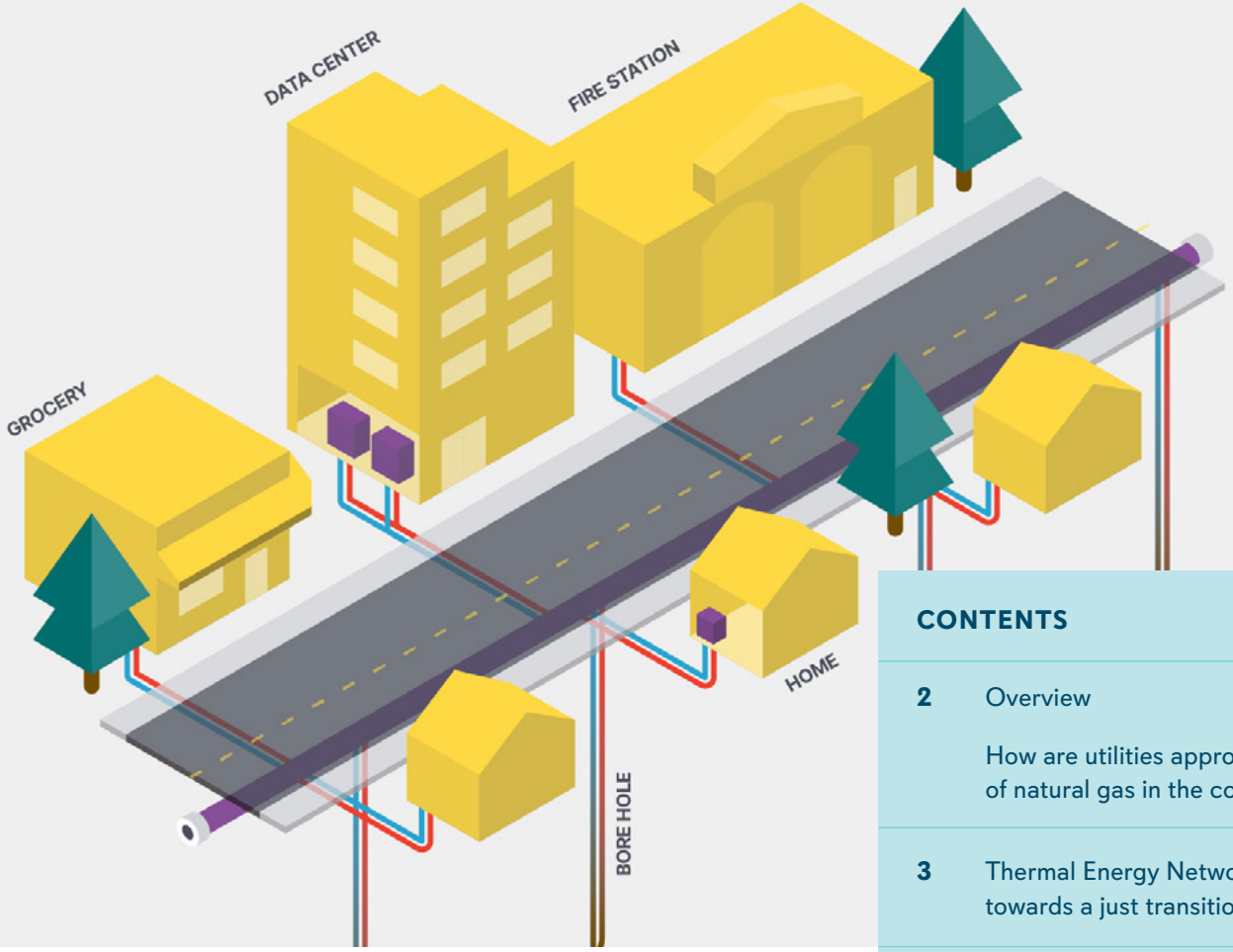
# THE FUTURE OF GAS

## Decarbonizing gas utilities through thermal energy alternatives

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# OVERVIEW

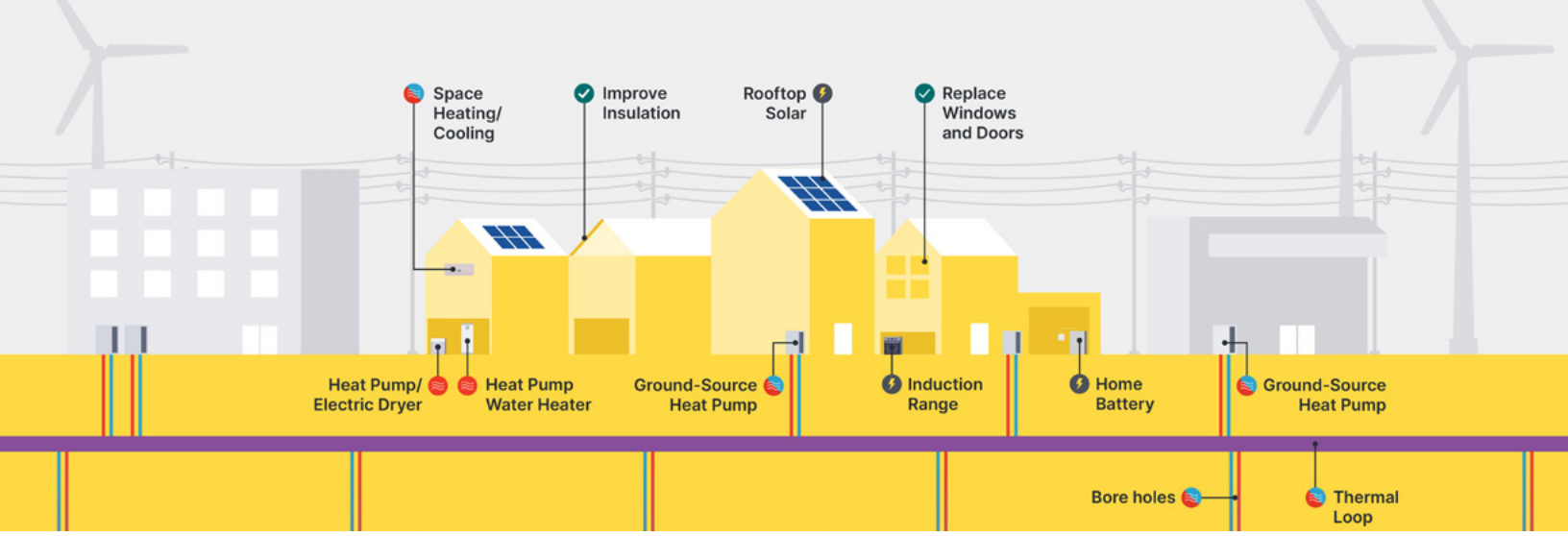
**THE DECARBONIZATION OF THE ENERGY UTILITY SECTOR**, which comprises 25% of U.S. GHG emissions, is a top priority for investors in the ICCR network. The focus to date has been on decarbonizing electricity production, reducing methane leaks in gas distribution value chains, and ensuring a just transition in the process. The current transition of gas distribution companies, whose product is used especially in cities for heating buildings, as well as for household appliances, is increasingly of concern. The net-zero transition plans of energy utilities continue to include investments in maintaining and expanding their gas businesses, despite the urgent need to move away from fossil fuels. Ageing gas systems prone to methane leaks must be repaired in the short term, but companies are currently asking for large sums from ratepayers in cities across the country for wholesale replacement of gas systems that risk becoming stranded assets after 15-20 years. These systems are designed to last for 50-70 years, but climate concerns argue for the immediate transition to electrification and alternative thermal energy systems to replace the use of fossil fuels.

Investors are concerned about the expensive 'solution' to the 'sustainability' of gas networks advocated by the American Gas Association and major gas utilities, i.e., the use of renewable natural gas (RNG) and hydrogen to replace the current use of fossil gas. Cost studies of a mix of RNG and low-carbon hydrogen reveal this combination to be unduly expensive, and there are serious limitations on the supply of RNG. Investors should consider engaging gas utilities on the urgent need to consider truly sustainable alternatives to the continued investment in gas infrastructure and should consider the deployment of non-combusting thermal energy networks including geothermal networks.

