THE GREEN NEW DEAL AND GREEN TRANSITIONS

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ABSTRACT

In February 2019, Representative Ocasio-Cortez and Senator Markey introduced a "Green New Deal" Resolution in Congress, calling for a ten-year mobilization toward action on climate change, socioeconomic inequality, and other issues. A Green New Deal—evoking the language of FDR-era policy—envisions a transition to a green economy that is integrated with concern for the social and economic welfare of those who are most harmed by environmental degradation and those who are most likely to be displaced by the reinvention of U.S. infrastructure and energy systems.

This Article addresses the need for engaging with regulatory transition theory in order to assess the legal, policy design, and implementation challenges of a Green New Deal. Regulatory transition theory explains how economic, legal, and political pressures can lead to policies that are counterproductive, unjust, and inefficient. Key examples of this phenomenon are found throughout the core U.S. environmental-legal framework, which has been plagued by overly generous transition relief in the grandfathering of aging infrastructure and through other policies that differentiate between "new" and "existing" sources. This history provides important lessons for designing a Green New Deal around four principles: equity, efficacy, efficiency, and political coalition-building. Some solutions for transitions that can be effectively implemented may be intuitive but must overcome political economy challenges and legal barriers.

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INTRODUCTION

Alexandria Ocasio-Cortez, the youngest woman ever elected to Congress, has captivated a new generation interested in social and environmental policy.[1] One week after her election in November 2018, Ocasio-Cortez made headlines by appearing at a rally staged by the Sunrise Movement[2] outside now-Speaker Nancy Pelosi's office.[3] Ocasio-Cortez and other Democrats in Congress adopted the activists' rallying cry for a "Green New Deal" before and after the 2018 midterm election.[4] In February 2019, Ocasio-Cortez introduced a Green New Deal Resolution[5] in the House of Representatives, with the support of a counterpart in the other chamber, Senator Ed Markey of Massachusetts—a politician of an older generation

1. *See, e.g.*, David Remnick, *Alexandria Ocasio-Cortez's Historic Win and the Future of the Democratic Party*, NEW YORKER (July 23, 2018), https://www.newyorker.com/magazine/2018/07/23/alexandria-ocasio-cortezs-historic-win-and-the-future-of-the-democratic-party (profiling Representative Ocasio-Cortez shortly after her victory in the Democratic primary in June 2018).

2. For a profile on the climate-justice advocacy group, the Sunrise Movement, and one of its founders, Varshini Prakash, see Wen Stephenson, *Varshini Prakash of the Sunrise Movement on Climate Justice, the Green New Deal, and Revolution*, NATION (June 4, 2018), https://www.thenation.com/article/sunrise-movement-climate-change-varshini-prakash-green-new-deal/; see also the Sunrise Movement's website, https://www.sunrisemovement.org/.

3. Anthony Adragna & Zack Colman, *Ocasio-Cortez, Youth Protesters Storm Pelosi Office to Push for Climate Plan*, POLITICO (Nov. 13, 2018), https://www.politico.com/story/2018/11/13/ocasio-cortez-climate-protestors-push-pelosi-962915.

4. David Roberts, *The Green New Deal, Explained*, VOX (Dec. 21, 2018), https://www.vox.com/energy-and-environment/2018/12/21/18144138/green-new-deal-alexandria-ocasio-cortez [hereinafter Roberts, *The Green New Deal, Explained*].

5. Recognizing the Duty of the Federal Government to Create a Green New Deal, H.R. Res. 109, 116th Cong. (2019), https://www.congress.gov/116/bills/hres109/BILLS-116hres109ih.pdf.

who helped lead an unsuccessful push for climate legislation a decade earlier.[6]

The "Green New Deal" as a phrase is not new,[7] but the concept has quickly burst onto the political scene—perhaps more so than its proponents could have anticipated.[8] It has captured imaginations in a landscape where media and public alike are searching for a simple, yet overarching, concept that defines political priorities for a new generation of leaders, looking toward a post-Trump policymaking era.[9] Notably, those who are shaping the Green New Deal are young and new to politics—activists who reject the political status quo, having been raised in a time when, from birth (or even before), climate change has been a recognized problem.[10]

Since Ocasio-Cortez took up the mantle of the Green New Deal in the House office hallways, countless commentators have scrambled to define a scope for what constitutes the Deal and what it represents.[11] The name evokes a comparison to the FDR-era New Deal and is similarly based on economic intervention to provide employment opportunities, enhance social-safety-net programs, and invest heavily in public goods.[12] The Green New Deal is a reinvigoration of the idea of industrial policy as social policy[13] with an

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6. *See* American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009) ("An act [t]o create clean energy jobs, achieve energy independence, reduce global warming pollution and transition to a clean energy economy."). Frequently referred to as the "Waxman-Markey" legislation based on the names of the principal sponsors in the House and Senate, the bill was approved by the House of Representatives in 2009 but stalled in the Senate. *H.R.2454—American Clean Energy and Security Act of 2009*, CONGRESS.GOV, https://www.congress.gov/bill/111th-congress/house-bill/2454 (last visited April 27, 2020).

7. In 2007, *New York Times* columnist Thomas Friedman described a "Green New Deal" as a "rallying call" for "a broad range of programs and industrial projects to revitalize America." Thomas L. Friedman, *A Warning from the Garden*, N.Y. TIMES (Jan. 19, 2007), https://www.nytimes.com/2007/01/19/opinion/19friedman.html?module=inline; *see also* Roberts, *The Green New Deal, Explained*, *supra* note 4 (describing the history of the "Green New Deal" phrase over decades, including its use by Green Party candidates, President Obama, and others prior to 2018).

8. *See* Roberts, *The Green New Deal, Explained*, *supra* note 4 ("There is a sense among those involved that they have caught a tiger by the tail.").

9. *See infra* note 36 and accompanying text.

10. *See, e.g.*, Meredith Hankins, *I've Been Waiting My Whole Life for a Green New Deal*, LEGAL PLANET (Feb. 8, 2019), http://legal-planet.org/2019/02/08/ive-been-waiting-my-whole-life-for-a-green-new-deal/ (describing what Representative Ocasio-Cortez represents for millennials who support stronger action to stop climate change than older politicians).

11. *See infra* note 36 and accompanying text.

12. *See* Steven Fraser, *The Greening of the New Deal*, NATION (Oct. 18, 2019), https://www.thenation.com/article/archive/green-new-deal-history/ (comparing the Green New Deal with its namesake and explaining that the Green New Deal is more ambitious in its proposals for public investment and social programs).

13. Robinson Meyer, *A Centuries-Old Idea Could Revolutionize Climate Policy*, ATLANTIC (Feb. 19, 2019), https://www.theatlantic.com/science/archive/2019/02/green-new-deal-economic-principles/582943/. Meyer refers to "industrial policy" as "the set of laws and regulations that say the federal government can guide economic growth without micromanaging it." *Id.* In other words, the government

explicit "green" layer to address the transition toward a more sustainable economy.[14]

There is no comprehensive, authoritative definition of what constitutes the Green New Deal, and it is not the goal of this Article to provide one. However, the Resolution introduced by Representative Ocasio-Cortez and Senator Markey outlines several key characteristics of Green New Deal discourse.[15] At its heart, the Resolution, and the call for a Green New Deal, integrates proposals for climate-change mitigation, job security, investment in infrastructure, environmental sustainability, and justice for minorities and other vulnerable communities.[16] As David Roberts has written, there are "three core principles" that reflect the Green New Deal idea: "decarbonization, jobs, and justice."[17] The responsibility to address climate change is a central organizing theme, but not the sole target. Proponents intentionally placed progressive social and economic policy goals, including universal access to health care and job security, alongside environmental justice.[18]

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actively seeks to influence economic activity in the country through regulation and through investment characterized by government spending; however, the government is not engaging in central planning of economic activity, and much of the investment may go to stimulate private business or public-private relationships in industrial and other sectors. *Id.* Although the idea of a Green New Deal is dressed in "socialist regalia," the economic concept it is built on, and the historical precedent of the post-Depression New Deal, suggest a less radical departure from capitalism. *Id.*

14. It is perhaps more useful to think of the Green New Deal nomenclature in this way—as a "green" variation on the New Deal, rather than a New Deal-like variation of what might fundamentally be considered environmental policy. Centrist critiques of the Green New Deal, in lamenting the extension of social programs—i.e., "non-climate provisions"—into climate policy, misread the context of the proposal. *See, e.g.*, Jonathan Chait, *Democrats Need an Ambitious Climate Plan. The Green New Deal Isn't It*, N.Y. MAG. INTELLIGENCER (Feb. 7, 2019), http://nymag.com/intelligencer/2019/02/democrats-need-a-climate-plan-the-green-new-deal-isnt-it.html (speculating that the Green New Deal's socioeconomic goals would hinder its goal of urgent climate action).

15. H.R. Res. 109, 116th Cong. (2019). I use the term "Green New Deal discourse" to reflect the diversity of opinions and viewpoints about how to construct a Green New Deal. Commentators in the technocratic political center, such as Thomas Friedman, might describe the Green New Deal as "green capitalis[m]," characterized by "free-market competition to ensure that mankind can continue to thrive on Earth." Thomas L. Friedman, *The Green New Deal Rises Again*, N.Y. TIMES (Jan. 8, 2019), https://www.nytimes.com/2019/01/08/opinion/green-new-deal.html. David Roberts, on the other hand, has referred to it as "a form of social-democratic populism." Roberts, *The Green New Deal, Explained*, *supra* note 4. As I employ it in this Article, Green New Deal discourse is closer to the latter, focused along the lines of proposals supported by Representative Ocasio-Cortez, the Sunrise Movement, and other actors that have driven most of the media attention since late 2018 on the topic. The defining element in this discourse is that it integrates efforts to remedy socioeconomic inequality, environmental pollution, and climate change in a push for sweeping policy reform.

16. H.R. Res. 109, at 5–6 (laying out the Resolution's "Green New Deal goals").

17. Roberts, *The Green New Deal, Explained*, *supra* note 4.

18. The juxtaposition of socioeconomic and climate policy has led conservatives to criticize the Green New Deal as the culmination of a leftist ideological project. *See, e.g.*, Ross Douthat, *One Cheer for the Green New Deal*, N.Y. TIMES (Feb. 9, 2019), https://www.nytimes.com/2019/02/09/opinion/alexandria-

The Green New Deal Resolution is a short document that encompasses goals for legislation and priorities for government action, rather than specific policies.[19] The Resolution declares a need for action in the context of the 2018 report from the Intergovernmental Panel on Climate Change (IPCC) on the dangers of global warming beyond 1.5°C above pre-industrial temperatures.[20] Although the scope of the Resolution addresses far more than climate-change mitigation itself, the climate crisis is clearly a key driver for the Green New Deal's ambitious timelines, highlighting the urgency of action that would be necessary to avoid the worst impacts of a drastically warmed planet.[21]

In the months after the Green New Deal Resolution was unveiled, conservative media and the Republican Party quickly built opposition to the concept.[22] The opposition took two forms: first, characterizing the Green New Deal as a serious, dangerously radical proposal; and second, as an idea too crazy to be taken seriously.[23] In March 2019, a floor vote on the Resolution in the Senate failed, as Senate Republicans called for a quick vote to highlight its lack of support.[24] However, the Green New Deal concept has

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ocasio-cortez-green-new-deal.html (calling the Green New Deal "#fullsocialism"). Centrist and left-of-center environmentalist critiques either agree or see the Green New Deal's socio-environmental combination as a tactically unwise distraction from climate policy. *See, e.g.*, Jonathan Chait, *The Green New Deal Is a Bad Idea, Not Just a Botched Rollout*, N.Y. MAG. INTELLIGENCER (Feb. 12, 2019), http://nymag.com/intelligencer/2019/02/green-new-deal-aoc-bad-idea.html.

19. *See* H.R. Res. 109 (consisting of 14 double-spaced pages).

20. *Id.* (opening with a summary of the IPCC report's findings); *see also generally* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, GLOBAL WARMING OF 1.5°C, at 177–283 (Valérie Masson-Delmotte et al. eds., 2019), https://www.ipcc.ch/sr15/ (detailing the risks of global warming of 1.5°C or more, including ecosystem and species loss; increased drought, heatwaves, and flooding; declining ocean and agricultural productivity; decreased water and food security; and continuing sea-level rise into the next century).

21. The Resolution's ten-year mobilization period coincides with its call, based on the IPCC's report, for "global reductions in greenhouse gas emissions from human sources of 40 to 60 percent from 2010 levels by 2030." H.R. Res. 109, at 3.

22. An analysis in March 2019 showed the disproportionate attention paid to the Green New Deal on Fox News versus center- or left-leaning networks. Ted MacDonald, *Fox News Discussed the Green New Deal More Often than CNN and MSNBC Combined*, MEDIA MATTERS (Apr. 9, 2019), https://www.mediamatters.org/blog/2019/04/09/Fox-News-discussed-the-Green-New-Deal-more-often-than-CNN-and-MSNBC-combined/223383.

23. Perhaps no reaction to the Green New Deal by a public official has been as bizarre as Senator Mike Lee's speech on the Senate floor in March 2019 with visual aids mocking the idea. *See* Allyson Chiu, *A Senator's Argument Against the Green New Deal: A Machine Gun-Toting Ronald Reagan Riding a Velociraptor*, WASH. POST (Mar. 27, 2019), https://www.washingtonpost.com/nation/2019/03/27/senators-argument-against-green-new-deal-machine-gun-toting-ronald-reagan-riding-velociraptor/?utm_term=.4b6f8eaf49cd (reporting on Senator Lee's effort to lampoon the Green New Deal with a series of posters featuring, among other things, Ronald Reagan astride a velociraptor and scenes taken from *Star Wars* and *Sharknado*).

24. Dino Grandoni & Felicia Sonmez, *Senate Defeats Green New Deal, as Democrats Call Vote a 'Sham'*, WASH. POST (Mar. 26, 2019), https://www.washingtonpost.com/powerpost/green-new-deal-

had a significant impact on the 2020 Democratic presidential primary, serving as a reference point for 2020 candidates in rolling out their environmental, energy, and climate policy agendas.[25]

The Green New Deal represents the potential for a new wave of environmental law, 30 years removed from the last major reform to U.S. environmental law that ended with the Clean Air Act Amendments of 1990.[26] The integration of socioeconomic justice with environmental law provides a new angle for drafting and proposing legislation. However, any new law will also need to be integrated with old laws and will need to address the ongoing implementation challenges those old laws still face.[27]

The idea for societal transformation toward a green economy is, by design, disruptive. Decarbonizing the power, transportation, industrial, and agricultural sectors—while investing in new infrastructure and maintaining a commitment to justice and equity—will require massive transitions in law, policy, and economic activity. Transitions associated with deep decarbonization—such as electrifying transportation, replacing conventional fossil-fuel combustion in the electricity sector with renewable or low-carbon sources, changing agricultural practices, and rethinking urban planning and building design—will necessarily involve massive-scale turnover from large capital investments in carbon-intensive infrastructure to either carbon-free or dramatically more energy-efficient infrastructure.[28] The Green New Deal, as

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on-track-to-senate-defeat-as-democrats-call-vote-a-sham/2019/03/26/834f3e5e-4fdd-11e9-a3f7-78b7525a8d5f_story.html?utm_term=.82df50888782.

25. *See, e.g.*, *Tackling the Climate Crisis Head On*, WARREN DEMOCRATS, https://elizabethwarren.com/plans/climate-change (last visited Apr. 27, 2020) (presenting the Green New Deal as the centerpiece of Elizabeth Warren's plan for climate action); David Roberts, *The 4 Best Ideas from Jay Inslee's New Climate Justice Plan*, VOX (July 30, 2019), https://www.vox.com/energy-and-environment/2019/7/30/20731958/jay-inslee-for-president-climate-change-justice-plan-green-new-deal (arguing that Jay Inslee's proposal offers a detailed execution of the Green New Deal); Umair Irfan, *Beto O'Rourke Now Has the Most Robust Climate Proposal of Any 2020 Presidential Candidate*, VOX (May 1, 2019), https://www.vox.com/2019/4/30/18522680/beto-orourke-2020-climate-change-proposal (comparing Beto O'Rourke's climate plan to Green New Deal proposals backed by the Sunrise Movement).

26. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, 104 Stat. 2399 (codified as amended at 42 U.S.C. §§ 7401–7671q (2018)).

27. *See, e.g.*, J.B. Ruhl, *What Happens When the Green New Deal Meets the Old Green Laws?*, AM. C. ENVTL. LAW. (Mar. 27, 2019), http://www.acoel.org/post/2019/03/27/What-Happens-When-the-Green-New-Deal-Meets-the-Old-Green-Laws.aspx (noting the challenges that building new energy infrastructure faces under the National Environmental Policy Act, Endangered Species Act, and other laws).

28. *See generally* 2 JAMES H. WILLIAMS, BENJAMIN HALEY & RYAN JONES, US 2050 POLICY REPORT: POLICY IMPLICATIONS OF DEEP DECARBONIZATION IN THE UNITED STATES (2015), http://usddpp.org/downloads/2015-report-on-policy-implications.pdf [hereinafter WILLIAMS ET AL., U.S. DDPP POLICY REPORT] (examining strategies and investments the United States must make to limit warming to 2°C or less). This report, which accompanied a technical document outlining pathways for decarbonization by mid-century, was prepared as a country-level contribution to the Deep

now embraced by Ocasio-Cortez and others, is the first big-picture concept for unifying legislative approaches for climate mitigation, adaptation, and resilience with the need for community-minded, inclusive policy to ensure that the green transition is a just one.[29]

In undertaking major economic, social, and regulatory transitions like those envisioned in a Green New Deal, policy design must address the distributional implications—that is, who and which sectors will bear the burdens and costs associated with the transitions. Those who have made significant investments in current infrastructure have an interest in protecting those investments, wanting to avoid shouldering the cost of stranded assets that have become technologically or environmentally obsolete. Policymakers who are concerned about overall cost will want to make transitions as efficient as possible. Notions of fairness and equity also play a role in a green transition in the transportation, energy, and other sectors in determining how to decarbonize while enhancing the welfare not only of those who suffer the most from environmental degradation, but also those workers and communities who may be displaced in a green economy.

