Power To The People

Regenerative Design
for the Just Transition to a Renewable Energy Commons

by

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# Interactive

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Abstract

Anthropogenic climate change is the most cataclysmic issue facing all life on our planet. The IPCC recently announced that 12 years remain to prevent 2.7°C of warming in order to avert a complete climate catastrophe\textsuperscript{1}. It is up to my generation to mitigate this calamity, as today’s young people will inherit the brunt of extreme weather events, rising sea levels, biodiversity loss, and global temperature increases. In particular, low-income folks, indigenous people, and communities of color are disproportionately affected by climate change, as made evident by the Flint water crisis, the Dakota Access Pipeline, and the proximity of working class neighborhoods to coal-fired power plants. Furthermore, as economic inequality worsens, greenhouse

gas emissions increase. The Carbon Disclosure Project reported that 100 companies are responsible for 71% of global carbon emissions. Therefore, climate change is an issue of justice, equity, and power — upheld by unremitting legacies of colonialism, white supremacy, neoliberalism, and patriarchy.

Fossil fuels account for the majority of greenhouse gas emissions contributing to climate change. Therefore, we need to transition to 100% renewable energy immediately. However, we must also transform the structures of power that preside over our energy system to ensure the just transition to a democratic and cooperative energy economy. Political power, or governance, and economic power, or capital, over the renewable energy sector must be redistributed to communities impacted by climate change to establish autonomy, self-determination, and ownership. Combining theoretical analysis with field research, case studies, scientific data, and current events, this thesis proposes a solution to our climate crisis by eradicating ecological violence and fostering a renewable energy commons.

This capstone comprises of an interdisciplinary project-based thesis that culminates in the launch of a startup organization called *Power To The People*. The written component of my thesis is separated into two parts that investigate the nexus between regenerative design, energy democracy, and social ecology. Part I explores the causes and consequences of climate violence — specifically, the role of capitalism and the state in perpetuating hierarchies of power across race, class, and

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gender. Part I concludes with a social, political, economic, environmental, and technological blueprint for shifting our energy system into a commons by designing infrastructure for an ‘energy internet,’ inspired by phenomena observed in the ecosphere and consciousness. Part II describes a business plan for the operations of Power To The People. The business plan is a response to the problems and proposals illustrated in Part I, outlining the organization’s strategy to mitigate climate change, dismantle ecological violence, foster energy democracy, and cultivate a renewable energy commons. At its core, the organization’s strategy is 1) to advance the movement for climate justice through the application of regenerative design, and 2) to develop community-oriented energy economies, models of social ownership, and platforms for energy democracy.

*Power To The People* is an incubator for the renewable energy commons, and this thesis is a primer for the just transition towards a more regenerative and equitable future. As the Green New Deal rightfully gains popularity across the United States, this project aims to push conversations about energy democracy, social ownership, and the commons into popular discourse. Therefore, the proposals and analyses herein can be considered an addendum to the Green New Deal. By synthesizing interactive media, design-oriented methodologies, civic engagement, and traditional analysis into a project-based capstone, I hope this thesis can transcend the academy and inspire a comprehensive strategy and manifesto for mitigating our climate crisis. As college students, we have the radical ability to transform our communities into microcosms of the world we wish to inherit. That is the intention of this thesis.
Preface

Welcome to Power To The People, a project-based honors capstone for the College of the Environment at Wesleyan University! Over the course of the 2018-2019 school year, I have been working rigorously with the Patricelli Center for Social Entrepreneurship within Wesleyan’s Allbritton Center for the Study of Public Life to develop a startup organization. The organization’s goal is to cultivate energy democracy, foster a renewable energy commons, and eradicate climate violence. The written component of this thesis comprises of a primer for the work that the organization will undertake. It can even be considered as an addendum to existing efforts for drafting a Green New Deal1.

1 The Green New Deal is primarily being advocated for by the Sunrise Movement, an organization co-founded by Evan Weber. Weber is a Wesleyan alumnus from the
The Structure

As a project-based capstone, the structure of this thesis is nontraditional. The thesis begins with a one-pager — a brief document used to summarize the problem that *Power To The People* aims to address, and the strategy that the organization will undertake to solve the problem. The subsequent chapter conveys general information about the organization, including its mission statement, guiding principles, and core values. The Statement of the Problem follows that chapter, and consists of a collection of six interrelated essays that builds a theoretical framework for *Power To The People*, describes the root causes of the problem that the organization intends to tackle, and presents multiple case studies of communities that are already spearheading just and equitable solutions to our climate crisis. Afterwards, you will find a business plan that describes the operations of *Power To The People* in detail, and suggests a blueprint for how the organization will address the issues described in the Statement of the Problem. After the business plan, I have provided an example of an adaptable policy that *Power To The People* would propose as a template to mitigate climate change. Beyond the policy recommendation, I’ve included additional miscellaneous materials that went into the development of this project. These consist of an ecosystem map that charts out various stakeholders, a pitch deck that archives the evolution of this project, and other assorted resources. I have also developed an interactive multimedia component that can accompany the reader throughout the duration of this thesis.

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class of 2013, and majored in Environmental Studies. His senior capstone project for the College of the Environment was the development of a “U.S. Climate Plan,” which was a precursor to the Green New Deal.
The Intention

I hope this project can have an influence on society at large, but I also intend to for it to have an impact on the way honors theses are conducted at Wesleyan. Specifically, this capstone is intended to set a precedent for the university’s Beyond 2020 Goals. President Michael Roth drafted the Beyond 2020 Goals to extend the Wesleyan 2020 Strategic Initiative into the next decade, striving to promote academic rigor, civic engagement, and project-based learning. According to the Beyond 2020 Goals, in order to enhance the ability of students to translate what they are learning into what they will do after graduation, ... every Wesleyan student should complete a project larger than a classroom assignment before graduating. ... Projects that translate into the world beyond the university [demonstrate Wesleyan's] broad, interconnected education aimed at giving our students tenacious yet flexible ways of thinking appropriate for a rapidly changing world.²

This project embodies both the interdisciplinary breadth and practical idealism intrinsic to Wesleyan’s liberal arts education. Therefore, it is intended to kick-start President Roth’s initiative for the forthcoming decade by setting a precedent to encourage more students to pursue project-based honors theses with a social or political impact in their senior year.

The Journey

This capstone is the culmination of a project that I have spent multiple years working on. Indeed, the earliest document on my computer pertaining to the project’s inception dates back to February 12th, 2010. Back then, the project took a more nebulous form, but had a very straightforward objective: *to design an environmentally regenerative renewable energy infrastructure — modeled on the quantum biophysics of consciousness — in order to ignite a social, political, economic, and ecological revolution.* This was a very ambitious goal, and has since been modified, simplified, and narrowed down. The result is this capstone, a project that has further evolved and come to fruition throughout my four years at Wesleyan University. The core of the project has nonetheless remained intact over the years — indeed, even Chapter 5 of the Statement of the Problem investigates the quantum biophysics of consciousness, and proposes a practice that I’ve coined ‘neuromorphic biomimicry’ to redesign our renewable energy infrastructure. However, the scope and form of the project has transformed drastically over time.

At Wesleyan University, the project’s development began with my college admission essay for the Common Application. When I applied for college, I submitted an essay with the following paragraph:

> I want to design an electrical smart grid that derives its energy the same way that neuronal microtubules produce consciousness from interacting with quantum vacuum energy. Perhaps that means running cities on a network of artificial neurons to eliminate oil from poisoning our climate and our democracy.3

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At Wesleyan, the project was further refined when I participated in the Patricelli Fellowship during my sophomore year. As a Patricelli Fellow, I decided to implement the project as an organization, and developed the tools, techniques, and resources for launching a startup nonprofit. During my junior year, I studied abroad in Vietnam, Morocco, and Bolivia with the SIT International Honors Program to research climate change and the politics of food, water, and energy. While abroad, I was exposed to a variety of perspectives, strategies, and social movements from international communities at the forefront of climate change. I synthesized that research and experience into this project, and have provided case studies within the Statement of the Problem from Morocco and Bolivia. Finally, in my senior year, I pursued the project as a thesis with mentorship from Makaela Kingsley, Director of the Patricelli Center for Social Entrepreneurship, and Anthony Ryan Hatch, Associate Professor of Science in Society, African American Studies, Sociology, and Environmental Studies. Under their guidance, I have created a capstone for the College of the Environment that encompasses the interdisciplinary academic breath of the Environmental Studies major, the American Studies major, and the Integrated Design, Engineering, & Applied Science minor. The thesis is an attempt to stitch together my academic studies with my extracurricular passions, creative endeavors, campus activism, and experience as a climate justice organizer in New York City. I intend to continue pursuing this project with my career aspirations beyond Wesleyan — by restoring power to the people!
Interactive Multimedia Experience

Directions

I have developed an interactive multimedia counterpart to accompany you throughout the thesis. Using software called Twine and the coding language of HTML, I have programmed a nonlinear web version of this project. The digital version can be shared, revisited, and may be revised over time. Presently, the interactive web version can be considered the official website of Power To The People. It has some exclusive multimedia features, footnotes, and addenda that cannot be included in a text-only thesis document, so please feel free to experiment and explore it while you read this thesis. All textual content is identical, and the experience is designed so that you may traverse back and forth between this
document and the interactive web version as you proceed. However, it may be easier to read the Statement of the Problem on this document, rather than on the webpage. The web version will be continuously updated as *Power To The People* grows in scale and scope, so please return to it in the future. While this document is set in stone, the webpage will always be up-to-date.

**Navigation**

To begin the interactive multimedia experience, you must click the blue “Welcome” button.
To navigate throughout the interactive accompaniment, you must click on the **blue text**. Sometimes the text will say “Next.”

Other times, however, you will have to click on a **word** or **key concept** to proceed.

If you get stuck, do **not** use the “back” button of your web browser!
Instead, use the blue “Back” button.

If you can’t find the back button for some reason, click on the dark grey arrows inside of the webpage. They are difficult to see, but located on the left side of the webpage.

If you have any issues with the navigation, please feel free to contact me at my Wesleyan email address.
To access the webpage for the interactive multimedia experience, please click here.

If you are unable to click on the link, please navigate to:

http://philome.la/ninthera/power-to-the-people/play

Alternatively, you can scan the following QR code using a smartphone to access the interactive multimedia experience:
The Problem

Climate change is the most catastrophic threat facing humankind and all life on earth. Fossil fuel combustion accounts for 31% of U.S. greenhouse gas emissions, and the IPCC has announced that we have until 2030 to prevent 2.7°C of warming and reduce 412 ppm of CO2 to 350 ppm in order to avoid a complete climate catastrophe in 2040. However, it is not enough to merely transition to renewable energy. Rather, we must drastically transform the structures of power that govern over the renewable energy infrastructure to create a more just & equitable environment for all.

Power To The People is an incubator for the renewable energy commons, experimenting with radical and innovative directions for applying the practice of regenerative design towards climate justice. We take a multi-step approach to addressing climate change by fostering an energy commons:
Renewable Energy

No more fossil fuel, pipelines, nuclear power plants, or extractive energy methods like fracking.

Energy Democracy

We craft participatory platforms for direct democracy so members of every community have control over all decisions related to energy production, distribution, and consumption.

Social Ownership

We transition the energy system under ownership of the community, and not by state or corporate entities that accumulate profits at the expense of the planet.

Municipalization

Governance of the energy infrastructure is regulated at the hyperlocal level, allowing community members to get involved with political management of energy.

Decentralization

We will replace our antiquated infrastructure with decentralized microgrids, photovoltaics, wind turbines, and battery storage technology to increase efficiency and resilience.

Energy Internet

We are building the renewable energy internet by networking microgrids with blockchain mesh networks to aggregate energy and automatically redistribute surplus to communities with deficits.

Alternative Economy

By creating a renewable energy commons, we are creating a peer-to-peer energy economy that challenges the hegemony of capitalism by redistributing wealth throughout the community.

Regenerative Design

We integrate renewable energy infrastructure into the architecture of cities by designing with biomimicry, open & participatory design, and permaculture. We use tools like 3D printing to restore urban ecologies.

Climate Justice

We take an intersectional & ecocentric approach to environmental justice & energy justice to mitigate climate change while making our communities equitable for all. We also work with labor unions to ensure that a just transition secures jobs for workers.
What is *Power To The People*?

Based in New York City, *Power To The People* is a cooperative organization that fosters energy democracy through regenerative design, operating at the nexus of design, politics, and ecology.

Our mission is to design an alternative energy economy to mitigate climate change, democratize the regeneration of our planet, and foster self-determination for communities around the politics of energy.
Who We Are

Regenerative Design for Climate Justice

*Power To The People* is a cooperative organization founded by Joshua Nodiff that aims to implement energy democracy through regenerative urban design and community engagement. This entails supporting climate justice campaigns, exploring new advancements in renewable energy technology, and working with communities to redistribute democratic power back into the hands of the people. This can only be accomplished through the socialization and democratization of the energy infrastructure.

In practice, this means designing systems of cooperative microgrids that are owned and operated by the community, and crafting a digital renewable energy internet. By socializing and democratizing the means of production and distribution of energy, we can fight climate change, dismantle plutocracy, tackle environmental racism and classism, and defeat climate colonialism. *Power To The People* is an endeavor that aims to rebuild new equitable economic systems and political institutions to foster a renewable energy commons.

We are an incubator for the renewable energy commons, experimenting with radical and innovative directions for applying the practice of regenerative design towards climate justice.
Mission and Vision

*It’s not about where you get your solar panels from, but how you use them.*

*Power To The People* is grounded in the praxis of social ecology, energy democracy, and environmental justice. We are the next generation of environmental leaders, fighting to regenerate ecosystems and mitigate climate change. It is up to our generation to avert the climate crisis, as young people will inherit the brunt of extreme weather events, rising sea levels, biodiversity loss, and global temperature increases. Our primary goals are eliminate plutocracy, create more participatory models of direct democracy in our political and economic institutions, achieve social and environmental justice through equitable urban design, and build a renewable energy commons. We approach these goals by embracing frameworks of ecocentrism and intersectionality. In doing so, we understand that all of the Earth's residents are interwoven in a web of life, and all systems of oppression are inextricably linked. We cannot address any one system without addressing the others, and we cannot exploit our ecosphere at the demand of humankind.

Our Principles

Social Ecology

"Conceptualized as a critique of current social, political, and anti-ecological trends, social ecology espouses a reconstructive, ecological, communitarian, and
ethical approach to society. As a body of ideas, social ecology envisions a moral economy that moves beyond scarcity and hierarchy, toward a world that reharmonizes human communities with the natural world, while celebrating diversity, creativity and freedom."\(^1\)

**Energy Democracy**

"Energy Democracy means ensuring that everyone has access to enough energy. However, the energy must be produced in a way that it neither harms nor endangers the environmental or people. Concretely, this means leaving fossil fuels in the ground, socializing and democratizing the means of production and changing our attitude towards energy consumption."\(^2\)

**Social & Environmental Justice**

We are committed to implementing social and environmental justice with our work. "Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. It will be achieved when everyone enjoys the same degree of protection

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from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.”\textsuperscript{3}

“The environmental justice movement grew out of a response to the system of environmental racism where communities of color and low-income communities have been (and continue to be) disproportionately exposed to and negatively impacted by hazardous pollution and industrial practices. Its roots are in the civil rights movement and are in sharp contrast to the mainstream environmental movement, which has failed to understand or address this injustice. The environmental justice movement emphasizes bottom-up organizing, centering the voices of those most impacted, and shared community leadership.”\textsuperscript{4}

By applying this framework to the fight against climate change, we are striving for environmental justice, energy justice, and climate justice.

**Intersectionality**

"Intersectionality is the idea that multiple identities intersect to create a whole that is different from the component identities. Each element of a person is inextricably linked with all of the other elements in order to fully understand one's identity. This framework can be used to understand how systemic injustice and social

\textsuperscript{3} U.S. Environmental Protection Agency. “Environmental Justice.” EPA.gov. N.d.
inequality occur on a multidimensional basis. Intersectionality holds that the conceptualizations of oppression within society—such as racism, sexism, classism, ableism, homophobia, transphobia, xenophobia and belief-based bigotry—do not act independently of each other. Instead, these forms of oppression interrelate, creating a system of oppression that reflects the 'intersection' of multiple forms of discrimination."^5

**Ecocentrism**

Ecocentrism is the worldview that espouses the Earth's ecosystems and its constituents as having no lesser intrinsic value than that of humankind. "The ecocentric argument is grounded in the belief that, compared to the undoubted importance of the human part, the whole ecosphere is even more significant and consequential: more inclusive, more complex, more integrated, more creative, more beautiful, more mysterious, and older than time. The 'environment' that anthropocentrism misperceives as materials designed to be used exclusively by humans, to serve the needs of humanity, is in the profoundest sense humanity's source and support: its ingenious, inventive life-giving matrix."^6

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**Just Transition**

The Just Transition is

a vision-led, unifying and place-based set of principles, processes, and practices that build economic and political power to shift from an extractive economy to a regenerative economy. This means approaching production and consumption cycles holistically and waste-free. The transition itself must be just and equitable; redressing past harms and creating new relationships of power for the future through reparations. If the process of transition is not just, the outcome will never be. Just Transition describes both where we are going and how we get there.

Just Transition strategies were first forged by labor unions and environmental justice groups, rooted in low-income communities of color, who saw the need to phase out the industries that were harming workers, community health and the planet; and at the same time provide just pathways for workers to transition to other jobs. It was rooted in workers defining a transition away from polluting industries in alliance with fence line and frontline communities.

After centuries of global plunder, the profit-driven industrial economy rooted in patriarchy and white supremacy is severely undermining the life support systems of the planet. *Transition is inevitable. Justice is not.*

We must build visionary economy that is very different than the one we now are in. This requires stopping the bad while at the same time as building the new. We must change the rules to redistribute resources and power to local communities. Just transition initiatives are shifting from dirty energy to energy democracy, from funding highways to expanding public transit, from incinerators and landfills to zero waste, from industrial food systems to food sovereignty, from gentrification to community land rights, from military violence to peaceful resolution, and from rampant destructive development to ecosystem restoration. Core to a just transition is deep democracy in which workers
and communities have control over the decisions that affect their daily lives.

To liberate the soil and to liberate our souls we must decolonize our imaginations, remember our way forward and divorce ourselves from the comforts of empire. We must trust that deep in our cultures and ancestries is the diverse wisdom we need to navigate our way towards a world where we live in just relationships with each other and with the earth.\(^7\)

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Regenerative Design

“Regenerative design is a concept based on process-oriented systems theory. The word ‘regenerate’ means ‘to create again.’ A regenerative system makes no waste; its output is equal to or greater than its input; and part or all of this output goes toward creating further output — in other words, it uses as input what in other systems would become waste.

Although regenerative design is a part of sustainable living, it is not the same as sustainable design. Sustainability implies something that endures over time without degrading, but it does not regenerate itself or create anything new. A plastic bottle sustains; a plant regenerates. Sustainable design aims to provide for fundamental human needs; regenerative design goes further in that it plans for the future co-existence and co-evolution of humans and other species.”

More information about the structure of our organization can be found in the business plan, in Chapter 7.

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Part One
Statement of the Problem

Introduction

In an era demarcated by anthropogenic climate change, intersections between social inequity, economic exploitation, and political turmoil have engendered a desolate transnational reality for millions of people. International governments have co-opted discourses surrounding “sustainability,” creating hierarchies of power between the nation-state and the populations most vulnerable to ecological degradation. Meanwhile, as the state apparatus perpetrates structural violence to protect the capitalist mode of production under a neoliberal regime, communities across the planet are resisting resiliently with alternative approaches that radically
disrupt the status quo. A transition towards a more equitable and regenerative future is unfolding across the planet. It is up to the rest of the world to join in solidarity and implement alternatives that seek to dismantle the institutions that defend power imbalances.

Climate change is not merely an environmental issue. It is a social, political, and economic crisis that is rooted in the hierarchies of power engendered by a capitalist mode of production and enforced under the auspices of the nation-state apparatus. Climate change cannot be addressed without first dismantling these underlying causes by transforming the structures of power that govern over the scarcity of ecological resources. This capstone will investigate alternative models of ownership over the energy system that reject both the private sector and the state within the United States and abroad to address our social, ecological, and climatic catastrophe.

The Statement of the Problem is arranged as a collection of interrelated essays to provide theoretical foundations and cite real-world examples, from the local scale to the international scale, in support of the endeavors laid out in this project. Each essay is interwoven as a chapter into the Statement of the Problem, providing analytical frameworks and case studies that build upon each other cumulatively. The first chapter examines the science behind climate change and the cataclysmic role of fracked gas in New York, detailing the dangers of fossil fuels as they pertain to human and non-human health, the climate and biosphere, and local systems of politics. The second chapter explores the rise of neoliberalism as an economic and political regime, analyzing the environmental consequences of capitalism in the U.S. and
Morocco while introducing fundamental theoretical frameworks. The third chapter investigates the social costs of climate change, illustrating how the police state, carceral state, militarization of the U.S.-Mexico border, and conflict in Israel/Palestine are inextricably linked in a nexus of climate violence. The fourth chapter takes a comparative approach to analyze field research from the U.S., Morocco, and Bolivia, assessing hopeful and emergent models of ownership over food, water, and energy systems that resist the transnational hegemony of capital and the state. The fifth chapter presents a response to eco-fascism with four possible futures that juxtapose egalitarianism and hierarchy with scarcity and abundance, considering energy and agriculture. The chapter hypothesizes the radical redesign of our energy infrastructure by mimicking symbiotic interrelationships in the ecosphere and the quantum biophysics of consciousness, inspired by examples of mutual aid exhibited by mycelia and microtubules. The sixth chapter proposes the socialization and democratization of the renewable energy infrastructure, while interrogating existing energy policies of plutocracy and imperialism, shifting structures of power, and examining the emerging technologies of decentralization and decarbonization. Each chapter is intended to paint a preface to the work that Power To The People strives to accomplish, elucidating the root causes of our ecological and climatic calamity, demonstrating the urgency of climate change and the magnitude of its consequences, and proposing viable solutions to the crisis by fostering a more equitable and regenerative future for all.

Many theoretical and analytical frameworks will be introduced and recollected in each chapter, however the overarching theme interweaving all chapters
is the notion of the commons. Silvia Federici, an autonomist Marxist feminist scholar, notes that the “commons have been the thread that has connected the history of the class struggle into our time, and indeed the fight for the commons is all around us” (Federici, 2013). In the present-day United States, “Mainers are fighting to preserve access to their fisheries, under attack by corporate fleets; residents of Appalachia are organizing to save their mountains threatened by strip mining; open source and free software movements are opposing the commodification of knowledge and opening new spaces for communications and cooperation” (Federici, 2013). While Power To The People strives to cultivate a renewable energy commons, many resources can be transformed into a commons. One of the most important examples “has been the creation of urban gardens, which have spread across the country, thanks mostly to the initiatives of immigrant communities from Africa, the Caribbean or the South of the United States” (Federici, 2013). Urban gardens have “opened the way to a ‘rurbanization’ process that is indispensable if we are to regain control over our food production, regenerate our environment, and provide for our subsistence. The gardens are far more than a source of food security. They are centers of sociality, knowledge production, and cultural and intergenerational exchange” (Federici, 2013). This is explored further in Chapter 4.

According to Federici, “the left has not posed the question of how to bring together the many proliferating commons that are being defended, developed and fought for so that they can form a cohesive whole and provide a foundation for a new mode of production” (Federici, 2013). Therefore, she presents a feminist perspective on the commons that “is important because it begins with the realization that, as the
primary subjects of reproductive work, historically and in our time, women have depended on access to communal natural resources more than men and have been most penalized by their privatization and most committed to their defense” (Federici, 2013). Federici argues that “no common is possible unless we refuse to base our life and our reproduction on the suffering of others, unless we refuse to see ourselves as separate from them. Indeed, if commoning has any meaning, it must be the production of ourselves as a common subject. This is how we must understand the slogan ‘no commons without community’” (Federici, 2013). ‘Community,’ however, must “be intended not as a gated reality, a grouping of people joined by exclusive interests separating them from others, as with communities formed on the basis of religion or ethnicity, but rather as a quality of relations, a principle of cooperation and of responsibility to each other and to the earth, the forests, the seas, the animals” (Federici, 2013). In other words, we must retain an ecocentric and feminist approach as we cultivate the creation of the commons.

A feminist approach must embrace equity across all genders, particularly towards trans women, indigenous women, and women of color, as well as nonbinary and gender-nonconforming folks. However, “assigning women this task of commoning/collectivizing reproduction is not to concede to a naturalistic conception of femininity. [Rather.] the reorganization of reproductive work, and therefore the reorganization of housing and public space, is not a question of identity; it is a question of labor and, we can add, a question of power and safety” (Federici, 2013). According to Federici, “arguing that women should take the lead in the collectivization of reproductive work and housing is not to naturalize housework as a
female vocation” (Federici, 2013). Instead, it is refusing to “obliterate the collective experiences, the knowledge and the struggles that women have accumulated concerning reproductive work, whose history has been an essential part of our resistance to capitalism” (Federici, 2013). Reconnecting with this history is “a crucial step for women and men today both to undo the gendered architecture of our lives and to reconstruct our homes and lives as commons” (Federici, 2013). The quest to foster an energy commons will be a central concept throughout the following chapters. It is valuable to maintain the feminist and ecocentric perspectives professed by Federici, and remain mindful of the hierarchies of power reproduced throughout the historic struggle for the commons.

To view a cinematic trailer for the Statement of the Problem, please click here.

If you are unable to click on the link, please navigate to:

https://drive.google.com/open?id=1ED8vCbpYajbbD_62eDXNf7FTmMBkEBeY

Alternatively, you can scan the following QR code using a smartphone:
Climate change is the most cataclysmic issue facing the planet, and it is up to my generation to fight back. The Intergovernmental Panel on Climate Change recently announced that “if greenhouse gas emissions continue at the current rate, the atmosphere will warm up by as much as 2.7°F above preindustrial levels by 2040, inundating coastlines and intensifying droughts and poverty” (Davenport, 2018). In other words, we currently have 412 parts per million, or ppm, of carbon dioxide in the atmosphere as of April 2019, and we need to reduce it to 350ppm by 2030 in order to avert a global ecological collapse. As of 2019, we only have 12 years to drastically curtail global greenhouse gas emissions until we’re stuck in an irreversible climate catastrophe (Davenport, 2018). In order to mitigate climate change, we need to transition to 100% renewable energy by 2030 and decommission all existing fossil fuel infrastructure. According to Dr. Kimberly Nicholas, a climate scientist at Lund University,

Right now, annual global average temperature is about 1°C hotter than average. One degree Celsius might not sound like a big increase in temperature, but it’s the difference between life and death for thousands of people. Earth has always had natural cycles of warming and cooling, but not [at the rate] we’re seeing now. The top five hottest years on record are 2016, 2015, 2014, 2013, and 2010. And rising temperatures doesn’t
only mean it’s getting hotter. The Earth’s climate is complex — even a small increase in average global temperature means big changes, with lots of dangerous side effects (Nicholas, 2016).

Atmospheric CO2 levels have skyrocketed in recent years.¹

Climate change is anthropogenic. In other words, there is irrefutable scientific evidence that demonstrates that human beings are causing climate change, largely by burning fossil fuels. Rising temperatures correlate almost exactly with the release of greenhouse gases. Before the 18th century, when humans in the industrial west began to burn coal, oil and gas, our atmosphere typically contained about 280 parts per million of carbon dioxide. Now, as the use of fossil fuels spreads through the world, the amount of carbon in the atmosphere is skyrocketing (Nicholas, 2016).

Indeed, “an overwhelming 97% of scientists agree that climate change is being caused by human greenhouse gas emissions. There is no meaningful debate about the basic science of climate change” (Nicholas, 2016). Scientific evidence for climate change and the discovery that “more CO2 in the atmosphere will warm the climate

¹ https://climate.nasa.gov/evidence/
dates back to the 1890s. Attacks on the credibility of climate science are perpetuated by vested interests, including the fossil fuel industry, which has pumped millions of dollars into creating uncertainty about our understanding of climate change” (Nicholas, 2016). Throughout history, such attacks on credibility were largely orchestrated by fossil fuel companies. For example,

The oil company Exxon knew about climate change’s impact in the 1970s, and found out that action would impact their bottom line. As a result, they joined an industry-wide attack on the truth, creating a false debate that prevented action for decades. Now we know that Exxon, and other companies like Shell, have been taking actions to protect their infrastructure from climate change for decades — while fighting action to protect the rest of us (Nicholas, 2016).

In order to effectively combat climate change, we must listen carefully to the scientists that have been silenced by the fossil fuel industry. However, there other historically marginalized voices that we must pay close attention to. In particular,

it’s also important to listen to indigenous, traditional and local knowledge. In many places of the world elders and community leaders are sharing their understandings of how ecosystems are changing. If we pay attention to what scientists and frontline communities are telling us, instead of fossil fuel industry deceptions, the message is clear: Humans are causing the rapid onset of climate change, which is already bringing costly impacts across the world. The best way to stop it is by keeping fossil fuels in the ground (Nicholas, 2016).

The effects of climate change aren’t just going to happen — they are already happening right now across the planet. For instance, “global grain yields have declined by 10% from heatwaves and floods connected to climate change, unleashing hunger and displacement. Over 1 million people living near coasts have been forced from their homes due to rising seas and stronger storms, and millions more are
expected to flee in the coming years” (Nicholas, 2016). Therefore, to mitigate anthropogenic climate change, we must phase out all existing fossil fuel infrastructure immediately and prohibit the construction of new coal, oil, gas, and nuclear infrastructure.

Oil and coal are notorious fossil fuels. The combustion of coal and oil for fuel is the largest source of air pollution, and “pollution, much like wealth, is not distributed equally in the United States” (Lambert, 2019). Researchers have found that “air pollution is disproportionately caused by white Americans' consumption of goods and services, but disproportionately inhaled by black and Hispanic Americans”

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(Lambert, 2019). In particular, “after accounting for population size differences, whites experience about 17% less air pollution than they produce, through consumption, while blacks and Hispanics bear 56 and 63% more air pollution, respectively, than they cause by their consumption, according to the study” (Lambert, 2019). Air pollution from the combustion of oil and coal for fuel is “linked to more cardiovascular problems, respiratory illness, diabetes, and even birth defects,” including asthma, pneumonia, bronchitis, heart disease, organ damage, and cancer (Lambert, 2019). To eliminate air pollution, reduce greenhouse gas emissions, and mitigate climate change, it is paramount that we replace fossil fuel infrastructure with renewable energy infrastructure — in particular, solar and wind. It is also economically advantageous to transition to renewable energy. A recent analysis of 6,685 coal plants around the world finds that it is “now cheaper to build new renewable generation than to run 35% of coal plants worldwide. By 2030, that percentage increases dramatically, with renewables beating out 96% of today’s existing and planned coal-fired generation” (Foehringer Merchant, 2018). Furthermore, “nearly 75% of coal-fired power plants in the United States generate electricity that is more expensive than local wind and solar energy resources” (Murphy, 2019). By 2025, “enough wind and solar power will be generated at low enough prices in the U.S. that it could theoretically replace 86% of the U.S. coal fleet with lower-cost electricity” (Murphy, 2019).

Oil and coal aren’t the only non-renewable sources of energy. Nuclear is another example of a dirty and dangerous energy source. The mining of uranium is “an extremely dirty process that isn’t immediately apparent when people think about
nuclear power. Uranium mining requires a lot of fossil fuels in order to extract uranium and process it” (D’Arrigo, 2014). Unlike fossil fuels, nuclear fuel does not vanish once it is consumed. Instead, it leaves copious amounts of radioactive waste. The nuclear waste, also known as irradiated fuel, has “the same volume and mass when it comes out of the reactors as the nuclear fuel that went in several years earlier. But when it is removed to put in fresh fuel, the fuel rods are 6-8 million times more radioactive than when they went into the reactor” (D’Arrigo, 2014). For every pound of enriched uranium that goes into a nuclear reactor, “there are over 25,000 pounds of radioactive waste produced in the mining and processing of uranium. … Uranium mines, mills, and enrichment plants are disproportionately located in indigenous communities. Many of these communities suffer from birth defects, cancer, immune deficiencies, etc. as a result of contamination from uranium and its byproducts” (D’Arrigo, 2014). Furthermore, the used fuel remains “extremely hot for hundreds of years. Radioactive materials in the waste remain a threat to health, water, and the environment for hundreds of thousands of years” (D’Arrigo, 2014). Currently, there is no way to dispose of nuclear waste in “an environmentally safe or responsible way. As nuclear reactors in the United States have been running since 1942, waste has been piling up at nuclear facilities awaiting the government to find an environmental solution for it” (D’Arrigo, 2014). Moreover, there aren’t “strict environmental standards guiding the disposal or clean-up of uranium mines and milling sites. Thousands of uranium mines have simply been abandoned” (D’Arrigo, 2014). Nuclear power plants also consume more water than fossil fuel power plants. For example, “the state of New York is trying to close the last two reactors at the Indian
Point Nuclear Power Plant. Indian point consumes twice the amount of water as the entire city of New York daily, and it kills about a billion fish and other organisms per year, placing a tremendous burden on the Hudson River and on the fish species there” (D’Arrigo, 2014). Therefore, the operation of nuclear power plants and the extraction, generation, and cleanup of nuclear energy are all dangerous and polluting processes.

