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Diligent Zero

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DILIGENT ZERO

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ABSTRACT

Energy transition policies will soon transform the backbone of our globalized economy. Problematically, leading policymakers advocate for a form of energy system shock therapy: they argue we should abandon fossil fuels to achieve net zero greenhouse gas emissions as soon as technically feasible. Because current energy systems have deep structural importance for our daily lives and determine everything from where we live to how we work, such shock therapy has potentially catastrophic economic, social, and cultural consequences around the world. I argue that we can achieve meaningful energy transition success without such catastrophic consequences if we pivot from a net zero policy focus to a diligent zero legal perspective; this perspective holistically promotes the progressive realization of human rights, as well as environmental and climate commitments. The literature has already identified the crucial importance of due diligence for policymakers and business executives in the context of climate and environmental law, human rights, and corporate governance. What the literature has missed so far is that energy transition diligence can only guide energy transition decision-making if we conduct such diligence holistically rather than piecemeal in siloed and competing climate, environmental, human rights, and corporate governance due diligence streams.

I argue that a holistic energy transition diligence is possible, and in fact compatible, with existing climate, environmental, and human rights regimes. I provide a map for conducting energy transition diligence. Diligent Zero *is the first article to argue for such a holistic diligence approach to energy transition and gives lawyers a focal point for securing an equitable and sustainable energy transition process.*

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I. INTRODUCTION

THE future of world society depends on our ability to manage the coming energy transition.[1] If we come up short, we may cause an ecological collapse that will take world society down with it.[2] But acting brings peril in itself. For example, electric cars use minerals that are toxic to produce.[3] Not only that, recent reports suggest that major solar panel producers rely on forced labor associated with an ongoing genocide.[4] And energy transition itself can bring entire economies to their knees. For example, economies like the Republic of the Congo (Congo) are entirely dependent upon the export of fossil fuels.[5] Take

1. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, GLOBAL WARMING OF 1.5°C vi (Valerie M. Delmotte et al. eds. 2018) [hereinafter IPCC 1.5° C], https://www.ipcc.ch/sr15 [https://perma.cc/C7ET-Z6W7].

2. *See* Paul R. Ehrlich & Anne H. Ehrlich, *Can a Collapse of Global Civilization Be Avoided?*, 280 PROC. OF THE ROYAL SOC'Y B: BIOLOGICAL SCIS., Mar. 7, 2013, at 3 (arguing that global civilization risks collapse due to anthropogenic climate change).

3. *See, e.g.*, Rick Mills, *Copper, The Most Critical Metal*, MINING.COM (Dec. 6, 2020, 12:04 PM), https://www.mining.com/web/copper-the-most-critical-metal [https://perma.cc/FXG5-99VL] ("The latest use for copper is in renewable energy, particularly in photovoltaic cells used for solar power, and wind turbines."); Annie Kelly, *Pollution Causing Birth Defects in Children of DRC Cobalt Miners–Study*, GUARDIAN (May 6, 2020, 3:15 PM), https://www.theguardian.com/global-development/2020/may/06/pollution-causing-birth-defects-in-children-of-drc-cobalt-miners-study [https://perma.cc/X69S-D5DC] ("Thousands of people in the Democratic Republic of Congo (DRC) are being exposed to dangerous levels of toxic pollution that is causing birth defects in their children as they mine for cobalt used to make rechargeable batteries for smartphpones, laptops, and electric cars . . . .").

4. Ana Swanson & Chris Buckley, *Chinese Solar Companies Tied to Use of Forced Labor*, N.Y. TIMES (Jan. 28, 2021), https://www.nytimes.com/2021/01/08/business/economy/china-solar-companies-forced-labor-xinjiang.html [https://perma.cc/MBK6-4D98]; *see* Peter Mattis, *Yes, the Atrocities in Xinjiang Constitute a Genocide*, FOREIGN POL'Y (Apr. 15, 2021, 1:14 PM), https://foreignpolicy.com/2021/04/15/xinjiang-uyghurs-intentional-genocide-china [https://perma.cc/9MDU-Q5HH] (outlining China's systematic destruction of the Uyghers); *see also* John Hudson, *As Tensions with China Grow, Biden Administration Formalizes Genocide Declaration Against Beijing*, WASH. POST (Mar. 30, 2021, 4:54 PM), https://www.washingtonpost.com/national-security/china-genocide-human-rights-report/2021/03/30/b2fa8312-9193-11eb-9af7-fd0822ae4398_story.html [https://perma.cc/J74M-BCM2].

5. CONTRIBUTION PRÉVUE DÉTERMINÉE AU NIVEAU NATIONAL [NATIONALLY DETERMINED CONTRIBUTION PLAN] 2 (Sept. 21, 2015) [hereinafter Congo-NDC], https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Congo%20First/NDC_Congo_RAPPORT.pdf [https://perma.cc/DT4Z-7QWS].

away that income, and the country faces economic ruin. It is not clear which path we should take to manage the energy transition, nor at what cost. Neither is it clear what criteria we should use in making that decision.

The dominant approach is to think of energy transition as a political economy problem.[6] Policymakers in particular seek to develop "the most technically feasible, cost-effective and socially acceptable" energy transition solution.[7] Such an approach focuses on price tags (estimated to be around $4.5 trillion in new investments by 2050)[8] and seeks to distribute costs and impacts efficiently.[9] The high costs will doubtless have significant impacts on developing economies,[10] but this approach justifies the costs in terms of the significantly higher costs of inaction.[11]

There is a catch, however. While efficiency is obviously important,[12] so are equity concerns.[13] What should we do when efficiency and equity point in different directions? I argue that we can only answer this question when we begin to think about global energy transition policies through a legal lens. Surprisingly, the current leading policy proposals on energy transition do not rely on the law to guide energy transition decision-making at all.[14] Such oversight by global policymakers obscures the importance of the distribution of environmental, climate law, and human rights consequences.[15] Thus, it is true that energy transition will demand

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6. For a thoughtful and nuanced introduction to the political economy of energy transition, see DOUGLAS ARENT, CHANNING ARNDT, MACKAY MILLER, FINN TARP & OWEN ZINAMAN, THE POLITICAL ECONOMY OF CLEAN ENERGY TRANSITIONS (2017).

7. Int'l Energy Agency [IEA], *Net Zero by 2050, A Roadmap for the Global Energy Sector*, at 3 (May 17, 2021) [hereinafter IEA-2050 Report], https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf [https://perma.cc/P83H-7SY6].

8. *See id.* at 81.

9. *See id.* at 55 (prioritizing new, sustainable infrastructure over updating existing structures due to the relative impact each would have).

10. *See id.* at 82 (noting that "direct government financing" is necessary for the infrastructure development needed to reach energy goals, particularly in developing economies).

11. *Id.* at 157 ([I]mpacts are likely to be lower than assessments of the cost of climate change damage . . . .").

12. *Id.* at 55.

13. ARENT, ARNDT, MILLER, TARP & ZINAMAN, *supra* note 6, at 11.

14. Such proposals include the benchmark 2021 report by the International Energy Agency, IEA-2050 Report, *supra* note 7, *passim*, and policymaking by the World Bank Group, such as its conclusions about the economic and political motivations of fossil fuel-dependent countries' energy systems, GREGORZ PESZKO ET AL., WORLD BANK GROUP [WBG], DIVERSIFICATION AND COOPERATION IN A DECARBONIZING WORLD *passim* (2020), https://openknowledge.worldbank.org/bitstream/handle/10986/34011/9781464813405.pdf?sequence=2&isAllowed=y [https://perma.cc/52VA-6J4U]. Arguably, the European Union's recent "Green Deal" suffers from the same deficiency. *See Delivering the European Green Deal*, EUR. COMM'N (July 14, 2021) [hereinafter EU Proposal], https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en [https://perma.cc/57A7-JE6K].

15. *See infra* Part II. Inequality arising as an equity concern is arguably also a matter of network power—power that tends to be concentrated as a historical matter. *See* DAVID SINGH GREWAL, NETWORK POWER: THE SOCIAL DYNAMICS OF GLOBALIZATION 142 (2008). As a methodological matter, see also MATTHEW E. KAHN, ADAPTING TO CLIMATE CHANGE: MARKETS AND THE MANAGEMENT OF AN UNCERTAIN FUTURE 11–12 (2021)

mobilization of all of world society to outlive the climate change threat.[16] Success will demand sacrifice.[17] But it still must account for an additional variable that is currently missing: the distribution of relative burdens and benefits of energy transition.[18]

In this Article, I argue that lawyers have a central role to play in getting energy transition right. Instead of considering feasibility, cost-effectiveness, and social acceptability each in its own right, lawyers must ask if our policies meet climate and environmental obligations holistically while also realizing human rights.[19] Lawyers must ask these questions at the very earliest stage—the legal regimes governing energy policies and projects necessitate due diligence in their application. This diligence requirement is a matter of international human rights law,[20] environmental law,[21] and domestic law, such as administrative rulemaking.[22] Just as importantly, companies also must engage in human rights and environmental diligence before making important investment decisions.[23]

The key problem is that energy transition policies are subject to inconsistent due diligence regimes, including climate diligence, environmental diligence, and human rights diligence. This inconsistency can lead to deadlock. For example, environmental law facially prohibits the killing of

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(noting the difference in impact of climate change on poor and wealthy households and the increasingly powerful feedback loop between poverty and climate hazard).

16. *See* IEA-2050 Report, *supra* note 7, at 50.

17. *See id.* at 67–69.

18. Macroeconomic research arguably does not even intend to study such a relative sharing of burdens and benefits but rather focuses on net results. For a discussion of the negative consequences of this perspective, see BINYAMIN APPELBAUM, THE ECONOMISTS' HOUR 330 (2019).

19. *See generally* Tade Oyewunmi, Penelope Crossley, Kim Talus & Frédéric Sourgens, *Introduction: Energy in a Carbon-Constrained World*, in DECARBONISATION AND THE ENERGY INDUSTRY: LAW, POLICY AND REGULATION IN LOW-CARBON ENERGY MARKETS 1 (Tade Oyewunmi, Penelope Crossley, Kim Talus & Frédéric Sourgens eds., 2020) (outlining the goals of a comprehensive, law-based approach to energy transition).

20. *See* DIANE A. DESIERTO, PUBLIC POLICY IN INTERNATIONAL ECONOMIC LAW 159 (2015) [hereinafter DESIERTO PUBLIC POLICY].

21. *See* PHILIPPE SANDS, JACQUELINE PEEL, ADRIANA FABRA & RUTH MACKENZIE, PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW 499 (Cambridge Univ. Press, 4th ed. 2018); DANIEL BODANSKY, JUTTA BRUNNÉE & LAVANYA RAJAMANI, INTERNATIONAL CLIMATE CHANGE LAW 41–48 (2017).

22. *See, e.g.*, Daniel A. Farber, *Continuity and Transformation in Environmental Regulation*, 10 ARIZ. J. ENV'T L. & POL'Y 1, 10 (2019) (discussing collaborative climate governance); Gabriel Pacyniak, *Making the Most of Cooperative Federalism: What the Clean Power Plan Has Already Achieved*, 29 GEO. ENV'T L. REV. 301, 333 (2017) (discussing traditional notice and comment regulation); Albert C. Lin, *Myths of Environmental Law*, 2015 UTAH L. REV. 45, 56 (2015) (discussing NEPA diligence).

23. U.N. Secretary-General, *The Report of the Working Group on the Issue of Human Rights and Transnational Corporations and Other Business Enterprises*, ¶¶ 10–15, U.N. Doc. A/73/163 (July 16, 2018); Churchill Mining PLC v. Republic of Indonesia, ICSID Case No. ARB/12/14 and 12/40, Award, ¶¶ 516–27 (Dec. 6, 2016). This requirement is frequently a matter of domestic corporate and securities law. *See* Veronica Root Martinez, *Complex Compliance Investigations*, 120 COLUM. L. REV. 249, 249 (2020); Melvin A. Eisenberg, *The Duty of Good Faith in Corporate Law*, 31 DEL. J. CORP. L. 1, 17 (2006). And it is now part and parcel of corporate culture at leading energy and mining companies. Ray Chartier & Kellie L. Johnston, *ESG Considerations in Oil and Gas Deals: Risks and Opportunities (Canada & Globally)*, 18 OIL, GAS & ENERGY L. INTEL. 1, 5 (2020).

endangered birds, but it is a climate imperative to expand wind power despite the fact that it does, in fact, kill endangered birds.[24] To help energy transition policymakers, lawyers must be able to resolve this deadlock.[25]

This deadlock can be resolved. The different diligence regimes must be combined into a single decision matrix. We must consider the impacts of energy transition policies holistically rather than piecemeal.[26] This approach is fundamentally consistent with recent climate change jurisprudence like the German Constitutional Court's 2021 landmark climate decision in *Neubauer v. Germany*.[27]

We now need to translate this holistic approach to due diligence regimes. Holistic diligence must collect data and assess risks across the entire spectrum of potential energy transition, climate, environmental, and human rights impacts.[28] This includes not just the projects themselves but also the supply chains on which they rely.[29] We then must develop a risk mitigation strategy that accounts for the complex risks energy systems and supply chains create.[30] Diligence must propose maximally ambitious pathways, even if some risks cannot be accounted for without undermining the bigger energy transition effort.[31] Finally, we need to build monitoring and adaptation programs to assess and correct policies and projects once we see their actual impacts.[32]

This approach offers five key insights. First, energy transition policies and projects can only be successful if they robustly engage stakeholders

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24. *See Wildlife Concerns Associated with Wind Energy Development*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/midwest/wind/wildlifeimpacts/index.html [https://perma.cc/7UE3-QZGJ].

25. *See generally* IEA-2050 Report, *supra* note 7, at 3 ("[T]hat pathway remains narrow and extremely challenging, requiring all stakeholders . . . to take action this year and every year after so that the goal does not slip out of reach.").

26. Surprisingly little work has been done to date on holistic diligence. For one recent exception, see generally Chiara Macchi, *The Climate Change Dimension of Business and Human Rights: The Gradual Consolidation of a Concept of "Climate Due Diligence,"* 6 BUS. & HUM. RTS. J. 93 (2021). Macchi argues that climate, environmental, and human rights obligations for corporations are mutually reinforcing, thus suggesting a holistic approach to due diligence. *Id.* at 93. As I will discuss later, this is more problematic in the policy space in which environmental, climate, and human rights law may in fact point in different directions.

27. *See* Bundesverfassungsgericht [BVerfG] [Federal Constitutional Court], Mar. 24, 2021, 157 Entscheidungen des Bundesverfassungsgerichts [BVerfGE] 270 (2021) (Ger.) [hereinafter Neubauer].

28. *See infra* Part II.

29. *See* Melissa J. Durkee, *Interpretive Entrepreneurs*, 107 VA. L. REV. 431, 473–75 (2021) (discussing the problems of global supply chain diligence); Rachel Chambers & Anil Yilmaz Vastardis, *Human Rights Disclosure and Due Diligence Laws: The Role of Regulatory Oversight in Ensuring Corporate Accountability*, 21 CHI. J. INT'L L. 323, 327 (2021) (discussing the relative dearth of legislative actions on supply chain diligence to date).

30. *See* Albert C. Lin, *The Missing Pieces of Geoengineering Research Governance*, 100 MINN. L. REV. 2509, 2542 (2016) ("Existing energy systems are deeply resistant to change because of their long-lived and extensive infrastructure, as well as their complex and interrelated components.").

31. *See infra* Section III.B.

32. *See infra* Section III.C.

and local communities from the earliest due diligence stages through monitoring and implementation.[33] Transparent communication and buy-in from affected communities make the difference between successful and unsuccessful energy transition policies and projects. The law governing due diligence supports both; a heavy-handed, top-down approach, however well-intentioned, supports neither.

Second, we can develop several diligent zero pathways, not just one narrow net zero pathway.[34] We can look to increase feasible environmental protection, climate achievement, or human rights realization without reducing one of the other outcomes. That is, we look for Pareto optimal pathways to energy transition.[35] With few caveats, policymakers can adopt each Pareto optimal pathway in light of their respective values and community needs. This approach is fundamentally consistent with the bottom-up climate governance approach adopted in the 2015 Paris Agreement.[36] And it provides a means to engage more fully to secure buy-in from relevant energy transition stakeholders.

Third, energy transition progress must never be achieved on the back of serious impairments of human rights and the right to development.[37] Both climate change and energy transition threaten the right to development and the realization of human rights.[38] Diligent energy transition policies must ensure that those most severely affected by such policies do

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33. *See* OWEN L. AENDERSON, JACQUELINE L. WEAVER, JOHN S. DZIENKOWSKI, JOHN S. LOWE, KEITH B. HALL & FRÉDÉRIC GILLES SOURGENS, INTERNATIONAL PETROLEUM LAW AND TRANSACTIONS 682–707 (2020) (discussing the importance of stakeholder engagement in community development agreements); Pacyniak, *supra* note 22, at 333 (discussing the same in the notice-and-comment context).

34. *See* IEA-2050 Report, *supra* note 7, at 3–4 ("There is no one-size-fits-all approach to clean energy transitions.").

35. *See* Jesse D. Jenkins & Valerie J. Karplus, *Carbon Pricing Under Political Constraints: Insights for Accelerating Clean Energy Transitions*, *in* THE POLITICAL ECONOMY OF CLEAN ENERGY TRANSITIONS 39, 41 (Douglas Arent, Channing Arndt, Mackay Miller, Finn Tarp & Owen Zinaman eds., 2017) (discussing Pareto optimality in the climate mitigation context).

36. Catherine Powell, *We the People: These United Divided States*, 40 CARDOZO L. REV. 2685, 2719 (2019) ("The road from the 1992 Rio Earth Summit to the 2015 Paris Agreement illustrates a shift from the more traditional, top-down, 'regulatory' approach to a more polycentric, bottom-up, 'catalytic' approach.")

37. The right to development is associated with the third generation of human rights treaties. CHRISTIAN TOMUSCHAT, HUMAN RIGHTS: BETWEEN IDEALISM AND REALISM 137 (3d ed., 2014). There is ongoing treaty codification of this right. Zamir Akram (Chair-Rapporteur of the Human Rights Council Working Group on the Right to Development), *Draft Convention on the Right to Development*, U.N. Doc. A/HRC/WG.2/21/2, at 1 (Jan. 17, 2020) [hereinafter Development Convention], https://www.ohchr.org/Documents/Issues/Development/Session21/3_A_HRC_WG.2_21_2_AdvanceEditedVersion.pdf [https://perma.cc/P94N-6H2U]. As discussed in a recent U.N. session on the right to development, the right to development is "integral to the realisation of all other rights." Michelle Bachelet (United Nations High Commissioner for Human Rights, Opening remarks to the 21st Session of the Intergovernmental Working Group on the Right to Development, (May 17, 2021), https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=27097&LangID=y [https://perma.cc/5AFR-4AC4]. It is therefore not a right that should be limited to the third generation of human rights treaties. It encompasses all generations of positive and negative rights. Development Convention, *supra* note 37, art. 6(2).

38. *See* TOMUSCHAT, *supra* note 37, at 134–37 (explaining the interrelated nature of various human rights).

not lose the progress made in human rights realization since decolonization.[39]

Fourth, energy transition policies endanger the resilience of energy systems at their peril. Any policy that impairs resilience will likely be met by defection by stakeholders, which will undercut the implementation of the policies and projects in question.[40] Worse still, it is likely to be accompanied by self-help, which itself poses a serious threat to climate change mitigation.[41]

Fifth, energy transition must rely on a broad energy policy mix to achieve a robust yet manageable transition process. This pathway is likely to lean on hydrogen and small modular reactor nuclear as a significant component of our global energy future;[42] it will likely also look to carbon capture and carbon removal.[43] Further, transition is likely to consider solar radiation management as a tool to buy time to establish supply chains and energy infrastructure in a sustainable manner.[44]

These insights are relevant to global and U.S. due diligence efforts. President Biden has ordered the federal government to conduct climate impact due diligence under the National Environmental Policy Act (NEPA).[45] The Paris framework coordinates similar global efforts.[46] Both the U.S. and global efforts can draw on the diligent zero approach to inform their choices.

My argument for a diligent zero approach is not just a technical legal argument. It is ethical. We cannot achieve our energy goals on the backs

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39. *See* Development Convention, *supra* note 37, art. 4(1) ("[A]ll peoples have the inalienable right to development . . . based on all other human rights and fundamental freedoms."). *See also* Bundesverfassungsgericht [BVerfG] [Federal Constitutional Court], Mar. 24, 2021, 157, Entscheidungen des Bundesverfassungsgerichts [BVerfGE] 270 (2021) (Ger.). 1 BvR 2656/18 at 42–43; MARIA MONNHEIMER, DUE DILIGENCE OBLIGATIONS IN INTERNATIONAL HUMAN RIGHTS LAW 291 (2021).

40. *See infra* Part IV.

41. *See infra* text accompanying notes 355–56.

42. *See* Phred Dvorak, *Japan's Big Hydrogen Bet To Revolutionize Energy Market*, WALL ST. J., (June 13, 2021, 2:08 PM), https://www.wsj.com/articles/japans-big-bet-on-hydrogen-could-revolutionize-the-energy-market-11623607695 [https://perma.cc/AW8E-56WZ]; Bruce R. Huber, *The New Nuclear? Small Modular Reactors and the Future of Nuclear Power*, 1 NOTRE DAME J. EMERGING TECH. 458, 460 (2020).

43. *See* Nichola Groom & Hyunjoo Jin, *Tesla CEO Musk Puts $100 mln Jolt into Quest for Carbon Removal*, REUTERS (Apr. 22, 2021, 4:39 PM), https://www.reuters.com/business/autos-transportation/tesla-ceo-musk-puts-100-mln-jolt-into-quest-carbon-removal-2021-04-22 [https://perma.cc/K7KN-8NU9]; Fiona Harvey, *Boris Johnson Urges Major Economies To Go Carbon Neutral by 2050*, GUARDIAN (Feb. 4, 2020, 1:19 EST), https://www.theguardian.com/environment/2020/feb/03/pm-urges-major-economies-to-go-carbon-neutral-by-2050 [https://perma.cc/HRV5-P2BT].

44. *See* Jeff Tollefson, *US Urged To Invest in Sun-Dimming Studies as Climate Warms*, NATURE (Mar. 29, 2021), https://www.nature.com/articles/d41586-021-00822-5 [https://perma.cc/7S3V-DQZ3] (discussing new research to "artificially cool Earth").

45. Exec. Order 13,990, 86 Fed. Reg. 7037, 7042 § 7(e) (Jan. 20, 2021); Memorandum from Christina Goldfuss, Couns. on Env't Quality, Exec. Off. of the President, to Heads of Federal Departments and Agencies (Aug. 1, 2016) [hereinafter NEPA-Guidance], https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf [https://perma.cc/6RMU-Y9B].

46. *See* IEA-2050 Report, *supra* note 7, at 3.

of others. I cannot ask anyone to endure catastrophic ecosystem collapse while I remain sheltered in my technological bubble.[47] And I cannot ask anyone to make deep sacrifices in the name of energy transition while I continue to enjoy a good life.[48] To do either is to deny others moral agency.[49] Plenitude at the cost of dehumanizing my neighbor is morally corrosive. Such moral corrosion ends in tragedy—even when it is effective, it transforms my life into a fearful pursuit of continued domination of my supposed lesser. A life lived in such fearful pursuit of dominion impoverishes all.[50] Prudence and diligence guard against its beginning and against the tug of convenience away from the advice of conscience. Diligence, therefore, is more than a legal technicality. It is imperative for an ethical energy transition.

