

A ROADMAP
TO AN EQUITABLE
LOW-CARBON

FUTURE:

**FOUR PILLARS
FOR A JUST
TRANSITION**

PREPARED FOR
**THE CLIMATE
EQUITY NETWORK**

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INTRODUCTION

The Imperative of Addressing Climate Change

The signs that the climate crisis is already happening are clear. The most recent Intergovernmental Panel on Climate Change report detailed the evidence from more than 6,000 studies that found that over the past decade, a series of record-breaking storms, forest fires, droughts, coral bleaching, heat waves, and floods have taken place around the world in response to the 1.0 °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. 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. Even if such cuts were to begin immediately, reaching this threshold would not be prevented, only delayed.

Any chance of staving off even worst impacts from climate change depends on significant reductions in GHG emissions and a move from a fossil fuel-based economy to a low-carbon economic future. While this transition is fundamentally necessary, the challenges it poses are great. Every aspect of our economy and our society is dependent upon fossil fuel use – from the reliance on electricity provided by fossil fuel power plants to the tax revenue local communities receive from fossil fuel extraction and facilities to the jobs held by those working in an industry that may keep their incomes high but often puts their communities at risk. The imprint of fossil fuels is so deeply embedded within our way of life that ceasing its use will require a fundamental shift in how we procure and use energy.

The good news is that this shift is possible—and California is already on a path to a low-carbon future. In addition to several ambitious climate targets, in September 2018, then-Governor Jerry Brown signed an executive order pledging the state to achieve carbon neutrality no later than 2045.² As the world's fifth largest economy, the commitment California made to reduce greenhouse gases can provide a pathway to a low-carbon future that could lay the groundwork for others to follow.³ But to get there, we need to aim even higher than California's already ambitious goals.

Transitioning away from fossil fuels must be done more quickly and also in a manner that protects workers and communities economically dependent on the fossil fuel industry. Transitioning is also an opportunity to include those who have historically been excluded from the jobs and economic benefits of the extractive economy and expand the populations who have access to future jobs and economic opportunities. As we move to a low-carbon future, environmental justice communities should be prioritized for job creation and renewable energy generation. Without protecting displaced workers and expanding opportunities to other workers, transitioning to a low-carbon future will replicate the mistakes and inequalities of the extractive past and present.

Considering the Climate Gap

Just transition efforts must take a holistic and comprehensive approach that moves beyond addressing only the issue of fossil fuels and consider that for too long, environmental justice communities have borne the environmental and economic costs of the extractive economy while receiving very few of the associated benefits. The disproportionate burden that marginalized communities face from the impacts of climate change, also known as the “climate gap,” include these costs.⁴ The climate gap acknowledges that 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 reasons, including a lack of resources available to deal with the financial, social, and environmental impacts of climate change.⁵

September 2018
San Francisco, CA
Hundreds of Indigenous and Frontline community representatives gathered outside of Governor Brown’s Climate and Forest Task Force meeting leading up to the Global Climate Action Summit in September.

Source: Peg Hunter on Flickr



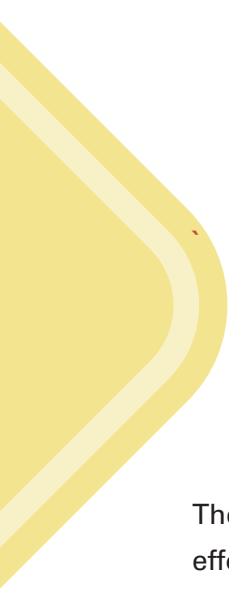
We must not adopt climate policies that increase inequality, continue to place disproportionate burdens on marginalized communities, or allow the climate gap to persist. Research shows that we cannot assume communities will automatically benefit from an overall reduction in fossil fuel use and carbon emissions.⁶ For example, researchers found that greenhouse gas emitting facilities are disproportionately located in marginalized communities and that reducing greenhouse gases under the California Cap-and-Trade program has yet to yield meaningful reduction in localized pollutants, which negatively affects people's health and disproportionately impacts these neighborhoods.⁷ Targeted policy is needed to ensure these communities are protected. Carbon reduction that fails to address the harms that environmental justice communities have been forced to bear is neither just nor desirable.

Moreover, in order to address historic wrongs, a just transition must be broader than focusing only on carbon reduction. Similar to ideals in the federal Green New Deal,⁸ just transition efforts must contribute to the transformation of our economy and our society to a future that includes access to decent work, health care, and education leading to an improved quality of life.

Project Purpose

The three-part framework on equitable implementation developed by USC Program for Environmental and Regional Equity (PERE) provides a guide for just transition efforts that: 1) acknowledges the past historic burdens placed upon communities of color and low-income communities; 2) develops strong coalitions and community voice for shared decision-making in the present; and 3) ensures future-oriented policies reduce, rather than enhance, inequity.⁹

Applying this framework, we suggest that for a transition to a low-carbon future to be just, we must address the burdens placed upon environmental justice communities who have borne disproportionate environmental, social, and economic burdens of the fossil fuel economy. In addition to correcting these disparities, opportunities must be provided to those that have been historically excluded from the fossil fuel economy. Just transition efforts should facilitate and support diverse coalition building and community engagement to center workers and communities in just transition plans. Finally, a low-carbon future must include remediation of environmental damage from extractive industries and the creation of good, family sustaining jobs open to all displaced workers, new workers previously excluded from fossil fuel employment, and community members to reduce inequity and seed a widely-shared prosperous future. Looking ahead, a just transition also ensures a long-term transformation of these communities into stronger local economies.



Toward this vision, this report provides a roadmap for a just transition for environmental justice communities built on four pillars: strong governmental support, dedicated funding streams, diverse and strong coalitions, and economic diversification.

The four pillars of just transition were developed based on analysis of previous transition efforts, policy analysis, interviews with directly impacted stakeholders and community leaders, and in response to questions posed by the Climate Equity Network. (The complete list of questions can be found in Appendix A.) The research in this report is only one part of just transition and is meant to provide a reference point and framework to facilitate a broader discussion of how to move towards policy implementation and coalition building. Far from being dispositive, the four pillars of just transition are meant to provide a blueprint for communities fighting to ensure that sustainability and equity goals are fully integrated and community voices shape future policies to transition our economy away from fossil fuels.

There is more research to be done on just transition, particularly within specific sectors, such as agriculture. Every sector will be impacted by the transition to a low-carbon future differently and this report does not address specific sectors. Future research should address needs and opportunities on a sectoral basis and focus on the specific needs of rural communities. 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 Professor Robert Pollin's work, which estimates a nationwide investment of \$50 billion annually for climate stabilization, of which \$500 million should go to transition fossil fuel workers.¹⁰

A HISTORY OF UNJUST TRANSITION

Transitioning away from fossil fuels is not the first industrial transition workers and communities have faced. To assist workers negatively impacted by globalization and trade, the Trade Adjustment Assistance program (TAA) 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.¹¹ 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.¹²

Between 1974 and 2013, fewer than half of the 4.8 million eligible workers received program benefits.¹³ Of those workers who did receive assistance, 40 percent of displaced workers did not find employment within the first two years after their initial job loss and another 40 percent found work at lower wages with fewer benefits.¹⁴ 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.¹⁵

However, with strategic changes, transition programs, such as the TAA program, 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, are necessary for successful transition programs.¹⁶ Unsurprisingly, without continual financial assistance, participants enrolled in training programs generally dropped out when the financial assistance ended.¹⁷

Moreover, demand for workers needs to be aligned with a supply of trained workers. Jobs must be available for trained workers when they complete their training programs, rather than some time in the future. One failure of the TAA is the inability to place workers in similar paying jobs with similar levels of benefits, an outcome that can both shatter hopes and seriously impact life trajectories. Using subsidies to ensure well-paying jobs are available for trained workers will help complete the pipeline from training to placement.

CALIFORNIA CONTEXT

While everyone will be impacted by decarbonizing our economy, communities economically dependent upon fossil fuel extraction, processing, and use will feel the negative economic consequences from decarbonization more acutely and more immediately. Closing fossil fuel refineries and power plants that are a substantial contributor to a community tax base will leave schools, services, and infrastructure projects under-funded.

