

# Building an Electrification Strategy and Roadmap

Featuring New E Source Consulting Tools

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Web conference



**E Source**

# Today's speakers



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Strategy, Technology & New Products

# Why electrification?

- Provide load growth and generate revenue
- Advance energy-efficiency and demand-response programs
- Boost customer satisfaction
- Meet new regulatory challenges
- Reduce customers' energy expenditures
- Reduce carbon emissions
- Create opportunities to serve disadvantaged communities
- Enhance grid resiliency and emergency preparedness
- Facilitate adoption of distributed energy resources (DERs), storage, and microgrids



# What we're not talking about today

## Gas versus electric

- We inform; we don't advocate
- Many electric and dual-fuel utilities have internal or external mandates to electrify
- Remember: We also conduct a lot of work on advancing efficient gas technologies

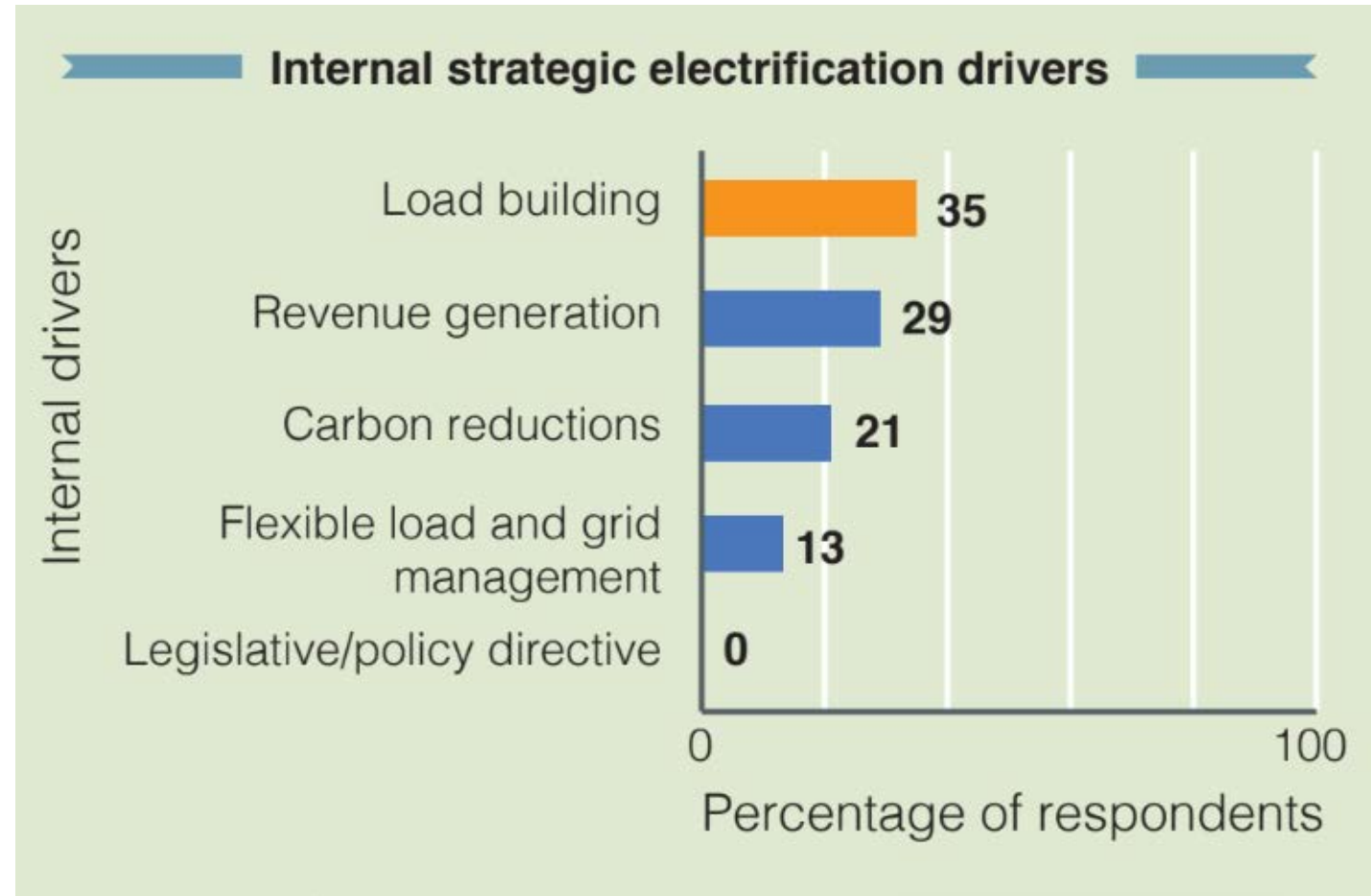




# Current state of the industry

# Many forces are pushing electrification

- High-quality products are finally available (heat pumps, induction stoves, electric vehicles [EVs])
- The grid is becoming decentralized and more reliant on DERs
- Greenhouse gas mandates mean gas is viewed unfavorably by some ...
- ... and increased renewables are a cleaner alternative
- Cheaper in new residential constructions
- Stagnating load growth and a need for new revenue-generation opportunities



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# Interest among utilities is skyrocketing

Last fall we polled utility members, and

**69%**

said they have an electrification strategy or are planning on developing one.

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When we asked a similar question in 2017,

**almost no utilities**

said they were pursuing electrification.

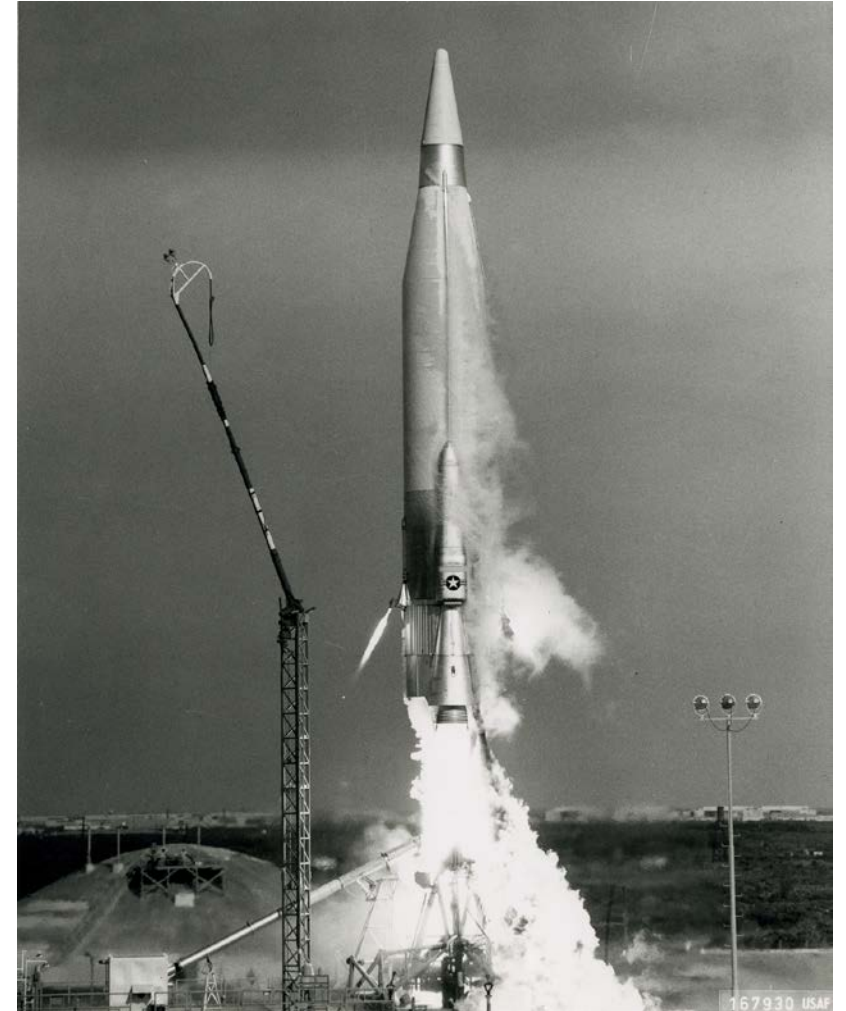
# Poll: Do you have an electrification strategy?

