In Pursuit of Beneficial Electrification

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Senior Director, Customer Energy Solutions

Midwest Energy Efficiency Conference
What has happened in just 3 years

- Renewable-energy and emissions-reduction goals have skyrocketed.
- Renewable energy costs have plummeted.
- Electrification now has far different implications.
Rapid decrease in costs of wind/solar

Levelized Cost of Electricity By Source

WIND: Costs 67% less compared to 2010

SOLAR: Amazing 83% less cost compared to 2010

NATURAL GAS: 37% lower costs compared to 2010

COAL: Smallest change, at only 8% lower costs.

Source: EIA & Lazard
Cities and communities are taking action*

455 cities support climate goals,
Over 100 have committed to 100% renewable power or carbon neutrality

*as of 10/15/18
What are we trying to achieve with electrification?

- Decarbonizing and improving environments
- Optimizing the electric grid and reduce electric rates
- Reducing overall energy costs for consumers, including non-participants
A commitment to equity

A new report, *Equitable Building Electrification: A Framework for Powering Resilient Communities*, highlights the benefits for low-income residents. Building electrification can have significant benefits for low-income communities.

The report was produced in partnership between The Greenlining Institute and California’s Energy Efficiency for All coalition.
Energy utilities are unique stakeholders

- Customer relationships
- Access to capital
- Infrastructure development
- Energy-supply choices
- Rate design/pricing
The electrification framework
Getting to yes ... use the same terminology

- Beneficial
- Environment
- Savings
- Cost-effective
- Fuel switching
- Winners and losers
Defining beneficial electrification

Environmentally beneficial electrification

Grid-efficient electrification

Economically efficient electrification
### Electrification Benefits Matrix

<table>
<thead>
<tr>
<th>Economic</th>
<th>Environment</th>
<th>Grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lower bills</td>
<td>• Carbon reduction</td>
<td>• Built in battery storage in EVs</td>
</tr>
<tr>
<td>• Lower rates</td>
<td>• Local air pollution improvements</td>
<td>• Opportunity to expand pricing options, smart meter benefits</td>
</tr>
<tr>
<td>• Savings leads to</td>
<td>• Reduction in health problems and costs</td>
<td>• Load factor improvements</td>
</tr>
<tr>
<td>spending $</td>
<td></td>
<td>• Allow more renewables on grid</td>
</tr>
<tr>
<td>• Non-participant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Health benefits</td>
<td></td>
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</tbody>
</table>
Defining beneficial electrification

Environmentally beneficial electrification

Less carbon and lower rates for nonparticipants

Grid-efficient electrification

Lower rates and lower bills

Economically efficient electrification

Less carbon and lower bills

The SWEET SPOT: Carbon, rates, and bills are all reduced
Learning about Electrification through the DSM Lens
Typical DSM Program Cycle

Load/Mkt. research → Potential Study → IRP → DSM Strategy → Program Design

Rebates/Pricing → Field Work → Marketing → EM&V → Reporting
Creating a cost-effectiveness test for beneficial electrification helps us optimally allocate our resources by rigorously comparing the costs and benefits related to each sector of our beneficial-electrification framework.
Key principles for an electrification cost-effectiveness test

- Values electrification as one of many resources
- Reflects policy goals on carbon, rates, reliability
- Takes into account all relevant impacts
- Is forward-looking, taking full measure life into account
- Is transparent

Adapted from National Standard Practice Manual
Trends in cost-effectiveness evolution

Massachusetts lays ground for electrification resource test

California authorizes DSM funds for fuel switching and part of broader TRC and PACT

In 2020, E Source is doing an industry benchmark to look at how cost-effectiveness treatments are evolving.

For more information contact kate.merson@esource.com
Regulatory incentives for beneficial electrification
Why Should Electrification Programs Receive Regulatory Incentives?

- Well-designed and executed electrification can bring large-scale benefits to customers and society.
- Utilities are uniquely positioned to execute beneficial electrification programs.
- Utilities, especially those with decoupling, may not have a [strong enough] financial incentive for electrification.
- Oversight will ensure programs are cost-effective and are achieving stated goals.
- Environmental urgency should drive specific goal-based actions in electrification, which would be accelerated with incentives.
Beneficial-electrification incentive maturity
Transportation Electrification
What’s the electrification potential?