Although California leads the nation in renewable energy production,¹⁸ 43.4 percent of in-state electricity generation comes from natural gas.¹⁹ To shift to only renewable energy will require infrastructure upgrades, electrical grid upgrades, a strengthening of safety net programs, and many other efforts.²⁰ This roadmap helps identify which communities are likely to be in need of immediate transition assistance based on where current fossil fuel facilities are located and how communities can proactively plan for transition efforts.

California Oil and Gas

Source: blmcalifornia on Flickr



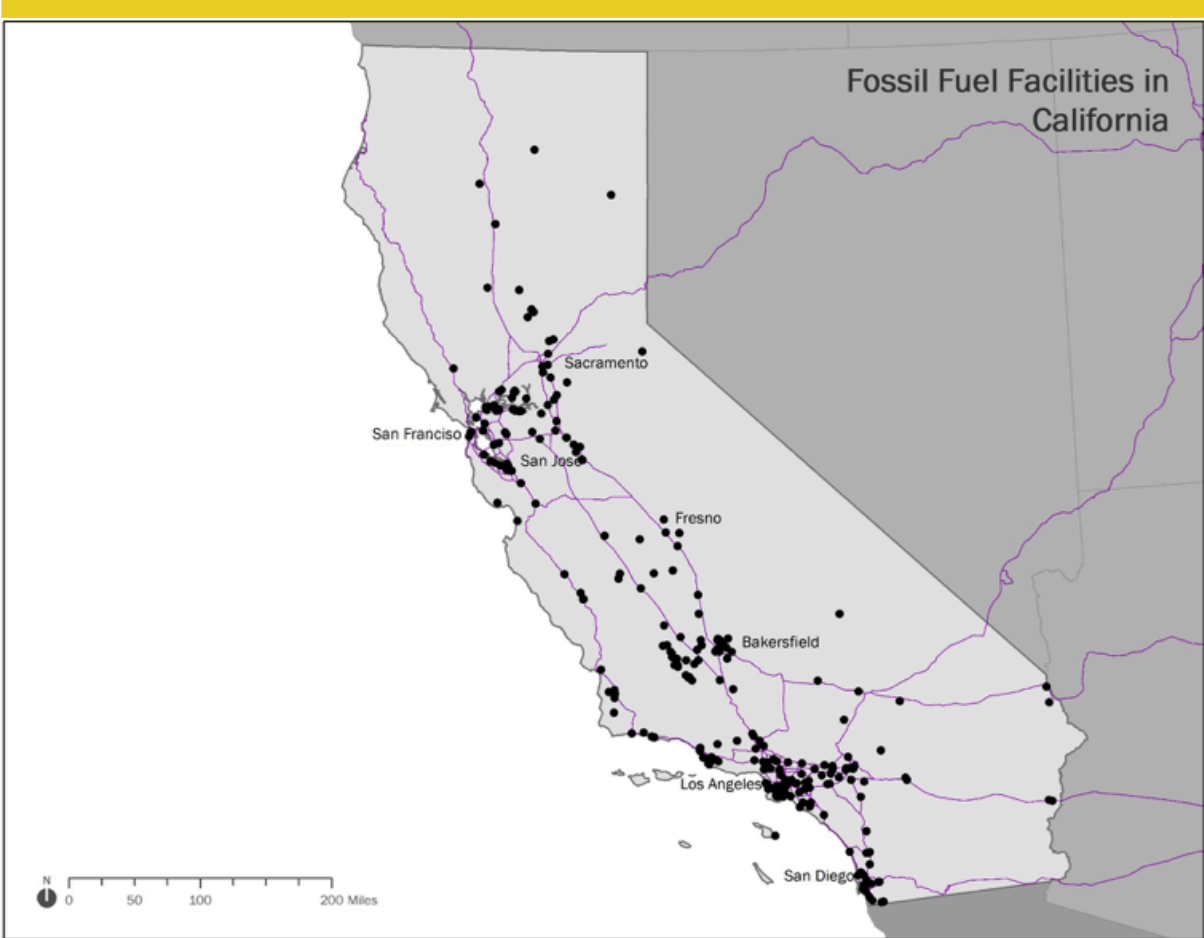
The following maps show where fossil fuel facilities and environmental justice communities are located. These maps are a visual representation of where fossil fuel facilities are placed and their proximity to environmental justice communities. As shown in the maps, environmental justice communities bear a disproportionate share of nearby fossil fuel facilities. As a result, these communities are exposed to higher levels of the co-pollutants that accompany fossil fuel operations 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.”²¹ What this research suggests is that the pollution burden placed upon communities of color is not offset by economic and/or employment gains. This finding underscores the need to adopt deliberate and targeted policy solutions that bring environmental and economic benefits to environmental justice communities.

The fossil fuel facilities shown in these figures include coal and natural gas power plants and those with the following North American Industry Classification System (NAICS) 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.

To identify environmental justice communities, we use CalEnviroScreen version 3—a spatial mapping tool developed by CalEPA, which identifies communities facing a disproportionate cumulative pollution burden and indicates areas vulnerable to pollution.²² 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 PM2.5. Population vulnerability indicators include low educational attainment, poverty, linguistic isolation, unemployment, and measures of health status.²³

The first map (Figure 1) shows where fossil fuel facilities are located in the state. 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.

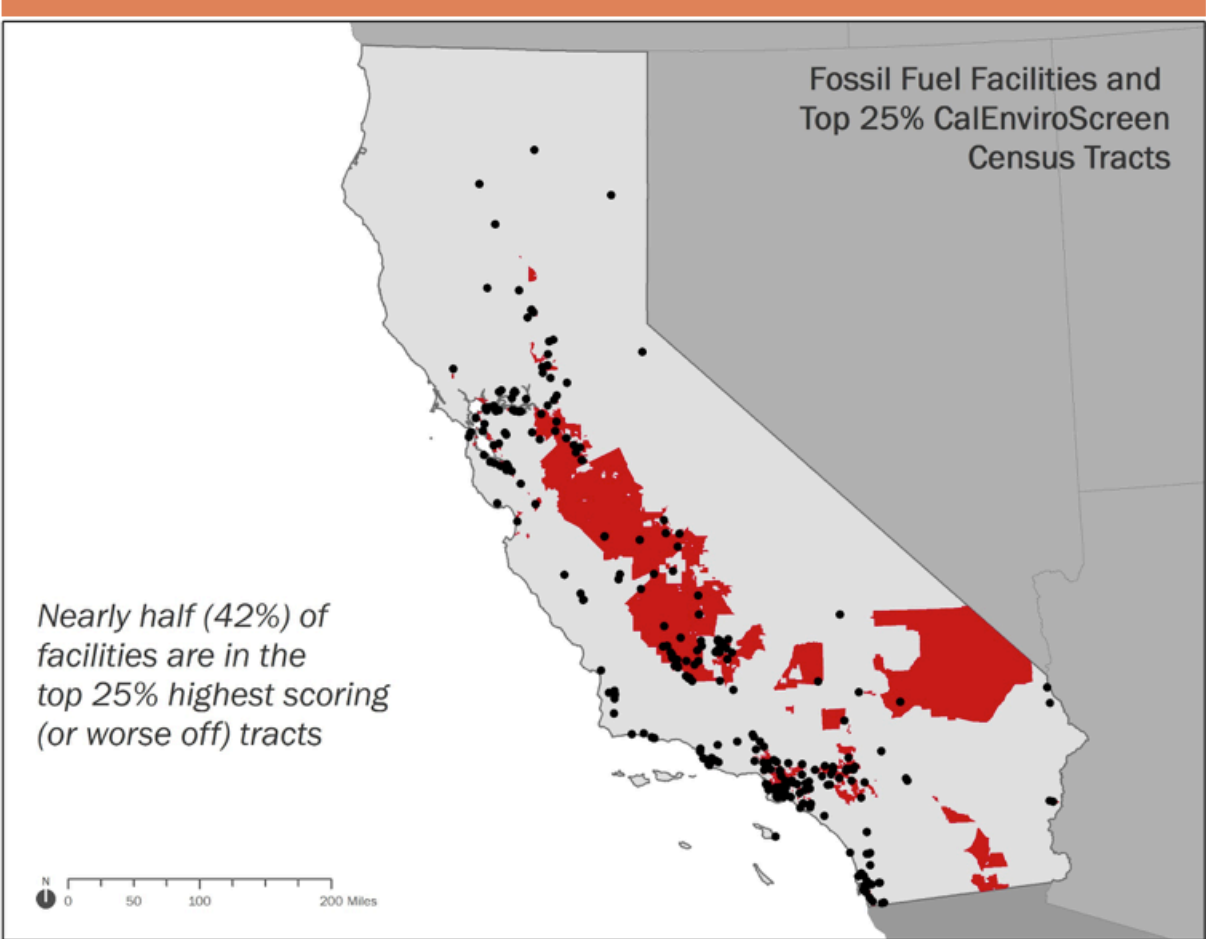


Source: June 2018 Update of CalEnviroScreen 3.0, OEHHA; Power Plant Inventory, California Department of Energy; California's Greenhouse Gas Inventory CARB.

