



# **The Projected Impact of the Energy Transition Act on Native American Communities in New Mexico**

The Closure of the San Juan Generation Station as a Case Study  
for Wider Movement Toward Clean Energy in New Mexico

June 2019

## **NOTES & DISCLAIMER**

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## Key Aspects of the Energy Transition Act

Passed in the 2019 session of New Mexico’s legislative session, the Energy Transition Act (ETA) is a watershed opportunity for the state that can motivate a significant transition from fossil fuels towards a more renewable or clean energy-based economy.<sup>1</sup> Some of the main components of the law most relevant to Tribal communities in New Mexico are summarized below:

- Available Funding for Transition: There is funding within the legislation to transition from fossil fuel-based operations, including \$40 million for San Juan County and other affected communities for economic development purposes, such as severance packages for displaced plant and coal mine workers.
- Reclamation: There is up to \$30 million in funding for clean-up and remediation of the San Juan Generating Station.
- Renewable Energy Standards Set: Investor-owned utilities will be required to provide 50% renewable energy by 2030, 80% by 2040 and be 100% carbon-free in energy production by 2045. Rural electric co-ops, with slightly different standards, will need to provide 50% renewable energy by 2030 and be 100% carbon-free using 80% renewables by 2050.
- Available Job Training Resources: Funding and resources will go toward workforce re-training for plant and mine workers. For example, apprenticeships prioritizing residents in disadvantaged or affected communities will be required for energy jobs in the state. We define “affected communities” as “New Mexico counties located within one hundred miles of a closing New Mexico electricity-producing facility, resulting in at least forty displaced workers.”
- Replacement Power to be Built in San Juan County: The bill directs up to 450 megawatts of replacement power to be built in San Juan County, a policy intended to replace the lost property-tax base for the county and other municipalities associated with the coal mine and related entities when they close.
- Funds for Community Engagement Efforts: The ETA creates three funds under management of the Workforce Solutions, the Economic Development, and the Indian Affairs Departments. The three departments will hold community meetings in affected communities to solicit feedback on the utilization of these funds. The Indian Affairs Department will lead a more extensive community engagement process, including visits to every chapter within affected communities to solicit feedback and recommendations. This process will ensure inclusion of Native American communities in strategic planning from the on-set of these efforts.
- Creation of a Community Advisory Committee: The ETA requires each of these departments to appoint a convener responsible for appointing members of the Community Advisory Committee. The law requires that the Community Advisory

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<sup>1</sup> For the full legislation, see: <https://www.nmlegis.gov/Legislation/Legislation?chamber=S&legtype=B&legno=489&year=19>

Committee include a member from each of the following stakeholder communities:

- Each municipality in affected communities
- Each county in affected communities
- Each Indian Nation, Pueblo, Tribe in affected communities
- Each land grant in affected communities
- Four appointees representing diverse economic and cultural perspectives of affected communities, and one appointee representing displaced workers in affected communities

The following table presents the tentative timeline for this full process:

<b>Proposed Deadline</b>	<b>Action</b>
July 2019	Indian Affairs Department Tribal outreach begins
August 2019	Departments appoint conveners
September 2019	Conveners appoint Community Advisory Committee members (conveners will solicit recommendations from affected communities for Community Advisory Committee members)
October 2019	1 <sup>st</sup> required meeting with all three departments
March/April 2020	2 <sup>nd</sup> required meeting with all three departments
September 2020	3 <sup>rd</sup> and final required meeting with all three departments
2022	Expected availability of money from the departments' funds



## **The ETA Will Fundamentally Change New Mexico's Energy Production Economy**

The ETA is a truly transformational law with huge implications for New Mexico's economy and environment. New Mexico is currently heavily reliant on coal, which supplies roughly 50% of its electricity. Natural gas supplies another 30%, and only 20% currently comes from renewable energy. New Mexico is the fifth-largest oil producing state in the nation, producing roughly 5% of the national crude oil and also approximately 4% of the nation's natural gas.<sup>2</sup> Similarly, New Mexico possesses roughly 2.5% of the nation's estimated recoverable coal reserves.<sup>3</sup> Although coal deposits exist around New Mexico, the San Juan Basin is the state's largest coal-bearing region and the only area currently being mined.<sup>4</sup> The state's coal production has decreased in the past decade, but New Mexico's three active coal mines continue to account for almost 2% of U.S. total mined coal. Two of the state's three mines are dedicated suppliers to neighboring coal-fired power plants.

Given the current substantiality of New Mexico's fossil fuel-based infrastructure, the strong tie between the economy of New Mexico and fossil fuel production is not surprising. The most recent state budgeting process reflects the powerful role oil production plays in state resources, as a boom in oil revenues provided the state with a surplus of approximately \$1.4 billion. Governor Michelle Lujan Grisham signed a \$7 billion budget in April 2019 that included raises for teachers and state employees, millions for infrastructure improvements, and roughly \$450 million in new funds for education.

