

## Introduction

On many afternoons, it is the windiest place on earth.

Carving out the narrowed girth of southern Mexico, the Isthmus of Tehuantepec is home to an anemometric quality that is nearly unmatched. Wind is valuable here, its steady pulse an ideal quotient of kinetic force to turn the blades of turbines that, in turn, make electricity. With this wind development might follow; with this wind new wealth might follow. And these are two of the reasons why the Oaxacan isthmus now represents the densest concentration of wind parks on land anywhere in the world. But in this wind other things are also gathered and captured: birds and turtles, trucks and barricades, dirt and money.

This book began as a way to follow wind, and wind power, as a “salvational object”: a social and technical apparatus to mitigate climate change in environmentally precarious times. How wind power was being located—epistemically, infrastructurally, and politically—were my abiding questions at first. However, what was initially an exercise in political economic reasoning or an accounting of resources and their manipulations, became something more. Across hundreds of conversations and thousands of hours of encounter, it became increasingly clear that energy transition is not the work of people alone. In questions of power, both energetic and political, people’s aspirations and their cosmological views are crucial. But it is also the case that human actions can never disclose the full extent of how new energy forms are able to reassemble the lifeworlds of creatures, or how they can shape the potential of inanimate things. Concentrating only on the sociocultural dimensions of energy risks obscuring others, particularly how

the elemental force of wind, in itself, might become differently. Deeply political projects of renewable energy development and the rise of wind parks have come to occupy the Isthmus of Tehuantepec. Unequivocally. But coincident with this truth are others: biota and stones, machines and infrastructures, dust and air. It was in the wind itself that my attentions first became bent, because when it blows and when its velocity and pressure reach their apex, the wind insists that everything is much more than *anthropos*.

This book follows the wind, but it also describes an antidote to the Anthropocene—the epoch of human imprint upon all earth systems from the geologic to the biotic, from the chemospheric to the hydrological, and from the cryospheric to the atmospheric. As a concept, the Anthropocene hails a particular kind of encounter between deep time and human habit; it is meant to highlight a genealogy of consequences as well as presage precarious futures. Anthropogenic impacts from energy extraction, production, and use have surfaced the reciprocal relationships between excess and deprivation, and they have become harbingers for the unsustainable logics that have driven petromodernity.<sup>1</sup> The material forms and interactions that we call “energy” have always been harvested from what the industrialized world has named “the environment.” But if the paradigm of the environment has sought to emphasize interdependencies and mutualities, the human-energy nexus has increasingly come to reveal the corrosive ways that people and energy sources interact. Widespread human demands to have energy at our disposal present a calculus between human aspirations for power, human attempts to manage the climate, and the vital possibilities of all creatures, plants, and beings.<sup>2</sup> Within the parallel worlds of energy and environment, it has become clear that although renewable energy transitions demand the adoption of less catastrophic fuel sources, equally critical is understanding how human energetic desires—for light and heat, for movement and flourishing—either correspond with or deeply disrupt the energetic needs of other biotic life and the systems on which we all depend.<sup>3</sup> Therefore, the argument that I develop throughout this book is that we cannot capture the contemporary dynamics of energy and environment without attending to an array of other-than-human relations including those with nonhuman beings, technomaterial artifacts, infrastructures, and geophysical forces.

By exploring the routes and passages between energies and environments, lives and machines, and the forces that compel them, I also want

to create a narrative patterning that is at once anticipatory and interruptive. An anticipatory approach is instructive in times that are marked by ecological discord because it attunes our attention to the subjunctive future of the might be.<sup>4</sup> In anticipation, prognoses float, undetermined but not unknown; questions are raised, but conclusions hang in suspension. Wind also enters here as an interruptive force, awakening air and rousing it from stillness. In following the wind, intermittencies find their way into these pages through things like birds and dust, dead dogs and trash, gusts and stillness. The architecture I have developed across the book is likewise anticipatory and interruptive; chapters oscillate back and forth between the contentious development of the massive Mareña Renovables wind park and the ways in which particular other-than-human forces and entities came to challenge that project.

Parallel to the case of Mareña Renovables, I devote attention to three distinct other-than-human actors in the saga of wind power: wind, trucks, and species. Each of these entities has had a profound role in the development of wind power. Strong and steady wind is, of course, a prerequisite for the development of wind power; it is elemental in the most literal way. But trucks, like wind, are also everywhere within wind power in the isthmus, moving men and materials and operating to create particular political outcomes. And in the places where wind power is being developed, there are also myriad species with those threatened by industrial-scale wind parks appearing in particularly stark forms.

While wind, trucks, and species all hold ethnographic resonance for the case of wind power in Oaxaca, each also provides an analytic for the scalar thinking that the Anthropocene demands. They mark temporal coordinates both past and future. Wind that blew centuries ago was a force that can be said to have partly inaugurated the Anthropocene. It was wind power, after all, that blew colonial exploration and imperial exploitation to the New World. In the mid-twentieth-century “Great Acceleration” of carbon use, trucks served as a mechanism to embody the work of fossil-fueled modernity. And finally, in the precarious future of Anthropocene conditions, there are species—the compendium of all known life hanging in the balance in an unbalanced world. Species includes flora and fauna as well as a future humanity, all of which now face uncertain geoenvironmental risks. Through knowing wind power more closely—in its elemental, technological, and more-than-human forms—my hope is to assemble ecologies differently and to look for a new, turbulent prototype.

