the remaining potential is in Central and East Africa, particularly in Cameroon, Congo, DR Congo, Ethiopia and Mozambique, but there are also significant opportunities in Southern Africa (Angola, Madagascar, Mozambique and South Africa) and West Africa (Guinea, Nigeria and Senegal)” (IEA 2014, p.470).

and Ethiopia have considerable theothermal potential (IEA 2014 p.473). Other countries—such as Brazil, China, India, and Turkey—all also have considerable hydroelectric potential (Yüksel 2009).

This objection does not, of course, undermine the other reason for granting extraction rights to developing countries, namely that by doing so it provides a stream of revenue and can thus further development (Bridge and le Billon 2013).

**Second:** At this point, however, it is worth noting that this second development-based argument also needs to be handled carefully, for it is unlikely to be the case that granting extraction rights to fossil fuels to be used for export is *necessary* for development. This would assume that there are no other options for development, and we would need further argument to show whether this is the case. The conclusion should, thus, be that granting extraction rights provides *one source of revenue* for development.

To develop this point further: we should bear in mind that rather than granting developing countries the extraction rights for remaining fossil fuels, another way of meeting their development needs would be for those assets to be stranded *but the society be compensated for that*. There could, that is, be a system that built on the underlying rationale that underpinned the Yasuní-ITT Initiative, and sought to further development, while also keeping fossil fuels in the ground. Clearly, such a proposal would need to be able to address many practical issues (including those that led to the failure of the Yasuní-ITT Initiative, such as ensuring a regular supply of revenue). However, the relevant point in this context is simply that recognizing the developmental needs of some countries with fossil fuels does not in itself necessarily entail granting them extraction rights (for revenues) because an alternative system (stranding plus compensation) could, in principle, realize the same goal too. Fossil fuel rich developing countries can thus legitimately make the point that assuming that some remaining fossil fuels can be extracted, then—other things being equal—they have a strong pro tanto claim to be entitled either (a) to extract them to further their developmental goals or (b) to receive suitable compensation and be enabled to develop if their fossil fuel assets are stranded.

**Third:** At this point a third point is worth noting, namely that—irrespective of whether fossil fuel rich developing countries receive extraction rights or whether their assets are stranded and they receive compensation—it is crucial to ensure that the benefits are shared equitably (Nuffield Council on Bioethics 2011, chapter 4, pp.76-77) and that they do not simply go to unaccountable political and economic élites. It is, of course, a familiar fact that many resource-rich countries have experienced low development and that benefits have not been

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This said, it should be noted that it would be a mistake to assume that large scale hydroelectric power is unproblematic. For a recent assessment see Ansar, Flyvbjerg, Budzier, and Lunn (2014). For a particular example, see the controversies concerning the construction of the Belo Monte dam in Brazil (Hall and Branford 2012).

shared equitably. The extensive literature on the “resource curse” and on managing natural resources effectively and justly is, of course, key here.<sup>48</sup> For the argument from development to be persuasive, then, it needs to show that granting extraction rights (or financial compensation received as part of an agreement to strand fossil fuel assets) would actually benefit the needy and vulnerable, and that the revenues generated would not go to élites.

**Fourth:** It is important to recognize that the development-based argument for granting access to fossil fuels could only generate limited rights to extract that would apply in the short-term but would need to be phased out. Given the volume of greenhouse gases that may be permissibly emitted (Allen et al. 2009, pp.1163-1166), it is vital that all countries—including developing countries—transition to a low-carbon economy.

**The verdict:** There is an imperative to develop. Given that some countries have fossil fuel reserves and development needs, there is a case for either allocating the remaining permissible fossil fuels to developing countries or stranding the assets but compensating the societies for the benefit foregone. However, other sources of energy and other ways of promoting development should also be borne in mind.

#### B: Historical Responsibility

Having considered one criterion, we turn now to a second. Many ethical analyses of climate change argue that the ascription of responsibilities to mitigate climate change should take into account the historical record. Such approaches appeal to a principle of “historical responsibility,” according to which (roughly stated) past actions have implications for future rights and responsibilities. A very common variant of this argument focuses on the use of fossil fuels in the past, arguing that those who have used the most and thus emitted the most greenhouse gases have the greatest responsibility to mitigate climate change and fund adaptation (Neumayer 2000; Shue 2014, pp.182-186; Caney 2005, 2010a).

One question then is whether the underlying kind of reasoning—one that appeals to the concept of “historical responsibility”—can be applied to the subject of this report, namely on who can extract the remaining fossil fuels and, if so, to what extent, and, on what basis. Is it possible to draw lessons about extraction rights bearing in mind the historical record?

To answer this question, it is worth distinguishing between different interpretations of the concept of “historical responsibility.” One has been introduced above. It states:

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<sup>48</sup> See, for an excellent recent statement, Michael Ross’s *The Oil Curse* (2013) and also Leif Wenar’s *Blood Oil* (2016).

