Climate, Health, and Equity Implications of Large Facility Pollution Sources in New Mexico

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About PSE Healthy Energy

PSE Healthy Energy is a nonprofit research institute dedicated to supplying evidence-based scientific and technical information on the public health, environmental, and climate dimensions of energy production and use. We are the only interdisciplinary collaboration focused specifically on health and sustainability at the intersection of energy science and policy. Visit us at psehealthyenergy.org and follow us on Twitter @PhySciEng.

About The University of New Mexico

The University of New Mexico serves as the state's premier institution of higher learning and provider of health care by promoting discovery, generating intellectual and cultural contributions, honoring academic values, and serving our community by building an educated, healthy, and economically vigorous New Mexico. This report is a collaboration between faculty in the UNM School of Law Clinical Law Program, the College of Population Health, and the Center for Social Policy. The report also supports UNM's Just Transition Grand Challenge, an interdisciplinary initiative of UNM that seeks to support the creation of economic opportunities for vulnerable and historically disadvantaged communities through the transition to clean energy and climate resilience.

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Executive Summary

In 2019, New Mexico Governor Michelle Lujan Grisham issued an executive order establishing a goal of cutting New Mexico greenhouse gas (GHG) emissions 45 percent by 2030.[1] In parallel, the state legislature enacted the 2019 Energy Transition Act (ETA), which requires New Mexico utilities to decarbonize their electricity supply by 2045.[2] In keeping with these actions, state agencies issued regulations to reduce GHG emissions from oil and gas and transportation sources and to implement the ETA.

These ambitious policies are essential to address the climate-driven extreme weather events, such as record-breaking wildfires, drought, and heat, which are already impacting New Mexico. However, current state policies stop short of requiring all large stationary sources to cut GHG emissions in keeping with reductions required by the state's climate goals. This omission is important because these large emitters, which include fossil fuel-fired power plants, oil refineries, gas processing plants and compressor stations, manufacturing plants, and landfills, contribute a large share of the state's GHG emissions. **In order to achieve its climate goals, the state will likely need to establish policies that require further GHG emission reductions from large stationary sources.**

Large stationary sources also release a large quantity of other air pollutants such as nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter (PM), volatile organic compounds, and air toxics. These pollutants—referred to in this report as health-damaging air pollutants—affect breathing, heart functions, and neurological systems, and can cause premature deaths and adverse birth outcomes in populations exposed to them.

Our existing system of federal and state air pollution control laws frequently fails to adequately protect low-income communities and communities of color from these health-damaging air pollutants. Lower-income neighborhoods or neighborhoods with higher numbers of Native, Latino, or Black residents are frequently exposed to higher levels of air pollution and experience higher rates of health impacts associated with air pollution.

[1] Addressing Climate Change and Energy Waste Prevention, Exec. Order 2019-003, Jan. 29, 2019, https://www.governor.state.nm.us/wp-content/uploads/2019/01/EO_2019-003.pdf [hereinafter Lujan Grisham Climate Change Exec. Order].
[2] NMSA 1978 § 62–18–1 et seq.

When climate policies are designed with public health in mind, they can simultaneously support efforts to reduce greenhouse gas and health-damaging air pollutant emissions from stationary sources. Not all climate policies will achieve significant reductions of health-damaging air pollutant emissions, however. Climate policies that focus solely on achieving aggregate greenhouse gas emission reductions can allow health-damaging air pollution to persist, or even increase, in certain communities.

When climate policies are designed with public health in mind, they can simultaneously support efforts to reduce greenhouse gas and health-damaging air pollutant emissions from stationary sources.

This report analyzes GHG and health-damaging air pollutant emissions from large stationary sources in New Mexico, as reported by the New Mexico Environmental Department and the U.S. Environmental Protection Agency (EPA), as well as the socio-demographic characteristics of the communities living near these sources. It also suggests how these findings can inform the development of climate policies that will reduce greenhouse gas emissions from large stationary sources while also equitably reducing health-damaging air pollution in vulnerable communities.

The report was authored by a team of researchers from PSE Healthy Energy and the University of New Mexico (UNM) and supports UNM's new Just Transition Grand Challenge initiative.[3] The report was informed by engagement with community organizations participating in Power4NewMexico, and the Center for Civic Policy served as an advisor and fiscal agent. The project was funded by a grant from the Environmental Defense Fund.

Key Findings

I. Large Stationary Sources Contribute Approximately One Quarter of the State's GHG Emissions

We identified 189 large stationary sources that either require Clean Air Act Title V permits or that emit enough GHG pollution to be required to report to EPA. Taken together, these sources reported emissions of 31.4 million metric tons of carbon dioxide equivalent ($MTCO_2e$) in 2019,

[3] The Just Transition Grand Challenge is an interdisciplinary initiative of UNM that seeks to support the creation of economic opportunities for vulnerable and historically disadvantaged communities through the transition to clean energy and climate resilience. *Just Transition Grand Challeng*e, UNM, https://grandchallenges.unm.edu/level-1-teams1/just-transition-grand-challenge.html.

or approximately 25 percent of the state's emissions compared to the 2018 inventory (the most recent available). Of these sources, 128 reported emissions over 10,000 $MTCO_2e$ in 2019, and 86 reported emissions over 25,000 $MTCO_2e$.

Power plants are the largest contributors of GHG pollution among these facilities, with 20 sources contributing 68 percent of emissions in 2019. The 120 large oil and gas sources—including gas processing plants, compressor stations, and refineries—contributed 23 percent (N.B. this does not include tens of thousands of smaller emitting sources, such as individual oil and gas wells).[4] Other categories of large stationary facilities include landfills (12 sources), military facilities (3), mines (8), manufacturing facilities (4), educational institutions (3), and airports (12).

II. Large Stationary Sources are Significant Contributors of Health-Damaging Air Pollutants

Based on 2019 data, it's likely that large stationary sources are responsible for the majority of the state's SO_2 emissions and a substantial share of NO_2 emissions as well. Both of these are potent health-damaging air pollutants.

In 2019, large stationary sources reported the release of 31,000 metric tons of NO_2, 7,800 metric tons of SO_2, 16,000 metric tons of carbon monoxide, 1,400 metric tons of PM, and 870 metric tons of hazardous air pollutants. For comparison, these NO_2 emissions are roughly half of transportation sector emissions, which is the largest sole contributor of NO_2 emissions.

III. Oil and Gas and Electric Power Sectors Are the Largest Contributors of Health-Damaging Air Pollutant Emissions Among Large Stationary Sources

In 2019, the electric power sector contributed the largest share of SO_2 emissions and large shares of NO_x, carbon monoxide, hazardous air pollutants, and PM. Since 2019, however, two

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[4] Gas processing plants recover natural gas liquids from a stream of natural gas and control the quality of the gas to be marketed; compressor stations pressurize natural gas to pump it long distances; a refinery manufactures finished products from crude oil, natural gas liquids, or other hydrocarbons. Glossary, U.S. Energy Info. Admin, https://www.eia.gov/tools/glossary/index.php. Approximately 50,000 active oil and gas wells also emit substantial quantities of GHG emissions and health-damaging pollutants, but are not covered by this report. *See* Elena Krieger et al., PSE Healthy Energy, Equity-Focused Climate Strategies for New Mexico: Socioeconomic and Environmental Health Dimensions of Decarbonization 59 (2021), https://www.psehealthyenergy.org/our-work/programs/clean-energy/western-states-deep-decarbonization/new-mexico/.

of the largest coal-fired power plants have retired. These retirements substantially reduced health-damaging air pollutants from this sector, although they remain significant.

After these retirements, large stationary sources from the oil and gas sector are by far the largest source of health-damaging air pollutant emissions among these facilities. In fact, oil and gas sources contribute approximately two-thirds of SO_2, NO_x, and carbon monoxide, the majority of hazardous air pollutants from all large stationary sources, and half of stationary source PM.

IV. Smaller "Large Sources" are Important Contributors of Health-Damaging Pollution

Some of the "large" sources we identified fall below the greenhouse gas emissions threshold that is sometimes used in regulatory programs: 25,000 $MTCO_2e$ per year. Our findings show that these smaller "large" facilities—those emitting between 10,000 and 25,000 $MTCO_2e$ per year—contributed 3 percent of total large stationary source greenhouse gas emissions in 2019 (excluding retired facilities). At the same time, these facilities contribute a larger share of health-damaging air pollutant emissions: 15 percent of SO_2 and 13 percent of NO_2 emissions. These data suggest that some small sources have disproportionately high co-pollutant emissions.

V. Many Large Stationary Sources Are Located in Communities with a High Proportion of People of Color or Low-Income Households

Twenty-seven large stationary sources are located in relatively populous areas where more than 10,000 people live within three miles. Of these surrounding areas, 63 percent have populations above the median for low-income populations; approximately 44 percent are above the median for populations of color. Health impacts from such facilities are highest per-capita near the emission source and downwind, but associated air pollution can travel across the entire state and beyond. Low-income communities, communities of color, and those with high other socioeconomic and public health vulnerabilities are more likely to have adverse health outcomes when exposed to such pollution.

Seven of these facilities, including the Rio Grande Generating Station (Sunland Park) and the Rio Bravo Generating Station (Albuquerque) are located in communities that have very high levels of both people of color and low-income households; these populations may be more vulnerable to the effects of air pollution.

At the same time, many of New Mexico's large stationary sources are located in relatively rural areas. Seventy facilities have fewer than ten people living within three miles of the facility, although some of these—such as the coal plants—have been found to have significant health impacts across the entire state.

VI. Four Areas Stand Out as Regions with Clusters of Large Stationary Sources

Our analysis identified four clusters of large stationary sources. These are:

- **San Juan Basin:** San Juan, Rio Arriba, and McKinley counties include 65 large facilities, 56 of which are in the oil and gas sector. This region has a very high population of Native American residents.
- **Permian Basin:** Chaves, Lea, and Eddy are home to 69 facilities, 53 of which are in the oil and gas sector.
- **Albuquerque, Bernalillo, and Sandoval Counties:** The metropolitan area has the largest population in the state and contains 15 large stationary sources, including a mine, landfills, manufacturing, an airport, and the university.
- **Las Cruces and Dona Aña County:** Nine large stationary sources are situated in this region, and three facilities are located in low-income communities of color in Sunland Park.

Policy Implications

I. Reducing GHG Emissions from Large Stationary Sources Provides Opportunities to Reduce Health-Damaging Air Pollutants

Many of the strategies used to reduce GHG pollution from large stationary sources also reduce health-damaging air pollutants. If large stationary sources in New Mexico were to reduce their GHG emissions in line with the 45 percent reductions required by Governor Lujan Grisham's executive order, such reductions would likely result in substantial reductions of health-damaging air pollutants, although such benefits may vary with greenhouse gas reduction strategy (e.g., carbon capture and sequestration and hydrogen co-firing may increase the production of certain health-damaging air pollutants if implemented without adequate emissions controls).

II. Public Health Benefits Require Actual GHG Emission Reductions from In-State Facilities

The scale of public health benefit will be determined in part by the policy levers used and the level of actual GHG emission reductions achieved at large stationary sources within New Mexico.

If the state relies on an aggregate cap policy to reduce emissions, compliance flexibilities such as trading, linking with other jurisdictions, and offsets could limit the amount of public health benefits that result. For this reason, the state should consider limiting such trading flexibilities for some or all covered or large stationary sources if an aggregate cap policy is adopted. Such limits could range from a complete prohibition to targeted limits on trading and offsets in areas that have disproportionately high pollution or on high-emitting sectors. If an aggregate cap is used, it would also be critical to ensure that the cap was set and maintained at a level that required real, continuing reductions and included a mechanism to revisit the cap level if necessary.

An alternate approach would be a stand-alone complementary policy that requires additional reductions of health-damaging air pollutant emissions from large stationary sources. One approach would be to strengthen health-damaging air pollution emission limitations in existing state programs required by the Clean Air Act.

III. Including “Smaller” Large Sources Increases Public Health Benefits

Our analysis found that while sources that emit less than 25,000 MTCO2e do not comprise a large share of GHG emissions from large stationary sources, they do disproportionately contribute to the share of health-damaging air pollution from these sources. Including smaller “large” sources in a GHG reduction program could therefore increase the health benefits of the program.

IV. Policies Focusing on the Oil and Gas Sector are One Way to Increase Health Benefits

The retirements of two large coal-fired power plants make the oil and gas sector the largest source of health-damaging air pollutants among the large facilities we analyzed. The state's clean energy policy demonstrates how a sector-specific policy that requires ambitious, continuous improvements can lead to substantial reductions in health-damaging air pollutants. New Mexico's recent regulations on air pollution emissions from the oil and gas sector establish critical safeguards, however, additional policies are needed to achieve continuous improvements from this sector in keeping with the state's GHG emission targets. State policymakers should consider requiring emissions reductions consistent with state climate targets as one way to maximize health benefits, either through a stand-alone policy or through limits on compliance flexibilities in an aggregate cap.

V. Policies Focusing on Regional Clusters Could Also Increase Health Benefits

Another option for state policymakers would be to consider policies that require large stationary sources to achieve aggregate greenhouse gas reductions in the four "cluster" regions we identified, or to limit compliance flexibilities in these regions.

VI. Prioritizing Enforcement at High-Emitting Facilities Could be a Useful Complementary Strategy

Several high-emitting facilities have closed in part because of enforcement actions brought by the state or lawsuits brought by environmental organizations. Fully funding state enforcement capacity and focusing enforcement on large emitters, or emitters in vulnerable communities, could be a valuable complement to a climate policy that includes large stationary sources.

VII. Policymaking Processes Should Ensure Impacted Communities Have a Seat at the Table

A key demand of the environmental and climate justice movements is to ensure those communities that are most impacted by pollution, and that have been historically marginalized, are able to fully and meaningfully participate in the policymaking process. New Mexico policymakers should build on existing processes to ensure that impacted communities can meaningfully engage in the development of climate policies that also equitably achieve reductions of health-damaging pollution.

VIII. The State Should Consider Creating a More Robust Data Program and Conducting Disparate Pollution Analyses

Our analysis encountered significant data gaps in the emissions data available from the EPA and the New Mexico Environment Department. In developing climate policies that include large stationary sources, state policymakers should ensure that data on both GHG and health-damaging air pollutant emissions are up-to-date, accessible, and transparent, and should also collect and publish data on compliance transactions. The state should also consider making data available to the public through an online mapping tool, similar to what other states have adopted, and should consider conducting regular disparate pollution impact analyses.

IX. A Comprehensive Policy Also Needs to Address Transportation, Small Distributed Sources, and Buildings

Our analysis only focused on large stationary sources of air pollution. Any comprehensive state climate policy would need to address GHG and health-damaging air pollutant emissions from other sectors as well, including transportation, small, dispersed oil and gas sources, and buildings. Analyzing emissions from these other sectors was beyond the scope of this report.

1.0 Background

Why Examine GHG and Health-Damaging Air Pollution Emissions from Large Stationary Sources?

Large stationary sources—which include fossil fuel-fired power plants, oil refineries, natural gas processing plants and compressor stations, manufacturing plants, and landfills, among others—collectively contribute a large share of GHG emissions in New Mexico. These sources are also responsible for large amounts of other air pollutants besides GHGs that cause harm to people's health. Implementing policies to reduce GHG emissions of these large stationary sources also presents an opportunity to reduce emissions of health-damaging air pollutants.

This report seeks to inform conversations about how to implement an equitable climate policy in New Mexico by analyzing the levels of GHG and health-damaging air pollutant emissions from large stationary sources and the socio-demographic characteristics of the communities where these sources are located.

1.1 Meeting State Climate Targets Likely Requires Stronger Climate Policies for Large Stationary Sources

New Mexico is already experiencing the harms of climate change, including record-breaking wildfires,[5] severe drought,[6] and record high-heat days.[7] These impacts will only become more severe without dramatic action to curb greenhouse gas (GHG) pollution emissions.[8]

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[5] Tim Wallace & Nadja Popovich, *A 'Perfect Recipe for Extreme Wildfire': New Mexico's Record-Breaking, Early Fire Season*, N.Y. Times, June 1, 2022, https://www.nytimes.com/interactive/2022/06/01/climate/new-mexico-wildfires.html.
[6] A. Park Williams, Benjamin I. Cook & Jason E. Smerdon, *Rapid Intensification of the Emerging Southwestern North American Megadrought in 2020-2021*, 12 NATURE CLIMATE CHANGE 232 (2022), https://escholarship.org/uc/item/6sm1c6hf.
[7] Erica Meyer, *Extreme Heat Becoming the Norm for New Mexico*, KRQE NEWS 13, July 16, 2020, https://www.krqe.com/weather/extreme-heat-becoming-the-norm-for-new-mexico/.
[8] David Gutzler, New Mexico's Climate in the 21st Century A Great Change is Underway, Summer New Mexico Earth Matters (2020), https://geoinfo.nmt.edu/publications/periodicals/earthmatters/20/n2/em_v20_n2.pdf.

In a 2019 executive order Governor Lujan Grisham set a state goal to cut GHG emissions 45 percent from 2005 levels by 2030,[9] and the Governor also subsequently also announced a goal of achieving net-zero emissions by 2050.[10] The Governor's executive order directed state agencies to take specific actions and to plan for meeting state targets. In parallel, the state legislature enacted the 2019 Energy Transition Act (ETA), which requires New Mexico utilities to supply 100 percent decarbonized electricity to customers by 2050 through a Clean Energy Standard (CES).[11] In keeping with the executive order, state agencies established regulations to reduce GHG emissions from existing oil and gas sources, large coal-fired power plants, and cars and light trucks, as well as regulations to implement the ETA's CES.[12]

These are critical policies that will collectively cut GHG emissions by a significant degree. Three of these policies, the CES, the coal-fired power plant performance standard, and the oil and gas regulations, will cut GHG emissions from some large stationary sources. As described below, however, these policies collectively stop short of requiring GHG emission reductions from all large stationary sources at a level consistent with New Mexico's climate targets.

- **Clean Energy Standard:** The ETA's CES requires most New Mexico utilities to supply New Mexico utility customers with electricity sourced from 100 percent zero-carbon sources by 2045 (for for-profit utilities) or 2050 (for rural electric cooperatives), but it does not place any obligations on power plants that generate electricity for utilities operated by local governments in New Mexico or for utilities providing electricity to customers outside of the state.[13]

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[9] Lujan Grisham Climate Change Exec. Order, supra note 1.

[10] Theresa Davis, *Lujan Grisham Calls for Net-zero Emissions by 2050*, Albuquerque J., Oct. 25, 2021, https://www.abqjournal.com/2440566/lujan-grisham-calls-for-net-zero-emissions-by-2050.html.

[11] NMSA 1978 § 62–18–1 et seq. Gov. Lujan Grisham directed state agencies in her executive order to work with stakeholders to develop such legislation and strongly supported the ETA. *See* Lujan Grisham Climate Change Exec. Order, *supra* note 1; Off. of the Governor, Press Release: Governor Signs Landmark Energy Legislation, Mar. 22, 2019, https://www.governor.state.nm.us/2019/03/22/governor-signs-landmark-energy-legislation-establishing-new-mexico-as-a-national-leader-in-renewable-transition-efforts/.

[12] *See* New Mexico Interagency Climate Change Task Force, New Mexico Climate Strategy: Progress and Recommendations 12-17 (2021), https://www.climateaction.nm.gov/wp-content/uploads/2022/05/NMClimateChange_2021_final.pdf.

[13] NMSA 1978 § 62-16-4 (establishing requirement that "zero carbon resources shall supply one hundred percent of all retail sales of electricity in New Mexico" but exempting rural electricity cooperatives and municipally-owned utilities); NMSA 1978 § 62-15-34 (establishing a target for rural electricity cooperatives, but not municipally-owned utilities, of meeting CES by 2050 unless technical, reliability, or economic barriers exist). The ETA's CES defines a "zero-carbon resource" to mean a power plant that "emits no carbon dioxide into the atmosphere, or that reduces methane emitted into the atmosphere in an amount equal to no less than one-tenth of the tons of carbon dioxide emitted into the atmosphere, as a result of electricity production." NMSA 1978 § 62-16-3(K).