- Yes, it's in place
- We're currently developing one
- We don't have one



# So how do we develop (or improve) our electrification strategy?

- Learn from the best in the business
- Make sure it's customer-focused
- Create a roadmap



Source: media.defense.gov

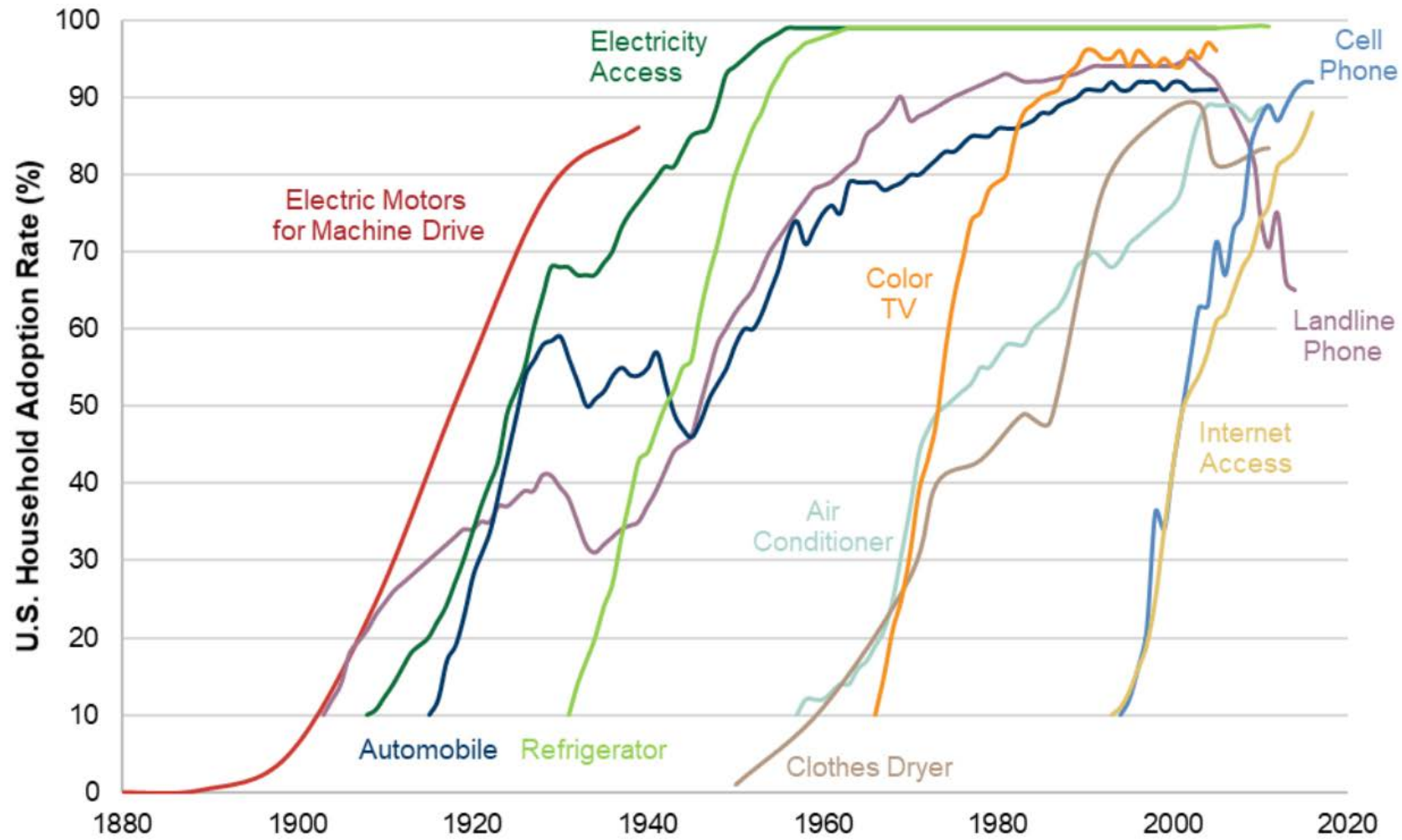


# Learn from the best in the business

# Lessons from existing programs: Strategies to achieve electrification goals

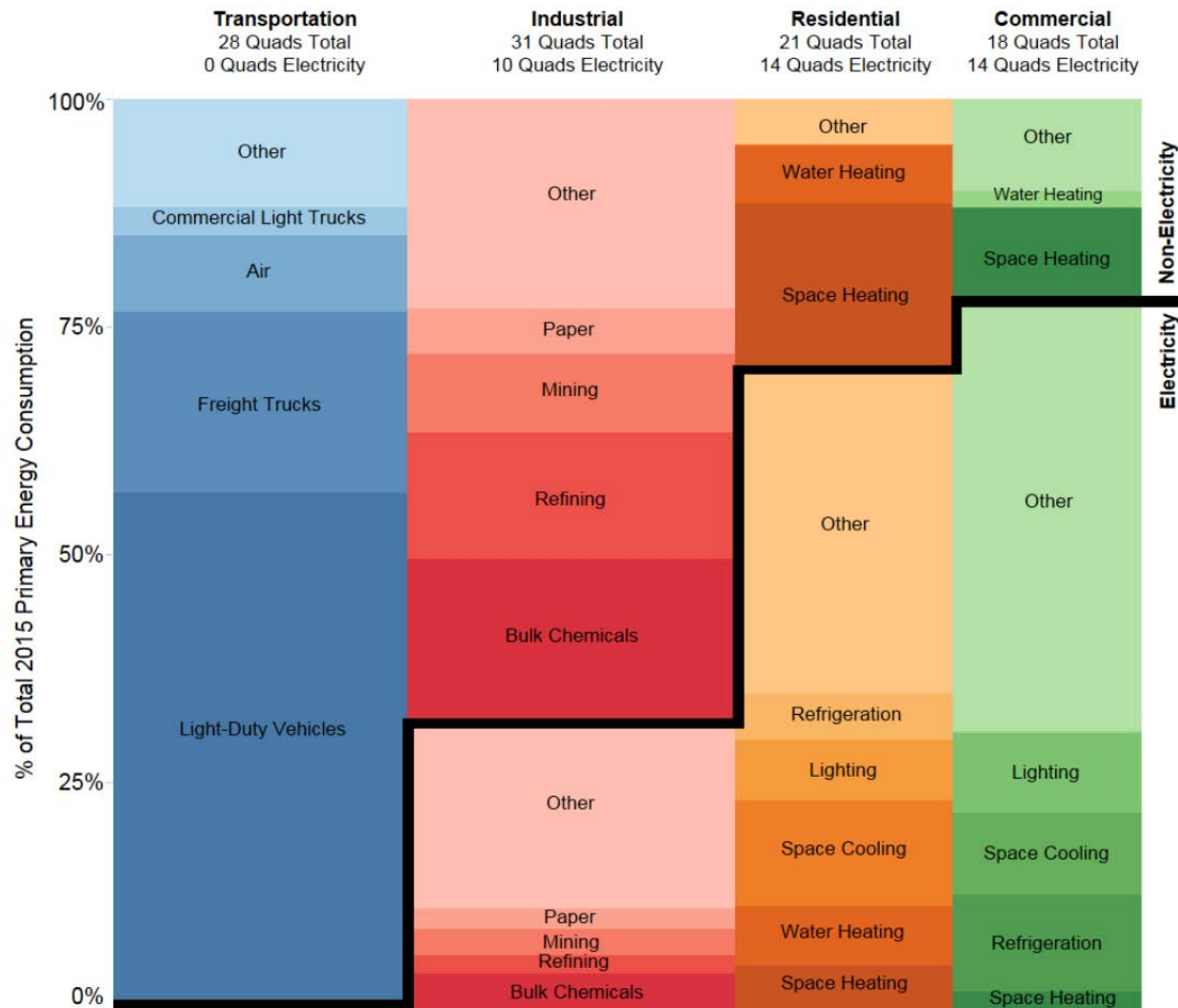
- 1 Pursue aggressive advertising campaigns for EVs
- 2 Be the trusted energy advisor; direct to helpful resources
- 3 Streamline customer participation; offer in-person consultation and application assistance
- 4 Establish partnerships with influential stakeholders
- 5 Leverage demand response with electrification
- 6 Capitalize on funding from the Volkswagen emissions settlement

