Regulatory and Policy Options to Enable Beneficial Building Electrification

Michigan's Council on Climate Solutions - Buildings and Housing Workgroup

Regulatory Assistance Project (RAP)®

Jessica Shipley
jshipley@raponline.org
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org
1 Context
Status Quo: Inherited Policies

While many technologies and the policies supporting them have served us well in the past …
Regulation Needs Renovation

... new policy priorities and technologies are driving a need for change.
Building Emissions Not Declining

Annual CO₂ emissions from electric power and buildings sectors
Million metric tons CO₂, US total, 2007–2019

Electric Power: Down 33% since 2007
Buildings: Up 7% since 2007

Source, EIA; Adapted from slides by Rocky Mountain Institute

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Fossil Fuels Still Dominate Space and Water Heating

Final energy use in residential buildings

Source: EIA’s Residential Consumption Survey (RECS) 2015
The Opportunity of Building Electrification

- Efficient, clean, and controllable – cost-effective electric end-use technologies installed in US buildings will produce benefits:
  - Cost savings
  - Grid flexibility
  - Lower emissions
The Challenge

- Can regulatory frameworks evolve to enable greater electrification?
- Barriers exist in both regulation and policy:
  - Will hard-to-serve consumers benefit?
  - What should energy efficiency policy & programs look like?
  - Should fossil gas systems continue to expand?
  - How will customers and utilities benefit from flexible building loads?
Renovating Regulation to Electrify Buildings: A Guide for the Handy Regulator

By Jessica Shipley, Dr. Asa Hopkins, Kenji Takahashi and David Farnsworth

- Equitable building electrification
- Load flexibility and grid interactive buildings
- Rate design
- Energy Efficiency Policy and Programs
- Building codes, performance standards
- Gas utility network extension policies
2 Equitable Building Electrification
Access to Equitable Building Electrification

• Goal: ensure that all consumers get access to the benefits of building electrification

• Persistent barriers exist throughout energy regulatory structures
  • The “…and equity” problem
  • Regulators could benefit from additional knowledge and insight into hard-to-reach communities
  • PUC processes are not historically accessible to non-experts
A Renovation Toolkit

- Get a better handle on how well existing programs and policies are working
- Reassess and improve programs regularly
- Improve opportunities for meaningful engagement in policymaking and regulation
- Intentionally design more effective building electrification programs to recognize the needs of a diverse public
3 Load Flexibility and Grid-Interactive Efficient Buildings
Buildings as Grid Resources

Efficient
Persistent low energy use minimizes demand on grid resources and infrastructure.

Connected
Two-way communication with flexible technologies, the grid and occupants.

Smart
Analytics supported by sensors and controls co-optimize efficiency, flexibility and occupant preferences.

Flexible
Flexible loads and distributed generation/storage can be used to reduce, shift or modulate energy use.

What is Load Flexibility?

Water Heating Load Profile

Hours of the day

uncontrolled  controlled

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Challenges and a Renovation Toolkit

Need better articulation of the value of flexibility

- Use pilots to illuminate the various value streams in utility service territories

Traditional regulation disincentivizes utilities from pursuing load flexibility

- Address throughput incentive and capital bias

Utilities rate designs dull consumer awareness and prevent realization of value

- Structure rates to communicate the system value of flexibility

Utility planning fails to recognize flexible buildings as a resource

- Incorporate flexible buildings as a resource into long-term planning
4 Rate Design
Rate Design Renovations Needed

• Structure rates to communicate the system value of flexibility
• Time-differentiated energy charges are needed for the economics of building electrification
# Oklahoma Gas & Electric: Variable Peak Pricing

<table>
<thead>
<tr>
<th>Customer Charge ($/month)</th>
<th>$13.00</th>
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<table>
<thead>
<tr>
<th>Off-Peak (cents/kWh)</th>
<th>3.27</th>
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<tbody>
<tr>
<td>On-Peak (2-7 pm) (cents/kWh)</td>
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<tr>
<td>Low</td>
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<td>Standard</td>
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<tr>
<td>High</td>
<td>18.40</td>
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<tr>
<td>Critical</td>
<td>38.00</td>
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</tbody>
</table>
5 Energy Efficiency Policy and Programs
EE Program Success

Electricity savings from ratepayer-funded efficiency programs

Energy Efficiency Programs Influence Customer Choices

- Enable or obstruct electrification
- Tend to reward switching to a more efficient appliance that uses the same fuel
- Often explicitly disallow fuel switching

Source for images: The Home Depot
Energy Efficiency Programs Influence Customer Choices

- Programs may be working at cross-purposes to BE

- Ultimately: which one saves more energy? Lifetime costs? Emissions?

Source for images: The Home Depot
Challenges and a Renovation Toolkit

Traditional Energy Efficiency Resource Standards hinder fuel-switching (e.g. electrification)
- Replace existing policy targets with fuel-neutral goal

Many state EE policies prohibit using program funds for fuel-switching
- Remove fuel-switching prohibitions

Few EE programs offer building shell improvements with other EE measures
- Where appropriate, evaluate building weatherization with electrification

Current cost-benefit frameworks may not be appropriate
- Explore new methods to evaluate electrification programs and activities
6 State and Local Building Regulations
Current Barriers to Electrification

- Lack of information on baseline energy use and emissions
- Lack of information and familiarity with electrification technologies
- Split incentives between owners and renters
A Renovation Toolkit

- Municipal or state governments can use regulatory tools for new and existing buildings.
Building Codes for New Buildings

- Adopt “electrification friendly” building codes for new buildings
  - Electrification codes: All-electric codes, electric preferred codes and electrification-ready codes
  - Net-zero energy (NZE)/emissions codes
- Three pathways
  - NZE/electrification codes as minimum codes by state or local governments
  - Statewide stretch code
  - Local reach codes
Example: CA Local Electrification Codes

Energy Benchmarking & Energy/Emissions Building Performance Standards

7 Gas Utility Network Extensions
Gas Line Extensions Status Quo

- Principles:
  - Try to avoid unnecessary costs
  - Align costs and benefits

- Status quo: the cost of new gas service is partly socialized

But, regulatory context is changing, so policies are out of alignment with principles:
- Gas is not necessary to provide cost-effective heating service
- Cost recovery math based on use over 50+ years
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Regarding the ”need” for new gas infrastructure
- Consider updating the gas utility's obligation to serve
- Conduct robust gas infrastructure planning, informed by policy goals

Regarding the cost of new gas infrastructure
- Update the calculation of “economic” line extensions
- Consider adding a social cost of GHG emissions
Coming Back to Equity

• Equity should be a key consideration for regulators examining the future of gas
  • *Between customers and over time*: Shifting costs to the future is not equitable

• Low-income customers and renters face barriers to electrification

• Customers who electrify more slowly will bear an unfairly higher cost, unless regulators:
  • Update how gas assets are paid for
  • Avoid building unnecessary new gas infrastructure
Key Points

• Regulatory frameworks need to evolve to enable the benefits of building electrification

• Barriers exist in regulation and policy, but so do options for decision-makers to take action immediately
More Info

Renovating Regulation Paper:  

Renovating Regulation Webinar:  

RAP Beneficial Electrification Papers:  