- **Performance Standard for Large Coal-Fired Power Plants:** The ETA also requires the state's Environmental Improvement Board (EIB) to set a GHG emission "performance standard" for very large coal-fired power plants, and the EIB recently completed a rulemaking to establish this standard.[14] The standard will effectively prohibit very large coal-fired power plants that do not use at least partial carbon capture and sequestration (CCS). There is only one power plant—the recently-shuttered San Juan Generating Station—that could be subject to the standard.[15] Notably, if the San Juan Generating Station reopened with partial CCS and operated at a level just meeting the standard, it would continue to emit substantial quantities of GHGs and health-damaging air pollutants.[16]
- **Oil and Gas Regulations that Reduce Methane:** The EIB and the state's Oil Conservation Commission (OCC) each established regulations under their respective legal authorities that will reduce methane emissions from large and small oil and gas sources.[17] These rules are nation-leading regulations that generally require operators to use technologies and processes that capture or control larger quantities of methane and health-damaging air pollution emissions than are ordinarily used in oil and gas production.[18] The OCC's methane waste rule also requires operators to capture 98 percent of natural gas produced from their wells,[19] and the EIB's rules require more frequent leak inspections at oil and gas wells located near homes, workplaces, and schools.[20] In general, these regulations are expected to significantly reduce the rate of methane and health-damaging air pollution emissions. Because the regulations include many different standards for many different pieces of equipment, and because measuring methane emissions from the complete oil and gas production system is complicated, it is unknown exactly how much the overall rate of emissions will decline. Moreover, production varies depending on the price of oil and natural gas and other

[14] The standard applies to new and existing coal-fired power plants with an original installed capacity over 300 megawatts and limits emissions to no more than 1,100 pounds CO_2 per megawatt hour. NMSA 1978 74-2-5(B)(1)(b); Env't Improvement Bd., Statement of Reasons and Final Order, EIB No. 22-28(R) (Nov. 10, 2022).
[15] See Form EIA-860 detailed data with previous form data (EIA-860A/860B), Energy Info. Admin., https://www.eia.gov/electricity/data/eia860/ (last visited Nov. 28, 2022) (San Juan Generating Station only coal-fired power plant in New Mexico with a nameplate capacity over 300 megawatts).
[16] The City of Farmington and Enchant Energy Corp. are seeking to reopen the power plant and to add CCS, although the majority owners of the power plant have said that "fundamental threshold issues" have not been addressed that would allow the proposal to move forward. *See* Kevin Robinson-Avila, *Effort to Transform NM Coal Plant to Carbon-capture Facility Faces Huge Hurdles*, Albuquerque J., Nov. 5, 2022, https://www.abqjournal.com/2546674/enchant-energy-faces-huge-hurdles-at-san-juan.html.
[17] 20.2.50.1 et seq. NMAC; 19.15.27.1 et seq. NMAC.
[18] *See* Susan Montoya Bryan, *New Mexico Adopts Stiffer Pollution Rules for Oil and Gas*, Assoc. Press, April 15, 2022, https://apnews.com/article/business-new-mexico-environment-air-quality-2a94d803f7df4308290f22bf85f1a2cc.
[19] 19.15.27.9 NMAC.
[20] 20.2.50.116(C) NMAC.

factors. If oil and gas production increase sufficiently, the overall level of GHG and health-damaging air pollution emissions can increase—even if the rate of pollution has declined.

In short, while these are important policies that will achieve significant reductions from some large stationary sources, they do not require that all large stationary sources achieve GHG emission reductions that are in keeping with New Mexico's climate targets. In order to achieve economy-wide reductions of 45 percent GHG emission reductions from 2005 levels by 2030 and net-zero emissions by 2050, the state will likely need to establish policies that require further GHG emission reductions from large stationary sources.

In order to achieve economy-wide reductions of 45 percent GHG emission reductions from 2005 levels by 2030 and net-zero emissions by 2050, the state will likely need to establish policies that require further GHG emission reductions from large stationary sources.

1.2 Large Stationary Sources Also Emit Substantial Quantities of Health-Damaging Pollutants

Large stationary sources are also responsible for substantial emissions of other air pollutants besides GHGs that cause harm to people's health. These include pollutants such as nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM)—all designated as **criteria pollutants** under the federal Clean Air Act—which are emitted by many types of sources and can harm people when they exist in high enough concentrations in the ambient air.[21] For example:

- Emissions of **NO_2 and SO_2** can both exacerbate or cause asthma and potentially increase susceptibility to respiratory infections. NO_2 also contributes to the formation of ground-level ozone (smog) which harms the respiratory system. Both NO_2 and SO_2 can contribute to the formation of particulate matter.[22]
- **Particulate Matter (PM)** pollution refers to particles that are so small that they can be inhaled or even get into the bloodstream. PM pollution can lead to premature death

[21] Criteria Air Pollutants, U.S. Env'tl Prot. Agency, https://www.epa.gov/criteria-air-pollutants (last visited Sep 23, 2022).
[22] *Id.*

for people with heart or lung disease, and can also cause heart attacks and aggravate respiratory problems.[23]

In addition, large stationary sources also emit hazardous air pollutants that are toxic even in small doses. These include the following among others:

- **Volatile organic compounds (VOCs)** that include **formaldehyde** and **benzene** among other toxins. Both cause cancer and can harm the respiratory system. Benzene can also cause anemia, brain damage, and birth defects.[24] These are commonly emitted from oil and gas facilities.[25] VOCs can also react with NO_2 to form ozone.
- **Mercury**, a neurotoxin that eventually settles in water and accumulates in fish and shellfish and can lead to learning disabilities in children.[26]

Our federal-state system of air pollution control laws often fails to adequately protect low-income communities and communities of color from these pollutants.[27] There are many examples of lower-income neighborhoods or neighborhoods with higher numbers of Native, Latino, or Black residents that have higher levels of air pollution or higher levels of adverse health outcomes that can be caused by air pollution.[28] Several scholars have adopted an environmental justice framework for understanding and addressing environmental burdens that the poor and populations of color experience due to exposures of toxic harms and receiving less legal and other protections compared to white and higher income communities.[29]

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[23] Particulate matter pollution is often categorized by size, as either less than 10 micrometers in diameter (PM_{10}) or less than 2.5 micrometers ($PM_{2.5}$). *Id.*

[24] *Health Effects Notebook for Hazardous Air Pollutants*, U.S. Env't Prot. Agency, https://www.epa.gov/criteria-air-pollutants (last visited Sep 23, 2022).

[25] Heny Patel and Lesley Feldman, Clean Air Task Force, Fossil Fumes: 2022 Update (2022), https://cdn.catf.us/wp-content/uploads/2016/06/14175846/fossil-fumes-report-2022.pdf.

[26] *Health Effects Notebook for Hazardous Air Pollutants*, U.S. Env't Prot. Agency, https://www.epa.gov/criteria-air-pollutants (last visited Sep 23, 2022).

[27] *E.g.* Robert D. Bullard, *Environmental Justice in the 21st Century: Race Still Matters*, 49 Phylon 151 (2001); see also Ann E. Carlson, *The Clean Air Act's Blind Spot: Microclimates and Hotspot Pollution*, 65 U.C.L.A. L. Rev. 1036 (2018).

[28] *E.g.,* Christopher W. Tessum et al., *$PM_{2.5}$ Polluters Disproportionately and Systemically Affect People of Color in the United States*, 7 Sci. Advances eabf4491 (2021), https://www.science.org/doi/10.1126/sciadv.abf4491; Haley M. Lane et al., *Historical Redlining Is Associated with Present-Day Air Pollution Disparities in U.S. Cities*, 9 Env't Sci. Tech. Letters 345 (2022), https://doi.org/10.1021/acs.estlett.1c01012; Robert J. Brulle & David N. Pellow, *Environmental Justice: Human Health and Environmental Inequalities*, 27 Ann. Rev. Pub. Health 103 (2006), https://doi.org/10.1146/annurev.publhealth.27.021405.102124.

[29] *See* Jason Corburn, *Concepts for Studying Urban Environmental Justice*, Env't Health Persp. 4:61-65 (2017).

1.3 Climate Policies Designed with Public Health in Mind Can Reduce Both GHGs and Health-Damaging Air Pollutants

Climate policies present an opportunity to address some of these inequalities because policies that reduce GHG pollution almost always reduce these health-damaging types of pollution as well. That is because reducing GHG pollution generally requires reducing combustion of fossil fuels for a given unit of output or it requires capturing some or all of the pollution produced.[30]

Climate change policies do not necessarily require that GHG emissions are *reduced at an equal rate* from *all facilities*, however.[31] This is because the most common GHG pollutants—CO_2 and methane—do not directly harm human health, although they do cause climate change. For the purpose of combating climate change, it does not matter which facility reduces carbon dioxide or methane, as long as the necessary reductions are achieved. In order to make compliance cheaper and more flexible, some climate policies therefore focus on achieving aggregate GHG emission reductions from a group of sources.

Scholars and community advocates have long pointed out that ignoring where GHG emission reductions are achieved can perpetuate widespread existing environmental injustices.[32] For example, it is possible that under climate policies that only consider aggregate emission reductions, a large facility could close in a richer neighborhood, leading to increased use of similar existing facilities in poorer neighborhoods to compensate. This could lead to a net reduction in GHG emissions (satisfying the climate policy), and even to a net reduction in the emissions of health-damaging air pollutants, but it could also have the indirect effect of maintaining or even increasing health-damaging pollution in the poorer neighborhood.[33]

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[30] *E.g.*, J. Jason West et al., *Co-benefits of Mitigating Global Greenhouse Gas emissions for Future Air Quality and Human Health*, 3 Nature Climate Change 885 (2013), https://www.nature.com/articles/nclimate2009.
[31] *See* Meredith Fowley, Reed Walker & David Wooley, Brookings Institution, Climate Policy, Environmental Justice, and Local Air Pollution, (2020), https://www.brookings.edu/research/climate-policy-environmental-justice-and-local-air-pollution/. Policies that do not necessarily require emission reductions from a specific sources include policies that set an aggregate cap over a universe of sources, policies that set individual standards for sources but allow trading or offsets, and carbon tax policies.
[32] *See, e.g.,* Cal. EJ Advisory Comm., Recommendations and Comments of the EJ Advisory Committee on the Implementation of the Global Warming Solutions Act of 2006 (AB 32) on the Draft Scoping Plan (2008), https://www.arb.ca.gov/cc/ejac/ejac_comments_final.pdf.
[33] *See* Lara Cushing et al., *Carbon Trading, Co-pollutants, and Environmental Equity: Evidence from California's cap-and-trade program (2011–2015)*, 15 PLOS Medicine e1002604 (2018), https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002604; Corbett Grainger & Thanicha

Researchers and policymakers at all levels of government are increasingly stressing the need to incorporate equity and justice principles in addressing climate change. This includes ensuring that health-damaging pollution is equitably reduced in all communities along with GHG emissions, especially those that suffer disproportionately from such pollution.[34] For example, President Joseph Biden's executive order on "Tackling the Climate Crisis" also directs agencies to "make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities…."[35] The Intergovernmental Panel on Climate Change–the United Nations' body of scientists tasked with advancing knowledge about climate change–has broadened the scope of its reporting to include consideration of "just and equitable transitions,"[36] including the benefits of reducing health-damaging air pollution together with GHG emissions.[37]

Justice principles also require that all people—especially those who have been historically marginalized, subject to injustice, or have most at stake—have the opportunity to play a meaningful part in developing policies to respond to the climate crisis.[38]

This report seeks to inform conversations about how to implement an equitable climate policy in New Mexico by analyzing the levels of GHG and health-damaging air pollutant emissions from large stationary sources and the socio demographic characteristics of the communities where these sources are located.

Ruangmas, *Who Wins from Emissions Trading? Evidence from California*, 71 Env't Res. Econ. 703 (2018), https://doi.org/10.1007/s10640-017-0180-1.

[34] *E.g.* Jalonne Lynay White-Newsome, *A Policy Approach Toward Climate Justice*, 46 The Black Scholar 12 (2016), https://doi.org/10.1080/00064246.2016.1188353.

[35] Exec. Order No. 14008, 86 Fed. Reg. 7619 (Jan. 27, 2021), https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/.

[36] Intergovernmental Panel on Climate Change, Summary for Policymakers: Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change 9 (2022), https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_SPM.pdf (prepublication version).

[37] Intergovernmental Panel on Climate Change, Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change at 3-106 to 3-107 (2022), https://www.ipcc.ch/report/ar6/wg3/ (prepublication version).

[38] *See* EPA definition of environmental justice: "The fair treatment and meaningful involvement of all people regardless of race, color, culture, national origin, income, and educational levels with respect to the development, implementation, and enforcement of protective environmental laws, regulations, and policies." *Learn About Environmental Justice*, Env't Prot. Agency, https://www.epa.gov/environmentaljustice/learn-about-environmental-justice (last visited Nov. 29, 2022).

State legislators have already indicated that such environmental justice considerations will likely be an important component of any future state climate policy that addresses GHG emissions from large stationary sources. In 2022, several legislators, including the then-Speaker of the House, introduced the Clean Future Act, which would have codified state GHG reduction targets and would have directed the EIB to establish binding GHG emission limits consistent with these targets for sources that it regulates. The legislation would have allowed a type of trading of GHG emission reduction requirements among regulated sources, but would have required that the trading protocol take into account "geographic location" and "the impact … on disproportionately impacted communities or environmental justice communities."[39]

1.4 Other Sources of Emissions

One note on this report is that it only considers emissions from large stationary sources. These sources represent a large and important sector of greenhouse gas emissions and other air pollution in New Mexico. They are also relatively small in number, and therefore easier to analyze and regulate, and can have disproportionate pollution effects on local communities.

But they are far from the only sources of pollution, and in particular, there are two other large categories of air pollution that are not captured here. One is the transportation sector, which is the second largest source of GHG emissions in New Mexico behind the oil and gas sector and also a large source of criteria pollutants.[40] The second area of notable omission is smaller oil and gas sources. While large oil and gas sources, such as refineries, gas processing plants, and compressor stations, are captured in this report, smaller sources such as individual wells are not captured. There are thousands of such wells operating in New Mexico, and they also contribute substantially to criteria and hazardous air pollution.[41]

1.5 Relationship to "Equity-Focused Climate Strategies for New Mexico" Report

This report builds on a 2021 PSE Healthy Energy Report titled Equity-Focused Climate Strategies for New Mexico.[42] That report analyzed GHG and health-damaging air pollutant emissions data from the transportation, buildings, industrial, and electricity generating

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[39] H.B.6 at Sec. 6, 55th Leg., 2nd Sess. (2022).
[40] Krieger et al., *supra* note 4, at 18.
[41] *Id. at 59.*
[42] *Id.*

sectors, as well as how health-damaging emissions from those sectors affect vulnerable communities, and assessed the potential for decarbonization strategies to mitigate those impacts. The report also looked at cross-sectoral considerations, including factors such as energy cost burdens and cleanup and transition opportunities from resource extraction.

This current report reflects many of the same themes, but builds on the prior report by focusing specifically on large stationary sources. This universe of sources includes both power sector and industrial sources grouped together, sources that are sometimes regulated together in state climate policies. This report compiles and analyzes more detailed GHG and health-damaging pollution data on large industrial sources in a way that allows them to be directly compared to power sector sources. It also analyzes the implications of our findings for climate policies targeting large stationary sources.

2.0 Methodology

2.1 Universe of Sources

In order to identify New Mexico's large stationary facilities and associated greenhouse gas and co-pollutant emissions we primarily utilized three publicly available databases: (1) the New Mexico Environment Department's (NMED) Emissions Analysis Tool,[43] (2) the EPA's Facility Level Information on GreenHouse gases Tool (FLIGHT)[44], and (3) the EPA's National Emissions Inventory (NEI).[45] The NMED tool most recently reported data for 2019, so we similarly used FLIGHT data from 2019 for consistency, although 2020 was also available.[46] NEI's most recent data was from 2017, so we scaled these emissions to 2019 levels based on emission rates when possible (see below).

We used the NMED tool to identify a core set of 137 distinct facilities or polluting sites—what the EPA refers to as point sources. NMED aggregates GHGs and criteria pollutant emissions data from Title V sources—that is, facilities which require a federal Title V permit to operate as potential major pollution sources under the Clean Air Act. However, NMED does not report emissions from facilities in New Mexico regulated by the City of Albuquerque Environmental Health Department, which regulates major sources in Bernalillo County. NMED also does not report emissions from sources located within the Navajo Nation, such as the Four Corners Generating Station (the Navajo Nation operates its own air pollution control program under the Clean Air Act).

We expanded our dataset to include 38 additional major greenhouse gas emitters not included in NMED's tool by using the FLIGHT tool, which includes point sources with GHG emissions over 25,000 $MTCO_2$/year.[47] Through FLIGHT we were able to identify five facilities within Bernalillo County, as well as one in the Navajo Nation Tribal Land. We cross-checked and updated facility locations using satellite view on Google Maps. When the latitude and

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[43] *New Mexico Environment Department's Emissions Analysis Tool*, New Mexico Envi't Dept., https://eatool.air.net.env.nm.gov/aqbeatool/ (last visited July 25, 2022).
[44] *2019 Greenhouse Gas Emissions from Large Facilities*, U.S. Env't Prot. Agency, https://ghgdata.epa.gov/ghgp/main.do?site_preference=normal (last visited July 25, 2022).
[45] *2017 National Emissions Inventory (NEI) Data*, U.S. Env't Prot. Agency, https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei (last visited May 25, 2022).
[46] 2020 Emissions were likely also impacted by the COVID-19 pandemic.
[47] *Using GHG Inventory and GHGRP Data*, U.S. Env't Prot. Agency, https://cfpub.epa.gov/ghgdata/inventoryexplorer/data_explorer_flight.html (last visited Nov. 27, 2022).

longitude was not provided through the downloaded datasets, we searched for the locations online and added them to the master dataset. Finally, we supplemented our facility list and gaps in reported emissions with data from NEI to create a master dataset containing a total of 189 unique facilities.

The second step was to categorize the facilities by class and type. We manually researched all the facilities to define which class and type they belonged (i.e. oil and gas, mining, power plant, etc.). Certain gas facilities included multiple source types, such as gas processing plants with compressor stations and underground storage on site. We classified these under the umbrella category of gas processing plants, and they are listed as a single source.
Next, we added GHG emissions and co-pollutant data first from NMED, followed by FLIGHT if NMED data were unavailable, and finally by NEI, with some final data for power plants provided by the EPA's Clean Air Markets Program Dataset.[48] Each of these three databases contains a different subset of GHG, criteria air pollutant, and hazardous air pollutants emissions. NMED reports GHGs including carbon dioxide, methane, and nitrous oxide (N2O). NMED reports criteria air pollutants including carbon monoxide, NO_2, SO_2, and PM_{10}. For hazardous air pollutants (HAPs), NMED provides the total mass of emissions but does not identify individual air pollutants. The FLIGHT tool reports total greenhouse gas emissions using global warming potentials for methane and nitrous oxide from AR4.[49]

NEI reports greenhouse gas emissions as individual pollutants thus, the GHG data was aggregated by manually using global warming potential from AR4—since NEI data was reported in tons—then added for a total emission value for consistency across all the databases. NEI reports criteria air pollutants including carbon monoxide, NO_2, SO_2, PM_{10}. HAPs from NEI were summed to provide consistency with the NMED database. There were six facilities from NEI whose co-pollutant data were scaled using GHG to air pollutant ratios to estimate 2019 emissions. We also included NO_2 and SO_2 data for a single gas plant using data from the U.S. Energy Information Administration.[50]

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[48] *Custom Data Download, Clean Air Markets Program Data*, U.S. Env't Prot. Agency, https://campd.epa.gov/data/custom-data-download (last visited Nov. 27, 2022).
[49] The Intergovernmental Panel on Climate Change's Fourth Assessment Report, released in 2007, uses a global warming potential for methane that has been increased in recent reports. More specifically, current scientific understanding is that the warming impact of methane is higher than previously believed.
[50] *Electricity Data Browser*, Energy Info. Admin., https://www.eia.gov/electricity/data/browser/ (last visited Oct. 10, 2022).