# Electrification isn't a new trend



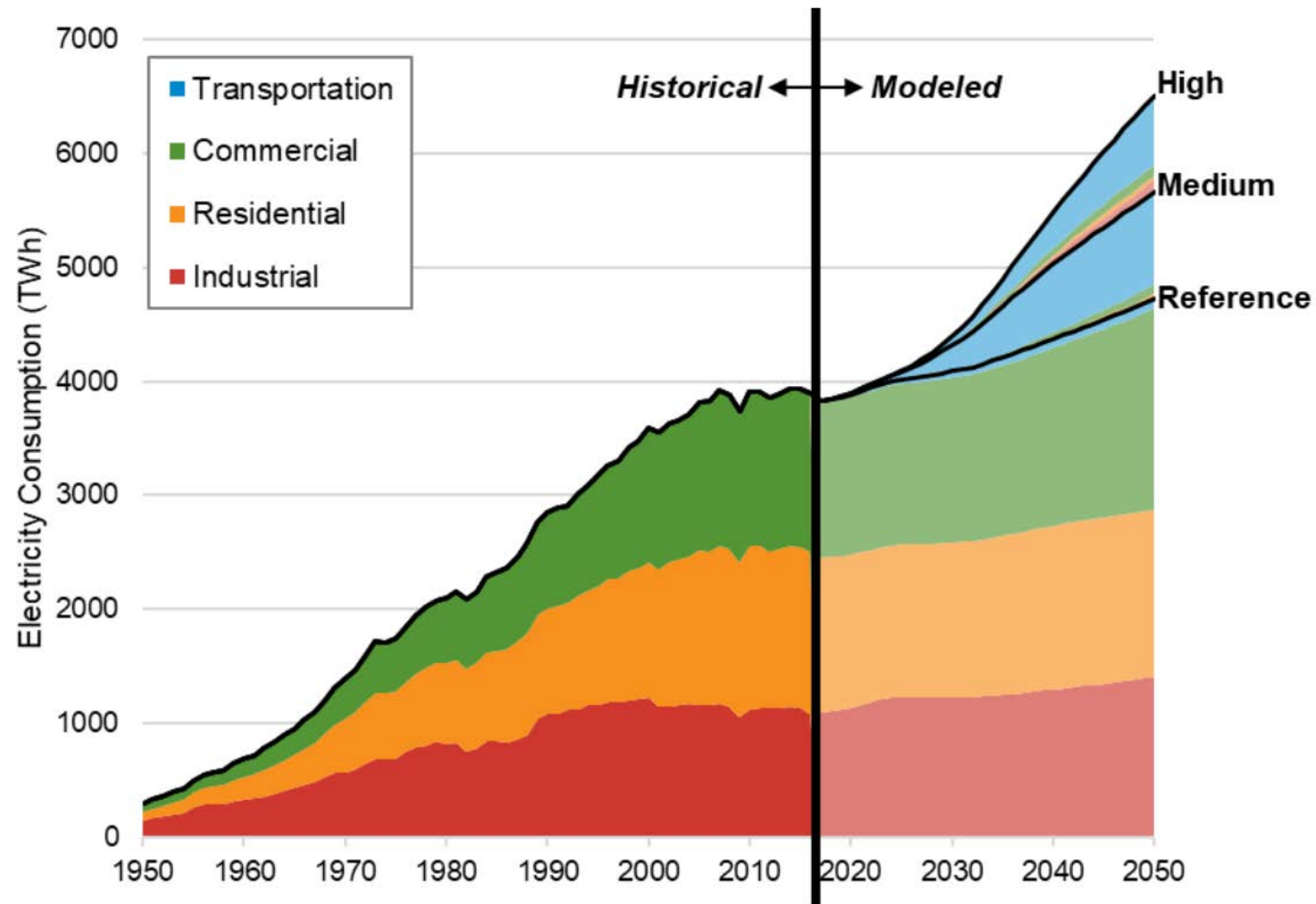
Source: [Electrification Futures Study](#) (PDF), National Renewable Energy Laboratory

# What's left to electrify?



Source: [Electrification Futures Study](#) (PDF), National Renewable Energy Laboratory

