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Green • Clean • Sustainable

Resilience & Critical Infrastructure to enable Boston's decarbonization goals

FACTS

Resiliency
The ability to serve critical energy loads during a multi-day outage.

Weather Related Outages
Between 2003 and 2012, an estimated 679 widespread power outages occurred due to severe weather disrupting the lives of millions of Americans.

Value of Resiliency
Between 2003 - 2012, weather-related outages are estimated to have cost the U.S. economy an inflation-adjusted annual average of $18 billion to $33 billion

Baseload Fuel
In most cases, fossil fuel is necessary to serve critical energy loads during a multi-day outage.

*Data from 2013 report prepared by the President's Council of Economic Advisers and the U.S. DOE's Office of Electricity Delivery and Energy Reliability, with assistance from the White House Office of Science and Technology

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Natural Gas Concerns

The drilling and extraction of natural gas from wells and its transportation in pipelines results in the leakage of methane, the primary component of natural gas.

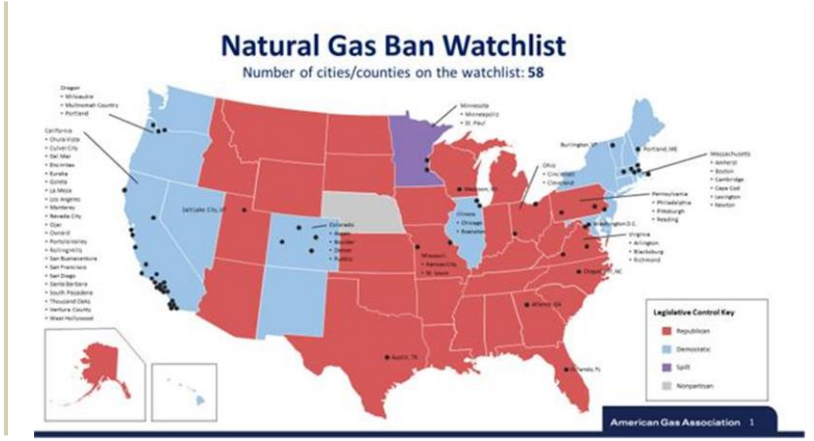
Environmental Movement

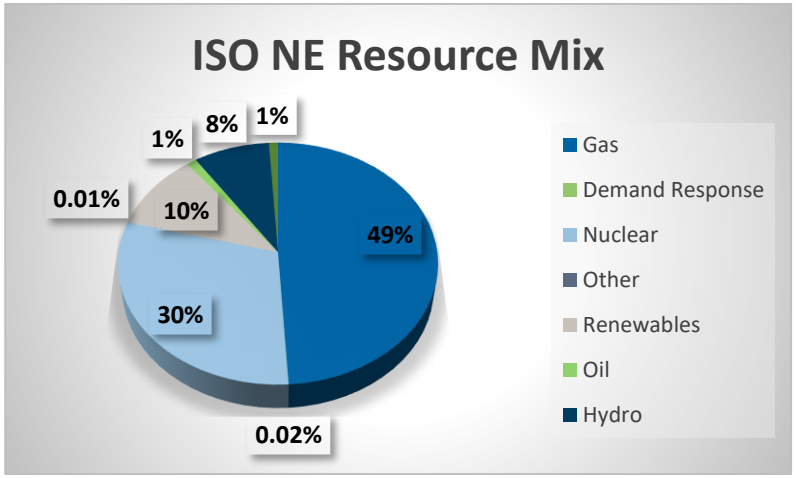
With concerns about natural gas's impact on climate change rising, several cities and towns have started exploring outright bans on new natural gas hookups in commercial and residential buildings.

Natural Gas – Baseload Fuel

Nearly half of the region's electric generating capacity uses natural gas as its primary fuel (about 15,000 MW), and natural-gas-fired power plants produce about 40% of the grid electricity consumed in a year.

Methane is up to 34 times stronger than CO_2 ,the reference gas for Global Warming, at trapping heat over a 100-year period and 86 times stronger over 20 years.

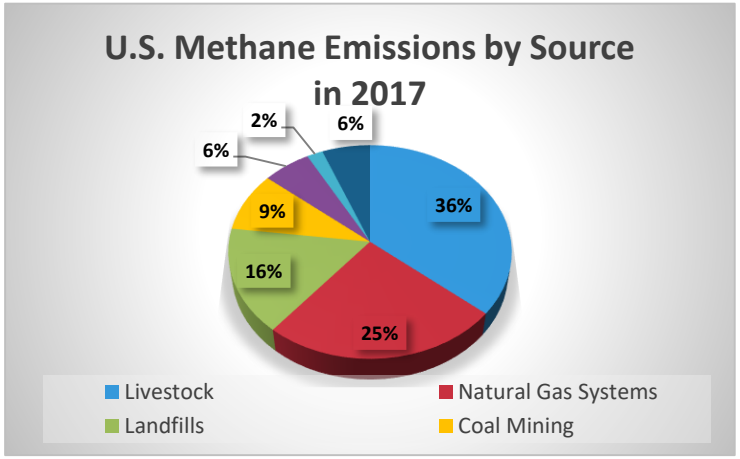




Renewable Natural Gas (RNG)

Renewable Natural Gas

- Alternative to natural gas
- Makes use of resources that are **already in our environment and** are typically **generated from human activities**.
- Instead of voluntarily extracting natural gas that is already sequestered in the earth, we can capture biogas in its raw form that is a result of the decomposition of biomass (i.e., organic matter) and process it into a usable form of energy.



