RMLD

Reading Municipal Light Department

RELIABLE POWER

TIME-OF-USE RATES

MEAM-CES Conference - December 8, 2021

Joyce Mulvaney

RMLD TOU RATES

- Implemented in 1993
- Offers time-based pricing to coincide with on-peak and off-peak periods
- Intended to reduce peak demand through pricing triggers
- Provides a rate that allows customers to save money on their electric bill by changing their behavior

CURRENT TOU RATES

Residential TOU Schedule A2 Rate

Industrial TOU Schedule I Rate – available to all non-residential customers but targeted toward large industrial accounts

Two Pricing Tiers:

- On-peak: M-F 12pm-7pm excluding holidays
- Off-peak: all other hours

Requirements:

- Customer must stay on rate for a minimum of one year
- TOU meter must be installed (no cost to customer)

RESIDENTIAL: STANDARD RATE VS TOU

November 2021 Rate Examples

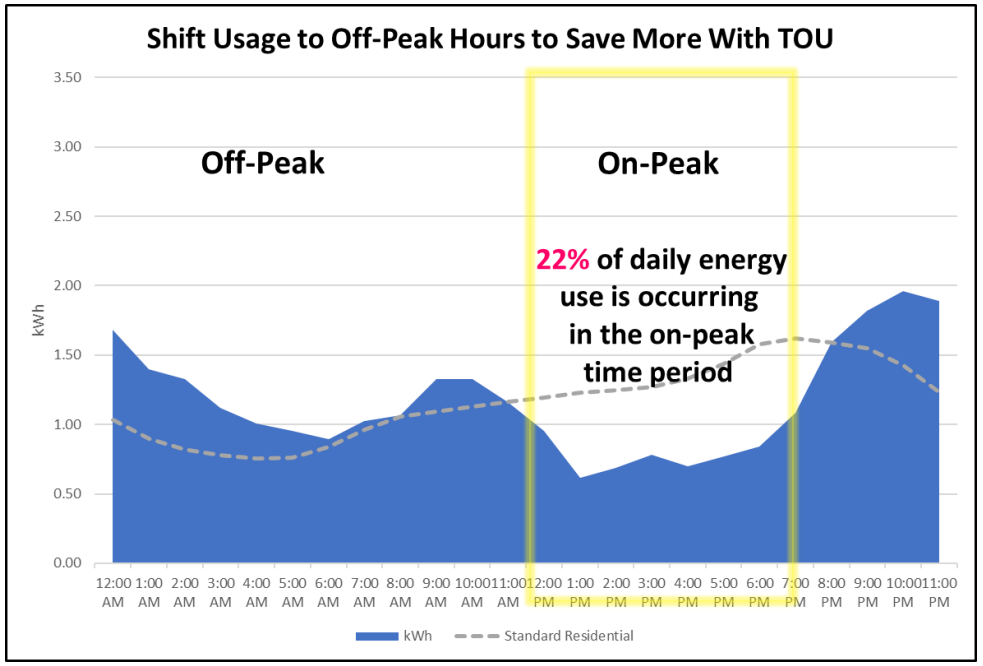
	Standard Residential Rate	Residential TOU Rate	
Customer Charge per month	$5.12	$8.00	
Distribution Energy Charge per kWh	$0.06711	$0.04022	
Energy Conservation Charge per kWh	$0.00100	$0.00100	
NYPA per kWh (November 2021)	-$0.00292	-$0.00292	
Fuel per kWh (November 2021)	$0.04600	On-Peak	Off-Peak
		$0.09535	$0.03187
PPCT per kWh (November 2021)	$0.03804	$0.03804	
Total Cost per kWh (average usage)	**$0.16**	**$0.13**	

Current # of Residential Customers on TOU: **556** (27,139 standard residential customers)

Source: RMLD Service Requirements Handbook Appendix C: Rates, and Current Monthly Rate Adjustments

SHIFTING USAGE SAVES MONEY

Shifting from 38% on-peak to 22% on-peak results in a 19% savings.



	Residential Rate	Time-of-Use Rate
	Nov 2021 $/kWh Rate	Nov 2021 $/kWh Rate
Daily Electricity Cost:	$3.11	$2.39
Monthly Bill b/f		
Customer Charge:	$95.00	$72.75
Customer Charge:	$5.12	$8.00
Monthly Bill:	$100.12	$80.75
Savings:		**$19.37**

