Analysis of Potential Pathways to a Clean Energy Future in Illinois

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Table of Contents

List of Figures

List of Tables

1. Executive Summary

In 2024 the Illinois Commerce Commission ("ICC") opened an investigation into the future of natural gas and issues associated with decarbonization of the gas distribution system. The ICC noted that the "gas distribution system must change" to reach Illinois' goal of "economy-wide 100% clean energy by 2050." The ICC directed the investigation to fully explore issues arising from decarbonization in the gas distribution system, develop recommendations for future Commission policies and action, and develop recommendations for any necessary legislative changes.

This report lays out an approach to analyzing a subset of fundamental questions raised by the Illinois Future of Gas Proceeding, particularly related to the costs and bill impacts of alternative pathways to accomplish the decarbonization goals. **Error! Reference source not found.** presents the resulting costs from 2025 to 2050 of four possible Illinois-centric decarbonization portfolios as defined in Table ES 1. Table ES 2 presents the rate impacts from the scenarios in **Error! Reference source not found.**.

From the analysis provided in this report, several conclusions become apparent:

- The cost of mandated full electrification (100% Clean Energy) is projected to exceed $1 trillion by 2050, resulting in more than a 2000 percent increase in Illinois natural gas rates.

    - The increased cost includes roughly $540 billion in new electric infrastructure and about $638 billion in payments—modeled as a rebate program—from a dwindling set of gas consumers to consumers choosing to switch to full electrification. By 2050, the rebates eventually induce all consumers to exit the gas system.

    - Despite the ongoing transition of gas customers, nearly $43 billion in additional natural gas infrastructure investment is required to maintain the safety of the natural gas system through 2050. Which parties pay for the remaining investment in the gas system in 2050 is an issue that will need addressed in the future.

    - This pathway has the potential to eliminate all emissions from utility-delivered natural gas applications, assuming that the electric generation portfolio will fully transition to new renewable energy sources supported by an expanded fleet of battery resources.

- Other potential modeled pathways that leverage some use of natural gas result in lower total costs while significantly contributing to emissions reductions.

    - The modeled costs of these other pathways fall between $340 and $391 billion from 2025-2050 which translate into rate increases from 500 to 580 percent. (Rate Cap – No RNG, Rate Cap Moderate RNG, and New York Model)

    - These alternative pathways include moderate levels of full electrification but rely more heavily on energy efficiency or hybrid heating systems. Considering there is no government mandate to electrify in these scenarios, the cost of the rebate program and the cost of electric upgrades fall to between $114 to $135 billion and $173 to $204 billion.

    - These alternative scenarios remove about 60 percent of total emissions relative to the 100% Clean Energy scenario.

- The estimated costs of clean energy mandates in Illinois only include the directly attributable costs to reducing emissions in the natural gas utility delivered gas sector and do not include the cost of the Illinois clean energy goal to other sectors of the economy such as transportation or agriculture.

- Full mandated electrification requires increasingly higher rebate payments to induce those customers who are either unwilling or unable to undertake electrification measures.

- Full electrification requires the need for extensive investments in new carbon free electric capacity as well as delivery infrastructure (though increased electric sales does offset some of this disadvantage).

- Electrification combined with RNG can lower costs relative to full electrification, though many of the cost associated with full electrification remain.

- Each scenario includes remaining natural gas infrastructure costs borne by a declining customer base. Under the 100% Clean Energy scenario, all throughput is eliminated by 2050, leaving stranded costs without a clearly defined recovery mechanism.

- Under Business-As-Usual ("BAU"), the recent trend in capital investments causes upward pressure on rates in the near term. Over the 25-year horizon the average growth in base rates is about 2.2 percent annually, slightly exceeding expected inflation.

- Under the 100% Clean Energy scenario, rates increase by nearly 14 percent annually through the end of 2049. (In this model, the utility sells no gas in 2050 which means 2050 gas rates are undefined since the rate is calculated as the total cost divided by gas sales. The substantial remaining unrecovered costs of the natural gas system in 2050 will need to be recovered through an as yet undefined mechanism.)

- Under the rate cap scenarios with No RNG and Moderate RNG, rates increase to the cap at about 6.7 percent annually. Under the New York Model, rates increase about 7.3 percent annually. The main difference between these scenarios is the different choices in the decarbonization portfolios.

- The natural gas bill impacts would affect 4.2 million natural gas customers. To the extent that mandated electrification causes electric rates to increase above the Business-As-Usual case, electric customers are affected as well.

Table ES 1: Cost of Alternative Decarbonization Portfolios (2025-2050)

	100% Clean Energy	Rate Cap - No RNG	Rate Cap - Moderate RNG	New York Model
Total Cost	**$ 1,222 Billion**	**$ 391 Billion**	**$ 340 Billion**	**$ 350 Billion**
Total CO_2e Reduction (tons)	560,454,547	330,021,455	326,936,692	327,132,637
Cost/Ton CO_2e Reduction	$ 1,855	$ 607	$ 455	$ 483
Total Out-of Pocket Costs per Residential Customer (1)	$ 43,868	$ 6,916	$ 4,892	$ 7,660
Total Decarbonization Rebate Cost per Residential Customer (2)	$ 16,828	$ 9,428	$ 8,001	$ 18,094

Results generated by Illinois Future of Gas model provided with this report. Total costs include total customer out of pocket costs, total rebate costs, and total electric and natural gas infrastructure costs of each scenario. Costs are measured in nominal dollars. The "New York Model" includes decarbonization portfolio developed by the New York gas utilities which relies more heavily on Renewable Natural Gas (RNG) and hybrid heating systems relative to the two "Rate Cap" scenarios.

(1) Out of pocket costs paid by consumers to electrify above best alternative technology.
(2) Decarbonization rebates are paid by natural gas customers on the utility system to natural gas customers undertaking electrification measures.

Table ES 1: Composition of Alternative Decarbonization Portfolios (2025-2050)

	100% Clean Energy	Rate Cap - No RNG	Rate Cap - Moderate RNG	New York Model
Residential High Efficiency Furnace	0%	45%	50%	NONE
Residential Hybrid Heating	0%	45%	50%	75%
Residential Full Electrification	100%	10%	NONE	NONE
Commercial Partial Electrification	0%	50%	50%	30%
Commercial Full Electrification	100%	20%	NONE	NONE
Industrial / Transport Electrification	100%	25%	NONE	NONE
Renewable Natural Gas	NONE	NONE	25%	52%

Table ES 2: Rate Impacts Under Alternative Decarbonization Portfolios (2025-2050)

Scenario	2025	2035	2040	2045	2050	Increase From 2025
Business-As-Usual ("BAU")	$ 7.57	$ 9.81	$ 10.92	$ 12.00	$ 13.10	173%
100% Clean Energy	$ 7.57	$ 19.57	$ 31.97	$ 59.70	$ 159.77	2112%
Rate Cap - No RNG	$ 7.57	$ 12.94	$ 17.34	$ 24.37	$ 38.03	503%
Rate Cap - Moderate RNG	$ 7.57	$ 13.55	$ 18.14	$ 25.40	$ 38.25	506%
Rate Cap - New York Model	$ 7.57	$ 13.51	$ 18.34	$ 26.86	$ 43.87	580%

Under the 100% Clean Energy scenario gas utilities no longer have customers beginning in 2050. The table presents the end of year 2049 rates for the 100% Clean Energy scenario. Results generated by Illinois Future of Gas model provided with this report.

2. Background and Context

On March 7, 2024, the Illinois Commerce Commission ("ICC" or "Commission") opened an investigation into the future of natural gas ("Future of Gas") and issues associated with decarbonization of the gas distribution system. (ICC Initiating Order in Docket 24-0158 "Future of Gas Initiating Order" initiating the "Illinois Future of Gas Proceeding").[1] The Future of Gas Initiating Order notes that the "gas distribution system must change" to reach Illinois' goal of "economy-wide 100% clean energy by 2050." (Id. pp. 1-2). Yet the ICC recognized that Illinois legislation is "silent on authority to pursue decarbonization in the gas sector." (Id.)[2] Recognizing that reaching the clean energy goal may include both ICC initiated policy changes as well

[1] On November 16, 2023, the ICC issued three final orders regarding rate relief for Nicor Gas Company ("Nicor"), Ameren Illinois Company ("AIC"), North Shore Gas Company ("NS") and Peoples Gas Light and Coke Company ("PGL"). In each order the ICC directed its staff to prepare and future of gas process initiating order withing 90 days. *See* Final Orders in Docket Nos. 23-066 ("Nicor Final Order"), 23-0067 ("AIC Final Order"), and 23-0068/0069 (Cons.) ("NS/PGL Final Order").

[2] *Decarbonization* is not defined by legislation and is used in this context to refer to the general reduction of carbon, or carbon equivalent, emissions from energy sources. *Clean energy* is defined in 415 ILCS 5/3.131 as "…energy generation that is substantially free (90% or greater) of carbon dioxide emissions." Illinois legislation declares that it is the "…policy of this State to rapidly transition to 100% clean energy by 2050." (20 ILCS 3855/1-5(1.5))

as potential legislative changes, the Commission identified a number of issues for consideration in the Illinois Future of Gas Proceeding and directed the investigation "to fully explore issues arising from decarbonization in the gas distribution system, develop recommendations for future Commission policies and action, and develop recommendations for any necessary legislative changes." (Id. citing Nicor, AIC and NS/PGL Final Orders).

The Illinois Future of Gas Proceeding was divided into two phases. Phase 1 workshops were held in April and May 2024 exploring topics for discussion in Phase 2. (Facilitator's Final Phase 1 Report, Section IV, pp. 23-37). This included seven workshop meetings, written workshop material, and written informal reply comments from participants on issues discussed in the workshop culminating in the final Phase 1 Report identifying topics in twelve categories. (Celia Johnson Consulting LLC, 2024, "Facilitator's Final Phase 1 Report"). [3]

Phase 2 began in September 2024 and was divided into two parts. Phase 2A addressed foundational issues related to policy and alternative decarbonization pathways. This report is presented as part of Phase 2A. Phase 2B will begin in March 2025 with a set of working groups to discuss pathway options and collect data concerning pathways and technologies discussed in Phase 2A. Phase 2B is scheduled to end in summer 2025.

While this document does not address all possible issues for discussion in the Phase 2B portion of the Illinois Future of Gas Proceeding, this paper lays out an approach to addressing a subset of fundamental questions raised by the Illinois Future of Gas Proceeding as paraphrased below:

1. What targets and timelines can reasonably be assessed for decarbonization in Illinois?
2. What are the costs of various decarbonization strategies both for natural gas services and alternatives to natural gas utility services?

[3] The Facilitator's Final Phase 1 Report describes other communication processes used in Phase 1.

3. What is the cost of various pathways for both the electricity system and the natural gas system?
4. What is the effect of various pathways on the affordability of energy services to consumers in Illinois?
5. What are the impacts of reducing gas emissions on energy reliability, resource adequacy, resiliency, and safety?

This report is designed to provide the stakeholders with a statewide view of Illinois' potential paths to a clean energy future. Section 3 provides background on the Illinois natural gas sector highlighting its scope and relative importance as a source of greenhouse gas emissions ("GHG"). Section 4 presents an overview of national trends in natural gas policy towards a clean energy future. Section 5 presents a framework for analyzing pathways to a potential clean energy future. Section 6 presents the modeling approach based on the framework outlined in Section 5. Section 7 provides a summary of the results.

The goal of this document is not to advocate for any specific pathway to a clean energy future rather the report provides a rational policy framework and modeling approach to help Illinois stakeholders identify a pathway that best suits the needs of the state and its citizens.

3. The Current State of the Illinois Natural Gas Utility Sector

3.1. The Size and Scope of the Illinois Natural Gas Utility Sector

In 2023, nine investor-owned natural gas utilities served over 4.2 million customers in Illinois. (Table 1). Of these nine companies, five (Ameren IL, Nicor Gas, Peoples Gas, North Shore Gas and MidAmerican, also referred to as the "Major Illinois

Gas Utilities") serve nearly 99% of the natural gas utility customers in Illinois.[4] (Table 2)

Table 1: Illinois Investor-owned Gas Utilities (2023)

Company	Primary Service Area	Total Number of Customers
Ameren IL	Central/Southern Illinois	811,557
Liberty Utilities	Central/Southern Illinois	20,998
Consumers Gas	Carmi Area	5,163
Illinois Gas	Lawrenceville-Olney area	9,285
MidAmerican	Quad Cities	65,709
Mt. Carmel	Mt. Carmel	3,390
Nicor Gas	Northern Illinois Outside Chicago	2,266,416
North Shore Gas	North Suburbs of Chicago	163,537
Peoples Gas	City of Chicago	884,912
Total Illinois		4,230,967

Source: ICC *Comparison of Gas Sales Statistics*; *Annual Report on Electricity, Gas, Water and Sewer Utilities*

The Major Illinois Gas Utilities provide bundled sales—delivery and gas commodity to roughly 3.9 million sales customers, and transportation services—delivery only—to about 282,000 transport customers.[5] (Table 2). These utilities own tens of thousands of miles of distribution and transmission mains and underground storage fields with over 200 billion cubic feet of storage capacity. (Table 3)

Table 2: 2023 Customer Count of Illinois Gas Utilities

Company	Residential	Commercial	Industrial	Transportation	Total*
Ameren IL	742,875	58,097	261	9,247	811,557
Liberty Utilities	18,986	2,000	9	3	20,998
Consumers Gas	4,575	572	14	-	5,163
Illinois Gas	8,087	946	251	1	9,285
MidAmerican	60,335	5,211	43	114	65,709
Mt. Carmel	3,026	362	-	-	3,390
Nicor Gas	1,916,606	132,848	7,514	209,448	2,266,416
North Shore Gas	140,710	10,055	1	12,771	163,537
Peoples Gas	773,427	60,714	4	50,767	884,912
Total	3,668,627	270,805	8,097	282,351	4,230,967

* Total includes Public Authorities, Sales for Resale, and Interdepartmental. Source: ICC "Illinois Gas Utilities Comparison of Gas Sales Statistics," 2023

[4] North Shore Gas and Peoples Gas are both wholly owned indirect subsidiaries of WEC Energy Group. These figures only include gas utilities regulated by the Illinois Commerce Commission.

[5] Transport customers buy gas commodity from suppliers other than the local utility.

Table 3: Mains and Storage Assets of Illinois Gas Utilities

Company	Transmission	Distribution	Illinois Storage
	Miles	Miles	BCF
Ameren	1,551	17,562	24
MidAmerican	60	1,170	
Nicor	879	33,824	150
Peoples Gas	340	4,600	36.5
North Shore Gas	58	2,350	

Data is approximate. Compiled from ICC Form 21 and company websites.

Natural gas is integral to the current Illinois energy sector including commercial, industrial, and residential applications. Residential customers make up over seventy-five percent of utility-sold gas and about fifty percent of the total end use of gas. (Table 4; Figure 1). Industrial and commercial customers make up the majority of transport load, which is about half of total annual throughput. [6] (Table 4; Figure 1)

Table 4: 2023 Sales and Transport of Illinois Gas Utilities

Company	**Residential** (Therms)	**Commercial** (Therms)	**Industrial** (Therms)	**Transport** (Therms)	**Total*** (Therms)
Ameren IL	469,937,550	140,781,112	30,746,843	986,684,583	**1,630,440,829**
Liberty Utilities	9,218,258	9,041,286	1,286,683	608,185	**20,154,412**
Consumers Gas	2,665,142	1,241,461	1,465,863	-	**5,670,835**
Illinois Gas	5,181,937	1,091,476	2,907,112	165,620	**9,346,145**
MidAmerican	45,524,485	22,206,261	6,818,571	85,637,714	**194,625,811**
Mt. Carmel	1,749,654	1,045,981	-	-	**2,799,439**
Nicor Gas	1,830,952,244	458,065,836	54,003,012	2,431,311,552	**4,774,332,644**
North Shore Gas	165,726,424	37,674,553	715,353	120,688,053	**324,804,383**
Peoples Gas	612,364,436	264,615,152	2,226,618	619,683,141	**1,498,889,347**
Total	3,143,320,130	935,763,118	100,170,055	4,244,778,848	**8,461,063,845**

* Total includes Public Authorities, Sales for Resale, and Interdepartmental Source: ICC "Illinois Gas Utilities Comparison of Gas Sales Statistics," 2023

[6] In 2023, transport customers, on average, consumed 15,034 therms per customer annually. Residential customers consumed 857 therms per customer annually. Even within customer classes, transport customers tend to consume significantly more than sales customers. "Illinois Gas Utilities Comparison of Gas Sales Statistics," ICC, 2023.

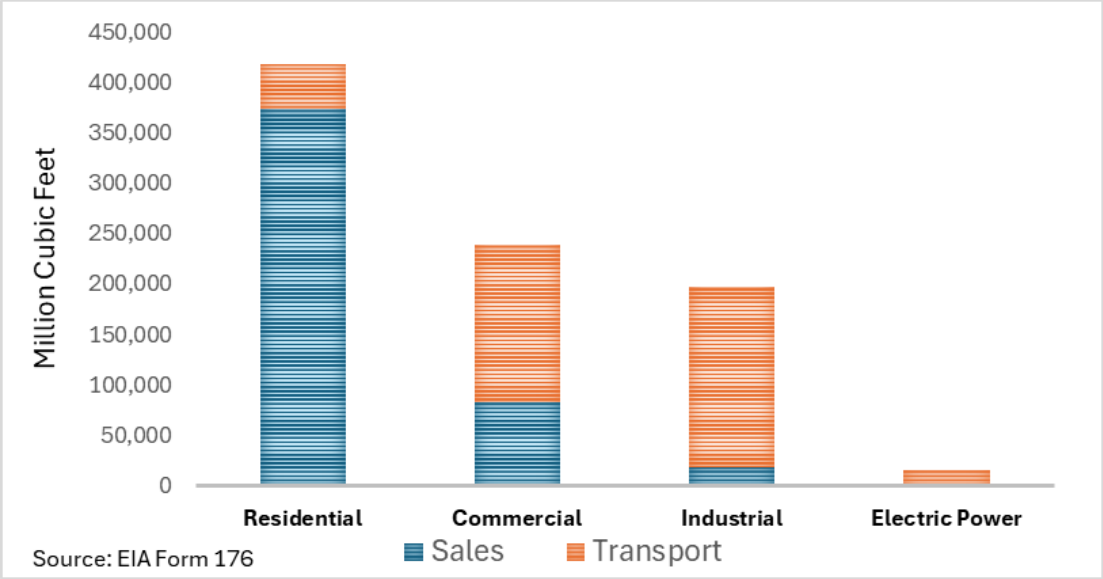


Figure 1: 2022 Sales and (Intrastate) Transport by Illinois Gas Utilities

In 2023, Illinois consumers spent over $5 billion on natural gas, either transported or supplied by Illinois gas utilities. (Comparison of Gas Sales Statistics for Calendar years 2022 and 2023, ICC, July 2024). Residential customers alone spent over $3 billion with approximately 70 percent of housing units in Illinois are connected to one of the Major Illinois Gas Utilities. Since natural gas is primarily used for space heating, natural gas utilities deliver nearly four times the heat content to residential customers compared to electric utilities. (Figure 2).

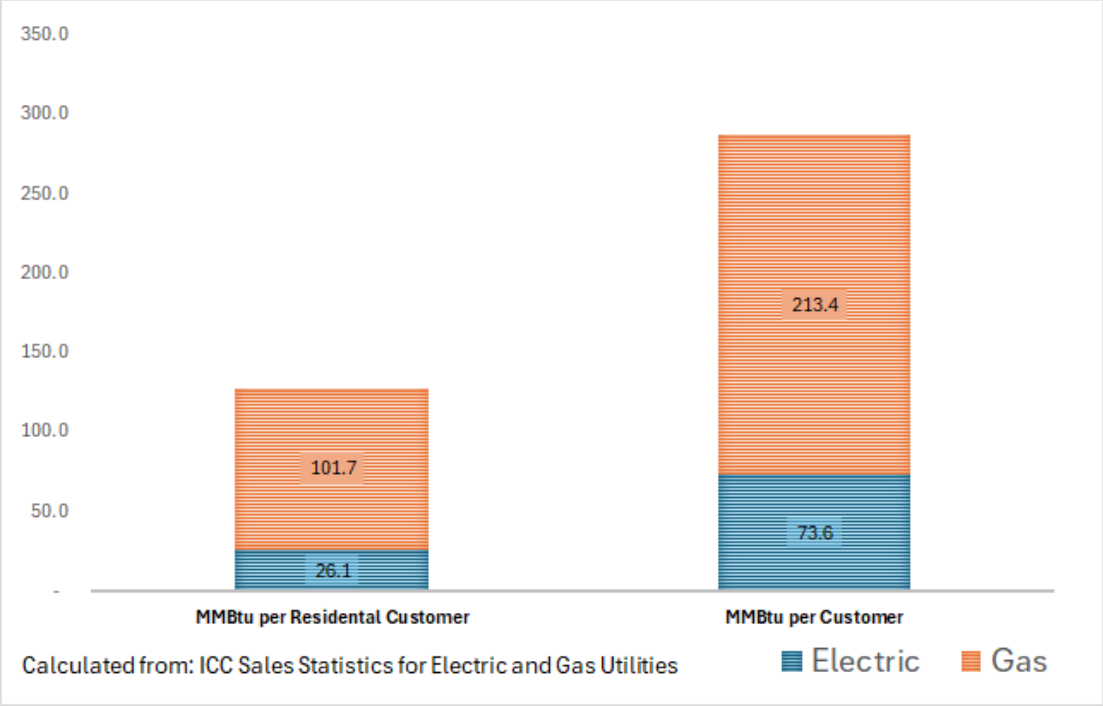


Figure 2: 2023 Heat Content of Energy Delivered by Illinois Electric and Gas Utilities

3.2. Greenhouse Gas Emissions from Illinois Gas Utilities

This report is not intended to set a baseline for greenhouse gas ("GHG") emissions, rather this section provides an estimate of the relative amounts of GHG emissions from major sources. Estimating the total GHG emissions from Illinois consumers and gas utility operations of Illinois gas utilities would require analysis of the entire supply chain including production (wells and surface equipment), processing (dehydration, absorption or compression and cooling equipment), transportation (over interstate pipelines), storage (above and below ground), local distribution and end use by customers. Since utilities and other emissions sources are required to provide data to the U.S. Environmental Protection Agency ("EPA") on emissions and utilities provide energy sales data to federal and state regulators, a snapshot of the Illinois GHG inventory has been created as shown in Figure 3.