- A. The Use Version: The more that an agent (say, a given society) has used fossil fuels for energy in the past, and thus the more that they emitted greenhouse gas emissions in the past, then the less that that agent has a claim to future use (and future emissions); furthermore, by the same reasoning, the less that an agent has used fossil fuels in the past, and thus the less that they emitted greenhouse gases in the past, then the more they have a claim to future use.

This is the conventional principle that is commonly invoked in ethical analyses of climate change.

In itself this principle does not entail any particular conclusion about extraction rights. However, with this in mind we might consider two other interpretations of the concept of historical responsibility that, arguably, do have implications for extraction rights. Consider, for example,

- B. The Extraction Version: The more that an agent (say, a given society) has extracted fossil fuels in the past the less strong their claim to extract fossil fuels in the future; and the less that an agent has extracted fossil fuels in the past the more that they have a claim to extract them in the future.

The rough thought here is that if there is a resource which is limited (either because it is finite or because it has to be limited to meet a societal goal, in this case avoiding dangerous climate change) then, other things being equal, those who have taken most in the past have least claim to take it in the future; and those who have taken least in the past have the strongest claim to take it in the future.

Consider too a third principle which is also grounded in the idea of historical responsibility:

- C. The Benefit Version: The more that an agent (say, a given society) has benefited from the extraction of fossil fuels in the past the less strong their claim to future benefits from fossil fuels; and, the less that an agent has benefited from the extraction of fossil fuels in the past the more that they have a claim to the benefits from the extraction of fossil fuels in the future.

The Extraction Version and the Benefit Version might come to roughly similar conclusions, but it is worth noting that they are distinct. Some might extract some resources but others, in addition to those who extracted the principles, might benefit from them. This might happen in at least three ways. First, later generations might enjoy benefits from the extraction activities of earlier generations; second, if a country exports the natural resources then the firms that purchase them, their shareholders and their employees also benefit, although they themselves were not involved in the extraction process; finally, consumers



might benefit from the extraction of resources but not be involved in the extraction process.

Though they are distinct, it is worth noting that, in the context that is the focus of this paper (namely the equity issues surrounding stranding carbon assets), both the Extraction Version and the Benefit Version might provide support for the view that developing countries have a strong claim either to extract existing fossil fuel reserves or to compensation for not extracting them.

The underlying principle that agents should bear responsibility for their past actions is an established one. Its application to the policies required to combat climate change and to the extraction of existing fossil fuel reserves, however, faces some complications.

**First**, one response to appeals to historical responsibility is that while the current generation may legitimately be held responsible for its past actions it is unfair to make it pay for the actions of previous generations. This is a point often made against the Use Version. That is, it is often said to be unfair to require current generations to bear a burden because of the emissions of past generations of their society.

Someone might argue, in a similar vein, that the Extraction Version is unfair. Current generations should not be made to bear a burden because past generations of their society extracted fossil fuels.

A number of different replies can be made to this concern. For example, some would respond that the agent in question is not an individual but a country. The argument then is that industrialized countries, like the UK, extracted fossil fuels in the past and so these countries have a reduced claim now (Caney 2005, pp.758-759).

Others would respond that the objection has no force at all against the Benefit Version. They can reply that even though many fossil fuels were extracted by previous generations and not by current individuals, current individuals (primarily in affluent countries) have benefited from the emissions of the past and so should pay. In addition to this, many others—in the developing world—have not so benefited from past extraction and so are entitled to benefit from the extraction of remaining fossil fuels.<sup>49</sup> The Benefit Version is thus not undermined by the fact that many fossil fuels were extracted by previous generations since its focus is not on who extracted (or who used) fossil fuels, but on who benefited from the extraction of fossil fuels, and current people benefit from the extraction of fossil fuels which they were not involved in extracting.

A **second** objection sometimes made against arguments which rely on the principle of historical responsibility is that it can be unfair to penalize people who

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<sup>49</sup> For discussion see Caney 2005, pp.756-760; Gosseries 2004, pp.41-42; Shue 2014, pp.182-186.

engaged in certain actions in the past if they could not have reasonably known about the implications of their past actions. This is a point often made in connection with the use of fossil fuels in the past. The argument is that those who emitted high volumes of greenhouse gases in the past were often excusably ignorant of their harmful impacts, and thus it is unreasonable to penalize them for those consequences. Some might argue in a similar vein that it might be unfair to deprive people now of rights to extract fossil fuels because, and to the extent that, they were excusably ignorant of the future implications of their actions. The thought here would be: If they had known of the future implications then they might have behaved differently and lowered their use.

