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NET EMPLOYMENT BENEFITS OF DEEP DECARBONIZATION IN NEW MEXICO

REGIONAL, SECTORAL, AND OCCUPATIONAL ANALYSIS AND RECOMMENDATIONS FOR QUALITY JOBS AND ECONOMIC INCLUSION

BY INCLUSIVE ECONOMICS

IN PARTNERSHIP WITH GRIDLAB, NRDC, SIERRA CLUB, EVOLVED ENERGY, PSE HEALTHY ENERGY, AND CLIMATE + CLEAN ENERGY EQUITY FUND

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EXECUTIVE SUMMARY

This research paper is the third in a series looking at pathways to deep decarbonization in New Mexico. The first paper analyzes the technologically and economically feasible pathways to deep decarbonization in New Mexico, and the second assesses equity impacts and suggests recommendations for an equitable transition.[1,2] This paper models and examines the employment effects associated with three different decarbonization pathways and a reference case. In addition to statewide modeling, it parses these effects across six regions, across industrial sectors, and by occupation. The results are provided in terms of direct jobs, which are those that will be required to decarbonize, and total jobs, which include all jobs created from the ripple effects of the investments required to decarbonize, including both in-state supply chain jobs and the jobs created when workers spend their income on in-state goods and services. Job loss associated with reduced expenditures on fossil fuels is also factored into this analysis.

The employment modeling accounts for the increase in employment resulting from the investments required to decarbonize and the decrease in employment resulting from reduced use of fossil fuels in New Mexico. These job gains and job losses are aggregated into the results shown in Figure ES-1, thus providing a measure of the net employment effects, which are generally positive. The fossil fuel segments of some industries and specific occupations see small net-negative effects, but they are dwarfed by the significant gains in the broader industry or occupational category.[3] The analysis clearly shows that decarbonization will result in gains in economic activity and employment (see Figure ES-1). Renewable energy development, building retrofits, and distributed solar provide the greatest contributions to jobs in the state, but ensuring that these are good, stable, career-track jobs and that they are accessible to underrepresented workers will require intentional policies and efforts.

Each of the three decarbonization pathways results in an increase in direct jobs, starting immediately. The central and slow electricity cases show higher job growth in the earlier

1 Arjun Krishnaswami, Jill Horing, and Noah Long, "Climate Action in New Mexico: Pathways to Combat the Climate Crisis Through Energy Infrastructure Investments and Pollution Reductions" (Evolved Energy, PSE Healthy Energy, GridLab, Climate and Clean Energy Equity Fund, NRDC, Sierra Club, and Inclusive Economics, February 2021), https://gridlab.org/wp-content/uploads/2021/02/GridLab_NM-Overview.pdf.

2 Elena Krieger, PhD, Boris Lukanov, PhD, Ana McPhail, PhD, Audrey Smith, MPH, and Annelise Dillon, MS, "Equity-Focused Climate Strategies for New Mexico: Socioeconomic and Environmental Health Dimensions of Decarbonization" (Physicians, Scientists, and Engineers for Healthy Energy [PSE], August 2021), https://www.psehealthyenergy.org/wp-content/uploads/2021/08/Equity-Focused-Climate-Strategies_New-Mexico_Report.pdf.

3 It is possible that the job loss modeled is conservative because this analysis is not based on assumptions regarding the in-state effects of other states' decarbonization activities. Because New Mexico is a net exporter of fossil fuels, the state's oil and gas industry and its workforce are vulnerable to the decarbonization activities of neighboring states.

years, while the 100-percent fossil-free electricity case, which takes advantage of New Mexico's considerable wind and solar resources, sees job growth between 2040 and 2050. The constraints in the decarbonization modeling pushes the renewable investment out to 2040, but the actual deployment could and should be smoother and steadier over time. From a workforce perspective, condensing renewables development into a few years could be hampered by labor shortages, lead to intermittent work, and trigger high job loss after the investment period, whereas long-term, sustained investment can support new apprenticeship and other training programs and ensure stable and continuous employment.

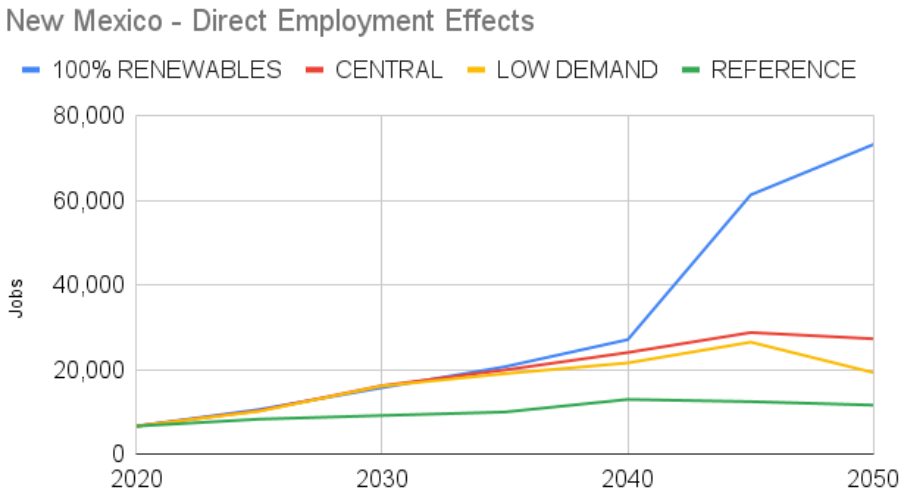


Figure ES-1. New Mexico Jobs From Different Decarbonization Pathways

The 100-percent renewables scenario shows the largest increase in jobs by 2050. This large, late increase in jobs is a result of the model's optimized decision to delay large fossil-fuel-replacing investments until the model's last time step. This late increase in jobs differentiates the fossil-free scenario from the others that were modeled; it should be considered somewhat separately rather than directly compared to the other scenarios.

Relative to the reference scenario, all six regions of New Mexico would benefit from decarbonization activities by 2030. Under each decarbonization pathway, the southeast, northeast, and southwest regions see significant job growth, due mainly to renewable development. Figure ES-2 shows net decarbonization job growth by region for the central scenario.

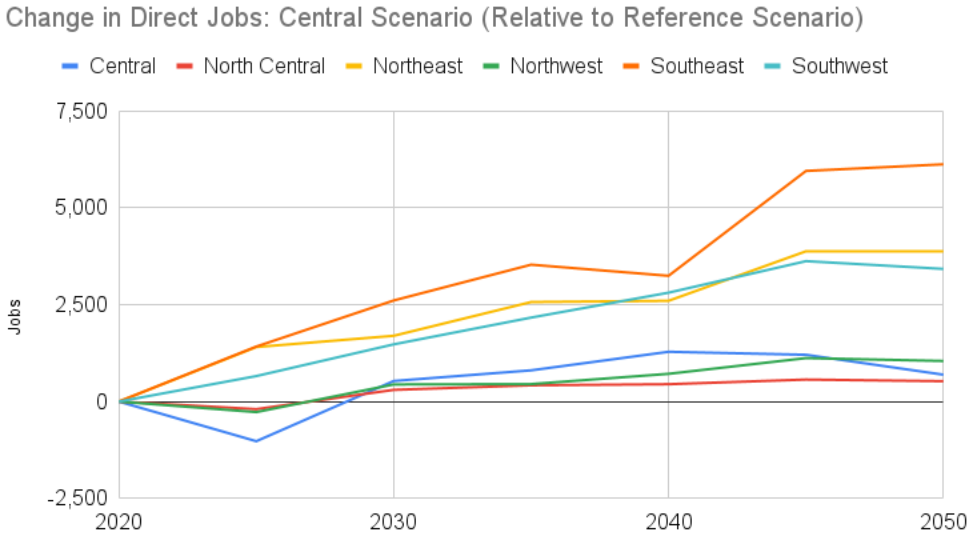


Figure ES-2. Direct Employment Effects due to Decarbonization Activities, by Region: Central Scenario

Table ES-1. Percent Increase in Regional Employment by Year 2030, Relative to 2019

REGION	100% RENEWABLES	CENTRAL	LOW DEMAND	REFERENCE
Central	1.7%	1.7%	1.8%	1.4%
North Central	1.7%	1.7%	1.8%	1.3%
Northeast	10.2%	10.5%	10.2%	5.4%
Northwest	2.2%	2.2%	2.3%	1.6%
Southeast	4.2%	4.3%	4.3%	2.8%
Southwest	3.1%	3.1%	3.2%	1.9%
TOTAL	2.6%	2.6%	2.7%	1.8%

Table ES-1 shows the percent increase in jobs by region by the year 2030 relative to regional employment in 2019. Each region will see an increase in total employment relative to a 2019 baseline. This effect is particularly pronounced in the northeast region, where jobs grow more than 10 percent relative to 2019.

In terms of industrial sectors, the largest impacts, by far, are in the construction industry, which accounts for roughly 90 percent of the new jobs in each scenario. Construction activities include building new renewable energy facilities, transmission infrastructure expansion, building and home energy retrofits, electric vehicle charging infrastructure, building new manufacturing facilities to produce clean energy equipment, and the installation or replacement of equipment like HVAC systems, heat pump water heaters, or induction stoves in buildings. Most "clean energy" jobs in the State of New Mexico will be in the construction sector.

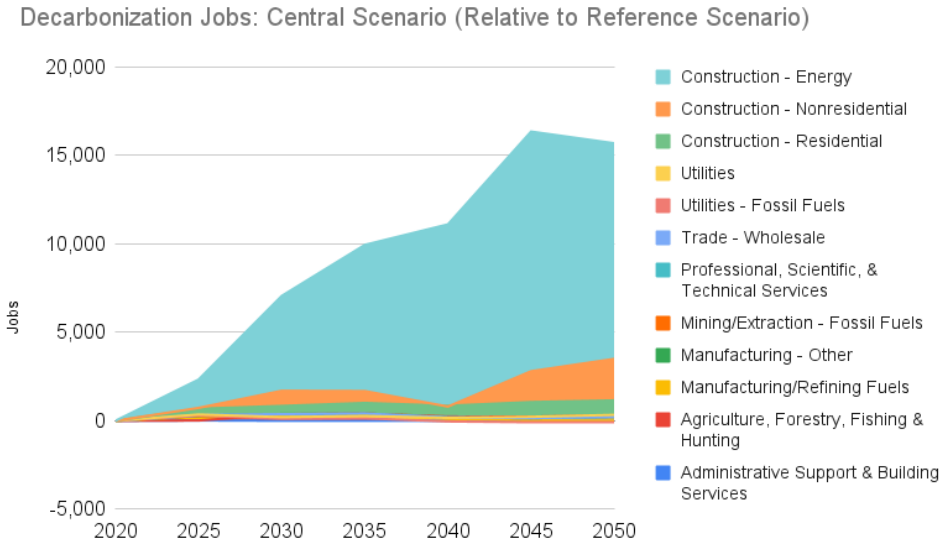


Figure ES-3. Direct Employment Effects, by Industrial Sector: Central Scenario

Figure ES-3 shows the change in direct decarbonization jobs for the central scenario. Because of the scale of job growth, the small categories of job loss are difficult to discern. While the model shows a loss of fossil-fuel-related utility jobs of 295 by 2050 in the central scenario, there is an increase in non-fossil utility jobs of 409 by 2050, a net gain of more than 100 utility jobs.

As expected from the industrial impacts, construction- and maintenance-related occupations see the highest growth. Other occupations including administrative and office support, sales, and service jobs also grow significantly. These high-growth occupations are represented by stars in Figure ES-4. These are middle-income occupations, many of which do not require a four-year or college degree.

With the construction occupations, the expansion of registered apprenticeship programs and use of registered apprentices on projects are good ways to ensure that there is skilled and trained worker availability to meet

growing labor market demand and that new investments are supporting career-track, family-sustaining jobs. The last section of this report provides detailed data on New Mexico's apprenticeship programs for the in-demand occupations. The data show higher participation by women and workers of color, as well as higher graduation rates among the union apprenticeship programs, but there is still much room for improvement in this regard. Continuing to improve diversity, equity, and inclusion can be supported with targeted hire standards, contractor diversity programs, and pre-apprenticeship programs with wrap-around services, apprenticeship, and pipelines to apprenticeship. This paper provides detailed regional data and recommendations to support improved job quality and job access in the energy transition.