## How Wind Collapses, in the Future Subjunctive

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We could begin anywhere on a continuum, tilting toward one position or the other, and find ourselves, ultimately, in a story of utter failure or a tale of extraordinary success. Here are two scenarios of how wind collapses in the future subjunctive.

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### SCENARIO 1

*The Mareña Renovables wind park would have been the largest wind park in all Latin America.*

*It would have generated almost 400 megawatts of electricity, enough to power more than 600,000 Mexican homes. With the isthmus wind as its resource, the 132 turbines and their generators would have prevented almost 900,000 tons of carbon dioxide emissions every year for at least two, perhaps three, decades. Financed by a consortium of international investment programs—part Japanese, part Australian, and part Dutch—the Mareña park would have put millions of dollars into the hands of environmentally conscious investors, providing capital for sustainable infrastructure projects in the future. The companies that would have purchased the clean power from the park would have benefitted from receiving bonos de carbono (carbon credits), offsetting their carbon footprint, and burnishing their profiles as socially responsible corporate enterprises. In the isthmus, jobs would have multiplied during the construction phase, giving work to unionized laborers from across southern Mexico. Local construction companies would have sold their goods. Once built, the project would have provided jobs in engineering, maintenance, and management. Indigenous communal landholders, ikojts (Huave) and binnizá (Zapotec) people, would have collected millions of pesos for the lease of their land. These funds, in the hands of farmers and fisherfolk, would have been invested in better homes, equipment, and education.<sup>5</sup> More things would have been bought. People would have been healthier and happier, and development would, at last, have arrived in the more remote regions of the isthmus. Roads would have been paved, streetlights would have appeared. Politicians and agencies of government would have been pleased. Mexico would have stood prouder, leading countries of the global South toward greener futures.*

*The Mareña park, like many of the wind power projects now occupying the isthmus, would have had all of the signatures of success, including*

*immense amounts of transnational capital and unflinching state support. It would have been devoted to a new regime of energy that not only would have empowered Mexico but also would have lived as an energetic infrastructure to heal the world's wounded climate.<sup>6</sup> But this would be a failure.*

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#### SCENARIO 2

*The Mareña Renovables wind park would have been the largest wind park in all Latin America.*

*It would have occupied seventy-three acres of territory, its ivory turbines arcing across a sliver of land between the Laguna Superior and the Laguna Inferior. The territory where it would have been erected is a biogeographically vulnerable place, a narrow sandbar, or barra. This sandy stretch of land would have been asked to support 132 turbines, each one reaching 105 meters (thirty-two stories) into the sky and weighing 285 tons. The 132 towers of steel, many tons of cement, and 396 blades churning the air might have created quakes in the sand, sending tremors across the lagoons. Lights atop the turbines would have burned day and night, and fish, shrimp, and other seaborne life might have retreated and migrated, leaving local fisherfolk without their daily catch. The fish might never have returned. And local communities in San Dionisio del Mar, Álvaro Obregón, and Juchitán might never have fished again. Construction work would have displaced many tons of mud and earth, and the docking stations where steel and concrete would have been off-loaded would have forever changed the barra. Jobs constructing the park would have gone to outsiders, not to residents of the region. And the work that would have materialized for local laborers would have been brutish, short, and poorly paid. For the lease of their land, some would have become richer while others would not. Frictions would have endured. Corporate lawyers would have designed the contracts as “evergreen with right to cancel,” meaning that landholders would have indentured their lands for decades. Automatic renewals on lease contracts would have come to feel very much like dispossession, or despojo—being robbed of one’s land. Indigenous and campesinos’ lands would appear, once again, to be vulnerable to the whims of the transnationals. Members of the comuna (communal estates), or comuneros (communal landholders), who originally signed contracts would feel that they had never been informed about the gargantuan size and impact of the park.<sup>7</sup> Wind power would cause strife*

*and pitched battles between neighbors and within families across the isthmus. And in the communities surrounding the barra where the massive wind park would have been located, protests, blockades, vehicle heists, and raids by state police would carry on for years. Those who vocally spoke out against the works of the project would receive death threats and beatings. But with perseverance and strategies learned over decades of political unrest, protestors would ultimately stop the park's construction. It would be arrested and incapacitated. This would be a success.*

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The case of the Mareña park, in the scale of its potential and the enormity of its collapse, is an instance of one megaproject undone. But while the park has its singularity, it can also be taken as emblematic of programs of renewable energy that fail to deeply engage with and account for the people, things, and other beings that are coincident with them. The anticipatory good that the park was meant to bring, both for local development and for the energetic redemption of the global climate, existed as subjunctive futures: the might be, the could be. But that potential began to wither. It was not a series of technical flaws that presaged the giant wind park's denouement. Instead, its collapse was consecrated in the relationship between human hopes and an increasingly frail ecosystem. Wind power would have been a cleaner way to generate electricity, but the creators of the Mareña project failed to realize the ways in which their plan reproduced an extractive model in which "resources" are possessed and sold and the proceeds are divided, often in inequitable ways.

It has been the *modus operandi* of fossil-fueled modernity to extract resources in places that are relatively remote from the centers of consumption.<sup>8</sup> However, in mimicking the logics that have underwritten the carbon economy for the last three centuries, renewable energy transitions risk repeating old conventions that end in ruin. New ecoenergy forms ought to instead proceed with an ethos of rehabilitation rather than resource extraction. This should be an exercise in rebalancing human aspirations for energy with the energetic life needs of the more-than-human beings with whom we are in orbit. It ought to be a reckoning with forces like wind and water as well as an encounter with our technomaterial apparatuses. In truth, we cannot afford to get it wrong.



