Impacts
Of Policy-Driven Residential Electrification

Richard Meyer
Managing Director, Energy Analysis, American Gas Association

The Council of State Governments
December 8, 2018
The American Gas Association, founded in 1918, represents more than 200 local energy companies that deliver clean natural gas throughout the United States. There are more than 74 million residential, commercial and industrial natural gas customers in the U.S., of which 94 percent — more than 70 million customers — receive their gas from AGA members. Today, natural gas meets more than one-fourth of the United States' energy needs.

www.aga.org
On January 1, 2018, the US set a new record for natural gas consumption.

Peak Day Natural Gas Consumption (Bcf per day)
Residential & commercial demand spiked due to record cold temperatures.

US Natural gas demand on January 1, 2018
(Billion cubic feet per day)

S&P Global
Residential & commercial demand: How much does 79 Bcf of natural gas represent?

US Natural gas demand on January 1, 2018
(Billion cubic feet per day)

79 billion cubic feet natural gas = 24 terawatt-hours of energy = 1,000 gigawatts over 24 hours.

US electric generation capacity: 1,074 gigawatts

S&P Global
Net summer capacity, 2016, EIA
Proposals to reduce greenhouse gas emissions take many forms.

Many studies may assume electrification of building energy loads to be a pathway to decarbonization.
States and municipalities have made commitments to pursue clean energy

406 Mayors, representing 70 million Americans, commit to uphold the Paris Agreement goals

Source: climatemayors.org
As the grid decarbonizes, the calls to “electrify everything” grow.

What happens when you electrify residential space and water heat?
Key Questions the Study Addresses

• Will policy-driven residential electrification actually reduce greenhouse gas emissions?

• How will policy-driven residential electrification impact natural gas utility customers?

• What would be the impacts on the power sector and on electric transmission infrastructure requirements?

• What would be the overall cost of policy-driven residential electrification?

• How do the costs of policy-driven residential electrification compare to other approaches to reduce emissions?
Electrifying the entire residential sector would nearly double the U.S. electric grid’s peak hourly demand.

Impact of Residential Electrification on Peak Winter Hourly Demand (GW)

- Historical Summer Peak Electric Demand: 856 GW
- Incremental Peak Demand Growth:
  - Historical Peak Electric Demand: 671 GW
  - Growth in Capacity (2016 to 2035): 81 GW
  - Market-Based Generation case: 267 GW
  - Renewables-Only case: 219 GW
  - Remaining Residential Gas Load: 441 GW
  - Potential Peak Electric Demand: 1,679 GW

Source: Implications of Policy-Driven Residential Electrification, 2018
Policy-driven residential electrification will be burdensome to the economy and consumers.

Total Cost of Renewables-Only Case by Sector:

- Consumer Energy: $615 billion
- Consumer Capital: $145 billion
- Power Sector Capital: $319 billion
- Transmission Capital: $107 billion
- Total Costs: $1,186 billion

Average U.S. Annual Costs Per Converted Customer:

- Average Energy Costs Before Elec.: $1,990 billion
- Incremental Power and Tx Costs: $510 billion
- Incremental Direct Consumer Costs: $910 billion
- Total Costs: $2,090 billion

Source: Implications of Policy-Driven Residential Electrification, 2018
Policy-driven residential electrification would be a very costly approach to emissions reduction.

Comparison of Cost Ranges for Greenhouse Gas Emissions By Reduction Mechanism

Source: Implications of Policy-Driven Residential Electrification, 2018
A Thoughtful Pathway
Natural Gas Technologies are Reducing Emissions
Emerging gas technologies can make substantial and cost-effective contributions to GHG reduction goals

| 100+ | Innovative Natural Gas Technologies for the residential/commercial market identified in our global search |
| 25-40% | GHG reduction potential on a customer basis by integration of these technologies and other efficiency practices |
| 80%+ | GHG reduction—sufficient to meet COP 21 goals—with inclusion of future combined heat and power technologies and Renewable Gas |

Source: Enovation Partners, May 2018