Figure 1: Fossil Fuel Facilities in California

Figure 2 overlays the location of fossil fuel facilities on neighborhoods identified by CalEnviroScreen (CES) as the most environmentally overexposed and socially vulnerable. As this map shows, 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 percent 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, over 40 percent of fossil fuel facilities are located in areas with the top 25 percent highest CES scores.

These communities are comprised of 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 percent of the CES scores are nearly 85 percent people of color (compared to 55 percent people of color in the rest of the state) and have nearly twice as high a share of people living below 200 percent of the poverty level.²⁴



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

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

The 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. A just transition, if integrating equity and sustainability goals, could provide opportunities to improve community health by reducing local pollution burdens while also targeting new job and training opportunities in these areas.

As the state transitions away from fossil fuels, renewable energy production has increased. In 2017, renewable energy was responsible for 30 percent of in-state power generation, of which solar energy represents 12 percent of overall total energy production and 60 percent of renewable power generation.²⁵ Renewable energy generation is also a strong job creator, especially when looking at the solar industry. For example, the Solar State’s 2017 Solar Census reported there were 86,414 solar jobs in California.²⁶

Whereas renewable energy is a strong job creator, there must also be a focus on the *quality* of jobs created. 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 workforce salary of \$50,014.²⁷ 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 percent of jobs in the overall workforce. 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.

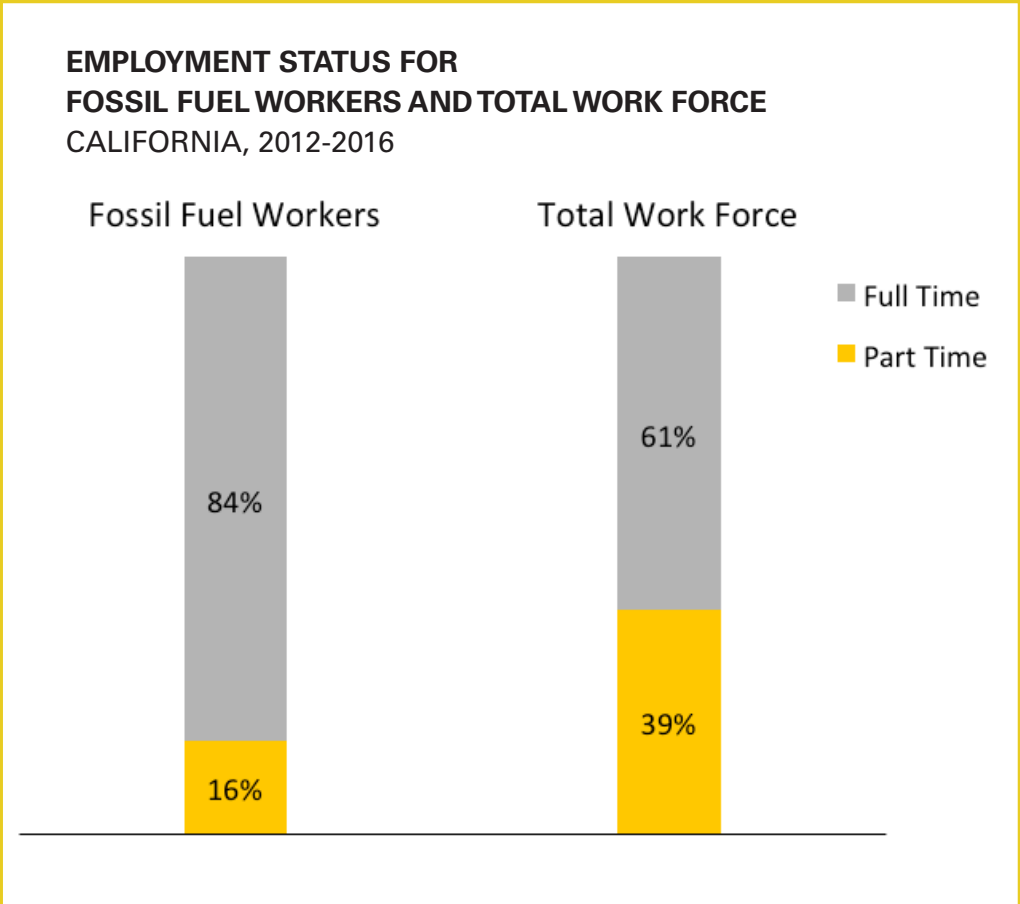


Figure 3 (Source: 2016 5-year American Community Survey (ACS) microdata from IPUMS-USA)

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.²⁸ In contrast, rooftop solar photovoltaic installers are paid the lowest within the industry.²⁹ This discrepancy underscores the need for a holistic approach to a just transition that looks beyond emissions reductions and towards creating a low-carbon economy with good, quality jobs.

Similar to the map of fossil fuel facilities, we provide a map that shows the location of renewable energy facilities in relation to environmental justice communities in California. We define renewable energy facilities 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 greenhouse gas 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 these facilities are placed in communities that have borne the environmental burden of fossil fuel facilities, which can be an indication that these communities may be receiving some benefit from a low-carbon transition. The map also shows 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 over 40 percent of fossil fuel facilities are in the top 25 percent of CalEnviroScreen tracts, the map below (Figure 4) shows that 29 percent of all renewable energy facilities are in the top 25 percent of CalEnviroScreen tracts.