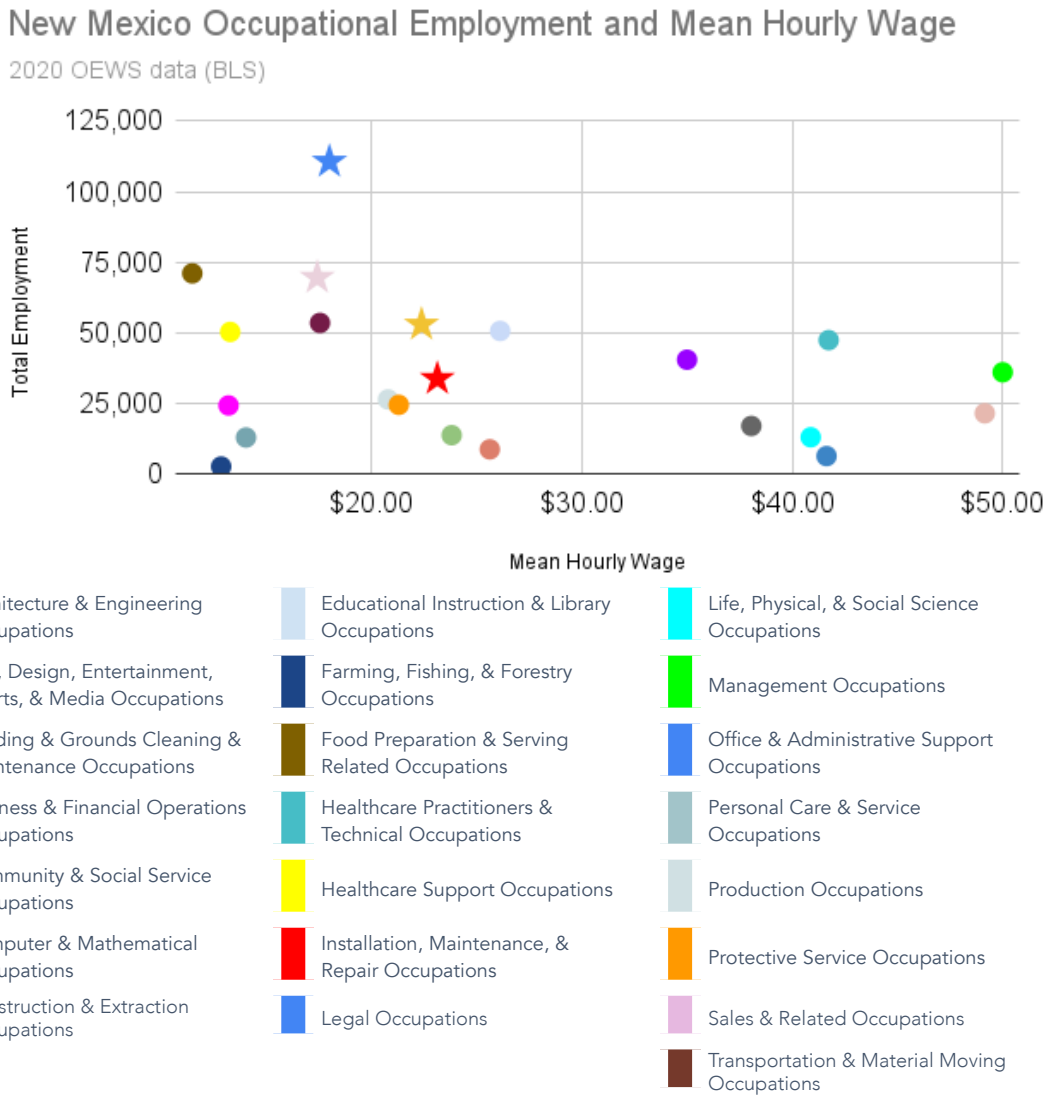


Figure ES-4. New Mexico Employment and Mean Hourly Wage, by Occupational Category

Due to the regional, sectoral, and occupational aggregation used in this paper, it is possible that acute job losses in single counties, industries, and occupations have been missed. This is not to gloss over the job losses or the particular hardships faced by displaced workers. Even when job loss is small, it must be mitigated and managed. The geographic and occupational distribution of employment effects provided in this paper shed light on where growth in clean-energy-related occupations will occur. It details how to ensure that new investments support high-quality, family-sustaining jobs that are accessible to workers facing transition and populations traditionally excluded from career-track employment. Recommendations regarding job quality and job access are provided so policymakers and advocates can design and adopt policies to ensure that no one is left behind.

Decarbonization can be an engine of good job creation and equitable economic development. Developing domestic manufacturing—and clean energy supply chains, specifically—would result in considerably more jobs than shown here, since our modeling is constrained by current in-state activities and industry relationships. In addition to creating good career-track local jobs, decarbonization activities will save consumers money over the long haul, thus increasing household income for non-energy goods and services. The long-term cost savings of decarbonization, as well as the cleaner air and reduced health expenditures, can also support broader economic development and diversification beyond clean energy, which are not captured in this paper. Economic diversification will continue to be important, particularly in regions currently dependent on fossil fuel activity.

INTRODUCTION

New Mexico's economy has long been subject to the booms and busts of fossil fuels, most markedly in counties such as Eddy and Lea in the southeast and San Juan in the northwest. Second in United States oil production,[1] New Mexico is also a significant methane gas producer and home to the nation's 10th-largest coal reserve.[2] But the state also boasts renewable energy potential among the best in the nation, namely, abundant sunshine and prime wind conditions, with considerable resources in these areas still untapped. With fossil fuel industries becoming increasingly volatile and at odds with a climate-safe future, New Mexico must reduce its reliance on extractive industries in favor of economically and environmentally sustainable alternatives.

The effects of climate change are already posing concrete challenges in New Mexico: more frequent extreme heat days; more devastating wildfires; reduced snowpack; dried rivers; and inadequate water for farming, recreation, and wildlife. Drought conditions are being aggravated by warmer, drier weather patterns and are disrupting fresh water supply in parts of the state. In the face of increasing climate urgency, New Mexico must chart a new way forward, with clean energy targets, economic and revenue diversification, and rapid decarbonization of its economy.

1 "U.S. States - Rankings - U.S. Energy Information Administration (EIA)," accessed September 3, 2021, https://www.eia.gov/state/rankings/#/series/46.

2 "New Mexico - State Energy Profile Overview - U.S. Energy Information Administration (EIA)," accessed July 19, 2021, https://www.eia.gov/state/?sid=NM#tabs-4.

POLICY CONTEXT

In January 2019, New Mexico Governor Michelle Lujan Grisham issued Executive Order 2019-003, calling for a statewide reduction in greenhouse gas (GHG) emissions of at least 45 percent by 2030 as compared to 2005 levels. This gubernatorial action was followed by the Energy Transition Act (ETA), signed into law in May 2019, committing the state to achieving 100-percent carbon-free electricity from public utilities by 2045, with renewables targets of 50 percent by 2030 and 80 percent by 2040. While progress has been made since 2019, reports suggest that it is not yet on pace to reach these goalposts, particularly with regard to GHG emissions. Meeting the targets will require a combination of powerful levers beyond what is in place thus far.

As of late 2020, New Mexico had two coal-fired plants still in operation, both in San Juan County and slated for retirement, one in 2022 and the other by 2031. The state's energy transition will also involve a shift away from gas-fired plants, which in 2020 accounted for more than a third of New Mexico's electricity generation.[3] Wind, solar, and storage are scaling up to replace gas- and coal-fired electricity. As a major energy export state, however, New Mexico cannot reach the GHG emissions reduction target set by EO 2019-003 solely by decarbonizing its electricity.

In 2018, oil and gas production in New Mexico accounted for more than 50 percent of statewide GHG emissions.[4] These emissions include high levels of methane—from venting and flaring practices as well as rampant leakage—to the extent that a massive methane "hot spot" exists over northwestern New Mexico.[5] The Environmental Defense Fund estimates that statewide methane emissions from oil and gas total more than 1.1 million metric tons a year, representing a climate impact equivalent to 25 coal plants or 21 million automobiles.[6] Meeting the EO 2019-003 targets will require a steep reduction of GHG emissions from oil and gas production in New Mexico, through a combination of cleanup and scaling back.

3 "New Mexico - State Profile and Energy Estimates," U.S. Energy Information Administration (EIA), accessed January 22, 2021, https://www.eia.gov/state/analysis.php?sid=NM.

4 Energy and Environmental Economics, Inc. (E3), "New Mexico Greenhouse Gas Emissions Inventory and Forecast" (Center for the New Energy Economy at Colorado State University, October 27, 2020), https://cnee.colostate.edu/wp-content/uploads/2021/01/New-Mexico-GHG-Inventory-and-Forecast-Report_2020-10-27_final.pdf.

5 Renee McVay, Hillary Hull, and David Lyon, "Oil and Gas Methane Emissions in New Mexico" (Environmental Defense Fund), accessed May 5, 2021, https://www.edf.org/sites/default/files/new-mexico-methane-analysis.pdf.

6 "New Mexico Oil & Gas Data," November 20, 2020, http://edf.org/nm-oil-gas/.

ECONOMIC CONTEXT

One in five New Mexican families spends 20 percent of its income on home energy bills, and more than 10,000 New Mexican residents, mostly Indigenous, have no electricity in the home.

Per capita income in New Mexico is among the lowest in the United States; more than 20 percent of the state's population live at or below the poverty level, and its child poverty rate is consistently the first- or second-highest in the nation.[7] One in five New Mexican families spends 20 percent of its income on home energy bills, and more than 10,000 New Mexican residents, mostly Indigenous, have no electricity in the home.[8] For the years 2015 to 2019, more than a quarter of the state's households did not have a broadband internet subscription.[9] With the prevalence of poverty in New Mexico comes a prevalence of problems such as food insecurity, illness, unequal access to education and health care, insufficient access to water and sanitation, and homelessness, all of which disproportionately affect Indigenous and rural communities.

Fallout from the COVID-19 pandemic has exacerbated economic hardship and unemployment in the state: between March and April 2020, the New Mexico economy shed 100,000 jobs. While some jobs returned in subsequent months, at year's end, the state still showed a net loss of more than 65,000 nonfarm jobs,[10] with leisure/hospitality and natural resources/mining topping the list of industries hit hardest[11, 12] In other words, unemployment since the start of the COVID-19 pandemic has been more concentrated among the lowest wage earners (those employed in accommodation and food services) and in rural mining communities.

Meanwhile, oil and gas production is at record levels; New Mexico was one of only three states to see an increase in production in 2020, even as the pandemic drove down demand for petroleum-based fuels.[13] Demand has bounced back, but with production becoming more efficient, oil and gas jobs in the state have not. Based on recent projections from the Bureau of Business and Economic Research (BBER) at the University of New Mexico, Capital & Main reports that in the first quarter of 2021, mining jobs still stood at 32 percent below pre-pandemic levels and "are expected to remain 25 percent or more below pre-pandemic levels for at least the next five years."[14] While mechanization is reducing the human effort that goes into oil and gas production, cutting pollution in the sector represents a growing need for workers: "Reducing methane leakage is a jobs-intensive process and will grow the workforce."[15] It is fair to say that employment levels in fossil fuel production are unpredictable and changing with new technologies.

Cleaning up New Mexico's oil and gas industry is one way to reduce GHG emissions in the state, a necessary adaptation along the road to a low-carbon economy. However, there are also economic arguments (climate urgency and

7 "Our Work," New Mexico Center on Law and Poverty, accessed January 22, 2021, http://nmpovertylaw.org/our-work/.

8 "Environmental Justice," Dreaming New Mexico - A Bioneers Collaborative Project, accessed January 22, 2021, https://dreamingnewmexico.bioneers.org/energy/environmental-justice/.

9 "QuickFacts: New Mexico. Households with a Broadband Internet Subscription, Percent, 2015–2019" (U.S. Census Bureau), accessed January 22, 2021, https://www.census.gov/quickfacts/NM.

10 "Nonfarm employment" is the general labor classification used by the U.S. Bureau of Labor Statistics for annual statistics (not seasonally adjusted).

11 "Roadmap to Recovery" (New Mexico Economic Recovery Council, January 12, 2021), https://indd.adobe.com/view/a642a83e-976c-4e67-9086-ccc189cdc771.

12 Alicia J. Keyes, "Target Economic Development Spending for Growth," Santa Fe New Mexican, January 9, 2021, https://www.santafenewmexican.com/opinion/my_view/target-economic-development-spending-for-growth/article_519455d6-5088-11eb-a412-dfbaeb42d321.html.

13 EIA, "Quick Facts" Updated March 18, 2021. New Mexico - State Energy Profile Overview - US Energy Information Administration, https://www.eia.gov/state/?sid=NM#tabs-1. Accessed June 25, 2021.

14 Jerry Redfern, "New Mexico Oilfield Jobs Not Projected to Rebound," Capital & Main, July 6, 2021, https://capitalandmain.com/new-mexico-oilfield-jobs-not-projected-to-rebound.

15 Krishnaswami, Horing, and Long, February 2021

Fossil fuels are not future-proof commodities, and failing to adapt is a recipe for one day leaving workers and assets stranded on a massive scale.

PROJECT CONTEXT

environmental concerns aside) for not just "greening," but also scaling back the state's major fossil fuel industry over time. "Factors such as international price wars, environmental liabilities, and the accelerating transition to renewable energy are already eroding the industry's economic dominance," says New Mexico economist Kelly O'Donnell, underscoring the importance of economic diversification to "moderate the effects of the oil and gas industry's almost inevitable decline."[16]

Climate change is no longer an eventuality; it is here, and its effects—severe flooding, storms, heat, drought, wildfires, etc.—are costly. Public and political will for climate action is growing. Globally, governments, companies, and individuals are increasingly adopting low-carbon models, technologies, and solutions. Economists warn that ignoring these trends is a strategic error.[17, 18, 19] Fossil fuels are not future-proof commodities, and failing to adapt is a recipe for one day leaving workers and assets stranded on a massive scale. By working now to build a low-carbon economy, based on good jobs, New Mexico can be the driver of its own change in the evolving energy landscape.

The state's future economic and climate resilience will depend on how effective its economic development, diversification, and investment strategies are in replacing fossil fuel jobs with low-carbon, high-road livelihoods that allow workers to make a good living across all parts of the state.

16 Kelly O'Donnell, "The Economic Impact of Oil Field Remediation in New Mexico" (O'Donnell Economics and Strategy, June 2021), https://42a99114-f241-4a3d-b5bd-a44f76a58dd1.filesusr.com/ugd/a6f2d7_e98332f541064621adeebc736f65dc8e.pdf.

17 "Fossil Fuels Are Terrible Investments, Says Top Energy Economist," Grist, July 9, 2015, https://grist.org/climate-energy/fossil-fuels-are-terrible-investments-says-top-energy-economist/.

18 Damian Carrington, "Fossil Fuel Firms Risk Wasting Billions by Ignoring Climate Change, Says IEA," The Guardian, July 9, 2015, sec. Environment, http://www.theguardian.com/environment/2015/jul/09/fossil-fuel-firms-risk-billions-ignoring-climate-change-iea.

19 Kate Gordon, Matt Lewis, and Jamesine Rogers, "Risky Business: The Economic Risks of Climate Change in the United States" (The Risky Business Project, June 2014), http://riskybusiness.org/report/national/.

This analysis is part of a project initiated by Sierra Club, GridLab, the Climate and Clean Energy Equity Fund, and the Natural Resources Defense Council (NRDC) to determine how New Mexico can reach its climate goals. They brought on leading experts to produce detailed technology and policy roadmaps for New Mexico's decarbonization, providing greater detail on energy system modeling and analysis of the health and equity implications for New Mexicans along the way. This project resulted in a paper from "Evolved Energy, Climate Action in New Mexico: Pathways to Combat the Climate Crisis Through Energy Infrastructure Investments and Pollution Reductions," published in February 2021, and complementary analysis by PSE Healthy Energy in "Equity-Focused Climate Strategies for New Mexico" (August 2021).[20, 21]

The research presented herein examines the employment and economic impacts of the decarbonization modeling by Evolved Energy. To enable data-driven assessments of the impacts of New Mexico climate policies, this report provides granular analysis (by industry and geography) of the employment and economic impacts of different decarbonization scenarios. It examines the effects of these outcomes across industries and regions (distributional effects), including measures of job quality such as occupational breakdowns, compensation, demographic trends, and training pathways. Lastly, it provides policy and program recommendations focused on job quality and job access to harness the momentum of large-scale change to create a more equitable low-carbon economy.

