Transportation Electrification Trends

A Work Study Presentation to the Kansas Corporation Commission

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Topics

• Introductions
• Beneficial Electrification
• Electric Transportation Trends and Policy Drivers
• Charging Flexibility and the Importance of Managing EV Load
• Rate Design
• Opportunities for Kansas
• Concluding Thoughts
Beneficial Electrification - Three Considerations

1. Saves Customers Money Over Long-Term
2. Reduces Environmental Impacts
3. Enables Better Grid Management
Savings from Efficiency Across Fuel Types

1 gallon of gasoline = 120 megajoules (MJ) of energy

33.33 kilowatt-hours (kWh) of electricity

takes you 25 miles in an average gas car for an efficiency of 4.8 MJ / mile.

2015 Honda Accord

takes you 114 miles in an average electric car for an efficiency of 1.1 MJ / mile.

2015 Nissan Leaf

A 78% reduction in end-use energy consumption.
Power sector fuel mix is changing: Midcontinent ISO example

Enables Better Grid Management


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

- Executive Branch: relaxed emissions regulations
- Congress not inclined to move EV clean transportation legislation, including extension of federal tax credit for EV purchases
- New Administration/Congress: TBD
Volkswagen Settlement $
State Level Policies

- Zero Emissions Vehicles – ZEVs
- Supportive Legislation
- State Strategies
  - PUC Decisions and Utility Programs,
  - Planning,
  - Pilot Programs, and
  - Tariffs to manage EV charging load
- Regional Agreements
Recent State EV Legislation

- **Planning – Goals and EV infrastructure**
  - Transportation electrification planning -- either state agencies (FL) or utilities (CO SB 19-077, MN)
  - Build out of EV infrastructure
    - Utilities – NJ, FL, CO
    - public/private partnerships for EV infrastructure -- WA
- **Incentives – 45 states have EV incentives – financial and non-financial**
  - Focused on: individual EVs, LMI, medium and heavy-duty vehicles, workplace charging grants
- **Remove barriers – define rules of the road**
  - Ensure charging stations accessible for all – CT, NH,
- **Empower PUCs**
  - Clarify whether EVSE are PUCs – MO, OK, IA
  - Authorize utilities to provide EVSE – CO, NJ, NM
  - Authorize TOU rates – MN, OR,
## Public Utility Programs – 2019

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The Key EV Opportunity: Managing Load

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

Drawing high amounts of power for short periods of time.
Managing Load – Maryland PSC

“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.”

“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.”

Pricing for Time of Use

EVs provide benefits for all ratepayers

- EVs have increased utility revenues more than they have increased utility costs which creates conditions for decreasing electric rates for EV-owners and non-EV owners alike.
- By charging during off-peak hours, EVs impose minimal costs on the grid and help to utilize existing resources more efficiently.
- Data show that EVs are requiring few distribution system upgrades and, when on TOU rates, are charging at low-cost times for the grid.
- Sources: Synapse, MJ Bradley, E3
Not All EVs are Created Equal

- Different needs and goals
- Different rate designs

Why V2X?, Presentation to EPRI, David Slutsky, July 2020.
https://assets.ctfassets.net/ucu418cgcnau/30ysc0gxRhiMSqO772tmuU/4c7f642ac90dc90d867f3ceee863a91f1/D2-1_Slutzky_David_Desk_for_EPRI_Talk_2020_07_23.pdf
Greatest Wind Resource
Planning

- Will *existing processes* – EE potential studies, program planning, integrated resource planning (IRP), and transportation planning sufficiently analyze electrification scenarios?
  - For example: comparing BAU versus high/mid/low transportation electrification scenarios, in addition to backing into the topic from POV of existing or likely carbon goals.

- Does the IRP process identify and quantify the benefits of utilities using:
  - EV charging to meet flexible demand;
  - The storage capabilities of EVs; and
  - All cost-effective energy efficiency, demand response and renewable energy to meet EV charging needs?
Concluding Thoughts

• Federal action on EVs unclear.
  o States will continue to lead EV policy
  o Some VW funding still available
  o Federal funding may become available

• Kansas well-positioned to fuel electric transportation:
  o EV load management continues to be the key to quicker and lower-cost deployment, and utility and consumer benefits.

• Planning (IRP) helps to:
  • Identify benefits,
  • Best secure those benefits, and
  • Prudently pay for them.
Beneficial Electrification of Transportation

- **Beneficial Electrification** A framework to help you sort through those opportunities
- Circumstances will vary:
  - Analyze for local conditions and trends
  - ID opportunities
  - Remove barriers
  - Consider pilots
  - Educate consumers

https://www.raponline.org/knowledge-center/beneficial-electrification-of-transportation/
Taking First Steps: Insights for States Preparing for Electric Transportation

• As the market for EVs continues to grow, states are taking their first steps to:
  • Prepare for this transition;
  • Promote beneficial outcomes; and
  • Avoid unnecessary challenges.

• Taking First Steps identifies insights and lessons learned across the country from States that are taking their first steps.

Electrification: Other RAP Resources

- Roadmap for Electric Transportation
- Taking First Steps: Insights for States Preparing for Electric Transportation
- Beneficial Electrification: Ensuring Electrification in the Public Interest
- Getting From Here to There: Regulatory Considerations for Transportation Electrification
- BLOG: 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.

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