2.1.1 Data Limitations

Missing data. As noted previously, the County of Bernalillo has its own air district, and tribes typically have sovereignty to regulate sources located on tribal lands, leading to our aggregation of data across multiple datasets. There is some chance that due to different reporting requirements in each territory, we may be missing some facilities. We identified a total of four facilities on tribal lands, for example, but there may be additional sites that we did not identify. In addition, we could not verify the location of six facilities (largely compressor stations), and 14 airports reporting emissions to NEI that we could not scale to 2019 estimates. Lastly, there were 27 facilities missing GHG emissions data and 32 missing co-pollutant data. Missing GHG facilities include six gas processing plants, 11 compressor stations, three potash facilities, three airports, a reinjection facility, a food facility, a pump station, and a landfill gas-to-energy plant that just came online. The facilities missing health-damaging air pollutant data include a mix of compressor stations, potash facilities, airports, mines, landfills, food facilities, manufacturing, gas processing plants, the reinjection facility, and some of the co-pollutants from power plants. As a result, our findings here may underestimate the total 2019 greenhouse gas and air pollutant emissions associated with large stationary facilities in New Mexico.

Data consistency between years. As described, we scaled the co-pollutant emissions from NEI's 2017 reporting to 2019 values using GHG ratios for each year, which likely introduces errors for the six facilities scaled. We used 2019 emissions for consistency, but as we describe below, oil and gas production has increased dramatically between 2019 and 2022. As such, oil and gas sector emissions have likely increased as well. However, we also note that certain facilities have retired since 2019. We have included some of those below, including most notably the San Juan Generating Station, but we may be unaware of the retirement of some smaller facilities.

The climate impact of methane. We also note that the databases used here report greenhouse gas emissions for non-CO_2 pollutants, such as methane, using AR4 global warming potentials over a 100-year time period. Scientific consensus suggests these values are higher than previously believed, and methane is also significantly more potent over 20 years than over 100 years. These databases also include only facility-level emissions, as opposed to the lifecycle emissions associated with fuel use. The GHG emissions reported for burning gas at a power plant, for example, include only facility emissions as opposed to the methane leakage that occurs during the production and processing of gas and transportation to the facility. Some of these emissions are likely captured in other parts of our analysis, such as compressor stations, but the use of an outdated warming potential and a 100-year timeframe still suggests that the climate benefits of cutting fossil fuel use, particularly in the near term, are likely much higher than reported here.

2.2 Demographic and Nearby Population Data

To assess the demographics of populations living in proximity to large stationary facilities, we aggregated population and socioeconomic data from the U.S. Census[51] and from the EPA's environmental justice screening tool EJScreen 2.0.[52] Health data, such as asthma and coronary heart disease, was aggregated from CDC PLACES.[53] For many of these indicators, they are are provided both as a raw value—e.g., the percent of the population falling below 200 percent of the federal poverty level—as well as a percentile compared to the rest of the census tracts in the state—e.g., how many census tracts have a lower share of low-income households. This percentile value is useful for assessing if facilities are located in an area with a disproportionate share of socioeconomically vulnerable populations.

While the cumulative public health impacts of stationary sources may extend for hundreds of miles away from the source of emissions, particularly in the case of airborne emissions from power plant stacks, the per capita impacts tend to be highest for populations living closest to these facilities. In addition, these households may be exposed to pollutants along numerous pathways, such as groundwater contamination from on-site disposal of coal ash by a power plant or from heavy-duty diesel trucks and equipment associated with industrial activity at a given facility. We therefore analyzed the populations living within close proximity to each of the large stationary sources identified. We used a three-mile radius to assess environmental and socioeconomic indicators, following precedent set in the EPA's Power Plants and Neighboring Communities Tool,[54] and the EJ Screening Report for the Clean Power Plan,[55] although we again emphasize that this radius is only a proxy for screening for disproportionate burdens on nearby populations and that the health impacts may extend beyond this population. We use the EPA's methods to calculate the individual indicator values from EJScreen and CDC's PLACES for populations living within a three-mile radius of each

[51] U.S. Census Bureau, https://www.census.gov/ (last visited Nov. 27, 2022).
[52] *EJScreen*: Environmental Justice Screening and Mapping Tool, Env't. Prot. Agency, https://www.epa.gov/ejscreen (last visited Nov. 27, 2022).
[53] CDC PLACES, https://www.cdc.gov/places/index.html (last visited Nov. 29, 2022).
[54] *Power Plants and Neighboring Communities Map*, U.S. Env't. Prot. Agency, https://www.epa.gov/airmarkets/power-plants-and-neighboring-communities-map (last visited Nov. 27, 2022).
[55] U.S. Env't Prot. Agency, EJ Screening Report for the Clean Power Plan (2015), https://19january2017snapshot.epa.gov/cleanpowerplan/ej-screening-report-clean-power-plan_.html.

facility, and assign percentiles to that nearby population based on how it ranks compared to census tracts across the state.[56]

[56] For the methods we used to estimate population demographics living within a specific distance to each facility, see the methods in: U.S. Env't Prot. Agency, EJSCREEN Technical Documentation at Appendix B (2021) https://www.epa.gov/sites/default/files/2021-04/documents/ejscreen_technical_document.pdf.

3.0 Results

3.1 Universe of Large Stationary Emission Sources

We identified a total of 189 unique large stationary source emitters in New Mexico. **Table 1** shows the number of facilities in each sector—e.g., power plants, oil and gas—and their total 2019 GHG emissions.[57] These facilities emitted a total of 31.4 MMT CO_2e in 2019. For comparison, the state's total 2018 GHG emissions across all sectors totaled 113.6 MMT CO_2e,[58] suggesting that large stationary sources are responsible for approximately a quarter of the state's GHG emissions.

The majority of the state's large stationary facilities (63 percent) are in the oil and gas sector, but 68 percent of large stationary source emissions came from the state's 19 power plants in 2019. The oil and gas sector, which includes facilities such as compressor stations (69), gas processing and treatment plants (37) and refineries (3), was responsible for 23 percent of 2019 stationary source emissions. However, it is important to note again that these values include only large stationary sources, and the oil and gas sector as whole (including emissions from oil and gas production and other sources) was responsible for more than a third of the state's total greenhouse gas emissions in 2018[59] and has probably grown since: New Mexico gas production increased by 50 percent between 2018 and 2021[60] and oil production increased by 84 percent over the same time period.[61]

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[57] As described in the methods, we do not have greenhouse gas emissions data for 27 of the 189 facilities. For half of these sites, we do have criteria air pollutant data. We do not know if the missing data were not reported, fell below a reporting threshold, or are due to the facilities being idled or retired in the case of sites reporting no emissions whatsoever.

[58] However, these emissions do not include sources on tribal lands, such as the Four Corners Generating Station. We include those here, because the health impacts of these facilities are still felt in New Mexico.

[59] Sharad Bharadwaj et al., Energy + Environmental Economics, prepared for Center for the New Energy Economy at Colorado State University, New Mexico Greenhouse Gas (GHG) Emissions Inventory and Forecast (2020), https://cnee.colostate.edu/wp-content/uploads/2020/10/New-Mexico-GHG-Inventory-and-Forecast-Report_2020-10-27_final.pdf.

[60] *Natural Gas: New Mexico Natural Gas Marketed Production*, U.S. Energy Info. Admin, https://www.eia.gov/dnav/ng/hist/n9050nm2a.htm (last visited Nov. 27, 2022).

[61] *Petroleum & Other Liquids: New Mexico Field Production of Crude Oil*, U.S. Energy Info. Admin, https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mcrfpnm1&f=a (last visited Nov. 27, 2022).

Table 1. Major Classes of Large Stationary Source Emitters in New Mexico. Annual emissions reported for 2019.

Facility Class	Number of Sources	Total GHG emissions ($MTCO_2e$)
Agricultural Service	4	100,869
Airport	12	74,892
Education	3	122,816
Power Plants	20	21,220,699
Landfill	12	872,071
Manufacturing	4	405,940
Military	3	654,096
Mining	8	611,063
Oil & Gas	120	7,322,685
Other	3	33,202
Total	**189**	**31,418,342**

Depending on where the GHG emissions threshold of large stationary sources is defined, the number of large stationary sources could range from 86 to 189. **Table 2** shows the major classes of large stationary sources by two thresholds: sources that emit over 10,000 $MTCO_2e$/year of GHGs and sources that emit over 25,000 $MTCO_2e$/year of GHGs. When comparing thresholds, the 128 facilities that emit more than 10,000 $MTCO_2e$/year of GHGs and the 86 that emit above 25,000 $MTCO_2e$/year of GHGs are responsible for 99.6 percent and 97 percent of the large stationary facility GHG emissions, respectively. Furthermore, regardless of emission threshold, power plants are responsible for at least 67 percent of total GHG emissions from large stationary sources in New Mexico.

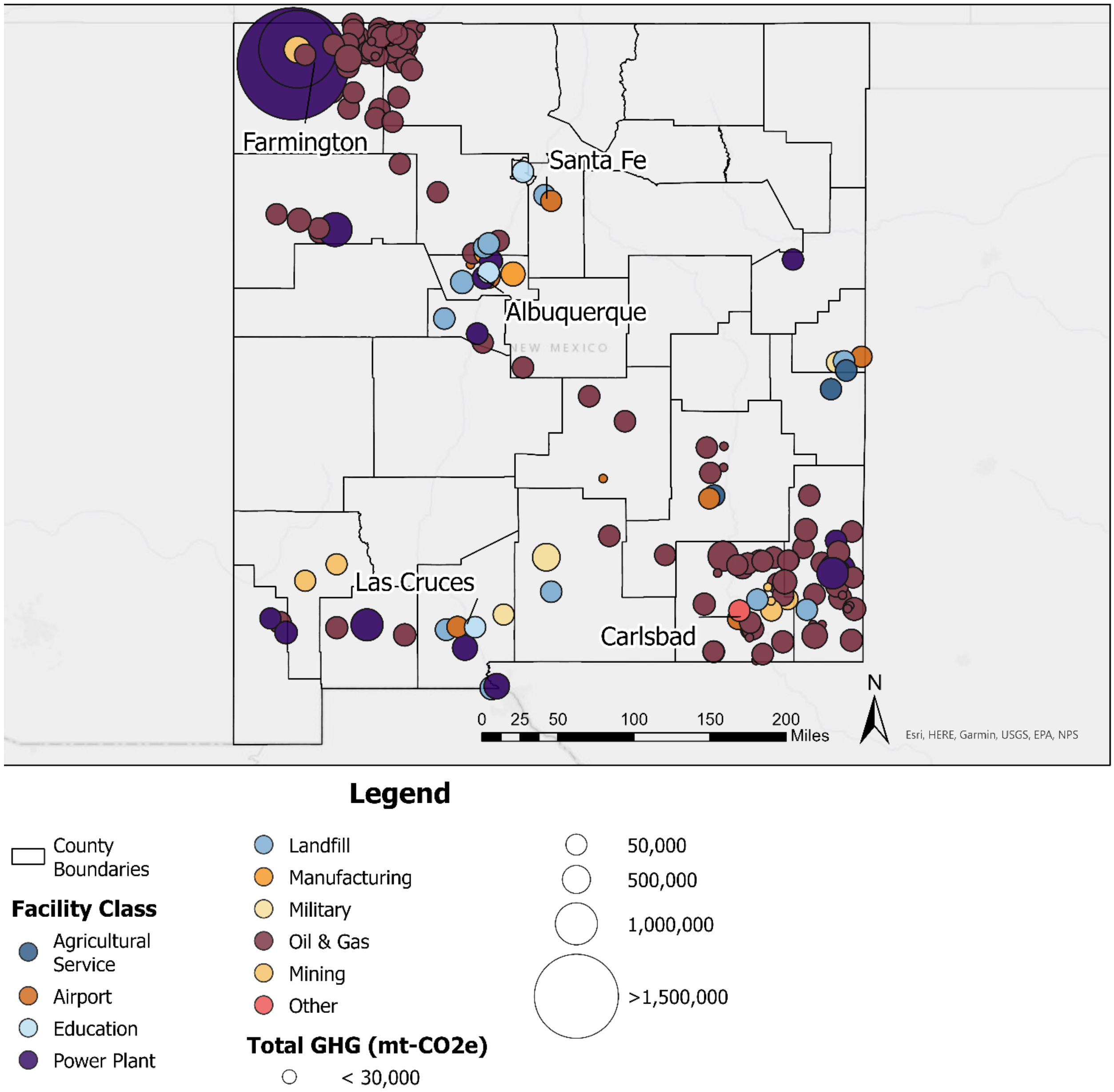
Table 2. Major Classes of Large Stationary Source Emitters by GHG Emissions Threshold in New Mexico.

	GHG Emissions Threshold			
	GHG > 10,000 MTCO2e/year		GHG > 25,000 MTCO2e/year	
Facility Class	Number of Sources	Total emissions	Number of Sources	Total emissions
Agricultural Service	3	100,869	2	76,790
Airport	1	68,333	1	68,333
Education	3	122,816	3	122,816
Power Plants	17	21,218,609	14	21,172,120
Landfill	12	872,072	11	851,983
Manufacturing	3	397,477	3	397,477
Military	1	642,791	1	642,791
Mining	2	599,750	2	599,750
Oil & Gas	85	7,231,733	48	6,571,672
Other	1	32,064	1	32,064
Total	**128**	**31,286,514**	**86**	**30,535,796**

Figure 1 maps the 2019 emissions from these large stationary greenhouse gas sources across New Mexico. San Juan County is home to the largest number of facilities (49) largely due to the large number of oil and gas facilities located in the San Juan Basin. Lea County and Eddy County, home to significant Permian Basin oil and gas production activity, have 31 and 32 facilities respectively. The Four Corners Generating Station, located on the Navajo Nation's tribal land, emitted more GHGs than any other single source (8.84 $MMTCO_2e$). Two of the state's five largest emitters, however, have retired since 2019: San Juan Generating Station (5.5 $MMTCO_2e$) and the Prewitt Escalante Generating Station (1.25 $MMTCO_2e$), both coal plants, have come offline. The remaining two largest emitters among the top five are both gas power plants: the Hobbs Generating Station (1.48 MM CO_2e) and Luna Energy Facility (1.06 $MMTCO_2e$). Four Corners itself is scheduled for retirement by the end of 2031. To meet its climate targets, New Mexico will have to develop strategies to reduce and ultimately eliminate greenhouse gas emissions from these remaining facilities. In spite of the retirements,

however, these reductions are not a given: for example, Luna Energy Facility's total electricity generation was higher in 2020 and 2021 than any previous year.[62]

Figure 1. Large Stationary Source Emitters in New Mexico. GHG emissions reported for 2019.



[62] *Electricity Data Browser*, U.S. Energy Info. Admin., https://www.eia.gov/electricity/data/browser/ (last visited Oct. 10, 2022).

3.2 Health-Damaging Air Pollutants from Large GHG Sources

In addition to greenhouse gas emissions, New Mexico's large stationary facilities simultaneously emit significant quantities of health-damaging air pollutants. As previously mentioned, exposure to criteria air pollutants such as NO_2, SO_2, and PM are associated with adverse cardiovascular and respiratory health impacts, including premature death. Hazardous air pollutants such as benzene are associated with cancer among numerous other human health impacts. Reducing greenhouse gas emissions at New Mexico's large stationary facilities holds the potential to simultaneously reduce these health-damaging air pollutant emissions. However, the magnitude of these emissions varies both by facility type and from facility to facility. Therefore, reducing a ton of GHG emissions at one facility may reduce significantly more, or a different type, of health-damaging air pollutants than reducing a ton of GHGs elsewhere. Below, we assess these co-pollutant emissions by facility type and in relation to GHG emissions to better develop strategies to simultaneously protect the climate and public health.

3.2.1 Health-Damaging Air Pollutants Analysis by Pollutant Type

Criteria Air Pollutants. New Mexico's large stationary facilities are the source of numerous criteria air pollutants. We analyzed emissions of pollutants for which we had data, including carbon monoxide, PM, NO_2, and SO_2. In 2019, these facilities released an estimated 31,000 metric tons of NO_2, 7,800 tons of SO_2, 16,000 metric tons of carbon monoxide, 1,400 metric tons of PM, and 870 metric tons of hazardous air pollutants. For comparison, these NO_2 values are roughly half of 2017 estimates for transportation sector NO_2 emissions, which is the largest sole contributor; and large stationary facilities likely account for the majority of statewide SO_2 emissions.[63]

The totals estimated here are likely an underestimate of 2019 emissions due, in part, to the unavailability of certain pollutant emissions from the Four Corners Generating Station and other facilities. However, the recent retirements mentioned above have reduced subsequent emissions. San Juan Generating Station, Prewitt Escalante Generating Station, and the recently retired Eunice Gas Plant together accounted for 26 percent of 2019 NO_2 emissions, 66 percent of SO_2 emissions, and 22 percent of greenhouse gas emissions. These are promising trends, indicating that recent retirements have not only reduced GHG emissions but have also reduced an even higher share of health-damaging air pollutant emissions.

[63] Elena Krieger et al., *supra* note 4, at 18.

Figure 2a shows total pollutant emissions by facility class. These are largely dominated by oil and gas, power plant, airport, and manufacturing emissions. **Figure 2b** shows the same data excluding recently retired facilities, and suggesting that the share of pollution from stationary sources is shifting moderately away from power plants towards oil and gas facilities.

Figure 2a. Estimated 2019 Health-Damaging Air Pollutant Emissions from New Mexico's Large Stationary Facilities. HAPs data and PM data were unavailable for Four Corners.

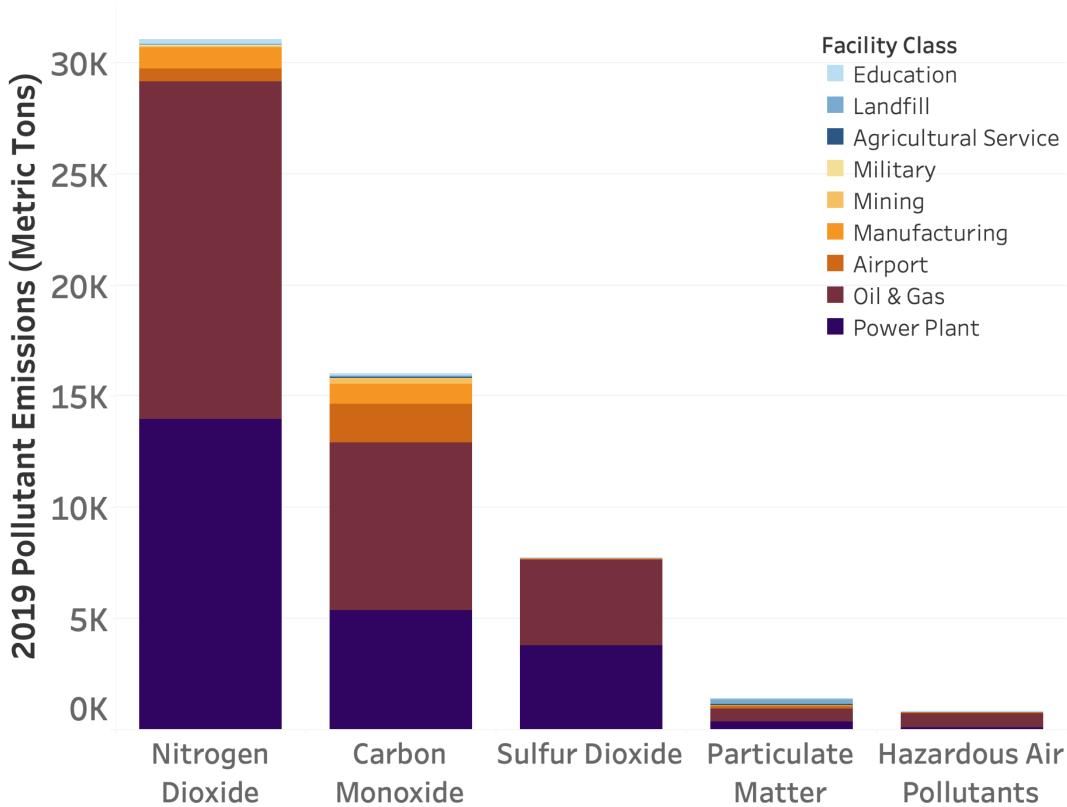
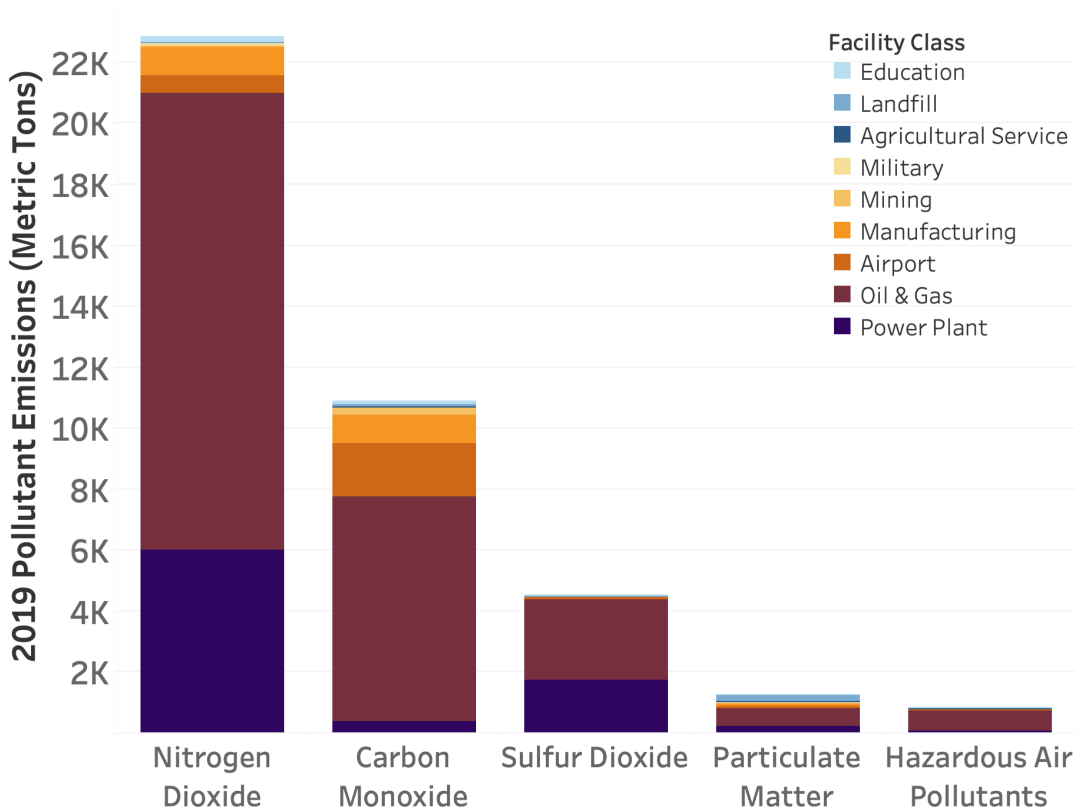


Figure 2b. Estimated 2019 Health-Damaging Air Pollutant Emissions from New Mexico's Large Stationary Facilities, Excluding Recently Retired Plants. HAPs data and PM data were unavailable for Four Corners.