20 Arjun Krishnaswami, Jill Horing, and Noah Long, February 2021.

21 Elena Krieger et al., August 2021

SCOPE OF THIS ANALYSIS

Our economic modeling reflects the ways in which this transition will affect the New Mexico economy and employment across sectors and across geographies, accounting for both increases and decreases in economic activity due to decarbonization. This is not to suggest that balancing the job equation is a simple tally of gains and losses. Job access and job quality need to be considered broadly, over the long term and in terms of who is benefitting.

The analysis presented here is constrained by the scenarios modeled, reflecting the technology and policy pathways identified to dramatically reduce emissions by 2050. Therefore, the job impacts revealed—and our related equity recommendations—are largely tied to energy and energy-related sectors. However, reshaping New Mexico's economy away from an unsustainable dependency on fossil fuels can and will involve diversification across sectors, which is beyond the scope of our analysis here.

Ensuring a just energy transition means making sure that workers are not left behind. It means making sure that job growth outpaces job loss and also that the jobs created are stable, secure, safe, and good-paying. The transition to a low-carbon economy is also an opportunity to address historic inequities by increasing opportunity for groups underrepresented in high-paying employment (Indigenous, people of color, women, veterans, etc.). With policies to support displaced workers and make sure traditionally underserved populations are well represented in high-quality employment as the economy evolves, New Mexico can forge a just and sustainable future.

With policies to support displaced workers and make sure traditionally underserved populations are well represented in high-quality employment, New Mexico can forge a just and sustainable future.

METHODOLOGY

This analysis uses the IMPLAN Input-Output model to ascertain the macroeconomic and employment effects of the deep-decarbonization scenarios.

Decarbonization Scenarios

The scenarios analyzed correspond to the following scenarios from Evolved Energy's February 2021 report.[22]

- **REFERENCE:** Represents business as usual. No emissions reductions are required, and New Mexico does not meet its EO 2019-003 goal.
- **CENTRAL (CORE):** In which New Mexico must achieve a 45-percent reduction in economy-wide GHG emissions from 2005 levels by 2030, compliant with EO 2019-003, and net-zero GHG emissions from the energy system by 2050.
- **LOW DEMAND (ENERGY EFFICIENCY SENSITIVITY):** Includes 1) lower building energy demand from more ambitious energy efficiency measures; 2) reductions in vehicle use from smart planning and public transit policies; and 3) increased flexibility of electricity load from buildings and vehicles.

Evolved Energy also considered a more ambitious scenario, the 100-percent renewables model, in which New Mexico brings its economy-wide GHG emissions to net zero by 2050. This scenario is presented separately from the others because it emphasizes the build-out of renewable energy, without necessarily considering the full range of interactive effects. In-state fossil fuel businesses' response to a fossil-free economy will have an influence on jobs that would require additional analysis.

- **100-PERCENT RENEWABLES (NET ZERO BY 2050 SENSITIVITY):** In which New Mexico must achieve net-zero GHG emissions by 2050 across the economy, not just for the energy system.

IMPLAN Model and Limitations

The economic and employment impact analysis below is based on converting outputs from the Evolved Energy Research (EER) deep-decarbonization scenario modeling into inputs for IMPLAN. IMPLAN is an input-output (I-O) model that maps how changes in spending circulate throughout the economy, based on existing industry relationships and spending patterns in a local economy. The IMPLAN model has 544 industry sectors for which it maps the upstream and downstream relationships. I-O modeling is typically used to analyze how a change in economic activity in one sector of the economy affects that sector as well as activities, employment, and labor income in other sectors of the economy. When you model an impact (e.g., change in spending, change in output, change in employment, etc.) to a particular industry, it uses preset industry spending patterns to discern the indirect and induced impacts resulting from the initial impact. IMPLAN is not dynamic, which means that it does not account for any feedback, such as price adjustments or business, worker, and consumer activity adjustments in response to changing prices.

For this analysis, we used as inputs the non-levelized increases and decreases in economic activity across the industries directly affected by the decarbonization scenarios. If these changes result in higher costs for households and businesses, they are reflected as a reduction in household and business income, and when changes result in

22 Arjun Krishnaswami, Jill Horing, and Noah Long, February 2021, 3.

The "direct" jobs are those directly affected from the activity modeled (e.g., investments in expansion of transmission infrastructure or construction of a wind farm). The "total" jobs include the direct jobs plus the "indirect" jobs that result from the intermediate (supply chain) expenditures and the "induced" jobs resulting from the spending of worker earnings.

reduced costs, they are reflected as an increase in household and business income. The impacts of these direct increases and decreases in spending ripple out across the economy, affecting other industries and jobs, and ultimately, they result in additional changes in spending on local goods and services.

The analysis provides the "direct" and "total" macroeconomic and employment effects. The direct effects are those created directly from the activity modeled (e.g., investments in expansion of transmission infrastructure or the construction of a wind farm), while the total impacts include the indirect effects that result from intermediate (supply chain) expenditures and the induced effects created by the spending of worker and business earnings.

Technology and policy pathways account for in-state changes in demand. As a result, the consumption of fossil fuels for power generation declines over time as the investment required to replace fossil fuels with clean energy increases. However, while the new investments required to decarbonize are captured in the energy systems modeling, the negative consequences for existing fossil fuel industries are difficult to predict and not in the scope of this paper. The IMPLAN model has captured the loss of jobs and economic activity associated with Evolved's modeled change in demand, but by excluding assumptions about how fossil fuel industries will respond to reduced in-state demand, the negative impacts are conservative. More detail on the specific methodology can be found in Appendix A, with the mapping on Evolved's modeling outputs to IMPLAN inputs in Appendix B.

Regions

For ease of conveying distributional impacts across the state, we allocated 33 county-level impacts to six regions shown in Figure 1. Appendix C provides the county names by region.

Figure 1. New Mexico's Regions

Sectors and Occupations

For ease of conveying distributional impacts across IMPLAN's 544 industrial sectors and 823 occupations, we allocated impacts to the higher-level groupings of sectoral and occupational categories. The sectoral and occupational aggregations are shown in Appendix D, Tables A1 and A2.

EMPLOYMENT RESULTS

The "direct" jobs are those directly affected from the activity modeled (e.g., investments in expansion of transmission infrastructure or the construction of a wind farm). The "total" jobs include the the direct jobs plus the "indirect" jobs that result from intermediate (supply chain) expenditures and the "induced" jobs resulting from the spending of worker earnings.

STATEWIDE IMPACTS

It is clear that in each decarbonization pathway modeled, the State of New Mexico would see an increase in direct employment relative to the business-as-usual reference case. The direct employment impacts are shown in Figure 2. The reference scenario is graphed as the green line. These figures represent jobs in the industries directly affected by the decarbonization scenarios; they are mostly clean energy jobs (e.g., construction of renewable energy, manufacturing clean fuels and products, performing energy retrofits, etc.) The low-demand scenario shows a small decrease in employment from 2045 to 2050, perhaps due to reduced energy consumption following large, early investments in efficiency. The 100-percent renewables scenario shows the largest increase in jobs by 2050, due to the large increase in energy infrastructure.

Figure 3 shows the economy-wide job effects of the decarbonization scenarios. Mainly these totals follow the same trend as direct job growth, differing only in the number of jobs (i.e., the total number of jobs are about double the direct jobs). The greater the intermediate spending in an industry and the stronger the in-state supply chains, the greater the indirect and induced employment ripple effects, measured as a multiplier. For every 100 direct jobs created due to decarbonization activities, another 72 to 95 jobs will be created in the state economy. This multiplier will increase as in-state supply chains for clean energy equipment develop.

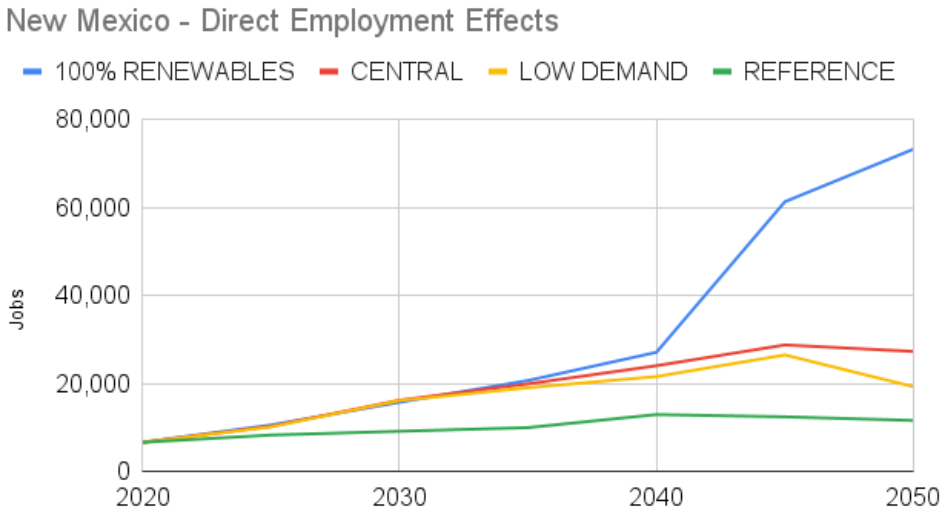


Figure 2. Statewide Direct Employment Effects of Decarbonization Scenarios

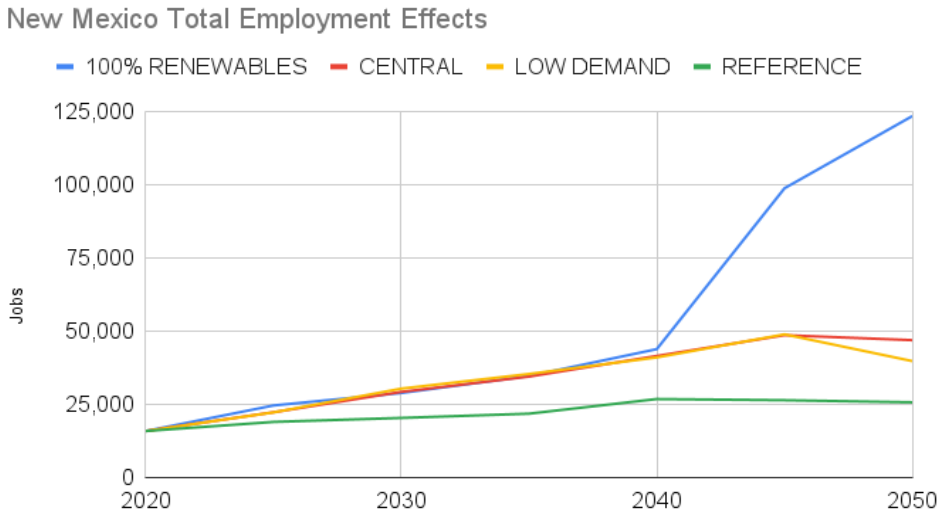


Figure 3. Statewide Total Employment Effects of Decarbonization Scenarios

The indirect and induced job multipliers are shown in Table 1. Relative to the reference case, the indirect and induced multipliers for the decarbonization scenarios are lower, likely because in-state supply chains for decarbonization activities have not yet been well developed in New Mexico. As more in-state businesses develop to meet changing energy needs and if New Mexico workers and households shift more spending of income and energy cost savings to in-state businesses, these multipliers will increase.

Table 1. Employment Multipliers (Indirect + Induced Jobs/Direct Jobs), by Scenario

	100% RENEWABLES	CENTRAL	LOW DEMAND	REFERENCE
Indirect and Induced Employment Multiplier	0.72	0.79	0.95	1.19

A summary of the total macroeconomic impacts by scenario is presented in Table 2. All three decarbonization pathways support greater job growth and economic activity relative to the reference scenario. The low-demand scenario creates the highest economic benefits in 2030, while the 100-perent renewables scenario creates the highest economic benefits in 2050. In the year 2040, the macroeconomic effects of all the decarbonization scenarios are about 50-percent higher than the reference scenario.

Table 2. Total (Direct, Indirect, and Induced) Macroeconomic Effects, by Scenario (Dollars Reported in $ Billion)

Scenario/ Year	Employment	Output	GDP	Labor Income	State & Local Taxes	Federal Taxes
100% RENEWABLES						
2030	29,000	$8.00	$3.44	$1.59	$0.31	$0.34
2040	44,000	$9.56	$4.68	$2.40	$0.37	$0.49
2050	123,000	$24.87	$12.34	$6.59	$0.95	$1.33
CENTRAL						
2030	29,000	$8.06	$3.47	$1.61	$0.31	$0.34
2040	41,000	$9.31	$4.44	$2.25	$0.37	$0.46
2050	47,000	$9.24	$4.68	$2.50	$0.37	$0.51
LOW DEMAND						
2030	30,000	$8.10	$3.51	$1.65	$0.31	$0.35
2040	41,000	$8.91	$4.25	$2.17	$0.36	$0.45
2050	40,000	$7.63	$3.84	$2.03	$0.32	$0.41
REFERENCE						
2030	20,000	$6.77	$2.72	$1.14	$0.26	$0.25
2040	27,000	$8.14	$3.37	$1.49	$0.32	$0.32
2050	26,000	$8.56	$3.45	$1.44	$0.33	$0.32

REGIONAL IMPACTS

The direct job effects across regions are largely driven by two factors: population and renewable resource potential. Regions with large populations will see more building retrofit and distributed solar jobs, while rural areas with more solar potential will see more large-scale renewable energy development. Figure 4 shows the direct clean-energy-related jobs by region for the three decarbonization scenarios relative to the reference scenario. Immediately striking is the distribution of employment benefits across regions.

The northeast and southeast regions of the state see significant job growth in the 100-percent renewables scenario, totaling 4.4 times more jobs than in reference case. Utility-scale renewables and other large-scale investments are allocated to regions based on renewable resource potential, so the large increases in jobs in these regions are likely due to high wind and/or solar potential. The northwest region also performs well under the 100-percent renewables scenario. The southwest region shows solid job growth across all three decarbonization scenarios.

The employment impacts are based on the pace of investments outputted by Evolved Energy's decarbonization modeling, which operates under constrained optimization. In the real world, investment may happen more smoothly. If the investment follows a steady path through 2050, decarbonization can support consistent career-track employment for New Mexico's workers.

