Designing Incentives and Technology Roadmaps for Beneficial Electrification

Highlights from the E Source white paper

Bryan Jungers, Gabe Cuadra, Steven Day, Tim Stout, and Ryan Odell

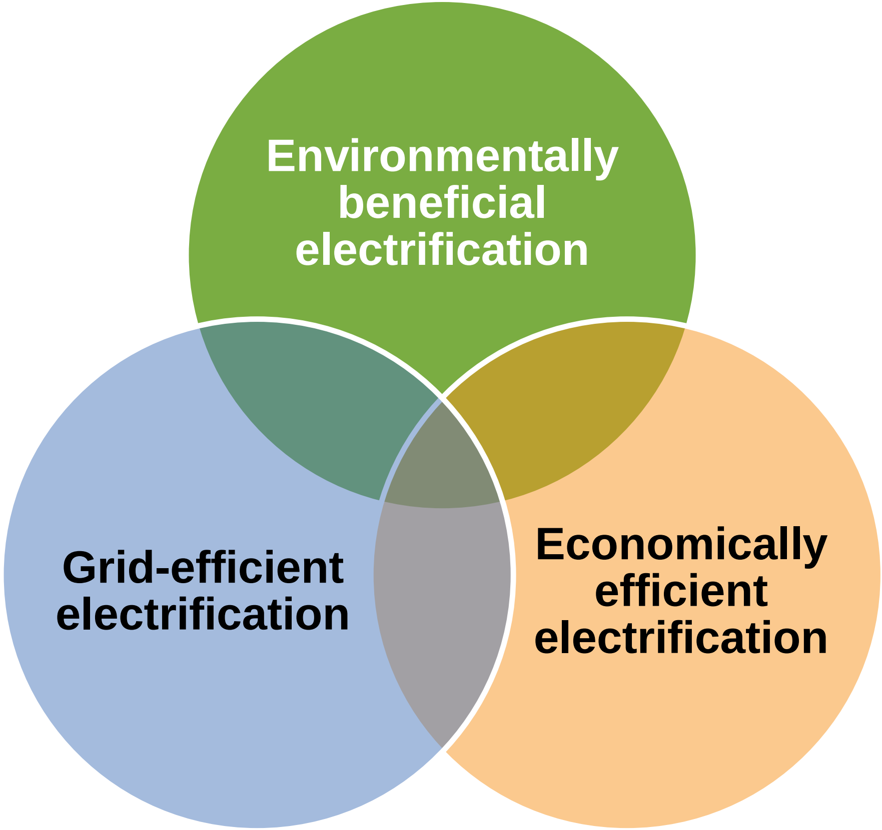
E Source

Web Conference

Recent developments

- Massachusetts approved 2019–2021 energy-efficiency plan (D.P.U. 18-110 through D.P.U. 18-119)
  - "… (1) provide energy and demand savings through strategic electrification that result in cost-effective reductions in GHG emissions and minimize ratepayer costs, and (2) result in customers switching to renewable energy sources or other clean energy technologies."
- New Efficiency: New York
  - 185 trillion Btus of end-use energy savings below the 2025 energy-use forecast, using a fuel-neutral approach.
- California
  - $1 billion annual budget for energy efficiency and building- electrification efforts.

Defining beneficial electrification



The Electrification Framework That Benefits Customers, the Grid, and the Planet

An E Source White Paper

Kevin Andrews, Gabe Cuadra, Luke Currin, Steven Day, Bryan Jungers, Bill LeBlanc, Ryan Odell, Jay Stein, Tim Stout, Courtney Welch

NOVEMBER 11, 2019

PDF this page | Print this page | Email this page | Add to My Favorites

View published | New draft | Moderate | Clone this deliverable

Contents

RELATED CONTENT

E Source Forum 2019

Industry Standard Practice for Commercial Equipment

Ethnographic Insights on Low Income, Connected Homes, and Electric Vehicles: E Design 2020 Residential Market Research