There have been multiple major nuclear disasters in recent history, including the SL-1 accident in 1961, the Three Mile Island accident in 1979, the Chernobyl disaster in 1986, and the Fukushima Daiichi disaster in 2011. The effects of each of those disasters are still observable today. Chernobyl, for example, still has an “18-mile uninhabitable zone where no one is allowed to live. There are still countries across Europe that experience environmental contamination as a result of the Chernobyl accident, which forces them to implement food restrictions. For example, in Germany, they can’t eat wild boar (previously a local delicacy) for fear of radioactive contamination” (D’Arrigo, 2014). Furthermore, there are “significant levels of illness, especially in areas like Ukraine, Belarus, and other areas surrounding Chernobyl, and the same thing is starting to happen around Fukushima. In just a few years, there has been a significant increase in thyroid tumors among children near Fukushima, likely caused by radioactive iodine released by the reactor explosions and leaks” (D’Arrigo, 2014). Food, water, soil, and air have become contaminated with radioactivity, and therefore the human bodies become harmed. Many women and children have become affected by nuclear radiation, leading to many reproductive illnesses and cancers, which “take years to become apparent” (D’Arrigo, 2014). Scientific evidence suggests that there’s “a 50% chance of another nuclear accident
like Chernobyl happening within the next 25-30 years. However, those odds may be an under-estimate. We’ve had five reactor meltdowns globally in just the last 40 years, and reactors in the U.S. and elsewhere are only getting older” (D’Arrigo, 2014). Therefore, nuclear energy is not a solution to our climate crisis. It is imperative that we decommission existing nuclear power plants and prohibit the development of future nuclear power plants.

Just like nuclear, coal, and oil, there is another non-renewable energy source that must be discarded. Fracked gas, often praised by the fossil fuel industry as a ‘bridge fuel’ towards renewables, is harmful and destructive to human and non-human life. We can observe the dangers of fracked gas using New York as a case study. In New York, the state government is colluding with the fossil fuel industry to build new fracked gas infrastructure in various counties across the state. Even though the State of New York banned fracking, the government still allows fracked gas power plants, compressor stations, and pipelines to be constructed across the state. Similar to the crude oil pipelines that are under construction across the United States, including the Dakota Access Pipeline, the Bayou Bridge Pipeline, and the Keystone XL Pipeline, fracked gas pipelines transport fossil fuels in ways that pose significant risk to the climate, local ecology, marginalized communities, and public health.

Fracked gas is also known as ‘natural gas,’ but this name is a misnomer intended to greenwash and guise its environmental detriments. Fracked or ‘natural’ gas is no bridge fuel. Rather, it is a fossil fuel primarily composed of methane, which is a greenhouse gas 84 times more potent than carbon dioxide (Greenpeace, N.d.). ‘Natural’ gas is typically extracted through hydraulic fracturing, or fracking, which
contaminates groundwater and produces radioactive isotopes of polonium, lead, and radon (Greenpeace, N.d.). Radon is the number one cause of cancer among non-smokers, according to the EPA, and is responsible for 21,000 cancer deaths in the U.S. every year (Grant, 2017). Methane and radioactive radon are a bad mix for human, climatic, and ecological health, and so ‘natural’ gas is not renewable, nor is it an effective strategy to mitigate anthropogenic climate change. There are numerous incidents of fracked gas leaking into the water supply, posing a serious crisis to human and non-human communities throughout the United States.

Within New York, forthcoming fracked gas pipelines include the Millennium Pipeline, Valley Lateral Pipeline, Minisink Compression Station, and CPV fracked gas power plant in Orange County that began operation in October 2018. They also include the Cayuga Power Plant, a coal-fired power plant that is being converted to burn fracked gas in Tompkins County around the Finger Lakes. In addition, these pipelines include the Algonquin Incremental Market (AIM) Pipeline, a fracked gas pipeline being constructed 105 ft away from the Indian Point Nuclear Power Plant in Buchanan, NY. High levels of radioactive tritium waste have already been discovered in the groundwater near the power plant. Should the AIM pipeline burst, the Indian Point power plant could explode, causing a nuclear meltdown that could be disastrous for the entire American Northeast (Ong, 2017).

Communities are joining the fight against another fracked gas pipeline — the Williams Pipeline. The Williams energy company is proposing to construct a 23.4-mile long interstate transmission pipeline that will carry fracked gas from the Marcellus shale of Pennsylvania across the Lower Bay of New York’s harbor (350,
N.d.). The pipeline will run along the south coast of Staten Island, and then cross the harbor south of Brooklyn, past Coney Island, to join existing pipelines 4 miles south of the Rockaways (350, N.d.). This segment of the pipeline, called the Northeast Supply Enhancement, is 26 inches in diameter and is set to expand the existing Transco pipeline by the winter of 2020 (Williams, 2017). Construction on the offshore portion of the pipeline will require labor for 24 hours/day, 7 days/week for over a year (350, N.d.). This will create conditions that are hazardous to the health and safety of workers — many of whom do not receive a living wage — while disturbing the neighboring communities with heavy noise, pollution, and excavation of the land.

I took this photo while filming a documentary called The Gas Rush in 2016.
The Williams Pipeline, which is being fought by eleven environmental organizations, transports fracked gas that is bought, processed, and shipped by Williams Companies, Inc. The gas is then sold to utilities, which hold a monopoly on fracked gas. For example, Williams Companies, Inc signed a 15-year contract to sell all fracked gas to National Grid, a British utility company that has a monopoly on gas and electricity operations in New York, Rhode Island, and Massachusetts (Williams, 2017). In New York City, National Grid will serve the fracked gas to Brooklyn, Staten Island, and parts of Queens, while Consolidated Edison will have a monopoly on fracked gas operations in the rest of Queens, Manhattan, the Bronx, and Westchester (350, N.d.). Williams Companies, Inc will also construct a new compressor station in Somerset County, NJ to pump the fracked gas across the pipeline (Williams, 2017).

There are multiple reasons to oppose the Williams Pipeline. The most important reason is that we need to be transitioning to 100% renewable energy instead of building new fossil fuel infrastructure in order to combat climate change. Fracked gas will release methane into the atmosphere, exacerbating greenhouse gas emissions and accelerating anthropogenic climate change. A second reason to oppose the Williams Pipeline pertains to its toxicity. The seabed that would be dug up for the pipeline contains unsafe levels of PCBs, arsenic, and dioxin (350, N.d.). In addition to carrying radon, the pipeline will reintroduce these toxic substances into the New York harbor. This will have a detrimental effect on human health, but it will also damage marine life as well. The New York harbor, which has a long history of toxicity, has been significantly cleaned up in recent years thanks to the bioremediation efforts of
community organizers, grassroots groups, and environmental regulators. In fact, recently there were over 100 reported sightings of humpback whales, dolphins, and seals in the New York harbor along Sheepshead Bay, Jamaica Bay, Rockaway Beach, Staten Island, and Long Island (Berke, 2013). While the water is still too toxic for humans to consume most fish caught in the harbor, the presence of diverse marine life indicates that the harbor is on track to recovering as a healthy ecosystem (Berke, 2013). The pipeline, which will be constructed under the harbor, will threaten this recovered marine biodiversity. The pipeline will require a trench to be drilled between 4 ft and 16 ft beneath the New York harbor to bury the pipe (350, N.d.). The ecological damage, introduction of toxic substances, noise, and water turbidity from pipeline construction will cause irreversible harm to marine life and return the harbor to its toxic past. The decades of struggle for marine remediation would have all been for nothing, only to be defeated by the fracked gas industry.

Another reason to oppose the pipeline is due to the safety record of the Williams energy company. Williams Companies, Inc and its subsidiary Transco have a record of multiple safety violations, including fires that left 6 dead and 102 injured (Corbett, 2018). Based on this previous history, a leak or rupture of the Williams Pipeline is not unlikely and would severely threaten shore communities — both human and non-human. Another reason to oppose the pipeline is due to its monetary cost. The Williams Pipeline will cost $936.5 million (Williams, 2017), and residents who buy fracked gas from National Grid will bear the brunt of this cost. As part of their contract with National Grid, the Williams energy company will earn a 14% interest rate over the next 15 years (350, N.d.). Williams Companies, Inc is also
involved in shady business practices. The company distributed $3 million to nonprofit organizations in New York, including the Brooklyn Public Library, WNYC, the New York Nature Conservancy, the New York League of Conservation Voters, the Audubon Society, New York Public Radio, Gay Men’s Health Crisis, United Way of New York City, and others (Williams, 2017). It is no surprise that these financial contributions correspond with political motives as well to strengthen and sustain the fracked gas industry within a state that banned fracking. For example, New York Governor Andrew Cuomo hired Maggie Moran as his campaign manager for his 2018 gubernatorial primary reelection campaign. Moran is a registered lobbyist for Williams Companies, Inc, in addition to other fossil fuel companies (Sirota, 2018). Williams Companies, Inc also donated $100,000 to the Democratic Governors Association, a group that supports Cuomo’s campaign (Sirota, 2018). This is not the only case of collusion between the New York government and the Williams energy company. Vicki Fuller, the former CIO of the New York State Comptroller’s Office, increased the State of New York’s pension investments in the Williams Pipeline from $75 million to $160 million over five years (Meiman, 2018). Fuller, a vocal opponent of fossil fuel divestment during her tenure under State Comptroller Tom DiNapoli, then left her position at the New York State Comptroller’s Office in July 2018 and immediately assumed a $300,000 director position with Williams Companies, Inc (Meiman, 2018). The pension fund for the State of New York is now one of Williams’ 100 largest institutional shareholders, demonstrating the deep collusion between the government and the fracked gas industry (Meiman, 2018).
The collusion between the government and the fracked gas industry extends to public housing. The New York City Housing Authority (NYCHA) has been promised fracked gas from the Williams Pipeline in an agreement to phase out the oil burners that currently provide heat to residents in public housing (350, N.d.). Williams Companies, Inc has deployed a scare tactic to make low-income residents afraid that they will freeze in the winter without a heating system powered by fracked gas. In reality, there numerous ways in which renewable energy can be used for heating without involving oil or fracked gas. For example, existing houses can be retrofitted and new houses can be designed to incorporate geothermal or passive/active solar heating. These heating methods do not require fossil fuels and are efficient, effective, and essential. It’s important to note that biofuels are not a viable alternative, as burning biofuel releases formaldehyde into the atmosphere and creates a monoculture system that competes for space against small-scale agriculture and hurts local farmers, permaculturalists, and the food justice movement.

Since the Williams Pipeline is an interstate transmission pipeline, it is not regulated by the New York State government. Instead, it is regulated by the Department of Transportation (DOT) and the Federal Energy Regulatory Commission (FERC), an agency that is notorious for its history of cronyism, plutocracy, and collusion with the fossil fuel industry. FERC is composed of five commissioners who are nominated by the U.S. President and confirmed by the U.S. Senate. Since the U.S. President is a climate change denier, it is no surprise that FERC is the enemy of the environment. So how do we fight the pipeline? Many environmental organizations have collected petitions, sent letters to governmental agencies, and testified at public
hearings. However, these are not enough. First, there needs to be a campaign to educate the general public that fracked gas is not clean — it is not a bridge fuel towards renewables, but rather a harmful greenhouse gas. The second step is to convince Governor Andrew Cuomo to deny the permits that allow Williams Companies, Inc to proceed with construction of the pipeline. The Williams energy company must receive a certificate from the New York Department of Environmental Conservation (DEC) declaring that the pipeline will not violate the Clean Water Act. However, the pipeline will indeed reintroduce toxic substances into the New York harbor, which may be a violation of the Clean Water Act. If Governor Cuomo intervenes and denies the water quality certificate, then the pipeline will be stopped. However, this is no simple task, as Cuomo has an infamous tendency to side with the fossil fuel industry. The third step is to demand that our elected officials pass HR 3671: The Off Fossil Fuels for a Better Future Act, which proposes a just transition to 100% renewable energy by 2035. As of October 2018, 46 congress members and 38 candidates have pledged to sign the Act, and 85 have pledged to not take campaign contributions from the fossil fuel industry (Food & Water Action, N.d.). Similar bills exist in New York State Assembly (A5105) and Senate (S5908). With the passage of these bills, we can begin to design an alternative energy economy that prioritizes the planet and people over profit. However, we cannot wait around idly for our elected officials to act on our behalf. We must understand that the state itself is responsible for the codification of climate violence, and therefore a solution to our climate crisis must transcend the confines of the state.
Beyond a Neoliberal Ecology

Human history has witnessed the rise and fall of countless political and economic regimes that are built upon hierarchies of power. In particular, the 21st century has been demarcated by a political and economic system that evolved from uneven relations of power between those who own capital and those who must sell their labor to survive. These uneven relations of power have engendered hierarchies across gender, race, and class to reinforce the production of capital, which is dependent upon the catastrophic extraction of ecological resources. Karl Marx had once identified this relationship as a rift in the social metabolism between humankind and nature, perpetuated in a feedback loop by capitalism. Indeed, a capitalist mode of production is necessarily contingent upon the demise of the environment, and is thus incompatible with endeavors to mitigate climate change and ecological destruction. Yet, as governments began to co-opt the environmental movement transnationally by the end of the 20th century, capitalism became codified by the state as the supreme solution to ecological degradation. This codification, as manifested by free trade agreements and institutions such as the World Bank, World Trade Organization, and International Monetary Fund, represented another deadly power dynamic that continues to perpetrate ecological violence: the marriage between capitalism and the
state. This collusive duo of political and economic power came to be known as neoliberalism, and is responsible for ecological calamity in United States and abroad. Outside of the United States, environmental calamity in Morocco is particularly shaped by neoliberalism. Nonetheless, radical alternatives to neoliberalism are indeed possible and inevitable if we are to dismantle social inequity and environmental destruction. Using political ecology as a framework of analysis, we can identify the structures of ecological violence exacerbated by neoliberalism in the United States and Morocco, and ultimately transition to a regenerative future beyond capitalism and its marriage to the state.

Karl Marx had once argued for the existence of an "irreparable rift in the interdependent process of social metabolism" (Marx, 1981). Social metabolism, according to authors John Bellamy Foster, Brett Clark, and Richard York in *The Ecological Rift*, is “the complex dynamic interchange between humans and nature of matter and energy which recognizes both natural constraints and human transformation of the interchange” (Foster et al., 2010). In other words, Marx’s metabolic rift can be understood as a dialectical divide within the symbiotic relationship between human beings and the natural environment. Indeed, humans are a part of nature, and thus the rift in social metabolism has engendered a false dichotomy between our species and the rest of the natural world. This rift, ignited and perpetuated by capitalism, has wreaked havoc on our planet and has jeopardized the future of all life on Earth. Indeed, capitalism is responsible for anthropogenic climate change and our terminal ecological crisis. Therefore, we must transition our economy away from the hegemony of capital if we intend to sustain life on Earth for future
generations.

Capitalism is a “system of self-expanding value in which accumulation of economic surplus — rooted in exploitation and given the force of law by competition — must occur on an ever expanding scale” (Foster et al., 2010). Climate change, ocean acidification, deforestation, and the decline of biodiversity can all be attributed to the accumulation of economic surplus within a capitalist mode of production. But how does capitalism operate? In Wage Labor and Capital, Karl Marx identifies that workers do not merely sell their labor under capitalism in exchange for money. Rather, capitalism is the result of the commodification of labor power, which the proletariat, or wage-worker, sells in exchange for capital in order to survive. According to Marx, “labor power was not always a commodity, and labor was not always wage labor” (Marx, 1849). The wage-laborer, however, "whose sole source of livelihood is the sale of his labor power, cannot leave the whole class of purchasers, that is, the capitalist class, without renouncing his existence" (Marx, 1849). Marx writes that the price of labor is related to the price of production, which is the minimum cost required for developing and maintaining an individual as a worker to produce the commodity of labor power (Marx, 1849).

The price of labor is therefore determined by the price of the necessary means of subsistence. In other words, the capitalist, or member of the ruling class, will continuously pay the worker whatever wage is determined to be the bare minimum required for the worker's own survival. Thus, wage-laborers will continue to serve as a submissive workforce for the capitalist and sell their labor power to the bourgeoisie, or ruling class, in perpetuity. If the capitalist were to pay wages below the minimum,
the worker wouldn't secure a livelihood and be able to devote labor time to the bourgeoisie. If the capitalist were to pay wages drastically above the minimum, the proletarian workforce would disappear, and capitalism would not be able to flourish without their labor power. Wages contract as competition between workers expands with the growth of productive capital (Marx, 1849). This fosters an endless cycle in which the relationship of power, the commodification of labor, and the exchange of capital perpetrate class violence. Labor power is "reduced to little more than a commodity, to be bought and sold on the market and manipulated for the sake of profit" (Foster et al., 2010). Therefore, capitalism exists as the “production of commodities by commodities” (Foster et al., 2010). Ultimately, climate change cannot be mitigated under capitalism, because it is impossible to regenerate the earth under an economic system that is rooted in the extraction of natural resources. In order to combat climate change, “politics must be emancipated from the power of private capital, in order for people to gain rational social control” (Foster et al., 2010).

In the modern day, capitalism has evolved into neoliberalism.

Neoliberalism is the dominant political and economic regime of the 21st century, and is responsible for the proliferation of ecological exploitation and social inequity. According to economist Ha-Joon Chang, "the core neoliberal agenda consists of deregulation, privatization, and opening up of international trade and investment" (Chang, 2007). In other words, neoliberalism is supported by a backbone of globalization, austerity, and neocolonialism. It is sustained by wealth inequality and wage disparities across social hierarchies of race, class, and gender. For example, “in 2013, the average white family had close to $678,000 in wealth,
compared with $95,000 for African-Americans. The divide between white women and black women is even more disheartening: The median wealth for white women in 2007 was $45,400, compared with $100 for black women and $120 for Latinas” (Thomas, 2016). As of 2019, “Asian women earn 97% of what white men earn, resulting in a pay gap of just 3%. White women earn 79% of what white men do, while black women earn 67% and Hispanic women earn 58%. When compared to black men, black women earn 89% of what black men do, and Hispanic women make 86% of what Hispanic men do” (Sheth, 2019). Under neoliberalism, economic power is concentrated in the ruling class, as the top 1% of the global population owns more than half of the world's total wealth, and political power is concentrated in plutocracies, oligarchies, and kleptocracies (Kirch, 2017). Moreover, the "big winners are those in the top 0.01%. These folks, who have a net worth of more than $100 million, have seen their share of wealth more than double since 1995, from around 5% to just under 12%. Over the past half century, they have nearly quadrupled their share of wealth" (Frank, 2014). Even worse, still, is that "roughly half of the world’s offshore wealth, or some $10 trillion, [belongs] to 92,000 of the planet's richest individuals — representing not the top 1%, but the top 0.001%" (Gavin Marshall, 2013). However, these are statistics from 2013-2014. As of 2019, 0.00025% of the American population — just 400 people — now own more wealth than the 150 million adults in the bottom 60% of the population, and have "seen their share of America's national wealth triple since the 1980s, while the wealth of much of the U.S. population has stagnated or declined" (Johnson, 2019). Specifically, the three richest individuals in the United States — Bill Gates, Warren Buffett, and Jeff Bezos —
collectively "hold more wealth than the bottom 50% of the domestic population" (Kirsch, 2017). There are also studies that demonstrate an inextricable correlation between the rise of neoliberalism and increasing rates of depression and anxiety. The World Health Organization reports that economic stress and inequality, specifically poverty and unemployment, are the leading causes of anxiety and depression (Sullivan, 2017). Rates of depression increased 18% between 2005 and 2015, and is now estimated to afflict over 300 million people worldwide (Sullivan, 2017). Moreover, approximately 800,000 people commit suicide each year (Sullivan, 2017). Indeed, neoliberalism has sparked a global mental health pandemic.

The pay gap in the U.S varies based on race, class, and gender.¹

Annual income for the 1% has skyrocketed since neoliberalism began.²

Neoliberalism began in the Americas on September 11, 1973 when the United States CIA, under the direction of President Richard Nixon, ordered a military coup d'état to overthrow Salvador Allende in Chile (Harvey, 2005). The United States replaced Allende, the first democratically elected socialist president in Latin America, with Augusto Pinochet, whose regime killed, tortured, and incarcerated over 40,000 Chileans (Harvey, 2005). The economic policies under Pinochet's military dictatorship were designed by economists from Chicago, and are considered to be the first major example of neoliberalism in the Americas. Analyzing neoliberalism from the framework of political ecology elucidates the environmental struggles faced by marginalized populations across the Americas, as well as in Morocco. Political ecology, according to anthropologist Arturo Escobar, investigates ecological distribution conflicts over "access to, and control over, natural resources, particularly

² https://eml.berkeley.edu/~saez/
as a source of livelihoods, including the costs of environmental destruction" (Escobar, 2006). Political ecology provides a lens for understanding how the structures of power created by neoliberalism lead to ecological damage and the inequitable distribution of natural resources in Morocco and the United States.

Neoliberalism has ushered in a Third Food Regime around the world, and we can examine Morocco as a case study to understand the effects of neoliberalism on the food system. A food regime is characterized by the "rule-governed structure of production and consumption of food on a world scale, ... [prioritizing] the ways in which forms of capital accumulation in agriculture constitute global power arrangements as expressed through patterns in the circulation of food" (Friedmann, 1993). In other words, the production, distribution, and consumption of food are choreographed as part of a political, social, and economic scheme for transnational power. According to sociologist Phillip D. McMichael, the “initial food regime analysis set parameters for historical analysis of opposing spatial relations within a political economy of an emerging international food system” (McMichael, 2009). Thus, he argues that the framework of the food regime can be traced back to 1870. This period, coined the First Food Regime, is characterized by the rise of monoculture, exploitation of free labor, and colonialism. McMichael writes,

The First Food Regime combined colonial tropical imports to Europe with basic grains and livestock imports from settler colonies, provisioning emerging European industrial classes, and underwriting the British 'workshop of the world'. Complementing mono-cultural agricultures imposed in colonies of occupation, nineteenth-century Britain outsourced its staple food production to colonies of settlement, over-exploiting virgin soil frontiers in the New World. (McMichael, 2009, 141).
According to food system analyst Harriet Friedmann, the framework for analyzing the Second Food Regime arose in the postwar period of 1947, when “alternative international [agrofood] regulation in the form of the proposal for a World Food Board was rejected” (Friedmann, 1993). The Second Food Regime was demarcated by the role of trade as a way to gain leverage in the Cold War, forcing colonies to adapt new emerging technologies, such as pesticides, while the United States pioneered the rise of large-scale animal agriculture. Friedmann writes, “The rules implicitly governing agrofood relations were established in the years immediately after World War II and worked stably enough for nearly twenty-five years to justify calling them a ‘food regime’” (Friedmann, 1993). However, new relations were “forged during that time, which by the early 1970s began to undermine the postwar system of food regulation” (Friedmann, 1993). These relations molded the Third Food Regime. According McMichael, the Third Food Regime has incorporated new regions into animal protein chains (e.g., China and Brazil), consolidating differentiated supply chains including a ‘supermarket revolution’ for privileged consumers of fresh fruits and vegetables, and fish, and generating populations of displaced slum-dwellers as small farmers leave the land. Part of this conjuncture includes an emerging global food/fuel agricultural complex, now in tension with various forms of localism (McMichael, 2009).

Whereas the food regime was previously used to analyze the rise of agricultural superpowers operating from within the United States, the Third Food Regime can be used to examine the recent “recalibration of ‘development’ at the global, rather than the national, scale” (McMichael, 2009). Indeed, the Third Food Regime is a lens for
describing a system in which agribusinesses have written the rules for securing transnational power to forcibly feed the masses into submission. Alas, Friedmann writes, “Stable rules cannot come from private and competitive organizations, despite the global reach of some corporations. There are two reasons for this. First, the very conditions that allowed for agrofood capitals to become pivots of accumulation have created new social actors and new social problems. Second, agrofood corporations are actually heterogeneous in their interests” (Friedmann, 1993). In other words, it is dangerous to have agribusinesses write their own rules for maximizing profit. Yet, that is the reality.

The Third Food Regime is a framework for understanding the underlying corporatization of food politics to secure global power. McMichael views the recent neo-liberal world order as resting on a ‘corporate food regime’, containing atavisms of the previous regime, and organized around a politically constructed division of agricultural labor between Northern staple grains traded for Southern high-value products (meats, fruits and vegetables). The free trade rhetoric associated with the global rule suggests that this ordering represents the blossoming of a free trade regime, and yet the implicit rules preserve farm subsidies for the Northern powers alone, while Southern states have been forced to reduce agricultural protections and import staple, and export high-value, foods (McMichael, 2009).

This is especially apparent with the neoliberalization of the food system in Morocco. Neoliberalism began in Morocco after the adoption of the International Monetary Fund's structural adjustment program in the 1980's (Moustakbal, 2017). According to Moroccan community organizer Jawad Moustakbal, the main economic policies dictated by the World Bank and the IMF focused on agriculture, which included
"shifting towards an export-oriented economy, particularly in agriculture, opening up of Moroccan market to foreign products, and decreasing subsidies for basic products like wheat, sugar, and oil. These economic trends were deepened by ostensibly 'free' trade agreements signed by Morocco in the mid-1990s" (Moustakbal, 2017). Using Escobar's analysis of political ecology, we can observe how neoliberal agriculture policies resulted in the termination of Morocco's food sovereignty, as a newfound dependence on agricultural imports from the global market disrupted the livelihoods of Moroccan farmers and consumers of locally grown staple crops. Moustakbal attributes this ecological and economic turmoil to a catastrophic convergence of militarism, neoliberalism, and climate change, which is codified in the despotism of the makhzen, or ruling class, of Morocco (Moustakbal, 2017). The makhzen personally profit from the privatization and degradation of natural resources, but masquerade their economic liberalism and despotism through greenwashing. Greenwashing is a disinformation tactic used by corporations and governments to adopt an ‘environmentally responsible’ persona, without taking serious measures to mitigate climate change. For example, the makhzen launched a zero-plastic bag campaign to guise their inaction on ecological damage, while appealing to the international attendees of the COP22 United Nations Climate Change Conference in Marrakech during November 2016 (Moustakbal, 2017). Greenwashing resulted in the creation of an eco-makhzen — a seemingly "green" ruling class — to conceal the inextricably toxic relationship between environmental degradation, food insecurity, and neoliberal agricultural policies in Morocco.
Morocco’s nexus of climate change, neoliberalism, and despotism.  

In the United States, neoliberalism has become indoctrinated into the very fabric of the nation-state. Neoliberalism, championed by both political parties in the American two-party duopoly, has perpetrated ecological violence across the United States by disrupting the equitable distribution of natural resources. One such resource is water. Examining the political ecology of water reveals how neoliberalism has proliferated a social-hydrological crisis. According to geographer Erik Swyngedouw,  

"under the current neoliberal hegemony, water rights are increasingly articulated via
dynamics of commodification of water, private appropriation of water resources,
dispossession tactics, and the like" (Swyngedouw, 2009). In other words, the right to
clean water is granted through the financialization and privatization of aquifers and
reservoirs. Common water rights in the United States are being transformed socially,
politically, and economically "into exclusive property rights whose access is
choreographed through market mechanisms" (Swyngedouw, 2009). Power over the
hydro-social cycle is being accumulated by dispossession, and access to water is
"organized through the power of money, irrespective of social, human, or ecological
need" (Swyngedouw, 2009).

Swyngedouw’s theory is made evident by the water crisis in Flint, Michigan.
In 2014, the drinking water source for Flint was changed from Lake Huron and the
Detroit River to the Flint River, since it was less expensive to draw water from the
latter source (Cummins, 2018). The water was insufficiently treated, and lead leached
from corroding water pipes into the drinking water of over 100,000 residents — most
of whom are Black (Cummins, 2018). This is, therefore, an example of environmental
racism, as a community of color was disproportionately exposed to environmental
toxicity. As of 2019, Flint's Black residents still don't have access to potable water,
however the Michigan Department of Environmental Quality approved a plan for
Nestlé to pump 250 gallons of water per minute just miles away from Flint (Cummins,
2018). Nestlé, whose CEO had notoriously declared that water is not a human right,
was only required to pay $200 in fees to the Michigan government in order to
privatize clean water (Cummins, 2018). Using Escobar's analysis of political ecology,
we can see how neoliberalism has caused a water distribution crisis, since potable water could have been redistributed equitably to communities of color across Flint, rather than further expanding Nestlé's monopoly of bottled water. According to journalist Shaun King, it would only cost $55 million to redistribute this water to Flint (King, 2018). Therefore, water privatization illustrates the role of neoliberalism in proliferating ecological calamity in the United States.

The social-ecological crisis of food insecurity in Morocco and the social-ecological crisis of water privatization in the United States demonstrate the adverse

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4 http://time.com/4189116/flint-michigan-water-study-photo/
impacts of neoliberal economic policies, designed in ‘public-private partnerships’
between transnational corporations, intergovernmental institutions, and nation-states.
Escobar argues that we must examine these relationships between "difference and
equality of access from the simultaneous and interrelated perspective of economic,
ecological, and cultural distribution conflicts" (Escobar, 2006). This is especially
evident in Morocco, in which the food that is now being imported from the global
market has eclipsed the cultural significance of locally grown staple crops.
Furthermore, Escobar argues that it is "necessary to strive for economic, ecological,
and cultural distribution equally because modernity and development have been built
through unfair distribution and unequal exchange on all three levels" (Escobar, 2006).
In other words, we must strive to redistribute natural resources and wealth equitably
across cultural, geographic, and social spheres. Using political ecology as a
framework of analysis, we can understand why the neoliberal hegemony of capital is
incompatible with ecological wellness. As geographer Richard Peet writes, "Political
ecology pushes us to highlight the fundamental contradictions between the logic of
global, and other forms, of capitalism and the very idea of reaching ecological
resiliency and sustainability" (Peet et al., 2011). Therefore, in order to mitigate
ecological destruction and social inequity, we need to transition radically beyond
capitalism by yearning for regeneration — not merely sustainability — of the entire
planetary ecosystem.
We are living in an age where the convergence of neoliberalism, fascism, and climate change has engendered a network of interconnected social injustices, ranging from global refugee crises to public health epidemics. These issues are grounded in the collusive interrelationship between capital and the state, which perpetuate our ecological and climactic calamity. Indeed, capitalism is the root cause of climate change. *The Guardian* reports that “just 100 companies have been the source of more than 71% of the world’s greenhouse gas emissions since 1988” (Riley, 2017). However, the hegemony of capitalism is directly defended by the state, which has expanded the militarization of policing throughout the United States to protect private wealth. The neoliberal marriage of capital and the state has pursued two principal objectives. According to *The Guardian*, “The first has been to dismantle any barriers to the exercise of unaccountable private power. The second had been to erect them to the exercise of any democratic public will,” (Lukacs, 2017). Furthermore, “Anything resembling a collective check on corporate power has become a target of the elite: lobbying and corporate donations, hollowing out democracies, have obstructed green policies and kept fossil fuel subsidies flowing; and the rights of associations like unions, the most effective means for workers to wield power together, have been
Climate change has exacerbated the role of the state in safeguarding capital, creating conditions of violence within the United States and throughout the world. In particular, these conditions have been demonstrated with the policing of water and energy infrastructure, the militarization of the U.S.-Mexico border in response to climate refugees, and the role of prison labor in the mitigation of extreme weather events. These examples are not isolated, but rather are inextricably linked on an institutional level. This chapter will examine how the carceral state and the prison-industrial complex, the U.S.-Mexico border and the military-industrial complex, the conflict in Israel/Palestine, the police state, and the surveillance state are all directly intertwined in the apocalyptic and cataclysmic era of climate change.

Many environmental sociologists have contended that the roots of climate change are situated in colonialism and racism. Whereas scientists have claimed that we are living in the Anthropocene, the geological epoch demarcated by the dominance of the human species, sociologists have argued that we are living under the Capitalocene, in which our geological epoch is defined by the impacts of capitalism. Sociologist Jason Moore dates the beginning of the Capitalocene to the sixteenth century, “which also witnessed the ‘discovery of the New World’ into which people were brought through the force of ‘blood and fire,’ the slave trade, the division of colonies among European powers, and the organization on a global scale of a mobile, racialized, gendered, and bonded workforce. Slavery and colonialism had a deep impact on the world-ecology” (Vergès, 2017). The ecological consequences of slavery and colonialism “became apparent only centuries later, in the era of modern technology, and many times only after the colonial states had acquired their
independence” (Vergès, 2017). The racialized roots of climate change parallel the racist and classist origins of the American institution of policing. According to *Time Magazine*, “the economics that drove the creation of police forces were centered on the preservation of the slavery system. Some of the primary policing institutions there were the slave patrols tasked with chasing down runaways and preventing slave revolts” (Waxman, 2017). Slave patrols were then reformed into police forces, which were “created to protect the new form of wage-labor capitalism that emerged in the mid- to late-19th century from the threat posed by that system’s offspring, the working class” (Mitrani, 2015). As Northern cities grew and filled with “mostly immigrant wage workers who were physically and socially separated from the ruling class, the wealthy elite who ran the various municipal governments hired hundreds and then thousands of armed men to impose order on the new working class neighborhoods” (Mitrani, 2015). At the core, police exist as the state’s apparatus for protecting capital.

It’s no secret that the police are still a racist institution. Policies such as stop and frisk, racial profiling, and broken windows policing are not only ineffective, but they are encoded in white supremacy and classism. While the number of people murdered by the police in the United States is disputed, many statistics indicate that over a thousand individuals have been killed each year since 2014, most of whom are Black or Latinx (Tate, 2018). Furthermore, policing extends to ecological resources as well. Natural resources are regarded as capital, and so resources such as oil, gas, and water are policed by the state and by private security firms. Water, for instance, is becoming scarcer as climate change worsens, and so Colorado employs a program for policing water resources. According to NPR, “local law enforcement can issue
citations for water violations and can police how people use and abuse the state's scarce natural resource” (Runyon, 2018). Most disputes are between farmers taking more water than what is allotted to them. The most recent science on climate change “shows the Colorado River Basin, which includes all of Montezuma County, will become hotter and drier as decades pass” (Runyon, 2018). In other words, water policing will continue to expand as desertification becomes more widespread.