This Article has five parts. Part I outlines the energy transition conundrum and introduces the IEA-2050 Report. Part II outlines how a legal diligence approach can resolve the energy transition conundrum. Part III outlines the reasonableness paradigm guiding diligent decision-making. Part IV argues that in this factually specific exercise of diligent judgment, human rights—and particularly the right to development—take the first position among equals. Part VI then provides various potential applications of the diligence framework that provide alternative pathways to energy transition.

II. THE ENERGY TRANSITION CONUNDRUM

On its face, energy transition should be reasonably straightforward to manage. Greenhouse gas emissions drive world temperatures up, which changes the global climate.[51] Ecosystems cannot adapt as fast as tempera-

47. *See generally* POPE FRANCIS, ENCYCLICAL LETTER *Fratelli Tutti* of the Holy Father Francis on Fraternity and Social Friendship ¶¶ 16–17, 30 (Oct. 3, 2020), https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20201003_enciclica-fratelli-tutti.html [https://perma.cc/R2FL-6R5X] ([W]e need to think of ourselves more and more as a single family dwelling in a common home."); STEPHEN M. GARDINER, A PERFECT MORAL STORM: THE ETHICAL TRAGEDY OF CLIMATE CHANGE 336–45 (2011) ("In current climate policy . . . the needs and aspirations of the less privileged should be taken into account in any agreement, so that it is not constructed solely for the benefit of the rich.").

48. *See generally* POPE FRANCIS, *supra* note 47, at ¶ 22 (condemning the exploitation of others for development and economic growth); ALASDAIR MACINTYRE, AFTER VIRTUE 254–55 (2d ed. 1984) (similarly criticizing modern political structures that elevate individualism over community interests); JOHN FINNIS, NATURAL LAW AND NATURAL RIGHTS 106–09 (2d ed. 2011) ("Put yourself in your neighbours' shoes . . . . Do not (without special reason) prevent others for getting for themselves what you are trying to get for yourself.").

49. *See* POPE FRANCIS, *supra* note 47, at ¶ 20; MACINTYRE, *supra* note 48, at 251–52; FINNIS, *supra* note 48, at 106–09.

50. *See* POPE FRANCIS, *supra* note 47, at ¶ 113 ("Every society needs to ensure that values are passed on; otherwise, what is handed down are selfishness, violence, corruption in its various forms, indifference, and, ultimately, a life closed to transcendence and intrenched in individual interests."); POPE FRANCIS, ENCYCLICAL LETTER *Laudato Si'* of the Holy Father Francis on Care for our Common Home ¶ 229 (May 24, 2015), https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html [https://perma.cc/GJ95-NMEQ].

51. *See* IPCC 1.5°C, *supra* note 1, at 4.

tures keep rising.[52] Cities like New Delhi have become nearly unlivable for a large number of people.[53] It stands to reason that we should simply stop emitting greenhouse gases as fast as possible.[54] The most direct way of doing so is to simply stop producing and burning fossil fuels.[55] This equation is the received wisdom of energy transition.[56]

This approach does not work as well as we might hope because of the central role energy plays in world society. Energy systems affect almost every aspect of our daily lives.[57] Energy systems dictate how we work, what education is available to us, and even how we worship (Zoom is not carbon neutral).[58] They determine how we commute to work,[59] which in turn can affect where we can live.[60] It affects if we can turn on an air conditioner.[61] Energy systems also affect what foods we can eat and store because of the energy intensity of food processing.[62] Unsurprisingly, energy systems indirectly affect employment. For instance, Disney alone used to employ more than 100,000 workers at its U.S. theme parks and welcomed more than 159 million travelers at its resorts globally, many of

52. *See id.* at 8.

53. Somini Sengupta, *In India, Summer Heat Could Soon Be Unbearable*, N.Y. TIMES (July 17, 2018), https://www.nytimes.com/2018/07/17/climate/india-heat-wave-summer.html [https://perma.cc/CDU7-CQMB]. *See also* ABHIJIT V. BANERJEE & ESTHER DUFLO, GOOD ECONOMICS FOR HARD TIMES 221 (Christine Marra ed., 2019).

54. David Biello, *10 Solutions for Climate Change*, SCI. AM. (Nov. 26, 2007), https://www.scientificamerican.com/article/10-solutions-for-climate-change [https://perma.cc/2DS8-UQEB]; Allyson Shaw, *13 Ways to Save the Earth from Climate Change*, NAT'L GEOGRAPHIC KIDS, https://kids.nationalgeographic.com/nature/save-the-earth/article/13-ways-to-save-the-earth-from-climate-change [https://perma.cc/3DKK-3QVD].

55. Tim Donaghy, *8 Reasons Why We Need to Phase Out the Fossil Fuel Industry*, GREENPEACE (Nov. 22, 2021), https://www.greenpeace.org/usa/research/8-reasons-why-we-need-to-phase-out-the-fossil-fuel-industry [https://perma.cc/WX22-WU8U].

56. *See* GARDINER, *supra* note 47, at 341; Damian Carrington, *Greta Thunberg Tells World Leaders To End Fossil Fuel 'Madness*,' GUARDIAN (Jan. 10, 2020, 8:03 AM), https://www.theguardian.com/environment/2020/jan/10/greta-thunberg-tells-world-leaders-to-end-fossil-fuel-madness [https://perma.cc/G2UE-YQ7T].

57. *See* WORLD ECON. F., ENERGY FOR ECONOMIC GROWTH: ENERGY VISION UPDATE 2012 7 (2021), http://www3.weforum.org/docs/WEF_EN_EnergyEconomicGrowth_IndustryAgenda_2012.pdf [https://perma.cc/26LU-BTK9] ("Energy is an input for nearly all goods and services.").

58. Lindsey McGinnis, *Zoom Isn't Carbon-Free. The Climate Costs of Staying Home*, CHRISTIAN SCI. MONITOR (Mar. 5, 2021), https://www.csmonitor.com/Environment/2021/0305/Zoom-isn-t-carbon-free.-The-climate-costs-of-staying-home [https://perma.cc/5TGW-57ZX].

59. *See* Stephanie Kelly & Laila Kearney, *U.S. Gasoline Shortage Eases, but Pumps Dry in Some Areas*, REUTERS (May 16, 2021, 10:39 AM), https://www.reuters.com/business/energy/us-gasoline-shortage-improves-some-regions-still-suffer-hefty-outages-2021-05-16 [https://perma.cc/NKA2-FYT5].

60. Real estate prices in New York increase by proximity to subway stations. James Barron, *The Subway Is Next Door. Should New Yorkers Pay Extra for That?*, N.Y. TIMES (Jan. 29, 2018), https://www.nytimes.com/2018/01/29/nyregion/subway-real-estate-nyc.html [https://perma.cc/WZV3-6EM3].

61. *See Air Conditioning Accounts for About 12% of U.S. Home Energy Expenditures*, U.S. ENERGY INFO. ADMIN. (July 23, 2018), https://www.eia.gov/todayinenergy/detail.php?id=36692 [https://perma.cc/5Z7S-DMRJ].

62. Alia Ladha-Sabhur, Serafim Bakalis, Peter J. Fryer & Estefania Lopez-Quiroga, *Mapping Energy Consumption in Food Manufacturing*, 86 TRENDS IN FOOD SCI. & TECH. 270, 270 (2019).

whom travel to the resorts by plane.[63] The data centers that support digital platforms like Google and Slack are responsible for as much energy consumption as the airline industry, and Bitcoin annually consumes the same amount of electricity as the whole of Sweden.[64] Energy transition, therefore, will have lasting impacts on a host of industries across all economic sectors and create equity issues for workers and consumers.

Energy policy also has an outsized global impact. Our current energy systems rely on global supply chains.[65] In fact, fossil fuels are the sole source of meaningful state income for some developing nations like Congo.[66] Similarly, the existing energy infrastructure is key for developing states to industrialize and meet development goals.[67] Energy transition policy will affect the ability of developing states to industrialize and consequently affect global supply chains for basic goods and services.[68] The manner in which we implement energy transition can have potentially catastrophic effects in the developing world.

Because of these complexities, the IEA-2050 Report's strategy was keenly anticipated.[69] The IEA is a nonpartisan institution.[70] The report rests on a political economy approach.[71] Its analysis relies on economic

63. Brooks Barnes, *Disney Lays Off 28,000, Mostly at Its 2 U.S. Theme Parks*, N.Y. TIMES (Sept. 29, 2020), https://www.nytimes.com/2020/09/29/business/disney-theme-park-workers-layoffs.html [https://perma.cc/SRL5-JA62] ("Disney's theme parks in California and Florida employed roughly 110,000 people before the pandemic."); Adrienne Jordan, *These Are the World's Most-Visited Theme Parks*, USA TODAY (May 23, 2019), https://www.usatoday.com/story/travel/news/2019/05/23/disney-world-magic-kingdom-world-most-visited-theme-park/1206310001 [https://perma.cc/J5WU-FZUF]; *Orlando International Airport Ends 2019 with Record 50.6 Million Passengers*, ORLANDO AIRPORTS (Feb. 11, 2020), https://orlandoairports.net/press/2020/02/11/orlando-international-airport-ends-2019-with-record-50-6-million-passengers [https://perma.cc/6463-XL36] (reporting 50.6 million annual passengers at Orlando airport).

64. Nic Carter, *How Much Energy Does Bitcoin Actually Consume?*, HARV. BUS. REV. (May 5, 2021), https://hbr.org/2021/05/how-much-energy-does-bitcoin-actually-consume [https://perma.cc/DES2-YVDM]; McGinnis, *supra* note 58, at 2–3.

65. *See* DANIEL YERGIN, THE NEW MAP: ENERGY, CLIMATE, AND THE CLASH OF NATIONS 156 (2020) (discussing the relationship between fossil fuels and economic growth in China).

66. Congo-NDC, *supra* note 5, at 2.

67. *See* Namit Sharma, Bram Smeets & Christer Tryggestad, *The Decoupling of GDP and Energy Growth: A CEO Guide*, MCKINSEY Q. 1, 1–4 (Apr. 24, 2019), https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-decoupling-of-gdp-and-energy-growth-a-ceo-guide [https://perma.cc/R5XB-7MJM]. This report surmises that energy demand will plateau despite growth opportunities worldwide. *Id.* Notably, even this report suggests that the decoupling occurs predominantly in post-industrial economies rather than industrializing economies. *Id.*

68. *See id.* at 9.

69. *See* IEA-2050 Report, *supra* note 7, at 3.

70. *See Mission*, INT'L ENERGY AGENCY (Nov. 26, 2020), https://www.iea.org/about/mission [https://perma.cc/F9B9-JU6Y].

71. *Compare* IEA-2050 Report, *supra* note 7, at 47–49 (setting out the method for creating the recommended net zero emission pathway), *with* Michael Veseth, *Political Economy*, BRITANNICA, https://www.britannica.com/topic/political-economy [https://perma.cc/5FNJ-GZDP] ("[P]olitical economy, branch of social science that studies the relationships between individuals and society and between markets and the state, using a diverse set of tools and methods drawn largely from economics, political science, and sociology.").

modeling, and in turn, these models drive the IEA's proposals.[72]

Representative of the political economy approach on which it rests, the report proposes "the most technically feasible, cost-effective and socially acceptable" path for energy transition.[73] The report sets out that the "key pillars of decarbonisation of the global energy system are energy efficiency, behavioural changes, electrification, renewables, hydrogen and hydrogen-based fuels, bioenergy and [carbon capture, utilization, and storage, or] CCUS."[74] Emission reductions are premised in part on behavioral changes, 75% of which "are achieved through targeted government policies supported by infrastructure development, e.g., a shift to rail travel supported by high-speed railways."[75] Much of the plan also depends on infrastructure investment in low emission, renewables-generated electricity.[76]

The IEA's plan is audacious. It projects that "[t]he share of renewables in total electricity generation globally increases from 29% in 2020 to over 60% in 2030 and to nearly 90% in 2050."[77] The report spells out that, to achieve this end, "annual capacity additions of wind and solar between 2020 and 2050 [must be] five-times higher than the average over the last three years."[78] The report then adds CCUS as an additional tool to "provid[e] a way to address emissions from some of the most challenging sectors."[79] Even with carbon capture, the report projects a reduction in the global electricity mix of coal from approximately 35% in 2020, to about 8% in 2030, and next to 0% in 2050; and of gas from approximately 23% in 2020, to about 17% in 2030, and less than 1% in 2050.[80] In fact, according to the report, "no exploration for new [oil] resources is required and, other than fields already approved for development, no new oil fields are necessary."[81]

The IEA's recommendations already drive policymaking. On July 14, 2021, the European Commission announced a plan to reduce the European Union's (EU) greenhouse gas emissions by 55% by 2030.[82] The proposal tracks the IEA's recommendations: it "proposes to increase the binding target of renewable sources in the EU's energy mix," doubling the share of renewables in the energy mix.[83] This increase is consistent

72. IEA-2050 Report, *supra* note 7, at 47–49.
73. *Id.* at 3.
74. *Id.* at 64.
75. *Id.* at 68.
76. *Id.* at 70, 73.
77. *Id.* at 73.
78. *Id.*
79. *Id.* at 79.
80. *Id.* at 117.
81. *Id.* at 101.
82. EU Proposal, *supra* note 14 ("All 27 EU member states . . . pledged to reduce emissions by at least 55% by 2030, compared to 1990 levels.").
83. *Id.*; *Overall Share of Energy from Renewable Sources*, EUROSTAT (Jan. 15, 2021), https://ec.europa.eu/eurostat/statistics-explained/index.php?title=file:Share_of_energy_from_renewable_sources_2019_data,15Jan2021.JPG [https://perma.cc/MZ75-DLEY].

with IEA recommendations.[84] Similarly, the European Commission's proposal "to increase energy efficiency targets at [the] EU level and make them binding" is consistent with IEA recommendations.[85] The same is true in broad outlines for the remainder of the policy proposals.

As audacious as the plan is, it runs into problems precisely when it comes to the knock-on effects of energy transition policies. This is problematic, given the IEA's own goal remains that "clean energy transitions must be fair and inclusive, leaving nobody behind."[86] For example, the IEA report acknowledges that "[t]he decline in fossil fuel use and prices results in a fall in GDP in the producer economies, where revenues from oil and gas sales often cover a large share of public spending on education, health care[,] and other public services."[87] The IEA does not account for this problem in its transition policy plan outright. Rather, it notes that "[s]tructural reforms would be needed to address the societal challenges."[88] Such advice risks leaving Congo and similarly situated countries behind—something that the IEA, after all, had hoped to avoid. The IEA reasons that "[n]onetheless, impacts are likely to be lower than assessments of the cost of climate change damages."[89] While true, this does not address how we should distribute the impacts of energy transition. Nor could it have done so in light of its modeling approach—such questions were beyond the model's reach.[90]

The plan also creates challenges for postindustrial economies like the Europoean Union and the United States. From a climate perspective, the IEA report sensibly discourages leisure and business flights.[91] The EU

84. *Compare* IEA-2050 Report, *supra* note 7, at 14, *with* Andreas Franke, *EU To Lift 2030 Renewable Energy Share Target to 38-40% from 32%: Leaked Document*, S&P GLOB. (May 5, 2021), https://www.spglobal.com/platts/en/market-insights/latest-news/electric-power/050521-eu-to-lift-2030-renewable-energy-share-target-to-38-40-from-32-leaked-document [https://perma.cc/LDK8-P362] ("EU wind energy capacity would need to be 433-452 GW by 2030 . . . ."), *and Wind Energy in Europe 2020: Statistics and the Outlook for 2021-2025*, WINDEUROPE (Feb. 25, 2021), https://windeurope.org/intelligence-platform/product/wind-energy-in-europe-in-2020-trends-and-statistics [https://perma.cc/QUN5-UXL8] ("Europe installed 14.7 GW (10.5 GW in the EU-27) of new wind capacity in 2020."). To reach 433 GW in a decade is slightly more than four times the 2020 number for the EU-27.

85. *Compare* EU Proposal, *supra* note 14, *with* IEA-2050 Report, *supra* note 7, at 14 ("A major worldwide push to increase energy efficiency is an essential part of these efforts, resulting in the annual rate of energy intensity improvements averaging 4% to 2030 . . . ."), *and Energy Intensity in Europe*, EUR. ENV'T AGENCY (Feb. 9, 2021), https://www.eea.europa.eu/data-and-maps/indicators/total-primary-energy-intensity-4/assessment-1 [https://perma.cc/3B6E-7H3L] (noting energy intensity improved in the EU at an average of 1.7% per year from 1990 to 2017). Notably, the EU is not homogenous in its energy intensity with new members having significantly higher energy intensity. EUR. ENV'T AGENCY, EN17 TOTAL ENERGY INTENSITY 1–2, https://www.eea.europa.eu/data-and-maps/indicators/en17-total-energy-intensity/en17-total-energy-intensity [https://perma.cc/Y9ZA-U86B].

86. IEA-2050 Report, *supra* note 7, at 4.

87. *Id.* at 156.

88. *Id.* at 157.

89. *Id.*

90. *See id.* at 48–49.

91. *Id.* at 85.

has recently proposed plans to implement this goal.[92] Such policies would likely lead to sizable hospitality worker layoffs and impact tourism-dependent regions like Central Florida or the Spanish Balearic Islands (Mallorca).[93] Energy transition policies will have to grapple with the job losses of hospitality workers who would have the wrong skillset for a post-energy transition economy.[94]

Just as problematically, increased growth in cyber economy and remote work also faces limitations. Net zero policies like the IEA's are premised on reducing global electricity generating capacity by 7% between 2020 and 2030 in order to move fossil-fuel-burning power plants offline quickly.[95] The IEA projects that, in the long run, such a reduction in generating capacity can leave room for economic growth "because of a fall in energy intensity (the amount of energy used to generate a unit of GDP)."[96] But the problem is one of timing as some "new" technologies like Bitcoin and Zoom are comparatively energy intensive.[97] Depending on how energy transition policies are planned and implemented, an early loss of generating capacity could topple the development of technologies and industries needed to employ workers in traditional sectors like hospitality. Further, the policies could also undermine our efforts to adapt to climate change itself.[98]

Where does this leave us? The IEA report proposes a radical approach to reach net zero greenhouse gas emissions by 2050. It does so for the laudable purpose of combatting climate change. But the initial question is incomplete. The report did not attempt to design the best energy transition policies, all things considered. It was asked the more technical economic modeling question of whether, in principle, a net zero 2050 plan was even possible.[99] As energy transition itself must be equitable and sustainable, we need to ask which policies are prudent rather than technically and economically feasible.

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92. EU Proposal, *supra* note 14.

93. *See* Ryan Gillespie & Adelaide Chen, *Central Florida Economy Stuck in Plateau as Hotels Remain Mostly Empty, I-4 Traffic Stays Light*, ORLANDO SENTINEL (Aug. 28, 2020, 11:51 AM), https://www.orlandosentinel.com/coronavirus/os-ne-coronavirus-progress-orange-20200828-sj36lz4honglhox2udtnmdrpmy-story.html [https://perma.cc/V4FS-97QB]; *Over 30% of Balearic Jobs Are in the Tourist Industry*, MAJORCA DAILY BULL. (Oct. 31, 2015), https://www.majorcadailybulletin.com/news/local/2015/10/31/42146/over-balearic-jobs-are-the-tourist-industry.html [https://perma.cc/FP4K-ZUVG].

94. *See Walt Disney World Statistics*, MAGIC GUIDES, https://magicguides.com/disney-world-statistics [https://perma.cc/7HXA-NTNU] (listing costume designers and horticulturalists among the park's 70,000 "Cast Members").

95. *See* IEA-2050 Report, *supra* note 7, at 56.

96. *Id.*

97. Carter, *supra* note 64; Peter Suciu, *Do We Need To Worry That Zoom Calls Use Too Much Energy?*, FORBES (Apr. 16 2021, 11:57 AM), https://www.forbes.com/sites/petersuciu/2021/04/16/do-we-need-to-worry-that-zoom-calls-use-too-much-energy/?sh=5295883564c2 [https://perma.cc/33U5-K4WZ].

98. For example, "[r]emoving barriers to international trade in labor, capital, and goods facilitates climate adaptation." MATTHEW E. KAHN, ADAPTING TO CLIMATE CHANGE: MARKETS AND THE MANAGEMENT OF AN UNCERTAIN FUTURE 223 (2021). But this also imposes "brain drain" on smaller and developing nations. *Id.* at 228.

99. *See* IEA-2050 Report, *supra* note 7, at 3.

If implemented, the IEA's approach poses risks. A historical analogy may be helpful. Following the dissolution of the Soviet Union, economists were asked to assist the newly freed states in devising policies to transition into free market economies.[100] Some influential economists advocated for "shock therapy" to transform their economies as quickly as possible.[101] Shock therapy ran into two related problems. First, it brought multiple economies to near collapse.[102] Then, just as importantly, societies rejected shock therapy in favor of gradualist governments.[103] Not only that, the gradualist governments stepping into the vacuum allowed authoritarian leaders to seize power.[104] As good intentions go, these went awry.

One might rightfully object that this critique of shock therapy relies on anecdotal evidence—the fact that shock therapy did not work in some instances should not mean that it could never work. Therefore, the criticism of energy transition shock therapy must go deeper.

A key problem with shock therapy is that its method risks imposing severe and unmitigated losses, even if it is successful when judged by its own terms. Historical failures of past shock therapies warn that losses can exceed projections.[105] But even successful shock therapy risks leaving significant losses where they fall. Therefore, shock therapy is problematic even if we believe past mistakes can be avoided in the energy transition context.

The reason for this problem is the IEA's methodological approach. The IEA's approach to shock therapy seems to fall into the Kaldor-Hicks efficiency trap.[106] The Kaldor-Hicks standard considers new policies to be efficient (and acceptable) to the extent that it is theoretically possible to

100. For a contemporary report, see Peter Passell, *Dr. Jeffrey Sachs, Shock Therapist*, N.Y. TIMES (June 27, 1993), https://www.nytimes.com/1993/06/27/magazine/dr-jeffrey-sachs-shock-therapist.html [https://perma.cc/3R58-B278].

101. Jeffrey Sachs, *Shock Therapy in Poland: Perspectives of Five Years*, THE TANNER LECTURES ON HUM. VALUES 267, 267–68 (April 6 & 7, 1994), https://tannerlectures.utah.edu/_resources/documents/a-to-z/s/sachs95.pdf [https://perma.cc/7H3U-5YN9].

102. *See* Barbara Crossette, *A Focus on Those Displaced by the Fall of the Soviet Union*, N.Y. TIMES (May 26, 1996), https://www.nytimes.com/1996/05/26/world/a-focus-on-those-displaced-by-the-fall-of-the-soviet-union.html [https://perma.cc/N3HB-53MX]. For a country study, see Enkhbayar Shagdar, *Neo-Liberal "Shock Therapy" Policy During the Mongolian Economic Transition*, ECON. RSCH. INST. NORTHEAST ASIA 1, 1–2 (April 2007), https://www.erina.or.jp/en/wp-content/uploads/2018/05/DP0703e.pdf [https://perma.cc/5VFS-UEXN]. Mongolia suffered severe economic consequences even if it did not suffer the kind of displacement from civil war that touched parts of the former Soviet Union. *Id.* On the rise of President Lukashenka, see Anders Åslund, *Europe's Last Dictator: The Rise and (Possible) Fall of Alyaksandr Lukashenka*, ATL. COUNCIL (Aug. 9, 2020), https://www.atlanticcouncil.org/blogs/ukrainealert/europes-last-dictator-the-rise-and-possible-fall-of-alexander-lukashenko [https://perma.cc/D6NQ-ENZ7].

