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U.S. Labor and renewable energy: green growth versus the Green New Deal

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ABSTRACT

In this article, I examine findings from an NSF-funded project on U.S. labor unions' stance on renewable energy technologies such as wind and solar power, which is neither simple nor well understood. The discourse on energy issues of 11 national-level U.S. unions posted to union websites from 2012 to 2020 was examined and coded using NVivo. While almost all unions in this study were enthusiastic supporters of renewable energy, the reasons for their support were very different, with different implications for the goal of low-carbon energy transition. Unions disagree on issues of 'just transition,' and exhibit lines of conflict on four issues: who should lead the energy transition; whether jobs in renewable energy are or could be as good as fossil fuel jobs; whether fossil fuels should be phased out; and whether a just transition necessarily includes transformation of unjust social relations. Union strategies regarding renewable and fossil fuel energy were characterized as 'Green Growth,' versus Green New Deal. Examining these contrasting strategies through the lens of theoretical perspectives including ecological modernization, feminist theory, Treadmill of Production theory, and the theoretical perspectives of Gramsci and Polanyi allows labor's role in energy transition to be better understood while refining sociological theory.

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The energy transition away from fossil fuels and toward the use of renewable energy has begun in the U.S. However, as of 2023, renewable sources supplied only 21.4% of electricity generated and 8.8% of total energy consumed (Energy Information Agency 2023). Economists and labor scholars have pointed out that without a significant increase in renewable energy sources it will be impossible to generate enough energy to enable the shrinkage of fossil fuel industries and reduce greenhouse gas emissions quickly enough (Pollin 2019; Sweeney and Treat 2018).

The U.S. Department of Energy defines 'energy workers' as those likeliest to be affected by changes in energy policy and energy technologies. The 7.9 million energy jobs in the U.S. are concentrated in five economic sectors: fuels, electricity generation, energy transmission, distribution and storage, auto manufacturing, and energy efficiency (United States Department of Energy 2017, 2020a, 2022). As of 2019, wages for all energy workers were 34% higher than the national median wage, but for workers in natural gas median hourly wage was \$30.33 compared to \$28.69 for coal, \$26.59 for oil, \$25.95 for wind, and \$24.48 for solar (United States Department of Energy 2020b). New jobs in renewable energy are being developed in a very different context from the fossil fuel energy jobs of the past. Since the 1970s, wages have been stagnant, fewer jobs offer benefits or pensions, and a greater proportion involve precarious work

arrangements. Job quality has degraded the most for men without college degrees (Howell and Kalleberg 2019), who make up a large proportion of energy workers, 74% of whom are male (United States Department of Energy 2022).

Labor rights and protections have also declined in the U.S. as a result of policy choices that deliberately weakened unions (Mishel and Bivens 2021), resulting in a sharp decline in union density. While only 5.7% of all U.S. private-sector workers were union members as of 2022 (Congressional Research Service 2023), 10% percent of solar and 11% of wind electricity generation workers were unionized or covered by a project labor agreement, versus 17% in coal, 17% in natural gas, and 20% in nuclear power (United States Department of Energy 2022).¹

Despite the decline in union density, U.S. labor unions are still important political and economic actors who are influential in the state's policy response to climate change (Mildenberger 2020; Streeck and Hassel 2003). However, their stance and role in the development of renewable energy technologies such as wind and solar power is neither simple nor well understood. In this study, I aim to increase understanding of the reasons for U.S. unions' support for renewable energy technologies, and how these reasons relate to the goal of low-carbon energy transition.

I will begin this article by discussing U.S. labor and energy transition. Then, I will discuss some important

theoretical perspectives and introduce the project and its methodology. Next, I will share findings that describe labor unions' stances toward renewable energy and explore the reasons why unions support the expansion of wind and solar energy. My results show that union support for renewables coalesces around two guiding ideas on energy transition: 'Green Growth,' and the Green New Deal. Finally, I will connect theoretical perspectives in environmental sociology to Green Growth and the Green New Deal, placing labor, renewable energy and resistance to low-carbon energy transition within the context of environmental sociology.

