Environmental Justice, Just Transition, and a Low-Carbon Future for California

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SUMMARY

We must substantially reduce carbon emissions within a short time line, and this rapid decarbonization will cause negative economic and social impacts on workers and communities dependent upon fossil fuel extraction and use. "Just transition" often refers to addressing the needs of those communities, but an equitable transition into a low-carbon future should also take into account environmental justice communities that have suffered from disproportionate exposure to environmental hazards and that could and should benefit from job creation. This Article presents the results of a community-informed research project analyzing the challenges and opportunities of a just transition for environmental justice communities in California. Through interviews, case studies, and original data analysis, a framework for just transition policy development is presented built on four pillars: strong governmental support, dedicated funding streams, diverse and strong coalitions, and economic diversification.

The signs that the climate crisis is already here are clear. The most recent Intergovernmental Panel on Climate Change report has detailed the evidence from more than 6,000 studies that over the past decade, a series of record-breaking storms, forest fires, droughts, coral bleaching, heat waves, and floods have occurred around the world in response to the 1°C of global warming that has taken place since the pre-industrial era.[1] These events, and the losses associated with them, are expected to become substantially worse with 1.5°C of warming currently targeted by global climate agreements, and far worse if these agreements are not effective.[2] Without major cuts in greenhouse gas (GHG) emissions, this warming threshold could be reached in as little as 11 years, and almost certainly within 20 years.[3]

Any chance of staving off even worse impacts from climate change depends on significant reductions in GHG emissions and a rapid shift from a fossil fuel-based economy to a low-carbon economic future. While this transition is fundamentally necessary, the challenges it poses are great. Though declining, the crude petroleum, natural gas extraction, and coal industries employed more than one million workers in 2016.[4] Oil and gas mining alone contributed more than $600 billion to U.S. gross domestic product in 2018.[5] Replacing the employment and economic contributions of fossil fuels will require substantial investment and planning.

With a federal Administration hostile to action on climate change, aggressive climate action must necessarily be led by states and localities. The size of many

Authors' Note: The authors would like to thank the 11th Hour Project for funding this research. We also thank the Climate Equity Network for supporting this research as well as its partnership, feedback, and invaluable ideas and insights along the way. Thank you also to Strategic Concepts in Organizing and Policy Education and the California Environmental Justice Alliance for coordinating and convening stakeholder feedback, and to our interviewees—Mariah Ashley (Black Mesa Water Coalition), Lauren Breyneart (outreach manager, Yes on 1631), and Ivy Brashear (Appalachian transition coordinator, Mountain Association for Community Economic Development)—for taking the time to discuss their experiences and share their wisdom with us. Finally, we thank the larger research team: Occidental College undergraduate research assistants Spruce Bohen and Jacqueline Dall for data collection and case study support; former USC PERE Data Management Specialist Gabriel Watson and Occidental College Professor James Sadd for data cleaning and geographic information system analysis; Occidental College Senior Program Coordinator Sylvia Chico for administrative support; USC PERE Senior Communications Specialist Gladys Malibiran for communications support; and former USC PERE research assistants Sandy Southivilay and Stina Rosenquist for copy editing.

1. Intergovernmental Panel on Climate Change, Global Warming of 1.5°C 5 (Valérie Masson-Delmotte et al. eds., 2018), https://www.ipcc.ch/sr15/.
2. *See id.*
3. *See id.*
4. U.S. Department of Energy, U.S. Energy and Employment Report 40-42 (2017), https://www.energy.gov/sites/prod/files/2017/01/f34/2017%20US%20Energy%20and%20Jobs%20Report_0.pdf.
5. Bureau of Economic Analysis, *Industry Data*, https://apps.bea.gov/iTable/iTable.cfm?ReqID=51&step=1 (last visited Jan. 5, 2020).

state economies allows for states to create meaningful climate policies. As the world's fifth-largest economy, California's climate commitment to reduce GHGs can provide a pathway to a low-carbon future that could lay the groundwork for others to follow.[6] Among the many ambitious climate policies the state has adopted, in September 2018, then-Gov. Jerry Brown signed an executive order pledging the state to achieve carbon neutrality no later than 2045, and also signed into law a bill requiring 100% of the state's electricity production to be zero-carbon by 2045.[7] Achieving these goals will not be possible without substantially decreasing, if not outright ceasing, the extraction and use of fossil fuels, even with advances in sequestration technology.[8] Moreover, to shift to only renewable energy will require infrastructure upgrades, electrical grid upgrades, a strengthening of safety net programs, and many other efforts.[9]

At the same time, while rapid decarbonization is needed to stave off the worst impacts of climate change, doing so will impose economic hardship on communities and workers dependent upon fossil fuel extraction and use. Identifying and mitigating the negative economic consequences of decarbonization, often referred to as "just transition," can provide an equitable transition away from fossil fuel extraction and use.[10] However, a truly just transition must go beyond the impact on fossil fuel workers and communities and address the disproportionate environmental burden that fossil fuel extraction and use has had on communities of color and low-income communities. Just transition must also ensure that the opportunities in a low-carbon future are made available to these communities, who have largely been excluded from the gains of the extractive economy.

This Article discusses how a just transition can be actualized in California by providing a policy framework based on data collected from expert interviews, case study analysis, and original data analysis. The first section makes the argument for why we need a just transition. The next two sections provide background on the economic and social challenges that must be addressed for a just transition. The final section presents a four-pillar policy framework for just transition policy formulation that includes strong governmental support, dedicated funding streams, economic diversification, and strong, diverse coalitions.

It is important to note how this work was developed. Funded by the 11th Hour Foundation, a coalition of directly impacted stakeholders, the Climate Equity Network provided guidance to researchers from Occidental College, the Program for Environmental and Regional Equity (PERE) at the University of Southern California (USC), and the University of California, Berkeley, on the concerns the communities they represented had when faced with decarbonization. Seeking to address both the likely job loss from decarbonization as well as redress the past harms borne by environmental justice communities, the four pillars were developed in collaboration and formed the basis for a report released in April 2019.[11] As a result, this is not only our academic intervention in this debate, but also an example of the potential strength of such community-engaged research.

I. The Case for a Just Transition

The inclusion of social and economic concerns in climate policy is not uniformly supported by those urging action on climate.[12] Some advocates argue that focusing on economic and social inequality detracts from the urgent need to drastically reduce GHG emissions.[13] However, a holistic approach to climate policy, such as the Green New Deal,[14] acknowledges that social and economic inequality are inextricably intertwined with carbon reduction.

For example, scholars have identified that marginalized communities bear a disproportionate amount of the environmental and economic costs of the extractive economy while receiving very few of the associated benefits.[15] Because of this "climate gap," already-burdened communities, often low-income and communities of color, will suffer the most adverse consequences from the impacts of climate change for several structural and institutional rea-