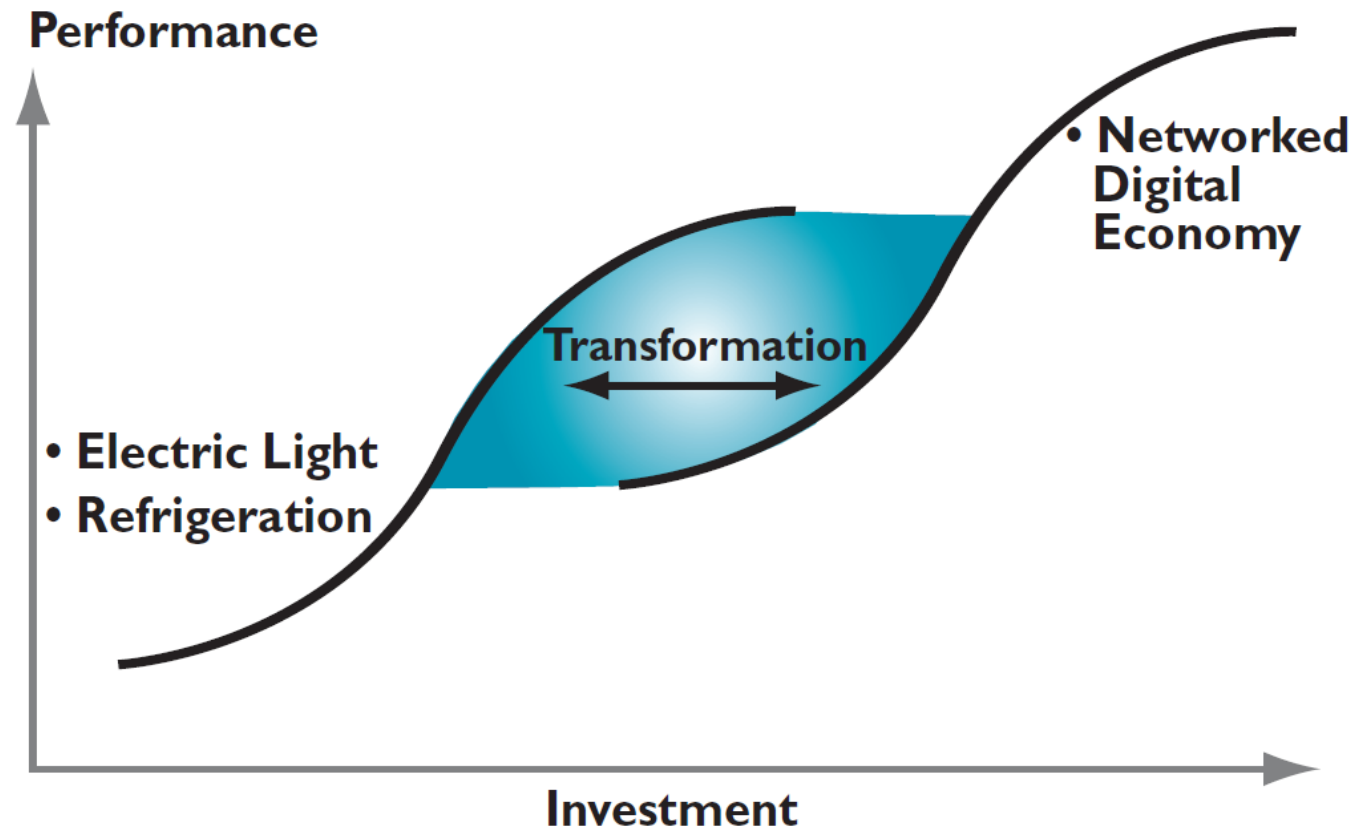
# The anticipated second wave



Source: [Electrification Futures Study](#) (PDF), National Renewable Energy Laboratory

# We're in the transformation phase

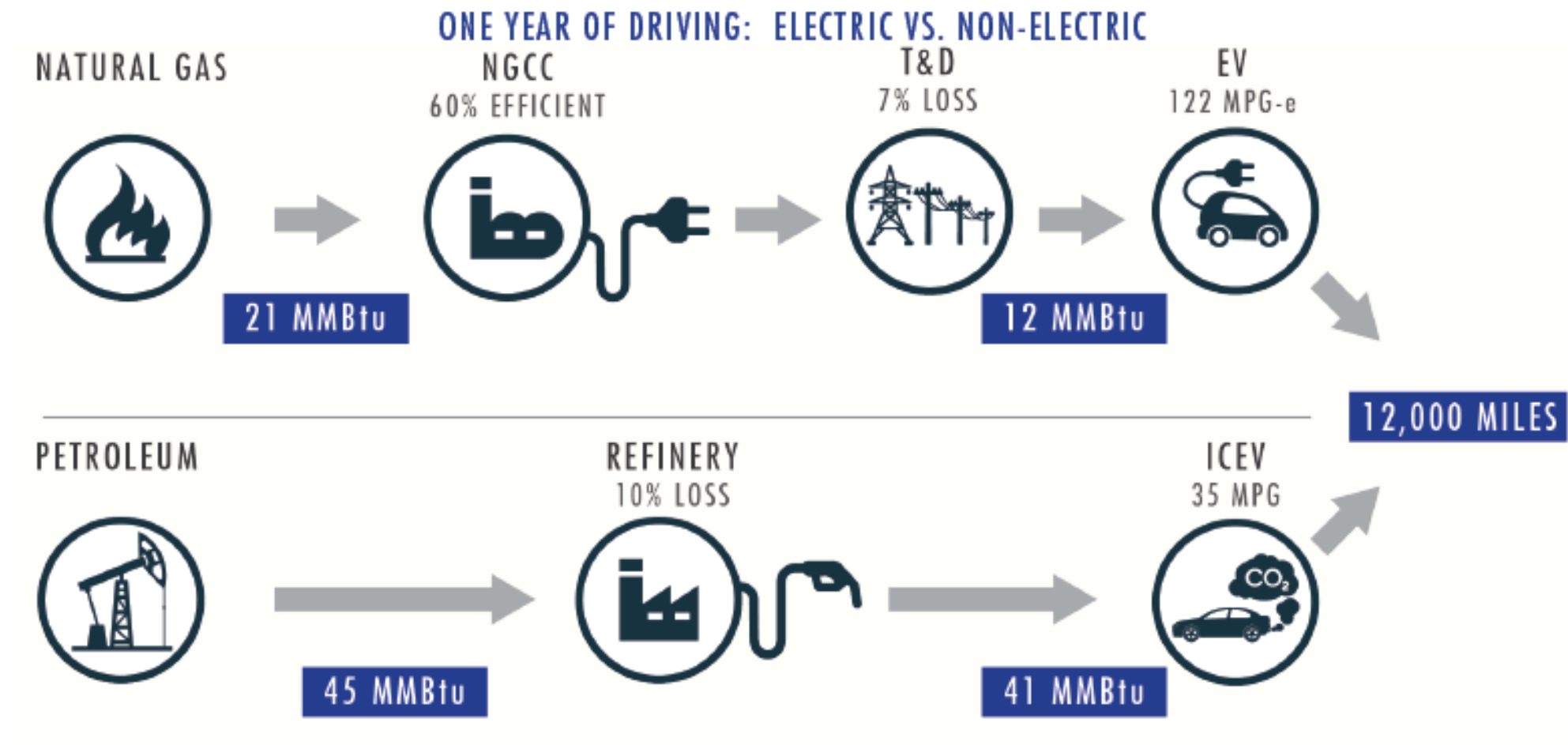
## Breaking the Limits on Electricity Value



Source: [Electricity Technology Roadmap](#) (PDF), Electric Power Research Institute



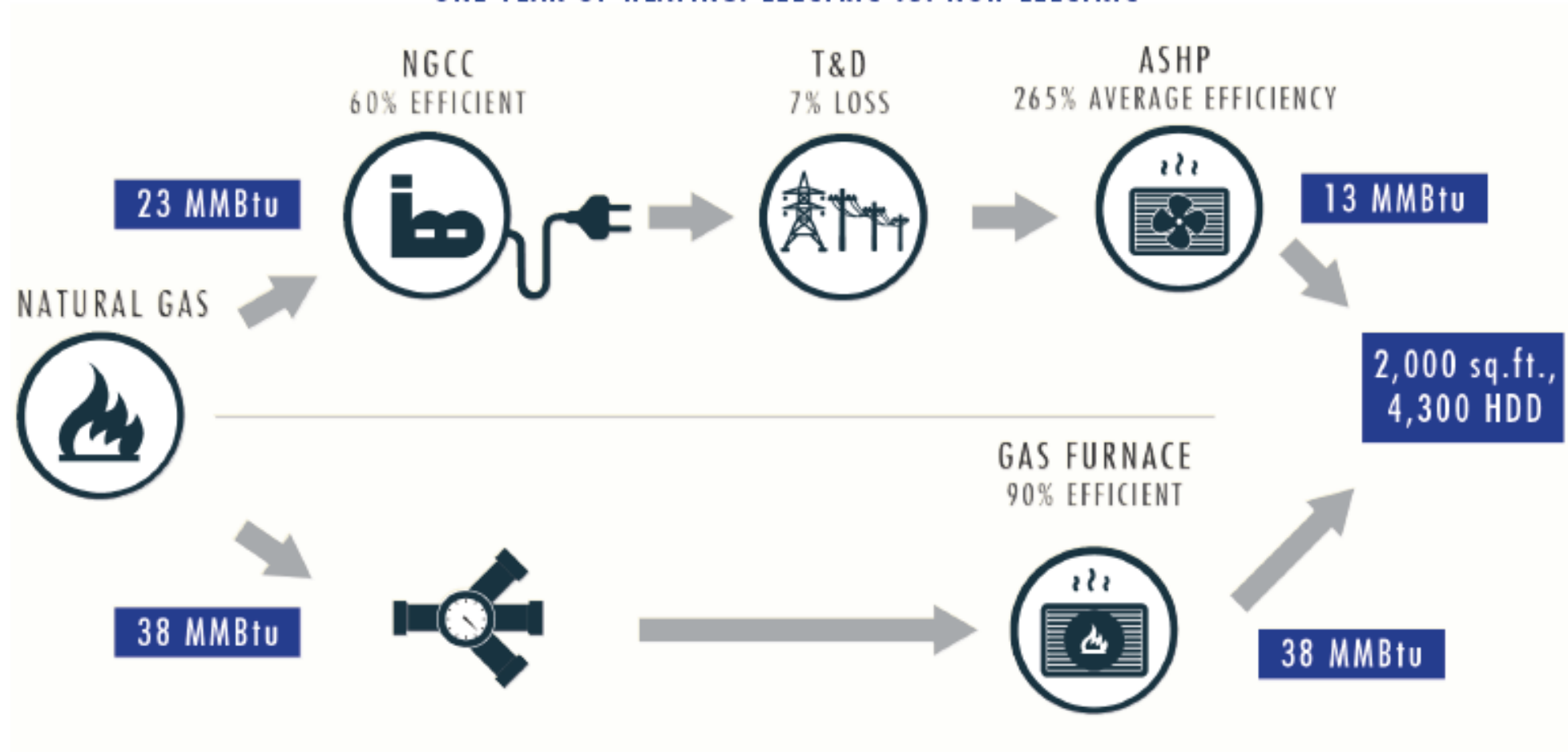
# Electric vehicles: An efficient choice