U.S. Labor and low-carbon energy transition

A transition to renewable energy will affect U.S. energy workers differently depending on their occupation; whether their jobs depend upon coal, oil or natural gas production networks (Stavis 2019), and the region of the U.S. in which they are located. For construction workers, employment has expanded due to efforts to build out renewable energy infrastructures (Cha et al. 2021), but electric utility workers are concerned that once built, wind turbine installations and solar panel arrays will require far fewer workers to run and maintain than was true of the old coal, oil and gas-fueled systems (Sicotte, Joyce, and Hesse 2022). The solar panel industry has added thousands of new jobs but has been implicated in manufacturing scandals including worker exposure to the toxic heavy metal cadmium (Mulvaney 2014) and the use of prison labor in the U.S. and abroad (Davidson 2023).

In some regions of the U.S. (e.g. California), utility-scale solar plants employ more unionized workers, offering higher pay and health and pension benefits (Philips 2014). However, in other regions (e.g. Georgia), publicly owned utility-scale solar jobs are nonunion, low-paying, and without benefits (Luke 2023). The residential solar panel installation industry, concentrated in California, Florida, New York, Texas and Massachusetts (Interstate Renewable Energy Council 2023) is notorious for using subcontracting and immigrant labor and offering low pay (Cha et al. 2021; Davidson 2023; Sicotte, Joyce, and Hesse 2022) and putting workers at risk with unsafe working conditions (Scheiber 2021). While much safer than coal mining and oil and gas work, solar installation involves the risk of burns, electric shocks, and falls (Occupational Safety and Health Administration 2020). As climate change advances, heat waves will make outdoor work in renewable energy construction and installation more hazardous.

For coal miners, 'energy transition' has meant the disappearance of jobs that sustained their region, leaving behind economic devastation (Abraham 2017; Carley et al. 2018). Reduced demand for coal is due

more to its replacement with inexpensive fracked natural gas than decarbonization measures. However, its decline is also eroding the security of electricians working in electricity generation, although electricians as a group are well positioned to take advantage of the high demand for their skills in solar, wind and nuclear energy (Sicotte, Joyce, and Hesse 2022). Some in occupations such as boilermaking, traditionally associated with coal-fired power plants, see very little demand for their skills in renewable energy (Sicotte, Joyce, and Hesse 2022).

Worker protection policies due to necessary phase-out of environmentally destructive industries were envisioned by labor leaders in the early 1990s, when Tony Mazzocchi, a leader of the Oil, Chemical and Atomic Workers union (OCAW), formulated a 'Superfund for workers' which included government-provided income supports, funding for college or retraining, and other provisions for displaced workers (Mazzocchi 1993). This idea eventually morphed into the 'just transition,' spreading from labor into academic discourse (Stavis, Morena, and Krause 2020). However, the just transition idea has become a point of contention among unions and their members, who view the phrase as a rhetorical device that whitewashes working people's disproportionate share of risk and costs from energy transition (Vachon 2023), experienced as mass layoffs taking place with little or no support from either industry or the state (Cha et al. 2021).

In addition to having different sets of material interests stemming from their occupation, U.S. labor unions also differ in their type and organization. Unlike industrial unions such as CWA, UE, and USW, construction unions such as IBEW, LiUNA, IUOE and UA do not work for one employer; instead, they work project-by-project, with their union providing workers through a hiring hall when needed. This tends to create an orientation closer to 'pure and simple business unionism' (Vachon 2022) in which the union's concerns and solidarities are narrowed to matters of employment and do not extend to issues of social justice (Hyman 2001). All but one of the 11 labor unions in this study (UE) had federated structures with policies made for locals at the national level and were affiliated with the umbrella organization AFL-CIO. In recent years, AFL-CIO has effectively imposed a position supportive of retaining fossil fuels on its members, because unions threatened by proposals to phase out fossil fuels have disproportionate power to influence the coalition (Vachon 2022).

The dynamics of U.S. labor unions may be unfamiliar to many environmental sociologists, who tend to theorize labor as a social movement in coalition with environmental movements (Ciplet 2022; Gould, Lewis, and Timmons Roberts 2004; Obach 2004), or as merely part of civil society (Mol, Spaargaren, and Sonnenfeld

2013). However, the urgency of mitigating greenhouse gas emissions pushes environmental sociology to more carefully theorize how climate change is affecting labor and working people, and how unions are shaping and participating in mitigation efforts.

Unions have taken opposing stances on who should lead and direct the development of renewable energy industries; whether renewable energy should replace or add to energy from fossil fuels, and whether drastic changes in the energy system should usher in the transformation of social systems (Sweeney 2017). They also disagree about whether jobs in renewable energy are or can be made to be equally as good as jobs in fossil fuels. All four lines of conflict are central to both questions of just transition and to the work of environmental sociology and speak to the importance of labor in shaping environment–society relationships.