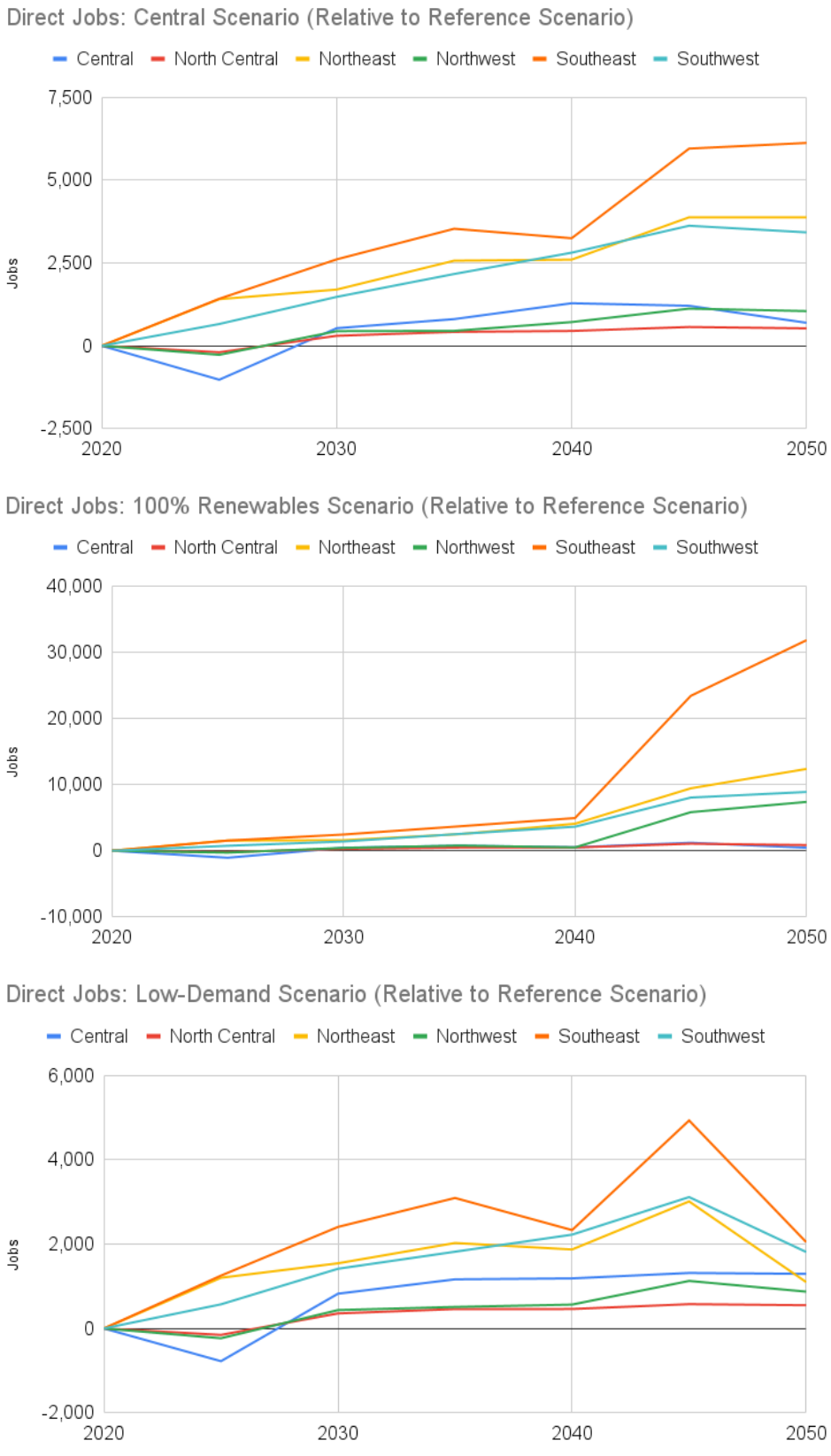
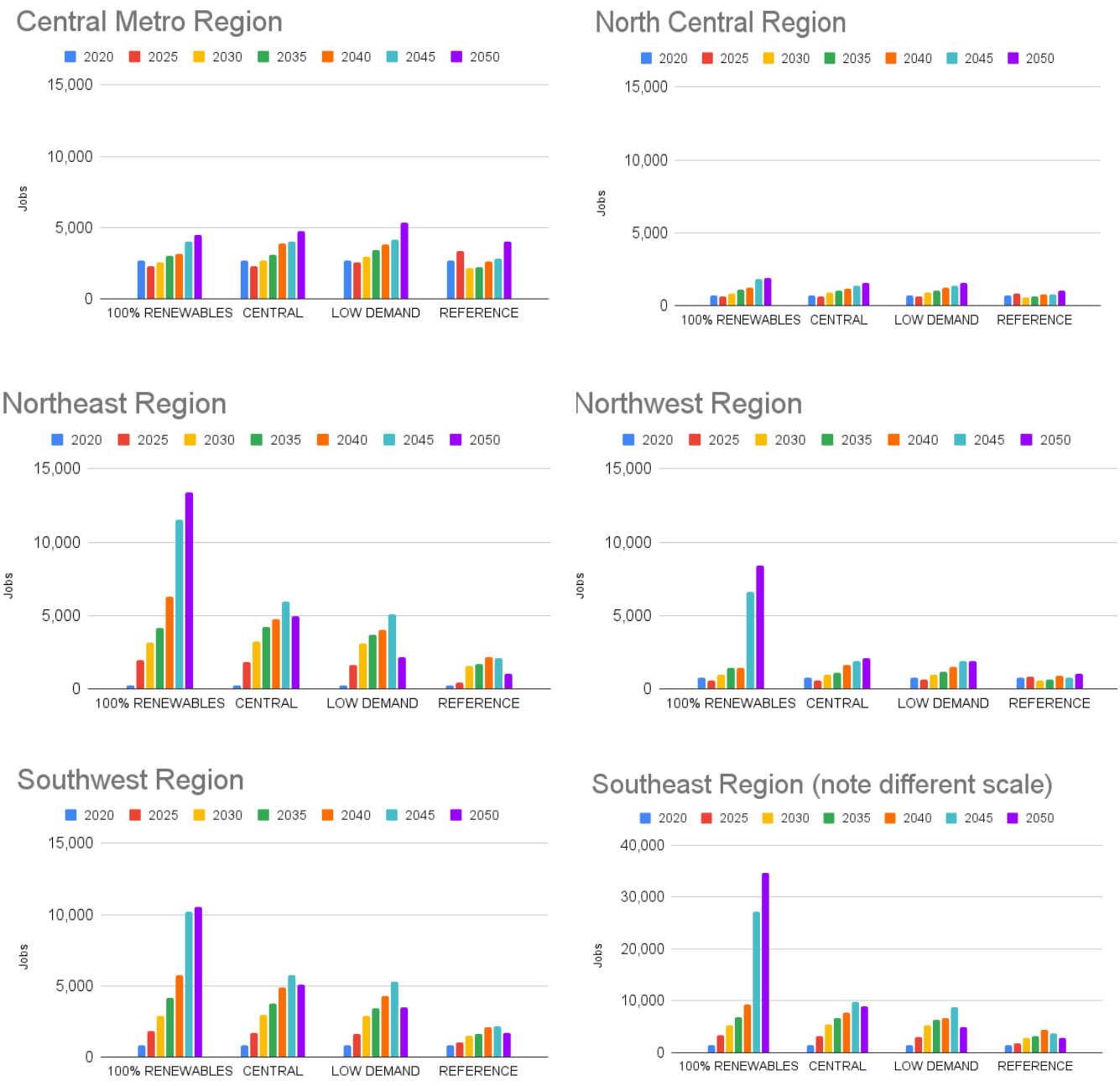


Figure 4. Decarbonization Jobs (Direct Effects), by Region

The regional results shown in the line graphs above are reproduced in Figure 5, which shows regional snapshots of the total annual jobs (including those in the reference scenario). The direct effects capture the jobs required to decarbonize the state economy and support a clean energy transition. These include jobs required to build renewable energy facilities, retrofit buildings, and manufacture equipment (e.g., vehicles, clean fuels, appliances, etc.) to meet New Mexico consumer demand (to the extent such manufacturing capacity is located in New Mexico). Detailed sectoral breakdowns of these jobs are provided in the next section.

Figure 5. Regional Direct Employment Effects (i.e., jobs related to decarbonization and clean energy transition)



The different-sized impacts across regions are partially explained by the decarbonization potential in different sectors. For example, rural regions with high wind or solar potential will see greater job gains than rural regions without such resources. Urban regions will see higher impacts than rural regions because of the population: more houses and buildings to retrofit, more rooftop solar potential, etc. To help make sense of these differences, we compare 2019 employment to the total job growth for each decarbonization scenario by 2030. Table 3 shows this comparison, and Table 4 represents regional job growth as a percent of 2019 employment.

As with the charts above, these data show that total employment effects by region are about double the direct employment effects. In other words, for every job created from the investment required to decarbonize, another job is created in the local supply chain and from local spending of labor income. These effects take into account the higher costs or higher savings to businesses and households related to decarbonization, e.g., higher or lower energy costs, fuel purchases, investments in cars or appliances, etc.

While the central region, which includes the Albuquerque metropolitan area, will see the greatest increase in jobs in each scenario, the more rural regions will see a greater percentage change relative to current (2019) employment. The northeast region will see particularly high job growth. By 2030, decarbonization investments could grow jobs in northeastern New Mexico by more than 10 percent. The southeast region would also fare well, with decarbonization investments growing regional employment by more than 4 percent by 2030. However, a slower and smoother rate of growth will ensure that decarbonization investments provide a stable source of employment over time, which is better for workers and easier to prepare for. Long-term, sustained investment can support new apprenticeship and other training programs and ensure stable and continuous work for workers and employers who invest in training.

Table 3. Change in Total Employment in Year 2030 Compared to 2019 Employment

REGION	2019 EMPLOYMENT	100% RENEWABLES	CENTRAL	LOW DEMAND	REFERENCE
Central	502,621	8,328	8,369	9,239	6,954
North Central	148,698	2,489	2,499	2,723	1,967
Northeast	34,146	3,491	3,596	3,477	1,841
Northwest	101,111	2,200	2,209	2,301	1,590
Southeast	184,638	7,800	7,955	7,905	5,079
Southwest	143,164	4,411	4,479	4,571	2,766
Statewide Total	1,114,378	28,718	29,106	30,217	20,196

Table 4. Percent Increase in Regional Employment by Year 2030, Relative to 2019

REGION	100% RENEWABLES	CENTRAL	LOW DEMAND	REFERENCE
Central	1.7%	1.7%	1.8%	1.4%
North Central	1.7%	1.7%	1.8%	1.3%
Northeast	10.2%	10.5%	10.2%	5.4%
Northwest	2.2%	2.2%	2.3%	1.6%
Southeast	4.2%	4.3%	4.3%	2.8%
Southwest	3.1%	3.1%	3.2%	1.9%
TOTAL	2.6%	2.6%	2.7%	1.8%

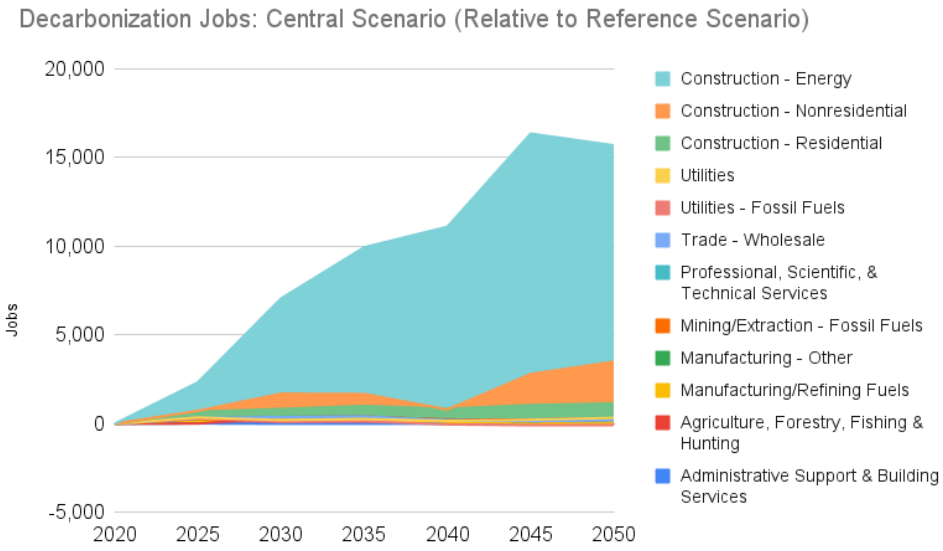
INDUSTRY IMPACTS

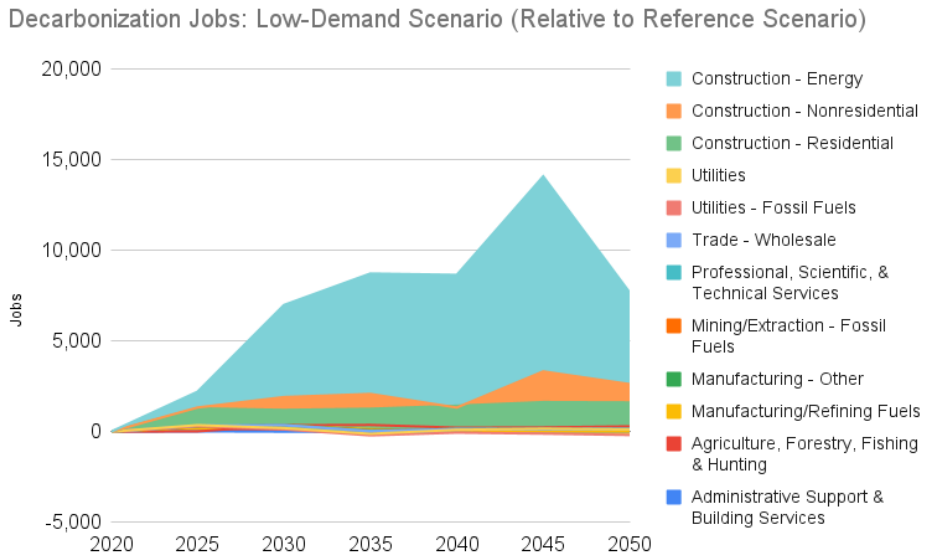
The largest impacts, by far, are in the construction industry, which accounts for roughly 90 percent of the new jobs. Construction activities include building new renewable energy facilities, transmission infrastructure expansion, building and home energy retrofits, electric vehicle (EV) charging infrastructure, building new manufacturing facilities to produce clean energy equipment, and the installation or replacement of equipment like HVAC systems, heat pump water heaters, or induction stoves in buildings. The distribution of decarbonization jobs across industries is shown in Figures 6. Most clean energy jobs in the State of New Mexico fall into the construction sector. If New Mexico had a stronger clean-energy-related manufacturing industry, the state would see higher job numbers there, but the modeling for this project was constrained by the extent to which in-state demand for particular products (e.g., vehicles, HVAC systems, household appliances, etc.) is currently met by in-state manufacturers.

