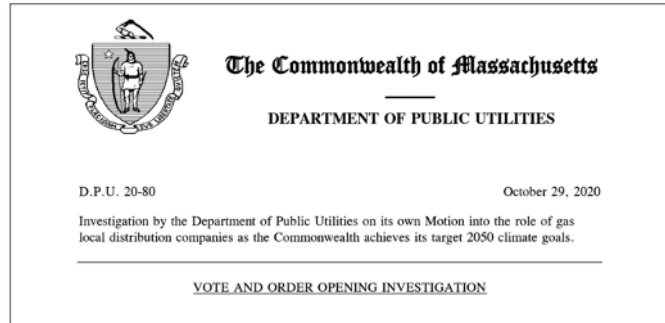


Goals

- Reduce emissions

MA Gas Decarbonization Planning



heet

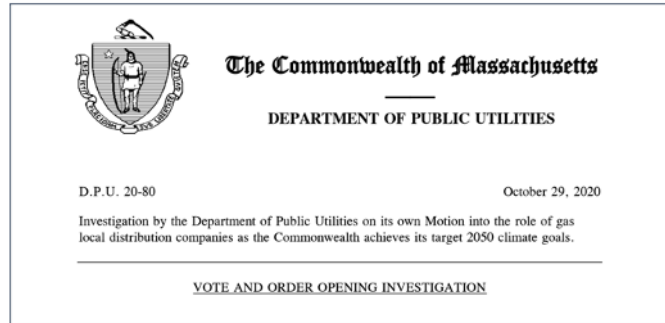
I'm Audrey Schulman, Co-Executive Director of HEET. We do not take funding from gas utilities or industry. It's an honor to address you, Chair Creem and Senator Barrett.

I'd say there are basically 6 goals of the 20-80 proceedings. They are to find methods for gas utilities to 1) reduce emissions

Goals

- Reduce emissions
- Provide heat

MA Gas Decarbonization Planning



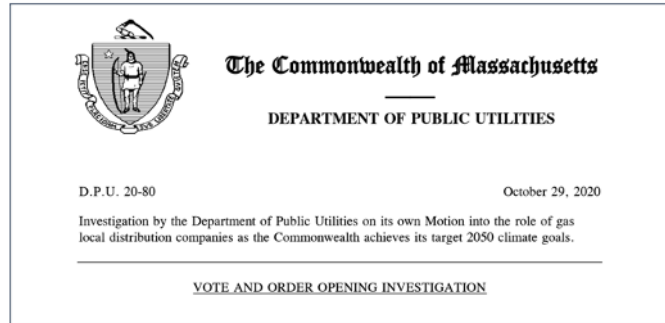
heet

while still 2) providing heat to homes and businesses.

Goals

- Reduce emissions
- Provide heat
- Affordable

MA Gas Decarbonization Planning



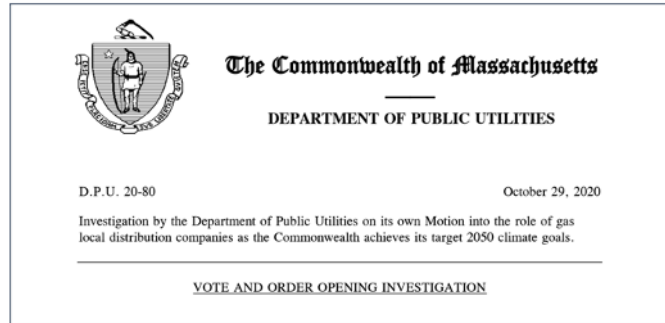
heet

3) at an affordable cost and

Goals

- Reduce emissions
- Provide heat
- Affordable
- Safe
- Equitable

MA Gas Decarbonization Planning



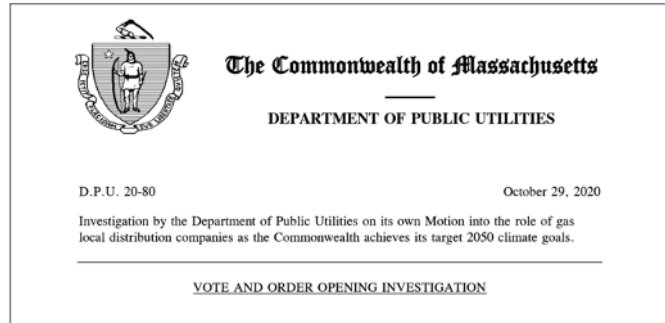
heet

in a 4) safe and 5) equitable way.