Sulfur Dioxide. Two of the state's three largest stationary sources of SO_2 emissions in 2019—the San Juan Generating Station and the Eunice Gas Plant, a gas processing facility—have since retired.[64] The Four Corners Generating Station remains the largest single source of SO_2 emissions, however. In 2019, New Mexico's coal plants emitted 48 percent of stationary source SO_2 emissions; gas processing plants were responsible for another 44 percent. Excluding retired facilities, 50 percent of SO_2 emissions came from Lea County, followed by another 40 percent from San Juan County (primarily from the Four Corners plant), and 6 percent from Eddy County. These emissions do not only affect populations in these counties, however; as described previously, SO_2 reacts in the atmosphere to produce PM, which can have health impacts on populations hundreds of miles from the source.

[64] Hannah Grover, *Eunice Gas Plant to Shutter as Part of Settlement Agreement*, NM Political Report, Sept. 15, 2021, https://nmpoliticalreport.com/2021/09/15/eunice-gas-plant-to-shutter-as-part-of-settlement-agreement/.

However, cumulative impacts are likely to be highest, per capita, in these counties and immediately downwind.

Nitrogen Dioxide. The three largest single emitters of NO_2 in 2019 were the San Juan, Four Corners, and Prewitt Escalante coal plants. Unsurprisingly, coal plants were the largest source of stationary NO_2 emissions, but not as disproportionately so as for SO_2: coal accounted for 34 percent of NO_2, followed by 24 percent from compressor stations, 12 percent from gas processing, 11 percent from gas power plants, and 3 percent from a single cement manufacturing facility. Emissions (after considering retirements) were concentrated in San Juan and Lea counties, although emissions were distributed throughout most counties. Much like SO_2, NO_2 can react in the atmosphere to form PM, as well as ozone, and have a public health impact over a broad region downwind.

Particulate Matter. The largest single sources of particulate matter emissions (that is, primary emissions, rather than the secondary formation described above) were from the Cerro Colorado Landfill in Albuquerque, followed by the San Juan Generating Station and two compressor stations. However, we note that we do not have PM emissions data for Four Corners, which is likely also a large source. Compressor stations (again, omitting Four Corners) were the largest facility type source of PM, followed by landfills, gas plants, coal plants, gas processing plants, airports, and refineries, among numerous other individual sources. PM sources were also more widely distributed among counties, with the greatest emissions (excluding retired facilities) in Bernalillo, Lea, San Juan, and Eddy, but nearly every county having some emissions. Moreover, we do not have emissions data for certain facilities, including the majority of the landfills. Given the high emissions from Cerro Colorado, it is likely that there are additional PM emissions from landfills and other sources across the state.

Carbon Monoxide. Carbon monoxide emissions are largest from San Juan Generating Station (again, Four Corners is missing data); the cement manufacturer; and Albuquerque International Sunport. From a sectoral standpoint, the largest emission sources are coal plants, compressor stations, gas processing plants, and airports. Even after the retirement of the San Juan Generating Station, however, San Juan remained the county with the largest total carbon monoxide emissions.

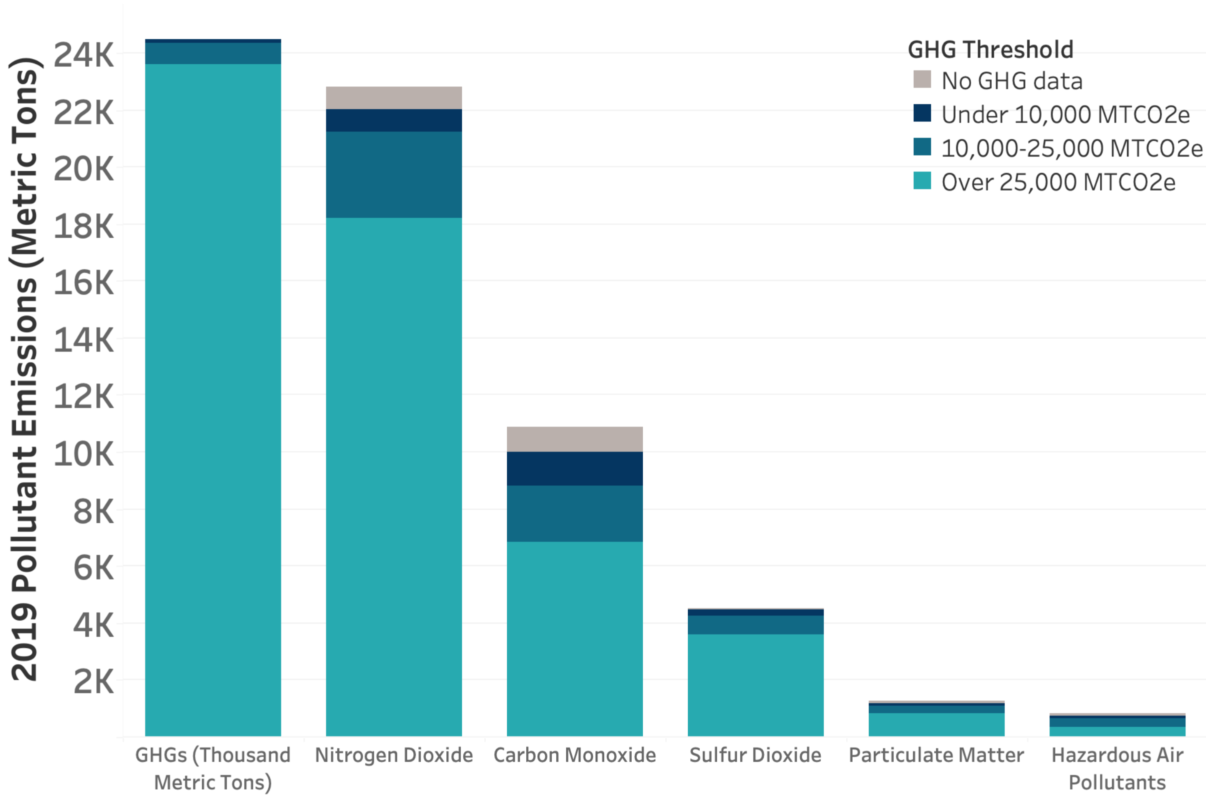
Hazardous Air Pollutants. Our hazardous air pollutant data is somewhat incomplete, and for most facilities is aggregated, rather than available by specific pollutant type. However, we can still try to understand overall trends for hazardous air pollutants from the available data. The sources are widely mixed—the largest four include a compressor station, a food processing facility, an airport, and a gas power plant. Much like other pollutants, the largest total emissions are from San Juan and Lea counties, followed by Eddy, Rio Arriba, and Chaves. The largest emitters, based on facility types, are compressor stations, gas processing plants, gas power plants, airports, and food facilities; again, we note missing data for some coal plants in particular.

3.2.2 Stationary Facility Emissions by GHG Emission Thresholds

Because we included all Title V facilities reporting to NMED, our initial inventory includes a number of facilities with GHG emissions that fall below the threshold used in various regulatory environments to manage GHG emissions from stationary sources. For example, as mentioned above, FLIGHT only reports GHG emissions from facilities with more than 25,000 $MTCO_2e$ per year. California's cap-and-trade system includes all facilities with emissions above 25,000 $MTCO_2e$, and reporting for facilities with emissions above 10,000 $MTCO_2e$ per year.

In **Figure 3**, we show the breakdown of pollutant emissions for facilities above a threshold of 25,000 $MTCO_2e$ per year, between 10,000 and 25,000 CO_2e per year, below 10,000 $MTCO_2e$ per year, and for facilities without pollutant data but no greenhouse gas data available. Retired facilities are omitted. The 86 facilities with greenhouse gas emissions above 25,000 $MTCO_2e$/year were responsible for 97 percent of large stationary facility GHG emissions in 2019, but only 79 percent of SO_2 and 80 percent of NO_2. The 128 facilities with GHG emissions above 10,000 $MTCO_2e$/year are responsible for 99.6 percent of GHG emissions, 94 percent of SO_2 and 93 percent of NO_2. These data suggest that some small sources have disproportionately high co-pollutant emissions. If a GHG threshold is set at 25,000 $MTCO_2e$ per year, policies to reduce GHG will need to be coupled with policies to reduce co-pollutant emissions from smaller facilities as well.

Figure 3. Stationary Facility Emissions by GHG Emission Threshold. Data reflect emissions from facilities with GHG emissions over 25,000 $MTCO_2e$ per year, from 10,000-25,000 $MTCO_2e$ per year, below 10,000 $MTCO_2e$ per year, and from facilities missing GHG emissions data. Data exclude recently retired facilities.



3.2.3 GHG Emissions Compared to Criteria Air Pollutants By Facility Class

As these data demonstrate, co-pollutant emissions are much higher from some facilities than others. Below, we plot greenhouse gas emissions from each facility as compared to NO_2 (**Figure 4**) and SO_2 (**Figure 5**) emissions from each facility. These plots give an indication of where there are very high co-pollutant emissions per ton of GHG emissions—and where emission reductions may therefore be particularly beneficial. For example, we see that San Juan Generating Station and Four Corners Generating Station are the largest total emitters of GHGs, SO_2, and NO_2—but that reducing a ton of GHG emissions from San Juan Generating Station would reduce more SO_2 than reducing a ton of GHGs from Four Corners Generating Station. Indeed, if we dig into data from the EPA,[65] we find that San Juan Generating Station

[65] *Clean Air Markets Program Data*, U.S. Env't Prot. Agency, https://campd.epa.gov/ (last visited Jan. 3, 2023).

emitted 40 percent more SO_2 and nearly four times as much NO_x per megawatt-hour of generation than Four Corners Generating Station, likely because Four Corners recently added new emission control technology. These findings do not suggest that emissions should not be reduced from Four Corners—again, this coal plant is the largest single source of SO_2 in the state—simply that co-pollutant emission rates were higher from San Juan Generating Station. This facility's recent retirement therefore has an outsized benefit in co-pollutant reductions compared to its overall impact on greenhouse gas emissions.

Similarly, we see that Chaco Gas Plant has a very high share of NO_2 emissions compared to GHG emissions and Eunice Gas Plant a very high share of SO_2 emissions. The recent retirement of the Eunice Gas Plant therefore also has outsized co-pollutant reduction benefits—and a greenhouse gas mitigation strategy focused on phasing out operations at gas processing plant operations would see significant pollution co-benefits from simultaneously reducing emissions at facilities such as Chaco Gas Plant. More broadly, these figures suggest that achieving the greatest public health benefits will require analyzing these emissions up front alongside greenhouse gas emissions, rather than simply analyzing post-hoc once the potential emission reductions once specific greenhouse gas emission targets are achieved.

Figure 4. 2019 GHG emissions compared to NO_2 emissions by facility class.

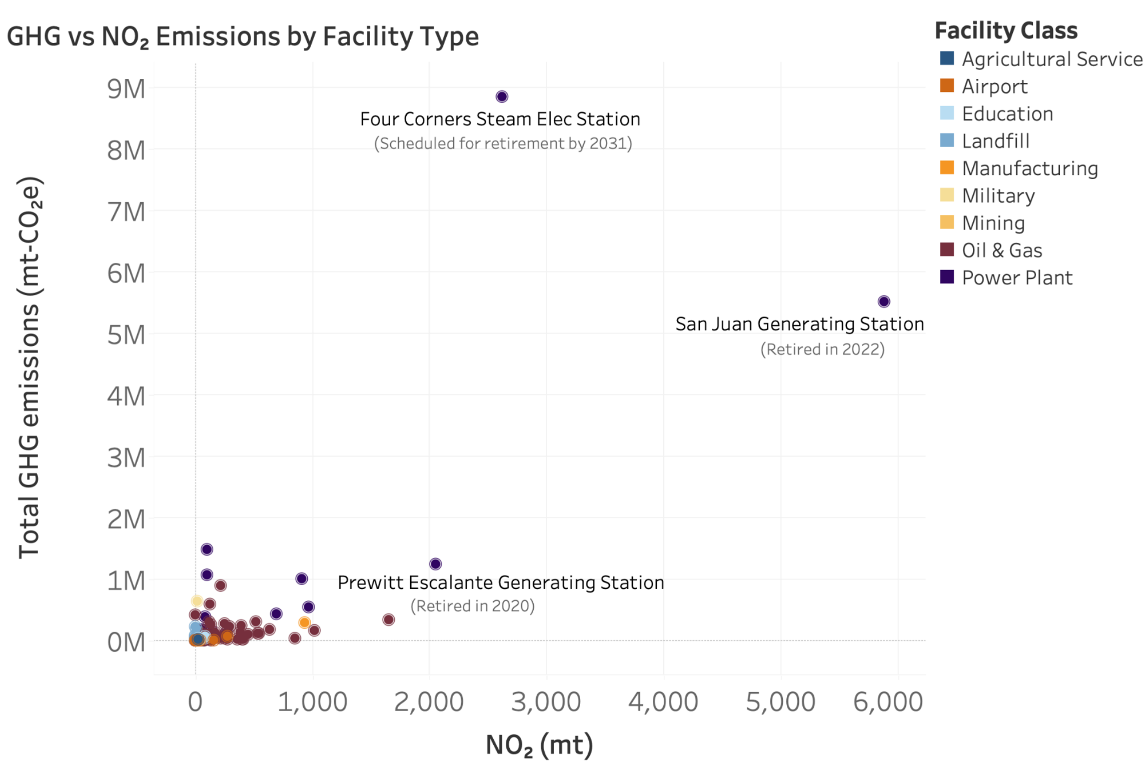
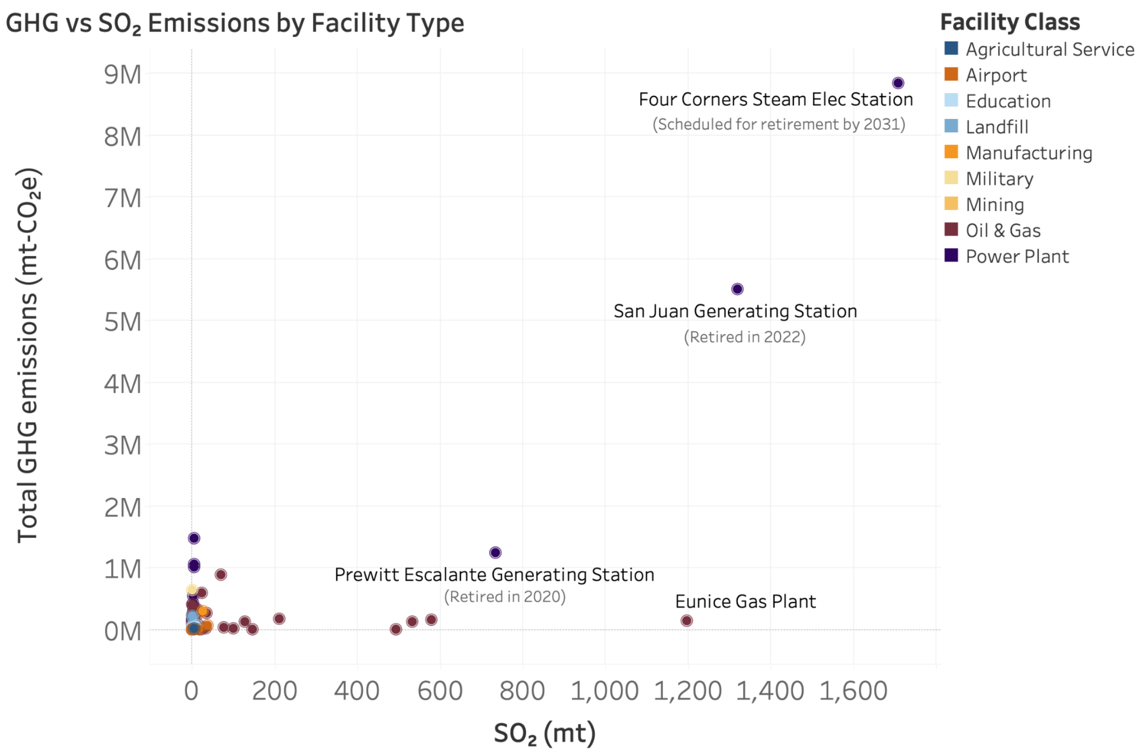


Figure 5. 2019 GHG emissions compared to SO_2 emissions by facility class.



3.2.4 Top 10 Large GHG Source Emitters by Pollutant and Owners

In addition to analyzing emissions from facilities in New Mexico, we gathered data on the owners of facilities. Tables **3a**, **3b**, and **3c** show the top ten GHG, NO_2, and SO_2 emitters and the owners of those facilities, respectively. When looking at the top ten GHG emitters, PNM Resources Inc is the owner of three of the top ten facilities: Four Corners Generating Station, San Juan Generating Station, and Luna Energy Facility. The total GHG emissions from these three facilities accounts for approximately 49 percent of the total GHG emissions from all facilities in 2019.

When looking at the top ten NO_2 emitters, both PNM Resources Inc and Xcel Energy own two facilities in the top ten NO_2 emitters. PNM Resources Inc-owned facilities included Four Corners Generating Station and San Juan Generating Station, which accounted for about 30 percent of total NO_2 emissions; while Xcel Energy-owned facilities included Maddox and Cunningham Stations, which accounted for about 6 percent of total NO_2 emissions. Lastly, when looking at the top ten SO_2 emitters, Targa Resources Corp owns three facilities: Eunice

Gas Processing Plant,[66] Saunders Gas Plant, and Monument Gas Plant. Targa Resources Corp-owned facilities account for approximately 12 percent of total SO_2 emissions in 2019.