In this analysis, the construction-related employment is distributed by sector, the sectors being residential, non-residential, and energy. Residential construction includes energy efficiency retrofits, electrification activities, and rooftop solar. Energy construction includes utility-scale renewable energy facilities, transmission and distribution infrastructure, and EV charging infrastructure. Non-residential construction will include commercial building retrofits, commercial solar, electrification activities, and the construction of new manufacturing facilities.

The intermediate expenditures within the directly affected industries affect some other industries, and the change in labor income associated with decarbonization activities impact yet another set of industries. Thus, most industrial sectors across the New Mexico economy experience ripple effects of decarbonization investments.

Occupations and industries are different. For example, not all of the jobs in construction are construction occupations. There are finance professionals, business managers, and accountants employed in the construction industry, just as there are electricians, pipefitters, or construction laborers employed in the utility, extraction, and other industries. When people train for occupations, they can move between industries that require those occupational skills. When people are trained for a very specific industry or a very specialized occupation, whether it be coal mining or solar installation, they are more vulnerable to ebbs and flows in industrial investment due to policy changes. The distribution of the jobs across occupations associated with decarbonization in New Mexico is shown in the next section.





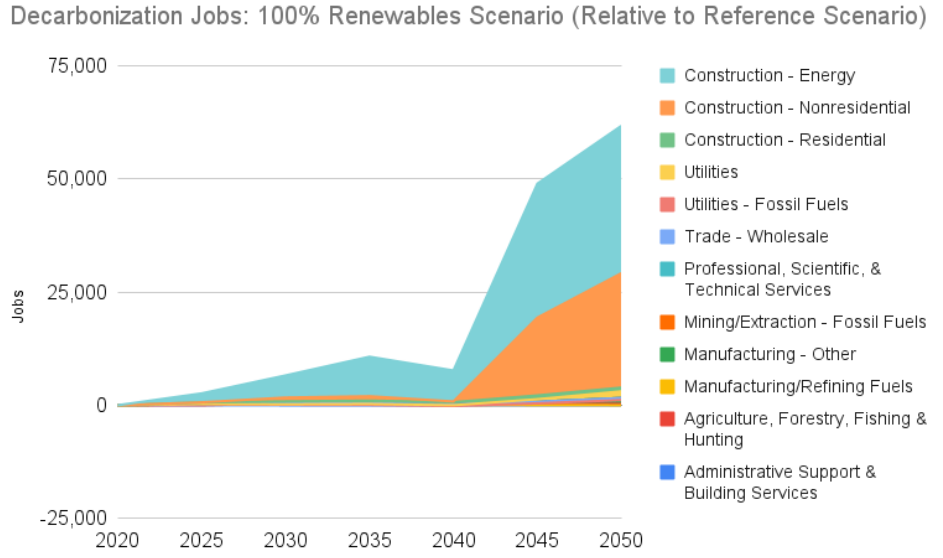


Figure 6. Decarbonization Jobs (Direct Effects), by Industrial Sector

Photo Credit: Catherine Werner, City of St. Louis IBEW Training Center

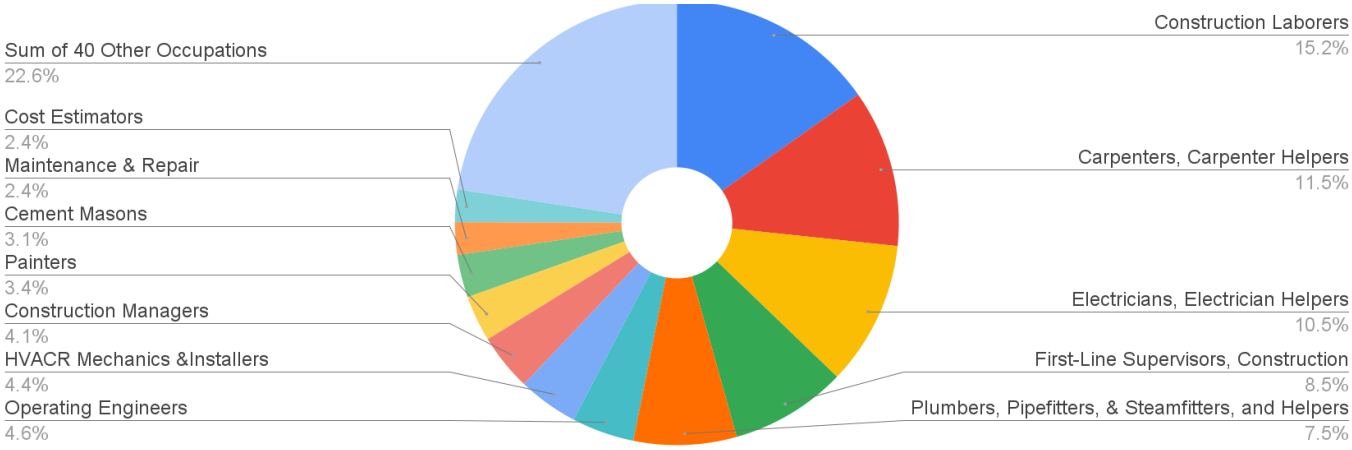
OCCUPATIONAL IMPACTS

The main difference between the decarbonization scenarios and the reference scenario is the higher percentage of construction occupations. The decarbonization scenarios show that 35 percent of the total jobs will be in construction occupations, whereas in the reference scenario only 27 percent of the jobs are in construction occupations. While the number of jobs in each occupational category differs by scenario, the percent distribution of jobs across occupations is consistent across the three decarbonization scenarios.

The top construction occupations are shown in Figure 7. IMPLAN's assignment of occupations to industries is based on federal employment surveys, and the categorization does not perfectly represent nuanced differences between general energy-related construction and renewable energy construction. The occupations required to install wind turbines and solar photovoltaic (PV) farms differ from those required to install new transmission lines. In addition, the jurisdictional boundaries of different work tasks can vary by trade. That said, most of the jobs in wind and solar construction and installation fall within traditional construction occupations (i.e. laborers, carpenters, electricians, etc.).

The key take-away for workforce development is to focus on broad occupational training leading to industry-recognized credentials, rather than investing in technology-specific training. This will allow greater transferability of skills across clean energy industries, provide workers more stable employment and job security, and ensure the State of New Mexico has the qualified workers needed to implement the full range of decarbonization activities.

Figure 7. Distribution of Jobs, by Clean Energy Construction, Operations, and Building Retrofit Occupations: Decarbonization Scenarios



The top eight clean energy construction- and building-retrofit-related occupations are provided by region in Appendix E. The charts in Figure 8 show these for each region in New Mexico. The largest need is in the southeast region, while the northeast region sees the largest increase in jobs relative to its current labor force. The results for the central scenario are shown below, but the data for all regions, all scenarios, all years are shown in Appendix E. The data should inform workforce development staff and apprenticeship coordinators to expand education and training programs across regions, calibrated to growing demand for particular occupations. Toward that end, these bars represent single-year snapshots of labor market demand due to decarbonization.

Figure 8. Top Eight Clean Energy Construction and Building Retrofit Occupations, by Region: Central Scenario in Three Most-Affected Regions

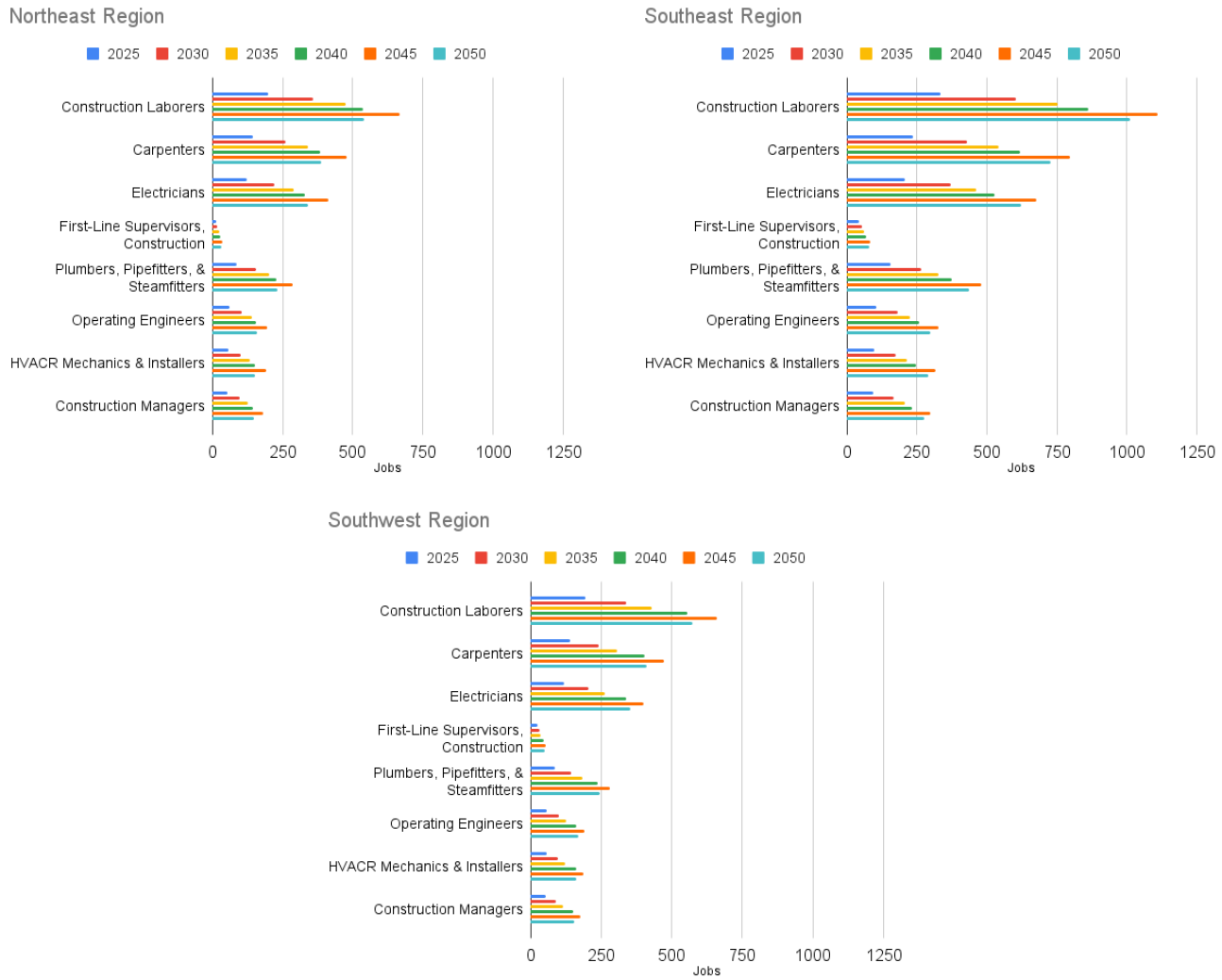


Table 5 provides the most recent wage data and educational and licensing requirements for the top clean energy occupations in New Mexico. All of these occupations are apprenticeable, and registered apprenticeship programs exist for these occupations throughout New Mexico. Appendix F provides information on the registered apprenticeship programs in New Mexico. Some apprenticeships are offered by single employers, while others are offered through joint labor–management apprenticeship training councils. Even among registered apprenticeships, quality can vary. More information on quality apprenticeships is provided in the next section.

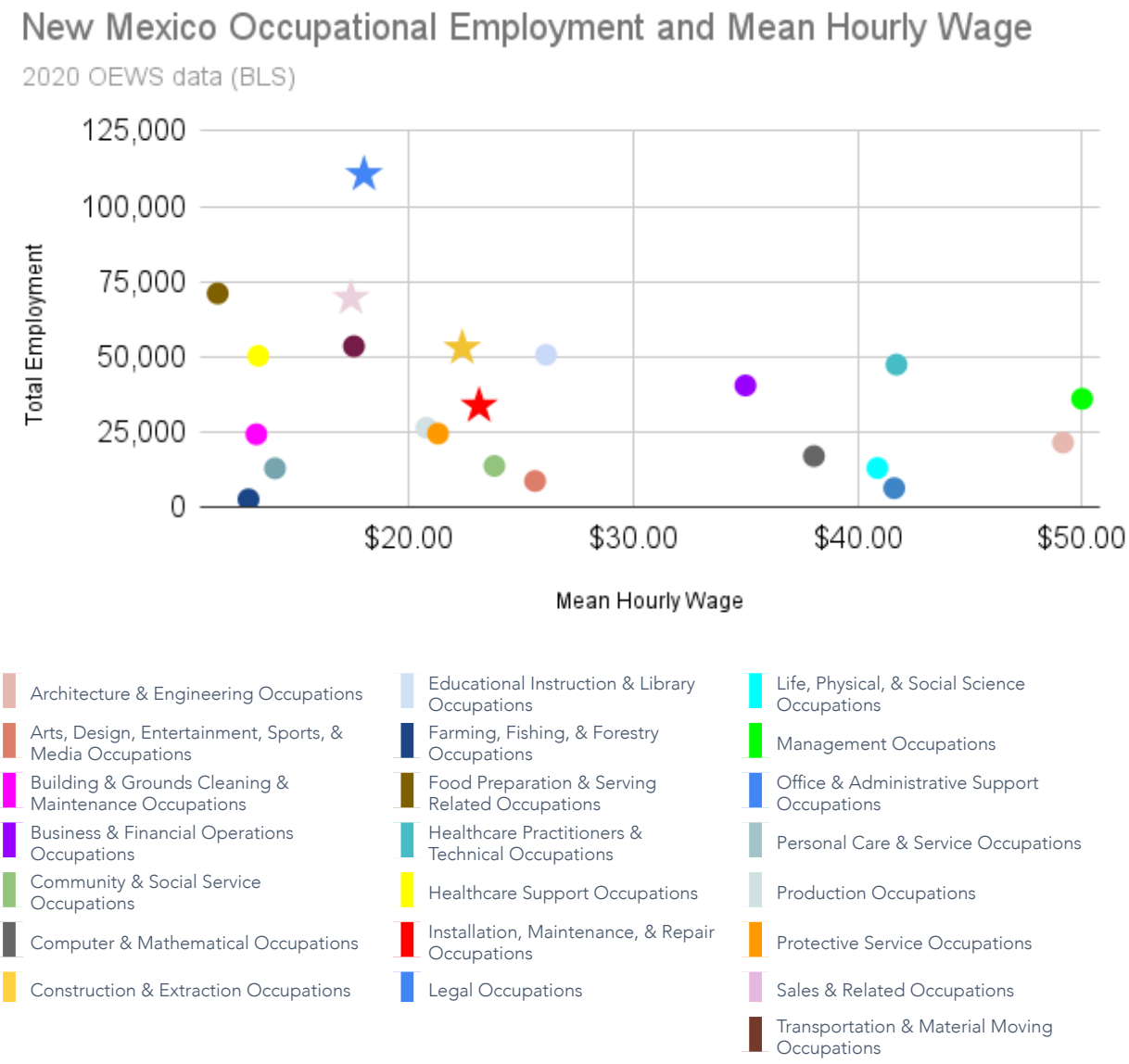
Table 5. Wages, Educational and Licensing Requirements for Top Clean Energy Occupations[23]