Theorizing renewable energy and labor in low-carbon energy transition

Multiple theoretical perspectives exist in environmental sociology that address different aspects of the labor–environment connection and renewable energy's role in a just low-carbon energy transition. While space limitations preclude a thorough discussion of all of them, I briefly address some of the perspectives most relevant to each of the four lines of conflict discussed above.

Two lines of conflict are closely related. The question of whether businesses, investors, the state or labor should lead and direct the development of renewable energy industries bears directly upon whether jobs in renewable energy are or can be made equally good as jobs in fossil fuels. Both questions point to the relative power of the state, business and labor.

The ecological modernization perspective (EM) views the innovation of superior technologies as the route to modernizing energy systems (Jänicke and Lindemann 2010). As the developers of technologies, private business/markets are partners with the state and 'civil society actors and organizations' (Mol, Spaargaren, and Sonnenfeld 2013, 19) in modernization. While EM exhibits faith in businesses as co-reformers, Karl Polanyi saw the need for state-enacted programs such as the New Deal to protect labor and land from being overexploited. Polanyi predicted a rising up of social movements to protect society from destruction resulting from subordination to economic forces (Polanyi 2001/1944). Arguably, the need for such protections has grown due to the ascendancy of neoliberalism (Brechtin and Fenner 2017; Ciptet 2022). Neither EM nor Polanyi theorizes a role for labor except as part of civil society. Polanyi's perspective has been critiqued as being insufficiently attentive to issues of power (Burawoy 2003; Ciptet 2022), while EM has been charged with being too

business-friendly (Buttel 2000) and ignoring issues of labor exploitation (Foster 2012).

Feminist theory contributes 'expertise in the study of power' (Bell, Daggett, and Labuski 2020, 2), and questions whether industries funded by private investors and characterized by vast power imbalances between renewable energy workers and corporate wind and solar industries can lead a just transition (Bell, Daggett, and Labuski 2020). The neo-Gramscian perspective prompts a search for an ideological framework that can challenge hegemonic energy system framing, which centers corporate authority and discourages challenges to present energy system practices. However, unlike Polanyi, Gramsci had less to say about the destructive impacts of the economic market on society (Ciptet 2022). For Treadmill of Production theorists (ToP), labor, the state, and corporate producers are locked together in shifting alliances, with the state feeling constant pressure to expand economic activity and corporations facing constant pressure to cut jobs and wages while expanding production (Gould, Pellow, and Schnaiberg 2015). ToP theorizes labor as fighting environmental degradation in coalition with environmental justice, anti-corporate and anti-globalization movements (Gould, Pellow, and Schnaiberg 2015, 77–79), and not necessarily through its own efforts to shape energy transition.

The second line of conflict is about whether renewable energy should replace or add to fossil fuel energy. EM is no help, as it cites the very development of renewable energy as proof that ecological modernization is taking place (Curran 2019). However, research on carbon emissions and energy efficiency does not support the claim that a more efficient energy system will be effective in achieving swift and sufficient greenhouse gas emissions. Instead, it has been proven that energy efficiency and the use of renewable energy sources do lead to decreased carbon emissions relative to economic activity; however, due to rebound effects, emissions either do not decrease enough or actually increase (Jorgenson and Clark 2012; York, Adua, and Clark 2022). This is due to the Jevons paradox, in which businesses in a capitalist economy tend to react to efficiency by increasing their use of a cheaper and more efficient resource, resulting in the production and consumption of more goods and more energy (York 2006). ToP theorists are pessimistic that 'green technology' developed within the capitalist system can bring about low-carbon energy transition, theorizing that the need for continual expansion will override attempts at energy efficiency (Gould, Pellow, and Schnaiberg 2015, 81).

