

Reinventing Energy Ethics

by

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ABSTRACT

Societies seeking sustainability are transitioning from fossil fuels to clean, renewable energy sources to mitigate dangerous climate change. Energy transitions involve ethically controversial decisions that affect current and future generations' well-being. As energy systems in the United States transition towards renewable energy, American Indian reservations with abundant energy sources are some of the most significantly impacted communities. Strikingly, energy ethicists have not yet developed a systematic approach for prescribing ethical action within the context of energy decisions. This dissertation reinvents energy ethics as a distinct sub-discipline of applied ethics, integrating virtue ethics, deontology, and consequentialism with Sioux, Navajo, and Hopi ethical perspectives. On this new account, applied energy ethics is the analysis of questions of right and wrong using a framework for prescribing action and proper policies within private and public energy decisions. To demonstrate the usefulness of applied energy ethics, this dissertation analyzes two case studies situated on American Indian reservations: the Dakota Access Pipeline and the Navajo Generating Station.

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CHAPTER 1

ENERGY TRANSITIONS AND ENERGY ETHICS

Energy in Transition

As societies transition to more sustainable energy systems, many important decisions arise with significant impacts on quality of life. Often coupled with uncertainty, social, environmental, and technoeconomic dimensions can be difficult to manage without a research guide, since they must take into account a plurality of interests, capabilities, values, governance structures, cultures, knowledge, resources, and histories. This dissertation begins to address this need by investigating one salient aspect of such a transition – energy ethics, and applies it to a discrete group of underrepresented people who already experience its consequences – indigenous communities.

Proponents of sustainability tend to view sustainable ways of life as ethical and unsustainable ways of life as unethical. Although sustainability researchers often promote new ways of living, they infrequently make explicit the philosophical foundations supporting the ethical merits of their sustainability initiatives. As one researcher notes, because “practitioners are continually involved in actions that embody ethical suppositions,” “there is a compelling need for guiding concepts that can facilitate more systematic and reflective practice” (Graffy 2012, 504). As policymaking tends toward an industrialist, value-neutral perspective, underlying ethical principles are seldom scrutinized (if ever made explicit), and whether current ethical principles are sufficient for good governance or it is “ethically necessary to shop around for alternatives” remains unanswered (Graffy 2012, 505). Furthermore, “sustainability definitions are neither virtue-oriented nor consequence-oriented: they neither tell us what we ‘ought’ to do nor

help us understand very well the cause and effect of practice,” and some simply fail to offer actionable guidance, binding decision criteria, or specific action-guiding choices (Graffy 2012, 521-522). Sustainability research could benefit from integrating ethics.

The transition from fossil fuel to clean, renewable energy sources is arguably the most significant change required to mitigate the harmful consequences of climate change for more sustainable societies. Without such changes, we risk flooding of coastal cities, extreme heat, storms, and other weather-related events, loss of agriculture, and, according to at least one estimate, extinction for up to 54% of today’s organisms, possibly including humans (Sherwood and Huber 2010; Levermann et al. 2013; Urban 2015; Friedlingstein et al. 2014). As a result, the future of the energy sector brings about some of the most ethically significant decisions we face, including: which energy sources should be used to generate electricity; what should be used to power transportation of goods and people; what should be the proper mix of public and private transportation; is wasted energy unethical; and how do people derive energy from food systems in ways that are least harmful to others?

Electricity generation and energy consumption across all sectors release approximately 78% of global greenhouse gas emissions (US Environmental Protection Agency 2016; Friedrich, Ge, and Damassa 2015). Renewable energy sources, such as wind and solar, produce much lower emissions than fossil fuels. Wind energy and solar photovoltaics are estimated to emit 34 and 41 gCO₂/kWh, respectively, over their lifecycles, while natural gas, oil, and coal emissions range from 443 to 1,050 gCO₂/kWh (Nugent and Sovacool 2014). Considering that 81% of energy worldwide was generated from fossil fuels in 2017, there is substantial room for improvement through emissions

reductions (Enerdata 2019). So far, 59 countries, 63 regions or states, 72 cities, 9 utilities, 21 institutions, and many corporations have shifted to, or are committed within the next few decades to shifting to, 100% renewable energy in at least one sector (e.g., electricity, transportation, heating and cooling) (Renewables 100 Policy Institute 2018). These transitions encourage us to reflect on the contributions of energy systems (i.e., technologies, infrastructures, and markets that supply energy) on our livelihoods and offer an opportunity to improve energy systems for reduced negative impacts on human lives and the environment. Yet, choosing unethical options within energy decisions threatens life and the planet as we know it.

Because of the impact of energy decisions on the lives of individuals other than the agent, energy decisions are almost always ethical in nature because ethics concerns actions that affect others. Decisions which only impact the person performing the action are prudential. For example, any flick of a light switch connected to the grid consumes energy, which the energy provider monitors to balance supply. This act also affects others: It uses energy that someone else cannot use; it required a fuel source or generating equipment that provided jobs upstream; and it brought about employment decisions and utilized resources that had impacts across the greater economy. These ripple effects accumulate from trivial effects at small scale but become very significant at a global-scale, particularly in climate influences.

Ethically controversial actions within energy transitions threaten job loss, relocation, dispossession of rights and influence, economic downturn, increased inequality between winners and losers, and environmental impacts. Treating an energy transition as a merely technical matter (as often occurs in traditional energy research)

ignores these social and environmental disruptions which can be much more detrimental to human and nonhuman livelihoods, impacting well-being in ways that range from whether someone is momentarily pleased to whether someone lives or dies. Many energy decisions are highly manageable, are within control of some decisionmaker, with alternatives from which to select, and typically without severe short-term effects. These decisions receive more scrutiny as people are generally becoming more aware of energy systems operations and their impacts. Recently, some scholars have argued for further integration of socially-oriented studies in the traditionally technically-focused research of energy (Miller 2014; Sovacool 2014a, 2014b; Spreng 2014; Ryan, Hebdon, and Dafoe 2014; Rochlin 2014; Sovacool et al. 2015; Schubert, Thuß, and Möst 2015; Stern 2017; Pellegrino and Musy 2017).

Social and environmental harms elicit ethical scrutiny of actions within energy systems. Examples of ethically controversial situations include: fracking operations that sometimes contaminate drinking water; the lack of energy access for billions of people around the world; oil spills, such as the Deepwater Horizon accident, one of the worst oil spills in history; and pollutant emissions from energy consumption, which contribute to climate change. These and similar problems conjure questions of whether our existing energy systems are ethical, just, sustainable, and contribute positively to people's well-being. These questions then naturally extend to consideration of energy systems that might come into being. As many regions of the world transition from fossil fuel-intensive energy systems to renewable energy sources, we must be sure that these changes are actually better, not just in terms of practical performance metrics, but also in terms of ethical merit, so that technology does not outpace our consciences.

Ethics is the field of philosophy that “involves systematizing, defending, and recommending concepts of right and wrong behavior” (Fieser 2018). It is typically concerned with actions that are voluntary and impact others since if the acting agent could not have done otherwise or impacts no one else, it is trivial to criticize the action. Three major ethical theories are mostly accredited to the work of four philosophers: Aristotle (virtue ethics), Immanuel Kant (deontological theory), and Jeremy Bentham and John Stuart Mill (consequentialism) (Aristotle 1984; Kant 1785; Bentham 1789; Mill 1861). In brief, virtue ethics analyzes the character demonstrated by the targeted action, and actions enhancing human flourishing are ethical. Deontology is also called duty-based ethics, due to understanding ethics as an obligation, rather than merely permissible as probabilism or satisficing theories claim (Hill 2009). These obligations are associated with good intentions, actions that can be performed by anyone universally, and show respect for all participants. Consequentialism bases ethical judgment on the consequences of the targeted action and seeks more positive than negative consequences.

Because character, intentions, respect, and consequences are essentially universal notions that span all cultures (even if sometimes defined in slightly different ways), these ethical theories are universally applicable and foundational to more specific perspectives which might vary from one culture to the next. The conventional view of philosophy, called ‘universalism,’ sees these cultural differences primarily as differences of perception; the underlying principles do not change across cultures. The opposing view ‘ethical relativism,’ generally rejected by philosophers, understands ethics as differing across cultures (Rachels 1999). Though there are only three major theories, a diverse set of ethical views may result because each theory can be detailed in many ways, and there

are variations in the interpretation of the original philosophers' works. So, not only is there potential for an evaluator's choice of ethical *theory* to differ, but there could be countless *reasons* provided within evaluators' arguments that would conform to each of these theories. Not all ethical theories must be used in any given analysis, and it is not likely that someone would ever identify all reasons for or against any action. Yet, it is beneficial for researchers interested in the ethical merit of an action to use as many ethical theories and to identify as many applicable reasons as is practical within the time available because typically having more reasons can provide more evidence for the evaluator's decision.

To leverage the expertise of energy researchers in motivating changes to more ethical and sustainable energy systems, this dissertation focuses on energy decisions within transitions from fossil fuel energy systems to renewable energy systems and their ethical impacts. I use the proverbial "we" (or "we of invitation") used by Bernard Williams and Julia Annas to invite anyone interested to join the conversation since nearly everyone is a user of electricity or fuels and since even the smallest energy decisions from flipping a light switch to deliberating construction of a new power plant have ripple effects across energy systems and beyond (Williams 1985; Annas 2015). In this way, this dissertation can be useful for researchers interested in the social impacts of energy systems.

Specifics of US Transitions - Indian Country Energy Belt

As energy systems in the US transition from fossil fuels to renewable energy sources, American Indian reservations with abundant energy resources are some of the

most significantly impacted communities. They sometimes have both the most to gain and the most to lose because of the prevalence of both new and old energy types on their land. That is, some reservations have abundant coal, uranium, and oil, which are being phased out, while others can have some of the highest solar and wind energy potentials across the nation, which are increasingly being adopted. This abundance has led to the creation of the moniker “Indian Country Energy Belt” to refer to the reservations in the Western US from Arizona to North Dakota (Figure 1). It is estimated that American Indian reservations contain 55% of the nation’s uranium, 30% of its coal, and 3% of its petroleum and natural gas (Allison 2015, 145). Although reservations only cover 2% of US land, they contain 5% of the US renewable energy potential, with estimates including over 300 GW of wind energy and over 6000 GW of solar energy potential (US Department of Energy 2012; Driscoll 2018; Open EI 2018). Along with natural gas in shale pockets, some reservations also have natural resources for staple energy types such as hydroelectricity, geothermal energy, and various biofuels. However, although energy transitions typically involve job displacement, they present a window of opportunity for reflection concerning whether the best energy systems are being put in place. Mindful of the significance these transitions can have on energy workers’ livelihoods, energy decisionmakers can use ethical reasoning to manage impacts and protect personal and environmental well-being during these transitions. Since the US emits the second-highest amount of greenhouse gas (approximately 15% of global emissions) after China, it is vital that US energy systems transition to forms of energy that are better able to mitigate climate change across the globe (US Environmental Protection Agency 2017). Therefore,

cooperation with Native Americans during the US energy transition is paramount to addressing anthropogenic climate change.

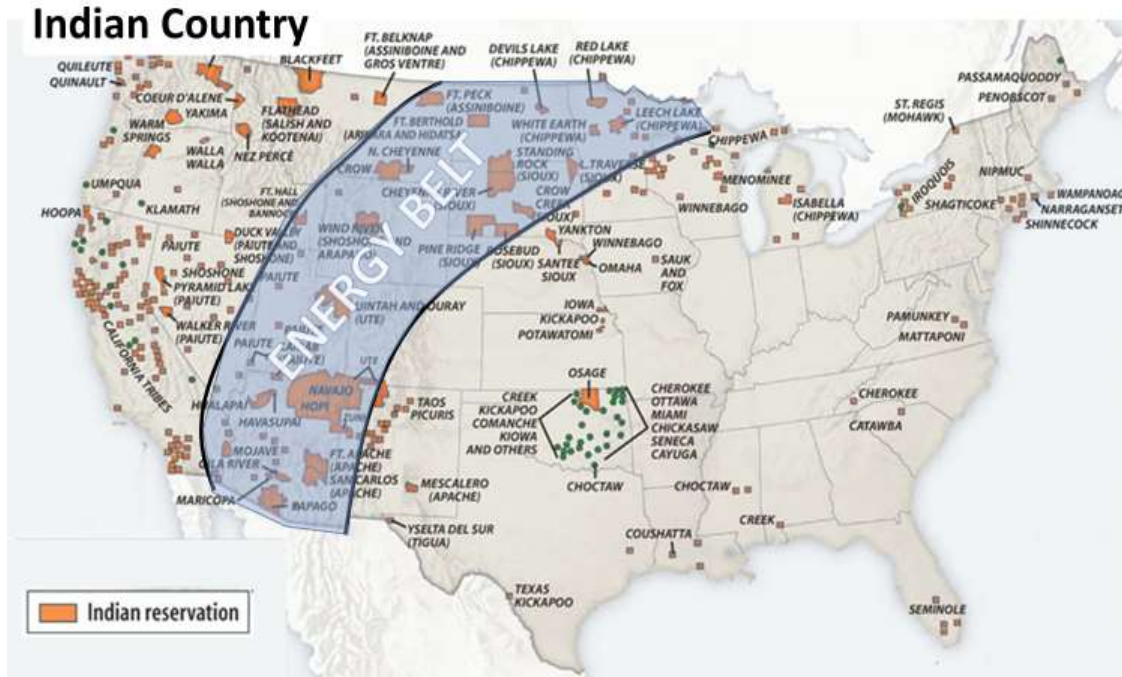


Figure 1: Illustrated Map of Indian Country Energy Belt (modified from <http://flashmedia.glynn.k12.ga.us/webpages/kadams/photos/24850/map-30-03.jpg>)

To investigate controversial cases of great significance within the US energy transition, I have selected two communities impacted by energy decisions within the Indian Country Energy Belt. I preview the cases here and provide further details in subsequent chapters. In the first case, the Dakota Access Pipeline was constructed from 2016-2017. Oil spills threaten contamination of the drinking water supply of the Great Sioux Nation at Standing Rock, SD, among others (Camp of the Sacred Stones 2016). While the Great Plains have some of the highest wind energy potential in the US, the decision to continue to enable fossil fuel exploitation in this region remains highly

contested. Media coverage assured that this case is well-recognized. Of relevance to this thesis, this case illustrates an unethical energy decision, where previous reflection could have influenced Energy Transfer Partners, L.P. (ETP), the corporation constructing the pipeline, to act differently to avoid significant ethical objections. While the threatened communities oppose ETP's enabling of the oil industry, they also fear for their health due to the water contamination threat. Considering the impact on communities, how ought the ethical merits of the construction of a pipeline be evaluated?

In the second case, the pending closures of Navajo Generating Station (NGS) in Page, AZ, a coal power plant serving the Southwestern US, and the Kayenta Coal Mine, which exclusively provides NGS with fuel, threaten to displace approximately 700 workers. Besides providing the most significant jobs to the local economy in an isolated region, these closures could end land lease payments that are vital to the Navajo and Hopi tribes. After the executive board voted to close the power plant in early 2017, an extension of operations is keeping the plant open until December 2019. In response, Navajo and Hopi tribes decided to transition from a coal-intensive economy to solar photovoltaic installations as a replacement revenue source. How should the ethical merits of an energy transition be evaluated? Of relevance to this thesis, this case illustrates an energy transition that is positive for the environment but difficult for a community that has suffered historical hardships. With issues of tribal sovereignty often associated with these types of societal decisions, it could be the case that the decision to pursue solar energy is not entirely voluntary. The ramifications for the future of the tribes could rest on this decision.

While these cases take place in American Indian communities, they represent similar decisions made across the US but involve additional ethical considerations from various perspectives from the local tribes. Though, tribes are not homogenous, just as nontribal communities often are not. For example, members of the Great Sioux Nation who extract oil upstream support the pipeline, while tribal members downstream are opposed. Similarly, while some Navajos favor NGS' closure for environmental reasons, the Navajo Nation had considered purchasing the power plant and mine in order to avoid closures, and hundreds of members have marched in protest of the closure at the Arizona state capitol. The challenge is in how to address these multiple interests simultaneously.

Summary of Chapters

Topics in the field of energy ethics span many energy types, phases of the fuel chain, governance and markets, and more, but the field is not yet well-established. The objective of this dissertation is to standardize the methods of applied ethics in the energy sector to strengthen energy ethics as a field of research that could influence energy decisions, including policymaking. Chapter 2 reviews the energy ethics literature and exposes the lack of a guiding document that could serve as a foundational reference tool for energy ethicists. While research that could be called 'energy morality,' 'energy justice,' or 'energy metaphysics' sometimes takes the name 'energy ethics,' these studies do not produce action prescriptions in most cases, as applied ethics does. I argue that convoluting these terms under the general moniker of 'energy ethics' disguises that different methods of analysis are being conducted. This conflation of concepts can confuse researchers not trained in applied ethics and would not be useful as a guide for

action as more direct, critical evaluation can provide. I do not claim that these other research perspectives are not useful; I only suggest that applied ethics is more action-oriented, rather than strictly theoretical or otherwise abstract, as some research can be. Although foundational work has been created by energy ethicists which defines energy ethics and begins to demonstrate the methods of applied ethics, the definition and frameworks provided do not conform to conventions in the broader field of (general) ethics (i.e., Frigo 2017; Sovacool and Dworkin 2014). To strengthen these foundations, I reinvent energy ethics with a new definition and more comprehensive ethical frameworks, using the same classic ethical theories – virtue ethics, deontology, and consequentialism – that are then demonstrated through case studies in subsequent chapters.

Chapter 3 evaluates whether the construction of the Dakota Access Pipeline was ethical. I use the applied energy ethics frameworks of the three major ethical theories described in Chapter 2 as well as a framework derived from Lakota Sioux ethics. The analysis more strongly opposes the pipeline's construction due to a lack of spill prevention and response plans, disrespect of concerns of tribal members and temporary workers, and impacts of dangerous climate change due to oil combustion emissions it facilitates. These aspects need to be addressed in order to qualify the construction as ethical, and until then, the pipeline arguably ought to be kept from operating. While the reasons provided in the case are not novel, the process of ethical evaluation that reveal the reasons that justify the competing stances (for and against construction) is different from how scholars have framed their research of the case. I derive the relevant action

prescription for the case by pointing out the aspects necessary to change in order to make the pipeline construction ethical.

Chapter 4 evaluates whether the Navajo Nation's transition to a solar economy is ethical. I use the three major ethical theories and additional frameworks derived from Navajo and Hopi ethics. While the analysis favors the transition to solar due to providing for tribal members' needs, respecting autonomy by asking permission to build on tribal members' land, and for a moderate pace that avoids bankruptcy, there are also caveats. Care should be taken in selecting photovoltaics with reduced human and environmental health impacts, and planning for end of product life would decrease intergenerational concerns, since these conditions could qualify the action as unethical. Again, it is not necessarily the case that the reasons within the arguments for and against the transition to a solar economy are novel. However, through this evaluation, not only are these reasons made explicit, but the justification from various ethical theories and indigenous perspectives that explains why and how those reasons constitute ethically salient aspects of the case is the novelty of the applied energy ethics analysis.

Chapter 5 concludes with a summary that might serve as a foundation for future energy transition studies. I offer new directions for research to expand energy ethics to new case studies and look forward to how ethical analysis might be incorporated into decision-making and policymaking. The dissertation is part of my series of projects working to improve energy systems with the greater purpose of making lives better through more ethical and sustainable decisions.

CHAPTER 2

REINVENTING ENERGY ETHICS

Introduction

The field of energy ethics does not yet have a systematic approach for prescribing actions in the energy sector, and without it, this research has less potential to be impactful than it might have. To make their work more useful for decisionmakers and to have their action prescriptions adopted in energy decisions, energy ethicists' research (e.g., Geerts 2017; Sovacool and Dworkin 2014; Frigo 2018; and others) should engage action decisions directly and explicitly and should formally evaluate the merits of those actions.

In this chapter, I reinvent energy ethics as a distinct subdiscipline of applied ethics to strengthen the reasoning used in energy decision-making and to increase the possibility of making ethical choices. After a brief summary of my argument and the motivation for it, the chapter has three main sections in which I review challenges and propose a new approach for addressing them. In the first section, I review the energy ethics literature and positive examples of applied ethics which serve as a starting point for understanding ethical analysis in the energy sector. In the second section, I argue that the literature is missing a guide for applied ethics, which is the need I begin to address in this dissertation. In the third section, I redefine energy ethics and present a structured approach for applied energy ethics, using ethical principles, such as those of the three major, classical categories of ethical theory—virtue ethics, deontological theory, and consequentialism. These frameworks provide a basis for applied energy ethics that overcomes the objections I raise to the existing definitions and frameworks. I explain the

challenges presented by energy ethics today and propose a different way of analyzing ethics through applied principles to respond to those challenges.

A Call for Action

To sharpen the arguments presented in the field of energy ethics to the crux of their conflicts and to strengthen action prescriptions into ethical obligations, we need a standardized methodology for making ethical analysis explicit. No devoted journal or citations among authors organize insights from one author or case to another. It is difficult to locate the literature for this reason. Some energy researchers might use normative words, like ‘rights,’ ‘fair,’ ‘wrong,’ ‘harm,’ ‘benefit,’ ‘should,’ ‘ought,’ ‘must,’ etc., colloquially without providing the principled analysis that constitutes applied ethics. To serve my overall thesis related to strengthening ethical reasoning in the energy sector, I argue that energy ethics does not have a standardized way of determining prescriptions for ethical action. While energy morality, energy metaphysics, or energy justice are often subsumed under the moniker of ‘energy ethics,’ these studies are not usually equipped to provide action prescriptions. I distinguish my work from other energy ethicists through distinct terminology and methods with distinct analytical tasks (i.e., Frigo 2017; Sovacool and Dworkin 2014). The more distinct terminology I use highlights those differences. With this new definition, standardized ethical frameworks, and new cases in subsequent chapters of this dissertation, I begin to work toward the goal of providing the field with a guide to improved ethical analysis.

Energy Ethics Today

To survey the field, I review three prominent aspects that characterize energy ethics research, including: its diversity of topics, its focus on the impacts of energy consumption on our lives, and its underlying ubiquity that sometimes goes unnoticed but at other times is what relates all of nature and provides the meaning of life.

Diversity of Topics

A diverse collection of articles addresses ethical issues in the energy sector (i.e., Kasperson et al. 1980; Kermisch and Taebi 2017). While ethical issues are commonly discussed across energy research in many disciplines, only a few dozen authors use the term ‘energy ethics.’ However, the field is much broader because many authors wrestle with social issues in the context of energy research, using ethical terminology and notions loosely, implicitly, or in colloquial senses (e.g., Cottrell 1955; Cook 1976; Vale 1986; Guy and Shove 2001; Nader 2010; Verbong and Loorbach 2012; Miller et al. 2015; Pasqualetti et al. 2016). Energy ethics spans all types of energy and fuels, the entire supply chain from extraction to wastes, various infrastructures, technologies, storage alternatives, energy markets and services, and more. It is a growing field of research, with recent special journal issues including *Energy Research and Social Science* (2017, Volume 30) and *Relations: Beyond Anthropocentrism* (2018, Volume 6). Energy ethics has not been limited to the work of philosophers, as anthropologists, religious scholars (e.g., Rasmussen et al. 2011; Peppard et al. 2016; Biviano 2018), and journalists frequently study these issues. The literature includes case studies throughout developed and developing countries across the world and their many cultures. A recent literature

review summarizes the field in a similar way to the way I discuss it here (i.e., Frigo 2018).

Nuclear energy ethics was frequently studied in the 1970s, and this topic of research is once again gaining attention because of an earthquake and subsequent tsunami that caused nuclear reactor meltdowns Fukushima Daiichi Nuclear Power Plant in Japan on March 6, 2011. The disaster spurred public outcry against nuclear power plants as people generally viewed this outcome as unacceptable, thereby condemning this energy source as unethical. This disapproval contributed to a campaign in Germany to eliminate nuclear power from the national portfolio, which is currently halfway to its goal. The disapproval led to a global downturn in the market, causing Westinghouse Electric Company, a leading nuclear energy company, to file for bankruptcy in 2017 and other nuclear power plants to be decommissioned rather than renewed. At least two new constructions in the US were recently abandoned rather than completed (Kennedy 2017; Legere 2018; Plumer 2017). In the wake of this sudden shift in the nuclear energy market, some authors have renewed debates over nuclear energy's ethical merits (Dieck-Assad 2012; Löfquist 2013; Hillerbrand and Peterson 2014; Andrianov et al. 2015; Kyne and Bolin 2016; Kermisch and Taebi 2017).

Authors often portray nuclear energy as ethical in some regards, with benefits of providing abundant, clean energy, but unethical due to risks associated with radioactive waste and the possibility of accidental disasters (Löfquist 2013; Hillerbrand and Peterson 2014; Kermisch and Taebi 2017). For instance, some scholars weigh these risks against the capabilities or freedoms provided by the energy that is generated (such as mobility or extra time granted due to the convenience of electric appliances), using Amartya Sen and

Martha Nussbaum's 'capabilities approach' (see Robeyns 2011) (Hillerbrand and Peterson 2014; Kermisch and Taeibi 2017). Sen and Nussbaum discuss well-being as capabilities available to an individual (Robeyns 2011). As these authors view it, more freedom of opportunity signifies a comparatively better life and a comparatively better energy source, and thereby a more ethical choice. Another nuclear energy ethicist cautions against making ethical assumptions based on probabilities of risk that rely exclusively on scientific models, especially regarding energy matters involving high uncertainty, because such reliance presumes that the scientific assumptions are reasonable, though they might not be (Brett-Crowther 1980). Instead of scientific models, surveys of potentially impacted stakeholders can also be used to gauge risk. Just as the science is sometimes uncertain, the related ethics might also be disputable. For this reason, some scholars recommend following a precautionary principle, which entails planning for a worst-case scenario (Rasmussen et al. 2011). As the nuclear energy topic demonstrates, a variety of ethical considerations can be taken into account within energy ethics' analyses.

Fracking, wind energy, and waste-to-energy are energy sources that provoke ethical controversy but have received less attention than nuclear or oil. Some of the arguments related to these energy types are reviewed here. One ethicist describes fracking as eco-blackmail because the allure of short-term revenue gains disguise long-term, negative impacts on public health (Cotton 2017). Another scholar supports fracking using "just war theory," using metaphors of a "justified continued use of force" (self-defense to protect one's livelihood), of "just cause" associated with selling natural gas to poor countries ("intervening to save a neighbor"), and of "proportional response" to harm

(e.g., poverty, oppressive governments, and impacts of climate change) (Peppard et al. 2016). As we can see, the reasoning of these two authors is very different.

In wind energy ethics, mistakenly assuming that national views on renewable energy coincide with local views hides a power discrepancy, and these underlying tensions can derail wind energy construction planning (Howe 2014). This ethicist condemns the paternalistic energy infrastructure construction as disrespectful, even if the idea is well-intentioned, since it imposes an energy source on a population without consent. Locals might protest such installations due to disagreeing with who is in power, a lack of ownership, share of profits, benefits, or inclusion in decision-making, or disruption of culturally-important locations. With similar implications concerning paternalism, an author surveyed Germans regarding waste-to-energy alternatives and found a public preference for scenarios including high-adoption of waste-to-energy infrastructure. However, these scenarios seem unrealistic due to political opposition. Now, the community must determine whether it can be ethical to settle with a second-best option (Renn 2003).

In a special journal issue on energy ethics, in *Relations: Beyond Anthropocentrism* (2018, Volume 6), scholars use principles from Braai, Ubuntu, and Annang (African philosophies), vitalism (a philosophy valuing all life), and Catholic ethics, presenting an eclectic mix (Ibanga 2018; Bethem 2018; Biviano 2018). Energy ethicists discuss a multitude of energy topics and support their views from a variety of ethical perspectives.

Impacts of Energy on Livelihood

Energy ethicists frequently discuss energy consumption as a significant determinant of our livelihood (the actions we do) and its impacts on well-being (how our lives are going) as an ethical matter (e.g., Forde 2017; Geerts 2017, 2018; Kesselring 2017; Mitcham and Rolston 2013; Tidwell and Smith 2015). Scholars distinguish two types of energy ethicists. *Type I* values energy production “as a virtue” and assumes coupled growth between consumption and well-being (Mitcham and Rolston 2013, 316). This perspective implies that “human beings have a categorical obligation to maximize energy production” (Mitcham and Rolston 2013, 316). *Type II* questions that linear relationship, contending that “equity and energy can grow concurrently only to a point. [...] Above this threshold, energy grows at the expense of equity” (Mitcham and Rolston 2013, 318). To *Type II* energy ethicists, “energy is argued to be at most a qualified rather than an unqualified good,” since “after crossing a certain threshold, increasing energy production and use reduces the quality of life” (Mitcham and Rolston 2013, 318). *Type I* energy ethicists conform to a traditional view in the energy sector, while *Type II* is critical of historical norms. Because of these two different accounts, energy consumption and its impact on well-being are controversial, and because our consumption impacts others, this controversy is an ethical one.

Energy security is also ethically controversial. For instance, while 78% of households in Zambia have “green” energy (solar and bio-based fuels), the remaining 22% of households lack energy access altogether (Kesselring 2017). Although 94% of Zambia’s national energy is generated from hydropower, more than 50% of the nation’s energy is designated to be used for copper mining rather than residential use (Kesselring

2017). The discrepancy between those who have clean power (including both residential and commercial users) and those who have none is a justice issue; the determination of whether the government has an obligation to provide energy access is an ethical issue. However, some scholars question the ethical merit of providing energy access while also questioning whether energy security is necessary and attainable (Tidwell and Smith 2015). Just as greater energy consumption is not necessarily better, increased energy access might also be questionable. Some scholars report that people living off-grid in Wales have had to find ways to “cope with abundance”; in practice, they use all of the energy they generate (Forde 2017, 91). Their condition creates questions of whether overproducing energy or wasting energy is unethical (Forde 2017, 91).

As more refined data have been collected, scholars find that “the form and amount of energy consumption in modern society may inhibit rather than enable human flourishing” (Geerts 2017, 521). In one example of *overefficiency* – when performance gains involve tradeoffs – overefficient heating which only heats rooms in use lowers the quality of life in the unheated rooms (Geerts 2017, 533). In another example, thinner bicycle tires are more aerodynamic but can inhibit riding in certain places or for long distances (Geerts 2017, 533). These examples question whether technological progress is always coupled with improved well-being. Furthermore, energy ethicists oppose the dichotomy between boundless consumerism and ecofrugality with a third option— qualitative abundance (Geerts 2018). That is, consumers need not feel torn between ever-increasing energy use and sacrificing for the sake of conservation, since lives can be improved by employing smart energy efficiency initiatives and with clean energy

generation from renewables. Ethicists are no longer taking it for granted that any amount of energy produced or consumed is necessarily good and are scrutinizing energy use.

Ubiquity of Energy Unites Us

While energy ethicists recognize that energy is the capacity to do work, they sometimes discuss energy in an abstract, theoretical sense. Energy is so central to our lives that it is more than just a tool (e.g., Chatti et al. 2017; Groves et al. 2017; Rasmussen et al. 2011; Surorov and Suvorova 2015); it is a source of meaning or purpose. Energy is given a spiritual, metaphysical, omni-present, and existential importance (e.g., Chatti et al. 2017; Surorov and Suvorova 2015). Energy is within all living organisms and enables our actions. Not only does energy animate us, some ethicists say that energy *is* us—all living beings and all matter *are forms of energy*. So, not only are energy decisions fundamental determinants of a good life in practical terms, energy researchers consider these decisions as affecting the way the universe shapes us and the way we shape the universe. While some might consider these ideas radical, they reflect some Eastern perspectives (such as some forms of Taoism) and other popular views in environmental ethics. Applied ethicists in other fields also try to contextualize their research.

Energy ethicists find meaning and interconnection through energy. Some discuss energy efficiency as a compelling imperative for a “personal lifecourse transition” (i.e., a lifestyle change) beyond the practical concerns of avoiding wastefulness (Groves et al. 2017, 72). They hope that the study of ethics helps students to articulate their values and to discover or make opportunities to operationalize their goals (Groves et al. 2017, 72).

Some ethicists see energy decisions related to mitigating climate change as the most important way to spend our time and boldly exclaim, “If you’re not spending every waking hour working on this, you’re probably not spending enough time on it” (Rasmussen et al. 2011, 879). Other ethicists present an abstract reductionist view, called “the energy-informational viewpoint,” which holds that “the general substance underlying the existence and development of the Universe and Man is energy; energy is the unique and universal nature of all being; everything is reduced to the amount and quality of energy;” furthermore, as they see it, “the main mission of humans in [the] Cosmos is generating high-quality harmonised energy; all human activity should be subordinated to solving this strategic problem” (Surorov and Suvorova 2015, 149, 157). In this view, “high-quality harmonised energy” refers to such things as love and peace, referring to the feelings or “good vibes” of these states as an admirable aim. Scholars see a shift from descriptions of energy as “produced and utilized by living organisms” and as “vital energy, life force,” to “energy *contained* in living or recently living biological organisms” (emphasis added) (Chatti et al. 2017, 32-33), which expresses a shift from a metaphysical unity with energy to treating energy as an external instrument. They assert that “bioenergy can be less a force of life and more a threat to life” (Chatti et al. 2017, 32-33), and they would rather see a return to a sense of greater unity with nature through energy systems that help life to flourish. In these ways, energy ethicists portray a motivation to not only change perspectives, but also actions and structures within energy systems.

