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**Imagining the end of fossil capitalism:
Supply-side climate policies and the fight to
leave fossil fuels under the soil**



Inaugural lecture by Professor Lorenzo Pellegrini

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Imagining the end of fossil capitalism: Supply-side climate policies and the fight to leave fossil fuels under the soil

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Abstract

This lecture presents ideas to think beyond fossil capitalism. The focus is on supply-side climate policies: policies that aim to directly reduce the extraction of fossil fuels, as opposed to the overwhelming majority of existing climate policies whose objective is to cut consumption of fossil fuels. Demand- and supply-side policies can be complementary and synergic. The introduction of policies to keep fossil fuels in the ground can also have galvanizing effects for environmental justice organizations. Ethics and feasibility intersect to determine the rights to (partial) compensation for the right holders over unburnable fossil fuel reserves.

The enactment of effective policies to leave fossil fuels in the ground seems currently unfeasible, and fossil fuel realism discourages us from thinking and articulating alternatives to fossil fuel capitalism. Apart from the need to develop elements of socially and environmentally just alternatives, academics have an opportunity to engage with social movements struggling to keep fossil fuels in the ground.

1. Introduction

This lecture presents some elements to think beyond fossil capitalism, focusing on supply-side climate policies as key for the transition away from fossil fuels. Supply-side climate policies aim to reduce directly the extraction of fossil fuels, as opposed to demand policies that cut consumption. Although, in principle, demand and supply policies are equivalent, they can be complementary and synergistic. The overwhelming majority of climate policies have focused on reducing the consumption of fossil fuels and the most commonly adopted climate policies, such as carbon taxes, emission trading, mandatory consumption/emission standards for vehicles, and subsidies to promote renewables, are targeting the greenhouse gas emissions associated with the consumption of fossil fuels. While the potential of policies to keep fossil fuels in the ground has long been underappreciated, there is currently a surge of interest in these policies. Instruments to keep fossil fuels under the soil include various forms of moratoria and bans on exploration and extraction as well as the restriction of investments to transport and transform fossil fuels (Lazarus and van Asselt, 2018).

Keeping fossil fuels in the soil to avoid greenhouse gas emissions is an (obvious) idea that was first promoted by social movements that combined their concerns with the socio-environmental liabilities generated by fossil fuels extraction, part of the broader 'resource curse' paradox, with climate

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² This lecture is partially based on (Orta Martínez et al., Forthcoming; Pellegrini et al., 2021a; Pellegrini and Arsel, Forthcoming). The cover picture is by Murat Arsel.

objectives. The campaigns and proposals of Environmental Rights Action (ERA)/Friends of the Earth Nigeria and *Acción Ecológica* from Ecuador to stop fossil fuel extraction in (certain parts of) the two countries are early notable examples. It is not surprising that locations where fossil fuel extraction has been associated with dismal socio-environmental impacts, such as Ecuador and Nigeria, are the ones where social movements promoted the conservation of fossil fuel reserves in situ (Martinez-Alier, 2021; Pellegrini and Arsel, Forthcoming; Temper et al., 2013). The government of Ecuador, under President Rafael Correa, was inspired by the proposal to enact a moratorium on oil extraction in the Ecuadorian Amazon and formulated a policy that would have limited extraction in the Yasuní National Park in exchange for partial compensation from the international community (Pellegrini et al., 2014). Although the ‘Yasuní ITT initiative’ was unable to raise the necessary funds and was eventually abandoned, it still represents a meaningful attempt to match climate policies with the preservation of a biodiversity hotspot, inhabited by indigenous people in voluntary isolation, while generating revenues for a middle-income country. The initiative showed the potential of geographically specific supply-side climate policies to generate substantial collateral benefits and raised the issue of compensation.