This Article addresses the need for engaging with literature on law and transitions in order to assess the legal, policy design, and implementation challenges of a Green New Deal.[30] Regulatory transition theory explains how economic, legal, and political pressures can lead to policies that are counterproductive, unjust, and inefficient. Due in large part to these pressures, the core U.S. environmental law framework developed over the past 50 years has been plagued by overly generous transition relief in the grandfathering of aging infrastructure and through other policies that differentiate between new and existing sources.[31] This history provides important lessons for designing an effective and equitable Green New Deal.

Part I first provides a primer on the Green New Deal, briefly outlining proponents' views as to its scope and various broad plans or options for pursuing a Green New Deal. A key component to understanding the scope of the Green New Deal is a brief assessment of the economic sectors, industries, and social groups that are likely to be affected by Green New Deal

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Decarbonization Pathway Project, led by the United Nations' Sustainable Development Solutions Network and the Institute for Sustainable Development and International Relations.

29. *See* Roberts, *The Green New Deal, Explained*, *supra* note 4 (summarizing the ambition of the Green New Deal as aiming "to decarbonize the economy and to make it fairer and more just").

30. I do not intend to make any particular claim in this Article about which specific policies should or should not be in a Green New Deal, such as which technologies should be preferred or excluded for energy generation. Rather, the focus is on the broad policy goals expressed in the Green New Deal Resolution and accompanying discourse, and how policy design can impact the equity, efficacy, efficiency, and political feasibility of the major transitions inherent in any notion of the Green New Deal.

31. *See infra* Part III.

transitions.[32] This Part further articulates four principles for designing green transitions: equity, efficacy, efficiency, and political coalition-building.[33] Part II introduces and reviews relevant literature on regulatory-transition theory, including a typology of transition relief. Part III discusses past legal and regulatory transitions, using case studies and critiques of previous transitions in environmental and energy law and placing them in the context of planning and implementing a Green New Deal. Part IV applies these lessons and concludes the Article by addressing some additional considerations in green transitions law, including how to deal with intergenerational concerns and vexing questions of baselines and timescales for a global, long-term problem like climate change. The literature on regulatory transitions and on environmental policy implementation identify a variety of solutions that can be built into Green New Deal-policy planning.[34] Many solutions for transitions that can be effectively implemented are generally intuitive but do face significant political economy challenges and legal barriers.[35]

I. GREEN TRANSITIONS: A GREEN NEW DEAL PRIMER

Since the Green New Deal caught hold as a rallying cry for progressive policy near the end of 2018, a wide range of actors—including Members of Congress, presidential candidates, governors, mayors, newspaper columnists, progressive advocacy groups, environmental non-profit organizations, think tanks, and others—have put forward ideas and plans to define the scope and objectives of a Green New Deal.[36] Although these visions differ in significant ways, I will refer to the Green New Deal Resolution as introduced in Congress,[37] as well as a policy document released

32. *See infra* text accompanying note 75 and Table 1.

33. *See infra* Part I.C.

34. *See infra* Part IV.A.

35. *See infra* Part IV.B.

36. *See, e.g.*, Renae Merle & David Weigel, *Ocasio-Cortez, Sanders Pitch Green New Deal Bill for Public Housing*, WASH. POST (Nov. 14, 2019), https://www.washingtonpost.com/business/2019/11/13/ocasio-cortez-sanders-pitch-green-new-deal-bill-public-housing/ (reporting on a bill proposed by Representative Ocasio-Cortez and Senator Sanders that would make the Nation's 1 million public housing units carbon-neutral by 2030); *supra* note 25 (citing climate action proposals from three 2020 presidential candidates); GREG CARLOCK ET AL., DATA FOR PROGRESS, A GREEN NEW DEAL (2018), http://filesforprogress.org/pdfs/Green_New_Deal.pdf (translating the Green New Deal's progressive vision into a set of policy goals and investments).

37. H.R. Res. 109, 116th Cong. (2019).

by the group New Consensus,[38] as a starting point for understanding the key components of any Green New Deal plan.

A. Green New Deal Goals

At the core of the Green New Deal is a set of five central goals that balance environmental objectives and social- and economic-justice concerns. The Green New Deal Resolution describes these five goals, calling on the federal government to enact a Green New Deal as follows:

> (A) to achieve net-zero greenhouse gas emissions through a fair and just transition for all communities and workers;
>
> (B) to create millions of good, high-wage jobs and ensure prosperity and economic security for all people of the United States;
>
> (C) to invest in the infrastructure and industry of the United States to sustainably meet the challenges of the 21st century;
>
> (D) to secure for all people of the United States for generations to come—
>
> (i) clean air and water;
> (ii) climate and community resiliency;
> (iii) healthy food;
> (iv) access to nature; and
> (v) a sustainable environment; and
>
> (E) to promote justice and equity by stopping current, preventing future, and repairing historic oppression of indigenous peoples, communities of color, migrant communities, deindustrialized communities, depopulated rural communities, the poor, low-income workers, women, the elderly, the unhoused, people with disabilities, and youth (referred to . . . as "frontline and vulnerable communities")[.][39]

The Green New Deal calls for a "mobilization" over a ten-year period to enact legislation and implement policy changes that will achieve these goals.[40] That mobilization is to be geared toward an extensive list of

38. RHIANA GUNN-WRIGHT & ROBERT HOCKETT, NEW CONSENSUS, THE GREEN NEW DEAL (2019), https://s3.us-east-2.amazonaws.com/ncsite/new_conesnsus_gnd_14_pager.pdf.

39. H.R. Res. 109, at 5–6.

40. *Id.* at 6.

objectives, including climate and disaster resiliency; infrastructure repair and upgrades; zero-greenhouse-gas (GHG) electricity; grid improvements and electricity access; retrofitting "all existing buildings" to improve energy efficiency; incentivizing low-polluting manufacturing and industry; addressing agricultural emissions; "overhauling transportation systems," including investment in public transit, high-speed rail, and zero-emission vehicles; funding programs that address the "adverse health, economic, and other effects of pollution and climate change" at a community level; land-use-based carbon dioxide (CO_2) removal; ecosystem restoration; hazardous waste and other pollution cleanup; and "international exchange of technology, expertise, products, funding, and services" to facilitate global achievement of Green New Deal goals.[41]

The top-line goal—complete decarbonization to net-zero GHG emissions in the United States—and the specificity of the timelines for results have been significant points of controversy among climate activists, environmentalists, and other climate hawks.[42] Some proponents of the Green New Deal in the Sunrise Movement,[43] and many critics of the Green New Deal,[44] have assumed that the Resolution calls for particular results, including complete decarbonization of the U.S. economy (or net-zero GHG emissions) by 2030. This has fueled criticism that the Green New Deal is unreasonably ambitious or technically infeasible.[45] Rather than setting specific timelines for results, the ten-year "mobilization" can also be seen as a timeframe set for actions that transition the economy toward a sustainable result, recognizing (perhaps) that different components of the transition may take more or less time to accomplish.[46]

The Resolution's listing of what goals are part of the Green New Deal project is important, but equally important is the description of *how* the policies to implement the goals will be developed. The Resolution calls for

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41. *Id.* at 7–10.

42. On the term "climate hawk," see David Roberts, *Introducing "Climate Hawks"*, GRIST (Oct. 21, 2010), https://grist.org/article/2010-10-20-introducing-climate-hawks/.

43. *See* Irfan, *supra* note 25 (reporting on the Sunrise Movement's critical response to Beto O'Rourke's plan of reducing emissions to 50% of current levels by 2030).

44. This has been a particularly controversial point. Many critiques of the Green New Deal, and some writings in support, have made this assumption. *See, e.g.*, Dan Farber, *To Dream the Impossible Dream*, LEGAL PLANET (Feb. 8, 2019), http://legal-planet.org/2019/02/08/to-dream-the-impossible-dream/.

45. *See* Cass R. Sunstein, Opinion, *The Misguided Idea in the House's Green New Deal*, BLOOMBERG (Feb. 26, 2019), https://www.bloomberg.com/opinion/articles/2019-02-26/green-new-deal-in-congress-has-a-big-flaw (emphasis added) (criticizing the Resolution's call for doing "as much as is technologically feasible," but acknowledging that the ten-year national mobilization called for "need not be read to insist on immediate *action*.").

46. *Id.*

"transparent and inclusive consultation, collaboration, and partnership with frontline and vulnerable communities" and others, "so that all people of the United States may be full and equal participants in the Green New Deal mobilization" and gain the benefits of living-wage jobs, health care, housing, economic security, and "clean water, clean air, healthy and affordable food, and access to nature."[47]

The New Consensus paper from January 2019 lays out the relationship between the environmental and socioeconomic ambitions of the Green New Deal, explaining the significance of the name:

> The Green New Deal is "Green" in the sense that its aim is to modernize our economy comprehensively so that we no longer have to poison our environment, subsidize decaying infrastructure, and sacrifice poor and working class communities to all manner of pollution and environmental degradation, simply to produce wealth that benefits a tiny fraction of Americans.
>
> It is a "New Deal" in the sense that it works on a scale not seen in our country since the New Deal and World War II mobilizations—carefully developed series of historic national projects, conducted on a grand scale, that put scores of millions of Americans back into productive and high-paying jobs and transformed our economy into the greatest engine of production and widely shared prosperity that the world had ever known.[48]

The comparison to the New Deal brings the idea of transition through government action and investment at a nationwide scale.[49] Though the Green New Deal is billed as a climate change response, to view it only as such would be to inappropriately emphasize the "Green" over the "New Deal."[50]

It is important to recognize that the original New Deal was deeply flawed by the inequity of some of its best-known programs. For example, New Deal-era banking, credit, and housing policies excluded black Americans from many of the programs that created the post-war American middle class.[51] Government-backed mortgages, handled by agencies that "redlined" black neighborhoods, enabled the construction of white-dominated suburbs.[52]

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47. H.R. Res. 109, 116th Cong., at 10–14 (2019).

48. GUNN-WRIGHT & HOCKETT, *supra* note 38, at 5 (emphasis omitted).

49. *Id.*

50. *See id.* (emphasis omitted) ("Equity is . . . as central to the design and goals of the Green New Deal as is addressing the existential threat of climate change.").

51. Mehrsa Baradaran, *Jim Crow Credit*, 9 U.C. IRVINE L. REV. 887, 889–90 (2019).

52. *Id.* at 890.

Generations later, the impact of these programs is still clearly reflected in the wide disparity between the average wealth and assets of black versus white households in the country.[53] Thus, while Green New Deal proponents draw on the rhetoric of the FDR Administration during the Great Depression and World War II, they also envision the Green New Deal as the fulfillment of the original New Deal's promise for those who were intentionally excluded or left behind.[54]

The remainder of Part I lays out the basic scope of what a Green New Deal might entail in achieving the five central goals of decarbonization, job security, infrastructure investment, environmental protection, and equity. I do not intend to provide any kind of comprehensive view of these topics or normative claim about what should be considered within these five goals; rather, this overview highlights the types of economic and social transitions that these goals would require.

B. Decarbonization: Social and Economic Transitions in Energy, Transportation, Industry, Agriculture, and Land Use

America runs on carbon. During the past century, we have built cities, streets, roadways, and transportation corridors—to move ourselves and our goods—dependent on the use of automobiles powered by gasoline.[55] We light our homes, power our electronic devices, and keep ourselves cool with electricity, the majority of which still comes from fossil fuels.[56] We eat meat and crops grown in agricultural systems that release methane, nitrous oxide,

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53. *See* Courtney E. Martin, Opinion, *Closing the Racial Wealth Gap*, N.Y. TIMES (Apr. 23, 2019), https://www.nytimes.com/2019/04/23/opinion/closing-the-racial-wealth-gap.html (citing data to show that "[t]he median white family has 41 times more wealth than the median African-American family and 22 times more wealth than the median Latino family," much of which is attributable to differences in homeownership and home values).

54. *See, e.g.*, GUNN-WRIGHT & HOCKETT, *supra* note 38, at 5 (describing the potential for the Green New Deal to "redeem [the] great promise" of FDR's vision, including the "Second Bill of Rights" proposed later in his administration).

55. For a reflection on the history of development around cars, see Nathan Heller, *Was the Automotive Era a Terrible Mistake?*, NEW YORKER (July 29, 2019), https://www.newyorker.com/magazine/2019/07/29/was-the-automotive-era-a-terrible-mistake.

56. In 2019, 38% of U.S. electricity generation came from natural gas, 23% from coal, and 1% from petroleum. *Electricity Explained: Electricity in the United States*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/index.php?page=electricity_in_the_united_states (last updated Mar. 20, 2020).

and other GHGs,[57] and we buy and use products manufactured with fossil fuels.[58]

In 2017, the United States emitted 6.457 million metric tons[59] of GHGs.[60] Although the United States has reduced emissions from a peak of 7.37 million metric tons in 2007, a large proportion of the economy, as well as millions of jobs, rely directly or indirectly on fossil fuels or other GHG-emitting industries.[61]

Five major sectors account for the bulk of GHG emissions in the United States: transportation, electricity generation, agriculture, industry, and residential and commercial energy use.[62] Transportation overtook electricity generation as the country's largest source of emissions, with 28% of the U.S. total in 2018.[63] While land use change and deforestation are major drivers of climate change globally—and land use changes accounted for a significant portion of U.S. emissions during past eras, as large swaths of forest were cleared—the United States is, in recent decades, a negative emitter of land-use-change CO_2, with more trees being planted than cut down.[64]

The Green New Deal Resolution does not articulate specific pathways for the decarbonization of various sectors of the U.S. economy, and Green

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57. *See* Stephen Russell, *Everything You Need to Know About Agricultural Emissions*, WORLD RESOURCES INST. (May 29, 2014), https://www.wri.org/blog/2014/05/everything-you-need-know-about-agricultural-emissions (identifying methane and nitrous oxide as the primary GHGs emitted by agriculture and specifying that most methane comes from cattle and most nitrous oxide comes from natural and synthetic fertilizers).

58. For data on the sources of GHGs in the U.S. industrial sector, see *Sources of Greenhouse Gas Emissions*, U.S. EPA, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions (last updated Apr. 11, 2020) [hereinafter U.S. EPA, *Sources of Greenhouse Gas*].

59. The figure is measured in CO_2-equivalent, to account for CO_2 (responsible for over 80% of the warming impact of U.S. emissions), along with methane, nitrous oxide, hydrofluorocarbons, sulfur hexafluorides, and other gases, some of which have a dramatically higher global warming potential per molecule than CO_2. *See* U.S. ENVTL. PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS 1990–2017, at ES-4, ES-9 (2019), https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf [hereinafter GREENHOUSE GAS INVENTORY]. The number represents the gross GHG emissions in the United States; net reforestation in the country reduces the United States' overall GHG emissions. *Id.*

60. Generic references in this Article to "greenhouse-gas emissions" or "carbon dioxide" include all recognized and inventoried GHGs, unless otherwise indicated.

61. *See* GREENHOUSE GAS INVENTORY, *supra* note 59, at ES-4 (charting emissions by year); *id.* at ES-10 to ES-17 (listing major sources of CO_2 and other GHGs).

62. U.S. EPA, *Sources of Greenhouse Gas*, *supra* note 58. In this categorization, electricity generation includes the emissions associated with residential, commercial, and industrial electricity use, accounting for them at the point of emissions at the power plant; separate categories for industry, residential, and commercial emissions refer to primary energy consumption or other on-site GHG emissions. *Id.*

63. *See id.* (reporting that, in 2018, 28% of GHG emissions came from transportation and 27% came from electricity generation).

64. *See* GREENHOUSE GAS INVENTORY, *supra* note 59, at ES-8 (showing that land-use change is a net carbon sink in the United States).

New Deal proponents have not agreed on details or priorities about how to target emissions sources.[65] However, climate policy advocates, scholars, and others have proposed a wide variety of pathways and plans in the past several years, outlining the types of changes that could lead to an 80% reduction of GHG emissions.[66] The purpose here is not to focus on specifics, but rather to indicate in broad terms the types of transitions envisioned in any plan consistent with the Green New Deal. Whatever its form, the Green New Deal will displace significant portions of the economy, replacing that economic activity with investment in new transportation and energy infrastructure, industrial practices, updates to residential and commercial buildings, and agriculture.[67] A brief discussion of how communities, employment sectors, and industries are likely to be affected by the Green New Deal provides necessary context for analyzing how law and policy can impact these transitions.

In 2013, the United Nations' Sustainable Development Solutions Network (SDSN) and the Institute for Sustainable Development and International Relations (IDDRI, in French) launched a program, the Deep Decarbonization Pathway Project (DDPP), under which policy experts in dozens of countries have drafted country-level reports analyzing potential feasible pathways for decarbonization.[68] In the United States, a team of researchers affiliated with the consulting group Energy and Environmental Economics, Inc. (E3), the Lawrence Berkeley National Laboratory, and the Pacific Northwest National Laboratory developed technical and policy pathways reports for 80% reduction in GHGs by 2050.[69]

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65. *See supra* Part I.A.

66. *See, e.g.*, 1 JAMES H. WILLIAMS, BENJAMIN HALEY, FREDRICH KAHRL, JACK MOORE, ANDREW D. JONES, MARGARET S. TORN & HAEWON MCJEON, US 2050 TECHNICAL REPORT: PATHWAYS TO DEEP DECARBONIZATION IN THE UNITED STATES 7 (Revision with Technical Supp. 2015), https://usddpp.org/downloads/2014-technical-report.pdf [hereinafter WILLIAMS ET AL., U.S. DDPP TECHNICAL REPORT] (proposing a plan to attain an 80% reduction in GHG emissions from their 1990 level by pursuing "(1) energy efficiency, including improved equipment and building envelopes; (2) fuel switching, including electrification and a shift to lower net CO2 gas and liquid fuels in end use sectors (3) decarbonization of energy supplies").