### The Transition from Fossil Fuels Will be Transformational for Tribes in New Mexico

Given that two of New Mexico's largest Tribal nations, the Navajo, and Jicarilla Apache Nations, are located in the oil, coal and gas-rich Four Corners region of northwestern New Mexico, the transition away from fossil fuel across the state will be vital to the state's Native American communities. The Jicarilla Apache Nation's reservation is on the eastern edge of the San Juan Basin, which is a robust hydrocarbon-producing area of the state. This prime location makes the Jicarilla Apache Nation the largest mineral rights owner in the basin, second only to the federal government.<sup>5</sup> The Navajo Nation has interest in a company that owns and runs oil, gas and coal operations on its lands in the San Juan Basin in New Mexico. The Four Corners Generating Station, one of the largest power plants in New Mexico, uses the coal from the San Juan mine.<sup>6</sup>

Despite a strong connection to the fossil fuel economic industry, Tribal communities in New Mexico all have potential benefit from the transition to renewable energy the ETA motivates. Several Tribal nations have recently developed solar power capacity. These include the Picuris Pueblo of New Mexico, which completed a one-megawatt, community solar PV array to supply energy to the Tribal buildings and residences on the Picuris trust land<sup>7</sup> and are

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<sup>2</sup> <https://www.eia.gov/state/?sid=NM#tabs-4>

<sup>3</sup> U.S. EIA, Annual Coal Report 2017 (November 2018), Table 2, Coal Production and Number of Mines by State, County, and Mine Type, 2017.

<sup>4</sup> New Mexico Energy, Minerals and Natural Resources Department, New Mexico Mines and Minerals Division, Active Mines in New Mexico, November 2014.; New Mexico Bureau of Geology and Mineral Resources, Importance of Coal Production in New Mexico, accessed December 15, 2018.

<sup>5</sup> <https://www.eia.gov/state/analysis.php?sid=NM>

<sup>6</sup> <https://www.eia.gov/state/analysis.php?sid=NM#123>

<sup>7</sup> U.S. Department of Energy, Office of Indian Energy Policy and Programs, "Community Solar to Meet 100% of Energy Costs for New Mexico Tribe," Press Release (January 11, 2018).

currently developing a second.<sup>8</sup> Santo Domingo Pueblo installed a 115-kilowatt PV system to fuel its water pump and water treatment facility.<sup>9</sup> As we discuss in more detail later in this report, the Jicarilla Apache Nation entered into an agreement with PNM and others to supply a large portion of the City of Albuquerque's power needs through a large-scale, solar-power hub on the Jicarilla Apache Nation. Solar energy is, therefore, going to be a strong foundation for Tribes looking to transition their economies from fossil fuel-based energy production to renewable energy.

Beyond solar power generation potential, almost all Tribes in the state of New Mexico have the potential to generate geothermal energy on their lands.<sup>10</sup> New Mexico Tribes also have biomass resources, as the state has one of the nation's top 10 largest concentration of Tribal forests. In 2017, wind energy contributed almost 14% of New Mexico's electricity generation, with almost 1,800 megawatts of installed electricity generating from more than 1,000 wind turbines.<sup>11</sup> Although New Mexico's greatest wind energy resources are in the eastern portion of the state, far from most Tribal communities, there is potential for greater wind energy production. Acoma Pueblo, estimated to have wind potential of 2,215 MW, has a large acreage of high potential wind capacity based on the National Renewable Energy Laboratory's wind power class system.<sup>12</sup> The Mescalero Apache Nation also has the potential for 2,340 MW of wind power.

The passage of the ETA is part of a national trend toward greater state-policy action toward renewable energy. The National Council of State Legislatures reported that there were 400 energy bills passed in 2018, with state-policy action in renewable energy growing in salience. Hawaii, California, and Washington D.C. all passed renewable portfolio standards legislation requiring utilities to meet a growing portion of their electricity needs with renewable sources. Nevada, Minnesota, Illinois, New York and Florida introduced 100% clean energy bills in 2019, signaling a continued movement toward renewable energy across the nation.

New Mexico's law appears to be much more expansive in the financial and economic impacts of the transition than those in other states. The inclusion of funding in the law to address workforce training and prioritize the most directly affected communities is a tremendous resource that, if invested wisely, can help New Mexico make a smooth transition toward a green energy-based economy.

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<sup>8</sup> U.S. Department of Energy, Office of Indian Energy Policy and Programs, "Department of Energy to Fund 15 Tribal Energy Infrastructure Deployment Projects," Press Release (August 15, 2018).

<sup>9</sup> U.S. Department of Energy, "Energy Department Selects 11 Tribal Communities to Deploy Energy Efficiency and Renewable Energy Technologies," Press Release (March 18, 2015).

<sup>10</sup> U.S. Department of Energy, National Renewable Energy Laboratory, Geothermal Resource Potential, accessed December 20, 2018.

<sup>11</sup> <https://www.eia.gov/state/?sid=NM#tabs-4>

<sup>12</sup> <https://www.bia.gov/sites/bia.gov/files/assets/as-ia/ieed/ieed/pdf/idc013229.pdf>

## **Landscape Analysis – Review of Relevant Research**

### Health and Environmental Implications Associated with SJGS Closure

The scan of the literature associated with the health implications of coal mining makes clear that the long-term health consequences for the workforce of the San Juan mine and the surrounding communities requires greater attention. Our landscape analysis focused specifically on work that examines the long-term consequences of mining beyond the closing of mines. The research on coal mines is not limited to the United States, as extraction of fossil fuels is obviously global. For example, there has been a movement across countries including Poland, Romania, Russia, and the Ukraine to reform their coal mining industries.<sup>13</sup>

Previous studies explore the effects of mine closures and their impact on local communities across the world. While the vast majority of studies explore the environmental and health effects of the closures, others capture the opinion of experts and the public in general. The overall conclusion from much of this work is that while mining closures have detrimental economic implications for communities in proximity to the mine, they also have important positive environmental and health effects. For example, coal mine dust causes severe respiratory diseases among coal workers, such as pneumoconiosis, silicosis, mixed dust pneumoconiosis, dust-related diffuse fibrosis, and chronic obstructive pulmonary disease (Laney and Weissman; Wang et al. 2013). The research notes that the severity of these conditions required lung transplantation for many of the patients that were able to receive treatment.