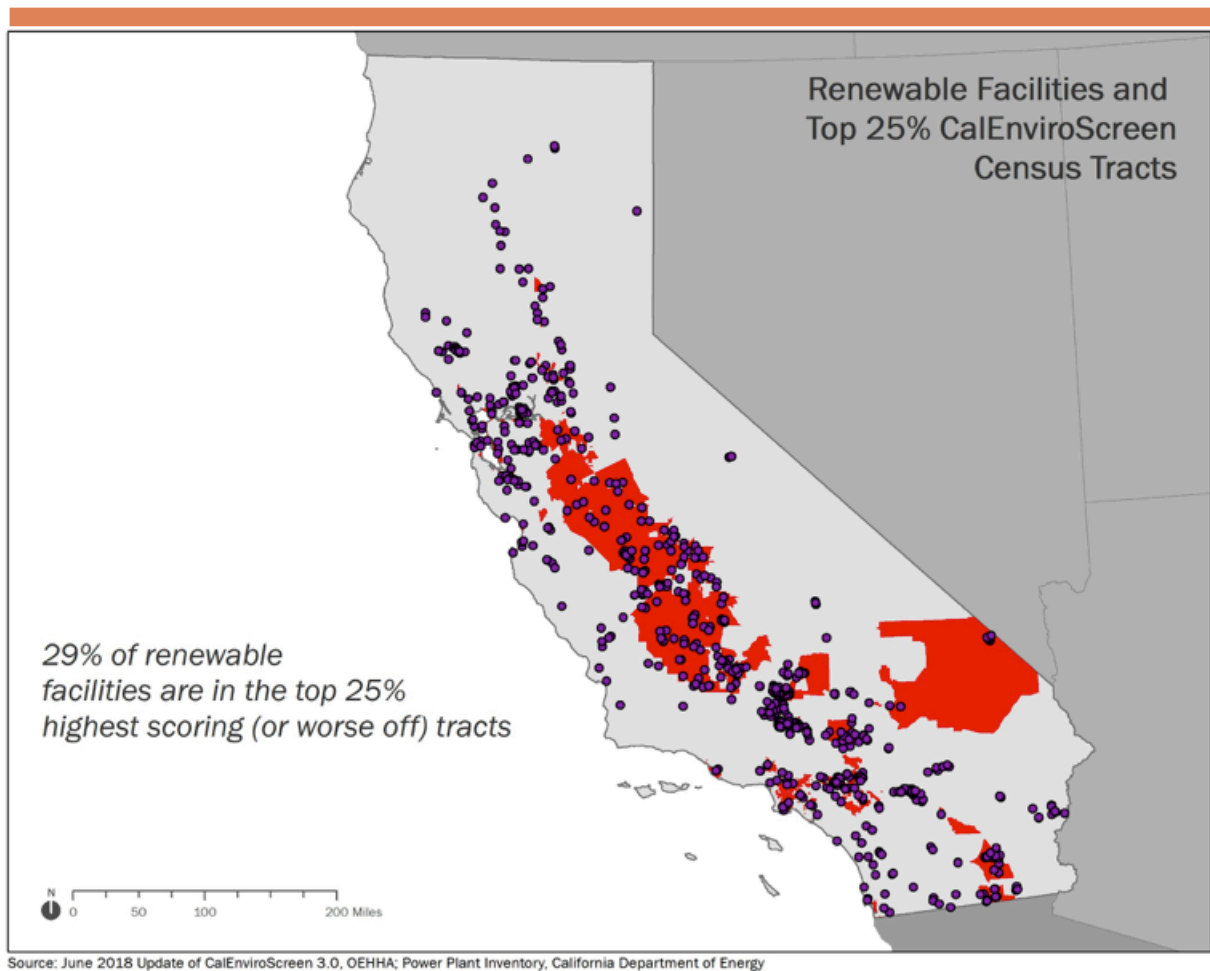


Figure 4: Renewable Energy Facilities and Top 25% CalEnviroScreen Census Tracts

Some renewable energy production is place-based, meaning there are areas of the state that are more suitable for renewable energy installation, particularly large-scale installations. 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.

While environmental justice communities are disproportionately exposed to pollution caused by fossil fuel facilities, the benefits of a transition to renewable energy are not being felt by the same communities. And, as mentioned above, these communities are not sharing in the economic and employment gains from fossil fuel activity.

For a just transition, renewable energy generation and use should be centered in communities that have borne the pollution burden of the extractive economy. As California moves to being 100 percent powered by renewable energy, environmental justice communities need to be prioritized for not only generation of renewable energy, but also job creation in carbon-free energy production.

Moreover, communities located near fossil fuel facilities should be prioritized for environmental remediation. When military bases were closed across the country during the rounds of Base Realignment and Closure (BRAC) between 1988 and 2005, the federal government oversaw environmental remediation of the former base sites, which was necessary to ensure that the land could be used productively after the bases closed. Of the bases that had been remediated by 2015, 41 percent of former military bases were reverted back to their original owners (many state and local governments deeded land for bases at reduced or no cost), 35 percent were conveyed to local redevelopment authorities to develop and create jobs, and 17 percent were conveyed for public benefit, which allows property transfers to state and local governments and nonprofit organizations for public benefits, including schools, facilities, and wildlife conservation.³⁰

Remediation not only returns land to productive uses, it can be a strong job creator, provide a transition employment pathway for fossil fuel workers and community members, and facilitate the development of local-serving government agencies and local non-profit institutions.

FOUR PILLARS OF JUST TRANSITION: A ROADMAP

While daunting, understanding that we must end the use and extraction of fossil fuels allows policymakers and stakeholders to create and implement transition plans to protect displaced workers and communities before extraction sites and plants close. Closing extraction sites and power plants cannot happen overnight or even within a few months. Shutting down these operations typically takes years, which gives advocates the time to organize a strong, diverse coalition, develop a proactive transition plan, and prepare elected officials to implement policies and funding streams to support these efforts.

Though limited, previous successful just transition examples can illuminate which elements must be included in a roadmap 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.

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	Mohave Generating Station and Black Mesa coal mine shut down
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	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 vision for the economy that re-imagines local economies free of fossil fuel infrastructure	Implementation of community visioning with particular focus on moving away from reliance on single industry	Obama Administration's POWER+Plan Town of Tonawanda Plan

Strong Governmental Support

The scale and scope of transition away from fossil fuels is best achieved with consistent, strong governmental support. Transitioning into a low-carbon future will require 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, are 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 programs. Private “green” businesses have a vital role to play—and, perhaps surprisingly, are already investing similar amounts of resources on lobbying as the dirty, polluting firms, according to a 2016 UCLA study.³¹ 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. This reality runs counter to the private sector mission of creating not just profit, but often short-term, quarterly profit returns.³² As a result, while the private sector has a key role to play, particularly 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 a transition away from fossil fuels for over 50 years.³³ At one point, the Ruhr region was the largest industrial site in Europe and coal and steel production were major employers.³⁴ However, coal mining and steel production became less and less competitive, as cheaper products became available on the global market.³⁵ As a result, the area has seen rising unemployment and industrial decline since the 1970s.³⁶ The number of workers employed in the coal industry fell from 473,000 in 1957 to just 11,447 in 2013.³⁷ The share of the economy provided by coal mining fell from 61 percent in 1960 to 21 percent in 2014.³⁸ Moreover, coal subsidies were completely phased out in 2018, making the cost of coal mining more expensive and even less competitive.³⁹

Ruhr, Germany

Source: Image by
Foto-Rabe from Pixabay



The dominant role coal and steel production played resulted in a small number of very large firms dominating Ruhr's economy, which meant that when coal and steel production began to decline, there were few industries available to help counter the economic losses from the declining industries.⁴⁰ Moreover, skills retraining was limited in the region due to the absence of higher-technical schools or universities.⁴¹ 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 reimagined economic development and attracted new industries and sectors that could diversify the economic and employment bases.⁴²

For longer-term transformation, the region looked to attract investment from high-tech and knowledge-based firms, expand the service sector, and promote local entrepreneurship.⁴³ For example, in the early 1990s (at a time when coal was still dominant), a former coal city, Gelsenkirchen, began to invest in solar energy, transforming the city into a "solar city, that today remains one the largest suppliers of solar energy in Europe.⁴⁴ The federal government also invested in building an educational infrastructure to create new technical institutions and universities in the region.⁴⁵

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 economic bases, which can then better withstand the loss of an industry or sector.

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 a Special Commission on Growth, Structural Economic Change and Employment to produce just transition plans for two lignite mining areas and to create a timeline for completely phasing out coal.⁴⁶ The Commission is comprised of multiple stakeholders, including industry, governmental ministries, environmental organizations, and trade unions.⁴⁷

The Ruhr example highlights how the challenging nature of transition requires strong governmental support. One of the biggest challenges to transition is the reimagining and reformation of carbon intensive economies, which requires a long planning and investment horizon. The public sector is more appropriate 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. Investing in small business development and seeding new industries through tax incentives or subsidies and training infrastructure, such as vocational schools, is also done through state or federal government programs and efforts.

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 dedicated to a program, community, or a 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.

