Housekeeping

You will receive a copy of the slides & a link to the recording
- To the email you used to register.

You can ask questions as we go along
- Simply type into the question box now or during the Q&A.

We will answer all the questions submitted
- If we are unable to get to all the questions, they will be answered individually after the presentation.

Today's Agenda

Jordan Folks
Associate Director
Opinion Dynamics

Dr. Sanem Sergici
Principal
The Brattle Group

Nathan Shannon
President & CEO
Smart Energy Consumer Collaborative

Emma Runge
Executive and Engagement Associate
American Council for an Energy-Efficient Economy

Dr. Sanem Sergici

Background

Principal, The Brattle Group

- The focus of Dr. Sergici's work has been on assisting electric utilities, regulators, market operators and technology firms in their strategic questions related to energy efficiency, demand response, distributed generation and understanding behavior of electricity prosumers.

- Dr. Sergici has been at the forefront of the design and analysis of dynamic pricing, enabling technology and behavior-based energy efficiency programs in North America.

- Dr. Sergici is a frequent presenter on the economic analysis of DERs and regularly publishes in academic and industry journals. She received her PhD in Applied Economics from Northeastern University in the fields of applied econometrics and industrial organization.

Jordan Folks

Background

Associate Director, Opinion Dynamics; SECC's Research Committee Chair

- Jordan uses a social science lens to study the intersection of human behavior and energy consumption. His customer research focuses on flexible load topics like innovative pricing, DR, and EVs; weaving energy equity throughout.

- Jordan blends his decade-plus experience in energy industry consulting with his academic background in behavioral research methodologies. He helps energy providers better understand what drives customer decision-making processes, how to better serve customers and how to make access to clean energy programs more equitable.

- He received his Masters in Sociology from Portland State University, where he used a community-based participatory research framework to research Portland's environmental injustices and community-sourced solutions.

Emma Runge

Background

Executive and Engagement Associate, ACEEE

- Emma Runge serves as the Executive and Engagement Associate and Deputy Lead of the Leading with Equity Initiative at the American Council for an Energy Efficient Economy (ACEEE).

- She assists ACEEE's local policy program with research and program management related to efforts to adopt, implement, and assess equitable clean energy policy. She contributes significantly to the Leading with Equity Initiative, which aims to integrate equity considerations more fully into ACEEE's Energy Efficiency Scorecards. She joined ACEEE in 2020.

- Emma earned a bachelor of arts in government with minors in inequality studies and law and society from Cornell University.
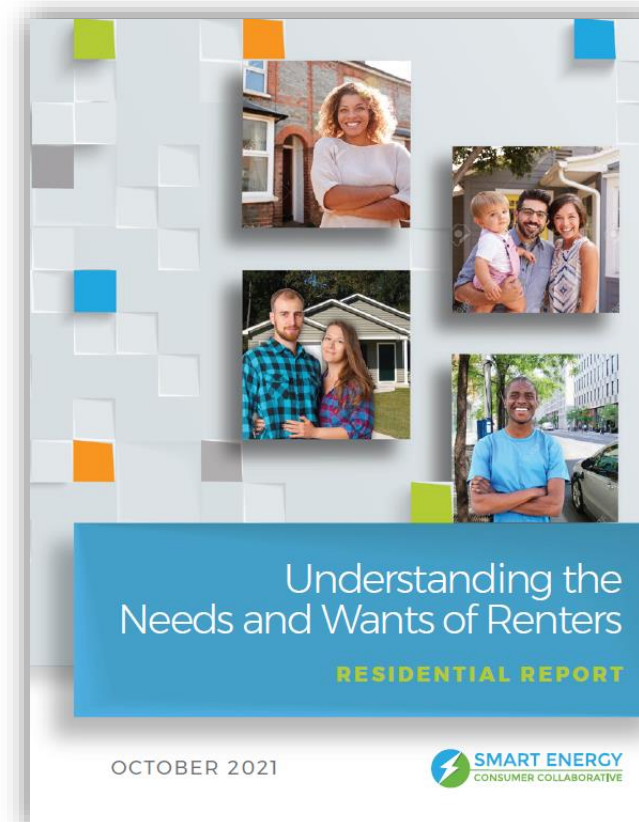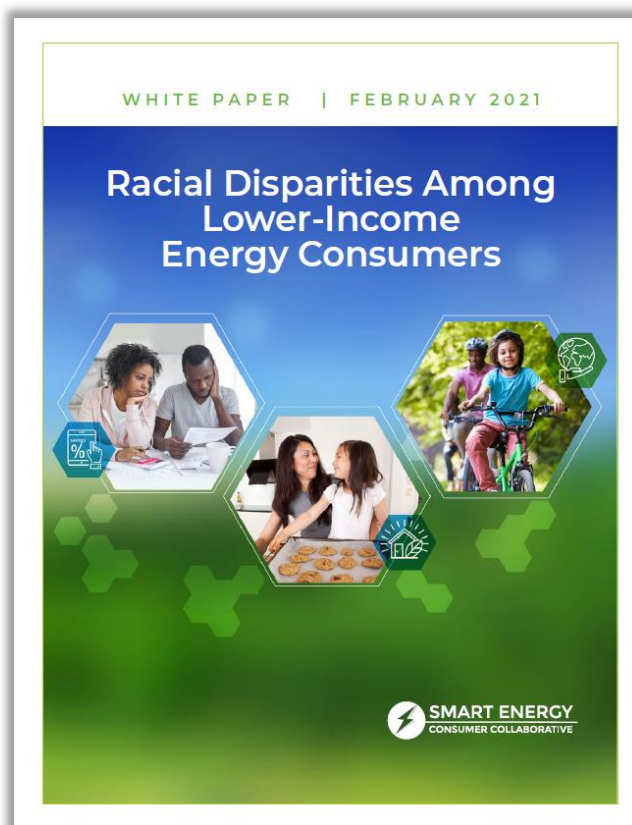
"2022 State of the Consumer" Report
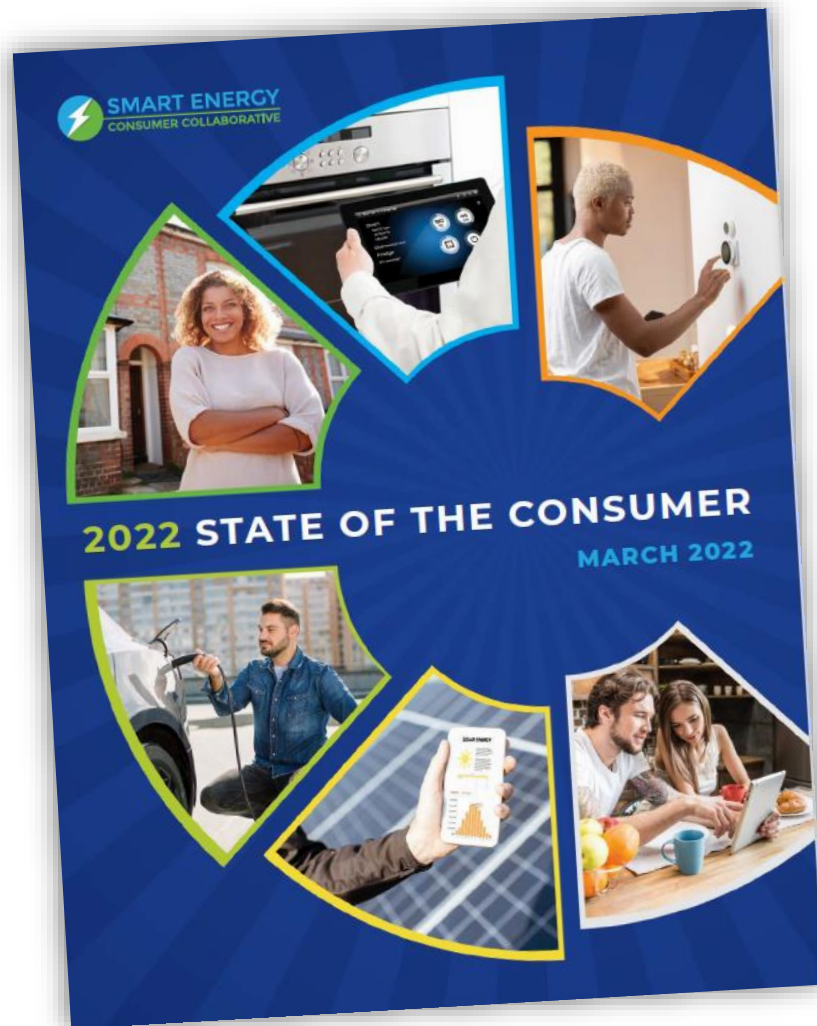
Annual meta-analysis of the previous year's research agenda

Provides six big-picture themes on the needs and wants of today's energy consumers

What Did We Research in 2021?

SECC worked with its members to craft a research agenda for 2021, and the "2022 State of the Consumer" report summarizes 2021 findings.

Racial Disparities Among Lower-Income Consumers

WHITE PAPER | FEBRUARY 2021

Racial Disparities Among Lower-Income Energy Consumers

SMART ENERGY
CONSUMER COLLABORATIVE
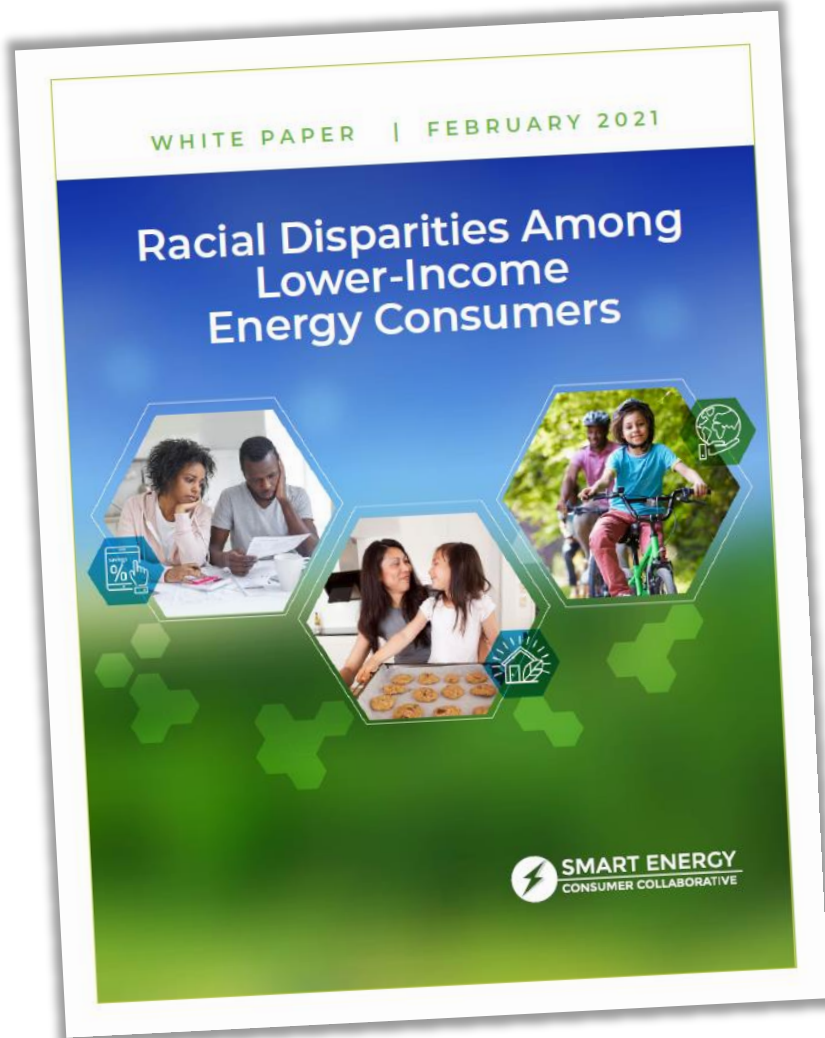
Based on an online national survey of 1,000 Americans with incomes under $50,000 annually

Highlights differences between white, Black and People of Color households around energy-related interests, concerns, behaviors, etc.

SMART ENERGY
CONSUMER COLLABORATIVE

Investigates consumer satisfaction and perceived benefits of smart home devices, especially those most directly related to home energy usage

Examines non-adopters of smart home devices and their barriers

Explores consumer concerns around data privacy and data security

SMART HOME AND ENERGY DATA: WHAT DO CONSUMERS WANT?