E Source electrification white paper

- What is beneficial electrification?
- What are the goals of beneficial electrification?
- The beneficial-electrification framework
- Cost-effectiveness tests for electrification
- Regulatory incentives for beneficial electrification
- Beneficial-electrification technologies
- Electrification through the customer’s eyes
- Next steps for utilities

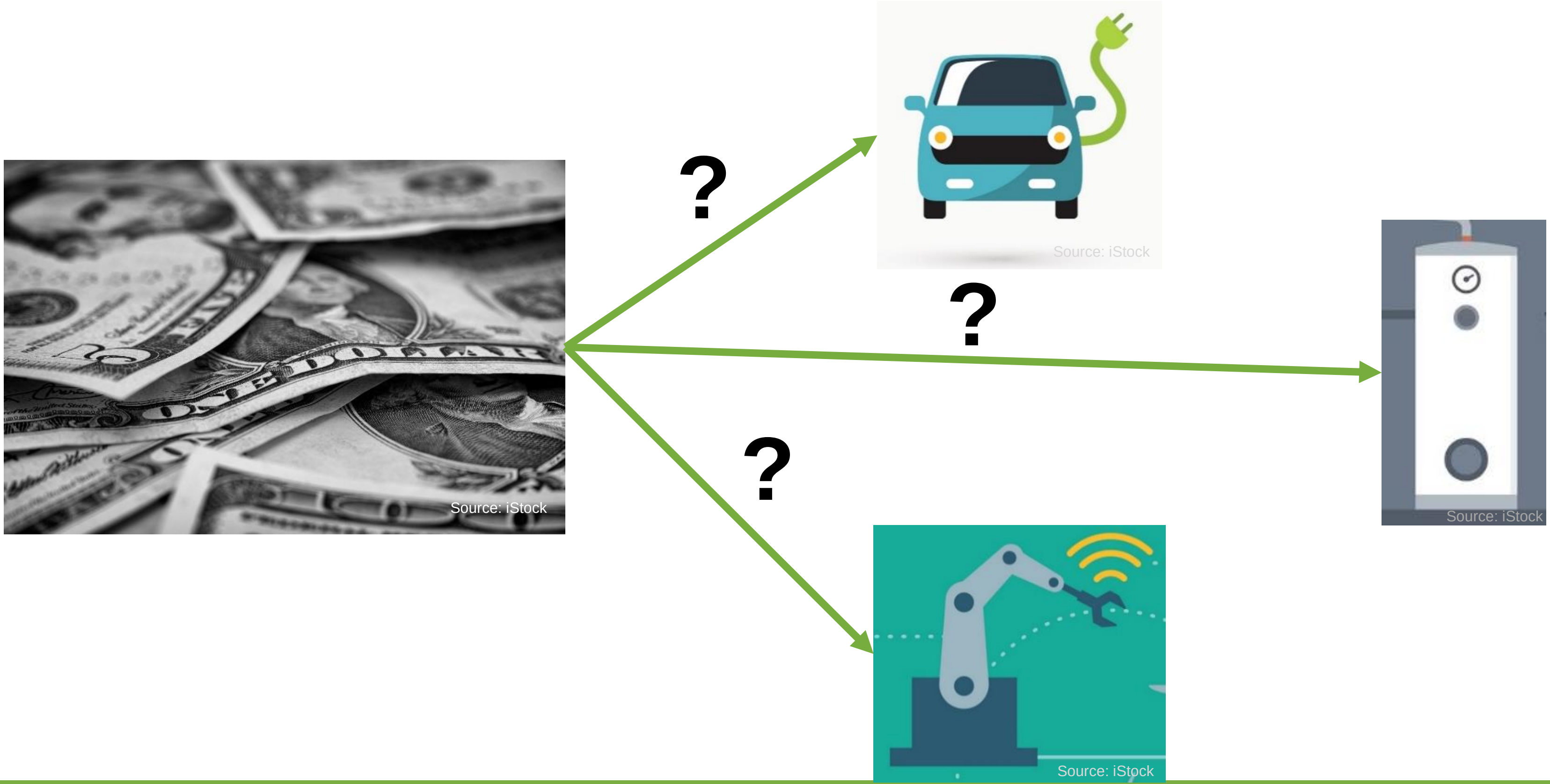
Today's agenda

- Cost-effectiveness tests for electrification
- Regulatory incentives for beneficial electrification
- Beneficial-electrification technologies
- Next steps for utilities

Cost-effectiveness tests for electrification

How do we decide what to pursue?

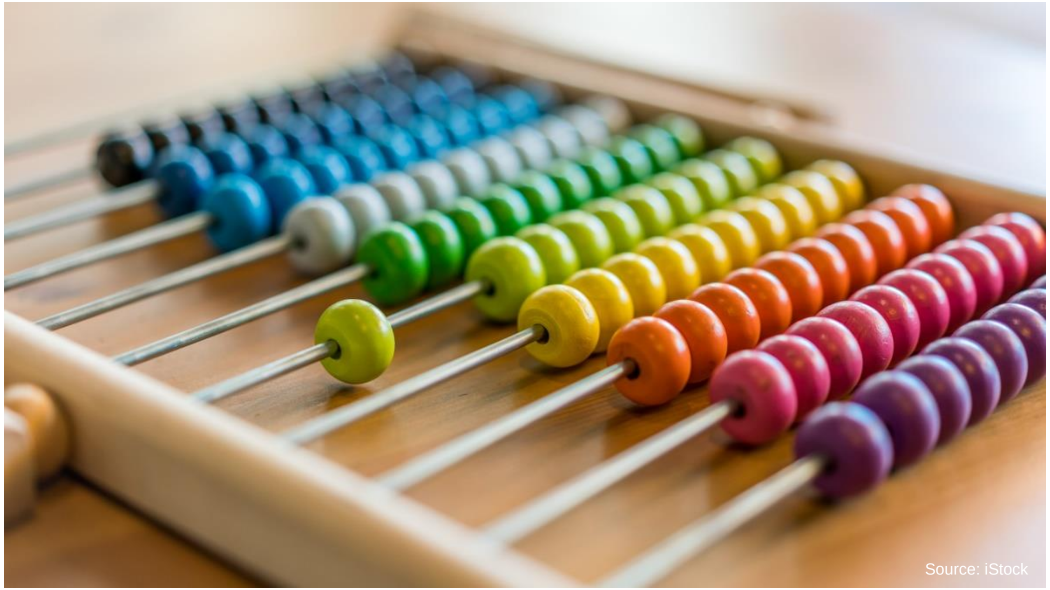
How do we decide what to pursue?



A new cost-effectiveness test

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



Key principles for an electrification cost-effectiveness test

- Values electrification as one resource

Adapted from National Standard Practice Manual

Key principles for an electrification cost-effectiveness test

- Values electrification as one resource
- Reflects policy goals

Adapted from National Standard Practice Manual

Key principles for an electrification cost-effectiveness test

- Values electrification as one resource
- Reflects policy goals
- Uses symmetrical costs and benefits

Adapted from National Standard Practice Manual

Key principles for an electrification cost-effectiveness test

- Values electrification as one resource
- Reflects policy goals
- Uses symmetrical costs and benefits
- Takes into account all relevant impacts

Adapted from National Standard Practice Manual

Key principles for an electrification cost-effectiveness test

- Values electrification as one resource
- Reflects policy goals
- Uses symmetrical costs and benefits
- Takes into account all relevant impacts
- Is forward-looking, taking full measure life into account

Adapted from National Standard Practice Manual

Key principles for an electrification cost-effectiveness test

- Values electrification as one resource
- Reflects policy goals
- Uses symmetrical costs and benefits
- Takes into account all relevant impacts
- Is forward-looking, taking full measure life into account
- Is transparent