103. John Marangos, *Was Shock Therapy Consistent with Democracy?*, 62 REV. SOC. ECON. 221, 222 (2004).

104. *See* Åslund, *supra* note 102. For a broader discussion of economic shock therapy as a particularly pernicious approach in other parts of the world such as Chile, see APPELBAUM, *supra* note 18, at 261–62.

105. *See supra* notes 101–104.

106. For a simple introduction to Kaldor-Hicks, see APPELBAUM, *supra* note 18, at 189.

offset new policies' losses by redistributing larger social gains to the losers.[107] As noted above,[108] the IEA justifies the prospect of severe impacts from energy transition policies because "impacts are likely to be lower than assessments of the cost of climate change damages."[109] Further, "the surge in private and government spending on clean energy technologies . . . creates a large number of jobs and stimulates economic output in the engineering, manufacturing[,] and construction industries[, resulting] in annual GDP growth."[110] Incurring the losses would thus appear efficient—we are limiting losses and offsetting these limited losses with greater gains elsewhere.

Centrally, the IEA's approach also appears to endorse the second and deeply controversial part of the Kaldor-Hicks standard. This standard does "not care whether everybody *was* left unharmed" and instead considers it "sufficient . . . that everybody *could* be left unharmed."[111] The IEA approach simply notes that structural reforms will be necessary "to address the societal challenges" caused by energy transition policies themselves[112] but leaves the problem unsolved. In other words, the IEA's approach to shock therapy does *not* internalize these structural reforms in its policy design. Instead, it is satisfied that its approach will be a success if such structural reforms remain possible in the future.[113]

Putting the full picture together, we can now see that even successful shock therapy guided by a political economy approach is content to risk breaking things first in the hope they might be fixed later. The approach is keenly aware of and, in fact, projects serious developmental losses as a result of the shock therapy it recommends.[114] The political economy approach does not include a correction for these anticipated losses in its definition of successful shock therapy. Assuming successful shock therapy therefore guarantees severe losses without any mechanism to secure that these losses will ever be corrected. As Binyamin Appelbaum notes, "[a]s with so much in economics, it ignores the question of distribution. It is a theory to gladden the hearts of winners; it is less clear that losers will be comforted" by the trade-offs they receive.[115]

This is not to say that we should not undertake reforms when doing so is urgent. Rather, the key lesson from shock therapy is that top-down expert advice has limited success when experts counsel radical change.[116] As the IEA report acknowledges, "[t]he wholescale transformation of the

107. For a more nuanced discussion, see David Singh Grewal & Jedediah Purdy, *Inequality Rediscovered*, 18 THEORETICAL INQUIRIES IN L. 61, 82 (2017).
108. *Supra* note 89 and accompanying text.
109. IEA-2050 Report, *supra* note 7, at 157.
110. *Id.* at 156.
111. APPELBAUM, *supra* note 18, at 189.
112. IEA-2050 Report, *supra* note 7, at 157.
113. *See id.*
114. *See id.*
115. APPELBAUM, *supra* note 18, at 189.
116. *See* William Boyd, *The Poverty of Theory: Public Problems, Instrument Choice, and the Climate Emergency*, 46 COLUM. J. ENV'T. L. 399, 472 (2021).

energy sector demonstrated in the [net zero pathway] cannot be achieved without the active and willing participation of citizens."[117] Such social acceptance, in turn, requires significant early engagement with affected communities on a local and global level.[118] This engagement must embed plans for an equitable distribution of the relative environmental, economic, social, and cultural burdens in energy transition policies and projects.[119] On the global level, any such distribution must not leave behind entire states or societies.[120] On the local level, it must secure a fair and sustainable path for all members of society to advance.[121] On the project level, it must protect the rights of the communities that abut project sites from pollution and provide them with a say regarding project design and implementation.[122] Policymakers and energy stakeholders must be mindful that energy transition is not just about achieving net zero emissions but about an energy infrastructure that supports equitable and sustainable development across world society.[123] The IEA report highlights areas of concern to achieve an equitable energy transition.[124] But it does not answer how transition policies should be formulated to fulfill this larger energy transition (nor was the IEA tasked with answering this question).[125]

For the remainder of this Article, I will argue that lawyers have a critical role to play in formulating equitable and sustainable energy transition policies. Lawyers are uniquely positioned to help in such a task because the law habitually balances incommensurable rights.[126] The many competing policy demands for energy transition precisely mean that prudent decision-making should look to the law to manage the decision-making process and avoid unanticipated consequences that place the entire energy transition enterprise in jeopardy. As I will argue in the remainder of this Article, there is a legal concept that can answer this problem. That concept is due diligence. I argue that the current focus on net zero driving the IEA-2050 Report should be expanded: we need to map a diligent zero pathway anchored in legal decision-making processes. It is only such a diligent zero pathway that can meet the ambition of securing a just transi-

117. IEA-2050 Report, *supra* note 7, at 67.

118. *See* GRALF-PETER CALLIESS & PEER ZUMBANSEN, ROUGH CONSENSUS AND RUNNING CODE: A THEORY OF TRANSNATIONAL PRIVATE LAW 244 (2010).

119. *See id.*

120. *See* Frédéric Gilles Sourgens, *A Parisian Consensus*, 60 COLUM. J. TRANSNAT'L L. 657, *passim* (2022) [hereinafter Sourgens Consensus].

121. *See id.*

122. *See* AENDERSON, WEAVER, DZIENKOWSKI, LOWE, HALL & SOURGENS, *supra* note 33, at 693–96.

123. *See* Sourgens Consensus, *supra* note 120, at 666.

124. *See* IEA-2050 Report, *supra* note 7, at 156–57 (noting the policy challenges for oil and gas producing states).

125. *See id.* at 3 (setting out the charge for the report).

126. *See* PHILIP PETTIT, REPUBLICANISM: A THEORY OF FREEDOM AND GOVERNMENT 92–93 (1997).

tion to net zero agreed to in the Glasgow Climate Pact.[127]

III. THE ENERGY DUE DILIGENCE FRAMEWORK

Diligence is part and parcel of care.[128] Care, in turn, is a question of judgment.[129] Such judgment is at the heart of responsible decision-making.[130] The minimum standards of responsible decision-making—judgment and care—are not just concerns of prudent business administration or sound public policy.[131] Diligence is a legal concept imposing obligations on private and public decision-makers alike.[132] Unsurprisingly, due diligence is a central part of legal regimes' governance of energy transition.

First, due diligence is a requirement of environmental law.[133] It has also become an essential element of the global climate regime.[134] Both are central to policymaking, including federal policymaking pursuant to NEPA.[135]

Second, due diligence is a central component of international human rights obligations. Such diligence obligations are frequently associated with so-called second- and third-generation human rights—positive rights such as the "right to water."[136] But states also have diligence obligations

127. Convention on Climate Change, Glasgow Climate Pact, ¶¶ 17, 20, 52, *published* Nov. 13, 2021, (advance unedited version), https://unfccc.int/sites/default/files/resource/cop26_auv_2f_cover_decision.pdf.

128. *See* Eisenberg, *supra* note 23, at 17; Tamar Meshel, *Swimming Against the Current: Revisiting the Principles of International Water Law in the Resolution of Fresh Water Disputes*, 61 HARV. INT'L L.J. 136, 163–64 (2020).

129. *See* Eisenberg, *supra* note 23, at 17 (discussing business judgment).

130. *See generally* Cristie Ford, *New Governance in the Teeth of Human Frailty: Lessons from Financial Regulation*, WIS. L. REV. 101, 142 (2010) (discussing new banking governance premised on designing for reliability); Anne Peters, Heike Krieger & Leonhard Kreuzer, *Due Diligence: The Risky Risk Management Tool in International Law*, 9 CAMBRIDGE INT'L L.J. 121, 122 (2020) (defining due diligence as the opposite of negligence).

131. Sir Andrew Likierman, *The Elements of Good Judgment*, HARV. BUS. REV. (Jan.–Feb. 2020), https://hbr.org/2020/01/the-elements-of-good-judgment [https://perma.cc/3PJR-AE6W]; Kevan W. Lamm, Nekeisha L. Randall, Alexa J. Lamm & Hannah S. Carter, *Policy Leadership: A Theory-Based Model*, 2019 J. LEADERSHIP EDUC. 185–86 (2019); Peters, Krieger & Kreuzer, *supra* note 130, at 122–23.

132. *See* Eisenberg, *supra* note 23, at 17; Danny Cullenward, *The Limits of Administrative Law as Regulatory Oversight in Linked Carbon Markets*, 33 UCLA J. ENV'T. L. & POL'Y 1, 7 (2015) ("administrative law places the burden of due diligence on agencies.").

133. *See* Michael Burger, Jessica Wentz & Radley Horton, *The Law and Science of Climate Change Attribution*, 45 COLUM. J. ENV'T. L. 57, 145–46 (2020); *see also* Robert V. Percival, *The EPA as a Catalyst for the Development of Global Environmental Law*, 70 CASE W. RSRV. L. REV. 1151, 1190 (2020) (discussing how EPA practices have attained a global reach through training programs); SANDS & PEEL, *supra* note 21, at 211–13.

134. BODANSKY, BRUNNÉE & RAJAMANI, *supra* note 21, at 41–48; Jutta Brunnée, *International Environmental Law and Climate Change: Reflections on Structural Challenges in a "Kaleidoscopic" World*, 33 GEO. ENV'T. L. REV. 113, 120–22 (2020).

135. Exec. Order, *supra* note 45, §1.

136. "[T]raditional categorization of three generations of human rights . . . traces the chronological evolution of human rights as an echo to the cry of the French revolution: Liberté (freedoms, 'civil and political' or 'first generation' rights), Egalité (equality, 'socio-economic' or 'second generation' rights), and Fraternité (solidarity, 'collective' or 'third generation' rights)." Frans Viljoen, *International Human Rights: A Short History*, UNITED NATIONS CHRON. https://www.un.org/en/chronicle/article/international-human-rights-law-

in the context of so-called first-generation human rights—negative rights such as the right not to be deprived of life or liberty without due process of law.[137] The EU is currently moving to require companies to conduct human rights related assessments as part of legal corporate compliance regimes.[138]

Finally, due diligence is a central component of environmental, social, and corporate governance (ESG) in the business context.[139] Such governance programs internalize environmental and human rights performance as a measure of success in investment decisions.[140] Then, these investment decisions are measured against ESG benchmarks.[141] Due diligence is a central part of companies' ESG programs, for example, in the transportation and energy industries.[142] These diligence standards internalize diligent judgment even when that judgment may not be required by specific legislation.[143] This form of governance relies heavily on self-regulation to implement environmental and human rights values in corporate decision-making.[144]

The key difficulty is that energy transition requires states and energy companies to conduct holistic diligence as opposed to disjointed or fragmented diligence.[145] As we will see, the various diligence regimes inform-

short-history [https://perma.cc/8KW4-6NBX]. *See also* Rebecca Bates, *Realizing the Right to Water Within Environmental Limits*, 23 U. DENV. WATER L. REV. 17, 22 (2019) ("[T]he recognition of the right to water provides a platform for aspirational and legal advocacy to address water stress and poverty at both international and domestic levels.").

137. *See* Viljoen, *supra* note 136; John H. Knox, *Horizontal Human Rights Law*, 102 AM. J. INT'L L. 1, 23 (2008).

138. *See* Resolution on Corporate Due Diligence and Corporate Accountability, EUR. PARL. DOC. PV(22) (2021), https://www.europarl.europa.eu/doceo/document/TA-9-2021-0073_EN.html [https://perma.cc/9AW4-FGKY]. For a discussion, see Dionysia Katelouzou & Peer Zumbansen, *The Transnationalization of Corporate Governance; Law, Institutional Arrangements, & Corporate Power*, 38 ARIZ. J. INT'L & COMP. L. 1, 52 (2021); Jonathan Bonnitcha & Robert McCorquodale, *The Concept of 'Due Diligence' in the UN Guiding Principles on Business and Human Rights*, 28 EUR. J. INT'L L. 899, 906 (2017).

139. Amy K. Lehr, *Fiduciary Duties for a Globalized World: Stakeholder Theory Reconceived*, 27 GEO. MASON L. REV. 81, 138 (2019).

140. *See* Robert G. Eccles & Svetlana Klimenko, *The Investor Revolution*, HARV. BUS. REV. (May–June 2019), https://hbr.org/2019/05/the-investor-revolution [https://perma.cc/442P-Q8EZ] (discussing investment decisions through an ESG lens).

141. Suzanne Kröner-Rosmalen, *ESG: The Transition to ESG Benchmarks and New ESG Disclosure Requirements*, LEXOLOGY (Dec. 16, 2020), https://www.lexology.com/library/detail.aspx?g=BB885ae3-cbd6-444a-a919-372c35b76601 [https://perma.cc/2YXN-59V9] (discussing EU ESG benchmarking efforts).

142. DAIMLER, BRIEF OVERVIEW—SUSTAINABILITY REPORT 25 (2020), https://www.daimler.com/documents/investors/presentations/daimler-ir-briefoverviewsustainabilityreport2020.pdf [https://perma.cc/9DDF-LYMC]; *Slavery and Human Trafficking Statement*, OIL & GAS CLIMATE INITIATIVE (2021), https://www.ogci.com/modern-slavery-policy [https://perma.cc/UF88-YBQW].

143. *See* Lehr, *supra* note 139, at 138.

144. Stavros Gadinis & Amelia Miazad, *Corporate Law and Social Risk*, 73 VAND. L. REV. 1401, 1439 (2020) (discussing ESG in the tech sector and noting, "In contrast with Facebook's casual apathy on privacy, ESG proposes voluntary self-regulation, developed through ongoing engagement with stakeholders, including regulators and other government authorities").

145. *See* W. MICHAEL REISMAN, THE QUEST FOR WORLD ORDER AND HUMAN DIGNITY IN THE TWENTY-FIRST CENTURY 185 (2012) (noting the importance of holistic, multi-

ing energy transition point in facially inconsistent directions—care for human rights, environmental protection, and corporate governance, among others.[146] If decisions must satisfy each diligence obligation independently, it may well be that regulators and businesses simply cannot make any decisions; what is diligent in one regime is not acceptable in another.[147]

The *New York Times* recently reported on such a dilemma for U.S. offshore wind development, which runs headlong into the Jones Act.[148] "The Jones Act's primary purpose is to regulate trade, meaning the transport of goods or people between two points in the United States."[149] The problem is that

> [t]he United States currently does not have a vessel that can construct turbines in transitional and deep waters, nor does the United States have a ship that can both transport the materials and perform the construction. There are foreign ships with these capabilities, but U.S. cabotage laws prevent these ships from taking domestic supplies from a U.S. port to a construction site in U.S. waters.[150]

As the *New York Times* notes, "[t]he United States could push through more projects if it was willing to repeal the Jones Act's protections for domestic shipbuilding, for example, but that would undercut the president's employment promises."[151] Even the most basic diligence by an energy company wishing to expand offshore wind will uncover this Jones Act problem. Short of incurring the significant expense of building or obtaining a U.S. vessel capable of transport and construction, climate action through this avenue is not possible.[152] So how should the United States respond to comply with its international climate obligations? Legitimate policy imperatives point in inconsistent directions and thus lead to inaction.[153] We will run into such Jones Act-style problems again in the next section.

Inaction is unacceptable. The climate threat is too urgent to ignore.[154] But this urgency cannot push other legal regimes to the side and claim the

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method assessment to avoid unintended consequences); Lin, *supra* note 22, at 56 (highlighting the need for qualitative rather than exclusively quantitative decision-making).

146. On this inconsistency, see Sourgens Consensus, *supra* note 120, at 659–62.

147. For a discussion about this problem, see Frédéric Gilles Sourgens, *The Precaution Presumption*, 31 EUR. J. INT'L L. 1277, 1278–79 (2020) [hereinafter Sourgens Precaution Presumption]. This problem is not fully addressed in holistic climate diligence because that approach assumes complementarity rather than tension between human rights, climate, and environmental law outcomes. Macchi, *supra* note 26, at 108–09.

148. Ivan Penn, *Offshore Wind Farms Show What Biden's Climate Plan Is Up Against*, N.Y. TIMES (June 7, 2021), https://www.nytimes.com/2021/06/07/business/energy-environment/offshore-wind-biden-climate-change.html?action=click&module=top%20Stories&pgtype=homepage [https://perma.cc/52B3-HHRR].

149. Nicolas Martino, *Offshore Wind Energy: Sophisticated Technology Struggling with Outdated Legislation*, 58 JURIMETRICS 59, 75 (2017).

150. *Id.* at 76 (internal citation omitted).

151. Penn, *supra* note 148.

152. *See id.*

153. *See, e.g.*, *id.*

154. *See* IPCC 1.5°C, *supra* note 1, at 32–33, 79.

wholesale supremacy of climate concerns over other legally relevant standards.[155] We need to identify a different way of making judgment calls and balance diverging rights against each other in decision-making. Therefore, energy transition diligence only works if the different diligence streams can be combined into a single decision-making matrix.[156]

I will argue in this Part that this is doable. As a start, each of these diligence regimes conceive of diligence in fundamentally the same way. Due diligence in each of these settings refers to an obligation of conduct and not an obligation of result.[157] That is to say, due diligence is a question of *how* decisions are made.[158] It is not a question of *what* decisions are made.[159] As I will discuss in the next section, this means that we can arrive at fundamentally different and inconsistent results diligently. Not everyone needs to reach the same conclusion. But diligence means that everybody has to approach decision-making in a similar way.

We can usefully break this diligence framework into three steps: (1) there must be an investigation on the basis of which a decision-maker can project potential outcomes from a proposed policy, investment, or venture;[160] (2) these projections then reveal risks that must be addressed through planning by means of a risk mitigation plan;[161] (3) such planning must also have built in, data-based monitoring to assess the performance of the policy, investment, or venture and adapt it as needed—mere planning is not enough.[162] Diligence in the energy transition context must combine different regimes into a single diligence decision-making framework. As I will argue, it must assess and reconcile climate risks with environmental and human rights risks.

Importantly, this approach means that there is significant room for policy disagreement and experimentation as energy transition gets underway. As different energy transition approaches mature, there should be a convergence as they generate data. These data points will become inte-

155. *See* Diane Desierto, *Calibrating Human Rights and Necessity in a Global Public Health Emergency: Revive the UN OHCHR's ICESCR Compliance Criteria*, EJIL: TALK! (Mar. 26, 2020) [hereinafter Desierto Human Rights], https://www.ejiltalk.org/calibrating-human-rights-and-necessity-in-a-global-public-health-emergency-revive-the-un-ohchrs-icescr-compliance-criteria [https://perma.cc/MCR2-Z3YQ].

156. *See* Calvert Cliffs' Coordinating Comm., Inc. v. U.S. Atomic Energy Comm'n, 449 F.2d 1109, 1114 (D.C. Cir. 1971).

157. Knox, *supra* note 137, at 23; Alan Boyle, *Introductory Remarks*, 105 AM. SOC'Y INT'L L. PROC. 423, 424 (2011); Vladyslav Lanovoy, *The Use of Force by Non-State Actors and the Limits of Attribution of Conduct*, 28 EUR. J. INT'L L. 563, 565 (2017). There is some disagreement whether due diligence should not be characterized as an obligation of result. *See* Elisa Ruozzi, *The Obligation To Undertake an Environmental Assessment in the Jurisprudence of the ICJ: A Principle in Search of Autonomy*, 8 EUR. J. RISK REGUL. 158, 164–65 (2017). This suggestion does go against the weight of authority. *See* Craig Martin, *Atmospheric Intervention? The Climate Change Crisis and the* Jus Ad Bellum *Regime*, 45 COLUM. J. ENV'T. L. 331, 357 (2020).

158. Lanovoy, *supra* note 157, at 565.

159. *Id.*

160. *See infra* Section III.A.

161. *See infra* Section III.B.

162. *See infra* Section III.C.

gral to the assessment of the relative success of different programs. These assessments themselves feed back into diligent energy transition management in the third step of diligence. Diligence is not just a means to exercise judgment. It is also how other stakeholders in energy transition communicate about the exercise of judgment and strengthen energy transition partnerships from the bottom up as energy transition is ongoing instead of requiring *ex ante* global agreement on the best transition pathway.

This approach also implies a trade-off. Diligence takes time. And diligence obligations invite litigation over whether diligence was conducted properly or at all.[163] Now, as time is of the essence, it would be odd to introduce a focus on diligence obligations that could further slow progress. As we will see in the Parts that follow, this is a valid concern. Yet, as we will also see, it is a challenge that is more likely to arise if we look at diligence as a checklist item only—something to put behind ourselves as quickly as possible. In those instances, we will see that diligence gives rise to significant delays. However, this is not the case to the extent that diligence is conducted in a truly communicative manner that involves stakeholders as true partners from the earliest point onward. This communicative aspect of diligence is the key principle that can secure its success and the speedy implementation of energy transition policies more broadly.

A. Diligent Investigations & Risk Assessment

Diligence must collect data and project risks.[164] Holistic diligence must do so across different traditional diligence regimes.[165] This Section outlines that holistic energy transition diligence must begin with diligence classically associated with energy transition planning—a risk assessment of climate change and available technology. Holistic diligence also must provide a risk analysis of the environmental and human rights impacts of energy transition policies and projects. Finally, holistic diligence must assess the environmental and human rights risks of the supply chains supporting energy systems. The second and third steps, in particular, will require early, transparent, and meaningful engagement of local communities to collect appropriate data and anticipate risks that will determine the practical viability of energy transition policies.

First, energy transition diligence must rely upon and internalize climate

163. *See* Melody Schreiber, *How One Inuit Community Won Against Big Oil*, New Republic (Oct. 9, 2018), https://newrepublic.com/article/151559/one-inuit-community-won-big-oil [https://perma.cc/Z6RV-PCE4] (detailing a legal battle between Native Inuits and the Canadian government over rights to Arctic waters).

164. *See* National Environmental Policy Act of 1969, 42 U.S.C. § 4332(C); Balt. Gas & Elec. Co. v. Nat. Res. Def. Council, Inc., 462 U.S. 87, 97 (1983); Corfu Channel (U.K. v. Alb.), Judgment, 1949 I.C.J. 4, 20 (Apr. 9).

165. *See* Strycker's Bay Neighborhood Council, Inc. v. Karlen, 444 U.S. 223, 227 (1980) (noting different legitimate concerns alongside environmental impact for administrative action).

research to assess the climate impact of global energy systems.[166] The work of the Intergovernmental Panel on Climate Change (IPCC) provides an authoritative factual basis and forward-looking risk assessments for such diligence efforts.[167] Just as intuitively, energy transition diligence also must investigate and assess risks related to the global energy systems.[168] We need to know what current energy systems look like and what their economic impact is.[169] Finally, to guide energy transition, we need to understand what alternative energy systems are available to replace greenhouse-gas-intensive generating capacity.[170]

Second, as we discussed in the previous Part, energy systems have significant knock-on effects on everything we do.[171] The risks of transitioning to different energy systems are relevant to charting an appropriate energy policy. To conduct this diligence, we will need a baseline. This baseline looks to the human rights impact and environmental impact of existing energy systems and of energy transition policies, projects, and investments. Such investigations must gather information on, and project future human rights impacts of, climate change itself.[172] Again, the IPCC has done significant research in this regard.[173]

Energy transition policies and projects themselves will have a human-rights impact. At a minimum, oil producing states such as Congo will be deprived of the resources to provide basic services to their populations.[174] This deprivation negatively affects the realization of the economic, social, and cultural rights of those populations.[175] Similarly, energy transition policies may affect the economic capabilities of industrializing states and thus negatively affect the realization of rights by people in those states, as well.[176] Finally, some groups within industrial and postindustrial societies are also more vulnerable to climate policies.[177]

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166. *See* IEA-2050 Report, *supra* note 7, at 30–46.