FIGURE INTRO.1. Wind turbines, Isthmus of Tehuantepec

### Aeolian Arrivals

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The power of electricity and green neoliberalism have converged in the isthmus, reshaping life in the region. Over sixteen months of fieldwork, our research team of two traveled to all the critical sites of wind power development in Oaxaca, from the isthmus where turbines were being sited to the country's capital where policy makers struggled to develop a program of energy transition that would be beneficial not only for the Mexican state but for the world's climate.<sup>9</sup> Our project became a practice of defamiliarizing “wind power” as a singular, technical, managed energy form, looking instead for the multiple ways that “aeolian politics” were gathering force. Aeolian politics—borrowing from the Spanish *energía eólica*, meaning electricity derived from wind power—emerged and evolved in many directions, from policy acts to the placement of bodies on barricades and from salvational winds to broken habitats. Aeolian conditions are everywhere in this work, expanding the term to mean many kinds of wind and their competing energies.

We set out to see what sorts of social impasses or collective victories were informing the terms of renewable energy futures. To do so meant understanding the positions of all involved, those commonly thought of as stakeholders. These were people living in the shadows of the turbines or on the threshold of a wind park yet to be born. And they were the land creatures and sea life inhabiting those same domains. They were renewable energy

company executives and representatives of the Federal Electricity Commission (CFE), Mexico's national electricity provider and sole grid operator. And they were environmental professionals tasked with protecting watersheds and environmental systems. They were officials at every level of governance from local representatives in the isthmus region to state policy makers in Oaxaca City to lawmakers in the country's capital. They were journalists and laborers, aspiring politicians and hard-boiled *caciques* (local bosses), truck drivers and fisherfolk. And they were those who lived in and with the wind. We spent many hours with activists who were opposed to the parks as well as those who applauded the arrival of the *eolicos* (turbines). Over the course of our work, we also spoke with many, many "regular" people about their thoughts on the wind parks, on development in Mexico, on Pemex (the state-owned petroleum company) and renewable energy, on climate change and transnational capital. These were people we encountered in the course of our days, who might not have seen themselves as implicated in the political sweep of wind power or renewable energy but who were, nonetheless, part of a greater aeolian politics.

We went to where the wind is in order to grasp how renewable energy forms were coming to occupy the global South. But we also went to where the oil is. Mexico continues to be a petrostate—in recent times it has been dependent upon oil revenue for 43 percent of its federal operating budget. With declining oil reserves, however, the country had suffered financially, with much of its economic lifeblood buried deep under water in the Bay of Campeche.<sup>10</sup> Some regions of the Mexican state, however, are rich with wind, and in the early part of the twenty-first century, the country's policy regime tilted optimistically toward the development of renewable energy infrastructures. In fact, Mexico was among the first countries in the developing world to institute comprehensive climate change legislation, earning the country international accolades from environmentalists and industrialists alike.<sup>11</sup> If we were seeking to understand the phenomena of energy, Earth and human habit, we found that conjunction in Mexico: bioplanetary effects and the multiple energies that have fueled them.

Corporate investment and state sponsorship inaugurated the development of wind resources in the Isthmus of Tehuantepec beginning in the mid-1990s when the first wind park, sponsored by the CFE, became operational in La Venta in 1994. By 2004 a full-scale study of the entire wind corridor, devised by the United States Renewable Energy Laboratory, provided evidence of the considerable wind power potential that the isthmus held. Much of the region's land was marked "excellent" for the



production of electricity.<sup>12</sup> During Felipe Calderón's presidency (2006–12), when the power of drug cartels soared and oil began to wane, a serious campaign began to develop the renewable energy sources of the isthmus. Although never compelled to do so through the Kyoto Protocol, new legislation in 2009 required that 35 percent of the nation's electricity come from noncarbon sources by 2024.<sup>13</sup> Lucrative incentives for private-public partnerships were created, and the Mexican wind power sector flourished. In 2008 there were only two parks, producing 84.9 megawatts of power in the isthmus. Four years later there were fifteen parks, producing more than 1,300 megawatts, making Mexico the second-biggest wind power producer in Latin America. By 2016 the wind energy infrastructure of the isthmus had expanded to twenty-nine parks with 2,360 megawatts of capacity, a 2,676 percent increase from the first years of operation. According to the Mexican Wind Energy Association, AMDEE,<sup>14</sup> Mexico's total installed wind power will reach 15,000 megawatts by 2020–22.<sup>15</sup> While these metrics are evidence of impressive and rapid growth in the wind corridor, they cannot begin to capture all the complexities of wind power. There is much more to it.

### Staying with the Turbulence in Transitions

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Wind power is not just any power.

It is a promissory force. Unlike mining, logging, or drilling for oil,<sup>16</sup> wind power generation is supposed to, in part, save the world. Infrastructural programs that claim to climatologically benefit the “greater good” hold a particular ethical ballast. Renewable energy projects would seem to righteously, and rightly, drown out the banal drone of greedy shareholders or demands for cheap fossil fuels. Wind power offers both redemption from dirty energy and, in places where wealth is sparse, the potential of economic salvation. But there is complexity all the way down. In many places in Latin American and elsewhere, denunciations against the environmentally destructive practices of fossil fuel extraction have now morphed into protests against projects marked by the ambiguous sign of “sustainability.” Challenges have arisen as to whether local places are being sacrificed in the name of global climate salvation.<sup>17</sup> And yet resistance to anything that is environmentally “sustainable” or is a technology of “resilience” can be taken as suspect. From one vantage point, those opposing new-energy infrastructures can be accused of obstructing the future and gambling with unknown climatological

consequences that are still evolving. By this logic, if local populations of people, and others, become irreversibly disrupted in the transition process, then that is simply the price to be paid. The global stakes are so high, and correcting the planet's faltering temperature equilibrium looms as the sine qua non of the subjunctive future. And yet old practices of extraction and exploitation can easily inhabit new spaces of sustainability, preserving a status quo that continues to seek cheap resources and vast tracts of exploitable land. Energy transitions thus beg the question, What precisely is being sustained? And what is being maintained?