## HOW ARE UTILITIES APPROACHING THE ROLE OF NATURAL GAS IN THE COMING DECADES?

The burning of fossil fuels in buildings accounts for about 10 percent of total U.S. carbon emissions. And, in 2020, 52% of households in the United States used natural gas for space heating, making it the main contributor to household greenhouse gas emissions. Despite the consensus on the need to move away from fossil fuels, gas utilities continue to maintain that fossil gas can be a "sustainable energy source." To this end, new pipelines are still being developed, and aging infrastructure is being replaced, rather than simply repaired. These decisions entail high upfront costs and threaten to maintain dependence on fossil fuels for years. Continued investment in gas infrastructure is premised on the development and implementation of new technologies, about which serious questions have been raised.

The first of these is the proposal to deploy "renewable natural gas," which is the use of methane derived from organic sources such as landfills, sewage treatment facilities, forests, livestock operations, and farms. Unfortunately, this is not the best solution, as there are questions about adequate availability and location, and it is not cost-effective compared to electrification. In addition to an expensive and inadequate supply of RNG, gas utilities are proposing the blending of 'low carbon' hydrogen (blue or green) into the pipeline. Given the climate footprint of the methane needed for the manufacturing of blue hydrogen and the energy intensity of the production process, it is hard to argue that blue hydrogen is a low-carbon fuel. Biomethane and green hydrogen can have limited, appropriate uses. Biomethane can be used on site to produce electricity. Green hydrogen can be a pathway to decarbonizing the hardest to electrify heavy industries and for on-site storage.

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But neither should be piped or burned as part of the gas utility distribution system. In addition, current pipeline infrastructure only allows a maximum blend of 20% hydrogen, which reduces GHG emissions by only around 6-7% in energy terms. Analyst Michael Liebreich's "Clean Hydrogen Ladder" describes heating as one of the least competitive uses for hydrogen.

Importantly, there have been significant advances in electric heat pump technologies, making these systems more effective in cold temperatures and a good alternative for heating and cooling buildings. Heat pumps have received important federal and state policy support and are being deployed more widely. At the same time, we believe that the decarbonization of the building sector and the gas utilities that supply their heating/cooling needs in urban areas should consider only options that have demonstrated scientific merit based on peer-reviewed research (and that do not require distributing or burning volatile, health-endangering, climate warming gasses). The environmental, social, and economic variables of each should be carefully considered.

## THERMAL ENERGY NETWORKS: A PATH TOWARDS A JUST TRANSITION

Thermal energy networks is the umbrella term for buildings connected by underground pipes, carrying non-combustible energy, for both heating and cooling. Geothermal networks are an important subset of thermal energy networks that utilize shallow boreholes to access the constant temperature of the earth for both energy and storage. These systems present an opportunity for gas utilities to decrease emissions efficiently, equitably and at scale and to evolve into thermal energy companies.

Widespread use of thermal energy networks, including networked geothermal, can reduce the amount of solar and wind buildout needed in the transition by greatly reducing the need to electrify all heating and cooling, particularly in cities and suburbs, and especially for new construction. There is growing evidence of the enormous potential for reducing GHG emissions inherent in these technologies when accompanied by housing retrofit programs.

Another advantage of their use is their contribution to grid reliability. The electrification of heating and cooling stresses the grid, especially during winter and summer peaks. Full electrification will require greater investment in generation and transmission, in addition to complicating management of the grid. A lower demand for electricity due to the greater efficiency of geothermal energy networks in particular, reduces the total costs of the system and ensures greater reliability, avoiding the so-called "Falcon Curve".

In addition to making the decarbonization of our energy system easier and more resilient, a shift to thermal energy networks would have positive impacts on people's health, both because of the reduction of toxic impacts at gas extraction sites and from avoiding the health problems stemming from the use of gas in residences. Because existing public subsidies tend to focus on homeowners, it can be very difficult for renters to access assistance in order to transition to new efficient heating and cooling systems, which disproportionately burdens historically neglected, low-income communities, often communities of color. In the future, these communities could be "trapped" as ratepayers of gas utilities, faced with ever increasing monthly bills to cover the fixed costs of a shrinking customer base, as households with resources switch away from gas.