COMMERCIAL: STANDARD RATE VS TOU

November 2021 Rate Examples

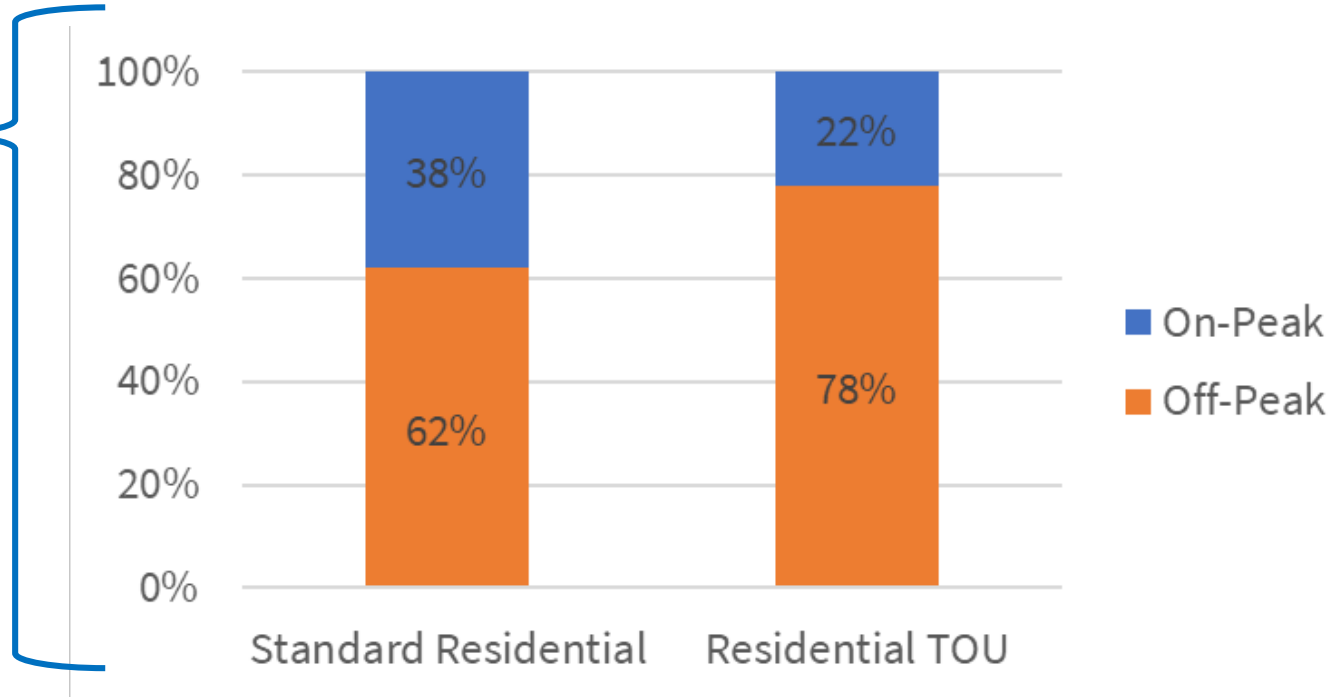
	Standard Commercial Rate	Industrial TOU Rate	
Customer Charge per month	$7.77	$39.18	
Distribution Energy Charge per kWh	$0.01725	N/A	
Distribution Demand Charge per kW	$8.13	$9.79	
Energy Conservation Charge per kWh	$0.00100	$0.00100	
Fuel per kWh (November 2021)	$0.04600	On-Peak	Off-Peak
		$0.09535	$0.03187
PPCT per kWh (November 2021)	$0.03804 per kWh	N/A	
PPCT Demand per kW (November 2021)	N/A	$8.00	
PPCT Energy per kWh (November 2021)	N/A	$0.03109	
Total Cost per kWh (average usage)	**$0.13**	**$0.11**	

89 Industrial TOU Customers represent 30% of total kWh sales, and 53% of C&I kWh sales
(3,686 standard commercial customers)

Source: RMLD Service Requirements Handbook Appendix C: Rates, and Current Monthly Rate Adjustments

MEASURING IMPACT/SUCCESS

- Residential customers are shifting load!
- TOU rate for larger C&I customers successfully minimizes loads during peak hours.



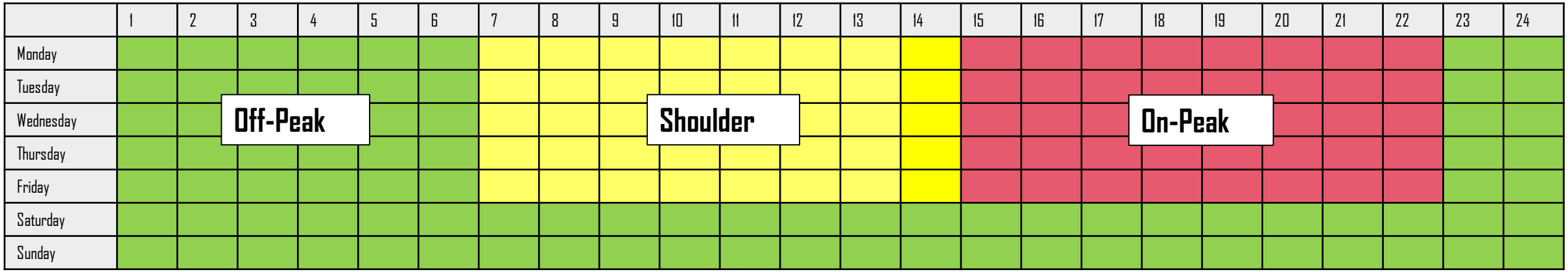
TOU AND ELECTRIFICATION

- In light of increasing electrification, reducing peak demand is even more important:
  - Electricity use expected to increase by over 1% annually in New England from 2021-2030
  - Summer peak demand expected to grow by 0.71% annually (driven strongly by electric vehicles)
    - EVs expected to make up ~7% of all light-duty vehicles by 2030, ~10% by 2032
    - 80% of EV owners charge their vehicles at home
  - Winter peak demand expected to grow by 1.34% annually (driven strongly by new heat pumps)
    - 23% of homes in MA expected to have full or partial heat pumps by 2030
- TOU rates are an effective mechanism to reduce peak demand

Source: ISO-NE CELT Report: 2021-2030 Forecast Report of Capacity, Energy, Loads, and Transmission, Published 5-3-2021

NEW EV-FOCUSED TOU RATE

- To be implemented in 2022: **Residential** TOU Schedule A3 Rate
- Targeted towards Electric Vehicle owners but open to any residential customer
- Three pricing tiers (rates TBD):
  - On-peak: M-F 2pm-10pm excluding holidays
  - Shoulder: M-F 6am-2pm excluding holidays
  - Off-peak: M-F 10pm-6am, weekends, holidays



RATE DEVELOPMENT CONSIDERATIONS

- Should the rate be for the whole home or should an additional meter by installed for the EV Charger?
- What is the billing infrastructure/software capable of?
- Minimize risk for customers while incentivizing behavior change?
- ???