- The top of Figure 3 presents total emissions by sector, as defined by US EPA, with the sectoral emissions from Illinois gas utilities shown as part of the total

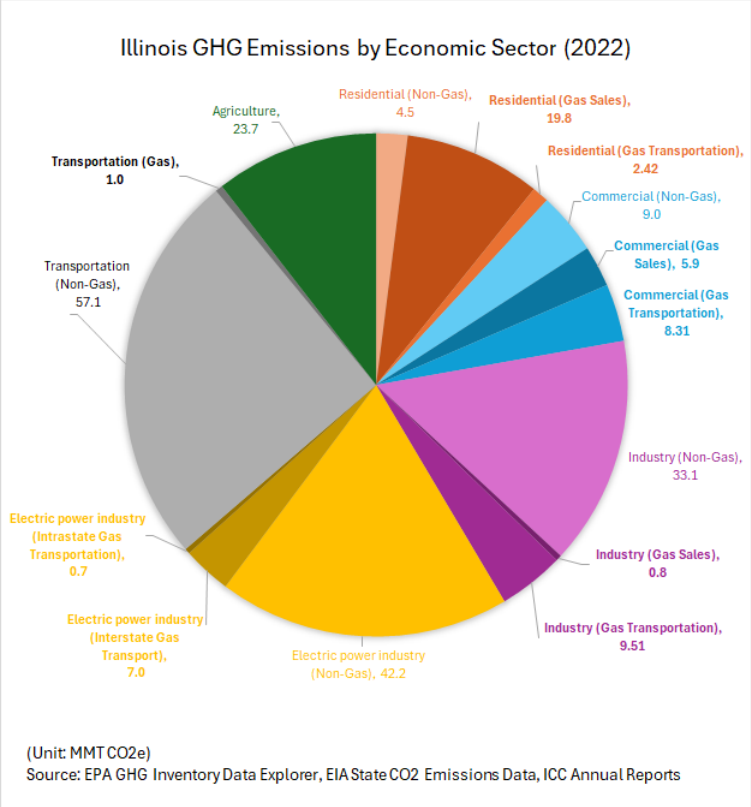
sector emissions.[7] Since the residential sector in Illinois primarily uses natural gas as a heating source, most emissions, roughly 87 percent, in that sector are from the sales of natural gas. For context, while Illinois residential customers produce most of the emissions from natural gas, these emissions represent about 10 percent of total Illinois emissions. In the commercial sector, gas makes up less than 60 percent of the total commercial sector's emissions and in the industrial sector less than 35 percent. In other sectors, including electric power generation, natural gas makes up a much smaller part of the total emissions.

- The bottom of Figure 3 shows the total emissions from the gas utility sector as a percentage of the total Illinois GHG inventory. The natural gas sector produces a little less than a quarter of total Illinois. While indirect emissions by Illinois gas utilities, emissions from customer use of gas, have largely followed usage patterns, customers have, adopted gas-reducing behaviors either through conservation efforts or energy efficiency measures.[8] For example, the compound annual growth rate ("CAGR") of customer count for the Major Illinois Gas Utilities from 2013-2023 is slightly positive (0.31%), while usage fell by about 0.79% annually.[9] Direct emissions from the Major Illinois Gas Utilities, emissions from the operation of the gas utility system, overall, a small fraction of the Illinois emissions inventory, have fallen slightly over the past decade. (EIA GHG Reporting Program). The reduction over time is, in part, due to investments made by Major Illinois Gas Utilities in leak remediation, integrity management programs, and removing old or vulnerable components (see e.g., Hermann, 2024).

[7] This graph shows the emissions associated with gas owned and sold by the gas utilities ("Gas Sales") and gas bought by customers using the gas utility delivery system ("Gas Transportation").

[8] . Navigant Consulting (2020) presents results from Nicor Gas's energy efficiency programs documenting the types of efficiency measures adopted and usage reductions from those measures.

[9] Annual gas usage in Illinois is typically noisy due to weather-dependent heating load. The figure cited above is a CAGR based on comparing 2023 with 2013. Nevertheless, total Illinois gas customer counts have increased every year since 2013 while total load has either remained flat, as measured by the slope of the time series, or fallen as measured by the CAGR. Source: Annual ICC Reports



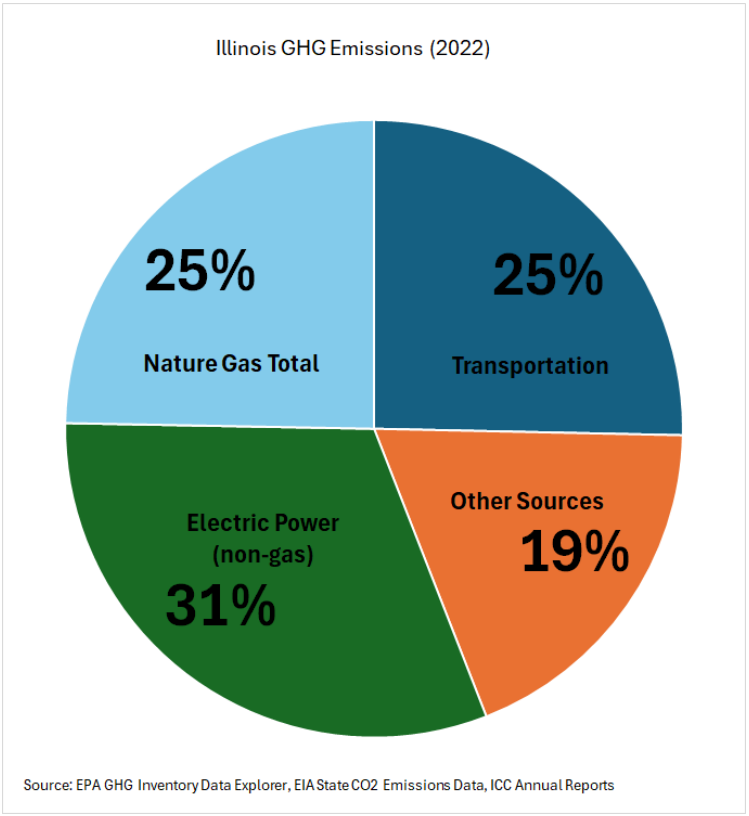


Figure 3: Total CO_2e Emissions by Sector in Illinois (2022)

3.3. Capital Spending by Illinois Gas Utilities

Utilities are capital intensive firms that require constant funding to maintain and improve facilities. Major types of spending include main replacement, storage facility upgrades (if applicable), new mains and services to serve new business, public infrastructure improvements related to moving utility facilities due to governmental requirements, as well as general spending such as investments in buildings, IT, and vehicle fleets. Figure 4 shows the total annual capital spending placed in service by four of the Major Illinois Gas Utilities from 2014 to 2023.[10] The average spending per year is roughly $1.35 billion with recent years showing higher spending.

Capital spending provides the basic benefits to the gas systems of reliability, safety, and energy security. Business and commercial customers take energy provision into locational decisions, along with other factors such as a quality workforce. Strong electric and gas networks attract new customers and provide incentives for existing customers to remain in Illinois. In addition, a portion of gas utility investment has an impact on the economy through the hiring of employees in trades such as construction, purchasing materials, and hiring local contractors. While this report does not estimate the effects of this spending through formal modeling, it is expected that the spending levels found in Figure 4 has contributed, and will continue to contribute, significantly to Illinois' economic growth.

[10] In-service spending and actual capital expenditure may differ due to long lead times for some projects. Data is for Ameren IL, Nicor Gas, Peoples Gas, and North Shore Gas.

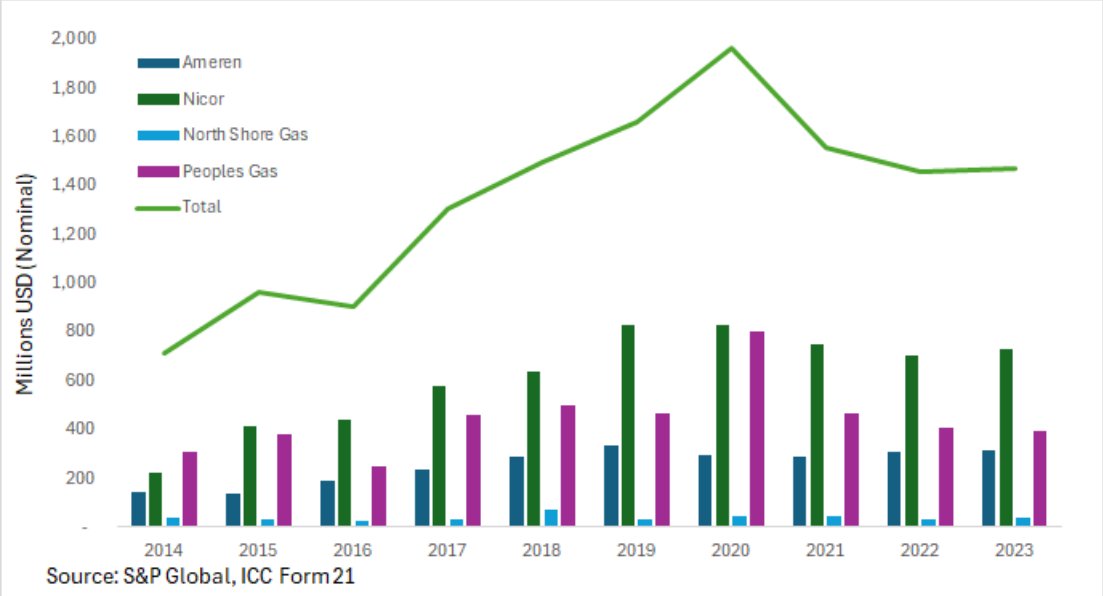


Figure 4: Capital Spending by Major Illinois Gas Utilities (2014-2023)

4. National Policy Discussions Concerning the Future of Natural Gas

Natural gas policy has evolved significantly from the 1970s energy crisis.[11] During the 1970s and 1980s the concern moved from the fear that natural gas would soon physically disappear to the concern that, while reserves may prove plentiful, the cost of extracting gas would soon make gas uncompetitive and unsuitable as a prime mover. By 1996, because of significant reforms of the regulation of natural gas production and transmission, natural gas began to take market share from coal in the production of electricity. By 2008 natural gas used for production of electricity was the single largest sector of natural gas use. (*See* McDermott and Peterson, 2024, Figure 1). The external costs of energy usage, namely carbon and other emissions, have been part of the energy policy picture since the early 1970s, and some policies, such as the sulfur dioxide cap and trade program, successfully addressed externalities (i.e., the Acid Rain issue), yet broad-based efforts at the national level to address the issue of emissions'

[11] Much of this discussion relies on McDermott and Peterson (2024).

potential to exacerbate the greenhouse effect were less well developed.[12] Some analysts recognized that the movement toward natural gas and away from coal represented a kind of *bridge* approach that would reduce GHG emissions naturally. Indeed, this occurred as total emissions from major energy sources, after peaking around 2006, have now fallen back to levels not seen since the early 1990s. (Id., Figure 2). Of course, natural gas was a ready-made substitute for coal and, given its attributes when burned, produced lower levels of carbon per unit of output. Between 2005 and 2019, there was a 32 percent decrease in carbon dioxide emissions from electricity generation, with over 65 percent of this reduction attributed to switching from coal to natural gas, compared to 30 percent from the adoption of renewables (EPA, 2021).

By the late 2010s, however, while many of the legacy coal-fired electric generation units had shut down, emissions, despite significant improvement, were still at levels that many considered a long-term concern. While *decarbonization* efforts in the electric industry at the state level have a long history encompassing a range of policies, including energy efficiency, pricing innovations, and renewable energy programs, in the natural gas industry such programs and policies have had less time to germinate. This has led to several states and other jurisdictions rethinking policies toward the natural gas industry, and particularly the role of natural gas at the retail level.

Several states and the District of Columbia have implemented mandated emissions goals which, if these goals are to be met, require emissions reductions in all sectors including retail natural gas. Some states, much like Illinois, have instituted formal (or formal-like) proceedings to address the *Future of Gas*. The genesis of these proceedings is varied. Several started due to formal legislation instituting climate goals for the state, others as a direct response to discussions of broader policy issues in rate cases. In these proceedings, often a set of *pathways* (or strategies) toward ultimate compliance with either mandated climate goals or aspirational goals are the focus of

[12] *See e.g.,* Chan Et al. (2012) summarizing the May 2011 Harvard Environmental Economics Program workshop and policy roundtable reflecting on the success of the Acid Rain program and the reasons for the failure of the of the Federal carbon cap and trade program.

the analysis.[13] For example, the Massachusetts D.P.U directed that its Future of Gas proceeding:

> …solicit utility and stakeholder input and develop a regulatory and policy roadmap to guide the evolution of the gas distribution industry, while providing ratepayer protection and helping the Commonwealth achieve its goal of net-zero GHG emissions energy. The Department anticipates that the roadmaps will identify strategies to help accomplish this task. For all identified pathways, the Department will endeavor to determine whether and how the LDCs can implement each pathway in a cost-effective way with a continued focus on safe and reliable service to their ratepayers. (MA D.P.U. 20-80, p. 4).

This directive sums up the challenges states face in moving toward a clean energy future: How will states achieve a net-zero or clean energy future while maintaining the traditional goals of the provision of public services, namely safe, reliable, and affordable service?

Massachusetts is not the only state to recognize these substantial challenges. In 2020, the California Energy Commission's Energy Research and Development Division published a final report on the transition to a clean energy future. (Aas, Et al., 2020). In the abstract to the report, the author's note:

> This study evaluates scenarios that achieve an 80% reduction in California's greenhouse gas emissions by 2050 from 1990 levels, focusing on the implications of achieving these climate goals for gas customers and the gas system. Achieving these goals is not guaranteed and will require large-scale transformations of the state's energy economy in any scenario. (Id. p. 3)

The *large-scale transformation* referred to in the above quote is the wide-scale electrification of buildings. Since heating (water or space) with electricity has traditionally been uneconomic due to technological limitations, natural gas filled the void left by electricity. In most jurisdictions in the US this implies that the existing stock of buildings, both commercial and residential, are inextricably linked to the natural gas infrastructure, and its cost structure, for heating applications. Even in the

[13] Some municipalities began implementing policy before the states could address the issue by instituting bans on new gas hookups. As result, roughly half of the states passed legislation prohibiting local entities from restricting access to public utility services regulated by the state.

most aggressive scenarios, the electrification transformation will take decades. Yet, regulators and voters will demand that the remaining gas utility assets continue to operate in a safe and reliable manner and, for those customers who do not wish to electrify or cannot economically justify electrifying, delivered natural gas prices must remain reasonable. This is a tall order that will require some decrease in gas infrastructure investment, an increase in electric infrastructure investment, as well as new policies that compensate losers from the benefits the winners receive. To address these challenges, states are implementing a range of policy changes, along with adjustments in the relationship between customers and utilities, as well as between different utilities.

These are but two of the jurisdictions currently addressing these issues or in implementation phases. (*See* Appendix B for a survey of U.S. state policy in this area. McDermott and Peterson (2024) provide a survey of line extension policies in the US.) Below is an, admittedly truncated, list of key issues under discussion within Future of Gas proceedings, ancillary proceedings, or follow-up proceedings:

- **Line Extension Policies**: How will new customers to the gas system be treated when requesting gas services?
- **Gas Long-Term Planning**: How does the changing policy landscape affect the regulatory review of natural gas assets deployed going forward?
- **Electrification, Renewable Gas, District Energy and Other pilots:** What technological solutions will ease the transition and provide similar or better services to customers?
- **Energy Justice and Affordability:** How does the transition away from the current level of reliance on natural gas affect the ability of consumers remaining on the natural gas system to afford service?

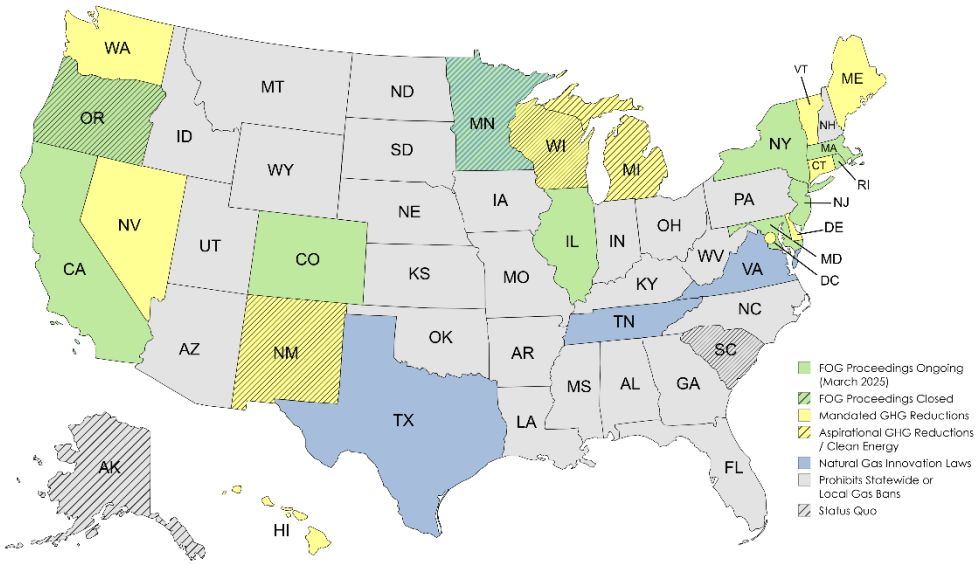
The above issues are only identified at the highest level, more detailed questions arise such as what technologies are deployable and when, what legislative or regulatory changes are necessary, what programs are needed to assure energy justice, reliability, and affordability conditions are met, how is "cost-effective" evaluated in this context as well as many other subsidiary questions. In Illinois, the Facilitator's Final Phase 1

Report, identified several "big picture" issues during the Phase 1 workshops that will appear in the Phase 2 discussions:

- Decarbonization Targets, Timelines, and Milestones
- Foundational Data and Methodologies
- Decarbonization Pathways
- Decarbonization Impacts on the Natural Gas System and Responses
- Customer Choice and Protections
- Cost and Affordability Considerations
- Equity, Environmental Justice, and Community Issues
- Electric Utility Considerations
- Economic Development and Businesses
- Workforce Considerations
- Utility Structure/Market Structure Issues
- Regulatory Changes and Strategies

There are many detailed policy and factual questions and issues that will need contemplation under each of these topic headings. To provide a snapshot of the policy environment, Figure 5 illustrates the current policy approaches in the US. Most states have no specific GHG emission standard or goal, and though some states have mandated goals, either explicit GHG emissions targets or clean energy targets—others have aspirational climate goals. One final note concerning the policy approaches, most jurisdictions in the US currently remain under, what might be broadly characterized as the *status quo*. That is, there are no explicit proceedings to address these issues, though even some states in this category have implemented specific targeted technology legislation consistent with broader clean energy goals. Yet, in many of these jurisdictions, state legislatures have preempted local authorities, such as cities or counties, from preventing customers from requesting and utilities providing new gas

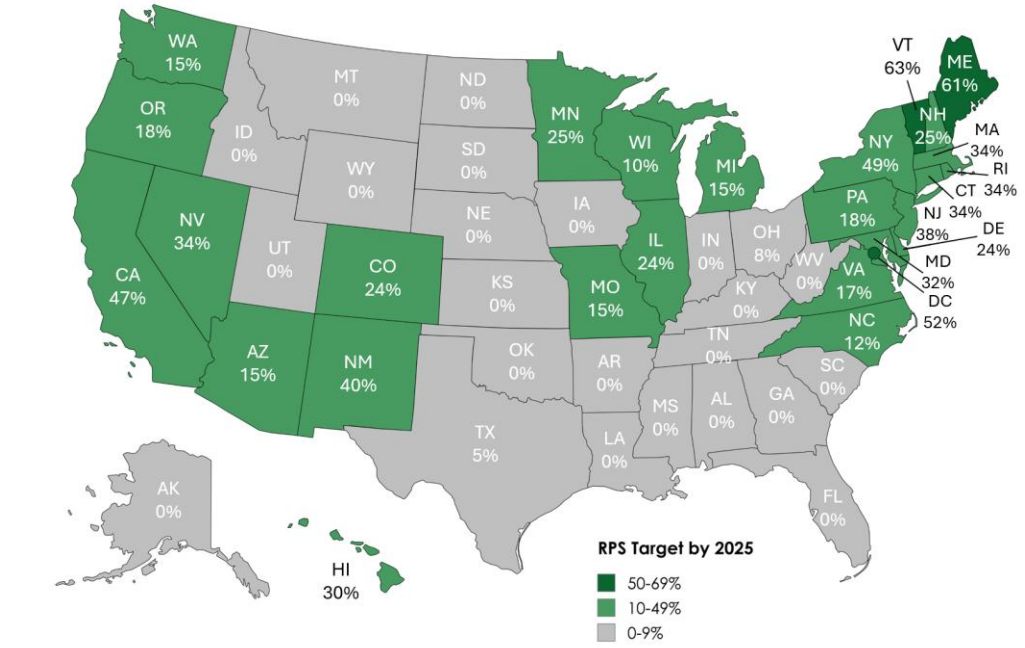
hookups.[14] Appendix B provides more details on state level approaches. Finally, it is worth noting that many jurisdictions have addressed the question of emissions from the electricity sector through renewable energy portfolio standards that require either a clean energy requirement or a percentage of renewable energy in the generation portfolio (or a combination of the two). Figure 6 shows the current (2026) renewable portfolio standards as a percentage of total energy and Figure 7 provides 2050 goals. These goals operate like GHG reduction targets, at least for the electricity sector.