No Guidebook for Applied Energy Ethics Exists

Historically, ethicists have only inconsistently engaged with energy decisions; so, the notion of integrating applied ethics into energy decision-making may seem foreign or even superfluous. Also, no foundational document exists to provide a common thread to the diverse subjects analyzed. There are no conventional standards and no traditions or precedents from which to draw. While one author has defined energy ethics and others provide an example of applied classical ethical theory in a way that could provide a benchmark, I criticize both of these attempts for what I see as significant weaknesses (i.e., Frigo 2017; Sovacool and Dworkin 2014). In this section, I explain that there is no standardized method for creating action prescriptions in the field of energy ethics in three ways. First, I explain the disorganization of the field, in order to help organize it. Second, I recognize that much of energy ethics is not applied ethics and uses different analytical methods. Third, I distinguish energy ethics and energy justice because the two are commonly conflated. Distinguishing between the two addresses a counterargument to my claim that energy ethics has no formal framework because the energy justice framework might be argued as a tool for applied ethics (i.e., Sovacool et al. 2017). I strive to improve the existing foundational work in the field by providing a new definition and standardized, classical ethical frameworks that can help reduce ambiguity in the literature. With these refined tools, I hope to make energy ethics a distinct field of research that may be used by researchers and decisionmakers alike.

Energy Ethics Is Disorganized

I criticize energy ethics as a disorganized field of research for three reasons, including: a lack of rules for choosing principles and cases, abstraction, and lack of definition.

Energy ethics is characterized by a plethora of topics. The diversity of topics and the principles used to analyze cases signifies growth of this young field, but also contributes to a sense of discontinuity across the literature. With such a vast span of topics and so many reasons used to support an argument, it can be difficult to compare one article to another. It is uncommon for energy ethicists to cite one another. In addition, authors do not typically use shared reasoning, which makes it difficult to determine whether they agree. So, with the variety of their case selection and evaluation methodology, it is difficult to identify the commonalities in their research beyond the recognitions that they are all speaking of energy and ethics in some manner. Speaking in one voice and collaborating on the most controversial topics can help to strengthen ethical reasoning in energy decisions. This diversity is not necessarily bad; it expands the field to new areas of study that had not been previously addressed. So, I am not advocating for eliminating diversity, but there ought to be conventions regarding which issues to address, how to address them, and how we should prioritize them.

Without standardization, unconventional principles may be used to justify a preconceived stance, rather than performing an unbiased analysis to determine ethical merit (e.g., Battistutta 2018; Delorme 2018; Feltrin 2018). Using unconventional principles requires justification and can potentially turn away readers who refute the relevance of those principles. Standardized principles might become perceived as

repetitive or perhaps boring, but they help to organize the field. Standardization also helps instructors who do not have to restart each case by teaching new principles. Sometimes, ethicists exclude counterarguments altogether which gives the misleading impression that the subject is not controversial (e.g., Delorme 2018; Feltrin 2018; Kass 2016; Meyer 2015). In addition, managing the variety of ethical content can be difficult for energy ethicists. Adding standardization helps to unite the field.

Energy ethicists are sometimes too abstract to be practical, which is typical of abstract philosophy (e.g., Szeman and Boyer 2017) but unlike discussions of energy systems or energy service which include decisions, actions, and impacts (e.g., Forde 2017; Geerts 2017, 2018; Kesselring 2017; Tidwell and Smith 2015). Theorizing at a global level and criticizing human energy consumption at large is too abstract but characterizes how some energy ethicists discuss the Anthropocene (e.g., Colebrook 2017; Jamieson 2017). The ‘Anthropocene’ identifies the era since the 1950s in which human society has become a dominant, geological force influencing the climate, surface, oceans, species, nutrient cycles, and other aspects of the environment (Crutzen and Schwägerl 2011). Although energy systems deserve much of the blame for the degraded state of the environment, they also have a significant role in sustaining healthy lives. Philosophers sometimes speak so generally that the fact that some forms of energy generation and consumption have more ethical merit than others does not arise. While not all energy ethicists have ambitions to influence energy decisions, for those that do, this abstraction is impractical since energy decisions are not made at a global level and since there is no single energy plan for the entire world. Furthermore, there is not one single energy

system, but a collection of many electrical, fuel, market, and technological systems that sometimes overlap.

One scholar has begun to organize the field by providing a foundational definition for ‘energy ethics’; however, the author creates two definitions that are difficult to distinguish (i.e., Frigo 2017). While this work is an important step to grounding the literature in a common terminology, the definitions do not clarify whether energy ethics is a descriptive or critical endeavor (e.g., Frigo 2017). One definition of “energy ethics” suggests it is descriptive: “an open space of discussion about the moral dimensions of energy before the prescription of any normative framework” and “is not an exercise in which scholars impose their own moral views onto those we study” (Frigo 2017, 10; Smith and Mette 2017, 4). A second definition of “ethics of energy” refers to a prescriptive, action-guiding inquiry (Frigo 2017). Along with these definitions, the author proceeds to describe both terms as relative to a group’s culture, which problematically ignores that most ethicists reject cultural relativism (e.g., Rachels 1999) (Frigo 2017). Defining ‘ethics of energy’ (but not ‘energy ethics’) as prescriptive also neglects the precedent set by the *prescriptive* fields of environmental ethics, business ethics, medical ethics, and media ethics (Frigo 2017, 9). Further elaboration provided for these terms conflates ‘ethics,’ ‘morals,’ ‘morality,’ and ‘justice,’ which can be confusing if these terms are separate and distinct. Since the problems of whether energy ethics is descriptive or critical, whether its principles are universal or relative, and whether they are distinct from morality or justice interfere with trying to make the terms ‘energy ethics’ and ‘ethics of energy’ distinct and since the solution the author provides that uses similar

sounding phrases does not make the distinction clear, it seems easier to treat these two terms as synonyms.

There is an important distinction to be made between ‘ethics’ and ‘morality’; while the terms are often used interchangeably, they represent two different research perspectives. This distinction seems to be the motivation behind the attempt to distinguish ‘energy ethics’ and ‘ethics of energy,’ and using different words makes the contrast easier to recognize and follows conventions for distinguishing descriptive and analytical methods (e.g., Frigo 2017). ‘Morals’ and ‘morality’ are descriptive accounts of a group’s views or beliefs, while ‘moral theory’ is the normative study of those beliefs (Gert and Gert 2016). ‘Ethics’ refers to principles that apply universally, and ‘ethical theory’ refers to the critical study of such principles (Gert and Gert 2016). ‘Morality of energy,’ ‘energy morality,’ or ‘energy morals’ would name descriptive anthropological research assuming cultural relativism, and ‘energy moral theory’ or ‘moral theory in the energy sector’ would classify research that is normatively critical and assumes relativism. ‘Energy ethics,’ ‘ethics of energy,’ and ‘ethical theory in the energy sector’ refer to the normative philosophical research which uses a critical and universal perspective.

The distinction between ‘ethics’ and ‘morality’ is important because descriptive ethics and critical ethics are different in objectives and results. Descriptive accounts recall the normative reasoning of a group, asking which considerations influenced a decision (taking the action for granted) and illuminating them more explicitly. Critical ethics research performs a *judgment* of an action, or the reasons used to justify performing it, by asking which features *should* influence the decision or *whether* the action was appropriate. To produce an action prescription, it is not enough to merely

acknowledge the reasons for decisions (as with a merely descriptive account) when the status quo is unacceptable (such as the energy sector's emissions' contributions to global warming) because the *judgment* that the status quo is unacceptable would not appear in a merely descriptive account. The author of merely descriptive research would only tell what happened (or is happening), not what *should* happen. In merely descriptive research, the judgment is left out, while in critical research, the author provides the judgment and ought to also include the criteria for judging.

While I am not saying that a researcher could never do both descriptive and critical research simultaneously or that either descriptive ethics or critical ethics is better, I argue that merely descriptive research approaches are inherently different than critical approaches and produce a different result. Problems arise when authors do not state whether their work is descriptive or prescriptive because it may appear that an author supports an action, but is actually giving no judgment about it. For instance, a detailed description of the Holocaust without acknowledgement of its atrocity could leave a question as to whether the author supports it.

Using the term 'energy morality' for descriptive research and 'energy ethics' for critical research standardizes terminology and clarifies their meaning. To further eliminate ambiguity, we can use 'energy ethics' to identify the field at large and 'applied energy ethics' to identify the particular approach using case studies and ethical theory that mirrors applied ethics work in other research areas (e.g., applied business ethics, applied bioethics, etc.). This proposed change conforms to the precedent used to help clarify similar ambiguities in medical ethics and could help to organize the field of energy ethics (i.e., Sulmasy and Sugarman 2010).

Energy Ethics Is Not Always Ethics

My second justification of the claim that energy ethics lacks a standardized guidebook for creating ethical prescriptions for action is that much of the ‘energy ethics research’ is not ethics and does not prescribe actions. Most energy ethics research is technoscientific, metaphysical, anthropological, or justice-oriented. These fields seldom, if ever, produce action prescriptions; they can be even more distinguished from ethics than morality was in the previous section. Sometimes energy ethics research is standardized, but the standard is not for ethical analysis but for another research discipline. As in the previous section, I do not claim that there is no place or use for these alternative methods of analysis, only that standardizing the terminology can clarify the type of analysis being performed to strengthen action prescriptions in the energy sector.

Energy scholars and philosophers rarely cross fields. Few energy researchers mention ethics, and even fewer philosophers discuss energy (Sovacool 2014, 15; Mitcham and Rolston, 315-316). A scientific perspective may be criticized for ‘ignoring the human element’ when it is too focused on technical matters, but human factors are crucial to ethics. While a scientific understanding can be important for determining which energy alternatives are available or which outcomes can be expected, scientists are not usually trained in ethics, and scientific conclusions are not usually action prescriptions. The methods of science are not usually applied to create judgments about whether actions are right or wrong.

The more abstract energy ethics literature that discusses energy as omnipresent and as a source of meaning and purpose is not ethics, but metaphysics. Like science,

metaphysics does not typically judge behavior. While the metaphysical perspective can help to provide context to energy ethics, it is different from practical decision-making.

Anthropologists contribute to the field of energy ethics nearly as frequently as philosophers do and have an entire special journal issue devoted to this line of research (i.e., *Energy Research and Social Science* 2017, Volume 30). However, energy ethicists note that “anthropologists do talk about ethics, just not as philosophers do” (Frigo 2018). Anthropology uses ethnography, which typically assumes ethical relativism (that justificatory principles can change across cultures), and does not rely exclusively on ethical principles for justification (for instance, cultural considerations such as language and ritual could be more significant). Furthermore, until recently, anthropologists studied the past and present with little to no interest in societies that are invented in an imaginary way (Frigo 2018). In contrast, philosophy is not as physically engaged with cultures (tending to be more theoretical), assumes ethical universalism (that justificatory principles hold true across all cultures), relies almost exclusively on ethical principles for justification, and frequently imagines other possible worlds in thought experiments. Anthropological research is more descriptive, whereas philosophy is more critical. While the line between the two disciplines is blurring as interdisciplinary studies share research methods, anthropologists do not usually engage in universal judgments of behavior.

The special issue on energy ethics published by *Energy Research and Social Science* (2017, Volume 30) illustrates changes in the field of anthropology, in some ways becoming more critical. It reflects a “third generation of anthropology’s engagement of energy” (Boyer 2014, 310). The first generation, Leslie White’s “Energy and the Evolution of Culture” (1943), was one of the first studies of energy’s integral role in

society. The second generation concerned impacts on indigenous rights during nuclear and oil crises in the 1970s and 1980s. Laura Nader's research regarding energy policy, politics, and "the culture of energy experts" serves as a notable exemplar during this era (Nader 1980). In this current generation, anthropology is typified by an "anti-anthropocentric" view, critical of how consequences of energy use and management impact human vitality (Boyer 2014, 316). Within this era, the 'Anthropocene,' anthropologists explore how energy decisions dictate lifestyles. Because of energy's ubiquity, daily choices are dependent upon energy services available or upon the externalities of energy systems, such as smog, water pollution, or altered landscapes. So, while anthropology is more traditionally descriptive, some anthropologists in the energy sector today take a critical perspective (e.g., Lennon 2017).

Yet, anthropologists' work does not utilize ethical principles and is not conducted assuming universalism, as applied ethics does. Anthropological energy ethics is better categorized as 'energy morality.' While I maintain that neither the methods of anthropology or philosophy are better, I only stress that anthropological methods are not as likely to produce action prescriptions. Therefore, anthropological research is unsuitable for the type of guide I argue is missing from the literature or for creating action prescriptions, since this way of thinking is not in the nature of their study.

The last distinction that I make is between energy ethics and energy justice, which is important because energy justice has a framework that might be confused as a guide for energy ethics. Though there are similarities, many elements distinguish the two. Ethics "involves systematizing, defending, and recommending concepts of right and wrong behavior," and justice is generally defined as "what we owe to each other" or

rendering to each person what is due (Fieser 2018; Miller 2017). Although there are times when actions are determined by asking what is owed to others and which types of actions would provide it, there are also times when reasons other than desert are used to deliberate action choices. Ethicists and justice scholars identify their problems differently, have different criteria for selecting solutions, and come to different conclusions about a case. This point is significant because energy researchers sometimes confuse energy justice with energy ethics.

An action can be just without being ethical or ethical without being just, depending on which principles are used to justify those claims. For instance, a proponent of justice might support the death penalty as *just* for a serial killer, but an ethicist might find it problematic to say that the execution of a murderer is ethical, since they are the same action. To give an example from the energy sector, while it might be ethical to give everyone access to free, clean, renewable energy through public funding, it could be considered unjust since some people already paid for solar photovoltaic systems to generate their own energy. Since ‘just’ does not imply ‘ethical,’ and ‘ethical’ does not imply ‘just,’ these notions should be kept distinct.

Appeals to ethics are often considered stronger than appeals to justice. While both terms are inherently normative and have political and mobilizing power, “justice gives way to other values” during collective decision-making, but ethical imperatives are commonly treated as obligatory and are not easily overruled by other values (Miller 2017; Fainstein 2010). For instance, judging an action as ‘unjust’ implies that it might be agreeable if performed differently, but an unethical action is often wrong no matter how it is done. For example, an unjust distribution may be fixed by providing resources in

different proportions than originally proposed, but the label ‘unjust’ does not necessarily imply that it is wrong to distribute such resources. Another difference is demonstrated in that justice principles tend to be contextual, but ethics principles tend to apply in the same way across all cases. For instance, a random lottery may be a just way to distribute food when there is not enough for everyone in a room, but not an appropriate way to distribute paychecks.

Scholars are increasingly urged to incorporate more ethics into energy research to lead decisionmakers into revealing their previously unstated normative views (Miller 2014; Sovacool 2014). I contend that it is imperative to keep energy justice and energy ethics conceptually distinct to encourage proponents of arguments about ethics or justice to more specifically elaborate on the reasoning that supports their conclusions. More explicit arguments improve decision-making by clarifying expressed judgments. I am not proposing that researchers or decisionmakers avoid integrating ethics and justice, and I acknowledge that scholars working in ethics and in justice often seek similar goals, such that their work can be complementary. I argue that since the concepts are different, the reasoning that supports some conclusion as either ethical or just should also be kept distinct. Since reasoning that something is ethical does not always support that it is also just, these arguments can produce conflicting conclusions.

Conflating energy ethics and energy justice can hide an underlying mismatch of principles. For instance, someone might mistakenly infer from justice principles that an action, say decommissioning a power plant, is ‘unethical.’ This judgment implies that decommissioning is wrong. However, this person might instead mean that the decommissioning is ‘unfair’ (unjust) but must be done (is the right thing to do). In other

words, while the action is viewed favorably, perhaps the specific strategy chosen for decommissioning is undesirable, or perhaps, the person is merely disappointed and wishes that the decommissioning was not necessary, for prudential or other reasons. Yet, when presenting an argument using a framework of certain theories or using labels ‘(un)just’ or ‘(un)ethical,’ normative cues are invariably conveyed to the audience, and these cues might misrepresent the presenter’s position.

This type of situation can be demonstrated through the closure of the Navajo Generating Station (NGS). Someone might believe that NGS should not close because of the hardships the Navajo employees could face in relocating, giving this evaluator the perception of unfairness. However, at the same time and for different reasons, that same evaluator might perceive the closure as the right thing to do (ethical) because of considerations of climate impacts caused by emissions.

Not only is justice sometimes confused with ethics, but sometimes different ethical theories are confused for one another. For instance, deontology is sometimes confused with consequentialism. Deontology emphasizes *intentions* as the salient criteria, while consequentialism emphasizes the *consequences of actions*. Consider energy negotiations. If the negotiators are unclear about the premises on which their positions are based, their conclusions will be faulty. This problem has been described in international climate conference negotiations in which one party inadvertently neglects effects and overemphasizes motivations, while the other party is hung-up on effects and neglects motivations (Ikeme 2003). In these cases, these debaters are talking past one another.

While energy justice is sometimes labeled ‘energy ethics,’ ethics and justice might be used to evaluate cases by asking different questions and to come to different

conclusions. When we conflate energy ethics and energy justice, we overlook the values and principles that (sometimes implicitly or unconsciously) guide decision-making. Energy researchers are beginning to notice the inherent differences between justice and ethics.

Energy justice and energy ethics are often conflated, and some of the rising popularity of energy ethics is due to the growing prominence of energy justice research. However, the framework of energy justice created by researchers in the United Kingdom (Table 1) is not a standard guide for applied energy ethics due to the differences in these fields such as the criteria used to determine ethical and justice conclusions, as well as the verdicts themselves (see Sovacool et al. 2017; Jenkins, Sovacool, and McCauley 2018; Jenkins, McCauley, and Warren 2017; Jenkins, McCauley, and Forman 2017; Jenkins 2016; Jenkins, Heffron, and McCauley 2016; Jenkins, McCauley, Heffron, Stephan, and Rehner 2015; Jenkins, McCauley, Heffron, and Stephan 2014; Heffron, Johnston, McCauley, and Jenkins 2013; McCauley, Heffron, Stephan, and Jenkins 2013). While there is a larger energy justice literature beyond these researchers, this framework is becoming the standard of its field, and even when not used in its entirety, elements of it are used by other authors. This energy justice framework provides principles and categories of justice to determine how problems are identified and solutions are evaluated. The framework draws heavily from environmental justice as the 10 principles for energy justice are an adaptation of the 17 principles of the environmental justice movement (Table 2) (LaBelle 2017; McCauley and Heffron 2018; Jenkins 2018).

Table 1: Conceptual Overlap Between Principles of Energy Justice and the Environmental Justice Movement

Energy Justice	Description	Corresponding Environmental Justice Principle
1. Availability	People deserve sufficient energy resources of high quality (suitable to meet their end uses)	12, 17
2. Affordability	All people, including the poor, should pay no more than 10% of their income for energy services	12, 17
3. Due process	Countries should respect due process and human rights in their production and use of energy	5, 7, 8, 9, 11, 13, 15, 16
4. Transparency and accountability	All people should have access to high quality information about energy and the environment and fair, transparent, and accountable forms of energy decision-making	5, 6, 7, 9, 10, 13, 14, 15
5. Sustainability	Energy resources should be depleted with consideration for savings, community development, and precaution	3, 4, 6, 9, 14, 15, 17
6. Intragenerational equity	All people have a right to fairly access energy services	2, 12, 16
7. Intergenerational equity	Future generations have a right to enjoy a good life undisturbed by the damage our energy systems inflict on the world today	2, 4, 6, 8, 9, 11, 13, 15, 16
8. Responsibility	All actors have a responsibility to protect the natural environment and minimize energy-related environmental threats	1, 3, 4, 6, 9, 10, 13, 14, 15, 17
9. Resistance	Energy injustices must be actively, deliberately opposed	9, 10, 14, 15, 17
10. Intersectionality	Expanding the idea of recognitional justice to encapsulate new and evolving identities in modern societies, as well as acknowledging how the realization of energy justice is linked to other forms of justice e.g. socio-economic, political and environmental	1, 2, 11, 13, 16

(Information for this table retrieved from Sovacool et al. 2017)

Table 2: Principles of the Environmental Justice Movement

1. Protecting earth and all species	Environmental justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.
2. Anti-discrimination	Environmental justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.
3. Sustainable resource use	Environmental justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things.
4. Safe nuclear development	Environmental justice calls for universal protection from nuclear testing, extraction, production and disposal of toxic/hazardous wastes and poisons and nuclear testing that threaten the fundamental right to clean air, land, water, and food.
5. Self-determination	Environmental justice affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples.
6. Accountability	Environmental justice demands the cessation of the production of all toxins, hazardous wastes, and radioactive materials, and that all past and current producers be held strictly accountable to the people for detoxification and the containment at the point of production.
7. Equal participation	Environmental justice demands the right to participate as equal partners at every level of decision-making including needs assessment, planning, implementation, enforcement and evaluation.
8. Safe working environment	Environmental justice affirms the right of all workers to a safe and healthy work environment, without being forced to choose between an unsafe livelihood and unemployment. It also affirms the right of those who work at home to be free from environmental hazards.
9. Victim compensation	Environmental justice protects the right of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care.
10. Government violations	Environmental justice considers governmental acts of environmental injustice a violation of international law, the Universal Declaration on Human Rights, and the United Nations Convention on Genocide.
11. Indigenous rights	Environmental justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination.
12. Restoration and fair access	Environmental justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and providing fair access for all to the full range of resources.
13. Informed consent	Environmental justice calls for the strict enforcement of principles of informed consent, and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of color.
14. Opposing corporate destruction	Environmental justice opposes the destructive operations of multi-national corporations.
15. Opposing oppression	Environmental justice opposes military occupation, repression and exploitation of lands, peoples and cultures, and other life forms.
16. Intergenerational equity	Environmental justice calls for the education of present and future generations, which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives.
17. Conscious consumerism	Environmental justice requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and to produce as little waste as possible; and make the conscious decision to challenge and reprioritize our lifestyles to insure the health of the natural world for present and future generations.

(Information for this table retrieved from Carder 2018)

These principles were originally influenced by the justice theories of prominent philosophers, such as John Rawls, Amartya Sen, and Martha Nussbaum (Rawls 2001; Sen 1999; Nussbaum 2011). One of these theories is ‘justice as fairness,’ which prescribes social systems that give the best advantage to the least well-off in the community as long as everyone’s equal claims to liberty are recognized, promoting equity and acknowledging that anyone could end up in such a condition at any time (Rawls 2001; Beatley 1984; Langhelle 2000). Justice as fairness rests on two principles:

- 1) Each person has the same infeasible claim to a fully adequate scheme of equal basic liberties, which scheme is compatible with the same scheme of liberties for all; and
- 2) Social and economic inequalities are to satisfy two conditions: first, they are to be attached to offices and positions open to all under conditions of fair equality of opportunity; and second, they are to be to the greatest benefit of the least-advantaged members of society (the difference principle) (Rawls 2001, 42-43).

Rawls’ theory shares a similarity with deontological ethical theory in that they both include respect of others as an important principle, but Rawls’ theory also is distinguishable from consequential ethics. Consequentialists select from alternatives based on maximizing the net collective good, and Rawls’ criterion selects the option that is best for the worst-off individuals. In Rawls’ theory, the collective good and impacts on those who are better-off are less significant concerns. Therefore, Rawlsian justice scholars and ethicists can disagree.

Another justice theory, the ‘capabilities approach’ developed by Amartya Sen and Martha Nussbaum, is integral to the Human Development Index (see Robeyns 2011). This theory labels basic opportunities to flourish as ‘capabilities’ defined as “the ability to satisfy certain elementary and crucially important functionings up to certain levels”

(Sen 1992, 45), and often equates capabilities to “freedoms” or “real opportunities” (Robeyns 2011). Capabilities differ from the related concept of ‘functionings,’ which are “various states of human beings” and “activities that a person can undertake” (Sen 1985). That is, functionings are “beings and doings,” and capabilities are “the opportunities to achieve those beings and doings” (Robeyns 2011). Nussbaum’s corresponding theory of justice entails providing essential capabilities to all people for a decent life (Robeyns 2011).

While the notion of capabilities for a good life is similar to Aristotle’s pursuit of human excellence and flourishing, Sen and Nussbaum’s theory is not based on character, habit, and virtue. That is, the capabilities approach is not a theory describing how one ought to live in order to be their best or how to act ethically; it is a theory of how to organize society (justly). Nussbaum’s theory of justice is also similar to a rights-based ethics approach (a type of deontological ethics), but while rights-based ethics can inform individual action and entails responsibilities within daily life, the capabilities approach is generally limited to responsibilities of governments (Robeyns 2011). Furthermore, while human rights are typically considered to be universal, Sen refers to “normal capabilities” (i.e., universal rights) as “absurd” and promotes a more contextualized theory (Sen, 1984, 311) (see also Sen 2004, 2005 for further distinctions).

Various categories of justice are used within this energy justice framework (i.e., provided by Sovacool et al. 2017). One definition of “energy justice” describes the central role of two of these categories: “a global energy system that fairly disseminates both the benefits and costs of energy services, and one that has representative and impartial energy decision-making” (Sovacool and Dworkin 2015, 436; see McCauley et

al. 2018 for an alternative definition). Distributive justice concerns costs and benefits and refers to equity, and procedural justice refers to inclusive stakeholder engagement (Ikeme 2003). Distributive justice is used to evaluate issues such as whether someone is disproportionately gaining at someone else's expense, whether someone is disproportionately harmed, or whether everyone gets a fair share of a resource. Distributive justice typically concerns outcomes; procedural justice concerns the process of deciding. Providing adequate time for public comment and giving proportional weight to stakeholders' interests are examples of procedural justice. A just process does not guarantee just results; so, decision-makers must consider both distributive and procedural justice (Fainstein 2010; Klinsky and Golub 2013).

The categories of justice can help to distinguish ethics from justice more generally. While it is common to judge outcomes as just or unjust, it is awkward to judge them as ethical or unethical, according to the distinct conventional usage of the concepts. Even consequentialists, the ethicists most concerned with outcomes, judge *action* as ethical or unethical, not the *outcomes of the action*. According to consequentialism, outcomes are judged as good or bad, or positive or negative, leading to the conclusion that the action is either ethical or unethical. To further emphasize the distinction, there is a difference in *currency* between justice and ethics (Miller 2017). That is, one aim of analysis in justice is proportional distribution, whereas the aim in ethics is typically either on an individual or a collective whole (Miller 2017). Furthermore, a just distribution is not guaranteed to follow from an ethical action, as the action may be approved for other overriding reasons of ethical merit. Similarly, a just distribution need not follow from an ethical deliberation, as deliberation is simply one type of action. For example, the

democratic process sometimes leads to unsettling policies. Likewise, a just negotiation is not necessarily ethical, as it may be wrong to negotiate such things, and just deliberations need not produce (decided and acted on) ethical action. This latter instance may be due to misinformation, a lack of will to act, a lack of consensus, or the wrongness of the decided action.

Recognition, corrective, and restorative justice are additional categories discussed in the literature, but these categories may not be distinguishable from distributive and procedural justice. Recognition justice, acknowledges that different people come from different backgrounds, have different needs and abilities, and have different feelings, and could be described as either procedural or distributive justice. If “treating unequals unequally” means giving them different consideration in decision-making, then recognition is a type of procedural justice. If their differences suggest they deserve different (amounts of) resources, then recognition is a type of distributive justice (Lucy 1981, 448). Corrective justice and restorative justice can be classified as subsets of distributive justice, since they involve allotting either a punishment or compensation for a harm, respectively. Energy justice scholars often use this framework of principles and categories of justice to retain consistency of method in their research, but energy ethics lacks such a basis.

Critique of Prior Accounts of Applied Energy Ethics

This dissertation is different from previous attempts to integrate applied ethics into energy research (e.g., Sovacool and Dworkin 2014; DesJardins 2001; Miller 2014). I conduct a more orthodox, systematic analysis using the three major, classical ethical

theories – virtue theory, deontology, and consequentialism – which are my standardized frameworks for applied energy ethics. For instance, some authors do not clearly distinguish ethics from justice (e.g., Miller 2014). Case studies do not always contain complete analyses (e.g., DesJardins 2001; Miller 2014). Rhetorical questions leave too much unanswered or assume that the ethical merit is obvious (e.g., DesJardins 2001). Occasionally, ethical theories are intermixed without clarifying the reasoning. That is, sometimes an author begins a statement describing “responsibilities,” which gives an impression of an ethical duty, but rather than support the reasoning with deontology, describes consequences that are better associated with consequentialism (e.g. DesJardins 2001). My work is different from others due to my explicit use of theory to guide less-experienced ethicists and to comprehensive case studies that present arguments in favor of and against the action.

One prominent attempt to integrate applied ethics into energy research lacks significant aspects of each of the three theories used (i.e., Chapters 3-5 of Sovacool and Dworkin 2014). While I am critical of this attempt, the document establishes a foundation for energy ethics research, and I suggest that revisions to update the methods can better serve as a foundational guiding document. Although the authors use the three major ethical theories, the versions used are not fully comprehensive versions of classical theory. For instance, in an account of virtue ethics, energy efficiency is described as a search for excellence; inefficiency is labeled a vice and assumed to be unethical absolutely (Sovacool and Dworkin 2014). A more conventional view defines virtue as an intermediate between vices of excess and deficiency, favoring actions done in moderation (Aristotle 1984). In the conventional view, actions are not right or wrong absolutely, but

instead, are wrong when habitually done in excessive or deficient amounts. It is more likely that the conventional view would allow some energy inefficiency (such as losses during transmission or conversion, since they are inherent to the physics of technology), without supporting radical wastefulness.

In the proceeding chapter, their account of Kantian deontology exclusively focuses on respect, neglecting two further tests of duty ethics, which are universalizability and intentionality (i.e., Sovacool and Dworkin 2014). Furthermore, the application of Kantianism is written in terms of rights violations, which convolutes patient-centered rights theory with Kant's agent-centered theory (Alexander and Moore 2016). This criticism is not to suggest that Kant never wrote about rights, but rights are not typically treated as a prominent feature of his work; so, it mischaracterizes the theory. Furthermore, neglecting to perform all three tests of Kantian ethics can lead to a faulty conclusion about the target action's ethical merit.

Lastly, one account of consequentialism rejects fossil fuels for having negative costs or harms while lauding renewable energy for its benefits (i.e., Sovacool and Dworkin 2014). While these aspects are certainly significant, this analysis could be strengthened by noting that fossil fuels also have benefits and that renewables also have harms. These additional details weigh both the pros and cons of each alternative for a complete comparison.

These theoretical accounts do not give a conventional portrayal of applied ethical theory. From them, evaluators might adopt incomplete or mistaken methods of analysis, which are more likely to lead to faulty conclusions. Practicality, impact, or credibility

might also be hindered. If it is to be properly supportive, energy ethics could use a new, standardized foundation.

Reinventing Energy Ethics

Ethical theory has only been applied to general case studies within the last several decades. In response to “apparent inattention to practical moral problems that arose in the wake of significant social and technological transformations” in the 1970s, “the field of applied ethics is now a well-established, professional domain sustained by institutional research centers, professional academic appointments, and devoted journals” (Axtell and Olson 2012, 183). While the rules of deontology and consequentialism were the first to be applied to case studies, virtue ethics followed in the late 1980s and is now also a distinct, mainstream approach (Annas 2015).

Professional ethics is studied and practiced in medicine, business, law, media, social work, engineering, sport, education, and environmentalism, but it has yet to be applied extensively to the energy sector (e.g., Beauchamp and Childress 2012; Johnson 2017; Pollock 2016; Harris et al. 2013; Day 2005; Simon et al. 2014; O’Neill et al. 2007). The absence is striking because energy issues can be just as life-threatening as medical issues and just as significant economically as business and law (Lim et al. 2012; Sovacool and Dworkin 2014; Teller-Elsberg et al. 2016; Maricopa County Public Health 2018). With lives on the line, some are calling for mandatory ethical training and “Hippocratic oaths” for energy managers, technicians, and decision-makers (Popper 1969; Probert 1976; Kashmeri 2017; Murphy 2017).

Proponents requesting more integration of energy ethics into research and decision-making are not trying to tell energy managers what to do paternalistically.¹ However, because energy decisions “will likely determine which people, plants and animals will live and die,” they “raise the most momentous ethical questions” (Brown 2003, 229). The claim that “most of the analysts working on global warming issues are not trained in ethics” can similarly be said of energy researchers and decisionmakers (Brown 2003, 234). Therefore, making energy ethics a specific focus can help to provide action-oriented, theoretical support to help overcome the challenges of incoherence and abstraction.

This dissertation defines applied energy ethics:

Applied energy ethics is the analysis of questions of right and wrong using a framework for prescribing action and proper policies within private and public energy decisions.

Put another way, ethical analysis of cases from the energy sector can be described as crafting philosophical arguments with positions in favor of and opposed to alternative actions. These arguments are created by critically analyzing the action’s merits according to given principles with the purpose of supporting a prescription for action. This definition has been crafted using similar language from definitions of business ethics, medical ethics, and environmental ethics to retain continuity with these related fields.

Principles and Application Methods of the Three Major Ethical Theories

While applying ethics to case studies is relatively new, the most commonly studied ethical theories have survived centuries of scrutiny to retain their prominence.

¹ This worry was similarly expressed when agricultural ethics was introduced (Dundon 2003).

Three major ethical theories are most strongly accredited to four philosophers: Aristotle (virtue ethics), Immanuel Kant (deontological theory), and the combination of the work of Jeremy Bentham and John Stuart Mill (consequentialism) (Aristotle 1984; Kant 1785; Bentham 1789; Mill 1861). The work of the originators of these theories continues today through the research of applied ethicists studying applied virtue (e.g., Hursthouse 2006; Walker and Ivanhoe 2007; Austin 2014; Van Hooft 2014; Annas 2015), virtue applied specifically to environmental ethics (e.g., Sandler 2007; Zwolinski and Schmidtz 2013; Cafaro 2015), applied Kantian deontology (e.g., Hardwig 1983; Reynolds and Bowie 2004; Fry 2011; Breakey 2009;), and consequentialism (e.g., Pettit 1991; Vallentine 2006; De Lazari-Radek and Singer 2017). The classical versions of these theories each provide a framework for creating arguments describing the ethical merits of an action and establish the conditions that determine what is ethical and unethical. I discuss each theory and present them in three forms to show a variety of ways to understand the framework constituted in each theory— as questions to consider, conditions to meet, and a generic, formulaic argument.