Source: [U.S. National Electrification Assessment](#) (PDF), Electric Power Research Institute

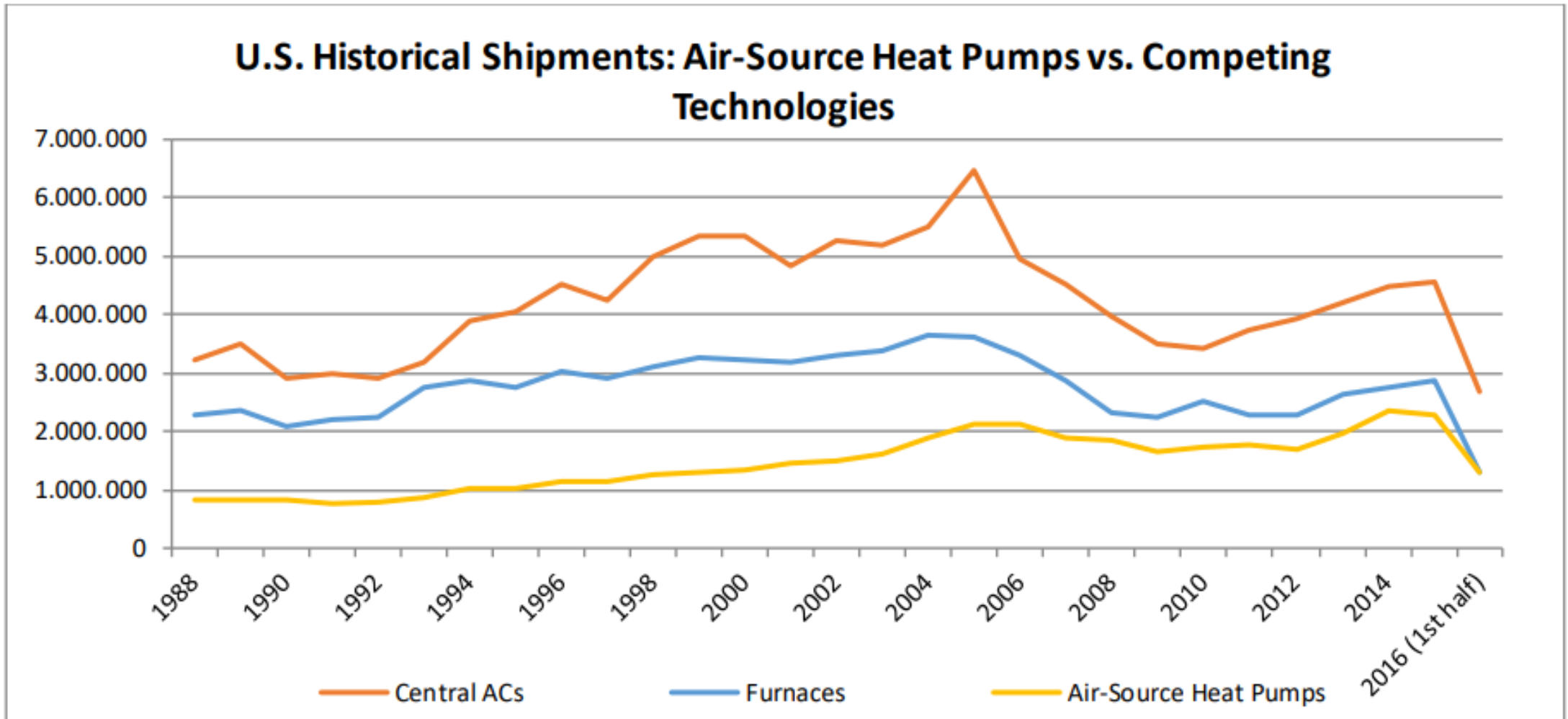
# Heat pumps are also quite efficient

## ONE YEAR OF HEATING: ELECTRIC VS. NON-ELECTRIC



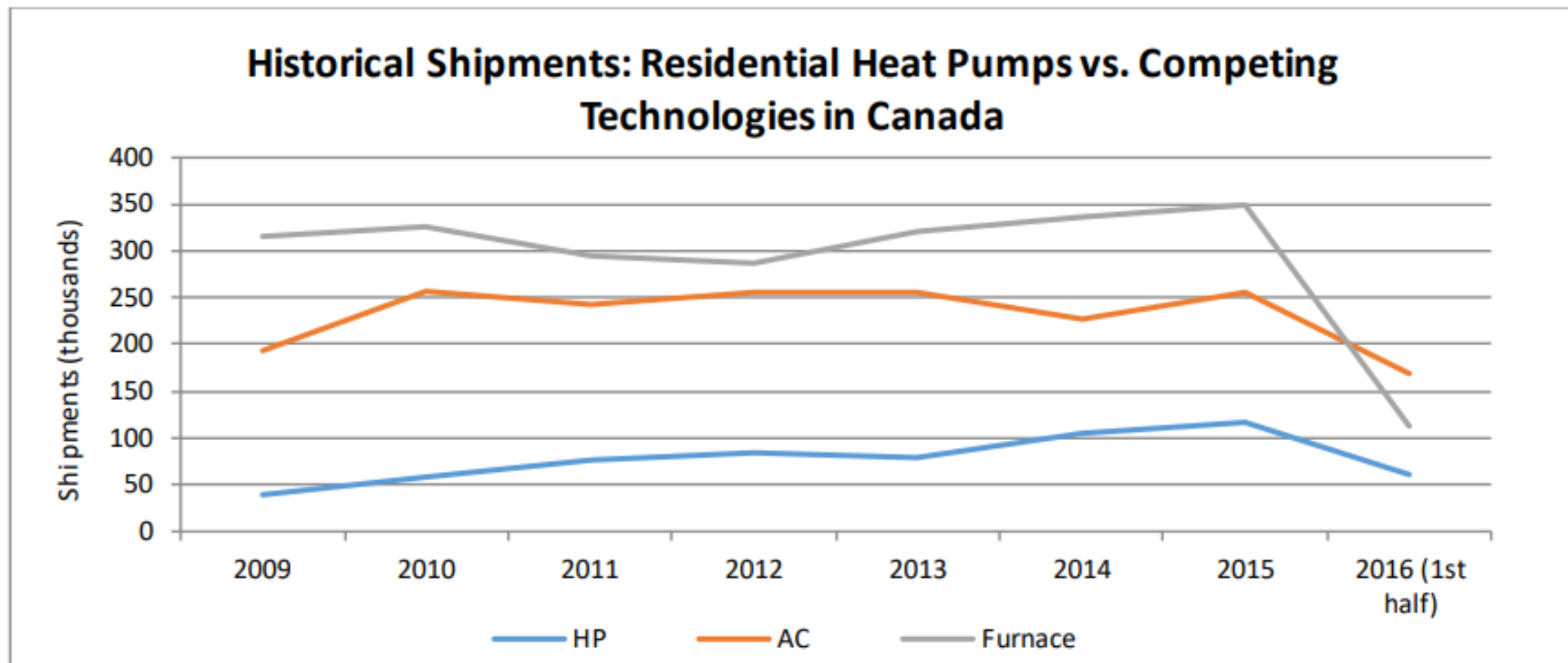
Source: [U.S. National Electrification Assessment](#) (PDF), Electric Power Research Institute