This research notes that there are indirect health effects for people associated with the coal mining operation beyond the coal plant employees receiving direct exposure to toxins. This includes work that finds that residents of nearby areas can develop lung diseases, such as pulmonary scarring, chronic obstructive pulmonary disease (COPD), emphysema, and chronic bronchitis (Cohen, Patel and Green 2008). Studies found negative effects on communities living around coal-powered generation stations. Yang and colleagues (2017), for example, find that there are severe adverse effects in fetal health. In their study of a coal-fired power plant in New Jersey, they found that when the power plant operated to full capacity with high emission levels, the likelihood of expecting mothers exposed to its downwind toxins having low or very low weight births increased by 6.5% and 17.1% respectively.

Despite the significant health consequences associated with coal mining, research indicates that after closure, some of the health inequalities of those whom mining operations affect decrease. For example, using data from the New Jersey Department of Health (NJDOH), the EPA's Air Markets Program Data (AMPD) and other meteorological sources, a study focused on New Jersey finds closing a power plant reduces the likelihood of having a low birth weight baby and having a preterm birth by 15 %to 28%.

We identified several studies that focus specifically on the impact of coal mining on the health of Native Americans. One of the overall findings from this research is that Native Americans are more likely to be affected by mining activity than other racial and ethnic groups (Jones 2017 and 2014). Lowther and colleagues (2000), for example, find that bronchiolitis-associated hospitalization among American Indian infants affected by coal mining is almost double than that of all US infants. Other researchers confirm this finding.

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<sup>13</sup> <https://www.semanticscholar.org/paper/Mine-Closure-and-its-Impact-on-the-Community%3A-Five-Haney-Shkaratan/74828abfa71011e1d7798741ac566162c942c5af>

This inequality stems from environmental racism. Mohai, Pellow, and Roberts (2009) define the term as the racial discrimination in environmental policy making, the enforcement of regulations and laws, the deliberate targeting of communities of color for toxic waste facilities, the official sanctioning of the life-threatening presence of poisons and pollutants in our communities, and the history of excluding people of color from leadership of the ecology movements. Recognizing the legitimacy of environmental racism, the EPA's National Center for Environmental Assessment released a study indicating that people of color are much more likely to live near polluters and breathe polluted air. The following quote from the study's authors represent the main finding from the report: "results at national, state, and county scales all indicate that non-Whites tend to be burdened disproportionately to Whites."

There is strong evidence to support the main finding of the EPA's report from independent academic researchers. For example, Lewis, Hoover and MacKensie (2017) find that negative environmental health disparities associated with mining were greater among American Indians, given that they are more likely to live near abandoned mines. The study identifies a number of health outcomes that are more likely to affect Native Americans as a result of the racial segregation imposed on them, including kidney disease and hypertension. Unfortunately, the consequences of living in the region can linger well beyond the closure of the coal mine, potentially leading to multi-generational health challenges for Tribal communities.

Similar to what has been found outside of New Mexico, we found evidence that Native Americans are more likely to suffer from health conditions associated with coal, with the Diné people being the focus of most of this work. The US Geological Survey Fact Sheet from 2006 revealed that: "Among the Navajo people, high levels of respiratory disease, such as asthma, exist in a population with low rates of cigarette smoking. The fact sheet suggests that air quality, both outdoors and indoors affects respiratory health for residents of the Navajo Nation.

This work suggests that, in addition to exposure to the impacts of the mining operations on air quality, many members of the Navajo Nation to burn locally mined coal in their homes for heat. This trend is consistent with other research which identifies a larger pattern of Native Americans using coal for home heating, which unfortunately could more broadly exasperate health effects associated with poor air quality combined with close proximity to the mines (Holman et al. 2004; Lowther et al. 2000; Pleis and Barnes 2008). These include studies specific to New Mexico (see Bunnell et al. 2010, and Gonzalez-Maddux et al. 2014 for Shiprock, NM; Cannon and Swanson for San Juan County; Powell for Navajo Nation).

Additionally, the Clean Air Task Force (CATF) *Toll from Coal Interactive Map* identifies the Escalante Plant in McKinley County as one of the coal plants significantly impacting health in New Mexico.<sup>14</sup> Since beginning service in 1984, the plant produces 1,453,830 tons of CO<sub>2</sub> Emissions per year. The CATF estimates that the Escalante Plant produces several negative health outcomes, including four deaths, multiple asthma-related ER visits, and 28 asthma attacks per year in the region. This task force estimates that the population-at-risk includes more than 5,000 individuals, including 2,064 children, who live in close proximity (12 mile radius) to the plant, with seven schools in the same radius. Racial segregation is just as powerful in New Mexico as observed in the national studies, as 91% of those who live around the Escalante plant are ethno-racial minorities.