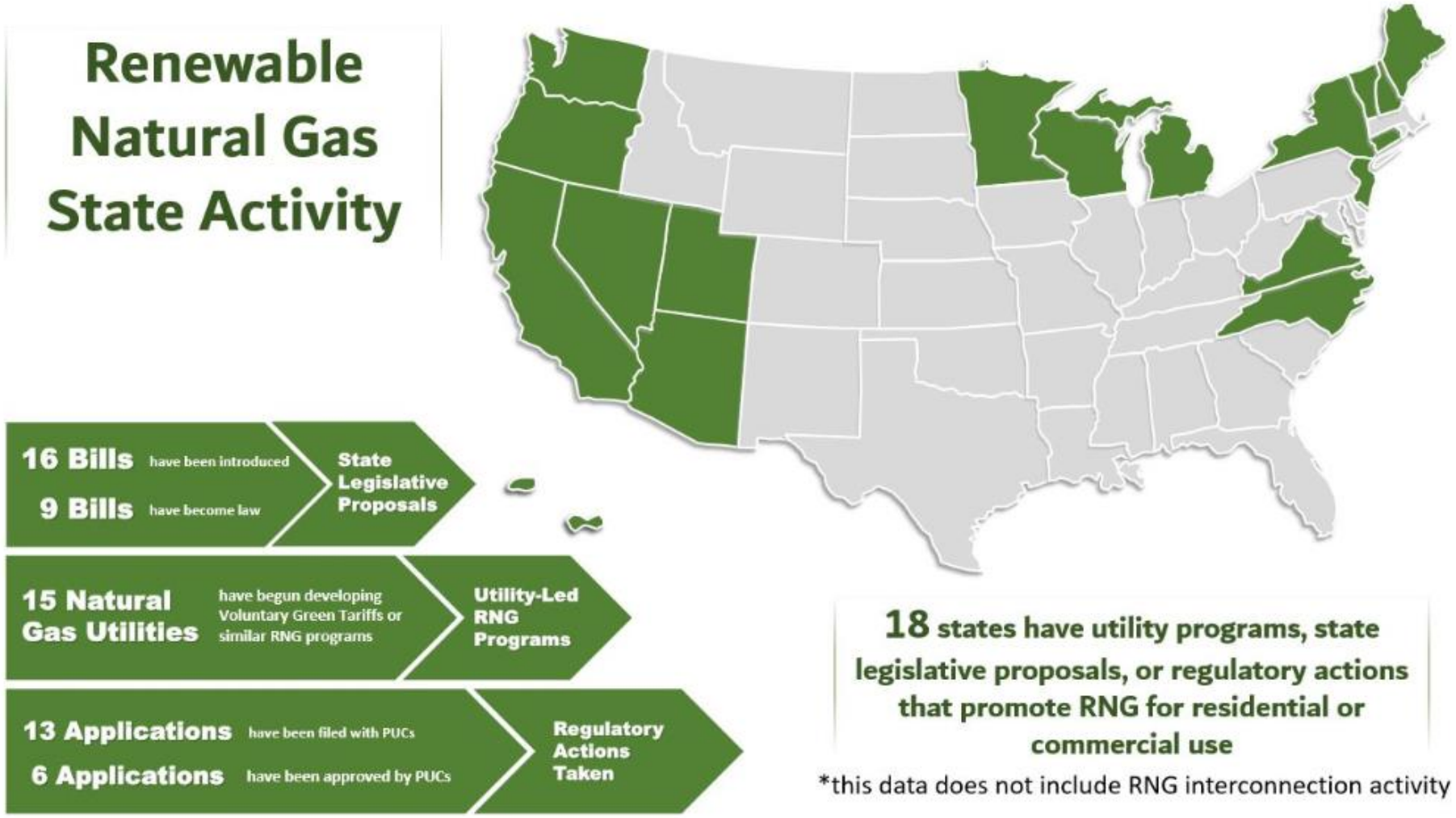
Carbon Neutral Fuel

- **Human Activity** (Livestock, landfills, and wastewater treatment) **accounts for 54% of U.S. methane emissions**.
- Given these sources' natural presence, the RNG produced contributes no net increase in greenhouse gas emissions.
- By contrast, burning virgin feedstocks of natural gas extracted from the earth add carbon dioxide that would otherwise have been remained sequestered underground.
- **RNG is considered carbon-neutral** under best-practice carbon accounting methodologies, and organizations can use it to **achieve carbon neutrality in their Scope 1 emissions** related to on-site equipment.

Cost Effective

- 2019 ICF Study concluded:
  - Cost of residential electrification would range between $572 to $806/ton of CO_2 reduced vs $300/ton for RNG
- A 2018 study by Navigant Consulting concluded:
  - Replacing 16% of California's natural gas supply with RNG could achieve greenhouse gas reductions equivalent to electrifying 100% of building loads in California by 2020.
  - Found that the RNG-based approach would be three times as cost-effective in achieving those greenhouse gas reductions as building electrification.

State Activity



Source: American Gas Association presentation to NARUC

A Study conducted by ICF for the American Gas Foundation finds that there is the potential to develop enough RNG supply to replace approximately 29% of the Natural Gas Demand in the Residential and C&I Sectors (only) in the US. Given the limited supply, to enable a Carbon Free Boston by 2050, we must **effectively address the lack of local regulation/legislation to support RNG as a carbon neutral replacement for natural gas** before it is too late.

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