67. *See infra* text accompanying note 75 and Table 1.

68. *About*, DEEP DECARBONIZATION PATHWAYS PROJECT, http://deepdecarbonization.org/about/ (last visited Apr. 27, 2020) (providing reports for Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, South Africa, South Korea, the United Kingdom, and the United States); *see also* WILLIAMS ET AL., U.S. DDPP TECHNICAL REPORT, *supra* note 66, at 1 (stating that the collaboration began in the fall of 2013). One of the main directors of the project has been renowned development economist Jeffrey Sachs. *Id.* at i.

69. WILLIAMS ET AL., U.S. DDPP TECHNICAL REPORT, *supra* note 66; WILLIAMS ET AL., U.S. DDPP POLICY REPORT, *supra* note 28. Both reports are available at *Countries: United States*, DEEP DECARBONIZATION PATHWAYS PROJECT, http://deepdecarbonization.org/countries/#united-states (last visited Apr. 27, 2020). Although the Green New Deal calls for full decarbonization, rather than 80%

The U.S. DDPP reports in 2014 and 2015 concluded that this level of decarbonization is "technically feasible" but requires a "transformation of the U.S. energy system," allowing for a few different combinations of choices about technologies.[70] The report focuses on three major transitions: (1) dramatic increases in energy efficiency in buildings, transportation, and industry; (2) full conversion of the electricity-generating sector to zero-GHG sources; and (3) switching from gasoline to electricity in transportation and from fossil fuels in other end-use sectors (such as industry, residential heating, etc.).[71]

Because the DDPP report focuses primarily on CO_2 from fossil-fuel use, it does not specifically address transitions that would be needed to reduce other GHGs.[72] Mitigation of CO_2 would also modestly reduce some other GHG emissions.[73] Transitions in agricultural, forestry, and land-use practices are also critical to any overall national decarbonization strategy.[74]

All of these broad transitions, by definition, will displace a variety of communities by significantly altering employment patterns, and will introduce costs that—without legal and policy changes in managing the transition—are likely to disproportionately impact poor and marginalized communities.[75]

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reduction, the DDPP report includes a wealth of detail and modeling that is useful in envisioning the technical requirements and policy implications for any significant cut in GHG emissions. *See id.*

70. WILLIAMS ET AL., U.S. DDPP TECHNICAL REPORT, *supra* note 66, at 8, 69.

71. *Id.* at xiv.

72. *See id.* at 49–55 (describing a model for reduction of GHGs other than CO_2 and for CO_2 emissions from forestry and land-use change).

73. For example, reducing demand for natural gas—a CO_2 source when it is burned—also leads to a reduction in the amount of methane, another GHG, that leaks directly into the atmosphere during natural gas production. *See id.*

74. *See* Aashna Aggarwal, Danielle Arostegui, Kendall DeLyser, Bethany Hewett, Emily Johnson & Alexander Rudee, *Achieving the Mid-Century Strategy Goals for Deep Decarbonization in Agriculture and Forestry* (Duke Univ. Nicholas Inst. for Envtl. Policy Solutions, Working Paper No. NI WP 18-02, 2018), https://nicholasinstitute.duke.edu/sites/default/files/publications/achieving_the_mid-century_strategy_goals_for_deep_decarbonization_web.pdf (examining decarbonization strategies for agriculture and forestry policy).

75. *See infra* Table 1.

Table 1. Illustrative impacts of transitions associated with decarbonization

Transition	Negative Economic, Environmental, or Employment Impacts	Positive Economic, Environmental, or Employment Impacts
Decarbonization of Electricity Generation		
Closing coal-fired and natural gas-fired power plants	Loss of power plant operation jobs	Lower pollution levels for nearby communities
Reduced demand for coal	Loss of coal mining and processing jobs	Reduced health impacts for coal sector employees; lower pollution and localized environmental impacts from mining
Reduced demand for natural gas	Loss of jobs in natural gas exploration, production, processing, and transportation sectors	Lower pollution and localized environmental impacts from resource extraction, processing, and transportation
Construction of wind, solar, and other zero-GHG power	Localized environmental impacts from construction and operations, as well as on-shore and off-shore transmission infrastructure; potential increase in electricity prices	Increased employment in construction, installation, and maintenance
Fuel Switching in Transportation and Other Sectors		
Switching from gasoline-powered to electric vehicles	Potential displacement of jobs in auto manufacturing, at car dealerships, car repair shops, gas stations and related transportation infrastructure; higher up-front costs for vehicles	Lower air pollution levels in cities and areas with high concentration of vehicles; economic savings in vehicle operation and maintenance
Fuel switching in residential and commercial buildings	Cost of replacing appliances, HVAC systems, etc.	Decreased environmental and safety risks from distribution of natural gas and other fuels

Buildout of transit systems	High up-front cost of construction	Availability of transportation options, facilitating employment and economic activities; reduced local pollution from personal vehicles
Changes in urban development patterns (smart growth)	More intense use of some urban areas	Increased livability and walkability of neighborhoods; lower transportation demand
Decarbonization/fuel switching in industry	Displaced or lost jobs; increased cost	Lower localized and regional pollution from industrial emissions; new employment in low-carbon industrial processes
Energy Efficiency Improvements		
Energy efficiency construction and retrofits (residential, commercial, and industrial)	Higher construction costs; cost of retrofitting	New employment in construction and retrofitting; cost savings from reduced energy demand
Reducing GHG Emissions from Agriculture and Other Sectors		
Transition to low-methane, low N_2O, and low-CO_2 agricultural practices	Displaced or lost jobs; increased food prices	New employment in different agricultural practices and processes; reduced localized environmental impacts (e.g., water pollution)

Table 1 lists as illustrative examples some of the impacts that would be likely to occur in the major transitions associated with decarbonizing the U.S. economy. These impacts are listed in broad terms and are not comprehensive, but rather provide a starting point for understanding the "winners" and "losers" from climate policy. The contribution of Green New Deal discourse is its explicit recognition that no serious climate policy can be neutral in its socioeconomic impacts, which leads to the Green New Deal's focus on addressing those impacts purposefully and simultaneously with climate mitigation.[76]

Sociological, political, and legal literature on *just transitions* connects labor and environmental concerns by examining the social and economic consequences of environmentally-motivated transitions.[77] More recently, commentators and scholars have referred to just transitions specifically in the context of climate change and the intergenerational concept of sustainable development, given the wide-ranging impacts and displacements inherent in comprehensive climate policy (as indicated in Table 1).[78] Ann Eisenberg's recent work on this subject clarifies the concept, defending just transition as a legal principle—with origins in the labor movement—that can "serve principles of economic equity, . . . make climate reform more achievable through coalition-building, and . . . bring environmental law more in line with the needs of the climate era."[79]

Political rhetoric and media narratives frequently highlight the impact of climate-related transitions on fossil-fuel sector employment—particularly in the coal industry.[80] For coal-mining communities in the Appalachian region,

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76. *See* GUNN-WRIGHT & HOCKETT, *supra* note 38, at 9 ("Deciding who can participate in the Green New Deal means . . . . deciding who can benefit from the economy and who cannot; who can transform income into wealth and who cannot; and whose children will prosper in the next generation and whose will not.").

77. *See, e.g.*, Ann M. Eisenberg, *Just Transitions*, 92 S. CAL. L. REV. 273, 285–89 (2019) (surveying prior work on just transitions, beginning with labor activism on environmental issues for workers and continuing in various fields of social-science scholarship).

78. For example, in 2012, the United Nations Conference on Sustainable Development (Rio+20) used "green economy" as one of the conference's organizing themes. Global institutions picked up on the concept as a way to emphasize the economic challenges and opportunities associated with sustainable development. The Rio+20 Conference's outcome document itself uses the phrase "green economy" 23 times. G.A. Res. 66/288 (July 27, 2012).

79. Eisenberg, *supra* note 77, at 329.

80. In July 2019, the sixth-largest coal company in the United States, Blackjewel, ceased operations at its mines in Harlan County, Kentucky; miners employed by the company camped out on train tracks to block coal shipments to protest the company's failure to pay them for the last few weeks of work they performed before the mine closures. Chris Kenning, *"We Just Want Our Back Pay": Busloads of Angry Laid-off Kentucky Coal Miners Head East*, LOUISVILLE COURIER J. (Aug. 4, 2019), https://www.courier-journal.com/story/money/companies/2019/08/04/kentucky-coal-miners-blocking-train-busing-west-virginia-pay/1902073001/.

the transition began decades ago, as coal production shifted toward higher-yielding areas in Wyoming and elsewhere.[81] The declining cost of natural gas and renewables that compete as electricity sources, together with increased regulation and environmental enforcement, have accelerated the decline of coal sector employment.[82]

Rapid growth in unconventional oil and gas development, as well as the building out of renewable-energy infrastructure, have created new employment opportunities at the same time that coal mining jobs disappear.[83] However, the benefits of this transition (some of which have mixed or negative environmental impacts in comparison to other energy and resource extraction activities) flow to different geographical areas and to different communities.[84]

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81. In 2017, 40% of U.S. coal was produced in Wyoming—significantly more than the 26% from the Appalachian region of Alabama, Eastern Kentucky, Maryland, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. *Coal Explained: Where Our Coal Comes From*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/index.php?page=coal_where (last updated Nov. 13, 2019). Wyoming's massive share of the nation's coal was produced by only 5,700 miners—11% of the country's employed miners. U.S. ENERGY INFO. ADMIN., ANNUAL COAL REPORT 2017, at 27 tbl.18 (2018), https://www.eia.gov/coal/annual/archive/05842017.pdf [hereinafter ANNUAL COAL REPORT 2017].

82. U.S. Department of Labor statistics show a nationwide decline from roughly 175,000 people employed by coal-mining companies in 1985 to 80,000 in 2010, followed by a further decline to record lows around 50,000 jobs from 2016 to 2019. The Department's month-by-month data is available at *BLS Data Viewer*, BUREAU OF LAB. STATS., https://beta.bls.gov/dataViewer/view/timeseries/CES1021210001 (last visited Apr. 27, 2020). More information on the coal sector is available in the U.S. Energy Information Administration's *Annual Coal Report*—visit https://www.eia.gov/coal/annual/ to access the most recent report. While different organizations' counts of sector-wide employment differ, depending on what is included (e.g., employment in coal-fired power-plant operations, etc.), the trends show similar declines. *E.g.*, *U.S. Labor Department: Coal Mining Employment Fell to Record Low in 2018*, INST. FOR ENERGY ECON. & FIN. ANALYSIS (Feb. 5, 2019), http://ieefa.org/u-s-labor-department-coal-mining-employment-fell-to-record-low-in-2018/ (citing a record-low, nationwide figure of 80,778 people "employed by mine operators and contractors").

83. *See*, *e.g.*, Naveena Sadasivam, *Oil and Gas Emissions Are Reversing Progress from Coal's Decline*, GRIST (Jan. 8, 2020), https://grist.org/energy/oil-and-gas-emissions-are-reversing-progress-from-coals-decline/ (contrasting the growth and investment in oil and natural gas plants with the decline in coal production and generation); Silvio Marcacci, *Renewable Energy Job Boom Creates Economic Opportunity as Coal Industry Slumps*, FORBES (Apr. 22, 2019), https://www.forbes.com/sites/energyinnovation/2019/04/22/renewable-energy-job-boom-creating-economic-opportunity-as-coal-industry-slumps/#4ec6226b3665 (contrasting renewable energy's recent boom in production and employment with coal's decline).

84. Unconventional oil and gas production has been highest in oil-shale basins, including in North Dakota, Pennsylvania, and Texas; wind and solar energy development has been concentrated in particular states due to a combination of both geographic and policy favorability. *See Natural Gas Explained: Where Our Natural Gas Comes from*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/natural-gas/where-our-natural-gas-comes-from.php (last updated Nov. 13, 2019) (mapping natural gas extraction in the United States); *Oil: Crude and Petroleum Products Explained: Where Our Oil Comes from*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/oil-and-petroleum-products/where-our-oil-comes-from.php (last updated Mar. 30, 2020) (mapping oil extraction in the United States); *Solar Explained: Where Solar is Found and Used*, U.S. ENERGY INFO. ADMIN.,

Asymmetries in the costs and benefits of policy changes—such as these described above—are pervasive in climate and environmental policy. Opponents of environmental regulation frequently raise the specter of lost jobs, economic hardship, and financial burdens as an objection to major changes.[85] In response, advocates for renewable energy, green infrastructure development, and other climate-related measures—in addition to or in place of environment-based arguments—often frame the benefits of these transitions in terms of employment impacts.[86] In the early years of the Obama Administration, the President and senior officials leaned heavily on this rhetoric in pushing for energy- and environment-related investments in the economic stimulus package that was enacted in February 2009.[87] For three years, the Bureau of Labor Statistics tracked "green jobs" as a category, including "jobs in businesses that produce goods and provide services that benefit the environment or conserve natural resources," as well as "jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources."[88] However, the Bureau discontinued this categorization under budget cuts in 2013.[89]

Notwithstanding the rhetoric of green jobs as a response to anti-regulatory criticisms at a macro level, the idea by itself fails to engage with the local displacement of jobs that are not so easily translatable into new opportunities. As posited in Table 1, local communities and workers experience environmental benefits when a refinery or coal mine closes; however, without some policy effort to smooth the transition or redistribute

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https://www.eia.gov/energyexplained/solar/where-solar-is-found.php (last updated Apr. 2, 2020) (mapping solar power in the United States); *Wind Explained: Where Wind Power is Harnessed*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/wind/where-wind-power-is-harnessed.php (last updated Mar. 24, 2020) (mapping wind power in the United States).

85. Examples of this rhetoric are too frequent to track. In President Trump's July 2019 address on environmental issues, he argued that the Green New Deal would "kill millions of jobs" and placed environmental protection and jobs in opposition to one another with the line: "We will defend the environment, but we will also defend American sovereignty, American prosperity, and we will defend American jobs." *Remarks by President Trump on America's Environmental Leadership*, WHITE HOUSE (July 8, 2019), https://www.whitehouse.gov/briefings-statements/remarks-president-trump-americas-environmental-leadership/.

86. *See, e.g.*, Michelle Chen, *Where Have All the Green Jobs Gone?*, NATION (Apr. 22, 2014), https://www.thenation.com/article/where-have-all-green-jobs-gone/ (describing the promise of green jobs during the Obama Administration and under the American Recovery and Reinvestment Act in 2009 and referring to earlier hopes of a "Green New Deal" at the time).

87. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115. *See* Chen, *supra* note 86 (recalling the promise that the stimulus package would create green jobs).

88. *Fact Sheet—Jobs in Renewable Energy and Energy Efficiency (2015)*, ENVTL. & ENERGY STUDY INST. (Nov. 6, 2015), https://www.eesi.org/papers/view/fact-sheet-jobs-in-renewable-energy-and-energy-efficiency-2015.

89. *Id.*

benefits, that positive impact is offset at the local level by job losses and secondary economic impacts on businesses and industries that rely on the presence of now-displaced workers.[90]

This same dynamic—with concerns over distributive justice—plays out in various other sectors that could be affected by a Green New Deal and associated transitions. For example, switching from gasoline-burning cars to electric vehicles (as well as fuel efficiency improvements) provides climate benefits as well as health benefits in communities near highways or in cities with high smog levels; however, increased up-front costs of purchasing new vehicles are a heavier burden for low-income households.[91] The disconnect between benefits and burdens illustrates the point: climate policy cannot be socially neutral. Because it will induce transitions, climate policy has the potential to exacerbate existing rural-urban, racial, gender, and wealth disparities without intervention to manage those transitions.

C. Four Principles for Green Transitions

In light of the overarching goals for a Green New Deal—integrating action for environmental and climate sustainability into programs for social equity and development[92]—this Article proposes four principles to evaluate green transitions and the way in which law and policy might affect them. First, in the context of the above discussion on distributive justice, *equity* ought to animate and drive transition-policy design as a first-order concern, both in terms of who bears the costs of transitions, as well as who bears the burdens of climate and environmental impacts. Second, policies should be measured on *effectiveness*, or rather, the extent to which they accomplish transition objectives. Third, and relatedly, the *efficiency* of policy is important. Although economic cost ought not be considered in isolation of other factors, conserving resources allows for further investments in transition policy.

The fourth principle is the consideration of *political feasibility*. The legal and policy tools that policymakers choose in designing transitions will affect

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90. In an interview, one of the Kentucky coal miners protesting the lack of pay from Blackjewel after it declared bankruptcy put it this way: "Job training would be great, but you could have all the training in the world and if there's not jobs here, we have to move away." Sarah Lazare, *Kentucky Coal Miners Are Blocking a Coal Train for Back Pay. We Talked to One About a Just Transition*, IN THESE TIMES (Aug. 5, 2019), http://inthesetimes.com/working/entry/22005/kentucky-coal-miners-blackjewel-block-train-climate-justice-just-transition.

91. PUGET SOUND CLEAN AIR AGENCY, FACILITATING LOW INCOME UTILIZATION OF ELECTRIC VEHICLES 1 (2018), https://pscleanair.gov/DocumentCenter/View/3638/Community-Electric-Car-Sharing----Executive-Summary?bidId=.

92. *See supra* text accompanying note 39 (quoting the goals from the Green New Deal Resolution, H.R. Res. 109, 116th Cong. (2019)).

the constituencies that will support those transitions. This principle is important, not just in evaluating the prospects for enacting reform, but also for reasons of path dependency: coalition-building in policy design can help make law "stick" by facilitating implementation and reducing economic or political incentives for backlash against the policy.[93] Well-designed transition policy is self-reinforcing, creating a greater likelihood of continued reform in the future, rather than less.

With these framework principles in mind, the next Part turns to examine regulatory transition theory as a method for explaining, as a descriptive matter, how and why legal and regulatory transitions occur in practice and how policy design influences the transition process as well as transition outcomes. Following this theoretical introduction is an analysis of previous changes in environmental law and policy as examples.[94] Applying the framework of principles for green transitions to historical examples highlights the successes as well as the failures of those changes. Placing them within the context of regulatory transition theory affords an opportunity to understand why transitions fail and how a Green New Deal can lead to more equitable and lasting outcomes.