More directly tied to the focus of our report, the CATF study identifies health conditions among the population living in proximity to the Four Corners Station located in San Juan,

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<sup>14</sup> [https://www.tollfromcoal.org/#/map/\(title:87//detail:87//map:87/NM\)](https://www.tollfromcoal.org/#/map/(title:87//detail:87//map:87/NM))



New Mexico. According to CATF, this plant was in service from 1963 to 1970, producing 6,850,185 tons of CO<sub>2</sub> emissions per year.<sup>15</sup> CATF calculates that the health impacts of this plant included 27 deaths, 16 heart attacks and 194 asthma attacks per year. Similar to the Escalante plant, the at-risk population included more than 5,000 children, with 12 schools and two places of worship within a 12 mile radius from the plant. Those living within close proximity to the Four Corners Station were racial and ethnic minorities, accounting for 77% of the population within the same distance of the plant, with most being Native American.

The CATF tool provides information for the San Juan Plant, also in the San Juan County, New Mexico region, that was in service from 1973 to 1982 and produced 12,423,184 tons of CO<sub>2</sub> emissions per year.<sup>16</sup> The CATF calculates that the health impacts of this plant included 20 deaths, 12 heart attacks and 142 asthma attacks per year. There were 21,184 individuals who lived in close proximity to the plant, including more than 7,000 children, who lived in a 12 mile radius from the plant. There were also 12 schools and two places of worship within the same radius. Similar to the other plants in New Mexico, people of color were the most affected, representing 68% of the surrounding population. Given the demographics identified for this region today, most of this population was Native American.

The online map tool created by the CATF is a great resource that could be replicated and updated with more contemporary data, if similar underlying data was made available. This is something that should be considered with future research.

#### The ETA Will Address the Negative Impact Coal Mining Has on the Environment

The list of coal mining's detrimental effects on the environment is long, ranging from acidic water reaching rivers, streams and groundwater to toxic air pollution.<sup>17</sup> Although some of these effects end with the closure of the mine or generation station, many persist and can even become more severe when mines are closed and abandoned. Acid mine drainage, for example, can occur where the coal mining process may have exposed rocks containing pyrite, which is often heavy in sulfur in closed or abandoned mines. When the sulfur reacts with rain water, it forms sulfuric and dilute acids which can wash into nearby rivers and streams.<sup>18</sup> Water quality assessments are critical in evaluating the impact, both short and long-term, of the coal mining operation on the water systems in the areas surrounding the plant and generation station.

The impact of coal mining and generation on the soil and land is also substantial. One of the most problematic aspects of coal mining operations on land quality is coal waste, which is second only to municipal solid waste in the nation's overall waste streams. Coal waste is often housed in impoundments located near the mine but can also be pumped into abandoned underground mines. In either case, the solid or liquid waste, which is almost always toxic, can leak or seep into the soil over time, making the land useless for farming or other purposes. A full land quality analysis is highly recommended both before and after the formal closure of a coal mine. We discuss this process in more detail later in the report.

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<sup>15</sup> [https://www.tollfromcoal.org/#/map/\(title:2442//detail:2442//map:2442/NM\)](https://www.tollfromcoal.org/#/map/(title:2442//detail:2442//map:2442/NM))

<sup>16</sup> [https://www.tollfromcoal.org/#/map/\(title:2451//detail:2451//map:2451/NM\)](https://www.tollfromcoal.org/#/map/(title:2451//detail:2451//map:2451/NM))

<sup>17</sup> The following resource provides a great overview of the many environmental effects specific to coal: [https://www.sourcewatch.org/index.php/Environmental\\_impacts\\_of\\_coal](https://www.sourcewatch.org/index.php/Environmental_impacts_of_coal)

<sup>18</sup> <http://www.worldcoal.org/coal-the-environment/coal-mining-the-environment/>

## **The Economic Consequences Associated with the Closure of the San Juan Generation Station and Movement to Clean Energy More Broadly**

Our scan of the research exploring the impacts of fossil fuel mine closures identified several important considerations for stakeholders in this sector as they approach strategic planning. These include the costs associated with lost tax revenues, assisting the workforce transition to other economic sectors and/or retirement, addressing environmental revitalization in the areas surrounding the plant, and finally, addressing the health conditions of affected community members harmed over multiple generations. There is variation in the projected losses amongst different researchers, as is summarized below, but the overall conclusions are clear: there will be significant economic consequences associated with the closure of the San Juan Generating Station in both the short and long-term.

### Lost Tax and Other Revenues

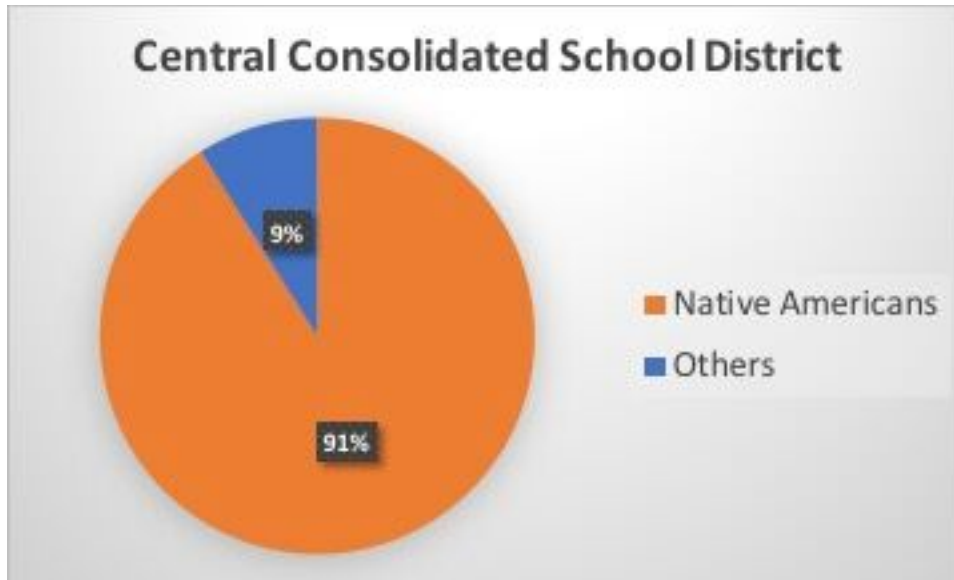
Although to our knowledge there has not been a research report specifically focused on the economic implications of the mine closure for Tribal communities, there has been useful research conducted for the wider region. We highlight the high points of this research, noting important limitations to this work when relevant.