Source: Appendix B

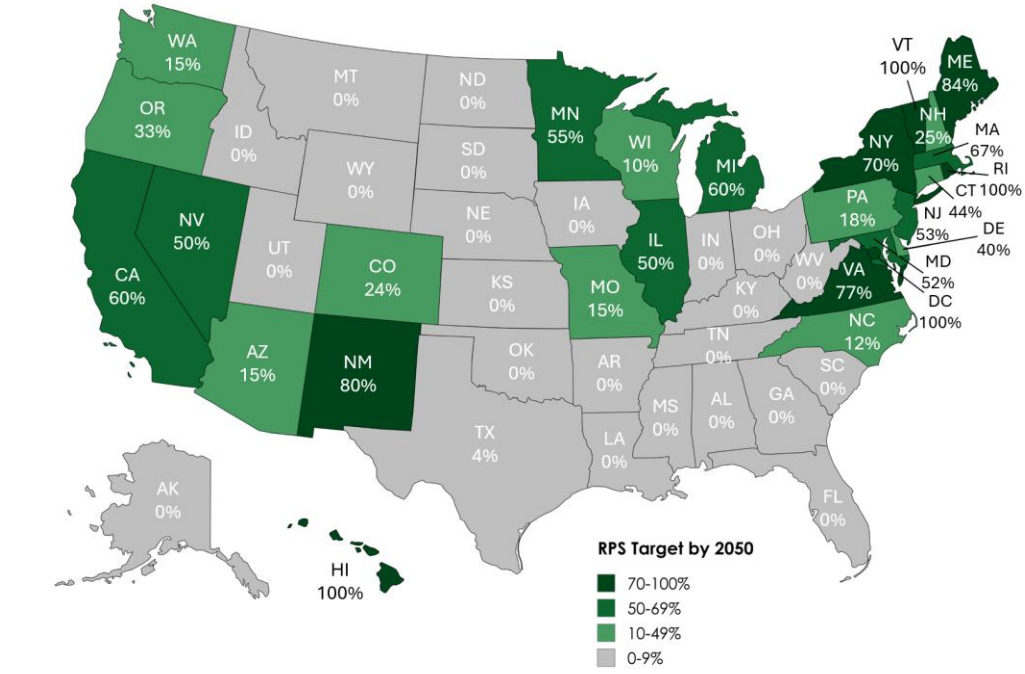
Figure 5: Natural Gas Policy by Jurisdiction

[14] This was likely in response to the burgeoning "gas ban" movement that came to prominence when Berkeley, California prohibited new gas connections in 2019 (beginning in 2020). Early in 2024, the US Court of Appeals for the Ninth Circuit decided that federal law preempted local ordinances from (effectively) banning use of natural gas appliances and Berkeley agreed to repeal the ordinance. *See California Restaurant Association v. City of Berkeley*, No. 21-16278, D.C. No. 4:19-cv-07668-YGR, April 17, 2023. What this decision means for the over 140 other actions taken by local entities remains an open issue. (https://buildingdecarb.org/zeb-ordinances) While these bans are primarily due to the concern over the implications of the emissions of heat-trapping gases, this is not the first time that natural gas has been banned for certain uses. In 1978, the *Federal Power Plant and Industrial Fuel Use Act* banned the use of natural gas for new electric generation in response to the concern that gas supplies were dwindling and heating customers, largely in the residential sector, might face shortages of heating fuel.



Source: U.S. State Renewables Portfolio & Clean Energy Standards, Lawrence Berkeley National Laboratory (August 2024)

Figure 6: US Renewable Energy Portfolio Standards (2025)



Source: U.S. State Renewables Portfolio & Clean Energy Standards, Lawrence Berkeley National Laboratory (August 2024)

Figure 7: US Renewable Energy Portfolio Standards (2050)

5. Developing A Policy Framework for Understanding Possible Futures of the Illinois Natural Gas Utility Sector

Policy evaluations have both qualitative and quantitative dimensions. When considering goals and the alternative pathways for achieving those goals, the analyst creates side-by-side comparisons of the advantages and disadvantages of the alternative pathways. The framework for the quantitative comparison is through cost-benefit analysis ("CBA").

The formal origins of CBA date to the mid Nineteen Century and the work of Jules Dupuit, among others, but the conceptual origins appear in the writings of Benjamin Franklin. A recent edition of a much-used textbook on CBA notes:

> Benjamin Franklin's advice about how to make decisions illustrates many of the important features of cost–benefit analysis. These include a systematic cataloguing of impacts as benefits (pros) and costs (cons), valuing the impacts in dollars (assigning weights), and then determining the net benefit of the proposal relative to the current policy (net benefit equal incremental benefits minus incremental costs). When we as individuals talk of costs and benefits, we naturally tend to consider our own costs and benefits, generally choosing among CBA is a policy assessment method that quantifies in monetary terms the value of all consequences of a policy to all members of society. Boardman *et al.* (2019, pp. 1-2).

The obvious benefits of using a CBA to evaluate policy choices lie in the potential for removing prejudgment and intuition from decision making and removing the oft-cited concerns that administrative agencies do the bidding of the well-connected or wish to expand their own power. Determining the value of policies on a comparable basis and comparing that to the costs of undertaking those policies often provides the sunlight necessary to make better decisions. Indeed, the administrative function of government in the US has become a cost-benefit undertaking over the past forty years. (Sunstein, 2021). Of course, the major concern with CBA is that if we knew the answer we would not need to undertake the CBA. Issues such as the incidence of costs and benefits and its distributional effects, the true welfare effects of policy, and the obvious problem of forecasting the future all suggest that a careful approach to CBA is used and perhaps updated often to reflect the latest information.

A formal comparison of the costs and benefits of the choice to decarbonize, however, is not the intent of this proposed work. Below we describe a method that is better termed a *cost effectiveness analysis* ("CEA"). The CEA suggested by this document differs from a full CBA in that only the costs of the alternative pathways for achieving the policy objectives are estimated. The benefits of undertaking the policy are not considered because we assume that the decision to evaluate a policy goal of clean energy in Illinois by 2050 has already been decided. The approach described in this document provides a method to understand the costs of achieving that goal.

5.1. Cost Effectiveness Framework for Analyzing Clean Energy Policy Options in Illinois

The emphasis of this project is to develop a standard cost framework for the evaluation of alternative policy options for achieving GHG emission reductions in the Illinois Public Utility Sector. To calculate the cost of policy alternatives, this project will adopt cost information from existing studies and match those costs with the goal of meeting a clean energy target. The intent of this exercise is to provide a model that can inform the stakeholders and policymakers of the costs of achieving stated goals and the levers that can help the state achieve those goals in a more cost-effective manner.

This approach recognizes that it is the deployment constraint facing speedy renewable energy adoption, and thereby electrification, which will dominate policy choices. The method described here also enables Illinois to develop a flexible policy framework capable of incorporating future technological breakthroughs to capture new GHG savings when cost effective.

5.2. Policy Analysis Framework

The analysis of the pathway scenarios will consist of four steps as described below.

Step 1: *Elucidate why the action is required.*

Stated broadly, the goal of any policy change is to improve social welfare. Given that a policy change has already been decided at legislative and regulatory levels, the relevant analysis focuses on cost-effective paths to accomplish the objectives.

Step 2: *Specify the set of alternatives for accomplishing the objectives.*

The next section of this report will present analysis of potential pathways for decarbonization. The underlying model, however, is sufficiently flexible to evaluate other pathways and to test the impacts of various underlying assumptions. The scenarios presented are:

Base Case:	Business-as-Usual ("BAU")
Scenario 1:	Achieve 100 percent clean energy by 2050 by employing full electrification (100% Clean Energy)
Scenario 2:	Maximize progress toward clean energy targets by 2050 without using RNG subject to a 500 percent rate increase cap by 2050 on the total delivered price of natural gas to Illinois consumers. (Rate Cap – No RNG)
Scenario 3:	Maximize progress toward clean energy targets by 2050 with moderate use of RNG subject to a 500 percent rate increase cap by 2050 on the total delivered price of natural gas to Illinois consumers. (Rate Cap – Moderate RNG)
Scenario 4:	Achieves emissions reductions approximately equivalent to Scenarios 2 and 3 based on a decarbonization portfolio proposed by major gas utilities in New York. (New York Model)

Step 3: *Identify the affected parties or stakeholders.*

Decarbonization in Illinois will impact most citizens in the state. Customers who choose to decarbonize their homes or businesses will incur upfront costs for new equipment. Both natural gas and electric customers are impacted by changing rates.

Step 4: *Identify and monetize the impacts of alternative pathways on each affected party.*

This study quantifies the cost of the total investments in decarbonization measures, as well as the associated effect on natural gas and electric retail rates. While not explicit in this analysis, the implications for economic development and local

business conditions are also important and will need addressed if deep decarbonization of natural gas is pursued in Illinois.

6. Modeling the Cost of Potential Future Pathways

A fundamental question that Illinois must address in pursuit of its clean energy goals is the cost of alternative pathways to achieve the goals. Decarbonization of the existing natural gas system could have significant impacts on customer rates. The cost of energy efficiency measures, electrification of heating load, and the premium cost of renewable natural gas are all considerations in the context of the Illinois Future of Gas Proceeding. Moreover, while some strategic pipeline retirements could occur, most of the natural gas infrastructure will need sustained investment even when serving significantly reduced loads, which could cause increased rates for the remaining gas customers. For example, a recent meta study of prominent net-zero studies found that achieving net zero by 2050 raised costs significantly relative to the baseline or reference case. (Nasta and Wissmiller, 2023, p. 26). In modeling clean energy scenarios for its service territory in New York, National Grid found that by 2050 overall residential bills increase between 300 to 3000 percent compared to the reference case, depending on the approach modeled. (National Grid, 2024, p. 122). While these scenarios are not actual proposals, this type of modeling is useful in examining boundary conditions and illustrating trade-offs involved in implementing clean energy pathways.

Illinois Future of Gas scenarios could also affect the electric system costs and rates. Recently, PJM reported a nearly 10-fold increase in capacity prices due to a combination of load growth, generation retirements or deactivations, and other factors (PJM, 2024). If significant parts of Illinois heating load are electrified, additional generation resources and reinforcement of the electric transmission and distribution grid are necessary. Increased electric sales will help offset the cost of additional infrastructure, but the net result will likely increase electric rates under plausible conditions.

To help Illinois stakeholders understand the magnitude of these costs under various alternatives, the project team developed the Illinois Future of Gas model

("IFGM") that calculates the total cost of decarbonization pathways and estimates the associated effect on natural gas and electric rates.[15] This document presents the resulting cost and emissions reductions from a few potential decarbonization pathways as estimated by the IFGM.

The analysis begins with a BAU scenario where natural gas is used much as it is today. The first decarbonization pathway scenario is 100 percent Clean Energy by 2050. This scenario models the elimination of natural gas use by retail customers by 2050 and relies heavily on electrification to achieve that end. This requires investment in end-use electrification measures and electric infrastructure which the IFGM estimates. The second and third scenarios model a cap on average total delivered natural gas rates statewide and quantifies the emission reductions that achievable by 2050 under that constraint.[16] The last decarbonization pathway scenario is based upon a model decarbonization portfolio proposed by several gas utilities in New York – particularly, partial electrification for heating and high use of RNG.

The goal of this modeling is not to advocate for one or another pathway, rather it is to provide a tool that can help the stakeholders in Illinois better understand the costs associated with different pathways to achieve a clean energy future.

6.1. Business-As-Usual Scenario

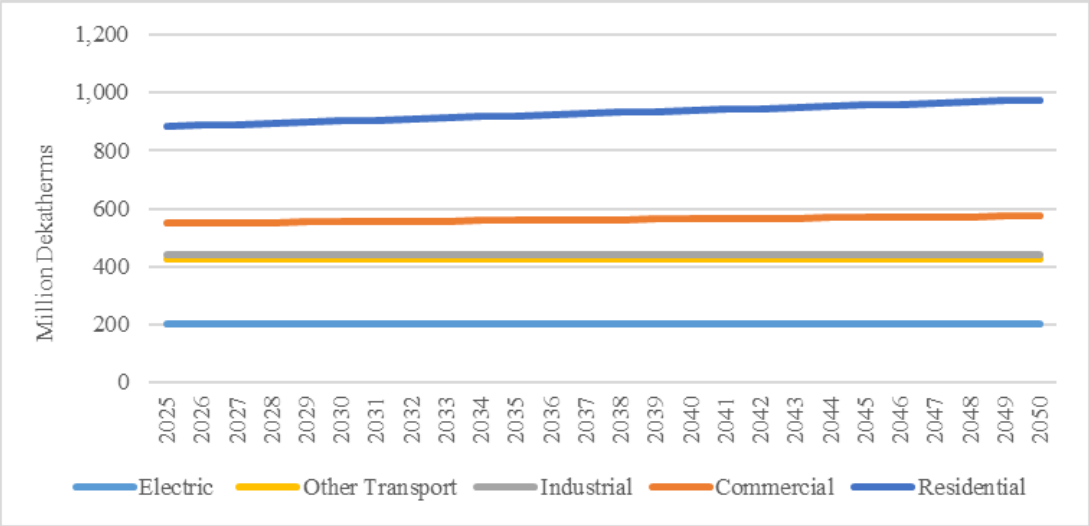
Modeling potential decarbonization pathways begins with the establishment of a BAU scenario that serves as the baseline for comparison. This scenario does not necessarily reflect the strategic plans of gas utilities in Illinois, rather, the forecast reflects continuation of capital investments, operations and maintenance ("O&M") expenses, and sales trends from recent years.

BAU natural gas sales volumes are derived from publicly available data from the Illinois Commerce Commission and other public sources. Future growth in gas sales was estimated at 0.4 percent annually. (Figure 8). The number of customers is based

[15] The IFGM is a Microsoft Excel model and is provided with this report. All data and sources are cited in the IFGM. Results from different scenarios evaluated in this report were generated using the IFGM.

[16] Total delivered natural gas rates refers to the cost of the utility service plus the cost of the gas commodity.

on the 2023 total customer count for each of the four largest utilities, or approximately four million customers. The growth rate is estimated at 30,000 residential and 2,500 commercial customers per year. Based on past usage, the average use per residential customer is 91 dekatherms ("Dth") per year, the average for commercial customers equals 400 Dth/year, and for industrial customers 1,826 Dth/year. Using these data, 2025 estimated total sales is 456 million Dth with another 426 million Dth of transport. Transport gas was further subdivided into electric generation and all other transport sales.

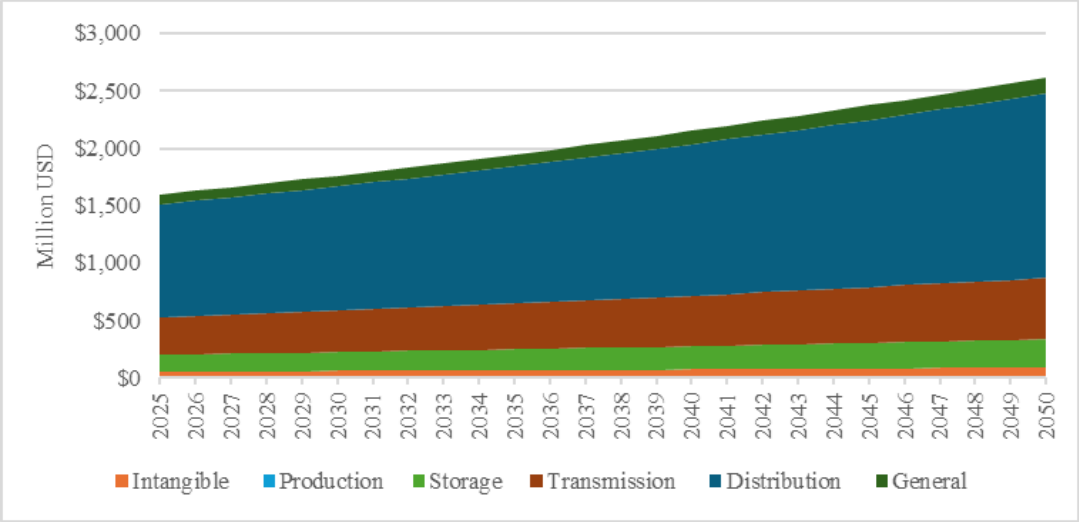


Source: Illinois Future of Gas model provided with this report

Figure 8: Business-As-Usual Gas Usage Forecast

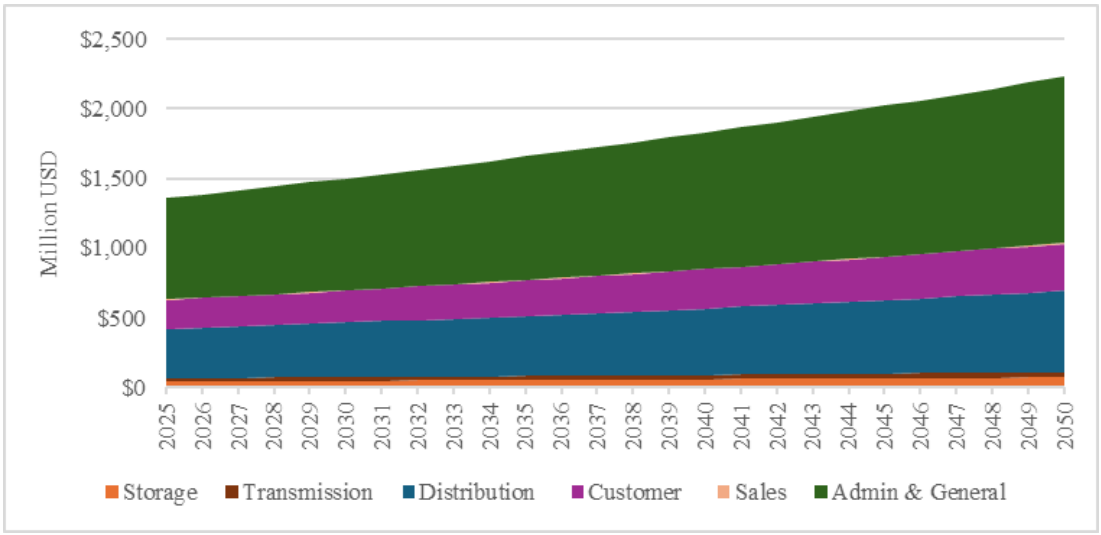
Statewide capital spending and plant-in-service additions are estimated using aggregate 2023 year-end cost data, and split by intangible, storage, transmission, distribution, and general plant investment. The 2025 estimated plant-in-service for Illinois gas utilities is $22 billion. In total, $1.6 billion in annual capital investments in the natural gas system is projected for 2025. Projected annual capital spending was estimated based on historical year-over-year changes in plant-in-service and escalated by the assumed inflation rate of two percent. (Figure 9). Operation and maintenance expenses are estimated using an approach like that used to estimate capital expenditures. This results in $1.36 billion O&M costs statewide starting in 2025 and projected to 2050. (Figure 10). The natural gas commodity price was set at $3.50/Dth with an

annual increase equal to the expected overall inflation rate over the study period. (Figure 12).