II. REGULATORY TRANSITION THEORY

Times change, as do laws and regulations. Major economic transitions can occur with or without the influence of law and policy. For example, scarcity of resources, technological developments, demographic shifts, or a variety of other causes may drive change that makes types of economic activities obsolete.[95] During any period of change, decisionmakers may alter laws or policies in order to meet their priorities for managing an ongoing transition.[96]

When policy changes are intended to force or shape economic or social transitions, policymakers also face the challenge of addressing foreseen transitions—and the expected economic and social costs—before they

93. *Cf.* Eisenberg, *supra* note 77, at 312 (arguing that environmentalists might have more success achieving climate and environmental action if they join forces with labor advocates).

94. *See infra* Part III.

95. *See* John M. Anderies, *Economic Development, Demographics, and Renewable Resources: A Dynamic Systems Approach*, 8 ENV'T DEV. ECON. 219, 219 (2003) (exploring the causes of economic transitions).

96. *Id.*

occur.[97] Regulatory transition theory provides a model for explaining how lawmakers and regulators manage these transitions.[98]

Transitions occur in every type of regulation and in every regulated sector. Economic scholarship on legal transitions has focused on how regulators allocate economic costs.[99] For example, tax policy scholarship has specifically addressed one type of regulatory transition—i.e., changes in the rates, categories, or applicability of taxation—and the associated financial impacts and changes in incentives.[100] Environmental law scholarship, in turn, has addressed some of the economic implications of transition policy, giving particular attention to the Clean Air Act.[101] Less attention in environmental scholarship has been paid to policies intended to address the social impacts of transition policy, including the disruption of communities that rely on regulated industries directly and indirectly for employment.[102]

This Part sets out an overview of the literature of regulatory transition theory in order to highlight its relevance to Green New Deal discourse. Prior experiences demonstrate valuable lessons about how to make environmental policy transitions consistent with the four principles identified earlier—how to make legal changes equitable, effective, efficient, and politically feasible.[103] Several elements are important, including a typology of *transition relief* to complement policy change,[104] a discussion of the problems associated with transition relief, drawing on political economy scholarship

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97. *Cf.* Eisenberg, *supra* note 77, at 321–22 (analyzing conditions, like foreseeability, that justify active intervention to ease economic transitions).

98. What I refer to in this Article as "regulatory-transition theory" is, specifically, focused on understanding transitions when there is a regulatory change intended to drive that transition.

99. *See generally, e.g.*, Louis Kaplow, *An Economic Analysis of Legal Transitions*, 99 HARV. L. REV. 509 (1986) (arguing that the market offers the most efficient method for allocating the risk involved in legal transitions).

100. *See generally, e.g.*, DANIEL SHAVIRO, WHEN RULES CHANGE: AN ECONOMIC AND POLITICAL ANALYSIS OF TRANSITION RELIEF AND RETROACTIVITY (2000) (examining transitions in the area of federal income tax law); Michael J. Graetz, *Legal Transitions: The Case of Retroactivity in Income Tax Revision*, 126 U. PA. L. REV. 47 (1977) (analyzing the effect of retroactivity and grandfathering in tax-law changes).

101. *See, e.g.*, Bruce Huber, *Transition Policy in Environmental Law*, 35 HARV. ENVTL. L. REV. 91, 114–21, 126–30 (2011) (providing a case study of transition relief under the Clean Air Act's regulation of heavy-duty diesel engines); Jonathan Remy Nash & Richard L. Revesz, *Grandfathering and Environmental Regulation the Law and Economics of New Source Review*, 101 NW. U. L. REV. 1677, 1724–32 (2007) (looking at the economic consequences of grandfathering in the Clean Air Act); Robert N. Stavins, *Vintage-Differentiated Environmental Regulation*, 25 STAN. ENVTL. L.J. 29, 49–56 (2006) [hereinafter Stavins, *Vintage-Differentiated Regulation*] (analyzing automobile emissions standards and stationary source regulation under the Clean Air Act).

102. Ann Eisenberg's recent article begins to fill this gap by explicitly analyzing the connection between labor and environmental interests in managing transitions. Eisenberg, *supra* note 77.

103. *See supra* Part I.C.

104. *See* Huber, *supra* note 101, at 96–107 (identifying the types and subtypes of transition relief); *see infra* Part II.A.

and public choice theory,[105] and an evaluation of proposed solutions to these transition problems.[106]

A. Types of Transition Relief

Bruce Huber divides transition relief in environmental regulation into two categories: *temporal* and *financial*.[107] Temporal relief distinguishes regulated entities, sources, or individuals based on the timing of some action—past, present, or future.[108] Typically, it either postpones or waives the application of a new requirement for sources, assets, or rights that existed or were already held prior to the legal or regulatory change.[109] Temporal relief may range from short-lived, defined grace periods, to permanent, full grandfathering that exempts an existing class of sources.[110] It may also include regulation that is set to phase in at a uniform or rotating timetable or schedule, as well as changes that kick in with a triggering event.[111] Environmental, public lands, and natural resources laws are filled with instances of temporal transition relief, frequently distinguishing between new and existing sources and grandfathering previously existing uses or rights.[112] Policies may also provide temporal transition relief in a variety of other contexts, such as zoning, land-use regulation, and building construction standards.[113]

Financial relief, on the other hand, involves direct or indirect compensation to regulated parties in order to facilitate or ease the burden of new compliance requirements.[114] Governments may provide tax subsidies to incentivize capital investments or changes in behavior or economic activity; loan guarantees or grants for building or maintaining infrastructure; or indirect financial subsidies, such as allowances for use in environmental compliance markets.[115]

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105. *See infra* Part II.B.

106. *See infra* Part II.B.

107. Huber, *supra* note 101, at 95.

108. *Id.* at 96.

109. *Id.* at 95.

110. *Id.* at 96.

111. *Id.*

112. *See, e.g.*, Stavins, *Vintage-Differentiated Regulation*, *supra* note 101, at 36 (including a table with examples from the Clean Air Act, Clean Water Act, Safe Drinking Water Act, hazardous waste management requirements, and California state motor-vehicle-emissions standards).

113. Huber, *supra* note 101, at 98–99.

114. *Id.* at 101.

115. *See id.* at 101–03 (providing examples of financial relief, including subsidies to farmers who put tillable land in the Conservation Reserve Program; grants to help public water systems comply with Clean Water Act and Safe Drinking Water Act treatment standards; and credit allowances for existing sources in a cap-and-trade system).

These types of relief may be used individually or in combination. For example, financial relief policies may include a sunset or phase-out provision, creating a time limit to the benefit;[116] conversely, grace periods or temporary grandfathering may come with some financial assistance to promote compliance before the extended deadline is reached.[117] Furthermore, as Huber discusses, policymakers can use both temporal and financial transition policy in the opposite direction by imposing retroactive liability, taxes, or charges, in order to recover costs associated with activity prior to the legal change.[118]

The Green New Deal expands the frame of reference for these types of transition relief. Transition policy focused on regulated industries—on the temporal or financial relief directly provided to regulated parties—obscures the range of policy options for addressing other types of impacts caused by legal or regulatory changes.[119] Regulatory transitions can lead to significant labor displacements when manufacturing facilities, mines, power plants, or other large employers close or move their operations; these changes also indirectly impact service industries and other sectors in surrounding communities that once supported the now-displaced workers.[120] Labor-centered transition relief, then—whether in delaying or phasing in the applicability of new regulations, or in providing financial or other resources in relief—places social and human elements of transition at the forefront and is an essential component of equitable transition policy. Previous experiences in the United States with labor-centered transition relief include, for example, direct financial grants to workers, unemployment benefits, job training, and relocation assistance.[121]

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116. *Id.* at 103–04.

117. *Id.* at 98, 103.

118. *See id.* at 105–07 (discussing retroactive liability under CERCLA and surface-coal-mining fees as examples).

119. *See, e.g.*, Eisenberg, *supra* note 77, at 292–94 (identifying sustainable development and environmental justice as lenses that could help policymakers address environmental externalities).

120. In at September 2019 event hosted by the University of Pennsylvania, when Rhiana Gunn-Wright of New Consensus was asked what single element of a Green New Deal she considered "non-negotiable," her response was "workforce development." Rhiana Gunn-Wright, New Consensus, Panel at University of Pennsylvania McHarg Center Event: Designing a Green New Deal, at 5:34:05 (Sept. 13, 2019) (video available at https://vimeo.com/359778899). Her focus on the worker side of decarbonization reflects the commitment to integrating equity, effectiveness, efficiency, and political feasibility in policy design. As articulated by Green New Deal supporters, labor transition policies are essential, not only to provide justice for those displaced from carbon-intensive jobs, but to ensure the availability of a trained workforce needed to fill the jobs in different sectors associated with decarbonization.

121. *See* Eisenberg, *supra* note 77, at 315 (describing several examples of labor transition relief policies under the Trade Adjustment Assistance Program).

B. Deconstructing Transition Policy

In legal and economic literature, scholars have identified several explanations for transition relief policy.[122] In industrial settings, three of those include: (1) an economic conclusion that employing temporal relief policies (applying regulation only to new sources) will lower the overall up-front cost of the regulatory transition; (2) concerns of "fairness" in applying regulation to sources, assets, or practices already in operation, relying in some instances on assumptions based on the prior regulatory environment; and (3) an observation that transition relief will generally make a regulatory change more politically palatable.[123] As Stavins has noted, "[b]oth regulated constituents and legislators have very strong incentives to favor" policies that differentiate between new and existing regulated units.[124]

Working through these three explanations—factors that motivate and incentivize transition relief—helps identify and expose the economic, social, cultural, and legal problems that transition relief policies can also create.[125] Each of these factors can blunt the effectiveness of a regulatory change and can lead to further opportunities for rent-seeking that undermine the efficiency and equitability of the changes.[126] Thus, although these drivers facilitate transitions, they may also, depending on how the policy is designed, make regulatory transitions slower, more expensive, and less equitable. Recognizing the existence of these factors and the ways in which they undermine transitions is important in designing a Green New Deal.

First, the economics of construction will often dictate that it will be cheaper to install or manufacture *new* capital assets, pollution control equipment, or products to meet new, more stringent regulations than to renovate or retrofit *existing* stock or products.[127] For example, if a new regulation calls for pollution control equipment for motor vehicles, on a per-car basis it will be cheaper to install the equipment during the manufacture and assembly process rather than recalling and retrofitting cars. Temporal transition relief policy can exempt cars currently on the road (requiring them

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122. *See, e.g.*, Stavins, *Vintage-Differentiated Regulation*, *supra* note 101, at 32–35 (offering alternative explanations for transition relief in the area of automobile emissions standards).

123. *Id.* at 35.

124. *Id.* at 32.

125. *See infra* notes 127–65 and accompanying text.

126. *See infra* notes 130–35, 147–50, 159–62 and accompanying text (detailing the unintended social costs associated with certain regulatory changes); *see also* Sebastian L. Mazzuca, *Rent Seeking*, ENCYCLOPÆDIA BRITANNICA, https://www.britannica.com/topic/rent-seeking (last visited Apr. 27, 2020) (explaining the concept of *rent seeking*, in which regulated entities expend resources or compete with others to gain an advantage by securing favorable regulation, subsidies, or other government actions that work for their benefit or for their competitors' detriment).

127. Stavins, *Vintage-Differentiated Regulation*, *supra* note 101, at 32.

only to meet the emissions standards applicable at the time they were originally sold) and apply the new regulation only to current or future model years.[128] Of course, such a regulation does nothing to curb pollution from old cars. However, because cars will need to be replaced within a relatively short period of time, the automobiles on the road will turn over as consumers buy new cars,[129] and the regulation will eventually address nearly every car in use.

While it may be cheaper for each individual car to include the new pollution control equipment at the time of manufacture, a policy of full grandfathering for existing cars can undermine both the effectiveness and equitability of the program.[130] A study in the 1980s, for example, concluded that changes in standards for carbon monoxide and nitrogen oxides in 1981 actually led to an *increase in emissions* of some pollutants for the first three years after implementation, when compared to a modeled scenario with no tightened standard.[131] In other words, differentiated regulation delayed the effectiveness of the standard, eliminating any short-term benefits, even though the policies would reach their desired environmental impact later on.[132]

Measures such as the above example also run counter to nationally and globally recognized principles at the heart of environmental law. Under the *polluter pays* principle, "the polluter should . . . bear the cost of pollution," internalizing the externalities that a person, organization, or state has caused or continues to cause.[133] With temporal transition relief, the polluter does not pay; rather, new market entrants that are subject to the changed standards or requirements shoulder all of the cost of meeting regulatory goals.[134] Although differentiated regulation may be less expensive in up-front costs in the aggregate, those financial burdens are not shared equally; crafted without care, these policies have the effect of absolving those who initially created the problem.[135] A Green New Deal provides an opportunity to reframe this

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128. Section 202 of the Clean Air Act requires the EPA to "prescribe . . . standards applicable to the emission of any air pollutant from any class or classes of *new* motor vehicles or *new* motor vehicle engines." Clean Air Act § 202(a)(1), 42 U.S.C. § 7521(a)(1) (2018) (emphasis added).

129. According to a recent study, the average car in the United States is 11.8 years old. Nathan Bomey, *Old Cars Everywhere: Average Vehicle Age Hits All-Time High*, USA TODAY (June 28, 2019), https://www.usatoday.com/story/money/cars/2019/06/28/average-vehicle-age-ihs-markit/1593764001/.

130. *See infra* notes 131–35 and accompanying text.

131. Howard K. Gruenspecht, *Differentiated Regulation: The Case of Auto Emissions Standards*, 72 AM. ECON. REV. 328, 330 (1982).

132. *Id.*

133. U.N. Conference on Environment and Development, *Rio Declaration on Environment and Development*, U.N. Doc. A/CONF.151/26/Rev.1 (Vol. I), annex I, princ. 16 (1993).

134. Huber, *supra* note 101, at 109.

135. *Id.* at 109–10.

distribution of costs in way that both promotes effective decarbonization strategies, as well as social equity. In order to make policy effective, it is crucial to avoid this type of redistribution toward historic or existing pollution sources, which places them in a more advantageous position than new or innovative competitors.

Second, proponents of differentiated regulation—especially those seeking transition relief from its application—raise concerns of fairness when laws and policies change.[136] If a power plant was built to comply with the appropriate legal and regulatory standards in place at the time of planning and construction, is it unfair to "change the rules in the middle of the game,"[137] while the plant is in operation and impose new, higher compliance costs?

Property rights advocates have successfully articulated this argument by bringing regulatory takings challenges to environmental, land-use, and other policies.[138] In the Supreme Court's often-cited, though convoluted, regulatory takings test expressed in *Penn Central*, one of the key factors the Court looked to was the "distinct investment-backed expectations" in making a particular use of property.[139] In other words, if a property owner or other regulated party has relied on previously applicable policy, courts will examine whether legal or regulatory change is constitutionally fair, within the meaning of the Fifth Amendment, or whether just compensation is required.[140]

At its extreme, the notion of regulatory takings would grind change to a halt—all regulatory change would be limited to the government's ability to pay property owners a bounty for any imposition on a *laissez-faire* regime.[141] It is impossible to consistently draw the line when raw potential for some kind of property use or activity transforms into a vested, constitutional, compensable right.[142] It is also unclear, under regulatory takings theory, why such a distinction should be made in the first place. After all, an efficient market should adequately price in the potential for whatever property uses or

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136. Stavins, *Vintage-Differentiated Regulation*, *supra* note 101, at 32.

137. Huber, *supra* note 101, at 107.

138. The concept stretches back nearly a century to *Pa. Coal Co. v. Mahon*, in which the Supreme Court found a compensable taking when the State of Pennsylvania prohibited subsurface mining of anthracite coal underneath residences, seeking to stop the process of subsidence. Pa. Coal Co. v. Mahon, 260 U.S. 393, 414 (1922).

139. Penn Cent. Transp. Co. v. New York City, 438 U.S. 104, 124 (1978).

140. *Id.*; U.S. CONST. amend. V ("[N]or shall private property be taken for public use, without just compensation.").

141. *See* Holly Doremus, *Takings and Transitions*, 19 J. LAND USE & ENVTL. L. 1, 24–25 (2003) ("Demands for compensation . . . are often thinly disguised efforts to prevent legal transitions.").

142. Huber, *supra* note 101, at 108.

development are permitted, as well as an estimate of the risk associated with potential regulatory changes.[143]

More crucially, the discussion over "fairness" to regulated parties during transitions presupposes the answer to the question: fairness for whom? Focusing on regulated parties' interests overshadows the justice and fairness issues for those who are directly impacted by environmental externalities, for workers in regulated industries, and for the public at large.[144] Vested interests may see prior destructive practices as "fair" simply because of historical tolerance of negative externalities.[145] Policy transitions with differentiated regulation may exacerbate, rather than alleviate, socioeconomic or racial inequalities.[146] If environmental regulation is only applied to new automobiles, power plants, or industrial facilities, the up-front costs may be lower in the aggregate and "fair" to existing actors based on their prior regulatory expectations.[147] However, providing exemptions (or delaying implementation) for existing sources leads to an unequal burden, both in compliance costs and in the distribution of negative environmental externalities like pollution and impacts on human health.[148] Regulation only of new sources does nothing to alleviate the disproportionate impacts borne by communities located close to, downwind from, or downstream from

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143. In criticizing the *Penn Central* takings test for its failure to measure the fairness of imposing the burden of regulatory change on a property owner, Doremus proposed a four-part test that includes, as one of the elements, "the extent to which [regulatory] change was foreseeable in advance." Doremus, *supra* note 141, at 31. In other words, if a change that prohibits an activity is foreseeable, that possibility should ideally be reflected in the property's market price. *Id.* at 35.