Center for Social Policy affiliated economist Kelly O'Donnell conducted an economic assessment for New Mexico Voices for Children focused largely on the implications for tax revenue losses to the region. Dr. O'Donnell identifies that the closure of the plant will remove substantial assets from the San Juan County property tax base, decreasing revenue for local jurisdictions including San Juan County, San Juan Community College, and the Central Consolidated School District (CCSD). Although not a focus of the existing research, the impact of lost tax revenue across these three jurisdictions will be felt heavily among Native American communities, given the demographics of the area. For example, nearly 37% of San Juan County's population is Native American according to the 2010 Census, with Navajo being the largest ancestry group.

As reflected in the figure below, the CCSD is of particular importance, as over 90% of the school district's student population is Native American. Finally, the student body of San Juan Community College is 31% Native American, according to the college's dashboard.<sup>19</sup>

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<sup>19</sup> <https://www.sanjuacollege.edu/institutionalresearch/student-demographics/>



In early 2018, the San Juan County assessor estimated the taxable values of the generating station and mine at \$349.4 million and \$25.2 million respectively for a combined taxable value of \$374.6 million.<sup>3</sup> O'Donnell's analysis indicates that San Juan County receives 4.1% of its property tax revenue and 3.2% of its total operating revenue from the coal mine and power plant. The impact on the school district will be consequential as well. CCSD receives \$3.5 million in annual revenue from property taxes on the mine/plant complex.<sup>20</sup> The plant and mine also contribute 49% of CCSD's total property tax revenue and 4.1% of its overall annual revenue. O'Donnell finds that only 5% of CCSD property tax revenue is used for operational purposes, with the rest funding capital improvements and debt service. Finally, the plant and mine account for 2.6% of San Juan College's revenue. San Juan College will also lose an estimated \$115,000 annually in scholarships provided by the mine and generating station.<sup>21</sup>

Several of the reports we pulled for the landscape analysis, including the Four Corners Economic Development's economic analysis, utilize Economic Modeling Specialists Inc.'s calculator tool (EMSI). The Four Corners Economic Development analysis included some additional entities that will see losses in tax and other revenue as a result of the closure of the generation station. These include the Farmington Municipal Schools (up to \$1.7 million in student funding), the Aztec Schools (up to \$165,000 in student funding), and Bloomfield Schools (up to \$77,000 in student funding). The full economic consequences associated with the closure of the mine and generating station are likely greater than projected as there are many indirect losses. For example, United Way will lose an estimated \$150,000 in donations from the plant and mine.<sup>22</sup>

The economic consequences associated with movement away from fossil fuel for energy production is of significant concern to Tribal leaders. For example, in a 2015 US Senate Committee on Indian Affairs hearing assessing the effects of potential closures of coal mining on Tribes, Senator Steve Daines stated that ending the regional coal production could

<sup>20</sup> The EMSI report reports a slightly higher \$3.6 million in property taxes.

<sup>21</sup> <https://www.usnews.com/news/best-states/new-mexico/articles/2018-09-29/closing-generating-station-could-have-huge-economic-impacts>

<sup>22</sup> <https://www.usnews.com/news/best-states/new-mexico/articles/2018-09-29/closing-generating-station-could-have-huge-economic-impacts>

increase to more than 80% in the Crow Reservation area from 47% in 2015, according to the Montana Chamber of Commerce. Although Lorenzo Bates, then-Speaker of the Navajo Nation cited a Arizona State University School of Business study finding that in the next 25 years the coal mine industry would generate about \$13 billion, he called to expand the industry and diversify energy production of the area, including renewable resources to “keep our balance with Mother Nature and the needs of our people.” These excerpts from the Senate hearing symbolize the complicated relationship Tribes have with the mining of coal.

### *Workforce Retraining and Transition*

The transition of the workforce from coal extraction to other sectors of the labor market is one of the most significant economic challenges associated with coal mine closures, with effects lasting several years after the immediate closure.<sup>23</sup> The research on projected job losses analyze both direct and indirect job loss. For example, Dr. O’Donnell estimates that there will be approximately 450 jobs directly eliminated with the closing of the San Juan Generating Station and the coal mine that provides the coal for energy production. Including indirect effects on labor, the study conducted by Four Corners Economic Development utilizing Economic Modeling Specialists Inc’s calculator tool (EMSI), estimates an annual loss in earnings of \$117,212,964, with 1,586 total jobs lost.

The Four Corners Economic Development analysis provides valuable characteristics of the workforce associated with the mine. It reports that 97% of SJGS employees live in San Juan County, as well as 92% of San Juan Mine employees. The high average salary levels of the workforce of the mine of \$86,000 annually is significant, as this is notably higher than the mean salary range of residents of San Juan and adjacent counties. This underscores the challenge of replacing these jobs with those with similar salary ranges. Four Corners Economic Development estimates that 96% of these salaries have employer-sponsored health insurance, making the associated benefits of this workforce a compounding factor in projected job losses.