Fossil fuels are another type of resource that is heavily policed. The events that unfolded around the Dakota Access Pipeline are a prime example of this. The Dakota Access Pipeline is a $3.8 billion dollar pipeline transporting oil from the shale fields in Stanley, North Dakota to Pakota, Illinois (Horn, 2016). The pipeline is owned by the Energy Transfer Partners corporation, and is located along the ancestral homeland of the Standing Rock Sioux tribe. The pipeline will surely poison the water supply for members of the Standing Rock tribe (Horn, 2016). The U.S. Army Corps of Engineers and the private security firms contracted by Energy Transfer Partners have waged violence against the indigenous community, dispatching armed soldiers and militarized police to terrorize the Standing Rock encampment as members were trying to protect their sacred land and water supply (Horn, 2016). This is an example of ‘climate colonialism,’ which describes the failure to address displacement, death, and destruction from climate change. Energy Transfer Partners hired TigerSwan, which “originated as a U.S. military and State Department contractor helping to execute the global war on terror” to curtail the indigenous-led resistance movement with militarized counterterrorism tactics (Brown, 2017). In their internal communications, TigerSwan compared the Standing Rock water protectors to a “jihadist insurgency,” and confronted protestors with a “heavily militarized police
apparatus including local and out of state police and sheriff’s deputies, as well as Bureau of Indian Affairs police and National Guard troops. The police became notorious for their use of [weapons], including rubber bullets, bean bag pellets, LRAD sound devices, and water cannons” (Brown, 2017). According to *The Intercept*, “The fact that a private security firm retained by a Fortune 500 oil and gas company coordinated its efforts with local, state, and federal law enforcement to undermine the protest movement has profoundly anti-democratic implications” (Brown, 2017). Leaked materials reveal TigerSwan’s militaristic approach to protecting its client’s interests and “the company’s profit-driven imperative to portray the nonviolent water protector movement as unpredictable and menacing enough to justify the continued need for extraordinary security measures” (Brown, 2017). In addition to partnering with public law enforcement, Energy Transfer Partners hired TigerSwan to oversee the work of the other security companies contracted to protect the pipeline, which included Silverton, Russell Group of Texas, 10 Code LLC, Per Mar, SRC, OnPoint, Leighton, and G4S (Brown, 2017).

Let’s take a look at that last company — G4S. G4S is the largest multinational private security firm in the world, and is often “brought into the stickiest situations, such as overseeing security for the Basrah Gas Company, an Iraqi natural gas company which Shell, Mitsubishi, and South Oil Company jointly own” (Horn, 2016). In addition to holding security contracts with the U.S. Department of Defense at Guantanamo Bay, G4S has a history of protecting the profits of the fossil fuel industry, managing emergency vessels operating in the Niger Delta for Chevron and maintaining a presence in Iraq where it considers itself “well placed to assist in the protection of the war-torn nation’s oil production which could make that country the
third largest oil exporter within a few years” (Horn, 2016). Furthermore, Defense Systems Limited — the precursor to ArmorGroup, a subsidiary owned by G4S — was contracted by BP in the late 1990’s to buy and supply military equipment to a Colombian army brigade to “police its Ocensa Pipeline, a 500-mile-long tube which at that time exported oil to the United States” (Horn, 2016). That brigade had “been implicated in two massacres by rightwing death squads under its control during the civil war” in Colombia and was said to “deploy psychological warfare and counterinsurgency techniques in the attempt to win over general public support for constructing the project and to marginalize ‘subversives’” (Horn, 2016). To make matters worse, G4S is involved in an international exchange program that brings together police, ICE, border patrol, and FBI from the U.S. with soldiers, police, and border agents from Israel (JVP, 2017). NGOs such as Jewish Voice for Peace have dubbed this military partnership ‘the Deadly Exchange.’ According to JVP, “In these programs, ‘worst practices’ are shared to promote and extend discriminatory and repressive policing practices that already exist in both countries, including extrajudicial executions, shoot-to-kill policies, police murders, racial profiling, massive spying and surveillance, deportation and detention, and attacks on human rights defenders” (JVP, 2017). Many major police departments, including the New York Police Department, the Los Angeles Police Department, the St. Louis Police Department, and the Ferguson Police Department — which the U.S. Department of Justice discovered to be routinely violating the constitutional rights of its Black residents — all maintain an active relationship with the State of Israel, exchanging ‘counterterrorist’ tactics and militarized weapons (JVP, 2017). As a major participant in the Deadly Exchange, G4S is no stranger to Israel/Palestine. G4S provided
“services at Israeli military checkpoints along Israel’s wall annexing Palestinian land in the occupied West Bank and inside settlements built in violation of international law. It also helped run prisons where Palestinians are tortured, abused and detained without charge” (Barrows-Friedman, 2016). In December 2016, many months after being contracted by the Dakota Access Pipeline, G4S succumbed to international pressure from the Boycott, Divestment, & Sanctions movement and sold their operations in Israel/Palestine for $110 million (Barrows-Friedman, 2016).

There are many environmental parallels between the violence against the Standing Rock Sioux at the Dakota Access Pipeline and violence against Palestinians.

1 https://www.thedailybeast.com/taxpayer-funded-horror-at-standing-rock
in Gaza and the occupied West Bank. For instance, the Standing Rock Sioux are protecting their water supply from contamination, and only 10% Palestinians in Gaza have access to clean water (Zogby, 2016). Indeed, 97% of drinking water in Gaza is contaminated with sewage and salt, and is considered unsafe to drink (Rinat, 2018). In the West Bank, the illegal Israeli settlements take 80% of the aquifer’s flow and leave Palestinians with 20% (Asser, 2010). According to the BBC, Palestinians are prevented from using their own water resources by a “belligerent military power, forcing hundreds of thousands of people to buy water from their occupiers at inflated prices. Moreover, Israel allocates to its citizens, including those living in settlements in the West Bank deemed illegal under international law, between three and five times more water than the Palestinians. This, Palestinians say, is crippling to their agricultural economy” (Asser, 2010). Another parallel is the issue of energy infrastructure. The Palestinian Authority, which governs the occupied West Bank, has been paying the Israeli government to supply electricity to Gaza since 2006 (Tahhan, 2018). In June 2017, the PA requested that Israel reduce Gaza's electricity supply by 40%. The move was “seen as an attempt by President Mahmoud Abbas to weaken the rival Hamas government in Gaza. When the PA asked Israel to cut back electricity, residents of Gaza started receiving only up to four hours of electricity a day as opposed to an average of six to eight hours. In response, the United Nations warned that longer power cuts threaten a ‘total collapse’ of basic services in Gaza” (Tahhan, 2018). In January 2018, the PA said it would allow Israel to “resume supplying the 50 megawatts of electric power it had asked Israel to cut” (Tahhan, 2018). However, the increase will actually be 25 megawatts, not 50, because one of the two turbines had to be shut down in order to cover the fee of $2.8 million per month to restore the power
supply to Gaza (Tahhan, 2018). In the occupied West Bank, dozens of solar panels donated by the Netherlands to generate power for the 150 Palestinian residents in Jubbet al-Dhib were confiscated by Israeli authorities in July 2017, claiming that the £307,000 equipment was installed without proper permits and permissions (McKernan, 2017). Therefore, the policing of energy infrastructure is a tactic shared between the U.S. and Israeli governments across the Deadly Exchange, and is further exacerbated in the era of climate change as communities are rushing to phase out fossil fuels and transition to renewable energy.

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**The water crisis in the occupied West Bank.**

2 https://visualizingpalestine.org/visuals/west-bank-water
The Deadly Exchange is also responsible for climate violence at the U.S.-Mexico border. The Israeli government has been an important partner and supporter of the militarization of the U.S.-Mexico border in three distinct ways. First, there have been “direct meetings between U.S. and Israeli politicians, allowing for the exchange of ideology and border policy and practices” (JVP, 2017). For instance, Homeland Security Director Kirjsten Nielsen traveled to the wall blockading Gaza. Israel’s Public Security Minister Gilad Erdan told the media that he “reckons that some of what Nieelson saw and learned in Israel will ‘certainly be implemented in what the United States is setting up on its border with Mexico’” (JVP, 2017). Second, there have been direct exchanges of security and surveillance technologies between Israeli corporations and U.S. military contractors. In 2014, the U.S. Department of Homeland Security awarded Elbit Systems, an Israeli corporation, a $145 million contract to “erect and maintain surveillance towers along the Arizona/Sonora (Mexico) border” (JVP, 2017). In Fall 2017, Elbit Systems announced “a contract to deliver even more radar and surveillance towers to militarize the Mexico-US border area, boasting it offers ‘field proven architecture’ tested on Palestinians” (JVP, 2017). Third, the Anti-Defamation League took Immigration and Customs Enforcement (ICE) officials from the U.S. to Israel at least three times between 2010 and 2015, and took Customs and Border Protection (CBP) officials at least once in 2016 through the ADL’s National Counter-Terrorism Seminar (JVP, 2017). These exchange programs allow U.S. border officials to meet with Israeli military and swap practices pertaining to checkpoints, detention centers, prisons, settlements, and airports. On a similar trip led by the Jewish United Fund in Chicago, participants watched a “live police exercise with helicopters, horse-mounted police, snipers, the K-9 unit and other
resources involved in the monitoring, interdiction and detaining of cross-border infiltrators” (JVP, 2017). Furthermore, the ADL organizes a counterterrorism seminar for law enforcement twice a year in the U.S. called the Advanced Training School (ATS), which is presented by members of the Israeli military and Israeli National Police. ICE officials have participated in each of the eight ATS sessions documented between June 2013 and December 2016 (JVP, 2017).

It’s evident that violence at the U.S.-Mexico border is directly influenced by the Israel-U.S. Deadly Exchange, but how exactly is this climate violence? As climate change worsens, more regions around the world will become inhabitable due to desertification, resulting in a drastic loss of water and fertile land for growing food. As a result of the convergence of ecological, political, and economic factors, larger populations of people will be forced to migrate. Climate refugees “currently lack any formal definition, recognition, or protection under international law even as the scope of their predicament becomes more clear” (McDonnell, 2018). Since 2008, “an average of 24 million people have been displaced by catastrophic weather disasters each year. As climate change worsens storms and droughts, climate scientists and migration experts expect that number to rise” (McDonnell, 2018). Within sub-Saharan Africa, South Asia and Latin America, 143 million people could be displaced by extreme weather events by 2050. In the U.S., “an estimated 2,300 Puerto Rican families displaced by Hurricane Maria are still looking for permanent housing, while government officials have spent years working to preemptively relocate more than a dozen small coastal communities in Alaska and Louisiana that are disappearing into the rising sea” (McDonnell, 2018). In 2018, the “combined budgets of just Customs and Border Protection and Immigration and Customs Enforcement reached more than
$23 billion, a figure that amounts to more than the budgets of all other federal law enforcement agencies combined” (Miller, 2018). This money is being largely allocated towards the expanding the militarization of the border, however a portion of the funds are ironically being allocated towards equipping the border patrol stations with solar panels, green roofs, and water-use reduction systems as part of the CBP’s efforts to be more energy efficient, water efficient — the part of northern Sonora and southern Arizona where the border is located has been experiencing a drought for 15 years — and to cut down the CBP’s greenhouse gas emissions by 28% under the Trump administration (Miller, 2017). Indeed, even a surveillance tower at the border in Ajo, Arizona is powered by solar panels (Miller, 2017). The greenwashing of border militarization while climate refugees are met with violence is beyond ironic.

The current and forthcoming influx of climate refugees to the U.S. will “most likely face the armed guards of border enforcement” (Miller, 2018). According to a 2003 Pentagon-commissioned report, “The United States and Australia are likely to build defensive fortresses around their countries because they have the resources and reserves to achieve self-sufficiency. Borders will be strengthened around the country to hold back unwanted starving immigrants from the Caribbean islands, Mexico, and South America” (Miller, 2018). In other words, the rationale for expanding the militarization of the U.S.-Mexico border is due to a selfish, xenophobic, and hyper-individualistic desire to quarantine natural resources from being shared by immigrants and refugees. If we look at the recent caravan of Honduran asylum seekers, droughts in Honduras are intensifying to the point that parts of the country are being converted entirely into deserts and communities are forced to migrate (Miller, 2018). In November 2018, the U.S. responded to Central American asylum seekers, many of
whom had traveled 3,000 miles from Honduras, by firing tear gas at more than 5,000
unarmed migrants as they attempted to cross from Tijuana, Mexico into the U.S. The
tear gas was reported to have drifted in the wind at least half a mile (Domonoske,
2018). 6,000 U.S. troops, including military engineers and military police, were
stationed at the border to support CBP officers, and President Donald Trump had
given authorization for U.S. forces to use lethal force against the migrant caravan
(Domonoske, 2018). Of course, the right to seek asylum is protected under both U.S.
and international law. Furthermore, if we examine the refugee crisis in Syria, we can
see that Syria has been experiencing its worst drought in 900 years, which is
attributed to climate change. The drought, which began in 2006, has “forced as many
as 1.5 million rural denizens to crowd into cities alongside Iraqi refugees and
decimated the country's livestock. Water became scarce and food expensive. The
suffering and social chaos caused by the drought were important drivers of the initial
unrest” (Mansharamani, 2016). Many Syrian climate migrants were originally
Palestinian refugees. Before civil war erupted in Syria, “an estimated 560,000
Palestinian refugees lived in the country” (Bolongaro, 2016). Since Jordan and
Lebanon “closed their borders to Syrian Palestinians from Syria in 2015, Europe has
become an increasingly attractive destination for them. According to the UN's
Palestinian refugee agency, UNRWA, more than 110,000 Syrian-born Palestinians
have fled Syria since the start of the conflict. Another 450,000 have been internally
displaced” (Bolongaro, 2016). As climate change worsens and makes conditions more
inhabitable worldwide, more climate refugees will be forced to migrate and be faced
with militarization at the border — militarization that is informed by the Deadly
Exchange between the U.S. and Israel.
Lastly, let’s examine the relationship between the carceral state and climate change. The U.S. incarcerates more people per capita than any other nation in the world. As of March 2019, “the American criminal justice system holds almost 2.3 million people in 1,719 state prisons, 109 federal prisons, 1,772 juvenile correctional facilities, 3,163 local jails, and 80 Indian Country jails as well as in military prisons, immigration detention facilities, civil commitment centers, state psychiatric hospitals, and prisons in the U.S. territories” (Wagner, 2019). Since the 1970s, the U.S. has seen a 700% increase in “the number of people imprisoned, a result of the growth in ‘tough on crime’ and ‘war on drugs’ policies, as well as a concerted effort to control and

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minimize the power of social movements and other forms of resistance from within communities of color” (Bernd, 2017). Prisons are “built on some of the least desirable and most contaminated lands in the country, such as old mining sites, Superfund cleanup sites and landfills. According to a GIS analysis of a 2010 dataset of state and federal prisons by independent cartographer Paige Williams, at least 589 federal and state prisons are located within three miles of a Superfund cleanup site on the National Priorities List, with 134 of those prisons located within just one mile” (Bernd, 2017). Exposure to toxicity is not the only environmental issue that incarcerated individuals face. For example, climate change has caused severe heat conditions to have detrimental effects within prisons. Texas officials have reported that 22 incarcerated individuals have died from heat stroke or hyperthermia as of 2017, and the Texas Department of Criminal Justice responded by recommending that prisoners drink two gallons of water on extremely hot days. However, at least one Texas prison had water contaminated with up to 4.5 times the level of arsenic permitted by the EPA (Funes, 2017). Some courts have ruled that “extreme heat conditions in prisons qualify as cruel and unusual punishment, which is unconstitutional. And others have argued in court that, for prisoners with heat-exacerbated illnesses, it’s also a violation of the Americans with Disability Act. These conditions are made worse by the unresolved problem of overcrowding in jails in prisons” (Mock, 2015). Individuals with mental illness, who are “disproportionately represented in America’s criminal justice system, are at particular risk from rising temperatures. People with mental illness are four times more likely to die of heat related complications. More generally, cognitive function declines with exposure to extreme heat” (Gross, 2018). Another example of climate violence in prisons is that
many correctional facilities in the U.S. refuse to evacuate incarcerated individuals in the event of a hurricane or other extreme weather event. For example, South Carolina officials ordered evacuations due to Hurricane Florence, however at least 650 incarcerated individuals at the MacDougall Correctional Institution were not evacuated. South Carolina has not evacuated prisons in response to hurricanes since 1999, which corresponds to a time when prison populations skyrocketed under the Clinton administration, while extreme weather events were becoming much more frequent (Lopez, 2018).

Mass incarceration in the United States is skyrocketing.4

There’s another aspect of the carceral state that we must evaluate — the role of climate violence in the prison-industrial complex. More specifically, we must examine the relationship between prison labor and climate change. According to a climate report issued by the Trump administration in November 2018, “the continued release of greenhouse gases from cars, factories and other sources will make fires more frequent, including very large fires that burn more than 12,400 acres. And wildfire risk in the United States won’t just be a Western problem” (Popovich, 2018). Climate change is responsible for the frequency and magnitude of wildfires in the U.S., and California in particular responds to wildfires with prison labor. Prison labor is legalized under the U.S. Constitution. The Thirteenth Amendment forbade slavery and involuntary servitude, “except as punishment for crime whereof the party shall have been duly convicted” (Benns, 2015). Punishments for incarcerated individuals refusing to work include “solitary confinement, loss of earned good time, and revocation of family visitation. For this forced labor, prisoners earn pennies per hour, if anything at all” (Benns, 2015). Over the decades, prison labor has “expanded in scope and reach. Incarcerated workers, laboring within in-house operations or through convict-leasing partnerships with for-profit businesses, have been involved with mining, agriculture, and all manner of manufacturing from making military weapons to sewing garments for Victoria’s Secret” (Benns, 2015). To respond to the 2018 wildfires in California, officials employed incarcerated workers to put out the climate-induced fires. The California Department of Corrections and Rehabilitation bragged about the use of prison labor for firefighting on Twitter in July 2018, saying “Today, more than 2,000 volunteer inmate firefighters, including 58 youth offenders, are battling wildfire flames throughout CA. Inmate firefighters serve a vital role,
clearing thick brush down to bare soil to stop the fire’s spread” (Lopez, 2018).

Incarcerated individuals make up nearly 40% of California’s firefighters, and the California Department of Forestry and Fire Protection has said it has “authority to operate 39 conservation camps statewide and 196 fire crews year round due to the cooperative efforts with the CDCR and the Division of Juvenile Justice” (Lopez, 2018). According to Democracy Now!, “While salaried firefighters earn an annual mean wage of $74,000 plus benefits, inmates earn just $2 per day with an additional $1 per hour when fighting an active fire. According to some estimates, California avoids spending about $80-$100 million a year by using prison labor to fight its biggest environmental problem” (Goodman, 2018). Of course, $1/hour is not a living wage, nor is it even a minimum wage. Incarcerated workers are not governed by the same labor laws that protect non-incarcerated employees. In the cases where incarcerated workers have attempted to organize or have sued their prison-employers to enforce minimum wage laws or the Fair Labor Standards Act, courts have ruled that “the relationship between the penitentiary and the inmate worker is not primarily economic; thus, the worker is not protected under the statutes. By judging the relationship between prisons and incarcerated workers to be of a primarily social or penological nature, the courts have placed wage and working condition protections out of reach for incarcerated workers” (Benns, 2015). Meanwhile, while the state of California has employed incarcerated individuals to fight wildfires on behalf of working class and middle class families, the ruling class has their own special alternative. According to The Atlantic, a private firefighting crew helped save Kanye West and Kim Kardashian’s $50 million mansion in Calabasas (Madrigal, 2018). Such private firefighting crews are often on the payroll of insurance companies,
including AIG, which has its own “Wildfire Protection Unit, while Chubb — and up
to a dozen other insurers — contract with Wildfire Defense Systems, a Montana
company that claims to have made 550 ‘wildfire responses on behalf of insurers,’
including 255 in just the past two years. Right now in California, the company has 53
engines working to protect close to 1,000 homes” (Madrigal, 2018). While the
California bourgeoisie are treated to private firefighting teams, the rest of the
residents are protected from wildfires by incarcerated workers, many of whom are
forced to return to prison where they experience extreme heat conditions. Therefore,
the carceral state is complicit in climate violence.

Climate change has increased the intensity and frequency of wildfires.⁵

The carceral state, the police state, the militarization of the U.S.-Mexico border, and the exchange program between the U.S. and Israel are all inextricably and institutionally interlinked. Under the current neoliberal and fascist regime, this nexus of state institutions is tasked to protect ecological capital — whether that be oil, gas, water, or land — and consequently afflict violence upon people of color, indigenous people, low-income folks, incarcerated individuals, immigrants, refugees, and asylum seekers. That violence is exacerbated in the era of climate change, in which the scarcity of resources such as food, water, and energy are rendering lands inhabitable and are making populations susceptible to the belligerence of the state. In order to eradicate climate violence, we must abolish the prison-industrial complex, demilitarize the U.S.-Mexico border, end the Deadly Exchange between the U.S. and Israel, and dismantle the structures of climate colonialism. It is paramount that we take these steps in order to build a better future for all people.
Anthropogenic climate change is the most catastrophic calamity threatening all life on Earth. As ecological and climatic conditions worsen detrimentally across the planet, resources such as food, water, and energy have become dangerously scarce. Countless proposals for addressing climate change have been established within mainstream political discourse, although the majority of proposed solutions are built within the framework of capitalism. Mainstream responses to climate change, as agreed upon by a small number of politicians and businessmen, are typically sorted into two categories: market-based solutions or government-based solutions. These two categories converge at the heart of neoliberalism, in which the global supremacy of capitalism is proliferated across the world by the economic policies of nation-states in power, and nation-states in debt to those with power. Nevertheless, both market-based solutions and government-based solutions to climate change act as mere band-aids, treating the symptoms of climate change but refusing to address the root causes of climate change — the hierarchies of power and ecological domination engendered by capitalism and the state. Addressing these root causes of climate change would
mean the complete upheaval of our political and economic paradigms, and those with power will never relinquish it voluntarily. Indeed, climate change is not merely an environmental crisis; rather, it is a struggle over power with social, economic, and political consequences. Therefore, to protect the power of the ruling class, mainstream solutions to climate change are designed within a capitalist and statist system. In order to truly mitigate climate change, we need to foster a system of autonomy, self-determination, and ownership grounded in community-oriented solutions to our ecological crisis. To do so, we must cultivate our efforts in an existing international movement to resist the hegemony of capital and state power.

While previous chapters have investigated the reasons why capitalism and the state perpetuate climate violence against marginalized populations across the planet, this chapter will focus on the radical alternatives already being put into praxis by communities in the United States, Morocco, and Bolivia. Using research collected during my semester abroad in Spring 2018, I will analyze alternative models of ownership over natural resources in these countries that reject both the private sector and state power.

The three selected case studies are evident of a current ongoing revolution that is challenging the neoliberal status quo. Revolution isn't just a theoretical dream for the future — it is happening right now in various pockets across the world. By rejecting the private sector and the state, communities in the United States, Morocco, and Bolivia are reclaiming autonomy, ownership, and self-determination from multinational corporations, governmental entities, and the global ruling class. In doing so, these communities are able to democratize the local management, production/distribution, and decision-making platforms that govern over natural
resources. Using these three existing case studies as a precedent, I intend to transform the "farfetched" concept of an ecological revolution into something tangible and replicable. The case studies include the Phat Beets garden in the United States, the Imider movement in Morocco, and the Water War in Bolivia. Each of these case studies seeks to implement social ownership over the systems that govern ecological resources, and has a culturally specific actualization depending on the local geopolitical context. These three case studies are not unilaterally perfect examples, as the Imider movement still enables extractivism. However, each case study sets a precedent that can be further refined and expanded.

My analytical framework is primarily based on the critical theory of social ecology. Social ecology offers a different framework of analysis than that of political ecology, which was discussed in Chapter 2. Political ecology, according to Arturo Escobar, investigates ecological distribution conflicts over "access to, and control over, natural resources, particularly as a source of livelihoods, including the costs of environmental destruction" (Escobar, 2006). Social ecology, on the other hand, is critical theory devised by Murray Bookchin, the late anarchist theorist from Vermont. It is conceptualized as a

critique of current social, political, and anti-ecological trends, social ecology espouses a reconstructive, ecological, communitarian, and ethical approach to society. As a body of ideas, social ecology envisions a moral economy that moves beyond scarcity and hierarchy, toward a world that reharmonizes human communities with the natural world, while celebrating diversity, creativity, and freedom (Bookchin, 2005).

In other words, the premise of social ecology is that hierarchies of power and domination engender ecological violence. Bookchin defines hierarchies of power as
the conditions of economic domination plundered by capitalism, the political domination exerted by the state apparatus, and the inequities between race, class, and gender (Bookchin, 2005). Examples of hierarchies and systems of domination include patriarchy, white supremacy, and colonialism. These hierarchies of power are, therefore, the root causes of climate change, as Bookchin writes that the ecological crisis is "firmly grounded in relations of hierarchy and domination between society and people" (Bookchin, 2005). Thus, any proposal to address and mitigate climate change must thereby seek to eliminate these root causes. For this reason, neoliberal proposals to address climate change (i.e. market-based solutions or government-based solutions) are inadequate and only further perpetrate ecological violence, as they reinforce statist and capitalist hierarchies of power and domination. The reason for this, in the words of Bookchin, is because it was not until organic community relation dissolved into market relationships that the planet itself was reduced to a resource for exploitation. This centuries-long tendency finds its most exacerbating development in modern capitalism. Owing to its inherently competitive nature, bourgeois society not only pits humans against each other, it also pits the mass of humanity against the natural world. Just as men and women are converted into commodities, so every aspect of nature is converted into a commodity, a resource to be manufactured and merchandised wantonly. The plundering of the human spirit by the market place is paralleled by the plundering of the earth by capital (Bookchin, 2005).

In other words, the hierarchies of power and domination resulting from the commodification of nature for capital manifest forms of ecological violence that are responsible for our environmental crisis and climate change. This is very similar to Karl Marx's theory of a metabolic rift, which has been used by many eco-socialist
theorists, such as John Bellamy Foster, to describe our ecological crisis. As described in Chapter 2, Karl Marx had conceptualized the dialectic relationship identified by Bookchin as an irreparable rift in the social metabolism between humankind and nature, emanating from within a feedback loop by the extractive nature of capitalism (Marx, 1981). John Bellamy Foster describes Marx's theory of the metabolic rift as a "solid and scientific way in which to depict the complex, dynamic interchange between human beings and nature, resulting from human labor" (Foster, 1999). By merging Bookchin's theory of social ecology with Marx's theory of the metabolic rift, we can investigate the ecological crisis from an analytical framework that perceives hierarchies of power and domination of nature as the root cause of climate change. In particular, the 21st century has been demarcated by hierarchies of power that have evolved from the uneven relations of power between those who own capital and those who must sell their labor to survive. These uneven relations of power have sustained inequities across gender, race, and class to reinforce the production of capital, codified by and married to the state apparatus as a neoliberal plutocracy. For these reasons, many social theorists have termed our current geologic epoch as the ‘Capitalocene,’ in contrast to what climate scientists have previously termed the ‘Anthropocene.’ As described in Chapter 3, whereas the latter describes a geologic epoch defined by anthropogenic contributions to our current climate, social theorists argue that it is misanthropic and erroneous to blame humankind itself for climate change. Rather, it is not the inherent fault of humankind, but instead it is the construct of capitalism that is responsible for climate change. Therefore, by renaming our geologic epoch as the Capitalocene, the blame is shifted from humankind to human systems of extraction and exploitation — or, as Bookchin phrases it, hierarchy and
domination.

So, what is the social ecological response to the Capitalocene? Murray Bookchin understood that the Capitalocene was protected and perpetuated by the apparatus of the nation-state, and so he determined that any efforts to mitigate our ecological crisis must simultaneously reject both capitalism and the state. Therefore, Bookchin developed a new political and economic system called communalism, which is born from the libertarian socialist school of thought. Libertarian socialism is an ideology within socialist and anarchist philosophies that advocates for stateless socialism, direct democracy, abolition of hierarchical and authoritarian institutions, and social ownership over the means of production (Bookchin, 2007). The prefix ‘libertarian’ refers to decentralization of state power, and had historically referred to anti-capitalist politics before being coopted by the right-wing in the United States during the 20th century (Bookchin, 2007). Within the larger school of libertarian socialism, communalism is described as the praxis of social ecology through a stateless system of governance in which autonomous municipalities practice social ownership from within a non-hierarchical federation (Bookchin, 2007). In such a system, political power would be decentralized to municipalities through the practice of direct democracy from within popular assemblies (Bookchin, 2007). These popular assemblies are organized along ecological lines into a confederation at the heart of political participation, aiming to ultimately eliminate the state. This stateless version of direct democracy at the core of communalism is called ‘libertarian municipalism,’ and is very important to my analytical framework because it is the cornerstone of social ecology. Most notably, libertarian municipalism is the philosophy that directly inspired Abdullah Öcalan to develop ‘democratic confederalism,’ the system of
governance being implemented with the Kurdish revolution in Rojava. The revolution is a militant struggle to create a stateless autonomous region in Syria, or Western Kurdistan, with a socialist economy, secular ideology, direct democracy, regenerative environment, and gender equality throughout the political system. Similarly to how Öcalan's model of democratic confederalism is based on libertarian municipalism, the various political platforms within my case studies also reflect the model of libertarian municipalism proposed by Bookchin.

Libertarian municipalism comprises of three major elements: 1) decentralization of power to eliminate hierarchical and authoritarian institutions, 2) participatory models of direct democracy that reject the state, and 3) alternative

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models of social ownership that reject capitalism and the private sector. By adhering to these three elements with our political and economic systems of governance, Bookchin declares that we can adequately address our ecological crisis. Therefore, private and state ownership are dangerously antithetical to environmental mitigation. Social ownership, on the other hand, is required to dismantle the root causes of climate change. Social ownership, in this case, refers to when the means of (food/water/energy) production and distribution are owned and managed by the people (i.e. communities themselves), and not by any centralized apparatus (nation-states and governments) or private entity (corporations, owners of capital, ruling class). Various forms can encompass collective ownership, common ownership, cooperative ownership, and community ownership. However, social ownership is in opposition to private and public ownership. The latter, in contemporary discourses, refers to state ownership. The process in which the means of (food/water/energy) production and distribution are placed under social ownership is called socialization (in contrast to both privatization and nationalization, which refers to private and state ownership respectively). Socialization can happen through various politically participatory processes, such as commoning, decentralization, democratization, localization, etc. In the transnational contexts of the United States, Morocco, and Bolivia, 'social ownership' can take on a different structural appearance based on cultural specificity of the region. Social ownership necessary for addressing our ecological crisis and rejecting the hierarchies of power and domination responsible for climate change.

Bookchin writes, "ecological problems cannot be understood, let alone solved, without a careful understanding of our existing society and the irrationalities that
dominate it. To make this point more concrete: economic, ethnic, cultural, and gender conflicts, among many others, lie at the core of the most serious ecological dislocations we face today—apart, to be sure, from those that are produced by natural catastrophes" (Bookchin, 2007). Indeed, domination of nature by hierarchies created by the state and the extractive capitalist mode of production are both necessarily contingent upon the demise of the environment. Therefore, models of private ownership and state ownership of ecological resources are incompatible with endeavors to mitigate climate change and ecological destruction. The solution, then, is to implement models of social ownership. The three case studies that I will analyze are examples of social ownership in praxis, and share many elements with libertarian municipalism.

My first case study is about Phat Beets, an anarchist community garden in Oakland, California. Oakland is a low-income neighborhood with predominantly Black and Latinx population, and is rapidly gentrifying in part due to the garden's presence (Cadji, 2018). Phat Beets was co-founded by Max Cadji, a Moroccan Jew from New Jersey and a community organizer in Oakland. Phat Beets aims to reclaim social ownership over the food system by implementing a model called "restorative economics" (Cadji, 2018). According to Cadji, their model of restorative economics is based on the praxis of food justice advocated by the Black Panther Party's 10-Point Platform. The Black Panthers, who originated in the same neighborhood of Oakland as Phat Beets, practiced this model of restorative economics over the food system in their ‘Free Breakfast Program,’ before it was shut down by the United States government as part of the FBI's Counter Intelligence Program, or COINTELPRO (Cadji, 2018). COINTELPRO was also responsible for the erroneous framing,
incarceration, and assassination of many Black revolutionaries, causing many Black Panthers to flee to Cuba, such as Assata Shakur, in fear of becoming political prisoners, like Mumia Abu-Jamal (Cadji, 2018). After disbanding, the food justice model of the Black Panthers became adapted as a restorative economics praxis by community members of Oakland, who came together to start Phat Beets (Cadji, 2018). Phat Beets attempts to decolonize the food system of Oakland on the communal level by serving as a 'sanctuary garden.' In other words, the garden is borderless — it has no walls or fences to keep people away. Rather, people of all backgrounds are encouraged to enter the garden at any time and take what they need. Thus, theft is rendered obsolete because capital is decoupled with food, since food is seen as a common resource necessary for survival, rather than a commodity (Cadji, 2018). As a sanctuary garden, nobody with the power to wage state violence, such as the police or immigration enforcement officers, is permitted to enter the garden. Instead, the sanctuary garden practices restorative justice so that community members in dispute can enter the space and resolve interpersonal conflicts from within the garden's healing circles (Cadji, 2018). In terms of education, Phat Beets teaches young community members how to decolonize their diets, by reconnecting residents with the nutritious food of their heritage to promote plant-based alternatives to the fast food that is widespread throughout Oakland (Cadji, 2018). In this way, Phat Beets creates an alternative model of social ownership in which the community has reclaimed autonomy over the food system of Oakland.
My second case study is of the Imider protest movement in Morocco. Imider is home to the Amazigh indigenous population, and is also the site of the largest silver mine in Africa (Tawja, 2018). The silver mine is owned by Managem, which is a private company that is owned by the king of Morocco (Tawja, 2018). Managem was one of the sponsors of COP22 (Tawja, 2018). The silver mine has been in operation since 1969, although the land being extracted belongs to 50 Amazigh families (Tawja, 2018). According to Moha Tawja, an activist and one of the leaders of the Imider protest movement, silver mining requires the use of cyanide to process silver ore.