# This is not a VHS versus Betamax story



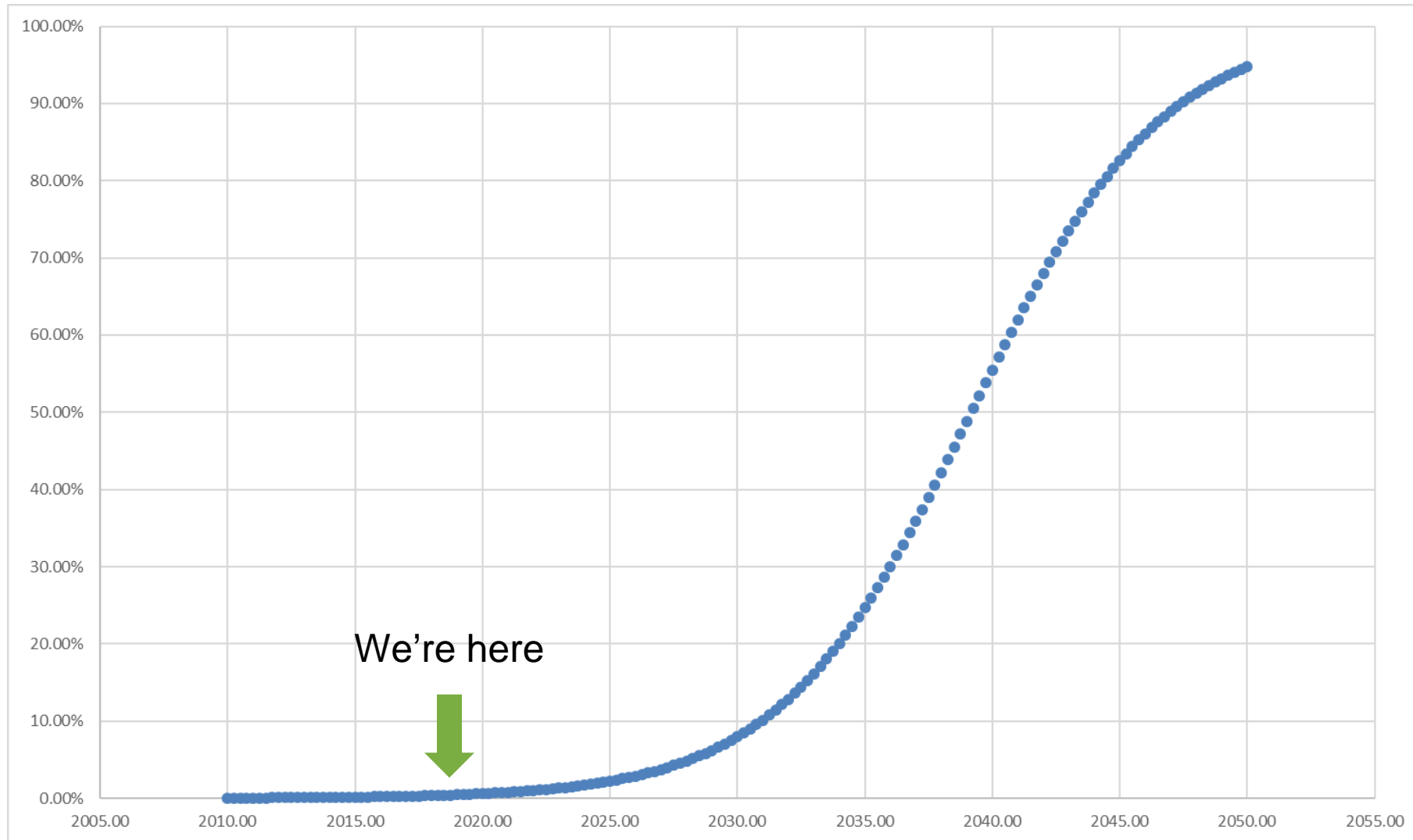
Source: [Heat Pumps in North America—2017 Regional Report](#) (PDF), Oak Ridge National Laboratory

# The outlook in Canada looks similar ...



Source: [Heat Pumps in North America—2017 Regional Report](#) (PDF), Oak Ridge National Laboratory

# And the path to EVs is even steeper



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# Where are the big, near-term wins?



**Seaport electrification**



**Bus electrification**



**Airport electrification**

# Transportation electrification, in stages

- Not competing directly against natural gas
- Significant market momentum already exists
- Several green initiatives support electrification
- Easily targeted, well-defined market segments
- Easier to reach customers, explain project benefits
- Per-project load growth and decarbonization potential
- Additional benefits, like supporting disadvantaged communities





**Make sure  
your plan is  
customer-focused**

# Electrification is a nascent, abstract concept

- Why should electrification matter to customers?
- Communicating about it will be a challenge akin to grid modernization
- Focus on the larger narrative of electrification, not on explaining technologies or the power system

# What's the larger narrative?

## Answer these questions

- What *problem* will electrification solve in customers' lives?
- What *difference* will electrification make in customers' lives?
- Will it make their family's and future generations' world safer? Cleaner? Healthier? More prosperous? More exciting?

**“Society should use less oil, coal,  
and natural gas ...”**

**US  
respondents  
n = 33,050**

**67%  
(7 or higher)**

**Canadian  
respondents  
n = 1,980**

**70%  
(7 or higher)**

# **“Renewables can replace fossil fuels ...”**

**US**  
**respondents**  
**n = 33,050**

**66%**  
**(7 or higher)**

**Canadian**  
**respondents**  
**n = 1,980**

**68%**  
**(7 or higher)**

**“My utility should source more  
renewables ...”**

**US  
respondents  
n = 33,050**

**67%  
(7 or higher)**

**Canadian  
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n = 1,980**

**68%  
(7 or higher)**

# Whatever your end goal ...



## Key takeaways

- Understand customers by starting with market research
- Design marketing with customers in mind
- Market to and communicate with specific customer segments



## Next steps

- Use E Source market research and tools to paint a picture of your customers
- Market through customer-preferred channels (email and phone)
- Expect customer responses through those channels
- Prepare for customer service





# Develop a roadmap

# Plenty of technologies, but which ones?

- **Transportation:**

- o Plug-in electric vehicles
- o Forklifts
- o Electric standby for refrigerated trucks
- o Airport ground support equipment
- o Medium- and heavy-duty vehicles
- o Specialized industry transport equipment
- o Port electrification

- **Manufacturing:**

- o Industrial Induction Surface Treating
- o Industrial Infrared Process Treating
- o Industrial Vacuum Furnace
- o Industrial Induction Melting
- o Process Heat and Steam Generation

- **Commercial Buildings:**

- o Heat pumps
- o Electric thermal storage
- o Heat pump water Heaters

- **Residential Buildings:**

- o Electric baseboard heating
- o Electric furnace heating
- o Heat pumps
- o Radiant heat
- o Hydronic heating with electric water heater
- o Electric thermal storage
- o Heat pump water heaters
- o Electric resistance
- o Electric ovens
- o Electric grills
- o Induction cooking
- o Electric clothes dryers
- o Ultrasonic clothes dryers