-Virtue Ethics-

Aristotle's virtue theory, described in *Nicomachean Ethics*, is based on the

“Golden Mean,” which defines virtue as an intermediate between extreme vices:

Similarly, with regard to actions also there is excess, defect, and the intermediate. Now excellence is concerned with passions and actions, in which excess is a form of failure, and so is defect, while the intermediate is praised and is a form of success; and both these things are characteristics of excellence. Therefore, excellence is a kind of mean, since it aims at what is intermediate (Aristotle 1984, 1106b8-1106b28 p. 1747).

Actions are not wrong absolutely but could be wrong in certain contexts. Although Aristotle admits that some actions “do not admit of a mean,” (i.e., should not ever be performed), such as adultery, theft, murder, and possibly others, actions typically should be done in moderation since doing them excessively is wrong, while performing actions deficiently is also wrong (Aristotle 1984, 1107a9-1107a27 p. 1748). Therefore, when applying virtue theory to a case, the first question to ask is where the action sits on a Golden Mean spectrum—is it deficient, moderate, or excessive? If an evaluator is merely constructing an argument of a preconceived position, then the evaluator would describe a favored action as moderate and an opposed action as either extreme. I evaluate from a neutral stance and instead construct arguments that highlight factors of the case that could be placed at any of the three positions. These arguments then must be compared to determine an ethical verdict. I will only be scrutinizing claims that an action is moderate if it is suspicious in some manner, but conditions which imply that the action is extreme (i.e., unethical) will require some manner of addressing that concern. I express this positioning as the condition: “If the action can be demonstrated as extreme or deficient in some regard, then the action is unethical.” If the action can be done more or less frequently or to a greater or lesser extent, then the agent is likely to have addressed this concern by acting more moderately.

To support the judgment imposed by positioning the action on a Golden Mean spectrum, Aristotle evaluates the action’s manifestation of the individual’s character—the type of person one’s actions show the person to be (Homiak 2015). Since someone can perform an action that is “out of character” (which would arguably not be a good reflection of the agent), the action is usually evaluated as if it were done habitually. When

applying virtue theory, a second question to ask is what sort of character is demonstrated by performing the action. Agents seeking to perform only ethical actions, as I assume, would avoid actions demonstrating bad character. Therefore, another condition for the evaluation related to this aspect is: “If the action can be objected for reflecting bad character, then the action is unethical.” To satisfy this condition, the agent might have to perform the action differently or with additional effort that explicitly demonstrates a more admirable character. For instance, sending a check to a charity organization and donating one’s time might both accomplish the same goal, but the difference in effort required might reflect character differently.

Character evaluations are a form of judgment, and Aristotle provides criteria to support these judgments. Both virtues and vices are types of habits that constitute one’s character. Virtuous habits are made of moderate actions that demonstrate human flourishing, excellence, or role model behavior. Vicious habits are made of excessive or deficient actions that hinder flourishing. Virtuous habits are ethical, and vicious habits are unethical. The ultimate aim of Aristotelian ethics is “eudaimonia,” a term sometimes translated as “happiness” or “flourishing” but more literally translated as “good soul” or a soul that is in proper order. For Aristotle, a good or excellent soul is one that functions well, and human functioning is related to the capacity to reason and to human’s social nature. Translated more loosely, it is sometimes referred to as “the good life.” While other theorists refer to the good life as a life of pleasure, Aristotle also includes right action. In this way, Aristotelian ethics is not merely selfishness, as it accounts for how others are treated, and similarly, the Aristotelian theory of well-being is not merely personal success, but a life that includes respect of others. So, the sense of human

flourishing in this concept includes both individual and collective meaning. Therefore, when applying virtue theory to a case, these further questions arise: 1) Is the action (done in this manner) one that can be promoted as a model of excellence, repeated habitually in similar situations? 2) Does the action help people to flourish? Conditions related to these aspects include: “If the action does not demonstrate role model behavior, a model of excellence, or promote human flourishing, then the action is unethical.” These determinations rest on such conditions as whether the action is something children ought to be taught, one we would want to see more people doing, helps growth or progress, or makes for admirable goals, for instance. To satisfy these conditions, the agent might need to modify behavior to conduct the action in a way that improves well-being of the agent and of others. While this suggestion seems similar to how a consequentialist evaluates ethical merit, they act for different reasons. The virtue ethicist improves others’ well-being for the sake of demonstrating good character; the consequentialist improves others’ well-being for the sake of doing more good than harm. A deontologist might also improve others’ well-being in order to show them respect. Helping others (i.e., improving their well-being) is generally ethical behavior, but each theory explains ethical reasoning in a different manner.

One particularly strong, orthodox example of applying virtue ethics to a case distinguishes ethical *actions of humility* in sport from unethical behavior (Austin 2014). Humility is described as the proper amount of self-assessment and self-lowering. Too much self-lowering amounts to a lack of confidence, or self-deprecation at a more radical level, and these ways of seeing one’s self could impair the ability to play the game, harm relationships with others, or generally embarrass or humiliate that person to a point which

keeps that person from not achieving more. On the other end of the spectrum, there is deficient self-lowering, which could also be called egotistical behavior. These boastful individuals can put themselves above other players (perhaps refusing to play), be rejected for endorsements due to vanity, underestimate opponents, causing them to be beaten in competition due to a lack of preparation, have a bad attitude toward relationships, or belittle people off of the field. Instead, a moderate amount of humility implies giving proper respect to opponents, acknowledging defeat, does not seek to dominate or harm others during competition, and does not exaggerate athletic talent as more significant than is reasonable off the field. The example also recognizes counterarguments, providing a comprehensive evaluation.

To summarize the application methods which constitute a standardized framework for virtue ethics, I list key questions, a checklist of conditions, and a generic form of argument. Fundamental questions of the general sort that capture the most significant aspects of virtue theory include:

- Is the agent doing too much or not doing enough, in such a way as the action might seem extreme to an outsider?
- Is the agent demonstrating admirable character by performing the action?
- Is the action (in this manner) one that can be promoted as a model of excellence, repeated habitually in similar situations?
- Does the action help people to flourish?

A second way to illustrate a virtue ethics framework is through qualifying conditions:

- If the action can be demonstrated as extreme or deficient in some regard,
or

- if the action can be objected for reflecting bad character, or
- if the action does not demonstrate role model behavior, a model of excellence, or promote human flourishing, then the action is unethical.

These conditions express reasons that the action could be considered unethical, and the agent should act to address these objections, if possible. If it is not possible to avoid these conditions, the action should not be done.

A formulaic way of constructing an applied virtue argument would fit a pattern such as this one:

[Insert action] is (un)ethical because it is [insert corresponding position on Golden Mean spectrum: deficient, moderate, or excessive]. Excessiveness in this case is demonstrated by [insert description of doing action excessively to clarify], which is excessive because [insert reasoning that shows impairment of human flourishing or bad role model behavior]. Habitually performing the action in this manner reflects poor character because [insert reason explaining viciousness].

Deficiency in this case is demonstrated by [insert description of doing action deficiency to clarify], which is deficient because [insert reasoning that shows impairment of human flourishing or bad role model behavior]. Habitually performing the action in this manner reflects poor character because [insert reason explaining viciousness].

The moderate amount of action which would demonstrate virtue is [insert description of doing action moderately to clarify], which is virtuous because [insert reasoning that shows enabling human flourishing, role model behavior, or human excellence]. Habitually performing the action in this manner reflects good character because [insert reason].

Although an evaluator does not have to stick to this exact form, the reasoning would generally capture the same considerations and use similar language, such as the keywords: excess, deficiency, character, excellence, and flourishing, to explicitly signal that virtue theory is being applied.

-Deontological Theory-

Kantian deontology, described in *Groundwork for the Metaphysics of Morals* (1785), can be summarized in three tests—intentions, universalizability, and respect. Kant describes ethics as obligations (duties) that all rational beings could discover through reason. Since rationality is important, Kant focuses on the intentions for performing the action. Good intentions are likely to produce ethical actions, while bad intentions are likely to lead to unethical actions. Therefore, the first questions to ask in applying deontology are what intentions are associated with the action and whether they are good or bad motivations. Good intentions support the action as ethical and only need to be scrutinized if suspicious. For example, while a profit motive is good for the agent, if profit comes at someone else's expense, then the motivation is suspicious. Bad intentions are a reason that an action is unethical. If the action is associated with ill intentions, then the agent must act in such a way so as to avoid this objection. While it is difficult to get inside someone's mind and expressions of intentions could be lies, the agent may have to behave differently to demonstrate alternative intentions to satisfy the condition to avoid this objection.

Kantian ethics is absolute and does not change in different contexts. It applies to everyone equally; therefore, an action is likely ethical if it can be universally obligated and unethical if it would be self-defeating to obligate the action:

Act only in accordance with that maxim through which you can at the same time will that it become a universal law (Kant 1785, Ak 4:421 p. 37).

It is also stated:

So, act as if the maxim of your action were to become through your will a universal law of nature (Kant 1785, Ak 4:421 p. 38).

A maxim refers to a rule of conduct. Kant argues that rules regarding ethical actions would be able to be obligated of everyone universally (as a universal law), and to capture this notion, I ask whether the action can be done universally (by everyone) and whether the action is self-defeating. If the action is not one that can be done universally or if performing it defeats its own purpose, then the action cannot be obligated of everyone, which means it could not be a universal law. Therefore, it would be unethical, and an agent must act in such a way so as to avoid this objection, by performing an action that everyone can do.

Lastly, as rationality is important in this perspective, autonomy is also important since it allows the expression of reason and is the source of human dignity, in this theory. Respect is defined as honoring the autonomy of others by refusing to use them involuntarily for one's own benefit without consent:

Act so that you use humanity, as much in your own person as in the person of every other, always at the same time as an end and never merely as means (Kant 1785, Ak 4:429 p. 46-47).

Actions that show others respect are likely ethical, while disrespectful actions are likely unethical. The evaluator applying this test to a case would ask whether the action is disrespectful by determining whether everyone involved is helping voluntarily. If someone involved in the performance of the action is not participating voluntarily, then action is unethical, and the agent must act in such a way so as to avoid this objection. This condition can be met by gaining the consent of participants, or in cases when

consent is not able to be achieved, the evaluator should at least demonstrate that the level of participation required is one that would be commonly agreeable (i.e., most would not find objectionable if asked). Sometimes, this qualification might be demonstrated by showing a benefit to the participants, but this reasoning would reflect consequentialism rather than deontology. Explaining that individuals have consented to similar involvement in the past is one way to demonstrate consent without having consent at the time, though such reasoning is not as strong as having actual consent.

These three tests support the ethical merits of an action using deontology. One case study regarding corporate ethics programs includes all three tests and stands out from other duty applications as a model example for this reason (i.e., Reynold and Bowie 2004). To summarize the application methods which constitute the standardized framework for deontological ethics, I again list key questions, a checklist of conditions, and a generic form of argument. Fundamental questions of the general sort that capture the most significant aspects of deontological theory include:

- What is the motivation for the action?
- In what ways can the action be replicated elsewhere?
- Does the action defeat its own purpose?
- How can the action be performed so that it respects all people impacted?

The conditions agents would strive to meet to avoid objections include:

- If the action is associated with ill intentions, or
- if the action is not one that can be done universally or is self-defeating, or
- if someone involved in the performance of the action is not participating voluntarily, then the action is unethical.

Agents seeking to only perform actions with no such objections would seek alternative ways of acting to avoid these reasons to object to the action or would do not the action.

A generic form of argument that reflects deontological ethics would include these types of considerations:

[Insert action] is ethical because the agent intends to *[insert good intention]* which is good because *[insert reason]*. The action is universalizable because *[insert reasoning that argument can be done by everyone and that it does not defeat its own purpose]*. The action also respects autonomy because *[insert reason confirming consent or agreeableness]*.

Similarly, an unethical action could be argued in this form:

[Insert action] is unethical because the agent intends to *[insert bad intention]* which is bad because *[insert reason]*. The action is not universalizable because *[insert reasoning that argument cannot be done by everyone or that it defeats its own purpose]*. The action also disrespects human dignity because *[insert reason neglecting consent or objectionable aspects]*.

Using the keywords: intentions, universal, self-defeating, respect, and autonomy, signal applied deontology.

-Consequentialism-

Though some forms of this theory are ancient, the founding of consequentialism is often attributed to Jeremy Bentham and John Stuart Mill (Bentham 1789; Mill 1861). Bentham and Mill are hedonic utilitarians. Utilitarianism is a type of consequentialism, and hedonic utilitarians judge an action by the pleasure or pain that results from it:

Actions are right in proportion as they tend to promote happiness, wrong as they tend to produce the reverse of happiness. By happiness is intended

pleasure, and the absence of pain; by unhappiness, pain, and the privation of pleasure (Mill 1861, 210).

Although their theories both focus on pleasures and pains, their theories have at least four differences. First, Mill contends that pleasures can be of varying quality in addition to varying in quantity. That is, some pleasures (usually intellectual pursuits) are of a higher quality and thereby preferable to lower quality or animalistic pleasures such as satiating hunger or bodily pleasures. Second, Mill evaluates the collective impact for everyone affected by the action, and Bentham only evaluates actions that result in the best consequences for the agent. Third, Mill not only sums the pleasures produced by the action in question, but also deducts the resulting pain. Fourth, Mill analyzes the consequences of rules of conduct that guide generally compliant, non-specific actions, while Bentham analyzes the consequences of an action itself. Yet, it is more common that ethicists acknowledge more positive consequences than mere pleasure and more negative consequences than only pains, for a more general consequence-based theory than these two authors describe.

In its most prevalent forms, consequentialists use a maximizing rule to seek “the greatest good for the greatest number” of people or “the most good for the most people,” called the “Greatest Happiness Principle.” Consequentialists typically conduct a “calculus” weighing positive and negative consequences for all stakeholders, similar to a cost-benefit analysis. They often treat the action with the highest “net good” (the total of the positive consequences reduced by the number of negatives) as the only ethical option, while other options are treated as unethical (or less ethical, if the evaluator believes ethics

is nonbinary). Peter Vallentyne provides a consequential calculus that is easy to understand (Vallentyne 2006).

I present a standardized consequentialist framework constructed of key questions, objectionable conditions, and a general form of argument. Consequentialism generally uses questions to evaluate ethical merit such as the following:

- Who is impacted, by which alternative actions, and in what ways?
- Which groups should be given priority due to their size or the significance of impacts on them?
- Which alternatives provide more positive than negative consequences?

One objectionable condition associated with consequentialism is:

- If the net good of the action is not the highest achievable among alternative options, then the action is unethical.

To address this concern, the agent might further consider these corollary conditions:

- If significant negative consequences of an action are avoidable, then the agent must act in such a way as to avoid these consequences.
- If a significantly large population is negatively impacted by the action in avoidable ways, then the agent must act to avoid these consequences.

These conditions demonstrate reasons that contribute to the net good and also specify how to act differently to avoid the objection that the action is unethical.

A generic form of argument reflecting consequentialism would include considerations such as the following:

[Insert action] is ethical because it produces the greatest good for the greatest number of people. The major stakeholder groups impacted by the action include [insert Group A, Group B, Group C, etc.]. [Insert explanation of size of each group, what the impact on each group is, whether the impact on each group is positive or negative from their perspective and why they judge it this way, the level of significance of the impact on each group]. [Repeat assessment for alternative actions]. [Include assessment comparing the net good of the alternative actions].

An additional way to depict a consequential calculus is in the form of a table comparing the positive and negative impacts of alternative actions:

Table 3: Generic Consequential Calculus

		Alternative Actions				
		A	B	C	D	E
Stakeholders	W	+	0	0	-	-
	X	+	-	-	+	+
	Y	+	-	-	-	-
	Z	-	+	+	-	-
Net Good		+2	-1	-1	-2	-3

Discussion of harms and benefits signal a consequentialist analysis, and selecting the action with the highest net good distinguishes it from other forms of analysis that also study outcomes. Because it can be cumbersome to identify and evaluate all consequences, I identify the most significant consequences and those that impact the largest groups in the proceeding analyses as a shorthand method to determine the action’s ethical merit.

Further Assumptions and Considerations

Along with the theoretical frameworks I described, I assume ethical realism, treat ethics as binary, and take a pragmatic approach to utilizing multiple theories. That is, I will assume that there is a truth to the ethical merit of the action and that the action is

either ethical or unethical, rather than ethical to a certain degree, for simplicity. I create arguments for and against performing the action from each ethical theory, using the frameworks previously described integrated with salient features discovered through extensive research of these events. I treat each ethical theory as having an equal claim to the truth of the matter regarding ethical merit of the action being analyzed and make no comparisons between arguments of different theories. I only scrutinize reasons in favor of performing the action if they are suspicious. I work more extensively with reasons against performing the action because I assume that agents seek to only perform an ethical action (i.e., with no objections against it that qualify it as unethical). I prescribe actions that could address these objections. Because the theories can produce arguments in favor of and against performing the action, there is additional judgment required to determine the overall ethical verdict in the case (i.e., whether the action is ethical and ought to be performed). Using these methods, I evaluate the targeted action and determine how to proceed to be ethical.

A pragmatist explains how a plurality of theories work together in a piecemeal fashion to give theoretical support to philosophical conclusions (i.e., Wimsatt 2007). Like having a variety of tools in a toolbox, utilizing multiple theories can help to persuade an audience of the proponent's position, providing evidence of the ethical merit of an action. More evidence typically creates a stronger argument. Although ethical principles are meant to apply universally, any one theory is not always easiest to apply to any given situation and not always the most relevant to or easiest understood by the audience. However, not all of the features of the three major ethical theories – character, intentions,

and consequences – will be significant or significant to the same extent in different situations.

To illustrate my view, I can adapt a philosopher’s discussion of scientific theories to the case of ethical analysis:

I suggest that we think of the different ethical theories as tools in a box that can be drawn upon to answer different questions. If ethicists want to know merit based on demonstrated character, then virtue ethics provides an answer. If they want to know what merit the agent’s intentions demonstrate, then deontology provides an answer. There is no uniquely correct and exhaustive evaluation of ethics. Each theory only provides informative partial considerations. Depending on what question one asks, one partial consideration might provide a cleaner parsing of ethical merit than the other. It would be a mistake for ethicists to anoint one theory as fundamentally correct and others as mistaken. Many ethical theories belong in the ethicists’ toolbox (adapted from Waters 2011, 11).

Similarly, pragmatists view the language provided in the various theories as another type of tool for expressing the proponent’s position (e.g., Rorty as described in Grippe 2018). Using the ethical theory’s vocabulary helps to explicitly demonstrate application of that theory.

Objections

In response to this proposal, at least two major objections and a few minor objections arise. One major objection is that standardization might constrain the field or does not suit the nature of this research, as demonstrated by the plurality of topics, principles, and arguments possible. In response, I reiterate that I support diversity but that unconstrained analysis contributes to a perception of disorganization. I am only suggesting to trim the hedges, not to uproot the entire garden. In the least, I am merely

criticizing two existing documents that could be argued to be foundational to the field (i.e., Frigo 2017; Sovacool and Dworkin 2014). I am not suggesting that only the three specific versions of the three major, classical ethical theories presented here should be used for ethical analysis, and I will add to them in subsequent chapters of this dissertation. I only suggest that because these theories represent fundamental concepts that reappear in similar fashion across cultures universally that they provide a basis on which the field rests. Acknowledging this basis brings an element of organization for even some of the most unconventional principles. Authors using unconventional principles might use these frameworks as a touchpoint merely to contrast their principles to conventional perspectives before proceeding in whichever way they see fit, for the sake of enhancing continuity with the larger literature. The questions, conditions, and forms of argument listed for each of the three ethical theories which provide the frameworks for analysis are meant to be a guide and not meant to be definitive in any way that excludes further elaboration or modifications. There are additional facets of each of the three classical ethical theories that are not captured in these questions, but I have chosen these aspects to highlight major considerations that exemplify some of the most commonly referenced aspects of the theories. These ethical theories have been expanded and altered in innumerable ways, and I am not opposing freedom of thought. I merely encourage strategies to help map the field of research and to make analysis more routine for those researchers less familiar with ethical study.

Another major objection is that the insights gained by making ethical reasoning more explicit might actually make problems worse. For instance, what may have been perceived as merely a difference of opinion might now (after explicit ethical analysis) be

an exposed conflict of interests and may create an impasse. I recognize that making ethical reasoning explicit can both strengthen and reveal weaknesses of an argument. Often, that type of insight is important for the individual or group presenting an argument. In response, there are methods for resolving conflicts of interests, and unless there is some sort of time constraint involved, that should not stop from refining an argument. With standardization, the issues can be refined so that opponents are not talking passed each other or creating strawman exaggerations. In this way, problems are better solved, rather than solutions that do not address the actual issue. Using similar language helps to begin to attain common ground, and willingness to enter into such a dialogue shows congeniality. This type of transparency should be welcomed rather than feared.

Minor objections might be raised regarding my assumptions and methods. Ethical realism assuming there is a truth to ethical merit might cause concern when considering a variety of ethical views exist, some of which change over time. The difference between perception and actuality addresses this objection. That is, there could be a gap or discrepancy between how any one or more evaluators understand the ethical merit of an action and its actual merit. The action is either ethical or unethical regardless of the arguments produced by a fallible evaluator; the evaluator's arguments do not make the action ethical or unethical. However, these arguments contribute to the evidentiary account that hopefully gets us closer to the truth of the matter; this contribution is known as "ethical progress." The assumption that the ethical theories have equal claim to the truth entails that these theories build our evidentiary account and contribute to ethical progress, closing the gap between perception and true ethical merit. For instance, slavery

was popularly accepted for centuries. To a realist, it is not the case that slavery became unethical when it was abolished, only that the popular understanding of slavery's ethical merit shifted in ways that we believed now better reflect its true ethical merit. Hopefully, the popular view is now correct, but there is a possibility that popular views can be wrong. Ethical analysis helps to align reasoning with other beliefs (i.e., amoral perceptions of the world, such as observations of nature and assumptions of how humans think and work) to help society gain a better understanding of truth, just as phenomenology and metaphysics also help to align perception of reality with the actual truth of these matters.

Someone might object to treating ethics as binary rather than having degrees of strength (i.e., actions that are more or less ethical than others). A spectrum of strength can still apply to my analyses, but rather than degrees of truth regarding ethical merit or degrees of ethical merit, I consider degrees of strength of the arguments based on the evidentiary account produced by the supporting reasons (i.e., some arguments are better than others; some reasons are stronger than others). More and better reasons build stronger belief in the true ethical merit of the action. If multiple theories provide a variety of reasons to object to particular conditions of the action, then there is stronger reason to believe that aspect makes the action unethical. When some theories evaluate an aspect of the case as a reason against the action's ethical merit while other theories evaluate that aspect in favor of performing the action, then the argument and the strength of belief are weaker. Such disagreements invoke skepticism. There may not be sufficient time to determine alternative actions to address these doubts, but in the least, the agent could proceed with greater caution in these instances, knowing that the matter is unsettled and

why it is controversial. In analyses when the theories agree, the agent can be more confident in the belief of the action's merit.

It might be controversial that an open, pluralistic approach allows for unreasonable theories, such as ethical egoism, to be applied to cases. The three major classical theories are the most commonly used in research, and additional ethical theories are provided in subsequent chapters, related to the communities impacted in those cases. While there are other forms of virtue ethics, deontology, and consequentialism and other ethical theories, these three theories, as presented by these authors, point out salient features that are universally acknowledged as ethically significant in many cases. Some theories such as ethical egoism (an ethical theory based on self-interest) are also well-known, but they are not as unanimously accepted as the three classical theories. Furthermore, ethicists typically reject most forms of egoism. Acceptable exceptions might include "rational egoism," which acknowledges that it is irrational (and perhaps immoral) for someone to act against their own interests, or "enlightened self-interest," which recognizes that some actions performed in the interests of others also support the agent's self-interest (Rand 1964; Seed et al. 1988). A comprehensive critique of these theories is beyond the scope of my project; however, I acknowledge that there is a spectrum of how much personal and others' interests ought to count in ethical analysis. I also recognize that radical forms of altruism are also suspicious if they require radical self-sacrifice, (as critiqued in Wolfe 1982). There might be additional ethical theories or principles that evaluators desire to apply to cases, but as mentioned previously, use of unconventional principles risk turning away readers. Evaluators must justify any additional theories or principles to ground their work in a similar way that the classical

theories are grounded. The additional ethical theories could also create conflicts with each other or with the classical theories. For instance, one theory might denote actions that give preference to the agent's family as ethical while another theory might denote such favoritism as unethical. Therefore, care must be taken to avoid contradicting theories because they would impede the ability to reach a verdict or confuse the action prescription.

Someone might object that the frameworks do not definitively produce an ethical verdict without additional subjective judgment. While ethical theories can create arguments both in favor of and against performing the action, there is a remaining responsibility for the evaluator to determine which argument is better. The framework does not yield decisive ethical decisions since weighing reasons for and against an action involves judgment regarding which reasons are given higher priority, but it is an ethical guide. Still, this weakness can be diminished through practice, meaning that ethicists (and anyone with a conscience) develop a sense of ethical merit that prioritizes some aspects of a case as more salient than others. For example, it is commonly understood that the loss of a human life is generally a worse than the loss of a few minutes of time, other things being equal. While I am optimistic that further study of axiology (the study of values) might reveal a formal method of weighing priorities through universally shared values, such a complex endeavor is beyond the scope of this dissertation. Without such a scheme, the methods I use to develop supporting reasons for action prescriptions in subsequent chapters will be assessed through my individual sense of their strength. However, the reasons themselves ought to have some weight, even if weighed differently by different evaluators. It is the *reasons* that support (or condemn) the action, rather than

the *verdicts*, that ought to be given higher authority than the verdicts in my analyses in this dissertation, thereby emphasizing the process more than the conclusions. To help standardize the evaluations and reduce the influence of personal judgments, I present the frameworks as conditional statements as one way of applying the ethical theories to a case.

The pluralistic approach invokes questions of how to proceed when theories do not agree on an action's ethical merit. For example, it may turn out that an action passes all but one of an evaluator's tests. This evaluator is not able to fully demonstrate the claim that the action is ethical, since one failed test suggests the action is unethical *for at least one reason*. If the evaluator wants to only perform actions that have no doubts regarding ethical merit, then the evaluator has reason not to perform this action. Not everyone has such a high bar, and not every choice allows enough time to overcome such high expectations. Yet, the strongest argument for ethical merit would find alternative ways to perform the action to avoid these apprehensions, when possible, and refrain from performing the action in cases where it is not possible to work around them.

Another conflict could occur if one ethical theory strongly supports the action but another theory strongly opposes it. In this situation, the argument is not as strong as it can be, had the theories agreed. As with the previous conflict, the reasons within the argument opposing the action should be further evaluated before proceeding to act, or the agent has reason to believe that the action is unethical *for those reasons*. Such an occurrence would likely result frequently, as using more ethical theories means integrating more principles and further tests that could provide reasons to doubt ethical

merit of the action and since theories tend to produce reasons both for and against actions.

Because of differing evaluation criteria, worries might arise regarding a conflict between ethical theories. Prescriptions from the classical theories I use do not conflict since any theory can produce reasons for and against a targeted action and since the targeted feature of a theory is not the same as the target of a different theory. For example, deontology evaluates intentions while consequentialism evaluates consequences. While evaluation of the *intentions* may produce a stronger argument in favor of the action, it is not necessarily contradictory should the evaluation of the *consequences* produce a stronger argument against the action, for instance. The reason favoring the action is only further evaluated if suspicious, and the reason against the action requires attention, just as in any other case. Consider fracking as an example. The good intention which supports fracking's ethical merit is to increase energy security for the US. Simultaneously, it may be argued that fracking is unethical due to the net negative consequences of health impairment due to water contamination which outweigh the energy benefits. In my proposed analysis, the energy security motivation is only scrutinized if suspicious because it supports performing the action. In the fracking example, energy security could be suspicious if the natural gas is exported rather than used domestically since energy security would not be provided in that way. However, without exportation, I assume this reason is uncontested. The objectionable condition of more harm than benefit requires some way of addressing this concern before the action can be considered ethical. The fracking company might donate profits toward healthcare, clean water, or otherwise provide positive benefits to locals put at risk of contaminated

water to offset the threat and disarm the objection. If the method for addressing the objection changes the intentions, then the intentions need to be re-evaluated. In the same way, if addressing an objection regarding intentions changes the consequences, then the consequences have to be re-evaluated. However, the theories are not necessarily in conflict, even if not fully aligned and analyzing similar aspects from different perspectives.

Similarly, it may be the case that the only option to address an objection to an action discovered by one theory is to violate another. In these situations, there is no universal solution. All ethical theories face these predicaments because they are beyond the scope of the theories themselves. One way to resolve this situation is by selecting the argument which provides stronger evidence or the ethical theory that has more meaning to the agent, and in that way, the agent is acting with integrity. If they are equally meaningful and their reasoning is equally strong, a third theory might be used to break the tie, or this aspect might simply be treated as having undeterminable ethical merit, suggesting that other conditions should be used to determine how to act in this case.

There are further questions and conditions that can be derived from the classical theories, but I provide a basic understanding at a beginner's level to illustrate some of the most prominent features of the theories. Additional and more advanced questions and conditions can be utilized by evaluators with greater knowledge and ability.

Conclusion

Energy ethicists have struggled to establish a coherent and systematic field of research that prescribes ethical action. They are held back from producing stronger

reasoning that might be more powerful in energy decisions when they do not use ethical principles for analysis. Without reference to ethical theory, they appear to be merely stating an opinion, and it is harder to recognize their work as ethics. The proposed standardized frameworks use the most common ethical theories as bases for action prescriptions to provide an organized structure to make analyses more easily recognized.

Energy ethicists also lack a formal definition for energy ethics to guide their research. Although one has been proposed, it is not yet universally adopted (i.e., Frigo 2017). Furthermore, this definition becomes confused with merely descriptive work, energy justice, and abstract reasoning, which are different from the conventional critical task of applied ethics. By defining energy ethics as a subfield of applied ethics, this proposed framework can make use of conventions of other professional ethics, such as business and bioethics, and does not need to start from scratch. Integrating a critical perspective sets philosophical study apart from some other disciplines and is appropriate for decision arenas where there is a choice between the status quo and alternative actions. Distinguishing from energy justice frameworks helps to strengthen reasoning of ethical merit which is not always the same as justice or fairness.

Energy ethicists tend to publish in reaction to crises, but their influence fades without building cohesive academic momentum through collaboration. Additionally, energy ethicists struggle with finding the right level between theory and practice where they can use general philosophical knowledge without becoming too abstract. Though, some authors are discovering a critical lens at the level of energy decisions which can more easily be adopted by decisionmakers. When they are not able to overcome these obstacles, energy ethicists have difficulty influencing energy decisions. In the proposed

standardized frameworks, there is consistency of method which can more easily accommodate comparative studies.

I propose changes here to begin to overcome these challenges by redefining energy ethics as a specialized subdiscipline of applied ethics. I believe that the foundation provided by the three major categories of ethical theories can help to identify this research as distinct, give consistency of method, and provide supportive reasoning to make action prescriptions that are more strongly supported. In this way, I hope it is clearer that energy ethics is not merely descriptive morality, not the same as a judgement of justice, and a source of action-oriented guidance for decisionmakers. Although I use three popular theories of ethics here, additional indigenous ethics from the Lakota Sioux, Navajo Nation, and Hopi Nation will also be integrated in Chapters 3 and 4.

While applied ethics does not create new solutions, it produces reasoning to either support or refute a target action. Using applied ethics will not guarantee an ethical decision is made (since the reasoning may be faulty), but ethical decisions are more likely to follow when explicitly using these methods of evaluation. Decision-making without ethical reasoning would be ethically haphazard at best. From ethical evaluations, the analyst establishes the conditions that prescribe the targeted action as well as conditions that demonstrate the action is unwarranted. In the next two chapters, I evaluate case studies related to the construction of the Dakota Access Pipeline and the closure of the Navajo Generating Station to show how the generic reasoning of each ethical framework makes sense of action alternatives in these cases.

CHAPTER 3

ENERGY ETHICS IN THE CASE OF THE DAKOTA ACCESS PIPELINE AND THE GREAT SIOUX NATION

Introduction

In this chapter, I demonstrate how energy ethics reinvented can prescribe action by evaluating the decision of whether to construct the Dakota Access Pipeline (DAPL). The pipeline construction is controversial because the benefits of improved energy security and lower oil prices are weighed against leaks that could harm public and environmental health, and a fear of leaks is reasonable because the pipeline has leaked multiple times since its completion (Brown 2018). Looking back on the construction, which was completed in 2017, I ask whether the pipeline should have been built. I see this investigation is important not only for determining whether the right action was selected in this case at the time, but whether the pipeline should be allowed to continue to operate today, and whether construction of similar pipelines (existing or proposed) is ethical.

I proceed to analyze the case as follows. First, I provide a historical account of major energy events and violent episodes involving the tribes of the Great Sioux Nation (*Oceti Sakowin Oyate*) and nontribal entities. Second, I describe the details of the modern-day case. Third, I analyze two competing economic analyses of the pipeline's construction. Fourth, I explain Lakota ethics and compare it to the other Western ethical theories described in the previous chapter. Next, I use all four ethical theories (Lakota ethics, virtue ethics, deontological theory, and consequentialism) to determine

contextually-specific conditions regarding the ethical merit of the pipeline's construction. Finally, I compare the economic and ethical analyses and address objections.

As I described in the previous chapter, I assume ethical realism and treat ethics as binary. These assumptions allow the arguments in favor of and opposed to the action to differ in strength, which requires further judgment to reach a verdict. I assume all four ethical theories used have equal claim to the truth of the matter regarding the ethical merit of the action. I only further scrutinize reasons in favor of the action if they are suspicious, but I propose action prescriptions to address all significant reasons that determine the action is unethical from any of the four theories to provide alternatives to decisionmakers.