Source: Illinois Future of Gas model provided with this report

Figure 9: Business-As-Usual Annual Capital Spend



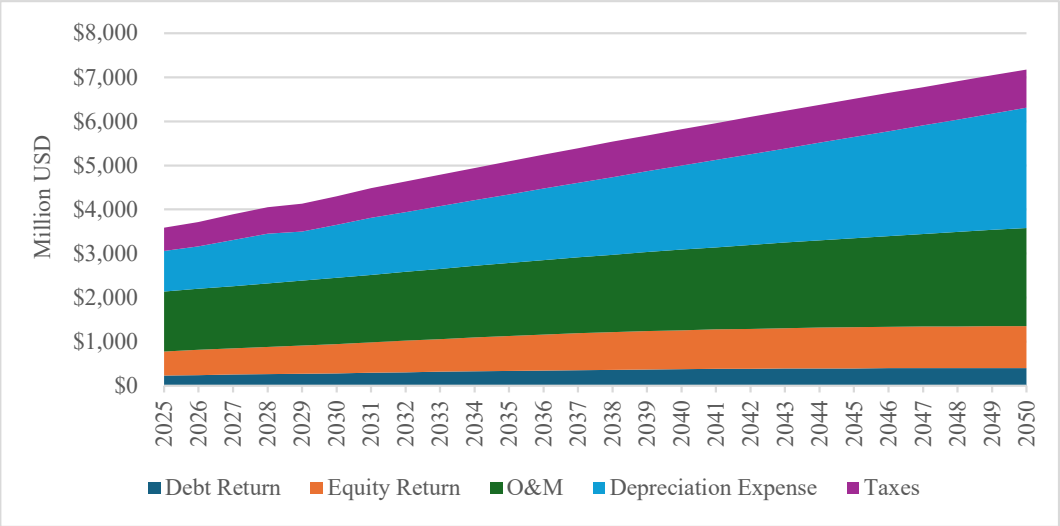
Source: Illinois Future of Gas model provided with this report

Figure 10: Business-As-Usual Annual O&M Spend

Using these inputs, the 2025 average natural gas price, excluding the price of the gas commodity, is $4.07/Dth.[17] This price was estimated using the revenue

[17] The natural gas price excluding commodity costs is generally referred to as the *base rate*. This is the price paid for delivering natural gas to a customer's premise and is regulated by the ICC.

requirement approach the ICC uses to set gas utility rates.[18] Plant-in-service estimates were then reduced by accumulated depreciation and accumulated deferred income taxes ("ADIT") to establish an initial rate base.[19] The rate base is multiplied by the overall cost of capital, including the cost of debt and equity, to obtain the total annual cost of capital to provide service. To obtain the annual statewide revenue requirement for any year, the total annual cost of capital for that year is added to that year's estimated level of O&M, depreciation, and tax expense. (Figure 11). The average base rate is calculated by dividing the resulting revenue requirement by sales volume for each year. (Figure 12). The average growth rate for base rates in the BAU scenario is 2.4 percent.

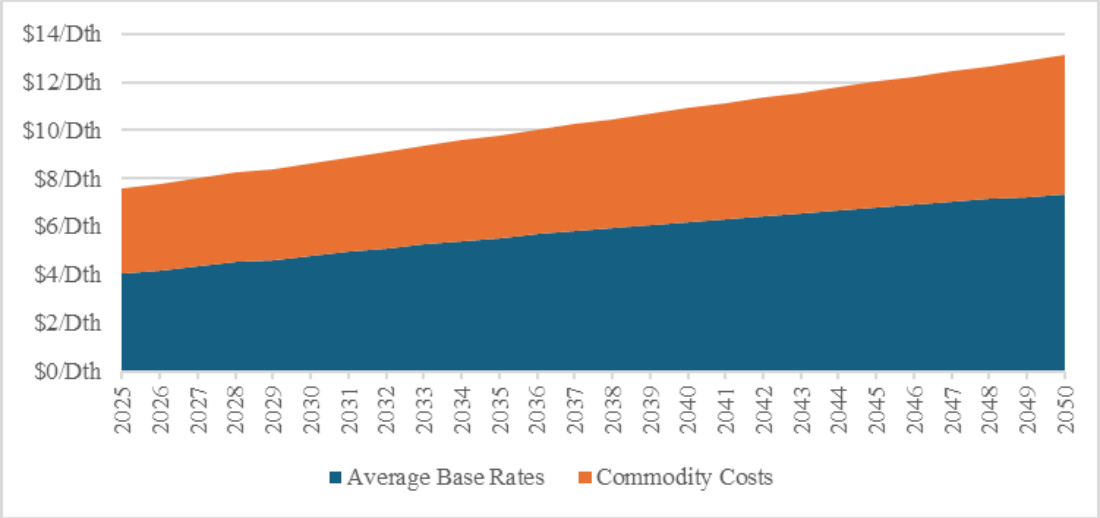


Source: Illinois Future of Gas model provided with this report

Figure 11: Business-As-Usual Gas Utility Revenue Requirements

[18] The revenue requirement is the total annual revenue necessary to fairly compensate a utility for providing service to customers.

[19] Rate base is a measure of the capital deployed by a utility to provide service to customers. ADIT compensates utility customers for tax expense allowed in rates that utilities have not yet paid to tax authorities.



Source: Illinois Future of Gas model provided with this report

Figure 12: Business-As-Usual Average Gas Rates

6.2. Natural Gas Decarbonization Supply Curves

A fundamental tool of economic analysis is the supply curve which measures the cost of providing goods at different quantities of the good. In this case, the good supplied is *clean energy*, or the decarbonization of the natural gas system.[20] As with any supply curve, the cost of producing low levels of a good, in terms of lost opportunity to produce other goods, is relatively small. This implies that the first increments of decarbonization of the Illinois natural gas system are achievable at relatively low cost. For example, rebates for more efficient natural gas furnaces will yield modest carbon reductions at a relatively low cost. As higher quantities of decarbonization are obtained, more advanced approaches are necessary, such as whole home electrification using heat pump technology or renewable forms of methane. The deepest emission reductions will require commercial building electrification,

[20] The opportunity cost of reducing carbon emissions is the lost benefit from using those resources to produce goods that consumers value. Those benefits are relatively low at low levels of carbon reduction but increase at higher levels of carbon reduction. For example, installing a programable thermostat to more effectively control heating systems has a lower opportunity cost per unit of clean energy compared to requiring all consumers to electrify housing.

potentially through the creation of geothermal district heating system, electrification of industrial processes, and potentially direct air capture of carbon.[21]

The first module of the IFGM is the creation of decarbonization supply curves. The project team collected data on the incremental cost and total carbon reduction potential of measures, which were then used to develop a curve reflecting the increasing opportunity cost of deeper carbon reductions. The decarbonization supply curves are designed such that increasing costs may exhibit linear or exponential growth based on predicted changes in costs over time.

The IFGM includes separate decarbonization supply curves for each general sector of gas usage. (Figure 13). For residential customers, this includes high efficiency furnaces, standard air source heat pumps ("ASHP") with natural gas furnace backup, cold climate ASHPs ("ccASHP"), and hot water heat pumps. Commercial and industrial decarbonization are modeled on a per customer basis rather than specific technology cost assumptions. The costs are based on research performed in other states and are more costly than residential decarbonization. Finally, the model also includes renewable natural gas ("RNG") as a decarbonization alternative which was deployed in certain scenarios. The details of developing these curves are found in the IFGM attached to this report.

Decarbonization supply curves were fit between a minimum per customer cost and a maximum per customer costs. The curves were then adjusted to reflect more linear or more exponential growth characteristics. Finally, the decarbonization costs were adjusted for the expected future inflation rate.

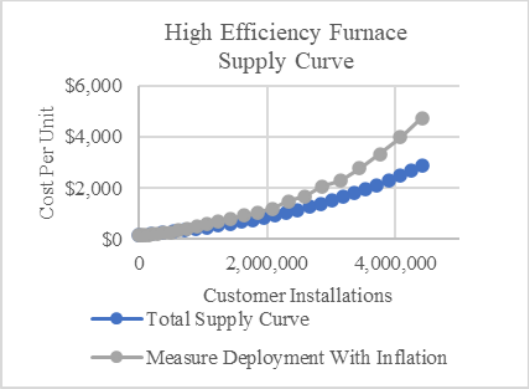
The IFGM can accommodate alternate user-defined inputs. The user can specify different cost assumptions for decarbonization technologies, the rate at which those costs increase, the cost of baseline technologies (i.e., standard heating equipment), and the utility rebates available to fund those investments. The decarbonization supply curves used to produce the results presented in this report are based on an exponential function but the user could choose other assumptions concerning the projected change

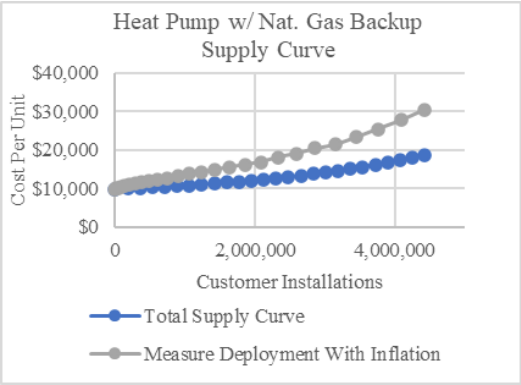
[21] Beyond the cost to decarbonize, it is crucial to consider technology readiness and other environmental and societal factors, such as land use, water use, and broader impacts.

in costs (e.g., linear or rapidly increasing costs at higher levels of penetration). One use of this functionality is modeling extremely high costs at deep penetration levels.

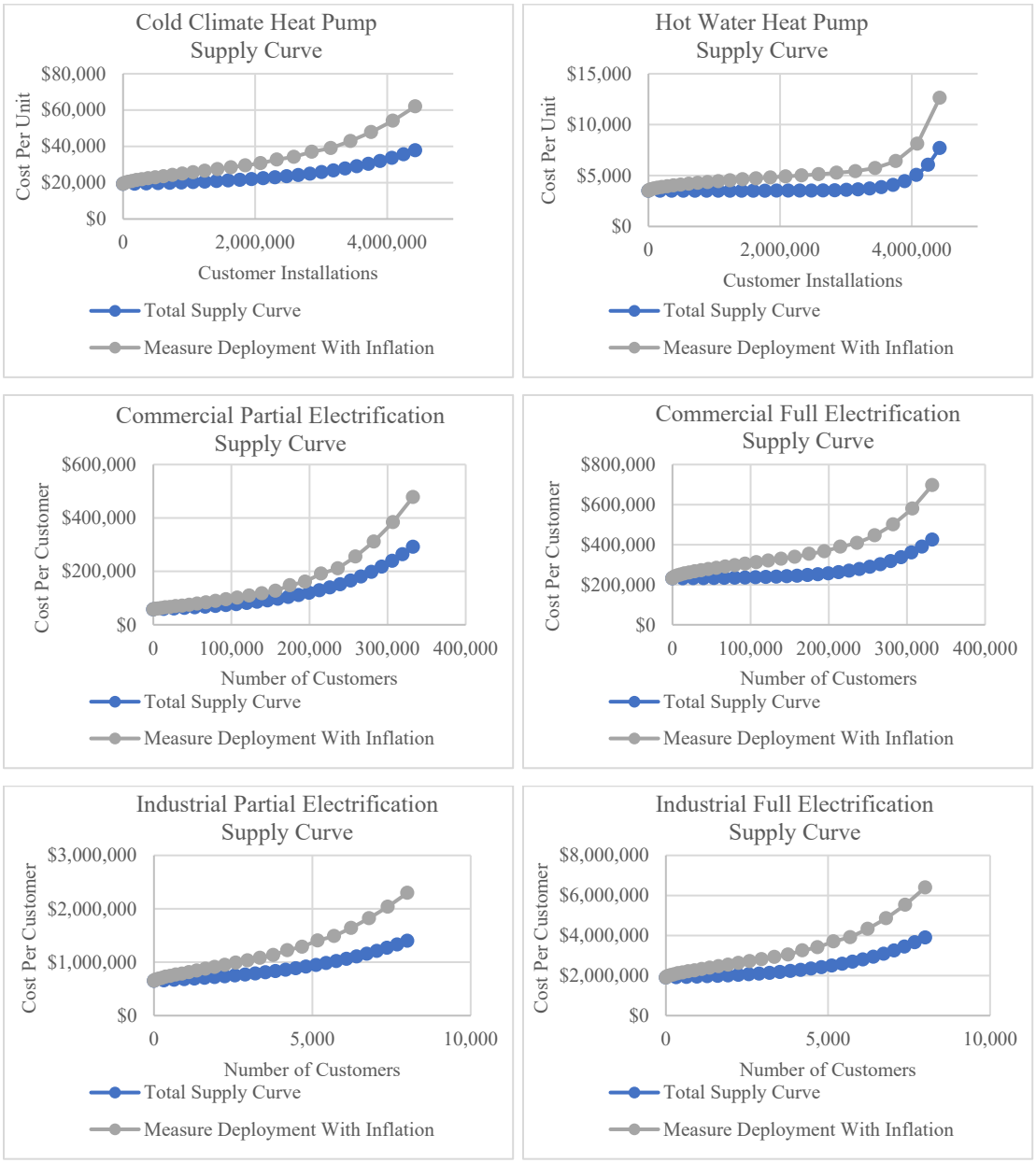
The user may also specify the penetration level by 2050 of each technology. For example, one could assume that 50 percent of residential homes adopt a standard ASHP with natural gas back up by 2050. Under this assumption, the 2.2 million of the 4.4 million residential customers deploy that technology, and the unit cost moves only halfway up the supply curve. Finally, since programs encouraging adoption of decarbonization technologies will evolve, the model assumes the incremental adoption rate grows by a fixed number of customers per year until the specified penetration level is reached in 2050.

The default assumptions for the cost of decarbonization measures in the IFGM are derived from a cost of electrification study conducted by Commonwealth Edison, which researched the costs of installing air source heat pumps in residential and multifamily homes, along with a limited number of electric appliances. (Shah, Morris, and Yaggie, 2024). The low and high costs for an ASHP are based on a single-family home with two dwelling units in the building.[22] The cost of electrification for commercial and industrial customers was based on the per Dth cost of residential electrification plus a fixed multiplier that reflects the technical difficulties associated with electrifying larger buildings. The model uses a fixed multiplier of 150 percent for commercial electrification and 200 percent for industrial customers.





[22] While the higher end costs for a 1-unit single family home reached almost $93,000, this may constitute an outlier and was excluded from the IFGM.



Source: Illinois Future of Gas model provided with this report

Figure 13: Illinois Future of Gas Model Supply Curves

6.3. Scenario 1: 100% Clean Energy by 2050

This scenario reflects Illinois' stated goal of 100 percent clean energy by 2050, exclusive of any carbon-based fuels, including RNG, as applied to the natural gas utility sector in Illinois. To model this outcome, full electrification measures in the IFGM are set to reduce emissions from the natural gas utility sector in Illinois to zero by 2050.

(Figure 14 presents the trajectory of gas sales under the 100% Clean Energy scenario versus the BAU case.) The resulting cost of total decarbonization of the natural gas sector in Illinois is exceedingly high, approximately $1.2 trillion, through 2050. (Figure 12). These costs include decarbonization investments for both direct gas sales and select transport customers (roughly $640 billion) and the costs of new electricity sector investments to accommodate the increased electric load from former gas customers (roughly $540 billion). By the end of 2049, average total gas rates—base rates plus commodity—will approach $160/Dth, over 2,000 percent higher than 2025 estimated price of $7.57/Dth. Under this scenario there are no gas sales in 2050 and, consequently, no estimated natural gas price in 2050. Roughly $2.5 billion of costs remain in the natural gas sector in 2050 under this scenario. It is currently unclear how Illinois will treat the remaining costs of the gas system in 2050. No matter how the remaining costs of the gas system are treated, i.e., who pays for those costs, such costs are properly part of the cost of a decarbonization policy.

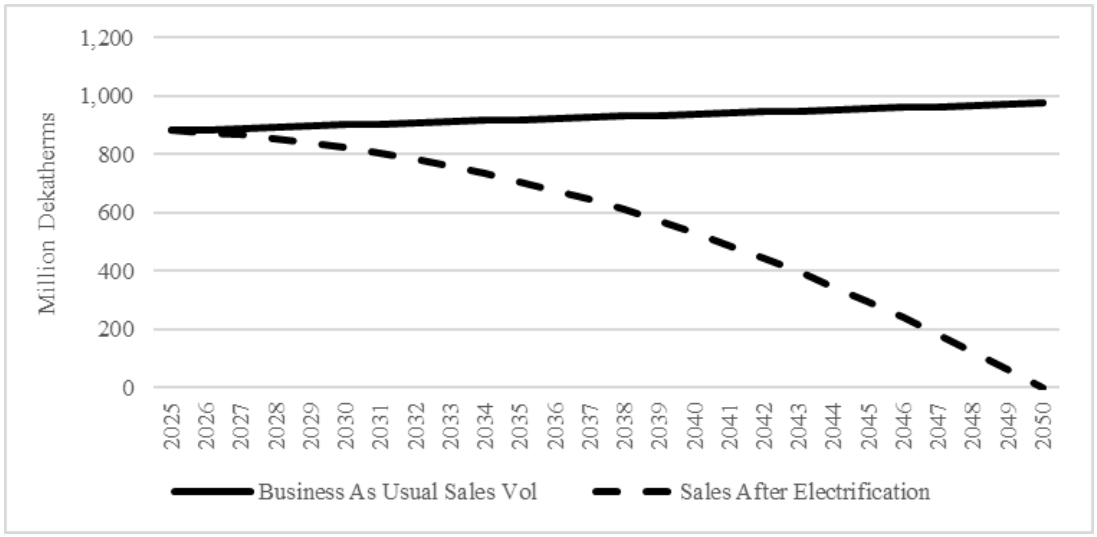
6.3.1. 100% Clean Energy Scenario Input Assumptions, Total Cost, and Decarbonization Calculations

The LFGM specifies full customer electrification and elimination of any carbon-based fuels to achieve the state goal of 100% Clean Energy by 2050. The model assumes that all residential, commercial, and industrial customers fully electrify their load by 2050 and that all transport gas is eliminated through electrification. The input assumptions for this scenario are found in Table 5. The IFGM assumes annual adoptions increase by a fixed number of customers per year until the 2050 target is met. This results in a linear increase in the number of annual additions, and a somewhat exponential growth in the number of cumulative additions. (Figure 15). The total cost of decarbonization is calculated by multiplying the annual additions by the annual per customer cost as specified by the supply curve, adjusted for inflation. By 2050, the annual costs reach nearly $100 billion per year. The cumulative cost of decarbonization investments is over $600 billion. (Figure 16). For context, the current gross investment in the Illinois natural gas system is approximately $22 billion and based on the assumed ongoing capital investment will reach $70 billion by 2050.

Carbon dioxide ("CO_2") modeling is based on the direct throughput of natural gas. While CO_2 emissions associated with transport gas are not the responsibility of natural gas utilities, the IFGM tracks those emissions to demonstrate compliance with the 2050 clean energy goal. CO_2 emissions were calculated based on 117 pounds ("lbs") per Dth and measured using U.S. tons (i.e., 2000 lbs). In 2025, the BAU scenario began with 40 million tons of carbon dioxide emissions and grew to 45 million tons by 2050. The 100% Clean Energy scenario was calibrated such that CO_2 emissions from the natural gas sector were reduced to zero by 2050. The modeled CO_2 emissions in the BAU and 100 % Clean Energy scenarios are presented in Figure 17.