This raises a reasonable concern. However, again a number of counter-arguments have been made. In particular, some will argue that whatever force this has for the Extraction Version, it does not have much force against the Benefit Version. The point remains that some did in fact benefit and others do so, and they have benefited considerably from this (whereas others did not); and it seems unreasonable to ignore this when considering who can extract fossil fuels in the future. Thus, when some have benefited from the prior extraction of fossil fuels, it is not unfair to ascribe a burden to them.<sup>50</sup>

A **third** point: Some criticize arguments from historical responsibility, arguing that people should not be held responsible for either all of the amount of fossil fuels they have extracted or for all the benefits they have received from the extraction of fossil fuels in the past. They argue that people should bear a responsibility only if their extraction of fossil fuels in the past exceeds their “fair share” of what they can extract, or if their benefits from the past extraction of fossil fuels exceed a “fair share” of benefits. In both cases this raises the question of what constitutes a fair share of either (i) extraction rights and (ii) benefits from extraction in the past. In light of the previous discussion of the right to develop, one appealing proposal is that people should have a right to develop and should not be held responsible for actions needed to attain that standard of living, but they can be held responsible for actions in excess of that. This position adopts a “poverty-sensitive” principle of historical responsibility (Caney 2010a). If we apply this to the Extraction Version, the argument would claim that once a society has extracted over and above what it needs to develop, then any additional extraction of fossil fuels can be borne in mind; and the more that a society extracts after that the less, other things being equal, it can claim in the future. Likewise, the less it extracts after that, the more it can legitimately extract in the future. The Benefit Version can be reformulated in a similar way. It would state that the more benefits a society has derived from the extraction of fossil fuels over and above the attainment of a decent minimum standard of living then the weaker its claim to extract existing fossil fuels in the future; the less that it has benefited from

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<sup>50</sup> The response here is in line with one often made in reply to what I termed the Use Version: See Shue 2014, p.186 and also Caney 2010a, pp.208-210; Gosseries 2004, pp.40-41.

extraction in the past, the stronger its claim to extract and benefit from fossil fuels now and in the future.

A **fourth** point remains. The analysis above draws attention to two principles that could be applied to the issue of extractive rights—the Extraction Version and the Benefit Version. It has also noted that although the two may generally converge in their conclusions there is no guarantee that they always will. This raises the question of which is the more plausible and how to decide which should take priority if they conflict. This raises complex issues. Three considerations are worth noting:

- A. Some will have extracted inefficiently and wastefully in the past. One worry about the Benefit Version is that if some extracted a resource but did not benefit greatly from that extraction because they were wasteful, the Benefit Version would seem to entail that less can be asked of them than of another society that has been more efficient at deriving benefits from similar extraction levels. It seems wrong (and to set a bad precedent) to let their inefficiency or wastefulness mean that they are entitled to more in the future. If they are responsible for an inefficient process and so derive fewer benefits than they could have had, then it is not clear why they should have stronger claims on future resources than others who have been more efficient in the past.
  - a. To meet this it would be better to redefine the Benefit Version so that it holds that those who had the “opportunity to benefit” from the extraction of fossil fuels and so “could have benefited” from the extraction have diminished claims in the future in proportion with that opportunity to benefit (independently of whether they fully derived the benefit from the extraction process). Otherwise those who extracted efficiently in the past get penalized (in comparison with those who extracted inefficiently), and the inefficient are rewarded for their wastefulness.
- B. Second, it is arguable that the more fundamental notion is that of benefiting. People generally care about opportunities to extract because of the opportunities to benefit. If a country’s fossil fuel assets are stranded it seems very plausible to think that their primary concern will be that a valuable source of benefits has been denied them. Given this, it seems that what they really care about—what really matters—are the benefits of extraction.
- C. Third, as was noted above, the Benefit Version is not vulnerable to certain objections made against the Extraction Version. It can more easily explain why those who live in societies which have in the past extracted fossil fuels may—other things being equal—have a reduced claim to the

benefits of the remaining fossil fuel resources even when they themselves were not involved in the past extraction.

For these reasons, while both matter, and while more could be said about the merits and demerits of both, the Benefit Version might be more fundamental.

**In summary**, countries that have either extracted more fossil fuels in the past (the Extraction Version) or have benefited more from the extraction of fossil fuels in the past (the Benefit Version) have a weaker claim to the remaining stock of fossil fuels that may permissibly be used. As a corollary, those countries with lower historical records of extracting fossil fuels and/or benefiting from the extraction of fossil fuels have a stronger claim to extract and/or enjoy the benefits of remaining fossil fuel reserves. Given the third point made above (§3), however, the historical record is not the only relevant consideration: the level of development matters too.<sup>51</sup>

The first two criteria, thus, play a crucial role in determining who have strong claims to extract and benefit from existing reserves of coal, oil, and gas—the past record and the level of development.<sup>52</sup> However, certain other criteria might also be suggested.

### C: Available Resources

One of these is whether other resources are available. As was argued above, fossil fuel reserves have two uses, both of which are relevant for allocating extraction rights. One use is domestic consumption. A second use, which is generally recognized to be more significant, is as a good that can be exported and thus generate revenues.

