

WHAT IS ENERGY JUSTICE? A PRIMER FOR NON-PHILOSOPHERS

By Rebecca Livernois

KEY TAKEAWAYS

1. There is a tension in the ability of energy sources such as fossil fuels to both enable and hamper the meeting of basic human interests. Fossil fuels therefore simultaneously fulfill and inhibit justice.
2. Externality theory, on its own, cannot resolve this tension because justice imposes an injunction on harmful actions.
3. Energy justice is upheld when individuals, countries, and organizations reduce the harm caused by their energy use to the greatest extent possible while fulfilling the duty to help provide energy, where possible, to those who require it to meet their basic needs.
4. Adhering to energy justice is consistent with the popular response of transitioning away from fossil fuel use on a trajectory that does not create further injustices. It is also consistent with a concurrent increase in fossil fuel use by those who require it to meet their basic human interests.
5. Upholding energy justice could reduce the severity of the collective action problem that inhibits climate action.

1. INTRODUCTION

As individuals, countries, and organizations contend with the transition to low-carbon energy systems to mitigate climate change, it is crucial to examine the issues of justice that could arise in this process. This article disentangles features of energy production, distribution, and consumption that create injustices with the aim of clarifying what constitutes energy justice. It argues that energy justice is upheld when individuals and countries minimize the harm their energy use causes while fulfilling the duty to provide energy, where possible, to those who need it to meet their basic needs. This conception of energy justice is characterized by an inherent tension in the ability of energy sources such as fossil fuels to both enable and hamper the meeting of basic human interests. This implies that a fragmented approach to global decarbonisation is justified from the perspective of energy justice, which means that there are some individuals or countries who are justified in maintaining or increasing their fossil fuel use while others are obligated to minimize their use.

This article discusses energy justice in the context of the philosophical concept of justice, which concerns what each individual is due. What individuals deserve as a matter of justice is usually based on the idea that each individual deserves to have their basic human interests met, such as the basic interest in being adequately nourished. This contrasts with the legal conception of justice, or upholding the law, which is informed by, but is distinct from, the philosophical concept of justice. For example, it is typically considered legal, but not just, for a member of one's community to starve when this could be easily prevented. The concept of justice also contrasts with ethics, or what is good or right to do. Justice is sometimes discussed as a special set of ethical claims that one is required to uphold, not merely what is good or virtuous to uphold. For example, as a matter of justice we are required to refrain from physically harming other people, while it is morally commendable, not a requirement of justice, to intentionally act to improve the well-being of another person who has already had their basic needs met.

This article proceeds as follows. Section 2 explains traditional theories of justice as well as the existing literature on energy justice, which tends to focus on localized instances of energy injustices. Section 3 argues that there is a key tension in the justice of fossil fuel use insofar as it both enables and harms basic human interests. Section 4 argues that it is important to distinguish between costs and injustices in order to develop an approach to mediating this tension. Section 5 discusses who is responsible for carrying out the requirements of energy justice, including individuals, states, and corporations. Section 6 argues that an implication of this account of energy justice is that states have a basic duty to not harm others via greenhouse gas (GHG) emissions if they are able to reduce these emissions, regardless of the actions of other states and regardless of the ultimate outcome of climate change. Hence, if states were to uphold energy justice, then the collective action problem that impairs climate action would be minimized.

2. PHILOSOPHICAL ACCOUNTS OF JUSTICE

2.1 Theories of Justice

Justice concerns what is due or owed to other people. It contrasts with other virtues such as charity, forgiveness, or goodness insofar as justice determines what people are entitled to. Hence justice, in contrast to other virtues, is enforceable (Miller 2021). An account of justice requires an account of the interests that are at stake when determining what kinds of protections people are entitled to.

Different accounts of justice agree on the basic idea that justice concerns what is owed to people but employ different accounts of what justice protects. For example, the relevant interests for theories of distributive justice are benefits and burdens. This, in turn, requires an account of what counts as a benefit and a burden to determine what should be fairly distributed across people, and indeed, what counts as a fair share. Egalitarians argue that a fair share is an equal distribution of material goods in society. Libertarians such as Robert Nozick (1974) argue that a fair share of material goods is one that is acquired through a historical chain of voluntary exchanges. Contractarians such as John Rawls (1971) argue that basic goods should be held in equal share, where the set of basic goods are determined behind a 'veil of ignorance' in which one imagines one could have been born as anyone in society. To

the extent that there is inequality in these basic goods, Rawls argues that this inequality should be advantageous to the least well off in society.