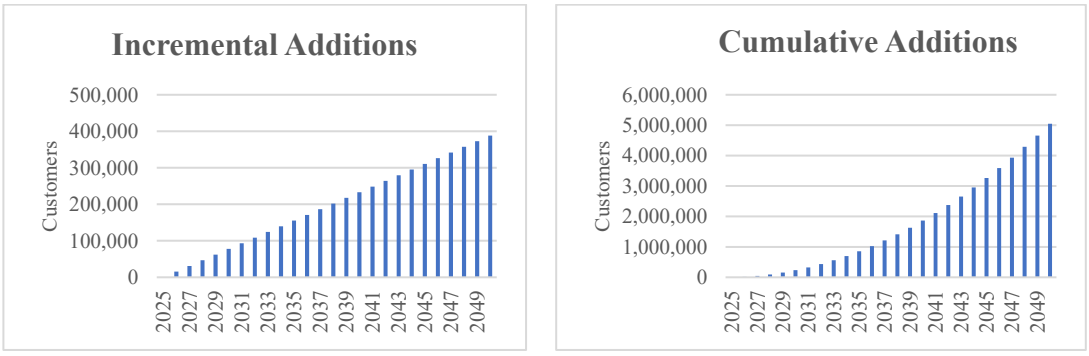
Table 5: 100% Clean Energy Scenario Input Assumptions

	Volumes	**Incremental Cost** (Gross cost less baseline measure & tax credit)
Residential ccASHP	100% adoption by 2050, 4,425,000 households 73 Dth per household per year	2026: $23,924 per household 2050: $102,192 per household
Residential Hot Water HP	100% adoption by 2050, 4,425,000 households 18 Dth per household per year	2026: $1,964 per household 2050: $11,607 per household
Commercial Full Electrification	100% adoption by 2050 332,500 commercial customers 400 Dth per customer per year	2026: $167,614 per customer 2050: $760,231 per customer
Industrial Full Electrification	100% adoption by 2050 8,000 industrial customers 1,826 Dth per customer per year	2026: $1,349,205 per customer 2050: $5,437,707 per customer
Electrification of Transport only Customers	100% adoption by 2050 283,000 transport customers 800 Dth per customer per year	2026: $377,132 per customer 2050: $1,710,520 per customer



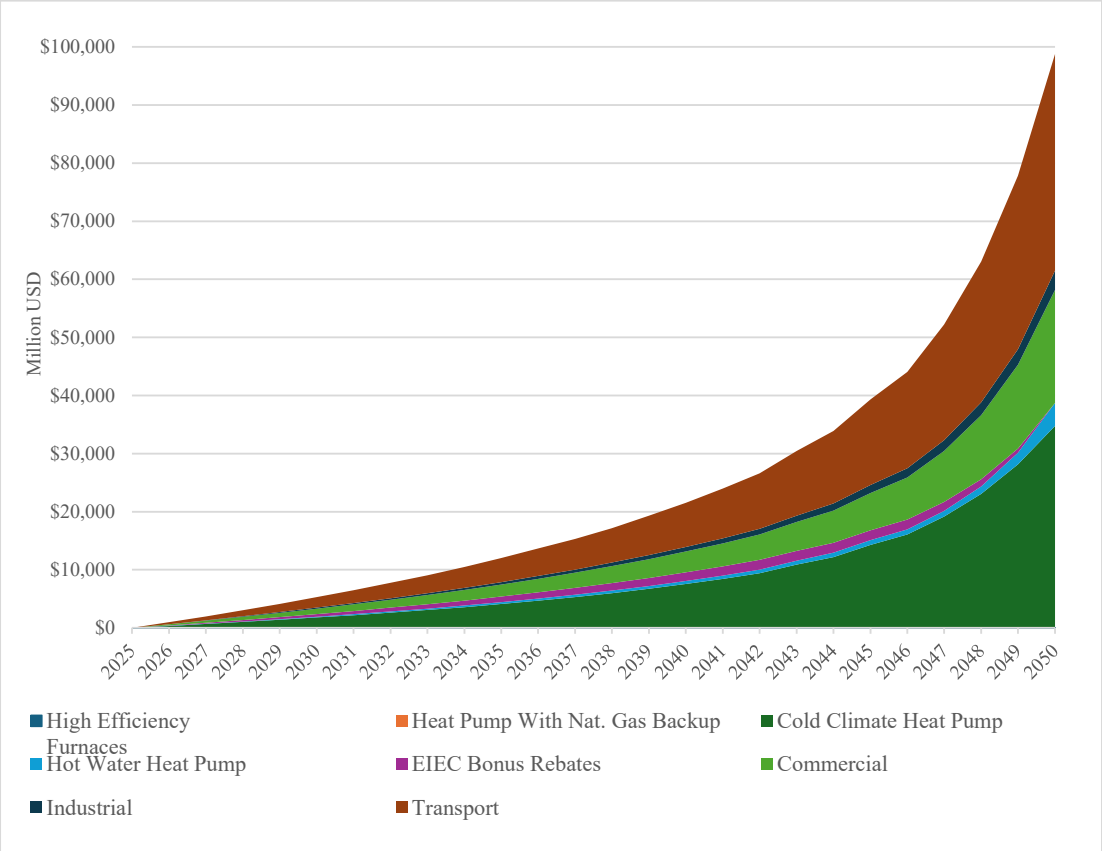
Results generated by Illinois Future of Gas model provided with this report.

Figure 14: 100% Clean Energy Scenario Total Gas Throughput



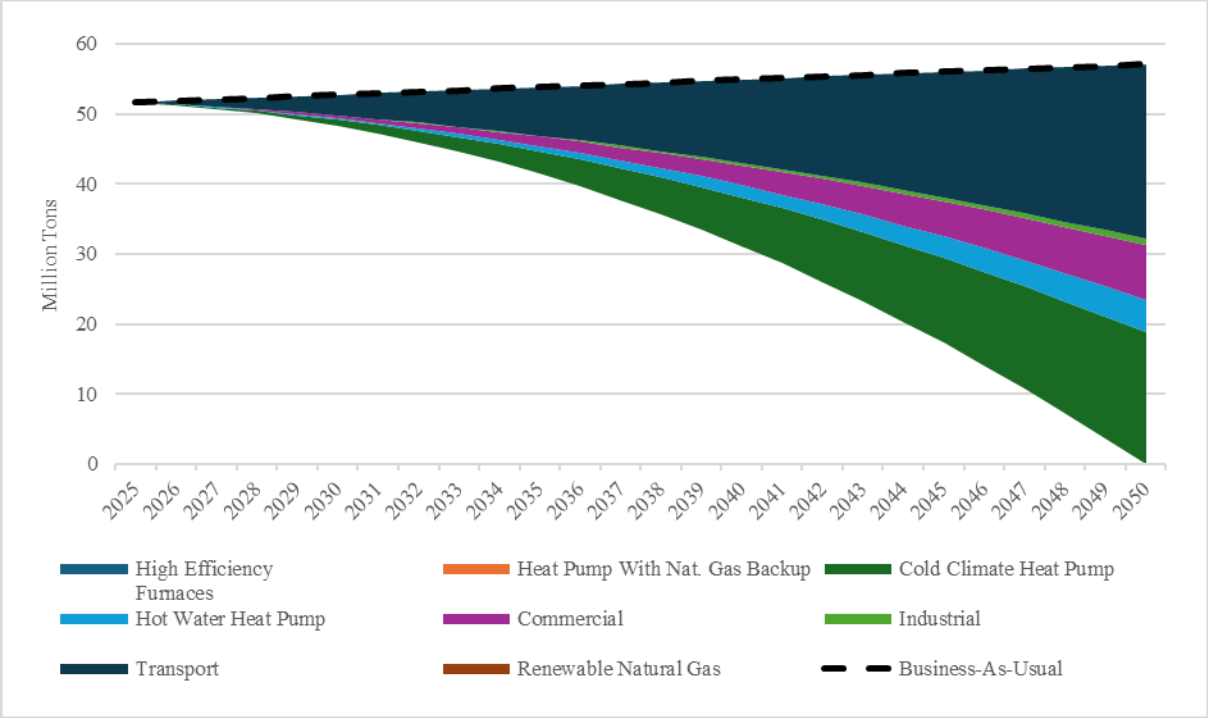
Source: Illinois Future of Gas model provided with this report

Figure 15: 100% Clean Energy Scenario Incremental and Cumulative Customer Additions



Results generated by Illinois Future of Gas model provided with this report.

Figure 16: 100% Clean Energy Scenario Annual Decarbonization Investments

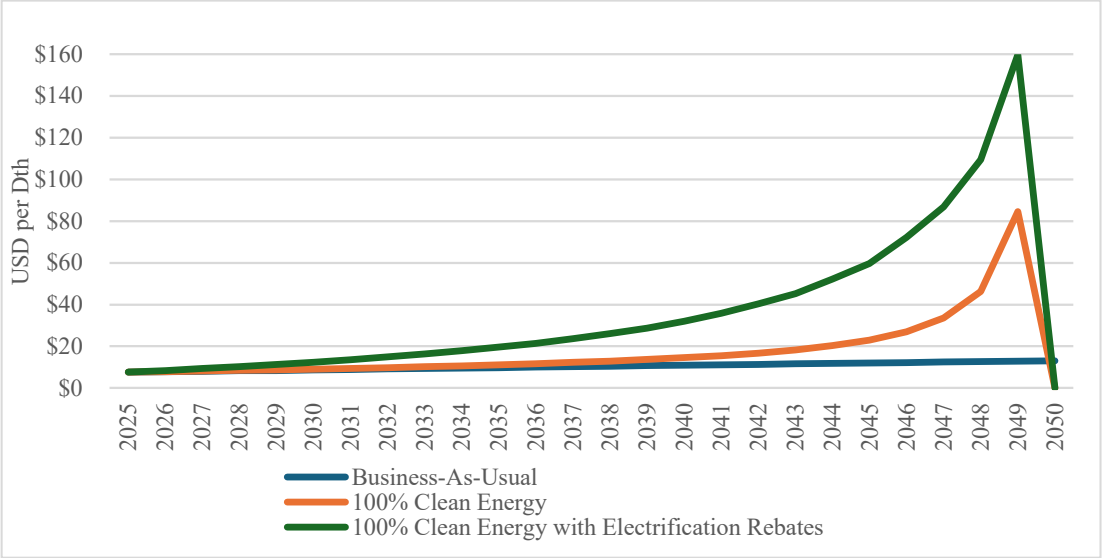


Results generated by Illinois Future of Gas model provided with this report.

Figure 17: 100% Clean Energy Scenario Annual CO_2 Reductions

6.3.2. 100% Clean Energy Scenario Natural Gas Rate Impacts

The impact of the 100% Clean Energy scenario on natural gas rates is significant. The largest driver of rate increases is falling sales volumes. As shown in Figure 18, rates increase exponentially through 2049 (the rates paid by the last few customers on the natural gas system). In 2050 there are no natural gas rates since all customers will have migrated off the system at that point.



Results generated by Illinois Future of Gas model provided with this report.

Figure 18: 100% Clean Energy Scenario Gas Rate Forecast

The IFGM forecast of average natural gas rates for the 100% Clean Energy scenario is based on decreased sales volumes, capital investments and O&M expenses, and any electrification rebates needed to induce customers to electrify. Due to migration of customers, for each two percent decrease in peak day gas volumes the model assumes a one percent decrease in capital investment and O&M (i.e., capital and O&M reductions are equal to 50 percent of peak day reductions). Projected peak day volumes are found in Figure 19 and the associated capital and O&M are presented in

Figure 20. The project team considers this a conservative assumption since, despite the substantial electrification of natural gas load, utilities must maintain and support pipeline infrastructure in accordance with Pipeline and Hazardous Materials Safety Administration ("PHMSA") integrity standards until the natural gas system is safety and completely taken out of service. The IFGM can accept different input assumptions regarding rebates paid to customers to incent installation of electrification and efficiency measures. In the 100% Clean Energy scenario, a rebate of 50 percent of the incremental cost of electrification measures is initially incorporated into gas base rates to incent electrification. The model expenses the rebates in the current year, rather

than amortizing the expenses over a longer period.[23] While it is common for utilities to provide energy-efficiency rebates, it is not plausible to support these rebates as sales volumes are reduced substantially. To capture this issue in the model, it was necessary to gradually phase out utility-funded rebates as electrification increases. After the utility-funded rebates are removed, the model assumes customers bear a greater share of electrification costs. This is a modeling choice, not a policy prescription. Some form of electrification incentive payment will likely remain after utility rebates are phased out. For modeling purposes, these transfer payments, at whatever level are necessary, are counted in the cost consumers pay to electrify. No attempt was made to explain how those transfer payments are funded or at what level. Figure 21 presents the split between utility-funded rebates and the costs that customers bear to electrify.

The 100% Clean Energy scenario has a higher utility revenue requirement than the BAU scenario through much of the electrification transition until the late 2040s when the utility-funded rebate payments phase out and the model assumes customers pay those costs (either in full or with transfer payments). Capital-related revenue requirement and O&M will also fall due to widespread electrification. The projected revenue requirement under the 100% Clean Energy scenario is compared to the BAU case in Figure 22.

Although the revenue requirement is much lower by 2050 in the 100% Clean Energy scenario, there are no customers left to pay the $4.9 billion natural gas revenue requirement that remains in 2050. (Table 6). The question raised by this scenario is who should incur the costs of the stranded assets and abandonment costs that may arise from deserted physical assets. The IFGM was not designed to contemplate these issues, though public policy will need to address this issue in the future.

[23] From the perspective of today, this assumption should have no net effect on the real total cost of decarbonization. Amortizing the rebates over a longer period will, however, increase the nominal cost of decarbonization due to financing costs.

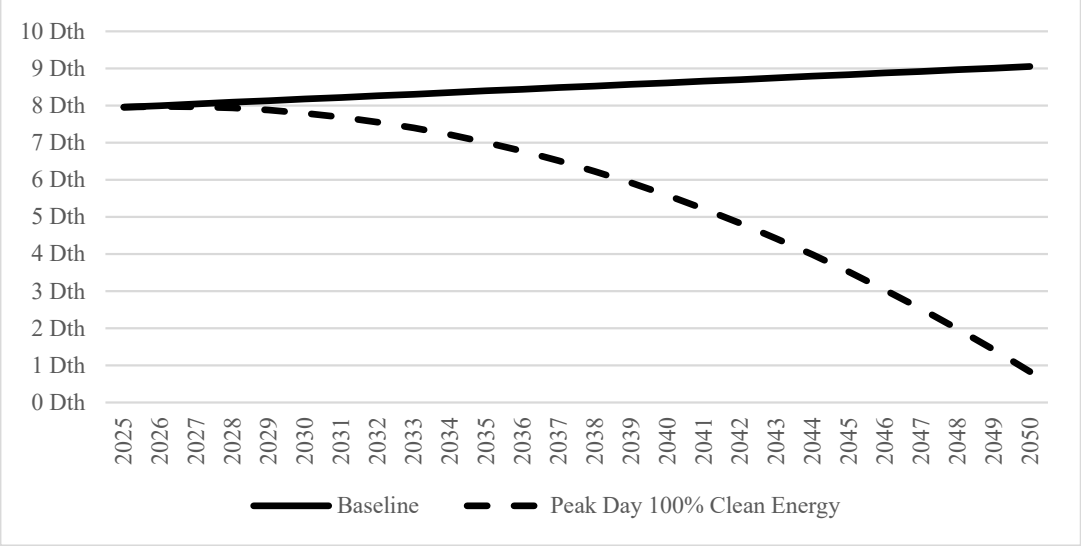
Table 6: Business-As-Usual vs. 100% Clean Energy Scenarios—Total Natural Gas Sector Investment 2025-2050 and 2050 Projected Natural Gas Revenue Requirements

	Business As Usual	100% Clean Energy	Difference
2025-2050 Total Capital Investments	$53.8 Billion	$43.0 Billion	($10.8) Billion

2050 Projected Revenue Requirements

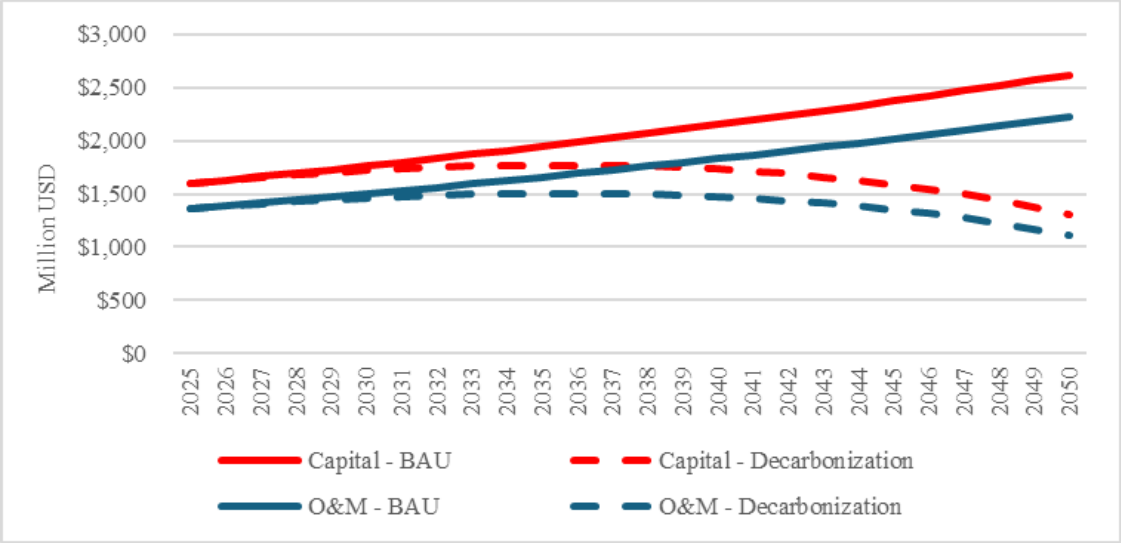
	Business As Usual	100% Clean Energy	Difference
Capital Related (return, deprecation, taxes)	$4.9 billion	$3.8 Billion	($1.1) Billion
O&M Expense	$2.2 Billion	$1.1 Billion	($1.1) Billion
Natural Gas Commodity	$3.2 Billion	$0	($3.2) Billion
RNG	$0	$0	$0
Electrification Rebates	$0	$0	$0
Total Revenue Requirements	$10.3 Billion	$4.9 Billion	($5.4) Billion
2050 Total Sales	975 million Dth	0 Dth	(975) Million Dth

Results generated by Illinois Future of Gas model provided with this report.



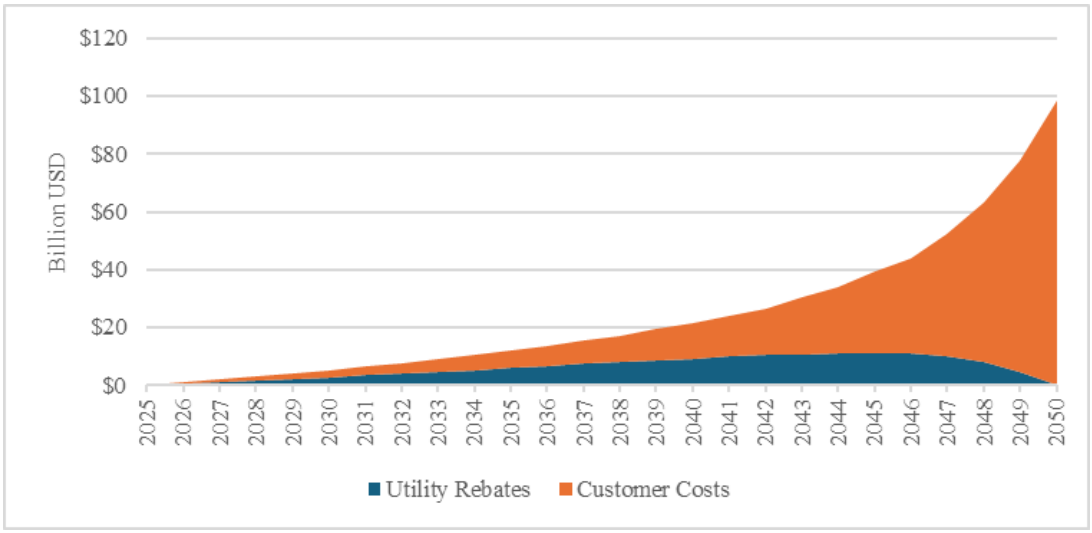
Results generated by Illinois Future of Gas model provided with this report

Figure 19: 100% Clean Energy Scenario Net Peak Day Volumes



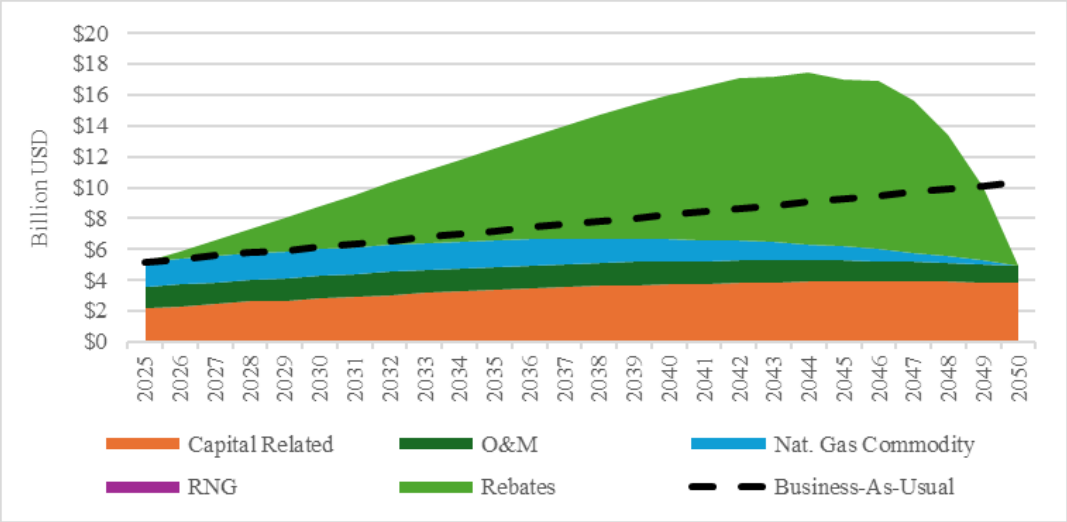
Results generated by Illinois Future of Gas model provided with this report

Figure 20: 100% Clean Energy Scenario Annual Capital and O&M



Results generated by Illinois Future of Gas model provided with this report

Figure 21: 100% Clean Energy Scenario—Total Cost of Electrification Measures (Utility Funded Rebates and Customer Funded Costs)



Results generated by Illinois Future of Gas model provided with this report

Figure 22: 100% Clean Energy Scenario Total Revenue Requirements

6.3.3. 100% Clean Energy Scenario - Electric System Impacts

The IFGM tracks the incremental electric sales and peak demand driven by electrification of the natural gas system. As electric sales increase, the model assumes energy needs are filled by a combination of wind and solar resources to ensure no net emissions increase. To the extent that the overall peak demand for electricity also increases, the model assumes that battery storage is added to support system reliability. Finally, based on the amount of electrified load added, the IFGM tracks capital investments in transmission and distribution infrastructure. The cost of wind, solar, and battery storage are inputs in the model. The version attached to this report used assumptions from the 2023 US Energy Information Administration Annual Energy Outlook modeling.[24] The costs from Table 7 were reduced to reflect available federal tax credits. The costs of new distribution and transmission capacity assumed for this report are calculated as the average embedded cost of distribution and transmission for the Illinois electric utilities but are changeable by the user.