It is worth noting that, in both cases, the case for granting extraction rights (or for compensating non-use of fossil fuels) depends to a large extent on whether the society that has fossil fuel reserves has other resources available.

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<sup>51</sup> It is worth re-iterating the point that the fact that a given country has a strong claim to develop and increase its energy consumption does not necessarily translate into a right to extract any existing fossil fuels in its jurisdiction. It entails a right to develop, but as was noted in the previous subsection this can sometimes be realized in other ways. So just because a country is not required to bear a heavy burden does not, in itself, entail that it should use fossil fuels if there are alternatives available that it can employ. It is important to bear in mind here – and elsewhere when considering claims to use existing coal, oil, and gas reserves – that what matters is not that people have rights to use certain resources but rather that they have rights to secure certain interests (in food, water, health, life, and a decent standard of living) (Hayward 2007, Caney 2012).

<sup>52</sup> This position is similar in spirit to the Greenhouse Development Rights Approach, pioneered by EcoEquity and others. In recent work, they have proposed a “Climate Equity Reference Framework” that allocates responsibilities according to (a) capability to pay (and so people’s level of development) and (b) responsibility (and so people’s historic emissions). This provides an appealing interpretation of the doctrine of Common but Differentiated Responsibilities and Respective Capabilities because it ascribes responsibilities to all, but it also calls for “differentiation” to reflect people’s different levels of emissions in the past and different levels of development now. One central difference with the approach taken in this paper, however, is that its focus is on consumption of fossil fuels and the related emissions, whereas the approach here concerns the extraction of fossil fuels.

Consider first a case where a society extracts fossil fuels and uses them in part to meet domestic consumption needs. Their claim for this kind of use will depend on whether they have other sources available that can also serve those same needs. Say, for example, there are two countries, X and Y, with identical needs, but where X has more access to clean sources of energy (such as solar photovoltaic, hydroelectric, geothermal, wind, or tidal) than Y does. In such a case then, other things being equal, X has a less strong case than Y. Where there are substitute forms of energy then a person or country's right to extract and use energy does not entail a right to serve those needs through the use of fossil fuels (Caney 2012a).

Consider now, secondly, the case of a country extracting resources for export. A similar point applies. That is, if a country has other (non-fossil fuel) resources in addition to fossil fuel reserves that it can export or it has other kinds of goods which it can trade profitably, then its case for using fossil fuels is accordingly weaker since it can develop its economy through exporting those other natural resources or providing other services or skills.

For these two reasons, the strength of claims to use fossil fuels (either for domestic energy consumption or for export) depends on what other resources a country has access to (to meet its domestic energy needs or to export to other countries).

**In summary**, this section has, thus far, identified three criteria that should inform policies concerning which assets should be stranded and whether compensation should be paid to those with assets: (a) their standard of living as reflected in their HDI, (b) the extent to which they have extracted fossil fuels in the past or benefited from the extraction of fossil fuels, and (c) whether people have other ways of meeting developmental needs. The next three subsections briefly explore three other considerations.

#### D: Carbon Intensity of the Economy

First, one might consider the carbon intensity of the economy. This measures the amount of carbon emitted in relation to GDP (Zhang et al. 2013, p.688).<sup>53</sup> "Carbon intensity" thus measures the efficiency of the use of fossil fuels. Many states seek to reduce the carbon intensity of their production. It might then be suggested that the stranding of assets should be guided by how efficient a country is in using its fossil fuel reserves.

Three points can be made in reply. First, the efficient use of fossil fuels is clearly an important policy objective.<sup>54</sup> It also helps advance the cause of justice, for less

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<sup>53</sup> <http://www.eia.gov/tools/glossary/index.cfm>.

<sup>54</sup> If one adopts a HDI approach it is worth bearing in mind that carbon intensity is defined in terms of GDP and thus (assuming that GDP and HDI do not correspond perfectly) we should not expect standard measures of carbon intensity to necessarily measure the carbon intensity of activities which promote human development.

wasteful use of scarce resources better enables people to promote their standard of living. At the same time, however, efficiency is not the only relevant consideration, and it would be unfair to penalize those who lack efficient technologies. In addition to this, one response to high carbon intensity might be not to take that as an immutable fact, but rather to improve it.

Furthermore, and more significantly, when fossil fuels are sold for export the carbon intensity of the country that is exporting them is not the relevant consideration: rather it is the efficiency of the importing country. So here countries with high carbon intensity should not be denied permission to extract the fossil fuels in their country.