6. Benjy Egel, *California Now World's Fifth-Largest Economy, Bigger Than Britain*, Sacramento Bee, May 4, 2018, https://www.sacbee.com/news/business/article210466514.html.
7. Executive Order B-55-8 to Achieve Carbon Neutrality (Sept. 10, 2018), https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf; S.B. 100, 2017-2018 Leg. Sess. (Cal. 2018), *available at* https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100.
8. Sarah Kurtz, *Can California Actually Achieve Carbon Neutrality by 2045?*, Pac. Standard, Sept. 14, 2018, https://psmag.com/environment/can-california-be-carbon-neutral-by-2045.
9. *It's Time to Upgrade the Electricity Grid*, Union Concerned Scientists (Feb. 2, 2017), https://www.ucsusa.org/clean-energy/increase-renewable-energy/upgrade-the-electricity-grid.
10. United Nations Framework Convention on Climate Change, Just Transition of the Workforce, and the Creation of Decent Work and Quality Jobs, https://unfccc.int/sites/default/files/resource/Just%20transition.pdf.
11. J. Mijin Cha et al., A Roadmap to an Equitable, Low-Carbon Future: Four Pillars for a Just Transition (2019), https://dornsife.usc.edu/assets/sites/242/docs/Just_Transition_Final_Report_2019.pdf.
12. *See, e.g.*, the *New York Times* editorial board questioning the inclusion of social programs as part of the Green New Deal: *The Green New Deal Is Better Than Our Climate Nightmare*, N.Y. Times, Feb. 23, 2019, https://www.nytimes.com/2019/02/23/opinion/green-new-deal-climate-democrats.html; and the *Washington Post* editorial board arguing against "muddling" climate policy with other social programs: *Want a Green New Deal? Here's a Better One.*, Wash. Post, Feb. 24, 2019, https://www.washingtonpost.com/opinions/want-a-green-new-deal-heres-a-better-one/2019/02/24/2d7e491c-36d2-11e9-af5b-b51b7ff322e9_story.html.
13. *See* N.Y. Times, *supra* note 12.
14. Though policy proposals are still forthcoming, H. Res. 109 lays out the principles for a Green New Deal, which include traditional climate policies, such as clean energy deployment and energy efficiency, as well as other social justice policies, such as the right to organize, stronger trade protections, and investment in public housing. *See* H. Res. 109, 116th Cong. (2019), *available at* https://www.congress.gov/116/bills/hres109/BILLS-116hres109ih.pdf; Rep. Alexandria Ocasio-Cortez, *Green New Deal for Public Housing*, https://ocasio-cortez.house.gov/gnd/public-housing (last visited Jan. 5, 2020).
15. Seth B. Shonkoff et al., *The Climate Gap: Environmental Health and Equity Implications of Climate Change and Mitigation Policies in California—A Review of the Literature*, 109 (Suppl. 1) Climatic Change S485 (2011), https://escholarship.org/uc/item/4815h61w; Rachel Morello-Frosch et al., USC PERE, The Climate Gap: Inequalities in How Climate Change Hurts Americans & How to Close the Gap (2009), https://dornsife.usc.edu/assets/sites/242/docs/The_Climate_Gap_Full_Report_FINAL.pdf/.

sons, including a lack of resources available to deal with the financial, social, and environmental impacts of climate change.[16] At the same time, these communities often emit far less GHG emissions, and therefore do not contribute to climate change at the same rate as wealthier populations.[17]

Targeted policies are needed to address the disproportionate burdens on marginalized communities. Research shows that it cannot be assumed overburdened communities will automatically benefit from universal programs, such as an overall reduction in fossil fuel use and carbon emissions.[18] For example, researchers found that GHG-emitting facilities are disproportionately located in marginalized communities, but reducing overall GHGs under the California Cap-and-Trade Program has yet to yield meaningful reduction in localized pollutants.[19] The continuing pollution negatively affects people's health and disproportionately impacts these neighborhoods.[20] To prevent increasing inequality, the transition away from fossil fuel extraction and use requires targeted policies that address not only the likely job loss from decarbonization, but also the historic legacy of exclusion. In short, a just transition must not just be compensatory but comprehensive.

Of course, job loss worries are real, but they are also not new. The challenges of transitioning away from a declining industry—in this case, fossil fuels—have been faced before, not always with great success. As just one example, to assist workers negatively impacted by globalization and trade, the Trade Adjustment Assistance (TAA) program began in 1974 to provide economic support for displaced workers, such as wage supplements, job reallocation allowances, income support for workers in training programs, and skills training and career counseling.[21] While intended to help displaced workers move into equivalent jobs and careers, uneven funding and support of the program, a restricted scope, and fluctuating eligibility requirements have limited the program's success.[22]

Between 1974 and 2013, fewer than one-half of the 4.8 million eligible workers received program benefits.[23] Of those workers who did receive assistance, 40% of displaced workers did not find employment within the first two years after their initial job loss and another 40% found work at lower wages with fewer benefits.[24] Moreover, due to the limited scope of TAA, the vast majority of today's unemployed workers, many of whom lost their jobs due to automation or robotics, are not eligible for support under the TAA program.[25]

The failure of the TAA program was due to its design, but such transition programs can be successful. Analysis from Cornell University and the Apollo Alliance argues that adequate financial support, including fully funded pensions and health benefits and transitional income support for as long as participants are in training programs, is necessary for successful transition programs.[26] Unsurprisingly, without continual financial assistance, participants enrolled in training programs generally dropped out when the financial assistance ended.[27]

Moreover, demand for workers must be aligned with the supply of trained workers. One of the failures of the push for green jobs during the Great Recession recovery was the inability to actualize "shovel ready" jobs.[28] While workers were trained to weatherize homes under the Weatherization Assistance Program, the program was unable to create the employment demand to place the trained workers.[29] Future transition efforts must align training with job creation to train workers for jobs that exist in the present, and not just for jobs that will be created in the future.

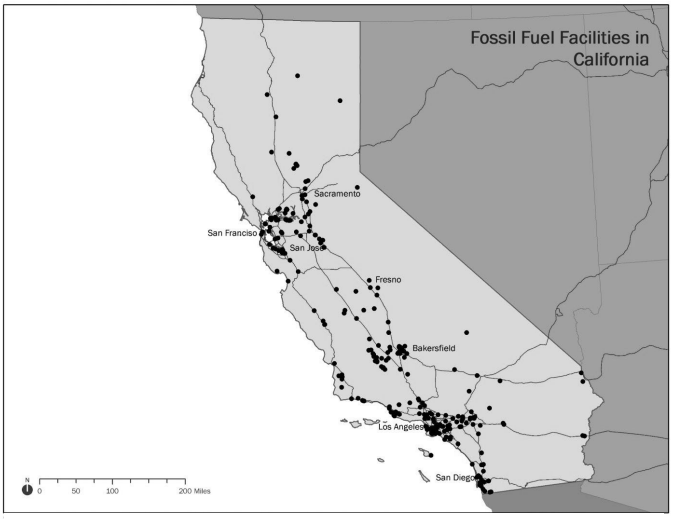
II. The Benefits and Burdens of Decarbonization

Communities economically dependent upon fossil fuel extraction, processing, and use will feel the negative economic consequences from ending the use of fossil fuel more acutely and more immediately. For example, closing fossil fuel entities that are a substantial contributor to a community tax base will leave schools, services, and infrastructure projects underfunded.[30] On the other hand, many of those communities may also experience health benefits from transition.