The third line of conflict centers on whether drastic changes in the energy system should usher in the transformation of social systems. The environmental justice perspective (EJ) views low-carbon energy transition as 'sustainable inequity' (Ciptet and Lindsey

Harrison 2020, 449) without just distribution of opportunities and burdens (Ciplet and Lindsey Harrison 2020). EJ defines the ‘working class’ as including women, immigrants, people of color and the unorganized as well as the unionized, and views dismantling structures of racism, sexism and class-based oppression as essential for enacting just transition (Ciplet 2022). EJ demands consideration of climate injustice, including the consequences of failing to reduce greenhouse gas emissions that fall disproportionately on marginalized groups such as the poor and people of color (Harlan et al. 2015). The EJ perspective considers unequal distributions of hazards from fossil fuels (Donaghy et al. 2023) and renewable energy (Levenda, Behrsin, and Disano 2021) but is also focused on inequitable procedures that preclude marginalized people and communities from participating in decisions about energy technologies, including renewables (Mulvaney 2017). Using the lenses of both Polanyi and Gramsci, Ciplet theorizes that energy transition can be both just and transformative when the concerns and leadership of those directly impacted are embedded in transition coalitions, and when such coalitions have gained enough strategic power (Ciplet 2022). He differentiates this from ‘disembedded’ coalitions, which enjoy legitimacy and power but are blind to the concerns of the marginalized, and thus reproduce inequality through unjust energy transition (Ciplet 2022).

Methods

Data for this study were collected as part of a larger project funded by the National Science Foundation. Eleven national-level U.S. labor unions were selected for study (see Table 1).

Unions were chosen for study using three criteria: first, they were national-level unions; second, they either took a public position on energy issues or traditionally represented energy workers; and third, they had locals in either New Jersey, New York or Pennsylvania in order to enable connections between the views of individual union members interviewed, and the official positions of the union. Due to space limitations, I focus only on the positions of unions

stated on their websites, by their authorized representatives. Official union positions on energy issues are derived from collective discussion and involve attempts to balance the interests of their members (Stavis 2018), including their conflicts between material interests and their interests in environmental quality (Räthzel and Uzzell 2011), while strategically advancing the union’s interests in the political arena.

All publicly available labor union discourse on energy issues that was posted to union websites between 1 January 2012 and 31 December 2020 was downloaded and saved to a database created with NVivo qualitative analysis software, yielding a total of 1,396 items, most of which consisted of 1–2 pages of text. Topics discussed in these items included energy policy proposals such as tax credits or government funding; renewable and fossil fuel energy-related projects; and employment issues in energy jobs. The time-frame was chosen to capture union responses to major developments in energy, such as the enactment of the Obama administration’s Clean Power Plan; discussion of controversial natural gas infrastructures such as the Keystone XL Pipeline; and political initiatives regarding energy such as the Green New Deal. The material included news stories from online union magazines such as IBEW’s *The Electrical Worker*; statements from union presidents; sample letters for members to send to take political action on energy issues; and announcements about new training facilities or training programs for solar and wind energy. Content was coded independently by five coders, and each coder read through and coded assigned text. Coded material was organized into 33 themes chosen to capture how unions viewed energy technologies and policies. Themes included ‘a bridge to cleaner energy,’ ‘energy as about jobs,’ ‘green new deal,’ ‘imagining energy futures,’ ‘importance of training,’ and ‘technological solutions.’

Union support for renewable energy

All unions wanted the state to protect labor rights, and all have advocated for policies such as the PRO Act and for the use of project labor agreements. The unions in this study were engaged in challenging corporate

Table 1. Labor unions.

Union	Federated	Occupations Traditionally Represented
Communication Workers of America (CWA)	AFL-CIO	Telecommunications Workers
International Brotherhood of Boilermakers (IBB)	AFL-CIO	Boilermakers
International Brotherhood of Electrical Workers (IBEW)	AFL-CIO, NABTU	Electricians
International Union of Operating Engineers (IUOE)	AFL-CIO, NABTU	Heavy construction equipment operators
Laborers International Union of America (LIUNA)	AFL-CIO, NABTU	Construction laborers
Transport Workers Union of America (TWU)	AFL-CIO	Transportation workers (including bus, train and subway operators)
United Association (UA)	AFL-CIO, NABTU	Plumbers and pipeline workers
United Auto Workers (UAW)	AFL-CIO	Auto manufacturing workers
United Electrical, Radio and Machine Workers of America (UE)		Transportation equipment manufacturing workers
United Steel Workers (USW)	AFL-CIO	Steel workers; oil workers; chemical workers; nuclear cleanup workers
Utility Workers Union of America (UWUA)	AFL-CIO	Utility workers

decision-makers' neoliberal practices in renewable energy such as outsourcing the manufacturing of renewable energy components and deregulating the energy system. Union support for renewable energy development was enthusiastic and uncontroversial among all but one of the unions in this study (the International Brotherhood of Boilermakers, or IBB), even though pro-renewables unions included some that traditionally represented coal, oil and gas workers, and some that worked on fossil fuel infrastructures. For example, IUOE, whose members work on large-scale public works construction projects, proudly pointed to their role in the first offshore wind farm in the U.S., Deepwater Wind on Block Island:

The Block Island site is the very first offshore wind farm in the United States. Securing a PLA with Deepwater Wind means that more than 60 highly skilled Operating Engineers are on the job. ('Wind on the Water.' *International Operating Engineer*, Fall 2015. IUOE website).

Energy workers' unions including IBEW, UA and UWUA took a leading role in training new workers on renewable energy technologies. For example, UWUA, IBEW and Ironworkers partnered in training apprentices and community college students to become renewable energy workers:

This week, Bay State Wind announced an exciting new partnership with the UWUA, IBEW and the Ironworkers for a proposed offshore wind project off the southern coast of Massachusetts. The announcement includes plans for a collaboration with Bristol Community College and the Massachusetts Maritime Academy to build and run an innovative training center that will prepare workers for new careers in the ongoing operation and maintenance of offshore wind technology. ('Bay State Wind Announces Partnership with UWUA, IBEW and Ironworkers on Offshore Wind Development and Training Initiative.' May 11, 2018. UWUA website).

Without trained renewable energy workers, it is not possible to greatly expand wind and solar energy infrastructures and increase their share of the U.S. energy mix. Thus, these unions are a vital part of laying the groundwork for low-carbon energy transition.

UWUA, a utility workers' union, supported the development of utility-scale solar energy in Appalachian Ohio:

'Utility-Scale Solar Energy Ohio energy provider, AEP, as part of an agreement with environmental groups last year to phase out some of its coal-fired power production capacity, or convert to gas, has also agreed to develop 400 megawatts of solar energy, with preference for that development taking place in Appalachian Ohio. More efficient in terms of both energy and economics, utility-scale solar also has a better carbon emissions profile than the kind of "roof-top" distributed solar systems more commonly

seen.' ('Infrastructure Investment Round-up.' *The Utility Worker*, October/November/December 2016. UWUA website).²

However, while unions all agreed that solar and wind energy are 'green' or 'low-carbon' energy technologies, only some categorized carbon capture, storage and use (CCUS), when used to continue fossil fuel use, as a green technology. Such disagreements underscored stark differences between unions in the reasons they supported renewable energy.

Support for renewable energy as layering technologies

Unions in which many members worked with both renewable and fossil fuel energy technologies supported renewable energy because their members were in demand to build renewable energy infrastructures, which could be layered on top of fossil fuels (Laird 2016) instead of displacing them. They saw renewables as part of an 'All-of-the-Above' energy system, a position clearly illustrated by this quote from UA, a plumbers' and pipefitters' union:

At the UA, we believe that an economy built to last must make the most of America's energy resources. That is why we support an 'all of the above' approach to developing new sources of energy, expanding oil and gas production, boosting renewable power generation, supporting growth in nuclear power, and increasing energy efficiency in all sectors. (UA website, n.d.)

The 'All of the Above' stance on fossil fuels regards renewable energy development as compatible with 'expanding oil and gas production,' suggesting that the primary goal is employment and not decarbonization.

IBEW did not view solar or wind as technologies for displacing fossil fuels and also included carbon capture and utilization, a technology developed by oil corporations in order to increase drilling yield, among 'new green technologies':

Confronting the challenge of climate change while ensuring America's energy security requires tapping into all of our clean power sources, including solar, wind, hydro, and nuclear, and investing in new green technologies like advanced battery storage and carbon capture utilization and sequestration. ('IBEW President Lonnie Stephenson on VP Biden's Clean-Energy Plan.' July 14, 2020. IBEW website).

Unions advocating the 'All-of-the-Above' energy system viewed carbon capture as a technological advance that would decouple coal, oil and gas use from dangerously high levels of carbon emissions, as this quote from IBB illustrates:

For years the International Brotherhood of Boilermakers has supported an 'all of the above'

energy policy and has long advocated for carbon capture, use and storage (CCUS) as the best solution that can truly reduce carbon dioxide emissions and preserve jobs, economies and social stability—while allowing for reliable energy produced by a mix of renewables, nuclear, fossil fuels and hydro power. CCUS technology will ensure *responsible* use of America's fossil energy resources. (IBB website, 'Boilermaker Issues: Energy,' 2019. Emphasis in original).