Goals

- Reduce emissions
- Provide heat
- Affordable
- Safe
- Equitable
- Maintain business operations

MA Gas Decarbonization Planning

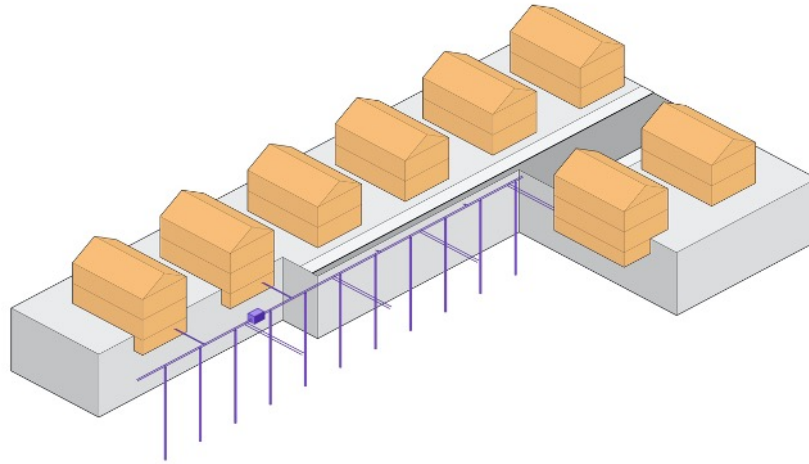


heet

And I think it's important to add the goal of having the utilities stay in business. None of us would enjoy seeing a utility death spiral. As the utility's revenue decrease, prices rise and customers with the financial means defect off gas to electricity, leaving just low income residents and renters to pay the fixed costs of maintaining the gas system.

“Networked Geothermal”

AKA the GeoGrid SM



6

heet

So, of the 8 pathways modeled, the E3 analysis shows that networked geothermal, or the GeoGrid, might meet those 6 goals pretty well.

The GeoGrid is a street segment system of networked ground source heat pumps and boreholes installed under the street where the gas pipes normally go. The system is filled with plain water, moving temperature through a neighborhood, allowing each building to pull off the heating or cooling it wants via heat pumps. Because each GeoGrid can interconnect, it can grow over time, transitioning gas utilities into non-emitting thermal utilities.

Goals

- Reduce emissions

Annual Emissions: Gas versus GeoGrid

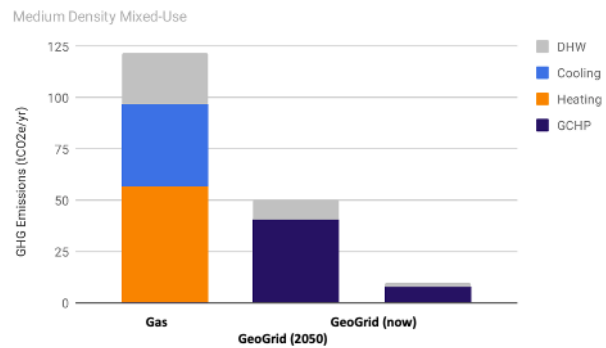


Figure V-3: Medium Density Mixed-Use GHG emissions from heating, cooling, and DHW

Buro Happold Engineering Feasibility Report



Let's discuss how the GeoGrid meets those 6 goals.

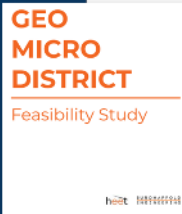
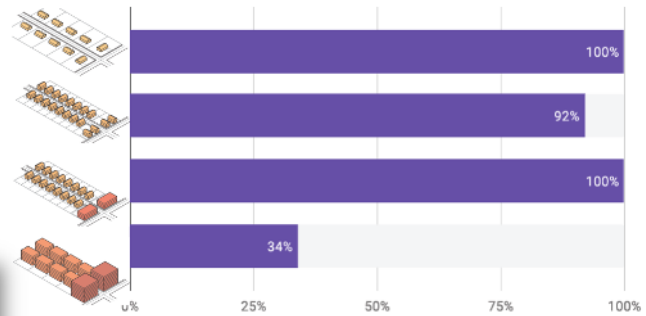
Any building connected to the GeoGrid reduces its emissions immediately 60% lower than gas. Those emissions will decline further as the electric grid moves to renewables.