144. For decades, the environmental justice movement has focused on the disproportionate burden that African-American and other racial minority communities face due to proximity to pollution sources, toxic waste, and hazardous materials sites. This impact has been documented in numerous studies. In 2018, for example, scientists affiliated with the EPA's National Center for Environmental Assessment published their finding that African-Americans have a 54% higher burden than the general population in exposure to particular matter ($PM_{2.5}$)—a more pronounced difference than that which can be explained by poverty status alone. Ihab Mikati et al., *Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status*, 108 AM. J. PUB. HEALTH 480, 481–82 (2018).

145. In many circumstances, practices that damage the environment may have been tolerated because the impacts were originally low or because the impacts were unknown. As Doremus has suggested, policy inertia may lead to the failure of regulations to keep up with changes in technology, scientific understanding, availability of information, and social preferences. Doremus, *supra* note 141, at 18–24. As environmental impacts increase, the marginal costs may also increase—as in the case of endangered species, where early losses of biodiversity may have been insignificant, but present actions represent major threats to a species's survival. *Id.* at 20. In those conditions, it may seem "unfair" to apply changed rules, but circumstances may show that the marginal costs of the previously allowed action justify the change. *See id.* (discussing biodiversity loss as a changed circumstance).

146. *Id.* at 14–15.

147. Stavins, *Vintage-Differentiated Regulation*, *supra* note 101, at 32.

148. Shi-Ling Hsu, *The Real Problem with New Source Review*, 36 ENVTL. L. REP. NEWS & ANALYSIS 10,095, 10,098 (2006).

existing sources.[149] Differentiated regulation may prevent polluting sources from moving to new areas, but by so doing, entrenches historical inequalities that disadvantage minority communities and other vulnerable populations.[150]

In addition to environmental justice concerns, the regulatory takings doctrine can have a devastating impact on the distribution of whose interests "count" in transition policy. The doctrine creates asymmetry between the interests of property owners (those who own capital, mineral or grazing rights, or real estate subject to new regulations) and the interests of labor, working classes, or nearby communities.[151] For example, when courts determine that new restrictions on development are a compensable regulatory taking, this may force state or local governments to indemnify real estate investors, but does not provide any relief for construction workers and other contractors whose opportunities also dry up.[152] The regulatory takings doctrine can therefore make capital- or landowner-centered transition relief legally necessary—in the name of fairness—while undermining fairness to others that lack the constitutional protection.

In terms of application to the Green New Deal, takings law may play a role in at least two ways. To the extent that policies require the early retirement of fossil-fuel infrastructure, some power plants and pipelines will become stranded assets when their use is restricted or phased out.[153] Takings law is relevant to the allocation of the cost of stranded assets in energy law—distributed by state public utilities commissions (and the Federal Energy Regulatory Commission) among utility shareholders, customer ratepayers,

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149. These impacts can be immediate or can remain dormant for a time until additional circumstances bring that historic exposure to the surface in a discriminatory manner. In Flint, Michigan, the problem of lead pipes was a long-standing issue, as was the pollution of the Flint River. Tim Carmody, *How the Flint River Got So Toxic*, VERGE (Feb. 26, 2016), https://www.theverge.com/2016/2/26/11117022/flint-michigan-water-crisis-lead-pollution-history. However, the drinking water crisis occurred when decision-makers combined the two (running corrosive water through the old pipes, contaminating the water), producing disastrous and discriminatory results.

150. *See supra* note 144 (citing one of countless studies documenting the fact that African-Americans and other minority communities bear a disproportionate share of the burden of environmental pollution).

151. The Fifth Amendment limits protection against uncompensated takings for public use to "private property." U.S. CONST. amend. V.

152. *See supra* note 151.

153. According to a study published in *Nature*, the world's already existing energy infrastructure—even excluding proposed new power plants—if operated as expected for its planned lifetime, will significantly exceed the IPCC's estimated carbon budget necessary to avoid likely global temperature warming by 1.5ºC. Dan Tong et al., *Committed Emissions from Existing Energy Infrastructure Jeopardize 1.5ºC Climate Target*, 572 NATURE 373, 375–76 (2019). Therefore, any successful effort at full decarbonization would likely include at least some forced early retirement or shutdown of existing infrastructure prior to the expiration of its planned useful lifetime, decreasing the expected value of existing investments.

and the government.[154] In addition, the construction of new energy and transportation infrastructure, such as electricity transmission or train lines, implicates the use of eminent domain, compensable as a taking of private property for public use.[155] Providing compensation to utility shareholders for use restrictions or closure of stranded assets is a transition policy with potential advantages for a Green New Deal as an effective and politically feasible option that preempts opposition from some sectors that would otherwise have a financial incentive to block decarbonization policies. However, such compensation can exacerbate inequality by diverting scarce transition resources toward capital and away from labor or the general public that also bears a financial burden in an energy transition.

Finally, public choice theory[156] provides an explanation for how political pressures favor over-generous transition relief. In industrial settings, existing industry, which may oppose regulation generally, is likely to favor "vintage-differentiated regulation" (i.e., standards that apply more stringently to new entrants) because it creates an artificial barrier to entry, making it more difficult for new competitors.[157] Legislators, concerned about the distribution of costs and benefits of regulation in their district—rather than overall costs and benefits—may also support differentiated regulation when there are asymmetries between the "losers" and potential "winners" in regulatory transitions.[158]

Therefore, although economic, legal, and political realities facilitate types of transition relief, a deeper exploration of these contributing causes also highlights the social and cultural problems that transition policy can create. When regulatory transitions are timed to impact concentrated interests

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154. Government approval of utility rates is, at a minimum, constrained by the Takings Clause, so as to ensure that utilities receive an adequate rate of return for the public's use of their private property. *See, e.g.*, Fed. Power Comm'n v. Hope Nat. Gas Co., 320 U.S. 591, 620 (1944) (Reed, J., dissenting) (citation omitted) ("The Congress may fix utility rates in situations subject to federal control without regard to any standard except the constitutional standards of due process and for taking private property for public use without just compensation.").

155. Use of federal eminent-domain power in energy infrastructure dates at least to 1947, when Congress granted eminent domain authority for natural-gas-pipeline construction. *See* Act of July 25, 1947, ch. 333, 61 Stat. 459 (codified as amended at 15 U.S.C. § 717f(h)) (amending § 7 of the Natural Gas Act of 1938 to allow the use of eminent domain for natural gas pipelines once a certificate of "public convenience and necessity" has been obtained). For further detail, see generally ERIC N. HOLMES, CONG. RESEARCH SERV., LSB10359, THIS LAND IS YOUR LAND? EMINENT DOMAIN UNDER THE NATURAL GAS ACT AND STATE SOVEREIGN IMMUNITY (2019), https://crsreports.congress.gov/product/pdf/LSB/LSB10359.

156. *See generally* PHILIP F. FRICKEY & DANIEL A. FARBER, LAW AND PUBLIC CHOICE: A CRITICAL INTRODUCTION (1991) ("Public choice theory is a hybrid: the application of the economist's methods to the political scientist's subject.").

157. Stavins, *Vintage-Differentiated Regulation*, *supra* note 101, at 33–34.

158. *Id.* at 34.

at a specific, cognizable moment—in other words, when transition occurs at a defined time or with a defined trigger—those powerful interests have a strong incentive to engage in rent-seeking behavior,[159] such as pursuing an exemption, pushing back the deadline, or redefining the trigger.[160] This may take the form of lobbying efforts to change deadlines legislatively or administratively, as well as efforts to litigate the definition of the trigger.[161] When such concentrated interests win a temporary victory (such as a deadline extension or temporal transition relief) and the policy simply delays the conflict at which the regulated party's interests are at stake, the rent-seeking behavior is likely to occur again until the policy design changes.[162]

Transition relief policies that erect artificial barriers to entry can hinder policy effectiveness and may, in some circumstances, stifle innovative investment that could lead to better outcomes.[163] When all costs associated with a transition are placed on new actors, and no costs on labor or other sectors are recognized, transition relief policy can entrench and exacerbate inequality.[164] Over the long term, this undermines transition objectives of cost-effectiveness, fairness, and political palatability.[165] Green New Deal discourse tackles this traditional view of transition theory head-on, offering a different approach toward coalition-building to overcome these tendencies. As seen in examples discussed below from environmental law as currently structured, new coalitions bringing together social justice and environmental concerns will be necessary in order to overcome transition policy obstacles

159. *See* Mazzuca, *supra* note 126 (explaining rent-seeking in the context of regulated industries).

160. As one example, federal renewable-fuel standards are defined year by year, encouraging continued battles at the EPA and in the courts about what level or standard will apply each calendar year. *See* Clean Air Act § 211(o), 42 U.S.C. § 7545(o) (2018) (requiring the Administrator to promulgate renewable fuel standards on a yearly basis). Data from 2013 to 2018 presented by the Energy Information Administration shows how application of the small refinery exemption from the renewable-fuel standard has increased sharply under the Trump Administration—another example of how this annual rent-seeking behavior works. *EPA Small Refinery Exemptions in the Renewable Fuel Standard Explained*, U.S. ENERGY INFO. ADMIN. (Nov. 14, 2019), https://www.eia.gov/todayinenergy/detail.php?id=41995.

161. For example, as discussed *infra* in Part III.A, under the Clean Air Act, the application of New Source Review to *modified* sources has encouraged a great deal of rulemaking changes by the EPA under different presidential administrations, as well as litigation about which types of investments regulated industries can make without being classified as a modified source.

162. One famous (non-environmental) example of this phenomenon of continued rent-seeking is Congress's repeated action to extend copyright duration, coincident with the expiration of Disney's copyright protection for Mickey Mouse. Steve Schlackman, *How Mickey Mouse Keeps Changing Copyright Law*, ART L.J. (Feb. 15, 2014), https://alj.artrepreneur.com/mickey-mouse-keeps-changing-copyright-law/.

163. Hsu, *supra* note 148, at 10,097–98.

164. *Cf.* Eisenberg, *supra* note 77, at 275–76 (explaining that a just transition must address the concerns of environmental justice communities and workers in carbon-intensive industries).

165. *Id.*

and pressures that can ultimately thwart policy efficiency, effectiveness, and equitability.

III. EXAMPLES FROM THE FIRST GENERATION OF ENVIRONMENTAL LAWS

Modern environmental law in the United States is now 50 years old. The major statutory framework for environmental impact assessment,[166] biodiversity conservation,[167] air pollution,[168] water pollution,[169] waste management,[170] and toxic substances management[171] was put in place in the span of only one decade. At the same time, Congress updated and "greened" other major laws regarding the use and management of public lands and natural resources.[172]

Regulatory transition theory described above provides a lens with which to analyze the effectiveness of these environmental laws. The statutes of the environmental decade started from a recognition that the legal institutions in place prior to the 1970s were inadequate to meet the era's environmental challenges.[173] Thus, Congress gave the newly formed Environmental Protection Agency (EPA) wide-ranging authority over the United States' air pollution, water pollution, hazardous waste, and other environmental

166. National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (1970) (codified as amended at 42 U.S.C. §§ 4321–4347 (2018)).

167. Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended at 16 U.S.C. §§ 1531–1544).

168. Clean Air Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676; Clean Air Act Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685 (codified as amended at 42 U.S.C. §§ 7401–7671q).

169. Federal Water Pollution Control Act Amendments (Clean Water Act) of 1972, Pub. L. No. 92-500, 86 Stat. 816 (codified as amended at 33 U.S.C. §§ 1251–1388).

170. Resources Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2795 (codified as amended at 42 U.S.C. §§ 6901–6981); Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Pub. L. No. 96-510, 94 Stat. 2767 (codified as amended at 42 U.S.C. §§ 9601–9675).

171. Toxic Substances Control Act of 1976, Pub. L. No. 94-469, 90 Stat. 2003 (codified as amended at 15 U.S.C. §§ 2601–2697).

172. *E.g.*, Federal Land Policy and Management Act of 1976, Pub. L. No. 94-579, 90 Stat. 2743 (codified at 43 U.S.C. §§ 1701–1787) (providing a coherent, system-wide scheme for management of federal public lands, especially those under the jurisdiction of the Bureau of Land Management, and prohibiting "unnecessary or undue degradation" of public lands); National Forest Management Act of 1976, Pub. L. No. 94-588, 90 Stat. 2949 (codified at 16 U.S.C. §§ 1600–1687) (revising the mission and purpose of the U.S. Forest Service in managing the National Forests, including a new mandate to prepare land and resource management plans for each forest unit).

173. Keith H. Hirokawa, *Disasters and Ecosystem Services Deprivation: From Cuyahoga to the Deepwater Horizon*, 74 ALBANY L. REV. 543, 545–47 (2011) (discussing Ohio's Cuyahoga River fire and Pennsylvania's Donora smog incident, both infamous environmental disasters that spurred Congress to enact environmental laws).

problems.[174] At the same time, Congress reformed and updated the mandate of the land management agencies, giving them a more direct command to consider environmental impacts.[175]

Fifty years of environmental law in the United States have led to tremendous success stories, such as the elimination of lead from gasoline, sharp decreases in emissions of sulfur dioxide and nitrogen oxides in many parts of the country, and the cleanup of important waterways.[176] However, many problems remain unsolved or under-addressed; progress in pollution control and the improvement of environmental and human well-being has been uneven.[177] This Part draws on earlier literature on the regulatory failures of major environmental statutes, viewing them through the lens of regulatory transition theory, and addressing the extent to which the environmental transitions brought about by these statutes were motivated by or consistent with principles of equity, effectiveness, efficiency, and political feasibility. Policy design in the first generation of environmental law—spurred by considerations of cost, perceptions of fairness, and politics—has contributed to the environmental failures experienced today.[178] Learning from those histories provides valuable lessons for present discourse about designing a Green New Deal and how to construct the next generation of environmental law and policy.

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174. *The Origins of EPA*, U.S. EPA, https://www.epa.gov/history/origins-epa (last updated Nov. 19, 2018).

175. All federal agencies are required to follow the National Environmental Policy Act and the Endangered Species Act. *See* National Environmental Policy Act § 102(2), 42 U.S.C. § 4332(2) (referring to "all agencies of the Federal Government"); Endangered Species Act § 7(a)(2), 16 U.S.C. § 1536(a)(2) (applying consultation requirements and responsibilities to "[e]ach Federal agency"). As to the main land-management agencies, for example, Congress updated the U.S. Forest Service's mandate by requiring an extensive land and resource management planning process: plans must take into account "economic and environmental" considerations and must "provide for diversity of plant and animal communities," among other requirements. 16 U.S.C. § 1604(g)(3)(A)–(B). Other examples of environmentally-conscious changes to federal land management decisionmaking are found in the Federal Land Policy and Management Act of 1976 and other contemporary statutes, such as the so-called Redwood Amendment to the National Park Service's Organic Act, in which Congress "reaffirm[ed]" a commitment to the conservation of national parks for "the common benefit of all the people of the United States." Act of Mar. 27, 1978, Pub. L. No. 95-250, 92 Stat. 163, 166 (codified at 54 U.S.C. § 100101(b)(2)) (emphasis omitted).

176. Timothy J. Sullivan et al., *Air Pollution Success Stories in the United States: The Value of Long-Term Observations*, 84 ENVTL. SCI. & POL'Y 69, 69–70 (2018).

177. *See, e.g.*, Mikati et al., *supra* note 144, at 480–83 (reporting that, compared to other racial groups, African-Americans face a disproportionate burden of particulate matter air pollution).

178. *See infra* text accompanying notes 195–98 (describing how the Clean Air Act's grandfathering provisions for stationary sources have enabled old coal plants to continue operating and polluting for decades beyond their expected lifespan).

A. Stationary Sources: Stay Put and Keep Polluting

The most cited story in the history of environmental regulatory transitions involves the Clean Air Act and the regulation of *stationary sources*.[179] The Clean Air Amendments of 1970 created a process for states to develop state implementation plans (SIPs) that guide each state toward the attainment of nationwide standards set by the federal EPA for certain common air pollutants.[180] The Amendments required that each state's plan "includes a procedure . . . for review (prior to construction or modification) of the location of new sources" of pollution to which certain provisions of the Act apply.[181]

In 1977, Congress significantly expanded the Clean Air Act's stationary source requirements.[182] In particular, the 1977 amendments established a preconstruction permit-review program for new and modified "major emitting facilit[ies]," run by the EPA or approved state regulatory agencies.[183] The permit-review program, commonly known as New Source Review (NSR),[184] includes a public hearing process and imposes significant substantive requirements—the new facility may not cause the area to exceed ambient air quality standards and must meet even more stringent standards in *nonattainment* areas, i.e., areas with excessive pollutant levels.[185] New facilities—in areas with air quality in attainment with national standards—are required to install the "best available control technology" (BACT) for each pollutant, based on a case-by-case, source-specific determination by

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179. *See, e.g.*, Huber, *supra* note 101, at 93 (citing the Clean Air Act's grandfathering policy as an infamous case of transition relief); *accord* Stavins, *Vintage-Differentiated Regulation*, *supra* note 101, at 49; *accord* Nash & Revesz, *supra* note 101, at 1678.

180. Clean Air Amendments of 1970 § 110, Pub. L. No. 91-604, sec. 4, 84 Stat. 1676, 1680 (codified as amended at 42 U.S.C. § 7410). This section of the Clean Air Act is commonly referred to as "section 110."

181. Clean Air Amendments of 1970 § 110(a)(2)(D) (current version at 42 U.S.C. § 7410(a)(2)(D)).

182. Clean Air Act Amendments of 1977 §§ 110–29, Pub. L. No. 95-95, tit. 1, 91 Stat. 685, 686–745 (codified as amended at 42 U.S.C. §§ 7401–7515).

183. Clean Air Act Amendments of 1977 § 165(a) (codified as amended at 42 U.S.C. § 7475(a)). A "major emitting facility" is any stationary source with the "potential to emit" either 250 or 100 tons of a given air pollutant, depending on the category of the source. Clean Air Act Amendments of 1977 § 169 (codified as amended at 42 U.S.C. § 7479(1)).