Adapted from National Standard Practice Manual

Setting up the equation

Utility system costs

- Program
- Electric system
- Utility incentives

Nonutility costs

- Environmental
- Public
- Participants

Source: iStock

Utility system benefits

- Replaced fuel system
- Electric system

Nonutility benefits

- Environmental
- Public
- Participants

Setting up the equation

Utility system costs
- Program
- **Electric system**
- Utility incentives

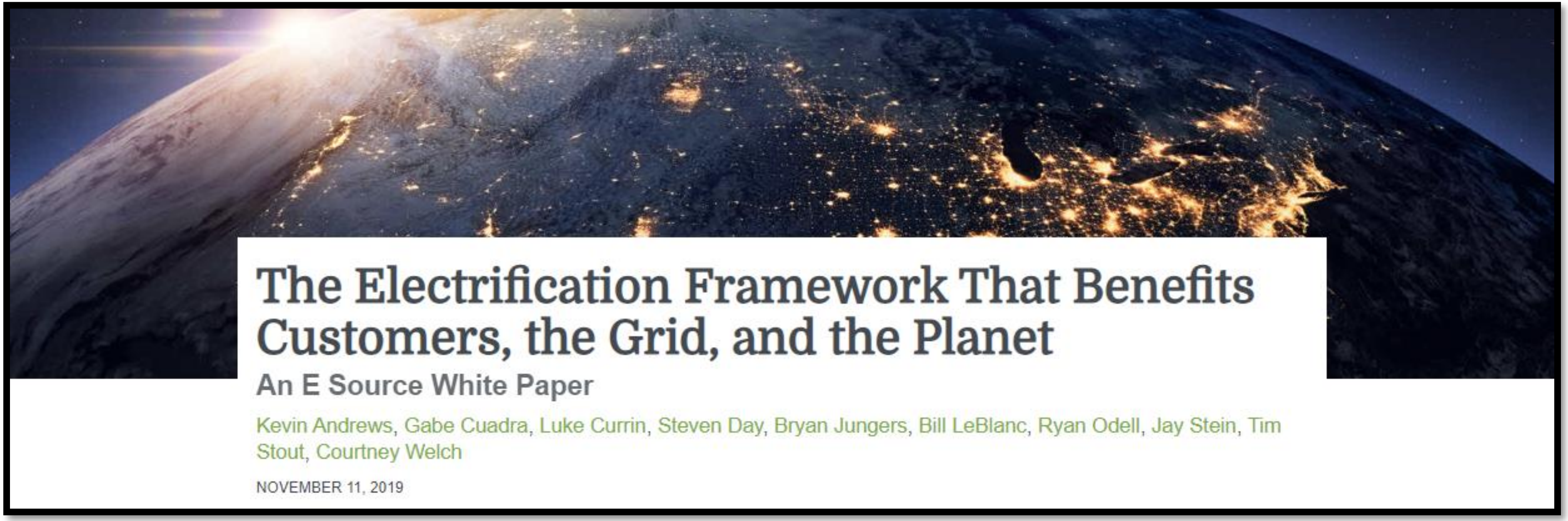
Nonutility costs
- Environmental
- Public
- Participants

Source: iStock

Utility system benefits
- **Replaced fuel system**
- Electric system

Nonutility benefits
- **Environmental**
- **Public**
- **Participants**

A simplified example



The Electrification Framework That Benefits Customers, the Grid, and the Planet

An E Source White Paper

Kevin Andrews, Gabe Cuadra, Luke Currin, Steven Day, Bryan Jungers, Bill LeBlanc, Ryan Odell, Jay Stein, Tim Stout, Courtney Welch

NOVEMBER 11, 2019

What about other traditional tests?

