Beneficial Electrification

CLIMATE CHANGE AND THE LAW

Vermont Law School

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Outline

• Let’s talk about Beneficial Electrification
• Let’s think about an example of how to implement it
Beneficial Electrification (BE) - Three Conditions

1. Saves Customers Money Over Long-Term
2. Reduces Environmental Impacts
3. Enables Better Grid Management
Isn’t all electrification created equal?

- Brattle: “Utility sales could nearly double by 2050”!
- Isn’t it all about load growth?
Beneficial Electrification (BE) - Three Conditions

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1. Saves Customers Money Long-Term
Efficiency Across Fuel Types

2. Reduces Environmental Impacts
Power sector fuel mix is changing: MISO example

3. Enables Better Grid Management

GTM, How California Can Shape, Shift and Shimmy to Demand Response Nirvana, January 26, 2017.

Managing Load

EVs can be a benefit … or a problem for the electric grid.

Draw high amounts of power for short periods of time.
Managing Load

EV load must be managed effectively, otherwise all ratepayers will share in the expensive costs of upgrading and maintaining the distribution system to accommodate increased load on the system.

Managing Load

Pairing EV adoption and EV charging with intelligent rate design can improve electric distribution system utilization and create downward pressure on rates through load management and system peak reduction.

Rates

At Least, Avoid High-Cost Hours

Source: Rhode Island Power Sector Transformation, Phase One Report to Governor Gina M. Raimondo (November 2017)
Level 2 EV charging is a lot like... an electric water heater!
Really!

Electric Vehicle
• 3.3 – 6.6 kW
• 2,000 – 4,000 kWh/year
• Can avoid morning and early evening peak charging
• Batteries likely equal a full day’s supply

Water Heater
• 4.4 – 5.5 kW
• 2,000 – 4,000 kWh/year
• Can avoid morning and early evening peak charging
• Tank usually covers a full day’s supply
Innovative & Efficient End Uses – Electrification Is Underway
Home temperature loss after 5 hours

With a temperature of 20°C inside and 0°C outside

- Norway: 0.9°C
- UK: 3°C
- Belgium: 2.9°C
- France: 2.5°C
- Spain: 2.2°C
- Sweden: 1.2°C
- Denmark: 1.2°C
- Netherlands: 2.4°C
- Germany: 1°C
- Austria: 1.2°C
- Italy: 1.5°C

Based on a sample of over 80,000 European homes

Beneficial Electrification
Some Conclusions

1. Saves Customers Money Over Long-Term
2. Reduces Environmental Impacts
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Some Conclusions about Electrification

• Efficiency First
• Beneficial Electrification
  • Does it Save Customers Money Over Long-Term?
  • Reduce Environmental Impacts?
  • Enable Better Grid Management?
Electrification: Some RAP Resources

- Beneficial Electrification (four-part series)
- Roadmap for Electric Transportation
- Taking First Steps: Insights for States Preparing for Electric Transportation
- Getting From Here to There: Regulatory Considerations for Transportation Electrification
- Blog post: We All Wish We Were More Flexible: Electrification Load as a Grid Flexibility Resource
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

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