The idea of supply-side climate policies has in the meantime been further embraced by more activists, with the notable example of Greta Thunberg who has serially repeated, with undeniable clarity and unassailable logic, that ‘we need to keep the fossil fuels in the ground’ (*Greta Thunberg speech at UN Climate Change COP24 Conference, 2018*) and has been able to inspire the ‘Fridays for the Future’ global movement. The idea of supply-side climate policies has also been travelling from social movements to academia and policy-making. There is currently a rise in academic interest in why, where and how to implement supply-side climate policies (Asheim et al., 2019; Fæhn et al., 2017; Green and Denniss, 2018; Pellegrini et al., 2021a; Pellegrini and Arsel, Forthcoming; Piggot et al., 2020; Zhu et al., 2021) and ‘unburnable fossil fuels’ (i.e., the portion of fossil fuels resources that cannot be combusted to respect the carbon budget) fall into the category of concepts for sustainability science originating in environmental justice organizations (Martinez-Alier et al., 2014). In terms of policy making, several countries have adopted forms of (partial) moratoria and bans on fossil fuel exploration and extraction (e.g., Greenland has banned oil exploration in 2021, and Ireland and Spain passed similar legislation), or have set timelines to get there over the next few decades –for example, in the case of France by 2040 (Frost, 2021). These countries include middle-income countries, with Costa Rica standing out and passing a moratorium on hydrocarbon exploration already in 2002 (James, 2021).

Fossil fuels underpin most anthropogenic greenhouse gas emissions, or approximately 73% of the total (Ritchie et al., 2020). Global greenhouse gas emissions, at 49.8 GtCO₂equivalents in 2019, have not peaked yet and over the past two decades, they have declined temporarily only in the aftermath of the global financial crisis of 2008 and the Covid-19 Pandemic (Ritchie et al., 2020). In fact, the global community is heading decidedly in the wrong direction and large fossil fuel projects that are in the planning have projected emissions of approximately 419 GtCO₂, on top of the 776 GtCO₂ associated with large projects that are already operational; these projects are ‘carbon bombs’ that need to be defused to keep to the international agreements on climate change (Kühne et al., 2022; UNEP, 2020). The 2018–2100 carbon budget associated with 1.5°C of global warming if compared to pre-industrial levels is 580 GtCO₂ (Welsby et al., 2021). In summary, while drastic emission abatement is urgently needed, the production policies of countries and the investment decisions of the fossil fuel industry are set to largely exceed the remaining carbon budget in line with the 1.5°C objective.

In this lecture, I will first address some of the motivations underpinning supply-side climate policies, discuss some of the characteristics of these policies, and present real existing cases of initiatives to limit the supply of fossil fuels. I will conclude by positioning these elements and experiences with supply-side climate policies within the wider challenge of imagining a post-fossil-capitalism future. I will also outline a research agenda to investigate the objectives and the mechanisms of the transition necessary to keep fossil fuels in the ground, while engaging with the social actors promoting climate action.

2. The basis for supply-side climate policies

In theory, at the very basic level, policies to control the demand or supply of fossil fuels are equivalent in terms of effectiveness. That is, effective policies to decrease the demand for fossil fuels at the global level would necessarily lead to a decrease in the supply of fossil fuels. However, supply-side policies can complement demand-side policies (countervailing some of their shortcomings) and synergize them, strengthening their effectiveness, since they can be seen as galvanizing for social movements. They are easier to monitor (if compared to policies to decrease the demand for fossil fuels), can be agreed upon only by a significant share of fossil fuel producing countries, ameliorate the leakage problem, can act as insurance if demand-side policies fail, and have the potential to produce collateral socio-environmental benefits.

Supply-side policies are characterized by different political economy dynamics if compared to demand-side ones. These distinctions are apparent in the way these interventions relate to the activities of environmental justice organizations and social movements more generally, as well as the way they can disarticulate the resistance to effective climate policymaking by fossil fuel interests (first and foremost, the industry) and fossil fuel producing states. With respect to the former, policies to limit extractive projects are concrete and potentially politically galvanizing, they can disrupt extraction projects, at various stages from upstream to transportation, that have a material and geographical dimension –in this sense, they have very material objectives (Green and Denniss, 2018). The enactment of supply-side initiatives can be promoted by environmental justice organizations that oppose extractive projects, while lending themselves also to strengthening anti-fossil fuel norms and, ultimately, increasing the likelihood of anti-fossil fuel movements further organizing to block fossil fuel projects. That is, the dynamics of these policies could lead to a virtuous cycle to stop specific projects or to pass national and international rules and agreements to reduce the fossil fuel supply. The construction of fossil fuel infrastructure and production itself are also easier to monitor if compared to demand interventions. Grassroots monitoring systems that have been put in place to track the impacts of the fossil fuel industry could be adjusted and repurposed to ensure that countries make good on their commitments not to extract (Green and Kuch, 2022; Mena et al., 2019).