In contrast to theories of distributive justice, capability theories of justice argue that justice requires that each person realizes a certain bundle of 'functionings,' such as access to water, education, freedom of choice, and freedom to vote (Sen 1993; Nussbaum 2006). Capability theorists hold that realizing a bundle of functionings enables basic human dignity. The notion of fairness therefore plays a smaller role in this theory than in theories of distributive justice because each person is due a certain set of functionings no matter what anyone else has. Other theories of justice instead hold that human rights are the interests at stake in justice claims (Sen 2005). What counts as a human right varies on different accounts, however; some hold that human rights are those that are written in law while others define human rights in an ideal scenario grounded in moral reasoning (Miller 2021).

Although these theories of justice offer distinct accounts of what constitutes a just state of affairs, they tend to agree on the interests at stake when it concerns access to the basic goods required for a dignified human life (Miller 2021). As I will argue in Section 3, access to energy concerns these basic goods. Therefore, an account of energy justice need not rest on any single theory of justice and instead can analyze the ways in which basic human interests are frustrated or enhanced by energy systems.

2.2 Climate, Environmental, and Energy Justice

There are several applied branches or theories of justice that focus on a specific domain in which justice issues arise. Climate justice, for example, is concerned with the justice issues that arise in the context of climate change. It largely focuses on the injustices imposed on future generations by GHGs emitted by the current generation. The driving question of this research is thus how to weigh the costs and benefits of GHG emissions across generations (Broome 2012; Caney 2014; Jamieson 2010).

Environmental justice instead arose as a social movement in the 1960s and exposed the disproportionate harm marginalized communities face as a result of environmental degradation such as pollution and toxic waste (Sze and London 2008). For example, an area in Louisiana colloquially named 'Cancer Alley' has a high density of petrochemical production and refining plants that emit carcinogenic pollution. In this area, low-income neighbourhoods as well as predominantly African American neighbourhoods are exposed to a higher level of toxins than higher-income and predominantly White neighbourhoods (James et al. 2012).

The literature on energy justice tends to treat energy justice issues as a subset of environmental justice issues. In doing so, this research focuses on the harms imposed on marginalized individuals and communities by local energy production facilities (Bickerstaff et al. 2018). It thus avoids adhering to any one theory of justice, and instead analyzes different categories of injustices related to energy use and production.

The general practice in energy justice research is to analyze the distributional, recognition, and procedural justice issues that arise in the energy system (Jenkins et al. 2021). Distributional energy justice concerns the allocation of costs and benefits of a new energy project or policy across society. For example, this type of justice issue concerns who benefits from a new nuclear power plant via cheaper and cleaner energy, and who bears the burdens via the risk of a malfunction, higher taxes to fund the new project, or the aesthetic costs to those living nearby the new plant. Some organizations (e.g., The Berkeley Lab) focus heavily on this type of justice with the aim of reducing the impact of

new energy policies or projects on the most vulnerable members of society. Recognition justice instead concerns whose voice gets heard in decision-making processes. For example, it might be an injustice to members of a local community if they are not consulted in the decision about where to site a new nuclear power plant in their community. Finally, procedural justice concerns the injustices that arise in the process of developing changes to the energy system. For example, it might be an injustice if the process involves community input that is heard at a stage in the process when the decisions are already finalized.

Energy justice research tends to focus on local instances of energy justice issues (Heffron et al. 2015, Heffron and MacCauley 2017).¹ O'Shaughnessy et al. (2023), for example, focus on distributional justice issues in the siting of solar and wind energy projects. Bickerstaff (2018) discusses the justice issues involved in siting a new nuclear energy power plant. Roddis et al. (2018) consider the justice issues related to community acceptance of offshore wind and solar in the UK.² Bednar et al. (2017) analyze issues of justice that arise in differing access to home heating in Detroit.