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This has led to massive environmental contamination, especially in terms of the water supply in Imider (Tawja, 2018). There had been a push for legislation to govern natural resource extraction, as the preexisting water regulations are ineffective because they lack the ability to enforce (Tawja, 2018). Companies therefore abuse this breach, leading to the looting of water. To make matters worse, indigenous tribes were revoked of all rights to Amazigh ancestral land, transforming the lands into government-owned territories and placing the resources extracted on the land under state ownership (Tawja, 2018). Laws have been passed that encourage mineral extraction, which leads to more waste and pollution in the environment (Tawja, 2018). Sand dune quarries were also exploited, which is a direct cause of soil erosion and mainly destroys agricultural lands. Despite the fact that laws exist to ban the collection of sand, the government nevertheless provided temporary authorization for companies to mine sand with impunity (Tawja, 2018). Furthermore, the rise in silver investments correlated with a rise in mining activities. Mining activities wasted 12 times as much water as Amazigh villages consume (Tawja, 2018). Other impacts included air pollution, soil contamination, adverse health impacts on the community, and cyanide toxicity killing the fish population for which the community relied on for sustenance (Tawja, 2018). In response to this rampant ecological violence, the Amazigh people began a protest movement in Imider to address these issues of water waste, mining, and resource extraction. For example, the Amazigh people prevented a water pipeline from extracting water resources from Imider area (Tawja, 2018). In response, Managem fired all Amazigh workers from the mine, and hired foreigners to work in their place. The company also mandated that only decedents of the foreign employees were eligible to work for Managem in the future (Tawja, 2018). These
labor injustices, combined with ecological violence, ignited the Imider protest movement. In 1996, 23 Amazigh residents of Imider were arrested — including two women — for protesting the construction of a new private water well (Tawja, 2018). The reason why I have chosen the Imider protest movement as a case study is due to a radical model of direct democracy enacted by the Amazigh people to conduct their protests. The model, called Agraw, resembles Bookchin's model of libertarian municipalism, and will be analyzed in a few pages.

An Imider encampment for the Amazigh.³

My final case study is of the Water War in Bolivia. In 1999 and 2000, multinational corporations colluded with the World Bank and the Bolivian government to privatize water in Cochabamba (Olivera, 2004). Cochabamba is the

third largest urban environment in Bolivia, with 600,000 residents living in the city (Olivera, 2004). However, Cochabamba had suffered from a shortage of water for over 50 years (Olivera, 2004). In June 1999, the World Bank sought to address the water crisis and issued a report recommending that there be "no public subsidies to hold down increases in the price of water service" (Olivera, 2004). The Bolivian government "followed the World Bank's recommendation and moved to privatize Cochabamba's water system" (Olivera, 2004). Law 2029 was passed on October 29, 1999, which criminalized the use of cooperative water systems that 50% of Cochabamba's population relied on for water delivery (Olivera, 2004). The law also made it illegal to harvest rainwater, and enacted a 40-year contract with Tunari Waters to manage the privatized water system of Cochabamba (Olivera, 2004). Tunari Waters is a multinational corporation based in the Cayman Islands, with shares owned by both the Bechtel Corporation and Samuel Doria Medina, a notorious Bolivian politician (Olivera, 2004). Bolivia's contract with Tunari Waters guaranteed a 16% rate of return per year on its investment and exclusive monopolistic rights to water distribution. This led to the confiscation of all preexisting cooperative water systems (Olivera, 2004). As a result, water bills skyrocketed as much as 300%, and many residents were unable to afford it (Olivera, 2004). According to Oscar Olivera, a Bolivian engineer and leader of the Water War, the privatization of water was not merely an ecological issue; rather, it was an issue with the way democracy was being practiced in Cochabamba. Olivera writes, "democracy is becoming confused with elections. At one time democracy — at least to us — meant participation in the distribution of wealth; collective decision-making on issues that affect us all; and pressure and mobilization in order to influence state policies. Now the only
acceptable meaning of 'democracy' seems to be competition in the electoral market" (Olivera, 2004). In other words, pseudo-democracy, in the electoral sense, redistributes all political power to the state, and relinquishes autonomy to the multinational corporations. In this instance, Tunari Waters capitalized on this electoral relinquishment of power and used it to monopolize the water distribution system. For Olivera and the Cochabamban population, the solution to reclaiming social ownership over the water system was "not through the electoral market. Politics should mean the collective discussion, decision-making, and implementation of solutions for our common problems. In Cochabamba, one common problem was water" (Olivera, 2004). The commoning of water in Cochabamba created a system of social ownership and direct democracy, akin to Bookchin's theory of libertarian municipalism.

*The Water War of Bolivia established a water commons.*

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4 https://democracyctr.org/article/bolivia-15-years-on-from-the-water-war/
I will be comparing and contrasting these three case studies in terms of three analytical criteria, or dimensions. The first dimension is how these case studies practice participatory models of direct democracy. The second dimension is how these case studies manage the regenerative production and distribution of ecological resources. The third dimension is how these case studies practice social ownership and reject both privatization and nationalization. To begin, let us investigate the first dimension. For Phat Beets, residents come together within the garden and practice a collective decision-making process in which all voices of the community are given equal weight (Cadji, 2018). All residents are welcome to participate in all decisions that govern the garden, and there is no hierarchy of leadership within the garden's management. Political power is delegated cooperatively and decisions are agreed upon via consensus, so that all residents are empowered with unabridged autonomy to implement their ideas and transform their dreams into realities within the garden (Cadji, 2018). Therefore, a consensus model of direct democracy is practiced at Phat Beets. With the Imider protest movement, the Amazigh people created a popular assembly akin to Bookchin's model of libertarian municipalism. Bookchin had argued that popular assemblies were the heart of democratic activity to actualize the vision of social ecology. Bookchin's model envisioned a stateless popular assembly without hierarchy and elections. Rather, Bookchin envisioned a face-to-face assembly in which participants came to agreement to enact political solutions collectively. The Amazigh people crafted model of direct democracy that functioned similarly to Bookchin's model. The Imider model is called "Agraw," and is based on the indigenous model of democracy that has been practiced for centuries (Tawja, 2018). Agraw works in six steps. First, the Amazigh participants gather in a circle. The circle
symbolizes equality, and consists of all villagers, including women, men, and children (Tawja, 2018). Next, there is no voting, since a vote "is making a decision on pre-made choices given to you and it can exclude a minority" (Tawja, 2018). Instead, every villager's opinion is voiced, which is considered to be more expressive than just a vote (Tawja, 2018). Notes are taken for all voices, and are then synthesized to make a decision that takes all voices into account (Tawja, 2018). Lastly, although special respect is reserved for the Amazigh elders, there is no hierarchy of power within the circle (Tawja, 2018). In this way, the Agraw model is a thriving example of direct democracy akin to Bookchin's model. The Agraw model is also very similar to the model of direct democracy practiced by the residents of Cochabamba during the Water War. Like Agraw, direct democracy was practiced by the residents of Cochabamba through popular assemblies. The popular assembly was called the Coordinadora, which served as the organizing body for the Water War (Olivera, 2004). The formation of the Coordinadora was very foundational for the success of the movement. The Coordinadora, in the words of Olivera, created solidarity and mutual trust where "people can lose their sense of fear and give a real content to democracy" (Olivera, 2004). This model of democracy is genuine, unlike the electoral system that has been implemented by the modern nation-state. Rather, this version of democracy is direct and participatory. According to Olivera, it answers the question "who decides what? — A tiny minority of politicians and businesspeople, or we ourselves, the ordinary working people?" (Olivera, 2004). Furthermore, Olivera says, "We wanted to make our own decisions. That was what democracy would mean in practice, and that was what the Coordinadora set out to accomplish" (Olivera, 2004). The Coordinadora, thus, contained the "meetings, assemblies, and
barricades that were the main instruments for struggle and liberation" (Olivera, 2004). This is very similar to the popular assemblies envisioned by Murray Bookchin's theory of libertarian municipalism. Therefore, the Coordinadora of Cochabamba, the Agraw model of the Imider movement, and collective decision-making model of Phat Beets are all participatory examples of direct democracy that reject hierarchy, electoral politics, and the state. The decisions made via these models have direct effects on the management of environmental resources.

The second dimension is how these case studies manage and mitigate the regenerative production and distribution of ecological resources. I use the term "regenerative" as opposed to "sustainable" because the latter term has been coopted by liberal discourse, corporations, and governments as a tool for reformism and greenwashing. Rather, the benchmark should be shifted to "regeneration," where we strive to regenerate the planet's ecosystems instead of merely sustaining them. Phat Beets practices regenerative management through the production and distribution of ecological resources. According to Cadji, the neighborhood of Oakland, California was previously a food desert, meaning that healthy and nutritious food was inaccessible to the community (Cadji, 2018). However, after Phat Beets started growing produce, the neighborhood began to practice food sovereignty, which is the “right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems" (Cadji, 2018). This is because the community garden was able to produce a surplus of fresh vegetables and other crops. Since the garden is explicitly anti-capitalist, fresh food is accessible to all residents, regardless of class, income, or socioeconomic status (Cadji, 2018). In this way, all residents are able to
harvest fresh and healthy food for free. These conditions of food production and accessible distribution are what qualifies food sovereignty within the neighborhood. With food sovereignty, Phat Beets is able to put regenerative ecology into praxis by mitigating the conditions of a food desert and implementing environmentally responsible management practices within the garden. The Imider movement, on the other hand, is more complicated. The Amazigh people were able to mitigate issues of water, soil, and air contamination by practicing regenerative ecological management over these resources (Tawja, 2018). However, the Imider movement had never intended to shut down the mines. They had aimed to reconcile environmental remediation with employment opportunities. Therefore, by keeping the mines open, the Amazigh had intended to create jobs for indigenous people (Tawja, 2018). Yet, while some of the ecological damage has been remediated, the extractive practices of mining continue to harm the environment. While the damage is less than before, it is not negligible. Therefore, the Imider movement was successful in remediating a large amount of ecological degradation, however the movement has continued to allow environmentally harmful extractivism to proceed. In this way, Imider is not a perfect example of regenerative ecological management, although it has made some progress. Lastly, the water situation in Cochabamba is a successful example of regenerative ecological management. Whereas prior to the Water War, water had been largely scarce and inaccessible, the cooperative systems of water distribution implemented by the Coordinadora made water availability more abundant, affordable, and accessible to all (Murray, 2015). Therefore, the key to ecological — and hydrological — mitigation and restoration was through the creation of equitable distribution systems. Communally-managed distribution ensured that water was being delivered equitably
to all residents, making sure that there was minimal waste and contamination (Murray, 2015). Without a profit incentive, the cooperative systems of water distribution had no motive to limit access to water, unlike their corporate predecessors who would refuse to deliver water if a resident could not afford the bill (Murray, 2015). However, the issue of water potability still remains. Nevertheless, Cochabamba is a thriving example of regenerative hydrological management and mitigation of water scarcity into water abundance.

The third and final dimension is how these case studies practice social ownership and reject both privatization and nationalization. For Phat Beets, the model of social ownership is very evident. Phat Beets is not a private farm, nor is it a state-run garden. It is a communal space, owned and managed collectively by each member of the community (Cadji, 2018). As Phat Beets does not seek to accumulate capital or make a profit, there is no privatization of the garden. All community members are able to harvest what they want, when they want, and how they want. In this way, everybody owns Phat Beets together (Cadji, 2018). Furthermore, the only individuals prohibited from entering the garden are actors of state violence, such as police officers (Cadji, 2018). In this way, Phat Beets rejects the state and capitalism while practicing social ownership. Again, the Imider movement is a bit more complicated. While it practices radical democracy, the mines that employ the Amazigh people are still privately owned (Tawja, 2018). To make matters worse, the mines are privately owned by the king of Morocco, further blurring the boundaries between private ownership and state ownership (Tawja, 2018). Therefore, whereas the mines themselves are privatized by the head of the state, the Agraw assemblies themselves are self-governed and act as autonomous collectives (Tawja, 2018). Within these
Agraw collectives, social ownership is practiced internally, however outside of the assemblies, social ownership is eclipsed by private ownership of the mines. Thus, Imider is not a perfect example of social ownership, compared to Phat Beets and Cochabamba. It does, however, compensate for this fault by practicing social ownership within the Agraw assembly. In Cochabamba, social ownership over the water commons is thriving. Activists like Oscar Olivera had successfully overthrown the multinational corporations that had been privatizing water (Olivera, 2014). However, according to Marcela Olivera, a water rights activist, "confronted by successful community organizing to keep the management of the commons at the community level and under popular control, the state intervened to reduce local autonomy and make the people dependent on government decision-making" (Olivera, 2014). Nevertheless, after defeating privatization, the Coordinadora was determined to defeat nationalization as well. The Coordinadora was successful in "saying we do not want to return to the state and we do not want our commons handled by the state. The people are not organizing to ask or make demands of the state, or to negotiate rights, but to determine and implement the conditions of their own lives" (Olivera, 2014). Therefore, the Coordinadora implemented an alternative model of social ownership that thwarted both private and state ownership. This model manifested itself in a network of cooperative water delivery systems, and remained under the ownership of the community and the management of the Coordinadora (Olivera, 2014). In this way, Phat Beets, the Imider movement, and the water activists in Cochabamba implemented various degrees of social ownership in their models. While these models are culturally specific to their geographic region, they reject nationalization and privatization, and advocate for ownership of ecological resources
by the community.

The intention of this chapter is to disseminate knowledge about how communities across transnational contexts are creating culturally specific examples of social ownership over ecological resources. The chapter has examined how social ownership is a viable alternative to private and state ownership to create an equitable and regenerative paradigm for mitigating climate change. The chapter has also elucidated a praxis utilized by communities to abolish hierarchies of power and eliminate structures of ecological violence. This analysis is intended to challenge notions of ecological scarcity by dismantling the structures, institutions, and systems that are grounded in exploitation, extraction, overconsumption, and economic hyper-individualism. Using Murray Bookchin's critical theory of social ecology and Karl Marx's metabolic rift as an analytical framework, we can understand how the Capitalocene is being challenged by radical alternatives that seek to dismantle capitalism and the state, which are the root causes of climate change and ecological violence. By comparing alternatives models in the United States with Phat Beets, Morocco with the Imider movement, and Bolivia with the Water War, we can see the efficacy and tangibility of models that reject state and private ownership. Indeed, the revolution we theorize and dream about is already unfolding across the world. It is time to transition towards renewable energy, food sovereignty, and water access for all people. However, if the structures of power that govern over the food, water, and energy systems are not radically transformed, then the matrix of social, political, and economic injustices will not be addressed as we transition towards a regenerative future. Therefore, we must simultaneously address social injustices alongside ecological injustices by transforming our political and economic regimes, particularly
as they pertain to governance over food, water, and energy systems. Solutions cannot come from the state or private sector, as these entities are structurally responsible for perpetuating ecological violence. Rather, solutions must come from community institutions that radically reject state and private ownership. These solutions already exist — the revolution is happening right now, and it is up to the rest of the world to replicate these models and implement alternatives that seek to dismantle the institutions that defend power imbalances.
Climate change is on track to materializing an irreversible planetary catastrophe unless we drastically curtail global greenhouse gas emissions within the next 12 years (Davenport, 2018). Carbon dioxide emissions are turning the oceans “more acidic, causing damage to corals and all life with a carbonate skeletons or shells and, if unchecked, potentially leading to mass extinctions of ocean life like those of the geological past” (Nicholas, 2016). If CO2 levels are “allowed to continue to approach 450 ppm (due by 2030–2040 at the current rates at which emissions are climbing), reefs will be in rapid and terminal decline world-wide from mass coral bleaching, ocean acidification, and other environmental impacts associated with climate change” (Nicholas, 2016). As of April 2019, we have reached 412 ppm of carbon dioxide in the atmosphere. To ensure the longevity of a safe and habitable planet, the maximum threshold for carbon dioxide in the atmosphere is 350 ppm. According to climatologist James Hansen, “If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted CO2 will need to be reduced to at most 350 ppm” (Jones, 2017). It is imperative that we begin curtailing global greenhouse gas emissions immediately in order to reach a drawdown to 350 ppm. Drawdown is “the point in time when the concentration
of greenhouse gases in the Earth's atmosphere begins to decline on a year-to-year basis” (Hawken, 2017).

As climate change intensifies, the United States government continues to weaken its adaptation and mitigation strategies. Under the administration of President Donald Trump — a man who has called climate change a ‘Chinese hoax’ — the United States has rolled back countless environmental policies. This began when Trump moved to withdraw the United States from the Paris Climate Agreement in June 2017. Subsequently, Trump eliminated the Clean Power Plan in October 2017, which “required the energy sector to cut carbon emissions by 32% by 2030” (Gibbens, 2019). Then, Trump rescinded “rules around releasing methane flares, inspecting equipment, and repairing leaks” (Gibbens, 2019). In August 2017, Trump revoked “an Obama-era executive order that required federally funded projects to factor rising sea levels into construction” (Gibbens, 2019). In 2017, Trump issued an executive order, which “narrowed the definition of what's considered a federally protected river or wetland” (Gibbens, 2019). Then, the National Oceanic and Atmospheric Administration, under Trump, approved five companies to use “seismic air gun blasts to search for underwater oil and gas deposits. Debate over the deafening blasts stem from concerns that they disorient marine mammals that use sonar to communicate and kill plankton” (Gibbens, 2019). In December 2017, Trump changed a policy so that “companies installing large wind turbines, constructing power lines, or leaving oil exposed are no longer violating the Migratory Bird Treaty Act if their activities kill birds” (Gibbens, 2019). Also, in December 2017, Trump removed climate change from the list of
national security threats, which meant “less Department of Defense research funding and a nationalistic viewpoint on the potential impacts of wildfires, droughts, hurricanes, and other natural disasters” (Gibbens, 2019). Under the Trump administration, “the size and influence of the EPA has shrunk, and it's illustrated by their diminished prosecuting power. Criminal prosecutions are at a 30-year low, and many violations that would have been prosecuted in the past are now being negotiated with companies” (Gibbens, 2019). Instead of promoting renewable energy, Trump attempted to revitalize the coal industry. Workers in the coal industry are inclined to suffer from anthracosis and pneumoconiosis, or black lung disease, due to long-term exposure to coal dust (Valdmanis, 2018). A study conducted by the National Institute of Occupational Safety and Health in 2018 shows a “resurgence of the incurable respiratory illness, the highest rate recorded in roughly two decades” (Valdmanis, 2018).

Trump also reduced the size of the Bears Ears and Grand Staircase-Escalante national monuments in Utah, which his administration “opened for mining and drilling companies in 2017” (Gibbens, 2019). Bears Ears has “tremendous cultural significance. The region has figured prominently in the history of the Native peoples of the area. It is home to over 100,000 Native American sites, including numerous burial grounds and petroglyphs. In the 19th century, Navajo leaders hid from forced relocation efforts in the nearby canyons” (D’Costa, 2018). In July 2015, leaders from the Hopi Tribe, Navajo Nation, Ute Mountain Ute Tribe, Pueblo of Zuni, and Ute Indian Tribe founded the Bears Ears Inter-Tribal Coalition, “a historic consortium of sovereign tribal nations united in the effort on multiple fronts to work
collaboratively to protect and promote sacred, spiritual, historical, natural, scientific and cultural resources on lands within the Bears Ears landscape” (D’Costa, 2018). These are just a select few of the numerous ways in which the Trump administration has weakened environmental policy and action on climate change in the United States.

The Bears Ears national monument is a sacred site.¹

The presidency of Donald Trump has also ushered in a wave of fascism in the United States. Under the frame of ‘white nationalism,’ fascism has become demarcated by widespread violent acts of antisemitism, Islamophobia, homophobia, transphobia, misogyny, and white supremacy in the U.S. and around the world. There

have been countless instances of domestic terrorism committed by ‘white nationalists’ between 2016 and 2019. On August 12, 2017, a ‘Unite the Right’ rally in Charlottesville, Virginia resulted in the injury of 28 people and one murder. A self-proclaimed neo-Nazi “rammed his car into a crowd of counterprotesters, killing Heather Heyer. Afterward, Trump insisted that ‘there’s blame on both sides’ for the violence” (Feinberg, 2019). On October 27, 2018, a gunman entered the Tree of Life – Or L’Simcha synagogue in the neighborhood of Squirrel Hill in Pittsburgh, Pennsylvania. The gunman murdered 11 Jewish congregants and injured 7 others as they were gathering for Shabbat services (Feinberg, 2019).

A neo-Nazi murdered Heather Heyer at a rally in Charlottesville.²

Furthermore, *The Washington Post* found that “counties that had hosted a 2016 Trump campaign rally saw a 226% increase in reported hate crimes over comparable counties that did not host such a rally” (Feinberg, 2019). The Federal Bureau of Investigation reported a “17% year-over-year increase in federal hate crimes across the U.S. [in 2017], the third consecutive yearly rise and the largest jump in federally reported hate crimes since the September 11 attacks” (Fitzsimons, 2018). 58% of all hate crimes in 2017 were based on race, and “the black community is an estimated 13.4% of the U.S. population but makes up 28% of hate crime victims” (Fitzsimons, 2018). Nearly 60% of hate crimes in 2017 “targeted gay men, 25% targeted a mix of LGBTQ people, 12% targeted lesbians, 2% targeted bisexuals, and 1% targeted transgender and gender-nonconforming people” (Fitzsimons, 2018). According to the FBI report, “of 1,564 anti-religious hate crimes in 2017, 938 targeted Jews. In other words, Jews were subject to 60% of anti-religious hate crimes [in the U.S.], despite constituting just 2% of the American population” (Rosenberg, 2018). These numbers mark a “37% increase from 2016, when Jews were the targets of 54% of all religiously motivated hate crimes and 684 incidents. While this indicates that anti-Semitic crimes have increased since Donald Trump’s election, it also isn’t exactly a historical aberration” (Rosenberg, 2018). In fact, anti-Jewish attacks “comprised 60% of all such crimes in 2014, 61% in 2013, 61% in 2012, 63% in 2011, 67% in 2010, and a whopping 71% in 2009. In other words, it’s not that American anti-Semitism has reached unprecedented levels under Trump; it’s more that people are finally starting to notice it” (Rosenberg, 2018). In New York, for example, hate crimes have increased by 6% between 2017 and 2018 (Liphshiz, 2018).
Antisemitic incidents rose by 22%, and “New York saw more hate crimes against Jews in 2018 than all other targeted groups combined, according to police figures” (Liphshiz, 2018).

The recent wave of fascism in an era of climate change has severe violent consequences. On March 15th, 50 Muslims were murdered at two mosques in Christchurch, New Zealand. The attacker had published a 74-page manifesto, justifying the Islamophobic massacre as an ‘act of environmentalism’ (Wilson, 2019). His advocacy for eco-fascism — a white supremacist ideology that positions racial purity as the only way to save the planet — is a wicked reminder of the bigoted tropes upholding climate violence. Drawing on eugenicist fears of resource scarcity and population growth, “eco-fascists are proselytizing for genocidal solutions to environmental problems” (Wilson, 2019). Eco-fascism is a “longstanding political ideology that is currently undergoing a revival in the fetid culture of the contemporary extremist right. In general, unlike many on the political right, eco-fascists concede the reality of looming ecological catastrophe” (Wilson, 2019). Eco-fascists have “lamented the despoliation of nature, which they associate with modernity and an industrial society which they feel has diminished the connections between race and territory” (Wilson, 2019). They are primarily concerned with “what they see as human overpopulation, and the tendency of migration and multiculturalism to move races out of their homelands” (Wilson, 2019). This line of thought can “ultimately be traced back to figures such as Thomas Malthus, who at the end of the 18th century claimed that population growth was outstripping the capacity for food production, and advocated population control as a solution” (Wilson, 2019).
It can also be traced to Nazi ecology, which was “linked with traditional agrarian romanticism and hostility to urban civilization,” and invoked ecological ideas as an “essential element of racial rejuvenation” (Wilson, 2019). While many conservatives, like Trump, are “fixated on denialism, parts of the radical right not only acknowledge environmental collapse, but welcome it as an opportunity to re-order society along their preferred lines, and to cleanse the Earth of those they despise” (Wilson, 2019).

So, how do we address these two calamities? How do we abolish fascism while simultaneously mitigating climate change? We cannot vote away a system that is deeply ingrained in white supremacy, classism, colonialism, and patriarchy. We cannot vote away hierarchies of power, or an economic system in which ecology itself has become subservient to the dominion of capital. Indeed, these issues are structural and require a radical transformation to the structures of power that govern us. A sociologist named Peter Frase has argued that we only have four possible futures ahead of us, based on combinations within an axis of ecological resource abundance versus scarcity and an axis of egalitarianism versus hierarchy. According to Frase, “the first axis dictates the economic base of the post-capitalist future, while the second pertains to the socio-political superstructure” (Frase, 2011). We can have one future in which hierarchy remains and resource scarcity remains. This is our current trajectory, which Frase calls ‘exterminism.’ Without a structural shift, we will continue to see fascism and climate catastrophe converge. We can have one future in which hierarchy remains and resource abundance is attained, which would resemble a type of neo-feudalism that Frase calls ‘rentism,’ where climate change is rendered obsolete yet wealth remains concentrated in the Mark Zuckerberg of
the world. Under this future, abundant resources would still be bartered in exchange for labor power. We can have one future in which egalitarianism is achieved but resource scarcity remains. Or, we can have one future in which both egalitarianism and resource abundance are attained. The latter future is the most equitable, ecological, and indeed feasible. If we are demanding an end to climate change and fascism, then we are demanding this latter future. We can apply the practice of regenerative design to transition us into the latter future — a post-scarcity society.

Peter Frase calls the post-scarcity future ‘communism’. ³

To destroy fascism and mitigate climate change, we need a future that satisfies both Frase’s egalitarianism axis and resource abundance axis. To establish the

³ https://medium.com/@baddeo/whats-easier-to-imagine-the-end-of-the-world-or-the-end-of-business-as-usual-fe6b480f2e90
egalitarianism requirement, we “must build the new world in the shell of the old. Ordinary people — neighbors and co-workers, students and strangers — can organize spaces to meet one another, forge relationships, and overcome the isolation of everyday life” (Herson-Hord, 2018). Through organizing participatory institutions at the grassroots, “we can meet our immediate human needs and form a new basis of power, for channeling the collective action of working-class people: to build and, yes, to fight. The vehicles of our resistance against capitalism and state repression can and must also be the building blocks of our democratic future” (Herson-Hord, 2018). As we cultivate “local cooperative economies and ever-more sophisticated systems of mutual aid, we can grow a new commons in the hands of ordinary people, a genuine socialism from below, an economic democracy” (Herson-Hord, 2018). Furthermore, our networks of “community councils, popular assemblies, tenant unions, and other bodies of participatory democracy can form a counterweight to the institutions presently governing our lives, organizing society in parallel against capitalism and the state” (Herson-Hord, 2018). Our labor unions can “seize the workplace; our tenant unions can take control of housing; our councils and assemblies can restructure political authority around their own processes of confederal direct democracy” (Herson-Hord, 2018). Indeed, direct democracy is a prerequisite for egalitarianism. From climate change to state violence to gentrification, “this is the essence of the problems we face: a crisis of democracy. When we organize, we can resist, but resistance is not governance. Even popularly elected governments disempower ordinary people, by placing an elite political class above us to rule on our behalf” (Herson-Hord, 2018).
To satisfy Frase’s abundance axis, we first need to foster social ownership over our systems of natural resources. This will be discussed in Chapter 6. However, we also need to eliminate the scarcity of our natural resources. In terms of food and agricultural resources, small-scale organic agriculture has been proven by the United Nations as the only viable model for food abundance to sustain the growing global population (Meyer, 2013). The most regenerative model of small-scale organic agriculture is permaculture. Permaculture is “the conscious design and maintenance of agriculturally productive systems which have the diversity, stability, and resilience of natural ecosystems. It is the harmonious integration of the landscape with people providing their food, energy, shelter and other material and non-material needs in a sustainable way” (Barth, 2016). Permaculture is a design-oriented agroecology practice based on the principles of perennial biodiversity, polyculture, upcycling of food waste, energy efficient planning, and energy cycling. These elements constitute a closed-loop system that “-turns waste into resources and problems into solutions, [because] a system that provides for its own energy needs is inherently sustainable” (Barth, 2016). With permaculture, each crop is planted intentionally such that it is placed in a relationship to another crop so that they can assist each other mutualistically in growth and function (Barth, 2016). The core concept of permaculture is that “every component of a structure or a landscape should fulfill more than one function. The idea is to create an integrated, self-sufficient system through the strategic design and placement of its components” (Barth, 2016). In other words, each element in the system performs many functions, and conversely each function is supported by many elements. Therefore, permaculture is a necessary
application of regenerative design for the purpose of creating food sovereignty.

Furthermore, we already have more than enough food to feed the entire world. Most of our food is allocated for animal agriculture, an industry that accounts for our highest concentration of greenhouse gas emissions (Hickman, 2009). We could feed an additional 4 billion people with the amount of food we reserve for livestock, and the United Nations estimates that only 795 million people are starving (Baker, 2013). The problem isn't with our production of food, but rather our distribution. Animal agriculture is responsible for 91% of rainforest destruction in the Amazon, with 136 million acres of rainforest already cleared and 1-2 acres cleared every second (Anderson, 2014). As a result of animal agriculture, 110 species are lost every day from habitat destruction in the rainforest (Anderson, 2014). Animal agriculture has also wasted a third of all freshwater sources on Earth, and accounts for 55% of water waste in the United States (Anderson, 2014). By comparison, domestic water use for humans has only resulted in 5% of water waste (Anderson, 2014). For reference, it takes 660 gallons of water to produce one hamburger, which is the equivalent of a human showering for two months (Anderson, 2014). Yet, water isn't the only resource wasted by the industry. Nitrous oxide, for example, is 296 times more destructive than carbon dioxide, and animal agriculture is responsible for 65% of nitrous oxide emissions (Anderson, 2014). Collectively, cattle in the United States produce 7 million pounds of excrement every minute, and the methane produced by cattle in the animal agriculture industry accounts for 51% of global greenhouse gas emissions (Anderson, 2014). This number, alongside the additional 13% of carbon emissions used to transport animal carcasses for human consumption, has a very clear impact on
climate change (Anderson, 2014). Moreover, the industry is notorious for labor abuses. 60% of farmworkers are undocumented immigrants from Central America, and 24% of the agricultural workforce comprises of women (Rodriguez, 2013). Many migrant farmworkers are paid below the federal minimum wage, and 80% of female-identifying farmworkers have experienced some form of sexual harassment, assault, or rape (Rodriguez, 2013). Many farmworkers also risk their lives and suffer from poor health due to working unusually long hours in the sweltering heat and sunlight. While engaged in heavy physical labor, migrant farmworkers are often exposed to carcinogenic pesticides, herbicides, insecticides, and biocides. Many refuse to speak out or attempt to unionize in fear of losing their jobs or being deported (Rodriguez, 2013). In order to transition to a future of egalitarianism and resource abundance, we must redistribute our food equitably while replacing the labor-intensive and resource-intensive industry of animal agriculture with a regenerative system of small-scale permaculture.

Migrant farmworkers typically experience abusive labor practices.\(^4\)

\(^4\) https://modernfarmer.com/2017/02/migrant-farm-workers-the-high-cost-of-cheap-labor/
Animal agriculture is a leading contributor to climate change.\(^5\)

Regenerative design has a wide range of applications, and the use of fungi has been instrumental for a multitude of purposes. Fungi are made up of intelligent threads, known as the mycelium. Mycelia are ecological marvels, and Paul Stamets, a renowned mycologist, has proposed six distinct design-oriented ways in which mushrooms can regenerate the ecosphere. First, mycelia can clean up oil spills.