Time of Use Rates & Electrification

Michael Vigeant
GreatBlue Research, CEO

Joyce Mulvaney
RMLD, Communications Manager

MEAM Conference 2021 | December 8, 2021

Agenda

- Intros
- Topics/Agenda
- Q & A

Your Presenters

Michael Vigeant

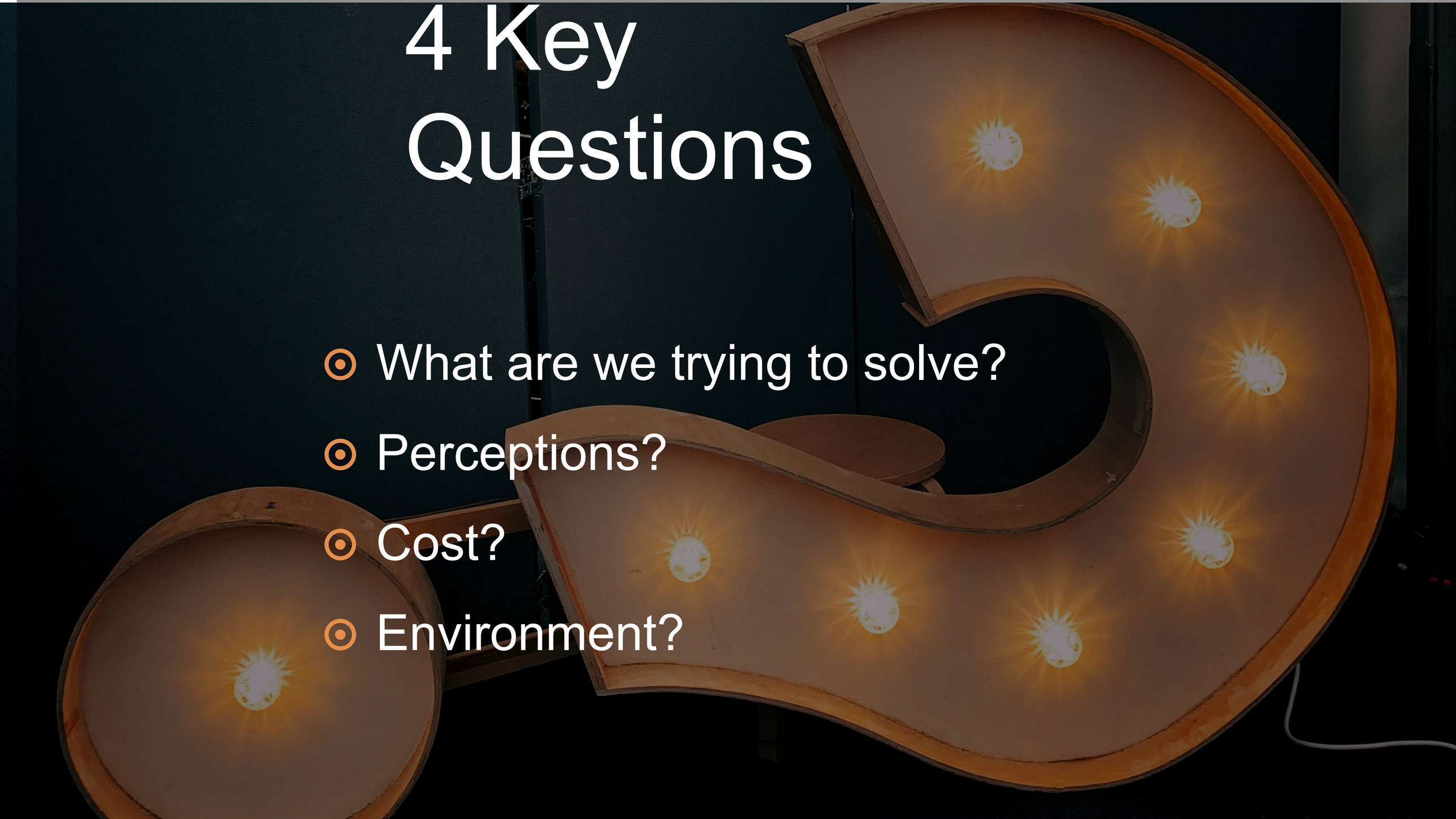
- 2 plus decades of market research experience
- MEAM partner since 1998
- Body double in TV show "Two and a Half Men"

ebrity

Joyce Mulvaney

- Eight years of utility communications experience
- ~ 5 years experience in electricity
- No known celebrity look-a-likes

4 Key Questions



- What are we trying to solve?
- Perceptions?
- Cost?
- Environment?

Utility Data More Important Than Ever!

Time of Use & Electrification

- What are customers current knowledge of TOU programs & electrification strategies?
- What are customers thoughts on the reduction of natural gas?
- What are the drivers & barriers for electrification?
- Perceptions of the path to Net Zero emissions?
- Understanding the impact of Electric Vehicles & charging stations