Table 3a. Top 10 GHG Emitters and Owners of Facilities.

Facility Name	Parent Company	Total 2019 GHG Emissions ($MTCO_2e$)
Four Corners Generating Station**	Navajo Transitional Energy Co LLC; UNS Energy Corp; Pinnacle West Capital Corp; PNM Resources Inc; Salt River Project	8,844,960
San Juan Generating Station*	PNM Resources Inc; City Of Farmington; Inc County Of Los Alamos; Utah Associated Municipal Power System; Tucson Electric Power Co	5,502,573
Lea Power - Hobbs Generating Station	Lea Power Partners LLC	1,484,218
Prewitt Escalante Generating Station*	Tri-State Generation & Transmission Assoc Inc	1,247,598
Luna Energy Center	PNM Resources Inc; UNS Energy Corp; Samchully Power & Utilities LLC	1,058,209
Xcel Energy - Cunningham Station Power Plant	Xcel Energy	1,006,105
Artesia Refinery	Hollyfrontier Corp	882,971
Holloman Air Force Base	US Air Force - Holloman AFB	642,791
Val Verde Gas Treatment Plant	Val Verde Gas Gathering Co LP	592,498
San Juan Mine	Westmoreland Mining LLC	566,230

Note: Facilities with (*) have retired since 2019; Facility with (**) scheduled for retirement by 2031.

[66] Note: this is a different facility than the Eunice Gas Plant.

Table 3b. Top 10 NO_2 Emitters and Owners of Facilities.

Facility Name	Parent Company	Total NO_2 (tons)
San Juan Generating Station*	PNM Resources Inc; City Of Farmington; Inc County Of Los Alamos; Utah Associated Municipal Power System; Tucson Electric Power Co	6,478
Four Corners Generating Station**	Navajo Transitional Energy Co LLC ; UNS Energy Corp; Pinnacle West Capital Corp; PNM Resources Inc; Salt River Project	2,881
Prewitt Escalante Generating Station*	Tri-State Generation & Transmission Assoc Inc	2,257
Chaco Gas Plant	Enterprise Products Partners LP	1,817
Eunice Gas Processing Plant	Targa Resources Corp	1,115
Maddox Station	Xcel Energy	1,064
GCC Rio Grande, Inc. Tijeras Plant	GCC Of America Inc	1,025
Xcel Energy - Cunningham Station Power Plant	Xcel Energy	999
Mountainair No7 Compressor Station	Energy Transfer LP	932
Rio Grande Generating Station	El Paso Electric Co	763

Note: Facilities with (*) have retired since 2019; Facility with (**) scheduled for retirement by 2031.

Table 3c. Top 10 SO_2 Emitters and Owners of Facilities.

Facility Name	Parent Company	Total SO_2 (tons)
Four Corners Generating Station**	Navajo Transitional Energy Co LLC; UNS Energy Corp; Pinnacle West Capital Corp; PNM Resources Inc; Salt River Project	1,883
San Juan Generating Station*	PNM Resources Inc; City Of Farmington; Inc County Of Los Alamos; Utah Associated Municipal Power System; Tucson Electric Power Co	1,453
Eunice Gas Plant	DCP Midstream LP	1,320
Prewitt Escalante Generating Station*	Tri-State Generation & Transmission Assoc Inc	810
Eunice Gas Processing Plant	Targa Resources Corp	638
Jal No3 Gas Plant	Energy Transfer LP	587
Denton Gas Plant	Davis Gas Processing Inc	543
Saunders Gas Plant	Targa Resources Corp	233
Maljamar Gas Plant	Durango Midstream LLC	162
Monument Gas Plant	Targa Resources Corp	141

Note: Facilities with (*) have retired since 2019; Facility with (**) scheduled for retirement by 2031.

3.3 Criteria and Hazardous Pollution in Vulnerable Communities

In addition to assessing the pollutant emissions from New Mexico's large stationary facilities, we assessed who lives next to these facilities and therefore may face larger per-capita health impacts than others. As described and mapped above, many of these stationary facilities are clustered in specific counties, including San Juan, Lea, and Eddy, suggesting nearby populations may be exposed to a high cumulative number of hazardous stationary sources.

Figures 6a and **6b** below map these facilities in relation to populations of color and low-income communities across the state, respectively. We estimate that 70 of the facilities have 10 or fewer people living within a three-mile radius, however, 27 facilities have more than 10,000 people living within three miles. The most urban emission sources include a mix of university campuses, manufacturing sites, gas power plants, airports, a few gas facilities, and landfills. When we look at facilities with more than 1,000 people living within three miles, those with the largest share of low-income populations living nearby include a mix of gas power plants, landfills, compressor stations, food facilities, an air force base, and airports. Those facilities with a large share of populations of color nearby include gas power plants, landfills, an enhanced oil recovery facility, compressor stations, and airports.

Figure 6a. Large Stationary Source Emitters and People of Color Percentile.

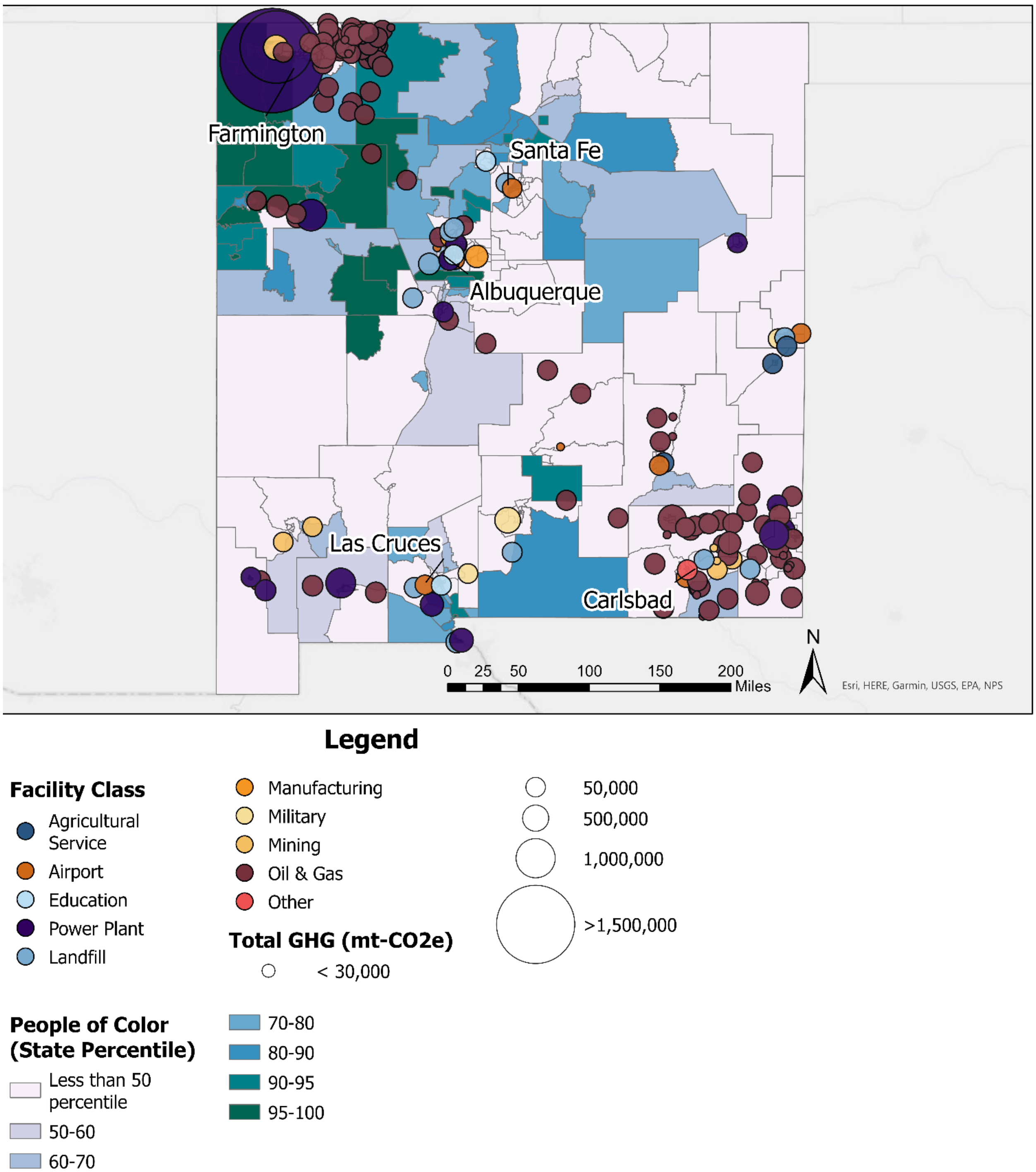
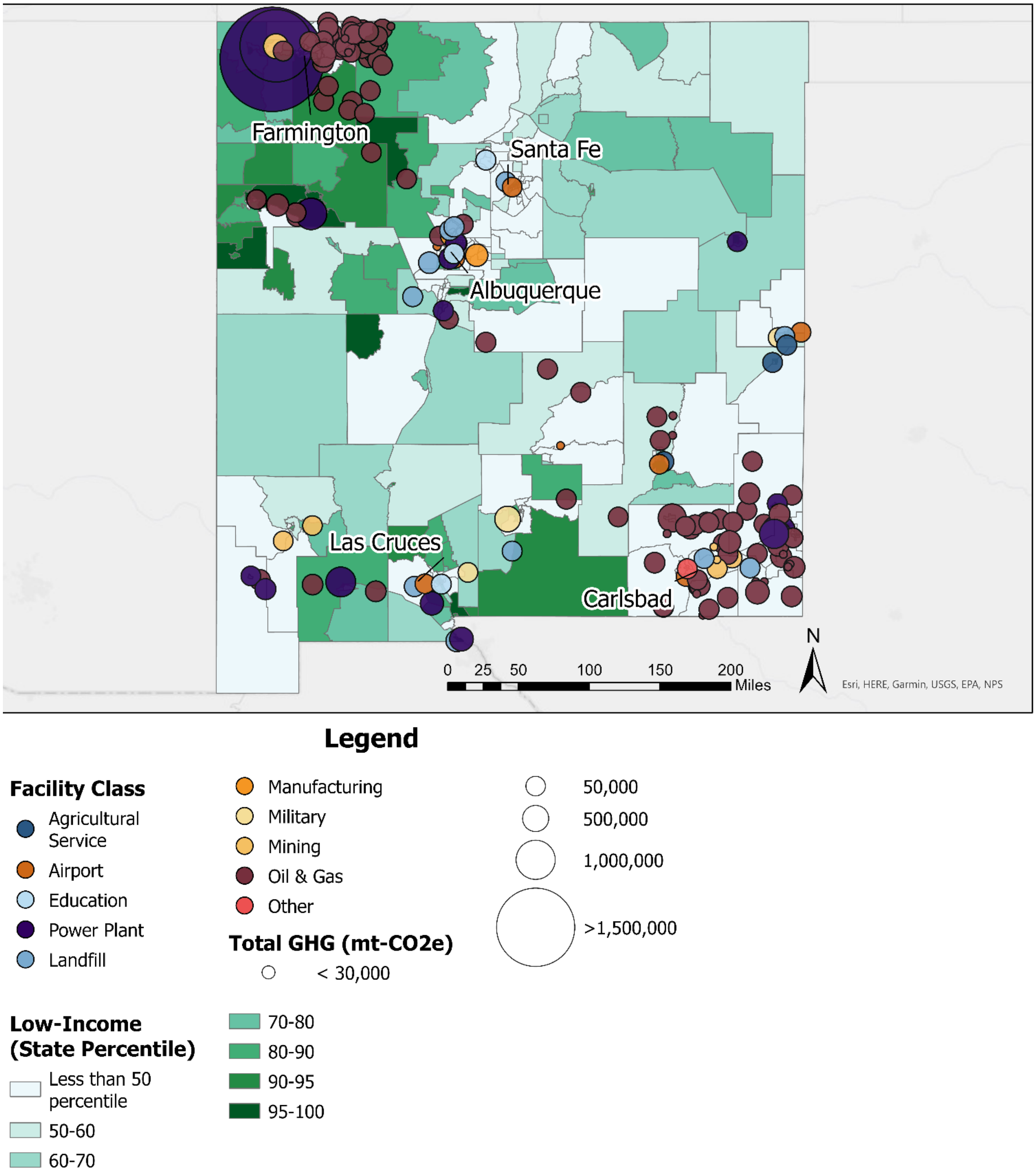


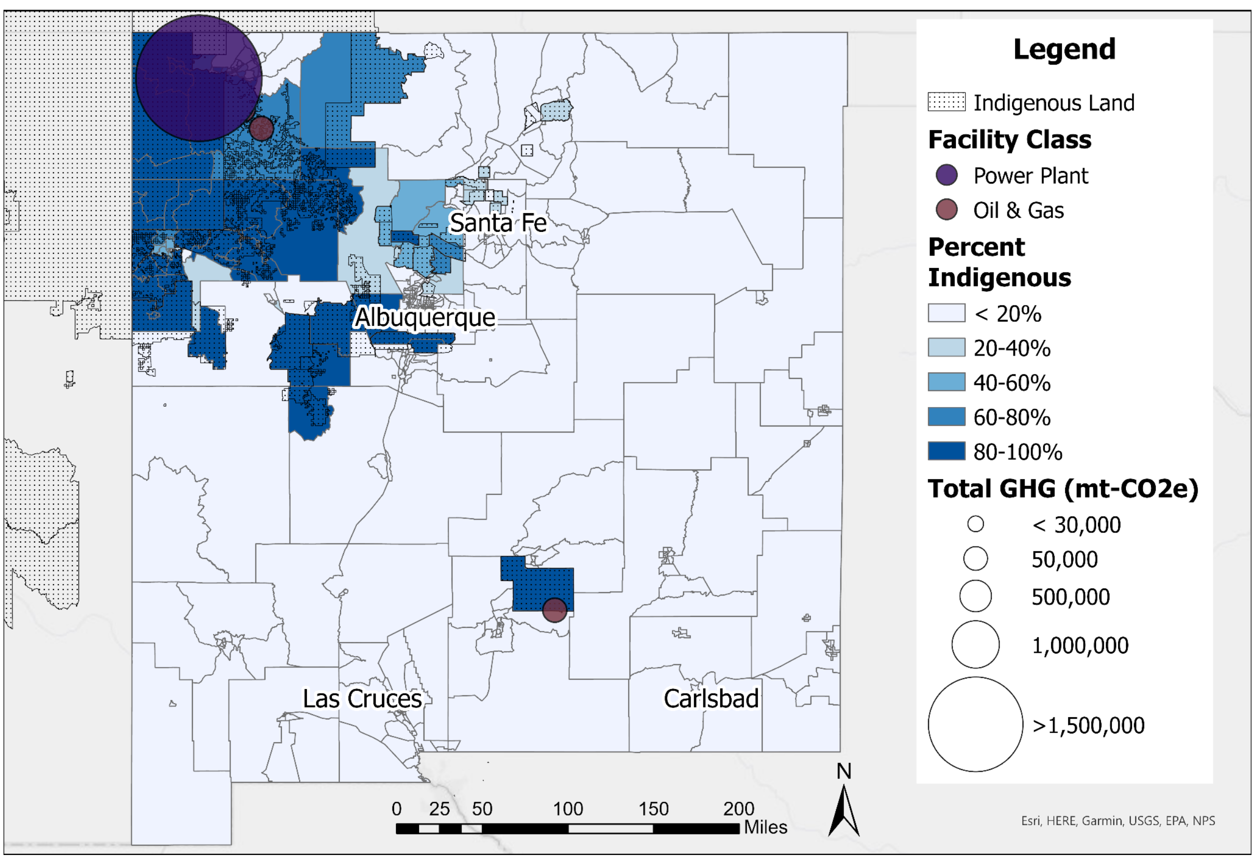
Figure 6b. Large Stationary Source Emitters and Low-Income Percentile.



3.3.1 Sources Located on Tribal Lands

Sources on tribal lands are not included in NMED's count of facilities nor the state GHG inventory, but there is still potential to reduce both GHG and health-damaging air pollutant emissions from these sites, which likely have the greatest per-capita impacts on nearby tribal communities. In **Figure 7** we identify four facilities that are located on tribal lands: Chaco Gas Plant, EPNG Station 6526 Blanco, Four Corners Generating Station, and Corona Compressor Station. Chaco Gas Plant and EPNG Station 6526 Blanco are located on Navajo Trust Land, Four Corners Generating Station is on the Navajo Reservation, and the Corona Compressor Station is on the Mescalero Apache Reservation. The highest GHG polluter, Four Corners Generating Station, is located in a census tract that is 93 percent indigenous. The Corona Compressor Station is also located in a census tract that is at least 90 percent indigenous, while the other two facilities are located in a census tract that are 76 percent indigenous. Although there were only four facilities identified as being on tribal land, our list of facilities may be incomplete.

Figure 7. Large Stationary Source Emitters on Tribal Land.



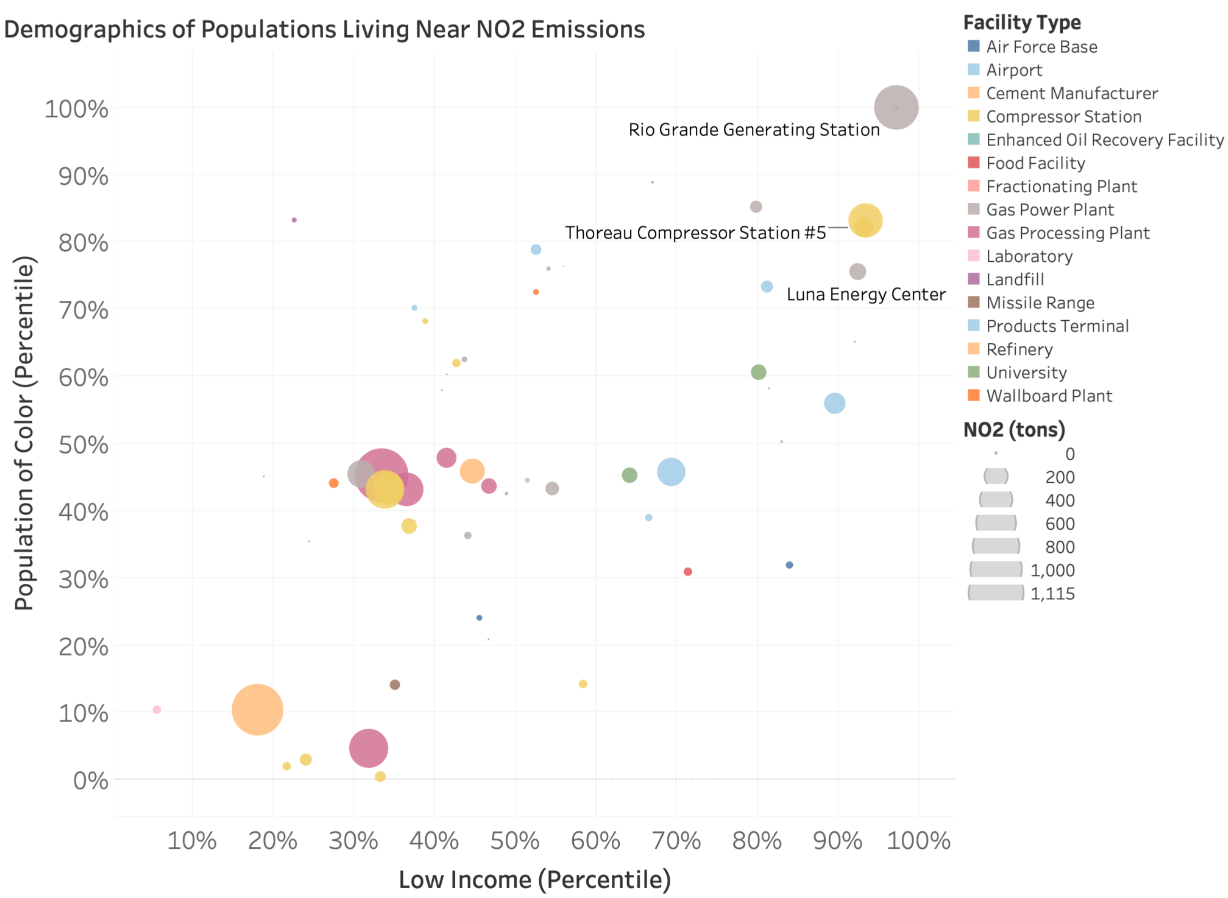
3.3.2 Demographics of Populations Living Near Facilities

In **Figure 8**, we plot each facility in relation to nearby population demographics. The bubble size indicates the total population living within a three-mile radius of the facility, and the axes illustrate the percentile low-income and percentile population of color for that population as compared to the rest of the state. Facilities in the top right of the figure have the highest share of nearby populations of color and low-income populations. We see that there are a number of gas power plants, compressor stations, and airports in particular that are located near low-income communities and communities of color, although there are large stationary facilities in large and small communities with a wide range of demographics across the state.