Third, we should recall the discussion of efficiency in the above, where it was noted that there are strong efficiency-based (and justice-based) reasons for extracting relatively clean fossil fuels (like gas) over fossil fuels (like coal) which have a higher global warming potential. One corollary of this might be that where a developing country has fossil fuel reserves that have a high global warming potential then there are efficiency-based reasons for stranding such fossil-fuel assets; but, there may also be justice-based reasons for compensating those affected for the opportunity forgone (if, say, they are developing or if they have not extracted them in the past). The policy response to two countries which are equally poor and have equally low extraction records in the past but one (S1) has cleaner fossil fuels than the other (S2) might be for S1 to have rights to extract and for S2 to be denied those but allocated compensation instead for stranding what would otherwise be a lucrative source of revenue.

#### E: Climate Vulnerability

Some might propose that vulnerability to the climate system should bear on the equitable stranding of assets.

In reply: the fact that some countries—particularly developing ones—are highly vulnerable to climatic changes clearly matters and should be addressed. However, it can be argued that this is a matter for “adaptation” to climate change and it is thus not clear why it should bear on a country’s “mitigation” responsibilities.

Someone might respond to this point by arguing that a country’s exposure to various harms is important and thus countries need a revenue stream to pay for the necessary adaptation. However, while this is true it takes us back to the first consideration (VII.A. HDI and Development) for what it points out is that the level of development matters and this is already covered by the first consideration. Societies facing severe challenges like poor infrastructure, poverty, and disease would be prioritized according to the first criterion: a country’s vulnerability to climate change is thus subsumed under this and there is no reason to give it differential treatment.

One complication to this analysis concerns its implications for countries that face expensive adaptation funds. Compare two countries with such costs. One of these has succeeded in increasing its Human Development Index, but the other one which faced similar opportunities has not done so. If we look just to the level of development, then the first society will receive less assistance here than the second society, and this seems perverse. It penalizes societies for performing well and raising their HDI. This will strike many as both unfair in principle and also as having perverse incentive effects.<sup>55</sup>

Two points might be made here. First, this raises an important concern. It entails that those determining which assets should be stranded (and which of those should be compensated) should look beyond just the level of development, and also take into account the opportunities different societies have to develop and factor that in. Second, however, the point under discussion does not necessarily entail singling out adaptation costs for climate change as a particular reason to attribute extraction rights: rather it calls for taking into account the burdens different societies face (which may include climate-related adaptation costs but may also include other kinds of burdens too). In short, then, it calls for a use of human development indices that goes beyond just the level of development attained and also takes into account the context, the incentive effects and the opportunities facing societies.

#### F: Governance Structures

Consider now governance structures. This is clearly vitally important and, as the extensive literature on the resource curse attests, the kind of political regime in place plays a major role in determining whether a society benefits from its ownership of natural resources or not. It is a commonplace notion that many countries rich in oil, coal, and gas remain poor and prone to conflict. Initiatives on ensuring transparency and accountable government thus play a vital role (Collier 2007, pp.38-52; Ross 2012; Wenar 2016).<sup>56</sup>

Realizing good governance, however, raises several difficult practical and ethical questions, and several points need to be borne in mind.

First, it is important to be clear about what follows from the importance of accountable governance structures. The absence of strong accountable governance structures in place does not in itself entail that a people have a lesser claim on natural resources (or on compensation for stranded assets). It is not a reason to penalize the members of those states. Rather it is a reason to work to reform the governance structures and thereby render them more transparent and accountable. It would thus be a mistake to take poor governance

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<sup>55</sup> I am grateful to a referee for raising this question.

<sup>56</sup> See here the principles affirmed by the Natural Resource Governance Institute (2014), the policies of the Extractive Industries Transparency Initiative (ETTI), and Oxfam's work on "natural resources and rights" (<http://www.oxfamamerica.org/take-action/campaign/natural-resources-and-rights/>).

as a given and respond to it in a reactive way. The best response is to continue to work towards transparency and accountability. This is valuable as a goal in itself. However, it is also valuable as a way of realizing a fair distribution of the benefits of natural resources within a society and over time.<sup>57</sup>

Second, however, it has been argued that fossil fuel revenues may make reform of governance more difficult, and, it might then be argued, that if this is the case there is a case for not allocating extraction rights to societies with poor governance institutions.<sup>58</sup> Clearly, a great deal depends here on the empirical question of the determinants of good governance. In his *The Oil Curse*, Michael Ross has argued that petroleum undermines democracy (2012, chapter 3). Furthermore, in his 2015 paper “What Have We Learnt about the Resource Curse” he concludes that “the greater a country’s oil income, the less likely it has been to transit to democracy” (2015, p.243) and that “there is strong evidence that higher levels of oil wealth help authoritarian regimes, and authoritarian rulers, ward off democratic pressures” (2015, p.248).

Several further points need, however, to be noted. The first is that Ross also notes that there are exceptions. He agrees with Thad Dunning’s (2008) argument that Latin America is an exception to the trend found elsewhere. As Ross writes of oil-producing states that transition to democracy: “All five of the countries that made successful transits [to democracy] were in Latin America: Venezuela (1958), Bolivia (1982), Argentina (1983), Mexico (2000), and Ecuador (2002) ... all of Latin America’s oil producers ...are now democracies” (Ross 2012, p.85: see also pp.85-86). Clearly, then, the relationship is not an iron rule.