16. *Id.*
17. Lutz Sager, *Income Inequality and Carbon Consumption: Evidence From Environmental Engel Curves* (Center for Climate Change Economics and Policy, Working Paper No. 319, and Grantham Research Institute on Climate Change and the Environment, Working Paper No. 285, 2017), http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2017/11/Working-Paper-285-Sager.pdf.
18. Lara Cushing et al., Carbon Trading, Co-Pollutants, and Environmental Equity: Evidence From California's Cap-and-Trade Program (2011-2015), 15 PLOS MED. e1002604 (2018), https://doi.org/10.1371/journal.pmed.1002604.
19. *See id.*
20. *See id.*
21. Jeffrey Zients, *Trade Adjustment Assistance: What You Need to Know*, whitehouse.gov, June 11, 2015, https://obamawhitehouse.archives.gov/blog/2015/06/11/trade-adjustment-assistance-what-you-need-know.
22. Elena Foshay et al., Apollo Alliance & Cornell Global Labor Institute, Making the Transition: Helping Workers and Communities Retool for the Clean Energy Economy (2009), https://www.yumpu.com/en/document/read/24699193/2009-12-11-california-labor-federation-attachment-2pdf.
23. Employment and Training Administration, U.S. Department of Labor, Trade Adjustment Assistance for Workers Program (2013), https://www.doleta.gov/tradeact/docs/AnnualReport13.pdf.
24. Lori G. Kletzer, Job Loss From Imports: Measuring the Costs (2001).
25. Mireya Solís & Jennifer Mason, *Globalization on the Cheap: Why the U.S. Lost Its Way on Trade*, Brookings (Aug. 28, 2017), https://www.brookings.edu/blog/order-from-chaos/2017/08/28/globalization-on-the-cheap-why-the-u-s-lost-its-way-on-trade/.
26. Foshay et al., *supra* note 22.
27. *Trade Adjustment Assistance: Improvements Necessary, but Programs Cannot Solve Communities' Long-Term Problems: Testimony Before the Senate Committee on Finance, Subcommittee on International Trade*, 107th Cong. (2001) (statement of Loren Yager, Director, International Affairs and Trade).
28. Office of Inspector General, U.S. Department of Energy, Special Report: Progress in Implementing the Department of Energy's Weatherization Assistance Program Under the American Recovery and Reinvestment Act (2010) (OAS-RA-10-04), https://www.energy.gov/sites/prod/files/igprod/documents/OAS-RA-10-04.pdf.
29. *See id.*
30. *See, e.g.*, the fiscal impact of closing coal mines on coal-dependent communities: Adele C. Morris et al., Brookings Institution & Columbia University, The Risk of Fiscal Collapse in Coal-Reliant Communities (2019), https://www.brookings.edu/wp-content/uploads/2019/05/Morris_Kaufman_Doshi_RiskofFiscalCollapseinCoalReliantCommunities-CGEP_Report_FINAL.pdf.

For example, the maps below are a visual representation of where California's fossil fuel facilities are placed and their proximity to environmental justice communities. The first map (Figure 1) shows where fossil fuel facilities are located in the state. The fossil fuel facilities shown in these figures include natural gas and coal power plants and those with the following North American Industry Classification System codes: crude petroleum and natural gas extraction; industrial gas manufacturing; natural gas distribution; natural gas liquid extraction; petroleum bulk stations and terminals; petroleum refineries; pipeline transportation of crude oil; and pipeline transportation of natural gas. These data come from the California Department of Energy Power Plant Inventory and the California Air Resources Board. As shown, there are clusters of facilities around the East Bay/Sacramento area, around the Bakersfield oil region, and in the South Bay near Los Angeles.

Figure 1. Fossil Fuel Facilities in California



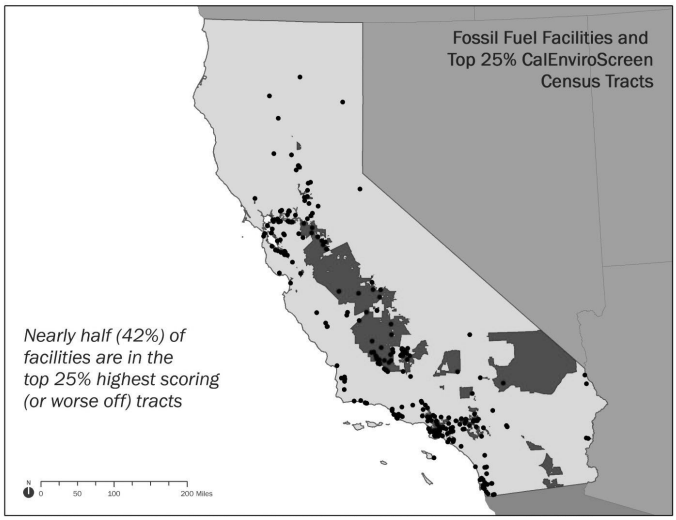
Source: June 2018 Updates of CalEnviroScreen 3.0, OEHHA; Power Plant Inventory, California Department of Energy; California's Greenhouse Gas Inventory CARB.

Previous research suggests that environmental justice communities bear a disproportionate share of the effects of nearby fossil fuel facilities. As a result, these communities are exposed to higher levels of the co-pollutants that accompany fossil fuel operations at higher rates than other communities across the state. In addition, few of the economic and employment benefits from the fossil fuel facilities favor environmental justice communities, leaving these residents with the environmental burden of fossil fuels and little of the benefits. Researchers from the University of Massachusetts, Amherst, found that the pollution burden placed upon communities of color exceeds the share of employment and "greatly exceeds their share of higher paying jobs."[31] What this research suggests is that the pollution burden placed upon communities of color is not offset by economic and/or employment gains.

To look at this pattern, we make use of CalEnviroScreen version 3.0—a spatial mapping tool developed by the California Environmental Protection Agency, which identifies communities facing a disproportionate cumulative pollution burden and indicates areas vulnerable to pollution—to identify environmental justice communities.[32] Specifically, CalEnviroScreen combines 21 indicators of environmental quality and population characteristics to identify communities most burdened by the cumulative impact of multiple sources of pollution and social and health stressors. Environmental quality indicators include measures of ambient pollution and proximity to pollution sources—most of which are not regulated under cap and trade—including hazardous waste sites, polluted water bodies, traffic density, pesticide usage, drinking water quality, and ambient air quality measures for ozone and fine particulate matter ($PM_{2.5}$). Population vulnerability indicators include low educational attainment, poverty, linguistic isolation, unemployment, and measures of health status.[33]

Figure 2 overlays the location of fossil fuel facilities on neighborhoods identified by CalEnviroScreen as the most environmentally overexposed and socially vulnerable. As this and the following maps show, there is significant overlap between where fossil fuel sites and environmental justice communities are located. The "top 25 percent of CalEnviroScreen census tracts" refers to the top 25% of neighborhoods with the highest cumulative impact scores—or, those that suffer the most from the cumulative impact of pollution burden and socioeconomic and health vulnerability. As shown, more than 40% of fossil fuel facilities are located in the areas with the top 25% highest CalEnviroScreen scores.

Figure 2. Fossil Fuel Facilities and Top 25% CalEnviroScreen Census Tracts



Source: June 2018 Updates of CalEnviroScreen 3.0, OEHHA; Power Plant Inventory, California Department of Energy; California's Greenhouse Gas Inventory CARB.

31. Michael Ash & James K. Boyce, *Racial Disparities in Pollution Exposure and Employment at US Industrial Facilities*, 115 Proc. Nat'l Acad. Sci. 10636-41 (2018), *available at* https://doi.org/10.1073/pnas.1721640115.

32. California Office of Environmental Health Hazard Assessment, *CalEnviroScreen*, https://oehha.ca.gov/calenviroscreen (last visited Jan. 5, 2020).

33. Matthew Rodriguez & Lauren Zeise, California Environmental Protection Agency & California Office of Environmental Health Hazard Assessment, Update to the California Communities Environmental Health Screening Tool: CalEnviroScreen 3.0 (2017), https://oehha.ca.gov/media/downloads/calenviroscreen/report/ces3report.pdf.

These communities comprise residents who are low-income, often majority people of color, and face higher pollution burdens than other communities; for example, communities in the top 25% of the CalEnviroScreen scores are nearly 85% people of color (compared to 52% people of color in the rest of the state) and have nearly twice as high a share of people living below 200% of the poverty level.[34]

Seven percent of fossil fuel facilities are in the top 5% of highest-scoring tracts. Both the more detailed and the more general spatial patterns indicate that environmental justice communities likely face more of the pollution burdens associated with living in proximity to these facilities while the benefits of fossil fuel production, including access to energy and employment, are shared broadly across geographies.