[24] As of the writing of this report, EIA has not produced a new Annual Energy Outlook report.

The 100% Clean Energy scenario adds a total of 56 percent to total electric sales forecast by 2050 relative to the baseline. (Figure 23). The winter peak demand increases by 530 percent, becoming over four times the size of the summer peak demand. (Figure 24). This estimated increase in peak electric demand in winter is primarily a result the decreasing efficiency of electric heating as temperatures fall. The current model assumes that heat pump coefficient of performance ("COP") falls to 1.5 in the coldest winter conditions. COP is a measure of the efficiency of a heat pump in terms of transferring heat per unit of electric energy.

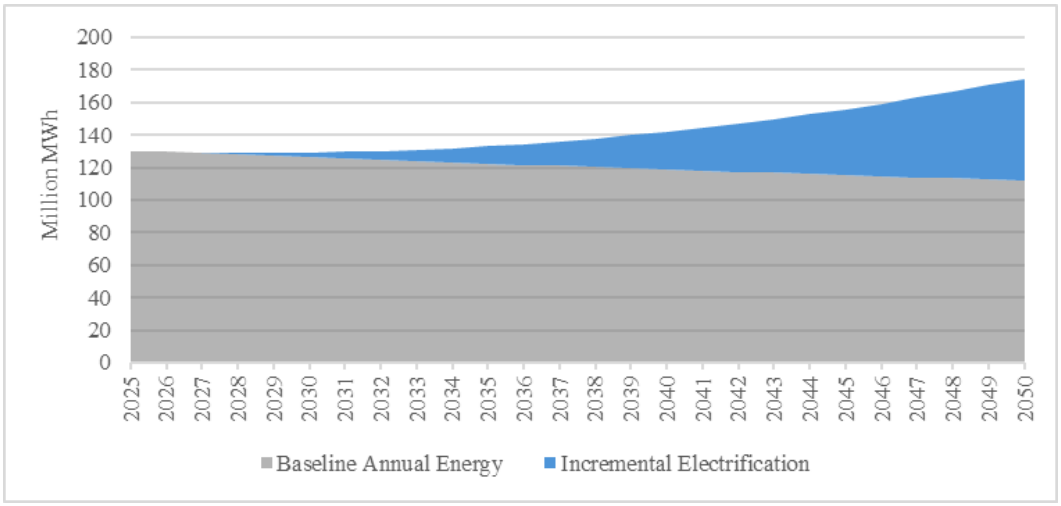
As a result of the incremental load, forecast capital investments in electric capacity from 2025 through 2050 increases by $401 billion. (Figure 25). The largest part of this increase is associated with battery storage capacity, though substantial increases in transmission investment are required as well. The model assumed the use of battery storage to meet peak demand, since this is the most common carbon free technology used today for system reliability. Battery storage on this scale, however, has never been implemented. It is unclear whether energy storage alone could ensure overall electric system reliability at these penetration levels.

While the subnational increases in electric infrastructure are forecast in the 100% Clean Energy scenario, the incremental sales volumes help offset the effect on electric rates. The BAU electric rate forecast escalates at an average rate of three percent. In the 100% Clean Energy scenario, electric rates begin to increase in 2033, once the winter peak demand exceeds summer peak demand, and by 2050, electric rates are roughly double the rates in the BAU scenario. (Figure 26)

Table 7: Electric Capacity Cost Assumptions

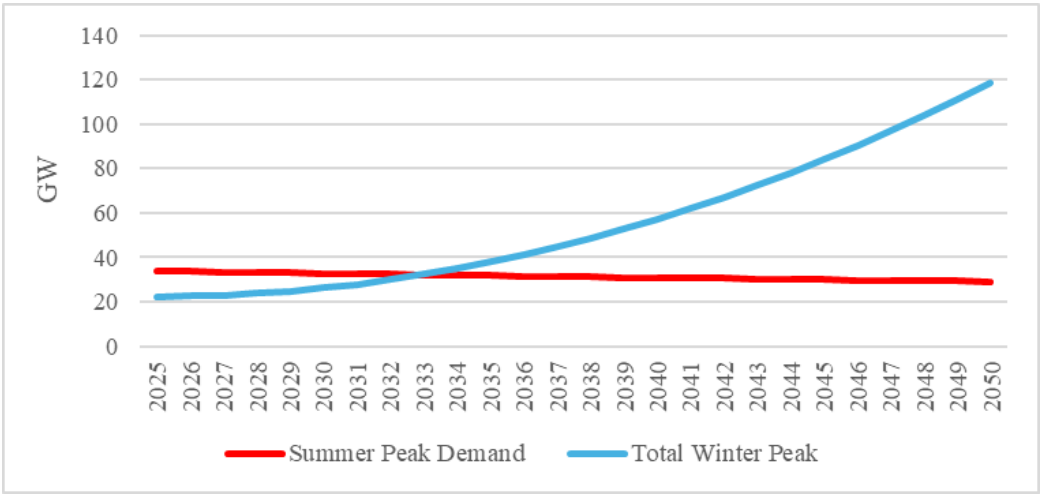
	2025 Costs
Wind	$1,845/kW
Solar	$1,636/kW
Battery	$1,005/kW
Transmission	$428/kW
Distribution	$485/kW

Source: EIA Assumptions to the Annual Energy Outlook, Table 3. Solar escalated to 2025 by inflation. Wind and battery adjusted to reflect expected prices in the region. T&D based on average embedded cost in Illinois.



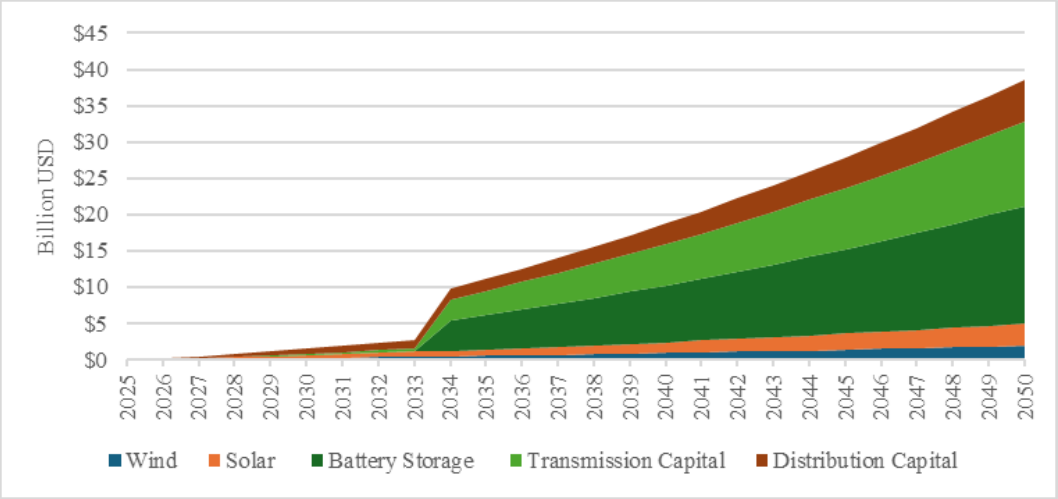
Results generated by Illinois Future of Gas model provided with this report.

Figure 23: 100% Clean Energy Scenario Annual Electric Sales



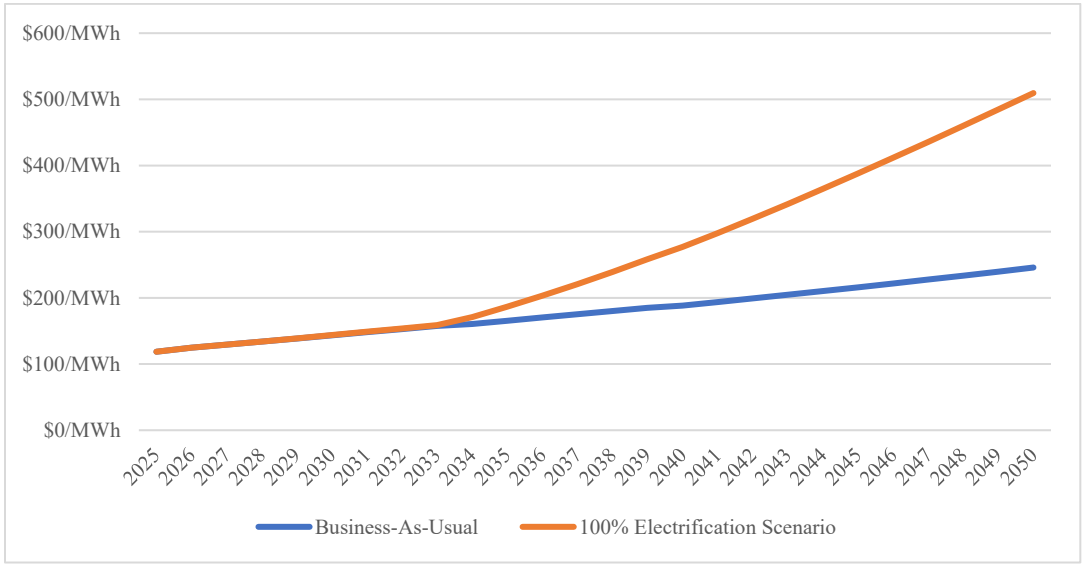
Results generated by Illinois Future of Gas model provided with this report.

Figure 24: 100% Clean Energy Scenario Summer and Winter Electricity Peak Demand in Illinois



Results generated by Illinois Future of Gas model provided with this report

Figure 25: 100% Clean Energy Scenario Incremental Electric Capital Investment



Results generated by Illinois Future of Gas model provided with this report

Figure 26: 100% Clean Energy Scenario Electric Rate Forecast

6.4. Alternative Scenarios

To explore an alternative pathway for Illinois, the IFGM was used to evaluate three other scenarios. Two scenarios limit the natural gas total rate increase to five times the 2025 total rate by 2050 (Scenarios 2 and 3) and one uses a decarbonization portfolio based on the assumptions from the major New York gas utilities in their Long-Term Gas Plans. (Scenario 4). This last scenario relies more heavily on RNG and

hybrid electrification and is calibrated to reduce emissions by 2050 roughly in line with Scenarios 2 and 3. The portfolio mix for these scenarios is found in Table 8.

Scenario 2: Maximize progress toward clean energy targets by 2050 without using RNG subject to a 500 percent rate increase cap by 2050 on the total delivered price of natural gas to Illinois consumers. (Rate Cap – No RNG)

Scenario 3: Maximize progress toward clean energy targets by 2050 with moderate use of RNG subject to a 500 percent rate increase cap by 2050 on the total delivered price of natural gas to Illinois consumers. (Rate Cap – Moderate RNG)

Scenario 4: Achieves emissions reductions approximately equivalent to Scenarios 2 and 3 based on decarbonization portfolios proposed by major gas utilities in New York. (New York Model)

The cost and rate impacts of the alternative scenarios are significantly lower than the 100% Clean Energy scenario. (Table 11, Table 12, Figure 27). The total scenario costs, including investments at customer premises and investments in electric and gas infrastructure, vary between $340 to $390 billion, in comparison to the total cost of 100% Clean Energy of $1.2 trillion. (Table 9). In these alternative scenarios, natural gas total throughput falls by 42 to 50 percent from 2025 through 2050 and, despite significantly lower costs, these scenarios still achieve over 50 percent reduction in CO_2 emissions in 2050 in comparison to the Business-As-Usual case. (Figure 28, Table 10) These scenarios also employ lower cost decarbonization measures compared to the 100% Celan Energy scenario. (Figure 29) Yet these alternative scenarios lead to significant reductions in CO_2 emissions. The largest contributors to carbon reductions are reductions in transport gas, hybrid heating--heat pump with natural gas backup—and RNG. As modeled, the alternative scenarios provide meaningful decarbonization of the Illinois natural gas system with lower rate impacts for customers. While rates in Scenario 2 and 3 increase five times by 2050 from the 2025 rates, that is equivalent to between 290 to 335 percent increase in 2050 compared to the Business-As-Usual scenario. While these scenarios triple natural gas rates in 2050, certainly not a desirable outcome, never-the-less, this is a lower impact alternative pathway to advancing Illinois's climate goals.

As in the 100% Clean Energy scenario, the increased penetration of electrification drives growth in the winter peak demand. While the Illinois electric system is typically a summer-peaking system, the shift towards electrification for heating purposes will turn the electric system into a winter-peaking system. For example, winter peak demand in Scenario 2 (Rate Cap– No RNG) grows sufficiently by 2044 to match the summer peak demand in Illinois thereafter exceeding summer demand. (Figure 30). Yet, the use of partial electrification mitigates effects on the Illinois electric system. Using natural gas backup systems to provide heat on the coldest days avoids the need for costly battery storage capacity, though incremental investments in renewable energy and the transmission and distribution systems are unavoidable even in these alternative scenarios. Indeed, because Scenarios 2 and 3 (rate caps without and with RNG) primarily add electric load during the off-peak period, electric rates tend to move like the BAU scenario, growing at a rate of inflation until the 2040s with a slight decrease prior to 2050. This is expected if the unit cost to serve incremental load is less than the total average rate of the electric system. In this model, that partially results from the assumptions that wind and solar resources will continue to benefit from favorable tax treatment, such as production tax credits ("PTCs"). Elimination of PTCs would increase the cost of incremental renewable electric generation and electric rates. Figure 31 illustrates this effect using Scenario 2 (Rate Cap – No RNG).

Table 8: Decarbonization Portfolios for Scenarios 2, 3, and 4

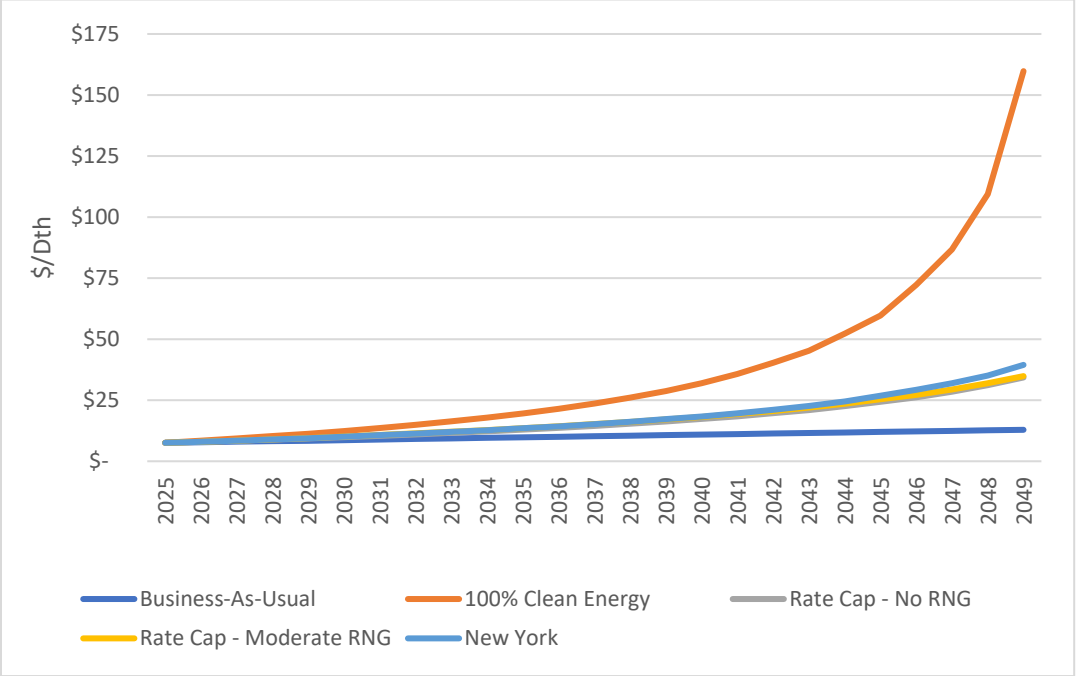
Scenario 2: Rate Cap – No RNG Total Measure Penetration	
High Efficiency Furnaces	45%
Heat Pump with Natural Gas Backup	45%
Cold Climate Heat Pump	10%
Hot Water Heat Pump	90%
Partial Commercial Electrification	50%
Full Commercial Electrification	20%
Partial Industrial Electrification	25%
Transport Gas - Electrification	25%
Renewable Natural Gas	0%
Scenario 3: Rate Cap – Moderate RNG Total Measure Penetration	
High Efficiency Furnaces	50%
Heat Pump with Natural Gas Backup	50%
Hot Water Heat Pump	75%
Partial Commercial Electrification	50%
Full Commercial Electrification	10%
Renewable Natural Gas	25%
Scenario 4: New York Model Total Measure Penetration	
Heat Pump with Natural Gas Backup	75%
Hot Water Heat Pump	75%
Partial Commercial Electrification	30%
Renewable Natural Gas	52%

Source for New York Model: Final Gas Long-Term Plan, Case 23-G-0437, April 26, 2024. NYSEG and RGE, field with NYPSC.

Table 9: Cost Comparisons for All Scenarios

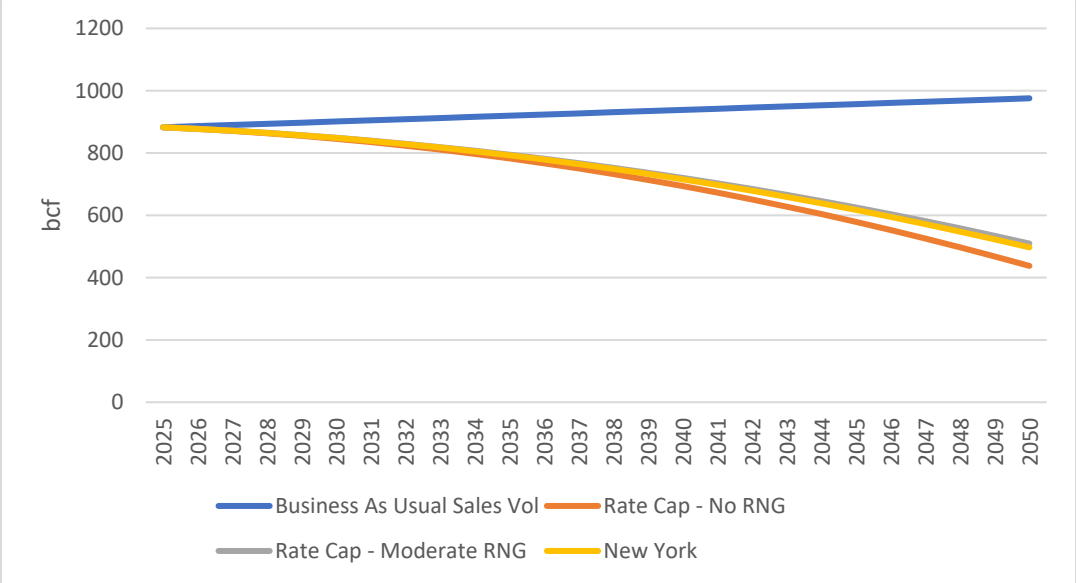
		Rate Cap		
	100% Clean Energy	**No RNG**	**Moderate RNG**	**New York Model**
Total Cost (Billion USD)	$1,222	$391	$340	$350
Total CO_2 Reduction (million tons)	560	330	327	327
Cost per Ton CO_2 reduction	$1,855	$607	$455	$483
Cost per Residential Customer	$43,868	$6,916	$4,892	$7,660

Results generated by Illinois Future of Gas model provided with this report. Total costs include total customer out of pocket costs, total rebate costs, and total electric and natural gas infrastructure costs of each scenario. Costs are measured in nominal dollars. Cost per residential customer equals the out-of-pocket costs to electrify housing units paid by consumers above the best alternative technology divided by the number of customers.