Test	Insights if applied to electrification
Participant Cost Test	Outlines whether the participant will come out financially ahead or behind
Ratepayer Impact Measure Test	Weighs impact on nonparticipants. Should include impact on both electric and fossil fuel customers
Societal Cost Test	Values externalities stakeholders decide to omit from the primary resource test
Program Administrator Cost Test	Could test the value of grid improvements (such as load leveling and demand response facilitation) to total program costs

Are there exceptions to this approach?

?

Regulatory incentives for beneficial electrification

Using DSM shareholder incentives as a roadmap for beneficial electrification incentives

- Like DSM, electrification has complex goals and poses new challenges to utilities.
- Utilities are beginning to implement a range of incentive designs for electrification—varies by type of electrification initiative (e.g., building versus vehicles).
- Some utilities are proceeding without shareholder incentives, at least initially.

History of DSM shareholder incentives

- Utilities nationwide have adopted demand-side management (DSM) shareholder incentives as a reward for achieving goals such as savings and cost-effectiveness.
- Over years, utilities have honed shareholder incentives for DSM to enhance their efficiency.

Getting buy-in from regulators to adopt shareholder incentives

- Regulatory buy-in is essential to ensure utilities and regulators are aligned in their principles and goals around shareholder incentives.
- Nationwide case studies of electrification provide evidence that electrification programs yield measurable, cost-effective results.

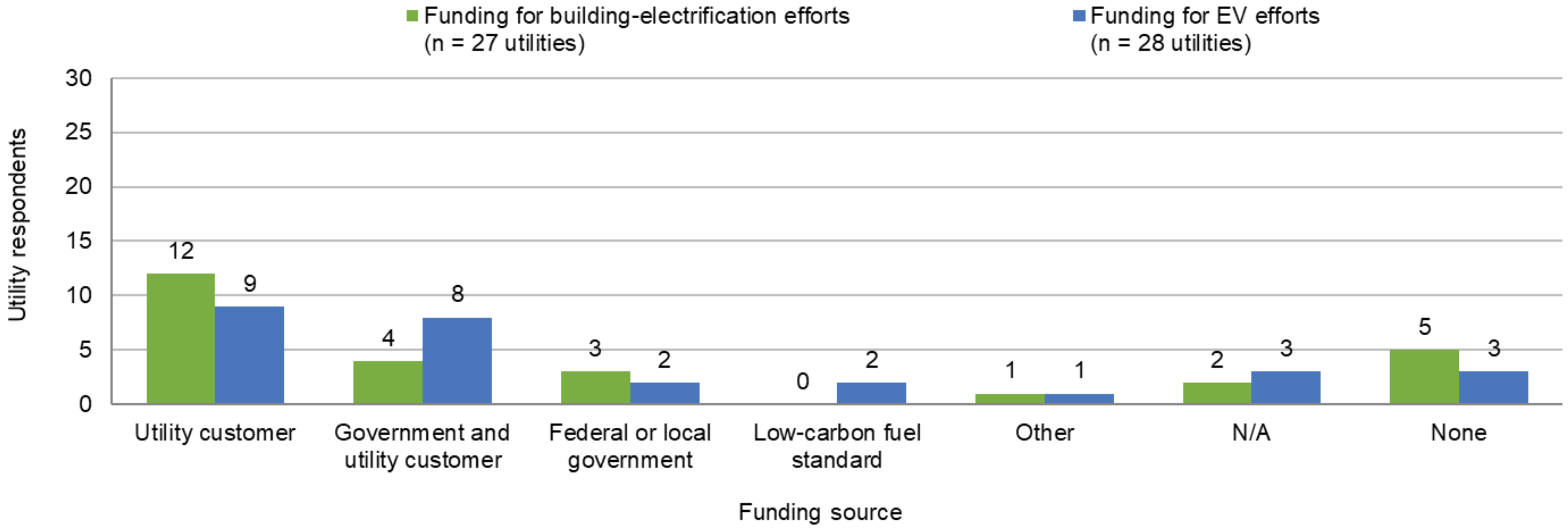
Regulators may push back on incentives

- Regulators may challenge the need for shareholder incentives as utilities are already receiving various benefits from electrification such as increased kilowatt-hour sales and significant CO_2 reductions.
- A key objective of electrification is achieving major incremental CO_2 reductions. Incentives may be instrumental for achieving these goals.