JUNE 2021

SMART ENERGY
CONSUMER COLLABORATIVE
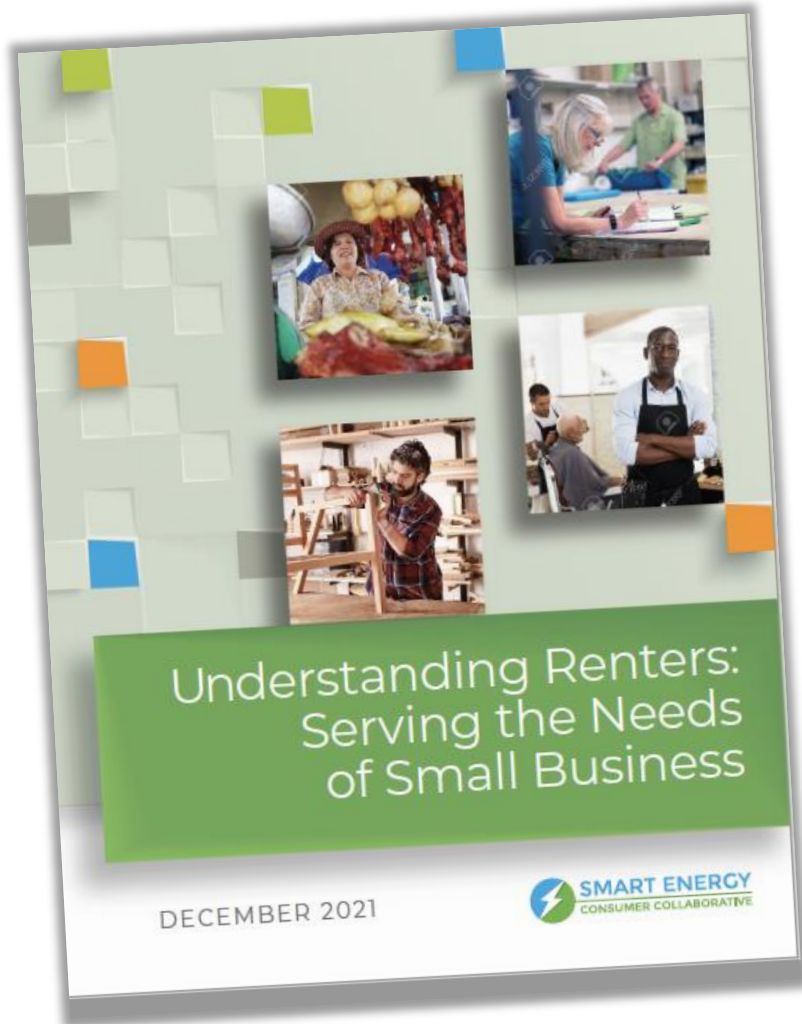
Residential Customers Who Rent Their Homes
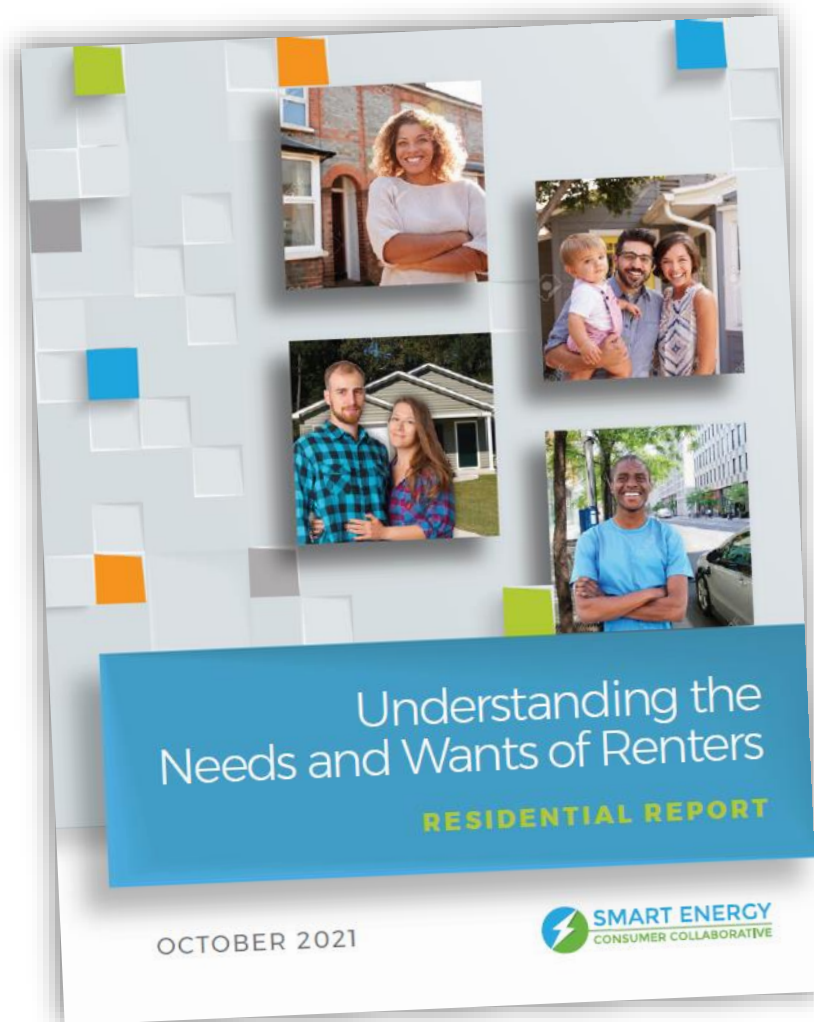
Aims to better understand residential renters as consumers and to explore their attitudes, values and preferences regarding energy management activities and utility programs

1,000 renters in the United States who pay for their energy bills

In-depth interviews with five landlords

Understanding the
Needs and Wants of Renters

RESIDENTIAL REPORT

OCTOBER 2021

SMART ENERGY
CONSUMER COLLABORATIVE

Small Businesses Who Rent Their Facilities

Focuses on the energy-related concerns and interests of small businesses with fewer than 100 employees that lease commercial property

Based on twenty 30-minute interviews with business owners that occupy rental properties in nine U.S. states

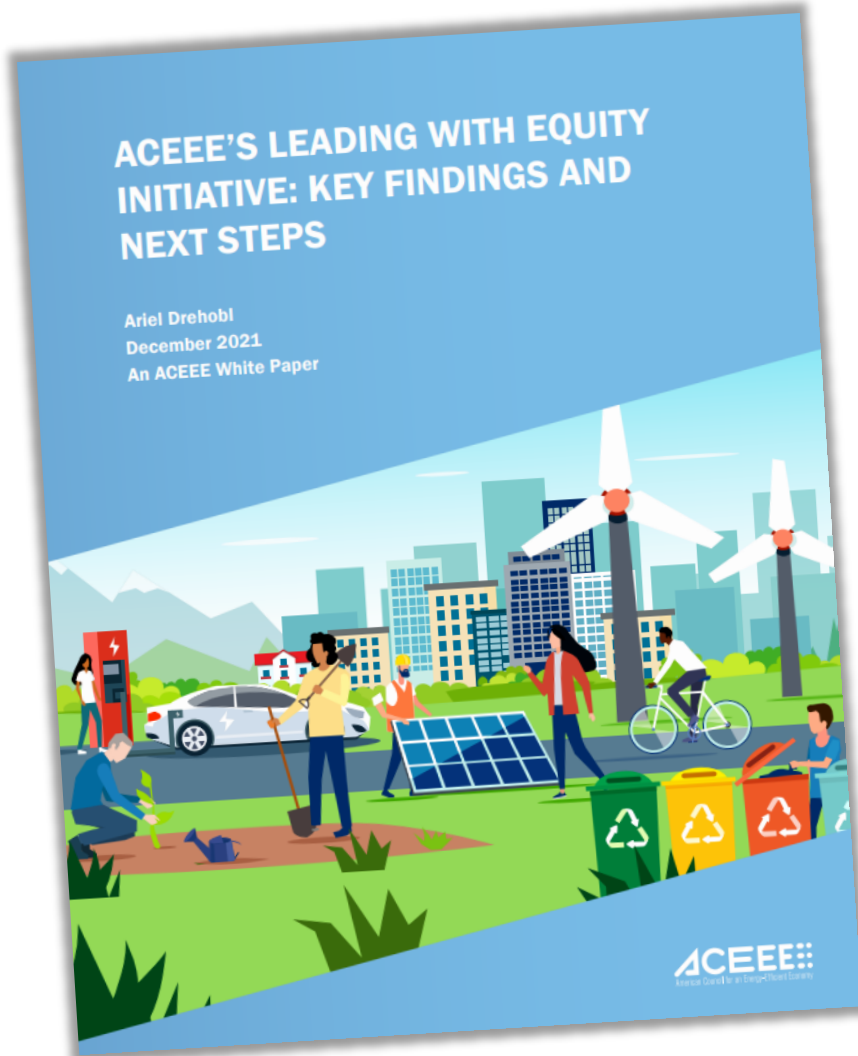Electric Vehicles: Driving the Customer Experience
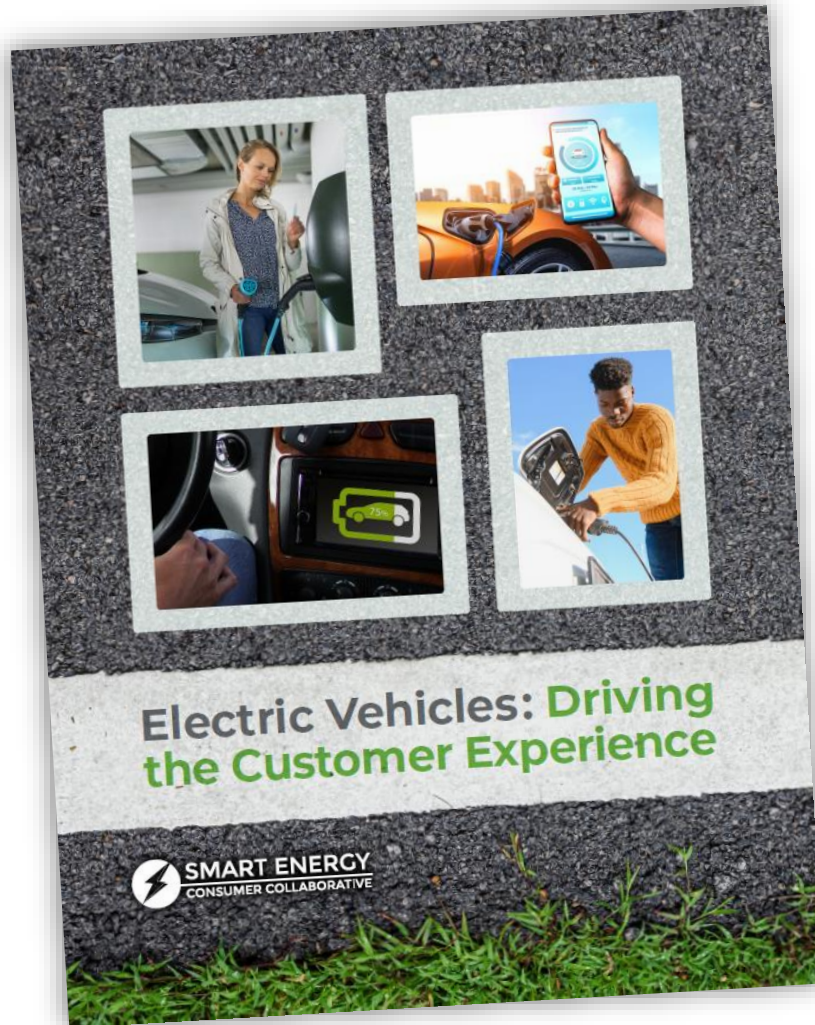
Provides insight into consumers' knowledge and attitudes about EVs as well as the experiences of current EV drivers

Based on an online survey that was administered to 1,000 residential consumers in the U.S.

The sample was boosted with an additional 750 respondents who currently own an EV

ACEEE'S LEADING WITH EQUITY INITIATIVE: KEY FINDINGS AND NEXT STEPS

Ariel Drehobl
December 2021
An ACEEE White Paper

ACEEE

The Customer Action Pathway to National Decarbonization

PREPARED BY

Sanem Sergici
Ryan Hledik
Michael Hagerty
Ahmad Faruqui
Kate Peters

PREPARED FOR

ORACLE

SEPTEMBER 27, 2021

Brattle

Out of the following, which of these customer-focused initiatives is your organization prioritizing the most in 2022?

Theme One

Consumers are ready to take action to help meet decarbonization goals.

Harnessing the Power of Customers on the Road to Decarbonization

PRESENTED BY

Sanem Sergici, Ph.D.

APRIL 07, 2022

Brattle

Introduction

Customer-driven adoption of GHG-reducing technologies will play a key role in achieving decarbonization targets

- Ambitious decarbonization targets are being set by states, counties, and cities
- Utilities and states are responding to these decarbonization targets by laying out pathways for achieving them
- We expect these targets to become more aggressive in the next few years at both the state and federal levels

Brattle recently completed a study for Oracle to quantify the decarbonization impact of customers adopting new technologies and energy consumption behaviors in the next 10-20 years

- This study focuses specifically on the GHG reductions from the residential sector and light-duty vehicles (LDV)
- Brattle's in-house models are used to estimate the load impact of customer adoption of new technologies and behaviors, and the corresponding GHG emissions impacts at the regional and national level

We quantify the total aggregate impact of *ambitious but achievable* adoption of new GHG-reducing technologies, rather than impacts that are incremental to what is already expected to be achieved under a *status quo* case

Customer Action Pathway to Decarbonization

Since 2005, annual U.S. energy-related greenhouse gas (GHG) emissions have declined by 878 MMT (or 13%)*

- 85% of the reductions are from reduced electric power sector generation emissions (e.g., reduced coal generation)

While the bulk of the decarbonization work to date focuses on understanding the impact of building a "greener grid", it is important to consider what can be achieved through customer-directed actions
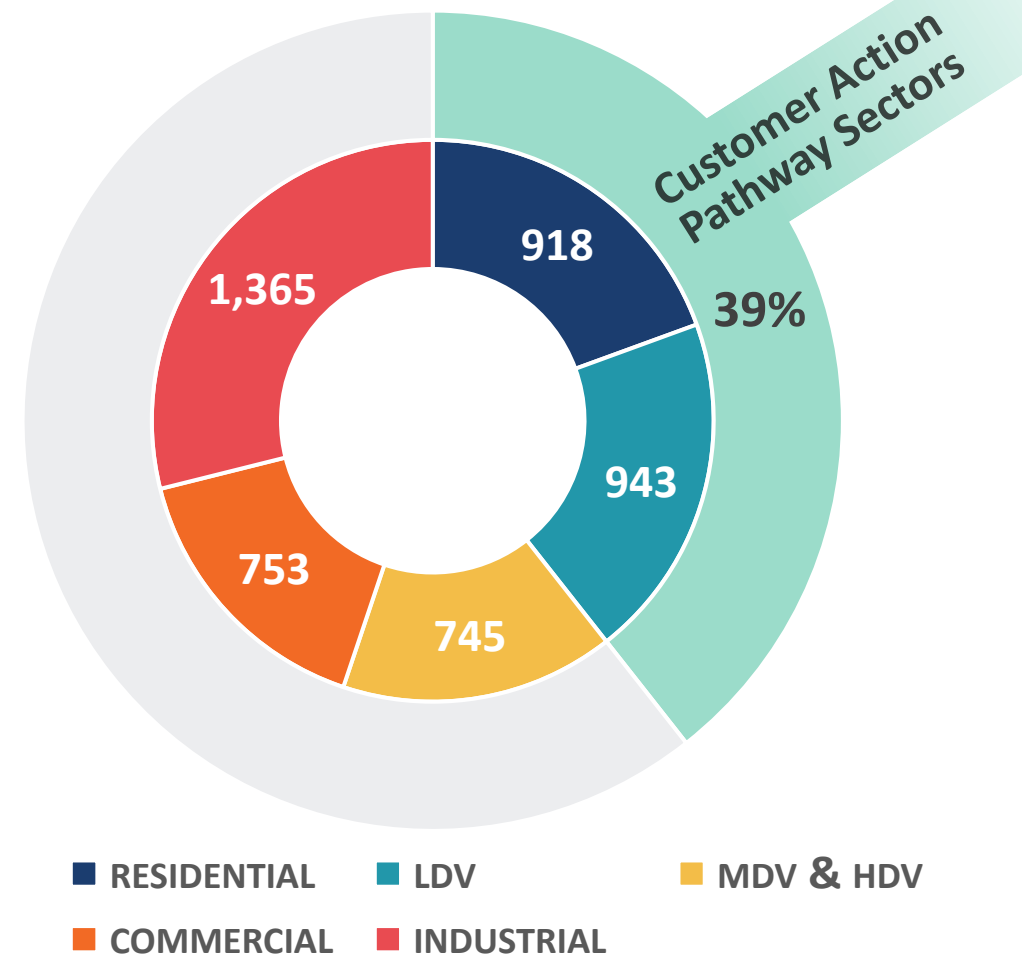
This report focuses on two sectors, **Residential** and **Light-Duty Vehicles**, in which customer actions have a direct impact on GHG emissions

- Residential and LDV sectors account for 1,861 MMT in 2021, or about 40% of total U.S. energy-related GHG emissions
- Customer adoption of GHG-reducing technologies combined with additional clean power generation will be necessary to reduce emissions

We refer to the customer-directed actions analyzed in this study as the "**Customer Action Pathway**" to decarbonization

*Source: EPA's GHG Inventory.