184. Two separate statutory programs—Nonattainment New Source Review for regions in excess of national ambient air quality standards and Prevention of Significant Deterioration in regions currently meeting standards—are collectively referred to as New Source Review (NSR). Nash & Revesz, *supra* note 101, at 1682–83.

185. Clean Air Act §§ 110(j), 165(a), 42 U.S.C. §§ 7410(j), 7475(a)(3).

state agencies under plans approved by the EPA (or a determination by the EPA itself in states where the EPA has not delegated this authority).[186]

The NSR program is a tremendously significant example of grandfathering—permanent transition relief.[187] The 1977 amendments drew a bright line: the NSR process and pollution control technology requirement would only apply to sources that begin construction after the Act took effect.[188] Existing sources are exempt so long as they stay put: NSR will only kick in if the source is "modifi[ed]"—a statutorily defined term that refers to "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted."[189]

Four decades of NSR implementation have yielded mixed results and have exposed several problems with the statutory and regulatory design. Literature on the Clean Air Act's application to the power plant sector highlights the ways in which overly generous transition policy results in "perverse incentives" for regulated parties.[190] Just as regulatory transition theory would predict, grandfathering in the NSR program has made pollution reduction more costly and less efficient in the long run.[191] Further, the sharp distinction between new and existing has not been fair—it has been bad for

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186. Clean Air Act § 165(a)(4), 42 U.S.C. § 7475(a)(4). The Clean Air Act defines "best available control technology" with reference to the types of considerations the relevant agency must make in determining how the technological standard will apply to an individual source. "Best available control technology" is

> an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation . . . which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable . . . through application of production processes and available methods, systems, and techniques . . . for control of each such pollutant.

Clean Air Act § 169(3), 42 U.S.C. § 7479(3).

187. *See, e.g.*, Hsu, *supra* note 148, at 10,095–96 (explaining that grandfathering creates incentives for older sources to keep operating); *accord* Huber, *supra* note 101, at 93 n.9.

188. Clean Air Act § 165(a), 42 U.S.C. § 7475(a) (applying the permit requirement only to any "major emitting facility on which construction is commenced after August 7, 1977").

189. Clean Air Act § 111(a)(4), 42 U.S.C. § 7411(a)(4). The "modification" part of the "new source" definition in 42 U.S.C. § 7411(2) is incorporated by reference in § 7479; for any "construction" of "modification[s]" that began after 1977, the NSR provisions of the statute apply. Clean Air Act § 169(2)(C), 42 U.S.C. § 7479(2)(C) ("The term 'construction' when used in connection with any source or facility, includes the modification . . . of any source or facility.").

190. *See* Hsu, *supra* note 148, at 10,096 (charging the Clean Air Act's grandfathering policy with creating "perverse incentives" for operators of old plants); *accord* Nash & Revesz, *supra* note 101, at 1733; *accord* Stavins, *Vintage-Differentiated Regulation*, *supra* note 101, at 52–53.

191. *See* Hsu, *supra* note 148, at 10,097–98 ("The net effect of grandfathering is that newer, cleaner plants are sometimes left unbuilt. Older, dirtier plants keep running.").

everyone other than the owners of pre-1977 existing facilities, exacerbating inequalities that were in place when these facilities were built.[192]

Here, two major problems merit discussion. First, the NSR distinction between new and existing sources created a powerful incentive to keep old power plants in operation for a long time—much longer than the lifespan originally anticipated at the time of their construction.[193] Second, the ambiguous nature of the *modification* concept—and its importance in triggering the full expense of NSR for grandfathered plants—predictably led to decades of litigation and lobbying as to what constitutes a modification.[194]

As Shi-Ling Hsu notes, significant studies showed that grandfathering for a single coal-fired power plant could represent an asset worth as much as $150 million for its owner in competition with a new power plant that would be required to install emission-control equipment.[195] Allowing existing sources to continue to emit at high levels, while placing the burden of environmental compliance only on new sources, is inherently unfair. Despite articulated justifications, it acts as "a simple transfer payment to those with grandfathered plants from those that lack them."[196] The operation of the statute leaves the viability of this $150 million asset up to the owner's decision about whether to construct a new facility.[197] This boost to the value of the old plant means the owner will be willing to expend significant resources to maintain it and to avoid the classification of any maintenance or upgrades to it as a modification.[198]

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192. *See id.* (observing that, while grandfathering has been perceived by laypeople as fair, it is fundamentally unfair).

193. *Id.* at 10,097 (noting that over one-third of power plants operating today are over 50 years old).

194. The issue continues today. In 2018, as part of the EPA's proposal to repeal the Obama-era Clean Power Plan, the EPA proposed significant regulatory revisions exempting the types of modifications that its rule was calling for (i.e., heat-rate efficiency improvements at power plants) from NSR, even if the modifications resulted in running those plants at a higher capacity, emitting greater levels of pollutants. Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program, 83 Fed. Reg. 44,746, 44,774–83 (proposed Aug. 31, 2018). The EPA ultimately backed off on including this explosive change in the already-controversial Affordable Clean Energy (ACE) Rule when it was finalized in 2019; however, the EPA has still indicated its plans to pursue NSR reforms. *See* Repeal of the Clean Power Plan, 84 Fed. Reg. 32,520, 32,521 (July 8, 2019) (to be codified at 40 C.F.R. pt. 60) ("[T]he EPA intends to take final action on the proposed NSR reforms in a separate final action at a later date.").

195. Hsu, *supra* note 148, at 10,096 & n.11. Hsu cites a study from the National Research Council showing the estimated costs of SO_2 and NO_x controls. NAT'L RESEARCH COUNCIL, INTERIM REPORT OF THE COMMITTEE ON CHANGES IN NEW SOURCE REVIEW PROGRAMS FOR STATIONARY SOURCES OF AIR POLLUTANTS 111–12 (2005).

196. Hsu, *supra* note 148, at 10,098.

197. *Id.* at 10,096.

198. *Id.*

Randy A. Nelson, Tom Tietenburg & Michael R. Donihue's empirical test of 44 privately-owned utilities from 1969 to 1983 provides further evidence for how this dynamic has played out in practice.[199] They found that for these utilities "environmental regulations increased the average age of fossil-fueled steam generating plants by an average of 3.29 years."[200] The effect continued in subsequent decades, as the average age of coal plants in the United States increased.[201]

The hard distinction between existing versus new and modified sources has created a powerful incentive to litigate and lobby with regard to what constitutes a modification.[202] Taking the example of a plant with an exemption from NSR regulation valued at $150 million—because there has been no clear, foreseeable rule about what constitutes a modification and will push the facility over the line from no regulation to expensive, onerous requirements—the owner has a strong financial interest in obscuring what is going on at the plant, lobbying for exemptions, or fighting enforcement through litigation.[203] Financial and other resources expended in doing so are inefficient drags on environmental compliance and weaken the impact of the regulatory transition.[204]

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199. Randy A. Nelson, Tom Tietenburg & Michael R. Donihue, *Differential Environmental Regulation: Effects on Electric Utility Capital Turnover and Emissions*, 75 REV. ECON. & STATS. 368, 373 (1993).

200. *Id.*

201. The U.S. Energy Information Administration reported at the end of 2016 that the average age of coal-fired power plants in the United States was 39 years. Roughly half of the plants in operation date to before the 1977 Clean Air Act amendments. *Most Coal Plants in the United States Were Built Before 1990*, U.S. ENERGY INFO. ADMIN. (Apr. 17, 2017), https://www.eia.gov/todayinenergy/detail.php?id=30812.

202. Nash and Revesz chronicle the history of regulatory changes and litigation on the issue of modification. Nash & Revesz, *supra* note 101, at 1681–1707. The EPA has long recognized an exemption for the routine maintenance and repair of stationary sources (referred to as the "RMRR" exemption). *Id.* at 1689. However, this simply moved the fight to what is considered "routine." During the George W. Bush Administration, the EPA sought to blow open this exemption by defining RMRR to include any investment up to 20% of the plant's value—a change which could have essentially allowed plant owners to extend the life of sources indefinitely by turning over the facility gradually and maintaining its exempt status. *Id.* at 1697; Hsu, *supra* note 148, at 10,100. The D.C. Circuit invalidated this rule change. New York v. EPA, 433 F.3d 880, 890 (D.C. Cir. 2006). According to Hsu, this problem of ambiguity in the definition is never going to be solved. Hsu, *supra* note 148, at 10,102. In other words, so long as there is permanent grandfathering of existing sources, the program will continue to encourage this sort of gaming to avoid regulation.

203. Hsu, *supra* note 148, at 10,096.

204. That is, facility owners spend resources to preserve regulatory exemptions that could be spent on anything from improving labor conditions to research and development of new, more efficient technology.

Decarbonization in the Green New Deal will require complete decarbonization of the electricity-generation sector,[205] but it will also require closure and transitions in the operation of other stationary source categories, including oil refineries, petrochemical manufacturing facilities, and other operations that create inequitable environmental burdens on their surrounding communities. Many coal-fired plants have closed in the past several years, with a large portion of these over 40 years old; however, most analysts attribute these closures to the cost-competitiveness of natural gas, renewables, and other generation, rather than to regulation.[206] To the extent that regulation has driven coal plant closures, rules other than NSR have been responsible, such as the Mercury and Air Toxics Standards instituted by the EPA under the Obama Administration, which, unlike NSR, apply also to existing sources.[207] Thus, the Green New Deal will need to regulate stationary sources differently, with a reoriented legal framework toward equity, effectiveness, efficiency, and political feasibility. The NSR program, while a valuable tool in existing law, is undermined by its inability to address the oldest, most significant pollution sources.[208]

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205. Or at least near-complete decarbonization, with net decarbonization if generation includes the capture and storage of CO_2 or another means of offsetting minimal remaining emissions.

206. *See, e.g.*, INST. FOR ENERGY ECON. & FIN. ANALYSIS, RECORD DROP IN U.S. COAL-FIRED CAPACITY LIKELY IN 2018 (2018), http://ieefa.org/wp-content/uploads/2018/10/Record-Drop-in-U.S.-Coal-Fired-Capacity-in-2018_October2018.pdf (predicting that coal power plants will continue to close in the face of low prices for renewable and natural-gas generation). Of course, the replacement of coal-fired power plants with natural-gas-fired generation presents its own transition problem, as it merely reduces, rather than eliminates, conventional and climate pollutants. Brad Plumer, *As Coal Fades in the U.S., Natural Gas Becomes the Climate Battleground*, N.Y. TIMES (June 26, 2019), https://www.nytimes.com/2019/06/26/climate/natural-gas-renewables-fight.html (explaining that while natural gas produces only half the CO_2 of coal for each megawatt-hour of electricity generated, it still significantly contributes to GHG emissions).

207. *See* National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units, 77 Fed. Reg. 9303, 9303 (Feb. 16, 2012) (to be codified at 40 C.F.R. pts. 60 and 63) (promulgating stringent standards for mercury emissions that have arguably led to coal power plant closures). The rule was reviewed in *Michigan v. EPA*, in which the Supreme Court remanded the rule to the EPA for failure to consider the potential costs of regulation at the point of deciding when to regulate. Michigan v. EPA, 135 S. Ct. 2699, 2712 (2015). The EPA ultimately kept the essence of the rule in place after making a new determination that regulation of toxic air pollutants from the power sector is "appropriate and necessary." *See* Clean Air Act § 112(n)(1)(A), 42 U.S.C. § 7412(n)(1)(A) (2018) (specifying the standard the EPA must satisfy when it promulgates rules for electric-utility steam-generating units). Coal power and air-sourced mercury emissions have decreased significantly under the rule. Sonal Patel, *How Did MATS Affect U.S. Coal Generation?*, POWER (Oct. 4, 2018), https://www.powermag.com/how-did-mats-affect-u-s-coal-generation/.

208. As a caveat to the above discussion, a significant part of the story of NSR's failures has been a lack of consistent enforcement. No policy design change could completely make enforcement issues go away; the ability to avoid NSR by undertaking significant modifications without regulation had a lot to do with lax enforcement in the first place. Beginning in 1999, when the Clinton Administration finally decided to crack down on and go after the worst violators, the dynamic changed to lobbying and litigation about exemptions such as the RMRR rule. *See Coal-Fired Power Plant Enforcement*, U.S. EPA,

B. Loitering in the CAFE: Regulation of Car Emissions and Fuel Efficiency

Transportation is now the largest contributor of GHG emissions in the United States.[209] Yet, conventional pollution from automobiles—including nitrogen oxides that contribute to hazardous ground-level ozone, as well as lead, carbon monoxide, and toxic air pollutants—has been a major target of environmental regulation for decades.[210] Recognizing the lack of effective federal clean air policy, the State of California first began regulating vehicle emissions in the 1960s.[211] Later, Congress stepped in, giving authority to the EPA to create uniform federal limits on pollution from cars under Title II of the Clean Air Act, while leaving in place California's ability to enact more stringent rules.[212]

Energy policy led to a parallel track of car regulation that began in the 1970s. At the height of the oil-price crisis after OPEC nations cut production, the Energy Policy and Conservation Act (EPCA) created the initial federal requirement for fuel-economy standards.[213] Set by the Department of Transportation's National Highway Traffic Safety Administration (NHTSA), the Corporate Average Fuel Economy (CAFE) Standard requires auto manufacturers to meet a minimum level of fuel efficiency across an average of all the manufacturer's vehicles.[214] The initial justification for CAFE standards was as an energy-saving measure, rather than an environmental

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https://www.epa.gov/enforcement/coal-fired-power-plant-enforcement (last visited Apr. 27, 2020) (listing enforcement cases). Enforcement efforts were continued under the Bush Administration, but have been accompanied by never-ending litigation about definitions for which you can never have a clear, applies-in-every-situation rule. *See* Hsu, *supra* note 148, at 10,101–02 (noting that the Bush Administration's NSR policy led to seemingly endless legal wrangling).

209. U.S. EPA, *Sources of Greenhouse Gas*, *supra* note 58 (indicating that, in 2018, 28% of U.S. GHG emissions came from transportation, while 27% came from electricity generation, 22% from industry, 12% from commercial and residential sources, and 10% from agriculture). The *New York Times* interactive feature from October 2019 shows the increase in transport-related CO_2 emissions for each metropolitan area in the country since 1990. *See* Nadja Popovich & Denise Lu, *The Most Detailed Map of Auto Emissions in America*, N.Y. TIMES (Oct. 10, 2019), https://www.nytimes.com/interactive/2019/10/10/climate/driving-emissions-map.html?module=inline.

210. *E.g.*, Clean Air Act § 202, 42 U.S.C. § 7521 (creating emission standards for motor vehicles).

211. Nicholas Bryner & Meredith Hankins, *Why California Gets to Write Its Own Auto Emissions Standards: 5 Questions Answered*, CONVERSATION (Apr. 6, 2018), http://theconversation.com/why-california-gets-to-write-its-own-auto-emissions-standards-5-questions-answered-94379.

212. Clean Air Act §§ 202, 209, 42 U.S.C. §§ 7521, 7543. When California demonstrates that it has compelling and extraordinary circumstances that require stringent mobile-source regulation, and so long as those regulations are at least as stringent as federal requirements, the EPA is required to grant California a waiver to implement its own rule, despite the Clean Air Act's general preemption of state-level vehicle-emissions standards. Clean Air Act § 209(b), 42 U.S.C § 7543(b).

213. Energy Policy and Conservation Act, Pub. L. No. 94-163, 89 Stat. 871 (1975) (codified as amended at 42 U.S.C. § 6201).

214. 49 U.S.C. § 32902.

control.[215] Congress updated and affirmed this energy independence-energy security justification for updated regulation during the Bush Administration in the 2005 Energy Policy Act and the 2007 Energy Independence and Security Act, as oil prices rose sharply during the middle of that decade.[216]

Fuel-economy and tailpipe-emissions regulation have converged in the context of climate mitigation. Following the Supreme Court's decision in *Massachusetts v. EPA*,[217] the EPA issued its finding that GHGs endanger public health and welfare, leading to a statutory obligation under Title II of the Clean Air Act to place limits on vehicle GHG emissions.[218] Under the Obama Administration, the EPA coordinated its standard for new vehicles (expressed in grams of CO_2 emitted per mile) with NHTSA's fuel-economy standard (expressed in miles per gallon of gasoline).[219]

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215. *See* 49 U.S.C. § 32902(f) (directing the Secretary of Transportation to consider energy conservation in setting fuel-economy standards).

216. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (codified as amended in scattered sections of the U.S.C.). The Energy Independence and Security Act of 2007 (EISA) mandated updated CAFE standards for cars beginning in 2011, leading to "at least" a 35 mpg average by 2020, with averages after 2020 to be set at the "maximum feasible average fuel economy standard" determined by NHTSA for each model year, as per the rest of the statutory section. Energy Independence and Security Act of 2007, Pub. L. No. 110-140, sec. 102, 121 Stat. 1492, 1499 (codified at 49 U.S.C. § 32902(b)(2)). The EISA also included a dramatic increase in the Renewable Fuel Standard as a measure to reduce U.S. reliance on oil imports and provide a dedicated market for corn-based ethanol fuel. *See* Clean Air Act § 211(o), 42 U.S.C. § 7545(o) (requiring the Administrator to promulgate regulations to increase the amount of ethanol in fuel).

217. Massachusetts v. EPA, 549 U.S. 497, 534–35 (2007) (interpreting Clean Air Act § 202(a)(1), 42 U.S.C. § 7521(a)(1), to require the EPA to regulate carbon emissions if they endanger the public).

218. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009).