Figure 8. Demographics of Populations Living Near Facilities.

In **Figure 9**, we show facility NO_2 emissions (reflected in the bubble size) as compared to the percentile for low-income populations and populations of color living within a three-mile radius, excluding facilities with less than 1,000 people living nearby. This figure shows more specifically that in low-income communities and communities of color, gas power plants, compressor stations, and airports are some of the largest sources of NO_2 emissions.

Figure 9. Demographics of Populations Living Near NO_2 Emissions.



We note that the coal plants are not shown in the above figure, largely because these three plants have between 80-240 people living within three miles of each one. Even when we include them, nearby populations are not disproportionately low-income or populations of color. This does not mean that these plants do not have significant health impacts on these populations—as described before, these are some of the largest sources of health-damaging air pollutants across the state—but more simply that few people live immediately nearby and the health impacts of these plants are widely distributed. The Toll from Coal estimates that annual emissions from New Mexico's coal plants, San Juan, Four Corners, and Prewitt Escalante, are responsible for 14, 11, and six deaths respectively.[67]

The location of the gas plants brings forth a decision-making trade-off. The coal plants, as described, are some of the largest sources of health-damaging air pollutants in the state, and will need to be phased out to mitigate GHG emissions (although we note that Four Corners is located on tribal land and therefore does not get counted in the state inventory of GHGs). Phasing out the gas plants will also have significant health benefits, as described. However, leaving on gas power plants after these retirements risks leaving behind significant NO_2 emissions in low-income communities and communities of color, as shown above. For example, the largest circle in the top right corner of the plot is the Rio Grande Generating Station, a gas plant. An equitable clean energy transition must consider the transition away from these facilities as well.

3.3.3 Large Stationary Sources and Public Health Impacts

Figure 10 below maps the location of large stationary sources in relation to the prevalence of asthma across the state among adults 18 years and older. In New Mexico, about 10 percent of adults are currently living with asthma–compared to about 8 percent of adults in the United States.[68,69] McKinley, San Juan, and Cibola counties have the highest asthma prevalence of 13.4 percent, 11.7 percent, and 11.5 percent, respectively. These three counties have a higher asthma prevalence among adults compared to both the state of New Mexico and the country. Of those three counties, San Juan has the highest number of facilities at 49–which accounts for approximately a quarter of the facilities in the entire state. Additionally, about 90 percent of those facilities are in the oil and gas sector.

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[67] *Toll from Coal*, Clean Air Task Force, https://www.tollfromcoal.org/ (last visited Jan. 3, 2023).
[68] *Most Recent Asthma State or Territory Data*, Ctr. for Disease Control and Prevention, https://www.cdc.gov/asthma/most_recent_data_states.htm (last visited Nov. 23, 2022).
[69] *Most Recent National Asthma Data*, Ctr. for Disease Control and Prevention, https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm (last visited Nov. 23, 2022).

Figure 10. Large Stationary Source Emitters and Asthma Prevalence (adults 18 years and older).

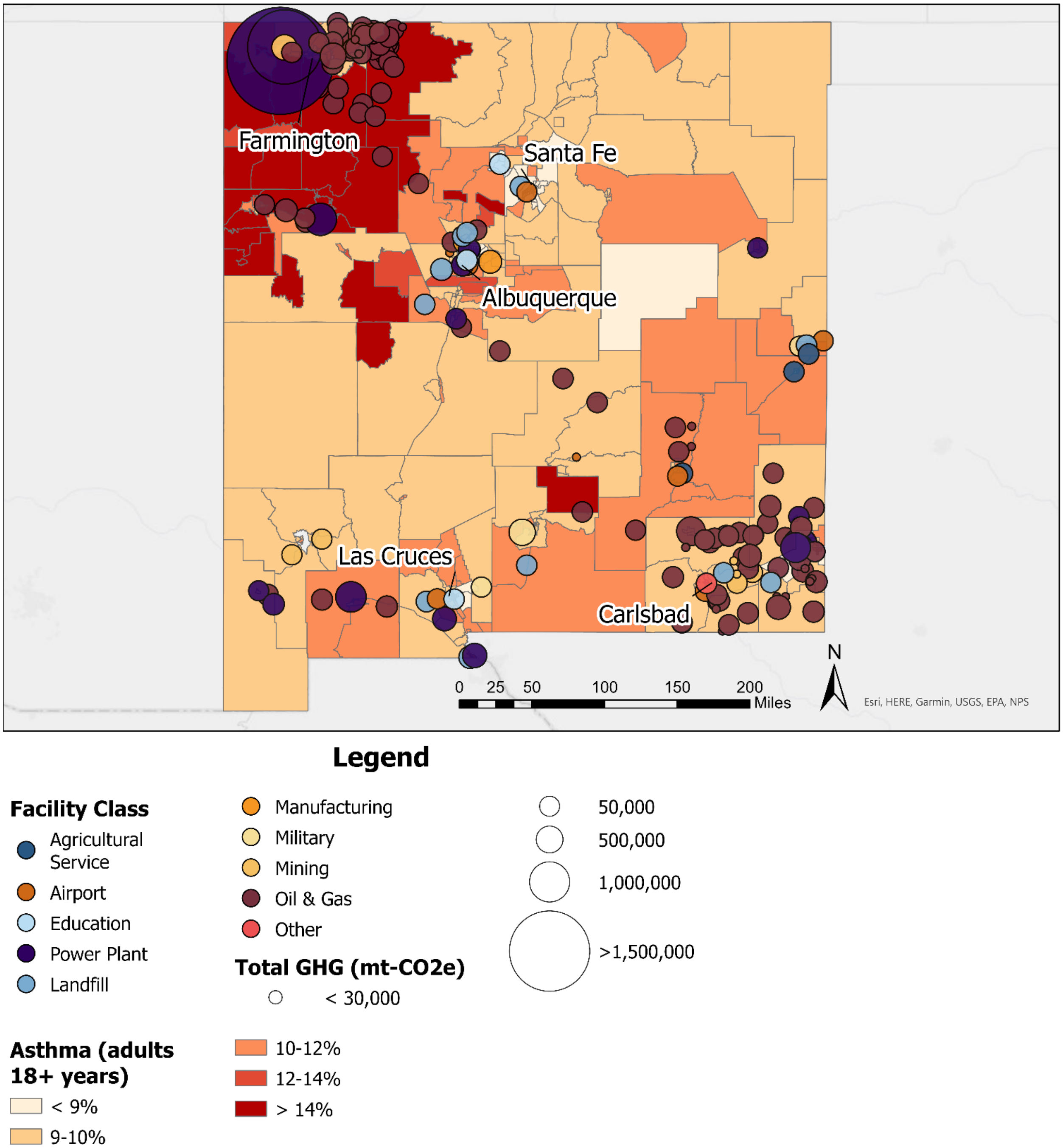
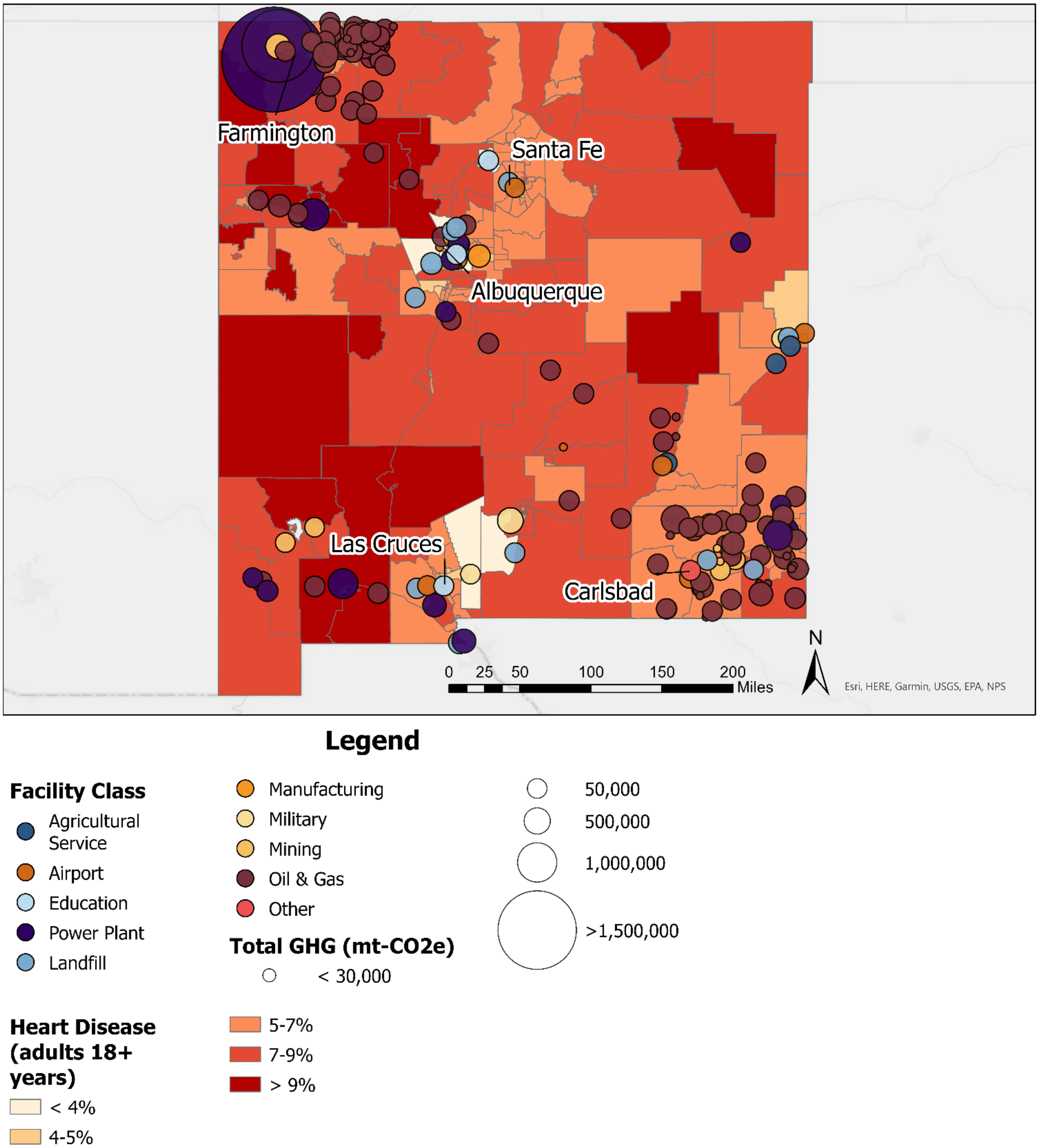


Figure 11 below maps the location of large stationary sources in relation to the prevalence of heart disease across the state among adults 18 years and older. The age-adjusted prevalence of heart disease in the U.S. is about 8.1 percent, while in New Mexico it accounts for 7.7 percent.[70] Luna and Catron counties have the highest age-adjusted prevalence of heart disease at 7.2 and 7.1 percent, respectively. Luna County is home to one of the top emitters in the state: Luna Energy Facility (1.06 $MMTCO_2e$). Furthermore, residents living within a three-mile radius of the Luna Energy Facility are in the 95th percentile for coronary heart disease compared to other census tracts across the state. This means that residents within a three-mile radius of the facility have higher coronary heart disease prevalence than 95 percent of the state.

[70] *Annual Report*, America's Health Rankings, https://www.americashealthrankings.org/explore/annual/measure/CVD/state/NM?edition-year=2020 (last visited Nov. 29, 2022).

Figure 11. Large Stationary Source Emitters and Heart Disease Prevalence (adults 18 years and older).



3.4 Regional Trends

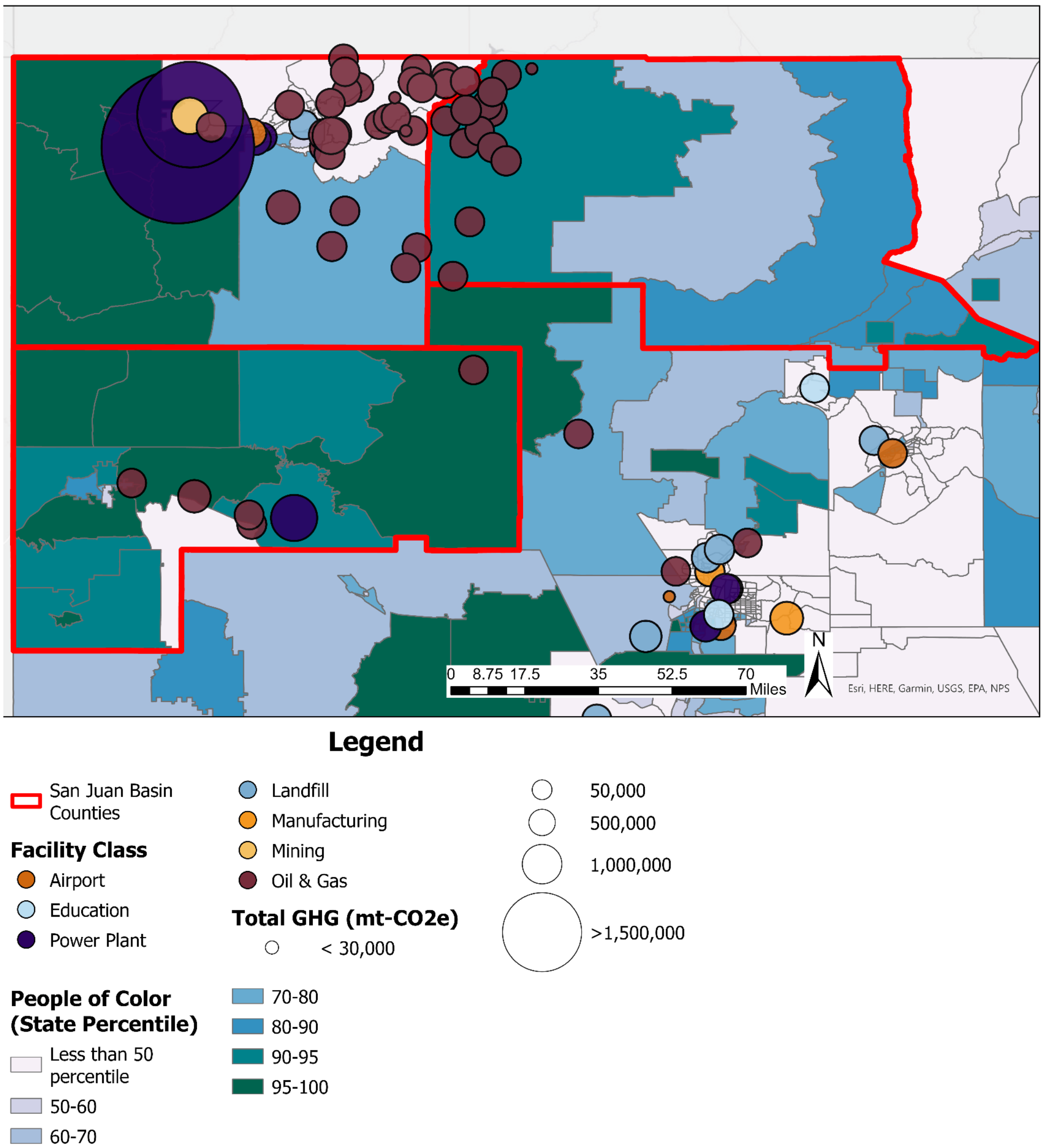
As the large stationary facility maps show, many of these facilities are clustered in four areas: the San Juan Basin, the Permian Basin, Albuquerque and Bernalillo County, and Las Cruces and Doña Ana County. We describe some of these trends below.

3.4.1 San Juan Basin

The counties in the San Juan Basin, including San Juan, Rio Arriba, and McKinley, are home to 65 large stationary facilities, 56 of which are in the oil and gas sector (**Figure 12**). (Parts of Sandoval County also overlap with San Juan Basin, but the large stationary sources in Sandoval are all clustered on the outskirts of Albuquerque.) The largest individual sources of SO_2 and NO_2 pollution in the San Juan Basin in 2019 were the three coal plants, but two of these have subsequently retired, leaving the Four Corners Generating Station as the largest single source. The largest major sources of HAPs and PM also include compressor stations and the Gallup Refinery in McKinley county, although this refinery has reportedly been "permanently idled."[71] Many of the facilities are located in relatively rural areas, but both Farmington and Bloomfield are home to a number of large stationary facilities, in particular gas processing plants and compressor stations in Bloomfield.

[71] Robert Brelsford, *Marathon Permanently Idles Two US Refineries*, Oil and Gas J., Aug. 3, 2020, https://www.ogj.com/refining-processing/refining/article/14180915/marathon-permanently-idles-two-us-refineries.

Figure 12. Large Stationary Source Emitters in the San Juan Basin—San Juan, Rio Arriba, and McKinley Counties.



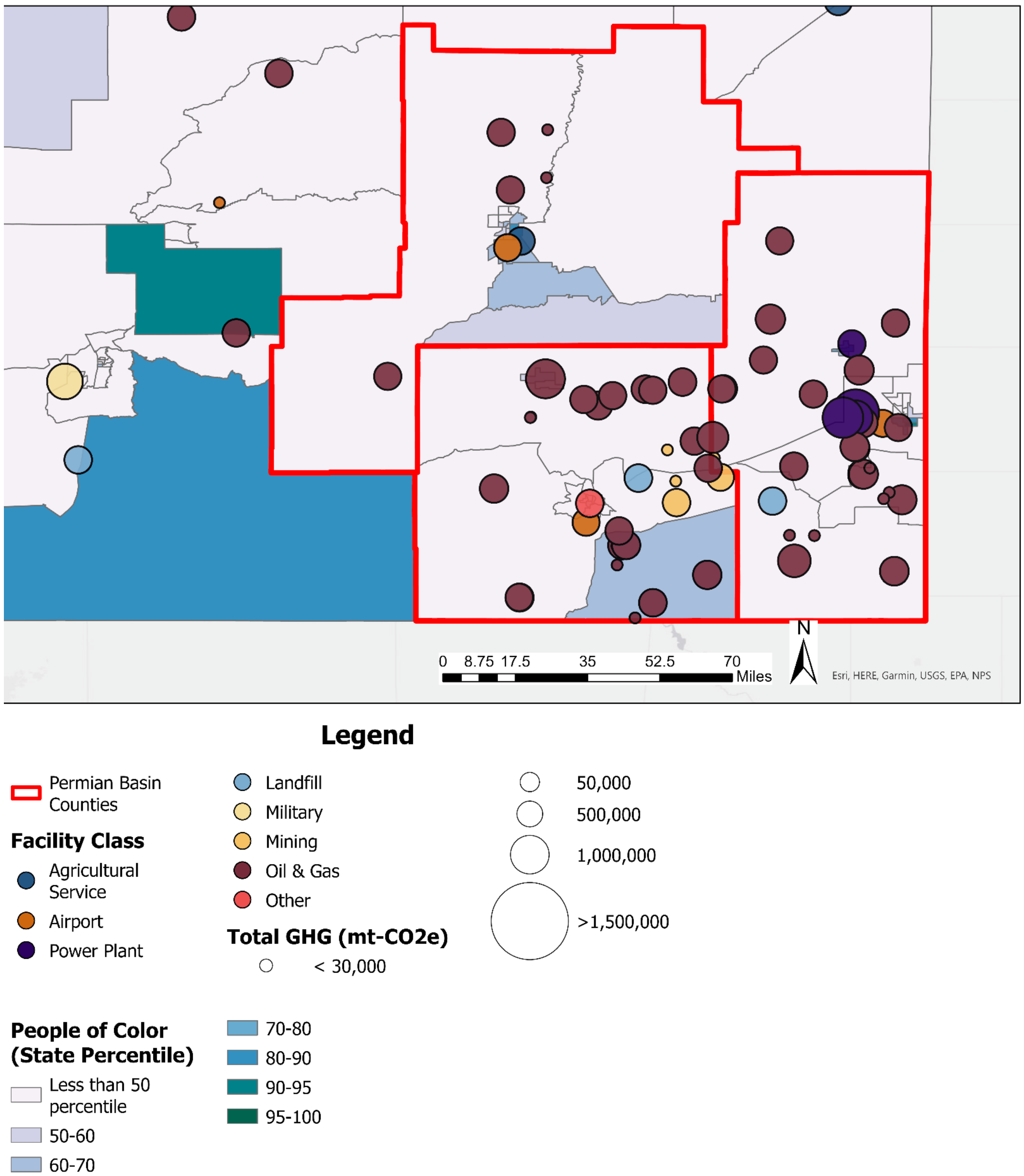
Only 22 of the 65 sites have emissions over 25,000 $MMTCO_2e$/year, however, meaning many of them would not be regulated if this threshold were set for GHG emission regulations. 32 of the oil and gas facilities have GHG emissions under 25,000 $MMTCO_2e$ (23 have emissions between 10,000-25,000 $MMTCO_2e$), and another 6 are missing data entirely. The vast majority of 2019 SO_2 emissions in this area would still be captured by a 25,000MMT CO_2e threshold, but only about 80 percent of NO_2 emissions (accounting for recent coal plant retirements). Most of the rest would be captured under a 10,000 $MMTCO_2e$ threshold.