PROJECTED 2021 US GHG EMISSIONS BY END USE (MMT)

Customer Action Pathway Sectors

918

39%

943

745

753

1,365

- **RESIDENTIAL**
- **LDV**
- **MDV & HDV**
- **COMMERCIAL**
- **INDUSTRIAL**

Source: EIA AEO 2021.

Customer Action Pathway GHG Reducing Technologies

- The primary sources of customer-specific energy demand and GHG emissions are from LDV transportation and residential electricity demand, followed by residential space and water heating

- GHG reducing technologies exist across all sources of energy demand and GHG emissions for customers to play an active role in achieving future GHG emissions reductions

Emissions Source	2021 Energy Consumption	2021 GHG Emissions	GHG-Reducing Technologies (Modeled in this Study)	Non-Power Sector GHG Emissions	Power Sector GHG Emissions
Residential Electricity Demand*	21 Quads	598 MMT	BTM Solar	—	↓
			Electric Energy Efficiency (EE)	—	↓
LDV Transportation	14 Quads	943 MMT	BEVs and PHEVs	↓	↑
Residential Space Heating & Water Heating	10 Quads	446 MMT	Space Heating: Air-Source & Ground-Source Heat Pumps	↓	↑
			Water Heating: Air-Source Heat Pumps & Electric Resistance	↓	↑
			Gas Energy Efficiency	↓	—

*Includes total electricity consumption for all residential end uses.
Note: BTM Solar and EE reduce emissions from *all* residential demand. BEV stands for Battery Electric Vehicles and PHEV stands for Plug-In Hybrid Electric Vehicles.

High-Level Analytical Approach

Estimated GHG emissions reductions in 2030 and 2040 using the following approach:

- Identified "ambitious but achievable" nationwide residential customer adoption by 2030 and 2040 of each GHG reducing technology based on public studies and Brattle's prior work

- Applied customer adoption rates to each region's projected fuel demand in 2030 and 2040 based on AEO 2021 projections

- Developed hourly demand/generation forecasts to analyze power generation emissions impacts

- Estimated energy efficiency and BTM solar GHG emissions impacts:
  - Calculated avoided power generation GHG emissions based on hourly marginal emissions rates

- Estimated transportation, space heating and water heating electrification GHG emissions impacts:
  - Calculated avoided GHG emissions from direct fuel usage (e.g., reduced gasoline emissions)
  - Calculated incremental power generation GHG emissions based on hourly marginal emissions rates by region
  - Calculated net impact on GHG emissions

Ambitious but Achievable Customer Technology Forecasts

GHG REDUCTION TECHNOLOGY*	APPROACH	2030 ADOPTION	2040 ADOPTION	REFERENCED PUBLIC FORECASTS*
Residential Electric Energy Efficiency	Create an U.S.-wide forecast based on public reports and Brattle studies	250 TWh annual savings; 1.5% savings/year from 2020 through 2030	320 TWh annual savings; 0.5% savings/year from 2030 through 2040	DOE meta-analysis, EPRI, NREL, Brattle reports
Residential Gas Energy Efficiency	Assume national % annual reductions are consistent with electric EE forecasts. Savings applied after heating electrification related gas demand reductions.	1.5% annual savings from 2020 through 2030	0.5% savings from 2030 through 2040	NREL, Center for Energy and Environment, Synapse, Brattle analysis comparing regional electric and gas EE potential
Residential BTM Solar	Create a region-specific forecast based on public reports	115 GW nationally; 16% of residential homes w/ BTM solar arrays	135 GW nationally; 20% of residential homes w/ BTM solar arrays	NYISO, ISO-NE, California Energy Commission, AEO, Vibrant Clean Energy

*See slide 28 for sources

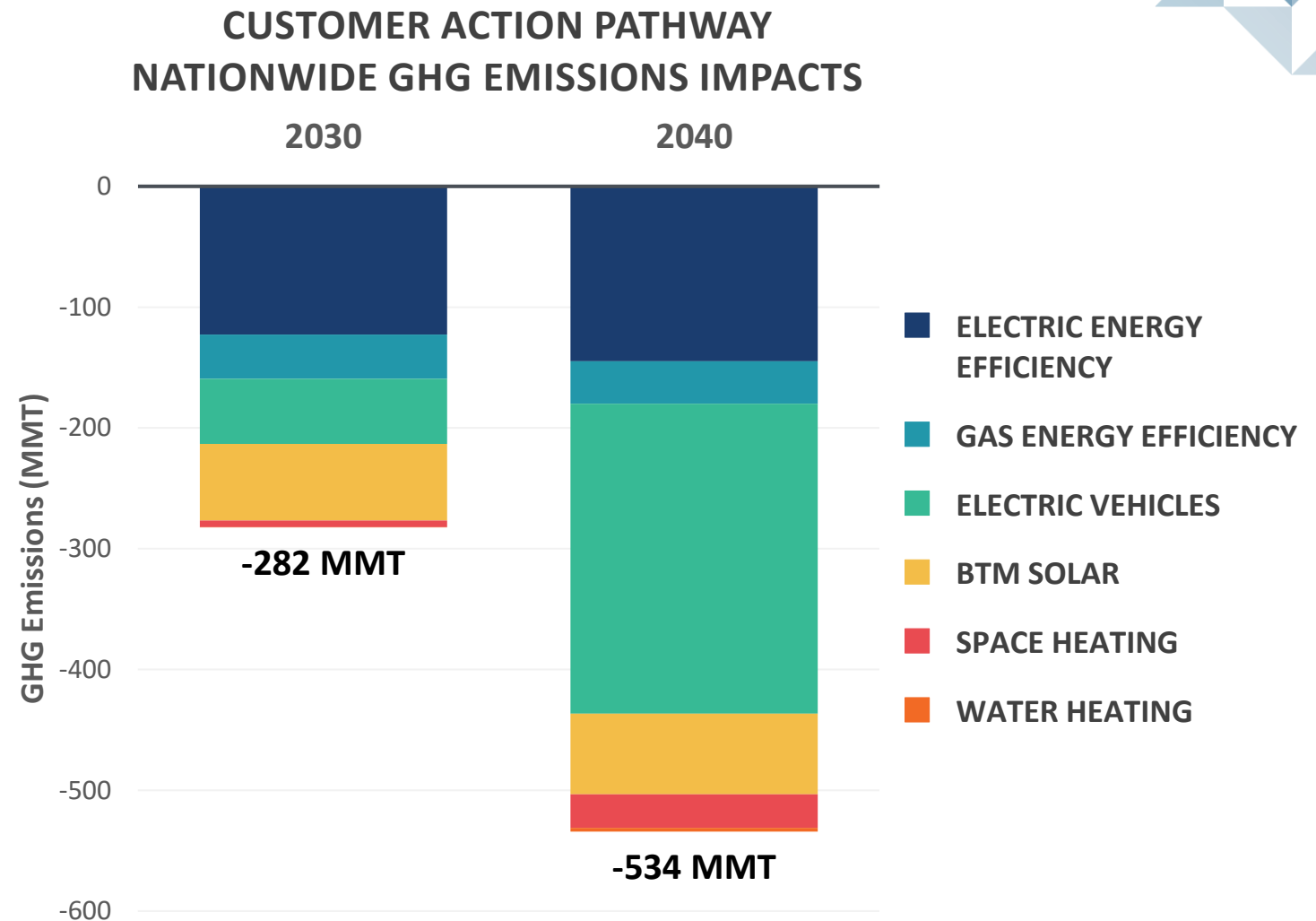# Ambitious but Achievable Customer Technology Forecasts

GHG REDUCTION TECHNOLOGY	APPROACH	2030 ADOPTION	2040 ADOPTION	REFERENCED PUBLIC FORECASTS*
Battery Electric Vehicles (BEV) and Plug-In Hybrid Vehicles (PHEV)	Develop EV adoption forecast using Brattle model that projects future BEV and PHEV stock, % annual sales, vehicle turnover, and % electric vehicle miles traveled	40% of new vehicle sales; 16% of total vehicles	89% of new vehicle sales; 58% of total vehicles	Brattle modeling, benchmarked to public forecasts
Residential Space Heating Air-Source Heat Pumps and Ground-Source Heat Pumps	Apply the national adoption forecast from NREL EFS high scenario to regional space heating fuel demand forecasts	24% of demand electrified *(Note: 17% of space heating electrified as of 2020)*	45% of demand electrified	NREL's EFS High scenario (2018)
Residential Water Heating Air-Source Heat Pumps and Electric Resistance Heaters	Apply the national adoption forecast from NREL EFS high scenario to regional water heating fuel demand forecasts	37% of demand electrified *(Note: 34% of water heating electrified as of 2020)*	51% of demand electrified	NREL's EFS High scenario (2018)

Customer Action Pathway GHG Emissions Reductions

The Customer Action Pathway could reduce GHG emissions by 534 MMT in 2040

- Residential electric & gas energy efficiency have the greatest near-term impact reducing 2030 emissions by 158 MMT and 2040 emissions by 180 MMT

- Rising EV adoption increases avoided GHG emissions from 53 MMT in 2030 to 256 MMT in 2040

- Behind the meter (BTM) solar installed on residential homes reduces 2040 emissions by 67 MMT

- Residential space and water heating electrification reduces 2040 emissions by 31 MMT

CUSTOMER ACTION PATHWAY NATIONWIDE GHG EMISSIONS IMPACTS

Legend:
- ELECTRIC ENERGY EFFICIENCY
- GAS ENERGY EFFICIENCY
- ELECTRIC VEHICLES
- BTM SOLAR
- SPACE HEATING
- WATER HEATING

2030: -282 MMT
2040: -534 MMT

Note: GHG emissions reductions represent emissions reductions in 2030 and 2040 compared to baseline emissions without customer action to adopt low GHG technologies, but assuming declining power generation emissions.

Customer Action Pathway Builds on Supply-Side Reductions

The Customer Action Pathway has the potential to **reduce GHG emissions by nearly twice as much as supply-side reductions alone** will contribute under existing policies

RESIDENTIAL AND LDV GHG EMISSIONS PROJECTIONS

GHG Emissions (MMT)

2,000
1,750
1,500
1,250
1,000
750
500
250
0

2021   2030   2040

- ENERGY EFFICIENCY
- ELECTRIC VEHICLES
- OTHER ACTIONS*

The Customer Action Pathway has potential to reduce 2040 emissions by 534 MMT

- ELECTRIC POWER GENERATION

"Greening the Grid" alone expected to reduce 2040 emissions by 284 MMT under existing policies

- GHG EMISSIONS

Achieving long-term deep decarbonization goals will **require even greater emissions reductions** from both the Customer Action Pathway described in this study and from supply-side power generation

* Other Actions include BTM solar and space & water heating electrification

Notes: Total emissions prior to Customer Action Pathway and electric power generation reductions assume 2021 residential emissions levels increase through 2040 with projected electricity, gas, and transportation demand from AEO 2021. Reduction in electric power generation emissions based on average power generation emissions rates (0.41 tons/MWh in 2021, 0.29 tons/MWh in 2030, and 0.23 tons/MWh in 2040) generated by Brattle's in-house capacity expansion model GridSIM (see slide 10). Future policies could accelerate both demand-side and supply-side emissions reductions.

Customer-driven actions have a critical role in achieving ambitious climate goals

These results highlight the importance of customer-driven actions in achieving ambitious decarbonization goals

- Avoiding 534 MMTCO2 in 2040 is the same as retiring 135 coal plants (Source: EPA)
- Customer Action Pathway GHG emission reduction potential is about 2x greater than projected reductions from supply side decarbonization efforts alone by 2040 under current policies
- GHG reductions achieved through the Customer Action Pathway in 2040 is equivalent to nearly 60% of the annual GHG reductions achieved from all sectors from 2005 to 2021

Near-term emissions reduction potential driven by energy efficiency and BTM solar through 2030, while customer adoption of electric vehicles could provide the largest emissions reductions by 2040

- EE and BTM solar have greatest 2030 impact due to current customer familiarity and higher near-term power generation emission rates. While adoption of both technologies continues beyond 2030 at a slower rate, the emissions impact is less significant by 2040 due to the lower power generation emission rates
- EV adoption emissions impact increase significantly from 2030 to 2040 due to the 4x potential increase in the total EVs on the road and the lower power generation emission rates

Additionally, load flexibility (e.g., smart thermostat programs, time-varying rates) will be a critical part of the Customer Action Pathway

- Load Flexibility facilitates the integration of renewable energy resources, reduces renewable energy curtailment, and mitigates the need for system upgrades to serve rising peak demand

Load flexibility will facilitate the transition to a decarbonized grid

- Load flexibility refers to managing customer load and distributed energy resources to provide overall value to the power grid and to consumers

- Load flexibility has an indirect but large role in decarbonizing the power grid, by facilitating the integration of renewables and potentially shifting load away from hours with high emissions

- There is a significant amount of untapped load flexibility potential in the residential sector. This will grow as more customers adopt EVs, batteries, smart thermostats, and other technologies

  - A 2019 Brattle study estimated that national load flexibility potential is 200 GW in 2030 (roughly 20% of peak demand)

  - More than half of the untapped potential comes from the residential sector

- Achieving this potential will require deliberate efforts to remove significant technical, market, and regulatory barriers

DECARBONIZATION BENEFITS OF LOAD FLEXIBILITY

- Reduce renewables curtailment by shifting usage to hours of low net load

- Reduce or shift usage away from hours with high marginal emissions rates

- Improve economics of solar PV by mitigating the late evening ramp in net load otherwise caused by these resources

- Facilitate cost-effective adoption of electrification by mitigating load impacts of new electricity-intensive end-uses

