



Forecasting Coal Plant Retirements and Coal-to-Gas Transitions in the United States

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Background

Coal-generating capacity in the United States has fallen steadily since its peak in 2011. In 2010, coal-fired generation accounted for more than half of electricity produced in the United States. A decade later, that fell to around a quarter of total generation. This shift has been driven primarily by the retirement of existing coal-fired generators. According to the Energy Information Administration (EIA) Form-860 data, 473 generators with a nameplate capacity of nearly 80 gigawatts (GW) retired between 2010 and 2019. This surge in retirements is due to a combination of aging infrastructure, pollution regulations, business and consumer tastes for cleaner generation, and lower natural gas prices resulting from the expansion of fracking in the United States. As a result, 133 plants across the country have replaced retired coal-fired generators with new natural gas generators according to Form-860 data.

A common concern is that coal plant closures will impact the economic outlook for surrounding communities. Preparations for future closures or repurposing typically require diverting limited resources that can impact public service provision today. However, preparations are

challenging because communities may not know when their coal plant will be retired or if it will be repurposed to burn natural gas. Recently, uncertainty about [future electricity demand](#), a changing [regulatory outlook](#) for coal plants, and direct federal [investments](#) and [emergency orders](#) have caused some utilities to delay or cancel retirements. At the beginning of 2025, coal plant operators had planned to retire [8.5 GW of capacity](#); however, 4.8 GW of planned retirements were delayed, and the operators of three coal plants (2.3 GW) cancelled plans to retire. While keeping these plants open temporarily sustains local employment and tax revenue, local economic development remains dependent on fossil fuels, and running uneconomic coal plants can lead to [higher electricity bills](#).

In other cases, utilities have proposed replacing retired coal generators with natural gas. While current combined-cycle natural gas plants [employ fewer workers than coal plants](#), repurposing a coal plant to burn natural gas will somewhat offset employment losses from coal plant retirements. However, nearby communities will remain dependent on fossil fuels, leaving these communities exposed to fossil fuel price volatility and fossil transition risk.