3.4.2 Permian Basin

Chaves, Lea, and Eddy Counties in the Permian Basin are home to 69 large stationary facilities, 53 of which are in the oil and gas sector (**Figure 13**). The next two largest sectors are mining and power plants. The largest individual sources of GHGs are power plants, a refinery, and gas processing plants. The majority of health-damaging air pollutant emissions come from oil and gas sector facilities, with additional significant contributions from power plants in Lea County and mining in Eddy. The largest single sources of NO_2 include two gas power plants and two gas processing plants. The region's large stationary SO_2 emissions are almost all from gas processing plants. PM is highest from two gas power plants and a refinery. The Artesia Refinery, elsewhere, has also been cited as a significant source of benzene emissions.[72] Many of these sites are relatively rural, but there are facilities located in cities as well, including Carlsbad, Roswell, Lovington, Hobbs, and Artesia.

[72] Adrian Hedden, *Study: Artesia's Navajo Refinery One of the Nation's Most Air-polluting Oil and Gas Sites, Carlsbad Current-Argus*, May 27, 2021, https://www.currentargus.com/story/news/local/2021/05/27/artesias-navajo-refinery-one-most-air-polluting-oil-and-gas-sites/5152980001/.

Figure 13. Large Stationary Source Emitters in the Permian Basin–Chaves, Lea, and Eddy Counties.

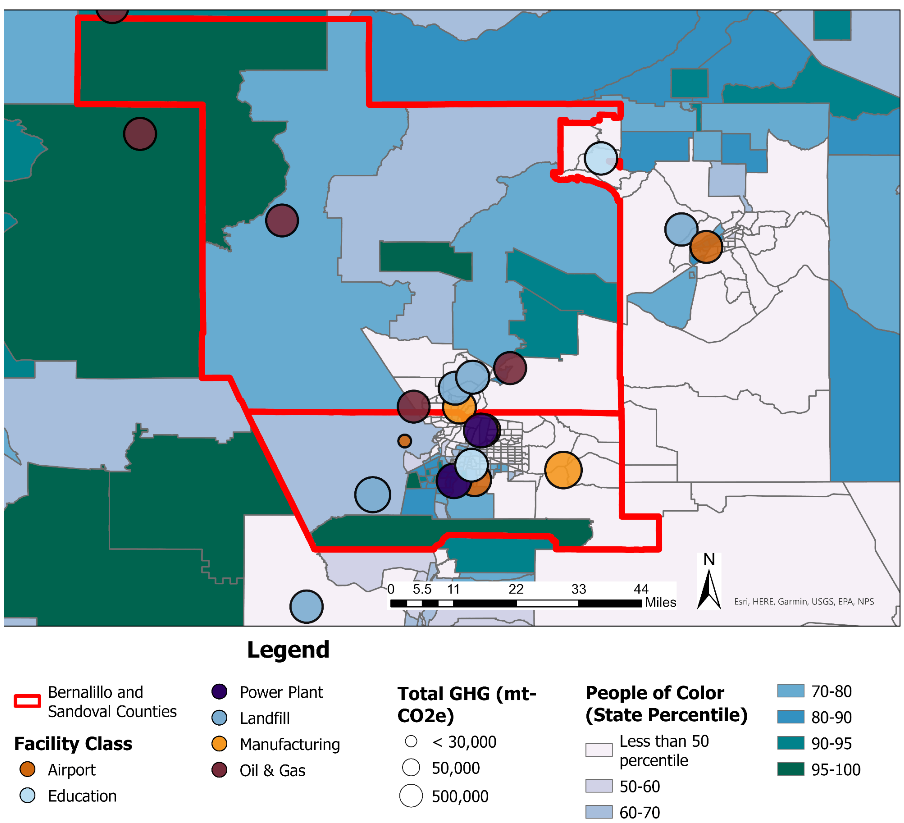


Only 31 of the facilities have emissions above the 25,000MMT CO_2e threshold, and another 14 emit between 10-25,000 MMTCO_2e per year. 96 percent of GHG emissions come from facilities with emissions over 25,000 MMTCO_2e per year, but only 71 percent of NO_2 emissions and 65 percent of SO_2 emissions. In this region, in particular, a disproportionate share of health-damaging air pollutant emissions come from relatively small GHG emitters.

3.4.3 Albuquerque and Bernalillo and Sandoval Counties

Perhaps unsurprisingly, the 15 facilities located in Albuquerque and just outside in Rio Rancho and other parts of Sandoval County have more people living nearby than in any other part of the state (**Figure 14**). The Albuquerque facilities, in particular, tend to be located in more low-income areas than the rest of the state. The vast majority of SO_2 and NO_2 emissions (over 97 percent) come from the 10 facilities with GHG emissions of over 25,000MMT CO_2e. Bernalillo has some of the largest total emissions of HAPs and PM, emitted from facilities such as landfills, airports, and manufacturing.

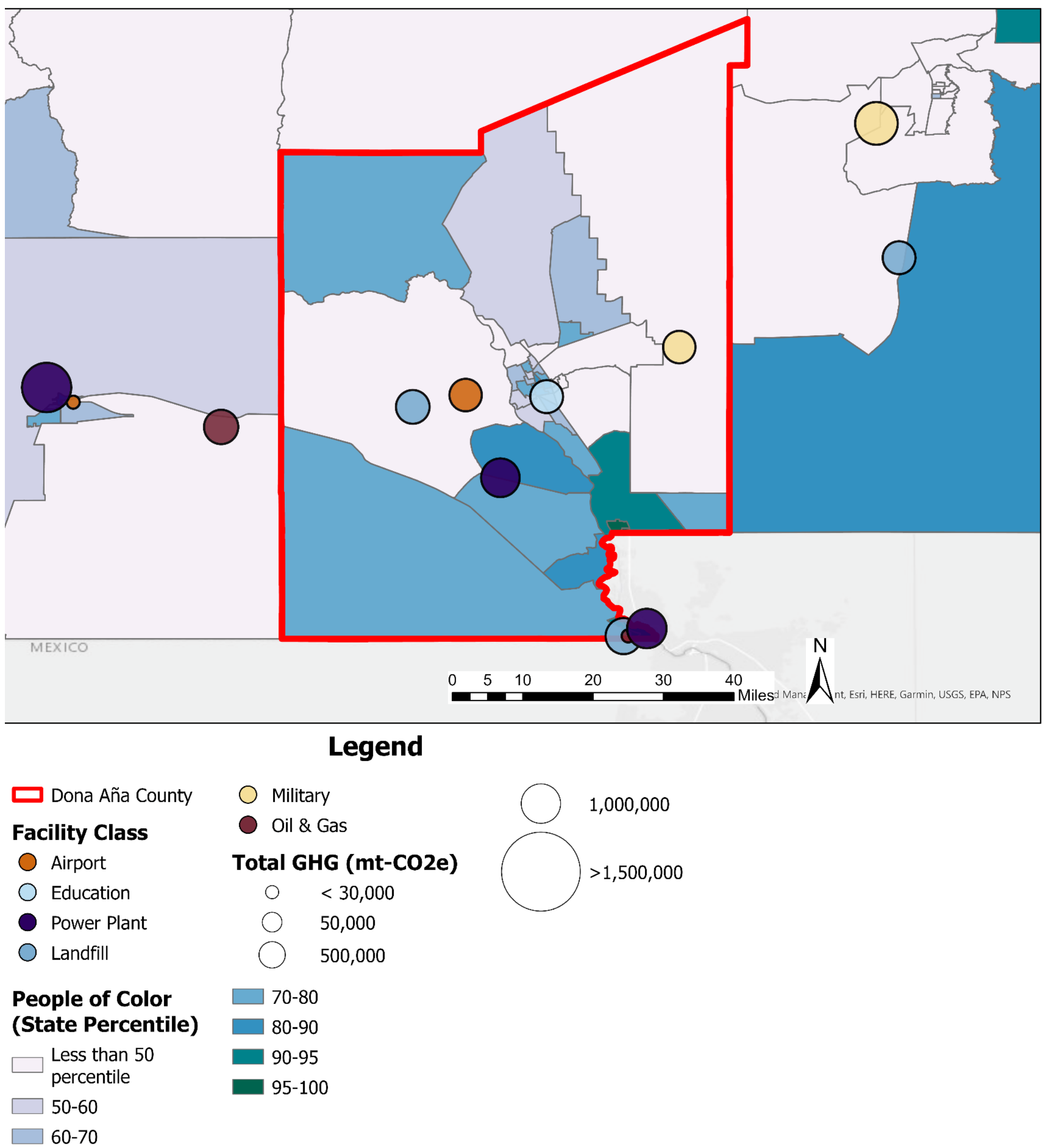
Figure 14. Large Stationary Source Emitters in Albuquerque and Bernalillo and Sandoval Counties.



3.4.4 Las Cruces and Dona Aña County

Doña Ana County is home to nine large stationary facilities (**Figure 15**). The largest sources of GHG emissions are the two power plants and two landfills. Three of these facilities—the Rio Grande Generating Station, Camino Real Landfill, and the Four Peaks Energy Plant—are located in low-income communities of color in Sunland Park. The Rio Grande Generating Station also emits more NO_2 than all other stationary sources in Doña Ana County combined. The largest source of SO_2 emissions is the Four Peaks Energy Plant.

Figure 15. Large Stationary Source Emitters in Dona Aña County.



4.0 Policy Implications

4.1 Reducing GHG Emissions from Large Stationary Sources Provides Opportunities to Reduce Health-Damaging Air Pollutants

New Mexico's large stationary sources contribute approximately 25 percent of the state's GHG emissions. They also emit a relatively large quantity of health-damaging air pollutants including NO_2, SO_2, PM, and hazardous air pollutants. These pollutants damage the health of New Mexicans, causing or exacerbating illnesses that affect the heart, brain, lungs and other systems.

Many of the strategies used to reduce GHG pollution from large stationary sources —particularly electrification with renewable energy and efficiency improvements—also reduce health-damaging air pollutants.[73] In her climate change executive order, Governor Lujan Grisham established ambitious and critical GHG reduction targets of achieving 45 percent reductions by 2030 from 2005 levels.[74] If large stationary sources in New Mexico were to reduce their GHG emissions to a comparable degree, it would likely result in substantial reductions of health-damaging pollutants. The level of such reductions would depend, however, on how each facility reduced GHGs. For example, hydrogen co-firing at gas plants may actually increase NO_x emissions without additional emission controls.[75]

For this reason, requiring GHG pollution emission reductions from New Mexico's large stationary sources is not only a critical component of comprehensive climate change policy, but it is also an opportunity to reduce the substantial quantities of health-damaging air pollutants emitted by these same facilities.

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[73] J. Jason West et al., *Co-benefits of Mitigating Global Greenhouse Gas Emissions for Future Air Quality and Human Health*, 3 Nature Climate Change 885 (2013), https://www.nature.com/articles/nclimate2009; G. F. Nemet, T. Holloway & P. Meier, *Implications of Incorporating Air-quality Co-benefits into Climate Change Policymaking*, 5 Env't. Rsch. Letters 014007 (2010), https://dx.doi.org/10.1088/1748-9326/5/1/014007; Anil Markandya et al., *Public Health Benefits of Strategies to Reduce Greenhouse-Gas Emissions: Low-carbon Electricity Generation*, 374 Lancet 2006 (2009), https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)61715-3/fulltext.
[74] Lujan Grisham Climate Change Exec. Order, *supra note* 1.
[75] *Hydrogen Cofiring Demonstration at New York Power Authority's Brentwood Site: GE LM6000 Gas Turbine*, EPRI (2022). https://www.epri.com/research/products/000000003002025166.

4.2 Public Health Benefits Require Actual GHG Emission Reductions from In-State Facilities

While reducing GHG emissions from large stationary sources provides a great opportunity to achieve public health benefits, the degree of benefit will depend on whether the state's climate policy results in actual GHG reductions from these facilities.

There are limited options for reducing GHG pollution from large stationary sources, and the opportunities vary greatly by facility and by industry. Sometimes the most effective strategy may be transitioning from one fossil fuel-fired facility, such as a coal-fired power plant, to a zero-carbon facility, such as a renewable energy power plant. Under these scenarios, some facilities may go to zero GHG emissions quickly, while for others, reducing even 10 or 20 percent may be very difficult or costly. For this reason, some states have adopted climate policies that set a cap on aggregate GHG emission reductions and allow individual facilities to emit more or less GHG emissions as long the total emissions from covered facilities meet the cap.[76]

This kind of averaging or trading meets the GHG pollution reduction goal, but it doesn't *necessarily* result in reductions of health-damaging air pollutants at any particular facility.[77] Under some circumstances, it could lead to increases in health-damaging air pollutant emissions if some facilities run more as others shut down. This can lead to unjust outcomes, especially if climate policies maintain or even exacerbate high quantities of air pollutant emissions in communities that already have a disproportionately high health burden or are particularly vulnerable.

In addition to averaging or trading, there are other policy mechanisms in state GHG reduction programs that can provide more compliance flexibility to large stationary sources but can also limit local public health benefits because they allow individual facilities to avoid making changes to reduce GHG emissions.

First, state programs sometimes allow "linking" with programs in other jurisdictions, meaning that facilities in one jurisdiction can effectively pay facilities in another jurisdiction to reduce

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[76] Vicki Arroyo et al., *State Innovation on Climate Change: Reducing Emissions from Key Sectors While Preparing for a New Normal,* 10 Harv. L. & Pol'y Rev. 385, 403-406 (2016).
[77] *See* Fowley, Walker & Wooley, *supra* note 31.

their emissions.[78] Depending on the economics at play, linking could drive GHG emission reductions—and the reductions of health-damaging air pollutants—in another state.

Second, some state climate policies also authorize the use of offsets, which allow facilities to invest in projects that will result in net GHG emission reductions—for example, by planting and maintaining forests that sequester CO_2.[79] Offsets provide another way for large facilities to avoid making changes onsite to reduce pollutant emissions.

Because these "compliance flexibilities" can allow a facility to avoid reducing GHG emissions on-site, they can limit the associated reduction in health-damaging air pollutant emissions. Maximizing public health benefits from a climate policy would therefore require ensuring that many of these GHG reductions actually occur at New Mexico facilities, and not through trading with out-of-state sources or through offsets.

Finally, many state climate policies authorize the use of carbon capture and sequestration (CCS) as a technology to reduce GHG pollution emissions.[80] CCS technology separates CO_2 from most of the other gasses and pollutants, and then sequesters the CO_2 deep underground. Until recently, CCS was a very expensive compliance strategy, but recently-enacted tax credits may make this strategy economically viable for a much greater number of stationary sources.[81] In terms of health damaging air pollutants, however, CCS can lead to both increases and decreases of emissions. One study found that CCS would lead to increases in nitrogen dioxide and particulate matter, while leading to decreases in sulfur dioxide emissions.[82]

For some pollutants, achieving public health benefits may also require limiting the use of CCS, hydrogen co-firing, and other strategies.

In short, a climate policy that requires substantial GHG pollution reductions from large stationary sources in New Mexico has the potential to also achieve substantial public health

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[78] *See*, *e.g.*, *Elements of RGGI*, Regional Greenhouse Gas Initiative, https://www.rggi.org/program-overview-and-design/elements (last visited Nov. 29, 2022) (describing how individual state programs are linked through regional initiative).
[79] *See*, *e.g.*, Compliance Offset Program, Cal. Air Res. Bd., https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program (last visited Nov. 29, 2022).
[80] *E.g.* NMSA 1978 § 62-16-3 (New Mexico CES defining zero carbon resource as a resource that "emits no carbon dioxide into the atmosphere").
[81] Gabriel Pacyniak, *State Sequestration: Federal Climate Policy Accelerates Carbon Storage, but Leaves Full Climate, Equite Protections to States*, ___ San Diego J. Climate & Energy L. ___ (forthcoming 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4269719.
[82] European Env't Agency, Air Pollution Impacts from Carbon Capture and Storage (CCS) (2011), https://data.europa.eu/doi/10.2800/84208.

benefits—including in communities of color and low-income communities—if the policy results in actual GHG emission reductions at these large facilities.

In a Cap Policy, Limiting Trading and Offsets is One Way to Promote Health Benefits

One way to ensure that GHG emission reductions occur at New Mexico facilities would be to limit the use of compliance flexibilities such as trading or offsets for some or all covered or large stationary sources. Such limits could range from a complete prohibition on such flexibilities to targeted limits on the use of such compliance flexibilities on high-polluting facilities located in areas that have disproportionately high pollution or vulnerable populations. Another potential strategy would be targeting limits on the oil-and-gas sector, which is now the largest source of GHG and health-damaging air pollutants among large facilities we analyzed. (See Subsections D and E below for additional information on the oil and gas sector and regional clusters of large stationary sources).

As discussed above, if facilities reduce GHG emissions through the use of CCS or fuel switching to hydrogen, this could still lead to continued or increased emissions by could still maintain or increase emissions of some health-damaging air pollutants with additional pollution controls.

For A Cap Policy to Achieve Health Benefits, the Cap Must Require Actual Emission Reductions

One additional policy consideration is that reductions in health-damaging pollution will only occur if facilities actually reduce GHG emissions. Historically, some cap programs have set initial GHG budgets at an inflated level that did not require real reductions in the early years of a program, although the cap declined over time.[83] Setting an initial cap at a level that requires real, near-term GHG emission reductions is critical for achieving public health benefits. Where there is uncertainty about baseline emissions data, a "price floor" for emissions allowances can be a tool to incentivize facilities to actually reduce emissions, as are mechanisms to revisit and ratchet down reduction requirements if it becomes evident that the initial "baseline" cap was set too high.

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[83] *See* Lesley K. McAllister*, The Overallocation Problem in Cap-And-Trade: Moving Toward Stringency,* 34 COLUM. J. ENV'T. L. 395 (2009).

Alternatively, States Can Implement a Complementary Policy That Requires Reductions of Health-Damaging Pollution

An equitable reduction of health-damaging pollution doesn't have to come through a policy focused on GHG emissions—and climate-focused policies should not be the exclusive strategy to reduce air pollution. A state could put in place two separate policies, one to reduce GHG emissions and another that requires additional reductions of health-damaging air pollution from the same facilities.[84]

One option is to implement more stringent requirements using existing air pollution control programs. Large stationary sources are already subject to a variety of state regulations implemented under state law pursuant to federal Clean Air Act requirements. These include regulations necessary to meet national or state ambient air quality standards for criteria pollutants, performance standards for new or modified sources, and standards for hazardous pollutants, among others.[85] For all of these requirements, both federal and state law allows the state's Environmental Improvement Board to set standards that are more stringent than what is required under federal law.[86]

The challenge with any complementary approach, however, is to ensure that the complementary policy is actually enacted to complement the climate policy.