- Provide real-time grid balancing services needed when increasingly dependent on intermittent generation resources
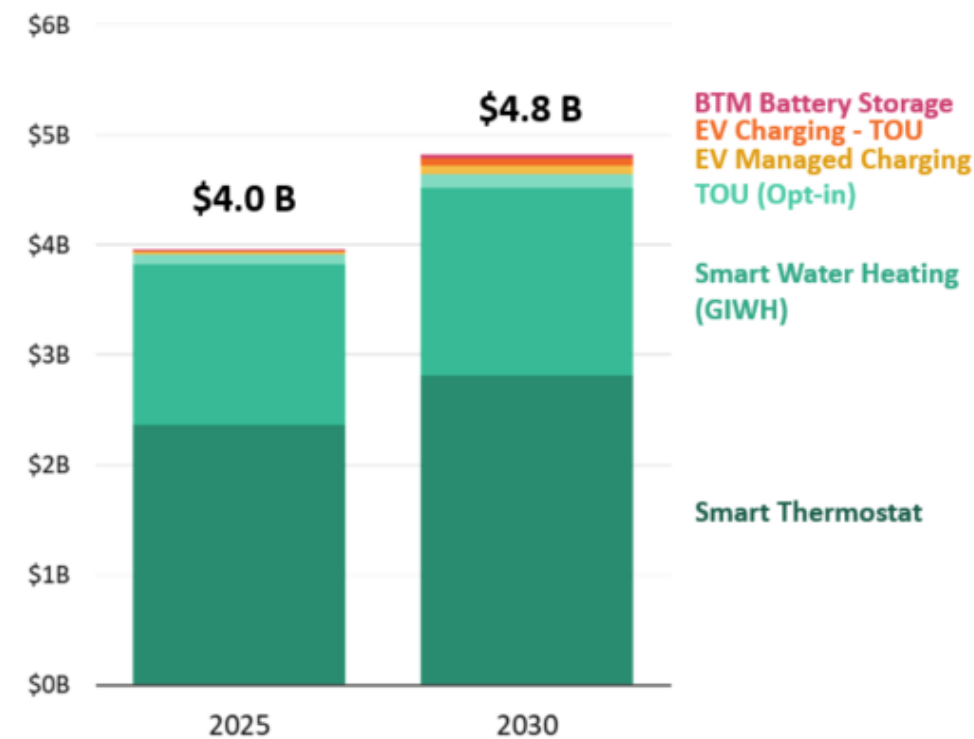
Residential Load Flexibility Potential

While smart thermostats and water heaters lead to the largest value, time varying rates may provide a significant value based on the rate type and deployment approach
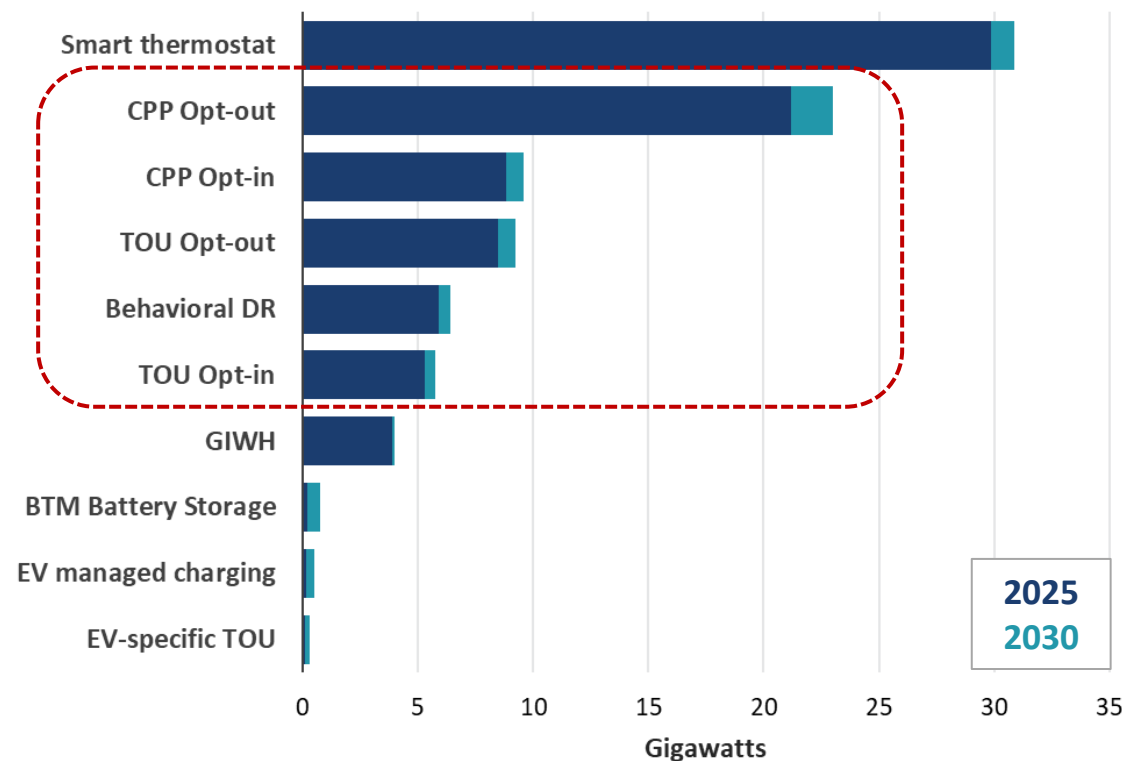
The potential estimates are based on achievable levels of adoption, but do not account for the cost-effectiveness of the options. Load flexibility value in nominal dollars.
*Source: Brattle LoadFlex Model*

Case: Pepco DC
EE and load flexibility as natural complements to electrification

A focus on demand-side initiatives will ensure that future load growth is efficient and flexible

With electrification, Pepco DC's future rate of load growth will remain within recent historical ranges

- Historically, Pepco has reliably managed annual peak demand growth rates **well in excess of 2%**

- If electrification is the primary pathway for achieving the District's decarbonization goals, we estimate that peak demand will grow at an **average annual rate of 1.4% to 1.7%** between 2021 and 2050

- On average, the system will grow at a rate that is higher than recent observed growth but well below growth rates that Pepco has reliably managed in the past

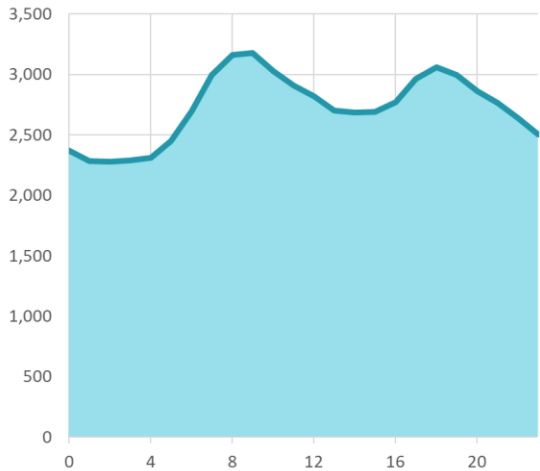**Pepco DC System Peak Demand** *Before EE and Load Flexibility*
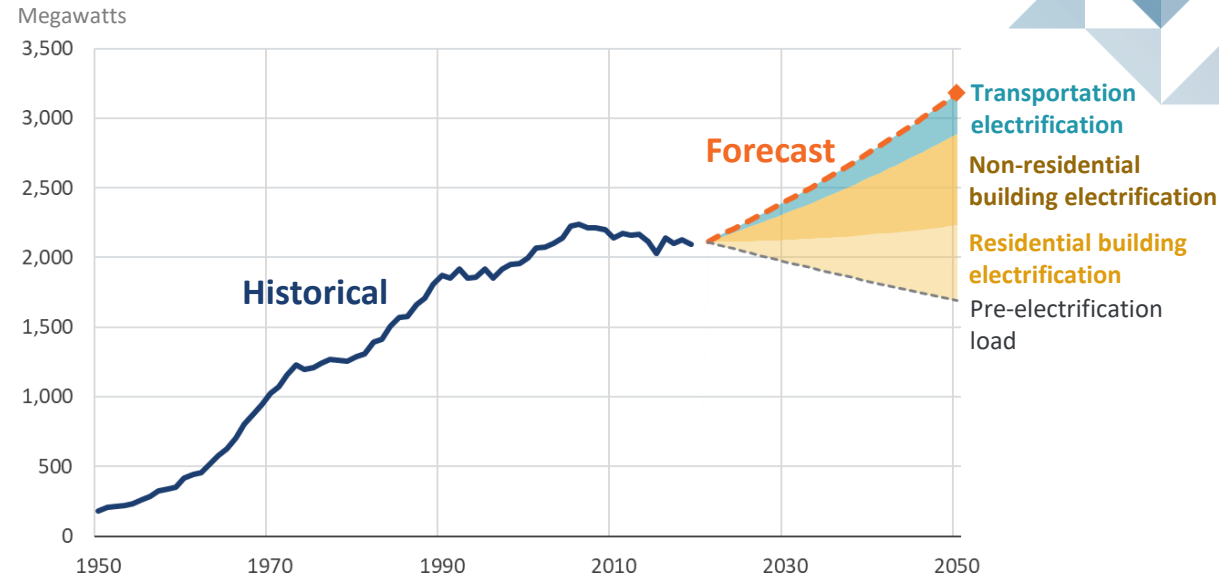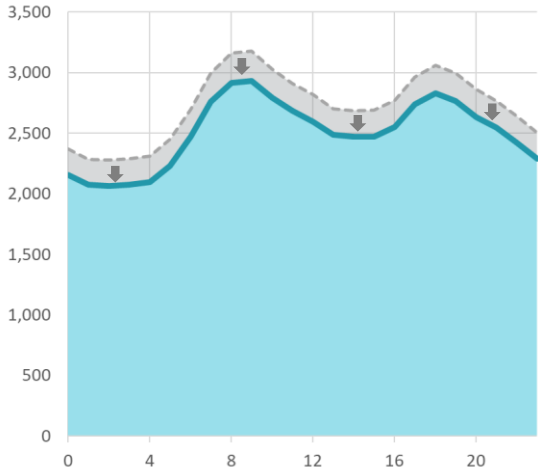
Compound Annual Growth Rate *by Decade*
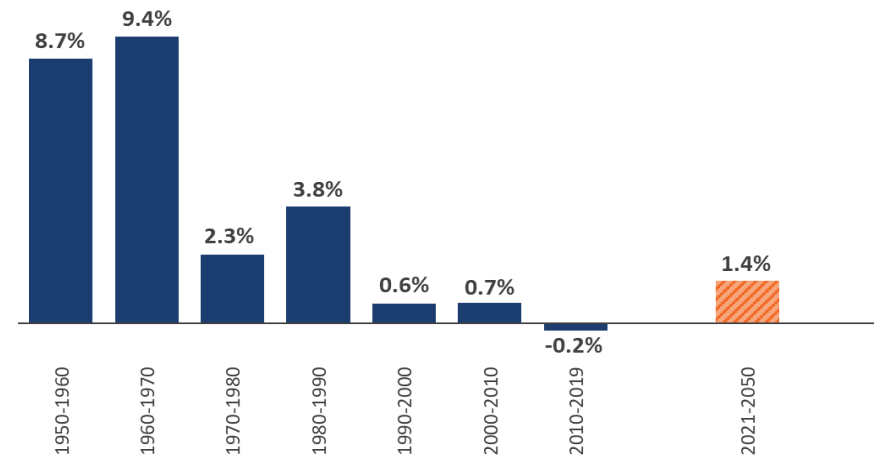
Case: Pepco DC
EE and load flexibility could reduce 2050 system peak demand by 14%

① Unmitigated 2050 Pepco DC load on winter peak day

② Energy efficiency reduces load during all hours

③ Dynamic pricing, interruptible tariffs, pre-heating, and BTM storage clip the morning peak with modest load building over several hours
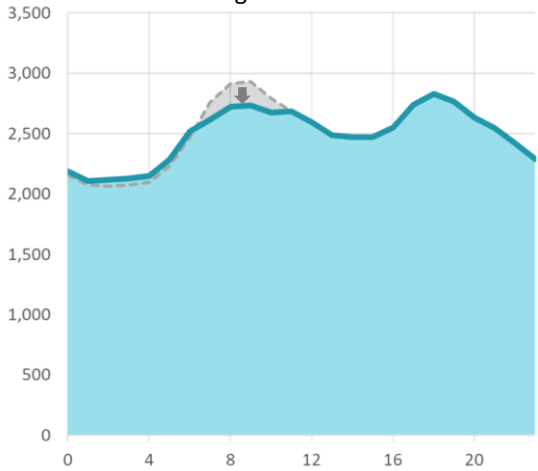
④ EV TOU reduces evening peak, shifting charging load to later hours
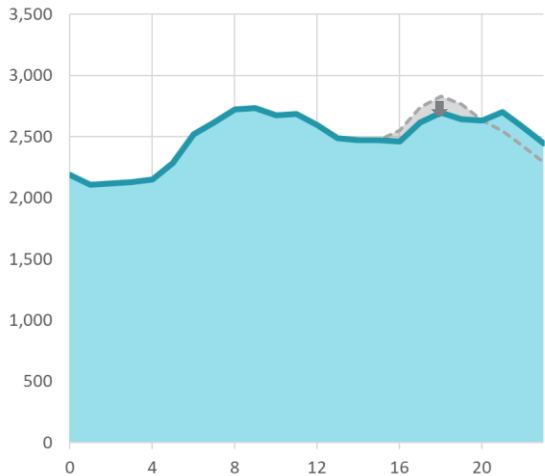
⑤ Mitigated 2050 Pepco DC load on peak day

Without EE and load flexibility

14% peak reduction due to EE and load flexibility
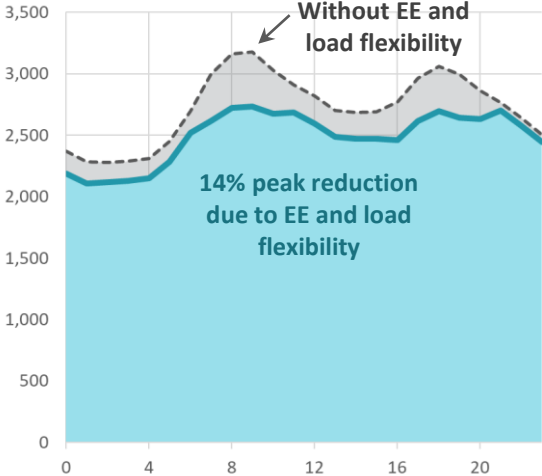
Note: Load impacts are shown for one illustrative portfolio. EE and load flexibility options could be pursued in different combinations, with varying operational strategies and levels of enrollment.

