Beneficial Electrification of Transportation: Electrification in the Public Interest

and

Roadmap for Electric Transportation

Presentation to the U.S. Climate Alliance

David Farnsworth and Camille Kadoch, Regulatory Assistance Project

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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.

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Beneficial Electrification
Ensuring Electrification in the Public Interest

By David Farnsworth, Jessica Shipley, Jim Lazar, and Nancy Seidman

Beneficial Electrification of Transportation

By David Farnsworth, Jessica Shipley, Joni Stiger, and Jim Lazar
Part of the Electrification in the Public Interest Series
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

1. Saves Customers Money Over Long-Term
2. Reduces Environmental Impacts
3. Enables Better Grid Management
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

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
At Least, Avoid High-Cost Hours

Source: Rhode Island Power Sector Transformation, Phase One Report to Governor Gina M. Raimondo (November 2017)
Beneficial Electrification (BE) - Three Conditions

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Roadmap for Electric Transportation: Policy Guide

Fact sheet
Policy Guide
Legislative options from states
Power point
Raponline.org/EV-roadmap
Action plan for electrification of transportation

- Plan your destination
- Drive investment with incentives
- Remove roadblocks
- Empower regulators
Plan your destination

- Establish goals and timelines
- Create state EV policy plans
- Lead by example with state fleet vehicles
- Enable regular statewide assessment updates
- Plan for future transportation funding sources

Image by Milada Vigerova from Pixabay
State planning options

Comprehensive

- Covers:
  - Incentives
  - Targets
  - Infrastructure
  - Monitoring EV market, chargers

- Options:
  - Phased EV plan
  - Simplified EV plan

Narrower provisions

- Statewide charging infrastructure plan -- NJ
- Essential public charging network – NJ, FL
- Regional transportation plan – WA
- Sustainable freight plan -- CA
Statewide Assessments

• Periodic Assessment of EV adoption – on track to meet EV adoption goals?
• Periodic Assessment of EVSE – is it enough to meet current and future levels of EV adoption?
• Assessment of EVSE deployment – is the EVSE deployed equitably, taking into account population density, geographical area or population income level, including low-, middle- and high-income levels?
How to remove roadblocks

- Ensure consumer-friendly charging infrastructure is widely available
- Ensure building codes provide for an electrified future
- Ensure electrification benefits all of society, including rural and low-income communities

Image by mathey from Pixabay
Building codes

Ensure people can charge at home and at work

• Update residential and commercial building codes
• Multi-Unit Dwellings right to charge
• Renters right to charge
Standards for Open Access and Payment Systems

- Billing and payment system interoperability and open access for EV drivers.
- The physical connection between the EVSE and vehicle.
- Data and communications protocols (i.e., network interoperability).
State studies

Be proactive on getting data on what we don’t know

• Low-income barriers
• Rural barriers
• Charging for those without home charging – 40%
Steps to empower regulators:

- Clarify roles and regulation in developing charging infrastructure
- Ensure integrated planning that includes EVs
- Develop smart rate design for EVs
- Consider enabling performance-based regulation for utility EV programs
Integrated Planning provisions

Does the new or existing planning process:

- Require the use of all existing resources?
- Should it be solely focused on electric utilities or electric distribution companies?
- Should other state agencies be involved in the planning process?
- Does it require utilities to utilize all cost-effective energy efficiency, demand response and renewable energy to meet EV charging needs?
Integrated planning continued

Does the IRP process:

• require utilities to make use of EV charging to meet flexible demand?
  • EV load is flexible with TOU rate; therefore, utilities can influence when drivers charge their cars, encouraging them to charge when cheap renewable energy is abundant.
  • Require utilities to consider utilizing the storage capability of EVs?
Rate design considerations

Studies show (1) if EV charging is not controlled it can cause increased costs to the grid and (2) if EV charging is controlled, all grid customers’ benefits increase.

States can direct PUCs to enact, or utilities to offer:

- Time-of-use rates
- EV only rate design
- Transit bus rates
- Rate design for EVSE charging stations
Utility roles in EVSE

Figure 4. Potential roles for utilities in EV charging infrastructure

No-regrets actions in COVID-19 era

- Planning
- Non-financial incentives for EVs
- Remove barriers
- Empower regulators
\section*{Other sources of funding: federal or private}

Example based upon RCW 47.80.090

- Acts on regional transportation planning organization

- Requires creation of a regional plan for electric vehicle infrastructure.

- Requirement to seek
  
  \begin{itemize}
    \item [federal or private funding]
    \item [public-private partnership funding]
    \item [federal or private funding first, before applying to the state] for the planning for, deployment of or regulations concerning electric vehicle infrastructure
  \end{itemize}
Other sources of funding: utility provision of EVSE

• Different structures:
  • Limited utility investment – up to make-ready stage, limited duration
  • Utility managed EVSE charging network
  • Utility as provider of EVSE charging services
• Importance of time-of-use rates
Electrification: Some RAP Resources

- Roadmap for Electric Transportation
- Taking First Steps: Insights for States Preparing for Electric Transportation
- Beneficial Electrification: Ensuring Electrification in the Public Interest
- Beneficial Electrification of 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