Grounded in Reality

The Impacts of Electrification in Metropolitan Chicago

Executive Summary

Introduction

As Illinois seeks to reduce greenhouse gas emissions, the continued use of natural gas, which provides efficient, safe, reliable, and affordable energy, will be essential to meeting this goal. Natural gas is already helping Illinois move to a cleaner energy future, providing reliable energy while driving down emissions and complementing renewables for more consistent grid reliability. The constant improvements through energy efficiency are also saving consumers money and protecting customer choice.

This analysis, prepared by the American Gas Association (AGA) using the forecasts developed by the National Renewable Energy Laboratory (NREL) and its ReEDS model of electric power markets[1], shows that the use of natural gas can support Illinois's economy by creating a sustainable path to a clean energy future while keeping energy costs low for consumers and businesses. Alternatively, employing an electrification policy in Illinois would do just the opposite, driving up costs for consumers, communities and businesses without significant environmental gains.

The Data Supports Natural Gas

AGA modeled the impact of a local gas moratorium in the tri-state Chicago metropolitan area[2] to understand the implications of a gas moratorium for consumers, the environment, and the local economy. The data shows just how devastating this would be in Illinois.

The analysis found that the annual average energy cost for a home with high-efficiency gas would be $1,150 per year. While the annual average energy cost for an all-electric home, without the addition of any upgrades to the electrical panel, is $2,140 per year – a significant cost burden for homeowners. In older homes, the average cost increases to $2,320 per year due to higher costs of equipment and electrical panel upgrades. All in, natural gas homes would save an average $1,000 to $1,170 a year, and the all-electric home would witness an 86-101 percent cost increase compared with a home with high-efficiency gas appliances. This increase in annual costs would be felt by a sizable portion of Chicago residents who have no financial cushion for an emergency expense and adds an unnecessary barrier to the economic recovery of all Americans who have had their savings drained by the COVID pandemic.[3][4]

[1] See Methodology section at end of "Grounded in Reality" report.

[2] Formally defined as Cook, DeKalb, DuPage, Grundy, Kankakee, Kane, Kendall, Lake, McHenry, and Will Counties in Illinois; Jasper, Lake, Newton, and Porter Counties in Indiana; and Kenosha County in Wisconsin.

[3] https://www.federalreserve.gov/publications/files/2018-report-economic-well-being-us-households-201905.pdf

[4] https://www.unitedforalice.org/Attachments/AllReports/19UW_ALICE_Report_IL_Full_Report_11.19.19_Lowres.pdf

The analysis assumed that electrification would proceed gradually over the next two decades as additional new buildings come online and existing buildings' heating equipment reaches end of life. Over a 20-year period, the cost of ownership from an electrified house in the Chicago area would be between $42,800 and $46,400, compared to $22,900 if using high-efficiency natural gas equipment. By 2041, net costs for residential customers in the Chicago metropolitan area would be $1.4 billion higher, and commercial customers' costs would be $903 million higher. Over the period from 2022 to 2041, residential customers' cumulative costs from a forced electrification policy would increase by $15.2 billion, and commercial customers' increase in costs would be $9.9 billion.

The higher costs of living and doing business would have significant and negative implications for economic growth in metropolitan Chicago. First, households facing higher energy costs would likely reduce their spending on consumer staples, which would negatively impact the service sector in the area. Businesses that pay more for energy would pass their higher costs along to customers or be less competitive.

And if Chicago enacted a local natural gas moratorium, the city would see even more economic devastation. By 2041, such a policy would mean 14,500 fewer jobs than it would if high-efficiency gas is available to consumers. Though these job losses would be spread broadly across the region's economy, certain sectors, such as healthcare; finance, insurance, and real estate; retail trade; and the hotels and food services sector would be especially affected.

And to what end? Despite all these costs to homeowners and businesses, the reduction in GHG emissions in the form of carbon dioxide (CO_2) from electrifying residential and commercial space and water heating would be minimal. The electrification scenario would decrease the Chicago area's net carbon dioxide (CO2) contribution to the National GHG Inventory by a mere 0.5 percent (from 2019 levels) compared to high efficiency gas – a cumulative 34.4 million metric ton reduction between 2022 and 2041.By 2041, the cost of this would be a tremendous $25.1 billion (net) for customers.

To put a finer point on it – the cost of saving one metric ton of CO_2 in Chicago in this scenario would be $732. For context, the current Biden administration prices carbon at approximately $51 per metric ton under the Social Cost of Carbon (SCC) tool.[5] The high costs of emissions reductions demonstrate that a forced electrification strategy is not the most economical way to reduce emissions nor the most environmentally beneficial.

In addition to the costs that home and business owners would shoulder, the societal costs of electrification are a critical piece of the data that need to be included in any discussion about a city or state's energy future. On a nationwide basis, electrifying the entire residential sector by 2035 would increase peak electric system demand and could require the size of the entire U.S. power generation sector to almost double. These significant increases in electric power demand would require massive new investments in new electric generation, transmission, and distribution infrastructure. The total economy-wide increase in energy-related costs from policy-driven residential electrification could be significant. In Illinois, the 20-year cost of owning an all-electric home would increase upwards of 102 percent over the lifetime of the appliance equipment.

Methodology

This analysis, prepared with data from the American Gas Association (AGA), shows that the use of natural gas can support Illinois's economy by creating a sustainable path to a clean energy future,

[5] The SCC is currently open for public comment: https://www.federalregister.gov/documents/2021/05/07/2021-09679/notice-of-availability-and-request-for-comment-on-technical-support-document-social-cost-of-carbon

while keeping energy costs low for consumers and businesses. AGA's estimate of the new emissions from power generation derive from the forecasts developed by the NREL and its ReEDS model of electric power markets. Assumptions for this analysis come from the Low Renewable Cost Scenario and its long-term projections of marginal emissions from new sources of demand. It's worth noting, however, that the costs described in this analysis for phasing out natural gas use through the replacement of heat pumps and water heaters, are really the bare minimum. This analysis does not touch on the additional costs that would be necessary to improve electric infrastructure, resilience, and reliability – not to mention the rate increases borne by the remaining natural gas customers as other customers are driven towards electrification of these appliances.

Conclusion

AGA has offered up this perspective as Illinois state government leaders develop a Greenhouse Gas (GHG) Emissions Reductions Roadmap that pursues an all-electric future that includes a target to "increase building efficiency and electrification." As the Roadmap prioritizes lower emissions and greater energy efficiency, natural gas is already playing a key role in accomplishing both of those goals while supporting consumers and businesses.

The natural gas industry and Illinois's natural gas utilities are committed to a sensible approach that includes all energy sources, innovative low carbon technologies like renewable natural gas and energy efficiency, without sacrificing the reliable energy that Americans want, need and expect.

As Illinois considers how it should best transition to a lower-carbon future, several key questions must be answered, including:

- How does the cost of forced electrification compare with other strategies to reduce greenhouse gas emissions?
- What are the cost and infrastructure impacts to the electric grid?
- How is customer choice factored into the decision to implement these policies?
- Which approach is best for local homes and businesses?

This analysis shows that removing natural gas from the state's suite of energy options would have negative impacts on residents and the economy with only minimal greenhouse gas emissions reductions. Cleaner-burning natural gas provides affordable, reliable energy that saves money for consumers and businesses, supports jobs, and helps reduce emissions, facts that need to be part of a transparent conversation around the future of our nation's