Scientific consensus has determined that carbon incineration needs to end, but transitions have proven to be ambivalent. They are at once anticipatory and unknown. Hope is gathered here, but caution is too. Distinct scales of ecological remedy—those tuned to “local” worries or, on the other hand, to “global” concerns—can be incommensurate, each focused on addressing particular kinds of distress and distinct vectors of contamination. By emphasizing benefits to planetary ecological systems, local ecosystems may be further imperiled; and yet in failing to ameliorate widespread global impacts, the entirety of the living world remains in jeopardy. Therefore, in order to take an ethical position that prioritizes future possibility, it is important that we attend to how the mechanisms of transition are being operationalized, precisely because they can create their own forms of harm for humans and others. Each increment of ecological care ought to be thought of and enacted as a composition toward a whole. So while there should be no argument about the superiority of wind over oil in terms of externalizations and environmental damage, the institutionalization of any new energy form should inspire questions before resolutions.<sup>18</sup> And it has.

As I earlier wrote, this book was meant to narrate an antidote to the Anthropocene. And in some ways, it still can, but not without hedging and equivocating as to whether human beings can rebalance a warped world and restore habitability.<sup>19</sup> The Anthropocene speaks of vulnerabilities and risks, not simply for particular creatures, plants, and persons, but in the aggregate and in the future. A growing awareness can be sensed in dramatic weather events, such as cyclones and superstorms, just as it can be read across mediascapes in reports of fatal heat waves and arable land becoming desert. Anthropogenically induced environmental precarity will not be felt the same everywhere by everyone; the consequences will be uneven. Nonetheless, people around the world are increasingly exposed to the direct material

and physical truths of ecological mutations and exaggerated weather forms. We are living it. And in this sense, the Anthropocene is not simply a geological designation for the human impact upon earth; it is a way of explicitly recognizing that impact. It is a state of consciousness.

As a planetary condition of precarity, the Anthropocene conjures a certain kind of extinctophilia, or an attunement to the necrotic. Each move that is made to chill the effects of a heating planet exists as an implicit recognition of human fragility.<sup>20</sup> Projects for sustainable energy that aim to mitigate further climate and biotic destruction are, in part, predicated upon the recognition that as a human species, we too are endangered. In ways like never before, “we” hang in the balance,<sup>21</sup> traveling the risky corridors of species being as the Anthropocene intensifies its effects. This means confronting extinction in new ways, that of other species and our own. But a state of impairment has a way of focusing attentions.<sup>22</sup> As Anna Tsing has described, life on a “damaged planet” is also a prerequisite for “livable collaborations,” which are, in turn, the stuff of survival. If ruins are now our gardens and blasted landscapes compose the sites of our livelihoods, then we need to find optimism and perseverance in these ruins, in the cracks and fissures, in the spores and weeds.<sup>23</sup>

This is where wind comes in. Like the air out of which it is made, wind thrives on interplay with bodies, both lively and inert. An oscillation of gases and heat differentials, wind is an insistent reciprocal exchange between air, beings, and objects. Its relationality is important, even indexical. It is in contact that wind is seen. We might think of leaves quivering or branches undulating, dust in the air or a plastic bag aloft. In all cases, wind is seen only in those places where it touches or moves something else. A pencil drawing of curled lines is a way to illustrate wind, as are graphs, charts, and maps. But ultimately wind is only ever made visible through its impact and influence on other matter, other materials, and other things. Wind’s ontology refuses to take separateness as an inherent feature of the world. Its relationality exists as an inverse allegory to the teleology of extraction that operates in one direction, to one end and for a singular purpose. And this is, in part, wind’s value—it has an existential precondition that appears only in the context of contact. Wind is touching, mutual, moving.

In an era of renewable energy transitions, wind exists as a heuristic assemblage where powers and future imaginaries are tethered to one another. But wind also refuses to be gathered or to be caught as a thing; it cannot be held in a jar. Unlike other resources—such as water, land, or oil, wind evades

enclosure; it is nothing if it is not movement, and therefore it is a force that is not easily made into a propertied object. Placed in a box, its ontic state is fundamentally transformed, becoming air. It is a force that may be captured but never contained.<sup>24</sup> While wind's kinetic force may be seized by the blades of turbines, wind in itself cannot be held. It is elementally loose. It is motion. Even as wind may be inanimate, it is nothing if it is not animated.

In ecologies of relationships that survive and sometimes thrive in the gusting winds of the isthmus, I want to avoid drawing deep divisions between the ontological capacities of nature and society and instead find their useful recompositions.<sup>25</sup> There is no fetishization of nature, or Nature, here. In fact we might begin with the acknowledgement that "nature" (or for that matter "environment" or "ecology") now exceeds and overflows definition.<sup>26</sup> Attempting semantic jurisdiction over the terms of what *is* or *is not* natural or constitutive of *the* environment is a conceit best left in historical place, like in mid-twentieth-century theories that lavished attention upon such binaries.<sup>27</sup> As Marilyn Strathern predicted a few decades ago, somewhat prophetically, our epistemic climate has increasingly come to represent an epoch "after nature."<sup>28</sup> These kinds of dissolutions and temporal demarcations seek new, re-adaptive thinking.