\(^5\) http://www.cowspiracy.com/facts/
Stamets “laid some mycelium on an oil spill as part of an experiment to compare it with other solutions. The fungi absorbed the oil, broke the carbon hydrogen bonds and re-manufactured it into carbohydrates. Soon, insects were attracted to the pile, then birds came to eat the insects, the birds dropped vegetation seeds and a new ecosystem was on its way” (Rostro, 2016). Second, mycelia can absorb farm pollution. Stamets “created burlap sacs filled with debris and mycelium and placed them downstream of farms to filter runoff. In a few days, the mushrooms had reduced the bacteria by 10,000 times” (Rostro, 2016). Third, mycelia can fight disease. Stametes tested a fungus called agarikon with the Department of Defense and “found that three strains are highly active against pox viruses and three are highly active against the flu” (Rostro, 2016). Fourth, mycelia can combat insects. Insects are “attracted to the mycelium, because there’s no spores,” and creating a trail of mycelia can lead insects out of a house (Rostro, 2016). Fifth, mycelia can facilitate bioremediation and create rich ecosystems in barren terrain. Stametes added “fungi spores that you add to soil, water and cardboard. That creates a rich environment to plant other seeds, like corns, beans, squash and onions for refugee populations. You can also use tree seeds to jump-start a new forest” (Rostro, 2016). Lastly, mycelia can build carbon banks on the planet while revitalizing soils. Instead of “wasting energy by going directly from cellulose to ethanol, Stametes uses mycelium as an intermediary, allowing the fungus to naturally convert cellulose into fungal sugars” (Rostro, 2016). Therefore, mycelia can sequester carbon, facilitate bioremediation, clean up pollution, and fight disease. Indeed, mycelia are fundamental to the regeneration of our planet, and I have developed a seventh practical use for them.
Regenerative design can facilitate the transition to a system of energy abundance. Energy is the fundamental underlying element to all material things, and we can truly transition towards a post-scarcity society if we establish egalitarian social ownership over the means of energy production. However, this can only happen if we also implement a technological shift as well. What if we redesigned the means of energy production — the electrical grid — to mimic nature’s own system of mutual aid? Mutual aid is a theory proposed by Russian scientist and philosopher Peter Kropotkin, based on his observations of the animal kingdom and the interrelationships between animals (Kropotkin, 1902). In ecology, these interrelationships are referred to as symbiosis. In order to attain energy abundance and, consequently, a post-scarcity society, I am proposing that we redesign the electrical grid to mimic the symbiotic interactions of mycelia. The mycelia are composed of thin filaments called hyphae, and interconnect to each other constituting a massive underground network (Flemming, 2014). According to the BBC, “we now know that these threads act as a kind of underground internet, linking the roots of different plants” (Flemming, 2014). The symbiotic relationships between mycelium are referred to as mycorrhizae, and corroborate Kropotkin’s observations of nature’s mutual aid. In fact, “around 90% of land plants are in mutually-beneficial relationships with fungi” (Flemming, 2014). This network between mycelium and flora, commonly dubbed as ‘the Wood Wide Web,’ can even interconnect land plants at very long distances. According to the BBC, “by linking to the fungal

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6 Energy abundance was a goal first envisioned by Nikola Tesla, a Serbian-American inventor who experimented with radiant energy, wireless power, and electrostatic fields in the early 20th century. Ultimately, the ruling class resisted his inventions, and his vision was never actualized (Perreault, 2013).
network, plants can help out their neighbors by sharing nutrients and information” (Flemming, 2014). Furthermore, “In mycorrhizal associations, plants provide fungi with food in the form of carbohydrates. In exchange, the fungi help the plants suck up water, and provide nutrients like phosphorus and nitrogen, via their mycelia” (Flemming, 2014). The mycelium is considered to be a superorganism, a complex system which describes a group of synergetically interacting organisms of the same species. The Wood Wide Web, however, is considered to be a holobiont, a complex system which describes a community of synergetically interacting organisms of different species. This is because mycelia act as channels of communication between other flora, plants, trees, and vegetation within a given ecosystem.

Mycelia interconnect fungi and flora within a ‘Wood Wide Web’.7

My proposal is that we use biomimicry — the practice of designing human infrastructure modeled on natural phenomena — to mimic mycorrhizae in our electrical grid. Assuming we transition to 100% renewable energy to combat climate change and curtail CO2 emissions, imagine if we redesigned our electrical grid to automatically and equitably redistribute energy from communities with a surplus to communities with energy deficits, similarly to how mycelium redistribute nutrients, carbohydrates, and water from plants with a surplus to plants with a deficit. In both scenarios, information from one node in the network (Plant A or Human Community A) would be indicating where the conduit (mycelium or electrical grid) should automatically redistribute the medium (energy or nutrients) to another node in the network (Plant B or battery in Human Community B). In doing so, we would be creating an ‘energy internet,’ per se, by replicating the symbiotic interactions of mycorrhizae — an example of nature’s own mutual aid, as foretold by Kropotkin — in our electrical grid. Of course, we would still have to place this system under social ownership, but at least we would have the technical means, in addition to the political means (assuming the condition of social ownership), of creating energy abundance. And with energy abundance, in addition to permaculture as a source of food abundance, we could evade climate change and establish a truly post-scarcity society. Indeed, it is possible and technically feasible to have egalitarianism with resource abundance.

In addition to imitating mycelia in our energy system, I propose that we imitate another phenomenon found in nature: consciousness. By mimicking the processes of neuronal microtubules, we can design a system of communication for
this emergent ‘energy internet’ such that signals can be sent efficiently across nodes. I call this practice ‘neuromorphic biomimicry,’ invoking the quantum biophysics of consciousness to inform the design of a digital renewable energy internet⁸.

‘Neuromorphic’ means to “mimic neurobiological architectures present in the nervous system,” and is typically associated with electrical engineering and the application of bioinformatics to computational electronics (Mead, 1990).

Neuromorphic biomimicry, on the other hand, is a term I’ve coined to reorient the mimicry of neurobiological architectures towards regenerative design. Artificial neural networks are typically employed in modern power grids, but my proposal goes a step beyond. By mimicking the quantum biophysics of consciousness, we can build an energy infrastructure that works in tandem with the biomimicry of mycelia in order to design a truly comprehensive renewable energy commons.

If we are to use regenerative design to develop an ‘energy internet’ based on the quantum biophysics of consciousness, then we must first break the system down into its component parts. The internet is a hub of interconnected information facilities in constant communication with each other. An energy internet, therefore, is a nexus

⁸ In 1965, an M.I.T. scientist named Leonard Kleinrock developed packet switching, a method of breaking down data into smaller packets for transmission to a destination (A&E, 2010). Packet switching spawned the ARPAnet, the internet's predecessor, that began operation for the U.S. government in 1969 (A&E, 2010). In 1971, the ARPAnet acquired the University of Hawai'i's ALOHAnet, and assimilated the networks at London's University College and the Norway Royal Radar Establishment in 1973 (A&E, 2010). As more networks merged with the ARPAnet, the creation of a standardized communication protocol was required. Therefore, a scientist named Vinton Cerf developed the Transmission Control Protocol, which is a "handshake that introduces distant and different computers to each other in a virtual space" (A&E, 2010). Cerf's protocol enabled Local Area Networks worldwide to communicate with each other. Thus, the internet was born.
of energy and information. Consciousness, too, is a nexus of energy and information. In order to understand how consciousness can serve as a model for the energy internet, we must first examine the parallels between three components: the brain, the internet, and the universe. Our brains consist of neurons that are made up of individual elements. Each element was initially formed in the heart of a massive star (Peckham, 2012). In other words, we are literally composed of stardust. In fact, all things — humans, non-human animals, rivers, forests, mountains, moons, planets, and so on — are, at their core, made of the same stardust. Our brains, however, have an even more intriguing relationship with the cosmos. A scientific study from Nature’s Scientific Reports suggests that “the very structure of our brains, as well as the things our brains can lay claim to — constructs like the Internet, social networks, etc. — resembles the underlying structure of the universe itself” (Peckham, 2012). The report posits asserts that “not only are we star-stuff, but there may be a kind of cosmic feedback loop in the design of our brains and what we’ve created using them” (Peckham, 2012). This cosmic fundamental pattern "describes a fractal manifold structure of spacetime" (Brown, 2014). The equivalence between “the growth of the universe and complex networks, [such as the brain.] strongly suggests that unexpectedly similar laws govern the dynamics of these very different complex systems” (Peckham, 2012). Other examples of complex systems include the Earth's global climate, the power grid, an ecosystem, a living cell, and ultimately the entire universe (Peckham, 2012). Indeed, the brain isn’t the only complex network that fits this cosmic feedback loop. The internet, too, demonstrates this same fundamental pattern. According to the report, the “structural and dynamical similarities of different
real networks suggest that some universal laws might accurately describe the
dynamics of these networks” (Peckham, 2012). To determine these results, the
research team conducted simulations of the universe on a supercomputer and
“discovered, to their surprise, that the causal network representation of space-time in
an accelerating universe was unexpectedly similar to the structure of complex
networks like the Internet, social networks — even our brains” (Peckham, 2012). The
study could ultimately pave a “universal way of explaining how complex systems
work — a common denominator for describing the behavior of complex networks,
our brains and the universe itself” (Peckham, 2012). Since the brain and the internet
both follow this fundamental cosmic pattern, we can delve a step deeper and examine
how consciousness itself can be a model for a new type of internet.

Consciousness has been studied by neurobiologists, physicists, philosophers,
psychonauts, and metaphysicians throughout human history. While consciousness
largely remains an enigma to this day, many researchers have postulated theories that
have been gaining traction in the scientific community. These theories are grounded
in experimentation. The observer effect, an established phenomenon in quantum
mechanics, states that a photon will collapse into either a particle or a wave, based on
the presence of a conscious observer. Until the observer becomes aware of the
photon, it is both a wave and particle simultaneously (Goswami, 1993). Dr. Amit
Goswami, a quantum physicist, argues that the relationship between the observer and
the photon is inherently rooted in consciousness, and suggests that consciousness
itself that chooses whether the photon becomes a wave or a particle (Goswami, 1993).
Thus, consciousness must be nonlocal; in other words, it communicates with quantum
objects through a 'tangled hierarchy' — a casual relationship of circularity — without making any physical contact, and without any significance pertaining to position, place, or distance in spacetime between the observer and the photon (Goswami, 1993). The observer’s local consciousness, then, must be in a nondual relationship with nonlocal consciousness. Therefore, if consciousness exhibits nonlocality, how do human and non-human organisms experience consciousness? What localizes consciousness within a biological system?

One of the most popular theories of consciousness is the Integrated Information Theory, or IIT. According to neuroscientist Christof Koch, chief scientific officer at the Allen Institute for Brain Science, “consciousness arises within any sufficiently complex, information-processing system. All animals, from humans on down to earthworms, are conscious; even the internet could be. That’s just the way the universe works” (Kim, 2013). Koch argues that we live in “a universe of space, time, mass, energy, and consciousness arising out of complex systems” (Kim, 2013). Koch, who spent three decades studying the neurological basis of consciousness, proposes a “scientifically refined version of an ancient philosophical doctrine called panpsychism” (Kim, 2013). Panpsychism is the belief that consciousness is the fundamental building block of all matter in the universe. The core claim of IIT is that a complex network is conscious if it “possesses a property called Φ, or phi, which is a measure of the system’s ‘integrated information’” (Horgan, 2015). Phi corresponds to “the feedback between and interdependence of different parts of a system” (Horgan, 2015). Koch equates phi to ‘synergy,’ which is how ‘integrated’ a system is, or the “degree to which a system is “more than the sum of its parts. In other words, phi
“gives you an information-theoretical measure of consciousness. Any system with integrated information different from zero has consciousness” (Kim, 2013). Phi can be a property of any entity, biological or non-biological. Even a proton can possess phi, because a proton is an emergent phenomenon stemming from the interaction of its quarks” (Horgan, 2015). Another property of any entity is it’s ‘conceptual structure,’ which corresponds to the “manner in which information is embodied and processed in a particular system at a particular moment” (Horgan, 2015). The conceptual structure “determines — or rather, is — the conscious experience” (Horgan, 2015).

Integrated information theory applies to any complex network that fits the aforementioned fundamental cosmic pattern. In the case of the brain, “it’s the whole system that’s conscious, not the individual nerve cells” (Kim, 2013). However, a superorganism such as the mycelia network, a holobiont such as the Wood Wide Web, or even an entire ecosystem, can also exhibit an emergent property of consciousness. According to Koch, “for any one ecosystem, it’s a question of how richly the individual components, such as the trees in a forest, are integrated within themselves as compared to causal interactions between trees” (Kim, 2013).

Furthermore, IIT suggests that consciousness is a local maximum. In other words, while two people are “conscious as individuals, there’s no conscious Übermind that unites us in a single entity. It’s the same thing with ecosystems. In each case, it’s a question of the degree and extent of causal interactions among all components making up the system” (Kim, 2013). When it comes to the internet,

The internet contains about 10 billion computers, with each computer itself having a couple of billion
transistors in its CPU. So the internet has at least $10^{19}$ transistors, compared to the roughly 1,000 trillion (or quadrillion) synapses in the human brain. That’s about 10,000 times more transistors than synapses. But is the internet more complex than the human brain? It depends on the degree of integration of the internet. For instance, our brains are connected all the time. On the internet, computers are packet-switching. They’re not connected permanently, but rapidly switch from one to another (Kim, 2013).

IIT has important implications when it comes to building new systems, such as an energy internet. One implication is that “you can build two systems, each with the same input and output — but one, because of its internal structure, has integrated information. One system would be conscious, and the other not. It’s not the input-output behavior that makes a system conscious, but rather the internal wiring” (Kim, 2013). IIT provides an important framework for understanding the ‘information’ component of the energy-information nexus. In order to understand how we can use consciousness as a model for the energy internet, we must examine the ‘energy’ component. Therefore, we must investigate the conditions of quantum biophysics within the brain.

Dr. Stuart Hameroff, MD, an anesthesiologist and professor at the University of Arizona, and Sir Roger Penrose, a renowned physicist and mathematician, hypothesized the orchestrated objective reduction, or ORCH-OR, model of consciousness. The theory looks at the dendrites of neurons, which are composed of cytoplasm. This cytoplasm is made up of cytoskeleton, and the cytoskeleton is composed of microtubules — polymers of tubulin. Although microtubules are present in all eukaryotic cells, it is only within neuronal dendrites that microtubules are composed of class III β-tubulin (Hameroff, 2014). Tubulin is composed of atoms,
which are made up of 99.999% empty space — and empty space is a vacuum that is always fluctuating with quantum foam (Haramein, 2012). The unique geometric structure of neuronal microtubules allows for quantum coherence to occur, in which quantum vibrations inside of the microtubules resonate with fluctuations from the quantum vacuum of spacetime9. This is because “microtubules may have a harmonic relationship with polarizable structures of the quantum vacuum” (Brown, 2014). The quantum vacuum is a nexus of energy and information. Some physicists, such as Craig Hogan, have hypothesized that the fabric of spacetime may even be ‘digital,’ composed of tiny computable bits — just like the internet. Information, according to Hogan, “constitutes the most basic unit of existence. Information rides on tiny bits; from these bits comes the cosmos” (Moyer, 2012). Koch believes the

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9 Dark matter makes up 23% of our universe, in contrast with the 0.4% of luminous matter. Intergalactic gas makes up 3.6% of our universe. The remaining 73% is hypothesized to be dark energy, which is responsible for the expansion of our universe (Duncan, 2009). If you strip away all the matter in the universe, spacetime becomes a vacuum. This vacuum is the ‘backdrop’ of the cosmos, since it permeates the entire universe. If we examine this ubiquitous vacuum below the Planck scale — which is the most infinitesimal measurement — we can examine that the vacuum, in its ground state, is a plenum of energy (Haramein, 2012). Due to its holo fractal geometry, this quantum vacuum, as it is called, is never really empty. Rather, it contains fleeting electromagnetic waves and virtual particles — including pairs of protons & anti-protons, and electrons & positrons — that pop into and out of existence. These are spawned via quantum fluctuations, which are temporary changes in the amount of vacuum energy in a point, or singularity, in spacetime (McTaggart, 2008). This phenomenon is called quantum foam. These fluctuations constitute the zero-point energy of the quantum vacuum, known as quantum vacuum energy, which in turn engenders a field known as the zero-point field. (Zero-point energy is the lowest possible amount of energy a field can have in its ground state.) The quantum vacuum's zero-point field pervades every inch of the cosmos, underlying all other fields in the universe, from gravitational fields to electromagnetic fields to Higgs fields (McTaggart, 2008). The sum of the zero-point energy in each these fields, in their ground states, constitutes vacuum energy. In other words, the quantum vacuum comprises of fluctuations that make up quantum foam, which engenders the zero-point field, which is quantized with zero-point energy called quantum vacuum energy. Makes sense, right?
existence of digital bits in the cosmos is evident of panpsychism. He says, “We live in a universe where organized bits of matter give rise to consciousness” (Kim, 2013). Neuronal microtubules encode these digital bits of information into biophotons. This is what engenders the experience of consciousness. Biophotons are photons of light produced, which act as the quanta of consciousness localized within a biological system (Hameroff, 2014). In other words, biophotons are units of energy embedded with information. Collectively, biophotons comprise the bioelectromagnetic field engendered by the nervous system, sending electrochemical signals throughout the entire body from cell to cell (Hameroff, 2014). Hameroff and Penrose had initially been criticized for the theory, as the brain "seemed too ‘warm, wet and noisy’ for apparently delicate quantum coherence” (Hameroff, 2015). However, an independent group of researchers accidentally discovered quantum vibrations inside microtubules in 2014, providing sufficient evidence of orchestrated objective reduction for the first time (Elsevier, 2014). The corroborating study is supported by the 2014 Nobel Prize-winning work by O'Keefe, Moser and Moser on grid cells, as well as research by Anirban Bandyopadhyay and scientists at National Institute of Material Science in Tsukuba, Japan (Elsevier, 2014). These experiments “clearly show microtubules have quantum resonances in gigahertz, megahertz and kilohertz frequency ranges (Elsevier, 2014).” Orchestrated objective reduction engenders local consciousness in a body.

In other words — avoiding all scientific jargon — microtubules in the brain's dendrites spawn biophotons from quantum vibrations. These biophotons are what enables the body to experience consciousness, carrying signals encoded in light from
one part of the body to another part of the body. In the words of Yoda, “luminous beings are we, not this crude matter” (Lucas, 1980). My theory of neuromorphic biomimicry proposes that we imitate this network of consciousness in order to design efficient communication systems for the emergent energy internet. The traditional internet is interconnected through Wi-Fi routers — devices that communicate via radio waves — which are hardwired into optical fiber cables that span entire seas.

However, by mimicking the biophotonic signals of microtubules, we can invent a more powerful and efficient alternative to Wi-Fi for the energy internet. Similarly to how microtubules communicate with the body through information encoded in light, we can have microgrids — decentralized grids containing distributed generation of

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10 Humans have been trying to understand consciousness for centuries. Biophotons, as units of consciousness, share a counterpart within many spiritual traditions and philosophies of mind. Throughout history, philosophers have sought to understand consciousness — from Plato to Descartes. Concurrently, multiple religions across the world had independently postulated so-called elements of consciousness, poeticized in numerous myths and folklore. Sufism posits the concept of the 'lataif-e-sitta,' and Judaism posits the concept of 'sephirot.' These are both conceived as corpuscles of consciousness, akin to biophotons (Dale, 2009). Biophotons within the nervous system share likeliness to the concept of 'qi' in the Chinese tradition, and 'ki' in the Japanese tradition, circulating the 'meridian' system and clustering into 'dantians' (Dale, 2009). In Hinduism, 'prana' circulating the 'nadi' system is comparable to biophotons in the nervous system, with clusters called 'chakras.' Dantians and chakras are concepts similar to the morphogenetic fields of biophotons (Dale, 2009). Advaita Vedanta posits the nonduality of ‘Brahman’ and ‘Atman,’ or soul and the cosmos, which is akin to the nondual relationship between local and nonlocal consciousness (Goswami, 1993). In Huayan Buddhism, ‘Indra’s net’ presents a metaphor for the holofractal geometry of the quantum vacuum (Haramein, 2012). Popular culture has provided numerous analogues as well. In Star Wars, for instance, ‘midi-chlorians’ communicating with ‘the Force’ is akin to microtubules resonating with the quantum vacuum. Each of these examples represents a culturally specific analogue, demonstrating how the notion of ‘consciousness’ evolved from a philosophical concept over the course of history, to a pantheistic conundrum grappled by different religions, to a biophysical concept studied by scientists, and to an idea fictionalized in contemporary stories, myths, film, television, and even popular anime and manga. Still, little is understood about consciousness, and so it remains an enigma to this day.
electricity — communicate across long distances through information encoded in light. Microtubules and microgrids have many similarities. Both transmit localized quantities of energy — consciousness and electricity respectively — over nonlocal distances. In other words, consciousness and the energy internet are both nexuses of energy and information. Thus, the energy internet must be modeled off consciousness, as it is nature's own energy-information nexus.

Therefore, I propose to use light fidelity, or Li-Fi, as the communication system for the energy internet. Like biophotons, Li-Fi is an alternative to Wi-Fi that transmits information encoded in light. Li-Fi, first coined by Dr. Harald Haas from Edinburgh University in 2011, is an emergent method of wireless data transmission, and is 100 times faster than traditional Wi-Fi (Wilson, 2018). In lab experiments, Li-Fi has exhibited the potential to reach speeds up to 224 gigabites per second (Wilson, 2018). The light "sends data through really fast flickering that the human eye can’t detect. The flickering, also known as 'refresh rate' in the world of displays, occurs at 10 times the speed of the light coming from TVs and computer monitors" (Wilson, 2018). Wi-Fi is inadequate for the energy internet, as radio waves are incredibly crowded already, and it’s certain to fall short of our growing data demands—anywhere from 20 times to a whopping 667 times short within 20 years, depending on how things play out. So we need something else for wireless transmission. Enter Li-Fi. It has 2,600 times the capacity of the radio spectrum. That means we could meet our 20-year data demands using just 0.8% of the entire visible and invisible light spectrum (Wilson, 2018).

Using the practices of regenerative design, we can design the architecture of cities to transmit Li-Fi for the energy internet, because
street lamps — and really, any LED — could take on the role of what’s been dubbed 'light as service,' where it provides data to pedestrians, vehicles, and all sorts of infrastructure components that might be in need of massive amounts of data, fast. That’s because Li-Fi can actually still operate in sunlight by filtering out the sun’s part of the light spectrum (Wilson, 2018).

If we combine Li-Fi with the biomimicry of mycelia, we can invent a digital renewable energy internet that is integrated into the architecture of cities and automatically redistributes energy equitably from communities with a surplus to communities with a deficit as communicated with signals of light.

Egalitarianism and abundance can coexist, and must coexist if we are to combat fascism and climate change concurrently. Indeed, we need a “non-hierarchical way of life that confers abundance and freedom to all” (Finley, 2017). Using neuromorphic biomimicry, I have proposed an alternative route to a future that rejects scarcity and mimics the symbiosis — or mutual aid — of mycelia and microtubules as a transition to abundance. Such a route would satisfy both the egalitarianism axis and abundance axis of Peter Frase’s roadmap to an equitable and ecological future.

Regenerative design is a necessary practice in the struggle to transition towards a post-scarcity society. We can invoke artistic movements, in addition to political and economic frameworks, in our endeavor to build a more just and equitable future. One such movement is solarpunk, which is a movement in speculative fiction, art, fashion and activism that seeks to answer and embody the question “what does a sustainable civilization look like, and how can we get there?” The aesthetics of solarpunk merge the practical with the beautiful, the well-designed with the green and wild, the bright and colorful with the earthy and solid. Solarpunk can be utopian, just optimistic, or concerned with the struggles en route to a
better world—but never dystopian. As our world roils with calamity, we need solutions, not warnings. Solutions to live comfortably without fossil fuels, to equitably manage scarcity and share abundance, to be kinder to each other and to the planet we share. At once a vision of the future, a thoughtful provocation, and an achievable lifestyle (Jay, 2018).

Solarpunk, as a speculative movement, can inform the aesthetic ideas that we incorporate into regenerative design, as well as the political vision that we incorporate into our praxis. At its core, solarpunk is concerned with invoking the power of imagination to envision a better — and, arguably, utopian — world. We cannot create a more equitable world unless we take bold risks, foster radical creativity, and collaborate with each other to cultivate the seeds of a better tomorrow. Indeed, there are already organizations, movements, and collectives working towards this political roadmap. In the United States, grassroots groups such as Demand Utopia, Cooperation Jackson, and the Symbiosis Revolution are establishing a municipal congress of ecologically minded organizations to build a post-scarcity society. The municipal congress is “fighting for a better world by creating institutions of participatory democracy and the solidarity economy through community organizing, neighborhood by neighborhood, city by city” (Herson-Hord, 2018). Cooperation Jackson, for example, is an initiative in Jackson, Mississippi to foster economic democracy, community ownership, dignity for all workers, and self-determination for people of African descent in the Deep South. In a city where “over 85% of the population is black while 90% of the wealth is held by whites, Cooperation Jackson cultivates popular power through participatory economic development” (Finley, 2018). Over several decades, Cooperation Jackson and its predecessors have “formed
a federation of worker-owned cooperatives and other initiatives for democratic and ecological production. This economic base is then linked to people’s assemblies, which broadly determine the project’s priorities” (Finley, 2017). This municipal congress is part of the larger radical municipalist movement, a revival of Murray Bookchin’s communalist praxis — inspired by the 1871 Paris Commune — to create a confederation of autonomous democratic cities in the United States and around the world (Finley, 2017).

‘Solarpunk’ is often depicted as an urban utopian ecological epicenter.¹¹

Radical municipalism is “distinguished by its insistence that the underlying problem with society is our disempowerment. Capitalism and the state not only cause extraordinary material suffering and inequality, they also rob us of the ability to play a meaningful role in our own lives and communities” (Finley, 2017). By seizing the power to make decisions, “they deprive us of our own humanity and sense of purpose

¹¹ https://jessicaperlstein.com/products/the-fifth-sacred-thing-1
— they deprive us of meaning” (Finley, 2017). The municipalist movement is based on ‘radical democracy,’ which is a framework for “helping to overcome racism, patriarchy, and other social hierarchies, by disassembling the material underpinnings of oppression and unraveling prejudice through common struggle to bring principles of equality to life” (Herson-Hord, 2018). It is through this “lived practice of cooperation and solidarity that we can learn to be democratic beings, to be citizens, who have re-learned the art of making decisions together” (Herson-Hord, 2018). To achieve this vision of radical democracy, we can “cultivate the new society within the shell of the old by eroding the state’s popular legitimacy and dissolving its power into face-to-face people’s assemblies and confederations. … People can, and ought, to be the experts regarding their own needs” (Finley, 2017). At the heart of the municipalist vision is the reclamation of the city as an arena for democracy. Capitalism has “birthed distorted American cities. Their vast, jutting shapes convey the helplessness and alienation of capitalist social relations. What little livable space does exist in recent years has been gobbled up by real estate and high finance” (Finley, 2017). Gentrification comes “nowhere close to describing the mass internal displacement taking place throughout the U.S. In San Francisco, a small, modest home costs about $3.5 to 4 million; simple one-bedroom apartments range from $3,500 to $15,000 per month to rent” (Finley, 2017). Fear and distrust of cities constitute “a central pillar of Trump’s far-right movement. The Trumpists are afraid of immigrants, black people and those who play with gender norms. … A whole gamut of caricatures are arranged in one foreboding image of a decadent cosmopolitanism” (Finley, 2017). In response, radical democracy is currently being practiced within many communities in the
United States and around the world to eradicate fascism. Numerous international social movements demonstrate the efficacy and vision of radical democracy.

From the Black liberation movement to the Kurdish freedom struggle, from housing justice initiatives to worker cooperatives, from immigrant organizers to indigenous revolutionaries, from base-building socialists to social ecology, from people’s movement assemblies to Occupy, from the block clubs to the shop floor, the conditions of our time are shifting radical politics towards an embrace of dual power, towards assembling real democracy in the here and now (Herson-Hord, 2018).

Indeed, a new “municipal paradigm is taking shape with the recognition that anti-racism, feminist liberation, economic justice and direct democracy are intertwined. Enthusiasm for this paradigm brews at the city level, where diverse peoples are encouraged by their surroundings to hold humanistic views” (Finley, 2017). The movement for a more just and equitable future — an egalitarian society with ecological abundance — is growing rapidly, and so we must continue to dream big and remain hopeful.
Chapter 6

Radical Infrastructure

We are witnessing an age of social, political, and ecological crisis revolving around energy. The United States has been rooted in the fossil fuel industry since the 19th century, and consumption of fossil fuels has increased drastically in recent years. In fact, American dependence on oil imports grew from 24% in 1970 to 65% by the end of 2005 (Tertzakian, 2005). Our addiction to fossil fuels for energy production perpetuates the calamities of environmental destruction and climate change. With the development of renewable energy technologies in the 21st century, the United States is more than ready to transition away from fossil fuels and towards solar and wind energy. Our current fossil fuel infrastructure is based on an antiquated system of utilities that dates back to the late 19th and early 20th centuries, and can be deconstructed into separate generation, transmission, and distribution technologies. Generation systems, such as coal-fired power plants, are responsible for energy production. Transmission systems, such as the electrical grid, are responsible for sending electricity from a generation site to a substation within a given community. Distribution systems deliver electricity from the substation directly to an individual residence. Together, this infrastructural network is owned and governed by a series of corporations that are inextricably linked to the State apparatus. This relationship
constitutes a plutocracy, and is defined by the marriage between the fossil fuel corporations and the U.S. government. Indeed, members of the ruling class hold an oligopoly over our disastrous oil-, coal-, fracked gas-, and nuclear-based energy infrastructure, and utilize their capital to influence our political system. According to Oil Change International,

In the 112th Congress, oil, gas, and coal interests have given over $20 million of this ‘dirty energy money’ to our Senators and Representatives, to influence their votes around industry-friendly measures from dismantling the power of regulatory bodies like the Environmental Protection Agency, to approving the Keystone pipeline, to opening up the outer-continental shelf to drilling (Oil Change International, 2014).

Throughout history, fossil fuel moguls have done everything possible as a ruling class to retain their wealth and control over society. Their social, political, and economic power immortalizes the supremacy of the fossil fuel industry, which in turn corrodes any illusion of democracy remaining in the United States. Therefore, we must transition our current energy system away from fossil fuels to mitigate our environmental crisis, while simultaneously transforming the power dynamics that preside over the energy infrastructure. Rather than being owned by private enterprises, the means of energy production, transmission, and distribution must be uniformly owned by communities on a local scale. Social ownership of the energy infrastructure would enable communities to generate their own electricity from renewable energy sources, since the fossil fuel industry would no longer have control over energy production. With the socialization and democratization of our energy infrastructure, communities can tackle climate change, abolish plutocracy, and restore power to the people.
Our fossil fuel energy infrastructure is currently owned by different private investors, including power plants, distributors, and electrical companies. These private entities typically hold a monopoly or oligopoly over energy utilities in a given area, and differ from region to region. On the east coast of the U.S., for example, Con Edison holds a monopoly over the municipal electrical utilities in the New York metropolitan area, including New York City, Westchester, and New Jersey (Fritz, 2015). Yet, we cannot discount the role of the State (capitalized in this chapter to differentiate it from U.S. state), which enacts safeguards to ensure that the fossil fuel industry maintains an oligopoly over the generation, transmission, and distribution of energy. One way in which the State enacts these safeguards is through the abundance

1 https://www.eeguides.info/2016/02/classification-of-overhead-transmission.html
of subsidies to “lower the cost of fossil fuel energy production, raise the price received by energy producers, or lower the price paid by energy consumers, allowing for corporate tax breaks” (Oil Change International, 2014). As of July 2014, fossil fuel subsidies in the United States were estimated to be at $37.5 billion annually, including $21 billion in production and exploration subsidies. Collectively, international governments pay American oil corporations at least an additional $775 billion to $1 trillion annually in subsidies (Oil Change International, 2014). The private companies and government agencies that preside over our energy infrastructure differ from region to region. Another way the State upholds the fossil fuel industry is through the relationships that regulatory agencies maintain with oil, gas, coal, and nuclear energy corporations. There are many governmental agencies responsible for governing the energy infrastructure, both on the federal level and state level. In New York, for example, these agencies include the New York Power Authority, the New York State Energy Research and Development Authority, and the New York Public Service Commission. Each of these agencies operate under the auspices of the Federal Energy Regulatory Commission, which is a subsidiary of the United States Department of Energy that is notorious for accepting money from fossil fuel lobbies in order to expedite the construction of fracked gas and oil pipelines (Northey, 2014). In order to terminate the collusion between the State and the fossil fuel industry, we first need to cut any stocks or bonds that are associated with the fossil fuel industry. This process is called divestment. Many organizations, institutions, universities, places of worship, and grassroots movements have heeded the call for divestment. The Movement for Black Lives, a collective of organizations committed to eradicating violence against Black communities, has demanded
divestment as a platform for racial justice. According to their policy proposals, “If we’re not serious about reducing emissions, the planet will keep getting hotter and Black people will continue to bear the biggest brunt of climate change. Divest from industrial use of fossil fuels and reinvest in community-based sustainable energy solutions to make sure communities most impacted — Black communities — are helping to lead that shift” (M4BL, 2014). Reinvestment is a core component of the divestment process. Money from the fossil fuel economy must be “reinvested into cooperative loan fund that can invest in cooperatively owned businesses. Money can go back to redistribute to cooperatives, particularly in Black communities” (M4BL, 2014). After divesting, we must then socialize the energy infrastructure. Socialization is the process of redistributing the means of energy production and distribution away from private enterprises and into communities directly.

The socialization — and subsequently, the democratization — of our energy infrastructure are processes that constitute a praxis known as energy democracy, which is an endeavor aimed at decentralizing governance and ownership over renewable energy systems to the local level. The definition of energy democracy, as agreed upon in Germany in 2012, is

Energy Democracy means ensuring that everyone has access to enough energy. However, the energy must be produced in a way that it neither harms nor endangers the environmental or people. Concretely, this means leaving fossil fuels in the ground, socializing and democratizing the means of production and changing our attitude towards energy consumption (Klima Allianz, 2012).

Therefore, energy democracy is the fundamental prerequisite for reclaiming the means of energy production, transmission, and distribution from the fossil fuel
industry and redistributing that power — both electrical and sociopolitical — directly to the people. The practice of energy democracy would require municipalities to socialize the energy infrastructure. The infrastructure would then be managed cooperatively by the community, and not by the State or by a ruling class of fossil fuel moguls. Communities could then opt to transition to 100% renewable energy in order to decarbonize the economy and mitigate anthropogenic climate change.

As long as the State functions to maintain a ruling class of fossil fuel tycoons, we can neither socialize the energy infrastructure nor implement energy democracy. Therefore, the plutocratic marriage between capitalism and the State must be severed as a precondition to energy democracy. To do this, we must first understand the government’s role in protecting plutocracy. In 2010, the conservative lobbying organization known as Citizens United challenged the Federal Election Commission by arguing that it was a First Amendment right for corporations to donate an unlimited amount of money to political candidates, elections, and agendas (Oyez, 2016). The U.S. Supreme Court ruled in favor of Citizens United, allowing for corporations and billionaires — such as Charles G. Koch and David H. Koch, two brothers with a net worth of over $100 billion, notorious for their influence in the fossil fuel industry — to pour their money into political parties, candidates, and legislators (Alman, 2014). Furthermore, an organization known as the American Legislative Exchange Council, or ALEC, perpetuates the fossil fuel plutocracy. According to its website, ALEC

is an organization of conservative state legislators and private sector representatives that drafts and shares model state-level legislation for distribution among the United States. ALEC works to advance the fundamental
principles of free-market enterprise, limited government, and federalism at the state level through a nonpartisan public-private partnership of America's state legislators, members of the private sector and the general public (Strauss, 2012).

