



NARUC

Summer Committee Meetings

Committee On Electricity



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Summer Committee Meetings

Subcommittee on Nuclear Issues



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Moderator: Hon. Greg White, Michigan

Dr. Lara Pierpoint, DOE

Mike Kormos, PJM

Richard Myers, NEI

Dr. Raj Barua, NRRI



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Dr. Lara Pierpoint
Senior Advisor, DOE



Nuclear Retirements: Outlook, Carbon Implications and Policy Options

NARUC
July 13, 2015

Lara Pierpoint, Ph.D.
Senior Advisor
U.S. Department of Energy



Nuclear Plants – Early Retirements

Reactor	Operator	Size (MW)	Location	Age at end of license period (years)	Age at retirement (years)	End of Operation (year)	Proximate Reason
Kewaunee (PWR)	Dominion	556	East WI	60	39	2013	Economics
Crystal River (PWR)	Duke Energy	842	Mid-FL	40	31	2009 (retirement announced 2013)	Damage during steam generator replacement
San Onofre 2 (PWR)	So Cal Edison	1070	Southern CA	40	29	2012	Faulty steam generators
San Onofre 3 (PWR)	So Cal Edison	1080	Southern CA	40	28	2012	Faulty steam generators
Vermont Yankee (BWR)	Entergy	605	Southern VT	60	41	2014	Economics
Oyster Creek (BWR)	Exelon	637	New Jersey	60	50	2019	Negotiation with the state; otherwise would have required cooling towers



Plants at Risk

- Financial institutions have “watch lists”- with overlaps, indicating which plants are at risk
- Risk factors include:
 - Single-unit, in merchant markets facing lowest wholesale prices
 - PPA expiration
 - Reductions in power prices in areas with high wind production + transmission constraints
 - Local political opposition



Drivers of Nuclear Electricity Cost Increases

- Capital expenditure on upgrades for license extension
- Capital expenditure on uprates
- Capital expenditure on safety-related upgrades (past: vessel-head replacement; future: hardened/filtered vents)
- Security-related upgrades
- Increased uranium prices



Current Risk Environment

Helpful

- EPA Clean Power Plan
- FERC has held 3 workshops on price formation in energy markets
- State legislation
- PPAs

Not as helpful

- Natural gas prices → electricity prices

Natural gas spot prices (Henry Hub)



eia Source: Natural Gas Intelligence



Benefits of Retaining Existing Nuclear Plants

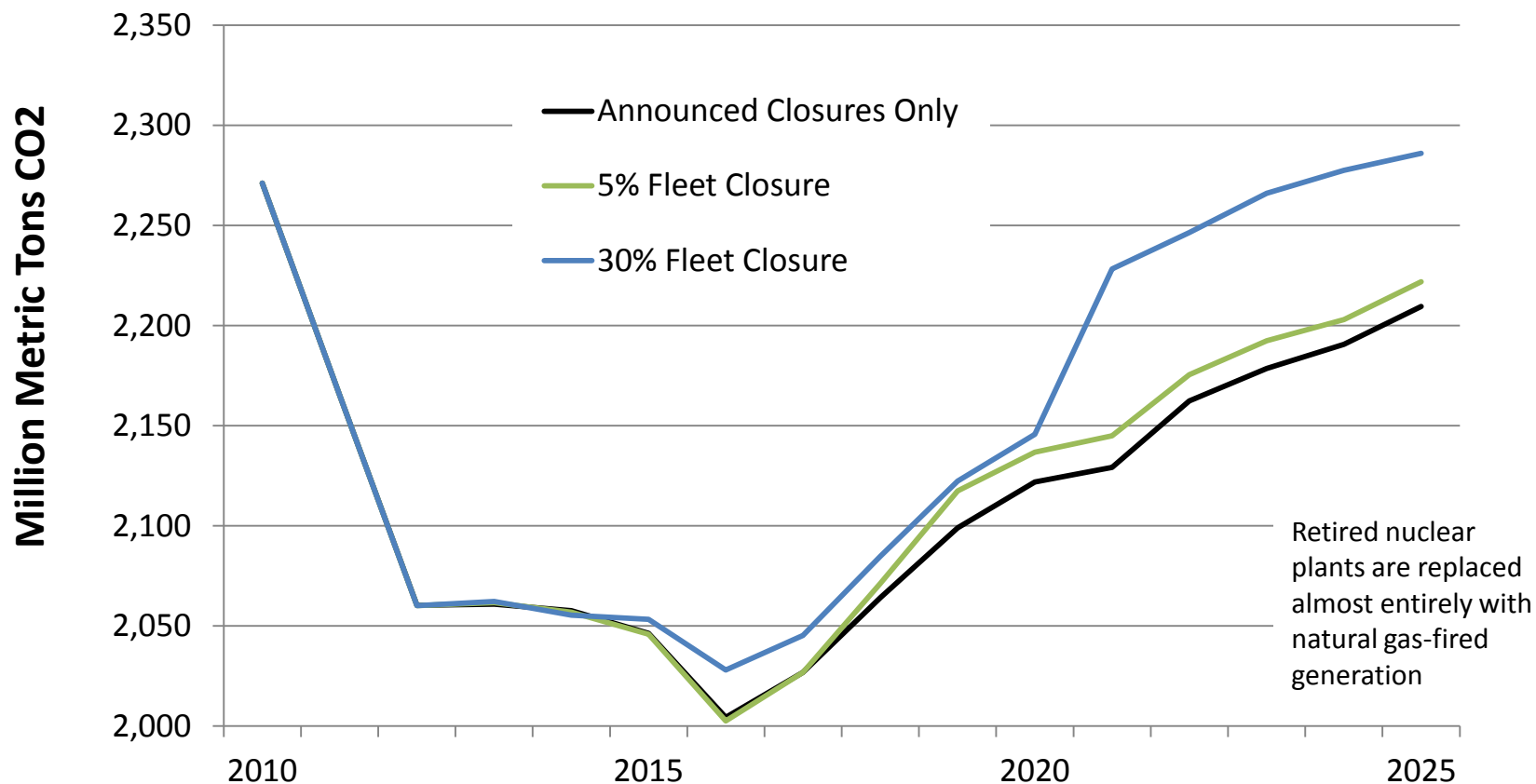
- Very low-carbon electricity
- Help mitigate risks associated with high reliance on a single fuel
- Nonproliferation/national security