167. IPCC 1.5°C, *supra* note 1, at 4.

168. *See* IEA-2050 Report, *supra* note 7, at 37–40, 64–84.

169. *See id.* at 37–40, 155–59.

170. *See id.* at 64–80.

171. For an insightful case study on the impacts of Russian energy value chains on different economies, see MARGARITA M. BALMACEDA, RUSSIAN ENERGY CHAINS: THE REMAKING OF TECHNOPOLITICS FROM SIBERIA TO UKRAINE TO THE EUROPEAN UNION (2021). Balmaceda follows the raw materials for Russian fossil fuel value chain from source to consumer through the entire value chain (refining, transport, sale, use, etc.). *Id. passim*. It is this Article's proposition that such a study is essential also in the context of renewables and in the context of comparing renewables to fossil fuels and nuclear energy.

172. Office of the High Commissioner on Human Rights, Joint Statement of the United Nations Special Procedures Mandate Holders on the Occasion of the 24th Conference of the Parties to the UNFCCC (Dec. 6, 2018), https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=23982&LangID=E [https://perma.cc/CV9Q-CDBE]. For further discussion, see Kristin Casper, *Climate Justice: Holding Governments and Business Accountable for the Climate Crisis*, 113 AM. SOC'Y INT'L L. PROC. 197, 198 (2019).

173. *See* IPCC 1.5°C, *supra* note 1, at 445–509.

174. *See* Congo-NDC, *supra* note 5, at 3.

175. *See id.*

176. Sourgens Consensus, *supra* note 120, at 17–18.

177. *See, e.g.*, Josh Saul, *Lower-Paying Labor Awaits Oil and Gas Crews in the Green Energy Transition*, BLOOMBERG (Mar. 4, 2021), https://www.worldoil.com/news/2021/3/4/lower-paying-labor-awaits-oil-and-gas-crews-in-the-green-energy-transition [https://

These impairments are nontrivial. Human rights centrally include the right to development.[178] This right to development is crucially linked to the right to electricity—the right to energy[179]—and it includes the right to a livable environment.[180] Energy is a central part of economic development on both ends.[181] To limit access to electricity and energy, or to impair the right to health and life, is deeply problematic.[182] So is the stranding of entire societies whose economies were built around existing energy systems.[183] These impacts have to be measured to the extent possible to construct a reasonably accurate model of the consequences of energy transition policies.

Energy transition policies and projects will ultimately have an environmental impact. These impacts include the risk to wildlife from renewable energy installations: wind farms and solar arrays.[184] They also include the environmental risk from nuclear power plants as well as modular nuclear plants.[185] Finally, they include the environmental impacts of carbon capture and other forms of geoengineering such as solar radiation management.[186] Policymakers have a diligence obligation to take action to prevent transboundary harm.[187] Policymakers and energy companies also have such an obligation domestically.[188] These impacts and risks will need

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perma.cc/DFS9-GHGB] (discussing energy workers); Mathilde Martin & Mine Islar, *The 'End of The World' vs. The 'End of The Month': Understanding Social Resistance to Sustainability Transition Agendas, A Lesson from the Yellow Vests in France*, 16 SUSTAINABILITY SCI. 601, 601 (2021) (discussing farmers).

178. Bachelet, *supra* note 37.

179. *See* Lars Löfquist, *Is There a Universal Human Right to Electricity?*, 24 INT'L J. HUM. RTS. 711, 711 (2020); Stephen R. Tully, *The Contribution of Human Rights to Universal Energy Access*, 4 NW. J. INT'L HUM. RTS. 518, 518–31 (2006).

180. HR 20 december 2019, NJ 2020, 41 m.nt. J. Spier (De Staat der Nederlanden/ Stichting Urgenda) (Neth.) [hereinafter Urgenda].

181. For a full discussion, see Sourgens Consensus, *supra* note 120, *passim*.

182. For the problem of energy justice, see Kirsten Jenkins, Darren McCauley, Raphael Heffron, Hannes Stephan & Robert Rehner, *Energy Justice: A Conceptual Review*, 11 ENERGY RSCH. & SOC. SCI. 174, 175 (2016).

183. *See id.* at 176.

184. *See* Daniel Oberhaus, *Why Do Solar Farms Kill Birds? Call in the AI Bird Watcher*, WIRED (Aug. 10, 2020, 8:00 AM), https://www.wired.com/story/why-do-solar-farms-kill-birds-call-in-the-ai-bird-watcher/?redirectURL[H]ttps%3A%2F%2Fwww.wired.com%2Fstory%2Fwhy-do-solar-farms-kill-birds-call-in-the-ai-bird-watcher%2F [https://perma.cc/3PAK-NVRV]; John Copeland Nagle, *Green Harms of Green Projects*, 27 NOTRE DAME J.L. ETHICS & PUB. POL'Y 59, 62, 66 (2013) (discussing wind and solar energy posing biodiversity threats).

185. *See* Daniel Michaels, *Mini Nuclear Reactors Offer Promise Of Cheaper, Clean Power*, WALL ST. J. (Feb. 11, 2021), https://www.wsj.com/articles/mini-nuclear-reactors-offer-promise-of-cheaper-clean-power-11613055608 [https://perma.cc/EWK5-MNKF] (discussing modular nuclear technology); Katherine Trisolini, *Holistic Climate Change Governance: Towards Mitigation and Adaptation Synthesis*, 85 U. COLO. L. REV. 615, 677 (2014) (discussing nuclear regulation).

186. *See* Eli Kintisch, *Technologies*, *in* CLIMATE ENGINEERING AND THE LAW: REGULATION AND LIABILITY FOR SOLAR RADIATION MANAGEMENT AND CARBON DIOXIDE REMOVAL 28–56 (Michael B. Gerrard & Tracy Hester eds., 2018).

187. Pulp Mills on the River Uruguay (Arg. v. Urug.), Judgment, 2010 I.C.J. 14, 55–56 (Apr. 20); *see also* SANDS & PEEL, *supra* note 21, at 211–13.

188. *See* Elizabeth Burleson, *Cooperative Federalism and Hydraulic Fracturing: A Human Right to A Clean Environment*, 22 CORNELL J.L. & PUB. POL'Y 289, 309 (2012)

to be measured and projected to gain a holistic understanding of the risks of different policy pathways.

Third, to understand the full impact of energy transition policies, we need to conduct additional diligence into the environmental and human rights impacts of energy transition supply chains. Different energy systems have different supply chains, and each of these supply chains has a unique environmental risk profile.[189] Robust reliance on renewable energy and electric vehicles, in particular, will require an "almost sevenfold increase between 2020 and 2030" for "critical minerals like copper, cobalt, manganese[,] and various rare earth metals."[190] International mining companies regularly conduct such diligence either as a matter of law or due to lender concerns.[191] Leading mining companies have adopted ESG programs that require them to follow best international practices in conducting such an assessment.[192] These data and risk projections should be included in holistic diligence. One risk that such diligence will likely uncover is that environmental risks may make projects cost prohibitive.[193] Even if mining companies can appropriately address environmental risks, programs to do so may delay commercial operation of those projects beyond net zero supply chain assumptions.[194]

(discussing lawsuits against the U.S. federal government seeking injunctive relief for the EPA to conduct an environmental impact assessment of hydraulic fracturing); *see also* Jonathan Skinner-Thompson, *Administrative Law's Extraordinary Cases*, 30 DUKE ENV'T. L. & POL'Y F. 293, 310–14 (2020) (discussing separation of powers in the context of climate impacts under the existing federal environmental statutory framework); Albert C. Lin, *Mismatched Regulation: Genetically Modified Mosquitoes and the Coordinated Framework for Biotechnology*, 51 U.C. DAVIS L. REV. 205, 223 (2017) ("NEPA does not require that agencies perform an ecological risk assessment.").

189. Kintisch, *supra* note 186, at 23, 179.

190. FREEPORT-MCMORAN, 2020 CLIMATE REPORT 30 (2020), https://fcx.com/sites/fcx/files/documents/sustainability/2020-Climate-Report.pdf [https://perma.cc/H59Q-JZJH].

191. *See* Fabiana Li, *Documenting Accountability: Environmental Impact Assessment in a Peruvian Mining Project*, 32 POLAR 218, 222 (2009) (discussing the global codification of EIA requirements following the 1992 Earth Summit); INT'L FIN. CORP., IFC PERFORMANCE STANDARDS ON ENVIRONMENTAL AND SOCIAL SUSTAINABILITY 5–16 (Jan. 1, 2012), https://www.ifc.org/wps/wcm/connect/c02c2e86-e6cd-4b55-95a2-b3395d204279/IFC_Performance_Standards.pdf?MOD=AJPERES&CVID=CKTjHBzk [https://perma.cc/TGV9-Y6AA] (setting out "Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts"). For a discussion of the performance standard, see Kristi Disney Bruckner, *Community Development Agreements in Mining Projects*, 44 DENV. J. INT'L L. & POL'Y 413, 418–19 (2016).

192. *See, e.g.*, RIO TINTO, STRATEGIC REPORT 2020 16 (Feb. 22, 2021) [hereinafter STRATEGIC REPORT 2020], https://www.riotinto.com/-/media/Content/Documents/Invest/Reports/Annual-reports/RT-annual-report-strategic-2020.pdf?rev=78cc987412034fc38b0ec27361c1007e [https://perma.cc/7RXW-KL59].

193. For a discussion of an economy lacking capabilities to effectively police environmental hazards from cobalt production, see Lena Mucha, Karly Domb Sadof & Todd C. Frankel, *The Hidden Costs of Cobalt Mining*, WASH. POST (Feb. 28, 2018), https://www.washingtonpost.com/news/in-sight/wp/2018/02/28/the-cost-of-cobalt [https://perma.cc/SSJ8-W3JV].

194. For one such example of delay, see Sergio Goncalves, *Portugal's Lithium Auction Could be Postponed to Early 2022—Ministry*, REUTERS (May 13, 2021), https://www.reuters.com/article/portugal-lithium-auction/portugals-lithium-auction-could-be-postponed-to-early-2022-ministry-idUSL8N2N0250 [https://perma.cc/FC32-XJWY]. On lithium supply chain issues, see Joshua S. Hill, *EVs May Face Production Delays from 2027 as*

Diligence must also investigate the potential supply chain impacts on human rights and project future human rights risks. Production supply chains for solar panels reportedly rely upon forced labor.[195] The IEA-2050 Report briefly notes potential human rights impact with regard to mining supply chains for renewable energy.[196] Legislation increasingly requires companies to investigate such supply chain risks as part of corporate decision-making.[197] Many companies already conduct such diligence as part of their ESG programs.[198] Policymakers must build similar diligence programs to assess global human rights impacts in policymaking.[199] These risks and impacts again must be measured to support diligent decision-making.

Broader energy transition diligence is necessary to avoid significant Jones Act problems. As it stands, there are significant corporate diligence requirements in place regarding the global and domestic human rights and environmental impact of energy projects as well as their supply chains.[200] Compliance with these diligence requirements itself can materially impact the timetables of policy implementation. Noncompliance with these diligence requirements would also materially impact energy projects. Consequently, both project and policy design must anticipate these problems to meet their ultimate goal—equitable, sustainable, and efficacious energy transition.

Newmont Mining's Conga copper-gold project in Peru is a helpful example of this dynamic.[201] Copper is one of the minerals needed for en-

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Lithium Mining Lags, DRIVEN (Apr. 16, 2021), https://thedriven.io/2021/04/16/evs-may-face-production-delays-from-2027-as-lithium-mining-lags [https://perma.cc/5PXS-NUSG]. For the IEA's assumptions, *see IEA-2050*, *supra* note 7, at 14, 44 ("Electric vehicles (EVs) go from around 5% of global car sales to more than 60% by 2030.").

195. *See* Swanson & Buckley, *supra* note 4.

196. *See* IEA-2050 Report, *supra* note 7, at 179.

197. *See* Kirsti Knolle, *Germany Passes Law on Tougher Oversight of Supply Chains*, REUTERS (June 11, 2021), https://www.reuters.com/article/us-germany-companies-supply-chains/germany-passes-law-on-tougher-oversight-of-supply-chains-idUSKCN2DN1AV [https://perma.cc/NT8W-ZQQH]. For an English summary of the law, see *Germany: Mandatory Human Rights Due Diligence*, DEBEVOISE & PLIMPTON (Apr. 30, 2021), https://www.debevoise.com/insights/publications/2021/04/germany-mandatory-human-rights-due-diligence [https://perma.cc/A77T-SC83]. For an initial analysis of the law, see Jaclyn Jaeger, *German Supply Chain Draft Legislation Expected To Have Far-Reaching Effect*, COMPLIANCE WEEK (May 18, 2021), https://www.complianceweek.com/supply-chain/german-supply-chain-draft-legislation-expected-to-have-far-reaching-effect/30391.article [https://perma.cc/SA53-PAKV].

198. *See Human Rights*, BHP, https://www.bhp.com/sustainability/community/human-rights [https://perma.cc/8TY9-SBTA].

199. *See generally* MONNHEIMER, *supra* note 39, at 278 (discussing extra-territorial licensing due diligence obligations). This diligence is arguably broader than required in U.S. environmental law. *NEPA-Guidance*, *supra* note 45, at 14. Given the ESG concerns, it is however important to consider these developments as a matter of project feasibility.

200. *See* MONNHEIMER, *supra* note 39.

201. *Newmont Board Approves Conga Project in Peru and Tanami Shaft Project in Australia*, NEWMONT (July 27, 2011) [hereinafter *Newmont-Approval*], https://www.newmont.com/investors/news-release/news-details/2011/Newmont-Board-Approves-Conga-Project-in-Peru-and-Tanami-Shaft-Project-in-Australia/default.aspx [https://perma.cc/KF99-S3TF].

ergy transition.[202] Newmont originally projected that "commercial operations [would] commence in late 2014 to early 2015."[203] The project has faced persistent complaints that it impairs fundamental human rights of indigenous peoples.[204] Resistance to the project reads like a movie script; one headline reads: "Peru governor to seek re-election, fight gold project from prison."[205] Litigation over land rights regarding the project reached the Peruvian Supreme Court and the Court ruled against the project.[206] The project currently lays dormant and is unlikely to enter commercial operations for at least another four years.[207] This is not a lone example. The Jadar lithium project in Serbia faced significant local community opposition.[208] The Serbian government—though it supports the project—is mulling whether to submit final approval for the project to a referendum.[209]

Delays in copper and lithium production impact supply chains that are already tight.[210] As the IEA notes, mining output will have to grow by 700% to meet demand in the next ten years to implement its proposals.[211] Any significant delays in bringing mines online will impact the entire energy transition process.[212] COVID-19-related supply chain disruptions illustrate how supply shortages of raw materials radiate up the supply chain.[213] Construction projects today are delayed and significantly more expensive due to a shortage of basic commodities such as lumber.[214] We

202. *See IEA-2050*, *supra* note 7, at 23.

203. *Newmont-Approval*, *supra* note 201.

204. *See* COLUM. L. SCH. HUM. RIGHTS CLINIC, CONGA NO VA: AN ASSESSMENT OF THE CONGA MINING PROJECT IN LIGHT OF WORLD BANK STANDARDS 1, 14 (Sept. 2015) [hereinafter CONGA NO VA], https://web.law.columbia.edu/sites/default/files/microsites/human-rights-institute/conganova_english.pdf [https://perma.cc/243W-23CB].

205. *Peru Governor To Seek Re-Election, Fight Gold Project from Prison*, REUTERS (June 30, 2014, 3:07 PM), https://www.reuters.com/article/uk-peru-newmont-santos/peru-governor-to-seek-re-election-fight-gold-project-from-prison-idUKKBN0F52EO20140630 [https://perma.cc/A83D-PC3G]. *See also Report: Newmont Mining's Conga Project Could Be Delayed Another 4 Years*, MINING (May 17, 2020) [hereinafter *Newmont Delay*], https://miningglobal.com/smart-mining/report-newmont-minings-conga-project-could-be-delayed-another-4-years [https://perma.cc/RGC4-5RVQ]; Paul Harris, *Castillo Maintains Hardline Mining Rhetoric*, MINING J. (Apr. 19, 2021), https://www.mining-journal.com/copper-news/news/1408594/castillo-maintains-hardline-mining-rhetoric [https://perma.cc/FJ62-UG66].

206. *Peru Supreme Court Rules Against Newmont in Dispute Over Gold Mine*, REUTERS (May 3, 2017, 2:51 PM), https://www.reuters.com/article/peru-mining-newmont/peru-supreme-court-rules-against-newmont-in-dispute-over-gold-mine-idUSL1N1I51GN [https://perma.cc/9ETZ-2TND].

207. *See Newmont Delay*, *supra* note 205.

208. *See* Radomir Ralev, *Serbia May Call Referendum on Rio Tinto's Jadar Lithium Project—Vucic*, SEENEWS (June 8, 2021, 13:21) [hereinafter *Serbia Referendum*], https://seenews.com/news/serbia-may-call-referendum-on-rio-tintos-jadar-lithium-project-vucic-743785 [https://perma.cc/PB68-LLGN].

209. *See id.*

210. *See* IEA-2050 Report, *supra* note 7, at 23.

211. *Id.*

212. *See id.*

213. *See* Sean Harapko, *How COVID-19 Impacted Supply Chains and What Comes Next*, ERNST & YOUNG (Feb. 18, 2021), https://www.ey.com/en_us/supply-chain/how-covid-19-impacted-supply-chains-and-what-comes-next [https://perma.cc/63SD-KXV9].

214. *See* Frank Morris, *Lumber Prices Are Staying Sky High—Even if the Pandemic Ends Soon*, NAT'L PUB. RADIO (Mar. 30, 2021), https://www.npr.org/2021/03/30/982805743/

can expect the same mechanism to affect energy transition projects if we do not diligently streamline energy transition supply chains. The inclusion of environmental and human rights diligence with regard to both energy transition projects and supply chains will go a long way to support this goal.

This begs the question: how do we conduct such energy transition policy and supply chain diligence? The first step of such diligence is meaningful community engagement.[215] The Conga and Jadar projects provide some helpful data points. The International Finance Corporation (IFC) originally backed the Conga project.[216] Therefore, it had to comply with IFC performance standards.[217] These standards require facially robust diligence.[218] The Jadar project, in turn, is operated by Rio Tinto.[219] Rio Tinto has a strong ESG program.[220] This program requires significant diligence.[221] Despite such robust diligence, both the Conga and Jadar projects were met with sizable community resistance.[222] Both contexts suggest that project stakeholders (including, notably, the governments of Peru and Serbia) did not engage sufficiently with local communities in understanding what impacts to measure and prevent. Even following global due diligence best practices runs into difficulty when projects cannot garner community support through meaningful early engagement.

A successful example of community engagement provides some further context. This example involves a Chevron-operated project in the Niger

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lumber-prices-are-staying-sky-high-even-if-the-pandemic-ends-soon [https://perma.cc/M3GU-M9PM].

215. *See* Construction of a Road in Costa Rica Along the San Juan River (Nicar. v. Costa Rica), Judgment, 2015 I.C.J. 665, 706-7 (Dec. 16) (discussing the state-to-state context); Mara Tignino & Christian Bréthaut, *The Role of International Case Law in Implementing the Obligation Not to Cause Significant Harm*, 20 INT'L ENV'T. AGREEMENT 631, 646–47 (2020) (discussing nascent obligation of community consultation in international environmental law); Office of the U.N. High Commissioner, *Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework*, at ¶¶ 17, 29, U.N. Doc. HR/Pub/11/04 (2011), https://www.ohchr.org/documents/publications/guidingprinciplesbusinesshr_en.pdf [https://perma.cc/4Y3C-HB8Y]; *see also* NEPA-Guidance, *supra* note 45, at 24–25 (highlighting the importance of early vulnerable community engagement).

216. *See Conga*, YANACOCHA (June 2013), http://www.yanacocha.com/wp-content/uploads/2014/04/Conga-Fact-Sheet.pdf [https://perma.cc/68WD-TAGH].

217. *See* COMPLIANCE ADVISOR OMBUDSMAN, COMPLIANCE APPRAISAL: SUMMARY OF RESULTS, (Oct. 22, 2018) https://www.cao-ombudsman.org/sites/default/files/downloads/CAOComplianceAppraisalYanacocha11_ENG.pdf [https://perma.cc/ND6Y-B27D].

218. *See* Mark Wielga, *Human Rights Impact Assessment*, *in* TEACHING BUSINESS AND HUMAN RIGHTS HANDBOOK 8–11 (2016).

219. *See Projects*, RIO TINTO, https://www.riotinto.com/en/operations/projects [https://perma.cc/SK5R-NHU6].

220. *See Company ESG Risk Ratings: Rio Tinto Ltd.*, SUSTAINALYTICS, https://www.sustainalytics.com/esg-rating/rio-tinto-ltd/1008740749 [https://perma.cc/T4DW-NHUP] (rating Rio Tinto's management of ESG issues as "strong"); *see also* Betty Moy Huber & Michael Comstock, *ESG Reports and Ratings: What They Are, Why They Matter*, HARV. L. SCH. F. CORP. GOV. (July 27, 2017), https://corpgov.law.harvard.edu/2017/07/27/esg-reports-and-ratings-what-they-are-why-they-matter [https://perma.cc/9DDE-P6KZ] (listing Sustainalytics as leading ESG ratings provider).

221. *See* STRATEGIC REPORT 2020, *supra* note 192, at 87.

222. *See Newmont Delay*, *supra* note 205, at 5; *Serbia Referendum*, *supra* note 208.