The closing of the Mohave Generating Station (MGS) and Black Mesa coal mine, and the impact it had on neighboring Native American communities, demonstrate the importance of having dedicated and steady funding.⁵⁰ The Mohave Generating Station was a two-unit, 1580 megawatt coal-fired power plant located in Laughlin, Nevada near the Arizona state border.⁵¹ The coal for MGS came from a 275-mile slurry line from the Black Mesa coal mine on the Hopi and Navajo Reservations, which was operated by Peabody Western Coal Company and jointly owned by the Navajo Nation and Hopi Tribe.⁵² The water for the slurry line was from an aquifer under the Hopi and Navajo reservations.⁵³ Southern California Edison operated MGS and was the primary owner.⁵⁴

Navajo Generating Station

Source: NicolasNova on Flickr



In 2006, Southern California Edison decommissioned and dismantled MGS.⁵⁵ During its period of operation, MGS and the associated coal mining polluted the reservations' air and water, but provided almost a third of the Hopi Tribe's entire revenues and 10-13 percent of the Navajo Nation's general fund.⁵⁶ In addition, 93 percent of the jobs at the coal mine were held by Native Americans—nearly all Navajo.⁵⁷ The total economic benefit to the tribes and local communities from MGS operations was estimated at \$83 million annually.⁵⁸

Closing the mine and the plant was an environmental victory, but also drastically reduced revenue that the Navajo Nations and Hopi Tribe relied upon. A strong just transition coalition worked with experts and allies to use the regulatory process in a creative way to provide a dedicated funding stream to support the Navajo and Hopi communities as the mine and power plant ceased operations. Through the SO₂ emissions trading program, a cap-and-trade mechanism, a separate account was created that was funded with revenue from sulfur allowances.⁵⁹ The sale of SO₂ allowances created a revolving fund of \$4.5 million annually to pay development deposits for renewable energy projects that benefit the Hopi Tribe, the Navajo Nation, and California ratepayers.⁶⁰ In addition, the Navajo Green Economy Fund and Commission was created within the structure of the Navajo Nation tribal government to support a just transition.⁶¹

**Navajo Elder
with protest sign**

Source: Black Mesa Water Coalition

The Black Mesa Water Coalition (BMWC), one of the members of the Just Transition Coalition, implemented several programs to help transition away from fossil fuels. The BMWC’s programs seek to preserve and protect the integrity of indigenous cultures while building strong, sustainable communities led by empowered, young people through both short-term programs, such as the Black Mesa Solar Project, and long-term visioning, such as the Restorative Economy Program.⁶²



The Solar Project’s goal is to generate 1-5 megawatts of Navajo-controlled energy. In the Restorative Economy Program, youth are taught to organize communities and learn to use traditional practices, such as wool production and farming, and sell products. As part of building a restorative economy, Marie Gladue, a Navajo elder, leads BMWC’s Just Transition Campaign to move from an extractive to restorative economy, using healing workshops to address the trauma caused to the land and people from the coal economy.⁶³

Another mechanism for creating a dedicated funding stream is dedicating revenue raised from a carbon fee, such as a carbon tax or cap-and-trade program, to just transition efforts. The chart below shows a comparison between the proposed Washington State Carbon Fee Initiative and California’s Cap-and-Trade program. While the campaign to pass a carbon fee in Washington was ultimately unsuccessful,⁶⁴ the proposed allocation of revenue provides a blueprint for how to fund and support community and worker transition.

The Greenhouse Gas Reduction Fund, which captures the proceeds from California’s cap-and-trade program, allocates funds to 12 state agencies to administer programs and grants that reduce greenhouse gas pollution. While research suggests that California’s cap-and-trade system is not addressing the disparities in exposure to environmental health hazards⁶⁵—a key concern for environmental justice communities—environmental justice communities fought for and won dedicated funding to benefit their communities through SB 535. The bill requires a certain percentage of cap-and-trade revenue, now increased to 35 percent, be dedicated to investments that benefit “disadvantaged communities” (as defined by CalEnviroScreen).⁶⁶ Through this legislation, revenue is being spent on projects like affordable housing, public transit, home weatherization, urban greening, and more.

Washington State Carbon Fee Initiative (I-1631)	California Cap and Trade
<p>Estimated revenue \$2.2 billion in first five years</p>	<p>As of Sept, 2018 \$8.5 billion in revenue</p>
<p>Revenue allocation:</p> <ul style="list-style-type: none"> ■ 70% to clean energy ■ 25% to clean water and healthy forests ■ 5% to local communities <ul style="list-style-type: none"> – Of all allocations, 35% will benefit EJ communities 	<p>Revenue allocation:</p> <ul style="list-style-type: none"> ■ AB 152 – requires revenue be put towards environmental protection, particularly air quality improvements ■ AB 2722 – funds community-led development and infrastructure projects that achieve environmental, health, and economic benefits in California’s most disadvantaged communities ■ SB 535 – priority population investments with at least 25% of revenue allocated to disadvantaged communities. An additional 5% of revenue is dedicated for projects benefiting low-income communities and/or households and 5% of revenue for projects benefiting low-income households and/or communities within 1/2 mile of a disadvantaged community ■ AB 398 sets out priority investment
<p>Investment Advisory panels provide recommendations for allocations</p> <ul style="list-style-type: none"> ■ 1/3 of each advisory panel must be comprised of representatives from indigenous tribes and vulnerable populations 	<p>Cap and Trade investments allocated by various agencies</p>
<p>Funds specifically allocated for worker transition, including wage and benefit replacement, training, relocation, and counseling services</p>	<p>No specific dedicated worker transition funding or program under Cap-and-Trade program</p>

Another funding example from California’s cap-and-trade program is the Transformative Climate Communities (TCC) Program, established through AB 2722, which supports community-led development and infrastructure projects that benefit the state’s most disadvantaged communities.⁶⁷ The California Strategic Growth Council reports that in its first year (2018), TCC allocated \$140 million to Fresno, \$40 million to the Watts community in South Los Angeles, and \$40 million to Ontario for comprehensive, integrated, cross-cutting projects to reduce the burden from climate change disproportionately felt by environmental justice communities.

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 California's cap-and-trade program could also be directed to explicitly fund just transition programs.⁶⁸

Funding streams should also support building 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.⁶⁹ Community investment should also include training residents to become decision makers to ensure those impacted by these decisions are the ones envisioning and implementing transition programs and policies.⁷⁰ Finally, funding streams should support workforce development strategies and ensure these efforts have funding to expand to communities across the state.

Strong, Diverse Coalitions

Just transition requires support for workers *and* communities. Workers *and* communities have borne the environmental and economic cost of the extractive economy and both workers and communities must be supported to ensure a just transition to a low-carbon economy. 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, the resulting transition addresses workers and communities more holistically and ensures that the solutions to climate change do not exacerbate existing inequalities.

The importance of strong, diverse coalitions does not ignore the challenges that come with bringing different interest groups together. Often, fossil fuel facilities are the main source of employment and tax revenue in communities. The loss of these jobs and revenues can make workers and advocates oppose closing facilities. Community members, who experience the negative environmental and social impacts of these facilities and did not have access to the associated jobs, can advocate for closing these facilities on a very short timeline. These tensions are real but focusing on shared goals can bring diverse interests together.

The shared goals between workers, community members, businesses, utilities, and environmentalists are clear: thriving communities with strong economies and clean air and water. A proactive, visionary transition plan can encompass and deliver these goals and ensure the burdens and benefits of transitioning to a low-carbon future are broadly shared. Bringing diverse interests together before facilities close allows for a transition plan that addresses the needs of directly impacted stakeholders and protects against one or two groups advancing their interests and leaving others behind.

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 workforce, 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.

Diablo Canyon Nuclear Power Plant on the Coast of California

Source:
2007_04_24_sba-sfo-lhr_048.JPG
Author:
Doc Searls, Santa Barbara, CA



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, the Joint Proposal, to protect workers and the community surrounding Diablo Canyon.⁷¹ The coalition included PG&E, the Natural Resources Defense Council, Environmental California, the Alliance for Nuclear Responsibility, and the pertinent unions—IBEW Local 1245—and the Coalition of California Utility Employees.

The Joint Proposal included replacing Diablo Canyon with a greenhouse-gas-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.⁷² When the Joint Proposal was presented, the CPUC approved only parts of the plan and funded transition programs at lower levels than proposed.