Arguably, these benefits are undervalued in the market; note these issues play differently depending on the market



Carbon Implications of Retirements

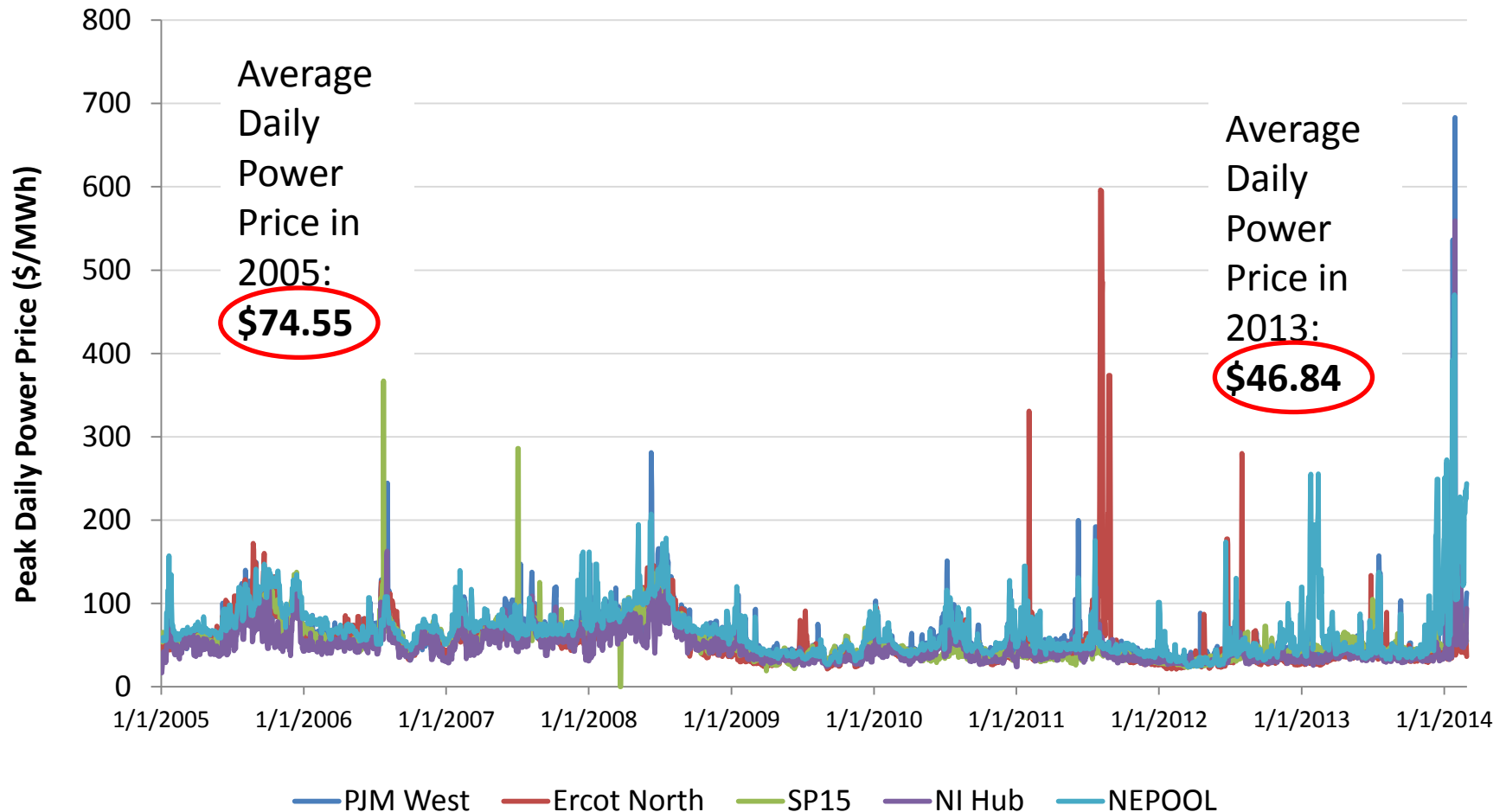
Estimated Annual CO₂ Emissions from Power Sector