Goals

- Reduce emissions
- Provide heat

Technical Feasibility (by street segment)

Ability to meet energy demand through 'shallow' boreholes in the street only



Buro Happold Engineering Feasibility Report

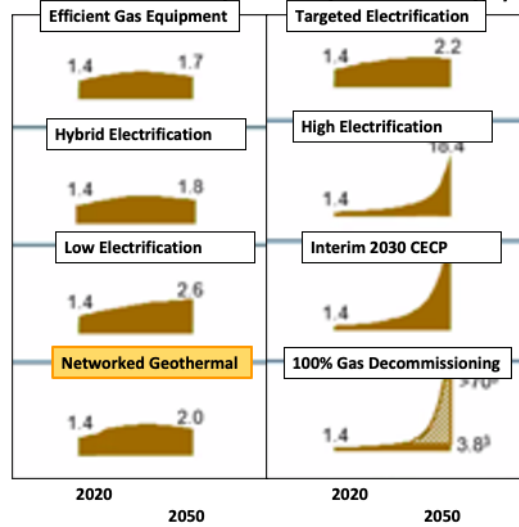


BuroHappold Engineering's feasibility study found the GeoGrid can provide almost all the heating we need in most of the state's gas service territory. It can also deliver cooling, which we need more of as the climate warms.

Goals

- Reduce emissions
- Provide heat
- Affordable
- Safe

Annual Revenue Requirement per Customer (\$k)



E3 Independent Report for MA Gas Utilities

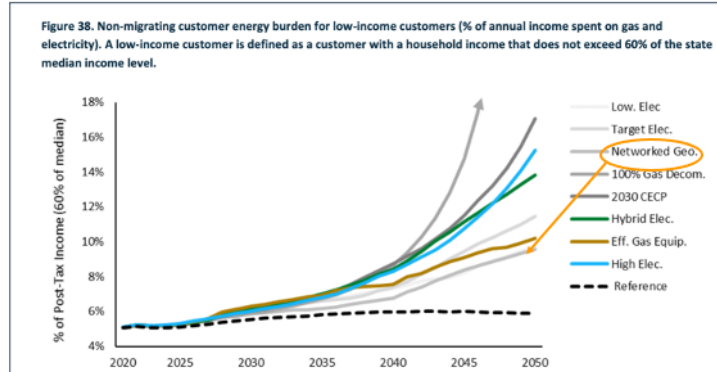
heet

In terms of affordability, here's E3's analysis for the 8 pathways of annual customer costs over the next 30 years as we transition. Basically, if the brown blob for a pathway spikes, that means prices spike. You can see the Networked geothermal pathway results in some of the lowest total energy bills. The average customer pays just \$2,000 per year for heating in 2050. That's a fraction of the customer bills for some of the other pathways. At the same time, the GeoGrid still moves us away from combustion. **And** improves safety, since there is just water in the pipes, not an explosive gas.

Goals

- Reduce emissions
- Provide heat
- Affordable
- Safe
- Equitable
- Maintain business operations

Low-Income Energy Burden



E3 Independent Report for MA Gas Utilities

heet

Of the eight pathways examined, the GeoGrid results in the lowest energy bill for low income customers who remain on gas.

That's partly because, as the GeoGrid grows, its increased geo revenue can offset the decline in gas revenue, helping the utilities to maintain operations and avoid a death spiral.

In terms of our net zero emissions mandate, the GeoGrid can flip the utilities from obstacles to accelerants. And the utilities are interested. Eversource and National Grid have been approved to install a total of 5 GeoGrid demonstrations over the next 4 years.

The problem is that the gas utilities can't legally install the GeoGrid except as demonstration installations. They can only sell gas and can only spend GSEP funds on gas infrastructure. This is something only you, the legislature, can change. Allowing them, the option to install the geogrid and to sell heating and cooling, incentivizing them to do so, will allow them in this critical moment the option to evolve. Potentially it can avoid the disaster of a death spiral and allow us to increase the speed and scale of our transition to safe, lower cost renewable energy.