Regulating GHG Emissions from Electricity Imports Is One Possible Way to Reduce Cross-Jurisdictional Pollution

In some cases, power plants outside of New Mexico's regulatory jurisdiction–for example across state borders or within the jurisdiction of Tribal governments–may emit GHGs and health-damaging air pollution that affect New Mexico residents. To the degree that this pollution is emitted because of combustion of fossil fuels in order to generate power for residents in New Mexico, one possible policy is to regulate GHG emissions associated with imports of electricity. California uses such a strategy in its GHG cap-and-trade program.[87]

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[84] One example is California's A.B. 617, a law which focuses on reducing health-damaging pollution that was passed at the same time as a reauthorization of California's cap-and-trade program. A.B. 2017 Cal. Stat. AB No. 617

[85] *See* Clean Air Act, 42 U.S.C. §§ 7408 - 7412.

[86] 42 U.S.C. § 7416; NMSA 1978 § 74-2-5(G).

[87] *See* Cal. Code Regs. tit. 17, § 95102 (definition of electric power entity includes imported electricity); Cal. Air Res. Bd. Presentation, Imported Electricity in California's Cap-and-Trade Program (2021), https://www.commerce.wa.gov/wp-content/uploads/2021/09/CARB-slides-CETA-workgroup-September-2021-Final.pdf.

4.3 Including “Smaller” Large Sources May Increase Public Health Benefits

Our report analyzed GHG and health-damaging pollutant emissions for all sources large enough to require a Clean Air Act Title V permit or to be required to report their GHG emissions (typically sources emitting over 25,000 $MTCO_2e$).[88] Most state GHG emission control programs only apply to sources that emit GHGs in excess of some annual threshold, or that are otherwise classified as large sources. For example, California’s cap-and-program applies to stationary sources that emit over 25,000 $MTCO_2e$.[89]

Our analysis found that while sources that emit less than 25,000 $MTCO_2e$ do not comprise a large share of GHG emissions from large stationary sources, they do disproportionately contribute to the share of health-damaging air pollutants from these sources. Including smaller “large” sources in a GHG reduction program could therefore increase the health benefits of the program.

One important caveat is that our analysis revealed significant data gaps from smaller sources. (See discussion below).

4.4 Policies Focusing on the Oil and Gas Sector Are One Way to Increase Health Benefits

Our analysis finds that two sectors contribute the largest share of both GHG pollution and health-damaging air pollutants: power plants and oil and gas. The state’s power sector policies are driving continual reduction of GHGs and health-damaging air pollutants. In contrast, the oil and gas sector does not yet have policies in place to achieve long-term, continuing emission reductions.

State’s Power-Sector Policies Driving Reductions

In the power sector, the state’s policies are driving substantial reductions of GHG pollution and health-damaging pollutants. The state’s 100 percent CES, enacted in the Energy Transition Act, requires New Mexico’s electric utilities to supply 100 percent of their electricity

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[88] *Learn About the Greenhouse Gas Reporting Program (GHGRP)*, Env’t. Prot. Agency, https://www.epa.gov/ghgreporting/learn-about-greenhouse-gas-reporting-program-ghgrp (last visited Nov. 29, 2022)(describing 25,000 $MTCO_2e$ reporting threshold for most sources).

[89] *E.g.,* Cal. Air Res. Bd., Cap-and-Trade Regulation Instructional Guidance 19 (2012), https://ww2.arb.ca.gov/sites/default/files/cap-and-trade/guidance/chapter2.pdf.

from zero-carbon emitting sources by 2045 or 2050 (depending on the type of utility).[90] The Energy Transition Act also provides a financial incentive for utilities to shut down large coal-fired power plants,[91] and requires a GHG performance standard for very large coal-fired power plants.[92]

The Energy Transition Act, together with state and federal enforcement actions and economic pressures, have led to the shut down of two coal-fired power plants: the San Juan Generating Station and Prewitt Escalante Station.[93] Like all coal-fired power plants, these facilities were not only major emitters of GHG pollution, but also emitted substantial quantities of health-damaging air pollutants.

Because the state's CES will require utilities to supply increasing levels of renewable and zero-carbon electricity over time, the state's policies will continue to drive reductions in GHG and health-damaging air pollution from this sector.

Notably, the state's largest coal-fired power plant, Four Corners Generating Station, currently continues to operate and is a large source of GHG and health-damaging air pollutant emissions. Four Corners is located on the Navajo Nation, and is therefore subject to the regulatory jurisdiction of the Navajo Nation, and not New Mexico state agencies. Currently, Four Corners is scheduled to close in 2031.[94]

One other important note is that as utilities close some fossil fuel-fired power plants, they may rely more on remaining facilities. This can result in increases of GHG and health-damaging pollution at those facilities. For example, as described above, Luna Energy Facility's total electricity generation was higher in 2020 and 2021 than any previous year.

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[90] NMSA 1978 §§ 62-16-4(A); 62-15-34(A).

[91] NMSA 1978 § 62-18-1 et seq.

[92] NMSA 1978 74-2-5(B)(1)(b); *see also* discussion in Section II.

[93] Alaina Mencinger, *It's Lights Out at the San Juan Generating Station*, Albuquerque J., Sept. 29, 2022, https://www.abqjournal.com/2536083/its-lights-out-at-the-san-juan-generating-station-ex-coalfired-ope.html; Hannah Grover, *Tri-State Announces It Will Close the Escalante Generating Station by the End of the Year*, Farmington Daily Times, Jan. 9, 2020, https://www.daily-times.com/story/news/local/2020/01/09/tri-state-announces-early-closure-escalante-generating-station/4423528002/.

[94] Ryan Randazzo, *Coal-burning Four Corners Power Plant will Cut Back on Operations, APS says*, Ariz. Republic, Mar. 12, 2021, https://www.azcentral.com/story/money/business/energy/2021/03/12/aps-four-corners-power-plant-reduce-operations-one-generator/4655198001/; Robert Walton, *New Mexico Denies PNM Bid to Exit Four Corners Coal Plant, Citing Lack of Replacement Resources*, Utility Dive, Dec. 16, 2021, https://www.utilitydive.com/news/new-mexico-denies-pnm-bid-to-exit-four-corners-coal-plant-citing-lack-of-r/611629/.

Requiring Continuous Reductions of GHG Pollution from the Oil and Gas Sector Could Increase Health Benefits

New Mexico has made substantial progress on tackling emissions from the oil and gas sector, but neither current state nor federal policies will drive the same long-term reductions as in the power sector.

In her climate change executive order, Gov. Lujan Grisham directed state agencies to establish regulations that would reduce emissions of methane, a potent GHG pollutant. State agencies recently finalized two separate regulations: one rule to prevent methane waste, another focused on limiting emissions of pollutants that form ozone pollution. Together, these two rules will substantially reduce both GHGs and health-damaging air pollutants from large and small oil and gas sources.[95]

In addition, the EPA is in the process of establishing federal pollution reduction requirements for oil and gas sources.[96] These regulations are not yet finalized, but they could require even more stringent reductions from some parts of the oil and gas sector. Moreover, if the EPA does not require stringent standards, the recently-enacted federal Inflation Reduction Act will subject large oil and gas sources to a sizable emission fee if they emit above a certain rate.[97] In general, however, these oil and gas regulations are focused on decreasing the rate of emissions—in other words, achieving less pollution for each cubic foot of gas or barrel of oil produced.

Unlike New Mexico's clean energy standard, none of these regulations will require the sector as a whole to continuously decrease emissions each year in keeping with the state's climate targets. This is particularly important because of the boom and bust nature of the oil and gas industry—if the price of oil and gas drives increased oil and gas production, emissions can increase. For this reason, the existing regulations will not be sufficient to achieve GHG

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[95] Adrian Hedden, *New Mexico Enacts Tougher Emissions Rules on Oil and Gas, Calls for 98 Percent Gas Capture*, Carlsbad Current-Argus, Mar. 21, 2021, https://www.currentargus.com/story/news/local/2021/03/25/new-mexico-enacts-tougher-emissions-rules-oil-and-gas/6971937002/. *See also* discussion in Section II.

[96] Press Release: EPA Issues Supplemental Proposal to Reduce Methane and Other Harmful Pollution from Oil and Natural Gas Operations, Env't Prot. Agency, Nov. 11, 2022, https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/epa-issues-supplemental-proposal-reduce.

[97] 42 U.S.C. §§ 7436(c)-(f); see Pacyniak, supra note 81, at 52.

reductions from the oil and gas sector that are proportional to the state's climate targets. Nor will they be sufficient to achieve comparable reductions in health-damaging air pollutants.

Our analysis finds that the oil and gas sector is the second largest source of GHG emissions from large stationary sources. After power plant retirements are subtracted, large oil and gas facilities are the largest source of health-damaging air pollutants from large stationary sources. Moreover, oil and gas sources are the vast majority of large facilities in the San Juan and Permian regional clusters that our analysis identified.

For this reason, one potential way to increase health benefits from a state climate policy would be to focus on achieving continuous declining emissions reductions from the oil and gas sector, similar to what the state's CES will require in the power sector. This could be achieved through a stand-alone policy for the oil and gas sector that requires the sector to continuously reduce absolute emissions, perhaps by basin. Alternatively, if the sector was placed under a broader cap policy, the policy could limit the use of trading, offsets, and potentially CCS in the sector. Again, one option would be to limit such compliance options by production basin.

4.5 Policies Focusing on Regional Clusters Could Also Increase Health Benefits

Our analysis identified four regions in the state where there are clusters of large stationary sources: the San Juan Basin; the Permian Basin; Albuquerque, Bernalillo and Sandoval Counties; and Las Cruces and Dona Aña County.

The people who live in these clusters disproportionately feel the effects of health-damaging pollution from large stationary sources. Some of these communities also have a larger share of residents of color or low-income residents.

Another way to increase health benefits from a state climate policy would be to require actual GHG reductions in cluster regions. This type of policy would have the benefit of reducing cumulative pollution burden in these areas. New Jersey has implemented a law that seek to reduce the "cumulative impacts" of air pollution,[98] and the Albuquerque and Bernalillo County Air Quality Control Board recently received a petition to implement a cumulative

[98] New Jersey Environmental Justice Law, N.J.Stat.Ann. § 13:1D-157 et seq.

impacts policy in their jurisdiction.[99] Several state climate policies include measures that seek to promote actual GHG reductions in high-pollution communities.[100] Policymakers could consider several strategies to achieve reductions in cluster regions, including direct reduction requirements and limits on compliance flexibilities like trading, offsets, and possibly CCS.

4.6 Prioritizing Enforcement at High-Emitting Facilities Could be a Valuable Complementary Strategy

Several high-emitting facilities have closed in part because because of enforcement actions brought by the state or lawsuits brought by environmental organizations.

San Juan Generating Station closed in part because of citizen lawsuits brought by environmental and community groups against the facility for not having a required permit.[101] The New Mexico Environment Department brought compliance actions that resulted in the closure of DCP Operating Company's Eunice Gas Plant and a sulfur recovery unit at ETC Texas Pipeline's Jal No. 3 Gas Plant.[102] Recently, environmental nonprofit Wild Earth Guardians brought an action against facilities of Oxy USA Inc., resulting in a proposed settlement agreement that has been filed with the court.[103]

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[99] *See* Mountain View Coalition, Press Release: Mountain View Coalition and NMELC Announces the Filing of Our Historic "Health, Equity, & Environment Regulation" to the ABQ-BERNCO Air Quality Control Board, Nov. 21, 2022, https://nmelc.org/wp-content/uploads/2022/08/RELEASE-MVC-CI-Press-Conf-11.21.22.pdf?blm_aid=3650562.

[100] For example, Washington's Climate Commitment Act requires the state to "identify overburdened communities," "conduct environmental justice assessments," direct funds to overburdened communities, and to potentially limit the ability of facilities in those communities to use offsets. *Washington's Cap-and-Invest Program*, Washington State Department of Ecology, https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act/Cap-and-invest (last visited Nov. 7, 2022). The New York State Climate Leadership and Community Protection Act, 2019 N.Y. Laws Sen. 6599, and California's climate laws, *see e.g.* A.B. 2017 Cal. Stat. AB No. 617, contain similar provisions.

[101] Hannah Grover, *Looking Back at the San Juan Generating Station and Those who Fought Against It*, N.M. Pol. Rep., Sept. 28, 2022, https://nmpoliticalreport.com/2022/09/28/looking-back-at-the-san-juan-generating-station-and-those-who-fought-against-it/.

[102] N.M. Env't Dep't., Press Release: Environment Department Settles Air Enforcement Case with DCP Operating Company, LP, Sept. 13, 2021, https://www.env.nm.gov/wp-content/uploads/2021/09/2021-09-13-EPD-AQB-DCP-SASFCO-Press-Release-Final.pdf; N.M. Env't Dep't., Press Release: Environment Department Settles Air Enforcement Case with ETC Texas Pipeline, Aug. 30, 2021, https://www.env.nm.gov/wp-content/uploads/2021/08/2021-08-30-NMED-settles-air-enforcement-case.pdf;

[103] Proposed Consent Decree and Order, *Wild Earth Guardians v. Oxy,* Docket No. 22-cv-797 (filed Oct. 25, 2022 D.N.M.).

Our analysis identified several facilities that have relatively high health-damaging pollutant emissions as compared to their GHG emissions. These include the Four Corners Generating Station, the Chaco Gas Plant, and the Rio Grande Generating Station. In addition, our report has identified the facilities that contribute the largest quantities of health-damaging pollutants in each of the regional cluster areas. If these facilities exceed their air pollution permit limits, prioritizing enforcement actions on these facilities could provide significant public health benefits.

For this reason, the New Mexico Environment Department and public-interest legal organizations should consider focusing compliance monitoring and prioritizing enforcement actions on such facilities.

One related factor is that the New Mexico Environment Department has previously requested additional funding for enforcement actions.[104] The state legislature should consider increasing funding for the Department for enforcement activities.

4.7 Policymaking Processes Should Ensure Impacted Communities Have A Seat At the Table

A key demand of the environmental and climate justice movements is to ensure those communities that are most impacted by pollution, and that have been historically marginalized, are able to fully and meaningfully participate in the policymaking process.[105] New Mexico policymakers should build on existing processes, including Gov. Richardson's Environmental Justice Executive Order,[106] the methane advisory panel process for oil and gas regulations,[107] and the process for developing climate equity principles for the New Mexico Climate Change Technical Advisory Group, to ensure that impacted communities can meaningfully engage in the development of future climate policies. This is particularly

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[104] Adrian Hedden, *New Mexico Officials Want More Funding to Enforce Oil and Gas Rules Amid High Pollution,* Carlsbad Current-Argus, Sept. 1, 2022, https://www.currentargus.com/story/news/2022/09/01/new-mexico-funding-oil-gas-fossil-fuel-permian-basin-air-pollution-environment-energy-legsilature/65465070007/.

[105] *See* Robert R. Kuehn, *A Taxonomy of Environmental Justice*, 30 Env't L. Rep. 10681 (2004).

[106] Environmental Justice Exec. Order, No. 2005-056 (Nov. 18, 2005), https://www.env.nm.gov/wp-content/uploads/2022/06/EO_2005_056.pdf (directing all "cabinet level departments and boards and commissions that are involved in decisions that may affect environmental quality and public health [to] provide meaningful opportunities for involvement to all people regardless of race, color, ethnicity, religion, income, or education level.").

[107] *Methane Advisory Panel*, N.M. Env't Dept., https://www.env.nm.gov/new-mexico-methane-strategy/methane-advisory-panel/ (last visited Nov. 29, 2022).

important with regards to developing policies that not only reduce GHG emissions, but that also equitably achieve reductions of health-damaging air pollution that is harming New Mexicans today.

4.8 The State Should Consider Creating a More Robust Data Program and Conducting Disparate Pollution Analyses

Our analysis encountered significant data gaps in the three databases that we examined. For some facilities we found GHG emissions data but no emissions data for health-damaging air pollutant emissions. For some other facilities, the situation was reversed.

In order to be able to ensure the effectiveness of any climate policy in reducing both GHG emissions and health-damaging air pollutant emissions from large stationary sources, it will be critical that the state has up-to-date, accessible, and transparent data for both types of emissions. Several states make such data available to the public through an online mapping tool.[108] New Mexico should consider implementing such a tool and using it to inform permitting and policy decisions to reduce pollution burdens. Moreover, the state should consider conducting regular analyses of pollution patterns to identify communities that are being disproportionately harmed by pollution, including communities that are particularly vulnerable to pollution because of health burdens or other vulnerability factors.

Finally, if the state implements a climate policy to reduce GHG emissions from large stationary sources, the state should analyze how effective and equitable that program is in reducing health-damaging air pollutants. If the program allows for use of compliance flexibilities like trading and offsets, the state should monitor and report on the use of such flexibilities, in order to assess whether they are maintaining or exacerbating "hot spots" of health-damaging air pollution emissions.

4.9 A Comprehensive Policy Also Needs to Address Transportation, Small Distributed Oil and Gas Sources, and Buildings

Our analysis focused on large stationary sources of air pollution. As described, this sector emits approximately 25 percent of GHG pollution in the state, and it also is responsible for a large quantity of health-damaging pollution. There are other sectors, however, that together

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[108] *CalEnviroScreen 4.0*, Cal. Env't Prot. Agency's Ofc. of Env't Health Hazard Assessment, https://oehha.ca.gov/calenviroscreen; *MiEJScreen: Environmental Justice Screening Tool (DRAFT)*, Mich. Dept. of Env't, Great Lakes, and Energy, https://www.michigan.gov/egle/maps-data/miejscreen.

represent the largest remaining sources of GHG emissions, and that are also large sources of health-damaging pollutants.

The transportation sector is the second largest source of GHG emissions in New Mexico.[109] This sector also emits large quantities of nitrogen dioxide, sulfur dioxide, volatile organic compounds, particulate matter, and air toxics.[110] In addition, smaller oil and gas sources—those that do not have Title V permits and therefore were not covered in our analysis—collectively emit a large amount of GHG emissions and similarly contribute health damaging air pollutants. Finally, the building sector is also a substantial contributor of GHG emissions and health-damaging air pollution.

While analysis of these sources was outside the scope of our report, any comprehensive climate policy would need to address GHG emissions from these sources, and should also consider the health-damaging pollution from these sources.

[109] Krieger et al, *supra* note 4 at 21.
[110] *Id.*

5.0 Conclusion

New Mexico has taken important steps to address climate change, including setting state-wide GHG emission reduction targets and establishing policies that will reduce GHG emissions in the power sector and among oil and gas sources. New Mexico's policies stop short, however, of requiring emissions reductions from all large stationary sources that are in keeping with the state's climate targets. Large stationary sources are important because they contribute approximately 25 percent of the state's GHG emissions and also emit substantial quantities of health-damaging air pollutants. Our analysis identified 189 large stationary sources, with 128 reporting emissions of over 10,000 $MMTCO_2e$ in 2019. Power plants and oil and gas sources were both the most numerous and the largest sources of GHG and health-damaging air pollutant emissions. Our analysis also identified four regions with clusters of large stationary sources: the San Juan Basin; the Permian Basin; Albuquerque, Bernalillo, and Sandoval Counties; Las Cruces and Dona Aña County.

Requiring additional GHG emission reductions from these sources will likely be necessary to meet the state's climate targets, and also presents an opportunity to reduce health-damaging air pollution and provide public health benefits. In order to achieve public health benefits along with GHG emission reductions, climate policies need to drive actual GHG reductions at large stationary sources. We identify a number of strategies that can be used to promote health benefits in a climate policy that includes large stationary sources, including: limiting compliance flexibilities like trading, linking, and offsets in any aggregate cap policy, potentially focusing on high-polluting sectors or regions with clusters of high-emitting facilities; using complementary policies to reduce health-damaging air pollution emissions; including "smaller" large sources that disproportionately contribute to health-damaging air pollution emissions; and prioritizing enforcement of high-emitting facilities. In addition, the state should build on existing processes and policies to ensure that impacted communities have meaningful involvement in policymaking and should also seek to remedy data gaps related to both GHG and health-damaging air pollutant emissions.