Another important political economy dynamic is that these policies need to be agreed upon only by fossil fuel producers and, under certain circumstances, it would be convenient for fossil fuel-producing countries to be part of an agreement to limit the production of fossil fuels. In fact, while demand-side policies tend to depress the value of fossil fuel reserves, supply-side policies make them scarcer and may raise their value. Interventions to limit the extraction of fossil fuels could be applied as economic instruments (e.g., taxes at the oil well or export taxes), or regulatory interventions limiting (or banning) exploration and extraction, or through hybrid modes (e.g. taxation of extraction, banning of exploration). Economic instruments could generate financial resources directly, but all interventions

that reduce supply would increase scarcity and can have positive price effects (Pellegrini et al., 2021a). The effect of the increased value of the fossil fuel reserves would have to be weighed against the commitments to leave part of the reserves under the soil and could generate a differentiated economic impact on different fossil fuel producers and it might also break the commonality of interests between fossil fuel industries and fossil fuel-rich states. As such, it would decrease the likelihood of monolithic opposition to these types of interventions.

This price effect ameliorates the problem of leakage/‘green paradox’ associated with demand-side climate policies. Intercountry leakage lowers the effectiveness of policies to decrease demand because it depresses the value of fossil fuels and countries (or more generally, economic agents) that are not bound by climate policies will have an incentive to increase their consumption of fossil fuels. As a result, the effectiveness of demand-side policies is diminished. Intertemporal leakage, the ‘green paradox’, is the incentive that the prospect of decreasing demand and declining prices might create for right holders to anticipate the extraction of their reserves before they lose value (Lazarus and van Asselt, 2018, p. 4). Supply-side policies can also create leakage effects, since by increasing scarcity they tend to raise prices, creating an incentive for nonconstrained producers to increase their supply. The opposite price effects of supply- and demand-side policies could (in part) reduce these forms of leakage and make the policies more effective.

Policies to reduce the extraction of hydrocarbons can also act as an insurance – if demand interventions fail to abate greenhouse gas emissions substantially, as is currently the case – and signal a genuine commitment to climate targets. In turn, insurance and commitment would drive investment decisions and technological choices away from fossil fuels. These commitments would reduce the volume of stranded assets (Aitken, 2022).

Finally, supply-side climate policies can offer collateral benefits by reducing resource curse effects and socio-environmental liabilities that are engendered by the extraction, transportation, and processing of fossil fuels. The large and ever-expanding literature on the resource curse is focusing on the subpar socio-economic performance of resource-rich countries, with a core of this literature based on econometric cross-country evidence (Papyrakis and Pellegrini, 2019) and more recent literature is investigating the same effects at the subnational level (Pellegrini et al., 2021b). On the liabilities of the fossil fuel industry, the ecological economics and political ecology literature covering environmental conflicts have, based on numerous case studies, demonstrated how environmental injustices generated by the fossil fuel industry tend to exacerbate existing forms of marginalization and constrain opportunities for local development (Arsel et al., 2019; Gaventa, 1982; Martinez-Alier, 2002; Martinez-Alier et al., 2016). Thus there can be many instances where commitment to climate policies might provide only part of the rationale for embracing supply-side climate policies. In fact, in several existing cases, moratoria and bans are made to coincide with local socio-environmental values (for example, natural parks or proximity to the coast for offshore drilling) and climate concerns are not the central motivation to decide on the conservation of fossil fuel reserves.

3. The conundrums of supply-side climate policies: responsibilities, rights to extract and compensation

The starting point of discussions on climate policies is a tension between the ethics of climate policies (what is the right thing to do) and the feasibility of the various alternatives (what can we actually do).