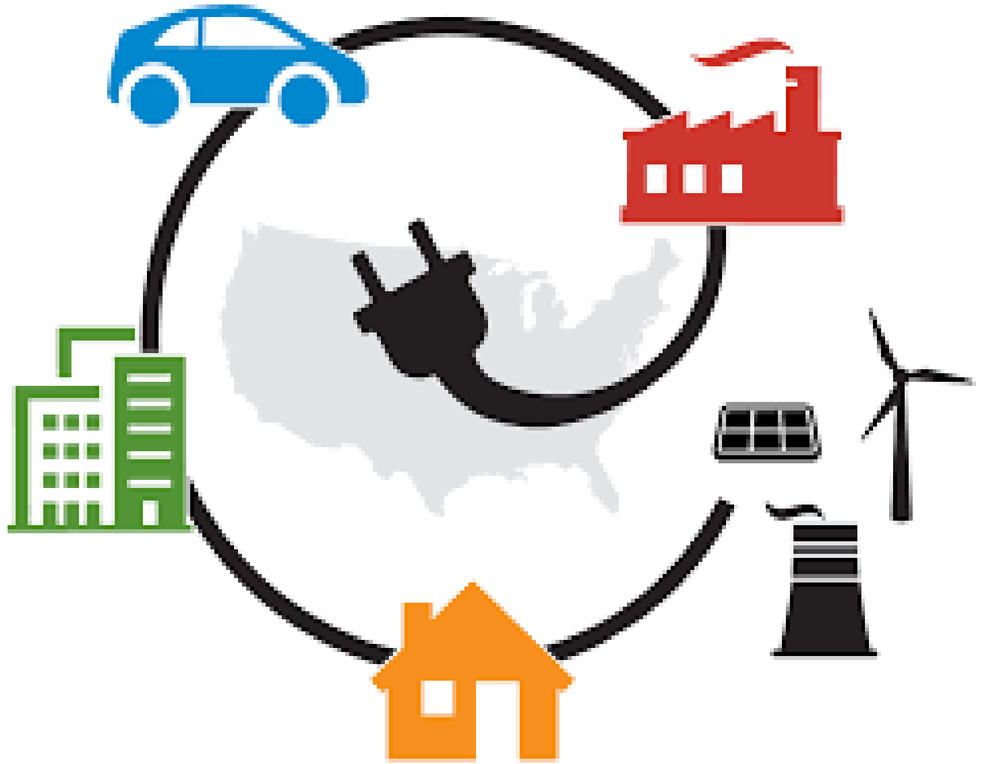
Electrification: What does it mean?
(Internally & Externally)

For the industry folks, it's more obvious.

For the general public :: Replacing technologies that use fossil fuels, like natural gas, with electricity as a source of energy.

What needs to change & what does the path look like?

- Heating & cooling
- Cooking
- Transportation
- EV infrastructure



Potential Headlines and/or Opportunities

- While carbon dioxide emission is not that high, burning natural gas also releases methane, which is a strong greenhouse gas that leaks to the atmosphere in a big amount. Burning natural gas also emits carbon monoxide, nitrogen oxides (NOx), and sulfur dioxide (SO2)

- Combustion of natural gas emits about half as much carbon dioxide as coal and 30 percent less than oil, as well as far fewer pollutants, per unit of energy delivered

- Environmental Protection Agency (EPA) shows that as of 2019, electricity accounted for 25% of GHG emissions
  - The transportation sector accounted for the highest GHG emissions at 29%
  - The commercial & residential sector accounted for 13% of emissions

- Deregulation to remove electric monopoly. Are we heading back there?

- Cost control measures in place?

Residential & Commercial Sectors

- Residential & Commercial buildings contribute to about 13% of all US greenhouse gas emissions
  - **Space Heating** - converting furnaces and boilers that run on natural gas to ground or air source heat pumps
  - **Water Heating** - replacing gas powered heaters with heat pump water heaters
  - **Cooking** - replacing gas ovens with propane, electric ranges & induction cook tops

- These conversions can be costly when:
  - Replacing existing technologies in older buildings/homes
  - Geographic areas such as the Northeast reach colder temperatures making conversions less economically feasible

Electric Vehicles- What to prepare for

- The transportation sector accounts for 29% of US greenhouse gas emissions
- A net zero emissions economy by 2050 would mean 300 million EV's on the road - we're currently at about 2 million today
- EV charging infrastructures - understanding the demand & planning for it

Benefits of Electric Vehicles

- EV's produce fewer CO_2 emissions
- Improve air quality
- More fuel efficient relative to gasoline & diesel
- Provide benefits to the electric grid by charging when electricity is abundant & demand is low
- Government tax credits

Opportunities

- Time-of-Use rate structures
- Financial incentives to switch to EV's
- Development of charging infrastructures
- Electrifying fleets
- Providing other incentives
- Energy storage at charging stations

One Size DOES NOT Fit All (Yet)!