The job losses will be felt heavily in Tribal communities, largely due to the high proportion of Native Americans whose employment is tied to the San Juan Mine and Generating Station. Roughly half the workforce at San Juan and a nearby mine that serve it are members of the Navajo Nation ([Storrow 2019](#)). Storrow (2019) also indicates that at Four Corners, where a Tribal mining company supplies coal, Native Americans comprise 80% of the workforce. To our knowledge, there has been no research that directly assesses overall job losses for Native American communities across all of the indirect sectors tied to the mine and generating station, which is something future research should evaluate.

Our landscape analysis examines the potential for transition to renewable energy to provide jobs to offset losses from the closure of the SJGS. A recent 2016 analysis found that with investment in retraining, the vast majority of U.S. coal workers could switch to PV-related positions.<sup>24</sup> The study also identified a correlation in the skill sets required and salaries of various positions in the coal and PV industries. The analysis provides optimism for the ability of stakeholders in this region to transition the displaced workforce into a new sector. However, the O’Donnell reports make a key point that solar power energy generation is less labor intensive than coal-produced energy. This means transition to this industry will not generate as many overall jobs for the region as the SJGS has, even with investment in

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<sup>23</sup>[https://pdfs.semanticscholar.org/3de6/9d45f779a1ce07d2c05e02eb5bb81a86032e.pdf?\\_ga=2.66505774.1220474540.1560607126-1269652832.1560607126](https://pdfs.semanticscholar.org/3de6/9d45f779a1ce07d2c05e02eb5bb81a86032e.pdf?_ga=2.66505774.1220474540.1560607126-1269652832.1560607126)

<sup>24</sup> Louie, Edward & Joshua Pearce. (2016). “Retraining Investment for U.S. Transition from Coal to Solar Photovoltaic Employment.” *Energy Economics*. 57. 10.1016/j.eneco.2016.05.016.

retraining. She also cautions that a lot of the job production associated with that industry will be short lived, tied largely to the construction needed over the first two years.

Multiple respondents in our qualitative interviews noted that the workforce of San Juan Mine are closer to retirement than the start of their career in the mining industry, a finding within the landscape analysis data. Although this needs deeper investigation, if accurate, this could reduce the need for retraining, particularly with investment in early retirement options for workers close to, but not yet at, retirement age.

Our discussions with interest group leaders and researchers identified the need for future research specifically on requirements to ensure that New Mexico has a workforce prepared for the transition to renewable energy. As discussed in more detail at the end of the report, this research should include current educational programs available to New Mexicans interested in finding employment in the renewable energy sector as well as the potential need for additional technical education programs offering degrees and/or certificates for career development in this sector and others to ensure that employment opportunities are available for the Native American community in this transition. Multiple experts in this area expressed concern that, despite language in the ETA emphasizing prioritization for disadvantaged communities in workforce retraining, Native American, Latino and other under-resourced communities could be excluded from future opportunities in the renewable energy workforce.

### Environmental Revitalization Costs

Our background research identified the need for financial investment to revitalize the land where the coal mine and generating station has been in operation, as well as the surrounding areas, to ensure safety for residents and availability for other economic development ventures. The San Juan Generation Station and mine sites will require substantial remediation. Even after this process, options for productive reuse of abandoned coal sites are not expansive. It appears as though transitioning to other forms of energy generation is the most common approach taken for coal plant operations, including renewable energy ventures.

The EPA has identified several reasons why moving toward renewable energy is ideal for coal plant operations. These include several advantages for developers interested in using the brownfield for new economic development activity<sup>25</sup>:

- Leveraging existing infrastructure
- Reducing project cycle times through streamlined permitting and zoning
- Improving project economics with reduced land costs and tax incentives
- Gaining community support through land revitalization efforts
- Protecting open space

Brownfields assessments are one of the first steps in remediating a property for future use and are vital for future economic development efforts, as investors use them for ensuring that the land is safe for other uses. The Environmental Protection Agency (EPA) Targeted Brownfields Assessment Program helps states, Tribes, and municipalities minimize the uncertainties of contamination often associated with brownfields that can make it difficult to acquire investors for new economic development in the contaminated area.<sup>26</sup> This program supplements other efforts to promote the cleanup and redevelopment of brownfields. Services listed under this program include site assessments, community outreach, and cleanup options and cost estimates. Program awards average \$100,000, but do not support assistance to conduct site cleanup or building demolition activities. These funds are also only

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<sup>25</sup> <https://www.epa.gov/re-powering/learn-more-about-re-powering#why>

<sup>26</sup> <https://www.epa.gov/brownfields/targeted-brownfields-assessments-tba>



available for locations that have redevelopment plans in place for the potentially contaminated area.

The EPA Targeted Brownfields Assessment Program just awarded a \$500,000 grant to the New Mexico Environment Department (NMED) from for brownfields assessment across the state. This assessment, when completed, will be highly useful for future efforts. Five of the eight priority sites the department will assess are in the northwest quadrant of New Mexico.<sup>27</sup> The results of this assessment should be tracked and funding sources should be investigated to conduct similar assessments in the northwestern quadrant surrounding the San Juan Generating Station. There will also be funds required to address the revitalization work identified in these assessments.