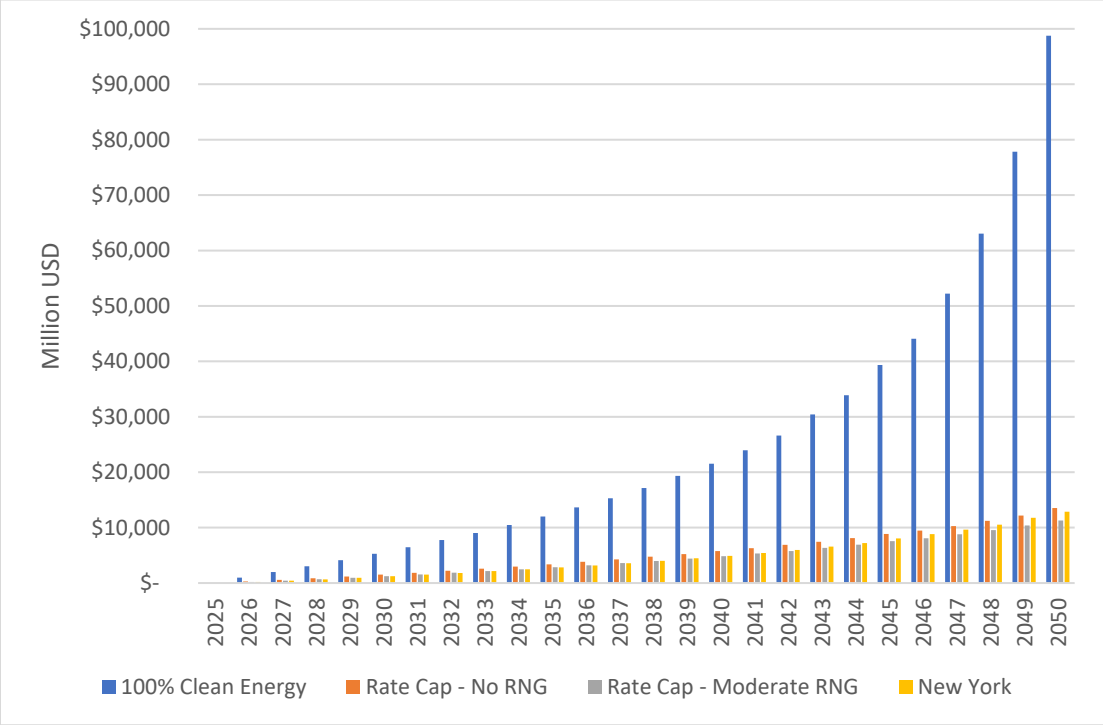
Results generated by Illinois Future of Gas model provided with this report

Figure 27: Gas Rate Forecast Comparison



Results generated by Illinois Future of Gas model provided with this report

Figure 28: Alternative Scenarios Natural Gas Throughput (Excluding RNG)



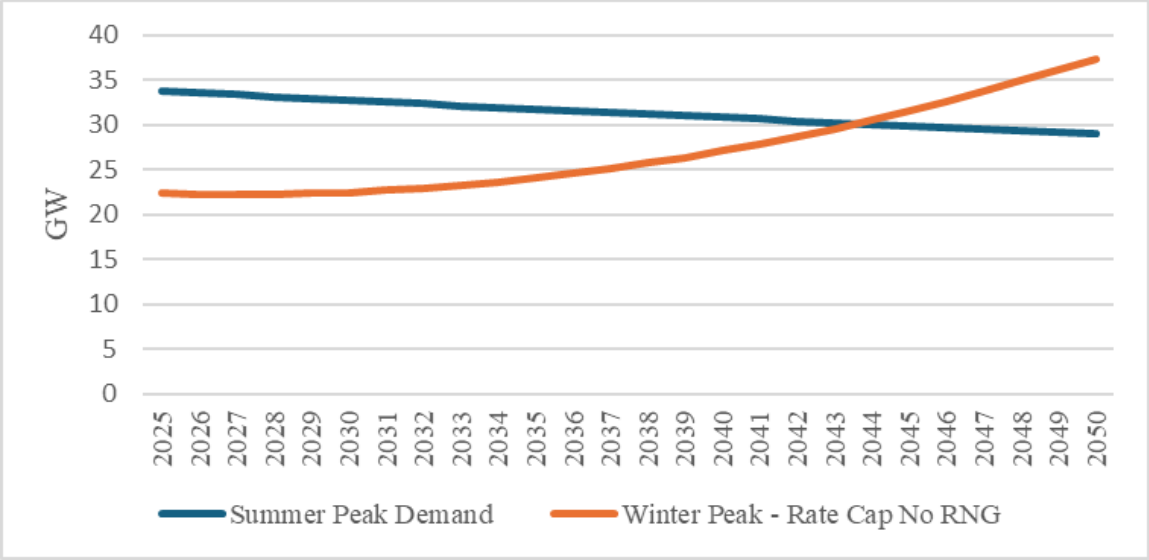
Results generated by Illinois Future of Gas model provided with this report

Figure 29: Annual Natural Gas Decarbonization Investments

Table 10: Alternative Scenarios CO_2 Emissions Reductions Relative to Business-As-Uusal in 2050

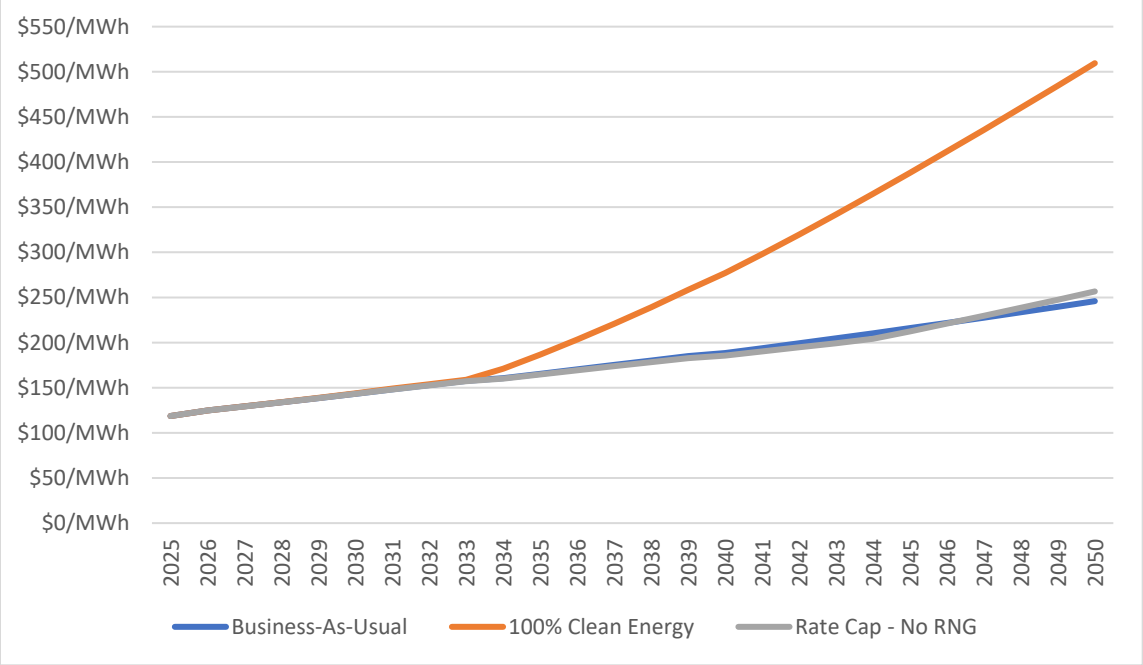
	Carbon Reduction in 2050 (Million Tons)	Percent Reduction in 2050
Rate Cap – No RNG	31.5	55.1
Rate Cap – Moderate RNG	29.9	52.5
New York	30.1	52.8

Results generated by Illinois Future of Gas model provided with this report



Results generated by Illinois Future of Gas model provided with this report

Figure 30: Rate Cap– No RNG Scenario Summer vs. Winter Demand



Results generated by Illinois Future of Gas model provided with this report

Figure 31: Rate Cap – No RNG Scenario Electric Rate Forecast

7. Summary

Illinois is engaged in a discussion of the fundamental role natural gas plays in providing necessary services to Illinois citizens. The Illinois natural gas sector currently plays a vital role in keeping people safe and comfortable while providing a necessary public service. Climate policies and concerns over future investment in the natural gas industry have led regulators to re-evaluate policies about the pathways to a clean energy future as noted above. This report provides the current state of the Illinois gas industry from an economic and environmental perspective, as well as a method for evaluating future pathways to a clean energy future that models (1) decarbonization supply curve; (2) natural gas infrastructure investment; (3) electric infrastructure investment; and (4) rate impacts. This model allowed the Project Team to evaluate the cost-effectiveness of three alternative pathways to the Business-as-Usual case:

Scenario 1: Achieve 100 percent clean energy by 2050 by employing full electrification (100% Clean Energy)

Scenario 2: Maximize progress toward clean energy targets by 2050 without using RNG subject to a 500 percent rate increase cap by 2050 on the total delivered price of natural gas to Illinois consumers. (Rate Cap – No RNG)

Scenario 3: Maximize progress toward clean energy targets by 2050 with moderate use of RNG subject to a 500 percent rate increase cap by 2050 on the total delivered price of natural gas to Illinois consumers. (Rate Cap – Moderate RNG)

Scenario 4: Achieves emissions reductions approximately equivalent to Scenarios 2 and 3 based on a decarbonization portfolio proposed by major gas utilities in New York. (New York Model)

The total costs of each over the study period and the rate impacts are found in Table 11 and Table 12.

Table 11: Cost by Scenario 2025-2050

2025-2050	100% Clean Energy	Rate Cap - No RNG	Rate Cap - Moderate RNG	New York
Natural Gas System	$42,984,066,939	$51,478,254,277	$52,243,295,859	$52,909,736,668
Total Decarb Costs	$638,253,258,815	$135,601,087,487	$114,428,638,326	$121,264,119,814
Electric Infrastructure	$540,669,659,722	$203,901,434,258	$173,424,367,668	$176,071,827,378
Total Cost	$1,221,906,985,475	$390,980,776,022	$340,096,301,854	$350,245,683,859
Total CO2 Reductions	560,454,547 tons	330,021,455 tons	326,936,692 tons	327,132,637 tons
Average Cost	$1,855/ton	$607/ton	$455/ton	$483/ton

Results generated by Illinois Future of Gas model provided with this report. Natural gas system costs measure the total costs for maintaining the system through 2050. Total decarbonization costs include total customer out of pocket costs and total rebate costs. Electric infrastructure measures the total costs of the electric system through 2050 under the various scenarios. Costs are measured in nominal dollars. The "New York Model" utilizes a decarbonization portfolio developed by the New York gas utilities which relies more heavily on Renewable Natural Gas (RNG) and hybrid heating systems relative to the two "Rate Cap" scenarios.

Table 12: Rate Impacts by Scenario 2025-2050

Scenario	2025	2035	2040	2045	2050	Increase From 2025
Business-As-Usual ("BAU")	$ 7.57	$ 9.81	$ 10.92	$ 12.00	$ 13.10	173%
100% Clean Energy	$ 7.57	$ 19.57	$ 31.97	$ 59.70	$ 159.77	2112%
Rate Cap - No RNG	$ 7.57	$ 12.94	$ 17.34	$ 24.37	$ 38.03	503%
Rate Cap - Moderate RNG	$ 7.57	$ 13.55	$ 18.14	$ 25.40	$ 38.25	506%
Rate Cap - New York Model	$ 7.57	$ 13.51	$ 18.34	$ 26.86	$ 43.87	580%

Under the 100% Clean Energy scenario gas utilities no longer have customers beginning in 2050. The table presents the end of year 2049 rates for the 100% Clean Energy scenario. Results generated by Illinois Future of Gas model provided with this report.

Appendix A: Benchmarking Results to Comparable Studies

The cost inputs for the Future of Gas model were compared, when applicable, to similar studies around the country that have been published recently. This included a study from ICF, a consulting firm, commissioned by Nicor, CenterPoint Energy's Natural Gas Innovation Act compliance filing in Minnesota (2023), National Grid's Long Term Gas Plan in New York (2023), and Xcel Energy's Clean Heat Plan in Colorado (2023). In general, the project team found that cost estimates from these studies have increased since the ICF study in 2021 and are even higher in the Future of Gas model, based on 2024 estimates, than the regulatory filings from 2023. Below is a summary of the project team's findings.

Benchmarking to Comparable Studies

Study	Hot Water Heat Pump	Air Source Heat Pump	High Efficiency Furnace
CenterPoint (Minnesota)[25]	n/a	$67,732 [26]	n/a
National Grid (New York)[27]	$3,267	$14,693	n/a
Nicor / ICF (Illinois)[28]	$2,502	$13,731	$808
Xcel Energy (Colorado)[29]	$4,124	$17,361 ccASHP $15,303 standard	$1,714 [30]
Future of Gas model (midpoint)	$4,500	$48,372	$5,375

[25] Docket No. G-008/M-23-215, Exhibit D: Full Pilot Descriptions, pg. 44
[26] Includes major energy efficiency upgrades, therefore cost estimate is higher
[27] Case No. 24-G-0248, "National Grid Revised Gas System Long Term Plan," October 2024
[28] ICF "Decarbonization Pathways for Nicor" September 2021
[29] Proceeding No. 23A-0392EG, Exhibit 102 Attachment DRA-1: E3, PSCo Clean Heat Portfolio Analysis
[30] Unit cost only. Total cost in Xcel model includes direct expansion cooling as well.

Appendix B: State-Level Survey of Gas Planning and Emissions Reduction Policies and Proceedings

State	Gas Planning / Future of Gas		Emissions Reduction	
	Proceeding	Legislative and Regulatory Summary	Proceeding	Legislative and Regulatory Summary
Alabama	(2021) H.B. 446	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	N/A
Alaska	N/A	N/A	(2023) S.B. 48 (2024) H.B. 50	SB 48 gives the state authority to develop carbon management projects on state lands and sell carbon offset credits and to lease state lands for carbon management purposes. The law will generate new revenue for the state, enable more active forest management, and ensure continued public access and use of state lands. H.B. 50 allows use of empty oil and gas storage fields to be utilized for carbon dioxide storage from carbon capture technology. The law establishes a fee schedule for exploration, development, and injection of carbon dioxide into storage fields.

Arizona	(2020) H.B. 2686	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2018) Energy Standard Modernization Plan (Docket # E-00000Q-16-0289 and Docket # RU-00000A-18-0284)	In 2018, the Arizona Corporation Commission (ACC) launched the Energy Standard Modernization Plan (Docket No. E-00000Q-16-0289) to promote cleaner energy, lower costs, and improve grid security, targeting 80% clean energy by 2050. Later that year, the plan was addressed in a separate rulemaking proceeding (Docket No. RU-00000A-18-0284). In 2020, the ACC proposed formal clean energy rules, revising them in 2021 to set emissions reduction targets: 50% by 2032, 65% by 2040, 80% by 2050, 95% by 2060, and 100% by 2070. However, in January 2022, the ACC voted 3-2 to reject the rules without issuing a formal order. A June 2022 notice confirmed the rulemaking's termination, but Docket No. RU-00000A-18-0284 remains open.
Arkansas	(2021) S.B. 137	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2023) S.B. 210	Amends existing Arkansas Code §§ 15-72-602 through 15-72-607 to regulate underground storage of carbon dioxide as well as previously-included natural gas.

California	(2020) Long-Term Gas Proceeding (Docket # R2001007)	In January 2020, the California Public Utility Commission (CPUC) initiated a proceeding to establish policies, processes, and rules for safe and reliable gas systems and long-term gas system planning. This action was prompted by local government measures to restrict gas expansion, anticipated future gas demand changes, California's strict greenhouse gas emission reduction goals, and a history of gas line incidents. In December 2022, the CPUC released a staff proposal on decommissioning parts of the gas infrastructure. By February 2024, the proposed order for phase 3 was announced. The proceeding consists of four tracks: Track 1: Gas Transition Scenario Analysis Track 2: Long-Term Gas-Planning Approaches Track 3: Opportunities for Interim Action Track 4: Reducing Gas System Costs, Avoiding Stranded Assets, and Ensuring Reliability, Safety, and Gas Commodity Cost Containment, including related revenue and ratemaking implications.	(2018) Executive Order B-55-18	Commits California to achieving carbon neutrality by no later than 2045. Additionally, the California Air Resources Board (CARB) recently released an updated Scoping Plan that outlines California's goals to reduce all fossil fuel consumption by 86% by 2045, among others.

Colorado	(2021) Amendments to Gas Rules Implementing SB 21-264 & HB 21-1238 (Docket # 21R-0449G)	The Colorado Public Utilities Commission (CPUC) initiated the proceeding "Amendments to Gas Rules Implementing SB 21-264 & HB 21-1238" in September 2021 to implement requirements from two legislative measures: SB 21-264 (Clean Heat Plans) and HB 21-1238 (Modernization of Gas Utility Programs). These laws mandate that Colorado gas utilities develop plans to reduce greenhouse gas emissions by 4% by 2025 and 22% by 2030. They also require a reassessment of the cost-effectiveness of gas distribution using updated social cost values for carbon and methane. The CPUC issued its final decision on December 1, 2022.	N/A	See policy summary on "Gas Planning / Future of Gas."
Connecticut	N/A	N/A	(2019) Executive Order No. 1 (2021) Executive Order No. 21-3	Executive Order No. 1 expands the Lead By Example program, setting targets for state facilities: a 45% reduction in greenhouse gas emissions, 10% in water use, and 25% in waste by 2030. The initiative includes all Executive Branch buildings and allows participation from the Judicial and Legislative Branches. In 2021, Executive Order No. 21-3 established interim targets to support the 45% emissions reduction goal. Connecticut is also a member of the Regional Greenhouse Gas Initiative (RGGI).

Delaware	N/A	N/A	(2023) H.B. 99	Mandates a 50% GHG emissions reduction by 2030 (2005 baseline) and net zero by 2050. The Department of Natural Resources and Environmental Control must adopt rules within 18 months to cut emissions from stationary sources and update the Climate Action Plan by 2025, with renewals every five years. The plan must assess existing reduction strategies, their effectiveness, and recommend necessary changes. Delaware is also a member of the Regional Greenhouse Gas Initiative (RGGI).
District of Columbia	(2020) In the Matter of the Implementation of Electric and Natural Gas Climate Change Proposals (Docket # 1167)	The DC Public Service Commission (DCPSC) initiated an investigatory proceeding (Docket # FC-1167) in 2020 in response to the 2018 merger of AltaGas and Washington Gas Light Company (WGL). As part of the merger settlement, AltaGas and WGL were required to submit a climate business plan aligning with DC's energy and climate goals. However, the plans submitted in 2020 were criticized by advocates as inadequate, prompting calls for a more rigorous evidentiary proceeding to evaluate the future of gas in DC. Meanwhile, the CleanEnergy DC Omnibus Act of 2018 expanded the DCPSC's mandate to include natural resource conservation, environmental quality, and climate change mitigation. This broader regulatory scope,	(2022) The Climate Commitment Act of 2022 (D.C. Law 24-176)	The District aims for carbon neutrality and climate resilience by 2045, with its own operations reaching neutrality by 2040. The Climate Commitment Act of 2022 codified interim climate targets, and an interagency task force is developing a 2040 roadmap to guide implementation.

		combined with stakeholder pressure, led the DCPSC to open a new proceeding to ensure utility plans align with DC's climate objectives.		
Florida	(2023) H.B. 1281(2023) H.B. 1645	H.B. 1281 prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.H.B. 1645 eliminates the term "climate change" from state statutes and establishes the state's future priority as ensuring an adequate, reliable, and cost-effective energy supply.	(2024) H.B. 1645	Repeals the state's renewable energy goals set in 2022, which targeted 40% by 2030, 63% by 2035, 82% by 2040, and 100% by 2050. The law also withdraws the state from the EPA's Climate Pollution Reduction Grants program.

Georgia	(2021) H.B. 150	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	N/A
Hawaii	N/A	N/A	(2022) H.B. 1800 (Act 238)	Mandates a 50% reduction in GHG emissions by 2030 (2005 baseline) and net zero by 2045. The State Energy Office must recommend regulatory and policy actions, including energy efficiency, land use and transportation planning, carbon capture, agricultural best practices, and alternative fuels. A report was due in early 2024. Hawaii lacks natural gas and instead produces synthetic natural gas (SNG) from petroleum by-products.
Idaho	(2023) H.B. 106	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	On behalf of the state, the Dept. of Environmental Quality received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program.The DEQ issued the Gem State Air Quality Initiative in March 2024.

Illinois	(2024) Docket # 24-0158	On November 16, 2023, the Illinois Commerce Commission (ICC) approved rate increases for several major gas utilities. In its Final Orders, the ICC directed staff to develop a "Future of Gas" proceeding plan, including workshops and a formal process. Docket No. 24-0158, initiatied on March 7, 2024, launched a two-phase workshop series. The first phase explored gas system decarbonization, electric distribution impacts, energy efficiency retrofits, cost considerations (including stranded assets), aging infrastructure, and integrated gas-electric planning. The ongoing second phase reviews stakeholder positions, identifies consensus and disagreements, and discusses potential legislative and regulatory actions.	(2021) The Climate and Equitable Jobs Act (Public Act 102-0662)	Commits Illinois to 100% clean energy by 2050.
Indiana	N/A	N/A	N/A	On behalf of the state, the Dept. of Environmental Management received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program.The DEM issued the Indiana Priority Climate Action Plan in March 2024.