Annual load growth below 1% is similar to recent trends over the past few decades

Average Annual Growth in Pepco DC System Peak Demand
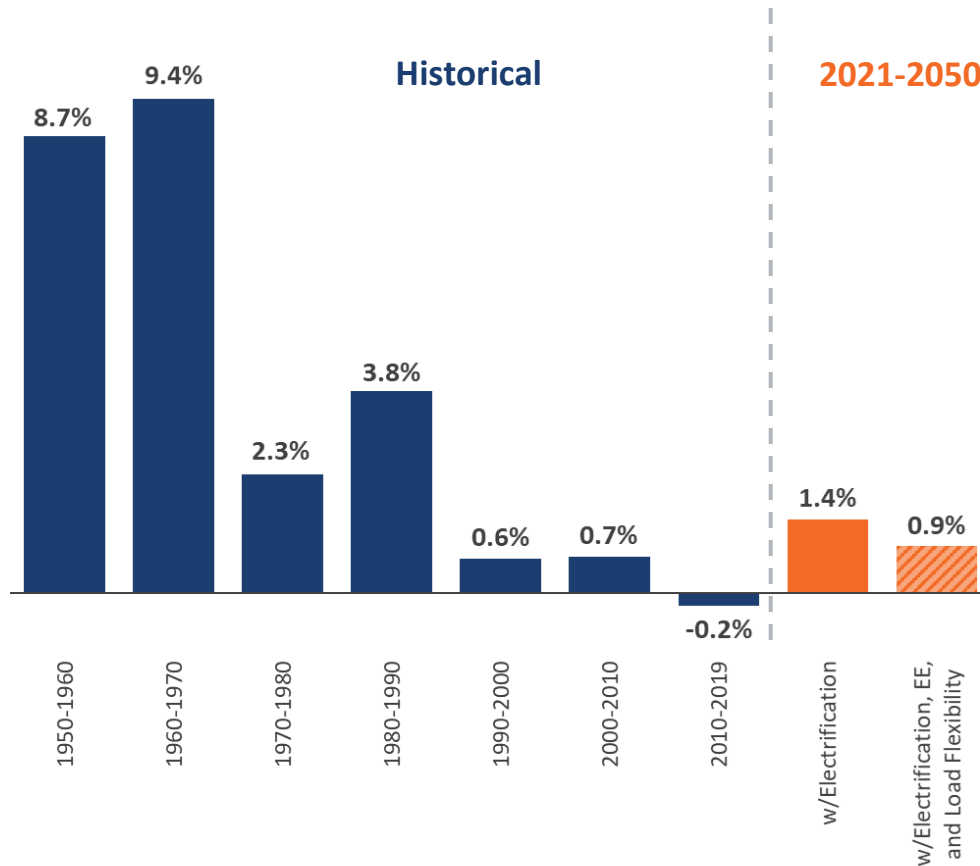
Pepco DC System Peak Load (MW)
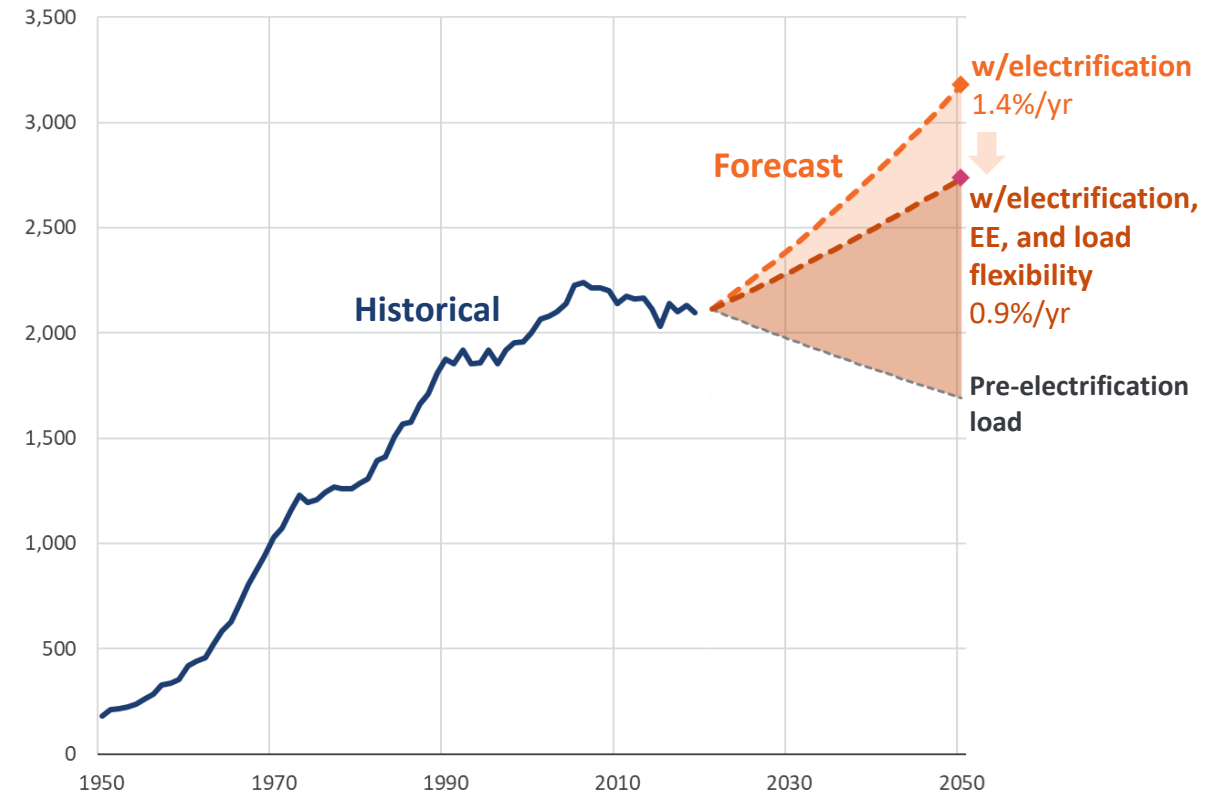
Notes: The post-2020 load growth trajectory shown here is extrapolated based on an average annual growth rate. The year-to-year growth trajectory likely would deviate from this trend but would reach the same 2050 peak demand level.

Closing Thoughts

- While supply side decarbonization should continue its acceleration, customer-side action should pick up speed

- Achieving long-term deep decarbonization goals will require even greater emissions reductions from both the customer-side pathways and from supply-side power generation

- Electrification of transportation and buildings is a key component of all ambitious climate plans

- Energy efficiency and load flexibility are natural complements to electrification

- In addition to being a major driver of near-term emission reductions, EE and load flexibility can significantly reduce future increases in peak demand and help moderate new capacity needs

- All of these actions involve "harnessing the power of customers" in the road to decarbonization through innovative programs, efficient pricing, enabled by utility and regulatory leadership

About the Speaker

Sanem Sergici

PRINCIPAL | BOSTON

Sanem.Sergici@brattle.com

+1.617.864.7900

Dr. Sanem Sergici specializes in the economic analysis of DERs, their impact on distribution system operations and assessment of emerging utility business models and regulatory frameworks. She regularly assists electric utilities, regulators, law firms, and technology firms on matters related to innovative retail rate design, big data analytics, grid modernization investments, electrification and decarbonization strategies.

Theme Two

Consumers are most likely to invest in smart energy technologies that are easy to use and demonstrate clear value.

Connecting with Consumers Based on Values

Green Innovators   **Tech-savvy Proteges**   **Movable Middle**   **Energy Indifferent**

MORE FAVORABLE   LESS FAVORABLE

Energy is on their mind	Energy not a priority
Tech savvy	Tech wary
Few barriers	Many barriers
Financial capacity	Limited financial capacity
Dependency on electricity	Low/static usage
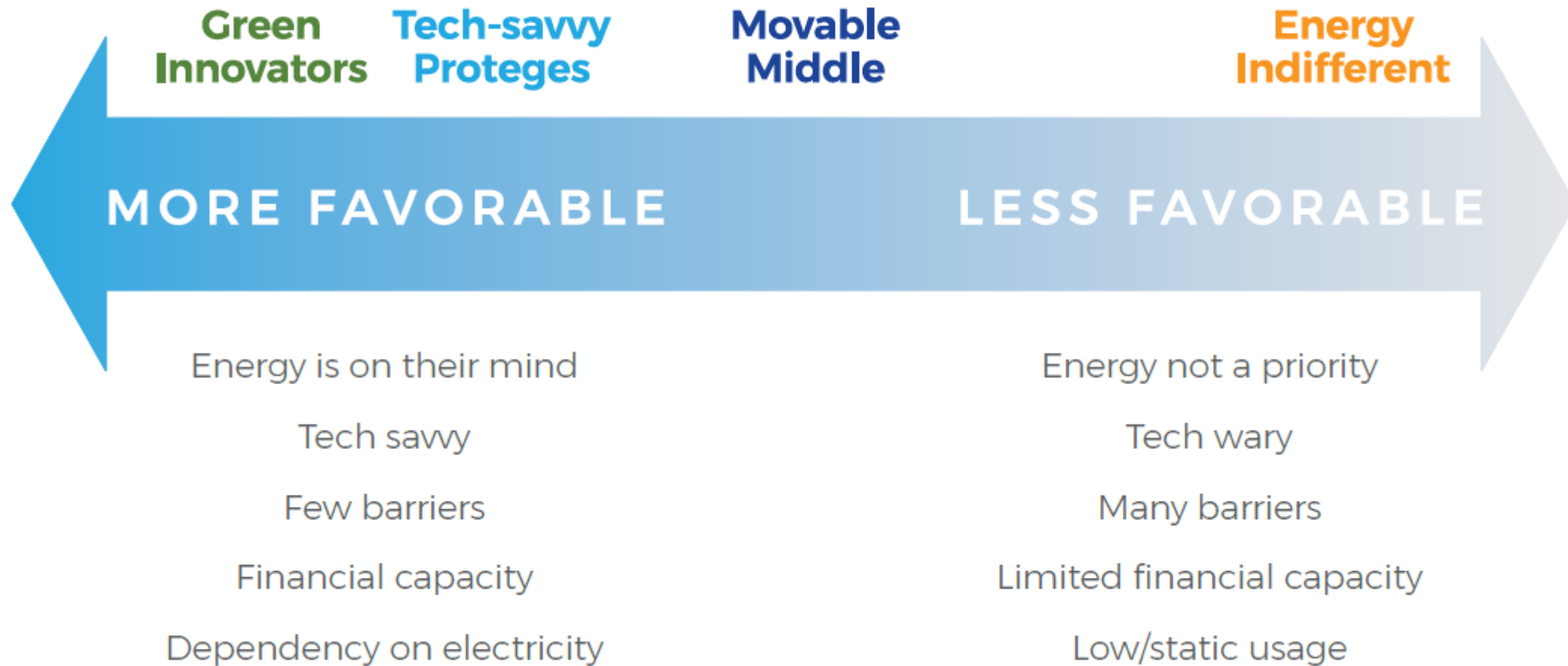
SECC's Current Consumer Segments

Segment Name	Proportion of Consumer Market	Age			Household Income*			Electricity Bill (Mean)
Green Innovators	20%	18–34 (29%)	35–54 (40%)	55+ (31%)	</=$50K (47%)	$50–$99K (29%)	$100K+ (20%)	$121.7
Tech-savvy Proteges	25%	18–34 (35%)	35–54 (35%)	55+ (30%)	</=$50K (37%)	$50–$99K (42%)	$100K+ (17%)	$132.0
Movable Middle	29%	18–34 (17%)	35–54 (32%)	55+ (51%)	</=$50K (52%)	$50–$99K (31%)	$100K+ (11%)	$117.0
Energy Indifferent	26%	18–34 (16%)	35–54 (25%)	55+ (59%)	</=$50K (57%)	$50–$99K (29%)	$100K+ (9%)	$112.8

*4–5% of respondents did not answer the income question, hence percentages do not add to 100.

Benefits Per Smart Home Device Owners

	Smart speaker	Smart thermostat	Smart appliances	Smart plugs/ power strips/ outlets	Smart light/ bulb/switch
n	750	539	372	438	424
It is fun to use/entertaining	56%	14%	25%	23%	25%
It is easy to use	54%	37%	37%	46%	46%
It allows me to multi-task/save time	28%	18%	29%	26%	21%
It makes my home more comfortable	25%	40%	28%	27%	31%
I can connect it to other smart home devices	25%	18%	21%	26%	24%
It stays on a reliable schedule	21%	34%	22%	25%	25%
It helps others in my family manage tasks/time	20%	14%	27%	17%	16%
I can control it away from home	18%	40%	26%	37%	36%
It saves me money	14%	38%	28%	25%	40%
It helps me reduce my electricity usage	13%	42%	29%	32%	35%
It helps me lower my carbon footprint	11%	23%	19%	22%	21%
Other benefits	4%	2%	4%	3%	2%
There are no benefits	2%	2%	3%	0%	1%

Base: Smart Home Device Owners, base varies by smart device owned – Smart speaker (n=750), Smart thermostat (n=539), Smart appliances (n=372), Smart plugs/outlets (n=438), Smart lighting/bulbs (n=424), Other benefits (n=76)
QDeviceBenefit. Based on your experience, what are the benefits of owning each of the devices below?
QDeviceBenefitOE. What other benefits are there to your smart home devices?

Are Owners Experiencing Challenges?

	Smart speaker	Smart thermostat	Smart appliances	Smart plugs/ power strips/ outlets	Smart light/ bulb/switch
n	750	539	372	438	424
It does not help me reduce my electricity usage/bill	13%	5%	8%	7%	7%
It is unreliable	10%	4%	5%	7%	7%
It shared private information without my consent	9%	6%	9%	6%	5%
It has a high upfront cost	7%	14%	13%	10%	12%
It is difficult to understand/use	7%	10%	11%	4%	8%
It does not make my home more comfortable	6%	4%	8%	6%	3%
It is difficult to set up	6%	11%	10%	9%	10%
There is no one to answer my questions/ help me use the device	6%	7%	6%	6%	8%
It does not save me or my family time	5%	4%	8%	5%	5%
I cannot connect it to other smart home devices	4%	6%	7%	6%	6%
It has a high ongoing cost	3%	5%	13%	6%	4%
It damaged my home	3%	4%	5%	5%	4%
Other issues/challenges	3%	4%	3%	5%	4%
There are no issues/challenges	55%	52%	44%	55%	55%

Base: Smart Home Device Owners, base varies by smart device owned – Smart speaker (n=750), Smart thermostat (n=539), Smart appliances (n=372), Smart plugs/outlets (n=438), Smart lighting/bulbs (n=424), Other benefits (n=93)
QDeviceChallenge. And are there any issues or challenges with each of the devices below?
QDeviceChallengeOE. And are there any issues or challenges with each of the devices below?