### Addressing Health Conditions of the Community

Our landscape analysis identified several health outcomes associated with coal extraction in the San Juan region. Although more limited than the ramifications associated with job losses, there are economic costs associated with the health inequalities associated with coal mining in the San Juan, NM region. George D. Thurston, a professor of environmental health at NYU, finds in his analysis that the San Juan Generating Station cost the public as much as \$240 million over the last few years in health problems attributed to the mine.<sup>28</sup> Dr. Thurston argues that this is probably an underestimate, because the plant likely affects communities beyond 200km (about 124 miles) around the plant. The plant's negative impact on air quality in surrounding parks and national recreation areas likely decreases tourism, critical for an area that brings in more than \$721 million in annual tourist dollars.

Future research should explore the more long-term costs in addressing health inequalities the negative consequences of coal extractions on the environment that the residents of the surrounding communities are likely to face. This should include an assessment of the potential health needs of the mines' and generating station's workforces, as well as the larger community.

### Research on the Feasibility of Transitioning to Renewable Energy/Other Economic Sectors

Dr. Kelly O'Donnell's report specifically addressed the economic context surrounding transitioning toward renewable energy, providing a generally positive economic outlook for this transition. For example, her economic modeling indicates that a 450-megawatt solar photovoltaic plant at or near the site could replace all lost property tax revenue and support 2,217 direct jobs and another 1,558 indirect jobs throughout the regional economy as well as generate more than \$67 million in additional tax revenue for state and local governments. She also notes that more expansive redevelopment in solar production would provide more substantial economic benefits. More specifically, Dr. O'Donnell notes that a redeveloped infrastructure of the mine could support over 2000 MW of solar PV capacity, which would replace the property tax base lost from site closure as well as replenish twice as many lost jobs.

This report and others note that due to its location, the San Juan Generating Station is an ideal site for generating replacement power for current customers and creating clean power for export. O'Donnell notes that current SJGS customers include PNM and the electric utilities of Farmington and Los Alamos, all of whom will need to purchase energy from another source when the San Juan operation closes. The mine also exports a significant amount of

<sup>27</sup> <https://www.abqjournal.com/1331961/state-environmental-agency-wins-epa-grant.html>

<sup>28</sup> [https://d3n8a8pro7vhmx.cloudfront.net/newenergyeconomy/pages/646/attachments/original/1441996401/SIGNE\\_D\\_FINAL\\_Declaration\\_of\\_Dr\\_George\\_Thurston\\_with\\_Attachments\\_1-13-12.pdf?1441996401](https://d3n8a8pro7vhmx.cloudfront.net/newenergyeconomy/pages/646/attachments/original/1441996401/SIGNE_D_FINAL_Declaration_of_Dr_George_Thurston_with_Attachments_1-13-12.pdf?1441996401)

energy out of state, including to Tucson Electric Power which owns just over 20% of SJGS. The sustained demand for energy the SJGS provides is key for the continued revenues associated with exporting power after the transition to clean energy.

O'Donnell provides an overall positive outlook in the transition toward renewable energy. Transition to solar energy will also have a significant benefit of utilizing a minimal amount of water, compared to energy produced from coal and other fossil fuel which are water intensive and threaten water quality. This is a critical issue to track, as New Mexico has had a long-term drought (despite the recent wet winter), and the coal plant consumes several billion gallons of clean water annually from the San Juan River.

Our team identified other economic sectors that could be viable alternatives to coal-powered energy generation in the research. These include attracting outdoor recreation businesses, which take advantage of the natural beauty of the region and tend to be more environmentally conscious. The City of Farmington established its Outdoor Recreation Industry Initiative (ORII) to attract and foster outdoor industry businesses, including guides, outfitters, and outdoor activity gear manufacturers. They are a key group to connect with for future research. Because outdoor recreation businesses and their investors tend to be environmentally conscious, access to clean power may motivate them to locate or expand in the Farmington area (O'Donnell 2018).

There are currently efforts at the early development stages to build a connection from the Burlington-Northern Santa Fe Transcontinental Railway to San Juan County, which will lower the transportation/shipping costs of businesses and Tribal government entities in the area, as well as incentivize new investment in the region ([Solutions, N.d.](#)).

The Northwest New Mexico's Comprehensive Economic Development Strategy Plan also includes several opportunities for economic development in the region, such as training a local workforce in uranium cleanup and construction and operation of the Navajo-Gallup Water Supply Project. These are valuable resources that can be useful for transition to a new economic development initiative or initiatives.

### Examples of Successful Transitions from Fossil Fuel to Renewable Energy

Our research included a search for examples of communities in a similar period of transition in energy production that might be good examples for the state to investigate. These include the partnership between the Jicarilla Apache Nation, the City of Albuquerque, and PNM to establish a large-scale, solar power hub on the Jicarilla Nation that will provide 50 MW of power. This public, private, Tribal Nation partnership will make the City of Albuquerque one of the national leaders in renewable energy use and the Jicarilla Apache Nation one of the largest producers of solar power among Tribal nations. This partnership is an ideal model to evaluate, as it represents a model of utilizing renewable energy for Tribal-based economic development through formal partnership with other governments. Some insights of this project to consider are:

- The Jicarilla Apache Nation has extensive oil and gas initiatives, so adding solar power provides an example of diversification of energy production.
- Resident businesses, schools, and the city government will be able to purchase power from the Tribe's solar plant, located in the same quadrant of the state as the San Juan plant.
- The City of Albuquerque's commitment to buying 25 MWs from the new solar plant for a minimum of 15 years provides the Jicarilla Nation with a solid demand stream. This public partnership could be investigated for the transition away from coal as a means

of guaranteeing early financial success for others interested in moving toward renewable energy.