Further support for this conclusion can be found in Pauline Jones Luong and Erika Weinthal’s study of post-Soviet states (Azerbaijan, Kazakhstan, Russia, Turkmenistan, and Uzbekistan). In *Oil Is Not a Curse: Ownership Structure and Institutions in Soviet Successor States* (2010) they find that “even those mineral-rich states that do not inherit strong institutions can nonetheless build them” (2010, p.4). On their view, the ownership structure—whether there is state ownership or private ownership—plays a key (and neglected) role.

To all this we should add that Ross notes that whether petroleum has effects on democracy, corruption, or violence depends on various conditions. As he puts it, “these effects are conditional” (Ross 2015, p.240). He further notes that the relationship has not always held. Indeed, he reports that “[f]rom 1960 to 1979, oil states and nonoil states were equally likely to transition to democracy” (Ross 2015, p.245). The link is thus not set in stone and there remains disagreement about whether oil stabilizes democracy or not (Ross 2015, p.245).<sup>59</sup>

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<sup>57</sup> Note here the 7th principle of Natural Resource Charter (Natural Resource Governance Institute 2014).

<sup>58</sup> I am grateful to a referee for raising this issue.

<sup>59</sup> Note one view is that whether oil and other revenues sustain undemocratic and unaccountable regimes depends, in part, on whether countries which buy oil and other fossil fuels from them, will trade with them



Given this, a case by case approach seems to be called for, and general statements about oil undermining democracy, while plausible in many cases, do not always necessarily hold.

**In summary**, the key considerations from the point of view of equity are (a) the level of development, (b) the historical record of extraction and benefits from past extraction, and (c) the availability of other resources<sup>60</sup>. The three other considerations analyzed, while important in their own right, do not necessarily directly bear on the specific question of the equitable response to stranding fossil fuel assets. The one exception to this is that the efficiency-based criterion give us reason to distinguish between two countries which are identical in all respects but one has cleaner fossil fuel reserves than another. Here both have the same claim to the same standard of living, but in the case of one (where the fossil fuel is relatively clean) it might be best to permit extraction and in the case of the other (where the fossil fuel is relatively dirty) it might be best to strand the asset but provide commensurate compensation.

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and treat them as the legitimate owners of the natural resources, or not. On this view, external countries and corporations enable autocracies to persist by trading with them, and thus the extent to which undemocratic regimes persist in fossil-fuel rich countries is not fixed and immutable, but depends, in part, on the behavior of the international community (Pogge 2008, Wenar 2016).

<sup>60</sup>Might there be other criteria? In his forthcoming book *Justice and Natural Resources* (forthcoming), Chris Armstrong argues that resource rich countries should be compensated if their fossil fuel assets are stranded. His reasoning is that countries in this position are having to forego an opportunity that would otherwise have been available to them (Armstrong forthcoming, chapter 10 section V). Two points should be noted here.

First, implementing a rule that has the effect that an agent must forego certain opportunities to enrich themselves does not in itself entail that that agent is entitled to receive compensation. To think this presupposes that the agent has a right to the economic benefits they would have been able to secure if this rule had not been implemented. It assumes, that is, that we should employ as a moral baseline “the standard of living that they would have had were it not for the rule” and that we are required to compensate for departures from that baseline. However, without further argument, it is not clear why we should accept these assumptions, and assume that agents have such rights. For example, banning the sale of landmines might reduce someone’s profit margin; but it does not follow that those who would otherwise make money from selling landmines have a right to compensation. Thus the claim that fossil fuel rich countries necessarily have a right to compensation because stranding assets reduces the possibility of them securing benefits is without justification.

A second point: it is worth noting that Armstrong’s claims are plausible in the context of developing countries. However, this is because such countries have a right to develop (and denying them the extraction rights without any compensation) compromises this right. Here what is doing the work is the right to develop. The most plausible version of his argument thus takes us back to the argument from development considered above.

## IMPLICATIONS OF AN EQUITY APPROACH FOR CBDR

Having considered what criteria might guide the stranding of fossil fuel assets, this section turns to the fifth question specified in this research, namely

“What would be the implications of an equity approach to stranding assets on the idea of common but differentiated responsibilities and respective capabilities? Of particular interest is whether such an approach to stranding assets further explodes the binary classification of developed vs. developing nations in common but differentiated responsibilities and respective capabilities.”<sup>61</sup>

The upshot of the analysis in the above section is that an equity approach to stranding assets is extremely likely to result in a differentiation between different non-Annex I countries and will undermine a simple distinction between developed and developing countries. The criteria that are morally relevant ones—from the point of view of justice and equity—come in degrees and so will not sustain a division between Annex I and non-Annex I countries.