IBB advocated for CCUS as a technology allowing 'responsible use' of fossil fuels, a position at odds with the notion of fossil fuel phase-out or just transition.

UWUA created a new position, Director of Renewable Energy, in 2020. In an interview posted on the UWUA website, Jim Harrison, the new director, emphasized the need to organize unions in renewable energy industries but sought to calm fears that this would mean 'shifting away from coal or gas:'

'We believe in "all of the above technology" with respect to the nation's energy mix, as well as responding to and reducing the effects of climate change. So, we are doing everything we can to make sure that coal assets, in particular, stay online for as long as they can. You can't match the jobs our members have in the fossil fuel and nuclear generation with jobs anywhere else. The fact of the matter is, there are more renewables coming to market and renewables are one of the lowest organized sectors in our industry and we should be working to organize there.' (Jim Harrison, *UWUA Magazine*, June 17, 2020).

The quote illustrates the union's efforts to keep coal on line as long as possible and the view that 'you cannot match' jobs in fossil fuels. However, it also emphasizes the need to organize unions in renewable energy industries and improve jobs in renewables.

Union support for carbon capture technology and the 'All of the Above' energy mix were coordinated and marshalled by the AFL-CIO. At their 2022 Convention, AFL-CIO conveyed an 'All-of-the-above' position in Resolution 5 on climate change, energy and union

jobs (AFL-CIO 2022). AFL-CIO's position in favor of continuing fossil fuel use aligns with the unions taking the most conservative stance on environmental issues (Vachon 2021). Social pressure for solidarity with workers most likely to be laid off due to decarbonization measures tends to cause other unions to fall in line with this vision for the energy future (Vachon 2023), even if some of their members disagree. Unions affiliated with AFL-CIO that traditionally represented energy workers and publicly stated their support for an 'All-of-the-Above' energy system included IBB, IBEW, LiUNA, UA and UWUA.

The all-of-the-above energy system as green growth

This orientation to energy transition has been characterized by labor scholars as 'Green Growth' (Räthzel and Uzzell 2011; Stevis 2023; Sweeney 2017), in which the growth of renewables is expected to result in just transition as a 'collateral result' (Stevis 2023, 17) of the innovation of superior technologies (Jacobs 2013; Jänicke and Lindemann 2010; Räthzel and Uzzell 2011). Green Growth prioritizes job growth over sustainability, thus it lends itself to viewing renewable energy as *an addition to* (not a replacement for) coal, oil and gas, and to resistance to the sunsetting of fossil fuels while simultaneously advocating for more renewable sources of energy (Hess 2019). The Green Growth orientation to renewables is also compatible with a narrower, 'business union' approach to changing the energy system, seeing it (except for issues of employment) as entirely separate from social issues such as racial or gender equity. Unions with this orientation are less likely to form alliances with other social movements and do not tend to see unequal distributions of harms from fossil fuels and climate change as 'their' issues (see Table 2).

Table 2. Differences in U.S. Labor unions' orientations to renewable energy development.

Orientation to Energy Issues	Green Growth	Green New Deal
Reason for supporting renewable energy	• Expands employment for energy workers. • Reduces greenhouse gas emissions by reducing the amount of fossil fuel used.	• Reduces greenhouse gas emissions by reducing the amount of fossil fuel used.
Renewable energy technologies' place in energy system	• To be layered atop fossil fuels.	• To displace fossil fuels.
Transition from fossil fuels to renewables	• Not necessary: CCUS will reduce greenhouse gas emissions enough.	• Necessary: plan to support displaced workers is needed.
Views on who should lead and direct development and deployment of renewables	• Business leaders, in partnership with the state. Unions demand a decision-making role in energy transition.	• The state. Unions demand a decision-making role in energy transition.
Social relations transformation as part of energy transition	• No: social relations are outside the scope of energy transition.	• Yes: energy transition should be just to fenceline communities, displaced workers, and the poor and racially marginalized.
Theoretical perspectives connected with orientation	• Ecological Modernization.	• Treadmill of Production.
Policy proposals connected with orientation	• Subsidies for renewables and CCUS through Inflation Reduction Act.	• Subsidies for renewables and CCUS through Inflation Reduction Act; Green New Deal; degrowth.