The types of justice issues that arise in a particular context can take many forms. For example, the extraction of fossil fuels in the oil sands of Northern Alberta is associated with leaking tailing ponds that spill toxins into rivers relied upon by Indigenous communities, leading to suggested links between the toxins and observed elevated rates of rare cancers (Westman & Joly 2019). Similar issues arise in the extraction of nickel and cobalt, which are required for manufacturing batteries for electric vehicles, insofar as the extraction process tends to cause harm to local communities (Sharma and Manthiram 2020). These injustices are intertwined with colonial and racial injustices to generate a double exposure to harm. Hence the localized instances of injustices caused by energy systems are important to expose, analyze, and prevent.

An account of energy justice that exclusively focuses only on localized instances of injustice is impoverished, however, because it does not capture the full range of issues that are unique to the energy system. The types of issues that arise in siting new energy infrastructure could arise with many public works projects, such as constructing a new highway or creating a new landfill. The remainder of this article therefore develops an account of the broader systemic features of energy justice which are specific to the energy system in its current form.

3. JUSTICE IN THE ENERGY SYSTEM

The energy system is currently dominated by fossil fuels, which remain the most reliable, affordable, and accessible form of energy. There is a desire, in many developed countries, to transition away from fossil fuels toward low-carbon alternatives that are currently less reliable, affordable, and accessible (Helm 2017). It is important to recount, in this context, why fossil fuels remain an important source of energy.

Energy is a basic input into a dignified human life. It is not a good we want for its own sake, but rather it is a good we need in order to live a good life (Jones et al. 2015). This is because energy is generally required for access to clean water, nutritious food, healthcare, and education.

¹ An exception is Jones et al. (2015) who instead advance a more complete theory of energy justice that recognizes the role energy plays in meeting basic human needs.

² See Jenkins et al. (2021) for a comprehensive review of the energy justice literature.

Billions of people worldwide still use dirty energy, including coal, charcoal, firewood, agricultural wastes, and dung that, although it allows people to meet their basic needs, is also harmful to their health, and especially harmful to women and children by way of its creation of indoor pollutants (IEA 2023). Nearly one third of people in the world use cooking fuels that generate harmful indoor pollutants that cause cardiovascular and respiratory illness as well as premature death (IEA 2023). Unreliable or inadequate access to energy also causes heat-related deaths and illness during heat waves, which is a growing problem as climate change progresses (Vicedo-Cabrera et al. 2021). Given that fossil fuels are reliable, relatively clean, accessible, and cheaper than other clean energy options, they could provide enormous benefits to much of the world.

Unreliable access to relatively clean and cheap energy thus inhibits an individual's ability to lead a decent life. It therefore constitutes a threat to life, food, water, health, and education, and therefore would be condemned by most theories of justice. Hence, access to affordable and relatively clean energy, which currently includes fossil fuels, is a matter of justice.

While the use of fossil fuels in place of dirty energy helps individuals to meet their basic interests necessary for a dignified life, it also generates by-products that cause harm to the very interests that it also protects. For people who live in close proximity to refineries, for example, this involves direct harm to their health. For the rest of the world, fossil fuel use generates justice issues via climate change. The use of fossil fuels causes, and will cause, many people to die due to climate damages, threatens people's interests in access to food and water via changing weather systems and desertification, and increases novel diseases as well as the geographic spread of existing diseases (Broome 2012).³ Fossil fuel use, via climate change, thus threatens life, food, water, and health, and thus would also be condemned by most theories of justice. Furthermore, the nations that would benefit the most by replacing dirty energy with cleaner energy sources such as fossil fuels also tend to be least-developed countries (LDCs) that are the most vulnerable to climate change (Winsemius et al. 2018).

Importantly, what is unjust about climate change is its effects on inducing poverty and threats to life (Moellendorf 2014). Given that a lack of clean reliable energy also induces poverty and is a threat to life, attempts to reduce climate damages ought not harm the same interests that climate change policy aims to protect. That is, climate change policy ought not slow development by inhibiting access to affordable and relatively clean energy (Moellendorf 2014). Mamidi et al. (2021), for example, find that a household's transition from dirty energy sources to cleaner energy such as fossil fuels significantly increased (12.2%) their household development, which includes household income, education, mass media exposure, and community trust.