Wholesale Electricity Prices

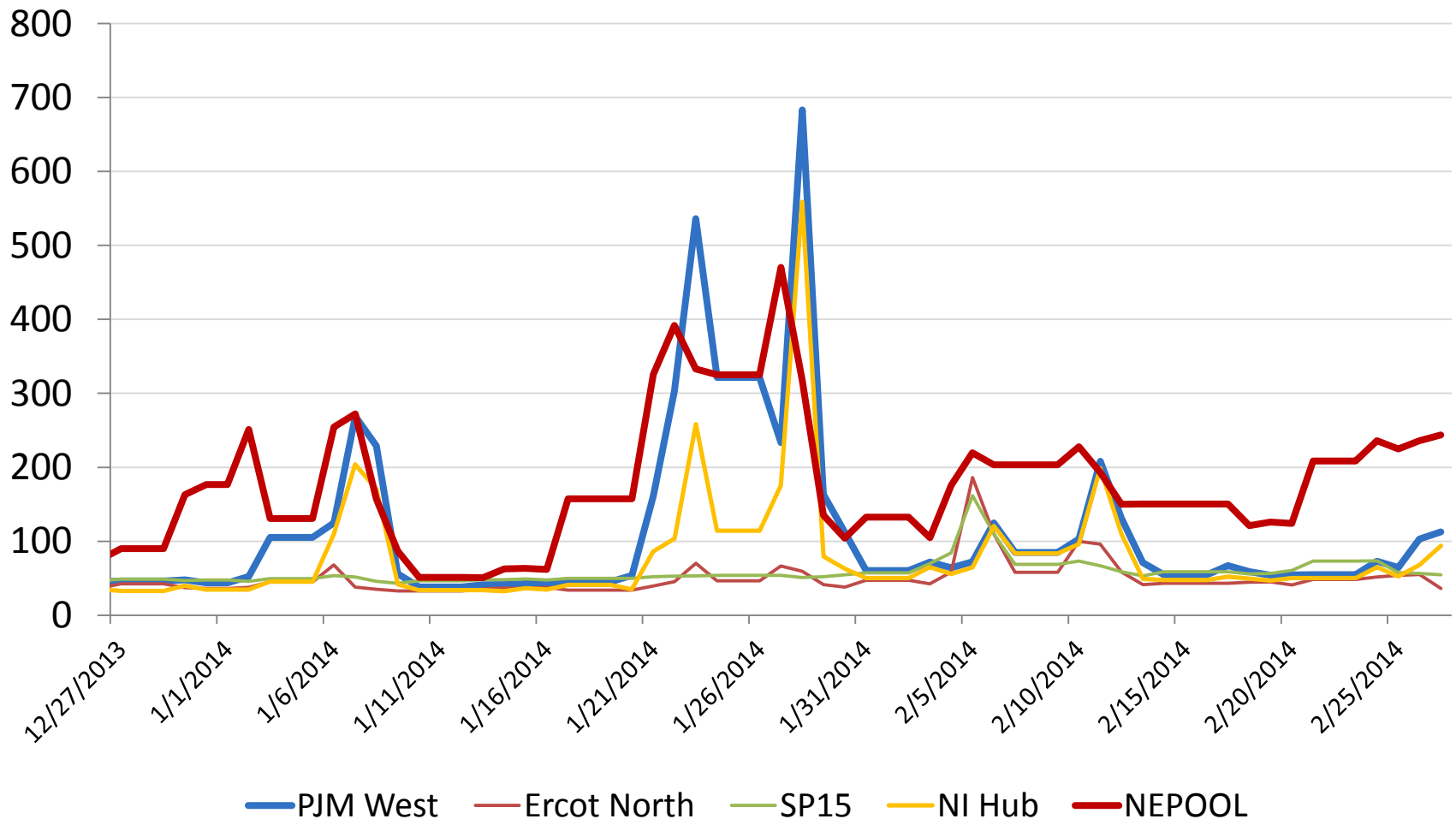
Day-ahead on-peak power price by market (\$/MWh)