Support for renewable energy as displacing technologies

The three unions that did not traditionally represent energy workers supported renewable energy not because it created new sources of employment for their members but for its potential to displace fossil fuels from the energy system and reduce greenhouse gas emissions. Two of the three (CWA and TWU) were members of AFL-CIO, but still took anti-fossil fuel positions. These unions' position was articulated most clearly and strongly by UE. At their 2018 convention, UE demanded a 'just transition' to a 'clean-energy economy' that they viewed as bringing 'far more new jobs:'

Delegates to UE's 75th Convention last August demanded 'massive investments by state and federal governments and U.S. businesses to convert to a clean-energy economy and create millions of good jobs in the process.' UE has joined a wide variety of labor, community, environmental and Indigenous organizations in demanding a 'just transition,' one which guarantees that workers who are displaced from occupations like coal mining are guaranteed job training and new, good jobs in the renewable energy sector. The good news is that the transition to a clean-energy economy has the potential to not just replace jobs lost in fossil-fuel-based industries but create far more new jobs. ('Facing the Climate Crisis: An Opportunity to Create Millions of Good Jobs.' August 14, 2018. UE website).

UE viewed the Green New Deal as essential for labor and the environment, and in 2018 passed a resolution endorsing it.

The clean energy economy and the Green New Deal

The philosophy and orientation of CWA, TWU and UE on renewable energy was compatible with the Green New Deal's plan to transform the energy system *and* social relations; UE in particular was a vocal supporter of the Green New Deal.

In its U.S. version, the Green New Deal entered the national spotlight when Congresswoman Alexandria Ocasio-Cortez joined climate activists in occupying congressional leader Nancy Pelosi's office in 2018. The following year, Ocasio-Cortez and Markey proposed a Congressional resolution for a Green New Deal. It included strong labor protections, a massive expansion of renewable energy, a shift from fossil fuels to renewable energy, massive public investment in employment expansion, a buildout of neglected public infrastructure (including public transit), and an end to oppression of deindustrialized rural communities, low-income workers, and 'front-line and vulnerable communities,' including people of color and the poor (2019).

Compared with Green Growth, the Green New Deal envisions renewable energy as part of a much more transformative low-carbon energy transition led by the state instead of market forces. It is characterized by policies that seek to transform both social and economic inequity and the energy system (Gunn-Wright 2020). Its economic philosophy is 'Green Keynesianism' which rejects the neoliberal approach and restores the state's more extensive Depression-era role in stimulating employment, providing for basic needs and managing production (Gunn-Wright 2020; Walker 2022).

The Green New Deal policy proposal included a federal jobs guarantee, universal childcare and healthcare, and large-scale investments in education, including workforce training (Gunn-Wright 2020). The job guarantee could be realized through federal funding of massive-scale public infrastructure projects such as building public housing and transportation, grid modernization and wind and solar energy arrays on public lands. This would constitute a partial socialization of the labor market, which would put pressure on private employers to raise wages (Guastella 2022). For this reason alone, the Green New Deal could be expected to appeal more to industrial unions with a social union orientation (such as UE). UE endorsed the Green New Deal because it provided a means to support displaced fossil fuel workers and redress the disproportionate impact of climate change on low-income communities and on people of color:

A just transition also requires a real commitment to guaranteed income, benefits, and direct assistance for workers and communities. Workers who lose fossil-fuel jobs should retain their pay and compensation as they transition into new types of work and should be provided with education and retraining opportunities well before they get laid off, and guaranteed jobs when their facilities close. Communities that have been devastated by pollution or damaged by the effects of rising global temperatures, which are disproportionately low income communities of color, should receive massive investments which ensure good union jobs and a healthy future. The Green New Deal offers our best hope to meet the challenge of climate change while creating millions of good union jobs. (UE website).

Most of the unions in this study were silent on the Green New Deal. However, while CWA and TWU did not explicitly endorse the Green New Deal, they supported fossil fuel phase-out by participating in climate demonstrations, supporting students in the climate strike in 2019, and opposing the building of the large interstate gas pipelines Dakota Access and Keystone XL. In 2019, CWA stated that they stood in solidarity with climate strikers.