Building electrification business case

Base: n = 14 utilities. **Question S4_10:** Please describe the business case your utility uses to promote building electrification to each of the following groups: regulatory board, board of directors, or council.

Utility funding sources for beneficial electrification

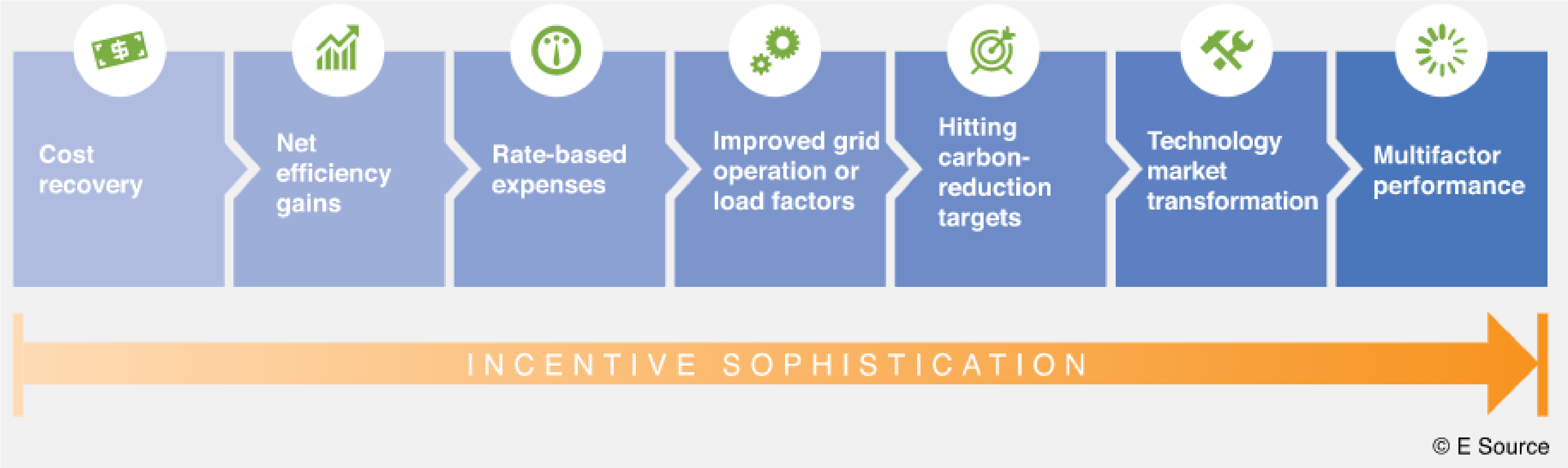


Base: Utilities providing data, n varies as shown. **Question S2_4b:** What is your utility's source of funding for electric vehicle (EV) efforts? **S2_4c**: What is your utility's source of funding for building-electrification efforts?

Structuring incentives

- Performance incentives
  - Btu reduction (residential and building electrification)
  - CO_2 emission reductions
- Cost-effectiveness incentives
  - Value of benefits compared to costs
    - Challenge in defining benefits
    - Will require sophisticated evaluation protocols
- Innovation incentives
  - Innovation in electrification strategies and technologies over time
- Incentives for expanding charging station networks