If there ever was one, the "thin bright line" between people and the mystified category of nature appears to be increasingly dissolving. Jackrabbits and Nissans, sand dunes and electric current, turtle eggs and stunted corn crops now all occupy this side of history, a cohabitational zone of socio-natural space. Many thinkers have begun to emphasize the importance of recognizing the coconstitution of human and nonhuman beings, or what Donna Haraway calls "making kin." As the demarcations between humans and nonhumans have increasingly crumbled, in rubble too is the contention that "natural" history can be disentangled from the history of "Man." From this, theses have emerged prompting questions as to how "human" human history really is or ever was.<sup>29</sup> Where we have singularized human activity and separated it from everything else, we have, in fact, failed to understand the evolution of modernity and globalization as processes of interaction between material forms and forces as well as among multiple species. Of course, the history of capital must likewise enter into this genealogy because it has conditioned lifeworlds the world over. In this context, it has become clear that the "social" in social theory needs to be repropotionalized, at least the "social" that has been bracketed as referring to exclusively human interrelationships.

## An Anthropology Alive to the Anthropocene

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Some have suggested that the Anthropocene is a remarkable and unique gift to the discipline of anthropology itself.<sup>30</sup> Both nominally and epistemologically, Anthropology has claimed to be *the* science of anthropos, and its practitioners have spent well over a century attempting to grasp the many ways of human being. However, anthropological work has likewise been keenly alert to the conditioned specificity of “nature,” particularly as a code that seems to surface most dramatically within its putative inverse: modernity. The bimodal categories of nature/culture and environment/society have sparked debate and challenged normative assumptions in the discipline for many decades. Such juxtapositions, their theoretical generativity, and the recognition of their limits have roots in philosophical propositions. But perhaps more importantly, they have been gained through empirical wisdom. The people with whom many anthropologists have worked, historically and in the present, often claim no rigid, exclusive, categorical distinction between human living and the material and multispecies domains in which people and their others interact and thrive.<sup>31</sup> From this accumulated insight, an anthropological fascination with a posthuman condition, multispecies studies, or more-than-human encounters would seem to be a rather “natural” outcome for a discipline that has observed firsthand the refusal of nature as a singular form.<sup>32</sup>

If the trouble with nature has been an anthropological preoccupation, displacing a universal understanding of *the* human might qualify as an anthropological obsession. Illustrating difference across human experience while also narrating transparticular similarities has remained at the core of anthropological work. Anthropologists have spent many decades demonstrating that there is more than one way to be human, and so it would seem the next step is to think through how the more-than-human is equally part of that story. In the conjunction of human and more-than-human encounters, attention to material things and other species should also encourage us to take humans as a species: a species that has altered earth systems and a species that faces its own status as newly endangered. Put another way, in a human-contorted world, we ought to push toward deepening the groove in which cross-species intimacies or socialites are evolving. Perhaps we are now even obligated to work beyond the human, as no element of human life exists untouched by ecosystemic circumstance. Where nature is increasingly erupting through human lives and vice versa, to ignore the unhuman is to walk willfully blind into a time of vivid possibilities.

The infusion of the more-than-human into the science of anthropos has not come *sui generis*. It has developed together with correlates in the physical sciences, from biology to physics.<sup>33</sup> Science and technology studies have stressed the incorporation of agentive technologies, machines, and apparatuses into human being, and this perspective has been woven into the analytics I use here. Feminist epistemologies, in particular, have provided generative ground for multispecies studies and techniques of science and technology. Attention to cyborgs, for example, explicitly called for the machinic to meet the biological, frustrating an easy separation between natural and “man-made.” In times of ecological instability, the biological itself can likewise be recognized as more permeable, or “transcorporeal,” as Stacy Alaimo has put it.<sup>34</sup> In the conditions of the present, I am especially cautious of delimiting our intellectual method to a facile version of actor-networked forms of agency.<sup>35</sup> In order to understand our environmentally precarious form of late industrialism, as Kim Fortun has reminded us, we must be responsive to the material and social ontologies of toxic conditions and unlivable environments that are not fully captured in actor networks.<sup>36</sup> Where discursive approaches to meaning have operated to distribute nodes of power and their outcomes, thinkers such as Karen Barad have also insisted that physical substance (matter) must be given its due in the world’s becoming.<sup>37</sup> Or perhaps many worlds’ becoming.<sup>38</sup> As she has put it, “Matter matters as much as mattering”; the physical and the significant are inseparable.<sup>39</sup>

The call to name this age the *Anthropo-cene* may appear to some as the ultimate aggrandizement of an overbearing species that is now carving its name into an epoch: the Age of Man.<sup>40</sup> However, as we well know, the Anthropocene condition did not come about through all people equally but from the cumulative acts of certain people with particular powers, the great majority of them being men. Past times that have valorized particular kinds of male achievement established a reigning Age of Men that, in turn, produced the Anthropocene age. And while the accumulation of human hubris may remain underfoot in plasticized and carbon forms in planetary stratigraphy, we can also aim to refuse the spirit of anthropos’s reign. If an Age of Men created the Anthropocene condition, it is now time to invert that logic. Response to ecosystemic precarity will need to come from everyone, everywhere; it is not that fault lies equally, because the global North bears the greatest blame, nor that solutions will be evenly executed, for the global South is facing the greatest scales of harm. There is risk in flattening species being into one grand humanity because it erases histories of exploitation and futures of unequal consequences. However, debates about the qualities, origins

and outcomes of the Anthropocene have invigorated questions about the place of the human in the world and the worlds that humans share with all other earthly life and things.