Tailoring the message to specific consumer segments can help industry stakeholders connect with consumers on their terms and provide them with the information and support they find most meaningful.

Theme Three

Consumers increasingly expect a high degree of personalization in their interactions with energy providers.

Consumer Actions Based on Monitoring Usage

SMART ENERGY CONSUMER COLLABORATIVE

Using Devices to Monitor Electricity

Smart Speaker
- 32%
- 7%
- 61%

39% Yes, Currently/ Past

Smart Thermostat
- 55%
- 12%
- 33%

67% Yes, Currently/ Past

Smart Appliances
- 55%
- 14%
- 30%

70% Yes, Currently/ Past

Smart Plugs/Power Strips/Outlets
- 43%
- 15%
- 42%

58% Yes, Currently/ Past

Smart Light/Bulb/Switch
- 42%
- 14%
- 44%

56% Yes, Currently/ Past

Legend:
- Yes, I currently do
- Yes, in the past but not currently
- No
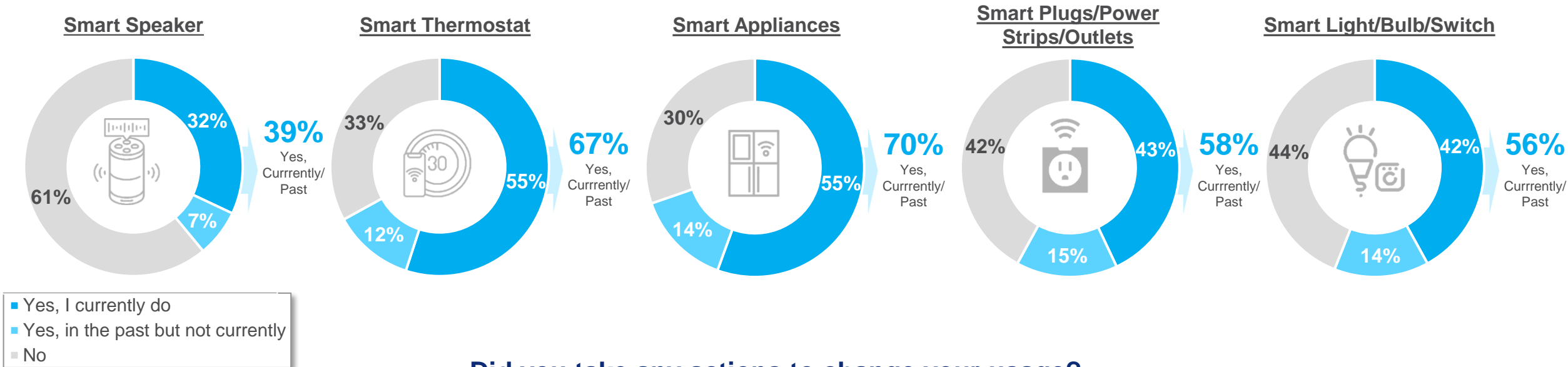
Did you take any actions to change your usage?
(Among those who have ever monitored usage)
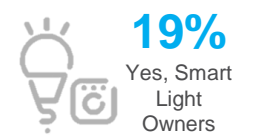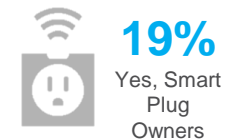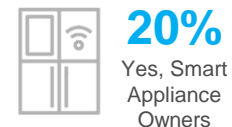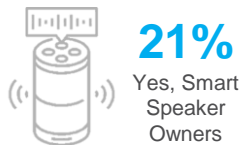
21% Yes, Smart Speaker Owners

21% Yes, Smart Thermostat Owners

20% Yes, Smart Appliance Owners

19% Yes, Smart Plug Owners

19% Yes, Smart Light Owners

Base: Smart Home Device Owners, base varies by smart device owned – Smart speaker (n=750), Smart thermostat (n=539), Smart appliances (n=372), Smart plugs/outlets (n=438), Smart lighting/bulbs (n=424); Net Yes to Any Device in QDeviceUsage (n=545)
QDeviceUsage. Have you ever monitored your electricity usage through any of the devices below?
QDeviceAction. Did you take any actions to change your usage? If so, what were they?

SECC Research Brief WEBINAR SERIES

Renters Are Interested in Receiving Offers

Among those who have not seen programs/offers, rebates, rate adjustments, etc. are the most popular. Green Innovators and Tech-Savvy Proteges lead interest, with-lower income renters more challenging to engage.

Interest in Each Offer
Among Those Who Have Not Seen It

TOTAL % Top 2 Box (Very/Somewhat Interested)	CONSUMER SEGMENT				INCOME		
	Energy Indifferent	Green Innovators	Movable Middle	Tech-Savvy Proteges	<$50K	$50-$99K	$100K+
Energy efficiency rebates/credits **78%**	65%	89%	73%	83%	74%	86%	78%
Rate adjustments for energy efficiency **78%**	61%	92%	66%	86%	74%	85%	78%
Free or discounted energy efficiency products **78%**	62%	91%	69%	84%	74%	83%	80%
A report of your monthly energy usage **74%**	57%	90%	58%	81%	71%	79%	78%
Access to your energy use data **72%**	56%	88%	62%	76%	65%	83%	78%
Energy efficiency programs **72%**	53%	87%	56%	84%	68%	80%	71%
Renewable energy programs **63%**	42%	83%	48%	72%	60%	70%	59%
Information on new energy efficient or smart energy technology **62%**	41%	81%	43%	73%	58%	69%	67%
Electric vehicles and electric charging **36%**	19%	48%	19%	48%	30%	45%	40%

At some point, consumers could grow impatient with the limited service they receive from energy providers who don't seem to know them well enough to engage them in meaningful opportunities. It's time to put customer data to work to deliver the personalized experience they have come to expect from other companies.

Theme Four

Consumers are inclined to trust their energy providers to help them manage their energy and protect their data.

Consumer Expectations for Electricity Providers

Statement	Agreement
I expect my electricity provider to take all the steps needed to keep my information secure	93%
My electricity provider should take steps to help the environment.	86%
I trust my electricity provider to keep my personal information secure	79%
My electricity provider should take an active role in helping me reduce my electricity bill	78%
I trust my electricity provider to give me the best advice on managing my energy	73%
My electricity provider gives me useful energy efficiency tips	73%
My electricity provider should provide more in-person support on energy efficiency tools and best practices	60%
My electricity provider should provide more live virtual support on energy efficiency tools and best practices	59%
I would give my electricity provider more control over my electricity usage if it saved me money	57%

Why Some Consumers Reluctant to Share Data

	Smart speaker	Smart thermostat	Smart appliances	Smart plugs/power strips/outlets	Smart light/bulb/switch
Interest in Sharing Usage with Provider % Top 2 Box (Very/Somewhat Interested)	29%	44%	40%	42%	43%
I am worried about who would have access to my data	62%	57%	54%	56%	56%
I do not know what the benefit or purpose would be	43%	35%	41%	41%	39%
I do not want to over-complicate my set up/make it too difficult to use	18%	19%	24%	23%	20%
I would not know how to start setting it up	10%	12%	11%	11%	12%
Other	8%	10%	9%	8%	7%

Base: US Gen Pop who Do Not Own Device - Smart speaker (n=977), Smart thermostat (n=1129), Smart appliances (n=1235), Smart plugs/outlets (n=1194), Smart lighting/bulbs (n=1209)
QDevIceE_E. How interested would you be in allowing your electricity provider to access the electricity usage information collected by each device to help you optimize your usage?
Base: Not Interested in Sharing Usage Information - Smart speaker (n=678), Smart thermostat (n=605), Smart appliances (n=719), Smart plugs/outlets (n=667), Smart lighting/bulbs (n=656), Smart Device Owners (n=796); Other (n=85)
QEEWhy. Why are you not interested in sharing your electricity usage information with your electricity provider for the devices below?
QEEWhyOE. Why are you not interested in sharing your electricity usage information with your electricity provider for the devices below?

SECC Research Brief WEBINAR SERIES
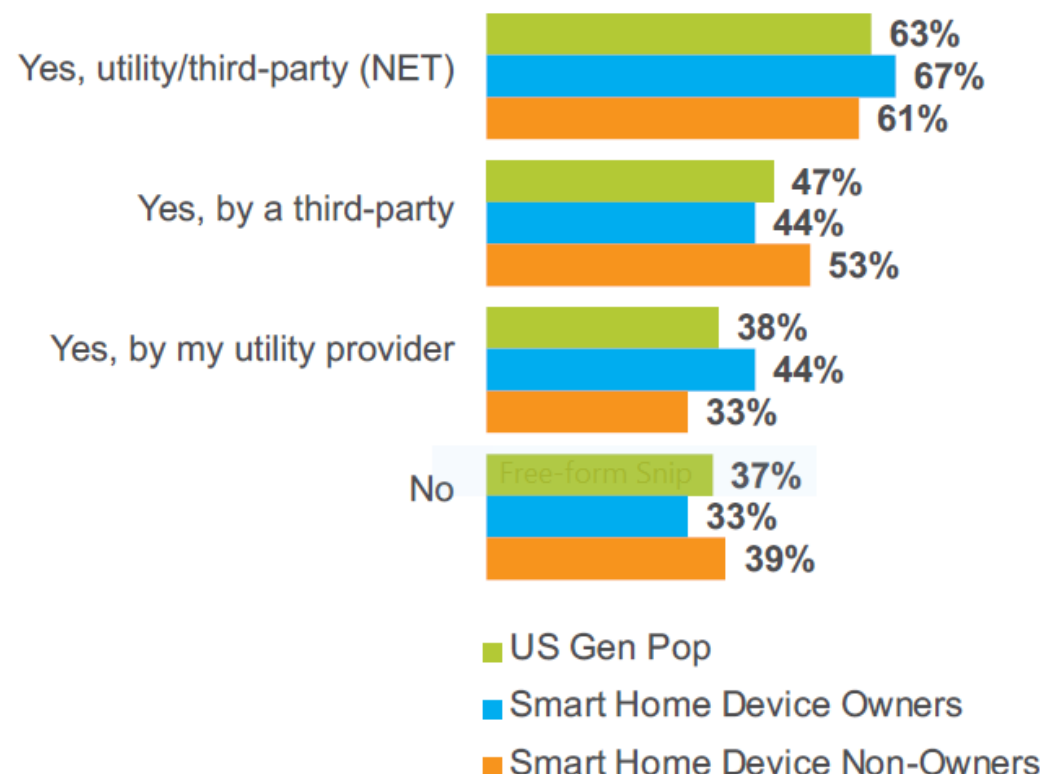
Willingness to Share Data for Benefits by Race

% Yes, Definitely

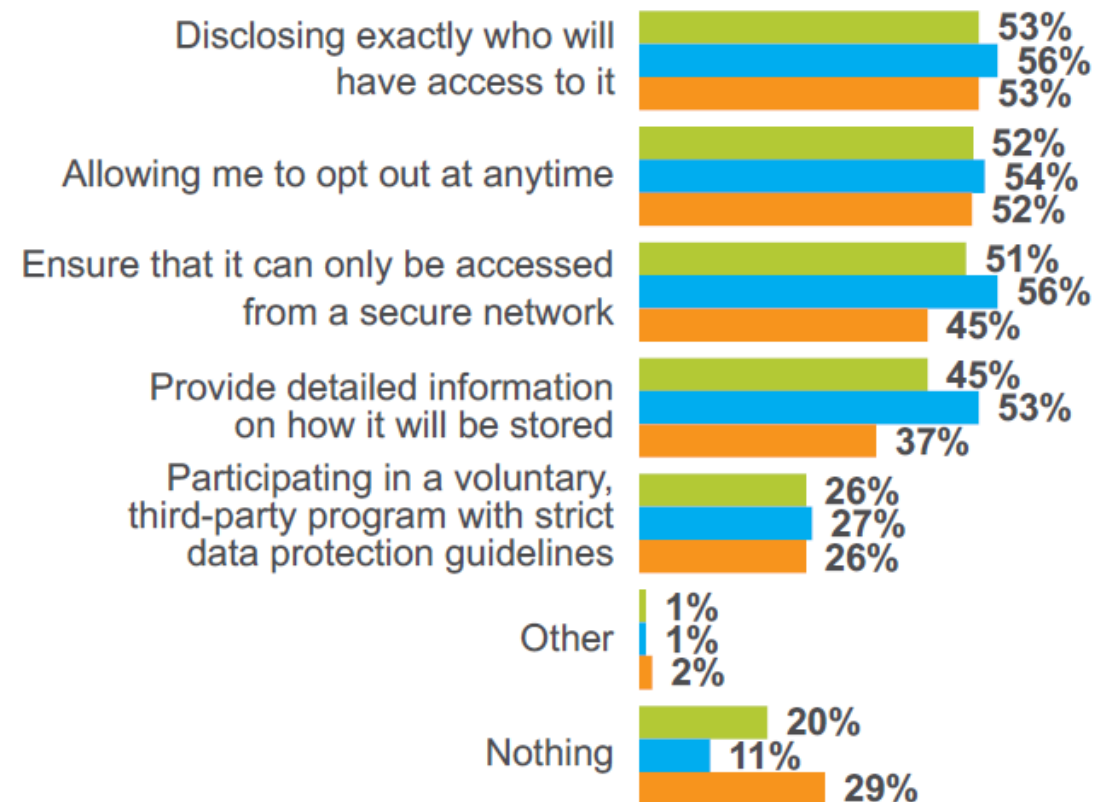|	White	Black	People of Color
Information on how to save money on your electricity bill while keeping your home comfortable	23%	46%	39%
Ability to see energy usage and cost by appliance/device	23%	38%	34%
Monthly report showing your energy usage data with personalized tips to save	23%	39%	33%
Information on what is the best rate plan for you	23%	41%	33%
Information on rebates/incentives for home energy efficiency upgrades	22%	35%	32%
Energy management tools for saving money, reducing your carbon footprint, or enhancing your in-home technologies	17%	37%	33%

Base: All Respondents (n=1307); White (n=758), Black (n=210), People of Color (n=549)
Q_DataSharing. Would you be willing to allow your electricity provider to share your usage information with a company that analyzes energy usage information if you were to receive each of the following in return?

Consumers trust their electricity providers, but trust is a fragile thing and must constantly be earned. Electricity providers should be transparent in communicating how customer energy data will be used and who will have access to it.

Theme Five

Consumers need support to gain equitable access to clean energy opportunities.

Equity and Buildings:
Definitions, Metrics, and State-Level Solutions

Emma Runge

American Council for an Energy-Efficient Economy

ACEEE
American Council for an Energy-Efficient Economy

An Equitable Energy System...