In other words, ALEC provides a platform for the ruling class to collaborate with policymakers when drafting legislation. Fossil fuels are among the issues advocated for by ALEC (Strauss, 2012). In order to abolish this plutocracy, we must first dismantle the crony relationship between the State and capitalism. The defeat of plutocracy is the first step towards establishing energy democracy, but the State will not do it out of its own interest. The ruling class will never relinquish its power voluntarily. There have been attempts, albeit unsuccessful, when the State has tried to vote away plutocracy. In September 2014, the Senate voted on a constitutional amendment, S.J. Res. 19, to overturn the Citizens United and McCutcheon Supreme Court decisions. The bill, if passed, would have established a constitutional amendment to ban the influence of money in politics (Sanders, 2014). Ultimately, the bill was rejected. Therefore, we cannot trust the State to dismantle plutocracy on its own accord — the people have to take power to make it happen. With the abolition of plutocracy, the fossil fuel industry will lose power and influence over our democracy. The collapse of a ruling class of fossil fuel tycoons will restore power to the people and consequently mitigate climate change.

We are currently experiencing an unprecedented number of ecological and climatic threats associated with anthropogenic climate change, impacting human and nonhuman communities across the Earth. Carbon emissions continue to worsen, extreme weather events continue to occur at a higher frequency, sea levels continue to rise, and global temperatures continue to increase, which endangers global
biodiversity and human society. In our perpetual quest to extract natural resources for material consumption and capital, humans have altered the Earth’s climate and ecosphere in unfathomably destructive ways. According to scientist Will Steffen, "climate change is a prominent sign of human-driven changes to the global environment. The evidence that the Earth is warming is unequivocal, and human emissions of greenhouse gases, most importantly carbon dioxide, have been responsible for most of the warming since the middle of the twentieth century" (Steffen, 2011). Steffen deduces that the risks of human-induced environmental change, such as "those associated with sea-level rise, extreme events, and shifts in rainfall patterns, rise sharply as the temperature climbs toward 2°C above pre-industrial and quite possibly beyond" (Steffen, 2011). Aside from animal agriculture, much of the greenhouse gas emissions responsible for the rise in global temperatures can be attributed to the fossil fuel industry. According to the Environmental Protection Agency, “the combustion of fossil fuels to generate electricity is the largest single source of CO2 emissions in the nation,” accounting for 31% of U.S. total greenhouse gas emissions (EPA, 2015). In other words, our addiction to fossil fuels for energy production is inextricably linked to the fate of our own species, as well as the fate of billions of other species and ecosystems across the planet. We must understand that humankind is not separate from nature, but rather exists as an inextricable part of nature.
Climate change creates a series of social, political, economic, and environmental issues that disproportionately afflict violence upon people of color and low-income communities. When corporations and governments plan where to designate carbon-polluting power plants, landfills, and waste treatment facilities, they tend to select the neighborhoods with higher populations of working class Black, Latinx, or indigenous people (Ewall, 2012). This intentional zoning evidences the State’s environmental racism and classism. With regards to the fossil fuel energy infrastructure in particular, the pollution from a coal-fired power plant is not only detrimental to the climate, but also poses serious health risks, such as asthma, which disproportionately impacts communities of color (Ewall, 2012). Furthermore, ownership of the current energy infrastructure is typically concentrated in the hands of affluent homeowners, who are often white. According to the Center for Social

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2 https://sites.psu.edu/blanchardcivicissues/2017/02/02/global-warming/
Inclusion,

The movement of community-driven energy solutions is fighting to solve problems with too little help to speed the pace, particularly in communities of color, who face extra barriers in ownership, financing, and access to technology. Most energy infrastructure ownership opportunities are reserved for homeowners: The federal production tax credit that finances renewable energy products only applies to homeowners – shutting out 25% of Whites and over 50% of people of color. ... Data around renewable energy capacity is not reliable or always accessible: Communities often lack accessible information and technical assistance regarding technologies, practices, and policies, which limit a community’s ability to participate in local energy planning (Center for Social Inclusion, N.d.).

Many of these social and environmental injustices can be traced to the colluding corporate and State forces that govern our fossil fuel infrastructure.

Hurricane Katrina is an example of environmental racism.³

³ https://www.washingtonpost.com/opinions/five-myths-about-hurricane-katrina/2012/08/31/003f4064-f147-11e1-a612-3cfc842a6d89_story.html
Fossil fuel infrastructure must be phased out immediately in order to spark the just transition towards energy democracy. As discussed in previous chapters, oil and gas pipelines, such as the Dakota Access Pipeline and Williams Pipeline, are prime examples of fossil fuel infrastructure with disastrous social and ecological consequences. However, this is also happening with the construction of another pipeline in New York and New England. Governor Andrew Cuomo of New York announced in 2016 that the groundwater in the Hudson Valley was contaminated with radioactive tritium waste, leaking from the Indian Point nuclear power plant in Buchanan, New York. To make matters worse, the Spectra Energy corporation is constructing 35 miles of new pipeline to transport fracked gas, running within 1,500 feet from the nuclear power plant (Ong, 2017). The expansion project is called the Algonquin Incremental Market Pipeline, or AIM. ‘Algonquin’ is a word that describes indigenous people of North America belonging to a particular linguistic group. Should the AIM pipeline burst, the Indian Point power plant could explode, creating a nuclear disaster potentially even more catastrophic than that of Fukushima Daiichi — and taking out the entire American Northeast (Ong, 2017). In 2017, the Federal Energy Regulatory Commission illegally approved the Atlantic Bridge, which is the segment of the Algonquin Pipeline that transports fracked gas to Connecticut\(^4\) and the larger New England area (Ong, 2017). In order to mitigate

\(^4\) Wesleyan University holds a contract with Spectra Energy and sources fracked gas directly from the AIM pipeline via the Atlantic Bridge. The fracked gas runs the cogeneration power plant on campus, which accounts for up to 87% of Wesleyan’s on-site energy production and 75% of Wesleyan’s greenhouse gas emissions (Mill, 2018). In October 2018, President Michael Roth agreed to a 3-year partnership between Wesleyan University and Eversource to conserve 3.2 million kilowatt hours of electricity annually (Mill, 2018). This partnership is intended to enable Wesleyan’s goal of becoming carbon neutral by 2050. If Wesleyan is serious about minimizing its
climate change and eradicate environmental injustice, we must terminate all fossil fuel infrastructure projects and phase out all oil and gas pipelines immediately. Then, we can begin to transition towards a socially-owned renewable energy system.

If we were to socialize the energy infrastructure, we could potentially reduce our nation’s interests for waging imperialistic wars. The U.S. military is “the largest contributor to emissions, [and the] war economy drives fossil fuel economy” (M4BL, 2014). Furthermore, the U.S. has sought to imperialize overseas oil reserves throughout history to boost the American fossil fuel empire. This can be illustrated in the United States’ war against Iraq in 2003, which was primarily fought over oil. President George W. Bush falsely claimed that Saddam Hussein was fostering Weapons of Mass Destruction in Iraq, yet was unable to back up his rhetoric with evidence (Malloy, 2015). Repeatedly, Bush retracted his previous claims, only to make more false statements until finally revealing that there were never Weapons of Mass Destruction in the first place (Malloy, 2015). The true rationale for the Iraq War was for the United States to imperialize the oil reserves of Iraq. Iraq holds the world’s fifth-largest proven oil reserves at 141 billion barrels, according to the U.S. Energy Information Administration. Vice-President Dick Cheney was the CEO of Halliburton, a multinational oil corporation. During the Iraq War, Halliburton was awarded a $7 carbon footprint and combating climate change, it must phase out fracked gas as the primary source of the university’s power. If we completely transition to on-site renewables and divest our endowment from all fossil fuels, we can strive to become a carbon-neutral — and maybe even a zero-carbon — campus by 2025, which is a commitment made by our peer schools, including Hampshire College and Oberlin College. Hampshire College is already producing 100% of its energy from on-site solar (Wernick, 2018), and Bowdoin College has already achieved carbon neutrality (Bowdoin, 2018). With only 12 years remaining to curb greenhouse gas emissions, what role will Wesleyan play in the struggle to avert this global climatic calamity?
billion contract for which only they were allowed to bid (Corbin, 2008). The FBI and Department of Justice opened a criminal investigation into Halliburton’s profiteering activities during the Iraq War at the request of Bunnatine Greenhouse, who complained to Army officials that Halliburton had been unlawfully receiving special treatment for work in Iraq, Kuwait, and the Balkans (Corbin, 2008). Suspiciously, the investigations were quickly dropped. Regardless, Halliburton profited $39.5 billion on the Iraq War (Young, 2013), demonstrating the influence of the fossil fuel industry within the military-industrial complex. This is an example of how the combined interests of capitalism and the State resulted in thousands of deaths and the destruction of our planet. Our war for oil in Iraq cost over 500,000 deaths and $845 billion to the United States, paid for by taxpayer dollars (Corbin, 2008). If we did not depend on a fossil fuel infrastructure run by plutocrats, we would have avoided the war altogether; 500,000 people would still be alive, and we would not be an additional $845 billion in debt. Perhaps if we socialize the energy infrastructure henceforth, we can prevent future wars and acts of imperialism from ever occurring.

In order to socialize and democratize the energy infrastructure, the people need to reclaim the means of energy production and distribution. In other words, communities need to have full autonomy and self-determination over all political, economic, and infrastructural decisions related to energy. This might appear overly ambitious at first, but it's already happened in Nebraska, which is the only U.S. state with a socialized energy system. Establishing energy democracy in the 1930’s through a series of legislation as part of the Rural Electrification Act of 1936, Nebraska — a conservative state with a population of 1.8 million people — democratically pushed for every single resident and business to receive electricity
from a community-operated system of energy cooperatives, rather than from the State or a corporation (Hanna, 2015). The Nebraska model is “made up of a network of 121 publicly owned utilities, 10 cooperatives, and 30 public power districts, which provide a platform for democratic participation and public accountability through publicly elected councils, power district boards, and cooperative boards” (Riofrancos, 2018). In recent years, “public interest in renewables has helped push Nebraska’s publicly owned energy corporation to double its power generation from wind energy every year since 2006, though only 17% of Nebraska’s energy was produced by renewables in 2015” (Riofrancos, 2018). According to Yes! Magazine,

Public and cooperative ownership keeps costs low for the state’s consumers. Nebraskans pay one of the lowest rates for electricity in the nation and revenues are reinvested in infrastructure to ensure reliable and cheap service for years to come. Payments, in lieu of taxes, from the state’s publicly owned utilities exceed $30 million a year and support a variety of social services throughout the state—including the public education system, (Hanna, 2015).

The Nebraska Power Association proclaims, “There are no stockholders, and thus no profit motive. Our electric prices do not include a profit. That means Nebraska’s utilities can focus exclusively on keeping electric rates low and customer service high. Our customers, not big investors on Wall Street, own Nebraska’s utilities,” (Hanna, 2015). Local control of the publicly owned electricity system is handled through democratic participation. Municipal utilities are run by elected cooperative boards, which meet regularly to determine logistics. These meetings are open to the public, and every Nebraskan has the opportunity to make decisions for the cooperative democratically. According to Yes! Magazine,
At the ground level, public utilities and cooperatives are run by publicly elected power district boards, cooperative boards, or elected city councils (often through appointed boards). These bodies establish budgets, establish service standards and policies, and set prices. Regularly scheduled meetings of power boards and councils are open to public involvement and comment. Should they so wish, every Nebraskan has the opportunity to become involved in the decisionmaking of their local electricity provider (Hanna, 2015).

Unfortunately, Nebraska’s infrastructure currently relies heavily on coal. Although the state has not yet embraced the transition towards renewable energy, the wind-energy movement is spreading to Nebraska, and residents will have the opportunity to vouch for renewable technologies via their democratic forum (Hanna, 2015).

Nevertheless, while their infrastructure needs to be upgraded to the 21st century, their model of direct democracy must be expanded to communities throughout the United States.

Under such a model of energy democracy, communities would become empowered to establish their own renewable energy cooperatives that are decentralized from the main electrical grid. With localized energy generation, neither the State nor corporate elite would retain any authority over the energy infrastructure. This would dismantle plutocracy, since the fossil fuel industry would lose profit, and would foster self-determination and ownership to communities at the local level. The most practical way to socialize and democratize the energy infrastructure is to establish renewable energy cooperatives within each community. Members of each community would determine pricing, sourcing, and maintenance operations using a platform of direct democracy similar to the model established by Nebraska — or any of the international models described in Chapter 4. Each energy cooperative would be
situated within a system of smart microgrids that are owned and operated directly by the community, and not by any corporate or State institution. According to Stanley Fritz, a community organizer with *We Act for Environmental Justice*,

Microgrids are small geographic areas that produce their own energy using renewable resources and are therefore not dependent on the main grid. Such systems can confer direct economic benefits on low-income residents by creating manufacturing, construction, and maintenance jobs while also providing savings. However, regulations must be passed to ensure that cost savings are passed down to tenants, not absorbed by property owners or middlemen. Green energy cooperatives can help maximize the economic benefit for tenants in this manner. Cooperatives allow local stakeholders to pool their resources to construct and manage their own microgrids, affording them maximum control over generation, consumption, and costs. In our workshops, people consistently expressed a desire for a more robust and democratic system of tenant associations. Such associations are an essential ingredient in the creation of larger systems of common property/resource ownership and management, such as cooperatively-owned microgrids. The fact that members of tenant associations already share a roof over their heads makes the prospect of “shared solar” that much more attractive (Fritz, 2015).

Essentially, each community would operate as an energy cooperative situated around a microgrid. Since microgrids are decentralized from the larger electrical grid, this would eliminate domination from corporate and State ownership. Microgrids also combine generation, transmission, and distribution systems into one amalgamated infrastructure, maximizing the seamless unification of component parts (Fritz, 2015). This eliminates the need for fragmented ownership of the individual generation, transmission, and distribution systems. Instead, all energy is produced locally and distributed to all residents of the community equitably.
Smart microgrids, however, take this to the next level, enabling the creation of a digital renewable energy internet. Smart microgrids are networked into the Internet of Things to optimize energy efficiency and increase resilience to extreme weather events, such that a hurricane wouldn't cause a major blackout to an entire city. A report funded by the Dutch government found that "microgrid technologies could make a local 'techno-economy' 90% self-sufficient, through the decentralized sharing of energy at the local level between multiple households," (Ahmed, 2018). A transition to microgrids could even pave the way for “100 percent self-sufficiency in power, heat, and water, and 50 percent self-sufficiency in food production” (Ahmed, 2018). According to the report, the integration of microgrids should be "done through an intelligent energy management system, that will charge your car when the sun is shining, and export excess electricity production to your neighbor's heat pump: a smart-grid. Ultimately, this smart, decentralized integration democratizes energy production and consumption, and allows consumers and cooperatives to take control of their own energy supply, which will help facilitate the renewable energy transition from the bottom-up” (Ahmed, 2018). Without integrating smart technologies, microgrids would "dramatically increase the load on the local grid, requiring costly infrastructure upgrades to sustain the system" (Ahmed, 2018). Smart microgrids are a type of energy system that “hold the potential for increasing energy efficiency, decreasing costs of energy use, decreasing the carbon footprint by including renewable resources, and transforming the role of the occupant. At the crux of the smart energy system is an efficient electric energy management system that is enabled by emerging technologies in the electricity grid and consumer electronics" (Zipperer, 2013). With smart microgrids, "people can also learn about which personal
actions are effective to promote a sustainable energy transition by providing them with feedback about their energy use or energy savings that they have realized" (Steg, 2015). By practicing equitable urban planning, communities can design these smart microgrid systems using open-source technologies so that they facilitate the distribution of energy without any proprietary ownership. Ultimately, technology alone cannot solve any social or environmental issue, but will instead proliferate injustice at the hands of the bourgeois elite. Rather, the structures of power that govern the technology must be transformed such that the technology is democratized and socially owned by the community, and not by any state or ruling class.

![Microgrids must facilitate the transition to solar and wind energy.](https://unsplash.com/)

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5 https://unsplash.com/
In order to foster an energy internet using smart microgrids, we must first build a new digital network that is owned and operated by the community. Currently, smart microgrids are networked into the Internet of Things in order to function. Therefore, a smart microgrid would currently be required to operate on a proprietary network under the auspices of a corporate Internet Service Provider, or ISP, without net neutrality. ISPs have been known to collude with State agencies such as the National Security Agency to create systems of mass surveillance (Park, 2016). After the collapse of the World Trade Center on September 11th, 2001, the United States established a paradigm of digital surveillance in an attempt to circumvent future acts of terror. Muslim communities became the primary target of State surveillance. This began on October 4th, 2001, when President George W. Bush secretly authorized the National Security Agency to track suspected terrorists by monitoring domestic communications without a warrant (Reifowitz, 2013). This was illegal, since the Foreign Intelligence Surveillance Act of 1978 prohibits the federal government from spying within United States territory without a warrant from a FISA court (Sanger, 2006). President Bush was not granted a warrant. On October 26th, 2001, President Bush ratified the Patriot Act, declaring, "the existing law was written in the era of rotary telephones. This new law that I sign today will allow surveillance of all communications used by terrorists, including emails, the internet, and cellphones," (Reifowitz, 2013). In 2005, it was revealed that Bush had wiretapped tens of millions of Americans' phone calls without FISA warrants using data provided by AT&T, Verizon, and BellSouth. Mark Klein, a technician for AT&T, said that the company let the NSA install a device in its cellular facilities that allowed the National Security Agency to monitor internet and phone traffic (Park, 2016). After renewing the Patriot
Act, President Bush signed the FISA Amendments Act on July 10, 2008, which gave the federal government the power to compel telecommunications companies to provide access to emails, phone calls, and text messages if “one party is reasonably believed to be overseas” (Reifowitz, 2013). It also gave legal immunity to the phone companies that had participated in the NSA's warrantless wiretapping program. Subsequently, the Foreign Intelligence Surveillance Court of Review secretly ruled that all telecommunication companies and Internet Service Providers must “cooperate with federal requests to monitor the international communications of Americans suspected of being terrorists” (Sanger, 2006). Therefore, in order to reject these Islamophobic and anti-privacy measures, an energy internet of smart microgrids must not depend on the standard internet. Rather, in order to reclaim power to the people, the use of smart microgrids must serve to resist mass surveillance. Thus, smart microgrids must be equipped with a mesh network instead of the standard Internet, which protects users from the surveillance systems governed by the State and the Internet Service Providers.

Smart microgrids must generate a mesh network in order to foster the digital renewable energy internet. A mesh network is a decentralized broadband alternative to traditional Internet Service Providers, owned and operated by the users who connect to it, rather than by telecom companies or the Federal Communications Commission. Mesh networks resist the oligopoly of Internet Service Providers by conjoining different network nodes — in this case, each microgrid — into a supernode. One of the best examples of a mesh network is NYC-Mesh, which is a municipal broadband commons project based in New York City. NYC-Mesh describes itself as a community-owned network consisting of
Wi-Fi router nodes spread throughout the city. The network has no central server and no single Internet service provider. All nodes cooperate in the distribution of data, also serving as a stand-alone network in case of emergencies or Internet shutdown. We are a community that shares ownership of a network. Collectively we have our own Internet connection at our supernode. Our supernode peers with other networks at an Internet exchange point and provides access to the Internet without traditional ISPs (NYC-Mesh, N.d.).

NYC-Mesh argues that the reasons for establishing a mesh network include “Self configuring; Emergency community networking; Freedom from the telecom oligopoly of Time Warner, Verizon, Comcast; A neutral network that does not block or discriminate content; Encryption to stop spying and censorship; Public Wi-Fi access points; Decentralized, no single point of failure; Community building with highly localized websites; Close the digital divide; Potentially higher symmetrical bandwidth than provided by the oligopoly; Creating an infrastructure commons. The community owns the network; Eventual self-sufficient network as alternative to Internet” (NYC-Mesh, N.d.). Thus, mesh networks have the potential to democratize the internet through social ownership. They can also be scaled to different sizes. For instance, Cuba has its own mesh network called SNET, which provides an alternative to the expensive, inaccessible, surveilled, and censored internet. According to Gizmodo,

Beginning in 2001, a small community of tech-savvy Cubans have been building a sprawling mesh network that stretches across Havana. This crowdsourced connectivity takes advantage of hidden Wi-Fi antennas and broadband cables stretched across rooftops to network over 9,000 computers across different neighborhoods in Cuba's capital. The resultant SNET, or streetnet, enables people to exchange news updates, share files, and even play online games like World of
By connecting smart microgrids to mesh networks, communities can democratize and socialize two codependent energy and information infrastructures simultaneously without compromising to the plutocracy of the ISPs or State surveillance. As proposed in Chapter 5, we must design our microgrid mesh networks with Li-Fi technology.

Mesh networks can be integrated into the architecture of cities.⁶

Using a technology known as blockchain, which is a decentralized ledger system for virtual consensus management, we can pair mesh networks with smart

⁶ http://www.skypackets.nyc/
microgrids. Blockchain can be used by microgrids to undermine the centralized authority of utility companies by using distributed generation technologies, such as battery storage systems, to communicate across the network at long distances (Peck, 2016). By interconnecting smart microgrids with blockchain-enabled mesh networks, we can invent an energy internet in which energy is generated locally and distributed globally across the internet. In this way, communities will have autonomous control and can reach a consensus about where their energy comes from. If this all seems too abstract and idealistic, there's already one place with a community-operated, blockchain-enabled, smart microgrid and mesh network system. It's in Park Slope, Brooklyn — simply called the Brooklyn Microgrid — and converges all these technologies into one infrastructure that empowers the community. It’s even connected to the NYC-Mesh network. The Brooklyn Microgrid shares a community solar array with all residents in the neighborhood, and

is building a peer-to-peer energy market for locally generated renewable energy that is driven by the very community it serves. The most basic version of a microgrid is a miniature utility grid that can still provide power to its residents even if the larger grid goes down due to power outages or other emergencies. Brooklyn Microgrid combines this function with the idea of a communal energy network composed entirely of local, clean energy (Peck, 2016).

Its purpose is to “increase the amount of clean, renewable energy generated in the community by members of the community, develop a connected network of distributed energy resources which will improve electrical grid resiliency and efficiency, and manage these distributed energy resources during power outages and emergencies to protect the community and local economy” (Peck, 2016).
Nevertheless, the Brooklyn Microgrid is still a benefit corporation, and not a municipal energy cooperative. While we need to replicate their technological model to communities across the U.S., we must also learn from Nebraska by socializing and democratizing the means of energy production, transmission, and distribution.

*Brooklyn Microgrid is a thriving example of a blockchain microgrid.*

We can create a digitalized renewable energy internet in which energy is produced locally and distributed over a peer-to-peer blockchain mesh network. With social ownership, this new energy internet would democratize the energy

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7 [http://brooklynmicrogrid.com/](http://brooklynmicrogrid.com/)
infrastructure and internet infrastructure jointly, dismantling the neoliberal forces that govern both infrastructures concurrently. Ultimately, the goal would be to create a federation of energy cooperatives that practice energy democracy. Each energy cooperative would be situated around a community-owned smart microgrid that is decentralized from the larger electrical grid, eliminating the power of plutocracy. Instead, the people would have power over their energy production and consumption, controlling all aspects of the infrastructure with direct democracy. Based on Nebraska’s model of energy democracy, residents can come together within each cooperative to determine pricing, sourcing, and maintenance operations via democratic forums and community town halls (Hanna, 2015). This model of direct democracy is something that must be replicated in the energy cooperatives of the future in order to truly eliminate State and corporate influence. Indeed, direct democracy is crucial for the efficacy of energy democracy. We must combine the democratic model of Nebraska with smart microgrid technology in order to truly transform the power dynamics that govern our energy infrastructure and decarbonize the economy. The creation of a federation of energy cooperatives situated around an energy internet could abolish a ruling class of fossil fuel tycoons. It could create participatory models of direct democracy that would reject the plutocracy of the fossil fuel industry, as the people would generate their own electricity from renewable sources as a collective. It would also mitigate climate change, fight mass surveillance, implement environmental justice, and dismantle the government's imperialistic motives for waging war over oil. Together, we can eradicate climate violence by restoring power to the people.
Chapter 7
Conclusion

It's often been said that it is easier to imagine the end of the world than it is to imagine the end of capitalism. I don't necessarily believe that's true. While the first three chapters of the Statement of the Problem outlined the cataclysmic consequences of climate violence inherent in the marriage between capitalism and the state, the latter three chapters illustrated viable alternative models of ownership, power, and self-determination to avert climate change and foster a more equitable and regenerative future for all. It's important to remember that while policy and technology are important elements in the just transition to a renewable energy commons, we cannot rely on those alone to implement climate justice. The technologies we want to employ for the creation of a renewable energy commons are considered ‘appropriate technologies’ — small-scale technologies of decentralization and decarbonation, owned and governed by an entire community. However, a ‘techno-fix’ is impossible, and the codification of policy alone will never radically transform a system built upon capital and the unremitting legacies of colonialism, patriarchy, neoliberalism, and white supremacy. By themselves, neither technology nor policy can ever address the root causes of climate violence. Instead, they will only proliferate business-as-usual under the guise of ‘progress’ — for instance,
greenwashing passing as the misnomer of reform. We cannot solve climate change under capitalism because it is impossible to regenerate the earth under an economic system that is inextricably rooted in the extraction of natural resources. Rather, we need a drastic transformation of the structures of power that govern our society, including our technologies and politics. We need to democratize, decentralize, decarbonize, and socialize the physical infrastructure of our energy system, but also the social infrastructure of our energy system. That includes shifting our local economies to value the equitable redistribution of community wealth, transitioning our municipal political systems over to participatory neighborhood assemblies, creating spaces of communal healing and restorative justice, and fostering interpersonal relationships around the commoning of our natural resources. That being said, I do want to touch upon one final example.

I want to elaborate on the notion of a digital renewable energy internet as an energy commons. This was touched upon particularly in the final two chapters, however I want to conclude with a deeper analysis of what this would entail. Remaining mindful of the impossibility of a techno-fix, I want to underscore the work of Jeremy Rifkin, a post-capitalist economist who coined the energy internet. Rifkin proposes that the production of renewable energy at a near zero marginal cost will enable to creation of a ‘collaborative commons.’ Marginal cost is "the cost of producing additional units of product, as this is where entrepreneurs and businesses make their profits in a market-exchange economy; and when marginal cost approaches zero, so too does profit" (Dew, 2015). The effects of near zero marginal cost "can already be seen wreaking havoc across several media industries, such as
entertainment, communications and publishing, as more and more content continues
to be shared and made freely available across digital, collaborative networks” (Dew, 2015). According to Rifkin,

The impact on society of near zero marginal cost solar and wind energy is all the more pronounced when we consider the enormous potential of these energy sources. The sun beams 470 exajoules of energy to Earth every 88 minutes — equaling the amount of energy human beings use in a year. If we could grab hold of one-tenth of 1 percent of the sun’s energy that reaches Earth, it would give us six times the energy we now use across the global economy. Like solar radiation, wind is ubiquitous and blows everywhere in the world — although its strength and frequency varies. A Stanford University study on global wind capacity concluded that if 20 percent of the world’s available wind was harvested, it would generate more than seven times more electricity than we currently use to run the entire global economy (Rifkin, 2015).

So then, what is the collaborative commons and how does this near zero marginal cost of renewable energy engender it?

The collaborative commons is an emerging mode of cooperative production across the Internet, also known as commons-based peer production. Commons-based peer production is a system in which people can freely contribute to information on the Internet without the need for financial compensation, and without being instructed by a hierarchal authority. Rather, users contribute information solely for the common good of the digitalized many-to-many community. In this way, market-based incentives for contributing information — which is how large-scale information sharing predominantly exists currently — are rendered obsolete. This is because the information circulated through the collaborative commons is not proprietary. According to Yochai Benkler, the professor who coined the terminology for this
mode of production, “The inputs and outputs of the process are shared, freely or conditionally, in an institutional form that leaves them equally available for all to use as they choose at their individual discretion” (Benkler, 2006). In other words, information is contributed and retrieved openly and equitably for the benefit of all individuals. The collaborative commons relies on peer production, which is defined as “not only by the openness of its outputs, but also by a decentralized, participant-driven working method of working” (Benkler, 2006). With commons-based peer production, social peer-to-peer processes can bring individuals together into one ubiquitous community — the internet — allowing for cooperative information sharing occurring under the most equitable conditions.

The collaborative commons is not merely an intangible commons of digital information. Rather, it can encompass renewable energy at a near zero marginal cost, as well as digital information. Indeed, as mentioned in Chapter 5, the emergent energy internet itself is a nexus of energy and information. According to an analysis of Rifkin's work by a journalist named Christopher Dew, "An open and distributed nature is what allows the Collaborative Commons to break the monopolistic holds of centralized corporations on capitalist markets, and enable peer-to-peer production to scale across lateral global networks at near zero marginal cost — for example, the sharing of distributed renewable energy across a decentralized smart-grid" (Dew, 2015). Furthermore,

On the Collaborative Commons, a new type of incentive is driving creativity and innovation. The expectation of financial reward loses relevance when prosumers begin to produce their own products for use and exchange, and marginal costs approach zero. In the Commons, the expectation of financial reward is
quickly being replaced by the desire to advance the social well-being of humanity. In other words, “economic welfare is measured less by the accumulation of market capital and more by the aggregation of social capital. ... While the capitalist market is based on self-interest and driven by material gain, the Commons is motivated by collaborative interests and driven by a deep desire to connect with others and share. If the former promotes property rights, caveat emptor, and the search for autonomy, the latter advances open-source innovation, transparency, and the search for community (Dew, 2015).

This, at the core, describes Rifkin's notion of the collaborative commons. So, how does Rifkin apply the collaborative commons to the energy internet?

The energy internet will shift us into the future.¹

¹ https://unsplash.com/
According to Rifkin, the collaborative commons engenders the digital renewable energy internet as the result of a paradigm shift that he dubs the "third industrial revolution." By assessing the factors contributing to the rise of the first and second industrial revolutions, Rifkin is able to demonstrate the rise of the energy internet. He writes,

Steam power transformed industries, and the world, in the 19th century; electricity and the telephone sped up this trend in the 20th. The information super highway was just getting its legs as we entered the 21st century. The peer-to-peer communication and collaborative distribution of the web make it an ideal model for a new kind of energy system. At the core of this new system will be renewable energies, which are already being increasingly used in Europe — the leader of the energy internet movement. ... We’re taking the electricity grid of Europe — the whole transmission grid — and we're transforming it to an energy Internet using the same technology we used with the communication Internet (Rifkin, 2014).

Patricia Mann, philosophy professor at Hofstra University, investigates Rifkin's energy internet as part of a post-capitalist transition. She writes,

Rifkin argues that these new technologies of renewable energy production, in combination with technologies of internet communication create the basis for a paradigm shift. Our contemporary system of capital-intensive, centralized, profit-generating fossil fuel energy production and distribution can be replaced by networks of individual microproducers and sharers of renewable energy. Rifkin’s analysis highlights democratizing, collaborative features of a decentralized, peer-to-peer, laterally scaled, renewable energy network of microproducers and consumers, supportive of a post-capitalist commons (Mann, 2017).

Furthermore, she argues that the microproduction and sharing of renewable energy should
become the foundational dynamic of a global struggle for a post-capitalist commons, a sustainable energy-based post-capitalist commons. ... An anticapitalist energy commons would directly challenge capitalist profit expectations in developed markets in the United States and elsewhere. An 'off-the-capitalist-grid' movement would be denounced as contrary to the public interest, as dangerous and subversive to the national interest, as soon as local electricity companies and national or transnational fossil fuel-based corporations became aware of its existence (Mann, 2017).

In terms of implementation, Mann foresees an effort to "coordinate a vast array of newly aligned grassroots climate and economic justice movements, all contributing to a post-capitalist transition, anchored within an emerging renewable energy commons" (Mann, 2017).

Indeed, Mann's analysis of Rifkin's claims identifies the energy internet and the collaborative commons as an integrated solution to our climatic calamity. However, the invention of a renewable energy internet must fit within the framework of — and facilitate the transition towards — a larger political and economic movement for the commons. Presently, we are living in a historic moment that political economists have termed ‘late capitalism.’ Originally used to describe the post-World War II economy, the term was re-appropriated at the end of the 20th century to describe the economic conditions of neoliberalism (Lowrey, 2017). The term regained popularity during the Occupy movement to describe growing wealth inequality, and has since been used to describe the stage of neoliberal capitalism in the age of the gig economy — such as Uber, AirBnb, and so forth (Lowrey, 2017). Most notably, however, scholars who study the history of capital predict that late capitalism will be the final stage of capitalism before the transition to a post-capitalist
future (Lowrey, 2017). For the reasons described in previous chapters, we must evolve past the extractive economy of capitalism if we intend to avert climate change and sustain life on Earth for future generations. The good news is that this very moment in history is ripe for a revolution. The world has seen many social movements in the past few decades to resist neoliberal capitalism, such as the Zapatista movement in Chiapas, Mexico, the Rojava revolution in northern Syria, the alter-globalization movement of Occupy Wall Street, and the liberation movement of Black Lives Matter. Movements are growing, and capitalism is failing. However, as described in Chapter 5, there are four possible futures that await us beyond late capitalism — and certain futures are even more despotic than our current regime.