To illustrate the point, consider three criteria that, it was argued, are relevant to determining an equitable response to the stranding of fossil fuel assets, namely:

1. Development needs and performance in terms of HDI;
2. Historical responsibility in terms of extraction of fossil fuels in the past or access to benefits from past extraction; and,
3. Access to other sources of energy and to other sources of wealth.

Different countries will differ on all of these dimensions. Consider (1): Countries will, for example, clearly fall along a spectrum. They will vary in terms of their current standard of living and the challenges they face.<sup>62</sup>

Consider now (2): If—following the argument made above—an equitable response to climate change requires taking into account either (a) how much societies have extracted fossil fuels in the past (the Extraction Version) or how much opportunity benefit they have derived from past extraction (the Benefit Version), or some combination of both, then clearly different societies will score differently. So (2) will yield a continuum and there is no guarantee that it will coincide with (1).

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<sup>61</sup>This is quoted from p.2 of the ‘Research Scope of Work.’

<sup>62</sup>As Eric Neumeyer also notes, countries vary considerably in terms of their energy needs (Neumeyer 2002, pp.7-12; 2004, p.39).

Turning now to (3): Countries will also vary in the extent to which they can develop without relying on exporting fossil fuels; some, for example, may have other natural resources or access to markets denied to others.<sup>63</sup>

In short, given that the three criteria admit of degrees and given that countries often perform very differently from each other compared on each of those criteria a simple distinction between Annex 1 and other countries is hard to defend. This said, while any strict binary categorization is difficult to sustain it would still, of course, be possible to group various countries together in rough categories and there may be an advantage from a political point of view of not abandoning broad categorizations.

The discussion so far has focused on how an “equity” approach would lead to a more complex differentiation of responsibilities and undermine the traditional Annex 1/non-Annex 1 categorization of Common but Differentiated Responsibilities and Respective Capacities. One further implication should also be noted, namely that it could also yield quite different conclusions as to who bears a responsibility. If for example, a country like Equatorial Guinea is granted rights to extract its resources (a right denied to some) and if, as a result, it acquires considerable revenues and scores highly on the HDI then, as a result, it would acquire some responsibilities.<sup>64</sup>

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<sup>63</sup> To give an example: those countries that have unusually high access to geothermal energy will, other things being equal, have weaker claims to use any fossil fuels they possess than those that do not. This bears on the claims of those countries that include East African Rift Valley, since this is “considered one of the most exciting prospects in the world for geothermal development, with total potential estimated at between 10 GW and 15 GW – more than East Africa’s total existing power generation capacity, a large share of which is concentrated in Ethiopia and Kenya” (IEA 2014, p.473).

<sup>64</sup> I owe this point, and the examples that follow, to a very helpful comment by an anonymous referee. Note also that what was earlier termed the Benefit Version might also support further responsibilities on resource rich countries (and do so more than the Extraction Version). A country like Equatorial Guinea may have responsibilities to disadvantaged societies that lack resources and thus lack the same opportunity to derive revenues (like Eritrea or Swaziland). Since these resource-poor societies have not benefited, and cannot benefit, from extracting resources then others, more fortunate than them in terms of their resource endowments, might (other things being equal) be under a responsibility to share some of the benefits. The Extraction Version, by contrast, would entail simply that countries that have historically not exploited their fossil fuel reserves may do so, but as such it does not directly help improve the condition of poor countries that lack such resources (like Eritrea or Swaziland).

## POLITICAL RISKS

Having identified the equity issues surrounding stranding of fossil fuel assets, this final section considers problems that seeking to realize equity might encounter. More specifically it considers the sixth question specified on page 15, namely:

“Would raising questions around equity and stranded assets generate major political risks to the UNFCCC process?”<sup>65</sup>

In reply: there are political risks in pursuing an equitable position on stranding fossil fuel assets, although the magnitude of these risks will vary depending on the specific policy pursued and whether developed countries are willing to exercise leadership. However, there are risks in any equitable position on climate change (including loss and damage, climate finance, mitigation targets and adaptation). Three points are worth bearing in mind.

**First**, if we bear in mind that humanity as a whole may not emit more than half a trillion tons of carbon if it is to have a 50% chance of not triggering a 2°C world, and if we also bear in mind that the Paris Agreement aims for an even more stringent target (Allen et al. 2009, pp.1163-1166; Collins and Knutti 2013, p.1033) then proposals to allocate the remaining extraction rights to resource-rich developing countries are likely to encounter some serious political obstacles. First, some resource-rich developed countries—aware of this and seeking to avoid dangerous climate change but wishing to utilize their own reserves—will simply resist plans to allocate extraction rights to the least advantaged. Alternatively, they might not contest any allocation of extraction rights to the least advantaged but also will not curb their own extraction of fossil fuels. This would maintain the flow of fossil fuels and not result in any price increase and thus not dampen the consumption of fossil fuels. As a result, humanity will exceed the trillion ton cumulative carbon budget and cause dangerous climate change. It is notable, in this context, that the Paris Agreement made no further step towards allocating specific responsibilities and limiting rights to emit greenhouse gases.<sup>66</sup> In addition to this, the USA has consistently resisted attempts to appeal to principles of historical responsibility.<sup>67</sup>

On the other hand, it can be argued that while some resource-rich affluent countries will resist allocating extraction rights to developing countries they might

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<sup>65</sup> This is quoted from p.3 of the ‘Research Scope of Work.’