Institutionalizes accountability for achieving equitable outcomes from government, utilities, and other stakeholders

Embeds inclusive, accessible, and authentic community engagement in the development of policies and programs

Recognizes and addresses historical, cultural, and institutional dynamics and structures that created past and current inequities

Ensures representation, power, and influence from community members and/or environmental justice advocates in decision-making and implementation processes
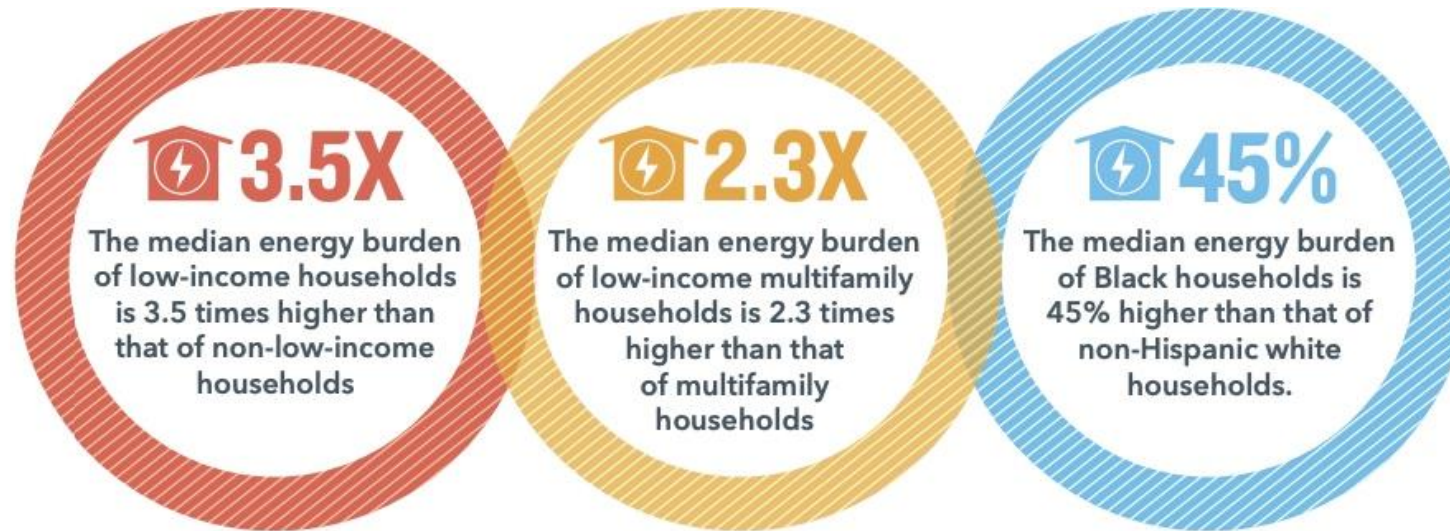
Considers intergenerational impacts and does not create policies or programs that unjustly burden future generations

Achieves a fair distribution of opportunities, benefits, and burdens for all communities

ACEEE
American Council for an Energy-Efficient Economy

53

www.aceee.org/topic/energy-equity

Energy Burden Findings: National Burdens

- Median energy burden is **3.1%,** and the median low-income energy burden is **8.1%**

- **A quarter of low-income households have an energy burden above 14.4%,** which is almost 4.5 times higher than the median energy burden

- **25%** of all households (**30.6 million**) have a high energy burden (above 6%)

- **36% of Black households** (6 million), **28% of Hispanic households** (4.6 million), and **36% of Native American households** (540,000) experience a high energy burden (above 6%)

3.5X
The median energy burden of low-income households is 3.5 times higher than that of non-low-income households

2.3X
The median energy burden of low-income multifamily households is 2.3 times higher than that of multifamily households

45%
The median energy burden of Black households is 45% higher than that of non-Hispanic white households.

National Energy Burden Factsheet available at aceee.org/energy-burden

History of Polices Impacting Energy Justice

- Older and poorer quality housing impacts health, comfort, and energy and water bills

- Historic policies have led to low-income households and communities of color concentrated in areas with historic disinvestment, poorer quality housing, greater pollution, and fewer high-quality jobs

- Examples of policies at the local, state, and federal levels impacting this outcome include:
  - **Redlining and racial covenants**
  - **Discriminatory lending and less of access to financial capital**
  - **Employment discrimination**
  - **Underfunded schools**

- At the same time, these communities face higher barriers to accessing traditional energy efficiency programs.
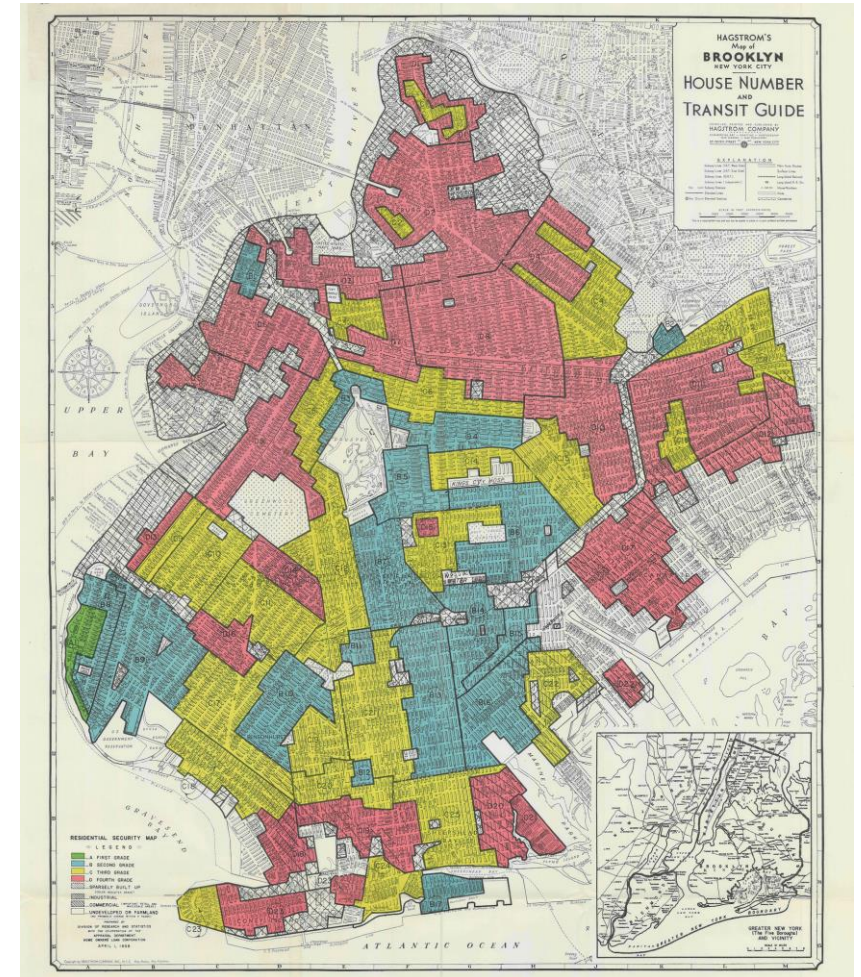

Image from NYT of redlining in NYC:
https://www.nytimes.com/2017/08/24/upshot/how-redlinings-racist-effects-lasted-for-decades.html

Equity Metrics and ACEEE's Scorecards

- ACEEE publishes Scorecards, including:
  - City, State, Utility
- Benchmark and measure progress on clean energy and energy efficiency
- Collect data to support policy action

ACEEE
American Council for an Energy-Efficient Economy
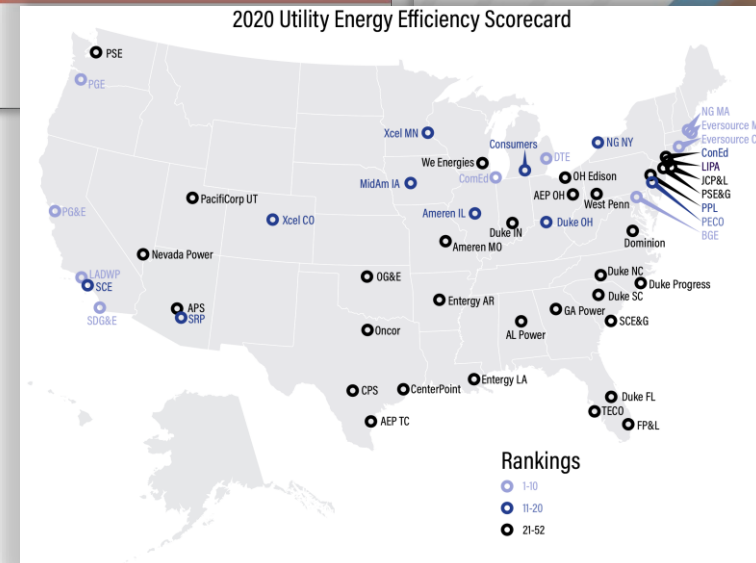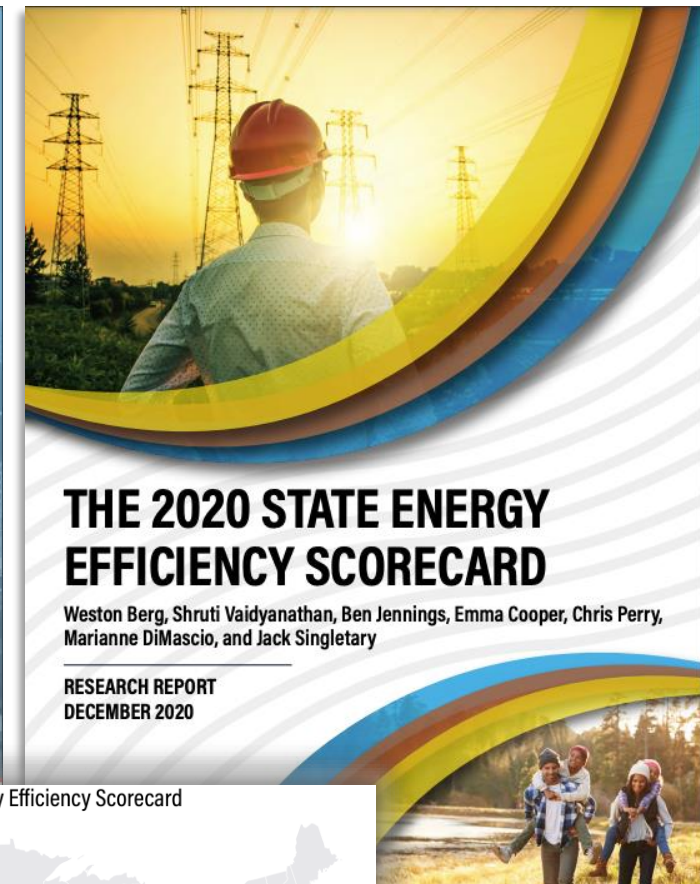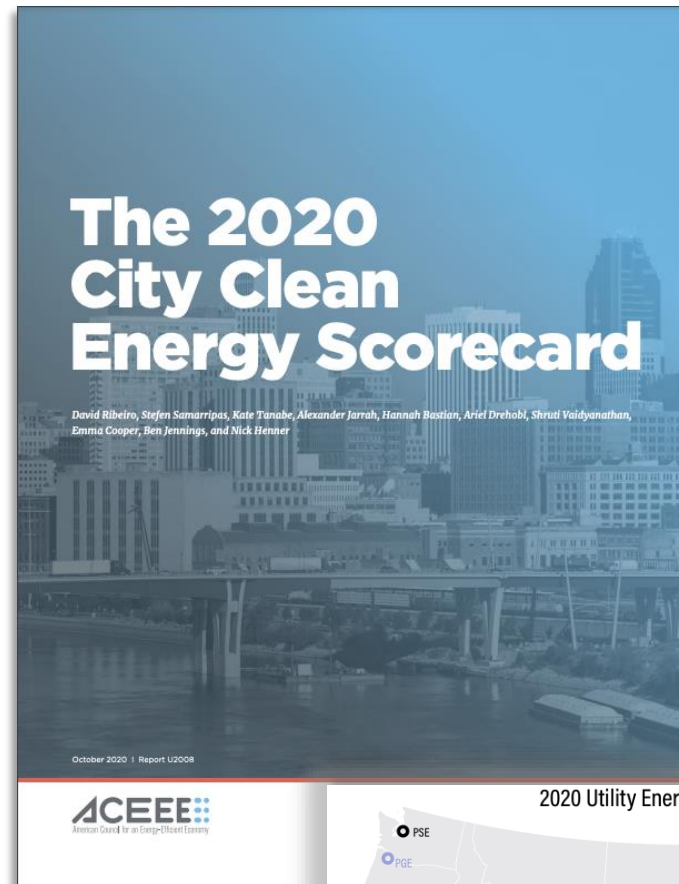
ACEEE's Leading with Equity Initiative

- Feedback that the leaders in Scorecards are not doing enough to advance equitable policies or programs

- Overall goal to ensure that all cities, states, and utilities leading in the Scorecards must be leading across equity-focused metrics

- Designed so that community-based organizations (CBOs) are helping to drive the development of a full landscape of improved equity-related metrics