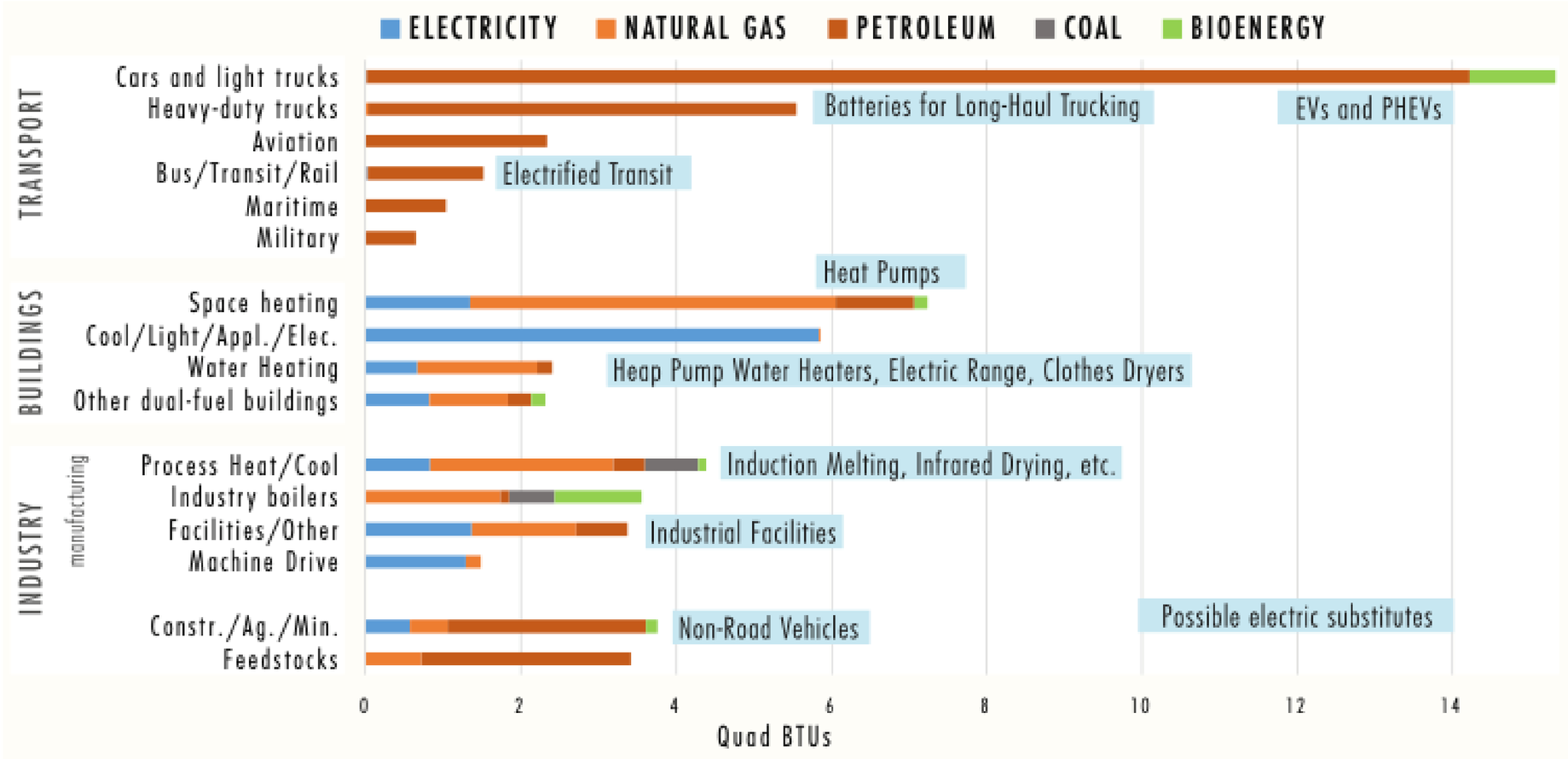


Figure 1-1. 2015 U.S. final energy by fuel and application. Possible electric substitutes in blue.

What’s the plan?

5 Steps to preparing for a carbon-neutral future:

1. **Energy Storage** - Investments & adoption in battery storage
2. **Automation & Communication** - Investments in these systems improve the reliability and efficiency of electric networks
3. **Digital Operations** - Increase operations to enable a fully digitalized utility work (i.e. using VR to be virtually “on-site” with customers)
4. **Next Gen Video Analytics** - Video & drone infrastructures to better track & manage assets and keep up with the increase in electricity use expected over the coming years
5. **Real Time Grid Analytics** - Software that uses artificial intelligence to predict what is happening on the grid, in real time

What are Utilities doing right now to prepare for Electrificatio

Transportation Electrification - EV Programs

Not just supplying the electricity but also:

- Improving customer programs - rebates, incentives
- Improve service offerings - offering tiered rate options
- Improving communications - assess awareness of programs & services

Solar

Smart meters

Connected Home Devices

Helping customers

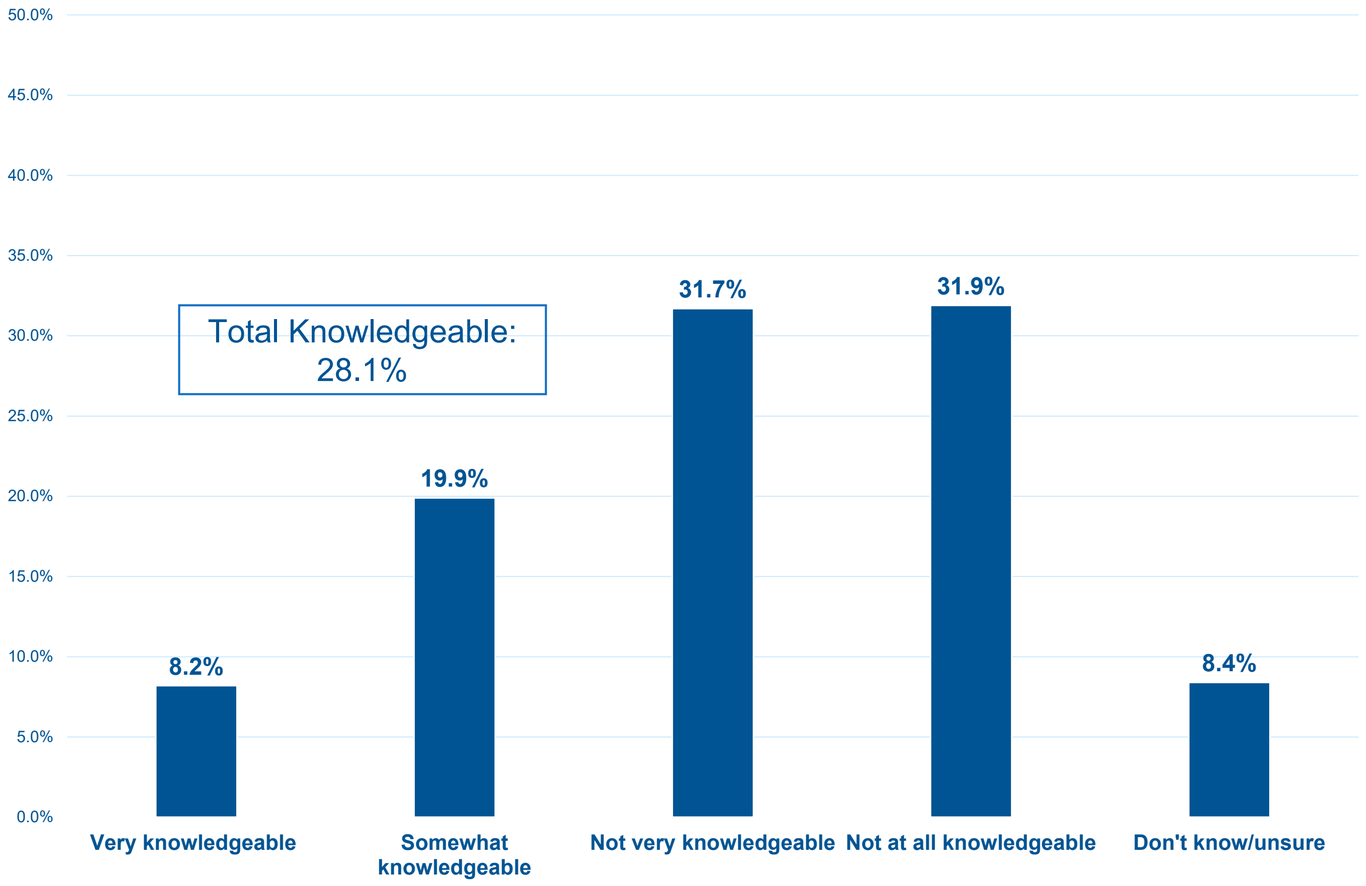
Long-Term Strategies for Electrification