What future do we want after capitalism? Certainly not the neo-feudalist regimes of rentism or exterminism that Frase had described. For centuries, leftists have imagined a future beyond capitalism. Some argue that social democracy, or the creation of a liberal welfare state, will suffice. Others argue that democratic socialism, in which both society and the economy are managed democratically and cooperatively, will come next. There are some who argue that libertarian socialism, in which a socialist economy and a decentralized direct democracy will replace capitalism and the state, is the ideal to strive towards. Others advocate for communism, in which the means of production are seized by the working class through revolution, and some encourage anarchism, a stateless society based on non-hierarchical free associations and mutual aid. Infighting exists within each of these leftist schools — arguments between progressive liberals, eco-socialists, Marxist-Leninists, communalists, Trotskyists, mutualists, autonomists, Maoists, anarcho-
syndicalists, libertarian municipalists, anarcho-primitivists, democratic confederalists, anarcho-communists, and others over which future is the most equitable and viable. No matter what, “one thing we can be certain of is that capitalism will end” (Fraser, 2011).

We can debate over which of these post-capitalist ideologies is the best, or the most practical, or the most realistic. I’m not here to make the case for one over another. I am, however, going to present a general blueprint for getting to any post-capitalist future. This blueprint is certainly not the only strategy for the transition to post-capitalism, but it is a feasible and viable one. It presents a series of prerequisites — many of which are already unfolding in our present society — that are necessary for a just and equitable future beyond late capitalism. To begin, let’s look at the birth of hip-hop. Yes, you read that correctly. On August 11, 1973, “an 18-year-old, Jamaican-American DJ who went by the name of Kool Herc threw a back-to-school jam at 1520 Sedgwick Avenue in the Bronx, New York. During his set, he decided to do something different” (Cohen, 2017). Instead of playing the songs in full, “he played only their instrumental sections, or ‘breaks’ — sections where he noticed the crowd went wild. During these ‘breaks’ his friend Coke La Rock hyped up the crowd with a microphone. And with that, hip-hop was born” (Cohen, 2017). At this moment, an artform was invented that had achieved something its predecessors had not — it had created a remix. A remix is, at its core, a form of resistance to capitalism. It is inspired by and draws upon preexisting works — often copyrighted works — but is itself something entirely new and different. It repurposes, deconstructs, recombines, and redistributes media for public consumption. This began with hip-hop, but has
since extended beyond music to film, literature, art, digital media, and information itself. Together, this constitutes ‘remix culture,’ which has ushered in a new mode of production in the age of the internet. Three examples of remix culture in particular are the free and open source software movement, the copyleft movement, and memetics.


Free software is “software that respects users' freedom and community. Roughly, it means that the users have the freedom to run, copy, distribute, study, change and improve the software” (Stallman, 2019). It does not necessarily mean that the software is free, but rather grants irrefutable liberties to users. Open source software means that the source code is openly shared so that people are encouraged to voluntarily improve the design of the software (Stallman, 2019). This is in contrast to proprietary software, which is often restricted by copyright licenses and has a hidden source code. Often, free software and open source software are in tandem with each other.

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2 https://invention.si.edu/invention-hot-spot-birth-hip-hop-bronx-new-york-1970s
other. The two most notable examples of free and open software are Linux and Wikipedia. Linux is the most popular free and open source operating system, and implemented a license called GNU that became a predecessor for the copyleft movement (Stallman, 2019). Wikipedia is a prime example of the collaborative commons — a public encyclopedia of virtually unlimited information in which all users are invited to add, edit, share, and consume material. Wikipedia is dubbed ‘the free encyclopedia’ because of these open liberties that it provides to users (Stallman, 2019). Wesleyan University also has a free and open source project that it helped pioneer in 2007 called HFOSS, or Humanitarian Free and Open Source Software, to develop software that meets a social need.

The next example is the copyleft movement, which seeks to transform the notion of intellectual property. In contrast to copyright, copyleft is “the practice of offering people the right to freely distribute copies and modified versions of a work with the stipulation that the same rights be preserved in derivative works created later” (Stallman, 2019). GNU was the first major software license to embrace copyleft rights, and is still extensively used today (Stallman, 2019). The most popular copyleft practice, however, is the Creative Commons. Established by Lawrence Lessig, a renowned professor at Harvard Law School and former presidential candidate in 2016, the Creative Commons is customizable license in which content creators can choose whether others may “remix, tweak, and build upon [their] work, even for commercial purposes, as long as they credit [the creator] and license their new creations under the identical terms” (Lessig, 2018). This thesis has a Creative Commons license, which means that others are free to distribute and build upon my
writing. More information about the Creative Commons license for this thesis can be found on the very last page.

Another example is memetics, the study of memes. A meme is an “idea, behavior, or style that spreads from person to person within a culture—often with the aim of conveying a particular phenomenon, theme, or meaning represented by the meme” (Dawkins, 1976). Coined by evolutionary biologist Richard Dawkins, a meme is considered to be a ‘unit of culture’ in the same way that a gene is a unit of biomolecular information (Dawkins, 1976). In the digital age, the creation, remixing, and dissemination of memes on the internet is giving rise to a new collaborative mode of production, democratizing the joint production of art and information and making the joint consumption of art and information unprecedentedly more accessible. The do-it-yourself production and distribution practice, or DIY, has origins in the punk movement, which itself is rooted in anti-capitalist values. In the age of the internet, remix culture is giving rise to nascent modes of production that resist the hegemony of capital and provide a platform, vision, and toolkit for a post-capitalist transition.

Remix culture fuels the post-capitalist transition because it manifests the collaborative commons. In order to flee late capitalism, we must move from the collaborative commons towards a post-capitalist society. This shift is called the ‘Commons Transition,’ which “describes proposals for action that prioritize civil society’s needs, towards a more democratic and environmentally conscious culture” (Bauwens, 2017). Constant economic growth “produces negative impacts and the capture, or enclosure, of scarce physical resources for private financial gain while abundant resources, such as information and culture, are made artificially scarce
through legal limitations” (Bauwens, 2017). A Commons Transition recommends peer-to-peer, or P2P, practices and networks for “sharing what’s abundant, and protecting what’s scarce. Peer decision-making at many scales, and the emergence of municipalist political movements, are part of this transition” (Bauwens, 2017). P2P is a “way in which peers freely collaborate with each other to create value in the form of shared resources, circulated in the form of commons” (Bauwens, 2017). A commons includes “three essential elements: a shared resource, co-governed by its user community, and the community’s rules for governance” (Bauwens, 2017). A commons could include natural resources, such as water, air, energy, or food, as well as created assets, such as culture and knowledge (Bauwens, 2017). If ‘commons’ is “the ‘what’ — the blend of resource, community and rules — ‘P2P’ could be considered the ‘how’ — methodologies, practices, governance and networks, as examples” (Bauwens, 2017).

The Commons Transition entails strengthening collaborative modes of production, such as commons-based peer production, in order to shift to a postcapitalist economy. Any economy is “informed by its prevailing value system. The dominant one prioritizes absentee profit maximization while simultaneously deeming carework and environmental stewardship as externalities” (Bauwens, 2017). Commons-based peer production “highlights new ecosystems of value creation comprised of three institutions: the productive community, the commons-oriented entrepreneurial coalition(s), and the for-benefit association” (Bauwens, 2017). To regenerate and restore a habitable planet, “it’s not enough, necessary, or advisable to seize the existing means of production. Rather, we need to reinvent the means of
production and the way we produce. Design Global, Manufacture Local (DGML) is a mode of production combining use of the digital knowledge commons with local manufacturing and automation technologies” (Bauwens, 2017). DGML entails utilizing 3D printing as the means of production in the 21st century. With 3D printers, you can instantly design and fabricate virtually anything using 3D modeling software. 3D printers have become much more accessible and affordable in recent years, and many public libraries in the United States now have 3D printers for open use. Therefore, 3D printing demonstrates the recent democratization and reorientation of the means of production. With 3D printers, communities can decentralize production to the local level, and community members can collaborate on the design and fabrication process using free and open source modeling software and peer-to-peer methodologies. Furthermore, the ‘ink’ in 3D printers can be composed of virtually anything. Most 3D printers currently utilize plastic filaments, but these can easily be replaced with biodegradable, compostable, recycled, mycelia-based, and plant-based materials. If 3D printers are hooked up to a solar panel, they can easily facilitate regenerative design and aid the mitigation of our climate crisis.

Commons-based peer production was “enabled by the digital revolution; now, that revolution is returning to physical space. Communities worldwide use open, digital knowledge commons to help design items to manufacture locally” (Bauwens, 2017). Platform Cooperativism, which “seeks to democratize the ownership and governance of the digital platforms that increasingly mediate our daily lives,” and Open Cooperativism, which “explores convergences between the logics of Commons-based Peer Production and the Commons with the world of cooperatives and the
Social and Solidarity Economy,” are used by communities to create their own livelihoods (Bauwens, 2017). Other communities “defend their political interests, and those of nature and civil society, through assemblies of the Commons, using forms of P2P politics. Together, all these elements create the necessary conditions for a Commons Transition to occur” (Bauwens, 2017). With a Commons Transition, we are able to move beyond late capitalism and build a post-capitalist society. Post-capitalism is possible because of

three major changes information technology has brought about in the past 25 years. First, it has reduced the need for work, blurred the edges between work and free time and loosened the relationship between work and wages. The coming wave of automation, currently stalled because our social infrastructure cannot bear the consequences, will hugely diminish the amount of work needed – not just to subsist but to provide a decent life for all (Mason, 2015).

Second, information is “corroding the market’s ability to form prices correctly. That is because markets are based on scarcity while information is abundant. The system’s defense mechanism is to form monopolies – the giant tech companies – on a scale not seen in the past 200 years, yet they cannot last” (Mason, 2015). By building business models and share valuations “based on the capture and privatization of all socially produced information, such firms are constructing a fragile corporate edifice at odds with the most basic need of humanity, which is to use ideas freely” (Mason, 2015). Third, we’re seeing the “spontaneous rise of collaborative production: goods, services and organizations are appearing that no longer respond to the dictates of the market and the managerial hierarchy” (Mason, 2015). Wikipedia, for example, is made and maintained by “volunteers for free, abolishing the encyclopedia business and
depriving the advertising industry of an estimated $3 billion a year in revenue” (Mason, 2015). Indeed, in the “niches and hollows of the market system, whole swaths of economic life are beginning to move to a different rhythm. Parallel currencies, time banks, cooperatives and self-managed spaces have proliferated, barely noticed by the economics profession, and often as a direct result of the shattering of the old structures in the post-2008 crisis” (Mason, 2015). The route beyond late capitalism is defined by collaborative production, such as “using network technology to produce goods and services that only work when they are free, or shared” (Mason, 2015).

We can look to the history of capital to visualize the transition towards post-capitalism. The only historic parallel we have is the replacement of feudalism by capitalism 500 years ago. The first thing we have to recognize is that

different modes of production are structured around different things. Feudalism was an economic system structured by customs and laws about “obligation.” Capitalism was structured by something purely economic: the market. We can predict, from this, that post-capitalism – whose precondition is abundance – will not simply be a modified form of a complex market society. But we can only begin to grasp at a positive vision of what it will be like. But if such a society is structured around human liberation, not economics, unpredictable things will begin to shape it (Mason, 2015).

As demonstrated by the aforementioned examples of remix culture, information is the substance that is corroding capitalism. Most laws concerning information “define the right of corporations to hoard it and the right of states to access it, irrespective of the human rights of citizens” (Mason, 2015). Information in the digital age is analogous to the creation of the printing press and the scientific method (Mason, 2015). What is
needed, then, is a radical project in tandem with our political movements to “to expand those technologies, business models, and behaviors that dissolve market forces, socialize knowledge, eradicate the need for work and push the economy towards abundance” (Mason, 2015). The aims of such a project include “a zero-carbon-energy system; the production of machines, products and services with zero marginal costs; and the reduction of necessary work time as close as possible to zero” (Mason, 2015). As with digital fabrication and 3D printing, the transition to post-capitalism must invoke regenerative design. The work “done at the design stage can reduce mistakes in the implementation stage. And the design of the post-capitalist world, as with software, can be modular. Different people can work on it in different places, at different speeds, with relative autonomy from each other” (Mason, 2015).

A post-capitalist society also presents the opportunity to transition us towards a post-work society, where “machines do the heavy lifting not for profit but for the people” (Merchant, 2015). Late capitalism has a tendency to automate labor and “to turn things previously done by humans into automated functions. In recognition of that, then the only utopian demand can be for the full automation of everything and common ownership of that which is automated” (Merchant, 2015). As a result, “employment as we know it [will become] a thing of the past” (Merchant, 2015). The automatons of this “new age offer a number of advantages beyond automation that promise to make drudgery redundant, including 3D-printing and algorithms smart enough almost to pass for human. An age of machine-abetted plenty appears to loom around the corner” (Merchant, 2015). In other words, machines can automate the entire digital fabrication process with 3D printers. We could foster “a society with
collective control over its own high-tech, work-reducing gadgets. … What little work will be necessary in the future, such as optimizing 3D-printers and agricultural robots, will be organized much the way editors currently manage Wikipedia — in a decentralized, non-hierarchical fashion” (Merchant, 2015). However, increasing automation only has the potential to render all involuntary labor obsolete if: 1) the means of automation are socially owned, and the wealth generated by automation is redistributed equitably within each community; and 2) we fabricate a post-scarcity economy with an abundance of recycled and upcycled materials, urban gardens and permaculture-based food systems, and a renewable energy commons. If we continue to automate but cannot transcend scarcity, we will still enjoy a luxurious post-work economy — as long as machinery is socially owned — however will have to heavily regulate consumption to avoid a total ecological collapse. Furthermore, if we indeed foster a post-scarcity society but the means of automation remain under the ownership of the ruling class — private ownership or state ownership — then we may shift to a neo-feudal society where we become serfs to the ruling class. If we do not change our current trajectory, then we will automate labor and kill jobs without abolishing work altogether. Mass unemployment, as well as the industrial overproduction and overconsumption of natural resources, would usher in a despotic social, political, and economic regime in tandem with ecological collapse. Therefore, information technology alone cannot possibly liberate us. We must simultaneously reclaim collective power by dismantling the political apparatuses of state power and the economic apparatuses of capital that exert violence to protect the power of the ruling class and prevent the transition to post-capitalism.
The renewable energy commons can establish a post-capitalist future.\(^3\)

The renewable energy commons could be the impetus for the just transition to a post-work and post-scarcity economy. *Power To The People* will continue to foster the energy commons and ignite the shift to a post-capitalist society. However, we are not alone. The seeds of change are indeed being planted by communities worldwide. If we don’t strive to cultivate those seeds, then we won’t be able to grow as a society. We can begin to build new alternatives to the state and capitalism right now, even if we have to participate in those systems inevitably to survive in the meantime. While we can vote for new senators, representatives, councilmembers, and presidents — particularly, those that support a Green New Deal — in the forthcoming elections, we

must simultaneously continue working outside the electoral and market systems to create new equitable institutions that reject the hegemony of capital, state violence, hierarchies of power, and resource scarcity. That is the potential of dual power, which is “an approach to revolutionary politics in which ordinary people organize themselves to govern society in parallel and in opposition to the governing institutions of capitalist society” (Herson-Hord, 2018). The dual power strategy, which is the approach taken by Power To The People, can “help sustain our communities under capitalism, channel our collective action to fight back more effectively, and eventually supplant the institutions of capitalism to become the governing structures of the liberated society” (Herson-Hord, 2018). This is a future I believe is possible, and this is a future that I will continue to fight for. But we will only win if we all fight together. As the science fiction and fantasy author Ursula K. Le Guin had once said, “We live in capitalism. Its power seems inescapable. So did the divine right of kings. Any human power can be resisted and changed by human beings” (Le Guin, 2014).
In the words of the poet Max Ehrmann,

*Beyond a wholesome discipline,*

*Be gentle with yourself.*

*You are a child of the universe,*

*No less than the trees and the stars;*

*You have a right to be here.*

*And whether or not it is clear to you,*

*No doubt the universe is unfolding as it should.*

*With all its sham, drudgery, and broken dreams,*

*It is still a beautiful world.*

*Be cheerful;*

*Strive to be happy.*\(^4\)

Part Two
The following chapter comprises of a business plan that describes how *Power To The People* will tackle the issues described in the Statement of the Problem. By cultivating community-oriented models of **autonomy**, **self-determination**, and **ownership** over the renewable energy system, the organization intends to develop a renewable energy commons to make cities more resilient to climate change, and foster a more just and equitable future for all. Fundamentally, the organization experiments with the practice of regenerative design and builds upon the theoretical framework of social ecology to advance **energy democracy** and the **just transition** within the movement for **climate justice**. Our proposals can be considered as an addendum to a Green New Deal. The key concepts of our praxis are bolded herein.
Executive Summary

*Power To The People* is a cooperatively owned and democratically managed organization facilitating the just transition towards a renewable energy commons. Our mission is to design an alternative energy economy to mitigate climate change, democratize the regeneration of our planet, and foster self-determination for communities around the politics of energy. At our core, we are experimenting with radical and innovative directions for applying the practice of regenerative design towards climate justice.

The Problem

Climate change is the most catastrophic threat facing humankind and all life on earth. Fossil fuel combustion accounts for 31% of U.S. greenhouse gas emissions, and the IPCC has announced that we have until 2030 to prevent 2.7°C of warming and reduce 412 ppm of CO2 to 350 ppm in order to avoid a complete climate catastrophe in 2040. However, it is not enough to merely transition to renewable energy. Rather, we must drastically transform the structures of power that govern over the renewable energy infrastructure to create a more just & equitable environment for all.

Why Power To The People?

Political and economic power over the energy sector is concentrated in corporate and state bureaucracies, rather than the people most intimately and directly
affected by these interrelationships of power. Currently, those with power have prioritized the accumulation of profit at the expense of the people and planet.

Our Theory of Change

Political power, or governance, and economic power, or capital, over the renewable energy sector must be redistributed to communities impacted by climate change in order to establish autonomy, self-determination, and ownership. Doing so will empower communities to become resilient to the imminent climate crisis, while practicing justice and equity for all.

The Solution

We will solve this problem and carry out our mission using a dual power strategy — by collaborating with stakeholders through the democratization, decentralization, socialization, and decarbonization of the energy economy.

Democratization

Democratization enables communities to reclaim the reigns of decision-making. We will democratize the renewable energy economy by building platforms for stakeholders to congregate and deliberate about decisions about the source of energy (percentage of solar versus wind), the price of energy (generation at a zero marginal cost), the governance of energy (municipal regulatory committees elected
directly by residents), **local energy policy and planning**, and the **flow of capital** (distribution of revenue between workers, maintenance costs, and dividend returns). We practice radical democracy, and assist communities with building participatory models of direct democracy on the local level to redistribute political and economic power to residents horizontally. Our strategy is to create a popular assembly within each community to facilitate the democratization of energy. Each popular assembly interfaces with neighboring communities within a translocal network, or federation, of energy cooperatives. We utilize blockchain to create a digital platform for democracy so that residents can propose and vote on decisions with their popular assembly directly from a smartphone or computer.

Our goal is to foster **energy democracy** across the United States.

**Decentralization**

Decentralization refers to the localization of power and the application of decentralized technologies, such as distributed generation, microgrids, and mesh network infrastructure. The decentralization of technology enables optimal energy efficiency, communication across the Internet of Things, and resilience against extreme weather phenomena induced by climate change to prevent blackouts and disruption of services to the power grid.

Currently, regulatory power over energy in the United States is concentrated at the state and federal levels, where agencies detached from the communities
affected by climate conflicts are at the reigns and are often beholden to the interests of the fossil fuel industry. We believe that power should be redistributed to localities, where residents are familiar with the particularities of their situation and remain loyal to the collective wellbeing of their community. The decentralization of power ensures that governance and decision-making over energy, including the design of local energy policy and urban planning, remains the product of a bottom-up approach to safeguard justice and equity. Our strategy is to employ the municipalization\(^1\) of governance and decentralize power over energy management to cities, towns, and neighborhoods. Decentralization also enables the creation of community wealth\(^3\) and ensures that the distribution of capital supports local circular economies\(^2\).

\(^1\)Municipalism

“The answer to planetary urbanisation, social isolation, the privatisation of our cities, and the ecological crisis is the building up of popular power – to make citizens of residents and consumers, of workers and neighbors. Radical municipalism is the idea that we can build popular assemblies and neighborhood councils, where people learn to manage their common life through face-to-face politics and develop the skills and the power to seize control: to take the city.” — Symbiosis Research Collective\(^4\)

We practice radical municipalism, which is a strategy to restore governance to the local, or municipal, level. We believe that decentralizing power to the level of

the neighborhood, town, and city will ensure the creation of popular assemblies — platforms to facilitate the democratization of the energy economy by having those most affected by the climate crisis make the decisions that govern their communities. The creation of a translocal confederation of popular assemblies and related municipalist projects will safeguard communication between localities about energy governance.

Circular Economies

We support the creation of local peer-to-peer circular economies to rebuild the health of systems. Circular economies are designed to minimize waste, maximize happiness, keep all resources and materials in use within the system, and regenerate ecosystems rather than exploit them. We believe circular economies should be grounded in degrowth — in other words, the overproduction, overconsumption, and commodification of natural and manufactured resources needs to be drastically curtailed. This means advocating for a resource-based economy, upcycling, and utilizing digital fabrication methods, such as 3D printing with biodegradable materials, to democratize the means of production.

Community Wealth

Community wealth is the concept of redistributing capital on the local level while combating poverty and unemployment. Community wealth ensures that social
and economic systems are lucrative, inclusive, collaborative, and place-based, relying on a unionized workforce, cooperative ownership, and investment in community institutions. We seek to build community wealth by fostering an alternative energy economy — a renewable energy commons.

The eight principles of community wealth.\(^5\)

\(^5\) https://cdn5-blog.p2pfoundation.net/wp-content/uploads/EightPrinciplesCWB.png
Socialization

We believe that reclaiming ownership over the means of energy generation, transmission, and distribution is essential towards attaining energy justice. Typically, ownership over the energy infrastructure is either be privatized (owned by private utilities), nationalized (owned by the nation-state), or socialized (owned by the community). We foster social ownership of the renewable energy infrastructure. In other words, we ensure that ownership over the renewable energy infrastructure remains shared by the community, and not controlled by private or state entities. We do this in several ways: we support the creation of community solar arrays and community wind farms, we build a network of renewable energy cooperatives in which residents are all owners, producers, and consumers — prosumers — of energy, and we design municipally managed microgrids to facilitate the flow of electricity between cooperatives.

Decarbonization

To mitigate anthropogenic climate change, we seek to decarbonize the economy. This means phasing out fossil fuel infrastructure, such as pipelines, compressor stations, and power plants that depend on coal, oil, natural gas, and nuclear energy. We fight to keep fossil fuels in the ground, dismantle extractive economic models, and strive to rebuild a zero-carbon economy in which renewable energy is produced locally at a zero-marginal cost. As a result, we do not believe that a carbon neutral economy is sufficient. Rather, carbon must be sequestered naturally
from our atmospheres and oceans, and no new carbon can be added as a result of our economic system.

We advocate for community choice aggregation and net metering as tools for municipalities to decarbonize. We support campaigns to divest our institutions, cities, and economies from fossil fuels and reinvest that wealth into the community. We facilitate the just transition to 100% renewable energy by 2030, and do so on a community-by-community basis. We do not consider hydroelectric dams or biofuels to be renewable, as the former hurts downstream communities and aquatic ecosystems, and the latter propagates monocultures and releases formaldehyde into the atmosphere. Degrowth is pivotal to decarbonization, and we are designing renewable energy economies that support the regeneration of ecosystems and provide alternatives to energy scarcity.

„Renewable Energy

We define "renewable energy" as the following:

- Solar
- Wind (onshore and offshore)
- Small-scale tidal or wave power
- Geothermal and geoexchange
We do not consider the following to be renewable:

- Oil
- Coal
- Natural gas
- Nuclear
- Large-scale hydroelectric
- Biofuels and agrofuels
- Energies acquired from ‘alternative extractive methods,’ such as hydraulic fracturing (fracking), mountaintop removal, etc.

To decarbonize the economy and mitigate climate change, we advocate for a just transition to renewable energy by harnessing 100% of our energy only from the sources listed in the first category. We reject all energy sources listed in the second category.

Organization Overview

Power To The People is based in New York City, however we frequently travel to communities across the United States to assist them with the just transition to a renewable energy commons. Eventually, we hope to expand our services internationally. We work with communities, neighborhoods, towns, and cities, as well as other organizations, to accomplish our aforementioned goals. We partner with
other environmental nonprofits, intergovernmental organizations, municipal agencies, local cooperative enterprises, and grassroots organizing efforts to ensure seamless collaboration among all stakeholders.

*Power To The People* is a nonprofit startup organization, and is structured internally as a cooperative. This means that all decisions are made collectively between our team, any compensation is distributed equitably, and each member of the team is an owner of the organization with equal voting power. Our Founder and Director is Joshua Nodiff. We comprise of a team of the next generation of problem solvers and regenerative designers.

We wear multiple hats and take on numerous roles. We are not a utility and we do not sell energy. We are a blueprint for communities to base alternative models on. We are a vehicle for the just transition. We are an advocacy group. We are a consultancy. We are a think tank. We are a creative space. We are a design firm. We are a fabrication laboratory. We are an education center. We are a network of energy cooperatives. We are building a movement. **We are an incubator for the renewable energy commons.**

As of 2019, *Power To The People* is not intended to be a self-sustaining business. We do not have full-time employees, nor do we have customers or investors. Rather, in this stage of our development, we comprise of a cohort of volunteers to accomplish our goals. Our team consists of individuals whose primary professions are independent from *Power To The People*. Their primary employment may or may not
pertain to environmental issues, but as long as individuals are committed to climate justice, they are welcome to participate in our organization — regardless of their profession. In fact, we believe in the interdisciplinary nature of our organization, and encourage diverse representation within our organization. We seek to craft a team with individuals from a large range of professions, whether it be law, policy, healthcare, politics, community organizing, urban planning, coding, engineering, tech, science, design, the arts, architecture, or anything else. Likewise, we facilitate a network of regenerative designers across a variety of professions committed to climate justice. By applying skills honed from a wide range of professions to the discipline of regenerative design, we take a multi-step approach to addressing climate change by fostering an energy commons.

**Renewable Energy**

No more fossil fuel, pipelines, nuclear power plants, or extractive energy methods like fracking.

**Energy Democracy**

We craft participatory platforms for direct democracy so members of every community have control over all decisions related to energy production, distribution, and consumption.

**Social Ownership**

We transition the energy system under ownership of the community, and not by state or corporate entities that accumulate profits at the expense of the planet.

**Municipalization**

Governance of the energy infrastructure is regulated at the hyperlocal level, allowing community
members to get involved with political management of energy.

**Decentralization**

We will replace our antiquated infrastructure with decentralized microgrids, photovoltaics, wind turbines, and battery storage technology to increase efficiency and resilience.

**Energy Internet**

We are building the renewable energy internet by networking microgrids with blockchain mesh networks to aggregate energy and automatically redistribute surplus to communities with deficits.

**Alternative Economy**

By creating a renewable energy commons, we are creating a peer-to-peer energy economy that challenges the hegemony of capitalism by redistributing wealth throughout the community.

**Regenerative Design**

We integrate renewable energy infrastructure into the architecture of cities by designing with biomimicry, open & participatory design, and permaculture. We use tools like 3D printing to restore urban ecologies.

**Climate Justice**

We take an intersectional & ecocentric approach to environmental justice & energy justice to mitigate climate change while making our communities equitable for all. We also work with labor unions to ensure that a just transition secures jobs for workers.
While we solicit donations and will fundraise, the revenue primarily goes towards the expenses of operating our services (i.e. stipends for travel, website, mutual aid resources, etc), and not currently towards a full-time salary for our team.

Timeline

This project has been in development since February 12, 2010. The project has evolved drastically over a period of 9+ years, and while the integrity and identity of the project has remained the same, the project became streamlined and further defined during my two semesters as a Patricelli Fellow in 2016-2017. My study abroad experience in Vietnam, Morocco, and Bolivia in the Spring of 2018 heavily informed the project, and I plan on launching the project upon my graduation from Wesleyan University in May 2019.

Ecosystem Analysis

There are many wonderful organizations doing incredible work to combat climate change on the local, state, and national scales. These organizations are interfacing with many governmental agencies and international nonprofits to broaden an ecosystem for building a massive climate justice movement. However, much of this work is concentrated solely on advocacy, policy, and electoral campaigns. No existing organizations are advancing the just transition through the application of regenerative design, or by fostering energy democracy through community wealth,
ownership, and self-determination. Likewise, no existing organizations are focusing on what comes after the just transition. *Power To The People* fills the gap in the movement by designing the physical and social infrastructure required to sustain what comes beyond the just transition. We will integrate this infrastructure into the architecture of cities to build just and equitable economies through the creation of an energy commons. We believe in collaboration over competition, and are working together with existing organizations at the frontlines of the movement to further our joint goals in the struggle for climate justice.

7*We're Stronger When We Collaborate*

"Climate change is not just an environmental issue, or a social justice issue, or an economic issue — it's all of those at once. It's one of the biggest challenges humanity has ever faced, and we are going to have to work together to solve it. That means bringing people together — not just environmentalists, but students, business owners, faith groups, labor unions, universities and more — and building diverse coalitions that are strong enough to put pressure on governments and stand up to the fossil fuel industry." — 350.org

**Roles and Responsibilities**

Our services entail crafting a blueprint of **social infrastructure** (political platform for energy democracy and economic model for community wealth)

11 [https://350.org/](https://350.org/)
and **physical infrastructure**\(^9\) (renewable technologies and microgrid networks). The blueprint will then be integrated into the architecture of cities to make them resilient to climate change. The design and implementation of this blueprint will look different within each community, depending on the specific conditions that are unique to each community.\(^{10}\)

We must be invited into the community, and we must not act on behalf of the community. Rather, we facilitate a platform for **open and participatory design** in order to encourage and enable all community members to get directly involved with the design and planning processes themselves. It's a grassroots community-oriented project, as the community members are most familiar with the specific facets of their situation — more so than us, the visitors. We remain cognizant of our positionality and we remain faithful to the vision conceived by each community. We do not believe in a one-size-fits-all model.

\(^8\)Social Infrastructure

*Social infrastructure comprises of, but is not limited to, the following:*

- Platforms for participatory models of direct democracy (i.e. popular assemblies and digitized e-democracy systems)
- Platforms for equitable and participatory design and urban planning
- Circular economies for fostering community wealth
• Mutual aid networks

• Spaces for communitarian and ecological healing, based in a syncretism of mindfulness, play, and restorative justice — to foster community popular assemblies and neighborhoods grounded in interpersonal relationships around the politics of energy and ecology

"How can designers move beyond the one-way display of information to involve others and build commitment, understanding, and communities supported by design? Can design meaningfully involve people to build social infrastructure, strengthening interconnection and social capacity?" — SCAPE Studio

9 Physical Infrastructure

Physical infrastructure comprises of, but is not limited to, the following:

• Smart microgrids

• Battery storage systems

• Community solar arrays

• Community wind farms

• Energy internet

• Mesh networks

• Renewable energy technologies

• Regenerative architecture

There are three distinct roles that go into the creation of this blueprint, corresponding with the three stages of **design thinking**: 1) inspiration; 2) ideation; 3) implementation.

**Role 1**

The first role is to visit communities, both within New York and throughout the broader United States, and listen to the stories, concerns, and desires of those most vulnerable to climate change. This includes centering indigenous voices, voices of workers, and voices from communities of color across urban and rural epicenters throughout the US. This also includes collecting feedback from municipalist projects as well as scientists, activists, community organizers, grassroots organizations, nonprofits, academia, and local leaders at the frontlines of the climate justice movement. The goal of this first role is to democratize policymaking, urban design, architecture, and city planning by creating a participatory and bottom-up platform for all stakeholders to contribute to the design of the blueprint.

**Role 2**

The second role is to translate these stories, ideas, concerns, and dreams into a viable and feasible action plan. This means prototyping policies that are grounded in scientific research and taking all voices into account to ensure the plan remains just. The goal of the second role is to help design the most comprehensive and innovative plan for mitigating climate change and democratizing the economy.
Role 3

The third role is to remain active in the execution of the blueprint upon its enactment, while promoting the creativity and autonomy of communities. This means ensuring that the plan is being adhered to, and is being carried out appropriately. For example, making sure that a city employs unionized workers in the construction of a microgrid, or ensuring that all residents are being consulted in the design of an urban food forest. The goal of the third role is to be sure that resources are being distributed equitably, fair labor practices are being followed, the environmental design process for each community remains participatory, and data pertaining to climatic, economic, and technical metrics is being collected.

Metrics

The importance of teamwork, collaboration, creativity, and empathy remains pivotal to each of these roles. Throughout every step of the process, teams must be established and relationships must be cultivated to foster the flow of communication. Channels of communication must remain active between communities and constituents, between grassroots organizations and policymakers, and between local, state, and federal agencies. From the very first day, Power To The People would create platforms to ensure that communication, transparency, and collaboration between all stakeholders remain open throughout the entire process.
Therefore, we measure success on the following four metrics: 1) Does the blueprint take all voices into account, centering marginalized voices? 2) Does it empower communities to follow a bottom-up approach towards executing the plan? 3) Does it promote the democratization and decarbonization of the economy, while taking an intersectional and ecocentric approach to social, political, and environmental issues? 4) Does it adequately implement adaptation and mitigation strategies for combating climate change? We are committed to improving upon these roles and metrics as we learn from any challenges along the way.

**Services and Technologies**

We are designing the energy commons through the creation of a digitalized **renewable energy internet**. This is described in detail within Chapter 6 of the Statement of the Problem. This requires building an energy internet — in which you can automatically redistribute a surplus of energy from one community microgrid to equilibrate a deficit of energy from another microgrid — by hybridizing **blockchain microgrids** with **li-fi mesh networks**. *Power To The People* designs this hybrid infrastructure and works with communities to integrate the designs into the architecture of cities. The result is an energy commons built on distributed generation and distribution technologies that are owned and operated directly by the community, and not by the state or by private owners.