Given that fossil fuels offer energy that is relatively clean, easily accessible, reliable, and affordable, meeting one's basic interests by using fossil fuels as a matter of justice also causes injustices insofar as it harms basic human interests via climate change. The key challenge of energy justice is how to weigh the need for affordable energy and the harm it causes.

It is important to note that the use of any existing form of energy, not just fossil fuels, generates both harms and benefits. For example, creating a new hydroelectric dam creates reliable and clean energy but also tends to displace communities, destroy culturally important sites, and disrupt ecosystems.

³ Note that this paper is concerned primarily with justice as it pertains to humans. Environmental ethics is the traditional venue for considering our moral duty to the natural world and the non-human beings it contains, while justice is typically concerned with human interactions.

Creating a nuclear power plant creates reliable and clean energy in the short term but creates a risk of catastrophic failure events and risks associated with storing nuclear waste. Refining cobalt for electric car batteries is highly toxic to workers and those living in close proximity to the plants (Sharma and Manthiram 2020). Any current form of energy has the potential to generate injustices. The next section thus addresses the question of how to evaluate the need for energy to meet basic human interests and the harm it causes.

4. MEDIATING THE TENSION IN UPHOLDING ENERGY JUSTICE

If justice is enforceable, then what is required of energy use that simultaneously generates a just and an unjust outcome? A framework is needed to mediate this tension to arrive at a workable solution.

4.1 *Externality Theory*

The theory of externalities in economics is a leading contender for this task because it is designed to determine the optimal allocation of a good that generates both benefits and costs. Externalities are generally understood as unpriced spillover effects. Carbon dioxide emissions are an externality because they are an unintended and unpriced byproduct of fossil fuel use that generate costs via climate change. When costly goods are not priced in the market system, they tend to be overproduced because they are treated as if they are free when, in fact, they are costly. Externalities are therefore produced at an inefficient level. This means that there are welfare gains to be made by increasing the price and thus reducing the quantity of emissions, for example by setting a tax on carbon dioxide emissions. The efficient level of emissions, and the associated level of fossil fuel use, is the level at which the total benefits net of total costs is maximized, where costs and benefits are measures of human welfare. This maximizes total welfare subject to the existing allocation of resources.

Externality analysis thus resolves the tension that arises from the production and consumption of desirable goods (e.g., energy derived from fossil fuels) that have negative third-party consequences (e.g., GHG emissions). This framework, however, takes welfare, or well-being, to be the basic unit of analysis. That is, the costs and benefits associated with energy use and carbon dioxide emissions are conceived of as gains and losses to individual well-being, and the solution is to maximize well-being. This analysis thus rests on a form of utilitarianism in which the goodness of a state of affairs is defined in terms of the consequences on the well-being of individuals.

While this framework is useful for setting policy in many cases, it is notoriously ill-equipped to deal with issues of justice. In its basic form, a utilitarian framework tends to recommend sacrificing the few for the good of the majority, which is exactly what theories of justice prohibit (Rawls 1971). If poisoning the water of a small, low-income community drastically reduces their well-being, but it makes millions of people better off through access to cheaper fossil fuels, then this could be a good outcome according to utilitarianism and an efficient outcome according to externality theory. Any adequate theory of justice, however, would prohibit this harm no matter how much other people gain in terms of well-being from the harm.

It is therefore important to distinguish costs from harms, and thus the different content of externality and justice claims. Costs that constitute a reduction in well-being are not necessarily harms that constitute an injustice. For example, a person can impose a cost on another by painting their house an unsightly colour; in doing so, welfare is reduced for the person who dislikes the house colour. This is not, however, an injustice. Individuals are not entitled to a certain level of well-being and are not entitled to be free

from others reducing their well-being (absent justice issues). This scenario presents an opportunity to increase overall well-being, for example by the neighbours paying the homeowner to re-paint their house, thus eliminating the externality; nevertheless, this is not an issue of justice.