Beneficial-electrification incentive maturity

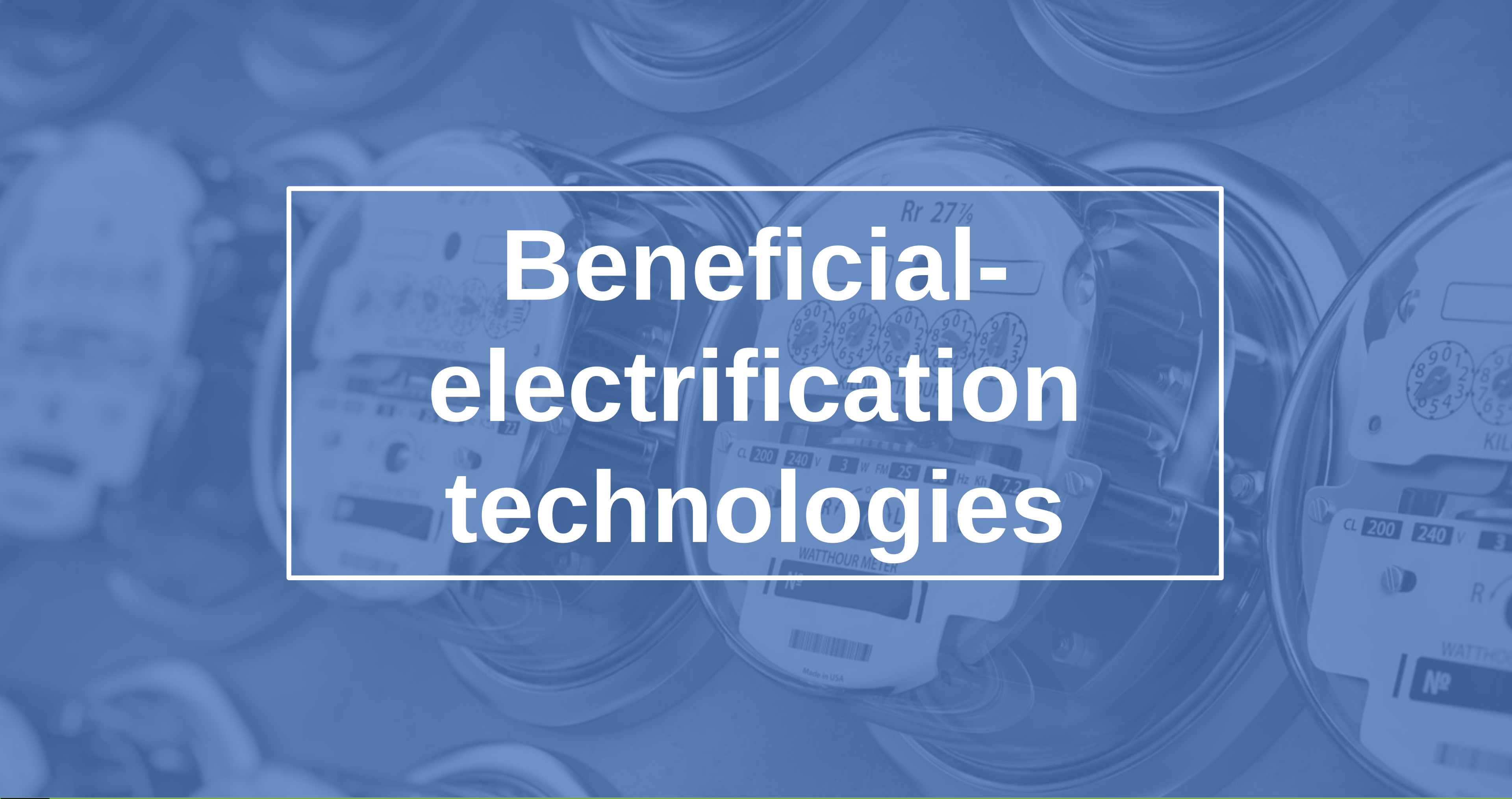


Funding and cost recovery of electrification initiatives: expensing

- Core funding sources: typically funded through similar mechanisms used for DSM (e.g., system benefit charges and supplemented through a variety of other sources)
- Cost recovery: expensing
  - Placing a surcharge on customers' bills to recover the costs of electrification
  - Recover costs in the year the costs are incurred
  - Helps utilities avoid accumulating costs over many years