219. 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, 77 Fed. Reg. 62,624 (Oct. 15, 2012). The Obama Administration's agencies set the CAFE standard and corresponding GHG standard at the equivalent of 54.5 mpg for new cars in model year 2025. *Id.* at 62,627. In 2018, the EPA and the NHTSA proposed a significant weakening of the standard, with efficiency increases to 36.9 mpg by 2020 and remaining flat after that year. Safer Affordable Fuel Efficient (SAFE) Vehicles Proposed Rule for Model Years 2021–2026, 83 Fed. Reg. 42,986 (proposed Aug. 24, 2018). On April 30, 2020, the EPA and the NHTSA published a final SAFE Rule in the Federal Register. *See* The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks, 85 Fed. Reg. 24,174 (Apr. 30, 2020) (to be codified at 40 C.F.R. pts. 86 and 600). The final rule increases fuel economy standards by 1.5% per year through 2026, reaching a projected 40.5 mpg by 2030—a greater increase in efficiency than the proposal, but far less than the Obama-era rule. *See id* at 24,175, 24,176. In September 2019, the agencies finalized separately a portion of the proposed rule, revoking California's waiver to implement its more stringent vehicle emissions regulations and reinterpreting the EPCA to preempt any GHG emissions standard set by the state. Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program, 84 Fed. Reg. 51,310 (Sept. 27, 2019) (to be codified at 40 C.F.R. pts. 85 and 86). California, a coalition of other states, and environmental groups have all sued the agencies to block this action; the EPA has never revoked a previously granted California waiver, and several scholars, including the Author, have argued that the EPA and the NHTSA's actions and interpretations are unlawful. *See, e.g.*, Nicholas Bryner & Meredith Hankins, *Trump Administration and California Are on Collision Course over Vehicle*

One key difference for policy on automobiles as opposed to the regulation of large stationary sources of air pollution is the shorter timeframe for investment and turnover of emissions sources. While fossil-fuel-fired power plants are built with an expected lifetime of 30 years or more, passenger automobiles tend to last on the road for an average of roughly 15 years.[220] Cars are shorter-term investments, with technology that more quickly becomes obsolete and with emissions split across hundreds of millions of tailpipes across the country, making it much less practical to retrofit existing cars to improve pollution controls or fuel efficiency.[221]

Notwithstanding these differences, vintage-differentiated regulation of motor vehicle emissions has led to similar issues, with detrimental effects on the effectiveness and equitable impacts of air pollution regulation.[222] Under the Clean Air Act, the EPA regulates emissions for new motor vehicles and can set technology-forcing standards to lower emissions in the future; however, the regulation of new vehicles means that older vehicles still on the road are grandfathered into compliance based on the standards in effect at the time the vehicle was manufactured.[223]

Economists have studied the effects of these asymmetric standards for several decades. In 1982, Howard Gruenspecht studied the EPA's new vehicle-emissions standards for carbon monoxide (CO) and nitrogen oxides (NO_x) and the effects that the regulatory transition would have on emissions and on vehicle lifespans.[224] Gruenspecht's model compared the 1981 standards to two different hypothetical scenarios: one in which there was no new CO and NO_x standard for new vehicles; and another in which the

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Emissions Rules, CONVERSATION (Aug. 2, 2018), https://theconversation.com/trump-administration-and-california-are-on-collision-course-over-vehicle-emissions-rules-100574 (commenting on the Trump Administration's attempt to revoke California's waiver to establish its own tailpipe emissions standards); *accord* ANN E. CARLSON, MEREDITH HANKINS & JULIA STEIN, AM. CONSTITUTION SOC'Y, SHIFTING GEARS: THE FEDERAL GOVERNMENT'S REVERSAL ON CALIFORNIA'S CLEAN AIR ACT WAIVER (2019), https://www.acslaw.org/wp-content/uploads/2019/02/CA-Car-Standards-IB-2019.pdf/.

220. *See* Todd Woody, *Most Coal-Fired Power Plants in the US Are Nearing Retirement Age,* QUARTZ (Mar. 12, 2013), https://qz.com/61423/coal-fired-power-plants-near-retirement/ (reporting that the average lifespan of a coal-fired power plant is 40 years); Antonio Bento, Kevin Roth & Yiou Zuo, *Vehicle Lifetime and Scrappage Behavior: Trends in the U.S. Used Car Market*, 39 ENERGY J. 159, 178 (2018).

221. Stavins, *Vintage-Differentiated Regulation*, *supra* note 101, at 43–44. Stavins explains additional differences: the only regulations that apply to existing cars are emissions inspections; essentially, regulation is designed only to ensure that the pollution control devices *as manufactured* are still working, rather than impose new standards once the car is on the roads. *Id.* at 45.

222. *Id.* at 32.

223. Clean Air Act § 202(a)(1), 42 U.S.C. § 7521(a)(1) (2018) (emphasis added) ("The [EPA] Administrator shall by regulation prescribe (and from time to time revise) . . . standards applicable to the emission of any air pollutant from any class or classes of *new* motor vehicles or *new* motor vehicle engines . . . .").

224. Gruenspecht, *supra* note 131.

standard was removed and replaced with a cash bounty available for 15-year-old cars.[225]

Because compliance with the emissions standard increased the purchase cost of cars, Gruenspecht found that the policy reduced new car sales and increased the lifespan of older, more heavily polluting cars.[226] As a result, Gruenspecht concluded that hydrocarbon and CO emissions for three years out (in 1984) would actually be *higher* under the EPA's stricter 1981 policy than under either of the two alternative scenarios (NO_x emissions, unlike the other two pollutants, would slightly decrease under the EPA's policy).[227] Essentially, it would take five to seven years for the policy to result in deeper emissions reductions than what could be achieved without any regulation—as the oldest cars were replaced, even without a tighter new standard—or with a bounty program.[228]

Thus, even in a sector of energy consumption that sees relatively frequent turnover in investment, a blanket grandfathering policy for all existing assets can delay and reduce the effectiveness of a regulatory transition.[229] The health impacts of transportation-related pollution that are exacerbated by these policy delays are more acutely felt by communities that live close to highways and other high-traffic areas.[230] Concentration of air pollutants from transportation are disproportionately higher in predominantly black and Hispanic communities than in white communities, raising significant equity issues with the design of mobile-source air pollution regulation.[231]

The CAFE standard was effective in improving nationwide fuel efficiency in its first decade.[232] However, from the early 1980s to mid-2000s,

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225. *Id.* at 329.

226. *Id.* at 329–30.

227. *Id.* at 330.

228. *Id.*

229. *Id.* at 330–31.

230. In 2010, the Health Effects Institute's review of epidemiological literature detailed the public health impacts of living within 300 to 500 meters of a major road, documenting increased incidences of childhood asthma and other respiratory diseases. HEALTH EFFECTS INST., TRAFFIC-RELATED AIR POLLUTION: A CRITICAL REVIEW OF THE LITERATURE ON EMISSIONS, EXPOSURE, AND HEALTH EFFECTS 10 (2010), https://www.healtheffects.org/system/files/SR17TrafficReview.pdf.

231. *See* Lara P. Clark, Dylan B. Millet & Julian D. Marshall, *Changes in Transportation-Related Air Pollution Exposures by Race-Ethnicity and Socioeconomic Status: Outdoor Nitrogen Dioxide in the United States in 2000 and 2010*, 125 ENVTL. HEALTH PERSP. 1, 8 (2017). Although the study found significant declines from 2000 to 2010 in the number of people exposed to NO_2 levels above international health guidelines, as well as some closing of the gap between minority and white populations' exposure to the pollutant, the authors found that "nonwhites were three times as likely as whites to live in a block group above the WHO guideline [for NO_2] in 2000, and 2.5 times as likely in 2010." *Id.*

232. U.S. EPA, 2018 EPA AUTOMOTIVE TRENDS REPORT: GREENHOUSE GAS EMISSIONS, FUEL ECONOMY, AND TECHNOLOGY SINCE 1975, at 6 (2019), https://nepis.epa.gov/Exe/ZyPDF.cgi/P100W

average fuel economy in the United States actually decreased: the CAFE standard remained constant, fuel prices were generally low, and manufacturers shifted to (and consumers bought) heavier, more powerful vehicles—switching away from sedans and toward SUVs.[233] Since 2004, fuel efficiency has increased sharply in an era of concern about high oil prices and energy security, followed by the implementation of the Obama Administration's joint EPA-NHTSA rule on fuel economy and GHG emissions.[234] Despite these fuel efficiency increases nationwide, vehicle miles traveled and transportation GHG emissions continue to increase, both in absolute terms, as well as per capita levels,[235] and the Trump Administration's new fuel economy rule for 2021 through 2026 cars has severely weakened the regulatory push for lower emissions beyond 2020.[236]

As with motor vehicle emissions standards under the Clean Air Act, the CAFE standard applies only to new vehicles, set prospectively for manufacturers across all of their vehicles for a given model year.[237] The statutory scheme for fuel economy provides no way to address vehicles currently on the road or to encourage switching to newer, more efficient cars.

Nearly 50 years' experience with this regulatory model for fuel efficiency shows weaknesses in efficiency, effectiveness, and equity as to the impacts of these standards.[238] Further, the politicization of the standard under the Trump Administration demonstrates the fragility of the "energy security" portion of the political coalition that had enacted stricter rules in 2005 and 2007.[239] All this is to suggest that the current model will not be sufficient to meet the goal of the Green New Deal of electrifying and decarbonizing transportation. A Green New Deal will require different or additional law to

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5C2.PDF?Dockey=P100W5C2.PDF (reporting that fuel efficiency improved until the 1980s).

233. *Id.* at D-5.

234. *Id.*

235. *See* Popovich & Lu, *supra* note 209 (showing the trend in absolute and per capita transportation-related GHG emissions by metro area from 1990 to 2017—a time period marked by increases in both measures in nearly every part of the United States).

236. *See generally* The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks, 85 Fed. Reg. 24,174 (Apr. 30, 2020) (to be codified at 40 C.F.R. pts. 86 and 600); *see also supra* note 219 (providing a brief outline of fuel economy standards under the Trump Administration).

237. 49 U.S.C. § 32902(a) (2018).

> At least 18 months before the beginning of each model year, the Secretary of Transportation shall prescribe by regulation average fuel economy standards for automobiles manufactured by a manufacturer in that model year. Each standard shall be the maximum feasible average fuel economy level that the Secretary decides the manufacturers can achieve in that model year.

49 U.S.C. § 32902(a).

238. *See supra* notes 224–36 and accompanying text.

239. *See supra* note 219.

facilitate more than incremental change in transportation efficiency and will need to do so with political coalition-building in mind.

The above two examples from the Clean Air Act—stationary and mobile sources—illustrate the applicability of regulatory transition theory in environmental law.[240] These Clean Air Act transitions demonstrate how cost considerations, administrability, and perceptions of fairness contribute to undermine or delay regulatory effectiveness, efficiency, and equity.

The types of distinctions made in the NSR program—i.e., grandfathering in existing infrastructure and investments—are not unique to pollution control and can be seen in a variety of policy contexts relevant to the Green New Deal. One critical example is the application of building codes. Whether for environmental and energy-efficiency or for other purposes, such as fire and earthquake safety, accessibility, etc., building codes govern the construction of new residential, commercial, or industrial buildings but exempt or grandfather in previous construction.[241] For buildings, this grandfathering creates long-term problems for climate and environmental action under a Green New Deal. Whereas automobiles, or even most power plants, are likely to be replaced as worn out or obsolete within this half-century, residential homes built today could be expected to stand through the end of the 21st century or longer.[242]

IV. DESIGNING LEGAL SOLUTIONS IN A GREEN NEW DEAL

The Green New Deal envisions a new decade of transitions in the United States, marked by rapid change from electricity, transportation, industry, and agriculture dependent on fossil-fuel combustion to a decarbonized economy.[243] The "New Deal" element in the phrase indicates an emphasis on government-driven investment and policy to employ workers, distribute the benefits of decarbonization to vulnerable or marginalized groups and communities, and ease the burden of the massive multisectoral transitions in the Green New Deal.[244]

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240. *See supra* notes 179–239 and accompanying text.

241. *See, e.g.*, N.Y.C., N.Y., ADMIN. CODE, tit. 28, ch. 10, § 101.4.1 (LexisNexis 2020) (exempting existing buildings, as a general rule, from energy conservation requirements); *id.* tit. 28, ch. 7, § 1101.3 (exempting existing buildings from accessibility requirements, unless they undergo significant alterations).

242. For discussion of this issue and the long-term expected lifespan of residential buildings as compared to other types of assets or infrastructure, see WILLIAMS ET AL., U.S. DDPP TECHNICAL REPORT, *supra* note 66.

243. *See* H.R. Res. 109, 116th Cong., at 6–10 (2019) (calling for a ten-year mobilization to accomplish the Green New Deal's goals).

244. *Supra* text accompanying note 48.

The application of regulatory transition theory and the experiences associated with environmental law during the past 50 years point toward the need for new solutions in a Green New Deal that will address transition problems. As described earlier, temporal transition relief is frequently the result of financial and political pressures.[245] However, overly generous relief in those transitions could undermine the effectiveness of regulatory transitions envisioned in the Green New Deal and could exacerbate existing inequalities.

Without making specific policy choices that need to be made in designing the Green New Deal, there are some basic outcomes fundamental to the idea. These include, at a minimum, rapid expansion of renewable energy generation and electricity transmission infrastructure, closure of fossil fuel-fired power plants, and major changes to U.S. transportation systems (including the prioritization of mass transit, as well as a transition away from gasoline-powered cars and trucks).[246] Overcoming the typical transition policy pressures will be critical to enable a Green New Deal that meets the goals of effectiveness, efficacy, and equity in a politically feasible way.

A. Solutions to Transition Problems

Economic and regulatory solutions are available to deal with the common problems in transitions seen in the Clean Air Act and other environmental laws. Some of these solutions are intuitive, but may be politically difficult; other solutions may help effectiveness, but bear financial costs; yet others ignore socioeconomic and distributional justice impacts.

No Grandfathering. First, in response to the tendency toward temporal transition relief,[247] Green New Deal law and policy can be structured without grandfathering, such that climate and environmental standards apply equally to new and old infrastructure. For example, once a new standard is put in place to limit pollutant emissions from power plants, the requirement would apply to all plants equally, regardless of location or age. While this shift in the application of environmental laws could create backlash and criticisms of "unfairness," it is important to note that knowledge about climate impacts in particular, and the emission of GHGs, is not a new phenomenon.[248] The

245. *See supra* notes 156–62 and accompanying text.

246. WILLIAMS ET AL., U.S. DDPP TECHNICAL REPORT, *supra* note 66, at xiv (outlining the major transitions needed to accomplish decarbonization).

247. *See supra* notes 107–13 and accompanying text.

248. Dr. James Hansen's famous congressional testimony on climate change was given in 1988, now over three decades ago. *See* Philip Shabecoff, *Global Warming Has Begun, Expert Tells Senate*, N.Y. TIMES (June 24, 1988), https://www.nytimes.com/1988/06/24/us/global-warming-has-begun-expert-tells-senate.html.

unfairness argument loses some potency, given that major economic actors have been aware of information with regard to their GHG contribution for quite some time.[249]

Mandated Retrofitting. Paired with grandfathering could be regulatory requirements that existing infrastructure, buildings, or assets be retrofitted to improve environmental performance and efficiency or to mitigate GHG emissions. As noted earlier, there is a need to tailor policy based on the expected lifespan of equipment, assets, or infrastructure and based on the relative expense of retrofitting.[250] One size does not fit all here: for some sectors, such as personal automobiles, retrofitting may be infeasible. Electrification of transportation over a short period of time, as the Green New Deal envisions, might be better accomplished by focusing on the production of new electric transportation, rather than requiring the retrofitting of gasoline-powered vehicles with battery-powered drivetrains.[251] However, for residential buildings, retrofitting would prove much more significant.[252] Given that virtually all of the homes and apartment buildings people live in could be expected to still be standing by the middle of the century, Green New Deal goals could never be accomplished in any reasonable time frame without massive retrofitting efforts for energy efficiency, fuel switching, and other changes.

Transition Phase-In. Less severe than a blanket policy of no grandfathering may be a firm phase-in schedule for regulatory transitions. For example, the retirement of polluting infrastructure could be tied to set time periods or to related policy timeframes, such as amortization schedules for capital investments in tax policy[253]—indicating that the owners of the asset should not have any further expectation of value in maintaining its use.

Of course, any phase-in period schedule will tend to incentivize regulated parties to seek continual extensions or additional ways to maximize

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249. *See, e.g.*, Shannon Hall, *Exxon Knew About Climate Change Almost 40 Years Ago*, SCI. AM. (Oct. 26, 2015), https://www.scientificamerican.com/article/exxon-knew-about-climate-change-almost-40-years-ago/ (reporting on an investigation that found Exxon understood the link between GHGs and climate change as early as 1977 and recalling that Exxon has spent the intervening years denying and refuting climate science).

250. *See supra* notes 127–29 and accompanying text.

251. *See* WILLIAMS ET AL., U.S. DDPP TECHNICAL REPORT, *supra* note 66, at 71–72 (noting that long-lived infrastructure requires retrofitting to meet new regulatory standards, whereas with short-lived equipment it is more economical to focus on new production).

252. *Id.*

253. That is, if an entity is able to claim tax benefits for the depreciation of a facility or pollution source over a 20-year period, then the law could require the facility to either close at the end of that amortization period or comply with current environmental requirements, to ensure that the grandfather exception does not lead to a windfall or artificially extend the useful life of the facility.

and prolong the value of their assets or investments.[254] For example, if a new statute or regulation in 2020 required all natural gas-fired power plants to close by 2030, the decade-long delay would ease political opposition to the measure in the short term, but as the deadline approaches, regulated industries would have a strong incentive to lobby to extend or eliminate the deadline. There may be alternative, more successful ways to design a statute or policy to overcome these problems. A policy could require the oldest, highest-polluting, or least efficient 5% of such plants to close each year for the next 20 years. The time delay could make the policy more politically palatable, and the gradual phase-in would ensure that no single year becomes significant enough in terms of cost to make the issue salient.