Occupation	Total employment	Average wage per hour	10th percentile wage per hour	90th percentile wage per hour	Educational requirements	License or Certification[24]
Construction Laborer	9,940	$16.56	$11.46	$22.90	Usually less than high school	No
Carpenter	3,220	$20.35	$12.37	$30.19	Usually less than high school diploma or equivalent	Licenses required for certain jobs
Electrician	4,050	$24.63	$14.67	$36.04	Trade school or apprenticeship	Journeyman, Electrical Contractor
First-line Supervisor of Construction Trades Workers	6,860	$31.57	$18.74	$50.88	Usually less than high school diploma or equivalent	Contractor's License
Plumbers, Pipefitters, & Steamfitters	2,440	$22.37	$14.46	$32.34	Trade school or apprenticeship	Contractor's License, Journeyman - Mechanical, Mechanical Contractor
Operating Engineers & Other Construction Equipment Operators	4,480	$24.41	$16.16	$36.38	Usually at least high school diploma or equivalent	Not specified
Heating, Air Conditioning, & Refrigeration Mechanics & Installers	1,440	$22.40	$13.57	$31.95	Usually at least postsecondary non-degree award	Contractor's License, Journeyman - Mechanical, Mechanical Contractor
Construction Managers	1,680	$46.04	$28.55	$68.30	Usually at least associate degree	Contractor's License

23 Bureau of Labor Statistics, Department of Labor, "May 2020 OEWS Estimates," accessed August 13, 2021, http://www.bls.gov/oes.
24 "Occupational Profiles," New Mexico Workforce Connection, accessed August 13, 2021, https://www.jobs.state.nm.us/vosnet/Default.aspx.

Figure 9 provides the most recent statewide employment numbers and mean hourly wages by occupational category. The occupations depicted by stars represent those with the highest job growth due to decarbonization. While these are not the highest-paid occupations in the state, the data indicate that decarbonization activities have the potential to create living-wage jobs for workers without a four-year or professional degree. There is always room to improve worker compensation, and doing so may be necessary to attract an adequate supply of workers.

Figure 9. New Mexico Employment and Mean Hourly Wage, by Occupational Category



JOB QUALITY AND INCLUSION

Good jobs can broadly be defined as those offering family-sustaining compensation, job security, and career mobility. Improving economic inclusion requires not only that good jobs exist (job quality), but that the diverse population of workers has equitable access to them (job access).

A pathway to a secure career in clean energy involves equipping workers with the skills they need to succeed in the in-demand occupations and calibrating training programs to market demands with a view to long-term job security. In the construction sector, quality pre-apprenticeship and apprenticeship programs strike this balance, providing established pathways to secure, family-sustaining jobs during and beyond the energy transition.

JOB QUALITY

Many clean energy training programs focus on a narrow set of skills that prepare workers for a narrow set of work tasks. This exposes them to excessive market volatility compared with workers who receive broad occupational training.

The significant growth in demand for construction workers in both the basic and specialty trades is apt to raise concerns about labor shortages and a need for investments in workforce training. Indeed, meeting aggressive climate goals will require massive infrastructure investments and significant growth in construction occupations. However, labor shortages cannot be adequately addressed with training or other "supply-side" strategies alone. Jobs must offer enough in the way of security, compensation, and other benefits to attract and retain skilled workers.

Since the 1970s, construction has shifted dramatically toward a "gig economy" model of self-employment, cutting costs for employers by stripping workers of benefits and protections. As a result, poor conditions for workers play a large part in the perceived "labor shortage." With less than 20 percent of construction projects in the United States today completed by unionized firms—compared to 80 percent in the 1970s—workers have increasingly lost leverage to combat low wages, job insecurity, lack of benefits and mobility, and abuses such as wage theft, which are all widespread today. Moreover, as union-coordinated apprenticeship programs declined in response to this trend, the nonunion sector failed to organize an alternative system for training workers. The "skills gap" decried for decades by homebuilders, homeowners, and construction firms has made plain the importance of organized training in maintaining a robust pool of skilled labor.[25] Training requires time and money. Unless the acquisition of credentials is tied to increased wages and better benefits, neither workers nor employers will make this investment.

Moreover, workforce development programs that focus on the *supply side* of the labor market can flood the market with new trainees ready to work when jobs for them do not exist. Excessive supply of trained workers relative to demand can drive down wages, which hurts incumbent workers as well as trainees, destabilizing and de-skilling the industry as retention of skilled and experienced workers becomes more challenging under these conditions. Furthermore, many supply-side training programs in the clean energy sector focus on a narrow set of skills that prepare workers for a narrow set of work tasks. Solar installation and wind technician programs are two examples of training that focus on narrowly defined skills, education, and competencies of workers, which exposes them to excessive market volatility.

25 For historical analysis of the "labor shortage" phenomenon in construction, driven by anti-union agendas since the 1960s and 19070s, see Andrew Yamakawa Elrod, "Built Trades," Phenomenal World, August 11, 2021, https://phenomenalworld.org/analysis/construction-labor-shortage.

Registered Apprenticeship

Broad occupational training, such as registered apprenticeships, can insulate against such volatility by strengthening workers' attachment to their occupations, thereby stabilizing the industry. Apprenticeship is an earn-as-you-learn training model with articulated wage progressions as trainees acquire skills and experience. Apprentices engage in both on-the-job training and classroom-based education, learning the theoretical and practical knowledge and skills to successfully complete a broad range of occupational tasks, including those required for a clean energy transition.

Apprentices engage in both on-the-job training and classroom-based education, learning the theoretical and practical knowledge and skills to successfully complete a broad range of occupational tasks, including those required for a clean energy transition.

Construction union apprenticeships are overseen by joint labor–management–apprenticeship training committees (JATCs), ensuring that the training meets the needs of workers as well as employers. Union apprenticeships are carefully calibrated to labor market demand. JATCs estimate how much work is coming up and how many new apprentices need to be recruited to fill the positions. This demand-driven model helps ensure that individuals who invest time in their skills development and training and employers who support them will see a return on their investment, while also ensuring that employers will have access to sufficiently skilled and trained labor to complete contracted jobs.

While apprenticeship training is expanding across many industries, the quality of apprenticeship programs varies significantly. Registered apprenticeships are vetted by either the U.S. Department of Labor, in the case of federally-registered apprenticeships, or the New Mexico State Apprenticeship Council, in the case of state-registered apprenticeships. In both cases, key elements of registered apprenticeships is that they provide pathways to certification by completing a specified number of on-the-job training hours and related technical instruction, and involve a demonstration of competency in defined subject areas. Even for registered apprenticeships, graduation rates are indicative the quality of the program. An effective program should be able to graduate about 50 percent of its apprentices. JATC programs are responsible for the majority of apprentices, and perhaps even more importantly, apprenticeship graduates.

Rather than investing public resources in workforce education and training, decarbonization investments should be tied to workforce standards that can "pull" trained workers into jobs. Project labor agreements, project stabilization requirements, community workforce agreements, responsible contractor pre-qualification, best-value contracting, prevailing wage requirements, and skill standards are all demand-side levers that create the market conditions to address labor shortages and expand opportunities for career-track training. Labor standards on public, ratepayer, and private investments will create more openings in quality apprenticeship programs.

As more apprenticeship openings and programs are created, investments also need to be made in creating more inclusive access to these opportunities. Barriers can be addressed through quality pre-apprenticeship or apprenticeship-readiness programs that provide a range of individualized support services during and after program completion to foster skills that workers need to enter and succeed in construction careers. Training programs can provide soft skills, professional development, and math tutoring to help applicants meet common criteria, as well as transportation and childcare support to reduce and remove barriers to success, disproportionately affecting women and workers of color.[26] Diversity and cultural competency training and practices among program staff and peers can likewise foster more inclusive and welcoming environments.

26 North America's Building Trades Unions, "Requirements Matrix," North America's Building Trades Unions, March 2017, https://nabtu.org/wp-content/uploads/2017/03/Requirements-Matrix.pdf, quoted in Frank Manzo, Betony Jones, and Katherine Luke, "How to Achieve Economic Justice in Illinois' Clean Energy Transition" Sierra Club and Inclusive Economics, January 2021, https://drive.google.com/file/d/1gEE1zRgg17YAsEvR-ngAgMTQuSRlYl4l/view

Installation labor represents just 11 percent of total solar project costs, so even large increases in worker compensation, have small effects on solar project costs.

Photo Credit: Catherine Werner, City of St. Louis, IBEW Training Center

Prevailing Wage

Prevailing wage laws work to recruit and retain skilled workers in the construction industry. While concerns that prevailing wage rules increase project costs abound, the vast majority of peer-reviewed studies have concluded that prevailing wage laws have no impact on public construction costs.[27] Labor costs represent a low percentage of total costs on construction projects, generally, and an even lower percentage of total costs on clean energy projects. Nationwide, in 2012, labor costs accounted for approximately 23 percent of total costs in construction, while the most recent federal data indicate that labor costs were just 11 percent of total solar project costs.[28, 29] This means that even wage increases of 20 percent would have minimal impact on construction costs, even before accounting for improved productivity, which tends to offset the potential impact.[30] When wages increase in construction, higher-skilled workers substitute in for less-productive workers.[31] Studies show that worksite productivity improves 14 to 33 percent as a result.[32, 33] Prevailing wage laws, therefore, increase worker efficiency, stabilize costs, and help to retain a skilled workforce.[34]

27 Frank Manzo and Kevin Duncan, "An Examination of Minnesota's Prevailing Wage Law: Effects on Costs, Training, and Economic Development" (Midwest Economic Policy Institute, 2018). An analysis of 335 school construction projects built before and after the 2015 repeal of prevailing wage in Indiana reveals that repeal had no statistical impact on the average cost per public school project. See: Frank Manzo and Kevin Duncan, "The Effects of Repealing Common Construction Wage in Indiana: Impacts on Ten Construction Market Outcomes" (Midwest Economic Policy Institute, 2018), https://midwestepi.files.wordpress.com/2018/01/mepi-csu-effects-of-repealing-common-construction-wage-in-indiana-final.pdf.

28 U.S. Census Bureau, "2012 Construction (NAICS Sector 23)," 2016, https://www.census.gov/data/tables/2012/econ/census/construction.html.

29 David Feldman, Vignesh Ramasamy, Ran Fu, Ashwin Ramdas, Jal Desai, and Robert Margolis. "U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020" (National Renewable Energy Laboratory [NREL], January 2021), https://www.nrel.gov/docs/fy21osti/77324.pdf, 45.

30 Furthermore, by promoting the use of higher-skilled workers, prevailing wage laws reduce expenditures on materials, fuels, and rental equipment. See: Kevin Duncan and Alex Lantsberg, "How Weakening Wisconsin's Prevailing Wage Policy Would Affect Public Construction Costs and Economic Activity" (National Alliance for Fair Contracting, 2015).

31 William Blankenau and Steven Cassou, "Industry Estimates of the Elasticity of Substitution and the Rate of Biased Technological Change between Skilled and Unskilled Labor," Applied Economics 43, no. 23 (2011): 3129–42.

32 Peter Philips, "Environmental and Economic Benefits of Building Solar in California: Quality Careers, Cleaner Lives" (Donald Vial Center on Employment in the Green Economy, Institute for Research on Labor and Employment University of California, Berkeley, 2014), http://laborcenter.berkeley.edu/pdf/2014/building-solar-ca14.pdf.

33 Other important factors to consider include apprenticeship enrollment, which is 6 to 8 percent higher, and apprentice completion of on-the-job and classroom training, which occurs at faster rates in states with prevailing wage laws. See: Cihan Bilginsoy, "Wage Regulation and Training: The Impact of State Prevailing Wage Laws on Apprenticeship" (Working Paper Series, Department of Economics, University of Utah, 2003), https://ideas.repec.org/p/uta/papers/2003_08.html; Cihan Bilginsoy, "The Performance of ABC-Sponsored Registered Apprenticeship Programs in Michigan: 2000-2016" (Illinois Economic Policy Institute, 2017).

34 Frank Manzo, Betony Jones, and Katherine Luke, "How to Achieve Economic Justice in Illinois' Clean Energy Transition" (Sierra Club and Inclusive Economics, January 2021), https://drive.google.com/file/d/1gEE1zRgg17YAsEvR-ngAgMTQuSRlYl4l/view.

New Mexico Apprenticeship Data

Table 6 presents the U.S. Department of Labor's record of New Mexico apprentices and programs for 2019.[35]

Table 6. New Mexico Apprenticeship Data

Active Apprentices	New Apprentices	Completers	Active Programs	New Programs
2,364	837	233	38	22

Table 7 provides apprenticeship data for the highest-growth occupations in New Mexico. More apprenticeship data can be found in Appendix F. We were unable to obtain program-specific demographic data.