Funding and cost recovery of electrification initiatives: rate-basing

- Cost recovery: rate-basing
  - Typically used for large capital investments such as power plants, transmission and distribution lines, etc.
  - Costs are incurred over 20 years or more and are included in base rates with a rate of return
  - Includes costs for electrification in base rates
- Other options and strategies are being explored but have not yet been implemented



Beneficial-electrification technologies

Don’t be afraid to go big …

Consumption = 85 megawatt-hours per year
Demand = 40 to 150 kilowatts
Carbon = up to 5.7 tons carbon dioxide equivalent

Consumption = 30 megawatt-hours per year
Demand = 30 to 90 kilowatts
Carbon = up to 2 tons carbon dioxide equivalent

Don’t be afraid to go off-road …

Source: Hernawan Widhi under a Creative Commons license

Source: National Renewable Energy Laboratory

And don't forget about the little guys!

Source: iStock

Source: iStock

Source: iStock

Industrial: the other big projects

- Immersion heat
- Transportable electric ladles


Source: iStock

Next steps for utilities

Let's get started

- Engage stakeholders within and outside of your utility

Let’s get started

- Engage stakeholders within and outside of your utility
- Establish an overall set of objectives for your electrification strategy

Let’s get started

- Engage stakeholders within and outside of your utility
- Establish an overall set of objectives for your electrification strategy
- Analyze grid effects and optimization

Let’s get started

- Engage stakeholders within and outside of your utility
- Establish an overall set of objectives for your electrification strategy
- Analyze grid effects and optimization
- Convince regulators that electrification benefits everyone

Let’s get started

- Engage stakeholders within and outside of your utility
- Establish an overall set of objectives for your electrification strategy
- Analyze grid effects and optimization
- Convince regulators that electrification benefits everyone
- Create an electrification potential roadmap

Let's get started

- Engage stakeholders within and outside of your utility
- Establish an overall set of objectives for your electrification strategy
- Analyze grid effects and optimization
- Convince regulators that electrification benefits everyone
- Create an electrification potential roadmap
- Create programs that customers actually want

Let’s get started

- Engage stakeholders within and outside of your utility
- Establish an overall set of objectives for your electrification strategy
- Analyze grid effects and optimization
- Convince regulators that electrification benefits everyone
- Create an electrification potential roadmap
- Create programs that customers actually want
- Deliver on your beneficial-electrification plan

E Source consulting solutions

1. Building an electrification strategy
2. Electrification technology roadmapping
3. Industry scan of best practices with the latest technologies
4. Customer-centric innovation
5. Customized to help you achieve your goals

Resources and events

- The Electrification Framework That Benefits Customers, the Grid, and the Planet (white paper)
- Part 1 of this series: Why and How You Should Pursue Beneficial Electrification (web conference)
- Results of the 2019 E Source Voice-of-Utility DER and Electrification Benchmark (web conference)
- E Design Week (in-person event)
  - Boulder, CO, Tuesday, December 10, 2019–Thursday, December 12, 2019


Q&A

Thank You! Questions?

Bryan Jungers
Lead Analyst,
Customer Energy Solutions, E Source
520-336-2812
bryan_jungers@esource.com

Gabe Cuadra
Senior Data Analyst,
Customer Energy Solutions, E Source
303-345-9105
gabe_cuadra@esource.com

Ryan Odell
Senior Analyst,
Customer Energy Solutions, E Source
303-345-9109
ryan_odell@esource.com

Tim Stout
Senior Advisor,
E Source
617-899-1011
tim_stout@esource.com

Steven Day
Associate Analyst,
Customer Energy Solutions, E Source
303-345-9114
steven_day@esource.com

Have a question? Ask E Source!
Submit an inquiry:
www.esource.com/question