In this chapter, I argue that avoiding excessive risks, respecting all stakeholders' autonomy, and addressing community and environmental concerns in a caring manner would be reasons to believe that DAPL's construction is ethical and permissible to be built. However, these conditions did not actualize. Because stakeholders were involuntarily exposed to harm and since the pipeline transports oil that is burned for energy, DAPL's construction was unethical and condemnable. I argue that, for these reasons (justified below), the pipeline's construction should have been done differently, and it remains unethical as long as these or similar conditions are unmet. I address these objections by explaining what ought to be done to make current operations ethical.

History of The Great Sioux Nation and Energy Disputes

The Great Sioux Nation has a contentious history with the US government. Although the French interacted with the Sioux for roughly 150 years prior, historians

often treat the Louisiana Purchase in 1803 and Lewis and Clark's expedition beginning in 1804 as the start of the US-Sioux history (Estes 2016). In 1862, one early encounter with the Sioux people stands as the largest mass execution of all time, when 38 Sioux were hung in a spectacle to inspire fear and obedience. In 1863, the Whitestone Massacre included 300-400 Sioux killed (Allard 2016). Violence continued in both Red Cloud's War (1866) and the War for the Black Hills, including the Battle of the Little Bighorn (Greasy Grass), known for the death of George Custer, in 1876. The US lost both these wars. Similarly, in 1890 at Wounded Knee, Sioux leaders Crazy Horse and Sitting Bull were killed, along with 300 others. It is said that the tribes fought these battles strictly defensively and that the massacres were unprovoked (Blackhawk 2014). These terrible events provoked resentment that lingers today.

The violent history sometimes also relates to energy. DAPL exemplifies "the third time that the Sioux Nation's lands and resources have been taken without regard for tribal interests" (Archambault 2016). Beyond fur, the Black Hills region hosted a gold rush in 1876. In 1877, the US government took the Black Hills from the Great Sioux Nation reservation to facilitate greater access to the region. This area would later be valuable for its bituminous coal and uranium. In the 1950s, the Pick-Sloan Plan created a series of dams along the Missouri River for hydroelectricity, agriculture irrigation, flood control, and navigation control that flooded 12 Sioux towns, displacing the occupants and defiling a sacred burial ground. Now, water and fossil fuels again combine in the new threat of DAPL.

Sioux scholars argue that DAPL violates these federal laws:

- Fort Laramie Treaty of April 29, 1868, which guarantees the tribe “undisturbed use” of the territory
- Executive Order 12898 on Environmental Justice, requiring assessment of disproportionate impacts to tribal or minority communities
- Pipeline Safety Act and Clean Water Act, because it is not identified as “high consequence” due to its potential drinking water impact, and for not assessing maximum possible spills in its emergency plans
- National Environmental Policy Act, since it is argued that an interdisciplinary Environmental Impact Statement ought to be done, rather than the less comprehensive Environmental Assessment that was performed
- Executive Order 13007 on Protection of Sacred Sites (Camp of the Sacred Stones, 2016, 4).

These objections are not without argument since proper operation of the pipeline is not so disruptive. Yet, a leak could be dangerous to public health, water safety, and soil quality. Furthermore, the pipeline does not cross current reservation land; however, the pipeline crosses land historically important to the Great Sioux Nation, and sacred sites were reported to be destroyed during pipeline construction. The tribes also “reject the appropriation of the name ‘Dakota’ in a project that is in violation of aboriginal and treaty lands” which gives a false impression that the Sioux support it (Camp of the Sacred Stones, 2016, 2). The Treaty of 1868 also requires consent of three-fourths of the Sioux, but this requirement has not been enforced in the Pick-Sloan Plan and is questionable because of the technicality that the pipeline is not on the reservation. Beyond lingering

resentment of past violence, these potentially illegal violations also create discontent among members of the Great Sioux Nation.

DAPL is not the first pipeline to disrupt the Dakotas. TransCanada's Keystone Pipeline System currently transverses along the eastern borders of North and South Dakota, carrying bitumen from tar sands fields in Alberta, Canada to Patoka, IL, and to additional terminals in Port Arthur and Houston, TX. The contentious Keystone XL Pipeline (Phase IV of the Keystone Pipeline System) was a proposed additional branch through Montana and western South Dakota, but it was temporarily defeated through intense public opposition in 2015. However, defeat was similarly short-lived as the Trump Administration executive orders (EO13766 and EO13807), which allowed for the completion of DAPL, also expedited environmental assessment to renew construction for Keystone XL. Yet, even with this expedition, Keystone XL has once again been halted in November 2018 by a US federal judge, citing an insufficient environmental assessment that still lacks spill plans, evidence of pipeline viability, and a comprehensive analysis of the full pipeline project (rather than pipeline segments) (Reuters 2018). The history of US-Sioux relations, previous resource grabs, potential illegality, and recent battles against other pipelines have infuriated the Sioux and neighboring communities.

Case Details

DAPL carries approximately 450,000 barrels of crude oil per day from extraction points within the Bakken Formation near Stanley, ND to a refinery hub in Patoka, IL. Construction was completed in 2017 after tumultuous protests that gained national attention in late 2016. Although a short delay postponed construction of the final segment

during Barack Obama's presidency, President Donald Trump took office and utilized executive orders (EO13766 and EO13807) to approve completion. The pipeline is controversial because it repeatedly passes various tributaries of the Missouri (*Mni Sose*) and Mississippi Rivers, including within a half-mile of Standing Rock Reservation, home to a portion of tribes of the Great Sioux Nation.

Because DAPL crosses these waterways and the Ogallala Aquifer (serving South Dakota, Nebraska, Wyoming, Colorado, Kansas, Oklahoma, New Mexico, and Texas), an oil spill potentially threatens drinking water and irrigation for households and farms throughout the Midwest. With protest slogans, such as "Water is life" ("*Mni wiconi*"); "Water is sacred"; "Can't drink oil"; and "Keep it in the ground", over 100 tribes were joined by sympathizers of Black Lives Matter, Occupy Wall Street, and US Army Veterans, expressing their discontent that additional precautionary measures to prevent or to respond to a spill in light of recent accidents were not being included in this pipeline project.

Along with threats to health, emissions created through oil combustion and throughout the fuel chain contribute to dangerous climate change. Therefore, these protests are not merely a local matter, with a wider significance that opposes all aspects of fossil fuel industries, giving the decisions in this case global import. In this wider context, the extraction and flaring practices are environmentally controversial. Although hydraulic fracturing (commonly called "fracking") is often utilized to extract natural gas, oil is the primary target of extraction in the Bakken fields. While natural gas is also released in the process, it is cheaper to flare methane here than to capture it for sale, creating fires that can be seen from space at night. While combustion lessens the

environmental impact of methane by converting it to carbon dioxide, the emissions are wasteful in that the fuel is not powering any work, frustrating environmentalists.

While DAPL faced opposition for social and environmental impacts, the \$3.7 billion project belonging to Energy Transfer Partners, L.P. (ETP) is part of a greater fuel system providing financial benefits and employment. Yet, both oil prices and hiring were on suspicious trajectories in 2014, as the pipeline was being considered, since it was unknown whether the gains of the previous five years would continue. The Bakken is the largest oil field in the lower, contiguous 48 states. Nearly 10,000 wells were profiting \$24 million each in 2014, and more were planned (Becker 2016, 20). The wells brought over \$2 billion to the state government and are part of an industry that is valued at \$1 trillion or 7.3% of US Gross Domestic Product (Becker 2016, 20). However, the boom that began around 2008 and grew some western North Dakota towns to three times their size may have already peaked before DAPL's construction began. Oil prices fell from \$90/barrel in 2013 to \$40/barrel in 2015 (Becker 2016, 1). There was only approximately one-third of the rigs (dropping from 174 to 65), 5,000 less jobs retained, and nearly half of the oil royalties (dropping from \$128 million to \$69 million) in 2015, as compared to 2014 (Becker 2016, 1). Yet, the looming national oil market decline was not anticipated to occur until after a plateau expected over a few years near 2020, according to Energy Information Administration projections at the time (Becker 2016, 20). Macro-scale projections created an optimism contradicting local pessimism; yet, the forthcoming production decline, as reserves were emptied, was indisputably going to occur at some time.

This mismatch of projected production versus reality and the resulting uncertainty did little to calm the nerves of locals. North Dakota's elderly population ranks second-oldest in the US at 14.4% (Sobolik 2016, 166). This oil spree was the third of its kind, with previous booms in 1951 and in the early 1980s. Many residents in the state can remember experiencing the busts that followed those booms that turned cities into ghost towns. Moreover, the Sioux reservations include six of the 10 poorest counties in the US (Estes 2014). Communities can often withstand population growth of about 5%, but breakdowns of social services are observed to occur at 10%-15% (Becker 2016, 15). The state noted an average population growth of 20%, with some areas seeing 32% (Williston) and 46% (McKenzie County) (Becker 2016, 16). The sure bust loomed menacingly as a tremendous influx of out-of-state workers flooded the region and strained social services.

The Great Sioux Nation are not the only tribes impacted by this fuel system, and not all Sioux are impacted equally. The Fort Berthold Reservation in North Dakota is home to the Three Affiliated Tribes (Mandan, Hidatsa, and Arikara Nation), and the Fort Peck Reservation in Montana hosts the Assiniboine and more Sioux tribes. These tribes are among the organizations extracting crude oil from the Bakken Formation which is transported via DAPL. While the benefits did not last forever and although corruption arose in those communities, it is inaccurate in a greater context to portray this debate as strictly harmful to Native Americans in the region, since members of the Great Sioux Nation not only live at the extraction site but have financially benefited from the oil extraction. However, research has not revealed any connection or agreements between the two Sioux reservations which could confirm sharing of benefits, and there is not

necessarily a contradiction between supporting extraction while taking offense to the pipeline's route. Today, the Seven Fires Council, a meeting of tribal councils of each of the major divisions within the Great Sioux Nation across their separate reservations, is more of an alliance between the divisions rather than a formal governing entity. The reservations each maintain their own tribal governance councils. So, while Yanktonai Dakotas live at both Standing Rock and Fort Peck reservations, they do not share a single governing body or share financial relations. With these considerations in mind, I ask whether DAPL should have been built.

Economic Analyses

On behalf of the Sioux and ETP, researchers have created two competing economic analyses that capture dominant narratives influencing the pipeline construction decision (Siegelman et al. 2014; Ackerman and Knight 2017). Economic analyses are included in the typical protocol for evaluating strategic infrastructure projects. I juxtapose these analyses with the ethical analyses later in this chapter. Here, I review each analysis and its criticisms.

On behalf of ETP and in favor of DAPL's construction, Siegelman and colleagues argue that the pipeline is motivated by desires to increase safety in terms of reduced leaks while transporting oil and to lower costs of transport and costs paid by consumers (at the pump) (Siegelman et al. 2014). The report evaluates the project at three scales, including: impacts at each of the four states the pipeline spans (North Dakota, South Dakota, Iowa, and Illinois), a regional aggregation of impacts across those four states, and a few anecdotes about nation-wide impacts. The researchers conduct the analysis using

IMPLAN, modeling software that uses input-output analysis tables to simulate transactions and their indirect and induced secondary spending cycles until they “leak” out of the territory, which is when the money exits or is spent outside of the territory. Besides monetary estimates, the model also predicts the number of jobs related to the project. The analysis includes estimates during the construction stage and long-term, post-construction effects. The primary figures cited are costs of construction, labor income, jobs (direct, indirect, and induced), production and sales gains (direct, indirect, and induced), and tax revenues (including state sales tax, local property tax, and income tax). Beyond these estimates, competition with crop transport by rail further negatively impacts costs.

DAPL is assumed economical because it is expected to provide 33,000 job-years with an average compensation of \$57,000 for a total labor income of \$1.9 billion, \$5 billion production and sales gains, and \$156 million tax revenue, at a cost of \$3.8 billion during the construction phase (Siegelman et al. 2014). The labor income estimate includes DAPL employees, contracted workers, and secondary jobs demanded through increased consumption of goods and services. Of the \$7 million in benefits created, employees collectively receive approximately 27%; businesses receive 71%; and governments receive 2%. After construction, the project remains economical with benefits of 160 job-years with an average compensation of \$68,750 for \$11 million in labor income, \$23 million in production and sales gains, and \$56 million in tax revenues at a cost of \$13 million (Siegelman et al. 2014). The long-term benefits are distributed 12% to workers, 26% to businesses, and 62% to governments. These distributions illustrate that the construction phase is more beneficial to employees and businesses but

less beneficial to governments, which receive a majority of the long-term benefit. Once construction ends, over 99% of the jobs disappear, and their impact on sales throughout the community diminishes. However, the community benefits if the government properly spends the money it receives on public services.

Analysis of the impacts to crop transport and safety considerations complement the cost-benefit analysis, but these sections of the report are controversial. Siegelman and colleagues explain that oil and crops compete for rail space. Although a majority of this section of analysis discusses a report that the authors acknowledge has been recalled for questionable calculations, the analysis as a whole can be further criticized for a lack of clarity and comprehensiveness (Siegelman et al. 2014, 42). For instance, the authors cite a backlog related to rail transport that could cause crops to fail but additionally say that the backlog has been diminished from a few weeks to only several days (Siegelman et al. 2014, 41). It is further unclear that such bottlenecks have had any noticeable impacts downstream for consumers of the crops (or significant impacts to the producers upstream), because these details are neglected. While “record” production of crops is cited and assumed to be good, there is no talk of whether it might be overproduction, though pre-consumer food waste is a problem in the US (Siegelman et al. 2014, 41).

Although it is stated that pipeline transport (99.999% effective) is more reliable than oil transport by rail (99.997% effective), it is also acknowledged that trains carry a smaller volume at a time; so, less product is likely to be lost during a rail accident than a pipeline spill (Siegelman et al. 2014, 48-49). However, trains and pipelines have both caused fatalities in recent accidents, but speeding trains running off-track can also damage buildings (Siegelman et al. 2014, 48-49). It is unclear whether rails or pipelines

are safer because the figures are not reported in comparable units. Railroad spills are cited for 2013, a year particularly high in spills at 800,000 gallons of oil. However, pipeline spills of hazardous liquids (not just oil products) over a five-year period occurred 361 times at 81,971 barrels per accident (Siegelman et al. 2014, 49). Converting the pipeline estimate to gallons in an average year for the sake of comparison yields the approximation that 248,568,860 gallons spilled from pipelines on average each year. It is unclear how much of this volume is oil products, but the absolute figure does not favor the authors' contention that pipelines are safer.

Furthermore, two noted incidents (the Kalamazoo River pipeline oil spill of 2010 and Lac-Megantic rail accident of 2013) both required five years of cleanup. The pipeline spilled roughly 1 million gallons, while the train spilled approximately 30,000 (Devereaux 2016; CBC 2013). The Kalamazoo River spill cost an estimated \$1.4 billion, but while the Lac-Magentic accident killed 47 people, it only cost \$225 million (Devereaux 2016; CBC 2013). Neither company involved in these incidents had enough insurance to cover the costs of the event, with only \$650 million and \$25 million in insurance, respectively (Devereaux 2016; CBC 2013). Therefore, these costs were absorbed by other stakeholders, as externalities of the firm at fault. There is no particular mention of insurance coverage in the DAPL analysis, but a critic might determine how much renewable energy, water, or spill prevention or cleanup equipment could be purchased for \$1 billion as an alternative investment.

While the report mentions trucks as a mode of transport between pipe and rail sites, truck transport is not considered as an alternative for complete trips. Two alternatives to DAPL are identified but dismissed abruptly. That is, building refineries

near the extraction site is unsuitable since it only changes the product transported (from crude oil to refined, which is still dangerous), and expanding rail infrastructure is mentioned as another alternative without any judgment or serious consideration (Siegelman et al. 2014, 45). While the household impacts that the economists mention help to make the data more meaningful to stakeholders outside the industry, they are listed at a national scale as a \$33 billion saved or at the transaction level as \$0.10 less per gallon of gasoline (Siegelman et al. 2014, 50). There is no deliberation of whether this \$55-258 in savings per household is worthwhile in comparison to the associated risks (i.e., climate change, water contamination, etc.) (among the other benefits). While the analysis estimates that 34% Keystone XL's jobs were filled by local workers, the economists list intentions to have at least 50% of DAPL's jobs filled by local workers, and IMPLAN assumes 90% of the direct jobs will be filled by local workers (Siegelman et al. 2014, 22). However, they make no guarantees and provide no strategies to reach these goals, which seem unrealistic in comparison to Keystone XL.

On behalf of the Sioux, Ackerman and Knight produce an opposing economic analysis condemning the pipeline's construction as an addendum in response to the preceding analysis. In this second study, two prior years of market downturn are used as evidence that completing construction would have little economic gain for the region. Since the pipeline is 92-98% complete at the time of writing, the authors assume only 2-8% of the benefits of construction are still available. Much of the economic benefit of construction comes from single time gains, and since the pipeline was nearly complete at that point, only a trivial amount of benefit was left to obtain. The authors also belittle the post-construction gains, noting that job gains and GDP increases only amount to 0.002%

of available jobs and current GDP in the region and no more than 0.02% in any state (Ackerman and Knight 2017, 9-10). Post-construction tax benefits for the region only reach 0.06% of current budgets and only 0.5% in the highest state (Ackerman and Knight 2017, 10). As a comparison, Colorado receives “more revenue *per month* from marijuana taxes and fees than North Dakota or South Dakota will get from a year’s worth of Dakota Access property taxes” (Ackerman and Knight 2017, 10). However, the authors are also concerned that \$2 billion (half of the construction costs) is in danger of being canceled because construction was behind schedule. The report is shortsighted for neglecting all benefits of construction produced thus far. The use of stock pricing is also controversial, since the authors note that construction is behind schedule and since stock pricing can change greatly in any given day.

One noticeable difference with this second study is the inclusion of perspective, as figures are stated relative to a wider context to support why the gains are trivial in the authors’ view. For instance, estimating figures in millions and billions sometimes seem like astonishing amounts to laypeople, but explaining that just a few dozen full-time permanent jobs are created in a region with over 8 million existing jobs provides a context that helps to demonstrate the (small) magnitude of impact. Ackerman and Knight also suggest that oil prices have dipped below a breakeven rate, which suggests that continued extraction may create economic losses rather than profits. They also emphasize accidents, providing some examples of recent worst-case scenarios and estimates of an average spill. However, their average spill cost of \$15 million per year does not seem as high relative to the revenues gained as the authors’ language portrays it (Ackerman and Knight 2017, 12).

In either analysis, the authors avoid addressing the range of uncertainty inherent in their assumptions and provide little comparison to alternative scenarios. Critics of the plans point out a variety of objections, including:

- the pipeline’s impact on global oil production is arbitrary;
- the jobs estimates are dubiously annualized;
- tracking spending and cash flows is difficult;
- the “social cost of carbon” is not included in calculations;
- energy security (real or imagined) is hard to quantify;
- and the state economies in the region and ETP were financially struggling at the time (Hytrek 2016; Paul 2016; Swenson; Thompson 2016; Williams-Derry 2016; Paul 2018).

There is no comparison of alternative energy development along the same route, such as constructing a wind turbine or solar photovoltaic farm, to produce energy for the nation rather than using oil. Renewable energy projects are noted to provide roughly 10 times the jobs provided per megawatt-hour as compared to fossil fuel-based projects (Sovacool 2008, 108). Transport of oil via trucks, leaving the oil in the ground, or reducing oil extraction to levels that existing pipelines can transport are further neglected scenarios. Additionally, these economic analyses are presented in a one-sided manner, rather than as a more comprehensive analysis of pros and cons. Some peculiarities could be a mistaken calculation or could be a rhetorical trick to present data more favorably. When analyses such as these do not give full comparisons of any alternatives, they lack a comprehensiveness that would give stronger support to why a particular option is better, rather than merely saying one option is good on its own. Furthermore, environmental and

social impacts are difficult to monetize, and there is nearly no reference to them in these studies, though there are methods to quantify these impacts, too. There is no mention of how DAPL's construction interferes with historical treaty agreements, and there is no mention of strategies that might help to mitigate the prevalence of crimes, drug use, prostitution, rape, and violence that occur more frequently during construction projects (Whyte 2018; Caraher and Conway 2016). There is no mention of water use or land use related to fracking, construction, or operation of the pipeline.

Economic analyses differ from ethical analyses, and economically efficient solutions are not guaranteed to be ethical. The most efficient way of completing a project might not produce the least harms (if not all harms are monetized) and might not avoid other unethical considerations that overrule efficiency. DAPL's economic analyses questionably assume that extraction of oil is not only desirable, but that we ought to accommodate increased extraction. Economics assume a goal of low cost, but environmentalists argue that fossil fuels are too cheap, leading to overconsumption. Similarly, economists assume increased spending throughout the impacted communities is beneficial and that the lack of ability to transport crops is negative. There are plenty more assumptions of questionable ethical merit within these reports that ought to be deliberated to determine whether the project ought to proceed.

Lakota Sioux Ethics

While the Great Sioux Nation consists of many tribes, the ethics of the Lakota Sioux have been shared in academic literature and can be used to derive a representative ethical framework (e.g., Byerly 2015; Caldwell 2017; Craig 1999; Verbos et al. 2011). I

introduce Lakota ethics and then compare and contrast them to the classical ethical theories in a non-judgmental manner. This tactic is selected to preemptively address objections criticizing that applying ethical theories cross-culturally is an unreasonable endeavor. I extend Lakota ethics the same claim to truth extended to the other theories. Lakota ethics is another tool in the ethical toolbox, which allows for another way of analyzing a case and of expressing ethical merit. Understanding this aspect of Sioux culture helps to further humanize deliberation of this case, rather than treating the issue as merely technical in nature.

Traditional values and the notion of “the hoop” define Lakota ethics as an ecocentric view, mindful of recurring behaviors. The four traditional values are bravery, generosity, fortitude, and wisdom. Lakota generosity is described as not taking more resources than needed and sharing liberally with others (Byerly 2015). One question to ask when applying Lakota ethics to a case is whether the action reflects these values, and actions which do not reflect these values would be considered unethical.

Lakota scholars describe ethics in terms of “the hoop” and “circles” of life which can describe either ethical or unethical behaviors. “Virtuous circles explicate increasingly positive human behavior in social systems, whereas vicious circles explain pathological negative spirals” (Verbos et al. 2011, 11). These vices could be cycles of poverty, depression, alcoholism, violence, greed, or other abuses that tend to perpetuate themselves. An evaluator would seek to determine whether a virtuous or vicious hoop would be perpetuated by the action. An agent should strive to avoid vicious hoops.

The hoop also refers to an interconnection and equality with other living things and with natural objects, giving Lakota ethics an inherent ecocentrism. The circle of the

universe includes plants, animals, rocks, stars, and all things, which also are considered “family”, as described in the common saying, “‘*Mitakuye Oysain*’ (‘All are relatives’)” (Craig 1999, 285). Lakota duty is “one's obligations towards the land”, whereby certain duties are naturally assumed by living in an area (Craig 1999, 291). Ceremonial functions are required to be performed to remain worthy of living there (Craig 1999, 291).

Therefore, evaluators would question whether an action respects other beings and nature as relatives and fulfills obligations to the land. Ethical actions reflect such concerns, while unethical actions neglect them.

Lakota scholars say that “each person’s acts are often measured in terms of their impact on the entire social unit, the *tiyospaye*, and people within the *tiyospaye* align together and cooperate for the good of all of its members” (Byerly 2015, 1). Evaluators using Lakota ethics would ask whether there is an overall positive or negative impact on the community as a result of the action. Agents would seek to behave in ways that produce positive overall impacts, mindful of the community’s needs. If actions neglect community needs or affect them negatively overall, the action is unethical.

Comparing it to the three major categories of ethics, Lakota ethics is most similar to Aristotelian ethics, but it does not use the Golden Mean description of virtue, even though its four traditional values (or virtues) echo Aristotle’s cardinal virtues—justice, courage, moderation, and wisdom. Both Lakotas and Aristotle value modesty, restraint, and temperance. Lakotas understand duty, but differently from Kant. Lakotas extend respect further than Kant to include not just persons, but nonhuman creatures and natural objects (Caldwell 2017). Furthermore, Lakota duty is derived from the land, while Kant’s duties arise from rational obligations of good will between autonomous individuals living

together. Lakota ethics is least similar to consequentialism. While Lakotas make decisions mindful of the public good, they do not traditionally calculate harms and benefits in such a quantitative way as most consequentialists do.

With an emphasis on sharing and caring, Lakota ethics arguably best matches feminist relationship-based ethics, or ethics of care, attributed to Nel Noddings (Noddings 2007). Feminist ethics is commonly categorized as a type of virtue ethics, rather than treated as a distinct category. Because Lakotas treat everyone as relatives and since “care for the human condition” extends to sharing of emotions and personal time, the Sioux might find ethics of care most agreeable (Byerly 2015, 1). Through emphasis on concern for others as parents care for a child, empathizing with others emotionally (rather than merely rationally in Kantian ethics), and inclusion of others in decision-making, feminist ethics matches Lakota ethics quite well.

While some distinctions might be made with other Western perspectives, descriptions provided by Lakota scholars use similar concepts of virtues, duties, and a role for consequences in Lakota ethics. Initiatives that can be shown to avoid excess, promote human flourishing, give concern to others’ needs as a thoughtful relative would show, and honor a sense of duty to the community and natural world would likely be viewed favorably by Sioux and non-Sioux communities. However, speaking of deficiencies, individual gains, cost-benefit analyses, and profit maximization would be more likely to appear foreign to Sioux members. That is not to say that no Sioux person would understand those ideas, but that these latter types of reasoning are less likely to be congenial to them and more likely different from the way they would typically explain themselves.

While Lakotas might not present their ethical perspective in such a rigid format as I describe, to summarize Lakota ethics as a structured framework for applied analysis, these types of questions arise:

- How do bravery, generosity, fortitude, and wisdom guide the action decision?
- What does the decision to act show about one's character?
- If the action were imagined as a recurring loop, would it foster goodwill or spiral into perpetuating ill-will for others?
- Does the action tend to all people and creatures as relatives?
- What do duties to the land obligate here?
- Does the action neglect certain peoples' needs?

To structure Lakota ethics into conditions that must be met for ethical merit, these qualifications can be applied to a case:

- If the action does not demonstrate bravery, generosity, fortitude, or wisdom, or
- if the action is feared to perpetuate negativity, or
- if the action neglects to treat all of beings and nature as relatives or neglect duties to the land, or
- if the action has an overall negative social impact or neglects community members' needs, then the action is unethical.

Agents striving to perform actions with no objection of their ethical merit would look for ways to act differently to avoid these concerns.

Ethical Analyses

By evaluating the ethical merits of the decision to construct the pipeline using four ethical theories— Lakota Sioux ethics, virtue ethics, deontological theory, and consequentialism, I reveal conditions that justify building it and those that condemn it. From these analyses, I determine that the construction is unethical and ought not to have proceeded unless certain actions were taken. Some of these action prescriptions might be enacted presently to make the operation of the pipeline ethical, to “right the wrong.” In this section, I present my arguments and evaluate them individually to reach a verdict. In the next section, I prescribe alternative actions to address objections to the ethical merit of the pipeline’s construction because some aspects are flagged by multiple theories.

Lakota Sioux Ethics

My analysis of whether to construct DAPL generally follows the framework of questions and qualifying conditions derived from Lakota ethics. I replace the generic “action” placeholder with the specific action being evaluated in this case (i.e., constructing DAPL) throughout the framework. This substitution produces these questions:

- How do bravery, generosity, fortitude, and wisdom guide the pipeline construction decision?
- What does the decision to construct the pipeline show about one’s character?
- Does the pipeline tend to all people and creatures as relatives?
- What do duties to the land obligate here?

- If the pipeline construction were imagined as a recurring loop, would it foster goodwill or spiral into perpetuating ill-will for others?
- Does the pipeline construction neglect certain peoples' needs?

I follow the previous order of questions to argue in favor of the pipeline from the Lakota perspective. To reflect Lakota traditional values, pipeline proponents might cite exporting oil to energy poor nations as demonstrating generosity because it exemplifies sharing with others. Proponents could argue that providing oil via the pipeline demonstrates good character since it helps to support a higher standard of living (domestically or internationally through exports). The direct route of the pipeline is arguably accommodating duties to the land and treating other creatures as relatives, by minimizing the area potentially impacted by a spill. If exporting the oil is for the goodwill of helping other countries to develop, then it would constitute a positive recurring loop, hopefully perpetuating further good. With energy access, consumers often are better enabled to live and work freely, and these improvements could lead to innovations, products, or services that help others by "paying it forward." Since the local communities are some of the poorest in the nation, the economic gains might bring new public services to their aid. These considerations give some reasons supporting the positive ethical merit for the pipeline's construction, but they are weaker than arguments opposing the construction.

For an opposing perspective, I construct an argument in opposition to DAPL's construction. Because Lakota generosity condemns taking more resources than needed and encourages sharing liberally with others, a profit motive would conflict with Lakota generosity if revenues from the pipeline are not distributed throughout the community.

The lack of safety precautions shows a reckless character that is not mindful of others. The threats to nonhumans are even greater than to humans, since humans have some capability of cleaning up spills or avoiding the area in the case of an accident, which animals and plants do not always have. The construction violated duties to the land by building in areas held sacred by the tribe. The pipeline helps to enable an addiction to oil and creates a perpetuating loop of social harms through increased occurrences of crime and violence during construction. The need for safe drinking water sources and mitigation of climate change threats remain unmet needs, put at greater risk via the pipeline.

Substituting DAPL's construction as the targeted action in the previous statements produces these more specific conditions:

- If the pipeline construction does not demonstrate bravery, generosity, fortitude, or wisdom, or
- if the pipeline construction is feared to perpetuate negativity, or
- if the pipeline construction neglects to treat all of beings and nature as relatives or neglect duties to the land, or
- if the pipeline construction has an overall negative social impact or neglects community members' needs, then the pipeline's construction is unethical.

If ETP seeks to only proceed with DAPL's construction if it avoids red flags which give reason to object to the construction, then ETP must consider alternative actions to avoid these concerns.

To compare these arguments, I evaluate opposing sides of the argument. DAPL is not convincingly demonstrating genuine generosity because the oil is sold for profit rather than given freely and may even be exploiting consumers abroad. The higher standard of living is arguably destructive of the planet, and the negligence of risk demonstrated by a lack of spill plans is a significant breach of character that should be addressed. As higher incidences of crime and violence are associated with infrastructure construction projects, more ought to be done to police these areas to maintain safety. To summarize, whether or not the pipeline construction demonstrates generosity is suspicious; disturbing sacred land, the impact of global warming, and potential impacts from spills violate duties to the land; and the disruption to the community caused by the busts after the temporary population boom are additional red flags to object to the pipeline's construction derived from Lakota ethics.

Virtue Ethics

As described in the previous chapter, Aristotelian virtues are habits of moderate actions that demonstrate good character (Aristotle 1984; Austin 2014). Habitually excessive or deficient actions display bad character and are vices. Good character (or bad character) results when those habits show (or fail to show) human flourishing, excellence, or role model behavior. While this view of ethics relies on a conceptual relationship such that (repeated) actions become habits which constitute character, there are judgments inherent in virtue analysis that leave room for difference of opinion to arise, such as what constitutes human flourishing, model behavior, or excessive action. Because of these differences of opinion, ethical analyses do not definitively settle all debates on their own,

but they help to expose salient features and build a case for or against the action, which help to determine whether to proceed with the action.

I replace the action placeholder with the pipeline construction to derive these questions to analyze the case from an Aristotelian standpoint:

- Is ETP doing too much or not doing enough, in such a way as the pipeline construction might seem extreme to an outsider?
- Is ETP demonstrating admirable character by constructing the pipeline?
- Is the construction of this pipeline (in this manner) one that can be promoted as a model of excellence, repeated habitually in similar situations?
- Does the pipeline help stakeholders to flourish?

In favor of the pipeline's construction, there are a variety of ways to illustrate a Golden Mean, related to the size, length, and number of pipelines constructed.

Constructing too few pipelines leads to deficient oil flows and reduced energy security, which would reflect poorly on the character of ETP and those in control of the oil system, as it shows they are not doing their part to provide energy resources and the peace of mind that comes with that. This example assumes current flow rates are insufficient and that other transport options are already providing the maximum they can. In comparison, DAPL helps to provide sufficient oil flow to meet demand. At the other extreme, a longer pipeline that avoids the protesting communities might be argued to be excessive if the length puts other communities or environments at risk (as ETP has argued) or if doing so makes the pipeline unmanageable for some other reason. However, the pipeline's route is rather straight, allowing for efficient transport, and it crosses fewer tributaries and states,

which reduces risks and bureaucracy of interstate transport, supporting its ethical merit. Scholars argue that larger pipelines are preferable because if their proposals are rejected, multiple, smaller pipelines are then proposed, which potentially increases the area of environment and number of communities impacted (Mazer 2017). Furthermore, the lines might be split into segment project proposals to escape more detailed analysis of the whole system (Mazer 2017). Proponents might also point out that pipelines have the lowest risk of accidents, when compared to trucks or rail (Furchtgott-Roth and Green 2013). These reasons lend support to building the pipeline from the perspective of virtue ethics. It may be awkward to talk about the character of a company or sector, but if ETP and the oil industry are efficiently constructing DAPL to meet needs safely, then they act admirably. Such action helps communities to flourish through the energy resources provided and reflects good stewardship through the emphasis of safety.