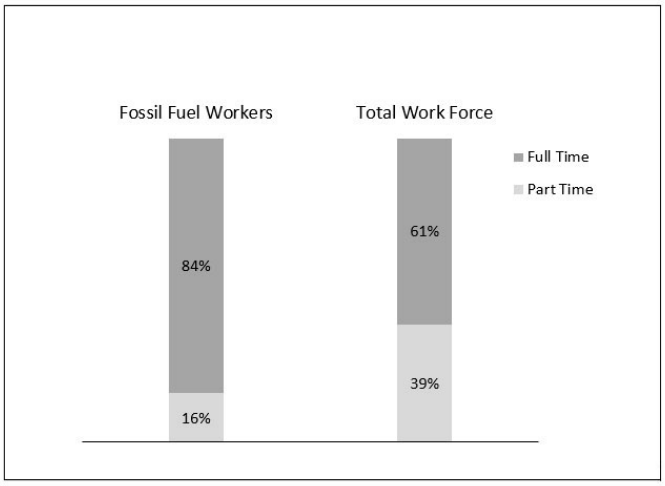
III. Is Renewable Energy Inherently Just?

As the state transitions away from fossil fuels, renewable energy production has increased. In 2018, renewable energy was responsible for 32.35% of in-state power generation, of which solar energy represents 13.99% of overall total energy production and 43.25% of renewable power generation.[35] Renewable energy generation is also a strong job creator, especially when looking at the solar industry. For example, the Solar Foundation's 2018 Solar Job Census reported there were 76,838 solar jobs in California.[36]

However, whereas renewable energy is a strong job creator, there must also be a focus on the *quality* of jobs created. Replacing well-paying fossil fuels jobs with poor-paying renewable energy jobs will lead to an unjust transition. Fossil fuel jobs pay significantly higher than the average job. In 2016, the average annual salary of a fossil fuel worker in California was $87,785, compared to the average annual work force salary of $50,014.[37] Moreover, as the chart below shows, workers in the fossil fuel industry are far more likely to be full-time employees than those in other sectors. Eighty-four percent of jobs in the fossil fuel industry are full-time, compared to 61% of jobs in the overall work force. Full-time jobs provide more economic stability and security, and as fossil fuel jobs decline, ensuring as many full-time jobs are created as possible is key to protecting workers in a low-carbon economy.

These data are not introduced to dissuade the creation of solar jobs. Rather, these data again show that targeted policy must be implemented to ensure a just transition. While a low-carbon alternative, renewable energy jobs are not inherently good jobs that pay family-sustaining wages, provide benefits, and provide a career pathway. Standards must be put in place to ensure they are good jobs, which requires policies that address more than just the carbon reduction potential.

Figure 3. Employment Status for Fossil Fuel Workers and Total Work Force, California, 2012-2016



Source: 2016 five-year American Community Survey microdata from IPUMS-USA.

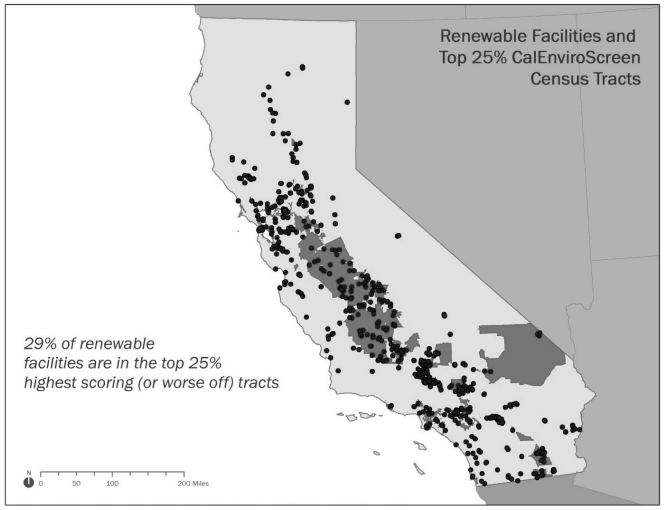
Moreover, while California is a leader in solar generation, the benefits of solar production are not shared equitably across the state. Although solar generation is a strong job creator, the quality of jobs depends on many factors. Utility-scale facilities that employ unionized labor provide high-quality jobs paying family-sustaining wages and benefits.[38] In contrast, rooftop solar photovoltaic installers are paid the lowest within the industry.[39] The discrepancy underscores the need for a holistic approach to a just transition that looks beyond only emission reductions but also toward creating a low-carbon economy that ensures good, quality jobs.

Similar to the maps of fossil fuel facilities above, we map the location of renewable energy facilities in relation to environmental justice communities in California. Renewable energy facilities are defined as power plants that use the following clean fuel types: solar voltaic, solar thermal, wind, geothermal, or battery. We define clean fuel types as energy generated with resources that do not produce co-pollutants—or those localized pollutants that directly harm human health that can accompany GHG emissions. These data come from the California Department of Energy Power Plant Inventory. Again, we use CalEnviroScreen to identify environmental justice communities.

As a parallel to the visual representation of the location of fossil fuel facilities and their proximity to environmental justice communities, we map renewable energy facilities to see whether renewable energy facilities are placed in communities that have borne the environmental burden of fossil fuel facilities, which can be an indication, although not a guarantee, that these communities may be receiving some benefit from a low-carbon transition. The maps also show

34. Data on demographics and income levels are taken directly from CalEnviroScreen (*see* California Office of Environmental Health Hazard Assessment, *Download Data*, https://oehha.ca.gov/calenviroscreen/maps-data/download-data (last visited Jan. 5, 2020)). The demographic data are from 2010 and so likely understate the current share of people of color in both the top 25% of tracts and the rest.
35. California Energy Commission, *Total System Electric Generation*, https://ww2.energy.ca.gov/almanac/electricity_data/total_system_power.html (last visited Jan. 16, 2020).
36. Solar Foundation, *Solar Jobs Census 2018*, https://www.solarstates.org/#states/solar-jobs/2018 (last visited Jan. 5, 2020).
37. Analysis of 2016 five-year American Community Survey microdata from IPUMS-USA.
38. Betony Jones & Carol Zabin, *Are Solar Energy Jobs Good Jobs?*, U.C. Berkeley Center for Lab. Res. & Educ. (July 2, 2015), http://laborcenter.berkeley.edu/are-solar-energy-jobs-good-jobs/.
39. *Id.*

Figure 4. Renewable Energy Facilities and Top 25% CalEnviroScreen Census Tracts



Source: June 2018 Updates of CalEnviroScreen 3.0, OEHHA; Power Plant Inventory, California Department of Energy.

which communities could be prioritized for future renewable energy deployment. Finally, this type of spatial analysis helps highlight areas that have both fossil fuel facilities and renewable energy facilities, such as Kern County. In these areas, special attention must be paid to ensure that a just transition is occurring.

While more than 40% of fossil fuel facilities are in the top 25% of CalEnviroScreen tracts, the map below (Figure 4) shows that 29% of all renewable energy facilities are in the top 25% of CalEnviroScreen tracts. And while 7% of fossil fuel facilities are in the top 5% of CalEnviroScreen tracts, only 4% of renewable energy facilities are in those same neighborhoods.

Some renewable energy production is place-based, meaning there are areas that are more suitable for renewable energy installation because of inherent solar resources, particularly large-scale installations.[40] For example, geographically, certain areas of the state are better suited for large-scale solar installations because they have open land that receives high-intensity sunshine. However, the cluster of renewable energy facilities, as shown above, indicates that there could be more renewable energy production in environmental justice communities currently burdened with fossil fuel industries.

IV. A Framework for a Just Transition

The fundamental underpinning of just transition is understanding and mitigating the negative economic and social consequences of decarbonization *and* coupling that with active strategies to incorporate those communities that have borne the environmental burden of the economy we are exiting rather than its economic benefits. Though limited, previous successful just transition examples can illuminate which elements must be included in a road map to ensure the transition away from fossil fuels is just and equitable. In the few successful examples of just transition, four key guiding principles emerge: (1) strong governmental support; (2) dedicated funding streams to support transition programs and efforts, including job training and creation; (3) strong, diverse coalitions; and (4) diversifying economic opportunity.