Table 7. New Mexico Federally Registered Apprenticeship Program, Highest-Growth Occupations

PROGRAM	OCCUPATION	JOURNEYMAN WAGE
ALBUQUERQUE PLUMBING, HEATING & COOLING, INC.	HVACR TECHNICIAN	$22.00
	PLUMBER	$22.00
ASSOCIATED BUILDERS & CONTRACTORS, INC.-NEW MEXICO	CARPENTERS	$19.78
	CONSTRUCTION CRAFT LABORERS	$15.00
	ELECTRICAL	$22.60
	HVACR TECHNICIAN	$23.00
	PLUMBERS & PIPEFITTERS	$21.68
ASSOCIATED GENERAL CONTRACTORS-NEW MEXICO	CARPENTER	$20.86
	LABORER	$15.04
CENTRAL NEW MEXICO ELECTRICAL COOP	LINEMAN	$36.23
CONTINENTAL DIVIDE ELECTRICAL COOP	LINEMAN	$39.53
ELECTRICIANS JATC	ELECTRICIAN	$33.65
CITY OF FARMINGTON UTILITY	LINEMAN	$42.79
HUSSMANN	INSTALLATION REFRIGERATION MECHANIC	$20.00
	SERVICE REFRIGERATION MECHANIC	$20.00
INDEPENDENT ELECTRICAL CONTRACTORS OF SOUTHERN NM	ELECTRICIAN	$22.64
NEW MEXICO LABORERS	GENERAL	$17.18
	LABOR	$18.40
SW CARPENTER & AFFILIATED TRADES JOINT APP & TRNG COMMITTEE	CARPENTER	$25.63
	CARPENTER (mill cabinet or light commercial)	$18.71
NORTHERN NEW MEXICO INDEPENDENT ELECTRICAL CONTRACTORS	ELECTRICIAN	$29.01
OPERATING ENGINEERS LOCAL 953	CRANE OPERATOR	$18.20
OPERATING ENGINEERS LOCAL 954	MECHANIC	$18.20
OPERATING ENGINEERS LOCAL 955	OPERATOR	$18.20
OPERATING ENGINEERS LOCAL 956	STATIONARY ENGINEER	$18.20
PLUMBERS & PIPEFITTERS LOCAL 412	HAVCR	$31.52
PLUMBERS & PIPEFITTERS LOCAL 413	PLUMBERS & PIPEFITTERS	$31.52
PUBLIC SERVICE COMPANY OF NEW MEXICO (PNM)	PNM-LINEMAN	$42.37
	PNM-SUBSTATION ELECTRICIAN	$42.37
SPRINGER ELECTRIC COOP.	LINEMAN	$21.00

35 "FY 2019 Data and Statistics," U.S. Department of Labor, September 30, 2019, https://www.dol.gov/agencies/eta/apprenticeship/about/statistics/2019.

EQUITY AND INCLUSION

Photo Credit: Rising Sun Center for Opportunity

Non-discrimination policies are meant to support equity and inclusion, but their real-world effectiveness is limited if they are unenforced or out of date. United States Federal Executive Order 11246 stipulates that federal contractors and contractors who receive federal assistance for construction projects must adhere to specified non-discrimination policies. These measures include participation goals of 6.9 percent for female workers nationwide and geographically specific goals for workers who are Black, Indigenous, and People of Color (BIPOC), which includes workers of Hispanic or Latinx ethnicity who do not identify as white.

While these federal standards are available and calculated to represent the demographic and geographic diversity of New Mexico, the "minority" goals are based on the 1970 Census and are out of date with the current racial and ethnic composition of some regions.[36, 37] For example, targets for BIPOC inclusion in New Mexico are 38.3 percent in Bernalillo and Sandoval counties (Albuquerque metropolitan area) and 45.9 percent in other counties, including San Juan and Santa Fe,[38] whereas the U.S. Census Bureau's 2019 American Community Survey estimates that collectively, the BIPOC population and people of Hispanic ethnicity who identify as white make up 62.6 percent, 56 percent, 64.2 percent, and 56.2 percent of the population in the four counties named, respectively.[39, 40, 41, 42]

Furthermore, federal standards require that contractors "engage in outreach and other good faith efforts to broaden the pool of qualified candidates to include minorities and women," meaning that if contractors fail to meet the participation goals, they are not in violation of the Executive Order.[43] State and local funding agencies could adopt more stringent requirements that trigger penalties when contractors fail to meet the established criteria for participation.[44]

36 According to the federal standard cited here, "Minorities include individuals who are Black, Hispanic [regardless of race], Asian or Pacific Islander, American Indian or Alaskan Native. As used in this guide, the term may mean members of these groups in the aggregate or members of an individual group. See 41 CFR 60-4.3(a)1.d. "Technical Assistance Guide for Federal Construction Contractors: Participation Goals for Minorities and Females," U.S. Department of Labor - Employment Standards Administration Office of Federal Contract Compliance Program, n.d., https://www.dol.gov/ofccp/taguides/tac_fedcontractors_jrf_qa_508c.pdf.

37 Office of Federal Contract Compliance Programs - U.S. Department of Labor, "FAQs on Nondiscrimination in the Construction Trades," https://www.dol.gov/ofccp/regs/compliance/faqs/NondiscriminationConstructionTrades_FAQs.htm#Q14.

38 It is worth noting that these are among the highest targets in the country, reflecting New Mexico's majority-minority population, surpassed only by the targets for Hawaii and certain areas of Texas and Florida. See "Technical Assistance Guide for Federal Construction Contractors," U.S. Department of Labor.

39 41 For each county, calculated as the difference between "Total Population" and "White alone, not Hispanic or Latino." 2019 American Community Survey 5-Year Estimates, "U.S. Census Bureau - Geography Profile: Bernalillo County, New Mexico | People and Population | Race and Ethnicity," 2019, https://data.census.gov/cedsci/profile?g=0500000US35001.

40 2019 American Community Survey 5-Year Estimates, "U.S. Census Bureau - Geography Profile: Sandoval County, New Mexico | People and Population | Race and Ethnicity," 2019, https://data.census.gov/cedsci/profile?g=0500000US35043.

41 2019 American Community Survey 5-Year Estimates, "U.S. Census Bureau - Geography Profile: San Juan County, New Mexico | People and Population | Race and Ethnicity," 2019, https://data.census.gov/cedsci/profile?g=0500000US35045.

42 2019 American Community Survey 5-Year Estimates, "U.S. Census Bureau - Geography Profile: Santa Fe County, New Mexico | People and Population | Race and Ethnicity," 2019, https://data.census.gov/cedsci/profile?g=0500000US35049.

43 "Nondiscrimination in the Construction Trades - FAQ," U.S. Department of Labor.

44 Julian Gross and PolicyLink, "Local and Targeted Hiring" (Policy Brief, Local Progress: The National Municipal Policy Network), accessed February 1, 2021, https://www.policylink.org/find-resources/library/local-and-targeted-hiring.

In 2019, according to the Solar Foundation's Solar Jobs Census, 36.5 percent of solar jobs in New Mexico were held by women, up from 21.8 percent in 2015. Hispanic or Latinx workers held 37.4 percent of solar jobs, compared to 39.5 percent in 2015.[45, 46] While these numbers show that women are increasingly well-represented in the field and that Hispanic or Latinx workers remain so, as the clean energy economy matures, inclusion and equitable participation of women and people of color at all levels of employment across all industries (not only solar) must remain a guiding principle.

A related national study, U.S. Solar Industry Diversity Study 2019: New Resources on Diversity and Inclusion in the Solar Workforce, surveyed 377 solar industry firms and 398 employees (72.5-percent men and 27.2-percent women). The responses indicate that people of color were less likely to be in manager, director, or president (MDP) positions: 37 percent of white solar workers held MDP positions, compared to 35 percent of Black solar workers and 25 percent workers of other races. While white workers made up 73.3 percent of the solar workforce overall, they held 88 percent of top executive positions. Although around 6 percent of both men and women respondents fell in the highest wage bracket of $75 or more per hour, the overall gender wage gap in solar stood at 26 percent, i.e., women earning 74 cents on the dollar compared to men. Only 26 percent of women reported being "very satisfied" with their wage and position, compared to 40 percent of men.

In terms of career advancement, the study finds the gender gap endures and is significantly greater for women of color: nationwide, only 60 Black women for every 100 men receive promotions to a manager position, compared to a ratio of 84 to 100 for white women.[47] The previous edition of the study in 2017 reported that women of color were "grossly excluded from the highest wage category, with only 4 percent of women of color earning wages above $75 per hour."[48]

Many industries lack the clear metrics needed to define and pursue equity goals. Tracking diversity trends through regular studies, as the solar industry is doing at the national level with its diversity study, is an important tool that should be implemented for all industries, with at least state-level granularity. In the case of solar, the 2019 study showed some improvement in job satisfaction and wages for Hispanic/Latinx and Black respondents compared to 2017. Overall, the findings illustrate the need to continue improving diversity and equity in compensation and promotion at all levels of employment, particularly with regards to gender and especially for women of color. To build training programs that successfully diversify the clean energy workforce also requires infrastructure to coordinate and track the network of frontline organizations providing direct and sustained support for members of economically disadvantaged communities, environmental justice communities, communities of color, and displaced fossil fuel workers.

The organization Young Invincibles makes the following recommendations for achieving gender parity in apprenticeship participation: set a gender equity target for the state's apprenticeships; fund diversity, equity, and inclusion (DEI) consultants to support the recruiting and retaining of women, particularly in male-dominated fields; release annual data on apprenticeship participation to track the state's progress toward gender equity; increase access to affordable childcare; and employ best practices for recruiting women. Tracking diversity metrics and pay parity isn't enough; in order to achieve real gender equity, the culture of construction needs to significantly shift to one that is truly inclusive. This transformation requires deep work that not only addresses the systematic and historical issues around gender and racial discrimination, but changes of processes, behaviors, and expectations for workers (i.e., culture) from top to bottom.

In the construction sector—the industry sector into which solar, wind, and grid infrastructure fall—there are significant compensation differentials between union and non-union workers. Published analyses show that unions boost hourly wages for all construction and extraction workers, regardless of race or gender. A case-study of wage premiums for construction and extraction occupations in Illinois, for example, found that unions raise wages by 49 percent for white workers and 56 percent for African American workers, and by 55 percent for men and 67 percent for women.[49]

45 The Solar Foundation, "New Mexico Solar Jobs Census 2019," 2019, https://www.solarstates.org/#state/new-mexico/counties/solar-jobs/2019.

46 The Solar Foundation, "New Mexico Solar Jobs Census 2015," 2015, https://www.solarstates.org/#state/new-mexico/counties/solar-jobs/2015.

47 "U.S. Solar Industry Diversity Study 2019: New Resources on Diversity and Inclusion in the Solar Workforce" (The Solar Foundation, Solar Energy Industries Association [SEIA], 2019), https://www.thesolarfoundation.org/diversity/.

48 "U.S. Solar Industry Diversity Study 2017: Current Trends, Best Practices, and Recommendations," (The Solar Foundation, 2017), https://irecusa.org/resources/2017-solar-industry-diversity-study/.

49 "How to Achieve Economic Justice in Illinois' Clean Energy Transition" (Inclusive Economics, ILEPI, and Sierra Club, March 2019), https://drive.google.com/file/d/1gEE1zRgg17YAsEvR-ngAgMTQuSRlYl4l/view.

RECOMMENDATIONS

Photo Credit: Rising Sun Center for Opportunity

Both climate change and the energy transition will affect workers—workers in the fossil fuel and energy-intensive industries, workers subject to the vagaries of harsh weather, workers dependent on natural resources threatened by climate change, and workers who have never had access to secure employment. The energy transition will create new jobs but will also see the decline of long-established jobs. While the data in this report do not model significant job loss (largely because the model does not account for the in-state effects of other states' activities, i.e., reduced demand for New Mexico oil and gas), shifting to a carbon-neutral economy will change the composition of the state's occupations and industries.

Built into New Mexico's Energy Transition Act (ETA) are a number of provisions aimed at ensuring a just transition, including the creation of community- and worker-transition funds and an apprenticeship utilization standard.[50] To maximize benefits and minimize costs on its path to decarbonization, New Mexico should continue investing in just transition tools and resources, support the growth of high-quality jobs, and improve access to jobs and contracting opportunities for women, people of color, and other marginalized people.

50 Cited from this comprehensive review of just transition measures adopted by various states: "State-Based Policies To Build A Cleaner, Safer, More Equitable Economy – A Policy Toolkit" (BlueGreen Alliance, July 24, 2020), https://www.bluegreenalliance.org/resources/state-based-policies-to-build-a-cleaner-safer-more-equitable-economy-a-policy-toolkit/.

1. Just Transition

If industries shutter, individual workers—and in some cases, entire communities—will require support to avoid excessive hardship. Workers may need retraining, wage guarantees, or bridges to retirement. Communities may require economic diversification and development investments. These are the elements of a just transition, but the need for transition support is best averted by minimizing industry destabilization that leads to abrupt layoffs.

Minimizing transition risks requires long-term planning. There are uncertainties as to the future of fossil fuel extraction and use, but when uncertainty leads to inaction, there is real risk for workers. Setting targets and engaging in long-term planning are essential to avoid industry death spirals and disorderly worker displacement. Avoiding layoffs requires managing fossil fuel decline to avoid—or at least plan for—the disruption to existing industries. By looking ahead, the state can negotiate retention bonuses to retain skilled workers even as an industry contracts, align industry contraction with retirements, and minimize or avoid layoffs. Long-term planning is also required for comprehensive statewide industrial strategy that is compatible with and supportive of a decarbonized economy as well as forward-looking economic diversification across all of New Mexico's unique regions.