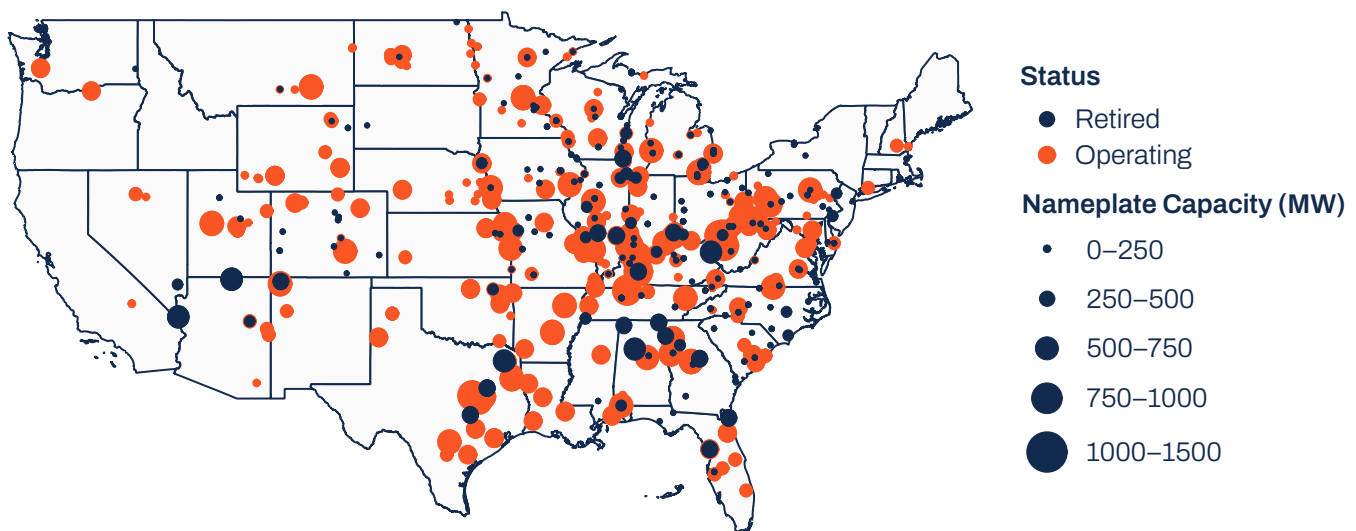
About this Research

To help communities prepare, we forecast when coal plants that were operational in the United States as of January 2020 (see Figure 1) are likely to retire and which are candidates to switch from coal- to natural gas-fired generation. Our methodology (elaborated on in this [working paper](#)) explicitly accounts for future uncertainty in electricity demand and fuel costs as well as hypothetical regulatory outlooks that might change the cost of burning coal in the future. Data for the analysis comes from Form EIA-860, Form EIA-923, and Form EIA-861M. We develop a dynamic model of generator divestment that identifies the time to retire that maximizes the expected value of the coal plant net of retirement costs in the form of scrapping machinery, decommissioning sites, and selling suitable land.

Our analysis proceeds in four steps. First, we

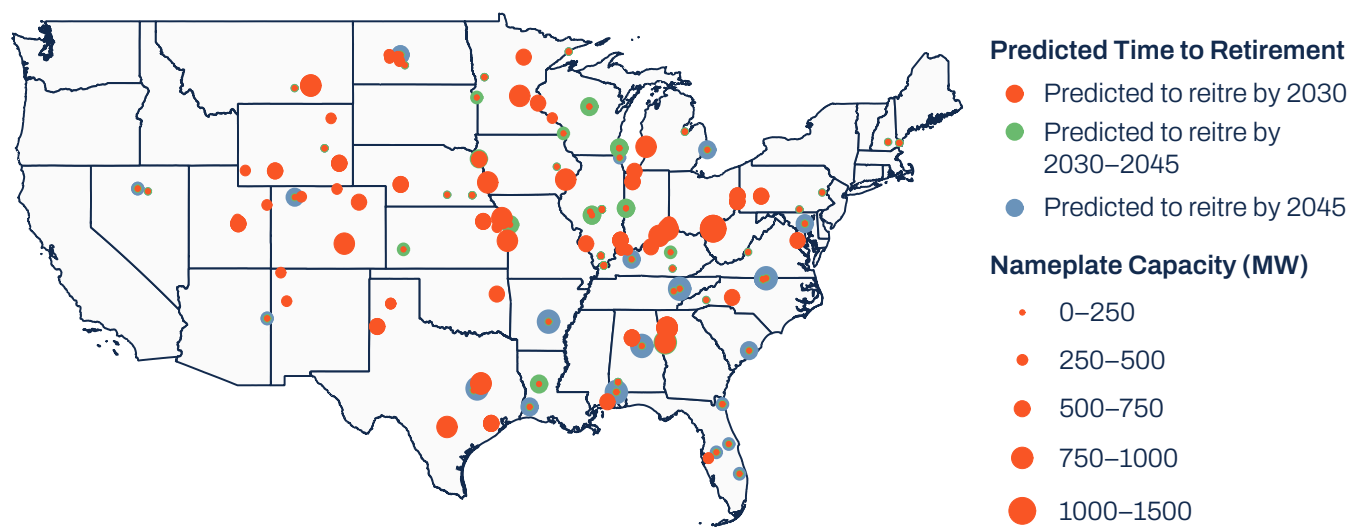
use our dynamic divestment model to infer unobserved retirement costs from the observed decisions of utilities that have already retired coal-fired generators. This step generates implied retirement costs for over 300 coal-fired generators that retired prior to 2020. Second, we impute retirement costs for coal-fired generators that were active at the start of 2020 using a machine learning approach. Third, we predict the retirement date for the coal-fired generators in the United States that were active at the beginning of 2020 assuming no changes in 1) the way coal and electricity prices evolve, 2) the efficiency and usage of the generator, and 3) the level of federal environmental policy. Fourth, we predict whether the generators at an active coal plant will switch to natural gas before they are predicted to retire. This four-step process leverages the observed retirement and switching decision of electric utilities to infer the timing of retirement for active generators and to assess the likelihood those retirements will be accompanied by new investment in natural gas generation.