Delta.[223] After an initial failure to garner community support, Chevron adopted a different strategy.[224] It engaged Professor Femi Ajibola and his local nongovernmental organization (NGO), New Nigeria Foundation, as a broker.[225] Professor Ajibola and the New Nigeria Foundation had deep local community ties to assist in community engagement.[226] At the same time, it provided the broker with meaningful resources to create local governance capacities to monitor project implementation.[227] It also provided means to these local governance mechanisms to support programs deemed essential by community deliberation.[228] The project thus supported local autonomy and capacity and became an integral part of local community development.[229]

Professor Ajibola later explained the difference between Chevron's earlier failed approach and the successful one he took: the earlier approach "was just appeasing community leaders . . . . But, they didn't listen."[230] Professor Ajibola explained that "[t]here are many companies that are well-intentioned but they don't understand the process of development."[231] Such companies, he elaborated, spend money on schools, hospitals, and other infrastructure they believe to be important.[232] Professor Ajibola concluded with an insight worth repeating in full in the current context:

> The unfortunate thing is that, number one, you cannot sit down and decide the needs and requirements of others for them. Number two, you cannot prioritize for them. Number three, even if you get it right—that is, you are able to identify what they need—it is extremely important that they own the process and that they own the structures in place for their development.[233]

Both the problematic projects—Conga and Jadar—and Professor Ajibola's successful approach in the Niger Delta suggest that early community engagement is central to ultimate success. This early engagement requires trusted go-betweens in the affected community and policy- and

223. *See* AENDERSON, WEAVER, DZIENKOWSKI, LOWE, HALL & SOURGENS, *supra* note 33, at 689–91.
224. *See id.*
225. *See id.*
226. *See id.*
227. *See id.*
228. *See id.*
229. *See id.*
230. WITOLD J. HENISZ, CORPORATE DIPLOMACY: BUILDING REPUTATIONS AND RELATIONSHIPS WITH EXTERNAL STAKEHOLDERS 98 (Taylor & Finance Group ed., 2017).
231. *Id.*
232. *Id.*
233. *Id.* Further, it is not clear that every community would wish to follow a similar developmental path. Thant Myint-U made such a point in the context of Burma/Myanmar. THANT MYINT-U, THE HIDDEN HISTORY OF BURMA, RACE, CAPITALISM, AND THE CRISIS OF DEMOCRACY IN THE 21ST CENTURY 202–03 (2020). Further, the very notion of imposing standards—however softly and well-intentioned—has a tendency to backfire. This dynamic was powerfully explored in the Eastern European context by Ivan Krastev and Stephen Holmes. *See* IVAN KRASTEV & STEPHEN HOLMES, THE LIGHT THAT FAILED: WHY THE WEST IS LOSING THE FIGHT FOR DEMOCRACY 74 (2019).

decision-makers. This engagement must assist in capacity building in affected communities to allow the community to identify impacts and risks to be measured in diligence. When these impacts and risks are identified meaningfully, the communities can deal with them. As the Conga and Jadar projects show, such impacts are not always obvious to outsiders. Successful diligence is not just a matter of global policy support for project companies and developing countries.[234] It depends on crucial community engagement and capacity building that actively listens to affected communities.[235]

The second part of conducting successful due diligence investigations is to focus on more than a single policy path. As a common-sense matter, to do otherwise is to fall prey to the law of the hammer: if you hold only a hammer, everything starts looking like a nail.[236] This can cause us to ask the wrong questions about what we should do, particularly when facing complex decisions.[237] To avoid this danger, diligent, or prudent, judgment compares multiple scenarios and makes a decision only after understanding how they differ from each other.[238] Prudent judgment requires data to make such comparisons logically. Due diligence, therefore, must collect this data to support discerning judgment.

The law, in fact, confirms this prudential insight.[239] Human rights obli-

234. *See generally* IEA-2050 Report, *supra* note 7, at 23.

235. *See* POPE FRANCIS, *supra* note 47, at ¶ 51. It is not enough to seek passive consent from affected communities whose raw materials are used higher up in energy value chains. Professor Adom Getachew powerfully explores how such regimes of weak consent following externally imposed value structures are deeply enmeshed in the colonial and post-colonial experience in Africa. *See* ADAM GETACHEW, WORLDMAKING AFTER EMPIRE 42 (2019). Particularly, Professor Getachew notes that President Wilson's project of the League of Nations used autonomy as a double-edged sword because, "if consent suggested anything like democratic decision-making, Wilson and Smuts argued that racially backward people were not suited for democracy but could partake in minimal forms of consent and were owed some modicum of respect." *Id.* Following Wilson's view leads to an unequal integration of those societies into world society. *See id.* at 32. In Professor Getachew's analysis, this lack of true respect for people in the Global South continues to affect contemporary global power relationships as "contemporary economic globalization should be situated within a long history of an imperial global economy." *Id.* Taking seriously the autonomy of people and peoples in resource producing states in the Global South means engaging with these communities on an equal footing and placing significant decisional authority in their hands. Any path that assumes that international institutions such as like the World Bank, Western think tanks, or global conglomerates know better than the people living in the communities at issue is not only arrogantly elitist; it is also tinged with the very same history of racism that Professor Getachew identifies. *See id.* This means power dynamics must be remade so that local communities are given their due and treated as full equals participating in an equitable manner in the resource and energy value chains they help to build.

236. *See* ABRAHAM KAPLAN, THE CONDUCT OF INQUIRY: METHODOLOGY OF BEHAVIOURAL SCIENCE 28 (2017).

237. *See* Valentina Azarova, *Adjudicators, Guardians, and Enforcers: Taking the Role of Non-Governmental Organisations in Customary International Lawmaking Seriously*, *in* INTERNATIONAL ORGANISATIONS, NON-STATE ACTORS, AND THE FORMATION OF CUSTOMARY INTERNATIONAL LAW 404–36 (Sufyan Droubi & Jean d'Aspremont eds., 2018).

238. *See* David R. Mapel, *Prudence and the Plurality of Value in International Ethics*, 52 J. POL. 433, 447–49 (1990).

239. *See* National Environmental Policy Act of 1969, 42 U.S.C. § 4332(C)(iii); NEPA-Guidance, *supra* note 45, at 9.

gations require states, for example, to move progressively towards full realization of economic, social, and cultural rights.[240] States must conduct diligence to meet this end.[241] And they must require companies to include this goal in their own ESG due diligence.[242] Diligence must compare different available avenues to achieve the progressive realization of human rights. While different paths are open, they are only open to the extent that they are diligently pursued.[243] The same is true in climate law.[244] There, states must establish that, for example, new power plants support the highest achievable climate ambition.[245] This highest ambition and progressive realization to secure human rights or secure climate change mitigation must rely upon a comparison to be meaningful.[246]

Of course, diligence does not need to consider every policy available. Such a requirement would bring judgment to a complete stop. But diligence exercises must be reasonable.[247] We will discuss reasonableness in more detail in Part III, but intuitively, decision-makers should at least consider several plausible alternatives so they can justify their ultimate choices.[248] The IEA report identifies several of these possible alternatives (even as it elects to pursue a different path that relies on them less): greater investment in nuclear power,[249] greater investment in hydrogen as against electrification of transportation,[250] greater emphasis on carbon removal (again, a technology given a subsidiary role in the IEA report),[251] or an assessment of more drastic forms of geo-engineering.[252] Diligent policymakers should consider some of these pathways in making policy judgments. This means that for each, policymakers must collect the kind of data discussed in this section. Once sufficient data to make risk projections is in hand, a holistic, forward-looking assessment is at least possible.

B. Risk Mitigation Planning

Collecting data is not enough. As we have seen in the last Section, part of the problem is that any one policy or project could run into Jones Act

240. *See* International Covenant on Economic, Social and Cultural Rights, art. 2, ¶ 1(1), Dec. 16, 1966, 1966 U.S.T. 521, 993 U.N.T.S. 3 [hereinafter ICESCR].
241. *See, e.g.*, Monnheimer, *supra* note 39, at 218.
242. *See, e.g.*, Desierto Public Policy, *supra* note 20, at 131.
243. *See id.* at 75.
244. *See, e.g.*, Bodansky, Brunnée & Rajamani, *supra* note 21, at 41–47.
245. *See id.*; NEPA-Guidance, *supra* note 45, at 14–16.
246. Assume someone asked me to bring the "largest dog" and I show up with a Teacup Chihuahua. The Teacup Chihuahua is the "largest dog" if it is the *only* dog, but it would be absurd to bring one otherwise. *See* Sarah Holloway, *Teacup Chihuahua—Pros and Cons of Living with the World's Tiniest Dog*, The Happy Puppy Site (Mar. 16, 2019), https://thehappypuppysite.com/teacup-chihuahua [https://perma.cc/4DBB-KE6F].
247. *See* Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 195–96 (D.C. Cir. 1991).
248. *See id.*
249. IEA-2050 Report, *supra* note 7, at 14.
250. *See id.* at 75–77, 108–11.
251. *See id.* at 79–81.
252. *See* Kintisch, *supra* note 186, at 31, 33–39.

problems—that is, situations that place rather sizeable obstacles in the way of effective energy transition.[253] These problems could be environmental in nature, or they could be human rights problems.[254] This Section addresses the Jones Act problem head-on: how does diligence lead to this problem, and how can diligence propose means to resolve that problem?

To answer these questions, we first need to look at what happens in due diligence after data is collected and projections are made. Once we have collected all of the data and made our projections about the climate, environmental, human rights, and economic impacts of a policy or project, diligence requires us to formulate a plan to address these impacts.[255] The point of diligence is to eliminate, or at least mitigate, the negative impacts identified in the investigatory phase.[256]

Diligence does not seek to eliminate impacts completely.[257] Otherwise, it would be an obligation of result rather than an obligation of conduct. Rather, the point of diligence is to take reasonable steps to address risks.[258] We will discuss what this reasonableness means in detail in Part IV, but at this point, we can already identify a key way in which diligence treats reasonableness: the measures taken in response to identified negative impacts must be proportionate efforts to address the threat.[259]

In many instances, this proportionality analysis is reasonably intuitive. Some impacts may be so negligible that we do not need to do anything at all. Other impacts may suggest a comparatively inexpensive fix. For example, it is reported that painting wind turbine blades black could reduce the rate of bird strikes by as much as 70%.[260] Should this study be confirmed, it may not be unreasonable to expect wind farms to implement this technology if endangered bird species are known to be in the area. And some impacts will require rather significant technological upgrades

253. *See id.* at 31–34, 36–37, 40–41.

254. *See supra* Section III.A.

255. *See* Strycker's Bay Neighborhood Council, Inc. v. Karlen, 444 U.S. 223, 227 (1980); Final Guidance for Federal Departments and Agencies on the Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact, 76 Fed. Reg. 3843 (Jan. 21, 2011) (to be codified at 40 C.F.R. pts. 1500, 1501, 1502, 1505, 1506, 1507, and 1508) [hereinafter NEPA-Monitoring]; LINDA S. SPEDDING, DUE DILIGENCE HANDBOOK: CORPORATE GOVERNANCE, RISK MANAGEMENT AND BUSINESS PLANNING 203 (2009); Katelouzou & Zumbansen, *supra* note 138, at 52. *See also* Indus Waters Kishenganga (Pak. v. India), Arbitral 11 R.I.A.A. 309, 354 (Perm. Ct. Arb. 2013); Peters, Krieger & Kreuzer, *supra* note 130, at 125–26; Tamar Meshel & Moin A. Yahya, *International Water Law and Fresh Water Dispute Resolution: A Cosean Perspective*, 92 UNIV. COLO. L. REV. 509, 546–47 (2021).

256. *See* Meshel & Yahya, *supra* note 255, at 548–49, 554–55.

257. *See* Peters, Krieger & Kreuzer, *supra* note 130, at 126.

258. *See, e.g.*, *id.* at 129; El Paso Field Servs., L.P. v. MasTec N. Am., Inc., 389 S.W.3d 802, 808–09 (Tex. 2012).

259. *See, e.g.*, NEPA-Guidance, *supra* note 45, at 11–12; Diego Venegas, *Compliance Programs and Ethics Issues*, *in* MINING AGREEMENTS: CONTRACTING FOR GOODS AND SERVICES 14-11 (2015). *See also* Marco Longobardo, *The Relevance of the Concept of Due Diligence for International Humanitarian Law*, 37 WIS. INT'L L.J. 44, 47–53 (2019) (discussing diligence in international law).

260. Mark Kinver, *Black Turbine Blade 'Can Cut Bird Deaths,'* BBC (Aug. 26, 2020), https://www.bbc.com/news/science-environment-53909825 [https://perma.cc/AN2V-KV62].

because of the severity of the threat they pose. For example, the reduction of methane emissions from oil and gas operations is a comparatively more involved process.[261]

Importantly, sometimes risks that seem negligible do materialize, leading to actual adverse consequences. But this does not make the original judgment any less diligent.[262] That is, we cannot look at diligence efforts with hindsight bias.[263]

The Texas electrical grid provides a good example.[264] Texas energy companies and regulators deemed the risk of weeklong freezes in the state too low given past weather patterns to justify the expense of winterizing gas facilities.[265] Similarly, in the wind sector, "winterization packages add about 5% to the cost of a turbine, and the power draw reduces the turbine's output."[266] Problematically, "[i]n Texas, where wind goes toe-to-toe with rival technologies on the basis of power pricing, any added cost is a killer."[267] Consequently, neither gas-fired power plants nor wind power plants purchased or installed cold weather packages when new power plants were first built.[268] Or, as leading Texas energy lawyer Becky Diffen put it, this reflected "a prioritization of cheap power over building for the worst case scenario."[269] Providing this cheap power was an express policy goal—and one that is on the whole beneficial.[270]

But a prolonged deep freeze did in fact engulf Texas in 2021.[271] And

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261. *See* OIL & GAS CLIMATE INITIATIVE, SCALING UP ACTION: AIMING FOR NET ZERO EMISSIONS 28–40 (Sept. 2019), https://48qdhih3uxxncvf45h3e296c-wpengine.netdna-ssl.com/wp-content/uploads/2019/10/OGCI-Annual-Report-2019.pdf [https://perma.cc/7XY4-35AJ].

262. *See* Longobardo, *supra* note 259, at 47–50, 54.

263. *See* G.M. LAWRENCE, EXETER CONSULTING & ANALYTICS: A PACIFIC FINANCIAL COMPANY, WHITE PAPER: PERCEPTUAL BIASES IN THE ASSESSMENT OF "REASONABLENESS" IN DUE DILIGENCE AND RELIANCE 3 (Oct. 2017), https://exeterltd.com/wp-content/uploads/2017/10/White-Paper-Perceptual-Biases-in-the-Assessment-of-Reasonableness.pdf [https://perma.cc/8LHU-6DY2].

264. *Grid Information*, ERCOT, http://www.ercot.com/gridinfo [https://perma.cc/RFG3-VR8C].

265. *See* BLACK & VEATCH, LONG-TERM ASSESSMENT OF NATURAL GAS INFRASTRUCTURE TO SERVE ELECTRIC GENERATION NEEDS WITHIN ERCOT: APPENDIX A, 4 (2013), http://www.ercot.com/content/committees/other/lts/keydocs/2013/BV_ERCOT_Gas_Study_Appendix_A.pdf [https://perma.cc/AL3G-8ACC].

266. Jim Krane, Robert Idel & Peter Volkmar, *Winterization and the Texas Blackout: Fail to Prepare? Prepare to Fail*, FORBES (Feb. 19, 2021, 10:55 AM), https://www.forbes.com/sites/thebakersinstitute/2021/02/19/winterization-and-the-texas-blackout-fail-to-prepare-prepare-to-fail/?sh=687445347c83 [https://perma.cc/ES25-H7LS].

267. *Id.*

268. *See id.*

269. Becky Diffen, *Why Texas Can't Handle Freezing Weather for a Week*, LINKEDIN (Feb. 16, 2021), https://www.linkedin.com/pulse/why-texas-cant-handle-freezing-weather-week-becky-diffen/?trk=Public_profile_article_view [https://perma.cc/38FH-3Y34].

270. *See* Ken Silverstein, *Deregulation Is Not the Central Culprit for Texas' Electricity Crisis*, FORBES (Mar. 1, 2021, 8:30 AM), https://www.forbes.com/sites/kensilverstein/2021/03/01/deregulation-is-not-the-central-culprit-for-texas-electricity-crisis/?sh=2596fb5c2cf7 [https://perma.cc/LV2L-QHQB].

271. Neelam Bohra, *Almost 70% of ERCOT Customers Lost Power During Winter Storms, Study Finds*, TEX. TRIB. (Mar. 29, 2021, 5:00 AM), https://www.texastribune.org/2021/03/29/texas-power-outage-ERCOT [https://perma.cc/W7J9-2J6T].

due to the decisions made by power companies and regulators, it had devasting effects on Texas residents.[272] The Texas grid came close to collapsing.[273] Understandably, commentators soon criticized Texas power companies and their regulators.[274]

Nevertheless, our diligence metric suggests that we need to be careful in placing blame. A result (near grid collapse) does not prove a lack of diligence.[275] We need to ask whether Texas power companies and regulators acted proportionately to known risk data.[276] Damningly, the Federal Energy Regulatory Commission (FERC) warned Texas power companies and regulators about cold weather risks after a milder freeze in 2011.[277] At the same time, the policy and project decisions were very much informed by data projections and policy preferences for cheaper energy at most times in exchange for a potential loss of generating capacity in extreme (and rare) scenarios.[278] It should therefore take a significant failure of judgment to conclude that conduct was not diligent.

The understandable temptation to lay blame can help us understand how Jones Act problems materialize. Consider what might have happened if Texas had heeded the 2011 warning to winterize new power plants appropriately.[279] Much of the wind power in Texas was installed *after* that 2011 warning.[280] Had that warning been implemented, wind power would have been more expensive to install due to regulatory burdens to winterize. These costs might not have been imposed on direct competitors, i.e., existing power plants.[281] The road not taken could also have wiped out the progress Texas's energy policies actually achieved:

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272. *See id.*

273. *See* Matt Largey, *Texas' Power Grid Was 4 Minutes and 37 Seconds Away from Collapsing. Here's How It Happened*, HOUS. PUB. MEDIA (Feb. 24, 2021, 5:18 AM), https://www.houstonpublicmedia.org/articles/news/energy-environment/2021/02/24/392290/texas-power-grid-was-4-minutes-and-37-seconds-away-from-collapsing-heres-how-it-happened [https://perma.cc/DNM8-3STQ].

274. *See, e.g.*, Silverstein, *supra* note 270; Bohra, *supra* note 271.

275. *See* Boyle, *supra* note 157, at 424 (asserting governments "will not be responsible for damage if they have acted with due diligence").

276. *See* Venegas, *supra* note 259, at 14-11.

277. FEDERAL ENERGY REGULATORY COMMISSION AND THE NORTH AMERICAN RELIABILITY CORPORATION, REPORT ON OUTAGES AND CURTAILMENTS DURING THE SOUTHWEST COLD WEATHER EVENT OF FEBRUARY 1-5, 2011 204 (2011) [hereinafter FERC/NERC Staff Report], https://www.ferc.gov/sites/default/files/2020-04/08-16-11-report.pdf [https://perma.cc/8LTG-DZRQ] (recommending that new plants "be able to perform at the lowest recorded ambient temperature for the nearest city for which historical weather data is available").

278. *See id.* at 214.

279. *See id.*

280. *See* Fred Mayes & Elesia Fasching, *Wind Is a Growing Part of the Electricity Mix in Texas*, U.S. ENERGY INFO. ADMIN. (Oct. 15, 2020), https://www.eia.gov/todayinenergy/detail.php?id=45476 [https://perma.cc/S32L-AYUK].

281. *See* Krane, Idel & Volkmar, *supra* note 266. For an instructive discussion of policy implications of grandfathering in the environmental policy context, see Bruce R. Huber, *Transition Policy in Environmental Law*, 35 HARV. ENV'T L. REV. 92–93, 96–99 (2011).

Texas is currently a leading state for installed wind generating capacity.[282]

We run into Jones Act problems because energy systems are highly complex. Adjusting any one regulation to meet laudable policy goals such as increasing cold weather resilience has systemic effects on what kind of future developments are feasible.[283] This complexity, in turn, has potential effects on what energy transition achievements are possible in the new regulatory environment.[284] And that, again, informs the realization of human rights and development outcomes that are possible in the context of existing energy infrastructure.[285] Diligence that seeks to address single issue problems (say, winterization of power infrastructure to adapt to the effects of climate change) is highly likely to have significant impacts beyond that issue. It must be broadened to take these broader impacts into account.

The same mechanism was at work in our original Jones Act problem. The installation of offshore wind turbines in the United States ran into the Jones Act requirements that regulate the transport and use for installation of U.S. vessels.[286] Complying with the Jones Act requires U.S. entities to build or purchase their own ships.[287] This is not economically feasible at this point and, in any event, would take significant time. Consequently, offshore wind projects are not moving at the pace needed to support U.S. energy transition efforts on the eastern seaboard.[288] This dilemma leaves the eastern seaboard with some difficult policy choices in its energy transition.

The answer to this problem can only be that we must prepare our risk mitigation plans holistically rather than piecemeal. As we have seen, the Jones Act problem is likely to materialize when we assess proportionality against only one goal or value—our actions may not ultimately be proportional when problems are later viewed as a whole. The United States' cabotage laws set a high bar for transport and construction of energy infrastructure in U.S. waters to protect the national maritime sector.[289] Cold weather resilience in power infrastructure is a similarly central goal for reliable energy access as climate change worsens.[290] But here, legiti-

282. *See* Abigail Anderson & Richard Bowers, *Texas Ranks First in U.S.-Installed Wind Capacity and Number of Turbines*, ENERGY INFO. ADMIN. (July 31, 2019), https://www.eia.gov/todayinenergy/detail.php?id=40252 [https://perma.cc/E8U3-FP6D].

283. *Compare* FERC/NERC Staff Report, *supra* note 277, § 11, 203–04 (proposing standards for greenfield developments) *with* Krane, Idel & Volkmar, *supra* note 266 (outlining price competition).

284. *See* Mayes & Fasching, *supra* note 280.

285. *See* Irina Ivanova, *Texas Winter Storm Costs Could Top $200 Billion—More than Hurricanes Harvey and Ike*, CBS NEWS (Feb. 25, 2021, 3:59 PM), https://www.cbsnews.com/news/texas-winter-storm-uri-costs [https://perma.cc/8Y4W-PUBL]; Soma Biswas, *Brazos Urges Texas Governor to Veto Winter Storm Finance Legislation*, WALL ST. J. (June 11, 2021, 7:09 PM), [https://perma.cc/DFC9-86M4] https://www.wsj.com/articles/brazos-urges-texas-governor-to-veto-winter-storm-finance-legislation-11623452943.

286. Penn, *supra* note 148.

287. *See* Martino, *supra* note 149, at 75.

288. *See* Penn, *supra* note 148.

289. *See* Martino, *supra* note 149, at 75.

290. *See* Krane, Idel & Volkmar, *supra* note 266.

mate concerns can result in a de facto veto of policies central to energy transition.[291] Obviously, that was never the intent of the Jones Act—energy transition was not even on the horizon when it was passed.[292] Likewise, it is unlikely to have been FERC's intent in 2011.[293]

Due diligence again needs to collect and produce data to address Jones Act problems holistically. As discussed in the last Section, such holistic diligence must involve affected communities as active participants in their own fate and identify which impacts and risks matter.[294] With these stakeholders as part of the decision-making process, we will need to collect sufficient data to project the systemic consequences of existing regimes and propose new regulations for energy transition. Energy companies already do so for proposed projects when they conduct legal and ESG due diligence.[295] Similarly, policymakers will need to account for effects across energy systems when implementing new regulations that affect energy transition as part of their respective diligence obligations.[296] Finally, both energy companies and policymakers will need to account for the global supply chain repercussions of such projects and policies, as codification efforts of supply chain diligence obligations such as those currently ongoing in Germany outline.[297] And they will need to account for the potential transboundary harm such projects and policies might produce in their own right.[298]

If due diligence is done well, it should identify when the measures required by existing or proposed rules are not technologically or economically feasible. In such scenarios, due diligence must collect data to explain why that technology is in fact not available or could not be developed in a timely manner. For instance, consider wind turbines and the threat they pose to migratory birds protected by the Endangered Species Act and the Migratory Bird Treaty Act; it is not possible to design wind turbines that pose no threat to birds.[299] Alternatively, diligence must establish that the cost of adopting required measures would not allow energy or mining

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291. *See* Penn, *supra* note 148.

292. *See* Constantine G. Papavizas, *The Story of the Jones Act (Merchant Marine Act, 1920): Part I*, 44 TUL. MAR. L.J. 460–64 (2020) (providing historical context).

293. *See* FERC/NERC Staff Report, *supra* note 277, at 203–04 (drawing no distinction between types of power plants).