Far from being dispositive, these four pillars of just transition are meant to provide a blueprint for communities to shape future policies to transition away from fossil fuels. Timing is important: closing extraction sites and power plants cannot happen overnight or even within a few months. Moreover, while we discuss what kind of policies and programs could be funded, we do not make specific cost estimates. Some general transition cost estimates can be found in Prof. Robert Pollin's work, which estimates a nationwide investment of $50 billion annually for climate stabilization, of which he argues $500 million should go to transitioning fossil fuel workers.[41] Finally, every sector will be impacted by the transition to a low-carbon future differently and this research does not address specific sectors—an area ripe for future research.

We provide a schematic below and then discuss all four pillars in detail. (See Table 1 below.)

Pillar #1: Strong Governmental Support

The scale and scope of transitioning away from fossil fuels is best achieved with consistent, strong governmental support. Transitioning into a low-carbon future will require both short-term policies to provide immediate support to communities and workers negatively impacted by plant and mine closures and decreasing oil and gas extraction. Short-term support for displaced workers, such as unemployment benefits and retraining programs, is already administered through federal and state programs.

Longer-term restructuring of local economies and transforming former fossil fuel sites is also best done through public, government programs. Indeed, private "green" businesses have a vital role to play—and, perhaps surprisingly, are already investing amounts of resources on lobbying similar to the dirty, polluting firms, according to a 2016 University of California, Los Angeles, study.[42]

However, we cannot rely on the private sector alone, as ultimately it has limited incentive to invest in and support displaced communities and workers at the level required because this support may not create short-term profit or have a high rate of return on investment.[43] As a result, while the private sector has a key role to play, particularly

40. Mark Bolinger & Joachim Seel, Lawrence Berkeley National Laboratory, Utility-Scale Solar: Empirical Trends in Project Technology, Cost, Performance, and PPA Pricing in the United States—2018 Edition (2018) (finding that most utility-scale projects are in California and the Southwest because of solar resource strength, in addition to supportive policies), https://emp.lbl.gov/sites/default/files/lbnl_utility_scale_solar_2018_edition_report.pdf.

41. Robert Pollin & Brian Callaci, *A Just Transition for U.S. Fossil Fuel Industry Workers*, Am. Prospect, July 6, 2016, https://prospect.org/article/just-transition-us-fossil-fuel-industry-workers.

42. David Colgan, *Green Businesses Are Spending Big Bucks on Lobbying Power*, UCLA, June 16, 2016, http://newsroom.ucla.edu/stories/green-businesses-are-spending-big-bucks-on-lobbying-power.

43. Georgios Altintzis & Esther Busser, *The Lessons From Trade Agreements for Just Transition Policies*, 6 Int'l J. Lab. Res. 269 (2014).

Table 1. Four Pillars of a Just Transition

Pillars of a Just Transition	Key Elements		Case Study Example
	Short-term	Long-term	
1. Strong Governmental Support	Policies that provide immediate support to communities and workers negatively impacted by plant and mine closures	Policies that restructure local economies and transform former fossil fuels sites	Restructuring of the coal and steel production industries in the Ruhr region in Germany
2. Dedicated Funding Streams	Address short-term needs, such as wage replacement or replacing lost tax revenue when a plant shuts down	Invest in long-term needs, such as seeding new business development and funding long-term training and retraining programs	Washington State carbon tax versus California's cap-and-trade program
3. Strong, Diverse Coalitions	Diverse interests—particularly workers and communities—work together before facilities close to create a transition plan that addresses the needs of directly impacted stakeholders and protects all needs	Diverse interests—particularly workers and communities—actively collaborate though transition activities, monitoring performance and building trust to tackle expanded challenges and more ambitious policy goals	The labor-community-environmental coalition that came together around the Diablo Canyon plant closing and proposed a joint proposal addressing each interests' needs
4. Economic Diversification	Create a vision for the economy that reimagines local economies free of fossil fuel infrastructure	Implement community visioning with particular focus on moving away from reliance on a single industry	Town of Tonawanda Plan

in diversifying local economies, as detailed below, both short-term and long-term policies are best suited to be administered through the public sector and require strong and consistent government support for a just transition.

The importance of the public sector is highlighted in the case of the Ruhr region in Germany, which has been undergoing an industrial transition for more than 50 years.[44] At one point, the Ruhr region was the largest industrial site in Europe and coal and steel production were major employers.[45] However, coal mining and steel production became increasingly less competitive as cheaper products became available on the global market.[46] As a result, the area has seen rising unemployment and industrial decline since the 1970s.[47] The number of workers employed in the coal industry fell from 473,000 in 1957 to just 11,447 in 2013.[48] The share of the economy provided by coal mining fell from 61% in 1960 to 21% in 2014.[49] Moreover, coal subsidies were completely phased out in 2018, making the cost of coal mining more expensive and even less competitive.[50]

Transitioning the Ruhr region required short-term, immediate assistance for displaced workers, such as unemployment benefits, pension, and health care benefits, and long-term policies that reimagine economic development and attract new industries and sectors that can diversify the economic and employment base.[51] For longer-term trans-

44. J. Mijin Cha, *A Just Transition: Why Transitioning Workers Into a New Clean Energy Economy Should Be at the Center of Climate Change Policies*, 29 Fordham Envtl. L. Rev. 196 (2017); *Social Partners and the Collaborative Approach Are Key to the Green Transition of the Ruhr Region*, Eur. Trade Union Inst., Feb. 9, 2016, https://www.etui.org/News/Social-partners-and-the-collaborative-approach-are-key-to-the-green-transition-of-the-Ruhr-region.
45. Dean Stroud et al., *Skill Development in the Transition to a "Green Economy": A "Varieties of Capitalism" Analysis*, 25 Econ. & Lab. Rel. Rev. 10-27 (2014), *available at* https://doi.org/10.1177/1035304613517457.
46. *See id.*
47. *See id.*
48. Altintzis & Busser, *supra* note 43.
49. *See id.*
50. *The Rise and Fall of Germany's Coal Mining Industry*, Deutsche Welle, Jan. 31, 2007, https://www.dw.com/en/the-rise-and-fall-of-germanys-coal-mining-industry/a-2331545.
51. *Social Partners and the Collaborative Approach Are Key to the Green Transition of the Ruhr Region*, *supra* note 44.

formation, the region looked to attract investment from high tech and knowledge-based firms, expand the service sector, and promote local entrepreneurship.[52] The federal government also invested in building an educational infrastructure to create new technical institutions and universities in the region.[53]

The inclusion of technical institutions and universities highlights the need to move beyond replacing coal/fossil fuels with renewable energy. As discussed further below, regions and communities benefit most from diverse economic bases and replacing one energy source with another continues sole-industry dominance. Instead, as evidenced in the Ruhr region, bringing in multiple industries and sectors strengthens economies that can better withstand the loss of a single industry or sector.[54]

While the region is currently struggling with higher rates of unemployment than the national average, the German government remains committed to transition and recently created the Special Commission on Growth, Structural Economic Change, and Employment to produce just transition plans for two lignite mining areas and to create a time line for completely phasing out coal.[55] The Commission comprises multiple stakeholders, including industry, governmental ministries, environmental organizations, and trade unions.[56]

The Ruhr example highlights how the challenging nature of transition requires strong governmental support. One of the biggest challenges to transition is the reimaging and reformation of carbon-intensive economies, which requires a long planning and investment horizon.[57] The public sector is better suited for this type of planning and investment because there is no pressure and incentive for short-term profits, as in the private sector. Moreover, short-term financial supports, such as unemployment benefits, are distributed through state and federal programs. Long-term planning for regional redevelopment requires a reimaging of economic development without the pressure of short-term profits or returns. Investing in small business development and seeding new industries through tax incentives or subsidies and training infrastructure, such as vocational schools, is also already done through state or federal government programs and efforts.