<sup>66</sup> Article 4.1 of the Paris Agreement, for example, does not give precise statements of how much respective parties should do, but says rather: “Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.”

<sup>67</sup> See Nitin Sethi on the USA’s opposition to principles of historical responsibility in the context of proposals for an “Equity Reference Framework” (2014).

be less opposed to policies compensating developing countries for not using fossil fuels in their own countries. In other words, they might support a proposal that is similar in spirit to REDD. Building on this, it can be argued that there could be a system whereby those in developing countries do not develop their fossil fuels and are compensated financially for doing so where those who pay for the compensation can include that as part of their contribution to mitigation.

This would help address the problem that faced the Yasuní-ITT Initiative—namely the lack of sufficient funds. It would also bring it closer in nature to existing flexibility mechanisms, such as the Clean Development Mechanism, which is an established feature of the international climate regime. It is also similar to other forms of paying for environmental services. The CDM is not unproblematic and there have been some very serious shortcomings and flaws (Caney 2010c, pp.217-218). However, it is worth considering a policy which seeks both to mitigate climate change and which does so in ways that further development. Furthermore, since doing so gives some flexibility to high emitting countries it might be welcomed by them.

In short, then, while there is a political risk the precedents of the REDD and CDM suggest that it is not insuperable. A scheme for stranding assets in which those who abstain from using them receive compensation for that (distributed equitably among those affected) and in which those who pay for the fund have that included as part of their mitigation commitments is worth serious consideration as an equitable and feasible way of addressing climate change in a way that respects the principle of Common but Differentiated Responsibilities and Respective Capabilities.

**Second**, if the policies towards stranding fossil fuel assets adopt the different criteria analyzed earlier in this paper then, as noted, this will lead to differentiation between non-Annex I countries. As such, some countries are likely to resist the fragmentation of Annex I and the unity of the G77. As evidence for this, it is worth noting that some opposed using Equity Reference Framework indicators “as a means to differentiate between developing countries” (Ad Hoc Working Group on the Durban Platform 2013, p.4). To give one important example, India has objected to the differentiation among non-Annex I countries that an ERF would entail.<sup>68</sup>

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<sup>68</sup> The point is well-expressed by Navroz Dubash and Lavanya Rajamani in “A Map and a Compass for Climate Talks,” *The Hindu* 23 July (2014). They write:

“Indeed, India, with some other like-minded developing countries, has actively rejected an Africa Group proposal for an “Equity Reference Framework,” which has focused on how burdens may be equitably shared given differing historical responsibilities, development needs and current capabilities. Operationalising this framework would require a multilateral assessment of national contributions. India has proven suspicious of any assessment, even though the use of criteria proposed by the Africa Group can only work in India’s favour. In the political and legal context of the ongoing negotiations, a rigorous and consequential multilateral assessment process is the solitary mechanism under discussion that could potentially assess and perhaps even deliver equity in the distribution of climate burdens as well as adequacy of contributions by countries in relation to the agreed 2°C temperature goal. India’s rejection of an assessment process

In reply: although breaking down the binary division between developed and developing countries might encounter some resistance it is not clear how much longer this binary framework can last in the UNFCCC process. The emergence of other groupings like BASIC might signal an evolution from the old divisions found in the Kyoto Protocol.

A **third** point, as was noted above, although stranding fossil fuel assets necessarily raises questions of distributive justice those are not the only considerations. More generally, one can distinguish between two perspectives.<sup>69</sup> One might be called “duty-bearer justice”: this seeks to ensure that the path to a zero carbon world shares burdens equitably, with due respect to the right to develop and honoring the principles of common but differentiated responsibility. The focus of this paper has been on what this might mean in the context of stranding fossil fuel assets. However, there is a second perspective—what might be termed “harm-avoidance justice”: this seeks to prevent harm. In this case it prioritizes preventing dangerous climate change.

Ideally, policies honor both sets of considerations. However, in practice, policy makers may be forced to strike a balance. It is thus important to adopt a policy to stranding fossil fuel assets that does not preclude reaching an effective climate regime that succeeds in avoiding dangerous climatic changes. At the same time, it is important to ensure that the transition to a safe climate and a zero carbon world honors duties to the world’s poorest (Caney 2016).

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sacrifices an opportunity to operationalise equity and risks allowing developed countries off the hook” (Dubash and Rajamani 2014).

<sup>69</sup>See Caney (2014).

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