The tasks required for the construction and maintenance of these systems are similar to traditional ones. Therefore, the positive impacts that their adoption can have for workers in the gas industries, which are typically unionized, must be considered, as they could maintain their positions through minimal reskilling. We have identified interest from unions in taking this path and hope that companies' willingness to do so will grow.

So far, the use of thermal energy networks has been limited, but we are already seeing systems emerge around university campuses and pilot programs, such as the one by Eversource in Framingham, MA. One of the objections to their deployment is high upfront costs, due to the drilling needed. While this is true, gas utilities are currently spending billions on the replacement of leaky pipes, and studies show the economic benefits of thermal networks in the medium and long term. Additionally, the use of waste heat and heat recovered from wastewater can reduce the upfront infrastructure costs.

At the same time, there are relevant regulatory issues that must be analyzed. Today, gas utilities are incentivized to maintain the status quo, due to the structure of rates and the way in which they are financed, for the construction of fossil infrastructure. It will be necessary to create a "business case" for companies in order to transition to the widespread use of thermal energy networks.

## SHAREHOLDER ENGAGEMENT

- Advocate for the expansion of thermal energy networks with gas utilities. These processes must involve the permanent workforce, at least for training purposes, and if contractors are required, their workforce should be unionized or offer prevailing wages.
- Ensure an effective assessment of the benefits and risks of the net-zero transition plans developed by gas utilities, including their real impact on GHG emissions, availability, costs, and the buildout of potential stranded assets, as well as the social and health impacts of continuing to use fossil fuels.
- Incorporate a just transition framework into the industry's development plans. These require special attention to how historically disadvantaged communities and racial discrimination are addressed.
- Promote the widespread implementation of reskilling processes in the workforce of gas utilities; the transition should not be paid for by the working class.
- Encourage gas utilities to leave the American Gas Association (AGA) due to the trade association's opposition to transitioning to systems with a lower environmental impact.

## POLICY RECOMMENDATIONS

- Support the development of thermal energy networks by instituting federal and state subsidies to encourage the adoption of home systems, public investments, and to support research development.
- Monitor, and ideally participate in, the development of state-level policies regarding the future of gas, such as those that have occurred in states like Massachusetts or New York.
- Advocate for the end of new fossil fuel infrastructure buildout.
- Participate in discussions about the viability of the gas utility business model in the current energy transition. Discussion should include a systemic view of how tariffs are set, plans for the end of fossil fuel use, the flight of ratepayers with access to capital from gas to electricity to power their heating and cooling systems, and the development of new services linked to thermal energy networks.

## ORGANIZATIONAL RESOURCES

- **Building Decarbonization Coalition**
- **Geoexchange**
- **Groundwork Data**
- **Heet**

## RESOURCES

- U.S. Dept. Of Energy, **Report on Costs and Emissions Reduction Through Mass Deployment of Geothermal Heat Pumps**
- **HEET, Strategies for Reducing the Hidden Costs of Methane Emissions & Transitioning Off Gas**
- **HEET, Philadelphia's Gas Pipe Replacement Plan: How Much Will it Cost and Does it Make Sense?**

- **Groundwork Data Research:**
  - **The Future of Gas in Illinois**, May 2024
  - **Leaked & Combusted: Strategies for Reducing the Hidden Costs of Methane Emissions & Transitioning Off Gas**, Dorie Seavey, PhD, May 2024
  - **Thermal Transition Strategy Study Non-Pipeline Gas Alternatives to Gas Pipeline Replacement**, May 2024
  - **New Construction and the Future of Gas in Massachusetts**, Feb. 2024
  - **Equitable Energy Transition Planning in Holyoke, MA**, Dec. 2023
  - **Philadelphia's Gas Pipe Replacement Plan: How Much Will it Cost and Does it Make Sense?**
  - **The Future of Gas in New York State**, March 2023
- **The Economic Value of Ground Source Heat Pumps for Building Sector Decarbonization Review of a Recent Analysis Estimating the Costs of Electrification in Canada**, Prepared by Dunsky for the Heating, Refrigeration and Air Conditioning Institute of Canada (HRIA), October 2020