Pillar #2: Dedicated Funding Streams

Both short-term and long-term transition support will require substantial funding. Programs need to be fully funded as well as have consistent funding. As seen in the TAA program example, inconsistent and uncertain funding streams limit the success of transition programs. Dedicated funding streams, where a consistent revenue stream is allocated to a particular program, community, or sector, provide the predictability and stability necessary for long-term planning. Funding is needed for short-term needs—such as wage replacement or replacing lost tax revenue when a plant shuts down—and for long-term needs—such as seeding new business development and funding long-term training and retraining programs.[58]

One mechanism for creating a dedicated funding stream is allocating revenue raised from a carbon fee, such as a carbon tax or cap-and-trade program. The table below shows a comparison between the proposed Washington State Carbon Fee Initiative and California Cap-and-Trade Program. While the campaign to pass a carbon fee in Washington was ultimately unsuccessful,[59] the proposed allocation of revenue provides a blueprint for how to fund and support community and worker transition.

The formula for revenue allocation in Washington was clear and straightforward and categorized into the types of projects that would receive funding and the communities that would receive funding.[60] Within the types of projects that would receive funding, 70% of revenue would go to clean energy projects, 25% to clean water and healthy forests, and 5% to local communities.[61] Of all total allocations, 35% would benefit environmental justice communities.[62] The proposal also included funds specifically allocated for worker transition, including wage and benefit replacement, training, relocation, and counseling services.[63] Investment advisory panels would provide recommendations for allocations and one-third of each advisory panel was required to comprise representatives from indigenous tribes and vulnerable populations.[64]

The Greenhouse Gas Reduction Fund, which captures the proceeds from the California Cap-and-Trade Program, allocates funds to 12 state agencies to administer programs and grants that reduce GHG pollution.[65] As research suggests that California's cap-and-trade system is not addressing the disparities in exposure to environmental health hazards[66]—a key concern for environmental justice communities—environmental justice communities secured dedicated funding from cap-and-trade revenue to directly and indirectly benefit their communities through S.B. 535.[67] The bill requires a certain percentage of cap-and-

52. *See id*.
53. *See id*.
54. Béla Galgóczi, *The Long and Winding Road From Black to Green: Decades of Structural Change in the Ruhr Region*, 6 Int'l J. Lab. Res. 217 (2014), *available at* https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---actrav/documents/publication/wcms_375223.pdf.
55. Just Transition Research Collaborative, Mapping Just Transition(s) to a Low-Carbon World (2018), http://www.unrisd.org/80256B3C005BCCF9/(httpPublications)/9B3F4F10301092C7C12583530035C2A5?OpenDocument.
56. *See id*.
57. *See* Galgóczi, *supra* note 54.
58. Robert P. Taylor, Institute for Industrial Productivity, Case Study: A Review of Industrial Restructuring in the Ruhr Valley and Relevant Points for China (2015), https://c2e2.unepdtu.org/wp-content/uploads/sites/3/2016/04/industrial-restructuring-in-the-ruhr-valley.pdf.
59. Hal Bernton, *Washington State Voters Reject Carbon-Fee Initiative*, Seattle Times, Nov. 6, 2018, https://www.seattletimes.com/seattle-news/politics/voters-rejecting-carbon-fee-in-first-day-returns/.
60. *See* Initiative Measure No. 1631, (Wash. 2018), https://www.sos.wa.gov/_assets/elections/initiatives/finaltext_1482.pdf.
61. *See id*.
62. *See id*.
63. *See id*.
64. *See id*.
65. California Climate Investments, *Background*, http://www.caclimateinvestments.ca.gov/about-cci (last visited Jan. 5, 2020).
66. Cushing et al., *supra* note 18.
67. S.B. 535, 2011-2012 Leg. Sess. (Cal. 2011), *available at* http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0501-0550/sb_535_bill_20120930_

Table 2. Washington State Carbon Fee Initiative v. California Cap-and-Trade Program

Washington State Carbon Fee Initiative (I-1631)*	California Cap-and-Trade Program**
Estimated revenue $2.2 billion in first five years	As of March 2019, $9.3 billion in revenue
Revenue allocation: ▪ 70% to clean energy ▪ 25% to clean water and healthy forests ▪ 5% to local communities • Of all allocations, 35% will benefit environmental justice communities	Examples of revenue allocation: ▪ Cap-and-trade funds used to support implementation of A.B. 617, which targets air pollution in environmental justice communities ▪ A.B. 2722: Funds community-led development and infrastructure projects that achieve environmental, health, and economic benefits in California's most disadvantaged communities ▪ S.B. 535: Priority population investments with at least 25% of revenue allocated to benefit disadvantaged communities with at least 10% going to projects located within these communities
Investment advisory panels provide recommendations for allocations: ▪ 1/3 of each advisory panel must comprise representatives of indigenous tribes and vulnerable populations	Cap-and-trade investments allocated by various agencies
Funds specifically allocated for worker transition, including wage and benefit replacement, training, relocation, and counseling services	No specific dedicated worker transition funding or program under cap-and-trade program

* Initiative Measure No. 1631 (Wash. 2018), https://www.sos.wa.gov/_assets/elections/initiatives/finaltext_1482.pdf.
** See Press Release, California Air Resources Board, Report: Cap-and-Trade Spending Doubles to $1.4 Billion in 2018 (Mar. 25, 2019), https://ww2.arb.ca.gov/news/report-cap-and-trade-spending-doubles-14-billion-2018; California Air Resources Board, Community Air Protection Incentives to Reduce Emissions in AB 617 Communities, https://ww3.arb.ca.gov/msprog/cap/capfunds.htm (last reviewed Apr. 19, 2019); A.B. 2722, 2015-2016 Leg. Sess. (Cal. 2016), *available at* https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB2722; S.B. 535, 2011-2012 Leg. Sess. (Cal. 2011), *available at* http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0501-0550/sb_535_bill_20120930_chaptered.html.

trade revenue, recently increased to 35%, to be dedicated to investments that benefit "disadvantaged communities" (as defined by CalEnviroScreen).[68] Through this legislation, revenue is being spent on projects like affordable housing, public transit, home weatherization, urban greening, and more.[69]

Another funding example from the California Cap-and-Trade Program to environmental justice communities is the Transformative Climate Communities (TCC) Program, established through A.B. 2722, which supports community-led development and infrastructure projects that benefit the state's most disadvantaged communities.[70] In its first and second rounds of funding, TCC allocated

chaptered.html.

68. A.B. 2722, 2015-2016 Leg. Sess. (Cal. 2016), *available at* https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB2722.
69. California Climate Investments, *2019 Project Profiles*, http://www.caclimateinvestments.ca.gov/2019-project-profiles (last visited Jan. 5, 2020).
70. A.B. 2722, 2015-2016 Leg. Sess. (Cal. 2016); California Department of Conservation, *Transformative Climate Communities Program*, https://www.conservation.ca.gov/dlrp/grant-programs/Pages/Transformative-Climate-Communities-Program.aspx (last visited Jan. 5, 2020).

$70 million to Fresno, $35 million to the Watts community in South Los Angeles, $35 million to Ontario, $23 million to the northeast San Fernando Valley in Los Angeles, and $23 million to Sacramento for comprehensive, integrated, cross-cutting projects to reduce the burden from climate change disproportionately felt by environmental justice communities.[71]

These dedicated funding streams are good examples of targeted investments and show the potential for funding a broad suite of projects and programs. Indeed, revenue from the California Cap-and-Trade Program could also be directed to explicitly fund just transition programs.[72]

Funding streams should also be invested to build capacity within communities. Supporting community-based organizing and training is necessary to equip residents with the tools needed to meaningfully engage in decisions impacting their lives and livelihoods.[73] Community investment should also include training residents to become decisionmakers to ensure those impacted by these decisions are the ones envisioning and implementing these programs and policies.[74] Finally, funding streams should support work force development strategies and ensure these efforts have funding to expand to communities across the state.