294. *See, e.g.*, HENISZ, *supra* note 230, at 123–24.

295. *See* Prajakt Samant & Simone Goligorsky, *Due Diligence for Energy and Commodity Asset Acquisitions*, REED SMITH (Jan. 18, 2017), https://www.reedsmith.com/en/perspectives/2017/01/due-diligence-for-energy-and-commodity-asset-acqui [https://perma.cc/Z3YV-PQ3M]; Jonathan Axelrad, Edgar Romo, Dino Barajas, Vanessa Wilson & Craig M. Tighe, *The Impact of ESG Metrics on M&A Transactions in the Energy Sector*, *in* ASSESSING ESG FACTORS IN THE ENERGY SECTOR: A HANDBOOK 8 (2020), https://www.dlapiper.com/~/media/files/insights/publications/2020/10/enr-esg-handbook_v9lm.pdf [https://perma.cc/6ZMR-GU79].

296. *See* Lead Indus. Ass'n, Inc. v. EPA, 647 F.2d 1130, 1184 (D.C. Cir. 1980). *See also supra* Section III.A.

297. *See* sources cited *supra* note 197.

298. *See* Tilmann Altwicker, *Transnationalizing Rights: International Human Rights Law in Cross-Border Contexts*, 29 EUR. J. INT'L L. 581, 586, 588–89, 594, 597 (2018).

299. On administrative guidance regarding such threats, see *Wildlife Concerns Associated with Wind Energy Development*, U.S. FISH & WILDLIFE SERV. [hereinafter USFWS],

companies to achieve a reasonable rate of return on their investment (meaning that core projects would not be pursued).[300] Further, it would need to establish that governments are not, in fact, capable of bridging the gap in question. For example, as of today, there is no fully reliable certification scheme to guarantee environmentally responsible and human-rights compliant cobalt sourcing.[301]

Armed with this data, diligence can logically establish which policies and project structures *are* technologically possible or economically feasible (e.g., permitting a reasonable return on investment). And it can establish what the consequences of implementing the project with such available safeguards would be. The U.S. Fish and Wildlife Service, for instance, has implemented such a scheme to support wind projects by requiring permits for turbines that even incidentally take or harm migratory birds and tracking impacts on protected bird species.[302] To the extent that certain technology is not available at all, the negative projected impact of the project or policy would simply materialize at full scale. What is more likely is the slight reduction of the impact with available technology. In the migratory bird context, we saw that recent initial studies suggest painting blades black may significantly decrease bird strikes.[303] With this data in hand, we can project what alternative energy transition pathways are available and what risks and costs each entails. Specifically, we can project the respective specific, unmitigated global climate, environmental, and human rights risks each of these pathways continues to pose. This means diligence now puts us in a position to compare the relative merits of each plausible pathway forward.

In principle, each of the different pathways this diligence effort suggests should offer Pareto-optimal strategies. "Pareto optimality" is an economics-based argument concerning the fairness of different allocations of resources.[304] As Nobel Prize-winning economist Amartya Sen puts it, Pareto optimality describes "a situation in which the utility (or welfare) of no one can be raised without reducing the utility (or welfare) of someone else."[305] This function has been used to discuss intergenerational equity in the climate change context—thus, "[a]n intergenerational distribution A is *Pareto-superior* to intergenerational distribution B if, in distribution A, one generation is better off and the other is not worse off,

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https://www.fws.gov/midwest/wind/wildlifeimpacts/index.html [https://perma.cc/44SA-Q764].

300. *See, e.g.*, Penn, *supra* note 148.

301. TRANSPORT & ENVIRONMENT, COBALT FROM CONGO: HOW TO SOURCE IT BETTER 6–7 (2019), https://www.transportenvironment.org/sites/te/files/publications/Cobalt%20from%20Congo_how%20to%20source%20it%20better_Final.pdf [https://perma.cc/Z4L2-4A6G].

302. USFWS, *supra* note 299.

303. *See supra* note 260 and accompanying text.

304. AMARTYA SEN, DEVELOPMENT AS FREEDOM 117 (1999) [hereinafter SEN DEVELOPMENT].

305. *Id.*

compared to distribution B."[306] It "is Pareto-optimal if no other distribution is Pareto-superior to it."[307] There is always more than one such Pareto-optimal distribution available.[308] Any Pareto-superior distribution realizes efficiency gains compared to a Pareto-inferior distribution. These gains themselves can be distributed in any number of ways between A and B.

Pareto's argument is helpful because energy transition diligence tries to measure welfare impacts according to different incommensurate metrics, such as environmental impact, human rights impact, and climate impact. To understand why the three impacts are incommensurate, consider the following thought experiment: would killing all human beings help stop climate change? That would certainly eliminate anthropogenic climate impacts entirely, but it would violate the right to life.[309] And is the impact of renewable energy projects on endangered bird species relevant to climate change impact? Not really, but it matters to environmental law.[310]

Given that these three impacts are incommensurate, we can apply the welfare function as a guide. We ask whether we can conceive of a policy or project structure that would both be economically feasible and increase the realization of one of the three factors without also reducing the realization of another. If the answer is no, we have reached a Pareto-optimal solution even if the solution underperforms the requirements of one of these factors viewed on its own. At a minimum, we know that a champion of such a policy could credibly submit the policy as the "best we can do" at the moment. That is, there is no better policy option available that gives to Paul but does not take from Peter. Of course, once we reach that point, the policy discussion turns into a zero-sum game—any gain we can make in one area will lead to losses in another.[311] We would trade environmental impact for climate or human rights impact or vice versa. Once we have reached that point, we cannot devise a better way to address our problems from a holistic perspective. We must choose one of the Pareto-optimal options on the table.

The job of due diligence is to provide a reasonable number of such Pareto-optimal alternatives and to determine the impact of not proceeding with the policy or project at all.[312] As with the number of alternatives due diligence needed to examine in Part II, due diligence does not need

306. Stephen Marks, *Valuing the Future: Intergenerational Discounting, Its Problems, and a Modest Proposal*, 41 ENV'T L. REP. 10615, 10624 (2011) (emphasis omitted).

307. *Id.*

308. *See id.*

309. *See* IPCC 1.5°C, *supra* note 1 (discussing anthropogenic climate change); William J. Aceves, *Valuing Life: A Human Rights Perspective on the Calculus of Regulation*, 36 L. & INEQ. 1, 2 (2018) ("The right to life and the corollary right to be free from the arbitrary deprivation of life constitute the defining human right.").

310. *See, e.g.*, USFWS, *supra* note 299.

311. *See* SEN DEVELOPMENT, *supra* note 304, at 117.

312. *But see* Eric A. Posner, *Transfer Regulations and Cost-Effectiveness Analysis*, 53 DUKE L.J. 1067, 1088 (2003) (arguing that NEPA and similar statutes only require disclosure that policy options are not Pareto-optimal and leaving the issue to the political process).

to run through every conceivable scenario. But it should at least establish scenarios that leave climate, environmental, and human rights outcomes in a reasonable, Pareto-optimal equipoise (say we achieve 50% of what we would have liked ideally on each scale) and scenarios that maximize each of these outcomes and project the relative impairment this cause to others. If we achieve 100% of our climate goal, what environmental and human rights goals can we still meet? And what environmental and human rights impacts can we reasonably project to occur in such a scenario? We will discuss in Parts IV and V what limits there are on choosing one of the alternatives and how this choice must occur to be diligent. Yet, as a preliminary matter, each of these Pareto-optimal alternatives is, in most instances, a choice one might diligently make.

C. Monitoring, Disclosure & Adaptation

Diligence is not finished once a policy or project is approved. We intuitively know that someone hardly shows good judgment if they ignore new information. We may not fault a person's judgment for getting on an outdoor ladder to do home repairs when the weather report predicts good weather. We would seriously doubt their judgment if they stayed on the ladder in a storm once the weather report had proved inaccurate. Intuitively, this means that diligence requires us to monitor what actually happens and adjust accordingly.[313]

The law bears out this intuitive assessment.[314] Environmental law requires environmental impact monitoring.[315] Similarly, climate law requires that states and non-state actors take stock of the greenhouse gases they actually emit.[316] This data is critical to gaining a detailed understanding of the human climate-change impact.[317] States and companies are gathering more detailed data as part of ongoing diligence efforts.[318] Monitoring, in turn, requires transparent disclosure.[319] The same diligence and disclosure obligations apply in the human rights context.[320]

ESG regimes, in principle, require companies to monitor and disclose outcomes to affected stakeholders. For example, oil and gas companies monitor greenhouse gas emissions to audit their methane reduction commitments.[321] Extractive industry companies use local participants to mon-

313. *See* Spedding, *supra* note 255, at 188–191.

314. *See, e.g.*, Pulp Mills on River Uruguay (Arg. v. Uru.), Judgment, 2010 I.C.J. 14, 18, 79 (Apr. 20).

315. *See, e.g.*, Sands & Peel, *supra* note 21, at 657–81.

316. *See, e.g.*, Paris Agreement art. 13(7)(a), *adopted* Dec. 12, 2015, T.I.A.S. No. 16-1104 [hereinafter Paris Agreement]; NEPA-Monitoring, *supra* note 255.

317. Paris Agreement, *supra* note 316, art. 14.

318. *See GHGRP Reported Data*, U.S. Env't Prot. Agency, https://www.epa.gov/ghgreporting/ghgrp-reported-data [https://perma.cc/4YJA-Q6BX] ; Oil & Gas Climate Initiative, *supra* note 261, at 27.

319. *See* Paris Agreement, *supra* note 316, art. 13(7)(a) (requiring disclosure of climate data).

320. *See* Monnheimer, *supra* note 39, at 233–36.

321. *See* Oil & Gas Climate Initiative, *supra* note 261, at 29–31.

itor the success of community development agreements intended to protect and promote human rights outcomes in the communities in which these companies operate.[322] Diligence thus means we must constantly gather information, and this information in turn informs future decision-making.

That being said, broader public ESG disclosures remain a thorny issue. Such disclosures are helpful for companies to signal their commitment to sustainable development.[323] They are also helpful for stakeholders to measure ESG performance.[324] At the same time, such disclosures pose legal risks.[325] Once disclosures are made, companies become more vulnerable to lawsuits asserting that disclosures were misleading or that the company had knowledge other than what it disclosed. This legal risk has led to an increase in disclosures that communicate comparatively little.[326] More jurisdictions are considering making such disclosures mandatory.[327] Similarly, standard-setting bodies are working on providing uniform metrics for disclosures that would limit the risk of potential litigation and further encourage more disclosures.[328] Yet, both movements are still ongoing.[329]

States and companies must act on this data. International environmental law requires such adaptation as a matter of black letter law.[330] By way of the structure of the Paris Agreement, climate law similarly requires such adaptation of policies.[331] Finally, human rights law also requires that states adjust their aim to the extent that disclosures indicate an underperformance of diligence.[332] The same is true in the business-and-

322. *See* Evaristus Oshionobe, *Community Development Agreements as Tools for Local Participation in Natural Resource Projects in Africa*, *in* HUMAN RIGHTS IN THE EXTRACTIVE INDUSTRIES: TRANSPARENCY, PARTICIPATION, RESISTANCE 77, 92 (Isabel Feichtner, Markus Krajewski & Ricarda Roesch eds., 2019) (discussing the best practices of local community participation in monitoring but noting that African CDAs do not follow this practice).

323. Patrick Bolton & Marcin T. Kacperczyk, *Signaling Through Carbon Disclosure*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Mar. 30, 2021), https://corpgov.law.harvard.edu/2021/03/30/signaling-through-carbon-disclosure [https://perma.cc/TL6J-8VQS].

324. *See* Hari M. Osofsky, Jacqueline Peel, Brett McDonnell & Anita Foerster, *Energy Re-Investment*, 94 IND. L.J. 595, 622 (2019).

325. *See* David R. Woodcock, Amisha S. Kotte, & Jonathan D. Guynn, *Managing Legal Risks from ESG Disclosures*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Aug. 12, 2019), https://corpgov.law.harvard.edu/2019/08/12/managing-legal-risks-from-esg-disclosures [https://perma.cc/2BGY-4V8J].

326. *See* Brett McDonnell, Hari M. Osofsky, Jacqueline Peel & Anita Foerster, *Green Boardrooms?*, 53 CONN. L. REV. 335, 364 (2021).

327. *See* HAROLD BLOOMENTHAL & SAMUEL WOLFF, SEC. L. HANDBOOK § 3:76 (2021) (discussing U.S. climate disclosure requirements); Natalie Nowiski, *Rising Above the Storm: Climate Risk Disclosure and Its Current and Future Relevance to the Energy Sector*, 39 ENERGY L.J. 1, 20–21 (2018) (discussing European disclosure requirements).

328. *See* Virginia Harper Ho & Stephen Kim Park, *ESG Disclosures in Comparative Perspective: Optimizing Private Ordering in Public Reporting*, 41 UNIV. PA. J. INT'L L. 249, 315–23 (2019).

329. *See id.* app. at 326 (summarizing the current ESG disclosure state-of-play).

330. *See* SANDS & PEEL, *supra* note 21, at 211–13.

331. Paris Agreement, *supra* note 316, arts. 4(3), 14(3).

332. *See* MONNHEIMER, *supra* note 39, at 233–36.

human-rights setting.[333]

Such action does not require states and companies to fully realize their original environmental impact or human rights impact goals. As noted above, diligence is an obligation of conduct, not result.[334] We must reasonably implement the measures outlined in a risk mitigation plan.[335] If the effort—the conduct—is appropriate, the failure to achieve results is not immediately legally relevant.[336]

An obligation of conduct requires us to use reasonable efforts to adapt to unanticipated circumstances.[337] Such reasonable efforts must maintain the original risk/reward equilibrium as far as reasonably possible.[338] If it is not possible to rebalance the risks and rewards, a policy or project may well need to be abandoned as unsafe.[339]

This is not the end of the analysis. We need to account for the negative impacts of abandoning the project or policy itself. Arguably, these impacts may be comparatively worse. One example is heating in Ulaanbaatar, Mongolia, the coldest capital in the world.[340] Winter temperatures drop below 20° Fahrenheit.[341] Many of the city's inhabitants live in traditional *gers* off the grid.[342] They use stoves burning raw coal to keep warm.[343] The resulting air pollution is a significant health and environmental problem.[344] Yet, telling people to endure –20° Fahrenheit without heat seems more problematic.[345] The Mongolian government took a different approach; it sought to displace raw coal with an alternative semicoke fuel.[346] It is unclear whether the policy will displace raw coal as the alternative fuel is not ideal in its own right,[347] but in a universe of horrible choices, it is inevitable to do harm. Diligence requires us to try to

333. *See* Astrid Sanders, *The Impact of the 'Ruggie Framework' and the 'United Nations Guiding Principles on Business and Human Rights' on Transnational Human Rights Litigation*, *in* THE BUSINESS AND HUMAN RIGHTS LANDSCAPE: MOVING FORWARD, LOOKING BACK 288 (Jena Martin & Karen E. Bravo eds., 2015) (discussing obligations to mitigate human rights impacts).

334. *See id.* at 294.

335. *See* PATRICIA BIRNIE, ALAN BOYLE & CATHERINE REDGWELL, INTERNATIONAL LAW & THE ENVIRONMENT 149–50 (3d ed. 2009).

336. *See id.* at 148–50.

337. *See id.* at 170.

338. *See id.* This is analogous to the duty of good faith renegotiating in the context of materially changed circumstances. *Duty to Renegotiate*, TRANS-LEX, https://www.trans-lex.org/935000 [https://perma.cc/QHA8-4GWA]. Such an approach would draw on the principle of *rebus sic stantibus*.

339. *See* BIRNIE, BOYLE & REDGWELL, *supra* note 335, at 150, 170.

340. Emily Kwong, *Mongolia's Capital Banned Coal to Fix Its Pollution Problem. Will It Work?*, NPR, (July 30, 2019, 5:08 AM), https://www.npr.org/2019/07/30/727688757/mongolias-capital-banned-coal-to-fix-its-pollution-problem-will-it-work [https://perma.cc/C76H-Q8L5].

341. *Id.*

342. *Id.*

343. *Id.*

344. *Id.*

345. *See id.*

346. *See id.*

347. *See id.*

do the least harm—sometimes even unsafe policies and projects cannot be abandoned.

In the context of energy transition, this problem gets worse. Available risk mitigation options already underperform ideal outcomes.[348] If policies or projects then underperform even their less-than-ideal goals, impacts are likely to be significant.[349] And yet room for adjustment is limited.[350] This difficulty can only be overcome through active stakeholder engagement. Such engagement uses transparent disclosures as a baseline for shared decision-making.[351] Decisions, again, try to find a new Pareto-optimal balance of achievable outcomes, which the new circumstances still permit.[352]

Without this engagement, energy transition policies risk failure. The Texas winter storms highlight why Texans swiftly reacted to the near-failure of the power grid. As the *Houston Chronicle* reports, diesel-operated backup generators now "fly off the shelves."[353] People do not trust their energy providers or energy regulators—over 40% of respondents in a February 2021 poll believed Texas utilities and Texas regulators were "very responsible" for the Texas blackouts.[354] Therefore, they engage in self-help.[355] This self-help further undermines collective climate efforts.[356] Such self-help sets up a tragedy of the commons—an overuse of shared resources threatens the sustainability of the resource base itself.[357]

To avoid these scenarios, affected people must be consulted early, have

348. *See supra* Section III.B.

349. *Id.*

350. *Id.*

351. *See* ORG. ECON. CO-OPERATION & DEV., DUE DILIGENCE GUIDANCE FOR MEANINGFUL STAKEHOLDER ENGAGEMENT IN THE EXTRACTIVES SECTOR 56 (2015), https://www.oecd.org/daf/inv/mne/OECD-Guidance-Extractives-Sector-Stakeholder-Engagement.pdf [https://perma.cc/5XYL-SE2E].

352. *See id.* at 52.

353. Paul Takahashi, *As Generators Fly Off the Shelves After Winter Storm, Some Texans Opt to Build Their Own DIY Version*, HOUS. CHRON. (June 13, 2021), https://www.houstonchronicle.com/business/article/Home-generator-demand-along-with-ingenuity-16244832.php [https://perma.cc/C55R-XDCB]; *Diesel Power Called Up to Aid Texas Electrical. Power Crisis, Storm Recovery:* GLOBENEWSWIRE (Feb. 18, 2021, 2:56 PM), https://www.globenewswire.com/news-release/2021/02/18/2178442/0/en/Diesel-Power-Called-Up-to-Aid-Texas-Electric-Power-Crisis-Storm-Recovery.html [https://perma.cc/A4MB-FAAQ].

354. Lisa Martine Jenkins, *Following Mass Power Failures in Texas, Over Half of Voters Say State Needs to Connect Its Grid to Others*, MORNING CONSULT (Feb. 24, 2021, 6:00 AM), https://morningconsult.com/2021/02/24/texas-power-grid-independence-polling [https://perma.cc/M6BC-SKNX]; Chloe Hall, *Texas Power Outage Sparks Outrage*, VAND. POL. REV. (Mar. 14, 2021), https://vanderbiltpoliticalreview.com/10322/us/texas-power-outage-sparks-outrage [https://perma.cc/ZZS7-DLA8].

355. *See* Takahashi, *supra* note 353.

356. *See* MARIA BRUCOLI, KRISTIAN STEELE, CHRISTOPH HAMELMANN, ELLIMAN JAGNE & DAISY MUKARAKATE, UNITED NATIONS DEVELOPMENT PROGRAMME, OFF-GRID POWER SUPPLY CARBON FOOTPRINT AND SUSTAINABLE ENERGY PLANNING OF PRIMARY HEALTH FACILITIES 2 (2015), https://www.undp.org/content/dam/undp/library/HIV-AIDS/Regional%20practices/UNDP%20Briefing_OffgridPower96.pdf [https://perma.cc/V3K3-MLB9].

357. *See* Garrett Hardin, *The Tragedy of the Commons*, 162 AM. ASS'N ADVANCEMENT SCI. 1243, 1243–44 (1968).

a stake in collective action,[358] and trust collective decision-making.[359] Building trust requires transparent, timely, and full communication.[360] And it requires that affected persons accept the policy decisions made on their behalf—they must believe that these decisions are in the interest of the whole community.[361]

Due diligence in energy transition requires states and companies to design effective consultation and disclosure mechanisms.[362] Diligence requires states and companies to conduct themselves reasonably—and design reasonable processes to address plausible risks.[363] The risk that energy transition policies and projects underperform environmental and human rights goals is certainly plausible; variables are many and their interactions are complex.[364] This heightens the risk of failure until more information is known—and can be shared—about the impact of energy transition policies.[365] Any diligent plan must address this systemic risk.

This means we will need to improve public reporting and local stakeholder participation in due diligence monitoring. For communication to work, states and companies must transparently report environmental, climate, and human rights performance data.[366] And they must do so in a way that makes these reports easy to compare and assess.[367] Further, local participation in adaptation mechanisms, too, must increase.[368] ESG developments are encouraging. But as of yet, they are insufficient as disclosures and local participation in monitoring is not universal.[369] Developments are headed in that direction.[370] Policymakers can assist in this development by creating disclosure safe harbors and thus reducing litigation risk as ESG disclosures, practices, and standards mature.[371]

Just as importantly, disclosures are instrumental to the success of future energy transition policies and projects. The more data we collect, the more risks become known.[372] And the more performance data we have, the better we can calibrate our response to developments on the ground in new projects.[373] Diligence therefore requires a doubling down on

358. *See* ELINOR OSTROM, UNDERSTANDING INSTITUTIONAL DIVERSITY 263–64 (2005).
359. *See id.* at 97–98.
360. *See id.* at 85–88; Tignino & Bréthaut, *supra* note 215, at 645–46.
361. *See* REISMAN, *supra* note 145, at 138–41.
362. *See* NEPA-Monitoring, *supra* note 255.
363. *See* ORG. ECON. CO-OPERATION & DEV., *supra* note 351, at 44–45.
364. *See* Catherine Bale, Liz Varga & Timothy J. Foxon, *Energy and Complexity: New Ways Forward*, 138 APPLIED ENERGY 150, 152 (2015).
365. *See* OSTROM, *supra* note 358, at 86–88.
366. *See id.*
367. *See* McDonnell, Osofsky, Peel & Foerster, *supra* note 326, at 364.
368. *See* Oshionobe, *supra* note 322 at 92 (analyzing best practices in local community participation).
369. *See id.*; McDonnell, Osofsky, Peel & Foerster, *supra* note 326, at 364.
370. *See, e.g.*, Ho & Park, *supra* note 328, at 315–23.
371. *See* Woodcock, Kotte & Guynn, *supra* note 325.
372. *See* Amro M. Elshurafa, Hind M. Farag & David A. Hobbs, *Blind Spots in Energy Transition Policy: Case Studies from Germany and USA*, 5 ENERGY REPS. 20, 21 (2019).
373. U.N. Econ. Comm'n for Eur., *Pathways to Sustainable Energy: Accelerating Energy Transition in the UNECE Region*, at 3, ECE/ENERGY/131 (2020).

transparent reporting obligations. And it requires robust standards and independent audits of reports.

The law already supports such developments. Diligence is a flexible, goal-oriented obligation of conduct.[374] Knowing that a goal cannot be efficiently achieved without a new process means we must adopt that process or run afoul of diligence obligations.[375] Flexibility, in other words, supports ambition. As we have seen, state and corporate practice support this understanding of diligence: both are increasing reporting requirements and improving reporting standards. Holistic diligence-based governance, therefore, very much appears to work as intended.