Figure 1. Retired and Operating Coal-fired Generators by Generating Capacity as of January 2020



Source: [EIA Form-860 data](#)

Figure 2. Predicted retirement time for coal generators operating as of January 2020



Our main finding is that the majority of communities around coal plants face imminent retirement (within the next four years) and are viable candidates for new investments in natural gas generation. Seventy-five coal plants (61 percent of the active coal plants in our sample) are forecast to retire by 2030. It makes financial sense to convert up to 73 percent of active coal plants to natural gas generation.

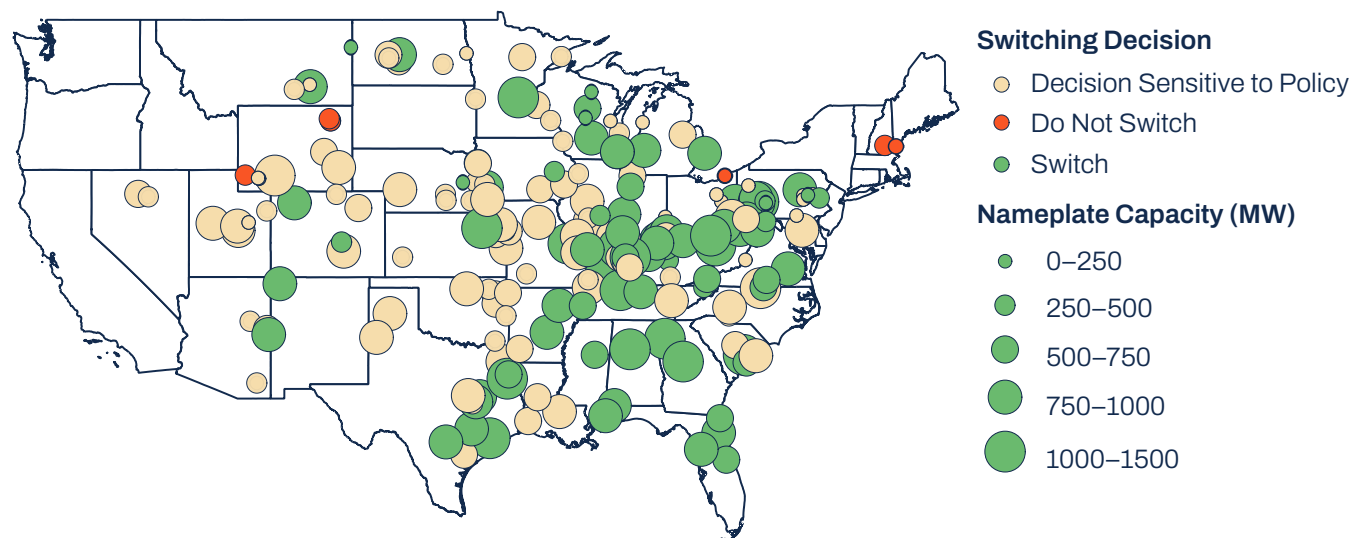
Our results should be viewed as an assessment of the financial viability of coal plants from the plant owner's perspective given recent trends in fuel and electricity prices observed at each plant. We do consider the possibility of future regulations (either at the state or federal level) that would change the cost of burning coal. However, we do not consider state mandates for coal plant closure or federal executive orders prohibiting coal plant closure that do not directly change the economic outlook for coal plants. We do not consider these mandates and executive orders for two reasons: 1) legal challenges are ongoing in the courts, and 2) we wish to highlight when these mandates

and executive orders may contradict a coal plant owner's financial incentives. For example, a mandate to close a coal plant by 2030 will have a minimal impact if it makes financial sense to close that plant in 2026. We also do not consider supply chain constraints that may limit the ability to build new natural gas generation. Our results should be revisited if the past becomes a poor predictor of electricity demand due to data center growth or the prospect for climate policy drastically changes the economic outlook of these plants.