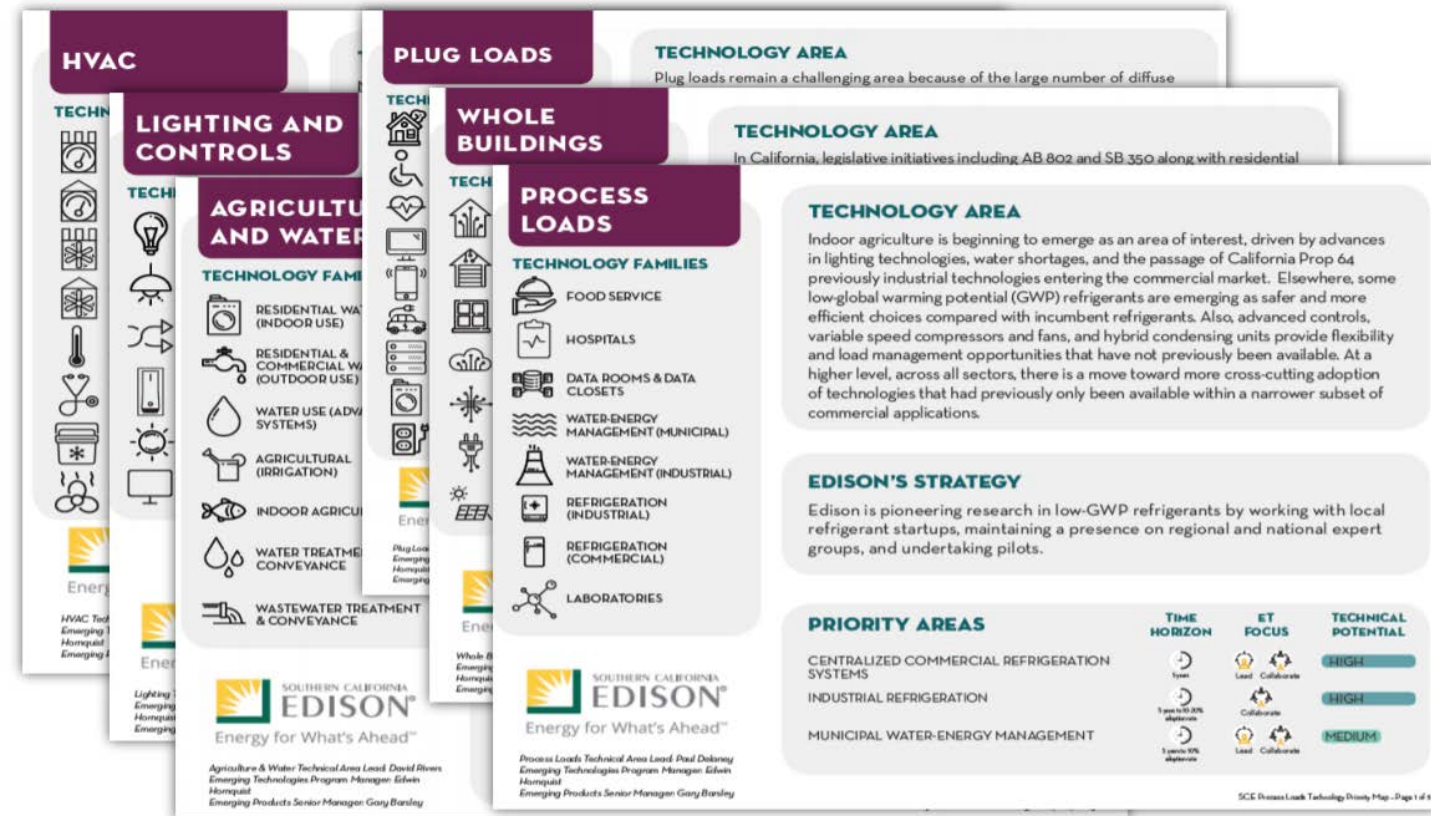
# How to prioritize and plan? A roadmap!

- A roadmap connects long-term *strategic goals* with short-term *tactical activities* that will get you there
- It should identify areas of highest and lowest priority
- It incorporates technological goals and is customer-focused
- It acts as a planning document internally and a communication piece for external stakeholders
  - Includes other utility teams, regulators, intervenors, partners, etc.

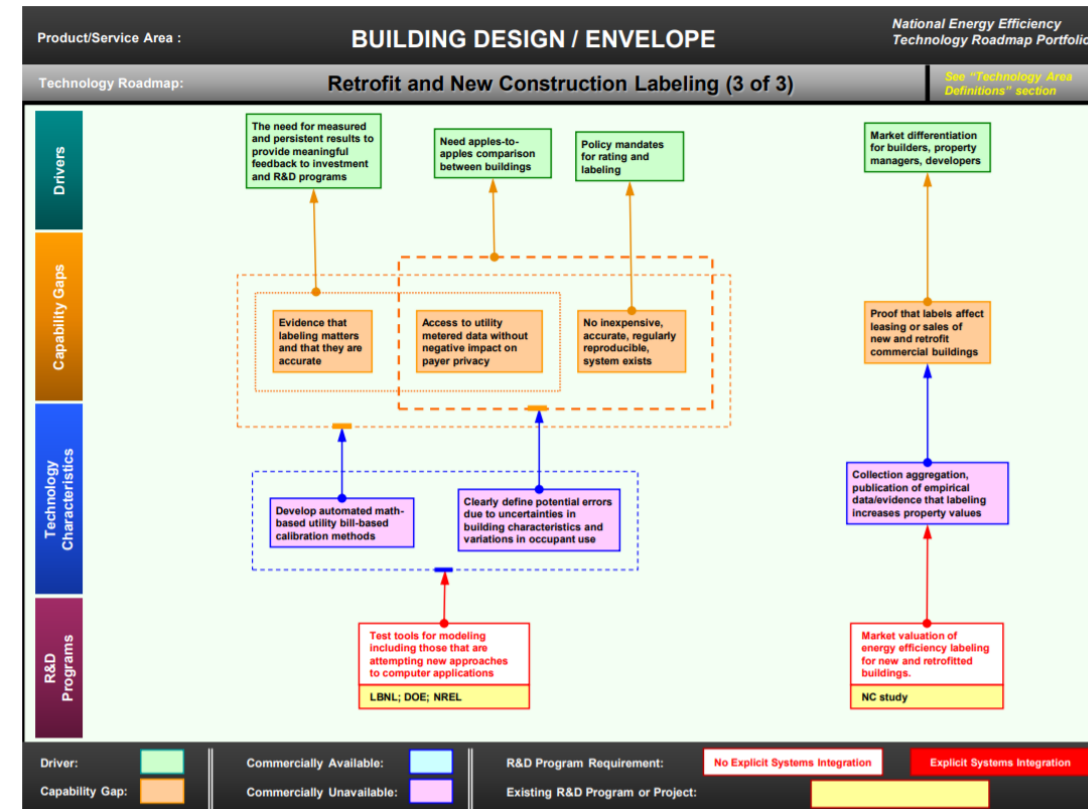
# Benefits of a roadmap

- Resource planning is easier
- You can proactively identify risks and obstacles
- It keeps staff and stakeholders in communication and on the same page
- It's an easy way to set goals and monitor progress
- It's the most cost-effective planning tool
- It facilitates clear, easy, and effective prioritization
- It facilitates partnerships and resource pooling
- It's a powerful tool for justifying budgets and activities

# A few industry examples



Source: ATMO.org



Source: Bonneville Power Administration

# Roadmap: Types of data

- End goal (usually 5 to 15 years)
- Annual utility interventions required to meet goals
- Intermediate goals and milestones
- Obstacles and risks
- Impact of each technology in meeting goals
- Unmet customer needs and non-energy benefits
- Tie-ins to demand-response, energy-efficiency, or other utility programs
- Nonutility forces impacting the technology