On the contrary, individuals are entitled to be free from harms that create an injustice. That is, harms constitute an injunction on action. Unlike externality analysis which relies on the ability to trade off the costs and benefits of goods, and thus involves the creation of costs at an optimal and often non-zero level, unjust acts cannot be traded off against just acts. A murderer is not absolved of moral responsibility for their unjust act of murder if they also saved the lives of other people; a person is not free of injustices if they have access to clean water and quality education but lack access to basic medical care.⁴

One way to cast this distinction is that efficiency concerns the distribution of well-being in society, whereas justice is concerned with the means to well-being. Both are important social considerations that deliver different information. Competitive markets excel at delivering efficient outcomes and thus maximizing well-being subject to the initial distribution of resources in society, but they do not ensure that the initial distribution nor the market outcomes are just (Horne & Heath 2022).

4.2 *Ought Implies Can*

The tension between the just and unjust elements of energy use is therefore not adequately addressed by externality analysis. Instead, this tension is best mediated by the ethical maxim, originating from Immanuel Kant ([1781] 1999), that 'ought implies can.' This means that if a person is morally required to do something, it must be possible for them to do it.

Applied to energy justice, this maxim implies that the extent to which we are required to both ensure access to energy for those who need it and to reduce GHG emissions depends on the extent to which both are possible. Given that immediately ceasing the use of fossil fuels to decrease GHG emissions is impossible, there cannot be a duty to carry out this action even though it would reduce the climate injustices we cause. Instead, this maxim implies that energy justice is upheld when individuals and countries minimize the harm their energy use causes on a trajectory that is both feasible and does not create further injustices, while fulfilling the duty to provide energy, where possible, to those who need it to meet their basic needs.

Upholding energy justice could take many forms. It could occur as a transition away from fossil fuels in developed nations toward low-carbon alternatives while many LDCs increase their fossil fuel use to accelerate development. It could also occur by developed countries subsidizing low-carbon energy infrastructure in LDCs to offset the increased costs compared to fossil fuels. Alternatively, it could occur from carbon capture technology or geoengineering while all countries continue to increase their fossil fuel use.⁵ Any strategy that is adopted to mitigate or adapt to climate change ought not

⁴ Note that precisely differentiating between costs and harms would require clarifying what counts as an issue of justice beyond the basic interests. This would require adopting a particular theory of justice, such as a capabilities or contractarian approach. On contractarian theories of justice, for example, inequality in access to energy would be just as long as it favours the most vulnerable in society, whereas egalitarians do not generally accept inequality at all. For the purposes of this article, however, such a precise distinction is not necessary. What matters here is that injustices are a distinct concept to costs, and that energy justice issues primarily concern access to the basic human interests on which all theories of justice agree.

⁵ These different strategies, of course, have significantly different potential issues of justice as well as different effects on the non-human world. For the purposes of developing an account of energy justice, which I have narrowed to human concerns, I exclude these environmental, ecological, and non-anthropocentric considerations. For more on this aspect of climate and environmental ethics and justice, see, for example, Henning and Walsh (2020) and Tuana et al. (2012).

create further injustices, and especially should avoid making vulnerable groups even more vulnerable (Sovacool et al. 2019; McCauley et al. 2019). For example, in transitioning from combustion engines to electric vehicles, the harm caused by the toxic process of creating batteries ought to be prevented, and thus we ought to prevent shifting the global injustices of climate change onto specific communities.

Hence this account of energy justice implies that providing fossil fuel energy to those who need it and cannot access or afford alternative low-carbon energy sources is consistent with the requirement to significantly reduce fossil fuel use for those who are able to do so. This account of energy justice therefore does not call for an abandonment of fossil fuel use, but rather minimizing the harms that are generated by both a lack of energy and the damages from GHG emissions, as well as the harms that might be caused in the low-carbon energy sector, to the greatest extent possible.

5. WHO IS RESPONSIBLE FOR ENACTING THE DUTIES OF ENERGY JUSTICE?

The previous sections argued that energy justice implies the duty to not harm others by emitting GHGs and the duty to aid those in meeting their basic needs via access to clean and reliable energy, insofar as one is able to carry out these duties. The question thus arises of who is responsible for carrying out these duties and for whom.