In terms of ethical dimensions, environmental justice and in particular the concept of ecological debt would allow for the allocation of responsibilities to those countries and companies that have been historically large emitters. Arguably, accumulated greenhouse gas emissions are the main driver of ecological climate debt and the responsibilities rest squarely on rich countries and large corporations, which have disproportionately contributed to the depletion of a global common good: the ability of the atmosphere to absorb greenhouse gases without altering the global climate. Therefore, the funds needed to finance the preservation of fossil fuel reserves should originate in the countries and companies that produced the majority of greenhouse gas emissions.

A straightforward application of the principle would allocate the rights to extract existing reserves based on ecological debt. That is, extraction rights would be inversely proportional to the accumulated emissions. However, in view of the problems associated with fossil fuel extraction (the resource curse and the socio-environmental liabilities discussed above) the right to extract might be a curse in disguise and I would argue that liabilities associated with ecological debt might be better used to source funds for adaptation and the transition to renewables.

In terms of rights to extract, a question looms large: how can right-holders make substantial and credible commitments to leave their fossil fuel reserves under the ground without a direct form of (partial) compensation? Newell and Simms (2019) observe that the experience of the Yasuní serves as ‘a note of caution about the difficulty of mobilizing funds for compensation from the international community and the reluctance to set precedents for other countries to use their fossil fuel reserves as a basis for demanding payment’. I would argue that the take-home message could be the converse argument that without compensation, it is difficult to persuade countries to forgo the extraction of substantial fossil fuel reserves. Countries will be reluctant to accept a restriction on their rights to extract short of receiving adequate funds. The demand for compensation is bolstered by the Democratic Republic of Congo (DRC) announcement in May 2022 that large areas of peatland and rainforest will be leased out to oil companies. Mr. Tosi Mpanu, the nation’s lead representative on climate issues, eloquently declared that the priorities are poverty reduction and economic growth and that the country’s ‘priority is not to save the planet’ (Maclean and Searcey, 2022). While DRC might be emblematic for the resource curse hypothesis and there are abundant ‘national’ motivations to protect peatlands and forests, the argument that ‘it’s time we get a level playing field [with rich countries who emitted most of the anthropogenic greenhouse gases] and be compensated’ is not entirely extravagant.

The Yasuní proposal can also provide a reference point to calculate (very roughly) how much it would take to compensate right holders to keep their reserves under the ground. The government of Ecuador asked for a compensation of 4.2 USD per barrel and considering the volume of oil and gas reserves that exceed the carbon budget associated with 1.5°C (Welsby et al., 2021), compensation for unburnable reserves of oil and gas would cost a staggering 5.4 trillion USD (Orta Martínez et al., Forthcoming). This very rough estimate might seem an insurmountable financial barrier to compensating right holders to keep their reserves under the ground, but recent experience with the COVID-19 pandemic suggests that facing crises countries and international institutions can mobilize funds of a similar magnitude (“Covid-19 Economic Relief,” 2022; “Recovery plan for Europe,” 2022; IMF, 2021).³ In many ways, the climate crisis requires an urgent and massive reaction such as the one

³ Also, as a comparison, the US alone since late 2001 to 2020 have spent on war an estimated 6.4 trillion USD.

caused by the pandemic, minus the nationalism that has imperilled and delayed the availability of vaccines globally (Arsel and Pellegrini, 2022a). Ultimately, when it comes to sourcing funding to avoid the existential threat of the climate crisis, the John Maynard Keynes dictum seems apt: 'Anything we can actually *do* we can afford' (Keynes, 2012, p. 270).

4. Actually, existing (incipient) initiatives to leave fossil fuels in the soil at the national and international levels

While numerous proposals to establish supply-side climate international agreements and country-specific initiatives are in the making, both types of interventions are emerging. In terms of international agreements, proposals to establish a 'Fossil Fuels Non-Proliferation Treaty' (Newell and Simms, 2019), are in the company of initiatives promoting the transition away from fossil fuels, such as the 'Beyond Oil and Gas Alliance' (BOGA) and 'Powering Past Coal Alliance' (PPCA). The BOGA is led by two countries (Costa Rica and Denmark) and has another 4 full member countries: France, Greenland, Ireland, and Sweden (BOGA, 2022); the PPCA can count 48 national governments as members (PPCA, 2022).

