NEGOTIATING CLIMATE CHANGE IN CRISIS

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https://www.openbookpublishers.com

ISBN Paperback: 9781800642607
ISBN Hardback: 9781800642614
ISBN Digital (PDF): 9781800642621
ISBN Digital ebook (epub): 9781800642638
ISBN Digital ebook (mobi): 9781800642645
ISBN XML: 9781800642652
DOI: 10.11647/OBP.0265

Cover image: Photo by Thijs Stoop on Unsplash available at: https://unsplash.com/photos/A_AQxGz9z5I
Cover design by Anna Gatti

10. End the 'Green' Delusions: Industrial-Scale Renewable Energy is Fossil Fuel+

Alexander Dunlap

Industrial-scale renewable energy does nothing to remake exploitative relationships with the Earth, and instead represents the renewal and expansion of the present capitalist order. This chapter argues that industrial-scale renewable energy is more accurately understood as 'fossil fuel+'. The purpose is to re-think the socio-ecological reality of so-called renewable energy to create space for the step-change of strategies needed to mitigate and avoid climate and ecological catastrophe.

Industrial-Scale 'Renewable Energy' Is a False Solution

Renewable energy is not the solution we think it is. We have inherited the bad/good energy dichotomy of fossil fuels versus renewable energy, a holdover from the environmental movement of the 1970s that is misleading, if not false. Fossil fuels are correctly understood to be at the heart of capitalism, industrialism, and state formation, the results of which have been ecologically catastrophic (Malm 2016). Meanwhile, industrial-scale renewable energy has emerged as the protagonist of our times, positioned as the solution to our ever-increasing energy consumption. Along with market-based conservation and 'natural capital' policy making, it is taken to be among the central mitigating forces against climate change and ecological degradation (as critiqued by Sullivan 2009; Huff and Brock 2017).

 https://doi.org/10.11647/OBP.0265.10

With the rise of the green economy and climate change legislation, renewable energy includes harnessing wind, solar, and other apparently infinite 'natural resources' to meet energy consumption on an unprecedented, ever expanding scale. Contrary to the claims of its proponents, however, it by no means adequately addresses the materially real problems posed by current levels of energy consumption, which are driven by capitalist growth imperatives that ultimately cause the ecological degradation and climate change we see today. A focus on the technocratic issue of energy consumption often leaves unchallenged the political-economic violence intrinsic to the production system that such energy powers (as also highlighted in Sullivan Chapter 11, this volume).

Industrial-scale renewable energy does nothing to remake the exploitative relationships with the earth and ecosystems created and reproduced by 'industrialised humans'—people acclimated to, and dependent upon, an industrial, capitalist way of life. The excessive concern with possible energy solutions within capitalism, as opposed to more fundamental social transformations, expresses our inability to imagine any other way of living, blinding us to the deeper socio-ecological insurrection that climate change makes necessary.

Industrial-scale renewable energy and the grid-centric systems it powers represent the renewal and expansion of the present political and capitalist order. Not only are existing social discontents such as inequality, discrimination, and exploitation reinforced by renewable energy, but the amount of infrastructure it presently requires clearly indicates the ecological costs involved in its full implementation. The wind and solar parks that span across fields and hillsides as far as the eye can see are harbingers of what this new energy system looks like. Questions need asking: where does all this metal come from? How much energy can this new energy system produce? What ecological impact does it have? And what kind of society does it propel and enable?

On Energy Extractivism

In 1980, American Indian Movement (AIM) activist Russell Means explained the uncomfortable reality of energy extractivism relating especially to uranium mining in Native territory (and echoed in the

similar concerns expressed by AIM activist the late John Trudell, in Sullivan Chapter 3, this volume). Confronting a room of revolutionary Communists about their desire for industrialism, Means (1985: 25) said:

> Right now, today, we who live on the Pine Ridge Reservation are living in what Euro society has designated a "national sacrifice area." What this means is that we have a lot of uranium deposits here and Euro culture (not us) needs this uranium as energy production material. The cheapest, most efficient way for industry to extract and deal with the processing of this uranium is to dump the waste byproducts right here at the digging sites. Right here where we live. This waste is radioactive and will make the entire region uninhabitable forever. This is considered by industry, and the white society which created this industry, to be an "acceptable" price to pay for energy resource development. Along the way they also plan to drain the water-table under this area of South Dakota as part of the industrial process, so the region becomes doubly uninhabitable. The same sort of thing is happening down in the land of the Navajo and Hopi, up in the land of the Northern Cheyenne and Crow, and elsewhere. Over 60 percent of all U.S. energy resources have been found to lie under reservation land, so there's no way this can be called a minor issue. For American Indians it's a question of survival in the purest sense of the term. For white society and its industry it's a question of being able to continue to exist in their present form.
>
> We are resisting being turned into a national sacrifice area. We're resisting being turned into a national sacrifice people. The costs of this industrial process are not acceptable to us. It is genocide to dig the uranium here and to drain the water-table, no more, no less. So the reasons for our resistance are obvious enough and shouldn't have to be explained further. To anyone.

As with the mining of fossil fuels and uranium, the siting and implementation of renewable energy systems entails the creation of such sacrifice zones, often on Indigenous land. These projects have thus confronted considerable pushback from rural and Indigenous populations, and the struggles around extraction outlined by Means have continued to intensify (Avila 2018; Dunlap 2017, 2019; Franquesa 2018; Lawrence 2014; Lucio 2016; Siamanta 2019). By clinging to ideas like 'sustainable development' and the 'green economy', progressives and other conscientious citizens are staking the future of the planet on dubious mechanisms of oversight, rife with conflicts of interest. The proliferation of voluntary UN standards, corporate social responsibility initiatives, private auditing firms (Brock and Dunlap 2018), and

free, prior, and informed consent (FPIC) are but "band aids of good intentions" (Dunlap 2018). They ultimately conceal the true costs of extractivism, especially for the Indigenous people most affected by it.

The distinctions drawn between fossil fuels and renewable energy involve a sleight of hand that masks the continued ecological degradations necessary for the continuation of consumer society and its ecological modernisation (see Bond and Downey 2012). Renewable energy requires immense amounts of mineral and fossil fuel resources, both in the construction of machinery necessary for extraction and for the manufacturing, transportation, construction and operation of wind turbines and other industrial-scale renewable energy systems.

For all these reasons, instead of conceiving renewable energy as a 'green' environmental solution, industrial or utility-scale renewable energy is more accurately referred to as 'Fossil Fuel+'.

Wind Energy as Fossil Fuel+

Let us focus the discussion on a single source of renewable energy: wind. Wind energy is something of a poster child for renewable energy in general, and is increasingly becoming a preeminent approach to climate change mitigation. Through fieldwork in the Isthmus of Tehuantepec region of Oaxaca, Mexico, where I was embedded for six months in a *polícia comunitaria*,[1] I witnessed firsthand the struggles and negative outcomes involved in the implementation of this form of renewable energy, even as it continues to be encouraged and incentivised by national and international climate change mitigation programmes.

Consider, for example, the resources required to construct a single two-megawatt wind turbine. One of these turbines uses roughly 150 metric tons of steel for reinforced concrete foundations, 250 metric tons for the rotor hubs and nacelles, and 500 metric tons for the tower (Smil 2016a), as well as 3.6 tons of copper per megawatt (Smith 2014).

1 The communitarian police were initiated after local Zapotec and Ikoots took over a town hall and expropriated the municipality's police truck (in 2013). This incident spawned the self-organisation of an unpaid community police force (*polícia comunitaria*) by Zapotec farmers and fishers to stop wind companies, politicians and others from entering the region to exploit their habitat/ecosystem.

Industrial steel production is currently impossible without burning coal, as metallurgical or coking coal is a vital ingredient in the process (Dıez and Barriocanal 2002; Smil 2016b). Now, imagine regions like the Isthmus of Tehuantpec, where roughly 1,700 wind turbines operate to provide energy to Walmart, Grupo Bimbo, industrial construction, mining, and other companies and industries (Dunlap 2019). These turbines require significant amounts of mining, and every stage of the mining process—from extraction, to processing, manufacturing, transport, construction and, to some degree, operation—requires a large expenditure of fossil fuels, a fact often neglected in the ecological accounting of wind energy (as similarly observed for 'clean energy' produced from uranium in Sullivan 2013). According to Guezuraga et al. (2012: 40) the main consumers of energy and producers of CO_2 for the turbines are "the production of stainless steel, followed by concrete and cast iron," while "plastic production represents the most energy intensive process of all materials".