Against constructing the pipeline, some protestors have argued that constructing this pipeline would create (or worsen) an (already) excessive number of pipelines and that “no more” should be built (i.e., Dhillon 2016). They argue that a fossil fuel economy shows poor character for disregard of the environment, or that oil pipelines are too risky to health (rather than promoting human excellence or flourishing). These claims are based on pollution, spills, production wastes, and other hazards of the fossil fuel industry (Laurel 2016; Willow and Wylie 2014; O’Rourke and Donnelly 2003). While ETP and the US Army Corps of Engineers might argue that they have performed sufficient environmental analysis (e.g., US Army Corps 2015), appropriately mindful of risks, a court decision in June 2017 has mandated that further evaluation and planning must be

performed to address concerns related to potential leaks, deeming current measures insufficient and risk exposure excessive (Hasselman 2018; Bender 2018; Lavelle 2017).

The conditions of virtuous action that the pipeline must meet include:

- If the pipeline construction can be demonstrated as extreme or deficient in some regard, or
- if the pipeline construction can be objected for reflecting bad character, or
- if the pipeline construction does not demonstrate role model behavior, a model of excellence, or promote human flourishing, then ETP must act in such a way so as to avoid this objection.

From a virtue perspective, the construction of the pipeline might be a financially-efficient way to transport oil from a short-term perspective, but other long-term, non-financial concerns seem to override this consideration, qualifying the construction as unethical. The character of ETP is unamiable since risks are excessive and since safety protocols are deficient. As Elizabeth Cook-Lynn, poet and critic from the Crow Creek Sioux tribe, asks, “Is what I am doing of value to the continuation of the Indian Nations of America?”, it can also be asked whether DAPL helps the Sioux to flourish (Cook-Lynn 1991, 13). Since most of the jobs are temporary, there is no substantial opportunity to flourish. Since the methane is flared and oil likely combusted, global warming threats also impede flourishing. As it is currently constructed, DAPL is unethical according to these considerations using virtue ethics.

Deontological Theory

Immanuel Kant describes ethics as obligations (duties) that every rational person can come to know through reason (Kant 1785). For instance, someone can determine through reason that it would be unethical to make a promise that the person knows cannot be fulfilled because it defeats the purpose of making a promise in the first place (a pledge to be fulfilled); that is, the promise is unreasonable because it is self-contradictory. If there are no other prevailing reasons that could defeat this seeming contradiction, then reason provides an obligation not to make the promise. There are three key elements to Kantian ethics—intentions, universalizability, and respect (Reynold and Bowie 2004). Failing the three tests would make the strongest case for an unethical action, while passing all three tests would make the strongest case for an ethical action. Because of the focus on rationality, intentions are important. Kant would rather someone act in some way simply because it is reasoned to be the right thing to do, though it turns out poorly, than to act for selfish reasons in many cases. Because ethics can be known through reason, it applies universally to all people. This principle helps to oppose hypocrisy or favoritism, such as the oddity of a country with nuclear weapons criticizing another country for developing nuclear weapons. If the maxim guiding the action is universalizable, then it is more likely ethical, but if it is not universalizable, it is likely self-defeating and thereby unethical. For instance, if everyone lied often, it would defeat the purpose of lying, since most people either expect you to be lying or simply no longer believe what anyone says, since lying is the norm. Lastly, Kant defines human dignity as expressed through rationally choosing how one ought to live; so, actions that respect

others' autonomy are more likely ethical, but actions that force someone to comply without consent or that use someone for another's gain are more likely unethical.

Converting the generic questions derived from deontology to analyze this case, I produce these questions about DAPL's construction:

- What is the motivation for building this pipeline?
- In what ways can the pipeline be constructed that can be replicated elsewhere?
- Does the construction of the pipeline defeat its own purpose?
- How can the pipeline be constructed so that it respects all stakeholders?

I create a duty-based argument against the pipeline's construction. A profit motive need not be unethical in all cases, but such an intention is not admirable in this case as it disrespects the local communities by involuntarily exposing them to risks of tainted water. Scholars also report one of the primary motivations for the DAPL project is the intention of gaining transport access to a coast (for refining and possibly export), but crude oil pipelines to the Atlantic and to the Gulf of Mexico were already available (Mazer 2017). Exporting crude oil to other (poorer) countries seems to be a self-defeating endeavor if profit is the motive, as margins are already low and ability to pay would be further reduced. Furthermore, climate change impacts portray the use of fossil fuels as a self-defeating endeavor that could make the planet uninhabitable for humans. Also, constructing pipelines to reduce the cost of oil might be a self-defeating action if it turns out that greater climate change threats from combustion of oil lead to a carbon tax that raises the price of oil. Additionally, if the pipeline is created for the purpose of energy

security in the sense of trying to avoid turmoil abroad related to battles for energy, then the pipeline is self-defeating as the domestic protests disrupt energy security locally.

On the other hand, ETP might argue an ethical duty to construct the pipeline to operate its business. They might support this claim by explaining that the pipeline respects consumers' choice to consume oil. Providing a basic service to communities seems to be a universalizable action. These considerations support the pipeline from a Kantian perspective.

The conditions of ethical merit in deontology that the pipeline construction must meet include:

- If the pipeline construction is associated with ill intentions, or
- if the pipeline construction is not one that can be done universally or is self-defeating, or
- if someone involved in the construction of the pipeline is not participating voluntarily, then ETP must act in such a way so as to avoid this objection.

This analysis using duty-based ethics determines that DAPL's construction is unethical. While the pipeline might be an expression of business autonomy for ETP, it is disrespectful of the tribes' autonomy and of those who involuntarily suffer harms of climate change. The argument that the pipeline is built to the best standards available or safer than other options still is not convincing that such construction could be universalized, since exporting and combustion make it self-defeating. While there is some measure of safety and environmental assessment performed, there are clear profit motives that seem to unethically override safety motives. The three tests of Kantian deontology more reasonably support the claim that DAPL's construction was unethical.

Consequentialism

Consequentialism is similar to a cost-benefit analysis in that positive consequences of the targeted action are weighed against its negative consequences to find the resulting “net good” of each alternative action being considered, but the costs and benefits are not limited to financial considerations. Each stakeholder counts equally in a consequential calculus, and impacts are evaluated through the perspective of those stakeholders (that is, whether it would be beneficial or harmful to them). In an economic analysis, for instance one done by a firm considering a new business strategy, stakeholders do not necessarily count equally, and impacts on the agent performing the action (the firm) are often weighted heavily, because utility for the company might be the goal rather than what is best for the public good. This strategizing is economic but not ethical. Economic evaluations might also maintain the agent’s (the firm’s) perspective when analyzing impacts on others, rather than evaluating from the impacted person’s point of view, but that would differ from convention in ethical analysis of using the stakeholder’s perspective. The ethical option is the one with the highest net good, doing the most good for the most people (collectively). Whereas in some economic analyses, options that are most favorable to the agent (the firm) and have least harms to others are likely to be favored. However, in some cases, what is best for a firm is not best for society, and ethicists might argue against their analysis as selfish or egoistic. However, economic analysis that treats all stakeholders as equal could be nearly indistinguishable from ethical analysis. For instance, proper economic analyses of public policy are like ethical analyses when they provide maximum utility for society. Unethical policymaking

results from disproportionately favoring the local community at the expense of harms to other communities.

In comparison to Kant, it is not the agent's intentions that matter in consequentialism, but the results of the action are what matter. As mentioned in the previous chapter, Jeremy Bentham and John Stuart Mill are among the most prominent consequentialists (Bentham 1789; Mill 1991; Vallentyne 2006). In a consequential analysis, the following questions are key to determining ethical merit:

- Who is impacted, by which alternative actions, and in what ways?
- Which groups should be given priority due to their size or the significance of impacts on them?
- Which alternatives provide more positive than negative consequences?

The conditions associated with consequentialism that ETP must meet include:

- If the net good of the pipeline construction is not the highest achievable among alternative options, or
- if significant negative consequences of the pipeline construction are avoidable, or
- if a significantly large population is negatively impacted by the pipeline's construction in avoidable ways, then ETP must act to avoid these consequences.

As the economic analyses and criticisms of them show, the energy and job impacts are relatively insignificant to region since the oil is likely to be transported by other means and used regardless of whether the pipeline is built. Here, I only highlight

some alternative actions that could potentially significantly change the consequences of the pipeline's construction.

The city of Bismarck, upstream from the Standing Rock Sioux reservation along the Missouri River, presents a large population (72,000) that justifies a downstream route (as currently constructed) to minimize harms created by a leak (as compared to only 8,000 living on the reservation), if it is assumed that these communities are the only people harmed. Alternative routes can be shown to be riskier since they would threaten more people and cross more bodies of water (upstream tributaries). Exporting to help other countries in need could also produce positive outcomes. However, besides comparing building the pipeline and not building it, further considerations of building the pipeline with extra safeguards to respond to leaks would likely show higher net good, which would change the construction from ethical in light of the claims just mentioned to an unethical endeavor.

In opposition to the pipeline, protestors would likely argue that the harm to their lives is a more significant harm in their calculus than the trivial benefits of company profit and \$0.10 savings on every gallon of gas. Furthermore, while Bismarck has a larger population, they are also more affluent and thereby more likely to be able to financially manage a spill than poorer communities have the resources to respond. The pending economic bust and the loss of culture caused by out-of-state workers might outweigh the temporary economic gains. Evidence of a loss of culture and reduced civility is found in increases in prostitution, violence, and other criminality, as well as the influx of 20-46% higher populations due to new people immigrating from other states (Becker 2016, 16). It is unknown whether the government revenues would be more than sufficient to cover the

influx of out-of-state workers to show that they provide benefit to the local community. Furthermore, the impact of climate change threats is menacing. As a consequentialist account includes more than financial considerations, it is difficult to support pipeline construction without greater safeguards for leaks. Because further safeguards could be implemented and since some greatly significant threats from water contamination and from climate change are not mitigated, the DAPL construction is unethical, since alternatives exist that could provide a greater good for a greater number of people.

Discussion

The multiple ethical analyses presented collectively paint a more comprehensive picture than any one of them alone could because they investigate different aspects of the case. They can be compared to the economic analyses mentioned previously. In an ideal economic analysis, the decision would follow from the evaluation. That is, the analyst would remain neutral until the evaluation determines whether it is best to proceed with the action, rather than take a stance and then find reasons to support that stance, which is not an analysis. The economic analyses previously discussed seem to only justify a preconceived stance, rather than to assess options neutrally because they do not give much consideration to opposing views or conflicting information. In the ethical analyses I provide, I give attention to arguments in favor and against the pipeline's construction to demonstrate that I have considered both sides of the argument and to show that I performed an analysis. While an analyst cannot completely remove personal feelings, I took a perspective in which I would allow the research to have an opportunity to

convince me. That is, I could have been swayed to adopt a stance opposing my original intuitions.

In the Lakota analysis, I discern that the lack of adequate spill prevention and response plans does not serve others' needs, other creatures as relatives, nor duties to the land. Though proponents of the pipeline's construction could present a weak case around ethical merit based on generosity, the crux of the matter falls on spill management and planning with consideration to impacts beyond the pipeline itself, such as global warming due to oil combustion. It seems to me less caring and more arrogant to pursue the pipeline construction without further safeguards and for a different purpose than using the energy for fuel. To show generosity, ETP might instead devote portions of proceeds to mitigating climate change, such as planting trees along the pipeline route or investing in renewable energy to offset carbon emissions. This change could help to meet the conditions of honoring duties to the land and treating others as relatives. Increased policing can help to keep crime rates and violence low, to hopefully break these cycles of negativity. Innovative ways to address additional community needs for water and better incomes can be provided through local hiring and delegation of community funds to water treatment and management plans.

Lakota ethics and virtue theory agree on measures that help serve community needs because they also help the community to flourish. Employing the Sioux in construction or in social services to address the population boom or providing preferential access to the oil (perhaps after it is refined) are additional measures to help them to flourish. Extraction or transportation taxes might also be financial mechanisms to redistribute wealth through DAPL to tribes or other communities to create emergency

funds or response systems in case of spills that would hinder their abilities to flourish. These practices were not performed during DAPL's construction, but some could be implemented now to address objections against its ethical merit.

Virtue ethics and duty ethics highlight similar concerns supported with different reasoning. Excessive pipeline networks and deficient risk mitigation capture ETP's bad character instantiated in the decision to construct the pipeline. Worries of climate change threats are further enabled rather than reduced, hindering human flourishing. The distribution of jobs primarily to non-locals seems to give deficient attention to the poverty within the Dakotas. Furthermore, safety is a minimal expectation, not excellence. For ETP to demonstrate excellence, they can address these needs to turn the Dakotas from some of the poorest counties in the US to some of the most attractive to live.

Using deontology, I discern a moral obligation to protect people by ensuring water safety that seems more reasonable than a supposed duty to offer a service, proposed in the argument favoring construction. Not just any business should be allowed to operate, even if popularly demanded. Disrespectful relations between stakeholders seem clearly manifested in the lack of spill planning and lack of foresight for climate impacts enabled by the pipeline system. Similarly, the delegation of revenues to emergency funds and climate offset measures can help to extinguish the objection that cite a profit motive as an ill-intention. Had ETP offered the Sioux priority for employment, the Sioux who live on the reservation would not be viewed as being used for ETP's gain through exposure to risk, since they might freely accept employment and thereby receive a portion of the revenue.

There are negotiable conditions that could have been deliberated between ETP and the tribe to help win their consent and perhaps might have convinced some members to join as voluntary (paid) employees, as builders or water protectors. I highlight further negotiations which may demonstrate more positive intentions and respect.

Tribal autonomy is important to many American Indian communities. Since the 1970s, some tribes, such as the Crow and Navajo Nations, have learned about energy resource management and contracting and have used this knowledge to gain greater control over energy resources and better revenues from royalties and operation agreements, such as the Fort Peck and Fort Berthold reservation tribes have gained. Sioux tribes request more direct participation in regional infrastructure projects to help regain the mutual agreement originally established in the Treaty of 1868 that requires tribal consent. However, DAPL was not constructed in this way, and its construction disrespected the autonomy of the tribes. Furthermore, financial compensation or another form of recompense may be in order for the destruction of sacred Sioux land during construction. Rerouting, spill prevention, and response plans could have been negotiated collectively to ease community apprehensions. These measures could be applied universally to all pipelines to support safety motives and achieve consent.

Additionally, since the Sioux referred to themselves as “water protectors” during the protests, they may find it amicable to be hired as a type of quality control or response team that could monitor the pipeline and respond to leaks. In this way, they would be in control of their own safety and could perhaps be given some authority over these aspects. This type of management position honors their human dignity through their autonomy, as

Kant endorses. While the Sioux were not employed this way during construction, this option is still available to make DAPL's operation ethical.

I offer the next proposal in recognition of the energy-water nexus, in which decisions concerning energy or water are sure to impact the other, and situate it with some historical context. A century ago, the tribes relied on the river for drinking water, but the Oahe Dam construction made the river water unsafe to drink (Allard 2016). Furthermore, fracking is water-intensive. "A typical fracking well in the Bakken needs about two million gallons of water to complete" (Braun 2016, 105). So, the community competes with fracking for their water supply. Additionally, Energy Transfer Solutions Inc. (ETSI) (not to be confused with Energy Transfer Partners, ETP), has been permitted an allotment of water for an interstate coal slurry, partitioning even more water to the energy sector (Caposella 2015). So, there are concerns that the river is overdrawn at times. An alternative use of the pipeline would be to pump water (possibly desalinated water from the Gulf of Mexico or Great Lakes) in a reverse direction (i.e., north or west, toward the Dakotas, rather than away from them), to accommodate the loss of water this area has experienced. This alternative use of the pipeline could allow the tribes to flourish.

To address objections regarding pipeline safety, some engineering changes might reduce potential for spills and restore the ethical merit of the pipeline. Adding coagulating agents to the oil slurry, coatings on the inside or outside of the pipeline, or a sealing agent at the spot of leaks might be possible innovations to improve safety. Including more safety valves along the route could also help to stop or control leaks.

To address water contamination concerns, backup water supplies should be arranged. However, the Sioux previously refused water allotment rights and monetary compensation, provided as amelioration for displacement and water losses due to the Pick-Sloan Plan dams, on principle; so, now that the pipeline has been built, they may not appreciate this gesture.

The Sioux are not the only individuals who need to be respected in this case; the impending bust creates problems for the out-of-state, temporary workers, too. The pipeline arguably does not impact Sioux daily life until a spill occurs, but the decisions of whether to frack and whether to build the pipeline will directly impact the construction workers' livelihoods. Cross-training pipeline construction workers with the skills to perform other construction projects or different skills to work across the fuel chain (post-construction) could help to retain their labor in ways that grant them extended job security and honors their human dignity rather than merely using them for their labor in order to profit, to help make DAPL's construction ethical.

Lastly, the Sioux argue that ETP inappropriately acquired the land for the pipeline. If ETP restore ownership of the land to the Sioux, it might go a long way toward improving relations with these tribes. However, many out-of-state workers have already moved into the region; so, putting the land under new authority or expanding the reservation into areas already occupied by nontribal members is a somewhat hypocritical way for the Sioux to regain their land, as it is similar to how they were first removed from it. Furthermore, the Sioux have refused monetary compensation in the past; so, it is unlikely that payments could settle this dispute. Still, monetary solutions at least might show an act of good faith and could perhaps be used to buy alternative water supply

solutions. Proponents of the pipeline might argue that the lands should be purchased by the Sioux so as to be protected as they please, but this suggestion appears callous in light of their history. If ETP secures the proper permits and rights-of-way (though an injunction argues it has not always done so), there is some support to the notion that it has properly acquired the route (Standing Rock Sioux Tribe 2016). As it stands, ETP's controversial permits and land obtainment add to the argument that DAPL's construction was unethical.

With consequentialism, analysis also favors other options besides proceeding with construction in the way it was done. Beyond safeguards and alternatives to combustion, as the economic analyses suggest, if jobs are a primary objective motivating the pipeline, more jobs might be available in energy efficiency or alternative energy (Sovacool 2008). For instance, a report from the US Department of Energy finds that 2.2 million employees worked in energy efficiency while nearly equal jobs were available when comparing the combination of solar and wind to oil, at approximately half a million jobs (US Department of Energy 2017, 29, 61). Hybrid and electric vehicle manufacturing also employ over 60,000 workers (US Department of Energy 2017, 74-75). Some of the local tribes have extensively promoted wind energy since at least 2008, and some of the largest wind energy projects on tribal land expect to begin operating in 2021, through their efforts (Clancy 2018; Jossi 2018; Kessler 2018). Alternative energy jobs continue to become more available while the fracking bubble bursts, with its jobs in decline. What the economic analyses discussed in a previous section neglect but is better captured in an ethics-oriented perspective is that jobs and revenue creation are not necessarily always

valued or valued to the same degree; it matters what types of jobs are created, for whom, for how long can the revenue last, and whether it is gained in appropriate ways.

Stepping back to a broader context, the decision to pursue an oil pipeline is an energy decision that supports the status quo rather than a transition to something new. Because of the conflict over the pipeline with some of the tribes, there is cultural instability that makes the project unsustainable. In this way, the lack of ethical merit in this energy decision contributes to a less sustainable future.

Objections

To be sure to treat these matters most seriously and comprehensively, I should respond to potential objections to claims that may have been too easily brushed aside throughout this discussion. One objection is that the pipeline is ethical because it enables international development through exported oil. This claim is controversial since oil consumption contributes to international climate change threats. It is difficult to determine whether a single pipeline contributes net positively or negatively to climate change on a national or global scale, but because ETP does not perform a broader environmental impact assessment, the burden remains on them to prove net positivity or face criticism. For this reason, this type of evaluation should be required for such projects (i.e., pipelines), especially when products are intended for export, though it is not standard protocol. Furthermore, it generally seems that more direct foreign financial aid or support for clean energy installations would provide the same benefits without the harms as compared to exporting oil.

A second objection is that there may simply not be any way to prevent or respond to leaks to make a safer pipeline, even if we ignore costs of safety precautions. I speculate about coagulants, valves, and other such precautions, which might not exist or might increase leaks. Even so, if the safest is not safe enough, then pipelines ought not be pursued. I am merely trying to imagine ways to overcome concerns over safety, but if it is not possible to be safer, then this reason to not build the pipeline is stronger than even I imagine it to be.

Third, this oil is going to be moved (perhaps in more dangerous ways with greater emissions) and consumed (combusted) anyway; so, this pipeline does not matter significantly in a larger context. Yet, the pipeline is not trivial, and this line of reasoning dilutes support of the pipeline construction almost as much as it criticizes objecting to the pipeline. All options of oil transportation should be given comparable analysis, and it should not be assumed that the oil is used for only one purpose. However, if certain uses are more dangerous than others, then it is perhaps necessary to restrict them.

Fourth, the pipeline arguably helps the Great Sioux Nation to flourish. This claim may refer to giving the Sioux tribes extracting the oil upstream a larger market to which to sell, to keeping Sioux members out of harm's way from being employed in the dangerous occupation of pipeline construction, or to the diversity of ideas brought through immigration of out of state workers into the Dakotas. This line of reasoning implies that the Sioux members are perhaps in denial or unaware of how this event impacts their lives or communities. I cannot imagine that the Sioux tribes would continue to fight pipeline projects and adamantly pursue wind projects if they were benefiting

overall from pipelines. I trust they are assessing their conditions accurately and that they would deliberate appropriately whether to voluntarily accept such jobs if offered.

A fifth claim might be made that giving the Sioux tribes a share of pipeline revenue or other preferential treatment (to jobs, water, or energy access) would only perpetuate their welfare state status and keep them from the autonomy they seek, which is further enhanced by having to fight for a cause. No community should intentionally have obstacles put in its way to promote its integrity, and the financial or resource aid might be enough to enable the tribes to become self-sufficient. It seems awkward to criticize the self-sufficiency of these tribes since they have existed longer than communities that have displaced them.

A sixth objection is that temporary jobs reduce the harm to which any one individual might be exposed. It might be possible to quantify the harms of accidents in comparison to the benefits of full employment, but such a determination of whether the risk is worth the reward should be left to the employees themselves. It would seem that when employees accept such risks, full employment is preferable, other things being equal.

It may be the case that all pipelines were being used to capacity at the time of construction of DAPL, requiring DAPL to be constructed. This condition, if taken to be true, is neither a reason for or against the construction of the pipeline; it merely limits the means available to transport the oil.

Someone may object to one energy company (ETSI) receiving water allowances while ETP is criticized for potentially contaminating water, as unfair discrimination. Yet, the water used in ETSI's operations might be recovered through proper treatment, while

ETP's normal operation does not require water. It is not normally the case that water would be set aside to be used for leaks and spills (i.e., to be contaminated), but it would be appropriate to designate sufficient water as a backup source in case of accidents.

In response to any number of objections to using the pipeline to transport water instead of oil, I will simply say that this alternative is only a suggestion and that much further analysis is needed to determine whether it would be beneficial to the community, feasible, and should receive ethical evaluation of its own. I only propose it as a potential option and do not claim to have performed a comprehensive assessment of its value beyond an assumption that water spills appear less dangerous than oil spills of equal volume and that the region's water availability has been hindered by previous projects such as the Pick-Sloan Dams. I acknowledge that pumping fresh water into the Great Plains may exacerbate the communities with further population booms, create intense water battles, and lead to further encroachment on tribal land. Each of these concerns should weigh into additional analysis of this option.

Objectors might also claim that members of the Great Sioux Nation are not all trained in oil (or water) systems and putting them in charge of such decisions might lead to harms to others. However, I do not intend to claim that the Great Sioux Nation be given full or complete authority over such matters. While it may be the case that they deserve a greater say in proportion to the impacts they face, it is not necessarily the case that they would be unchecked and that further training or education could not be provided to them to make them suitable authorities.

Next, an objection can be made that the tribe can move to escape harms or take countless other actions to protect themselves from threats associated with the pipeline.

Granting such claims does not significantly change the merit of whether the action is ethical. It only, at best, qualifies some of the impacts on one stakeholder group.

Motivating a dissenting group to be displaced from the land they have fought for over a century to keep secure does not provide favorable reasoning to support the construction.

It might also be objected that providing present people livelihoods through the oil, revenue, and jobs is more important than concerns over future people's livelihoods, as expressed in worries over climate change and impacts of combustion emissions on future generations. I side with Simon Caney on ignoring a "discount" on future generations as a form of discrimination and emphasize that some impacts of climate change are happening to present generations (Caney 2008). While particular harms caused specifically by the oil combusted after transport through this pipeline may take decades to manifest, similar occurrences have been happening for a century now. The delay is insignificant. The continuation of such harms perpetuated by pipelines is tragic.

One final objection to specific proposals within this chapter is that the land used for the pipeline can still be used for solar photovoltaics or wind turbines, such that these seemingly better power options are not actually competing with oil generally or DAPL specifically. I agree that such a scheme, similar to mixed-use development in urban planning where apartments are built over street-level shops, is more attractive than the pipeline on its own, but again, this more complex, hybrid, multi-energy infrastructure option is still subject to ethical scrutiny of its components. It ought to be determined whether any one of these energy infrastructures is ethical before any combination of them is considered.

Besides objections to particular details, the project of the entire chapter may be criticized for a lack of novelty. That is, it might be the case that all of these issues identified here have already been considered by the various stakeholders involved with this issue. This objection may be a true assessment of the included details, but it misses the purpose of this chapter, which is to illustrate how explicit, standardized applied ethical analysis is conducted. While these factors may have been considered at various points throughout the planning, protests, and further research of this case, there are not standardized applied ethics studies of the arguments that apply to either side of the pipeline debate. While there are a variety of energy morality, energy justice, and descriptive ethics accounts of the case, I argued in the previous chapter that those methods and perspectives from other disciplines are conducting studies with significant differences with applied energy ethical analysis and reach conclusions that are different in nature, sometimes compatible, and not necessarily in conflict to this study. It is the way these matters are discussed that is different, rather than a difference of what is discussed.

Conclusion

Due to massacres, flooding and shrinking of their native land, and a lack of sufficient consultation with the tribes, the Great Sioux Nation is reasonably upset about the construction of DAPL even before its construction. The tribes and their allies setup a protest camp at Standing Rock to attempt the block the completion of construction in order to protect their land, water, health, and to oppose climate impacts from the oil's eventual combustion. Both the economic analysis and environmental analysis presented

by proponents of the project give insufficient reason to move forward with construction. There is not a sufficiently low probability for potential accidents, not enough safeguards in place to prevent or respond to spills, no alternative energy analysis for comparison, and other deficiencies that make construction controversial. The benefits of full-time jobs are few, and the financial gains are short-lived. The quick increase in population stresses communities' service providers in already poor counties. These economic factors can be compared to other ethical factors to determine whether the pipeline ought to have been completed.

Four ethical analyses were performed to evaluate the merits of DAPL's construction, and each gives evidence that the pipeline construction is unethical. In order to say that DAPL's construction is ethical or that it ought to be allowed to continue to operate, a variety of conditions would need to change. In the virtue analysis provided, while the pipeline's construction might have positive merit in that it is an efficiently straight and perhaps the safest type of oil transport available, oil combustion emissions contributing to climate change and threats to environmental and public health from a potential oil spill are vicious habits encouraged by the fossil fuel industry that could eventually make the world uninhabitable, overriding the benefits oil-produced energy provides. It seems more reasonable to believe that DAPL's construction does not enhance human flourishing. However, if the proceeds or preferential access to oil are used to help the impoverished communities of North and South Dakota, then this change would reflect positively on the character of ETP. If the pipeline's construction is used to help the Great Sioux Nation to regain native land or used to pump fresh water from another source, then

the project would help the Great Sioux Nation to flourish and begin to reconcile for past losses.

The analysis of duty ethics argues that it is more likely to be the case that there is a duty to avoid building DAPL, rather than a duty to build it. DAPL's construction seems to disrespect both the tribes and the temporary workers seeking more fulfilling careers. The tribes argue that they were not consulted sufficiently and are involuntarily exposed to risk of contaminated water. Temporary workers might more meaningfully be put to work with cross-training that allows them to continue in new construction or post-construction duties to maintain sufficient work hours. Without proper safeguards, DAPL's construction cannot reasonably be said to be universalizable, and profiting seems to occur at others' expense, making it a bad motive. For these reasons, the analysis of duty ethics condemns DAPL's construction.

The consequentialist evaluation weighs the harms to the smaller population of the tribe and those impacted by climate change to alternative routes near a larger population, such as closer to Bismarck, ND. While DAPL's construction might not create much emissions contributing to climate change, the greater fossil fuel industry that includes it and is further enabled by it is producing what might soon become an inescapable threat to human existence. Because alternatives such as safer pipelines, leaving the oil in the ground, and not combusting the oil exist, DAPL's construction cannot be said to be the greatest good for the greatest number. Therefore, DAPL's construction is unethical.

Lakota ethics is distinguished by recurring hoops of behavior and ecocentrism which would condemn DAPL's construction, even if some considerations can be stated in favor of the construction. As with other theories, the lack of safety precautions is most

troubling, as they neglect the interests of others, rather than treating them as relatives. Obligations to the land the Lakota find sacred would keep the construction from occurring. Perpetuating social harms through the boom and bust of the oil industry reflect negative hoops. These considerations also determine the construction of DAPL to be unethical.

While changes can still be made to adjust operations to increase the ethical merit of the pipeline, each of the four ethical theories provide reasons to condemn the pipeline. Until these considerations are resolved, factors remain that make the pipeline's construction and its operation unethical.

CHAPTER 4

ENERGY ETHICS IN THE NAVAJO NATION'S TRANSITION FROM COAL TO A SOLAR ECONOMY

Introduction

In this chapter, I describe the shock that the Navajo Nation (*Diné*) experienced in 2017, when the executive board of the Navajo Generating Station (NGS) coal plant voted to prematurely end a contractual agreement that was to run until 2044. The case is ongoing, as the coal power plant is scheduled to close by December 2019. I analyze the ethical merits of whether to pursue a solar economy and its most significant impacts for the Navajo Nation, Hopi Nation, and community of Page, AZ. First, I provide some details of the Navajos' energy history in order to recognize important context for understanding their current attitudes toward non-tribal stakeholders. Second, I describe the case and explain the economic analyses that have been performed. Third, I acknowledge that the Navajo and Hopi tribes have their own ethics, which give some insight into their decisions. Then, I analyze whether the Navajo Nation should transition to a solar energy economy, using virtue ethics, deontology, consequentialism, Navajo ethics, and Hopi ethics. These analyses provide the determinant conditions of ethical merit of pursuing a solar economy, which are that it provides for those in need, begins to recover lost revenue and jobs, and respects tribal members' autonomy. While more needs to be done to replace losses of the closure of the plant and mine and to reduce negative impacts of the solar economy system-wide as they become available because these conditions make the action unethical, there is no reason to believe these factors will not

be addressed in time and may already be part of plans not yet available to the public. I argue that the transition to solar is the ethical choice and ought to proceed.

History of Navajos and Energy

Though their land has some of the richest coal, uranium, and solar energy resources in the US, the Navajo and Hopi people are not often discussed in energy journals. At over 300,000 members, the Navajo Nation is the largest Native American Indian tribe, and approximately 200,000 live on the reservation which covers roughly a third of northeastern Arizona and extends into Colorado, New Mexico, and Utah. The Navajo Nation has had a contentious relationship with the US government in the past. The tribe was forcefully relocated from Northern Arizona to Bosque Redondo, NM between 1864 and 1866, in what is called “The Long Walk.” Navajos have also suffered public health harms and soil and water contamination caused by uranium exposure (Tsosie 2009, 2015; Pasqualetti et al. 2016; Voyles 2015). The Navajo Nation somewhat reluctantly reorganized tribal governance into the Tribal Council to enable resource contracts and land use agreement when oil was discovered on the reservation in the 1920s (Voyles 2015).

Besides commercialized energy and fuels, the mass reduction of livestock performed by federal agents in 1930 is another important early energy event in Navajo history because of the tremendous economic and cultural disruption it caused to the tribe (Powell 2015). Worries related to overgrazing, regional development, and erosion motivated the US government to greatly reduce the herds on which the Navajo tribe traditionally depended for their way of life. It is an energy event because the sheep

provided nutritional energy and because the soil erosion was feared to impact energy generation at Hoover Dam, if loose soil would travel across Lake Mead and into the turbine apparatus.

Among different energy types, the Navajo Nation has the most experience with coal. Along with NGS and Kayenta Mine, Navajo Nation also is home to Cholla Generating Station, Four Corners Generating Station, San Juan Generating Station, and San Juan Coal Mine, and the Navajo Nation own the Navajo Mine (purchased in 2013) and two units of Four Corner Generating Station. However, a majority of Navajo people did not support Desert Rock Power Plant, proposed in 2006, which never materialized once plans were cancelled in 2011. The Navajo reservation encircles the Hopi reservation, which has a population of roughly 12,000 members and are the primary laborers of Kayenta Mine in the Black Mesa region of Arizona. More recently, the Navajo Nation began fracking on their land in New Mexico in 2014.

The Navajo reservation also has high renewable energy potential. They have installed wind turbines atop the mountain ridge in eastern, central Arizona, called “Big Boquillas Ranch,” and the Navajo Nation leads the US in solar energy potential. Because of the high solar insolation, the Navajo Nation has contracted to construct a series of solar photovoltaic farms to begin to offset the losses of NGS.

Case Details

In 2017, the executive board voted to cease operations at NGS coal plant in Page, AZ, citing tens of millions of dollars lost annually to competition of cheaper electricity from natural gas (Randazzo 2017b). The decision would end land lease revenues, valued

at as much as 85% of tribal budgets by some accounts (e.g., Locke 2018; Craft 2018), which would be significant losses to the tribes. While there is less moral outrage over the closure itself, the decision is more ethically controversial because of job losses potentially displacing approximately 400 plant workers. A later decision from majority owner and operator, Salt River Project (SRP), reduces some of this worry because they have offered their workers relocation to other plants. Another recent agreement among unspecified stakeholders extended operations through 2019, confirmed that Navajos will have first preference in post-decommissioning employment, and verified that payments to the tribe will continue for 35 years (Frazier 2017). These latter decisions provided some relief, but relocation to another coal plant, mine, or to Arizona's nuclear plant may only provide temporary relief, as coal plants, nuclear plants, and coal mines close across the nation (Haggerty 2017; Kennedy 2017; "Greene Co." 2018; Carley et al. 2018). Some workers struggle with accepting the relocation option because the Navajo people have a place-based identity which causes reluctance to live or work off-reservation.