However, International Brotherhood of Boilermakers (IBB) President, Newton B. Jones, made his union's opposition clear when he called the Green New Deal 'a lose-lose proposition' in an editorial:

'The urgency to mitigate climate change has pushed many to propose radical alterations to how humans exist on the planet. Some see the rapid abandonment of fossil fuels as essential to climate goals. This opinion certainly is at the core of the Green New Deal. In addition to the fact that they would indeed fail to achieve any significant impact on global climate change, such proposals do not adequately take into account the millions of jobs that would be lost in the resulting economic upheaval. It is a lose-lose proposition.' (Newton B. Jones, 'Climate solutions should (and can) save our planet and our jobs.' September 10, 2019. IBB website).

Jones viewed the Green New Deal as a source of 'economic upheaval,' and advocated for the use of CCUS as the best 'climate solution.'

A year after Joe Biden's swearing-in in 2021, the Inflation Reduction Act (IRA) was passed. While it represented the most significant U.S. climate legislation passed and included important labor protections, it was also a drastically scaled-down version of the Green New Deal that provided a decade-long extension of tax credits with direct-pay options for wind and solar industries and mandated registered apprenticeships and the prevailing wage as requirements for receiving tax credits. However, the IRA traded offshore wind for offshore oil and gas leases, and it included much more funding for CCUS than for wind and solar (Bigger et al. 2022). However, the Green New Deal remains a political proposal for just transition that includes plans to phase out fossil fuels and enact inclusive justice, both of which are ignored by Green Growth.

Conclusion: renewable energy, labor and theory

The labor unions in this study have staked out two competing perspectives on renewable energy. The construction unions representing many fossil fuel energy workers embraced Green Growth, which advocates renewable energy expansion to add jobs to the 'all of the above' energy system, while other unions advocated for the principles of the Green New Deal, which seeks the growth of renewable energy to usher in a low-carbon energy transition and an accompanying social transformation. Each strategy can be examined through the lens of sociological theory.

The Green Growth strategy finds its only theoretical support from the EM perspective. Green Growth-advocating unions reframe CCUS technologies as 'green energy technologies' that can be used to reduce greenhouse gas emissions while avoiding transition from fossil fuels. Neo-Gramscian theory points out that by doing so, they reinforce the legitimacy of the fossil fuel hegemony. Lavish funding of CCUS demonstrates that a Green Growth energy transition coalition has gained strategic power. However, it is 'disembodied': there is no evidence that concerns of those

disproportionately impacted by fossil fuels and climate change are visible to it (Ciplet 2022). Paradoxically, the Green Growth strategy enlists energy workers' unions leadership in training the much-needed renewable energy workers of tomorrow and striving to make jobs in renewables safer, more secure and fairly paid. However, unions embracing Green Growth are simultaneously working to keep their jobs in fossil fuels.

ToP locates the reasons for resisting fossil fuel phase-out in the need for continual expansion of production (Gould, Pellow, and Schnaiberg 2015), a need which is entirely compatible with the expansion of renewable energy. The Green Growth strategy lacks guardrails against the infinite expansion of energy production and consumption that would fuel catastrophic climate change.

The Green New Deal, with its emphasis on government stimulation of both employment and environmental reform, challenges neoliberalism and the strain of environmentalism focused on austerity, economic contraction and degrowth (Calhoun and Benjamin 2022; Huber 2022). However, unlike Green Growth, it is not incompatible with the shrinkage of environmentally destructive energy sources (Pollin 2019), which is part of the political program of degrowth proponents (Mastini, Kallis, and Hickel 2021).³ The Green New Deal centers the EJ perspective and the needs of all sectors of labor. Protection of the environment and labor is enacted through state action and leadership, but the state is theorized to be mobilized by civil society movements (Gould, Pellow, and Schnaiberg 2015; Polanyi 2001/1944).

The Green New Deal and any narrower conception of fossil fuel phase-out requires resistance to powerful fossil fuel interests, for which strong and inclusive coalitions are needed (Ciplet 2022). Labor unions with a strong commitment to social justice are already part of these coalitions. Further research is needed to theorize the conditions that would induce unions with a strong commitment to retaining the use of fossil fuels to join them.

Notes

1. Project labor agreements are collective agreements between labor and project owners or developers. They cover construction workers, who typically work on different projects for different employers.
2. But Ohio's Public Utilities Commission denied AEP's bid for cost recovery from ratepayers.
3. Degrowth proponents also advocate the growth of renewable energy industries (see Mastini, Kallis, and Hickel 2021).

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