Several individual countries and subnational governments have introduced or scheduled moratoria and bans (Gaulin and Le Billon, 2020). In fact, there might now be a wave of dissent to extractivist policies questioning the long-held 'commodity consensus' and the 'extractive imperative' that equated the extractive industries with engines of economic development (Arsel and Pellegrini, 2022b; Pellegrini, 2018). While first movers, such as Costa Rica had a 'tradition' of environmental policies and strong international standing, the promotion of similar policies by President Petro of Colombia (elected in 2022) represents a real break from past governments that considered mining a 'locomotive for development' (Becerra, 2013). At the same time, it is important to recognize that moratoria can always be reverted, as has been the case with Italy in 2022 (putting an end to the moratorium established in 2019, Pellegrini et al., 2021b; Rinnovabili.it, 2022). Additionally, Costa Rican President Chaves Robles, elected in 2022, made clear that fighting climate change is not a priority for his government and did not endorse the confirmation and strengthening of the existing moratorium through the legislature (Ruiz, 2022). Thus, while individual country commitments have been spearheading the movement towards supply-side climate policies, binding international agreements and powerful environmental justice movements might be crucial to ensure the long-term commitment of governments.

5. Imagining and contributing to a future post-fossil capitalism

In the current *Zeitgeist*, it is easier to imagine the end of the world than the end of fossil fuels. I am borrowing from Fredric Jameson, Slavoj Žižek and Mark Fisher, who wrote about the difficulty of imagining the end of capitalism (Fisher, 2009). Fossil fuel realism discourages us from thinking and articulating alternatives to fossil fuel capitalism. Fossil fuels played a defining role in the industrial revolution, leading to the advance of real-existing capitalism: they provided the opportunity to master enormous amounts of inexpensive energy, increase the size of production sites, and the opportunity to discipline the workforce (Angus, 2016; Malm, 2016; Mitchell, 2009). Ultimately, fossil fuels were the key to the rise of capitalism itself and crucial to making the process of sustained economic growth possible. Given the ongoing dependence of capitalist economies on fossil fuels, all capitalism is fossil

capitalism and this raises several questions regarding the conditions and the consequences of the necessary transformation to sustainability. Several questions loom large, the most fundamental ones are: what can post-fossil capitalism be like? and how to engineer a fair transition to post-fossil capitalism? Is a transition to renewable capitalism possible and desirable? Or some of the basics of capitalism will be put into question and the future will have to be post-capitalist? Looking back, capitalism leveraged fossil fuels as a source of cheap energy that, in turn, was key to the process of sustained growth, a process that continues to this day and is still accompanied by the profligate use of fossil fuels. However, capitalism has shown to be able to thrive, overcome crises, and expand under disparate conditions. Thus, the emergence of new 'renewable varieties of capitalism' is possible (Ćetković and Buzogány, 2016). To be sure, the search for more radical alternatives is possible and could combine acknowledging limits (starting from the carbon budget, the corollary of unburnable fossil fuels and the end of cheap energy under existing technologies) and organizing social mechanisms to satisfy basic socio-environmental rights (Arsel, 2022; Georgescu Roegen, 1975; Kallis, 2019).

In this lecture, I have highlighted some elements of how to imagine a future beyond fossil capitalism. Apart from discussing several other elements of this future, academic activities can also include many forms of productive engagement with environmental justice organizations and social movements. These engagements include the linking of local efforts to keep fossil fuel reserves underground with information on the global values overlapping with those reserves, and the possibility to contribute to global climate policy while generating considerable collateral benefits. The engagement can provide additional ammunition to the arguments that grassroots movements use in their struggles against fossil fuel projects as well as lead to more direct and in-depth knowledge of the corporate social irresponsibility strategies deployed by fossil fuel interests. Studying irresponsibility creates opportunities for academia to get further involved and make sure that corporations are more likely to be held accountable.

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