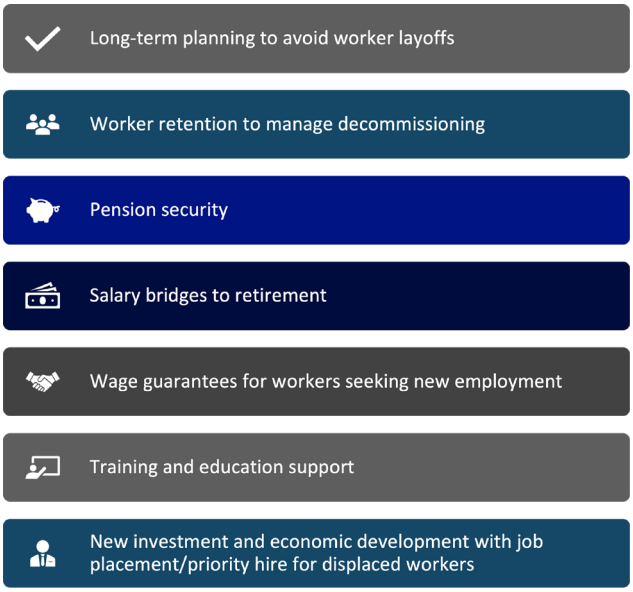


Figure 10.

Components of a Just Transition for Fossil Fuel Workers

2. Support High-Road Jobs

Creating secure family-sustaining jobs means both supporting responsible "high-road" employers and closing off the "low road" whereby firms gain a competitive advantage by skirting laws and regulations. High-road employers are those who invest in: reduction of pollution, emissions, and other environmental impacts; workplace health and safety; and employee benefits, compensation, and training. High-road firms cannot compete in an economy (or energy plan) that prioritizes low cost. Growing responsible businesses requires adopting and enforcing robust rules so that all participants in an industry meet threshold responsible employer criteria. In a global economy, New Mexico must align different facets of labor, economic, and industrial policy to explicitly support the high-road path to decarbonization.

PUBLIC PROCUREMENT: JOB-QUALITY STANDARDS

In order to firmly counter a "race to the bottom," labor standards, inclusive hiring practices, and environmental standards need to be embedded in RFPs and contracts whenever the state is spending money on goods or services. In general, public procurement is an under-utilized lever for meeting climate, equity, and workforce goals. It is through the procurement of both goods and services that the state government signals its policy priorities. Prevailing wage laws establish criteria for the utilization of registered apprentices as well as a threshold for worker pay and benefits. These laws ensure that firms employing skilled workers are not underbid, that public works construction can attract and retain a skilled workforce, that industry accounts for the full costs of doing business (i.e., not passing costs on to taxpayers by paying sub-standard wages that require welfare subsidies), and that public dollars will support the training of the next generation of skilled workers through apprenticeship.

Beyond construction, public contracting for other services is also a lever for job quality and job access. When a public contracting process prioritizes lowest cost over best value, it actually undermines the goals of developing a skilled, stable, and diverse workforce. New Mexico procures a wide range of products and services, many of which are related to its energy goals. Energy service contracts, transit vehicle purchases, and other public contracts are opportunities to ensure that the jobs the state is supporting are high-quality jobs accessible to workers or color and other marginalized individuals.

The U.S. Employment Plan (USEP) developed by the Jobs to Move America Coalition is a customizable tool to encourage companies competing for public procurement contracts to disclose information on job creation, job quality, and plans to recruit and train historically marginalized workers. It provides public agencies with guidance on building good jobs and equity into their bidding processes. LA Metro, Amtrak, and Chicago have already used USEP, and new legislation proposed in New York State would mandate the public bus system's conversion to electric using USEP.[51]

In addition to supplier diversity goals, it is equally important to establish standards protecting workers on public contracts. In the slow economic recovery following the Great Recession, more than 300,000 workers on federal contracts were victims of wage-related labor violations,[52] and repeated analyses of federal contracting data show that this trend is ongoing. Lowest-bid contracting especially harms women and workers of color, who are disproportionately employed in low-pay and high-risk industries.[53] High-road contracting can help end economic segregation that consigns women and workers of color to low pay and multigenerational wealth disparities. New Mexico can immediately put to use its annual outsourcing budget to ensure private sector adherence to the state's climate, equity, and workforce goals.

PRIVATE INFRASTRUCTURE REGULATION AND INCENTIVES

While prevailing wage laws only apply to projects where state or federal money is used, the state can leverage its other powers to improve the quality of jobs in the private sector. A tax credit can be offered for projects that meet certain labor standards, along with a tax exemption for projects that pay prevailing wage and for projects developed under a Project Labor Agreement (PLA) or Community Workforce Agreement (CWA).

Beyond tax credits and exemptions, permit review and licensing and skill standards are other ways the state government can influence job quality in the private sector. California just adopted legislation to require EV Infrastructure Training Program (EVITP) certification for crews that install EV charging infrastructure.[54] Illinois requires that distributed solar installers meet certification criteria equivalent to at least an associate degree.[55] Stringent licensing and skill standards can improve job quality while also ensuring public safety.

These measures should not be considered costs to state government because there are significant public benefits of higher worker wages. When jobs do not pay enough, workers turn to public assistance in order to meet their basic needs. Welfare expenditures can be reduced by higher wages and increases in employer-provided health insurance.

51 Jobs to Move America, "U.S. Employment Plan," April 10, 2020, https://www.ladbs.org/services/green-building-sustainability/existing-buildings-energy-water-efficiency-program/2016-ebewe-annual-report.

52 Office of Senator Elizabeth Warren, "Breach of Contract: How Federal Contractor Fail American Workers on the Taxpayer's Dime" (United States Senate), accessed August 13, 2021, https://www.warren.senate.gov/files/documents/2017-3-6_Warren_Contractor_Report.pdf.

53 In the Public Interest, "How Privatization Increases Inequality" (In the Public Interest, September 28, 2016), accessed August 13, 2021, https://www.inthepublicinterest.org/wp-content/uploads/InthePublicInterest_InequalityReport_Sept2016.pdf.

54 "Energy: Transportation Electrification: Energy Efficiency Programs: School Energy Efficiency Stimulus Program," Pub. L. No. AB-841 (2020), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB841.

55 "Illinois Solar Energy Association - Distributed Generation Installer Certification," Distribution Generation Installer Certification, accessed August 13, 2021, https://illinoissolar.org/dgcertification.

CUT OFF THE LOW ROAD

Improving job quality will be more difficult and less effective if firms that skirt laws and regulations continue to undercut responsible employers. In the gig economy, misclassifying employees as independent contractors allows companies to avoid supporting the social safety net or reimbursing workers for the costs incurred in doing their job, such as mileage reimbursement. Employee classification protects workers through workers compensation insurance, family and medical leave, unemployment insurance, and workplace health and safety laws. One study on the misclassification of truck drivers in California shows that compliance with the state's environmental regulation was lower for misclassified drivers because they could not afford the costs of compliance.[56] Cutting off the low road through increased enforcement and fines is essential for meeting the state's energy, equity, and workforce goals.

3. Improve Access to Economic Opportunity for People of Color, Women, and Other Marginalized Groups[57]

While we cannot achieve equity without ensuring job quality, improving job quality does not automatically improve equity. In fact, often, as job quality improves, jobs tend to become more exclusionary. This is the result of a broken system, and deliberate investments are required to counter this trend and build a system of equity and inclusion. These investments involve building and strengthening partnerships between employers, training providers, and community-based organizations; securing commitments from employers to hiring participants of training programs; conditioning financial assistance for clean energy or workforce development on targeted hire standards; expanding public sector employment; and improving access to broad occupational training.

BUILD PLACE-BASED TRAINING PARTNERSHIPS

When investing in workforce education and training, respond to employer needs, but also secure employer commitments to interviewing and hiring graduates of the training programs. In addition to employer partnerships, partnering with community-based organizations can support improved recruitment of under-represented populations and provide support services needed for participant success, such as childcare, transportation, mentoring, counseling, or other supports. No single entity in a community can, alone, correct for historic and systemic racism and sexism in tan industry. To ensure diversity, equity, and inclusion, invest in establishing and strengthening formal partnerships.

CONDITION PUBLIC FUNDING ON TARGETED HIRE STANDARDS

By emphasizing both job quality and job access together, New Mexico can enable inclusive access not only to jobs, but to good, career-track, family-sustaining jobs. Job training and education may improve outcomes for individual workers, but demand-side levers in the procurement process—like targeted and local hire criteria—are essential "pull" mechanisms that ensure upward mobility. To promote equity, tools to improve job quality and job access must go hand-in-hand; when they do not, better-quality jobs are likely to become more exclusionary, keeping people of color, women, and other marginalized people relegated to more precarious and low-paying employment. The clean energy industry has a lot of work to do to overcome race and gender disparities; the gender pay gap is greater in solar than in the broader U.S. workforce, and senior executives in the solar industry are disproportionately white.[58]

56 Sam Appel and Carol Zabin, "Truck Driver Misclassification: Climate, Labor, and Environmental Justice Impacts" (UC Berkeley Labor Center, August 2019), https://laborcenter.berkeley.edu/pdf/2019/Truck-Driver-Misclassification.pdf.

57 Supplier diversity initiatives and worker-owned cooperatives have been held up as promising tools for supporting economic equity; however, these are business/employer strategies, rather than workforce strategies and are not covered here. In both cases, efforts to support and build the capacity of these firms to meet job-quality and inclusion standards will be necessary. The structure and/or ownership of the firm alone does not fully protect workers from exploitation and low-road practices.

58 "U.S. Solar Industry Diversity Study 2019."

EXPAND THE PUBLIC SECTOR

A strong public sector is essential for long-term climate adaptation and resiliency. Communities benefit from a robust public sector. Public employees across all occupations enhance community well-being, help people navigate ordinary hardships, and respond effectively to emergencies. Public health workers, social workers, 911 operators, and librarians join with maintenance workers, stormwater managers, and others to maintain safe and operational systems and step up in times of crisis. There is also an opportunity for expanded public employment in energy efficiency, tree planting, and other climate activities.

Public-sector employment enhances racial equity in the workplace. Even as the private sector has remained segregated, the public sector has been a critical source of well-compensated, stable jobs for Black Americans since the mid-20th century. The median wage earned by Black employees is significantly higher in the public sector than in other industries. Some 44 percent of Black public-sector workers are able to gain economic security through homeownership, as opposed to 28 percent of Black private-sector workers.[59] From 2008-2010, 21.2% of all Black workers were public employees, compared with 16.3 percent of all other workers.[60] Public-sector contraction and outsourcing, therefore, disproportionately affects Black workers.[61] Expanding state and municipal employment can also support equity by providing jobs for individuals facing barriers to employment such as poverty, lack of a high school diploma or GED, a criminal record, homelessness, etc.

IMPROVE ACCESS TO BROAD OCCUPATIONAL TRAINING

Education and training will be essential to meet the demands of a low-carbon economy, but education and training do not create jobs, nor do they improve the quality of jobs created. Workforce education and training must be calibrated to labor market demand. Otherwise, the supply of workers can outstrip the demand for workers, increasing competition between workers and driving down wages.

Rather than training people for new "green jobs," an emphasis should be placed on training people for the greening of traditional occupations. Broad occupational training remains important. A worker will have more options, a more-stable career, and better pay as a fully licensed electrician than as a solar installer. Many of the jobs we think of as "green" are jobs that fall within traditional occupational jurisdiction. As the demand for workers proficient with new technologies grows, there is an opportunity to train more people with the foundational broad knowledge and skills to be able to grow and adapt with the technology.

Apprenticeship provides a college-alternative pathway to a family-sustaining career, but apprenticeships are competitive and selective. Pre-apprenticeship or apprenticeship-readiness programs are a good way to introduce new workers to trades work, provide them with some on-the-job experience, math skills, and work-readiness skills to successfully gain entry to and succeed in an apprenticeship program. The Multi-Craft Core Curriculum (MC3) is a comprehensive pre-apprenticeship training curriculum that has received support from industry, government, and labor partners.[62] Across the country, community-based organizations, high schools, and community colleges utilize the MC3.[63, 64] Many MC3 pre-apprenticeship programs are targeted to specific populations, such as women, opportunity youth, or formerly incarcerated individuals and provide specific wrap-around support services to help workers overcome barriers to quality training employment.

59 Deja Thomas, Lola Smallwood-Cuevas, and Saba Waheed, "Reimagined Recovery: Black Workers, the Public Sector, and COVID-19" (UCLA Labor Center, June 2020), https://www.labor.ucla.edu/publication/reimagined-recovery-black-workers-the-public-sector-and-covid-19/.

60 Steven C. Pitts, "Black Workers and the Public Sector" (UC Berkeley Labor Center, April 3, 2011), https://laborcenter.berkeley.edu/black-workers-and-the-public-sector/.

61 "How Privatization Increases Inequality" (In the Public Interest), accessed August 13, 2021, https://www.inthepublicinterest.org/report-how-privatization-increases-inequality-2/.

62 North American Building Trades Unions, "The Building Trades' Multi-Craft Core Curriculum: A Guide for Students and Parents," 2017, https://nabtu.org/wp-content/uploads/2017/08/MC3-in-Our-Schools-A-Guide-for-Students-and-Parents.pdf.

63 Tommy Burress, Tom Gannon, and Ragini Kapadia, "Community-Based Organizations and Union Apprenticeship Programs: Creating Pathways to Careers in the Unionized Construction Trades for Minorities and Lower-Skilled Workers" (Green Ways: A Jobs for the Future initiative, April 2011), https://jfforg-prod-prime.s3.amazonaws.com/media/documents/CommBasedOrg-UnionApprentProg_040212.pdf.

64 North American Building Trades Unions, "Why Should We Teach MC3 in Our Schools?," 2017, https://nabtu.org/wp-content/uploads/2017/03/Why-We-Should-Adopt-the-MC3-in-Our-School-2-22-17.pdf; North American Building Trades Unions, "What Is a Building Trades Apprenticeship Readiness Program?," (2018), https://nabtu.org/wp-content/uploads/2018/02/ARP-MC3-Program-Overview.pdf.

CONCLUSION

The analysis herein examines the impacts of a reference case and three defined scenarios for decarbonizing New Mexico's economy, each of which focuses on energy. The production and consumption of energy are indeed at the core of decarbonization, but the state's transition to a green economy can and must also involve changes in many other economic areas—the development of new sectors and the waning of others—which are not captured here. This diversification of the state's economy—for example, with remediation of areas polluted and depleted by extractive industries and by harnessing New Mexico's natural resources, beauty, and climate—will also create jobs across New Mexico's diverse regions. With intention and commitment, deep decarbonization can support the growth of high-quality jobs and improved economic opportunity for workers facing transition as well as those who've been left behind. The recommendations outlined can help forge a resilient, just, and sustainable future for the State of New Mexico.

APPENDICES