# What yours might look like

Variable capacity HVAC systems						
Technology	Description	Industry Considerations	Barriers	Time to maturity	Interventions	Team Priority Level
Variable refrigerant flow (VRF)	Ability of space conditioning system to modulate heating or cooling output in response to the thermal loads of the conditioned space and user input of occupants.	Not currently cost effective. Not openADR compatible. Low market penetration.	Cost effective optimized VRF systems with improved controls	5 years	Engage manufacturers as new products are developed.	8 - MEDIUM
Variable speed drive (VSD) compressors		Some are variable speed drives, some are multi-speed, most common is constant speed.	All new products have VSD; limited market	6-8 years	Develop design guidelines with EPRI, DOE.	
Fan motors (ECM)		Not commonly integrated in products. Limited to small motors.	Integration in all products by equipment makers	12 years	Field test products for performance, interoperability, installation and maintenance.	
Geothermal systems with variable refrigerant flow (VRF)		Not cost-effective. Limited by geography.	None identified	5+ years	Engage with standards committees (ASHRAE).	
Next generation heat pumps		Marketplace very limited; innovation is slow.	Ability to provide heating and cooling and operate in a variety of climatic conditions. Facilitate zero carbon efforts.	10 years	Enable connectivity to utility. Support wider adoption of variable through incentives.	

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# What next?

Two approaches, and we can help you with either!



# DIY with E Source subscription services

Distributed Energy Resource Strategy	Demand-Side Management	Technology Assessment
<ul style="list-style-type: none"><li>▪ <a href="#">Utility DER and Electrification Benchmark</a></li><li>▪ <a href="#">Strategic Electrification: Insights to Spark Your Interests</a></li><li>▪ <a href="#">Business Case for Electrification</a></li><li>▪ <a href="#">How Utilities Are Taking Charge of Electric Vehicle Adoption</a></li></ul>	<ul style="list-style-type: none"><li>▪ <a href="#">Beneficial Electrification Programs</a></li><li>▪ <a href="#">How to Evolve Your DSM Portfolio in a DER World</a></li><li>▪ <a href="#">DSM Programs and the Smart Home: The Journey Beyond Smart Thermostats</a></li><li>▪ <a href="#">Developing a Successful Strategic Electrification Program</a></li></ul>	<ul style="list-style-type: none"><li>▪ <a href="#">How Will Electrification Affect the Grid?</a></li><li>▪ <a href="#">Electric Vehicle Technology, Implications for the Grid, and Promotion Strategies</a></li><li>▪ <a href="#">Electrification Technologies for Commercial Customers</a></li><li>▪ <a href="#">Induction-Cooking Efficiency</a></li></ul>

Ask E Source: Small research-on-demand projects

Events, including web conferences, meetings, and major conferences

# And now we can fish for you!

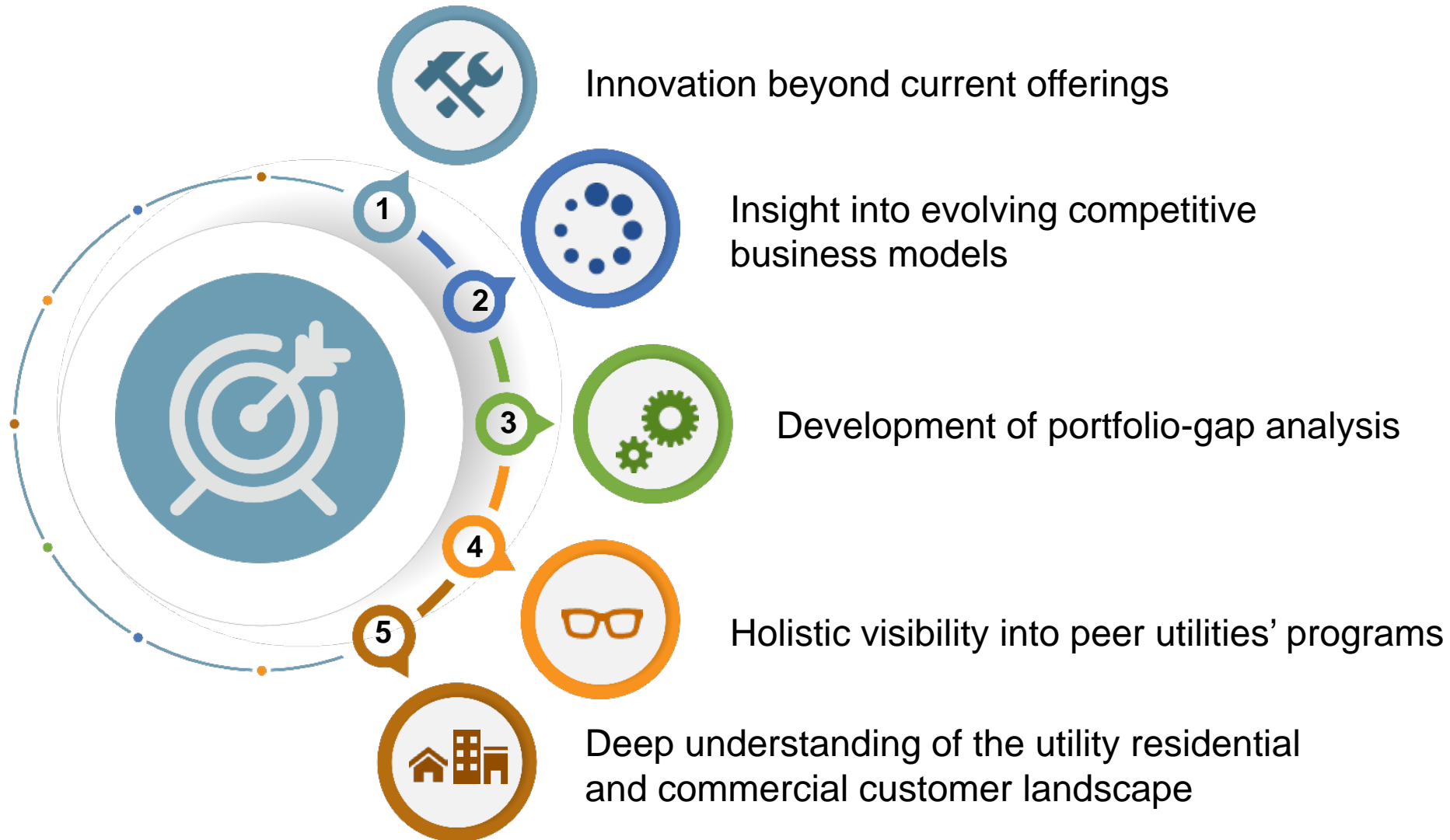
- Full-service electrification strategy development from E Source Consulting & Advisory Services
- Includes:
  - Technology penetration and potential evaluation
  - Long-term strategy development; identify short-term tactics
  - Customer-centric innovation
  - Any other features you need to be successful
- All based on best practices, with the latest technologies and the best research team around
- Fully customizable to meet your goals, regulatory concerns, local climate, and customer base



# Why we're excited about fishing for you

- Much faster development (months, not years)
- Not a huge new additional responsibility for your team
- Typically far cheaper than in-house roadmap development
- Plans are not developed in a vacuum
  - Incorporates all industry best practices
  - Can help you identify opportunities and partnerships to leverage
- We can update plans annually
- Customized to the specific goals of your department

# E Source DSM consulting solutions



# **Poll: Now that you've seen some of our approaches, how would you classify your electrification strategy?**

- It's great—among the best in class
- Good, but it could probably be improved
- We need a lot of help!
- We don't have a strategy or might have to start over

# Thank you! Questions?



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**Have a question? Ask E Source!**

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