Furthermore, these decisions still leave unclear whether enough available positions will result. Because more can be done to improve their lives rather than merely offering them more of the same, these arrangements arguably reflect a moral minimum but at least give these individuals options to consider.

Because Kayenta Coal Mine exclusively serves NGS, lacks infrastructure to supply another plant, and has no likely buyer, it will also close, displacing another 200 workers. While the larger Navajo Nation often attracts attention because of its name shared with the plant and larger population, the Hopi workers at Kayenta Mine could be in comparable or worse danger of losing their livelihoods. The coal workers have not

been provided a similar offer to relocate; however, they might be able to put their skills to use in Arizona's prevalent copper mines. Plant employees and miners receive much higher salaries with greater benefits than most of Page's minimum wage workers, presenting a further ethical complication, since they may not be the worst-off and may perpetuate or worsen existing inequalities (Wyloge 2017).

The tribes requested federal and local assistance, and secured a Department of Commerce grant, providing about \$625,000 (Hand 2017; Randazzo 2017a; US Economic Development Administration 2017). Locally, they have joined with Northern Arizona University and Coconino Community College to create new education programs in Page (Cowan 2018a) and have hired Arizona State University as consultants to discern potential renewable energy projects. While the Navajo Nation has opened one solar farm in Kayenta and while a second is being constructed, it is unclear how open the tribes are to renewable energy, considering reluctance to build on sacred ground and because the energy is often going off the reservations to urban consumers (Smith 2017). Furthermore, if urban stakeholders ask to build solar farms on tribal land without first outfitting their own buildings and spaces, it presents a somewhat hypocritical request since urban residents do not generally consider cities sacred. The Hopi are also investigating solar farms. Multiple large solar installations will be needed, considering that the coal land leases provided \$14 million annually and that a solar farm big enough to power nearby Flagstaff would provide \$3-5 million annually (Cowan 2018a). While distributed photovoltaics might more directly help the one-third of tribal households currently lacking electricity, it is unclear whether they want it, leaves payment responsibility unknown, and ignores financial needs of the tribe (Hand 2017). While the tribes are

considering solar, there is some chance that they are reluctant to proceed since they have not yet fully endorsed this path.

Because of the tribes' vulnerabilities (due to the poverty of its members and precariousness of being tied to a single power plant as a significant source of community revenue) and large amounts of money at stake, there are uncertainties about how to proceed ethically. Since competition from renewable energy is another underlying reason for the plant and mine closures, the tribes' hands are somewhat forced. The tribes might also be skeptical of assistance from the local photovoltaic provider, First Solar, because of the conflict, self-serving financial interest the solar company has. It is also difficult to determine just how well-off these communities are, considering the energy workers' salaries on one hand but historical struggles with pollution-damaged soil and waterways, alcoholism, unemployment, food insecurity, poor education, lack of electricity, heat, and running water, criminality, and suicides on the other (Tsosie 2009; Nadesan and Pasqualetti 2016; Cornell and Kalt 2010; Noisecat 2015). The uncertainty about motivations, competing objectives, and well-being can make it more difficult to create shared value through mutually beneficial initiatives. So, whose values and interests should take priority, and towards which needs should help be given remain significant ethical disputes related to this case. Should the Navajo Nation pursue or avoid a "solar economy"? Should they transition from an economy based primarily on coal-based electricity generation to one that receives its primary revenue through solar energy installations or avoid a solar economy and continue with coal?

Economic Analyses

Because the decision to transition to a solar economy is motivated by the closure of the plant and since economic reasons are cited as the reason for closing NGS, an understanding of the coal and solar financial markets is crucial to understanding one of the dominant narratives in this case. Multiple economic analyses regarding NGS, Kayenta Mine, and their impacts on local communities are publicly available and are a standard procedural step in energy decisions. These studies detail financial data but do not discuss ethical implications of the decision to close these facilities or many alternative actions. Five of these reports are described here.

The first report from the Institute for Energy Economics and Financial Analysis (IEEFA) (i.e., Schlissel 2017) determines that \$2.4 billion in subsidies would be needed to keep NGS open until 2030. Because such high subsidies are undesirable, the report implies that the closure is a good idea. This conclusion is based on operating expenses for NGS that have risen over \$40/MWh, while electricity is selling at market prices below \$25/MWh, which means the plant loses more than \$10/MWh without subsidy (Schlissel 2017, 3-8). Natural gas, solar energy, wind energy, and battery prices are all trending toward lower prices, while coal costs are rising, presenting a grim outlook for coal's future. Solar and wind energy also have the advantage of negligible operation costs, which economically incentivizes dispatching energy generated from these sources first, when available (Schlissel 2017, 11). This report was created in May 2017 and was one of the first to explain the plant's and market's financials to the public.

The IEEFA created a second analysis in June 2017 which was one of the first to discuss a transition plan in response to the closures (i.e., Sanzillo 2017). Lack of such a

plan created some tension in the early months following the board's vote to close, as many people interested in the situation were unsure of what the closure would mean for them and their communities. The author proposes creating an executive board to oversee small, local business ventures. The author assumes most of the money to fund these ventures would come from a federal infrastructure fund and that it would be used in three ways: to provide jobs, compensate the Navajo Tribal Council for lost revenue, and encourage diverse economic growth in the impacted communities. While the report improves on the previous report by giving slightly more detailed plans and proposes a shorter timeline (5 years) and lower expenses (\$370 million), it is dismissive of the jobs issue. The author states that the owners of the plant and mine have triple the needed job positions available in other locations due to regular annual turnover and new jobs expected before the end of 2019 and that the greater community has 27,000 similar positions (Sanzillo 2017, 4, 11). The author also notes that Kayenta Mine's land leases contribute approximately \$51 million annually to the tribes (\$28-37 million to the Navajo Nation, and \$14-14.7 million to the Hopi Nation) (Sanzillo 2017, 6). The report is missing details of specific initiatives that might be helpful for the communities, beyond generally stating that energy, agriculture, tourism, retail, meat processing, public safety, and infrastructure (including road construction, water treatment, waste treatment, telecommunications, and broadband) are priorities. A more detailed comparison between this report's plans and the failed Navajo Green Jobs program (Curley 2018) would help to show that these ideas are more advanced than previous (failed) initiatives.

A third report conducted on behalf of SRP in July 2017 notes that NGS contributes \$51 million to the economy of Page, AZ annually, which is credited for

maintaining 147 indirect or induced jobs (5% of Page’s employment) (Combrink et al. 2017). Another report commissioned by Peabody Coal includes an objection to the claim that the Central Arizona Project, a series of canals that supplies water to Phoenix and Tucson and the largest purchaser of NGS’s electricity, would lose \$38.5 million if continuing to purchase from NGS (Energy Ventures Analysis 2018). The authors of this fourth analysis claim instead that the Central Arizona Project would save \$370M by 2030 if it continued to purchase from NGS. IEEFA created a fifth analysis in the form of a briefing note to respond to the objection, stating that even if the objection were true (which IEEFA disputes as an unsubstantiated claim), the Central Arizona Project only purchases 25% of NGS’s electricity, which means that 75% of NGS’s production would still need to be subsidized or managed in another way to avoid losses. These five analyses indicate that over \$100 million of economic impact to the tribes and community of Page need to be offset to compensate for the closure of the plant and mine.

While there are a variety of economic analyses of the plant and mine available, the same cannot be said for the decisions of the Navajo and Hopi tribes to pursue solar energy, but anecdotes can be found in public news articles. The Navajo Nation’s first solar project since the NGS closure announcement, called Kayenta Solar, created an estimated \$15.6 million in economic activity during construction and employed up to 280 people at its height (Bebon 2018). This solar project is different from others in that land leases are not the only source of revenue for the tribe (Hay 2018). Navajo Tribal Utility Authority owns and operates Kayenta Solar and receives energy sales revenue as well. However, Kayenta Solar cost \$60 million, and a second solar farm, called “Kayenta II” will cost \$50 million (Associated Press 2017; Smith 2018). A third solar farm at

Cameron, AZ is in the planning stage. This third farm will not provide energy to Navajo homes but is expected to be co-located with a technology manufacturer and some additional utilities (water and communications) (Cowan 2018b). While Kayenta and Kayenta II are 27.3MW facilities, the Cameron farm is expected to produce 100-150MW (Cowan 2018b). The third farm should open by 2020. If these three solar installations create 200MW of electricity, they have replaced less than one-tenth of NGS's 2250MW. The Hopi are also planning a 19MW solar facility to supply Flagstaff with electricity, and an agreement between the Navajo Nation and SRP includes 500MW of power. Still, it will take time to construct these installations and to pay off the upfront loans needed to afford them. After construction, such facilities require less than a dozen full-time permanent employees to manage them. Even though a dozen such facilities need to be created to reach an equivalent production of energy, the number of employees is likely to be at a deficit in this transition, considering 100-200 temporary workers moving between installations and that a dozen facilities require a dozen employees each totals approximately 100-150 workers. The solar economy would be expected to employ approximately 200-350 people over the next decade or longer, which is only about half the number of direct energy employees of the coal economy. Because of the tens of millions of dollars in costs for these installations and the deficit of available jobs, the solar economy will require additional programs, such as rehabilitation of the coal site or employee transfers to other plants to compensate for losses.

Navajo Ethics

Although the Navajo Nation had previously restricted sharing information about their culture with Western audiences, Navajo scholars have recently begun describing Navajo ethics (e.g., Yazzie 1994; Vecsey 2015). While the Navajo people have terms for good (*hózhó*) and evil (*hóchó*), they are generally taught that “you can do what you want” and typically describes ethics as “relative to situation and to consequences rather than absolute” (Vecsey 2015, 82). Still, Navajos have “moral qualms” which include specific negative prescriptions, such as “do not rape, steal, molest a sleeping woman, argue over sexual jealousy, wish ill of another’s person or possessions, ridicule other people’s defects, commit adultery, kill, or lie” (Vecsey 2015, 82). “The Navajo moral code tends toward the negative, because ‘its only purpose is to rule out those actions which would make life in general impossible, such as sickness, hard feeling among men, or poverty’” (Vecsey 2015, 83). Yet, the notion of “obligation” is not foreign to the Navajo people. For instance, “the Navajo primary duty is to one’s kin group,” and “a Navajo is urged by tradition to preserve and promote *hózhó* as an effective moral duty” (Vecsey 2015, 85, 87).

Navajos oppose “monsters” akin to vices, such as “selfishness, greediness, envy, hate, and jealousy” (Vecsey 2015, 111). With regard to respect, Navajos are not to coerce others and see using someone else for one’s own gain as a form of witchcraft, punishable by death (Yazzie 1994, 180). Excess, particularly excessive wealth, is another form of witchcraft (Vecsey 2015).

Navajos generally have no concern for “intent, causation, fault, or negligence” but believe that bad fortune, shame, and “disruptive societal consequences” are deterrents to

behaving unethically and that consequences follow “from everything you say and do” (Yazzie 1994, 184, 188). Navajos generally want to avoid sickness, pain, trouble, embarrassment, and poverty and want to attain health, pleasure, wealth, and longevity (Vecsey 2017). Rather than maximizing collective utility at the possible expense of a few, the Navajo people generally seek win-win solutions and “compensation, rather than revenge and retribution” (Yazzie 1994, 185, 188). It is said that “just as good comes from good” and that “harm must be paid through restitution (*nalyeeh*)” (Yazzie 1994, 188).

Like other Native American tribes, respect is extended to other living beings as equals. Navajos conventionally call other people and nonhumans “relative” to symbolize this respect. This relational view best matches feminist care ethics due to the pragmatic way that Navajos try to constantly maintain positive relationships with everyone in the community as a central feature to their ethics that is not captured as well in the principles of the three major ethical theories (Noddings 2007). Empathy, inclusion, and subjective experience are criteria within care ethics. For instance, it is very important to Navajos to restore good relations, and in disputes, the perpetrator is treated as a victim as well (Yazzie 1994). This empathetic recognition contributes to the communal sense of equality they share with another.

While the Navajo people might not structure their ethical perspectives in this way, for the purpose of evaluating cases, these qualifying conditions can illustrate ethical merit from a Navajo-based perspective:

- If the action requires condemnable actions that make life impossible, such as rape, murder, stealing, lying, etc., or
- if the action involuntarily uses someone else for the agent’s gain, or

- if the action neglects duties to one's kin group, upsets natural balance (*hózhó*), or fails to treat others as relatives, then the action is unethical.

Agents seeking to only perform actions with no objections of ethical merit, as I assume, must act in such a way so as to avoid these objections.

Hopi Ethics

One Hopi scholar explains the ethics of the Hopi people (i.e., Glowacka 2009). Seeking a fulfilled life (*naavokyawintiwa*), the Hopi see role models of moral excellence, or moral exemplars, in spiritual entities, called the “*katsinam*”, discussed in their traditional *katsina* songs (Glowacka 2009). Their concepts of “*suyanis'unangwa* (good-heartedness)” and “*unàngwtalsino*” reflect good character, while “*okiw'unangwa* (poor heart)” suggests a bad character. The Hopi see their identity as a form of duty (Glowacka 2009). The Hopi value “sincere, heartfelt efforts to live right in accordance with traditional instructions (*wukwtutavo*)”, and they revere “the sense of proper and right living” “that helps people realize a good life.” (Glowacka 2009, 169, 171). On the other hand, the word “*nukpansino*” denotes bad intentions. Yet, they see ethics as “based not on universal moral laws” but culturally relative (Glowacka 2009, 169). The Hopi also oppose using others for one's gain without consent. Such a person is called “*powaqa*” and is said to “take the hearts from people, *unangwhorokna*” or “phrased differently, to weaken *qatsi'nangwa*, or the people's ‘will to live’” (Glowacka 2009, 177). Hopi songs encourage them to “correct their conduct for the benefit of the collectivity” (Glowacka 2009, 169). “Those who do not adhere to communal values, who display mental-

emotional imbalance, become more susceptible to illness and misfortune” such as suicide or social isolation (Glowacka 2009).

Hopi music often describes their ethical views in what could be seen as a hybrid of Western ethical perspectives. For example, one katsina song encourages “people to live right and come to care for each other (*naavaastoti*) so that rains representing the power of fertility and abundance of the harvest will arrive from all directions and ensure the continuity of the life cycle” (Glowacka 2009, 168). In this song, feminist care is described for its communal consequences (e.g., consequentialism), which bring fertility, a type of flourishing (important to virtue ethics). Hopi ethics is inherently vitalistic in that *life* is often held as something of the highest value, giving respect to all forms of life. For instance, the Hopi also personify nature and see equal kinship with nature, as the Navajo people do. They also believe in “the collective goal of sustaining life” (Glowacka 2009, 172). Their notion of care is exemplified in the notion that “caring for balance, in the sense of peacefulness in life, is actually caring for the conditions needed to maintain life” (Glowacka 2009, 173). The importance of care shows similarity to feminist ethics, but they also warn that chaotic emotions can impair duties and caution against “mental-emotional excess” (Glowacka 2009, 173). While these suggestions seem to reduce the importance of feelings in ethical decision-making, “coming together as one” is an important principle reflecting empathy. Hopi ethics is comparable to a vitalistic feminist ethical theory.

While Hopis might not express their ethics in such a structured approach, conditional statements reflecting their perspective can be used to evaluate cases, such as:

- If the action does not demonstrate imitate the *Katsinam*, or

- if the action demonstrates bad character (*okiw'unangwa*), or
- if the action is associated with bad intentions (*nukpansino*), or
- if the action does not avoid involuntarily using others (weakening their will to live, *qatsi'nangwa*), or
- if the action does not adhere to communal values or displays mental-emotional imbalance, or
- if the action does not respect all forms of life as of the highest value, then the action is unethical.

Agents must act to avoid these concerns if they wish to only act in ways that do not have objections of their ethical merit, as I assume in the forthcoming analyses.

Ethical Analyses

While both Navajo and Hopi tribes have decided to pursue solar energy as a way to transition away from their coal economies, their decisions may be rushed. That is, if the tribes are desperate due to the potential of losing significant revenues, they may be succumbing to pressure from others, settling for a lesser option. I evaluate whether the Navajo Nation ought to pursue a solar energy economy or avoid it, using virtue ethics, deontology, consequentialism, Navajo ethics, and Hopi ethics. Similar concerns apply to the Hopi's transition, and I only address theirs directly from their ethical perspective, though it also can be used in analyses of Navajo actions. I use only conditional statements (and not a framework of questions) for the Native American perspectives to avoid redundancy and because the tribes would not necessarily ask this sort of questions when

deliberating, but I still want to show how their perspective can be understood by an outsider.

*Navajo Ethics*²

The analysis through a Navajo perspective includes these conditional considerations, derived from substituting the pursuit of a solar economy for the action placeholder:

- If the pursuit of a solar economy requires condemnable actions that make life impossible, such as rape, murder, stealing, lying, etc., or
- if the pursuit of a solar economy involuntarily uses someone else for the agent's gain, or
- if the pursuit of a solar economy neglects duties to one's kin group, upsets natural balance (*hózhó*), or fails to treat others as relatives, then the Navajo Nation (or Hopis) must act in such a way so as to avoid this objection.

Because there is no rape, stealing, adultery, or murder involved in the decision to pursue a solar economy, the action thereby demonstrates ethical merit by avoiding these condemnable actions within Navajo ethics. Yet, the decision to pursue solar also ought not to be excessive or use others for one's own gain. Producing more energy than is demanded or capable of being used (due to lack of transmission, for instance) might be an example of excess to avoid, but the tribes are pursuing solar installations at a reasonable pace, taking care not to go bankrupt or to overburden the electric utilities with new

² A previous analysis comparing the proposal for the Dessert Rock Power Plant to alternative renewable energy projects is also available and has great insights relating Navajo ethics to energy issues (Ecos Consulting 2008).

generation. Similarly, the Navajo Tribal Utility Authority has confirmed with members at each solar project site that they would be willing to give up their grazing rights, where necessary, for construction (Hay 2018). By directly gaining the consent of these families on whose land they will build, the Navajo Tribal Utility Authority is regaining the trust of Navajos, showing respect, and honoring duties to their kin. The Navajo Nation might also see the pursuit of solar as a way to reconcile wrongs of the coal plant's previous pollution, which is a positive aspect of Navajo ethics. If site remediation of the plant and mine are performed in the future, these measures would further support reconciliation. By tending to the needs of tribal members (such as demonstrated in the expanded access to utilities that the Cameron project will provide), the solar economy combats poverty rather than perpetuating it, a Navajo duty mentioned previously. Sickness can also be avoided if the photovoltaics models chosen are created with less toxic substances and production wastes, so that health impacts across the entire supply chain system and end of product life are minimal.³ In these ways, Navajo ethics supports the transition to solar energy.

Hopi Ethics

These conditions of ethical merit from Hopi ethics can be applied to this case:

- If the pursuit of a solar economy does not adhere to communal values or displays mental-emotional imbalance, or

³ E-waste has already been noted as a problem of previous solar photovoltaic distribution initiatives by at least one scholar (Powell 2015).

- if the pursuit of a solar economy does not respect all forms of life as of the highest value, then the Navajo Nation or Hopis must act in such a way so as to avoid this objection.

The conditions mentioned in a previous section related to intentions, character, and using others are already discussed in the analyses of other theories, but they could also be refined with further study of what Hopis consider as good intentions, good character, and exemplary behavior of the *Katsinams*, from their perspective. I do not have extensive knowledge of this perspective which would support that type of more specific application here.

If the Hopi community takes precautions in its pursuit of a solar economy so as to respect all forms of life, such as using the energy to satisfy unmet needs within its own community, asking for permission to build on tribal members' land, and planning for proper disposal of photovoltaics in order to avoid health and environmental contamination in the future, then it is ethical to proceed. To acknowledge the value of plants and animals as living beings, the Hopi would likely be concerned with restoring the mine to a thriving habitat. Such restoration may go beyond the mine itself to also include wherever its waste has been transferred. These restorative acts and behavior improving their community would likely help in mental-emotional balance, as guilt from environmental destruction caused by coal mining and its pollution can be replaced by positive feelings. If done in this way, the restoration promotes life and is thereby ethical. As solar photovoltaic installations grow to replace the revenue, jobs, and energy lost from the coal plant's closure, the financial stress related to these deficiencies would become relieved. On the other hand, if restoration is not performed, the solar economy does not

eventually replace the losses from the closure of the mine, or uses photovoltaics that are harmful to life (due to toxic components, for instance), then their pursuit of a solar economy is unethical.

Virtue Ethics

I evaluate the case through the lens of Aristotle's Golden Mean by describing vices and virtues of solar production. As in the case from the previous chapter, the same general questions can be adapted to the details of the new case. From an Aristotelian standpoint, key questions include:

- Is the Navajo Nation doing too much or not doing enough, in such a way as the pursuit of a solar economy might seem extreme to an outsider?
- Is the Navajo Nation demonstrating admirable character by pursuing a solar economy?
- Is the development of the solar economy (in this manner) one that can be promoted as a model of excellence, repeated habitually in similar situations?
- Does the solar economy help stakeholders to flourish?

As stated earlier, the rate of transition to a solar economy could be evaluated, but it is difficult to find fault in their rate unless it were to bankrupt the tribe by transitioning too quickly or impair the tribe financially by not transitioning quickly enough.

Alternatively, the extent of transition could be evaluated, but because the energy of the coal plant primarily went off-reservation and because the shutdown of the coal plant is an all-or-nothing decision at this point, I am less interested in analyzing these aspects.

Furthermore, it is not controversial to say that the Navajo should neither be excessively dependent on solar revenue for its economy nor deficiently reliant. Instead, I analyze how much solar ought to be built, rather than at what pace or to what extent it impacts the community because it reflects controversial aspects of the decision, including where to build. The vices constitute excessive production of solar energy and deficient production, which correspond to building too much or too few solar photovoltaic installations, respectively. Between these extremes, an intermediary amount of solar production is virtuous and ought to be pursued. I address excess, deficiency, and moderation, in turn.

Excessive solar production would result if tribes gave up sacred land sites or forced reservation inhabitants to move in order to accommodate solar arrays. Abandoning their values by spoiling their land does not reflect an admirable character. Moving inhabitants of the reservation to construct a solar farm would also seem wrong since photovoltaics often can be placed on rooftops, allowing activities to continue underneath them. It would also be excessive if photovoltaic arrays are placed over scenic views, impeding the Grand Canyon, Antelope Canyon, or other tourist attractions, as they are important revenue sources to the community.

Deficient production could be argued if the solar revenues are not enough to compensate the tribe once the coal revenues end. Deficiency could also manifest if the jobs created through solar construction are not enough to cover losses of the plant and mine closures. Either of these situations fails to address two of the most pressing needs that have been broadcasted by the community. It is also arguably deficient if current Navajo citizens without electricity (who want it) do not obtain access to the energy since

a benefit of solar lies in its ability to be located on-site. This failure shows a poor character if Navajos are not taking care of their own.

The virtuous amount of solar production provides jobs, revenue, and electricity access to compensate for the eventual end of coal revenues and to address individual members' household needs. This action shows a model for other communities and demonstrates flourishing through healthier living (without the coal plant's emissions). The pursuit of solar energy can also serve as a model for other communities (tribal or nontribal). In this way, other chapters also have access to land that could be used for large solar farm installations, which could help other members of the tribe.

The conditions for virtuous action that must be met in this case include:

- If the pursuit of solar can be demonstrated as extreme or deficient in some regard, or
- if the pursuit of solar can be objected for reflecting bad character, or
- if the pursuit of solar does not demonstrate role model behavior, a model of excellence, or promote human flourishing, then the Navajo Nation (or Hopi tribe) must act in such a way so as to avoid this objection.

It seems to me that the Navajo Nation is meeting these conditions without drawing objections. However, further considerations beyond the contracted solar farms could be evaluated less favorably through the lens of virtue theory. One proposed option, introduction of a solar art display as a tourist attraction (see the Land Art Generator Institute website, for example), could be both excessive and deficient for different reasons. The solar art might be said to be deficient because it might not produce sufficient power or revenue to be significant, and it might be called an excessive use of materials.

As more solar contracts are confirmed, the solar economy will move from a deficient state to a sufficient state of providing energy, jobs, and revenue. These considerations can be compared to analyses from the other ethical theories.

Deontological Theory

Kant's ethics can help to determine whether there is an ethical duty to pursue solar or a duty to avoid solar. In a similar approach as in the previous chapter, intentions, universalizability, and respect can be tested by asking the following questions, refined for this case:

- What is the motivation for pursuing a solar economy?
- In what ways can a solar economy be developed that can be replicated elsewhere?
- Does the development of the solar economy defeat its own purpose?
- How can the solar economy be developed so that it respects all stakeholders?

The conditions of deontology that must be met in this case include:

- If the Navajo Nation's or Hopi's pursuit of solar is associated with ill intentions, or
- if the Navajo Nation's or Hopi's pursuit of solar is not one that can be done universally or is self-defeating, or
- if someone involved in the Navajo Nation's or Hopi's pursuit of solar is not participating voluntarily, then Navajo Nation or Hopi must act in such a way so as to avoid this objection.

In favor of the transition to solar, the intentions to provide jobs, revenue, and electricity access seem like reasonable motivations. While not every community has the solar irradiation that the Navajo Nation has, photovoltaics can produce at nearly any point on the Earth open to the sky; so, this action seems to be universalizable. The autonomy of the tribe is honored if the contracts are negotiated respectfully, voluntarily, and in ways that include everyone impacted. Furthermore, the land owners have provided consent for the installations on their lands, as already noted.

In opposition to solar, the land use may once again come into question if it impinges on tribal sacredness. Furthermore, the tribal government would be demonstrating selfishness, which is a poor motivation, if it is only seeking to restore its revenue and neglects community needs. Additionally, the action could be self-defeating if the solar technology impedes the tribe's ability to make decisions in the future, such as due to contractual obligations. "Selling out" by giving up land for solar farms could result in an employment boom during installation which dwindles to only a few dozen workers once construction is finished. This bust would be disrespectful to the workers given hopes of a new job that does not last, further supporting the judgment that it could be self-defeating. The three tests also show conditions that would determine that pursuing solar energy is unethical. However, none of these conditions are actualizing; so, there is no significant objection to the transition to solar at this time.

As an additional consideration, forming an energy cooperative (or expanding the current Navajo Tribal Utility Authority) might at first seem to be an instantiation of the tribe's value of self-determination (or Kantian autonomy), but it could also be judged unfavorably if the cooperative is pursued to cut ties with SRP, for example. Perhaps, the

cooperative would allow the tribe to remove SRP as a middleman in order to sell directly to urban consumers, maybe to earn more of the revenue. Such a move might backfire (i.e., become self-defeating) if the tribe is not as competent as it imagines its workers to be or if bureaucracy of legislation interferes with energy transactions (which SRP might already have produced workarounds to address). Similarly, a previous initiative to encourage renewable energy, the Navajo Green Jobs Movement in 2009, failed because it attempted to facilitate entrepreneurial opportunities for tribal members, though they lacked interest in business ownership and faced improper financing (Curley 2018). The transition to solar should avoid these shortcomings to avoid repeating this mistake. The solar art idea might also be self-defeating if the technology impairs tribal culture, as new technology sometimes brings new values as well, or it could be self-defeating if the expensive installation fails to attract tourists' interests. However, some of these concerns are more apt for consequence-based ethics.

Consequentialism

The impacts of the decision to pursue solar energy can also be analyzed to determine ethical merit. In a consequentialist analysis, the following questions are key to determining ethical merit:

- Who is impacted, by which alternative actions, and in what ways?
- Which groups should be given priority due to their size or the significance of impacts on them?
- Which alternatives provide more positive than negative consequences?

Consequentialist conditions that must be met in this case include:

- If the net good of pursuing a solar economy is not the highest achievable among alternative options, or
- if significant negative consequences of pursuing a solar economy are avoidable, or
- if a significantly large population is negatively impacted by pursuing a solar economy in avoidable ways, then the Navajo Nation (or Hopis) must act to avoid these consequences.

Some of the most prominent alternatives for action related to this case include: the Navajo Nation purchases the plant and mine to continue operation, contracting solar photovoltaic installations as currently planned, a solar art installation, retrofitting the plant building as a museum (dedicated to Navajo culture or energy history), converting the coal plant for natural gas combustion, converting the coal plant to a syngas processor (turning the coal to a fuel for sale), or any number of alternative economies focused on such things as tourism, Navajo culture, electric vehicles, and more. The stakeholders impacted include: owners, plant and mine employees, Navajo and Hopi tribal members, Page residents, regional energy consumers, residents downwind who suffer from pollutant emissions, competing energy utilities, photovoltaic providers such as First Solar, tourists, and nonhumans. A table illustrates a simplified consequentialist calculus of these options (Table 3).

Table 4: Simplified Consequentialist Calculus for Navajo Transition Case

		Alternative Actions							
		Navajo purchase plant and mine	Solar photovoltaic installations	Solar art installation	Convert plant to natural gas combustion	Convert plant to syngas processor	Tourism	Museum	Electric vehicle manufacturing
Stakeholders	Owners	+	0	0	-	-	0	0	0
	Plant employees	+	-	-	+	+	-	-	-
	Mine employees	+	-	-	-	+	-	-	-
	Navajos	-	+	+	-	-	+	+	+
	Hopis	+	+	+	-	-	+	+	+
	Page residents	0	+	+	+	-	+	+	+
	Regional energy consumers	0	+	-	0	-	-	-	-
	Residents downwind	-	+	+	+	-	+	+	0
	Competing utilities	+	-	0	-	+	+	+	+
	Photovoltaic providers	-	+	+	-	-	-	-	-
	Tourists	-	+	+	0	0	+	+	0
	Nonhumans	-	+	0	0	0	0	0	0
Net Good		0	+5	+3	-3	-4	+2	+2	0

The depicted analysis is overly simplified since it treats all stakeholders as constituted by the same number of people and their impacts as equally significant but gives a preliminary overview of ethical merit of available options in this decision.

The calculus shows that converting the coal plant is likely the worst option because, although it could keep the miners employed, the financial feasibility of investing in syngas processing equipment and poor revenue expectations give it the lowest net good. While solar art installations, tourism, or a museum show positive net good, they do not impact as many stakeholders positively as solar farming. The solar photovoltaic contracts as planned, produce the highest net good and are thereby the ethical choice.

Not all details that weigh into the consideration are captured in the table. The temporary benefit of the jobs is only a short-term gain. The health benefits of ending the coal emissions may take a decade or more to manifest. The water and land that become available by shutting down the plant and mine are additional significant benefits to consider, which are currently being contested in courts. The proposed 500MW solar agreement is less energy than the 2250MW that NGS produces; so, urban consumers will have to be supplied with energy from another source or reduce their consumption. However, the other forms of energy in this region are all cheaper and pollute less than coal; so, energy consumers are benefited. The solar contracts might aid in spreading jobs and revenue to other tribal chapters for additional benefits.

Beyond the human impacts, some utilitarian ethicists would also include impacts on nonhumans (e.g., Singer 1975). Pursuing solar could allow for restoration of the mine land, water, and air, which would benefit the local animals and plants. However, the solar farm might also change the light available under the photovoltaic units for plant life to grow. It is also important to consider the mining for metals and silica as components of solar modules. The mining is destructive of landscapes and can create wastes that can contaminate water and soil. While it is difficult to estimate any of these impacts, they can be considered to some extent.

Photovoltaic manufacturing also currently includes handling of toxic chemicals, which can cause health problems for workers. Silicon tetrachloride in older modules and cadmium in modern, thin-film modules can be toxic (Fthenakis 2009; McDonald and Pierce 2010). Beyond the immediate impacts of purchase and the upstream impacts of mining, the temporal downstream impacts are meaningful. Photovoltaics are not yet

designed to be fully recyclable. So, the toxic chemicals integrated during construction are still contained at end of life. Properly managed disposal processes can recover or neutralize these substances to prevent contamination and adverse health impacts. While the Navajo and Hopi tribes do not have control over which substances are used to create products if they do not manufacture them themselves, their purchasing power and decisions at the end of the product life have ethical implications. Plans for a solar economy that include stipulations for these spatial impacts within the greater solar economy and for intergenerational consequences will be less ethically controversial than plans without such foresight. This condition seems to have the potential to produce the most negative impacts; so, to avoid objection about the transition's ethical merit, toxicity and disposal ought to be integrated into the transition plan.

Discussion

Using five ethical perspectives, I determine that the pursuit of a solar economy is ethical. There are no major violations of condemnable behavior; therefore, Navajo ethics gives no strong reason against the energy transition. However, to increase the strength of the argument for ethical merit, further remediation of the plant and mine sites ought to be considered because it could provide more jobs and helps to rectify the coal industry's damage. Providing expanded utility access also strengthens the ethical merit. Hopi ethics brings attention to the impacts on all living beings. Mindfulness of the impacts from extraction to end of product life can strengthen ethical merit of the energy transition, but for now, the tribes are mindful of local needs and are not selling all of their energy off-reservation. Retaining some of the energy generated helps the tribes to flourish and

improves lack of energy access across the reservation. The pursuit of a solar economy has not been deficient but rather adequate. While the contracts thus far are ultimately not enough to offset lost jobs and revenues on their own, the slower pace of planning is at least aggressive enough to provide some jobs in the short-term while not bankrupting the tribes. Because of the even-handed transition pace, the decision is respectful of others and one that can be universalized. The tribes appear to be intentionally acting ethically by pursuing the solar economy in ways mindful of duties to respect others. The positive consequences of jobs and revenue for the tribes also support the transition to solar. The only remaining considerations are broader than the tribe, across the supply chain and at end of product life, which can still be part of the plan. The ethical theories each support the transition to solar energy.