Source: NREL, Electrification Futures Study
Sales of the top 8 EV models

“Do not count on the OEMs [car companies] to promote electric vehicles. Utilities must play that role for them to succeed.”

Nigel Zeid, Top Nissan Leaf sales agent nationally, recent E Source presentation
Considering purchasing an EV

National residential data

### 2018 (n = 32,469)

<table>
<thead>
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<th>Year</th>
<th>Percentage (%)</th>
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<tbody>
<tr>
<td>All US</td>
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</tr>
<tr>
<td></td>
<td>Not at all familiar</td>
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<tr>
<td></td>
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<td>Considering, have started researching</td>
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<td>Already own</td>
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<tr>
<td>2017 (n = 32,792)</td>
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<td>2016 (n = 33,050)</td>
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<td>2015 (n = 31,577)</td>
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<td>Not at all familiar</td>
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**Base:** All respondents.

#### Question G3.5: Which statement best describes the stage you are at in the purchase process for the following green or renewable technologies within your primary residence? All-electric vehicle that plugs in to charge

**Note:** Data may not add to 100% due to rounding. Percentages shown in the charts reflect weighted data; sample sizes (n) are based on unweighted data.

### 2018 (n = 3,760)

<table>
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<th>Percentage (%)</th>
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</thead>
<tbody>
<tr>
<td>All Canada</td>
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</tr>
</tbody>
</table>

**Base:** All respondents. Use caution when sample sizes drop below n = 30.

#### Question S4.3: All electric vehicle that plugs in to charge: Which statement best describes the stage you are at in the purchase process for the following green/renewable technologies?

**Note:** Data may not add to 100 percent due to rounding. Percentages shown in the charts reflect weighted data; sample sizes (n) are based on unweighted data.
EV success is not a guarantee

Utilities can help push EVs by doing targeted marketing rather than assuming everyone is “EV ready.”

Source: "Crossing the Chasm," Geoffrey Moore
Early adopters (13.5%):

- Visionaries
- Serve as the opinion leaders
- Have a natural desire to be trendsetters (Tesla)
- Serve as role models within their social group
- Adventurous (Tesla)
- Not necessarily cost sensitive (Tesla)
- Excellent test subjects to pilot the innovation
- Don’t require a full solution set

Circa: 2019 to 2023

Source: “Crossing the Chasm,” Geoffrey Moore
EV pilot and program information from our catalogue of EV initiatives

[Map of the United States with a color-coded legend showing the number of programs (1-5, 5-10, 10+)]

[Diagram showing distribution of programs by state:
- Smart charging pilots: 6
- EV incentive programs: 20
- Rate incentive programs: 34
- EVSE incentive programs: 67

Commercial incentives:
- EV incentive 9%
- Rate incentive 16%

Residential incentives:
- Smart charging pilot 7%
- EV incentive 21%
- Rate incentive 36%

Notes:
- n = 56 programs. EV = electric vehicle. EVSE = electric vehicle supply equipment.
- n = 70 programs. EV = electric vehicle. EVSE = electric vehicle supply equipment.

© E Source data from utility websites and the US Department of Energy
Valuable Role That Utilities Can Play

Understand buyers:
- Ethnographic research
- Quantitative research
- ID next set of buyers
- Create segments
- ID hot buttons, barriers

Motivate buyers:
- Advise about EVs
- Promote Benefits of EVs
- Tie to new technology, convenience, fun
- Connect to utility brand
- Social media
- Direct email

Create buyer experience:
- Bulk buy/lower $ 
- Ride and drives
- Workplace, fairs, sporting events
- Train salespeople
- Overcome barriers, fears
- Onboarding, understand rates, charging

Enhance driver experience:
- Home charging
- Off-peak rates
- Billing/benefits
- Work charging
- Public charging
- Engage through social media
- Rewards
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- Customer approach and motivation for purchasing DER and electrification technologies
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- Home battery storage perception, information, and satisfaction
- On-site and community solar preferred provider, information needs, and satisfaction
- Green pricing preferred provider, information needs, and satisfaction
- Additional resources

E Source [2019 Utility DER & Electrification Benchmark](https://www.esource.com)
DER Strategy Service

The DER Strategy Service covers pilots, programs, rates, business case and overall strategy for:

- Electrification
- Electric vehicles
- Behind-the-meter battery storage
- Green pricing programs and green tariffs
- Rooftop solar
- Community solar
- Microgrids
- Grid-edge / smart cities
Thank you! Questions?

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