Pillar #3: Strong, Diverse Coalitions

Just transition requires support for workers and communities that will be economically displaced by a movement away from fossil fuel production *and* environmental justice communities that have long been left behind. Environmental justice communities working in coalition with labor unions and workers' organizations recognize that both groups have the shared interest of protecting their communities and livelihood in the transition to a low-carbon economy.[75] Transition plans that are supported by a diverse coalition and represent different interests are stronger and more likely to identify and address the needs of workers and communities. When these coalitions stay together, they can ensure that the resulting transition addresses workers and communities more holistically, that solutions to climate change do not exacerbate existing inequalities, and that the very act of collaboration builds a stronger political basis for more ambitious goals and policy agendas.

The importance of strong, diverse coalitions does not ignore the challenges that come with bringing different interest groups together. Fossil fuel facilities can be the main source of employment and tax revenue in communities.[76] The loss of these jobs and revenues can make workers and unions oppose closing facilities.[77] Community members, who experience the negative environmental and social impacts of these facilities and did not have access to the jobs associated, can advocate for closing these facilities on a very short time line.[78] These tensions are real, but focusing on shared goals can bring diverse interests together and sustain their collaboration over time.

The case of the Diablo Canyon nuclear power plant closing provides an example of a proactive transition plan that, through the support of a strong, diverse coalition, provided a blueprint to safely take the plant offline with a trained work force, provide a future for the workers and communities, and ensure the power produced by nuclear energy would be replaced by renewables. Diablo Canyon is also an example of what a strong labor-community-environmental coalition can win by staying together and not settling for diminished transition packages that do not address the entire coalition's needs.

In anticipation of the plant's closing and the California Public Utilities Commission (CPUC) proceedings to determine the terms of retiring Diablo Canyon, a diverse coalition came together to propose a plan, called the Joint Proposal, to protect workers and the community surrounding Diablo Canyon and ensure the replacement for Diablo Canyon would be carbon-free.[79] The coalition included Pacific Gas and Electric Co. (PG&E), the Natural Resources Defense Council, Environment California, the Alliance for Nuclear Responsibility, and the pertinent unions, International Brotherhood of Electrical Workers (IBEW) Local 1245 and the Coalition of California Utility Employees.[80] The Joint Proposal included replacing Diablo Canyon with a GHG-free portfolio to substitute for the Diablo Canyon power; an employee retention, retraining, and compensation plan; and mitigation to the local community for the loss of tax revenue and other economic costs of closure.[81]

When the Joint Proposal was presented, CPUC approved only parts of the plan and funded transition programs at lower levels than proposed.[82] The proposed program for plant employees included a severance package for approximately 1,500 employees, a retention program to ensure

71. *See* California Department of Conservation, *supra* note 70.
72. *Id.*; A.B. 2722, 2015-2016 Leg. Sess. (Cal. 2016).
73. Center on Race, Poverty, and the Environment, Framework for a Just Transition in the San Joaquin Valley (2016) (available upon request).
74. *See id.*
75. *See, e.g.*, the work of the Just Transition Alliance, which brings together labor unions and environmental justice communities, http://jtalliance.org/ (last visited Jan. 5, 2020).
76. *See* Morris et al., *supra* note 30.
77. *See, e.g.*, the opposition of the International Brotherhood of Electrical Workers Local 18 to closing natural gas power plants in Los Angeles: Jon Regardie, *New Attacks Ads Are the Latest Salvo in a Battle Between a Local Union and the Mayor*, L.A. Mag., Nov. 20, 2019, https://www.lamag.com/citythinkblog/mayor-eric-garcetti-attack-ads/.
78. *See, e.g.*, the environmental justice advocates calling for the closure of the natural gas power plants in Los Angeles: *Op-Ed: DWP Is About to Commit Los Angeles to a Dirty Natural Gas Power Plant It Doesn't Want or Need*, L.A. Times, Aug. 25, 2019, https://www.latimes.com/opinion/story/2019-08-22/climate-dwp-coal-natural-gas-utah-renewable-energy-los-angeles.
79. Joint Proposal of Pacific Gas and Electric Company, Friends of the Earth, Natural Resources Defense Council, Environment California, International Brotherhood of Electrical Workers Local 1245, Coalition of California Utility Employees, and Alliance for Nuclear Responsibility to Retire Diablo Canyon Nuclear Power Plant at Expiration of the Current Operating Licenses and Replace It With a Portfolio of GHG Free Resources (June 20, 2016), https://www.pge.com/includes/docs/pdfs/safety/dcpp/JointProposal.pdf [hereinafter Joint Proposal].
80. *See id.*
81. *Id.*
82. CPUC, Decision Approving Retirement of Diablo Canyon Nuclear Power Plant (Jan. 11, 2018).

adequate staffing levels until closure, and a retraining and development program to facilitate redeployment of a portion of plant personnel to the decommissioning project and elsewhere within PG&E.[83]

The estimated cost of the employee program was $350 million to be recovered from ratepayers.[84] CPUC approved only $222.6 million for the program.[85] Moreover, the Joint Proposal had provisions to protect San Luis Obispo County against the loss of tax revenue from the closure of Diablo Canyon.[86] The Joint Proposal created the $85 million Community Impacts Mitigation Program, which would also offset any potential negative impacts to essential services, and the creation of the $10 million Economic Development Fund to ease local economic impacts arising from the plant's closure.[87] CPUC declined to fund the community transition plan through rate recovery.[88]

Rather than accept the CPUC diminished transition plan, the coalition behind the Joint Proposal went to the state legislature and introduced S.B. 1090, which required CPUC to accept the Joint Proposal as originally presented.[89] The bill passed both the state assembly and state senate and was signed by the governor on September 19, 2018.[90]

The Diablo Canyon example highlights several lessons for future just transition efforts. First, the proactive planning by a diverse coalition presented a plan to CPUC, rather than waiting for the Commission or other entity to provide a transition plan. In doing so, the impacted stakeholders—workers, communities, environmental advocates, and the operating utility—were the ones to create the transition plan and because they were directly impacted, they understood the needs of a diverse range of stakeholders and were able to create an equitable plan.

Second, the coalition stayed together in the face of an uneven CPUC decision. While the worker retention and transition programs were funded at a lower level, they did receive funding, whereas the community transition program and commitment to replace the nuclear energy with renewables were rejected. Instead of accepting the diminished plan, the coalition went to the legislature to ensure that all members of the coalition were protected. This signals how it is that the very act of collaboration can build a sense of mutuality and lead coalitions to persist over time rather than be derailed by immediate self-interest. By sticking together, the coalition created political pressure such that CPUC was ordered to accept the original Joint Proposal, a more comprehensive and equitable transition plan.

Pillar #4: Economic Diversification

The final pillar of just transition is diversifying the economic base. Overreliance on a single industry or sector leaves communities and workers extremely vulnerable when the industry or sector declines.[91] Investing in emerging and growing sectors provides a more diverse economy, and climate policy itself can help diversify economies. For example, since the adoption of A.B. 32 10 years ago, California has reduced emissions by 11% while also growing the state's economy by nearly 16%, refuting the idea that reducing emissions harms economic growth.[92] In fact, bold climate policy sparks innovation and, as California demonstrates, the ambitious GHG reduction targets created demand for new products and technologies. Businesses, with state support, responded with clean technological and market innovations that reduced emissions.[93]

Economic diversification is key to a holistic, comprehensive just transition that addresses the many needs and challenges facing communities. Moving away from fossil fuel requires a reimagining of the way our economy has developed since industrialization. Ensuring quality job creation, strong local economic growth, and attracting and retaining new industries is fundamental to creating a healthy economy and a pathway to a just transition.