IV. REASONABLENESS IN ENERGY TRANSITION DILIGENCE

Our discussion so far has highlighted that diligence must be reasonable.[376] Reasonableness, in turn, was typically a question of proportionality.[377] Reasonableness and proportionality are flexible standards.[378] This flexibility is helpful. But it can also introduce the potential for arbitrariness in decision-making.

The problem is made worse by the fact that we are trying to establish whether outcomes are proportionate to each other even though we cannot measure them on the same scale.[379] Human rights, climate, and environmental impacts each measure something different.[380] They each respond to different values.[381] So how does it make sense to put these values in proportion to each other?

The first answer to this question is that diligence always occurs in a specific factual context. I cannot be diligent in the abstract—there must be something to investigate.[382] The different human rights, climate, and environmental perspectives help to organize how to make sense of concrete risks.[383] They provide a map on which raw data points become intelligible information.[384]

Helpfully, this concrete context means that it is almost impossible to find a policy that completely isolates human rights, environmental, or climate impacts. Different policy options will have impacts across the board

374. *See generally* BIRNIE, BOYLE & REDGWELL, *supra* note 335, at 148–49.
375. *See generally id.*
376. *See supra* Section III.A.
377. *See* NICOLAS DE SADELEER, ENVIRONMENTAL PRINCIPLES: FROM POLITICAL SLOGAN TO LEGAL RULES 97, 99–100 (2002).
378. *See* BIRNIE, BOYLE & REDGWELL, *supra* note 335, at 149.
379. *See supra* Section III.B.
380. *See id.*
381. *See id.*
382. *See* Pulp Mills on the River Uruguay (Arg. v. Uru.), Judgment, 2010 I.C.J. 14, 55–56 (Apr. 20).
383. *See* REISMAN, *supra* note 145, at 184–85 ("[N]one of the non-adjudicatory decision functions can be discharged without some way of mapping the social process that enables the international lawyer to take vast amounts of 'data' and to organize and interrelate them in ways that render them useful 'information.'").
384. *See id.*

just by virtue of the complexity of energy systems.[385] For example, the human rights lens is sensitive to climate and environmental impacts.[386] We make use of our environment. Degrading that environment, therefore, is likely to have a panoply of human rights impacts.[387] These impacts, of course, affect life and health.[388] Air pollution in Ulaanbaatar, for example, reaches deadly levels, particularly for children.[389] But there are cultural impacts, too: the sky has cultural significance for Mongolia.[390] Air pollution, therefore, is not just significant from a health perspective but from a cultural perspective as well. Improving environmental and climate outcomes is therefore likely to register on human rights scales.[391]

What is reasonable in this context is not a question of abstraction. It is a question of comparing particular potential risks and outcomes to each other. And these risk clusters can be compared to each other precisely because they affect all three of our diligence outcomes at once—human rights, environment, and climate. We can therefore compare different paths in this conceptual topography even though each metric on its own is incommensurable.[392]

Further, as we assess different policy alternatives, we ask five distinct question*s* to assess the proportionality of the choices available to us. First, we ask if what we propose is actually feasible. Unaffordable diligence demands are more likely to be unreasonable and disproportionate, all things being equal.[393] The financial and technological capabilities of the parties are a further consideration in this context.[394] Tellingly, the requirement to produce detailed environmental impact assessments is triggered only to the extent that there is a cognizable risk of substantial pollution, i.e., the cost of such assessments is seen as an impediment to legitimate attempts by states to provide basic services to their

385. *See* Bale, Varga & Foxon, *supra* note 364, at 152.

386. *See* Urgenda, *supra* note 180.

387. *See* Michael Burger, *Bi-Polar and Polycentric Approaches to Human Rights and the Environment*, 28 COLUM. J. ENV'T L. 371, 374–84 (2003) (noting that "[t]he reinterpretation of existing rights to include environmental concerns is different from the mobilization strategy insofar as it defines environmental degradation itself as a human rights violation. This process of reinterpretation essentially comprises lawyering through the international system to read environmental protections into established human rights that do not explicitly provide for such protections" and articulating such arguments for and against).

388. *See, e.g.*, Urgenda, *supra* note 180.

389. *See* Kwong, *supra* note 340.

390. *See id.*

391. *See* G.A. Res. 44/25, Convention on the Rights of the Child, art. 24(2)(c) (Nov. 20, 1989). For further discussion, see generally Malgosia Fitzmaurice, *The Right of the Child to a Clean Environment*, 23 S. ILL. UNIV. L.J. 611, 617, 647 (1999); *see also* ICESCR, *supra* note 240, arts. 12(2)(b), 15(1)(a).

392. *See* AMARTYA SEN, THE IDEA OF JUSTICE 242–43 (2009).

393. *See* BIRNIE, BOYLE & REDGWELL, *supra* note 335, at 148; NEPA-Guidance, *supra* note 45, at 13.

394. *See* Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1996 Protocol, art. 2, 30 Aug. 1975, 1046 U.N.T.S. 138.

populations.[395]

Second, we need to determine the relevant affected community engagement and support for proposed energy transition policies and projects. World leaders like President Biden insist that energy transition can be a driver of economic growth.[396] The reason for this insistence is to create broader buy-in for energy policies.[397] Losing support is perilous for successful energy transition, as the French yellow vest protests have shown.[398] Unsurprisingly, leading legal scholars insist that energy transition remains consistent with economic growth.[399]

Community engagement must look beyond economic growth as a heuristic for community support.[400] Policies may create growth while negatively affecting the standard of living of a sizeable portion of community members and vice versa (a large part of the community can actually be increasingly better off despite flat economic growth).[401] We must therefore look beyond mere growth. The impact of policies and projects will differ from community to community because of the specific social, cultural, and economic context of each community.[402] Even understanding what impacts to measure and what risks might materialize requires an engagement with affected communities.[403] Anything short of early, transparent, and full engagement is significantly likely to obstruct policies or projects before they have left the planning stage, as the Conga project, for example, has shown.[404] The exercise of judgment is only diligent, reasonable, or proportional to the extent it bears such community engagement and support in mind.

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395. *See* SANDS & PEEL, supra note 21, at 662–74 (summarizing relevant provisions of the U.N. Convention on the Law of the Sea, the Convention on Environmental Impact Assessment in a Transboundary Context, and the Biodiversity Convention). Actions a state must take are also means-tied in jurisprudence. *See* Corfu Channel (U.K. v. Alb.), Judgment,1949 I.C.J. 4, 22; Legality of Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, 241 (July 8).

396. *See* Coral Davenport, Noam Scheiber & Lisa Friedman, *Biden's Big Bet: Tackling Climate Change Will Create Jobs, Not Kill Them*, N.Y. TIMES (Mar. 31, 2021), https://www.nytimes.com/2021/03/31/climate/biden-climate-jobs.html [https://perma.cc/2XS2-MTZ8].

397. *See* Elaine Kamarck, *The Challenging Politics of Climate Change*, BROOKINGS (Sept. 23, 2019), https://www.brookings.edu/research/the-challenging-politics-of-climate-change [https://perma.cc/M87V-BY79] (discussing political challenges of energy transition policies).

398. *See generally* Martin & Islar, *supra* note 177, at 603.

399. *See* Rafael Leal-Arcas & Antonio Morelli, *The Resilience of the Paris Agreement: Negotiating and Implementing the Climate Regime*, 31 GEO. ENV'T L. REV. 1, 58 (2018) ("The energy transition, which is happening at a slow pace, is an opportunity to protect the planet, as is also an opportunity to create jobs and provide economic growth.").

400. *See* DAVID PILLING, THE GROWTH DELUSION, WEALTH, POVERTY, AND THE WELL-BEING OF NATIONS 165 (2018).

401. *See id.* at 12 (discussing example of Japan's standard of living despite flat growth); BANERJEE & DUFLO, *supra* note 53, at 85–87, 200–08 (discussing danger of growth scenarios when viewed as more than a proxy).

402. *See supra* Section III.A.

403. *See* James M. Otto, *How Do We Legislate for Improved Community Development*, *in* EXTRACTIVE INDUSTRIES: THE MANAGEMENT OF RESOURCES AS A DRIVER OF SUSTAINABLE DEVELOPMENT 673, 681 (Tony Addison & Alan Roe eds., 2018).

404. *See generally* CONGA NO VA, *supra* note 204, at 7–8.

Third, we consider the degree of severe risk that potential policies and project structures pose to human rights, environmental, and climate concerns.[405] Intuitively, "ultra-hazardous [activities] require a much higher standard of care."[406] The same logic applies to ordinary activities that are known to have catastrophic accruing effects (i.e., emission of greenhouse gases).[407] In all instances in which there is a likelihood of harm, "legal prudence" may well dictate that a more detailed assessment be done and risk mitigation be more fully scrutinized.[408] Human rights risks in global supply chains also could be grouped in this category.[409]

Fourth, we ask what impact particular proposed approaches entail for energy resilience. Energy systems that do not deliver resilient solutions are likely to lead to stakeholder reactions, as we have seen.[410] Such reactions can undermine the climate achievements of policies that were originally beneficial.[411] Similar energy security concerns are arguably driving China and India not to divest from coal-fired power plants as quickly as might otherwise be possible.[412] Plans that underperform on energy resilience therefore run the risk of failure because of stakeholder defection. Consequently, diligence must bear this dimension in mind. Diligence must anticipate this risk to be effective.

Fifth, we compare energy transition policies and projects to evolving best practices.[413] Projects typically require use of the best available technology at the time of investment in new infrastructure.[414] These best practices do not just focus on technology. They also focus on human rights practices, such as community development design and project structure.[415] Underperforming in best practices requires an explanation and suggests that conduct may not have been reasonable or proportionate.[416]

As diligence is an obligation of conduct and not an obligation of result, there is no correct outcome in this reasonableness exercise.[417] Even "the existence of an adverse EIA [does not] place any duty on the proposing state to refrain from proceeding with a project, although in the final deci-

405. *See generally* BIRNIE, BOYLE & REDGWELL, *supra* note 335, at 148.
406. *Id.*
407. *See* Christopher Serkin & Michael P. Vandenbergh, *Prospective Grandfathering: Anticipating the Energy Transition Problem*, 102 MINN. L. REV. 1019, 1037 n.74, 1055 (2018); Jeffrey A. Smith, *The Implications of the Kyoto Protocol and the Global Warming Debate for Business Transactions*, 1 N.Y.U. J.L. & BUS. 511, 523–24 (2005).
408. Anderson & Bowers, *supra* note 282.
409. *See generally* Jaeger, *supra* note 197.
410. *See* Takahashi, *supra* note 353.
411. *See* BIRNIE, BOYLE & REDGWELL, *supra* note 335, at 169.
412. *See* Sourgens Consensus, *supra* note 120, at 1, 16, 20.
413. *See generally* BIRNIE, BOYLE & REDGWELL, *supra* note 335, at 148.
414. *See* Pulp Mills on River Uruguay (Arg. v. Uru.), Judgment, 2010 I.C.J. 14, 88–89 (Apr. 20).
415. *See* Li-Wen Lin, *Mandatory Corporate Social Responsibility Legislation Around the World: Emergent Varieties and National Experiences*, 23 UNIV. PA. J. BUS. L. 429, 468 (2021).
416. *See* BIRNIE, BOYLE & REDGWELL, *supra* note 335, at 148.
417. *See id.* at 218.

sion 'due account' must be taken of the findings."[418] The point is that we consider specific data points in light of these different metrics to assess what policy or project we should pursue. In extreme circumstances, the judgment could well be unreasonable on its face. For example, the use of forced labor deployed in the perpetration of genocide in any supply chain is an unacceptable human rights impact—the urgency of energy transition does not change that.[419] In other circumstances, diligence will show that a particular policy simply will not make the transition from policy test tubes to application in reality (just consider the U.S. Metric Conversion Act and look at road signs to confirm).[420]

Most instances will not be so extreme. Reasonable minds may differ. Diligence tells us what data policymakers and executives need to consider and how they need to approach this information in order to be reasonable. Yet, once they have done so, most any Pareto-optimal energy transition policy is acceptable subject to the limitations set out in the next section.[421]

This result is very consistent with the bottom-up governance approach underlying the current climate regime established in Paris in 2015.[422] The bottom-up approach grants stakeholders significant policy discretion to chart their own path.[423] If only one pathway were available, a bottom-up approach would be meaningless. Instead, we would all need to follow the same energy and climate trajectory. Inherent in a bottom-up governance approach is that different policy priorities are consistent with the exercise of diligent judgment. Some societies may value environmental sustainability more than energy resilience.[424] They may be willing and able to absorb the potential negative effect of reduced energy resilience.[425] Yet other societies may prioritize differently.[426] Both choices are dis-

418. *Id.* at 175.

419. *See* DINAH SHELTON, JUS COGENS 57 (2021) (prohibition against slavery is a *jus cogens* norm); Philippe Sands, *East West Street: Personal Stories About Life and Law*, 16 WASH. UNIV. GLOB. STUD. L. REV. 439, 453 (2017) ("Call something a genocide and it will be on page one . . . ."); *but see* Ido Vock, *Philippe Sands on the Uighurs: "Why Does it Matter if We Call It a Genocide?,"* NEW STATESMAN (July 28, 2020, 12:15 PM), https://www.newstatesman.com/world/asia/2020/07/philippe-sands-uighurs-why-does-it-matter-if-we-call-it-genocide [https://perma.cc/82TV-KUM3].

420. *See* Moni Basu, *Refusing to Give an Inch: America's Only Metric Road*, CNN, https://www.cnn.com/interactive/2015/07/us/metric-road-american-story [https://perma.cc/534K-YE2N]. Interestingly, there is a cost to not being a member of the metric system from a network perspective. *See* GREWAL, *supra* note 15, at 177.

421. *See supra* Section III.B.

422. *See* BODANSKY, BRUNNÉE & RAJAMANI, *supra* note 21, at 25. This bottom up approach falls between two modes of reconstituting an international society around shared values. *See* GREWAL, *supra* note 15, at 190–91.

423. *See* BODANSKY, BRUNNÉE & RAJAMANI, *supra* note 21, at 25.

424. *See* Nikos Tsafos, *In Defense of Energiewende*, CTR. FOR STRATEGIC & INT'L STUD. (Aug. 24, 2020), https://www.csis.org/analysis/defense-energiewende [https://perma.cc/TE6K-EYHM] (outlining German energy policies).

425. *See* Takahashi, *supra* note 353 (discussing the Texas power crisis).

426. *See generally* Frank Heinz, *ERCOT Issues Weeklong Call for Energy Conservation Continues*, NBC DFW (June 14, 2021, 9:11 PM), https://www.nbcdfw.com/news/local/ercot-issues-call-for-conservation-as-electricity-demand-surges-monday/2656613 [https://perma.cc/2FNW-B9WW].

tinctly diligent, even as they ultimately require fundamentally different approaches to energy transition and climate governance.

One should not exaggerate the consequences of following a bottom-up governance approach. As energy transition policies and projects gather momentum, they will also generate more data. And as they generate more data, they will make it more likely that successful policy choices will impact future diligence exercises. Such success stories limit risk and provide a clearer blueprint for others to follow, which will, in turn, lock in path dependencies in the same way as the QWERTY keyboard.[427] Other policies may be better in theory;[428] the fact that infrastructure has grown around a different approach is nevertheless going to favor following a given path.[429]

Similarly, past policy choices will limit what can realistically be done because each choice has consequences. A policy that underperforms on climate ambition limits the paths available to avoid climate tipping points.[430] The path will also narrow to the extent that we have made bets that did not pay off, even if those bets were reasonable at the outset. But again, in those instances, diligence would build learning and adaptation into the decision-making process itself. It would not mandate a result as such.

Reasonableness, in other words, provides a broad yardstick in the first instance to allow different actors to make different policy choices. Those policy choices will be suboptimal given the nature of energy transition challenges, as discussed in Part II. Yet, this alone should not be a reason to critique those choices. On the contrary, it should be a reason to question *how* those choices were made and in what context they stand. Once we learn from this context and the impact of those decisions, decision-making can adapt and learn appropriately from past experience.

Before we turn to the particular role of human rights, we can already see a markedly different perspective from a political economy lens.[431] If energy transition policies are guided by legal principles, we can introduce greater nuance in our assessments. It is not a matter of finding the single most efficient path.[432] It is a matter of finding a balance between different values we hold dear and different pathways that are available to us because legal decision-making allows us to make use of more data points as meaningful information.[433] A greater amount of information means, in the first place, that we see more obstacles. But this greater amount of information also means there are ultimately a greater number of poten-

427. *See* Frédéric G. Sourgens, *The Virtue of Path Dependence in the Law*, 56 SANTA CLARA L. REV. 303, 308, 311 (2016) [hereinafter Sourgens Path Dependence].

428. *See id.* at 317.

429. *See id.* at 370; *see also* BANERJEE & DUFLO, *supra* note 53, at 102 ("Herd behavior generates *informational cascades*: the information on which the first people base their decision will have an outsized influence on what all the others believe.").

430. *See* Sourgens Consensus, *supra* note 120, at 11.

431. *See* IEA-2050 Report, *supra* note 7, at 13.

432. *See id.* at 3.

433. *See* REISMAN, *supra* note 145, at 184.

tial paths open to us. Different stakeholders can walk down these different paths and thus serve as laboratories for energy transition success. Once more results are available to us, we can then make better decisions, all things considered, than had we mandated a single path only from the get-go. In Professor Ajibola's words, this room for choice allows societies to "own the process and . . . the structures in place for their development."[434]

V. THE PRIMACY OF HUMAN RIGHTS & THE RIGHT TO DEVELOPMENT

So far, we have assumed that all metrics to measure energy transition impacts were created equal. There is one important caveat. Constitutional rights and human rights are a distinct first among equals. As I will argue in this Part, this does not mean that human rights law replaces or otherwise overrules the other metrics of energy transition diligence. Rather, I argue that any assessment that would force a reduction in the realization of human rights in the name of energy transition would have to explain itself.

This human rights preference is built into the core of the Paris climate regime. The Paris regime expressly recognizes that "[p]arties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights."[435] It also lists specifically "the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and *the right to development*, as well as gender equality, empowerment of women and intergenerational equity."[436] Any reading of the Paris Agreement and climate mitigation obligations, therefore, has the realization of human rights *and* the right to development as its object and purpose.

This focus on human rights makes fundamental sense. Energy transition alters the backbone of international economic cooperation.[437] Such international economic cooperation can lay claim to legitimacy only if it is consistent with the value of human dignity.[438] Any fundamental reorganization of the international economic order, therefore, should only be le-

434. HENISZ, *supra* note 230, at 98.
435. Paris Agreement, *supra* note 316, at 2.
436. *Id.* (emphasis added).
437. *See* Sourgens Consensus, *supra* note 120, at 7. NEPA currently places a premium on such "human health, economic and social stability, ecosystem services or other benefits that increase climate change preparedness or resilience." NEPA-Guidance, *supra* note 45, at 23.
438. *See* Antony Anghie, *Time Present and Time Past: Globalization, International Financial Institutions, and the Third World*, 32 N.Y.U. J. INT'L L. & POL. 243, 248 (2000); *see also* ERNST-ULRICH PETERSMANN, INTRNATIONAL ECONOMIC LAW IN THE 21ST CENTURY: CONSTITUTIONAL PLURALISM AND MULTILEVEL GOVERNANCE OF INTERDEPENDENT PUBLIC GOODS 73 (2012) (taking a different approach to reach same conclusion); DESIERTO PUBLIC POLICY, *supra* note 20, at 159 (arguing for an approach that does not integrate international human rights law into international human rights law "but rather . . . show[s] ways by which States Parties to the ICESCR can feasibly integrate their compliance with

gitimate to the extent that it, too, is consistent with human dignity.[439] The object and purpose of human rights law is the protection and promotion of human dignity.[440] Consequently, human rights should have a central place in energy transition governance: they must safeguard against violence to the equal moral worth of any human being for the convenience of another.

The preference for human rights is not monolithic. Different human rights can demand very different results. Relevantly, in the energy transition context, human rights require that states reduce their greenhouse gas emissions—and thus change their energy infrastructure.[441] But just as importantly, human rights also require that states provide appropriate access to electricity and energy.[442] These two rights arguably are at odds with each other, at least in the short-term.

The recent German Supreme Court case in *Neubauer v. Germany* addressed this particular issue.[443] The court ruled that the German government was required to increase its energy transition ambition as a matter of article 20(a) of the German Basic Law. Article 20(a) states that "[m]indful also of its responsibility towards future generations, the state shall protect the natural foundations of life and animals by legislation and, in accordance with law and justice, by executive and judicial action, all within the framework of the constitutional order."[444] This provision reflects the human right to life and a principle of intergenerational equity.[445]

As Matthias Goldmann insightfully noted in an analysis of the decision shortly after it was promulgated, "[t]he novelty of this case . . . consists in

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obligations under the ICESCR and treaty obligations within international trade, finance, and investment law in IEL").

439. *See* DESIERTO PUBLIC POLICY, *supra* note 20, at 159–60. Such consistency with human dignity does not require a full integration of human rights norms, as Diane Desierto convincingly argues.

440. Notably, human dignity is a purposefully ambiguous concept in human rights law so as to allow a multiplicity of different ethical foundations. *See* Paolo G. Carozza, *Human Dignity*, *in* THE OXFORD HANDBOOK OF INTERNATIONAL HUMAN RIGHTS LAW 345, 348 (Dinah Shelton ed., 2013). Even on this pluralist footing, dignity informs how human rights law views the conditions in which human beings live—the right to housing, food, work, social security, culture etc. *See id.* at 355–56. As Paolo Carozza notes, dignity here can have a loadbearing function as "[i]nterestingly, although the American Convention on Human Rights only protects economic and social rights very weakly, the Inter-American Court has attached a robust notion of dignity to its interpretation and application of the right to life that allows that right to include a guarantee of the minimal socio-economic conditions for a life lived with dignity." *Id.* at 356.

441. *See, e.g.*, Urgenda, *supra* note 180, ¶ 5.7.9.

442. *See generally* Löfquist, *supra* note 179, at 711.

443. Neubauer, *supra* note 27, ¶¶ 30, 186.

444. Basic Law for the Federal Republic of Germany, art. 20(a) (Ger.), translation at https://www.gesetze-im-internet.de/englisch_gg/englisch_gg.html [https://perma.cc/X4GA-2HD7].