- **Community partnership can help accelerate energy transition**
  - Inclusion of all customer segments, including underserved communities
  - Credits for customers who enroll in energy saving programs
  - Incentives to home builders to construct electric homes
  - Community programs that assist low-to-moderate incomes participate
- **Utilizing AMI's for predictive analysis of future savings opportunities**
- **Changes to grids**
  - Costs associated to those changes
  - Updates to control centers & transmission lines will help manage more complex future grids
- **Time-of-use rates**
  - Helps reduce customer bill
  - Decreases wholesale expenditures
  - Decreases carbon emissions
  - TOU to manage EV charging

METRICS	BENEFIT		
	CUSTOMER	UTILITY	SOCIETY
ECONOMIC EFFICIENCY -it costs less	✓	✓	✓
ENERGY EFFICIENCY -uses fewer BTUs overall	✓	✓	✓
ENVIRONMENT -CO_2 savings -emission reductions, water savings	✓	✓	✓
GRID FLEXIBILITY	✓	✓	✓
ECONOMIC DEVELOPMENT -jobs creation and retention -development of community assets	✓	✓	✓
PRODUCTIVITY IMPROVEMENTS -plant output increase -reduction in energy intensity -improved product quality	✓		✓
WORKER SAFETY IMPROVEMENTS -reduced lost time and accidents	✓		✓

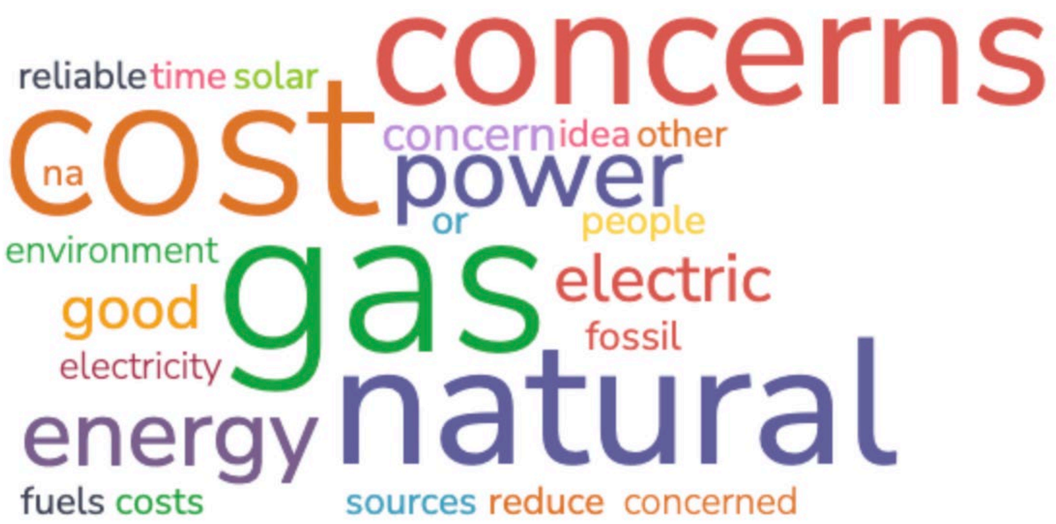
Figure 1-2. Efficient Electrification Potential Benefits. Metrics in blue are explicitly modeled in the USNEA. Other potential benefits have been explored in prior EPRI research or case studies.