The example of the Huntley Coal Plant shutdown in Tonawanda, New York, shows the importance of economic diversification as well as that of a strong coalition, the need for dedicated funding streams, and proactive visioning. Due to the falling cost of natural gas, the coal plant was no longer economically competitive and its operator, NRG, began to reduce production and tax payments to the town.[94] Between 2008 and 2012, the town lost $6.2 million in tax revenue.[95] As a result of the decrease in tax revenue, three schools in the town closed and the plant's work force was reduced by 60%.[96]

In response, those directly impacted by the plant's declining operations formed the Huntley Alliance, including the Kenmore-Tonawanda Teachers Association, the Western New York Area Labor Federation, the United Steelworkers, the IBEW, and the Clean Air Coalition.[97] For two years, the Huntley Alliance organized the town around a transition plan that would save the school system, protect workers, and protect against increased electricity costs for ratepayers. Their efforts were successful and, in 2015, when NRG officially announced it would retire the

83. *See id.*
84. *See* Joint Proposal, *supra* note 79.
85. CPUC, *supra* note 82.
86. *See* Joint Proposal, *supra* note 79.
87. News Release, PG&E, PG&E, SLO County, SLO Coastal Unified School District, Local Cities Reach Accord on Diablo Canyon Community Support Funding (Nov. 28, 2016), https://www.pge.com/en_US/safety/how-the-system-works/diablo-canyon-power-plant/news-and-articles/pge-slo-county-slo-coastal-unified-school-district-local-cities-reach-accord-on%20diablo-canyon-community-support-funding.page.
88. CPUC, *supra* note 82.
89. S.B. 1090, 2017-2018 Leg. Sess. (Cal. 2018), *available at* https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1090.
90. Jeff St. John, *California Passes Bill Requiring Diablo Canyon Plant to Be Replaced With Carbon-Free Resources*, Greentech Media, Aug. 24, 2018, https://www.greentechmedia.com/articles/read/california-bill-requiring-diablo-canyon-carbon-free.
91. *See* Morris et al., *supra* note 30.
92. Next 10, 2018 California Green Innovation Index—10th Edition 10 (2018), https://www.next10.org/sites/default/files/2019-06/2018-california-green-innovation-index.pdf.
93. *Id.*
94. Richard Lipsitz & Rebecca Newberry, Huntley, a Case Study: Building Strategic Alliances for Real Change (2016), http://www.labor4sustainability.org/wp-content/uploads/2016/09/The-Huntley-Experiment.pdf.
95. *Id.*
96. *See id.*
97. *See id.*

coal plant, the state legislature dedicated $30 million in gap funding, which increased to $45 million in 2017.[98]

The town of Tonawanda released an economic action plan called *Growing the Town's Economic Future* in 2017.[99] An advisory committee comprising town officials, Buffalo Center for Arts and Technology, Clean Air Coalition of Western New York, Erie County, and the Western New York Area Labor Federation, American Federation of Labor-Congress of Industrial Organizations, with support from the University at Buffalo Regional Institute and the Delta Institute, collaborated on the plan. The diverse coalition ensured that the community's voice and stakeholders directly impacted were present and represented in the economic action plan.

Growing the Town's Economic Future looks to leverage the state's gap funding to build upon existing initiatives and attract new industries to strengthen the tax base and create good, family-sustaining jobs. Among the strategies for building the town's economy are positioning the town as a regional hub for sustainable manufacturing and trade, building work force and career pipelines for younger workers, and redeveloping the town's waterfront district to attract tourists and new residents.

The Tonawanda example highlights the importance of not just economic diversification, but all of the just transition pillars. A diverse coalition was able to push for dedicated funding and a proactive plan, which was developed with governmental support and vision. The economic action plan looks to diversify the area's economy to strengthen it, protect it against any future economic decline, and provide a way forward to a stronger, growing economy.

V. Conclusion

Transitioning to a low-carbon future will be complicated, expensive, and require broad-based public and political support. Just transition requires a holistic, comprehensive vision that moves beyond emissions reduction to addressing issues of health care, affordable housing, transportation, and others to ensure communities and workers can thrive in a low-carbon future. The four pillars of just transition—strong governmental support, dedicated funding streams, strong, diverse coalitions, and economic diversification—can provide a road map to an equitable, low-carbon future.

Translating the pillars into policy can build upon previous examples and also include new initiatives, such as elements of the Green New Deal. The Green New Deal is indeed holistic, including such related policies as a federal job guarantee and comprehensive and affordable health care coverage as well as support for economic transition.[100] It represents an attempt to scale up our efforts to address climate change in a way that fits the scale of the problem; while some have labeled the program excessively "ambitious,"[101] this sort of ambition is desperately needed. But as supportive as we might be of the Green New Deal, one reality is that it will be hard to secure sufficient political support at the federal level, even if there is a major shift in which party controls the U.S. Congress and the presidency.

One way to build widespread support is to show that another world is indeed possible. In the American federal system, this often involves scaling up from state experimentation. California, with the world's fifth-largest economy and a firm commitment to decarbonization, can help. Using the procurement power of the state, local procurement requirements can both create demand for local businesses to fill, diversifying local economies away from fossil fuels, and substantially reduce GHG emissions by dramatically reducing supply chain emissions. Due to the size of the state, public procurement is able to create meaningful market demand that could impact the evolution of industries that will eventually work at a national scale.

Similar to ideas within the Green New Deal, the public sector can be a driver of job creation through public investments. Public projects are more likely to include local hiring provisions and prevailing wage standards, which ensure that the jobs created are both good jobs and available to local communities. These projects could include infrastructure upgrades, large-scale renewable energy, and energy-efficiency projects, all of which would meaningfully reduce GHG emissions and create good, family-sustaining jobs.

To both strengthen coalitions and redress past wrongs, these investments should be purposefully targeted to historically marginalized areas. Targeted investments can, and should, be funded through dedicated funding streams. Transformation into a low-carbon economy is a long-term investment, and programs and initiatives will be most successful if planned on a long horizon with funding predictability. Small business incubators, including community-based renewable energy installers, training and retraining workers, and capacity-building among community members, are investments that will help lead the transformation into a low-carbon future.

Moving away from fossil fuel requires a scale of effort previously unseen, and more research is needed to understand the challenges and its solutions. Ensuring that job loss and economic dislocation is minimized is important, but given the legacy of inequality and injustice associated with fossil fuels and extraction, transitioning to a low-carbon economy should be informed by a commitment to environmental justice. California, which has been America fast-forward in terms of demographic change, also needs to model a full-throated commitment to building an inclusive, equitable, and prosperous low-carbon future.

98. Elizabeth McGowan, *Rising From the Ashes, a Buffalo Suburb Ends Its Dependence on Coal*, Grist, July 11, 2017, https://grist.org/justice/a-working-class-buffalo-suburb-retired-a-coal-plant-the-right-way/.

99. University at Buffalo Regional Institute, Tonawanda Tomorrow: Growing the Town's Economic Future (2017), http://tonawandatomorrow.org/wp-content/uploads/sites/24/2017/08/TonawandaTomorrow-PlanJune15SinglePages.pdf.

100. H. Res. 109, 116th Cong. (2019), *available at* https://www.congress.gov/bill/116th-congress/house-resolution/109/text.

101. Ledyard King, *Green New Deal Too Ambitious for Some Democrats, Even Those Who Say Congress Must "Do Something,"* USA Today, Mar. 7, 2019, https://www.usatoday.com/story/news/politics/2019/03/07/green-new-deal-not-all-democrats-board-ambitious-climate-plan/3032887002/.