The Anthropocene may guide us to interrogate the consequences of a dominating anthropos; but, in truth, feminist thinking has always had that kind of attunement. The designation of an Anthropocene age invites a species reckoning to be sure, but it also summons gender trouble. This is a good thing. Old Cartesian distinctions that cleave human social and intellectual dispositions from their ecosystemic origins ought to continue to face critique. Equally important, however, is that the politics that have allowed for these sorts of inorganic fissures—which are almost always posed as natural—should likewise become part of a sedimented history of man that we leave behind.

That “anthropos”—as “Man”—resides so centrally within the notion of the Anthropocene is, in every way, an invitation to a feminist corrective; that corrective shapes the way I have written this book. Citational practice is one of the tools we have at hand as authors, and I use that prerogative intentionally here. While the scholarship in this book reflects a range of thinkers and disciplines, all of which are represented in the notes and bibliography, I prioritize feminist scholars of environment and ecological conditions in the text by using only their names in the body of the book. This is intended as a small counterbalance to the current politics of citation where male authors (often from the global North) continue to accrue more citational recognition, and thus legitimacy, particularly in the domain of theory. This is what Sara Ahmed has called “the citational relational.” My intervention here is meant to acknowledge and surface a dynamic that unfortunately continues in the production of knowledge. This may be an imperfect experiment, but it is, from my point of view, a beginning.<sup>41</sup>

### Fueling the Anthropocene

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The Anthropocene speaks to the human manipulation of terrains, animals, and air. It calls attention to a process that has been ongoing and that may, in fact, singularize humans as a species. While people have always changed the land, creatures, and atmospheres where they have lived, we now live in times of exaggerated scale and depth. Humans grew up in the Holocene, an epoch that began almost twelve thousand years ago. It was in those conditions that we learned our agriculture and our letters, arriving at a state that we have

been inclined to call civilization or culture.<sup>42</sup> But if the physical sciences have begun to agree upon the traceable existence of anthropogenic impact on earth systems, there remains disagreement as to *when* this Age of Man began and *what* it was that initiated it.<sup>43</sup> Propositions regarding the onset of the Anthropocene range widely. It may have begun with the age of agriculture or with imperial expansion to the (so-called) New World or with fossil fuels or with nuclear fission.<sup>44</sup> Each has its logical origins and outcomes. Holding these differences in place, what remains consistent about the Anthropocene are three things: it is about time; it is about exploitation; and it is about fuel.

#### TIME

The suffix “-cene” is derived from the Greek *kainos*, meaning “new.” But geological time is very slow and newness rare. And thus, the Anthropocene asks what it might mean to be *out of time*—chronically allochronic—incapable of imagining a seemingly boundless past, or an infinite future.<sup>45</sup> A new -cene might also attune us to what it might mean to be *out of time*—as in the jig is up and apocalypse is upon us. Distorted worlds may need troubled temporalities. And yet the Anthropocene continues in its accelerationist mode. Current extinctions are happening quickly.<sup>46</sup> We may worry about our own. These are times of prolepsis, where seeing a knife in the first act means knowing that the cut will certainly come. But we might also see a more hopeful foreshadowing here, where a grain of sand is a sign of a gem to come.

A fascination with Anthropocene causality and the periodizations of its unfolding is an indicator of one of the epoch’s signature dynamics: bringing us deeper into our collective encounter with time.<sup>47</sup> The marriage of human history and geologic time is a call to the subjunctive form. We may recognize the future as both a lure and a tripping point because the Anthropocene is an anticipatory exercise. We know for certain that the skyscape is radically altered for millennia to come. *Geos* itself, with a seemingly infinite existence, embodies time that is deep and long. Temporal immanence like this can be cognitively challenging for those who live the fleeting existence of a human life-span. When Kathryn Yusoff writes that the Anthropocene is an opportunity to imagine ourselves “geologically,”<sup>48</sup> in the slow accretive metaphors of minerals and timescales in the hundreds of thousands or millions of years, she is correct. And yet in many ways we have already been living geologically. While the Anthropocene underscores how humans have become geologic agents the world over, our cohabitation with hydrocarbons



and fossil fuels—harvested from deep down in geos—are an indication that we have long been, if unconsciously, already living geologically.<sup>49</sup>

Times that are marked under the sign of the Anthropocene may simply mean that the difference between life (bios) and nonlife (geos) is now more assertively marked, even as it has always existed and been apparent to some and not others. In Elizabeth Povinelli's reading, this historical juncture is no longer a matter of life and death. Instead the "new drama" being staged is a form of death "that begins and ends in Nonlife." Extinctions far and wide expose anthropos as simply another installment in a grander collective of not only animal life but all "Life" as opposed to the state of "Nonlife."<sup>50</sup> Traveling far enough back in time, we find that it was geos that supplied the conditions of bios's becoming. It was an "inert" earth that gave birth to all life. Just as humans have engraved themselves in and on geos, so too has geos permeated humanity in various ways: molecularly and biopolitically. The Anthropocene is therefore not only a way to locate the sedimentation of human practice, it is an invitation to uncover how bios has always been interlocked with geos.