In objection to my comments throughout these analyses, an opposing point of view may still elicit reasons to refrain from pursuing a solar economy. For instance, it may be claimed that the solar economy is repeating the previous historical mistakes of economic dependence on energy which has been plaguing the tribes for years. From uranium to coal to solar, this energy strategy may simply become a dead end after a few generations of revenue before it also collapses. After all, it is not yet clear that renewable energy can provide sufficient “energy return on energy invested” to become sustainable (self-perpetuating). There might be a more stable economic pursuit that would better serve as the basis of the tribal economy. Such reasoning is fair, but these worries can be relieved with proper planning. Just as the tribes should be diligent about not taking out more loans than they can repay, the energy production should be taken into account to ensure that proper cycles of decommissioning and replacement of solar modules are

conducted to retain continuity of power supply and revenue. Proper planning in this way also will contribute to appropriate job availability schedules so that tribes can plan for future training and know when other avenues for jobs will be needed.

The job deficit is a second objection. Combining the pursuit of a solar economy with energy efficiency, storage, and site restoration will help to compensate for energy, revenue, and job deficits. This more expansive solar energy economy that includes additional energy services can also provide diversity to help outlast market fluctuations that make some energy forms less attractive for extended periods of time. Energy itself is a fundamental societal need that makes for a good economic foundation when properly managed.

A third objection is that it might be argued to be best if the tribes did not associate with those who are not Native Americans and ought not to rely on communities outside of the reservations for revenue. This isolationist point of view might suffice if tribal members were willing to simplify their lives to rearrange their lifestyles so as not to need any resources imported or goods or services exported. Such a strategy seems radical. There are not clear animosities between the tribes and non-tribal individuals that would justify such a change in relations. There is plenty of opportunity to use the energy transition for mutually beneficial endeavors. None of these objections persuades me to change my conclusion that the pursuit of a solar economy seems appropriate for the tribes.

Conclusion

The Navajo and Hopi tribes could be significantly impacted by the closures of NGS and Kayenta Mine due to the dominant contribution the coal economy has made to their communities for generations. The abundance of solar energy potential on the reservations is a positive factor motivating a transition to a renewable energy economy, and the Navajo Nation has a long history with a variety of energy types. Still, there are economic, logistic, and ethical reasons for not pursuing a solar economy. However, in their current plans, the Navajo and Hopi tribes both seem to be pursuing solar as quickly as they can handle while not bankrupting themselves or sacrificing too much of their culture or self-determination in the process. Because the energy is also being used to help provide energy access and other necessary utilities (such as water, roads, and telecommunications), it seems that the tribes are being appropriately mindful of community members' needs. Though the Navajo Nation has asked some of its members to give up grazing rights (even though solar should allow for animals to continue grazing beneath or around them), the herding families have given approval to the solar projects. The tribes also seem to be appropriately mindful of not desecrating their sacred lands or tourist attractions in the process. While more needs to be done to make up for the difference, the decision to pursue a solar economy is an ethical action to take as one component of their multi-initiative solution to move away from coal. As plans for further installations arise, product disposal management is becoming more significant and ought to be accounted to eliminate those ethical concerns.

CHAPTER 5

CONCLUSION

Recap

This dissertation is part of a larger project to promote a more prominent role for ethics in both individual and societal decisions in order to enhance quality of life in ethical ways. In the preceding chapters, I proposed a new definition of applied energy ethics to improve upon the previous definition which conflates ethics and morality and excludes the importance of a critical perspective for producing action prescriptions. I updated existing evaluation methods by formulating standardized frameworks for analyzing case studies for each of the three major, classical ethical theories (virtue ethics, deontology, and consequentialism). I later introduced additional frameworks from three Native American tribes (Lakota, Navajo, and Hopi). I justified the need for this new approach to energy ethics due to the prevalence of non-technical language within the existing literature which often approaches ethics in an informal, colloquial way but conceals the differences between ethical analysis and other research methods, such as energy morality, energy metaphysics, and energy justice.

While energy ethics has been researched since the 1970s, it lacks a unifying, guiding framework and has not yet been adequately defined. It is disorganized because energy researchers fail to systematically integrate explicit ethical analysis into problem-solving and decision-making, because there are no rules for selecting cases to discuss or reasons to justify arguments, and because the level of discussion can be so abstract that it is impractical. Although standardized methods can be found in some writings called energy ethics, they usually are of a discipline other than ethics, such as metaphysics,

anthropology, or technical science. Therefore, it is inaccurate to call them ‘energy ethics,’ and those methods would not serve as the standardized guide to applied energy ethics that I argue is missing.

While energy justice uses a framework that is becoming popular, energy ethics is not the same as energy justice. Because something can be ethical without being just or just without being ethical, these conclusions should be more properly distinguished to determine whether the action is condemnable absolutely or simply needs to be performed in a different way. Ethics and justice conjure different normative cues, and more careful use of these terms can better communicate a speaker’s stance.

Transitioning to standardized ethical analyses helps to build consistency between authors who already struggle with continuity because they focus on a multitude of energy sources and services. The standardized frameworks are meant to aggregate the literature into a more unified conversation, so that the action prescriptions and justifications for those actions are easier to identify and to debate. If energy ethicists are united in a single conversation, it is easier to map the literature and to gain a sense of whether they tend to favor or oppose certain energy practices or policies. As judgments become more explicit, various energy types would become favored for energy transitions, which facilitates economies of scale. Standardization also strengthens the applied ethics field as a formal discipline of study that could be potentially useful for energy decisionmakers. Energy ethicists can prescribe action and influence energy decisions in a way that makes it practically useful researchers, policymakers, and decisionmakers.

The applied energy ethics frameworks are standardized versions of the three major, classical ethical theories. Utilizing virtue ethics, the ethical analysis tests whether

the targeted action might be argued as extreme due to the impact it would have on character if done habitually. If an action impairs human flourishing, the action is unethical. Utilizing deontology or duty-based ethics, the ethical analysis consists of testing whether the targeted action is self-defeating or if it disrespects others by using them involuntarily for selfish gain. Utilizing consequentialism, the ethical analysis consists of testing whether more positive consequences result from the targeted action than negative consequences. Additionally, analysis utilizing Lakota ethics tests whether the action creates a perpetuating cycle of good or evil actions, which are justified by duties to the land. Navajo ethical analysis tests whether the action exhibits condemnable behaviors, such as killing, stealing, and adultery. Hopi ethical analysis tests for actions that impair life. This dissertation assumed that the agent performing the action would not perform an action unless all reasons from any of these ethical theories that determine an action is unethical were addressed or otherwise avoided. The reasoning of each theory can be accumulated as a list of conditions for ethical merit, including the following:

- If the action can be demonstrated as extreme or deficient in some regard,
- if the action can be objected for reflecting bad character,
- if the action does not demonstrate role model behavior, a model of excellence, or promote human flourishing,
- if the action is associated with ill intentions,
- if the action is not one that can be done universally or is self-defeating,
- if someone involved in the performance of the action is not participating voluntarily,

- if the net good of the action is not the highest achievable among alternative options,
- if significant negative consequences of the action are avoidable,
- if a significantly large population is negatively impacted by the action in avoidable ways,
- if the action is feared to perpetuate negativity,
- if the action neglects to treat all of beings and nature as relatives or neglect duties to the land,
- if the action has an overall negative social impact,
- if the action does not demonstrate bravery, generosity, fortitude, or wisdom,
- if the action requires condemnable actions that make life impossible, such as rape, murder, stealing, lying, etc.,
- if the action neglects duties to one's kin group, upsets natural balance (*hózhó*), or fails to treat others as relatives,
- if the action does not demonstrate imitate the *Katsinam*,
- if the action does not adhere to communal values or displays mental-emotional imbalance,
- if the action does not respect all forms of life as of the highest value, then the agent must act in such a way so as to avoid this objection.

Case studies from Native American communities demonstrated the standardized frameworks in real-world situations. Communities making energy decisions are not the

only groups impacted since energy grids often interconnect communities. In this sense, we are all connected, and decisions go beyond these tribes. Furthermore, there are usually a variety of stakeholders from different backgrounds; so, understanding the ethical perspective of other stakeholder groups should better enable cooperative negotiations.

The Great Sioux Nation, Navajo Nation, and Hopi were influenced by recent decisions related to energy transitions with ethical implications. Their cases also provide alternative ethical theories from each of their cultures that demonstrate further methods that can be utilized in applied energy ethics. While both the Dakota Access Pipeline and Navajo Nation cases had portions of the tribes that supported the decisions, other portions of the tribe condemn the decisions. So, an analyst cannot merely say that one ought to do what the tribe values, since tribes are not homogenous. There can be four sets of potentially competing values belonging to the youth, the elderly, tribal tradition, and those members who have authority in the tribe, and these are sometimes different groups of people who could have different values. While the analysis tended to condemn the construction of the Dakota Access Pipeline for perpetuating climate change threats, neglecting to properly prevent or plan a response to address spills, and employing in exploitative ways, the pursuits of solar economies by the Navajo Nation and Hopi have more reasons to support the ethical merit of their energy choices. While the Great Sioux Nation was able to attract support from nontribal members across the nation, the state and federal governments were not persuaded. What is needed are ways to incorporate ethical evaluations into policymaking without necessarily dictating values to citizens. As activist ethicists establish themselves as authorities on these matters and begin to assist the public in appreciating ethical action and being intolerant of unethical action, they can earn

greater influence in institutional decisions. For example, Bill McKibben's campaign to divest from fossil fuel has led him to prominent roles, working in advisory positions in recent presidential candidates' campaigns.

Key Insights for Ethical Energy Transitions

Though two cases provide a small sample size, the insights they contain serve as a stepping stone for further research. Now, in other transitions from coal to solar or the next pipeline project, researchers have a foundation from which to build their arguments and decisionmakers have analysis already prepared which shows some significant aspects of the particular cases I studied, which might more generally also be applicable to their case. Instead of relying merely on their intuitions or searching for parallels in other applied ethics disciplines, such as medical, business, or environmental ethics, this research is more closely affiliated with their work in the energy sector. From the case studies within this dissertation, some reasoning can be extrapolated for other energy cases.

First, when energy decisions affect water access and potability or impact employment, it can be particularly controversial due to the importance of water and employment on human well-being. Virtue ethics evaluates these decisions based on impact to character. Deontology evaluates these decisions testing whether someone is being used for another's gain. Consequentialism evaluates to ensure that there are enough benefits produced to offset harms. Lakota ethics seeks to break hoops of recurring harms, turning them to perpetuating positive cycles. Navajo and Hopi ethics take issue with these attacks on life. In the DAPL case, risks related to well-being condemn the pipeline

construction, while in the NGS case, fostering the needs of the tribe members supports the transition to solar as ethical.

Second, not all jobs are equivalent due to the hours they provide, wages, knowledge and skills required, training provided, and length of contract, among other aspects. There could be cultural or societal reasons that justify employment distribution to particular groups so as to better serve the community's needs. One avenue of further research could involve expanding on how these particulars manifest when choosing new development projects, in a similar way to how the growing literature of "just transitions" explores downsizing at the end of an organization's life. In the DAPL case, temporary and non-local workers portray the construction as unethical, while in the NGS case, jobs that allow employees to continue working from one solar installation to the next provide job security, for positive ethical merit.

Third, while climate ethics is an established field of research, more can be said about when emissions are ethical, if ever. In the DAPL case, global warming impacts are a reason to object to pipeline construction. In the NGS case, emissions are partially responsible for the power plant and mine closures. Atmospheric impacts are becoming a more salient feature of ethical evaluation. Emissions can be objectionable due to duties to the land and community in various Native Americans' views, show poor character using virtue theory, or are self-defeating and disrespectful using deontological reasoning, beyond being a negative consequence.

Fourth, in similar fashion to temporality of jobs, ethicists must inspect long-term impacts of infrastructures. While a pipeline may be built to the best practices currently available, those specifications might still not be enough to prevent all leaks over time and

still might not be sufficient to give nearby communities a sense of peace. Similarly, for all the benefits of renewable energy, end of life disposal can still cause issues of waste management. Planning ahead by selecting equipment that avoids toxic components and having a plan for recovering the material components once the product is no longer serviceable are ways to maintain ethical merit. Acknowledging that renewable energy technology is still not yet assured to produce as much energy as required to manufacture it (energy returned on energy invested), these technical shortcomings need to be properly managed in planning so that short-term benefits do not blind us to long-term unsustainable systems. These aspects are some of the shared salient features of the cases that can be prescribed more generally to other cases.

New Directions for Research

Beyond the cases presented here, any form of energy generation, energy service, or aspect of energy systems can potentially be evaluated for ethical merit in the methods used in this dissertation. Some examples could investigate the ethical merit of building hydroelectric dams (controversial due to displacement of humans and nonhumans), humans rights abuses, such as child labor used in mining for lithium battery components, fracking, offshore wind farms, uranium mining, geoengineering, autonomous electric vehicles, SMART technologies, net metering policies, demand response contracts, a carbon tax, direct current (DC) transmission, mandatory rooftop solar photovoltaic laws, renewable portfolio standards, electric vehicle tax credits, subsidies to any energy type, energy export, public, utility-scale energy storage installations, markets, pricing, or lending, among many others. Furthermore, additional ethical theories can be introduced

to evaluate cases to further support or to object in new ways to these or other actions, such as African philosophies, Asian philosophies, and other indigenous perspectives.

This dissertation can hopefully serve as a stepping stone to future work with Native American tribes. Beyond energy, disputes between tribes and nontribal members continue. The ethical perspectives presented here can be expanded to more tribes and to new cases. The prescriptions in these cases might begin a conversation about remediating DAPL and to designing further plans for the new Navajo and Hopi economies.

I am also interested in researching how these formal methods of analysis can be integrated into formal policymaking decisions for even greater impact. Local and state governments are already involved in energy decisions, such as utility policy, siting of energy infrastructure, community solar energy installations and tax credits, electric vehicle charging station siting, road and public transit planning, biking infrastructure, and decisions which greatly impact energy consumption including green space, healthcare, and emergency management services. Government officials cannot be assumed to always take ethical action or to always use ethical reasoning when deliberating. Furthermore, popular opinion regarding any particular energy type does not necessarily make that energy type ethical. There is an abundant field of inquiry related to public perception and its role in influencing politics. When there are conflicts between public attitude, a policymaker's conscience, and what is ethical, there is room for research to determine what is the best course of action. Applied ethics decision-making can be incorporated into existing government employee training at all levels. Determining where and how to integrate ethics into the process is beyond the scope of this dissertation but among the

most important avenues for future research. In these ways, energy ethics can hopefully grow to become a more prominent influence in energy decisions.

The energy transitions we need are some of the most complex, transformative endeavors we have to perform to maintain the ability to survive on this planet. Native American lands are often abundant in energy; so, in many ways, the transition can impact them the greatest. We need to cooperate so that no one is left behind. The transition also presents a window of opportunity to right historic wrongs done to these communities. When we also consider that we will also be trying to simultaneously transition to Industry 4.0 with a zero-waste, circular economy that is not just more efficient but one that realigns the food-energy-water nexus of society toward a well-being economy, we are considering reorganizing most of society. With that level of disruption to how we currently live, knowing how often we take ethics for granted, we cannot continue to take these ideas lightly because people would continue to suffer, even if we choose what is better in the long-run. The value of life is too precious.

Ethics is powerful, because with it, someone can backward engineer from its rules and conditions to construct “the good life,” but we need to harness this power not just for ourselves (as an individual) but for a better society for all forms of life. So, in terms of where I am hoping to take this research, I want to continue to research to determine how to integrate these new philosophies not just to change business models, metrics of economic analyses, and decision processes with a few new checklists to scratch off but how to integrate the value of life into these fundamental questions of what it means to live with a purpose and how we structure our society for a better, more sustainable future.

REFERENCES

- “Greene Co. Coal Mine to Close, Costing Nearly 400 Jobs.” *CBS Pittsburgh*. (January 3, 2018). <http://pittsburgh.cbslocal.com/2018/01/03/greene-county-coal-mine-closing/>.
- Ackerman, F., and Knight, P. “Economic Impacts of Completing the Dakota Access Pipeline.” *Synapse Energy Economics, Inc.* (February 1, 2017). <http://www.synapse-energy.com/sites/default/files/Economic-Impacts-Dakota-Access-Pipeline-16-133.pdf>.
- Alexander, L., and Moore, M. “Deontological Ethics.” *Stanford Encyclopedia of Philosophy*. (2016). <https://plato.stanford.edu/entries/ethics-deontological/>.
- Allard, L.B. “Why the Founder of Standing Rock Sioux Camp Can’t Forget the Whitestone Massacre.” *Yes! Magazine*. (September 3, 2016). <https://www.yesmagazine.org/people-power/why-the-founder-of-standing-rock-sioux-camp-cant-forget-the-whitestone-massacre-20160903>.
- Allison III, J.R. *Sovereignty for Survival: American Energy Development and Indian Self-Determination*. New Haven: Yale University Press, 2015.
- Andrianov, A., Kanke, V., Kuptsov, I., and Murogov, V. “Reexamining the Ethics of Nuclear Technology.” *Science and Engineering Ethics* 21, no. 4 (2015): 999-1018.
- Annas, J. “Applying Virtue to Ethics (Society of Applied Philosophy Annual Lecture 2014).” *Journal of Applied Philosophy* 32, no. 1 (2015): 1-14.
- Archambault II, D. “Taking a Stand at Standing Rock.” *New York Times*. (August 24, 2016). <http://mobile.nytimes.com/2016/08/25/opinion/taking-a-stand-at-standing-rock.html>.
- Aristotle. *Nicomachean Ethics*, in Barnes, J. (ed.). *The Complete Works of Aristotle*. Princeton, NJ: Princeton University Press, 1984.
- Associated Press. “Navajo Nations first solar project now producing enough electricity for about 13,000 homes.” *AZ Central*. (August 29, 2017). <https://www.azcentral.com/story/money/business/energy/2017/08/29/navajo-nations-first-solar-project-now-producing-electricity-13-000-homes/613443001/>.
- Austin, M.W. “Is Humility a Virtue in the Context of Sport?” *Journal of Applied Philosophy* 31, no. 2 (2014): 203-214.

- Axtell, G., and Olson, P. "Recent Work in Applied Virtue Ethics." *American Philosophical Quarterly* 49, no. 3 (2012): 183-203.
- Battistutta, F. "The Energy of Ethics / The Ethics of Energy." *Relations: Beyond Anthropocentrism* 6, no. 2 (2018): 321-330.
- Beatley, Y. "Applying Moral Principles to Growth Management." *Journal of the American Planning Association* 50, no. 4 (1984): 459-469.
- Beauchamp, T.L., and Childress, J.F. *Principles of Biomedical Ethics*, 7th edition. Oxford: Oxford University Press, 2012.
- Bebon, J. "Navajo Nation Doubles Down on Solar Project, Signs Major MOU." *Solar Industry Magazine*, Zackin Publications, Inc. (January 29, 2018.)
<https://solarindustrymag.com/navajo-nation-doubles-solar-project-signs-major-mou/>.
- Becker, K.L. "Chapter 1: The Paradox of Plenty: Blessings and Curses in the Oil Patch." in Caraher, W., and Conway, K. (eds.). "The Bakken Goes Boom: Oil and the Changing Geographies of Western North Dakota." Grand Forks, ND: The University of North Dakota Digital Press, 2016.
https://digitalpressatund.files.wordpress.com/2016/02/caraher_conway_bakkengo_esboomv2.pdf.
- Bender, A. "Oil Keeps Flowing as Corps Misses Deadline for DAPL Environmental Study." *People's World*. (April 4, 2018).
<https://www.peoplesworld.org/article/oil-keeps-flowing-as-corps-misses-deadline-for-dapl-environmental-study/>.
- Bentham, J. *Introduction to the Principles of Morals and Legislation* (1789), in Bowring, J. (ed.). *The Works of Jeremy Bentham*. Chestnut Hill, MA: Adamant Media Corporation, 2005.
- Bethem, J. "Life Within Energy Policy." *Relations: Beyond Anthropocentrism* 6, no. 1 (2018): 69-85.
- Biviano, E.L. "Catholic Energy Ethics: Commitments and Criteria." *Relations: Beyond Anthropocentrism* 6, no. 1 (2018): 143-152.
- Blackhawk, N. "Remember the Sand Creek Massacre." *New York Times*. (November 27, 2014). <http://www.nytimes.com/2014/11/28/opinion/remember-the-sand-creek-massacre.html>.
- Boyer, D. "Energopower: An Introduction." *Anthropological Quarterly* 87, no. 2 (2014): 309-333.

- Braun, S. "Chapter 5: Revisited Frontiers: The Bakken, the Plains, Potential Futures, and Real Pasts." in Caraher, W., and Conway, K. (eds.). "The Bakken Goes Boom: Oil and the Changing Geographies of Western North Dakota." Grand Forks, ND: The University of North Dakota Digital Press, 2016.
https://digitalpressatund.files.wordpress.com/2016/02/caraher_conway_bakkengo_esboomv2.pdf.
- Breakey, H. "Without Consent: Principles of Justified Acquisition and Duty-Imposing Powers." *Philosophical Quarterly* 59, no. 237 (2009): 618-640.
- Brett-Crowther, M.R. "Energy and Ethics: A Partial View." *International Journal of Environmental Studies* 15, no. 4 (1980): 293-309.
- Brown, A. "Five Spills, Six Months in Operation: Dakota Access Track Record Highlights Unavoidable Reality — Pipelines Leak." *The Intercept*. (January 9, 2018). <https://theintercept.com/2018/01/09/dakota-access-pipeline-leak-energy-transfer-partners/>.
- Brown, D.A. "The Importance of Expressly Examining Global Warming Policy Issues Through an Ethical Prism." *Global Environmental Change* 13, no. 4 (2003): 229–234.
- Byerly, R. "Sitting in the Hoop of the People: Linking Lakota Values and Business Ethics." *Journal of Religion and Business Ethics* 3, no. 1 (2015): 1-18.
- Cafaro, P. "Environmental Virtue Ethics." in Besser-Jones, L., and Slote, M. (eds.) *The Routledge Companion to Virtue Ethics*. New York: Routledge, 2015.
- Caldwell, C. "Lakota Virtues and Leadership Principles: Insights and Applications for Ethical Leaders." *Journal of Management Development* 36, no. 3 (2017): 309-318.
- Camp of the Sacred Stones. "No Dakota Access Pipeline." (brochure). (2016).
https://d3n8a8pro7vhmx.cloudfront.net/honorearth/pages/2267/attachments/original/1470612897/ND_ZINE_updated.pdf?1470612897.
- Caney, S. "Human Rights, Climate Change, and Discounting." *Environmental Politics* 17, no. 4 (2008): 536-555.
- Caposella, P. "Impact of the Army Corps of Engineers' Pick-Sloan Program in the Missouri Basin." *Journal of Environmental Law and Litigation* 30 (2015): 143-218.

- Caraher, W., and Conway, K. (eds.). "The Bakken Goes Boom: Oil and the Changing Geographies of Western North Dakota." Grand Forks, ND: The University of North Dakota Digital Press, 2016.
https://digitalpressatund.files.wordpress.com/2016/02/caraher_conway_bakkengoesboomv2.pdf.
- Carder, E.F. "The American Environmental Justice Movement." *Internet Encyclopedia of Philosophy*. 2018. <https://www.iep.utm.edu/enviro-j/>.
- Carley, S., Evans, T.P., and Konisky, D.M. "Adaptation, Culture, and the Energy Transition in American Coal Country." *Energy Research & Social Science* 37 (2018): 133-139.
- CBC. "Lac-Mégantic Rail Disaster Company MM&A Files for Bankruptcy." *CBC News*. (August 7, 2013). <https://www.cbc.ca/news/business/lac-m%C3%A9gantic-rail-disaster-company-mm-a-files-for-bankruptcy-1.1338481>.
- Chatti, D., Archer, M., Lennon, M., and Dove, M.R. "Exploring the Mundane: Towards an Ethnographic Approach to Bioenergy." *Energy Research & Social Science* 30 (2017): 28-34.
- Clancy, H. "A New Frontier in Wind Energy on Native American Land, Cultivated by Six Sioux Tribes." *GreenBiz*. (October 17, 2018).
<https://www.greenbiz.com/article/new-frontier-wind-energy-native-american-land-cultivated-six-sioux-tribes>.
- Colebrook, C. "We Have Always Been Post-Anthropocene: The Anthropocene Counterfactual." in Szeman, I., and Boyer, D. *Energy Humanities: An Anthology*. Baltimore, MD: Johns Hopkins University Press, 2017.
- Combrink, T., Fitch, R., and Rouse, W. "The Economic Contribution of the Navajo Generating Station (NGS) on the City of Page." *Northern Arizona University, Alliance Bank Business Outreach Center, and Salt River Project*. (July 2017).
<https://nau.edu/economic-policy-institute/wp-content/uploads/sites/20/NGS-Economic-Impact-Study-Page-2017.pdf>.
- Cook, E. *Man, Energy, Society*. San Francisco: W.H. Freeman, 1976.
- Cook-Lynn, E. "The Radical Conscience of Native American Studies." *Wicazo Sa Review* 7, no. 2 (1991): 9-13.
- Cornell, S., and Kalt, J.P. "American Indian Self-Determination: The political Economy of a Policy That Works." *Faculty Research Working Paper Series*, Harvard Kennedy School. (November 2010).

- Cotton, M. "Fair Fracking? Ethics and Environmental Justice in United Kingdom Shale Gas Policy and Planning." *Local Environment* 22, no. 2 (2017): 185-202.
- Cottrell, W.F. *Energy & Society (revised): The Relation Between Energy, Social Change, and Economic Development*. Author House, 1955, revised 2009.
- Cowan, E. "City of Flagstaff and Hopi Tribe Partner on Renewable Energy Project." *Arizona Daily Sun*. (March 17, 2018a). https://azdailysun.com/news/local/city-of-flagstaff-and-hopi-tribe-partner-on-renewable-energy/article_303b0c8b-38ba-515a-af97-b26a027a85b3.html.
- Cowan, E. "Navajo Utility Proposes Solar Project Near Cameron." *Arizona Daily Sun*. (July 21, 2018b). https://azdailysun.com/news/local/navajo-utility-proposes-solar-project-near-cameron/article_361b8a26-0eb8-5619-b6bc-cd3407334bdb.html.
- Craft, M. "Potential Closure of Kayenta Mine a Revenue Crisis for Hopi." *Navajo-Hopi Observer*. (March 27, 2018). <https://www.nhnews.com/news/2018/mar/27/potential-closure-kayenta-mine-revenue-crisis-hopi/>.
- Craig, R.H. "Institutionalized Relationality: A Native American Perspective on Law, Justice and Community (Kinship Relations, Collective Rights, and Mutual Responsibilities within Lakota and Dakota Tribal Society)." *Annual of the Society of Christian Ethics* 19 (1999): 285-309.
- Crutzen, P.J., and Schwägerl, C. "Living in the Anthropocene: Toward a New Global Ethos." *Yale School of Forestry & Environmental Science: Yale Environment* 360. (January 24, 2011). https://e360.yale.edu/features/living_in_the_anthropocene_toward_a_new_global_ethos.
- Curley, A. "A Failed Green Future: Navajo Green Jobs and 'Energy Transition' in the Navajo Nation." *Geoforum* 88 (2018): 57-65.
- Day, L.A. *Ethics in Media Communications: Cases and Controversies, 5th edition*. Belmont, CA: Wadsworth Publishing, 2005.
- De Lazari-Radek, K., and Singer, P. *Utilitarianism: A Very Short Introduction*. Oxford: Oxford University Press, 2017.
- Delorme, D. "Contesting the Radical Monopoly: A Critical View on the Motorized Culture from a Cyclonaut Perspective." *Relations: Beyond Anthropocentrism* 6, no. 2 (2018): 215-232.

- DesJardins, J.R. "Ethical and Moral Aspects of Energy Use." in Zumerchik, J. (ed.) *Macmillan Encyclopedia of Energy*. New York: Macmillan Reference USA, 2001.
- Devereaux, B. "Kalamazoo River Oil Spill Timeline After 6 Years, Billion-Plus Dollars Spent." *MLive Media Group*. (July 2016). https://www.mlive.com/news/2016/07/kalamazoo_river_oil_spill_time.html.
- Dhillon, J. "Indigenous Youth Are Building a Climate Justice Movement by Targeting Colonialism." *Truthout*. (June 20, 2016). <https://truthout.org/articles/indigenous-youth-are-building-a-climate-justice-movement-by-targeting-colonialism/>.
- Dieck-Assad, F.A. "Mexican Nuclear Energy: An Opportunity or a Threat?" *Journal of International Energy Policy* 1, no. 1 (2012): 1-10.
- Driscoll, W. "Native American Lands Have 61 GW of Economic Solar Potential; DOE Loan Guarantees Available." *PV Magazine USA*. (July 30, 2018). <https://pv-magazine-usa.com/2018/07/30/native-american-lands-have-61-gigawatts-of-economic-solar-potential-federal-loan-guarantees-can-help/>.
- Dundon, S.J. "Agricultural Ethics and Multifunctionality Are Unavoidable." *Plant Physiology* 133 (2003): 427-437.
- Ecos Consulting. "Energy and Economic Alternatives to the Desert Rock Energy Project." *Diné Citizens Against Ruining our Environment (DinéCARE)*. (2008).
- Enerdata. "Global Energy Statistical Yearbook 2018." *Enerdata Yearbook*. (2019). <https://yearbook.enerdata.net/total-energy/world-consumption-statistics.html>.
- Energy Venture Analysis. "Economic Benefit Analysis of the Navajo Generating Station to the Central Arizona Water Conservation District and Its Customers." *Energy Venture Analysis and Peabody Coal*. (January 2018). <https://www.evainc.com/wp-content/uploads/2018/01/EVA.-Economic-Benefit-Analysis-of-NGS-to-CAWCD-Report.-01.2018.pdf>.
- Estes, N. "Declaring War on KXL: Indigenous Peoples Mobilize." *National Lawyers Guild's Mass Dissent. Special Issue: "Environmental Justice and Indigenous Resistance Movements"* 37, no. 3 (2014). <http://www.nlgmasslawyers.org/declaring-war-kxl-indigenous-peoples-mobilize/#more-660>.
- Estes, N. "Fighting for Our Lives: #NoDAPL in Historical Context." *The Red Nation*. (September 18, 2016). <https://therednation.org/2016/09/18/fighting-for-our-lives-nodapl-in-context/>.

- Fainstein, S.S. *The Just City*. Ithaca, NY: Cornell University Press, 2010.
- Feltrin, A.N. "Energy Equality and the Challenges of Population Growth." *Relations: Beyond Anthropocentrism* 6, no. 2 (2018): 313-320.
- Fieser, J. "Ethics." *Internet Encyclopedia of Philosophy*. (2018).
<https://www.iep.utm.edu/ethics/>.
- Forde, E. "The Ethics of Energy Provisioning: Living Off-grid in Rural Wales." *Energy Research & Social Science* 30 (2017): 82-93.
- Frazier, J. "It's Official: NGS Will Continue to Operate Until the End of 2019." *Navajo-Hopi Observer*. (December 12, 2017).
<https://www.nhnews.com/news/2017/dec/12/guest-column-its-official-ngs-will-continue-operat/>.
- Friedlingstein, P., Andrew, R.M., Rogelj, J., Peters, G.P., Canadell, J.G., Knutti, R., Luderer, G., Raupach, M.R., Schaeffer, M., van Vuuren, D.P., and Le Quéré, C. "Persistent Growth of CO₂ Emissions and Implications for Reaching Climate Targets." *Natural Geoscience* 7 (2014): 709-715.
- Friedrich, J., Ge, M., and Damassa T. "Infographic: What Do Your Countries Emissions Look Like?" *World Resources Institute*. (June 23, 2015).
<https://www.wri.org/blog/2015/06/infographic-what-do-your-countrys-emissions-look>.
- Frigo, G. "Energy Ethics: A Literature Review." *Relations: Beyond Anthropocentrism* 6, no. 2 (2018): 177-214.
- Frigo, G. "Energy Ethics, Homogenization, and Hegemony: A Reflection on the Traditional Energy Paradigm." *Energy Research & Social Science* 30 (2017): 7-17.
- Fry, J. "On the Supposed Duty to Try One's Hardest in Sports." *Philosophy in the Contemporary World* 18, no. 2 (2011): 1-10.
- Fthenakis, V. "Sustainability of Photovoltaics: The Case for Thin-Film Solar Cells." *Renewable and Sustainable Energy Reviews* 13, no. 9 (2009): 2746-2750.
- Furchtgott-Roth, D., and Green, K. "Intermodal Safety in the Transport of Oil." *Studies in Energy Transportation* (October) (2013). <https://ssrn.com/abstract=2345409>.
- Geerts, R.J. "Beyond Scarcity: Perspectives on Energy Transition." *Relations: Beyond Anthropocentrism* 6, no. 1 (2018): 49-67.