For example, the estimated cost of the employee program was \$350 million to be recovered from ratepayers.⁷³ CPUC approved only \$222.6 million for the program.⁷⁴ Moreover, the Joint Proposal had provisions to protect San Luis Obispo County against the loss of tax revenue from the closure of Diablo Canyon. The Joint Proposal created an \$85 million Community Impacts Mitigation Program, which would also offset any potential negative impacts to essential services, and the creation of a \$10 million Economic Development Fund to ease local economic impacts arising from the plant's closure.⁷⁵ The CPUC declined to fund the community transition plan through rate recovery.⁷⁶

Rather than accept the CPUC's diminished transition plan, the coalition behind the Joint Proposal went to the state legislature and introduced SB 1090, which required the CPUC to accept the Joint Proposal as originally presented.⁷⁷ The bill passed both the state Assembly and Senate and was signed by the Governor on September 19, 2018.⁷⁸

The Diablo Canyon example highlights several lessons for future just transition efforts. First, the proactive planning by a diverse coalition presented a plan to the 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. By doing so, the CPUC was ordered to accept the original Joint Proposal, a more comprehensive and equitable transition plan.

The example of the Huntley Coal Plant shutdown in Tonawanda, New York also shows the importance of a strong coalition, as well as the need for dedicated funding streams and proactive visioning. Due to the falling cost of natural gas, the Huntley Coal Plant was no longer economically competitive and its operator, NRG, began to reduce production and tax payments to the town.⁷⁹ Between 2008 and 2012, the town lost \$6.2 million in tax revenue.⁸⁰ As a result of the decrease in tax revenue, three schools in the town closed and the plant’s workforce was reduced by 60 percent.⁸¹

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 Steelworkers, the IBEW, the Clean Air Coalition, and the Sierra Club.⁸² 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 coal plant, the state legislature dedicated \$30 million in gap funding, which increased to \$45 million in 2017.⁸³

Community members give feedback on a draft of the Tonawanda Tomorrow plan at a public workshop during “Tonawanda Tomorrow Public Meeting #3”.

Source: One Region Forward on Flickr



The Town of Tonawanda released an economic action plan called *Growing the Town's Economic Future* in 2017.⁸⁴ An advisory committee comprised of 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, AFL-CIO, 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 workforce 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 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. Inherent to the plan is engaging with businesses and industries that share the same values and goals. Engaging businesses can strengthen coalitions, while highlighting their role as a key player in growing green jobs and diversifying economies, discussed in more detail in the next section.

Economic Diversification

The final pillar of just transition is diversifying economic bases. Overreliance on a single industry or sector leaves communities and workers extremely vulnerable when the industry or sector declines. As seen earlier, when a community is solely reliant on a power plant for economic security, for example, the consequences of the plant shuttering are far-reaching—from displaced workers to impacting school funding and essential services. Investing in emerging and growing sectors provides a more diverse economy and identifying these sectors is an important first step to reimagining new economic bases.

Moreover, economic diversification is key to a holistic, comprehensive just transition that addresses the many needs and challenges facing communities. Moving away from fossil fuels 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.

Since the adoption of AB 32 ten years ago, California has reduced emissions by 11 percent while also growing the state's economy by nearly 16 percent, refuting the idea that reducing emissions harms economic growth.⁸⁵ In fact, bold climate policy sparks innovation and, as California demonstrates, the ambitious greenhouse gas reduction targets created demand for new products and technologies. Businesses, with state support, responded with clean technological and market innovations that reduced emissions.⁸⁶ This example shows how bold climate policy generates new business demand, helping to diversify and strengthen the economy.

California's Buy Clean Program: In 2017, Governor Brown signed AB 262, the Buy Clean California Act. The Act leverages the economic power of the state to require the disclosure of greenhouse gas emissions for certain materials by contractors bidding on state infrastructure and construction projects.⁴⁸ Under the Act, the Department of General Services will develop a method to include the emissions data in reviewing contract bid and state agencies will be required to apply this method in reviewing contract bids for their projects.⁴⁹ This program incentivizes the use of low-carbon materials, which in turn creates market demand for low-carbon materials. By using the purchasing power of the state, California helps create a market for low-carbon material manufacturing and use, which can add new industries and companies to diversify local economies.

On the federal level, the Obama Administration attempted to address this issue of diversifying economies through the POWER+Plan (Partnerships for Opportunity and Workforce and Economic Revitalization). These investments were targeted toward regional economic diversification and was an attempt to scale up from the local and state examples highlighted previously. The POWER+Plan proposed more than \$9 billion to support:

- economic diversification in coal communities,
- employment and training services for workers displaced from the coal economy,
- the health and retirement security of coal miners and their families,
- the reclamation and redevelopment of abandoned mine lands, and
- the deployment of carbon capture and sequestration technology.⁸⁷

These measures aimed to protect displaced workers, revitalize coal communities and former coal mining sites, and invest in technology development. The first round of grants was expected to create or retain almost 8,800 jobs and leverage an additional \$210 million in investment.⁸⁸ Among the grant awards was \$7.47 million to the University of Pikeville in

Pikeville, KY to help launch a new College of Optometry to both grow the region's healthcare workforce and improve access to vision care in Central Appalachia.⁸⁹ These investments were targeted towards growing sectors, such as health care and technology, and ensuring that workers were trained for these sectors. The investment is expected to graduate 60 optometrists, provide care for 12,000 patients, and bring \$26 million in direct economic regional impact within three years.⁹⁰ Grants were also given to provide training and access to IT careers and develop small business hubs around the region.⁹¹ These investments are similar to how the Ruhr region invested in educational and training infrastructure to help bring new industries to the region.

The continuation of POWER+ investments is extremely unlikely, given the change in the Administration. The disruption facing the POWER+ program, and its potential grantees, again highlights how crucial consistent, predictable funding and support is for long-term planning. Starting and stopping investment leaves regions partially developed and stagnant.

The previous examples of Black Mesa and the Ruhr region also included economic diversification in their transition plans. Both former fossil fuel reliant communities invested in solar energy but also in other industries and sectors to minimize their reliance on one industry or sector. In Black Mesa, the focus was on shifting from an extractive to a restorative economy, one that is rooted in traditional practices and businesses that will lead to long-term rehabilitation of the land and economy. In Ruhr, in addition to "Solar City," the region invested in culture and education to provide multiple opportunities for members of its community. Moreover, the Tonawanda Tomorrow plan also looked to attract a diverse array of industries and businesses to strengthen the town's economic base.

CONCLUSION

Transitioning to a low-carbon future will be complicated, expensive, and require broad-based public and political support, but inaction is not an option. The impacts of climate change are already manifesting and there is an urgent need to be proactive about creating a just transition. While challenging, the transition to a low-carbon future also presents an opportunity to create a more equitable future with broadly-shared prosperity. 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—will provide a roadmap 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 provides several examples of strong governmental policies, such as a federal job guarantee and comprehensive and affordable health care coverage that address the need for a holistic transformation of our economy and society, as we transition away from fossil fuels.⁹²

The Green New Deal is also 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,”⁹³ this sort of ambition is desperately needed. This points to an issue that we have raised several times above: how can we take what seem like promising examples and build them out fully and rapidly?

Leveraging the role of California as the world’s fifth largest economy can help bring some of these programs to scale. Using the procurement power of the state, examples such as Buy Clean or local procurement requirements can both create demand for local businesses to fill, diversifying local economies away from fossil fuels, and substantially reduce greenhouse gas emissions by dramatically reducing supply chain emissions. Due to the size of the state, public procurement is able to create meaningful market demand.

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 greenhouse gas emissions and create good, family-sustaining jobs. These investments should be purposefully targeted to historically marginalized areas, as highlighted within this report.

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.

The challenge of the climate crisis is daunting. Almost every aspect of our economy has a tie to fossil fuels. Moving away from fossil fuel requires a scale of effort previously unseen and more research is needed to understand the challenges and its solutions. Given the legacy of inequality and injustice that fossil fuel and extraction has borne and the very real impacts of a changing climate, transitioning to a low-carbon economy is a moral and economic imperative. This transition is an opportunity to right the wrongs of the past and build an inclusive, equitable, and prosperous low-carbon future.

