It's Electrifying! What is Realistic? Vehicles, Homes or Everything?

An Economic Perspective on Residential Electrification

New England Energy Conference and Exposition

June 5, 2018
ICF Energy Solutions

- IT and Cyber Security
- Gas Customer Acquisition Analytics
- Risk and Vulnerability Analysis
- Environmental Compliance
- E&P Permitting
Policy-Driven Electrification of Residential Heating Loads

Discussion of residential electrification as a way to reduce GHG emissions is widespread.

However, the public policy debate on residential electrification has been incomplete.
Policy-Driven Electrification of Residential Heating Loads

- Would it actually reduce emissions?
- How would it impact the electric grid?
- What would the impacts be on consumers?
- Are there better (more effective, lower cost) approaches to reducing emissions?
Natural Gas’ Role is Critical in Both Total and Peak Energy Delivery

**Average Monthly Energy Delivery**

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Residential Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas Delivered to Consumers</td>
<td>1,473</td>
<td>381</td>
</tr>
<tr>
<td>Electricity Delivered to Consumers</td>
<td>1,063</td>
<td>392</td>
</tr>
</tbody>
</table>

**Peak Month Total Energy Delivery**

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Residential Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas Delivered to Consumers</td>
<td>2,529</td>
<td>1,070</td>
</tr>
<tr>
<td>Electricity Delivered to Consumers</td>
<td>1,301</td>
<td>531</td>
</tr>
</tbody>
</table>
Impacts of Residential Electrification in the Northeast

1. In the Northeast, residential electrification could increase GHG emissions.
   - Depending on power generation policy.
   - Reduction potential is less than 1% of annual GHG emissions.

2. In the Northeast, Policy-Driven Electrification would double individual customer energy costs from $2,300 per household per year to:

   $4,600 per household
3. **And to the economy**— The total increase in energy costs in the Northeast range from $393 Billion to $417 Billion (real $2016)

4. **With significant impacts (and costs) on the electric sector:**

$115 to $138 billion in investment in new generating and transmission assets.
Residential Electrification is a Much More Expensive Approach to Reducing Emissions than other Available Alternatives

Emissions Reductions Costs for Alternative Approaches to Reducing CO2 Emissions

- **Transportation - Fuel Efficiency Measures**: $-345 to $5
- **Power Sector GHG Credits (2018)**: $4 to $16
- **Renewable Natural Gas**: $15 to $86
- **New York Social Cost of Carbon**: $47 to $72
- **Transportation - Low Carbon Fuel Standard**: $75
- **Residential Electrification**: $572 to $806

[$2016 per Metric Ton of CO2$]
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