- Geerts, R.J. “Towards a Qualitative Assessment of Energy Practices: Illich and Borgmann on Energy in Society.” *Philosophy & Technology* 30 (2017): 521-540.
- Gert, B., and Gert, J. “The Definition of Morality.” *Stanford Encyclopedia of Philosophy*. (2016). <https://plato.stanford.edu/entries/morality-definition/>.
- Glowacka, M., and Sekaquaptewa, E. “The Metaphorical Dimensions of Hopi Ethics.” *Journal of the Southwest* 51, no. 2 (2009): 165-185.
- Graffy, E. “Agrarian Ideals, Sustainability Ethics, and US Policy: A Critique for Practitioners.” *Journal of Agricultural and Environmental Ethics* 25, no. 4 (2012): 503-528.
- Grippe, E. “Richard Rorty.” *Internet Encyclopedia of Philosophy*. (2018). <https://www.iep.utm.edu/rorty/>.
- Groves, C., Henwood, K., Shirani, F., Thomas, G., and Pidgeon, N. “Why Mundane Energy Use Matters: Energy Biographies, Attachment and Identity.” *Energy Research & Social Science* 30 (2017): 71-81.
- Guy, S., and Shove, E. *The Sociology of Energy, Buildings and the Environment: Constructing Knowledge, Designing Practice*. Routledge, 2001.
- Haggerty, J. “Colstrip: The Status of Key Policies and Decision Processes.” Montana State University, Resources & Community Research Group. (2017).
- Hand, M. “Trump Administration Throws Weight Behind Keeping Arizona Coal Plant Open.” *ThinkProgress*. (October 26, 2017). <https://thinkprogress.org/trump-fights-for-coal-plant-91d7b9fdead7/>.
- Hardwig, J. “Action from Duty but Not in Accord with Duty.” *Ethics* 93, no. 2 (1983): 283-290.
- Harris, Jr., C.E., Pritchard, M.S., Rabins, M.J., James, R., and Englehardt, E. *Engineering Ethics: Concepts and Cases, 5th edition*. Boston, MA: Wadsworth, 2014.
- Hasselman, J. “On the U.S. Army Corps’ Aug. 31 Decision on the Dakota Access Pipeline.” *Earth Justice*. (August 31, 2018). <https://earthjustice.org/features/inside-the-legal-case-dapl-update>.
- Hay, M. “A New Solar Facility Creates Jobs and Greater Energy Independence for the Navajo Nation.” *Make Change, Aspiration Partners, Inc.* (2018). <https://www.makechange.aspiration.com/articles/new-solar-facility-creates-jobs-and-greater-energy-independence-for-navajo-nation>.

- Heffron, R., Johnston, A., McCauley, D. and Jenkins, K. "Policy Deliverance for Low Carbon Energy Infrastructure in the UK." April 5, 2013, Conference Overview. *Energy Policy* 61 (2013): 1367-1369.
- Hill, J. "Probabilism Today: Permissibility and Multi-Account Ethics." *Australasian Journal of Philosophy* 87, no. 2 (2009): 235-250.
- Hillerbrand, R., and Peterson, M. "Nuclear Power Is Neither Right nor Wrong: The Case for a Tertium Datur in the Ethics of Technology." *Science and Engineering Ethics* 20, no. 2 (2014): 583-595.
- Homiak, M. "Moral Character." *Stanford Encyclopedia of Philosophy*. (March 9, 2015). <https://plato.stanford.edu/entries/moral-character/>.
- Howe, C. "Anthropocenic Ecoauthority: The Winds of Oaxaca." *Anthropological Quarterly* 87, no. 2 (2014): 381-404.
- Hursthouse, R. "The Central Doctrine of the Mean," in Kraut, R. (ed.) *Blackwell Guide to Aristotle's Nicomachean Ethics*, Oxford: Blackwell, 2006.
- Hytrek, N. "Dakota Access Pipeline Construction Making Economic Impact." *Sioux City Central*. (October 22, 2016). https://siouxcityjournal.com/business/energy/dakota-access-pipeline-construction-making-economic-impact/article_5b89b2d3-4637-5ada-a2cf-9f36018fc566.html.
- Ibanga, D.-A. "Renewable Energy Issues in Africa Contexts." *Relations: Beyond Anthropocentrism* 6, no. 1 (2018): 117-133.
- Ikeme, J. "Equity, Environmental Justice and Sustainability: Incomplete Approaches in Climate Change Politics." *Global Environmental Change* 13 (2003): 195-206.
- Jamieson, D. "Ethics for the Anthropocene." in Szeman, I., and Boyer, D. *Energy Humanities: An Anthology*. Baltimore, MD: Johns Hopkins University Press, 2017.
- Jenkins, K. "Setting Energy Justice Apart From the Crowd: Lessons From Environmental and Climate Justice." *Energy Research & Social Science* 39 (2018): 117–121.
- Jenkins, K. "Sustainable Development and Energy Justice: Two Agendas Combined." in Heffron, R.J. and Little, G. (eds.). *Delivering Energy Law and Policy in the EU and the US: A Reader*. Edinburgh, UK: Edinburgh University Press, 2016.
- Jenkins, K., Heffron, R. and McCauley, D. "The Political Economy of Energy Justice in Canada, the UK and Australia: A Nuclear Energy Perspective." in Van de Graaf, T., Sovacool, B.K., Ghosh, A., Klare, M. and Kern, F. (eds.). *The Palgrave*

- Handbook of the International Political Economy of Energy*. Palgrave Macmillan UK: Palgrave Handbooks in IPE, UK, 2016.
- Jenkins, K., McCauley, D. and Forman, A. “Energy Justice: A Policy Approach.” *Energy Policy* 105. (2017): 631-634.
- Jenkins, K., McCauley, D., and Warren, C. “Attributing Responsibility for Energy Justice: A Case Study of the Hinkley Point Nuclear Complex.” *Energy Policy* 108 (2017): 836-843.
- Jenkins, K., McCauley, D., Heffron, R. and Stephan, H. “Energy Justice, a Whole Systems Approach.” *Queen's Political Review* 2, no.2 (2014): 74-87.
- Jenkins, K., McCauley, D., Heffron, R., Stephan, H. and Rehner, R. “Energy Justice: A Conceptual Review.” *Energy Research & Social Science* 11 (2015): 174-182.
- Jenkins, K., Sovacool, B., and McCauley, D. “Humanizing Sociotechnical Systems Through Energy Justice: New Conceptual Frameworks for Global Transformative Change.” *Energy Policy* 117 (2018): 66-74.
- Johnson, C.E. *Meeting the Ethical Challenges of Leadership: Casting Light or Shadow*, 6th edition. Thousand Oaks, CA: Sage Publications, Inc., 2017.
- Jossi, F. “Can Sioux Tribes Pull off Largest Ever Clean Energy Project on Tribal Land?” *Fresh Energy, The Energy News Network*. (May 9, 2018).
<https://energynews.us/2018/05/09/midwest/can-sioux-tribes-pull-off-largest-ever-clean-energy-project-on-tribal-land/>.
- Kant, I. *Groundwork of the Metaphysic of Morals* (1785). translated by H.J. Paton. New York City, NY: Harper and Row, 1964.
- Kashmeri, S. “Needed: A Hippocratic Oath for U.S. Foreign Policy.” *The Berggruen Institute, The World Post, Huffington Post*. (September 22, 2013).
https://www.huffingtonpost.com/sarwar-kashmeri/needed-a-hippocratic-oath_b_3635913.html.
- Kasperson, R.E, Berk, G., Pijawka, D., Sharaf, A.B., and Wood, J. “Public Opposition to Nuclear Energy: Retrospect and Prospect.” *Science, Technology & Human Values* 5, no. 2 (1980): 11-23.
- Kass, S.L. “The Federal Government Should Buy Coal Plants, Shut Them Down and Pay to Retrain Their Employees.” *The Washington Post*. (June 3, 2016).
<https://www.washingtonpost.com/opinions/the-federal-government-should-buy-coal-plants-shut-them-down-and-pay-to-retrain-their->

- [employees/2016/06/03/eb08ebf4-0bdd-11e6-8ab8-9ad050f76d7d_story.html?utm_term=.75fc57f992e2](https://www.npr.org/sections/thetwo-way/2017/05/30/530708793/three-mile-island-nuclear-power-plant-to-shutdown-in-2019).
- Kennedy, M. “Three Mile Island Nuclear Power Plant to Shut Down in 2019”. *National Public Radio*. (May 30, 2017).
<https://www.npr.org/sections/thetwo-way/2017/05/30/530708793/three-mile-island-nuclear-power-plant-to-shutdown-in-2019>.
- Kermisch, C., and Taebi, B. “Sustainability, Ethics and Nuclear Energy: Escaping the Dichotomy.” *Sustainability* 9, no. 3 (2017): 446.
- Kesselring, R. “The Electricity Crisis in Zambia: Blackouts and Social Stratification in New Mining Towns.” *Energy Research & Social Science* 30 (2017): 94-102.
- Kessler, R. “Apex and Sioux to Develop Largest US Tribal Wind Projects.” *Recharge News*. (March 2, 2018). <https://www.rechargenews.com/wind/1445692/apex-and-sioux-to-develop-largest-us-tribal-wind-projects>.
- Klinsky, S., and Golub, A. “Justice and Sustainability.” in Wiek, A., Heinrichs, H., Michelsen, G., and Martens, P. (eds.). *Handbook of Sustainability Science*. Berlin, Germany: Springer, 2013.
- Kyne, D., and Bolin, B. “Emerging Environmental Justice Issues in Nuclear Power and Radioactive Contamination.” *International Journal of Environmental Research and Public Health* 13, no. 7 (2016).
- LaBelle, M.C. “In Pursuit of Energy Justice.” *Energy Policy* 107 (2017): 615-620.
- Langhelle, O. “Sustainable Development and Social Justice: Expanding the Rawlsian Framework of Global Justice.” *Environmental Values* 9, no. 3 (2000): 295-323.
- Laurel, A. “We Need to Be Talking About Standing Rock.” *Hyphen*. (September 6, 2016). <https://hyphenmagazine.com/blog/2016/09/we-need-be-talking-about-standing-rock>.
- Lavelle, M. “Judge Orders Dakota Access Pipeline Review, Citing Environmental Justice.” *Inside Climate News*. (June 15, 2017).
<https://insideclimatenews.org/news/14062017/dakota-access-pipeline-environmental-justice-review-standing-rock-court-ruling>.
- Legere, L. “FirstEnergy Takes First Step Toward Closing Beaver Nuclear Power Plant.” *Pittsburgh Post-Gazette*. March 29, 2018. <http://www.post-gazette.com/powersource/companies/2018/03/29/FirstEnergy-takes-first-step-toward-closing-Beaver-nuclear-power-plant/stories/201803290096>.

- Lennon, M. “Decolonizing Energy: Black Lives Matter and Technoscientific Expertise Amid Solar Transitions.” *Energy Research & Social Science* 30 (2017): 18-27.
- Levermann, A., Clark, P.U., Marzeion, B., Milne, G.A., Pollard, D., Radic, V., and Robinson, A. “The Multimillennial Sea-Level Commitment of Global Warming.” *Proceedings of the National Academy of Science of the USA* 110, no. 34 (2013): 13745-13750.
- Lim, S.S., Vos, T., Flaxman, A.D., Danaei, G., Shibuya, K., Adair-Rohani, H., ... Ezzati, M. “A Comparative Risk Assessment of Burden of Disease and Injury Attributable to 67 Risk Factors and Risk Factor Clusters in 21 Regions, 1990–2010: A Systematic Analysis for the Global Burden of Disease Study 2010.” *Lancet* 380, no. 9859 (2012): 2224–2260.
- Locke, K. “Closing Date for NGS Remains Unchanged.” *Navajo-Hopi Observer*. (April 24, 2018). <https://www.nhonews.com/news/2018/apr/24/closing-date-ngs-remains-unchanged/>.
- Löfqvist, L. “After Fukushima: Nuclear Power and Societal Choice.” *Journal of Risk Research* 18, no. 3 (2013): 1-13.
- Lucy, W.H. “Equity and Planning for Local Services.” *Journal of the American Planning Association* 47, no. 4 (1981): 447-457.
- Maricopa County Public Health. “Heat Associated Deaths in Maricopa County, AZ: Preliminary Report for 2017.” (2018). <https://www.maricopa.gov/DocumentCenter/View/37981/Preliminary-2017-Heat-Report-PDF>.
- Mazer, K. “Mapping a Many Headed Hydra: The Struggle Over the Dakota Access Pipeline.” *Infrastructure Otherwise Report* 1 (2017).
- McCauley, D., and Heffron, R. “Just Transition: Integrating Climate, Energy and Environmental Justice.” *Energy Policy* 119 (2018): 1-7.
- McCauley, D., Heffron, R., Stephan, H. and Jenkins, K. “Advancing Energy Justice: The Triumvirate of Tenets.” *International Energy Law Review* 32, no. 3 (2013): 107-110.
- McDonald, N.C., and Pearce, J.M. “Producer Responsibility and Recycling Solar Photovoltaic Modules.” *Energy Policy* 38, no. 11 (2010): 7041-7047.
- Meyer, R. “Buy Coal Now! It’s the Best Way for Climate-Concerned Billionaires to Fight Global Warming.” *The Atlantic*. (October 29, 2015).

- <https://www.theatlantic.com/technology/archive/2015/10/every-climate-concerned-billionaire-should-do-this-to-save-the-world/413020/>.
- Mill, J.S. "Utilitarianism." In *Collected Works of John Stuart Mill*, J.M. Robson (ed.). Toronto, Ont.: University of Toronto Press, 1991.
- Miller, C.A. "The Ethics of Energy Transition." *Proceedings of the IEEE Symposium on Ethics in Engineering, Science, and Technology*. IEEE Symposium on Ethics in Engineering, Science, and Technology. Chicago, IL, 2014.
https://ieeexplore.ieee.org/document/6893445/?arnumber=6893445&punumber%3D6883275%26sortType%3Dasc_p_Sequence%26filter%3DAND%28p_IS_Number%3A6893372%29%26pageNumber%3D3.
- Miller, C.A., Richter, J., and O'Leary, J. "Socio-Energy Systems Design: A Policy Framework for Energy Transitions." *Energy Research & Social Science* 6 (2015): 29-40.
- Miller, D.A. "Justice." *The Stanford Encyclopedia of Philosophy*. 2017.
<https://plato.stanford.edu/entries/justice/>.
- Mitcham, C., and Rolston, J. "Energy Constraints." *Science and Engineering Ethics* 19, no. 2 (2013): 313-319.
- Murphy, J.G. "What the Hippocratic Oath Means for NAFTA and Investment." *U.S. Chamber of Commerce, Above the Fold*. (August 7, 2017).
<https://www.uschamber.com/above-the-fold/what-the-hippocratic-oath-means-nafta-and-investment>.
- Nader, L. (ed.). *The Energy Reader*. Wiley Blackwell, 2010.
- Nader, L. *Energy Choices in a Democratic Society*. A Resource Group Study for the Synthesis Panel of the Committee on Nuclear Alternative Energy Systems for the U.S. National Academy of Sciences. Washington, DC: National Academy of Sciences, 1980.
- Nadesan, M., and Pasqualetti, M.J. "Chapter 24: Dispossession, Justice, and a Sustainable Energy Future." in Van de Graaf, T., Sovacool, B.K., Ghosh, A., Kern, F., and Klare, M.T. *The Palgrave Handbook of the International Political Economy of Energy*. London, UK: Palgrave Macmillan, 2016.
- Navajo-Hopi Observer. "Talks Continue on Future of Navajo Generating Station." *Navajo-Hopi Observer*. (May 9, 2017).
<https://www.nhonews.com/news/2017/may/09/talks-continue-future-navajo-generating-station/>.

- Noddings, N. "Chapter 2: Caring as Relation and Virtue in Teaching." in Walker, R.L., and Ivanhoe, P.J. (eds.). *Working Virtue: Virtue Ethics and Contemporary Moral Problems*. Oxford: Clarendon Press, 2007.
- Noisecat, J.B. "13 Issues Facing Native People Beyond Mascots and Casinos." *Huffington Post*. (July 30, 2015). https://www.huffingtonpost.com/entry/13-native-american-issues_us_55b7d801e4b0074ba5a6869c.
- Nugent, D., and Sovacool, B.K. "Assessing the Lifecycle Greenhouse Gas Emissions from Solar PV and Wind Energy: A Critical Meta-Survey." *Energy Policy* 64 (February) (2014): 229-244.
- Nussbaum, M. *Women and Human Development: The Capabilities Approach*. Cambridge, UK: Cambridge University Press, 2000.
- Nussbaum, M.C. *Creating Capabilities: The Human Development Approach*. Cambridge, MA: Belknap Press, 2011.
- O'Neill, J., Holland, A., and Light, A. *Environmental Values, 1st edition*. New York: Routledge, 2008.
- O'Rourke, D., and Connolly, S. "Just Oil? The Distribution of Environmental and Social Impacts of Oil Production and Consumption." *Annual Review of Environment and Resources* 28 (2003): 587-617.
- Open EI. "Wind Projects on Native American Lands." *US Department of Energy and National Renewable Energy Laboratory, Open EI*. (June 21, 2018). https://openei.org/wiki/Wind_Projects_on_Native_American_Lands.
- Pasqualetti, M.J., Jones, T.E., Necefer, L., Scott, C.A., and Colombi, B.J. "Paradox of Plenty: Renewable Energy on Navajo Nation Lands." *Society and Natural Resources* 29, no. 8 (2016): 885-899.
- Paul, E. "The Economic Impact of the Dakota Access Pipeline." *Penn State University, The Underground*. (November 7, 2016). <https://www.psuunderground.com/2016/11/07/nodapl-dakota-access-pipeline-economic-impact/>.
- Paul, M. "The Dakota Access Pipeline Doesn't Make Economic Sense." *Huffington Post*. (February 7, 2018). https://www.huffingtonpost.com/mark-paul/the-dakota-access-pipeline_b_14633114.html.
- Pellegrino, M., and Musy, M. "Seven Questions Around Interdisciplinarity in Energy Research." *Energy Research & Social Science* 32 (2017): 1-12.

- Peppard, C.Z., Belser, J.W., Biviano, E.L., and Martin-Schramm, J.B. "What Powers Us? A Comparative Religious Ethics of Energy Sources, Power, and Privilege." *Journal of the Society of Christian Ethics* 36, no. 1 (2016): 3-25.
- Pettit, P. "Chapter 19: Consequentialism." in Singer, P. (ed.). *A Companion to Ethics*, Blackwell, 1991.
- Plumer, B. "U.S. Nuclear Comeback Stalls as Two Reactors Are Abandoned." *New York Times*. July 31, 2017. <https://www.nytimes.com/2017/07/31/climate/nuclear-power-project-canceled-in-south-carolina.html>.
- Pollock, J.M. *Ethical Dilemmas and Decisions in Criminal Justice*, 9th edition. Boston, MA: Cengage Learning, 2017.
- Popper, K. "The Moral Responsibility of the Scientist." *Encounter* March (1969): 52-56.
- Powell, D.E. "The Rainbow Is Our Sovereignty: Rethinking the Politics of Energy on the Navajo Nation." *Journal of Political Ecology* 22 (2015): 53-78.
- Probert, S.D. "Energy Engineering: Ethics of an Emerging Profession." *Applied Energy* 2 (1976): 217-223.
- Rachels, J. "Chapter 2: The Challenge of Cultural Relativism." in Rachels, J. *The Elements of Moral Philosophy*, 3rd edition. New York: McGraw Hill College Publications, 1999.
- Rand, A. *The Virtue of Selfishness: A New Concept of Egoism*. New York: New American Library, 1964
- Randazzo, R. "Navajo Nation Officials Want President Donald Trump to Subsidize Kayenta Mine, Power Plant." *The Republic*, AZ Central. (March 30, 2017a). <https://www.azcentral.com/story/money/business/energy/2017/03/30/navajo-nation-officials-want-president-donald-trump-subsidize-kayenta-mine-power-plant/99782464/>.
- Randazzo, R. "Utilities Vote to Close Navajo Coal Plant at End of 2019." *The Arizona Republic*. (February 13, 2017b). <http://www.azcentral.com/story/money/business/energy/2017/02/13/utilities-vote-close-navajo-generating-station-coal-plant-2019/97866668/>.
- Rasmussen, L.L., Laurendeau, N.M., and Solomon, D. "Introduction to *The Energy Transition: Religious and Cultural Perspectives*." *Zygon* 46, no. 4 (2011): 872-889.

- Rawls, J. *Justice as Fairness: A Restatement*. Cambridge, MA: Harvard University Press, 2001.
- Renewables 100 Policy Institute. “It Is Happening Now.” (2018). <http://www.go100percent.org/cms/>.
- Renn, O. “Social Assessment of Waste Energy Utilization Scenarios.” *Energy* 28, no. 13 (2003): 1345-1357.
- Reuters. “US Judge Halts Construction of the Keystone XL Oil Pipeline.” CNBC LLC, NBCUniversal. (November 9, 2018). <https://www.cnbc.com/2018/11/09/us-judge-halts-construction-of-the-keystone-xl-oil-pipeline.html>.
- Reynolds, S.J., and Bowie, N.E. “A Kantian Perspective on the Characteristics of Ethics Programs.” *Business Ethics Quarterly* 14, no. 2 (2004): 275-292.
- Robeyns, I. “The Capability Approach.” *The Stanford Encyclopedia of Philosophy*. 2016. <https://plato.stanford.edu/entries/capability-approach/>.
- Rochlin, G.I. “Energy Research and the Contributions of the Social Sciences: A Retrospective Examination.” *Energy Research & Social Science* 3 (2014): 178-185.
- Ryan, S.E., Hebdon, C., and Dafoe, J. “Energy Research and the Contributions of the Social Sciences: A Contemporary Examination.” *Energy Research & Social Science* 3 (2014): 186-197.
- Sandler, R. *Character and Environment: A Virtue-Oriented Approach to Environmental Ethics*. New York: Columbia University Press, 2007.
- Sanzillo, T. “A Transition Plan for Communities Affected by the Closings of Navajo Generating Station and Kayenta Mine.” *Institute for Energy Economics and Financial Analysis*. 2017. <http://ieefa.org/wp-content/uploads/2017/06/IEEFA-Transition-Plan-for-Navajo-Generating-Station-and-Kayenta-Mine-060617.pdf>.
- Schlissel, D. “Briefing Note: Economic Picture Worsens for Navajo Generating Station.” *Institute for Energy Economics and Financial Analysis*. (April 2018). <http://ieefa.org/wp-content/uploads/2018/04/Economic-Picture-Worsens-Navajo-Generating-Station-April2018.pdf>.
- Schlissel, D. “End of an Era: Navajo Generating Station Is No Longer Economic.” *Institute for Energy Economics and Financial Analysis*. (May 2017). http://ieefa.org/wp-content/uploads/2017/05/End-of-an-Era_Navajo-Generating-Station_May-2017.pdf.

- Schubert, D.K.J., Thuß, S., and Möst, D. “Does Political and Social Feasibility Matter in Energy Scenarios?” *Energy Research & Social Science* 7 (2015): 43-54.
- Seed, J., Macy, J., Naess, A., and Fleming, P. *Thinking Like a Mountain: Towards a Council of All Beings*. Gabriola Island, BC: New Society Press, 1988.
- Sen, A. “Elements of a Theory of Human Rights.” *Philosophy & Public Affairs* 32, no. 4 (2004): 315-356.
- Sen, A. “Human Rights and Capabilities.” *Journal of Human Development* 6, no. 2 (2005): 151-166.
- Sen, A. *Commodities and Capabilities*. Amsterdam: North-Holland, 1985.
- Sen, A. *Development as Freedom*. New York: Random House Press, 1999.
- Sen, A. *Inequality Re-examined*. Oxford, UK: Clarendon Press, 1992.
- Sen, A. *Resources, Values and Development*, Cambridge, MA: Harvard University Press, 1984.
- Sherwood, S.C., and Huber, M. “An Adaptability Limit to Climate Change due to Heat Stress.” *Proceedings of the National Academy of Science of the USA* 107, no. 21 (2010): 9552-9555.
- Siegelman, H., Lipsman, M., and Otto, D. “An Assessment of the Economic and Fiscal Impacts of the Dakota Access Pipeline in North Dakota, South Dakota, Iowa and Illinois.” *Strategic Economics Group*. (November 12, 2014).
- Simon, R.L., Torres, C.R., and Hager, P.F. *Fair Play: The Ethics of Sport, 4th edition*. New York: Routledge, 2018.
- Singer, P. *Animal Liberation*. New York: HarperCollins Publishing, 1975.
- Smith, J., and High, M. “Exploring the Anthropology of Energy: Ethnography, Energy and Ethics.” *Energy Research & Social Science* 30 (2017): 1-6.
- Smith, N.L. “Navajo Tribal Utility Authority Opens First Large-Scale Solar Farm.” *The Daily Times*. (July 30, 2017). <http://www.daily-times.com/story/news/local/four-corners/2017/07/30/navajo-tribal-utility-authority-opens-first-large-scale-solar-farm/493090001/>.
- Smith, N.L. “New Solar Farm in Works Near Kayenta, Ariz.” *Farmington Daily Times, USA Today*. (January 19, 2018). <https://www.daily->

- [times.com/story/news/local/navajo-nation/2018/01/30/new-solar-farm-works-near-kayenta-ariz/1076790001/](https://www.nytimes.com/story/news/local/navajo-nation/2018/01/30/new-solar-farm-works-near-kayenta-ariz/1076790001/).
- Sobolik, J. “Chapter 9: Doctors Wanted: How the Bakken Changed North Dakota Health Care Delivery.” in Caraher, W., and Conway, K. (eds.). “The Bakken Goes Boom: Oil and the Changing Geographies of Western North Dakota.” Grand Forks, ND: The University of North Dakota Digital Press, 2016.
https://digitalpressatund.files.wordpress.com/2016/02/caraher_conway_bakkengoesboomv2.pdf.
- Sovacool, B.K. “Energy Studies Need Social Science.” *Nature* 51, no. July (7511) (2014a): 529–530.
- Sovacool, B.K. *The Dirty Energy Dilemma: What’s Blocking Clean Power in the US?* Westport, CT: Praeger Publishers, 2008.
- Sovacool, B.K. “What Are We Doing Here? Analyzing Fifteen Years of Energy Scholarship and Proposing a Social Science Research Agenda.” *Energy Research & Social Science* 1 (2014b): 1–29.
- Sovacool, B.K. *Energy & Ethics: Justice and the Global Energy Challenge*. Basingstoke, UK: Palgrave Macmillan, 2013.
- Sovacool, B.K., and Dworkin, M.H. “Energy Justice: Conceptual Insights and Practical Applications.” *Applied Energy* 142 (2015): 435–444.
- Sovacool, B.K., and Dworkin, M.H. *Global Energy Justice: Problems, Principles, and Practices*. Cambridge, UK: Cambridge University Press, 2014.
- Sovacool, B.K., Burke, M., Baker, L., Kotikalapudi, C.K., and Wlokas, H. “New Frontiers and Conceptual Frameworks for Energy Justice.” *Energy Policy* 105 (2017): 677–691.
- Sovacool, B.K., Ryan, S.E., Stern, P.C., Janda, K., Rochlin, G., Spreng, D., Pasqualetti, M.J., Wilhite, H., and Lutzenhiser, L. “Integrating Social Science in Energy Research.” *Energy Research & Social Science* 6 (2015): 95–99.
- Sovacool, B.K., Jones, B.R., and Sidortsov, R.V. *Energy Security, Equality, & Justice*. New York: Routledge, 2014.
- Spreng, D. “Transdisciplinary Energy Research – Reflecting the Context.” *Energy Research & Social Science* 1 (2014): 65–73.

- Standing Rock Sioux Tribe. 2016. "File for Injunction, 'Standing Rock Sioux Tribe v. U.S. Army Corps of Engineers.'" <http://earthjustice.org/sites/default/files/files/3154%201%20Complaint.pdf>.
- Stern, P.C. "How Can Social Science Research Become More Influential in Energy Transitions?" *Energy Research & Social Science* 26 (2017): 91-95.
- Sulmasy, D.P., and Sugarman, J. "The Many Methods of Medical Ethics: Or, Thirteen Ways of Looking at a Blackbird." In Sugarman, J., and Sulmasy, D.P. (eds.) *Methods in Medical Ethics*, 2nd edition. Washington, DC: Georgetown University Press, 2010.
- Suvorov, N., and Suvorova, I. "Scientific Basics of Forming Human Quality and Perfection to Ensure Holistic Sustained Development." *European Journal of Sustainable Development* 4, no. 1 (2015): 149-160.
- Swenson, D. "Fact Sheet: Interpreting the Dakota Access Economic Impact Study." *Public Broadcasting*. http://mediad.publicbroadcasting.net/p/wium/files/Dakota_Access_Fact_Sheet.pdf.
- Szeman, I., and Boyer, D. *Energy Humanities: An Anthology*. Baltimore, MD: Johns Hopkins University Press, 2017.
- Teller-Elsberg, J., Sovacool, B.K., Smith, T., and Laine, E. "Fuel Poverty, Excess Winter Deaths, and Energy Costs in Vermont: Burdensome for Whom?" *Energy Policy* 90 (2016): 81-91.
- Thompson, J. "The Twisted Economics of the Dakota Access Pipeline." *High Country News*. (December 12, 2016). <https://www.hcn.org/issues/48.21/the-twisted-economics-of-the-dakota-access-pipeline>.
- Tidwell, A.S.D, and Smith, J.M. "Morals, Materials, and Technoscience: The Energy Security Imaginary in the United States." *Science, Technology, & Human Values* 40, no. 5 (2015): 687-711.
- Tsosie, R. "Climate Change, Sustainability, and Globalization: Charting the Future of Indigenous Environmental Self-Determination." *Environmental & Energy Law & Policy Journal* 4, no. 2 (2009): 189-255.
- Tsosie, R. "Indigenous Peoples and the Ethics of Remediation: Redressing the Legacy of Radioactive Contamination for Native Peoples and Native Lands." *Santa Clara Journal of International Law* 203 (2015): 203-272.

- Urban, C.M. "Accelerating Extinction Risk from Climate Change." *Science* 348, no. 6234 (2015): 571-573.
- US Army Corps of Engineers. "Environmental Assessment: Dakota Access Pipeline Project, Crossings of Flowage Easements and Federal Lands." *US Army Corps of Engineers Digital Library*. (2015).
<https://usace.contentdm.oclc.org/digital/collection/p16021coll7/id/2427/>.
- US Department of Energy. "Developing Clean Energy Projects on Tribal Lands: Data and Resources for Tribes." *US Department of Energy, Office of Indian Energy*. (December 2012). <https://www.nrel.gov/docs/fy13osti/57048.pdf>.
- US Department of Energy. "US Energy and Employment Report." (January 2017).
https://www.energy.gov/sites/prod/files/2017/01/f34/2017%20US%20Energy%20and%20Jobs%20Report_0.pdf.
- US Economic Development Administration. "U.S. Department of Commerce Invests \$30 Million to Assist America's Coal Communities." October 11, 2017.
<https://www.eda.gov/news/press-releases/2017/10/11/2017-acc.htm>.
- US Environmental Protection Agency. "Global Greenhouse Gas Emissions Data." (2017). <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>.
- US Environmental Protection Agency. "Sources of Greenhouse Gases." (2016).
<https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.
- Vale, T.R. *Progress Against Growth: Daniel B. Luten on the American Landscape*. New York: The Guildford Press, 1986.
- Vallentyne, P. "Consequentialism." in LaFollette, H. *Ethics in Practice*. 3rd edition. Hoboken, NJ: Wiley-Blackwell, 2006.
- Van Hooft, S. (ed.) *The Handbook of Virtue Ethics*. Durham: Acumen, 2014.
- Vecsey, C. "Navajo Morals and Myths, Ethics and Ethicists." *Journal of Religious Ethics* 43, no. 1 (2015): 78-121.
- Verbong, G., and Loorbach, D. *Governing the Energy Transition: Reality, Illusion or Necessity?* London, UK: Routledge, 2012.
- Verbos, A.K., Gladstone, J.S., and Kennedy, D.M. "Native American Values and Management Education: Envisioning an Inclusive Virtuous Circle." *Journal of Management Education* 35, no. 1 (2011): 10-26.

- Voyles, T. *Wastelanding: Legacies of Uranium Mining in Navajo Country*. Minneapolis: University of Minnesota Press, 2015.
- Walker, R.L., and Ivanhoe, P.J. (eds.) *Working Virtue: Virtue Ethics and Contemporary Moral Problems*. Oxford: Clarendon Press, 2007.
- Waters, C.K. "Okasha's Unintended Argument for Toolbox Theorizing." *Philosophy and Phenomenological Research* 82, no. 1 (2011): 232-240.
- White, L. "Energy and the Evolution of Culture." *American Anthropologist* 45, no. 3 (1943): 335-356.
- Whyte, K.P. "Chapter 15: The Dakota Access Pipeline, Environmental Injustice, and the US Settler Colonialism." In Miller, C., and Crane, J. (eds.) *The Nature of Hope: Grassroots Organizing, Environmental Justice, and Political Change*. Boulder, CO: University Press of Colorado, 2018.
- Williams, B. *Ethics and the Limits of Philosophy*. London, Fontana, 1985.
- Williams-Dairy, C. "The Rickety Finances Behind the Dakota Access Pipeline." *Sightline Institute*. (November 17, 2016). <https://www.sightline.org/2016/11/17/the-rickety-finances-behind-the-dakota-access-pipeline/>.
- Willow, A.J., and Wylie, S. "Politics, Ecology, and the New Anthropology of Energy: Exploring the Emerging Frontiers of Hydraulic Fracking." *Journal of Political Ecology* 21 (2014): 222-236.
- Wimsatt, W.C. *Re-Engineering Philosophy for Limited Beings: Piecewise Approximations to Reality*. Cambridge: Harvard University Press, 2007.
- Wolfe, S. "Moral Saints." *The Journal of Philosophy* 79, no. 8 (1982): 419-439.
- Wyloge, E. "As Coal Plant Shutdown Looms, Arizona's Navajos and Hopis Look for Economic Solutions." *Navajo-Hopi Observer*. November 7, 2017. <https://www.nhnews.com/news/2017/nov/07/coal-plant-shutdown-looms-arizonas-navajos-and-hop/>.
- Yazzie, R. "Life Comes from It: Navajo Justice Concepts." *New Mexico Law Review* 24 (1994): 175-190.
- Zwolinski, M., and Schmidtz, D. "Environmental Virtue Ethics," in Russell, D.C. (ed.) *The Cambridge Companion to Virtue Ethics*. Cambridge: Cambridge University Press, 2013.