#### EXPLOITATION

The colonial affliction that began in the middle of the last millennium forever altered the movements of people, animals, and plants. Worlds were brought together in unprecedented ways, often brutal but sometimes benign. At each step, residual marks remained on the crust of the earth itself. Exploiting lands and people at scales that were heretofore unseen, imperial conquests and settler colonialism induced bouts of growth and withering. The transformation of forests and farms into private, enclosed plantations was often powered by enslaved human beings and their forced labor. As wild places were replaced with plantation monocropping, biotic abundance and panspecies habitats became denuded: contorted places to grow plants for profit. What began in the colonial era as the radical transformation of diverse kinds of human-managed farms, pastures, and forests is in the present exacerbated by agribusiness and industrial meat production, in what Anna Tsing and her colleagues have dubbed the "Plantationocene."<sup>51</sup> These biotic shifts may have multiplied in the fifteenth century, but those effects were intensified further in the long sixteenth century and the rise of capitalism.

While capital may be famously promiscuous, humanity on the whole cannot be assigned equal responsibility for the injurious channels that it has produced. Anthropogenic harms that have accrued under the figure of "the Capitalocene" are a combination of capital accumulation and the (human)

pursuit of power.<sup>52</sup> Operating in dialectical fashion, capitalism itself would become a world ecology enabled by changes in science, production, and the distribution of power. Capitalocene temporality, like that of the Plantationocene, resides in the extension of imperial seizures that engendered a restructuring of “natures” everywhere.<sup>53</sup> Plantations—and their close kindred in industrial agriculture—as well as capitalism continue to be at work in the here and now. As we recast history in the light of a deforming planet and climatological troubles, it is also vital to recognize that neither plantations nor capitalism nor industrial accelerations would have existed if it were not for anthropos. And that puts us back in the Anthropocene: a human-created epoch generating uncertain futures.

#### FUEL

The Anthropocene is often diagnosed as a plague of particular fuels and their burning. In the latter half of the eighteenth century, the European industrial revolution turned to new fuels and increased scales. Forests had been erased across much of Europe to sustain a growing population, but the machines of the industrial age required more efficient resources, and they were found in fossil fuels. The advent of the Anthropocene age can be traced, by some accounts, to one singular invention: James Watts’s steam engine. This was the juggernaut of a peripatetic modernity, fed by coal that it would burn and burn and burn. Two hundred years later the industrial age reached its zenith and the mid-twentieth century would become marked as the age of more. Everything exponentialized: human populations, modifications to land masses, production and trade, excavations of petroleum pockets and mineral beds, the use of nuclear power for war and energy, and the emissions of gases and pollutants accompanying each increase in scale. They call these velocities of change the “Great Acceleration.”<sup>54</sup> Speed and carbon formed an unprecedented coupling, and fuels became remainders residing in earth systems. Coal and oil, along with the split atomic nucleus, are the fuel forms that are most often associated with the Anthropocene and its accelerationist tendencies. But, I would argue, there is a critical other.

While petroleum certainly hastened anthropocenic conditions, we can also find the causal power of wind at work in the making of the Anthropocene. It was the power of wind that blew ships to the New World, inaugurating an age of imperial expansion and the increased exploitation of land and people, creatures and minerals. Wind-powered sailing ships transported goods back and forth, moving flora and fauna to disparate places, providing an aeolian infrastructure for the movement of people and things. It was

wind power and human greed that spurred the transatlantic slave trade. And through this set of abuses against anthropos came further intensifications of agriculture, continuations of displacement and the realignment of much of earth's matter. Wind that blew toward the New World led to certain kinds of futures. Captured within it, then and now, are other, potentially more equitable, possibilities.

Perhaps it is irrelevant to speculate on which time periods, social processes, or energetic sources can be charged with increasing ecological precarity. Does it matter, in the end, whether it was atoms or oil or wind at the root of it all? Maybe not. But maybe so. Unlike carbon fuels, wind has been positioned—by governments, industry, and environmental advocates alike—as a way to reverse the Anthropocene order. Therefore, while wind might be blamed for abetting the trouble on terra, it also embodies a response, a solution, or a method of energetic salvation. Wind thus holds us in an uncomfortable paradox: it exists as both partial cause and potential redemption for an anthropogenically wounded world.

This book is an attempt to live within that paradox by illustrating how wind fails when it is made to repeat the extractive logics that have sustained carbon modernity or, conversely, how it can succeed by giving its energetic potential not only as a source of power but as a source for imagining politics and ecologies anew.

THE FIRST CHAPTER OF this book is named for what it attempts to contain: “Wind.” While elemental forces of air, water, earth, and sunlight have long maintained human and other life on the planet, they are now more broadly recognized as spheres that are at once crowded with extinctions as well as teeming with energetic potential. In this chapter, I engage with how wind is a dynamic and heterogeneous figure—a force of aeolian multiplicity—that is formed by land and by hope, by technocratic management and by human care. In this process, I argue, wind becomes differently, moving from element to condition and from experience to resource. Wind power itself can be said to occupy very different places in any map of the Anthropocene as a force that fueled the epoch as well as one intended to undo it. Wind's very ontology, therefore, calls for a “deterrestrializing” of thought, and what this chapter ultimately shows us is that wind cannot in fact be contained, only captured for a moment.