Duties can be ascribed to agents, including individuals and collectives, who make informed, organized decisions. This includes governments, corporations, and organizations that have an organized decision-making process in place (Smiley 2023). The Federal Government of Canada, for example, has a duty to ensure that individuals in Canada have access to basic goods such as clean water, nourishment, and clean reliable energy. Individuals, governments, and corporations also have the basic duty to not harm others. This of course depends on their ability to cease the act that causes harm. An individual with no access to energy other than fossil fuels to meet their basic interests, for example, is not required to cease the use of fossil fuels to eliminate the harms they impose on others. If it is possible for a state to provide low-carbon energy options to individuals or to reduce the harm of emissions, however, through climate mitigation measures, and yet does not, then the state is blameworthy for the harm caused by their GHG emissions. If a corporation fails to implement technology that would minimize harm done to the surrounding community, then they are morally responsible for this harm caused, regardless of whether this harm is legal. Injustices can also occur through the production chain and trade (Healy et al. 2019). That is, moral responsibility can be ascribed to an organization that is voluntarily associated with a harm-causing agent or action in the production chain. Even if they did not directly cause the harm, they are implicated in the harm if they engage in trade with the harm-causing agent when they have the option to either not engage with trade with that agent or effect change in the behaviour of that agent (Smiley 2023).

It is not contentious that individuals, states, and organizations have a duty to not cause harm globally (Sovacool et al. 2019). The attribution of positive duty, or the obligation to aid others, however, is more difficult at the global scale because it is difficult for individuals and states to effect change beyond one's own political boundaries (Smiley 2023). Given that 'ought implies can,' the extent to which an agent has a duty to help provide energy to the international community is likely context dependent. Multi-national corporations, however, might have a duty to a wider international community because they are embedded in many nations, and therefore have greater global influence than other agents.

6. IMPLICATIONS OF ENERGY JUSTICE

One barrier to global action on climate change is that when states weigh the costs and benefits of reducing their emissions, they see that it is in their best economic interest to free-ride on the emission-reduction efforts of others while not investing in reducing their own emissions. This results from the fact that the benefits of individual countries' efforts to reduce emissions are enjoyed equally by all, given that the climate is shared by all. Climate action is thus hindered by a collective action problem. Individuals and states might also be dissuaded from taking climate action if they believe that their action will have little effect on the overall outcome of climate change.

This account of energy justice, however, holds that all agents have a duty to not cause harm to others through their energy use, and they have this duty regardless of the ultimate outcome of climate change. For example, Canada has a duty to not contribute to climate damages regardless of how much other countries reduce or increase their emissions. This implies that if agents upheld energy justice, then the global collective action problem in addressing climate change would likely be substantially reduced.

7. CONCLUSION

Energy sources such as fossil fuels both enable and hamper the meeting of basic human interests, which means that they simultaneously fulfill and inhibit justice. This dilemma is resolved by incorporating the maxim that one can only be morally required to do something if it is possible to do so. Energy justice is thus upheld when individuals, countries, and organizations reduce the harm their energy use causes to the greatest extent possible while fulfilling the duty to help provide energy, where possible, to those who require it to meet their basic needs. Given that there are options available primarily to developed countries and organizations to minimize the harm that their energy use causes, they have the duty to adopt these low-carbon options to the maximum extent possible. An energy just state of affairs might therefore involve increased fossil fuel use by those who need it to meet their basic human interests while others transition away from fossil fuels on a trajectory that does not create further injustices. This likely requires taking significant steps to prevent injustices that occur in the low-carbon energy sector.