National Public Power Data — Electrification



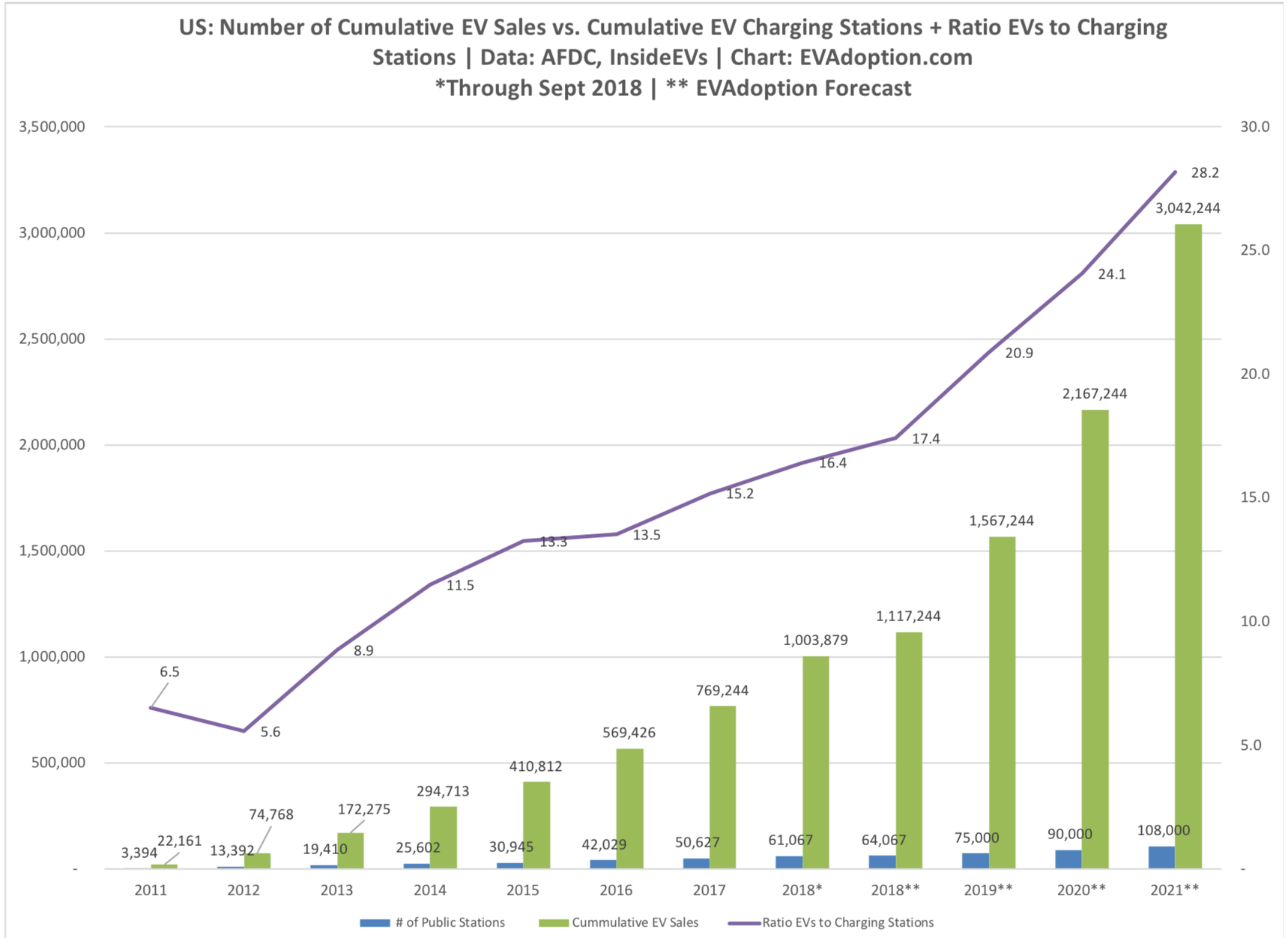
Q. How knowledgeable would you say you are of the concept of “strategic electrification”?

Q. Currently, there is an initiative going on called "strategic electrification." Strategic Electrification is the movement to reduce the consumption of natural gas and replace fossil-fuel burning technologies with electricity-based alternatives to increase energy efficiency. What are your top concerns, if any, of our country reducing its reliance on natural gas in its power supply?



*Data collected from the Public Power Data Source survey fielded from November – December 2021. N=3,000 public power customers nationwide.

Electric Vehicle Charging Stations



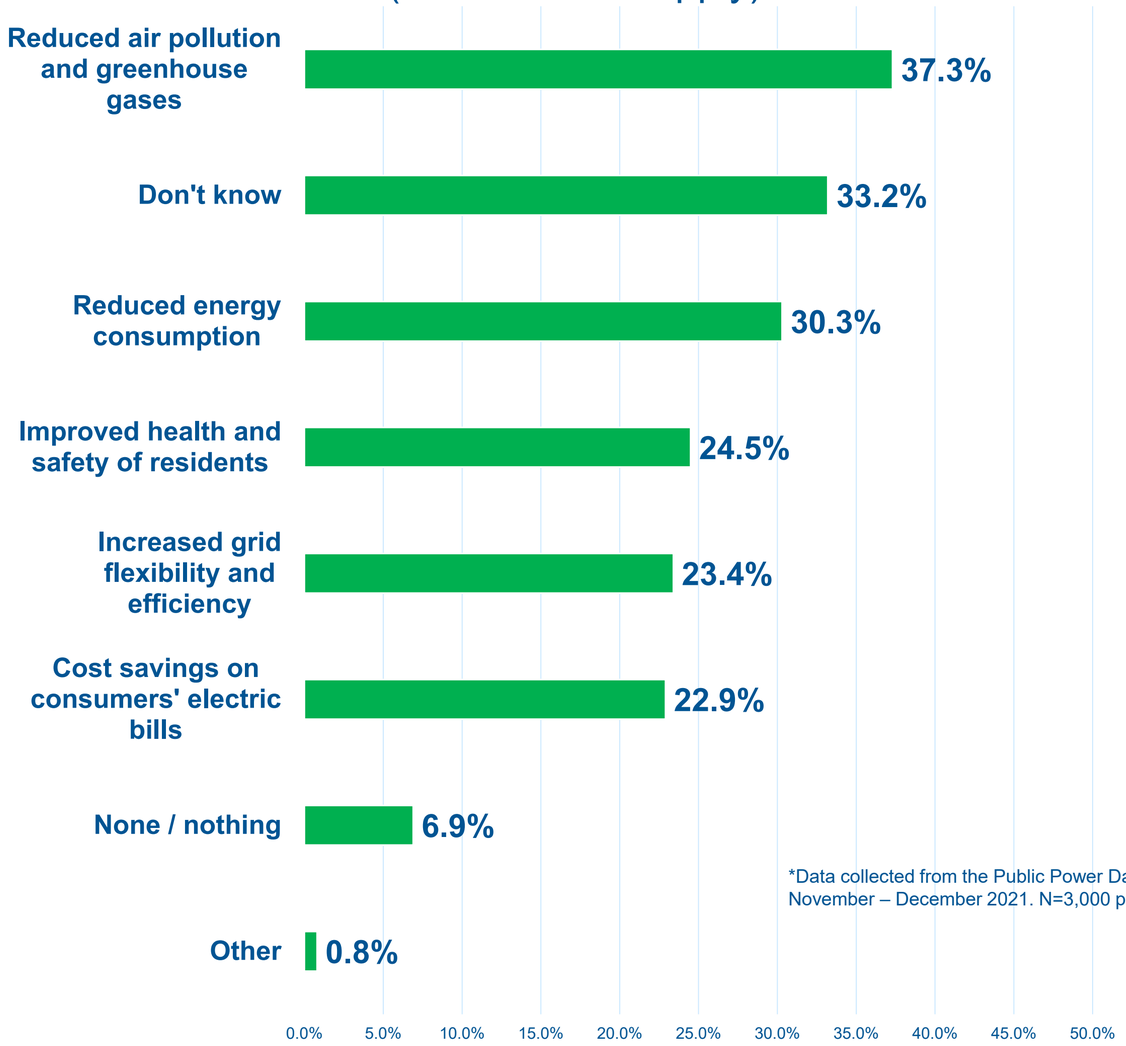
The EV charging station market is projected to grow 17% by 2022