Key Findings

- **Three in five coal plants face imminent retirement (see Figure 2).** Seventy-five coal plants – 61 percent of the plants in our sample – are currently candidates for retirement or are forecasted to retire by 2030. These electricity-generating assets are not profitable for a variety of reasons, such as low electricity prices, high coal prices, and degraded fuel efficiency due

Figure 3. Decision to switch generating capacity from coal to natural gas for coal plants operating as of January 2023



Note: “Do Not Switch” indicates switching to natural gas is not financially attractive to the operator. “Switch” indicates switching to natural gas is financially attractive to the operator. “Decision Sensitive to Policy” indicates the fuel switching decision depends on the presence of policies that raise the cost of burning coal.

to plant age. Utilities may be keeping these plants active in anticipation of [future electricity demand](#) (e.g., data centers), grid reliability concerns, or direct federal [investments](#) and [emergency orders](#). However, the future of these plants remains precarious. These plants are located across the country with concentrations in Indiana (seven plants), Texas (seven plants), Minnesota (five plants), North Dakota (five plants), and Ohio (five plants).

- **One in four coal plants may remain operational for the next two decades (see Figure 2).** Thirty-three coal plants—27 percent of the plants in our sample—are predicted to remain operational beyond 2045 given recent electricity and fuel prices in these areas and minimal federal climate policy over

the next two decades. These plants are located across the country with concentrations in Florida (four plants), Illinois (three plants), Kentucky (three plants), and North Carolina (three plants). Some of these retirement dates may be pushed forward by state-level mandates not considered in our analysis. For example, Illinois enacted the [Climate and Equitable Jobs Act](#) (CEJA) in 2021, mandating the closure of all privately owned coal-fired power plants in the state by 2030.

- **Most coal plants are viable candidates for conversion to natural gas (see Figure 3).** Switching to natural gas is a financially attractive option for owners of most active coal plants. Seventy-three percent of our sample are currently candidates for replacing

retired generators with natural gas generators. While switching to natural gas is financially attractive for plant owners, local communities will remain reliant on fossil fuels.

- **About half of the decisions to switch to natural gas are sensitive to the possibility of future policies that would increase or decrease the cost of using coal to generate electricity (see Figure 3).** The other half of fuel-switching decisions (48 percent) are insensitive to the possibility of policy-induced changes to the cost of burning coal. These plants are either so profitable or so unprofitable that a carbon tax equal to \$51 per ton of carbon dioxide (~350% increase in the coal price) or a \$40 per ton coal subsidy (~84% decrease in the coal price) will not change their outlook.

Policy Implications

- **Most local governments have less than five years to plan for the reduction in revenue triggered by coal plant closures and repurposing.** These local governments must prepare for future closures which may require diverting limited resources that can impact public service provision today. State and federal governments can help assist these preparation efforts, and some states such as Colorado, Minnesota, and New Mexico are implementing programs to do so.
- **New natural gas generation is a viable financial alternative for most coal plants.** Former coal plants are an attractive location for new natural

gas generation, because they offer existing connections to the electric grid. In addition, many communities are characterized by strong electricity demand and low natural gas prices, making natural gas an attractive alternative for utilities.

- **Federal, state, and local policies that lower or raise the cost of burning coal can influence the timing of retirement or a switch to natural gas for roughly half the existing coal plants.** The retirement and fuel switching decisions for the other half are largely immune to such policies. These plants are either so profitable or so unprofitable that potential policies do not change their economic outlook.

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Details on the methodology employed to predict retirement times: <https://www.nber.org/papers/w28949>

An interactive tool showing the data used and results for each coal plant: <https://baker.utk.edu/2026/09/01/u-s-coal-plants/>

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..... **About the Resilient Energy Economies Initiative**

The REE Initiative was established in 2024 to develop strategies that support the economies of fossil fuel–dependent communities across the United States as the energy system transforms. In addition to supporting action-oriented research to find what works, REE has built a community of scholars, policymakers, and economic development practitioners from the local, state, tribal, and federal levels to share knowledge and build relationships across the nation’s energy communities.

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