445. *See* Jelena Bäumler, *Sustainable Development Made Justiciable: The German Constitutional Court's Climate Ruling on Intra- and Inter-Generational Equity*, EJIL: TALK! (June 8, 2021), https://www.ejiltalk.org/sustainable-development-made-justiciable-the-german-constitutional-courts-climate-ruling-on-intra-and-inter-generational-equity [https://perma.cc/S472-PTCN].

the skillful entanglement of international law and institutions with constitutional law."[446] As Professor Goldmann pointed out, the *Neubauer* court makes three important moves. First, the court "crucially relies on the expertise provided by the Intergovernmental Panel on Climate Change (IPCC)."[447] It thereby "resuscitates the functionalist hope in international institutions as havens of rational discourse, a rare quality in times of societal polarization, spreading autocracy, mistrust in public institutions, and even state-sponsored misinformation."[448] Second, the *Neubauer* court "recognizes that the duty of the German government to protect fundamental rights does not end at its borders, but covers people abroad, including the group of plaintiffs living in Nepal and Bangladesh."[449] While foreign residents had standing to sue, the *Neubauer* court relied on the Paris Agreement as a means to dismiss their suit on the merits because "the government has met its duties to protect in the case at hand, particularly by ratifying the 2015 Paris Agreement."[450] And finally, the third step meets head on "the counter-majoritarian difficulty" of confronting "a tragic choice between democracy today" (that is, upholding the legislative approach of the German parliament to climate change mitigation) "and liberty tomorrow" (that is, protecting the right of the children-plaintiffs in the *Neubauer* case).[451] *Neubauer* "finds the impossible middle ground and holds the legislature accountable to its own commitments;" that is, the commitments already subject to legislative approval of the Paris Agreement.[452]

Importantly, the *Neubauer* court's focus was on core liberties, plural. The *Neubauer* court allowed that climate change did not pose the kind of risk that would allow the wholesale displacement of other rights.[453] In fact, part of the court's motivation for its judgment was that greenhouse gas emission reductions after 2030 might have to be achieved in such a short timeframe and require such efforts as to threaten basic legally protected freedoms.[454] The court reasoned that climate change mitigation could be displaced as a policy imperative to the extent mitigation policies disproportionately infringe upon other rights—but that "the relative weight" of non—climate-neutral "exercise[s] of freedom . . . decreases as climate change" worsens.[455] Notably, the regulation of CO_2 emissions becomes increasingly urgent under Article 20(a) of the Basic Law even before tipping points are reached because it would be unrealistic to ex-

446. Matthias Goldmann, *Judges for Future: The Climate Action Judgment as a Postcolonial Turn in Constitutional Law?*, VERFASSUNGSBLOG (Apr. 30, 2021), https://verfassungsblog.de/judges-for-future [https://perma.cc/A6K4-N9PJ].
447. *Id.*
448. *Id.*
449. *Id.*
450. *Id.*
451. *Id.*
452. *Id.*
453. *See* Neubauer, *supra* note 27, ¶ 120.
454. *See id.* ¶ 117.
455. *Id.* ¶ 120.

pect—quite apart from constitutional concerns—that we tolerate CO_2-emitting conduct without any mitigation and then demand, when tipping points are imminent, that conduct be immediately carbon neutral.[456] In other words, the impact of energy transition policies should be extended over the longest time available to reduce the impairment of constitutionally protected liberties as the loss of liberty to switch to carbon neutral conduct is negligible once a carbon neutral infrastructure is widely available.[457] But this requires that we start as soon as possible and be as ambitious as possible as early as possible so as not to impermissibly shift unconscionable liberty losses to future generations.

The reasoning of the German Constitutional Court is instructive because it uses a sustainable development lens.[458] It reasons that energy transition policies must sustainably allow development broadly conceived to continue unimpeded by today's policy choices.[459] That is, it should not impose an undue burden on either today's economy or the future of children.[460] And it does not allow any offsetting of human rights losses of one group (persons living after 2030) against the human rights gains of the current generation.[461]

This is broadly consistent with the right to development as that right is currently codified in the draft Convention on the Right to Development.[462] Centrally, Article 4 of the draft Convention states that the right to development is inalienable.[463] The right entitles every human person "to participate in, contribute to and enjoy economic, social, cultural, civil and political development that is consistent with and based on all other human rights and fundamental freedoms."[464] Article 4(2) expounds, "Every human person and all peoples have the right to active, free and meaningful participation in development and in the fair distribution of benefits resulting therefrom."[465] The Convention further expresses that "all human and legal persons, peoples, groups[,] and States have the general duty under international law to refrain from participating in the violation of the right to development."[466] Article 22 expressly includes sustainable development—that is, the ability of future generations to realize their right to development.[467] The reasoning of the German Consti-

456. *See id.*
457. *See id.* ¶ 121.
458. *See* Bäumler, *supra* note 445. As such, it is compatible with the underlying public trust rationale in U.S. climate actions such as Juliana, an action only dismissed on standing grounds. *See* J.B. Ruhl & Thomas A.J. McGinn, *The Roman Public Trust Doctrine: What Was It, and Does It Support an Atmospheric Trust?*, 47 ECOLOGY L.Q. 117, 120–21 (2020). Prior NEPA guidance already hints at this dimension as an important diligence factor. *See* NEPA-Guidance, *supra* note 45, at 20–22.
459. *See generally* Bäumler, *supra* note 445.
460. *See id.*
461. *See id.*
462. Development Convention, *supra* note 37, at 4.
463. *Id.* art. 4(1).
464. *Id.*
465. *Id.* art. 4(2).
466. *Id.* art. 7.
467. *Id.* art. 22.

tutional Court in balancing the right to development of respective generations follows the exact same logic by safeguarding as much of the right as possible for all, thus, defending the ability of the right.[468]

The logic of the German Constitutional Court, as well as the draft Convention on the Right to Development, does not permit trade-offs between different groups. It requires a proportionate treatment of all persons and does not permit one to benefit off the back of another.[469] Energy transition policies in post-industrialized economies must not undermine the right to development of persons in the energy supply chain. Similarly, policymakers must ensure that energy transition policies themselves do not undermine the right to development in industrializing and natural resource-rich countries. This imposes significant duties of inquiry and duties of risk mitigation and monitoring on proponents of energy transition policies. Political economy approaches address either of these human rights concerns only indirectly.[470]

This leaves unanswered what policymakers will need to establish in order to proceed with energy transition policies and projects should their diligence reveal that energy transition policies do, in fact, impair the right to development. Logically, policymakers need to establish that a proposed policy represents a reasonable path that least impairs the human rights of the most affected group. That is, complete inaction itself is inconsistent with sustainable development because it makes future generations worse off for suffering the consequences of climate change. But policymakers also need to establish that there is no reasonable path to lessen the impact on those whose human rights are most impaired. At its core, human dignity means that all human beings have equal moral worth.[471] This equal moral worth means that those most impaired would need to agree in principle that their privation is unavoidable—that is, they cannot be made better off without placing someone in a worse position than they are.[472]

This preference for human rights in a holistic diligence approach involving suboptimal outcomes still leaves a significant range of policy options on the table. It does not subordinate all other concerns to human rights—it seeks to secure compliance with human rights in energy transition side by side with other concerns.[473] Instead, this preference here provides a safeguard only. It limits policy options that would treat persons not as ends in themselves but as means to our energy transition success. We can differ in our judgments on the virtues of particular pathways in

468. *See* Neubauer, *supra* note 27, ¶¶ 117–20.

469. *See id.*; Development Convention, *supra* note 37, art. 4.

470. *See supra* Part I, Section III.A.

471. *See* Carozza, *supra* note 440, 348, 355–56.

472. *See generally* JOHN RAWLS, A THEORY OF JUSTICE 108 (Otfried Höffe ed., Joost den Haan, trans.) (2013). The argument here is not one of positive distribution of resources. Rather, it is one of a negative distribution of privations. *See id.* The argument developed by Rawls, however, should hold the stronger in the second context.

473. *See* DESIERTO PUBLIC POLICY, *supra* note 20, at 158–61.

many respects, but we cannot reasonably differ on this: to actively deprive others of their capacity to pursue a good human life in keeping with their values, desires, hopes, and dreams simply on the basis of geography, birth, or station must never be a policy option.[474] A development backstop to energy transition diligence achieves at least that much.

VI. CONCLUSION: A DIFFERENT PATH

Where does this leave us? This Article has argued that diligence can improve on approaches rooted solely in political economy. In particular, it has argued that values and community autonomy are key drivers for successful policy. The German Constitutional Court convincingly argues that energy transition policies must be driven first and foremost by concerns for sustainable development.[475] This sustainable development lens begins and ends with the realization of rights.[476] It does not look to the efficiency of energy policy as the end all be all. As Professor Ajibola powerfully reminded us, even the best technical solution is inconsistent with sustainable development if communities affected by those solutions did not own the process that led to their adoption.[477] Inefficient solutions that reflect our collective values, therefore, are both more sustainable in their actual social context and support development in the full ethical sense of the word rather than the narrowly economic sense.

As a practical matter, one key difference between the diligent zero lens and the political economy lens concerns supply chains. Proposals rooted in political economy approaches like the IEA Net Zero 2050 report made supply chain assumptions that do not fully account for human rights concerns. This problem is particularly pressing in the context of the electrification of transportation.[478] Due to the minerals needed for electrification, supply chains pose significant environmental and human rights hurdles.[479] Such hurdles can only be overcome with diligent stakeholder engagement.[480] But engagement takes time to do right, and the timeframe necessary to prevent a climate disaster might not allow for that.[481] Policymakers and industries, therefore, could reasonably seek an alternative to electrification.

A natural policy alternative is to rely on hydrogen-powered transportation as an alternative to electrification. This switch requires smaller, lighter batteries in vehicles and thus fewer mineral resources,[482] leaving

474. *See generally* Development Convention, *supra* note 37, art. 8(1).
475. Neubauer, *supra* note 27, ¶¶ 117–120.
476. *See id.*
477. *See* HENISZ, *supra* note 230, at 98.
478. *See, e.g.*, IEA-2050 Report, *supra* note 7, at 70–73.
479. *See id.*
480. *See* Part III.
481. *See generally* IEA-2050 Report, *supra* note 7, at 70–73.
482. *See* Rachel Graham, *Hydrogen Fuel Cell vs Electric Cars: What You Need to Know but Couldn't Ask*, EURONEWS (March 14, 2020), https://www.euronews.com/green/2020/02/13/hydrogen-fuel-cell-vs-electric-cars-what-you-need-to-know-but-couldn-t-ask [https://perma.cc/3GCA-ABJS].

us the time to get human rights and environmental diligence right. Hydrogen fuel cell vehicles already exist; all they need is infrastructure to support them.[483] This policy alternative also removes vehicles from the grid, meaning that generating capacity is available to support other economic activities, including the cyber-economy.[484] Japan and Japanese manufacturers, as well as German policymakers, are currently investing heavily in this alternative.[485]

Another policy alternative that may become more attractive is a reengagement with nuclear and small-scale modular nuclear power.[486] Current proposals like the IEA Net Zero 2050 report allow a reasonably limited role for nuclear power in the energy mix.[487] Stakeholders may view the environmental risks of nuclear power differently. Nuclear power is a carbon neutral and highly resilient form of energy.[488] This is an option available for policymakers looking to decrease greenhouse gas emissions while increasing available generating capacity beyond the limitations of renewable energy (France is an early adopter, China is currently looking to expand traditional nuclear capabilities, and the United States and the United Kingdom are increasing small modular reactor investments).[489] Policymakers who want to avoid the environmental risk of nuclear power like Germany can follow a different calculus[490]—perhaps it is no surprise that these countries tend to be the ones that look to hydrogen as an alternative to electrification of transportation.[491]

Some other policy alternatives are important because they change the climate equation from the other end. It is possible to change the carbon equation without altering the backbone of energy infrastructure. One

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483. *See id.*

484. *See supra* Part I.

485. *See* Dvorak, *supra* note 42 (discussing Japan); *Germany Investing _8B+ in 62 Large-Scale Hydrogen Projects; "We Are Making Germany a Hydrogen Country*," GREEN CAR CONGRESS (May 29, 2021), https://www.greencarcongress.com/2021/05/20210529-germanyh2.html [https://perma.cc/QL3R-3LSL].

486. *See* Huber, *supra* note 42, at 469, 475, 476; Daniel Garton, Richard Hill, Dipen Sabharwal, Andrew de Lotbinière McDougall, Kirsten Odynski & Vit Stehliík, *Why Small Modular Reactors Will Shape The Future of Nuclear Debate*, WHITE & CASE (June 8, 2021), https://www.whitecase.com/publications/insight/why-small-modular-reactors-will-shape-future-nuclear-debate [https://perma.cc/QES3-NHK6] (discussing small modular reactors).

487. IEA-2050 Report, *supra* note 7, at 39 fig. 1.8.

488. *See id.* at 14.

489. *See id.* at 37; Garton, Hill, Sabharwall, Lotbinière, Odynski & Stehliík, *supra* note 486 (discussing U.S. and U.K. policies supporting small modular nuclear reactors); Anmar Frangoul, *France's Love Affair with Nuclear Power Will Continue, but Change is Afoot*, CNBC (Mar. 10, 2021, 5:12 AM), https://www.cnbc.com/2021/03/10/frances-love-affair-with-nuclear-power-will-continue-but-change-is-afoot-.html [https://perma.cc/87QT-GMN8]. *But see* Lisa Bryant, *France Takes First Steps to Reduce Nuclear Energy Dependence*, VOICE OF AMERICA NEWS (Feb. 21, 2020, 1:29 PM), https://www.voanews.com/europe/france-takes-first-steps-reduce-nuclear-energy-dependence [https://perma.cc/F5JP-HWYW] ("[T]he government's broader energy strategy [is] to reduce French dependence on nuclear energy from supplying three-quarters of its electricity to about half by 2035.").

490. *See How Fukushima Triggered Germany's Nuclear Phaseout*, DEUTSCHE WELLE (Mar. 10, 2021), https://www.dw.com/en/how-fukushima-triggered-germanys-nuclear-phaseout/a-56829217 [https://perma.cc/Y634-ALBG] (discussing German phase out).

491. *See* Dvorak, *supra* note 42; GREEN CAR CONGRESS, *supra* note 485.

such strategy is to remove CO_2 emissions from large emission source points.[492] This technology is known as Carbon Capture Utilization and Storage, or CCUS.[493] The technology is currently in scaled experimental use.[494] If scaled up further, this technology will likely change the carbon intensity of our existing energy infrastructure.[495] Gas-fired power plants could become almost carbon neutral.[496] This, in turn, extends the window within which we can get energy transition right and provides a smoother, flatter curve with more opportunity for global adaptation. Policymakers, supermajors, and leading national oil companies are currently supporting such kickstarter projects on the Gulf Coast in Texas and Louisiana; on the Adriatic coast in Italy; in Teesside, United Kingdom; in Edmonton, Canada; in Rotterdam, the Netherlands; with the Northern Lights/Longship project in Norway; and with the China North-West hub in mainland China.[497]

It is possible to take this approach one step further: "Mining" CO_2 directly from the air is technologically feasible.[498] The technology is known as direct air capture or DAC.[499] This approach would not reduce emissions, but it would reduce the amount of CO_2 currently in the atmosphere.[500] If brought to scale, this technology would allow us to reverse trendlines and achieve negative emissions.[501] Before achieving negative emissions, it would allow us to complement emission reductions from energy infrastructure upgrades with emission reductions from carbon removal.[502]

Both CCUS and direct air capture are expensive technologies.[503] Both are at a relatively early stage of development—with CCUS closer to full-

492. *See, e.g.*, Kintisch, *supra* note 186 at 33, 41–51.

493. *CCUS Hubs*, OIL & GAS CLIMATE INITIATIVE, https://www.ogci.com/action-and-engagement/removing-carbon-dioxide-ccus/our-kickstarter-hubs [https://perma.cc/F6V3-DVGX].

494. *Id.*

495. *See id.*

496. *See* INT'L ENERGY AG., THE ROLE OF CCUS IN LOW-CARBON POWER SYSTEMS 15, 25 (July 2020), https://iea.blob.core.windows.net/assets/ccdcb6b3-f6dd-4f9a-98c3-8366f4671427/The_role_of_CCUS_in_low-carbon_power_systems.pdf [https://perma.cc/526F-KEEB].

497. *CCUS Hubs*, *supra* note 493.

498. Tito Jankowski, *Start Here: An Introduction to Mining 1 Trillion Tons of CO2 From the Air*, AIR MINING 101, https://coda.io/@tito/air-mining-101 [https://perma.cc/P7VL-RPHG]. *See also* Nils Rokke, *The Carbon Negative Solutions That Remove CO2 From the Atmosphere*, FORBES (Dec. 1, 2020, 4:06 AM), https://www.forbes.com/sites/nilsrokke/2020/12/01/the-carbon-negative-solutions-that-remove-co2-from-the-atmosphere/?sh=20fecc96488d [https://perma.cc/HZ7M-EQDM].

499. Anja Chalmin, *Direct Air Capture: Recent Developments and Future Plans*, GEOENGINEERING MONITOR (July 16, 2019), https://www.geoengineeringmonitor.org/2019/07/direct-air-capture-recent-developments-and-future-plans [https://perma.cc/67WH-9M9F].

500. *See* Rokke, *supra* note 498.

501. *See id.*

502. *See id.*

503. *See id.*

scale implementation.[504] That being said, market mechanisms exist to transfer the cost of development of these technologies to the private sector.[505] Such mechanisms could be further explored. Further, these market mechanisms could become additional means to provide enforcement mechanisms for diligence in energy transition planning.

Finally, we have it in our power today to reduce global temperatures with solar radiation management.[506] Such solar radiation management reproduces and escalates volcanic eruptions.[507] In doing so, it blocks out sunlight before it enters the atmosphere.[508] By reducing the energy that enters the atmosphere, we can take warming potential out of the equation before it even enters.[509] As it stands, this technology can be deployed today at comparatively low costs.[510]

This technology itself is ultra-hazardous and poses significant environmental risks.[511] Given these risks, it has remained on the outside of mainstream discussions, though this trend has recently changed. The National Academies of Science recently urged the U.S. government to study its use.[512] There is a simple reason for this: a sustainable, equitable energy transition is likely to require more time than we currently have.[513] This means we must consider taking measures that will allow us to hit a pause button so that we can complete an equitable, sustainable energy transition in the time needed to do it right. Solar radiation management may be our best means to do so. But determining whether that is the case will require additional diligence—diligence it is high time to start.[514]

So far, my account of possible alternative energy futures in this Part has focused on different "whats." I have outlined what policymakers might do differently if they follow legal diligence as opposed to a political economy approach. But these different whats are secondary to my argument. Legal diligence does not offer energy transition policymakers a different what. It offers a different "how."

The red thread running through *Diligent Zero* is that how we transition energy matters. That *how* is about making decisions premised on our best possible understanding of facts and of the future consequences of our

504. *See CCUS Hubs*, *supra* note 493 (discussing CCUS); *Our Technology*, CARBON ENGINEERING, https://carbonengineering.com/our-technology [https://perma.cc/JM7H-BWVK] (describing status of technology for one leading DAC company); *Direct Air Capture to Help Reverse Climate Change*, CLIMEWORKS, https://climeworks.com/co2-removal [https://perma.cc/MYM8-L24G]

505. *See* Sourgens Consensus, *supra* note 120, at 47–48.

506. *See What Is SRM?*, THE MGMT. DEGREES INITIATIVE, https://www.srmgi.org/what-is-srm [https://perma.cc/2YL2-2WY6].

507. DAVID KEITH, A CASE FOR CLIMATE ENGINEERING 11 (2013).

508. *What Is SRM?*, *supra* note 506.

509. *See id.*

510. *See* KEITH, *supra* note 507, at 21.

511. *See* CLIVE HAMILTON, EARTHMASTERS: THE DAWN OF THE AGE OF CLIMATE ENGINEERING 200–02, 208–10 (2013).

512. Tollefson, *supra* note 44.

513. *See id.*

514. *See id.*

conduct.[515] Diligence requires us to make decisions with eyes wide open to the risks we must accept.[516] Just as importantly, the *how* has also highlighted the need for all affected communities to have an equal seat at the table from beginning to end.[517] Human dignity demands that all have an active voice in determining their own fate.[518] It demands that this voice be taken seriously. Any socioeconomic reform that fails to provide those affected by reform an active voice or fails to listen to that voice is acting inconsistently with fundamental human rights.[519] It gets development wrong.[520]

For all to have an active voice in their own fate, we must be empowered to make decisions.[521] Making decisions means choosing, even if the choice we must ultimately make is utterly clear.[522] That is why alternative pathways are important and why this section has outlined a few different *whats* of energy transition to highlight that the *how* of energy transition is still very much a matter of our own moral, political, and economic agency. Law at its best supports that agency. It provides a meaningful place for expertise in detailing the likely outcomes of our choices.[523] But it does not prescribe what choice must be made.[524] No one expert holds the final card. We, as world society and affected communities within world society, do.

If we empower world society to make decisions about energy transition diligently, we have the tools to see it through to success. World society can, in fact, raise the $100 trillion long-term price tag needed for deep restructuring of the energy sector to succeed.[525] It can do so because no one sector need carry the load alone. States, international organizations, energy companies, mining companies, lenders, and institutional investors together have the financial wherewithal to meet that goal.[526] What is more, we stand at an unparalleled moment of human ingenuity—an ingenuity that now can draw on a global knowledge base with leading scientists hailing not just from the old European Great Powers and the United States but from recently industrialized powers like the BRIC states and a new crop of states like Uganda, Indonesia, and beyond.[527] We can mar-

515. *See supra* Section III.A.
516. *See supra* Section III.B.
517. *See supra* Section III.C.
518. *See supra* Part IV.
519. *See id.*
520. *See generally* HENISZ, *supra* note 230, at 123–24.
521. *See generally* MALCOLM SCHOFIELD, THE STOIC IDEA OF THE CITY 48–50 (1991).
522. *See id.* at 49.
523. *See supra* Sections III.A–B.
524. *See supra* Part III.
525. *See* IEA-2050 Report, *supra* note 7, at 81 fig. 2.22.
526. *See GDP (current US$)*, THE WORLD BANK, https://data.worldbank.org/indicator/NY.GDP.MKTP.CD [https://perma.cc/QUQ6-4NNL] (calculating global GDP as 84.68 trillion USD).
527. *See* Qinchang Gui, Chengliang Liu & Debin Du, *Globalization of Science and International Scientific Collaboration: A Network Perspective*, 105 GEOFORUM 1, 2 (2019); Peter Ndichu, *Technological Innovation Solves Challenges and Drives Scale in Uganda*, GSMA (Nov. 7, 2019), https://www.gsma.com/mobilefordevelopment/blog/technological-

shal this ingenuity to solve technical problems because the world economy we have built brims with high tech production centers on every continent but one.[528] What is missing is the collective will to fully embrace our decisions about possible energy futures as our own. This is what diligent zero adds more than anything else. It provides a pathway to engage and empower all of us to participate in this most vital of tasks: to rebuild the backbone of our world economy and transform energy systems into an equitable and sustainable bedrock for global cooperation.

innovation-solves-challenges-and-drives-scale-in-uganda [https://perma.cc/RYE2-E3LG]; Tahsin Saadi Sedik, *Asia's Digital Revolution*, INT'L MONETARY FUND (Sept. 2018), https://www.imf.org/external/pubs/ft/fandd/2018/09/asia-digital-revolution-sedik [https://perma.cc/7NRB-Z9MQ]; Ricardo Navarro, *Chile Is a Technological Reference when It Comes to Foreign Partnerships*, FORBES (Mar. 18, 2020, 7:20 AM), https://www.forbes.com/sites/forbestechcouncil/2020/03/18/chile-is-a-technological-reference-when-it-comes-to-foreign-partnerships/?sh=3f2c3b812b6b [https://perma.cc/54U3-GUUD].

528. There are no such facilities in Antarctica. *See* Abigail Ng, *India Is Set to Become a Vital Covid Vaccine Maker—Perhaps Second Only to the U.S.*, CNBC (Feb. 14, 2021), https://www.cnbc.com/2021/02/15/covid-india-could-play-an-important-role-in-producing-vaccines.html [https://perma.cc/AA3G-UT3R]; *COVID: South Africa to Host Vaccine Tech Transfer Hub*, DEUTSCHE WELLE (June 21, 2021), https://www.dw.com/en/covid-south-africa-to-host-vaccine-tech-transfer-hub/a-57985947 [https://perma.cc/4G55-VY6Y].