Market-Based Solutions. Economists, environmentalists, policymakers, and advocates have clashed in recent years as to the desirability of market-based solutions as an alternative or a complement to prescriptive environmental regulation.[255] As a form of financial transition relief, market tools, such as taxes, subsidies, tradeable quotas, and emissions cap-and-trade regimes, can distribute the burden of transition policies across different sectors and among new and old pollution sources.[256] Imposing fees or taxes tied to pollution emissions or environmental outcomes, rather than regulation tied to control equipment technology, could be used to address the grandfathering problem and level the playing field for new market entrants, if broadly applied.[257]

Economists favor market-based environmental policies to further the policy goal of efficiency. Once an environmental standard or objective is identified (e.g., the appropriate allowable total of pollution emissions over a given time period), market-based policies are intended to provide flexibility such that market principles and economic cost-benefit considerations drive regulated parties' behavior.[258] Efficiency can, in turn, advance the goal of efficacy in environmental policymaking by maximizing the environmental

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254. *See supra* notes 159–62 and accompanying text.

255. For an analysis of early experiences with market-based environmental regulation, see Robert N. Stavins, *Experience with Market-Based Environmental Policy Instruments*, *in* 1 HANDBOOK OF ENVIRONMENTAL ECONOMICS 355–435 (Karl-Göran Mäler & Jeffrey R. Vincent eds., 2003) [hereinafter Stavins, *Market-Based Environmental Policy*].

256. *See* Huber, *supra* note 101, at 101–03 (categorizing types of financial relief and giving examples); *see also supra* notes 114–15 and accompanying text.

257. A Pigouvian tax, named after economist Arthur Pigou, adds a charge based on the externalities of an activity—such as environmental pollution or contribution to climate change—that are not captured in the market price. *Externalities: Pigouvian Taxes*, ECONOMIST (Aug. 19, 2017), https://www.economist.com/economics-brief/2017/08/19/pigouvian-taxes.

258. *See generally* Stavins, *Market-Based Environmental Policy*, *supra* note 255 (describing the benefits of market-based environmental regulation and analyzing examples from around the world).

benefit that can be gained with scarce resources.[259] Limiting costs may help political coalition-building among fiscally conservative decisionmakers. However, market-based solutions are subject to rent-seeking behavior by creating a financial stake in exemptions, allowances, or special rules in market-based regulations.[260] Further, market-driven approaches frequently raise environmental justice and equity concerns, because they tend to focus on aggregate cost efficiency in policy implementation, rather than considering the distributive impacts of pollution and other environmental problems on disadvantaged or marginalized communities.[261]

In addition to the political economy critique of market-based environmental regulation, environmental justice advocates raise concerns that issues of equity—not adequately reflected in market-based decisionmaking because they have not traditionally been considered financially quantifiable—are swept under the rug with a presumption that market-based solutions lead to efficient outcomes.[262] If a company that operates a polluting source must internalize the economic externalities of pollution, but can allocate those costs (whether internally or externally via trading), it will be likely to do so in a way that minimizes costs. This can lead to the phenomenon of pollution *hot spots* where pollution remains cheaper to

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259. *Id.*

260. In a cap-and-trade system, setting the level of *allowances* that can be used to meet the cap is subject to this pressure. Carbon dioxide cap-and-trade systems to date, such as the European Union's Emission Trading Scheme (E.U. ETS) began with the grandfathering of existing sources by granting them free allowances based on historical emissions. Edwin Woerdman, Oscar Couwenberg & Andries Nentjes, *Energy Prices and Emissions Trading: Windfall Profits from Grandfathering?*, 28 EUR. J.L. & ECON. 185, 185–86 (2009). This was done, ostensibly, as a measure to increase the political palatability of the proposal for energy companies. Granting free allowances, however, leads to "windfall profits" for regulated entities when the opportunity costs of using the allowances are passed on to consumers. *Id.* at 186. In their look at early experiences under the E.U. ETS, Woerdman et al. conclude that only auctioning the allowances (i.e., not pre-determining the price or tightening the cap) avoids the windfall profits issue. *Id.* at 197.

261. In California, the debate about the environmental justice impacts of the state's GHG emissions cap-and-trade program became a focal point for the state legislature in 2017. Sean Hecht, *The Future of California's Greenhouse Gas Cap and Trade Program After 2020: A Conversation*, LEGAL PLANET (May 9, 2017), https://legal-planet.org/2017/05/09/the-future-of-californias-greenhouse-gas-cap-and-trade-program-after-2020-a-conversation/. Environmental justice advocates opposed parts of the reauthorization of the program that were supported by state Democratic Party leadership and enacted by the Legislature. *Id.* The blog Legal Planet posted a series of viewpoints on the state's cap-and-trade program that illustrate the economist-environmental justice divide on the policy. *Id.*

262. *See* Amy Vanderwarker & Kay Cuajunco, *Equity at the Center: SB 775 and AB 378 Create New Path Towards More Equitable, Effective Climate Policy*, LEGAL PLANET (May 12, 2017), https://legal-planet.org/2017/05/12/guest-bloggers-amy-vanderwarker-and-kay-cuajunco-equity-at-the-center-sb-775-and-ab-378-create-new-path/ (highlighting that California's cap-and-trade system works fine for GHGs which have a global effect, but ignores co-occurring toxic air pollutants with local effects, meaning that efficient allocation of carbon emissions may cause a disproportionate allocation of burdens to public health and quality of life).

externalize.[263] In the case of the Clean Air Act's Acid Rain trading program, early studies showed that compliance led to emission cuts from the worst polluters, having a "cooling" effect on already existing hot spots.[264] However, environmental justice advocates remain concerned about the impact climate cap-and-trade schemes are having with regard to hot spots of co-pollutants that are emitted by major sources along with GHG (but unregulated by GHG-specific caps).[265]

For these political and equity-based reasons, the Green New Deal generally eschews market-based solutions to climate and other environmental problems.[266] The Green New Deal emphasizes the connection between environmental and socioeconomic challenges.[267] Thus, Green New Deal proponents are skeptical of the approach over the past three decades to rely on markets, unless paired with other regulation or specifically designed in a way to drive equitable outcomes.[268]

B. Intuitive Policy Meets Difficult Politics

Transition problems in implementing a Green New Deal proposal are not difficult to imagine. Grandfathering and other overly generous forms of transition relief lead to inefficient, ineffective, and inequitable results that could undermine the objectives of any Green New Deal effort. Policy solutions to address these transition problems are easily identifiable, at least in general terms—including, as discussed above, a prohibition on grandfathering, mandated retrofitting, and phased-in regulation that avoids regulatory bottlenecks or trigger points that raise the stakes for concentrated

263. In climate regulation, hot spots are not a concern, because common GHGs disperse widely in the atmosphere, and the climate impacts are global, rather than local. This is in contrast to pollutants, such as mercury or other toxic air pollutants, that have localized environmental impacts, meaning that communities near concentrated pollution sources will experience disproportionate harmful effects. *See, e.g.*, Ann E. Carlson, *Designing Effective Climate Policy: Cap-and-Trade and Complementary Policies*, 49 HARV. J. ON LEGIS. 207, 221 (2012) (comparing the George W. Bush Administration's widely criticized proposal for a cap-and-trade scheme for mercury emissions with proposals for cap-and-trade GHG regulation).

264. Byron Swift, *Allowance Trading and SO_2 Hot Spots—Good News from the Acid Rain Program*, 31 Env't Rep. (BNA) 954, 955 (2000).

265. Vanderwarker & Cuajunco, *supra* note 262.

266. Spencer Bokat-Lindell, *Do We Need the Green New Deal?*, N.Y. TIMES (Sept. 3, 2019) https://www.nytimes.com/2019/09/03/opinion/climate-change-green-new-deal.html (presenting both sides of the debate over the Green New Deal as a tool for combating climate change, including the effectiveness of market and non-market strategies for controlling carbon emissions).

267. *Id.*

268. It is worth noting that Woerdman et al.'s study of the E.U. ETS recommends that a cap-and-trade best designed to avoid the windfall profits problem is one that offsets the cost of pollution allowances with cuts to labor (payroll) taxes, conveying the message that pollution costs money while labor is encouraged. Woerdman, Couwenberg & Nentjes, *supra* note 260, at 198.

interests lobbying to delay or roll back changes. However, the economic and political conditions that create pressure for transition relief[269] are likely to present significant political hurdles to adopting forward-looking regulatory policy under a Green New Deal.

As climate science has become more fine-tuned in the past several years, some commentators have gravitated toward the concept of a *carbon budget*—the amount of global GHG emissions likely to keep global temperatures below the 1.5 or 2°C thresholds.[270] Equitable measures of how to allocate any such global budget would leave most of these amounts to developing countries that are still in the process of providing secure, affordable, and reliable energy.[271] Regardless of any allocation, a recent study in *Nature* demonstrated that, at a global level, existing and proposed fossil-fuel energy infrastructure, even if used only until the end of the infrastructure's expected lifespan at the time of construction, already accounts for roughly 846 metric gigatons of CO_2-equivalent (depending on a variety of factors).[272] This total alone is well above the 420 to 580 metric gigatons of GHG emissions that are likely left in the 1.5°C carbon budget, and more than half of what is left in a 2°C budget.[273]

In other words, the most up-to-date scientific studies and models suggest that to avoid catastrophic damage from climate change, international and domestic policy must limit not only the GHG emissions associated with projects and activities in the future, but also mandate the early retirement of some existing infrastructure.[274] Any substantial component in a Green New

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269. *Supra* Part II.B.

270. *See generally, e.g.*, Joeri Rogelj et al., *Estimating and Tracking the Remaining Carbon Budget for Stringent Climate Targets*, 571 NATURE 335 (2019) (comparing and analyzing several different attempts to quantify a carbon budget consistent with 1.5º or 2°C targets).

271. Considering historical GHG emissions, the United States (and the rest of the industrialized world) have used far more than an equitable share of the GHGs released since the start of the Industrial Revolution. *See* MARCIA ROCHA ET AL., HISTORICAL RESPONSIBILITY FOR CLIMATE CHANGE—FROM COUNTRIES EMISSIONS TO CONTRIBUTION TO TEMPERATURE INCREASE 8 (2015), https://www.climateanalytics.org/media/historical_responsibility_report_nov_2015.pdf (showing pie charts of historical GHG emissions, with the United States responsible for 20% of global GHG emissions from 1850 to 2012—the highest share of any country).

272. *See generally* Dan Tong et al., *Committed Emissions from Existing Energy Infrastructure Jeopardize 1.5°C Target*, 572 NATURE 373 (2019). The paper's authors estimate 658 metric gigatons (a range of 226 to 1,479) from already-built infrastructure, 41% of which comes from infrastructure in China. "Committed emissions" from proposed projects represent an additional 188 metric gigatons (a range of 37 to 427). *Id.*

273. *Id.*

274. *See id.* at 376. The development of rapidly scaled-up and widespread negative emissions technologies could offset some of this need, but the quantity of "committed emissions" would render any such solutions partial and marginal; the limited storage capacity for long-term sequestration of carbon means negative emissions technology most likely cannot balance out the entirety of our overcommitted fossil-fuel infrastructure.

Deal toward early retirement or closure of electricity generation, industrial facilities, and transportation infrastructure will raise additional, complex legal and political challenges.

In this vein, Green New Deal legal and policy design can draw on the experiences of public utilities law in previous transitions, such as the transition away from nuclear power construction in the late 1970s and 80s. Due to safety concerns (and changing economic projections about the demand for electricity generation), utilities scrapped many planned nuclear plants throughout the 1980s.[275] Variations in state public utilities law led to differences in how those sunk, stranded costs were absorbed—either by utility shareholders or by consumers (i.e., electricity ratepayers). In *Duquesne Light Co. v. Barasch*, the Supreme Court addressed this scenario, ultimately denying a utility's constitutional takings claim against Pennsylvania's "used and useful" standard that prohibited the utility from applying the costs of a canceled project to its customers.[276] The Court did not mandate as a matter of federal constitutional law any particular way to handle this cost dispute, but the case raises issues that could recur if a Green New Deal forces utilities or other infrastructure owners to prematurely close facilities or abandon current plans.[277]

Making the intuitive legal design choices in a Green New Deal that avoid transition pitfalls—avoiding grandfathering and mandating retrofitting—requires incorporating those choices into a package that overcomes political coalition-building barriers. In other words, because grandfathering has political benefits (protecting existing interests and advancing a "fairness" policy framing),[278] policy that avoids grandfathering must be constructed in a way that overcomes the political liabilities with a different set of advantages.

Green New Deal ideas can turn the tables on political coalitions that have favored over-generous transition relief, and instead foster a stronger, more robust regulatory transition toward low-carbon infrastructure. Rather than pairing pro-regulation interests with the interests of existing industry to create barriers to entry, a Green New Deal plan can appeal to both labor and

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275. *See, e.g.*, Duquesne Light Co. v. Barasch, 488 U.S. 299, 302 (1989) (mentioning the history that led up to the cancelation of the nuclear plant at issue in the case).

276. *Id.* at 301–02.

277. In a more recent application of this problem, South Carolina utility regulators are still dealing with the aftermath of the unfinished V.C. Summer nuclear project, canceled in 2017 after expenditures of roughly $9 billion. Brad Plumer, *U.S. Nuclear Comeback Stalls as Two Reactors Are Abandoned*, N.Y. TIMES (July 31, 2017), https://www.nytimes.com/2017/07/31/climate/nuclear-power-project-canceled-in-south-carolina.html.

278. *See supra* note 123 (identifying fairness and political palatability as two of the three reasons governments provide transition relief).

environmental interests by funding job-heavy infrastructure retrofitting and rebuilding projects. To meet goals of equitability for both displaced workers and those disproportionately impacted by environmental harms, transition relief can focus on financial transitions, rather than temporal relief that delays and undermines the effectiveness of regulatory changes. This financial relief could be directed both toward labor sectors and toward capital-asset owners, in the form of payments that incentivize early retirement rather than subsidies for prolonged use of fossil fuels.[279]

A final lesson from earlier environmental laws that can be applied in designing a Green New Deal is crafting law and policy with enforcement and enforceability in mind.[280] Recent scholarship on environmental compliance and enforcement has shown how choices about institutional design, monitoring programs, and rules about transparency influence compliance rates, as well as the level of public participation in implementing changes.[281] Making these choices wisely may lead to more effective, efficient, and equitable results, without the political challenge of setting more stringent requirements or standards.

CONCLUSION

The Green New Deal idea is ambitious in its scope and in its goal: an economy-wide transition that integrates environmental and socioeconomic interests in addressing the crises of climate change, environmental pollution, poverty, and discrimination.[282] Precise policy plans are in flux, but the Green New Deal name has stuck and has significantly influenced environmental and industrial policy platforms of 2020 presidential candidates,[283] as well as state and local-level actions.

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279. On the extent to which elimination of fossil-fuel subsidies would likely drive decreases in GHG emissions, see Peter Erickson et al., *Why Fossil Fuel Producer Subsidies Matter*, NATURE, Feb. 6, 2020, at E1. *But see generally* Jessica Jewell et al., *Limited Emission Reductions from Fuel Subsidy Removal Except in Energy-Exporting Regions*, 554 NATURE 229 (2018) (calculating a lesser degree of reductions due to differences in the nature and level of fossil-fuel subsidies and taxes in different countries).

280. *See, e.g.*, NEXT GENERATION ENVIRONMENTAL COMPLIANCE AND ENFORCEMENT 2 (LeRoy C. Paddock & Jessica A. Wentz eds., 2014) (discussing the concept of "rules with compliance built in").

281. *See, e.g.*, LeRoy C. Paddock, David L. Markell & Robert L. Glicksman, *Introduction to* IV ELGAR ENCYCLOPEDIA OF ENVIRONMENTAL LAW: COMPLIANCE AND ENFORCEMENT OF ENVIRONMENTAL LAW 1–17 (Michael Faure ed., 2017) (introducing a volume on developments in the enforcement of environmental law written by contributing scholars and policymakers from around the world).

282. H.R. Res. 109, 116th Cong. (2019).

283. *See, e.g.*, *Where Democrats Stand: Climate Change*, WASH. POST, https://www.washingtonpost.com/graphics/politics/policy-2020/climate-change/green-new-deal/ (last visited Apr. 27, 2020) (showing statements from several Democratic candidates in response to the

The problems associated with transition relief point to a central challenge: how to craft a Green New Deal that garners support from existing actors, without undermining the long-term effectiveness of the plan. The growing literature on *just transitions* highlights the imperative to regard social, economic, and environmental transitions as interrelated.[284] Rather than complicating the feasibility of environmental policy, the Green New Deal represents the idea that aligning these interests—i.e., bringing labor and environmental justice interests together with supporters of strong climate action—can lead to a different coalition that can avoid the pitfalls of the first generation of environmental laws.

The long-term dimension of climate change—with global impacts felt over centuries, rather than days, months, or years—raises the issue of intergenerational equity. Perhaps the one certainty in climate change is that change will come, whether in significant legal and policy changes to manage an effective response to mitigate climate change, or as a result of warming and sea-level rise that threaten to disrupt and harm billions of people, present and future. As a cautionary note, it is worth remembering that "[t]he judgment of posterity has not been kind to America's record of worker transition in other periods of economic upheaval."[285] Designing a Green New Deal is a critical opportunity to apply the lessons from those transitions and to do better.

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question of whether they support the Green New Deal Resolution). The candidacy of Washington Governor Jay Inslee has driven significant innovation in climate-policy planning, as he made climate change the signature issue during his brief campaign; other candidates have since drawn on his framework. *See* Zoya Teirstein, *A Q&A with the Policy Wonks Who Wrote Jay Inslee's Climate Plans*, GRIST (Sept. 20, 2019), https://grist.org/article/a-qa-with-the-policy-wonks-who-wrote-jay-inslees-climate-plans/ (explaining the lasting impact of the framework on the election).

284. *See generally* Eisenberg, *supra* note 77.

285. John Copeland Nagle, *The War on Coal*, 5 LSU J. ENERGY L. & RESOURCES 21, 28 (2017) (alteration in original) (quoting RICHARD MARTIN, COAL WARS: THE FUTURE OF ENERGY AND THE FATE OF THE PLANET 35 (2015)).