REFERENCES

- Bednar, Dominic J., Tony Gerard Reames, and Gregory A. Keoleian. 2017. The Intersection of Energy and Justice: Modeling the spatial, racial/ethnic and socioeconomic patterns of urban residential heating consumption and efficiency in Detroit, Michigan. *Energy and Buildings* 143: 25–34.
- Berkeley Lab. <<https://eta.lbl.gov/energy-equity-environmental-justice>>.
- Bickerstaff, Karen. 2018. Justice in Energy System Transitions: A synthesis and agenda. In Eds. Ryan Holifield, Jayajit Chakraborty and Gordon Walker, *The Routledge Handbook of Environmental Justice*. Routledge: 388- 399.
- Bickerstaff, Karen, Gordon Walker, and Harriet Bulkeley. 2013. *Energy Justice in a Changing Climate: Social equity and low-carbon energy*. Zed Books Ltd.
- Broome, John. 2012. *Climate Matters: Ethics in a warming world*. W. W. Norton and Company.
- Caney, Simon. 2014. Climate Change, Intergenerational Equity and the Social Discount Rate. *Politics, Philosophy & Economics* 13,4: 320-342.
- Healy, Noel, Jennie C. Stephens, and Stephanie A. Malin. 2019. Embodied Energy Injustices: Unveiling and politicizing the transboundary harms of fossil fuel extractivism and fossil fuel supply chains. *Energy Research & Social Sciences* 48: 219–34.
- Heffron, Raphael J. and Darren McCauley. 2017. The Concept of Energy Justice Across the Disciplines. *Energy Policy* 105: 658-667.
- Heffron, Raphael J., Darren McCauley, and Benjamin K. Sovacool. 2015. Resolving Society's Energy Trilemma through the Energy Justice Metric. *Energy Policy* 87: 168-176.
- Helm, Dieter. 2017. *Burn Out: The endgame for fossil fuels*. Yale University Press.
- Henning, Brian G. and Zack Walsh (Eds.) 2020. *Climate Change Ethics and the Non-Human World*. Routledge.
- Horne, L. Chad and Joseph Heath. 2022. A Market Failure Approach to Justice in Health. *Politics, Philosophy & Economics* 21,2: 165-189.
- IEA (International Energy Agency). 2023. A Vision for Clean Cooking Access for All. *World Energy Outlook Special Report*. <<https://www.iea.org/reports/a-vision-for-clean-cooking-access-for-all>> Accessed Sept 23, 2023.
- Initiative for Energy Justice <<https://iejusa.org/>>
- James, Wesley, Chunrong Jia, and Satish Kedia. 2012. Uneven Magnitude of Disparities in Cancer Risk from Air Toxics. *International Journal of Environmental Research and Public Health* 9: 4365-4385.
- Jamieson, Dale. 2010. *Reason in a Dark Time: Why the struggle against climate change failed—and what it means for our future*. Oxford University Press.
- Miller, David. 2021. Justice. In Eds. Edward N. Zalta and Uri Nodelman, *The Stanford Encyclopedia of Philosophy*.
- Jenkins, Kirsten E. H., Benjamin K Sovacool, Niek Mouter, Nick Hacking, Mary-Kate Burns, and Darren McCauley. 2021. The Methodologies, Geographies, And Technologies of Energy Justice: A systematic and comprehensive review. *Environmental Research Letters* 16: 1-24.
- Jones, Benjamin R., Benjamin K. Sovacool and Roman V. Sidortsov. 2015. Making the Ethical and Philosophical Case for “Energy Justice.” *Environmental Ethics* 37: 145-168.