We only utilize **open source technologies**.
Policy Proposals

We also work with community stakeholders to design grassroots policy recommendations to regulate this infrastructure from the bottom-up. These policies include, but are not limited to, community choice aggregation, net metering, equitable urban planning, wealth redistribution of fossil fuel companies as reparations for communities disproportionately impacted by environmental racism and classism, ending fossil fuel subsidies, encouraging renewable energy subsidies, Green New Deal, etc. An example of our policy proposals can be found in Chapter 8.

*Power To The People* proposes viable policies to eradicate climate violence by implementing community-based models of social ownership over the energy system, while rejecting the hegemony of capital and the state. At its core, the organization’s strategy is 1) to advance the movement for climate justice through the application of regenerative design, and 2) to develop community-oriented energy economies, models of social ownership, and platforms for energy democracy. Our primary policy proposal has four components: 1) democratize and decarbonize the energy economy via municipal assemblies that determine energy sourcing and pricing; 2) decentralize the power grid into smart microgrids equipped with battery storage technologies; 3) implement algorithms to redistribute excess energy from microgrids with a surplus to microgrids with a deficit; 4) place the entire system under community ownership. Such a policy would be an addendum to the Green New Deal by fostering a renewable energy commons. By practicing participatory methods of regenerative design,
municipalities would replace fossil fuel power plants with solar and wind infrastructure to dismantle environmental racism and classism. *Power To The People* can play a central role in creating an equitable future with millions of green jobs, clean air, and no wars over oil.

**Design Proposals**

We also constitute a center for the advancement of regenerative design as a discipline and praxis, furthering the scholarship, art, science, and interdisciplinary application of the field. This includes facilitating educational spaces, creative spaces, and action-oriented spaces.

We utilize a regenerative design methodology to make the architecture of cities more resilient to climate change. This comprises of biomimicry, biophilic design, participatory design, open design, design thinking, urban design, urban planning, permaculture design, and landscape architecture. We work at the intersection between social infrastructure, community engagement, and regenerative urban design, and intend to tackle climate change through innovative explorations and applications of design. Furthermore, we believe human-centered design should be reoriented as ‘ecosphere-centered design’ to reject anthropocentrism in the design discipline and apply the field of design towards the regeneration of the planet and the many ecosystems that comprise it.
Our Services

We provide the following services. More options are available upon request:

- Consulting
- Design
- Urban Planning
- Social Infrastructure
- Think Tank
- Advocacy
- Policy
- Fab Lab/Maker Space
- Education
- Community Organizing
- Specialized Workshops
- Retreats and Outdoor Excursions
- Movement Building
- Mutual Aid
- Media, Journalism, and Writing
- Multimedia (film, music, animation, etc)
- Art-, Music-, and Storytelling-based Actions
- Performance Venue and Gallery
- Custom

Fees are based on a sliding scale, and we will be in touch to determine the most equitable prices.
Financial Plan

As previously stated, Power To The People is a nonprofit startup organization, and is democratically structured and cooperatively owned. Currently, we are not intended to be a self-sustaining business, but rather a collective of volunteers committed to the advancement of climate justice through regenerative design. This means that we do not rely on external funding in order to be successful with our services and operations. While we solicit donations and will fundraise, the revenue primarily goes towards the expenses of operating our services (i.e. stipends for travel, website, mutual aid resources, etc), and not currently towards a salary for our team.

Should we need more funding for our operating expenses, we plan to get money from various foundations and grants, and intend to receive payment directly from municipalities for our services. We will also supplement our capital with revenue from hosting workshops, creative spaces, and consultation fees. However, we do not anticipate our operations to be contingent upon the procurement of these funds. Until we become a self-sustaining 501(c)(3) nonprofit with financial support from foundations and grants, our primary source of revenue will be crowdfunding.

Should we charge a fee for our services, the fee will be determined based on a sliding scale. In other words, we will ask communities and/or municipalities to pay what they are able to afford, and no more. Since we reject the hegemony of capital and neoliberalism in our mission and core values, we do not accept corporate money.
Supplemental Revenue

We may also supplement our expenses by charging admission for creative spaces, educational spaces, consultations, and workshops that we host. These include, but are not limited to: design services, fabrication services, think tank services, social infrastructure workshops, production studio services, and facilitating an arts venue and gallery — including theater, music, visual art, etc. We partner with local music and arts organizations to host these events and fundraise through admission fees. Each of these ancillary services supports the advancement of our political mission.

A brief list of examples include: curating an art exhibit on energy justice; booking a concert of bands to call attention to environmental racism; being commissioned to design and fabricate custom items for sale using digital fabrication equipment; hosting restorative justice spaces to heal incidents of communal climate violence; etc.

Donations and Memberships

We certainly accept funding, but we do not depend on it for income or other essential services. In addition to the crowdfunding and revenue previously described, we also accept donations and memberships. These can be one-time or reoccurring payments. Ultimately, we believe that having multiple funding streams will be beneficial to our operation expenses.
Memberships are on a sliding scale. Individuals can become a monthly member, a bimonthly member, an annual member, or select the period of time for which they would like to remain a Member of the organization. While individuals can select the amount of money they wish to donate at any time, there are several default membership positions.

**Membership Status**

- For $5 a month, you are considered an **advocate**.
- For $10 a month, you are considered an **ally**.
- For $15 a month, you are considered an **accomplice**.
- For $25 a month, you are considered a **activist**.
- For $50 a month, you are considered a **organizer**.
- For $100+ a month, you are considered a **innovator**.

- For $25 a year, you are considered a **supporter**.
- For $50 a year, you are considered a **sustainer**.
- For $75 a year, you are considered a **friend**.
- For $100 a year, you are considered a **comrade**.
- For $200 a year, you are considered a **leader**.
- For $500 a year, you are considered a **radical**.
- For $1000+ a year, you are considered a **revolutionary**.
We use Patreon and ActBlue as our platforms for accepting reoccurring memberships and one-time donations respectively. Memberships are non-exclusive, meaning anybody is eligible to become a Member. Despite these positions and titles, memberships are always pay-what-you-can.

Partnering With Us

We are always looking for more individuals and organizations to join our cause! If you represent an organization, we would love to be a part of your network and partner with you in the fight for climate justice! Please reach out to us, and we will be in touch with how we can work together and best support each other.

We are always looking for individual volunteers, organizers, activists, artists, and scholars to work with us! If you are interested, please contact us, and we will be in touch as soon as possible!

Unfortunately, we have no paid positions available at this time. We will soon be hiring staff for our core team, however our staff is largely unpaid (although a stipend may eventually be available). If you would like to stay in touch about forthcoming opportunities for our core team, please reach out to us and attach a preliminary cover letter and resume.
Flow of Values

Ultimately, through our memberships, we want to build a network of organizers, activists, cooperations, organizations, environmental designers, urban planners, permaculturalists, and so forth as the network that comprises Power To The People. This can serve as a hub for people of all trades, passions, talents, and abilities to contribute their respective aptitudes to this common cause.

A portion of our revenue is redistributed into the local economy of the communities we collaborate with. In other words, we want to create a mutual aid network in which a portion of our revenue is redistributed into the circular economies of communities most impacted by climate change and environmental racism/classism. This revenue would enrich the alternative energy economies that we aim to foster, and will fortify community wealth. We believe in investing in the livelihoods of the communities we collaborate with.

Conclusion

This concludes the business plan for Power To The People. This is a living document, meaning that the business plan may evolve over time and modify as the organization further develops. The business plan is not intended to be an all-encompassing document that details the complexities of the organization's vast operations, but rather serves as a general set of guidelines for setting our core agenda in motion.
Policy
Recommendation

Introduction

*Power To The People* will draft, develop, recommend, and enact policies to foster energy democracy and cultivate the renewable energy commons. However, *Power To The People* must be invited into a community, and must communicate directly, openly, and transparently with local residents on designing the most comprehensive policies for mitigating climate change. Community engagement is best practiced when “local community groups and coalitions themselves identify potential outcomes or indicators of change.”¹ In other words, local residents are most familiar with the social, political, economic, environmental, and cultural contexts that

are unique to their community. In order to minimize intrusion and develop the most effective policies, Power To The People will utilize community-based participatory research and design methods. We will collaborate directly with residents and grassroots organizations to propose policies using a design thinking methodology.

Design thinking is an approach towards solving complex and multifaceted social issues based on the creativity and diversity of a given team. Teams develop solutions to social issues and wicked problems based on careful observation with a meticulous and fastidious attention to detail. These solutions are developed after various trials and temporary failures set the groundwork for new possibilities and unforeseen perspectives. Solutions are conceived collectively and collaboratively by all members of a given team, developing over the course of three distinct yet interconnected stages of design thinking. The first stage is the inspiration or empathy phase. The second stage is the ideation or creativity phase. The third stage is the implementation or execution stage. Each of these stages is cyclical rather than linear; in other words, trials will perpetuate in feedback loops until prototypes become successful and implementable.

Using the Bay Area of California as an example, the following chapter contains a template policy proposal that can be adapted for various municipalities across the United States. The policy has four objectives in California: 1) develop an offshore wind farm on the coast of the Pacific Ocean; 2) decentralize the power grid into smart microgrids equipped with battery storage technologies; 3) implement an
algorithm to redistribute excess energy from microgrids with a surplus to microgrids with an energy deficit; 4) place this entire system under community ownership.

The Situation

California is the 3rd largest oil-producing state in the United States, and fossil fuels remain the primary source of electricity generation in the state.\(^2\) Despite passing many environmental protection policies, California continues to support fossil fuel production because 50% of all new fossil fuels in the state are acquired using "enhanced recovery techniques," such as fracking, and is thus exempted from complying with environmental law due to the Energy Policy Act of 2005\(^3\). However, former Governor Jerry Brown signed a bill in 2015 mandating that utilities generate 50% of their electricity from renewable energy sources by 2030\(^4\). Power To The People proposes to mitigate climate change and curtail greenhouse gas emissions by phasing out California's fossil fuel production in favor of a community-owned offshore wind farm on the coast of the Pacific Ocean, which is a prime location for offshore wind.\(^5\) This would meet and potentially exceed the 2030 demands, as well as the demands to limit global greenhouse gas emissions agreed upon by the

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international community during the Paris Climate Accords in 2015.6

The Options

California has two options. The first is business-as-usual. While California may meet 50% renewable energy by 2030, the remaining percentage of energy sources will remain nonrenewable and exacerbate the effects of climate change. Furthermore, the renewable energy projects developed by 2030 will not necessarily be under community ownership, which means that the price of electricity will be determined by private for-profit interests. Additionally, the geographic planning of infrastructure developments may not adhere to environmental justice demands of low-income communities and communities of color, particularly those in Richmond where the Chevron oil refinery is located and will continue to pollute Black and Latinx neighborhoods.7 The second option is to build an offshore wind farm along the coast of the Pacific Ocean. California will meet the renewable energy demands agreed upon by Governor Brown with the creation of offshore wind, perhaps exceeding the 50% requirements or meeting the requirements earlier than 2030. By reducing fossil fuel consumption, we will mitigate climate change.

Policy Proposal

First, the policy requests the U.S. Bureau of Ocean Energy Management to begin the development of an offshore wind project on the coast of the Pacific Ocean.

Primary funding would come from the U.S. Department of Energy, as the agency has distributed $190 million for 73+ offshore wind projects.\(^8\) The majority of these projects have been concentrated on the east coast of the U.S., but California is a prime location for offshore wind, as "it's estimated that nearly a terrawatt of electricity will be generated off the coast of California, 13 times more capacity than all the land-based wind farms across the country generate."\(^9\)

The second step is to develop a battery storage system to complement the offshore wind project. The intermittency of wind power requires battery storage systems to be integrated into the power grid. *Power To The People* will implement battery storage systems and decentralize the power grid into smart microgrids, thereby increasing the system's resiliency to climate change-induced extreme weather events.

Third, *Power To The People* will implement an algorithm to redistribute excess energy from microgrids with a surplus to microgrids with an energy deficit. Smart microgrids are networked into the Internet of Things, and an algorithm or AI will automatically redistribute surplus energy equitably across the microgrid network to allocate adequate energy to all communities. It would also create a local economy based on peer-to-peer energy trading.\(^10\)

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Lastly, *Power To The People* would democratize the renewable energy infrastructure with community ownership. Residents can agree upon the price of energy, which would maximize affordability, as the absence of a profit incentive would encourage all revenue to go towards the maintenance and service of the system while allowing low-income neighborhoods to participate in the system. Similarly, introducing renewable energy to communities of color in Richmond would phase out pollution from the Chevron plant, as advocated by residents\(^{11}\). It is imperative that *Power To The People* enacts this policy to further develop renewable energy, reduce carbon dioxide emissions, create a zero-carbon economy, and mitigate climate change. The policy will protect human and non-human health, create jobs in the renewable energy industry, and enable California to uphold the 2015 Paris Climate Agreements, despite resistance from the federal government.\(^{12}\)


Introduction

The Ecosystem Map illustrates the various institutions, agencies, corporations, utilities, nonprofits, and grassroots movements that interact within the social, political, and economic landscape of energy. In particular, this Ecosystem Map focuses on the landscape of energy within New York, as that is where *Power to the People* is located. The intention of the Ecosystem Map is to identify and chart the interrelationships between various stakeholders within the context of the energy democracy across various scales — international, federal, state, and municipal. This list includes our allies as well as adversaries; not all stakeholders share our mission or vision. This list is incomplete, as it is nearly impossible to include every stakeholder.
Intergovernmental

- United Nations
  - Intergovernmental Panel On Climate Change
  - United Nations Environment Programme
  - United Nations Department of Economic and Social Affairs
    - Sustainable Development Goals
    - UN Energy

Federal Government

- Environmental Protection Agency (EPA)
- Department of Interior
  - Bureau of Ocean Energy Management (BOEM)
- Department of Energy
  - Office of Electricity Delivery and Energy Reliability
  - Office of Energy Efficiency and Renewable Energy
- Federal Energy Regulatory Commission (FERC)
- Nuclear Regulatory Commission (NRC)
- United States Department of Housing and Urban Development

New York

New York State Government

- New York State Energy Research and Development Authority
  - State Energy Plan
- New York Power Authority
- New York Independent System Operator
- New York Public Service Commission
- New York Department of Environmental Conservation

**New York City Government**

- Department of Citywide Administrative Services
  - DCAS Energy Management (DEM)
- Department of Environmental Protection
  - Office of Climate Change
- NYC Mayor’s Office
  - Climate Policy and Programs Team
    - Office of Sustainability
    - Office of Recovery and Resiliency
    - Office of Environmental Coordination
- Department of City Planning
- Department of Design & Construction
- Department of Information Technology & Telecommunications
- Department of Parks and Recreation
- NYC Public Design Commission

**Institutions**

- Columbia University Earth Institute
- NY Society for Ethical Culture
- Institute for Social Ecology
- Omega Institute
  - Center for Sustainable Living
- Museum of Reclaimed Urban Space
Nonprofit

- Food and Water Watch
- Clearwater
- Greenpeace
- Grassroots Environmental Education
- 350.org
- Sierra Club
- We Act for Environmental Justice
- Riverkeeper
- Waterkeeper
- Project Drawdown
- Powershift

Grassroots

- Occupy the Pipeline
- Beyond Extreme Energy
- Sane Energy
- SAPE
- NYC Mesh
- Resist Spectra
- Demand Utopia
- Dragonfly Collective
- Beyond the Grid
- Uprose
- Democracy Collaborative
- New Economy Coalition
- Cooperation Jackson
- Swale
Political Groups

• Democratic Socialists of America
  o Libertarian Socialist Caucus
• Peoples Power Assemblies
• Working Families Party
• Our Revolution
• Sunrise Movement

Utilities

• Con Edison
• National Grid
• Brooklyn Microgrid

Businesses

• TIR Consulting Group, LLC

Federations

• Symbiosis Collective
• NY Energy Democracy Alliance
• Climate Justice Alliance

Media

• Democracy Now
• The Intercept
• Motherboard
• The Ecologist
• Roar Magazine
• Jacobin
Introduction

The bulk of the work that went into this thesis cannot be adequately captured in a written document. As a multi-year project, there are numerous materials that have gone into establishing *Power To The People* as an organization. Many of those materials have evolved over the years, but are omitted from this document. Unfortunately, there is not enough space in this thesis to include all the materials and resources that went into this project since its inception on February 12, 2010.

Therefore, the following pitch deck serves as an abridged archive in lieu of including the plethora of resources. The pitch deck is used to pitch the organization to potential investors, colleagues, comrades, contests, employers, and anybody curious in learning more about *Power To The People*. I have prepared five pitches: a 1-minute version, a
3-minute version, a 5-minute version, a 10-minute version, a video-version, and an audio version. The video version may be accessed here, and the audio version may be accessed here. Each of these pitches has been delivered to various public audiences between 2016-2018, including the Wesleyan Seed Grant contest, the Senior Seminar for the Wesleyan College of the Environment, the SustainUS Creative Challenge for the COP23 U.N. Climate Change Conference, the Patricelli Fellowship pitch fest, and several other audiences.

Since some of these pitches date back to 2016, it serves as an archive, documenting the evolution of this project since my sophomore year at Wesleyan. Some of the information included within the earlier pitches has since been refined, reevaluated, revised, or rejected from future pitches. Therefore, do not be alarmed if there are details in some of the following pitches that have not been expounded upon in this thesis. Most likely, I have decided that those early details no longer fit into the current scope of this project. Yet, I am including them here to demonstrate the growth of this project over time. All mentions of “Project Nexus” refer to the former codename for this project.

That being said, please feel free to skip this chapter! Everything herein has already been discussed in much greater detail in previous chapters. You’ve already ascertained the following information, and so the remainder of this chapter might feel very redundant. You may skip ahead to Chapter 11, or you can skim through the following archive of pitches at your leisure. The choice is yours! ☺
One-Minute Pitch

Climate change is the most catastrophic threat facing our species and the planet, and it's up to our generation to fix this mess.

The root cause of climate change is money in politics, and replaces our democracy with plutocracy, which is a system of government married to the corporations.

Therefore, how do we dismantle plutocracy and mitigate climate change?

My solution is to socialize and democratize the renewable energy infrastructure.

In other words, the people need to reclaim the means of energy production and distribution.

Currently, Nebraska is the only U.S. State that has a socialized energy infrastructure.

This model needs to be upgraded to the 21st century and expanded everywhere.

I'm working to start an organization called *Power To The People* that will do this using urban environmental design.

The most practical way to transform this theoretical notion into a viable reality is to create smart microgrids that are owned and operated by the community, and not by any corporate or federal institution. I call this "Project Nexus."

Smart microgrids are electrical utilities that operate independently from the larger grid, and are networked into the internet of things for optimal efficiency.

*Power To The People* will design these smart microgrids using open-source technologies, so that they operate as energy cooperatives.

In this way, communities will have autonomous control and can reach a consensus about where their energy comes from.

This would create participatory models of direct democracy that would replace the plutocracy of the fossil fuel industry, as the people would generate their own electricity from renewable sources as a collective.

The effects of this project have the potential to ignite a social, political, and economic revolution, such as dismantling environmental racism and classism through equitable urban planning.

Together, we can save our planet from destruction by restoring power to the people.
Three-Minute Pitch

I'm pursuing a project around energy democracy, which is an endeavor aimed at decentralizing renewable energy systems at the local level.

Doing so would empower communities to mitigate climate change.

Climate change is the most catastrophic threat facing our species and the planet, and it's up to our generation to fix this mess.

Climate change creates a series of social, political, economic, and environmental issues that disproportionately affect people of color and low-income communities.

The root cause of climate change is money in politics, which requires capitalism to continue exploiting the planet and people for profit.

As a result, our democracy is replaced with plutocracy, which is a system of government that is married to the corporate elite.

Therefore, how do we simultaneously dismantle plutocracy and fight climate change?

My solution is to socialize and democratize the renewable energy infrastructure.

In other words, the people need to reclaim the means of energy production and distribution.

This might seem overly ambitious at first, but it's already happened in Nebraska.

Their model for energy democracy needs to be upgraded to the 21st century and expanded everywhere.

I'm starting an organization called Power To The People that will achieve this using an approach grounded in urban environmental design.

The most practical way to do this is to create a system of smart microgrids that are owned and operated directly by the community, and not by any corporate or state institution.

I call this "Project Nexus."

Smart microgrids are electrical utilities that operate independently from the larger grid, and are networked into the internet of things for optimal efficiency.

Using the internet of things, we can create a mesh network, which is a decentralized federation of encrypted servers that resist the monopoly of internet service providers.
By connecting smart microgrids onto mesh networks, we can invent a digitalized renewable energy internet in which energy is generated locally and distributed globally.

With equitable urban planning, *Power To The People* will design these systems using open-source technologies, so that they operate as energy cooperatives.

In this way, communities will have autonomous control and can reach a consensus about where their energy comes from.

This would create participatory models of direct democracy that would reject the plutocracy of the fossil fuel industry, as the people would generate their own electricity from renewable sources as a collective.

Together, we can save our planet from destruction by restoring power to the people.

**Five-Minute Pitch**

I'm pursuing a project around energy democracy, which is an endeavor aimed at decentralizing renewable energy systems at the local level.

Doing so would empower communities to mitigate climate change by revolutionizing the power dynamics which govern the energy infrastructure.

Climate change is the most catastrophic threat facing our species and the planet, and it's up to our generation to fix this mess.

As you can see in these photos, we are experiencing a variety of ecological issues associated with climate change. Carbon emissions continue to worsen, sea levels continue to rise, and global temperatures continue to increase, which endangers biodiversity and human society.

The root cause of climate change is the neoliberal collusion between capitalism and the state, which enables fossil fuel corporations to continue exploiting the planet and people for profit.

Climate change creates a series of social, political, economic, and environmental issues that disproportionately afflict violence upon people of color and low-income communities.

Many of these issues can be traced to the colluding corporate and state forces that
govern our fossil fuel infrastructure.

The most recent example of this is the Dakota Access Pipeline, which brought militarized terror against indigenous people who were trying to protect their sacred land and water supply.

This is also happening here in Connecticut, with the Algonquin Pipeline. Last week, the Federal Energy Regulatory Commission illegally approved the Atlantic Bridge, which brings fracked gas along the Algonquin Pipeline to our communities here in Connecticut.

As a result of the fossil fuel money inextricably linked to our political systems, our democracy is replaced with plutocracy, which is a system of government that is married to the corporate elite.

Therefore, how do we simultaneously dismantle plutocracy and fight climate change?

This is our current fossil fuel infrastructure. To fight climate change and preserve ecological and human health, we need to transition to a renewable energy infrastructure. But the social, political, and economic issues will still be replicated unless we transform the power dynamics of the infrastructure as well.

Therefore, the solution is to socialize and democratize the renewable energy infrastructure.

In other words, the people need to reclaim the means of energy production and distribution.

This might seem overly ambitious at first, but it's already happened in Nebraska, which is the only U.S. state with a socialized energy infrastructure.

Their model for energy democracy needs to be upgraded to the 21st century and expanded everywhere.

The most practical way to do this is with a system of smart microgrids that are owned and operated directly by the community, and not by any corporate or state institution.

Smart microgrids are a decentralized nexus of local electrical utilities that operate independently from the larger grid, and are networked into the internet of things for optimal efficiency.

Communities can engage in equitable urban planning to design these microgrid systems with open-source technologies so that they operate as energy cooperatives, dismantling the environmental racism and classism against people of color and low-income communities.
With microgrids connected to the internet of things, communities can create a mesh network, which is a decentralized federation of encrypted servers accessible to the public that resist the monopoly of internet service providers by connecting different network nodes (in this case, each microgrid) into a supernode.

Using a technology known as blockchain, which is designed to maximize privacy and security against state and corporate surveillance, this supernode has the potential to become a digitalized renewable energy internet.

By interconnecting smart microgrids with blockchain-enabled mesh networks, we can invent an energy internet in which energy is generated locally and distributed globally.

In this way, communities will have autonomous control and can reach a consensus about where their energy comes from.

If this all seems too abstract and idealistic, there's already one place with a community-operated, blockchain-enabled, smart microgrid and mesh network system. It's in Brooklyn, simply called the Brooklyn Microgrid, and converges all these technologies into one infrastructure that empowers the community.

Nevertheless, the Brooklyn Microgrid is still a private entity. While we need to replicate their technological model to communities everywhere, we must also learn from Nebraska by shifting the means of energy production and distribution into public domain.

With social ownership, this new energy internet would democratize and socialize both the energy infrastructure and the internet infrastructure jointly, dismantling the neoliberal forces that govern both infrastructures currently.

This would create participatory models of direct democracy that would reject the plutocracy of the fossil fuel industry, as the people would generate their own electricity from renewable sources as a collective. It would also fight climate change, implement environmental justice, and dismantle the government's imperialistic motives for waging war over oil.

Together, we can save our planet from destruction by restoring power to the people.
Ten-Minute Pitch

I’m pursuing a project around energy democracy, which is an endeavor aimed at decarbonizing and decentralizing the political, economic, and technological systems of renewable energy at the local level.

Doing so would empower communities to mitigate climate change by transforming the power dynamics which govern the energy infrastructure.

My capstone will culminate with launching an organization, called Power To The People, to actualize this vision. Power To The People will be a cooperatively-run organization that fosters energy democracy through regenerative design, operating at the nexus of politics, design, and ecology.

Climate change is the most catastrophic threat facing humankind and all life on earth, and it's up to our generation to fix this mess.

We are already experiencing a variety of ecological issues associated with climate change. Carbon emissions continue to worsen, sea levels continue to rise, and global temperatures continue to increase, which endangers biodiversity and human society.

The Intergovernmental Panel on Climate Change recently announced that we only have until the year 2030 to prevent 2.7 degrees Celsius of warming and drawdown our current 405 parts per million of carbon dioxide towards 350 parts per million in order to avoid a complete climate catastrophe beginning in 2040.

Next to animal agriculture, fossil fuel combustion accounts for the majority of global greenhouse gas emissions.

However, it is not enough to merely transition to renewable energy. Rather, we must drastically transform the structures of power that govern the renewable energy infrastructure to create a more just and equitable environment for all.

My research suggests that the root cause of climate change is capitalism. Specifically, the relationship between fossil fuel corporations and state regulators enables the exploitation of the planet and people for profit. Under the Trump administration, the US government is strongly incentivizing fossil fuel production and consumption as a means of accumulating capital. Some have even argued that we are now living in the capitalocene rather than the anthropocene. We cannot mitigate climate change under an economic regime that is built upon the extraction of fossil fuels.

As a result of the fossil fuel money inextricably linked to our political system, our democracy is replaced with plutocracy, which is a system of government where power is concentrated in wealthiest individuals. That power needs to be redistributed back to the people.
From public health epidemics to refugee crises, climate change has created a series of social, political, economic, and environmental issues that disproportionately afflict violence upon people of color and low-income communities. Yet, humans are not alone. From species loss to ecological niche destruction, communities of nonhuman animals and plants are also in danger.

Therefore, how do we simultaneously dismantle plutocracy and fight climate change?

My solution is to socialize and democratize the renewable energy infrastructure.

In other words, the people need to reclaim the means of energy production and distribution.

This means reinventing an alternative energy economy and fostering a renewable energy commons at the local level.

This might seem ambitious, but it's already happened in Nebraska, which is the only U.S. state that has practiced energy democracy on a large scale since the 1930’s as a result of the Rural Electrification Act.

Their model for energy democracy needs to be upgraded to the 21st century and expanded everywhere.

I’m also looking at other models of social ownership both in the United States and around the world. One of the most exciting examples is the water system of Bolivia, which was transformed into a water commons by a movement known as the Water War, led by Oscar Olivera in 2000.

The most practical way to do this with energy is through the municipalization of energy governance and the practice of regenerative design.

In other words, we can design a system of smart microgrids that are owned and operated directly by the community, and not by any corporate or state institution.

Smart microgrids are a decentralized unit of local electrical grids that operate independently and interdependently from the larger power grid, and are networked into the internet of things for communication, efficiency, and resilience. But we certainly cannot rely on technology alone to fix the mess.

Communities can engage in equitable urban planning to integrate these microgrid systems into the architecture of cities. Then, we can use this infrastructure to build a federation of energy cooperatives, creating a peer-to-peer energy economy where all revenue is reinvested into the community.

Communities can then create a mesh network, which is a decentralized collection of
encrypted nodes that aggregate into a community-owned internet infrastructure. Mesh networks have a long history of resisting telecom oligopolies in New York, Chicago, and even Cuba. The confluence of microgrids with mesh networks has the potential to create a digitized renewable energy internet.

My model of design for an energy internet as a nexus of information and energy is inspired by research on mycelium networks and microtubule networks. I call this “neuromorphic biomimicry.”

In the same way, for instance, that mycelium exchange nutrients across ecological networks, we can invent an energy internet in which electricity is generated locally and distributed from community to community by interconnecting microgrids along mesh networks.

So how does it work? If a surplus of energy is generated within one particular microgrid, the energy internet would aggregate the surplus and automatically redistribute it to microgrids in the network with a deficit.

By designing a radically democratic platform for managing the governance of this system, communities will have autonomous control and can reach a consensus about where their energy comes from.

If this all seems too abstract, there's already one place with a community-operated smart microgrid and mesh network system. It's in Brooklyn, called the Brooklyn Microgrid, and converges all these technologies into one infrastructure that empowers the community.

Nevertheless, the Brooklyn Microgrid is still privately owned. While we need to replicate their technological model to communities everywhere, we must also learn from the ownership models of Nebraska and Bolivia by shifting the means of energy production and distribution towards social ownership.

The organization that I am launching will spearhead this transition and address each of these social, political, technological, economic, and environmental elements.

Together, we can save our planet from destruction by restoring power to the people.
Joshua Nodiff is a graduating senior at Wesleyan University, majoring in Environmental Studies (with a concentration in Regenerative Urban Design) and American Studies (with a concentration in Political & Social Ecology), and a minor in Integrated Design, Engineering, and Applied Science (IDEAS).

Josh has studied the social, political, and economic dimensions of our climate crisis, with a focus on the nexus between social ecology, energy democracy, permaculture, and regenerative design. He is interested in the design of social infrastructure to foster spaces for interpersonal and communal healing, and the role of
commoning to make the architecture of cities more resilient to climate change. He hopes to apply these pursuits towards the movement for climate justice, and join in the struggle for building a more just and equitable future.

Throughout his four years at Wesleyan University, Josh served on numerous committees. He was elected the Chair of Environmental Sustainability for the Wesleyan Student Assembly, and served on the Student Life Committee, Student Affairs Advisory Committee, Sustainability Advisory Group for Environmental Stewardship, Green Buildings Committee, Major Maintenance Committee, Environmental Studies Major Committee, and others.

Josh has also been involved in the leadership of various student organizations at Wesleyan, including Students Against Fossil Fuels, Students for Ending Mass Incarceration, Veg Out, the United Student/Labor Action Coalition, WesDivest, the Sunrise Movement, and many others. Prior to Wesleyan, Josh co-founded organizations in New York City, including Students Against Police Brutality and the Committee of Students Against Injustice.

Josh is also a musician and has a background in the arts, 3D modeling, and digital design & fabrication. He is a graduate of Fiorello H. LaGuardia High School of Music & Art and Performing Arts, where he majored in Technical Theater and served as the President of the Student Government and Residential Audio Engineer. Josh has served on the crew for over 25 theatrical productions, which can be found here.
Acknowledgments

This thesis was written at Wesleyan University in Middletown, Connecticut. Middletown was built on the stolen land of Mattabesset, home of the Wangunk people.

I would like to extend my deepest gratitude and appreciation to the following individuals for their ongoing guidance, wisdom, and mentorship:

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Communities

All my communities at Wesleyan, the Omega Institute, Wayfinder, Surprise Lake, LaGuardia, B'nai Jeshurun, Table 1, IHP, and my New York City community

All my friends.
Unfortunately, the entire plethora of reference materials could not be synthesized into this document. To view an assortment of supplementary materials pertinent to this project, please visit the Are.na channel for this thesis. Are.na is a visual platform for organizing multimedia information. Over the years, I have been collecting articles, texts, data, theories, praxis, case studies, scientific research, speculative fiction and artwork, and news stories that are pertinent to this project. In 2017, I began chronicling these materials on Are.na. All materials collected prior to that date have not yet been transferred to Are.na — as I have thousands of resources related to this project, and have not been able to sort through and organize them — however I will add those materials to the Are.na channel in the future. As of May 2019, over 1,500 supplementary materials are located in the Are.na channel for this
project. Therefore, I recommend browsing through the appendix on Are.na, and subscribing to the channel for future updates.

**To view the appendix, please click [here](https://www.are.na/josh-n/project-nexus).**

If you are unable to click on the link, please navigate to:

https://www.are.na/josh-n/project-nexus

Alternatively, you can scan the following QR code using a smartphone:
Introduction

There are many key concepts and terms defined and discussed throughout this thesis, and so I have provided a Glossary & Index to organize the vast terminology. It is much easier to navigate the Glossary & Index from within the Interactive Multimedia Experience. It can be found under “Additional Resources.” From there, you may click on a word or phrase and be taken directly to its definition, or to the passage of text where the concept is discussed. Navigation from within this document will diminish the Glossary element, as definitions of terminology will not be listed herein. However, you may follow the page numbers that correspond with the terms below to locate the definition of a key concept from prior chapters. Nonetheless, I highly recommend utilizing the Interactive Multimedia Experience for this chapter!
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People, Not ‘Serve and Protect’.” *In These Times*, In These Times. January 6, 2015.


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**Chapter 4**

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Chapter 6

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**Chapter 7**

**Conclusion**


In accordance with the Honor Code, I affirm that this work is my own and all content taken from other sources has been properly acknowledged.

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