In “Wind Power, Anticipated,” chapter 2, I track the evolution of wind power and its parks in the Isthmus of Tehuantepec. In this origin story is

embedded the developmental aspirations of those who promoted the growth of wind power as a renewable energy source. In its most dramatic utterances, wind power was anticipated as a salvational object with far-reaching benefits. Out of this calculus came the Mareña Renovables wind park, which would have been the largest single-phase wind park ever installed in Latin America. I take the case of Mareña as paradigmatic of the challenges facing wind power in Mexico and, by extension, elsewhere. For those who promoted the project, its creation held enormous ethical potential not only to generate great quantities of renewable electricity but to provide social and economic development to the region. For those who stood in opposition to the project, firm ethical ground also upheld them: rejecting corporate mega-projects and the industrialization of their environment. What I demonstrate in this chapter is that origins matter to outcomes.

Trucks, the subject of chapter 3, would seem to be an unlikely nonhuman collaborator in the development of renewable energy. Trucks embody petromodernity in almost every way, from their masculinist stereotyping to their fossil-fueled metabolism. However, in this chapter I show how trucks are fundamental to the evolution of wind power: compelling the process, physically, politically, and often affectively. In empirical terms, they are always at work in the construction of wind parks or transporting the material goods for their operations. Trucks literally drive wind power: in the men they transport, in the politics they create, and in the hopes and terrors they foment. Trucks enable mutual communication between matter and form. As a temporal marker, trucks also occupy the apex of Anthropocene accelerations, and trucks therefore serve as “indicator machines” as well as “transitional objects”—expressions of human and machinic interplay that lie between petromodernity and a renewable future. This chapter makes the argument that technomaterial tools, objects, or artifacts, such as trucks, need to be taken as (a) consequential “matter” in understanding the ecosocial politics of energy transition.

In chapter 4, “Wind Power, Interrupted,” I navigate the second part of the story of the wind park that never was. Although bolstered by powerful allies and drawing from all the forces of governmentality, developmentalism, and transnational capital, the Mareña project found itself irretrievably interrupted by accusations of trampling indigenous sovereignty and endangering other-than-human lifeworlds. For many supporters of the wind park, criticism of it was motivated by desires for personal financial gain. But for those opposed to the park, its collapse was a resounding victory against domination and displacement. Mediated across international news outlets

and echoing through the channels of the Mexican nation-state, the Mareña project became a paradigmatic case, as one government official put it, “of how it should not be done.” This chapter details those impasses to show that while the project may have intended to bring “transition” to the region—in the form of renewable energy and economic development—those protesting the park saw no such transition. Opposition to the project ultimately shaped a philosophical critique as to whether renewable energy is really anything “new” at all, especially when seen from the point of view of centuries of domination and militant responses to that domination. I argue that in the end, transition is nowhere an objective or neutral process but one predicated on subjective positioning.

Chapter 5, “Species,” is an invitation to unthink species as a classificatory system of categorization and to instead *be with* species. In this chapter, human expressions of displacement—like fears about the loss of land and territory—find their analog in other species’ displacements: from jackrabbits to sea turtles. Species life in the isthmus is qualified differently in the context of anthropocenic conditions and this is consequential to how humans diagnose, quantify, and seek to manage the species life that is wrapped up in wind. Humans are a powerful species within the figure of the wind: calculating measures of “environmental risk” in the offices of government agencies and making claims about which humans, animals, or plants should be allowed to thrive or die in the isthmus. The feminist philosopher Isabelle Stengers has called attention to the value scales associated with animal testing, and I similarly take species in the Anthropocene as a particular form of animal testing: trials for both human and nonhuman lives that currently hang in biotic balance.

In chapter 6, “Wind, in Suspension,” Mareña’s fate is sealed. Through the rise and demise of what would have been the largest wind park in Latin America, it becomes clear that the project suffered no technoscientific undoing but was instead sacrificed to the play of suspicions. Proponents of the park saw opposition to it as the work of troublemaking outsiders and political opportunists preying upon green capitalist enterprises, extracting bribes and mounting protests to enhance their own financial and political networks. For those opposing the park, its supporters were equally suspect: interested only in their profit margins, in the form of rents and contracts, and abetting the extraction of resources in a place keenly attuned to the privations of transnational capital. The giant wind park was conceived in the paradigm that its global climatological good would correspond with the ecological, economic, and social worlds that comprise human and other-than-human life

across the isthmus. But as I show, failures of attunement ran deep: histories of insurrection and displacement were not given their due, and perhaps more important, the imagined futures of local residents were fatally ignored. While the wind park's destiny was tied to all manner of political maneuvers by caciques and corporate representatives, ultimately wind power would be drowned in the watery spaces between people and fish.

The conclusion to *Wind and Power in the Anthropocene* is a joint reflection on the collaborative research that is detailed in each of the volumes of the duograph, *Ecologics* and *Energopolitics*. In our final chapter, we look toward aeolian futures through the turbulent present of aeolian politics. In revisiting the years of research and analysis invested in this project, we return to the original premise that compelled us to the field, and to Oaxaca in the first instance: namely, the global necessity of adopting less catastrophic fuel sources in order to avert further anthropogenic harm and climatological insecurity. In revisiting this work, we also affirm more strongly than ever that renewable energy transition must be undertaken in a more fulsome way than it generally has been and that it must include the contingencies of both anthropological concerns and the more-than-human lives that energy infrastructures touch. Transition, we find, fails to achieve its potential when it is muted by the logics of extraction that have ruled the last several centuries. In the end, we do not merely need new energy sources to unmake the Anthropocene; we need to put those new energy sources toward creating politics and ecologics that do not repeat the expenditures, inequalities, and exclusions of the past.