Iowa	(2021) H.B. 555	H.B. 555 prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	Opted out of the Climate Pollution Reduction Grants program through the EPA.
Kansas	(2021) S.B. 24	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2009) Renewable Energy Standards Act (H.B. 2369) (2015) S.B. 91	Establishes a voluntary goal for utilities to generate 20% of peak demand from renewable sources by 2020. Eligible sources include landfill and wastewater methane and hydrogen. Originally a mandate, S.B. 91 revised the Renewable Portfolio Standard (RPS) to a voluntary target.

Kentucky	(2021) H.B. 207	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	Opted out of the Climate Pollution Reduction Grants program through the EPA.
Louisiana	(2020) S.B. 492	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2020) Executive Order JBE 2020-18	Established the Climate Initiatives Task Force to recommend strategies for reducing GHG emissions from 2005 levels by 26-28% by 2025, 40-50% by 2030, and achieving net zero by 2050. Louisiana's first Climate Action Plan was released in February 2022.

Maine	(2023) L.D. 698 (2023) L.D. 1724	L.D. 698 requires the Public Utilities Commission (PUC) to monitor FERC proceedings on interstate natural gas capacity in New England and the Northeast. If beneficial to state ratepayers, the PUC may participate to secure the lowest gas and electricity prices. It also defines "renewably sourced gas" as pipeline-quality gas derived from anaerobic digestion, gasification, landfill gas, wastewater treatment, or low-carbon alternatives like hydrogen. The PUC may gather information on existing and near-term replacements for natural gas in commercial and industrial sectors. The Beneficial Electrification Policy Act (L.D. 1724) allows the Governor's Energy Office (GEO) to petition the PUC to procure renewable energy to meet state emissions and renewable goals. It requires the Efficiency Maine Trust to include a three-year beneficial electrification plan in its triennial plan with annual updates. The bill redefines "beneficial electrification" as the use of electricity to reduce fossil fuel consumption.	(2019) Public Law Chapter 476 (38 MRSA §576-A)	Sets Maine's greenhouse gas emissions reduction targets, aiming for a 45% reduction below 1990 levels by 2030 and an 80% reduction by 2050. In 2021, the law was amended to include a goal of achieving net-zero greenhouse gas emissions by 2045. Maine is also a member of the Regional Greenhouse Gas Initiative.

Maryland	(2023) Petition of the Office of People's Counsel for Near-term Priority Actions and Comprehensive, Long-term Planning for Maryland's Gas Companies (Docket # 9707)	Maryland's Office of People's Counsel (OPC) has requested the Public Service Commission (PSC) to initiate a proceeding on the future of gas. This proceeding will focus on ensuring that the planning, practices, and future operations of gas public service companies align with the public interest. Additionally, it will ensure that the rates charged to utility customers remain just and reasonable.	(2022) Climate Solutions Now Act (S.B. 0528)	Mandates a 60% GHG reduction from 2006 levels by 2031 and net-zero emissions by 2045. Maryland is also part of the Regional Greenhouse Gas Initiative (RGGI).
Massachusetts	(2020) The Future of Gas (Docket # 20-80)	Massachusetts's "Future of Gas" proceeding (#20-80) began in 2020 after the Attorney General petitioned the Massachusetts Department of Public Utilities (DPU) to investigate the role of gas in achieving the state's net-zero greenhouse gas emissions goal by 2050. The proceeding is also driven by concerns over the aging gas infrastructure, highlighted by the Merrimack Valley pipeline explosion. The ruling on December 6, 2023, mandates that natural gas companies align their infrastructure investments with the state's climate goals. Utilities must now demonstrate that they have considered climate-friendly alternatives, such as non-emitting thermal energy infrastructure, electrification, and energy efficiency measures, before recouping returns on new gas infrastructure investments.	(2022) Bill S.9	Enacted under the Global Warming Solutions Act and the Next-Generation Roadmap for Massachusetts Climate Policy, this Bill sets the 2050 statewide GHG limit at net zero. This means emissions cannot exceed 85% below 1990 levels, with the remainder offset by carbon removal. Sector-specific sublimits collectively exceed the 85% reduction target. Massachusetts is also part of the Regional Greenhouse Gas Initiative (RGGI).

Michigan	(2023) S.B. 273	Starting Jan. 1, 2025, electricity providers must include a waste reduction plan in their customer energy optimization plans, which may also cover electrification measures. PSC-regulated electric and gas providers must submit energy waste reduction plans in 2025, with future filings required within six months of a final order. Natural gas providers must file every four years after 2025. Electrification programs must provide health and safety benefits or meet specific criteria and cannot raise rates for non-participating customers. Utilities must offer low-income energy waste reduction programs for single- and multifamily households. By July 1, 2024, the PSC must establish a framework for energy waste reduction programs and set alternative compliance payments.	(2023) S.B. 271	Establishes a Clean Energy Standard (CES), requiring utilities to procure 80% clean energy from 2035-2039 and 100% thereafter. Electric providers must submit a CES compliance plan to the PSC, reviewed every four years. The bill also updates Renewable Energy Credit (REC) requirements, mandating 15% renewable energy through 2029, 50% from 2030-2034, and 60% annually after 2034.

Minnesota	(2021) In the Matter of a Commission Evaluation of Changes to the Natural Gas Utility Regulatory and Policy Structures to Meet State Greenhouse Gas Reduction Goals (Docket # G-999/CI-21-565)	This proceeding was prompted by the 2021 Natural Gas Innovation Act, encourages utilities to propose innovation plans exploring alternatives like electrification, district energy, carbon capture, hydrogen, RNG, and energy efficiency.On July 25, 2024, MPUC approved the state's first natural gas innovation plan from CenterPoint Energy. The $105.7 million plan includes 17 pilot projects and seven R&D programs, to be implemented over five years to decarbonize gas utility operations.	(2023) Statute 216H.02	Statute 216H.02, enacted in 2007 and amended in 2023, sets legally binding greenhouse gas (GHG) emissions reduction goals for Minnesota, aiming for a 15% reduction from 2005 levels by 2015, 30% by 2025, 50% by 2030, and net-zero emissions by 2050. To achieve these statutory goals, Minnesota developed the Climate Action Framework, which outlines immediate and near-term actions across six key areas.
Mississippi	(2021) H.B. 632	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	On behalf of the state, the Dept. of Environmental Quality received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program. The DEQ issued the Priority Climate Action Plan in March 2024, calling it the "Clean Air Mississippi Project", or CAMP.

Missouri	(2021) H.B. 734	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	On behalf of the state, the Dept. of Natural Resources received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program.The DNR issued the Missouri Plan for Environmental Improvement Grants in February 2024.
Montana	(2023) S.B. 208	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2023) H.B. 170	Repeals the state's energy policy goals and energy policy development process that was passed in 1990.
Nebraska	(2024) LB 867	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	On behalf of the state of Nebraska, the Dept of Environment and Energy received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program. The first Nebraska Priority Climate Action Plan was issued in February 2024.

Nevada	(2021) Investigation Regarding Long-Term Planning For Natural Gas Utility Service In Nevada; (Docket # 21-05002)	This proceeding was initiated to investigate long-term natural gas planning. While not legislatively mandated, the proceeding aligns with Nevada's Climate Action Plan, which targets net-zero emissions by 2050 and advocates reducing gas use. Advocacy efforts may have also influenced the decision.	(2019) S.B. 254	Sets GHG reduction targets of 28% by 2025, 45% by 2030 (from 2005 levels), and zero or near-zero emissions by 2050.
New Hampshire	(2021) S.B. 86	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	On behalf of the state of New Hampshire, the Dept of Environmental Services received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program. The first New Hampshire Priority Climate Action Plan was issued in March 2024. New Hampshire is also a member of the Regional Greenhouse Gas Initiative.

New Jersey	(2022) Executive Order 317 (2023) In the Matter of the Implementation of E.O. 317 Requiring the Development of Natural Gas Utility Plans (Docket # GO23020099)	Executive Order 317 initiated the "Future of the Natural Gas Utility" proceeding with the goal of reducing gas utility emissions by 50% by 2030 (from a 2006 baseline). In response, the NJ Board of Public Utilities (NJBPU) paused a $2.5 billion infrastructure investment to reassess future gas projects. The NJBPU will also recommend strategies that balance emissions reductions, costs, and job support, including for unions.	(2021) Executive Order 274	Establishes an interim target to reduce greenhouse gas (GHG) emissions to 50% below 2006 levels by 2030. New Jersey is also a member of the Regional Greenhouse Gas Initiative.
New Mexico	(2023) Executive Order 2023-001 (2023) BLM Public Land Order No. 7923	Executive Order 2023-001 bans new oil and gas leases on state trust lands within one mile of schools until further notice. It also directs the State Land Office to review existing leases and agreements in these areas for compliance with requirements such as plugging inactive wells, remediating spills, and meeting air quality standards. Additionally, a BLM order withdraws 336,404 acres of public lands surrounding Chaco Culture National Historical Park from mining and leasing under federal mineral laws, with exceptions for mineral materials. This aims to protect the lands and their cultural heritage in New Mexico.	(2019) Executive Order 2019-003	Sets a 45% GHG reduction goal by 2030 (from 2005 levels). The EO also called for a market-based carbon cap, transportation emissions reductions, updated building codes, and renewable energy collaboration. The Climate Change Task Force released New Mexico Climate Strategy reports in 2019 and 2021. In 2024, the Environment Department and Energy, Minerals, and Natural Resources Department released the Priority Climate Action Plan under the EPA's Climate Pollution Reduction Grants (CPRG) initiative.

New York	(2020) Proceeding on Motion of the Commission in Regard to Gas Planning Procedures (Docket # 20-G-0131)	In May 2020, the New York Public Service Commission (PSC) initiated the "Proceeding on Motion of the Commission in Regard to Gas Planning Procedures" (#20-G-0131). This proceeding aims to develop a gas moratoria protocol and align gas system planning with the Climate Leadership and Community Protection Act (CLPCA), which mandates emission-free electricity by 2040 and sets emissions reduction targets. The proceeding was prompted by gas moratoria imposed by Con Edison and National Grid in Westchester, Long Island, and NYC in 2019, which highlighted flaws in the gas planning process. Rather than approving new pipeline construction, the PSC seeks to establish a framework to assess the risks and steps involved in future capacity crises.	(2019) Climate Leadership and Community Protection Act (S.B. 6599)	Mandates New York to reduce GHG emissions 40% by 2030 and 85% by 2050 (from 1990 levels). New York is also part of the Regional Greenhouse Gas Initiative (RGGI).
North Carolina	(2023) H.B. 130	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2018) Executive Order 80	Sets North Carolina's climate goals, including GHG reductions, increased ZEV adoption, and lower energy use in state buildings. In October 2019, the Department of Environmental Quality released its Clean Energy Plan, targeting a 70% reduction in power sector GHG emissions (from 2005 levels) by 2030 and carbon neutrality by 2050. No legislative or regulatory actions have followed.
North Dakota	(2023) H.B. 1234	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2023) S.B. 2089	Established the Clean Natural Gas Capture and Emissions Reduction Program to incentivize natural gas capture and utilization at oil and gas well sites and gathering pipelines.

Ohio	(2021) H.B. 201	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	On behalf of the state, the Ohio Environmental Protection Agency (Ohio EPA) received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program. Ohio EPA will develop a Comprehensive Resiliency Plan (CRP) in 2025, which will provide greater detail and analysis of the state's GHG reduction measures and implementation plans.
Oklahoma	(2020) H.B. 3619	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	On behalf of the state of Oklahoma, the Dept of Environmental Quality received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program. The first Oklahoma Priority Action Plan was issued in March 2024. The Kiowa Tribe and Muscogee Nation also developed action plans.

Oregon	(2021) Natural Gas Fact-finding Investigation: (Docket # UM 2178)	In 2021, the Oregon Public Utilities Commission (OPUC) initiated the "Natural Gas Fact-finding Investigation" (UM 2178) in response to Governor Brown's Executive Order 20-04, which set ambitious greenhouse gas reduction targets. Originally not focused on gas transition, the proceeding has since expanded into a broader Future of Gas discussion, encouraging utilities to develop decarbonization plans.	(2007) H.B. 3543 (2020) Executive Order 20-04	HB 3543 (2007) set Oregon's original GHG reduction targets, aiming to halt emissions growth by 2010, reduce emissions 10% below 1990 levels by 2020, and achieve 75% below 1990 levels by 2050. In 2020, Executive Order 20-04 revised these targets to 45% below 1990 levels by 2035 and at least 80% by 2050. In 2023, the Climate Action Roadmap to 2030 proposed further updates, setting goals of 45% below 1990 levels by 2030, 70% by 2040, and 95% by 2050.

Pennsylvania	(Failed 2023) S.B. 143	This law aimed to prohibit governmental entities from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state. The legislation was referred to the House after passing through the Senate but failed in committee.	N/A	Pennsylvania's governor and legislature remain divided over joining the Regional Greenhouse Gas Initiative (RGGI). Lawmakers argue the governor lacks authority to impose carbon pricing, equating it to a tax that requires legislative approval. In 2022, the Department of Environmental Protection issued rules via executive order, triggering legal challenges. On Nov. 1, 2023, the Commonwealth Court struck down the regulation, siding with legislators. The governor's office appealed, and the case is now before the Pennsylvania Supreme Court. Meanwhile, Pennsylvania remains listed as an RGGI member.
Rhode Island	(2022) Investigation into the Future of the Regulated Gas Distribution Business in Rhode Island (Docket # 22-01-NG)	In June 2022, the Rhode Island Public Utilities Commission (RIPUC) initiated the "Investigation Into The Future of the Regulated Gas Distribution Business in Rhode Island in Light of the Act on Climate" (Docket #22-01-NG) to assess the future of regulated gas distribution under the 2021 Act on Climate, which mandates net-zero emissions by 2050. The proceeding also responds to a recent gas outage on Aquidneck Island, highlighting capacity concerns.	2021 Act on Climate	Establishes enforceable emissions reduction mandates and updates the 2014 Resilient Rhode Island Act. The law sets legally binding targets to reduce GHG emissions 45% below 1990 levels by 2030, 80% by 2040, and achieve net zero by 2050. Rhode Island is also a member of the Regional Greenhouse Gas Initiative (RGGI).

South Carolina	N/A	N/A	N/A	On behalf of the South Carolina, the Catawba Nation, and several large municipalities in SC, the Palmetto Air Quality Collaborative received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program. The first South Carolina Priority Climate Action Plan was issued in March 2024.
South Dakota	(2023) H.B. 1239 (2023) S.B. 174	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	N/A	Opted out of the Climate Pollution Reduction Grants program through the EPA.

Tennessee	(2023) S.B. 367 (2023) H.B. 946	S.B. 367 prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state. H.B. 946 requires political subdivisions imposing clean energy requirements on public utilities to recognize a broad range of permissible energy sources, including solar, wind, hydropower, hydrogen, nuclear, natural gas, fuel cells, waste-to-energy, geothermal, energy storage, dedicated energy crops, industrial byproduct technologies, waste heat recovery, combined heat and power, pumped storage hydropower, and compressed air energy storage. In 2022, the Tennessee Natural Gas Innovation Act was enacted, encouraging the integration of innovative natural gas resources into the state's energy infrastructure.	N/A	On behalf of the state of Tennessee, the Dept of Environment and Conservation received planning grant funding from the U.S. EPA's Climate Pollution Reduction Grant (CPRG) program. The first Tennessee Volunteer Emissions Reduction Strategy was issued in March 2024.

Texas	(2023) S.B.1017	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state. In 2024, the Texas Commission on Environmental Quality launched the New Technology Implementation Grants (NTIG) to help cover the additional costs associated with reducing emissions from industrial facilities and stationary sources across the state.	(2023) S.B. 784 (2023) S.B. 1860	S.B. 784 grants Texas exclusive authority over GHG emissions regulation, barring municipalities and political subdivisions from enacting or enforcing their own measures. S.B. 1860 prohibits municipalities from holding elections on climate charters without legislative approval. Climate charters adopted before the bill's effective date remain valid until 2026.
Utah	(2021) H.B. 17	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2021) Concurrent Resolution Encouraging Statewide Emissions Reduction Goals (House Concurrent Resolution 5)	In 2019, the Utah Legislature tasked the University of Utah with developing the Utah Roadmap to address climate and air quality challenges. Released in January 2020, the roadmap recommended GHG reduction targets from a 2005 baseline: 25% by 2025, 50% by 2030, and 80% by 2050, along with a 50% reduction in air pollutant emissions by 2050 (from 2017 levels).In 2021, the Legislature introduced House Concurrent Resolution 5 (H.C.R. 5), endorsing these goals. However, the resolution failed to pass, and no further legislation has been introduced to enforce the roadmap’s recommendations. Despite this, the roadmap continues to shape Utah’s climate and air quality policy discussions.

Vermont	(2024) Climate Superfund Act (H.B. 809)	The Climate Superfund Act creates the Climate Superfund Cost Recovery Program under the Agency of Natural Resources. It requires fossil fuel extractors and crude oil refiners operating between 2000 and 2019 to pay for their share of greenhouse gas-related costs in Vermont if their emissions exceeded one billion metric tons. Funds collected support climate resilience projects. Governor Phil Scott did not sign the bill, but it was allowed to become effective after five days of the governor's inaction.	(2023) S.B. 5 (2023) Rulemaking Docket # 23-2220-RULE	S.B. 5 establishes the Clean Heat Standard to reduce GHG emissions from the thermal sector. It requires the Public Utility Commission (PUC) to create a tradeable clean heat credit system, setting annual credit retirement requirements for obligated parties. Eligible clean heat measures must have a carbon intensity below 80 by 2025, 60 by 2030, and 20 by 2050. Pipeline renewable natural gas (RNG) and other renewable gas substitutes qualify if parties secure physical delivery contracts. Following 2023 legislation, the PUC initiated Case No. 23-2220-RULE to develop the Clean Heat Standard and submit a proposed rule to the legislature by January 15, 2025. On February 14, 2024, the PUC submitted an initial report outlining progress. If implemented, the standard would require obligated parties to retire credits annually to meet thermal sector emission reduction targets. Vermont is also a member of the Regional Greenhouse Gas Initiative (RGGI).

Virginia	(Failed 2023) H.B. 1783	This law aimed to prohibit governmental entities from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state. The legislation was referred to the Senate after passing through the House but was passed by indefinitely in the Senate. In 2022, the Virginia General Assembly passed the Virginia Energy Innovation Act, which encourages natural gas utilities to invest in renewable natural gas (RNG) projects.	(2020) S.B. 94 Executive Order 9	In 2020, Virginia passed S.B. 94 which established GHG emissions reductions goals of net-zero emissions by 2045, and electric power generation goals of 30% renewable energy by 2030 and 100% carbon-free electric power by 2040. In 2022, Gov. Glenn Youngkin issued Executive Order 9, which requires the Department of Environmental Quality to reevaluate Virginia's participation in the Regional Greenhouse Gas Initiative (RGGI) and begin regulatory processes to end it. Currently, several parties have filed suit against the case and are waiting ruling, though previously filed suits have not had favorable rulings in court. Virginia has been removed from the list of RGGI members and did not participate in the March 2024 auction.
Washington	(2021) Energy Decarbonization Pathways (Docket # U-210553)	The Washington Utilities and Transportation Commission (WUTC) initiated the "Energy Decarbonization Pathways" proceedings in 2021 to assess how investor-owned electric and gas utilities can reduce greenhouse gas emissions under state law (RCW 70A.45.020). The proceeding examines emissions, capacity, and the tension between expanding gas infrastructure and climate goals. The Climate Commitment Act targets a 45% emissions reduction below 1990 levels by 2030 and 95% by 2050.	(2021) Climate Commitment Act (S.B. 5126)	Established a cap-and-reduce program for Washington's largest emitters. The policy allows businesses flexibility in cutting emissions while supporting the state's goal of a 95% GHG reduction by 2050.

West Virginia	(2021) H.B. 2842	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2023) S.B. 609	Prohibits coal, oil, or natural gas power plants from decommissioning or deconstructing without Public Energy Authority approval. Approval requires a third-party analysis assessing the social, environmental, and economic impacts at local and state levels, as well as potential alternatives, including reconstruction with novel or green technologies.
Wisconsin	(Failed 2023) S.B. 49	This law aimed to prohibit governmental entities from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state. The bill passed in the Senate and moved on to the House, where it ultimately failed to pass.	(2019) Executive Order 38	Established the Office of Sustainability and Clean Energy (OSCE) to collaborate with utilities in achieving 100% carbon-free electricity by 2050. The OSCE released Wisconsin's first Clean Energy Plan in 2022.

Wyoming	(2021) S.F. 0152	Prohibits a governmental entity from restricting a person or entity from using utility services from a provider that is capable of providing service and is otherwise authorized to do business in the state.	(2020) H.B. 200 (2024) S.F. 42	H.B. 200 required coal and natural gas power plants to install carbon capture technology to reduce emissions to 650 lb/MW (annual average) by 2030. In 2024, S.F. 42 amended the law to apply only to coal plants, raising the emissions cap to 18,750 tons CO_2/year, increasing the utility threshold to 10,000+ customers, and extending the deadline to 2033. The law took effect in March 2024.

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