- A need to comply with sustainability goals motivated the City of Albuquerque to move in this direction, making it and other cities in New Mexico potential partners in a similar venture.
- It is estimated that it will take at least a year to build the infrastructure for mass solar production of energy once initiated, putting the start of energy production in late 2021.

The EPA provides several helpful case studies of communities that have successfully transitioned from coal plant operations to solar power generation.<sup>29</sup> Among those included in their case studies, we highlight the Apache Powder Superfund Site near Benson and St. David, Arizona.<sup>30</sup> Despite the relatively small (1.4 kW) capacity of this combined solar and wind operation, the economic impact of this post-coal infrastructure is noteworthy. This case-study provides a great example of the ability of renewable energy transition to off-set environmental clean-up costs associated with revitalizing damaged land. More specifically, the new solar and wind systems address necessary and ongoing groundwater clean-up activities, given that this was a former chemicals and explosives manufacturing superfund site. The renewable energy systems substantially reduce the 30-year clean-up cost from \$25 million to approximately \$2.5 million. Furthermore, the EPA case study notes that the overall cost of the solar system and windmill pump was three times less expensive than the potential cost of running power lines and paying for electricity at remote areas of the 1,100-acre site. This project demonstrates the value of using renewable energy for remediation on contaminated sites, particularly when power is needed in off-grid areas.

We also connected with the Delta Institute, a Chicago-based nonprofit organization that helps communities transition from coal plants to other economic industries. Although they operate primarily in the Midwest, they might be a good partner with whom to consider hiring or consulting. Our report includes our interview with their team, and the appendix also includes several documents they provided to assist the effort to begin strategic planning.

## **New Mexican Attitudes Toward Environmental Protection and Economic Development: Connections to the Land is Key**

Although we were not able to identify any surveys or focus groups specific to Native Americans in New Mexico, there is some interesting work done for Hispanic New Mexicans that we believe provides some useful insights. Most notably, the firm Latino Decisions conducted a poll focused on attitudes toward land preservation and energy extraction in 2014 on behalf of Hispanics Enjoying Camping Hunting and Outdoors (HECHO) that revealed Hispanics in New Mexico value protecting public lands.<sup>31</sup> For example, a robust 94% of New Mexico's Hispanic population believe that "before leasing lands to oil and gas companies, government officials should consult with our communities to identify lands important to our heritage, potentially too valuable to drill."

One of the main findings from this research was that the vast majority (80%) of Hispanic New Mexicans have strong familial connections to the land going back multiple generations, and this ancestral and familial connection to the land influences attitudes toward energy extraction. Furthermore, while 73% of Hispanics in New Mexico believe it is "very important"

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<sup>29</sup> See: <https://www.epa.gov/re-powering/re-powering-success-stories-powering-remediation#file-121335>

<sup>30</sup> [https://www.epa.gov/sites/production/files/2015-04/documents/success\\_apachepowder\\_az.pdf](https://www.epa.gov/sites/production/files/2015-04/documents/success_apachepowder_az.pdf)

<sup>31</sup> [http://www.latinodecisions.com/files/5714/0233/2896/HECHO\\_2014\\_Toplines.pdf](http://www.latinodecisions.com/files/5714/0233/2896/HECHO_2014_Toplines.pdf)

for government to preserve and protect public lands and open spaces for family recreation and the overall well-being of the environment, the share that thinks it is “very important” increases to 81% among those with strong family ties to the region.

More directly tied to the focus of our report, energy extraction vs. job growth, a similar pattern emerges. When asked to indicate whether they identify more strongly with a view that the transition process will “lead to energy independence and create jobs” or alternatively, “create toxic pollution and damage the environment,” 49% of the overall sample sides with the statement focused on damage to the environment compared to 42% who identify more strongly with the job growth and energy independence side of this debate. It is important to note that the authors point out that this is the only area in their study that showed a lack of strong pro-environment attitudes. However, the majority of Hispanics in New Mexico with strong ties to the land (52%) believe the drilling process is bad for the environment, regardless of the job opportunities it could provide compared to only 36% among those without strong familial ties that are strong and binding. Given that Native American families who live in New Mexico have even deeper ancestral and familial connections to the land on which they reside, we anticipate that a similar relationship between connection to land and views toward energy policy exists for Native Americans in New Mexico.

## **Conclusion: Next Steps**

The Energy Transition Act will fundamentally shift the economy in the state of New Mexico. The state’s heavy reliance on fossil fuels will mean that the transition towards clean energy will require intensive strategic planning and investment in the creation of both infrastructure and training programs. This will ensure that communities across New Mexico are prepared for the transition. Our landscape analysis reveals that the state’s Tribal communities will be particularly impacted by the ETA. The move away from fossil fuels will have a marked and positive impact on the health of these communities as many Tribes have been disproportionately exposed to the environmental hazards of extraction taking place near their homes. However, these same communities are also vulnerable to the economic consequences associated with closure of mining operations that have served as the foundation for many Tribal economies. We suggest that more in-depth research be conducted that focuses specifically on how the transition to a clean energy workforce will ensure that New Mexicans from Native American communities are not left behind in the movement away from fossil fuels.

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