From the perspective of carbon accounting, steel, concrete, and cast iron production are the main consumers of energy, with the ecological costs of mining and processing the rare earth minerals required to create permanent magnet generators in wind turbines being relatively disregarded. But where do these minerals come from, and what is the ecological cost of their extraction? Many of the rare earth minerals required for the operation of the turbines—such as dysprosium, praseodymium neodymium, terbium—come from places like Baotou, Inner Mongolia, and Ganzhou, South East China, which have produced some 85–98% of rare earth minerals used in wind turbines, electric cars, smart phones and other technologies between the late 1980s and 2015 (Hongiao 2016). The socio-ecological costs of this extraction are high.

The Costs?

A BBC report from 2015 called the Baotou mining and processing area "hell on Earth": a terrifying, dystopian industrial environment filled with pollution and cluttered with factories, pipelines, high-tension wires, and artificial lakes oozing "black, barely-liquid, toxic sludge" that "tested at around three times background radiation" (Maughan 2015; also see Klinger 2017).

Rare earth mining is also disastrously inefficient. Mined with open pit, underground, or leached in-situ methods, rare earth ore deposits contain "low concentrations [of desired minerals] ranging from 10 to a few hundred parts per million by weight" (Yang et al. 2013: 133). Most concerning, however, is that,

> [t]he mining and processing steps for refining of rare earths tend to be energy, water and chemical intensive with significant environment risks affecting water discharges (radionuclides, mainly thorium and uranium; heavy metals; acid; fluorides), tailing management and air emissions (Haque et al. 2014: 621).

Echoing the observations on uranium extraction by Russell Means quoted above, wind energy thus similarly involves socially and ecologically destructive mining processes that produce large amounts of mining tailings (or waste) containing heavy metals, thorium, and radioactive materials that enter the air, water, soil, animals and people. The quantity and intensity of this pollution is difficult to measure, for both political and scientific reasons, making accounting for all ecosystem impacts not only costly, but impossible.

While in theory wind turbines can be built without rare earth minerals (as in geared turbines), this is not currently the case for the majority of utility-scale wind parks—especially wind turbines located offshore or in areas with extremely strong winds. This is because rare-earth-based PMSG (permanent magnet synchronous generator) turbine technology allows for the construction of more compact turbines which require less maintenance, making them more profitable to operate. The bigger the turbine, the more there is to gain for the operator by installing PMSG models (Lovins 2017).

Like other industrial enchantments (such as computers or smart technologies), wind farms continue to require levels of extraction that generate toxic and radioactive waste excluded from carbon accounting and often exempt from outdated life-cycle assessments (Kiezebrink et al. 2017; Klinger 2017).

While further research on the exact levels of ecocide and political violence is necessary, the fact remains that the green economy is expanding demand for destructive mining of iron ore, copper, oil, and rare earth minerals. This in turn is part and parcel of the creation and

expansion of sacrifice areas engulfing entire regions of China and the mountains, rivers, and forests across the world.

The political and environmental costs of implementing these renewable wind energy systems are also high. Scale, placement, mitigation practices, and energy-use are foundational for assessing the viability and long-term socio-ecological sustainability of wind turbines. This means taking cognisance of the quantity and location of large-scale turbines, as well as the various political and socio-geographical factors involved in their construction.

For example, while it is ill advised to place them on lands used for semi-subsistence production by Indigenous groups, within 1.5 kilometres of people's homes, or in areas with fresh groundwater, farming, and fishing areas, this is precisely what has happened on the Isthmus of Tehuantepec (Dunlap 2019), from which the following observations derive. The construction and placement of wind turbines requires the creation of roads that clear trees and animal habitats and compact soil. They also require the creation of wind turbine foundations that range, depending on the site, between 7–14 metres (32–45 ft.) deep and about 16–21 metres (52–68 ft.) in diameter. The foundations require the filling of groundwater with solidifying chemicals before filling them with steel reinforced concrete. During operation, leaking oil seeps into the ground where animals graze and into water wells where people drink. And this leaves aside the effects of concrete production, as well as the violence involved in building wind or other renewable energy systems on Indigenous territory. On top of all this, each wind turbine only has roughly a 30–40 thirty-to-forty-year lifespan before it needs to be decommissioned and, hopefully, recycled (Habib and Wenzel 2014).