The increase in charging stations is currently not paced to keep up with the increase of EV purchases.

Municipalities have an opportunity to help meet the demand with the implementation of more charging stations

National Public Power Data — Electrification

Q. In your opinion, what are the benefits of “strategic electrification”? (Select all that apply)



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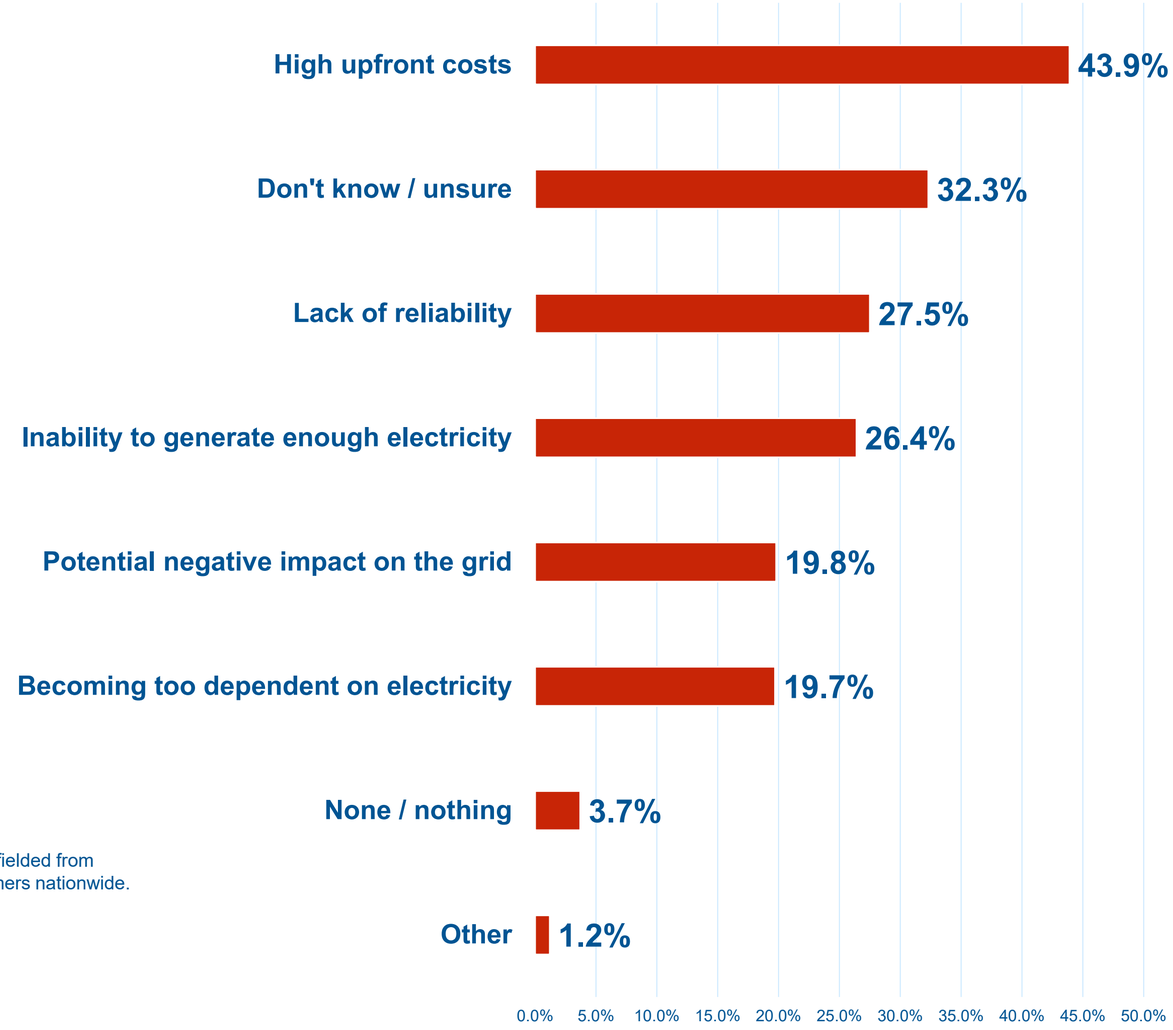
Q. What do you believe to be the drawbacks of “strategic electrification”? (Select all that apply)



Michael Vigeant , CEO

(860) 740-4000
mjv@greatblueresearch.com

Glastonbury, CT

/GreatBlueResearch

@GBResearch