APPENDIX A: RESEARCH QUESTIONS

1. What are the key components and objectives of what a just transition could/should look like in California? This should include a broader, more expansive definition of Just Transition (JT) including issues of land, ownership, housing, worker voice/organizing.
2. What best practices and lessons learned can be gleaned from other industrial transitions, particularly in the context of regional industry hubs (e.g., West Virginia and its coal mining industry)?
3. What has been the role of the public sector (and at what level) in transitioning industry in the past and what was the outcome?
4. What are specific communities, industries, jobs, and other considerations that will be impacted by a just transition?
5. What are the implications for developing community-level approaches (versus specific industry or industrial site specific approaches) to a just transition? What key systems must be involved?
6. What industries are most ripe for just transition or seem to have the most potential to benefit from JT? What are the considerations and criteria (i.e., metrics, benchmarks)—e.g., job growth potential, existing structures and practices, etc.?
7. What are concrete policies or steps that local and state policymakers can take toward a JT vision?
8. What kinds of capacity do communities and residents need to build to leverage power and voice in the new economy?

ENDNOTES

- ¹ “Global Warming of 1.5°C” (Geneva, Switzerland: Intergovernmental Panel on Climate Change, World Meteorological Organization, 2018), 5, <https://www.ipcc.ch/sr15/>.
- ² Jerry Brown, “Executive Order B-55-8 To Achieve Carbon Neutrality,” C.F.R. 2-2 § (2018), <https://www.gov.ca.gov/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf>.
- ³ Benjy Egel, “California Now World’s Fifth-Largest Economy, Bigger than Britain,” The Sacramento Bee, May 4, 2018, <https://www.sacbee.com/news/business/article210466514.html>.
- ⁴ Rachel Morello Frosch et al., “The Climate Gap: Inequalities in How Climate Change Hurts Americans & How to Close the Gap” (USC Program for Environmental and Regional Equity, May 2009), <http://dornsife.usc.edu/per/climategap/>.
- ⁵ Morello Frosch et al.
- ⁶ Lara Cushing et al., “Carbon Trading, Co-Pollutants, and Environmental Equity: Evidence from California’s Cap-and-Trade Program (2011–2015),” PLOS Medicine 15, no. 7 (July 10, 2018): e1002604, <https://doi.org/10.1371/journal.pmed.1002604>.
- ⁷ Cushing et al.
- ⁸ Alexandria Ocasio-Cortez, “Text- Recognizing the Duty of the Federal Government to Create a Green New Deal.” Pub. L. No. H.Res.109 (2019), <https://www.congress.gov/bill/116th-congress/house-resolution/109/text>.
- ⁹ Vanessa Carter, Manuel Pastor, and Madeline Wander, “Measures Matter: Ensuring Equitable Implementation of Los Angeles County Measures” (Program for Environmental and Regional Equity, University of Southern California, January 2018), https://dornsife.usc.edu/assets/sites/242/docs/M_A_Final_WebVersion_02.pdf.
- ¹⁰ Robert Pollin and Brian Callaci, “A Just Transition for U.S. Fossil Fuel Industry Workers,” American Prospect Longform, July 6, 2016, <https://prospect.org/article/just-transition-us-fossil-fuel-industry-workers>.
- ¹¹ 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>.
- ¹² Elena Foshay, Jill Kubit, and Lara Skinner, “Making the Transition: Helping Workers and Communities Retool for the Clean Energy Economy” (Apollo Alliance & Cornell Global Labor Institute, 2009), https://www.climatechange.ca.gov/eaac/comments/2009-12-11_California_Labor_Federation_attachment_2.pdf.

- ¹³ U.S. Department of Labor, Employment and Training Administration, “Trade Adjustment Assistance for Workers Program” (Washington D. C.: U.S. Department of Labor, Employment and Training Administration, 2013), <https://www.doleta.gov/tradeact/docs/AnnualReport13.pdf>.
- ¹⁴ Lori G. Kletzer, *Job Loss from Imports: Measuring the Costs* (Washington, DC: Institute for International Economics, 2001).
- ¹⁵ Mireya Solís and Jennifer Mason, “Globalization on the Cheap: Why the U.S. Lost Its Way on Trade,” Brookings (blog), August 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/>.
- ¹⁶ Foshay, Kubit, and Skinner, “Making the Transition: Helping Workers and Communities Retool for the Clean Energy Economy.”
- ¹⁷ Loren Yager, “Trade Adjustment Assistance: Improvements Necessary, but Programs Cannot Solve Communities’ Long-Term Problems” (Washington, DC: United States General Accounting Office, July 20, 2001).
- ¹⁸ U.S. Energy Information Administration (EIA), “California - State Energy Profile Analysis,” November 15, 2018, <https://www.eia.gov/state/analysis.php?sid=CA>.
- ¹⁹ California Energy Commission, “Total System Electric Generation: 2017 Total System Electric Generation in Gigawatt Hours,” June 21, 2018, https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html.
- ²⁰ Union of Concerned Scientists, “It’s Time to Upgrade the Electricity Grid,” February 16, 2017, <https://www.ucsusa.org/clean-energy/increase-renewable-energy/upgrade-the-electricity-grid>.
- ²¹ Michael Ash and James K. Boyce, “Racial Disparities in Pollution Exposure and Employment at US Industrial Facilities,” *Proceedings of the National Academy of Sciences* 115, no. 42 (October 16, 2018): 10636–41, <https://doi.org/10.1073/pnas.1721640115>.
- ²² OEHHA Admin, “CalEnviroScreen,” Text, OEHHA, November 27, 2014, <https://oehha.ca.gov/calenviroscreen>.
- ²³ Matthew Rodriguez and Lauren Zeise, “Update to the California Communities Environmental Health Screening Tool: CalEnviroScreen 3.0” (Sacramento, CA: California Environmental Protection Agency and the Office of Environmental Health Hazard Assessment, January 2017), 0, <https://oehha.ca.gov/media/downloads/calenviroscreen/report/ces3report.pdf>.
- ²⁴ Analysis of data from CalEnviroScreen 3.0 (<https://oehha.ca.gov/media/downloads/calenviroscreen/document/ces3results.xlsx>) and the 2017 5-year American Community Survey summary file.
- ²⁵ California Energy Commission, “California Energy Commission,” 2019, <https://www.energy.ca.gov/>.
- ²⁶ The Solar Foundation, “Solar Jobs Census 2017,” accessed March 27, 2019, <http://www.solarstates.org>.
- ²⁷ Analysis of 2016 5-year American Community Survey (ACS) microdata from IPUMS-USA.
- ²⁸ Betony Jones and Carol Zabin, “Are Solar Energy Jobs Good Jobs?,” UC Berkeley Center for Labor Research and Education (blog), July 2, 2015, <http://laborcenter.berkeley.edu/are-solar-energy-jobs-good-jobs/>.

²⁹ Jones and Zabin.

³⁰ U.S. Government Accountability Office, "Military Base Realignment and Closures: DOD Has Improved Environmental Cleanup Reporting but Should Obtain and Share More Information" (Washington, DC: United States Government Accountability Office, January 2017), <https://www.gao.gov/assets/690/682204.pdf>.

³¹ David Colgan, "Green Businesses Are Spending Big Bucks on Lobbying Power," UCLA Newsroom, June 16, 2016, <http://newsroom.ucla.edu/stories/green-businesses-are-spending-big-bucks-on-lobbying-power>.

³² Georgios Altintzis and Esther Busser, "The Lessons from Trade Agreements for Just Transition Policies," *International Journal of Labour Research* 6, no. 2 (July 1, 2014): 269.

³³ A version of this case study appeared in the *Fordham Environmental Law Review*, J. Mijin Cha, "A Just Transition: Why Transitioning Workers into a New Clean Energy Economy Should Be at the Center of Climate Change Policies," *Fordham Environmental Law Review* 29, no. 2 (December 1, 2017): 196; European Trade Union Institute, "Social Partners and the Collaborative Approach Are Key to the Green Transition of the Ruhr Region," European Trade Union Institute (ETUI), February 9, 2016, <https://www.etui.org/News/Social-partners-and-the-collaborative-approach-are-key-to-the-green-transition-of-the-Ruhr-region>.

³⁴ Dean Stroud et al., "Skill Development in the Transition to a 'Green Economy': A 'Varieties of Capitalism' Analysis," *The Economic and Labour Relations Review* 25, no. 1 (March 1, 2014): 10–27, <https://doi.org/10.1177/1035304613517457>.