ACEEE'S LEADING WITH EQUITY INITIATIVE: KEY FINDINGS AND NEXT STEPS

Ariel Drehobl
December 2021
An ACEEE White Paper
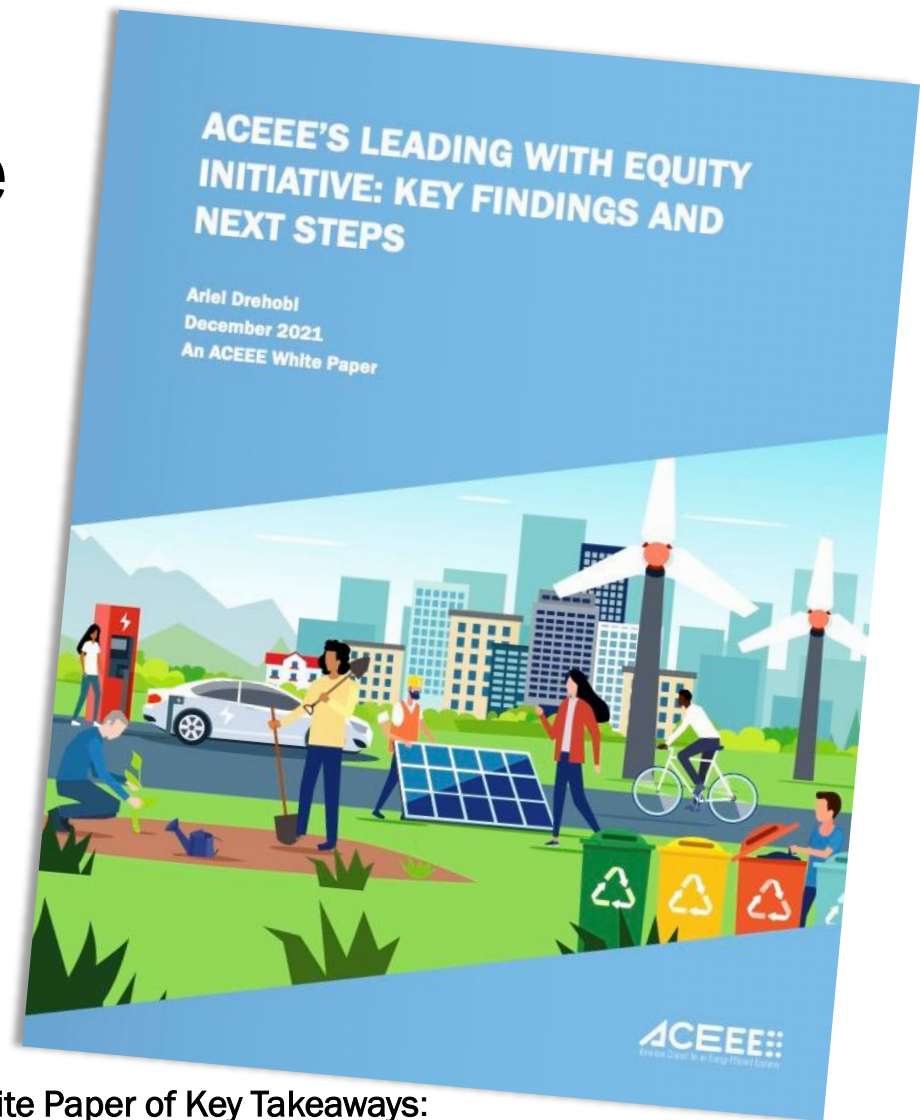
- White Paper of Key Takeaways:
  aceee.org/white-paper/2021/12/aceees-leading-equity-initiative
- Sign up for Newsletter updates:
  survey.alchemer.com/s3/6168745/ACEEE-LWE-Interest-Form

2021 Workshop Process

Workshop #1: Vision — April 2021

Workshop #2: Data — June 2021

Workshop #3: Metrics — September 2021

Report Findings — December 2021

Note: We facilitated parallel workshops with community-based organization and advocate representatives and utility representatives.
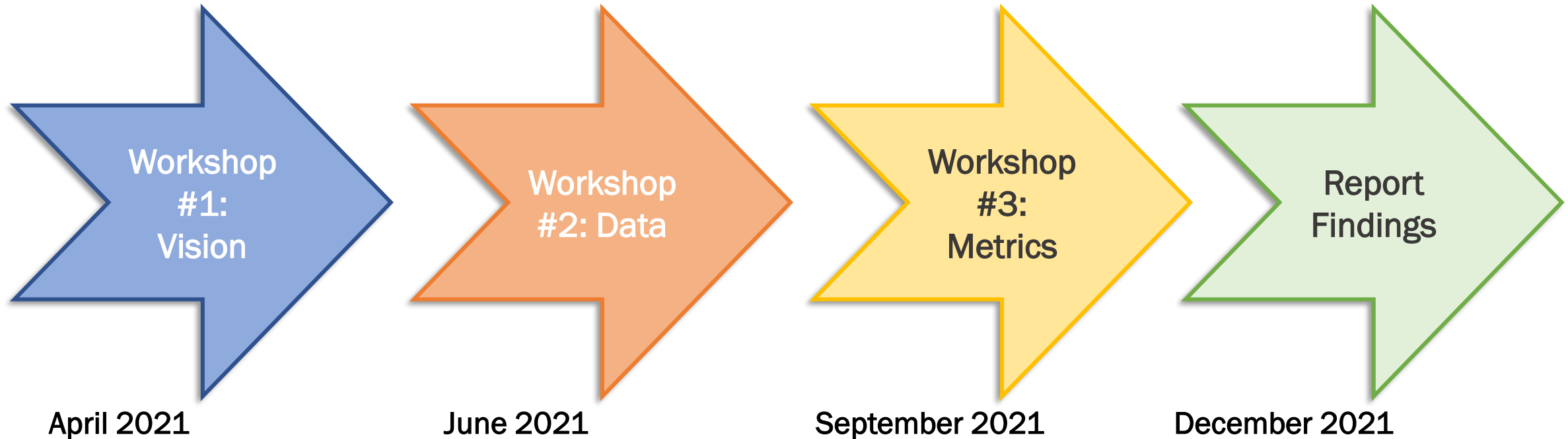
Key Takeaways on Equity Data

- Need to change how we define and measure the success of clean energy programs, (i.e., not only energy savings but broader health & wealth outcomes)

- More robust demographic data (i.e., race and ethnicity), location data, and workforce data needed

- Regulators have a key role to play to help leverage data, such as by requiring and/or standardizing rules around data access, data sharing, and utility equity-related goals

- Need for more equitable representation in decision-making processes, both in stakeholder processes and in those who are making decisions (i.e., gov staff, public utility commissions, utility staff)

- CBOs and advocates identified a disconnect between the best practices for equitable policies and outcomes lauded by ACEEE's scorecards and other industry recognition and the experience of folks on the ground

Prioritized Equity-Related Metric Categories
that emerged from the Leading with Equity workshop series

Procedural Equity Metrics

- Defining impacted communities
- Equitable engagement processes
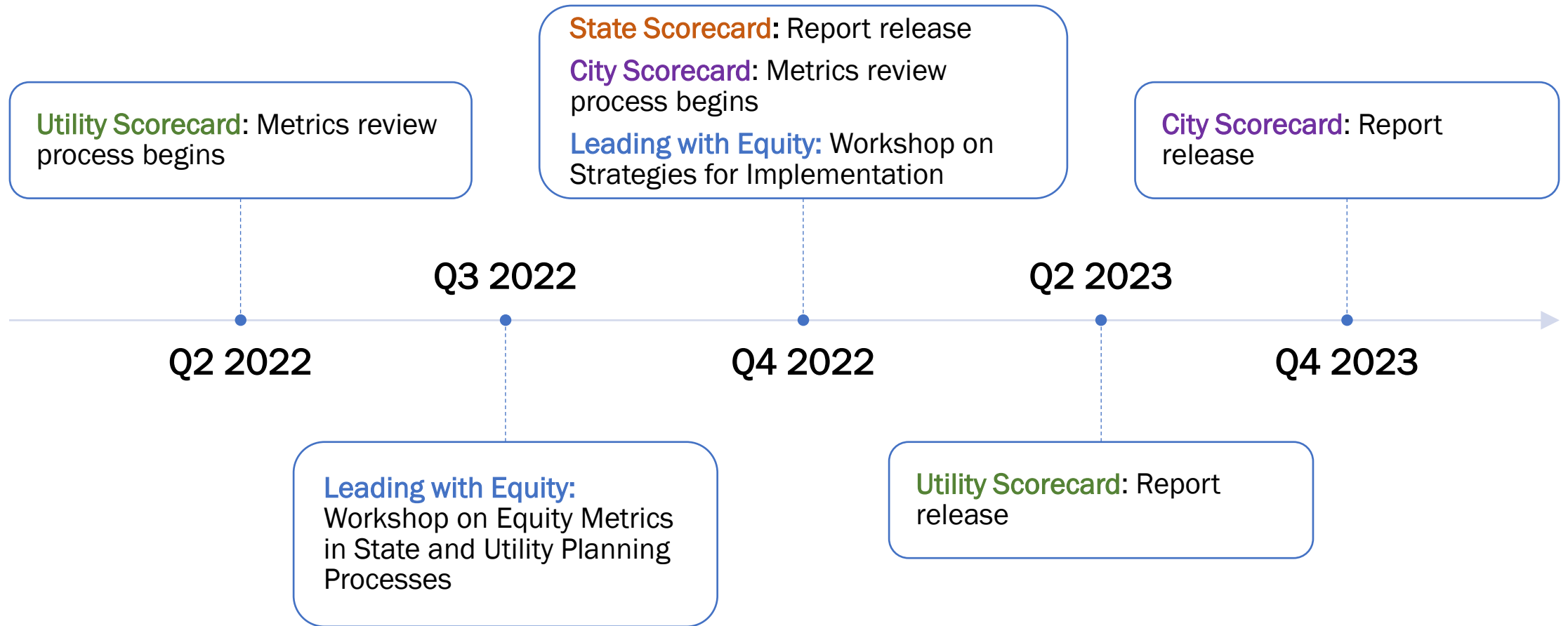- Compensation for engagement
- Language access

Distributional Equity Metrics

- Energy affordability goals and progress
- Access to existing program resources
- Equitable distribution of all benefits
- Data on disconnections and energy access

Structural Equity Metrics

- Consumer protections
- Data access and transparency
- Community wealth building policy and outcomes
- Benchmarks and evaluations

Timeline of Next Steps

Utility Scorecard: Metrics review process begins

State Scorecard: Report release
City Scorecard: Metrics review process begins
Leading with Equity: Workshop on Strategies for Implementation

City Scorecard: Report release

Q3 2022

Q2 2023

Q2 2022

Q4 2022

Q4 2023

Leading with Equity: Workshop on Equity Metrics in State and Utility Planning Processes

Utility Scorecard: Report release

Thank you for your time!

Please reach out with any follow-up questions at erunge@aceee.org.

Theme Six

Consumers respond favorably to innovative utility partnerships.

Where Low-Income Consumers Seek Energy Info

	White	Black	People of Color
My electricity provider	62%	61%	56%
Government websites	26%	32%	32%
Non-profit organization websites	13%	14%	20%
Community organizations	12%	11%	14%
Social media	6%	19%	19%
A trusted contractor	8%	13%	14%
Friends/family	6%	15%	14%
My landlord or property manager (RENTERS ONLY)	4%	6%	7%
Other, please specify	13%	3%	4%
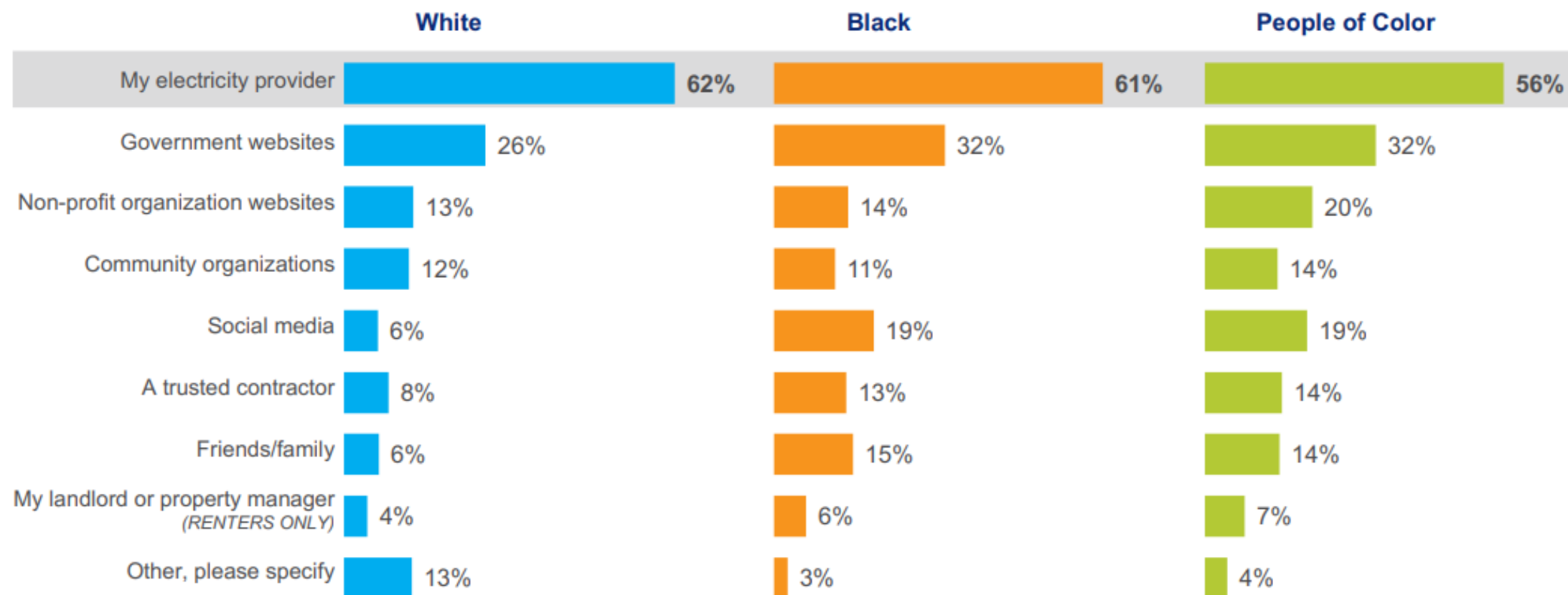
Base: All Respondents (n=1307); White (n=758), Black (n=210), People of Color (n=549)
Q_EESources. When looking for ways to save money on electricity, where do you typically go for information?

Trustworthiness of Electric Vehicle Information

Consumers that do go to their electricity provider for information trust the information they receive.
However, non-profit organizations are the most trustworthy.

Trustworthiness of Information Sources
% Top 2 Box – Very + Somewhat Trustworthy

Information Source	Chart	Energy Indifferent 63*	Movable Middle 75*	Tech-savvy Proteges 170	Green Innovators 124
Non-profit organization websites	100%	100%	-	100%	100%
Auto magazines/websites	99%	100%	100%	98%	100%
My electricity provider	97%	100%	100%	93%	100%
Friends/family	97%	100%	92%	99%	94%
Vehicle manufacturers	92%	95%	98%	88%	91%
Government websites	89%	72%	100%	90%	90%
Vehicle dealers	88%	87%	93%	82%	91%
Community organizations/groups	81%	-	-	77%	100%
Social media	76%	70%	60%	77%	83%

*CAUTION: Small Base Size
Base: Sought information about electric vehicles- US GenPop (n=432); Energy Indifferent (n=63*), Green Innovators (n=124), Movable Middle (n=75*), Tech-Savvy Proteges (n=170)
QINFOTRUST. You mentioned that you go to the following sources for information on electric vehicles. How trustworthy do you think each source of information is?

Ensuring adequate and convenient access to charging infrastructure is essential, requiring the collaboration of multiple stakeholders. It is important to ensure equitable access for lower-income communities, particularly communities of color, as well as renters and residents of multi-family dwellings.