- Kant, Immanuel. (1999 [1781]). *Critique of Pure Reason* in Eds. Paul Guyer and Allen W. Wood, *The Cambridge Edition of the Works of Immanuel Kant*. Cambridge University Press.
- Mamidi, Varsha, Vijaya B. Marisetty, and Ewan Nikhil Thomas. 2021. Clean Energy Transition and Intertemporal Socio-Economic Development: Evidence from an emerging market. *Energy Economics* 101: 1-16.
- McCauley, Darren, Vasna Ramasar, Raphael J. Heffron, Benjamin K. Sovacool, Desta Mebratu, and Luis Mundaca. 2019. Energy Justice in the Transition to Low Carbon Energy Systems: Exploring key themes in interdisciplinary research. *Applied Energy* 233-234: 916-921.
- Moellendorf, Darrel. 2014. *The Moral Challenge of Dangerous Climate Change: Values, poverty, and policy*. Cambridge University Press.
- Mulvaney, Dustin. 2013. Opening the Black Box of Solar Energy Technologies: Exploring tensions between innovation and environmental justice. *Science as Culture* 22,2: 230-237.
- Nozick, Robert. 1974. *Anarchy, State, and Utopia*. Basic Books.
- Nussbaum, Martha. 2006. *Frontiers of Justice: Disability, nationality, species membership*. Harvard University Press.
- O'Shaugnessy, Eric, Ryan Wise, Ben Hoen, Joseph Rand, and Salma Elmallah. 2023. Drivers and Energy Justice Implications of Renewable Energy Project Siting in the United States. *Journal of Environmental Policy & Planning* 25,3: 258-272.
- Rawls, John. 1971. *A Theory of Justice*. Harvard University Press.
- Roddis, Philippa, Stephen Carver, Martin Dallimer, Paul Norman, and Guy Ziv. 2018. The Role of Community Acceptance in Planning Outcomes for Onshore Wind and Solar Farms: An energy justice analysis. *Applied Energy* 226: 353-64.
- Sen, Amartya. 1993. Capability and Well-being. In Eds. Martha Nussbaum and Amartya Sen, *The Quality of Life*. Clarendon Press: 30-53.
- Sen, Amartya. 2005. Human Rights and Capabilities. *Journal of Human Development* 6,2: 151-66
- Sharma, Shyam S. and Arumugam Manthiram. 2020. Towards More Environmentally and Socially Responsible Batteries. *Energy & Environmental Science* 13: 4087-4097.
- Smiley, Marion. 2023. Collective Responsibility. In Eds. Edward N. Zalta and Uri Nodelman, *The Stanford Encyclopedia of Philosophy* (Fall 2023 Edition).
- Sovacool, Benjamin K., Mari Martiskainen, Andrew Hook, and Lucy Baker. 2019. Decarbonization and its Discontents: A critical energy justice perspective on four low-carbon transitions. *Climatic Change* 155: 581-619.
- Sze, Julie and Jonathan K. London. Environmental Justice at the Crossroads. *Sociology Compass* 2,4: 1331-1354.
- Tuana, Nancy, Ryan L. Sriver, Toby Svoboda, Roman Olson, Peter J. Irvine, Jacob Haqq-Misra, and Klaus Keller. 2012. Towards Integrated Ethical and Scientific Analysis of Geoengineering: A research agenda. *Ethics, Policy & Environment* 15,2: 136-157.
- Vicedo-Cabrera, A. M. et al. 2021. The Burden of Heat-Related Mortality Attributable to Recent Human-Induced Climate Change. *Nature Climate Change* 11: 492-500.
- Westman, Clinton N. and Tara L. Joly. 2019. Oil Sands Extraction in Alberta, Canada: A review of impacts and processes concerning Indigenous peoples. *Human Ecology* 47:233-243.
- Winsemius, Hessel C., Brenden Jongman, Ted I.E. Veldkamp, Stephane Hallegatte, Mook Bangalore, and Philip J. Ward. 2018. Disaster Risk, Climate Change, and Poverty: Assessing the global exposure of poor people to floods and droughts. *Environment and Development Economics* 23: 328-348.

ABOUT THE IVEY ENERGY POLICY AND MANGEMENT CENTRE

The Ivey Energy Policy and Management Centre is the centre of expertise at the Ivey Business School focused on national energy business issues and public policies. It conducts and disseminates first class research on energy policy; and promotes informed debate on public policy in the sector through supporting conferences and workshops that bring together industry, government, academia and other stakeholders in a neutral forum. The Centre draws on leading edge research by Ivey faculty as well as by faculty within Western University.

More information is available at
www.ivey.ca/energy



IVEY
Business School

Energy Policy and
Management Centre

WESTERN UNIVERSITY · CANADA

AUTHOR

Rebecca Livernois is an expert in both environmental philosophy and the philosophy of economics. Her research examines the philosophical foundations of environmental problems, including the economic theories used to understand these problems and the policies used to address them. She holds a PhD in Philosophy and a Masters in Economics from the University of British Columbia.

The findings and opinions contained in this report reflect solely those of the author. The Ivey Energy Policy and Management Centre submits reports for external review by academic and policy experts and energy sector stakeholders. The Centre gratefully acknowledges support from organizations and individuals listed on the Centre's website: <https://www.ivey.uwo.ca/energycentre/about-us/supporters>