³⁵ Stroud et al.

³⁶ Stroud et al.

³⁷ Altintzis and Busser, "The Lessons from Trade Agreements for Just Transition Policies."

³⁸ Altintzis and Busser.

³⁹ DW Staff, "The Rise and Fall of Germany's Coal Mining Industry," Deutsche Welle, January 31, 2007, <https://www.dw.com/en/the-rise-and-fall-of-germanys-coal-mining-industry/a-2331545>.

⁴⁰ Robert P. Taylor, "Case Study: A Review of Industrial Restructuring in the Ruhr Valley and Relevant Points for China" (Washington, DC: Institute for Industrial Productivity, July 2015), <http://www.iipnetwork.org/Industrial%20Restructuring%20in%20the%20Ruhr%20Valley.pdf>.

⁴¹ Taylor.

⁴² European Trade Union Institute, "Social Partners and the Collaborative Approach Are Key to the Green Transition of the Ruhr Region."

⁴³ European Trade Union Institute.

⁴⁴ European Trade Union Institute; Erica Peterson, "In Germany, A City Moves Away From Coal," WFPL News, December 7, 2015, <http://energyfuture.wfpl.org/in-germany-a-city-moves-away-from-coal/>.

⁴⁵ Peterson.

- ⁴⁶ Just Transition Research Collaborative, “Mapping Just Transition(s) to a Low-Carbon World” (United Nations Research Institute for Social Development and the University of London Institute in Paris, December 2018), [http://www.unrisd.org/80256B3C005BCCF9/\(httpPublications\)/9B3F4F10301092C7C12583530035C2A5?OpenDocument](http://www.unrisd.org/80256B3C005BCCF9/(httpPublications)/9B3F4F10301092C7C12583530035C2A5?OpenDocument).
- ⁴⁷ Just Transition Research Collaborative.
- ⁴⁸ Assembly Bill 262, Bonta. “Public Contracts: Bid Specifications: Buy Clean California Act,” https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB262.
- ⁴⁹ Frequently Asked Questions About Assembly Bill 262, the Buy Clean California Act, <https://www.sierraclub.org/sites/www.sierraclub.org/files/sce/sierra-club-california/PDFs/FAQFINALMarch29.pdf>
- ⁵⁰ A version of this case study appeared in the Fordham Environmental Law Review, Cha, “A Just Transition.”
- ⁵¹ Alan Ramo and Deborah Behles, “Transitioning a Community Away from Fossil-Fuel Generation to a Green Economy: An Approach Using State Utility Commission Authority,” *Minnesota Journal of Law, Science & Technology* 15, no. 1 (January 1, 2014), <https://digitalcommons.law.ggu.edu/pubs/619>.
- ⁵² Ramo and Behles at 510.
- ⁵³ Ramo and Behles.
- ⁵⁴ Ramo and Behles at 509.
- ⁵⁵ Ramo and Behles at 517.
- ⁵⁶ Ramo and Behles.
- ⁵⁷ Ramo and Behles.
- ⁵⁸ Ramo and Behles.
- ⁵⁹ Ramo and Behles.
- ⁶⁰ Indigenous Environmental Network, “Peabody’s Declaration of Bankruptcy Is ‘No Surprise’: Navajo Tribal Members Demand Just Transition to a Sustainable Economy,” April 14, 2016, <http://www.ienearth.org/peabodys-declaration-of-bankruptcy-is-no-surprise/>.
- ⁶¹ Navajo Green Job (The Navajo Green Economy Coalition, 2009), <https://www.youtube.com/watch?v=tAJHuRxbImE>.
- ⁶² Spruce Bohlen, Occidental College, Interview with Mariah Ashley, Black Mesa Water Coalition, at Occidental College, October 10, 2018.
- ⁶³ Spruce Bohlen, Occidental College, Interview with Mariah Ashley, Black Mesa Water Coalition
- ⁶⁴ Hal Bernton, “Washington State Voters Reject Carbon-Fee Initiative,” *The Seattle Times*, November 6, 2018, <https://www.seattletimes.com/seattle-news/politics/voters-rejecting-carbon-fee-in-first-day-returns/>.
- ⁶⁵ Cushing et al., “Carbon Trading, Co-Pollutants, and Environmental Equity: Evidence from California’s Cap-and-Trade Program (2011–2015).”

- ⁶⁶ Autumn Burke, “Transformative Climate Communities Program.,” Pub. L. No. AB-2722 (2016), https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB2722.
- ⁶⁷ Burke; California Department of Conservation, “Transformative Climate Communities Program,” 2018, <https://www.conservation.ca.gov/dlrp/grant-programs/Pages/Transformative-Climate-Communities-Program.aspx>.
- ⁶⁸ California Department of Conservation, “Transformative Climate Communities Program”; Burke, Transformative Climate Communities Program.
- ⁶⁹ Center on Race, Poverty, and the Environment, “Framework for a Just Transition in the San Joaquin Valley,” 2016, available upon request.
- ⁷⁰ Center on Race, Poverty, and the Environment.
- ⁷¹ “Joint Proposal of Pacific Gas and Electric Company, Friends of the Earth, Natural Resources Defense Council, Environmental 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” (PG&E, June 20, 2016), <https://www.pge.com/includes/docs/pdfs/safety/dcpp/JointProposal.pdf>.
- ⁷² “Joint Proposal.”
- ⁷³ “Joint Proposal.”
- ⁷⁴ Public Utilities Commission of the State of California, Decision Approving Retirement of Diablo Canyon Nuclear Power Plant (January 11, 2018).
- ⁷⁵ PG&E, “PG&E, SLO County, SLO Coastal Unified School District, Local Cities Reach Accord on Diablo Canyon Community Support,” November 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.
- ⁷⁶ Public Utilities Commission of the State of California, Decision Approving Retirement of Diablo Canyon Nuclear Power Plant.
- ⁷⁷ Bill Monning, “Bill Text- Diablo Canyon Nuclear Powerplant,” Pub. L. No. SB-1090 (2018), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1090.
- ⁷⁸ Jeff St. John, “California Passes Bill Requiring Diablo Canyon Plant to Be Replaced With Carbon-Free Resources,” August 24, 2018, <https://www.greentechmedia.com/articles/read/california-bill-requiring-diablo-canyon-carbon-free>.
- ⁷⁹ Richard Lipsitz and 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>.
- ⁸⁰ Lipsitz and Newberry.
- ⁸¹ Lipsitz and Newberry.
- ⁸² Lipsitz and Newberry.

- ⁸³ 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/>.
- ⁸⁴ University at Buffalo Regional Institute, “Tonawanda Tomorrow: Growing the Town’s Economic Future” (State University of New York at Buffalo, School of Architecture and Planning, 2017), <http://tonawandatomorrow.org/wp-content/uploads/sites/24/2017/08/TonawandaTomorrowPlanJune15SinglePages.pdf>.
- ⁸⁵ NEXT 10, “2018 California Green Innovation Index- 10th Edition” (NEXT 10, August 30, 2018), 10, <https://www.next10.org/2018-gii>.
- ⁸⁶ NEXT 10, 10.
- ⁸⁷ The White House Office of the Press Secretary, “Fact Sheet: Administration Announces New Economic and Workforce Development Resources for Coal Communities through POWER Initiative,” August 24, 2016, <https://obamawhitehouse.archives.gov/the-press-office/2016/08/24/fact-sheet-administration-announces-new-economic-and-workforce>.
- ⁸⁸ The White House Office of the Press Secretary.
- ⁸⁹ The White House Office of the Press Secretary.
- ⁹⁰ The White House Office of the Press Secretary.
- ⁹¹ The White House Office of the Press Secretary.
- ⁹² Ocasio-Cortez, Text- Recognizing the duty of the Federal Government to create a Green New Deal.
- ⁹³ Ledyard King, “Green New Deal: Not All Democrats on Board with Ambitious Climate Plan,” *USA Today*, March 7, 2019, <https://www.usatoday.com/story/news/politics/2019/03/07/green-new-deal-not-all-democrats-board-ambitious-climate-plan/3032887002/>.