Fossil Fuel+

These unpleasant facts are why renewable energy should really be called fossil fuel+. The plus sign indicates the added benefit of the renewable component or multiplier present in renewable energy systems, while simultaneously acknowledging their dependence on fossil fuel based-technologies and extractivism. The '+', or renewable, component is dependent on fossil fuels, and thus is not entirely positive in CO_2 emissions terms. A focus on the benefits of renewable energy systems

additionally overlooks the simple but paramount question: what is all this energy used for?

Renewable energy is opening and widening new wind, solar, and other natural resource frontiers, and in doing so it is r*enewing capitalism* as well. In addition to private industry, militaries are beginning to take an increased interest in renewable energy systems (as also observed in Bigger et al.'s chapter, this volume). The same techniques and technologies that are helping corporations expand in ostensibly 'green' directions will be applied to power military infrastructures and equipment. Whether the question is of solar in the Middle East, wind power in Mexico, or aircraft carriers that run on biofuels, these relations support the expansion of capitalism whilst obscuring its gut-wrenching crises and obstructing effective action (Al-Waeli et al. 2017; Bigger and Niemark 2017; Dunlap 2017).

Industry and security forces are beginning to acknowledge their ecologically destructive operations, and repressive forces are looking for ways to become ecologically 'sustainable'. Such "sustainable violence" is not just the result of "bad governance" (Dunlap 2017). It is inextricably bound with industrial extraction and efforts to economise on the destructive and repressive actions of governments, industry and security forces involved in the expansion of industrial-scale renewable energy systems.

Fossil fuel industries—whether coal, natural gas, or oil—are also beginning to invest and use renewable industry to legitimise their resource extraction operations and diversify their energy-related holdings (as outlined by Wright and Nyberg, this volume). Examples range from Gas Natural Fenosa, which is investing in wind parks in Mexico (Dunlap 2019), to RWE in Germany, operator of the largest coal mine in the country, which is setting up their own green daughter company—Innogy—to invest in wind energy and other 'renewables' after spending years subverting and lobbying against them (Brock and Dunlap 2018). Grupo Mexico is also buying wind in Mexico and solar parks in the US to cloak their company in a 'green' image. Meanwhile, they are powering the extraction of raw materials with renewable sources (Dunlap 2019; GrupoMexico 2016). With Andrea Brock, I have called this the "renewable energy-extraction nexus", which demonstrates the intimate relationship between forms of extraction—whether

wind, natural gas, coal, or copper—necessary for renewable energy development and the continued subsumption of the Earth and its inhabitants to industrial society (Dunlap and Brock 2021).

The Renewable Energy-Extraction Nexus

The renewable energy-extraction nexus also renews the multiple and self-reinforcing extractivisms comprising the material structure of the state: becoming part of the intricate web of subsidies, collaboration and, at times, competition that feeds the techno-industrial machine, spreading its infrastructure and values across the planet. This expansion happens at a great disregard for the costs involved, whether for people (particularly Indigenous or rural communities in both the Global North and South), animals, plants or geophysical nature.

The preceding considerations allow us to recognise renewable energy as renewing destruction (Dunlap 2019). It entails revived and intensified relations of domination that have much in common with colonial and centre-periphery dynamics. When people embrace renewable energy systems, many do not realise that they require various forms of violence against people, environments, and animals, which must remain hidden for obvious reasons. These systems, which require concrete, steel, copper, rare earth minerals and, by extension, fossil fuel and mineral extraction, are made to appear acceptable through their placement out of sight and out of mind, in the materially poor, rural, and Indigenous territories of the Global South and North.

When liberals, progressives, 'the Left', and even environmental justice activists applaud the large-scale transition to renewable energy, they ignore the many hazards that would otherwise be unacceptable to them.

Displacing fossil fuel industries to the Global South, where there are fewer environmental regulations and political rights, also enables the use of excessive forms of state-private security violence against anyone who might protest them. The material necessary for renewable energy can only result in an increase in extractivism in the Global South and all the negative consequences this entails for people on the ground. If we do not confront these facts, then the solution of today—like previous energy systems and regime changes—will likely result in the

complicated tyrannies of tomorrow. Recognising renewable energy as Fossil Fuel+ is a first step to combat the fairytale of renewable energy. By highlighting the myths surrounding renewable energy, we also create the groundwork for greater environmental considerations and the enactment of radical ecological alternatives that address the roots of consumer society and its marketed solutions.

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