Price spikes look different by region

Day-ahead on-peak power price by market (\$/MWh)





Policy Options

Policy Type	Example	Challenge Addressed
Partner with States/RTOs	Incentivize signing of PPAs	Markets may not fully value the benefits of nuclear
Regulatory	Consider cost-of-service contracts for existing low-carbon generation in wholesale markets (likely requires legislative change)	Markets may not fully value the option to maintain low-carbon power
Subsidies	tax credits or loan guarantees for plant uprates; price floors	Reduce risk/financing costs for uprates, enabling replacement of lost nuclear power elsewhere
Targeted Tax Support	accelerated depreciation for safety- or environment-related investments at existing plants	High costs of regulatory compliance
Technology Support	R&D on operations within the LWR sustainability program	Increased O&M costs due to aging



DOE Programs

- Office of Nuclear Energy
 - LWR sustainability program
 - SMR licensing support program
 - Advanced reactor and fuel cycle R&D
- Energy Policy and Systems Analysis
 - Continued tracking of nuclear retirement risks
 - Implementation of QER recommendation on valuation to “work with stakeholders to develop a framework(s) for identifying attributes of services provided to the grid by electricity system components, as well as approaches to incorporate the valuation of grid service attributes in different regulatory contexts...”
- Loan guarantees



Backup



Light Water Reactor Sustainability (LWRS) Program

■ Develop fundamental scientific basis to enable continued long-term safe operation of existing LWRs (beyond 60 years):

- Improve reliability
- Preserve carbon-free generation
- Support long-term economic viability
- Sustain Safety

■ Focus areas:

- Materials Aging and Degradation
- Advanced Instrumentation and Controls
- Risk-Informed Safety Margin Characterization
- Systems Analysis and Emerging Issues (includes research to support post-Fukushima lessons learned)

Accomplishments

- Completed the development of a detailed database on irradiated concrete degradation. This database, together with mechanistic modeling, will support the development of a predictive model for concrete degradation.
- Released the first Beta version of the new RELAP-7 code. RELAP-7 is a modern, updated thermal-hydraulics reactor plant simulation code.
- The Arizona Public Service Company received a Nuclear Energy Institute Top Industry Practice (TIP) award for an advanced outage control center automation pilot plant project implemented in conjunction with the Light Water Reactor Sustainability program.



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Small Modular Reactor (SMR) Licensing Technical Support Program

- In 2012, DOE initiated a 6-year/\$452M program to provide financial assistance for design engineering, testing, certification and licensing of promising SMR technologies with high likelihood of being deployed at domestic sites in the mid-2020's.
- Commercial SMR development is being accelerated through public/private arrangements with 50% cost share provided by U.S. industry partners.
- Site permitting and licensing activities being planned:
 - U.S. Government Interagency Agreement for the Tennessee Valley Authority's Clinch River Site -- Developing Early Site Permit (ESP), expected mid-2019; Cost-shared 50/50
 - Second NuScale Cooperative Agreement -- NuScale to partner with a utility to explore siting SMR on or near Idaho National Laboratory; Site-related activities needed to develop license application; Cost-shared 50/50





Status of SMR Industry Partnerships

■ B&W mPower America

- Cooperative Agreement established with team consisting of B&W, Bechtel, and TVA in April 2013
- Initial DOE commitment of \$101 M through March 2014
- B&W announced a reduction in funding in the February 2014 timeframe (to approx. \$15 M/year)
- B&W and DOE in process of establishing a path forward to meeting goals of the program



■ NuScale Power

- Selection of NuScale announced on December 12, 2013
- Cooperative agreement signed on May 27, 2014
- DOE plans to provide \$217 M through 2017
- Design Certification application submittal to NRC expected in December 2016
- Focus is on a 2023 deployment



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Mike Kormos

PJM



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Richard Myers

VP Policy

Development, NEI

Nuclear Energy 2015: Focus on Value

Richard Myers

Vice President, Policy Development
Nuclear Energy Institute

NARUC Summer Meeting

July 13, 2015

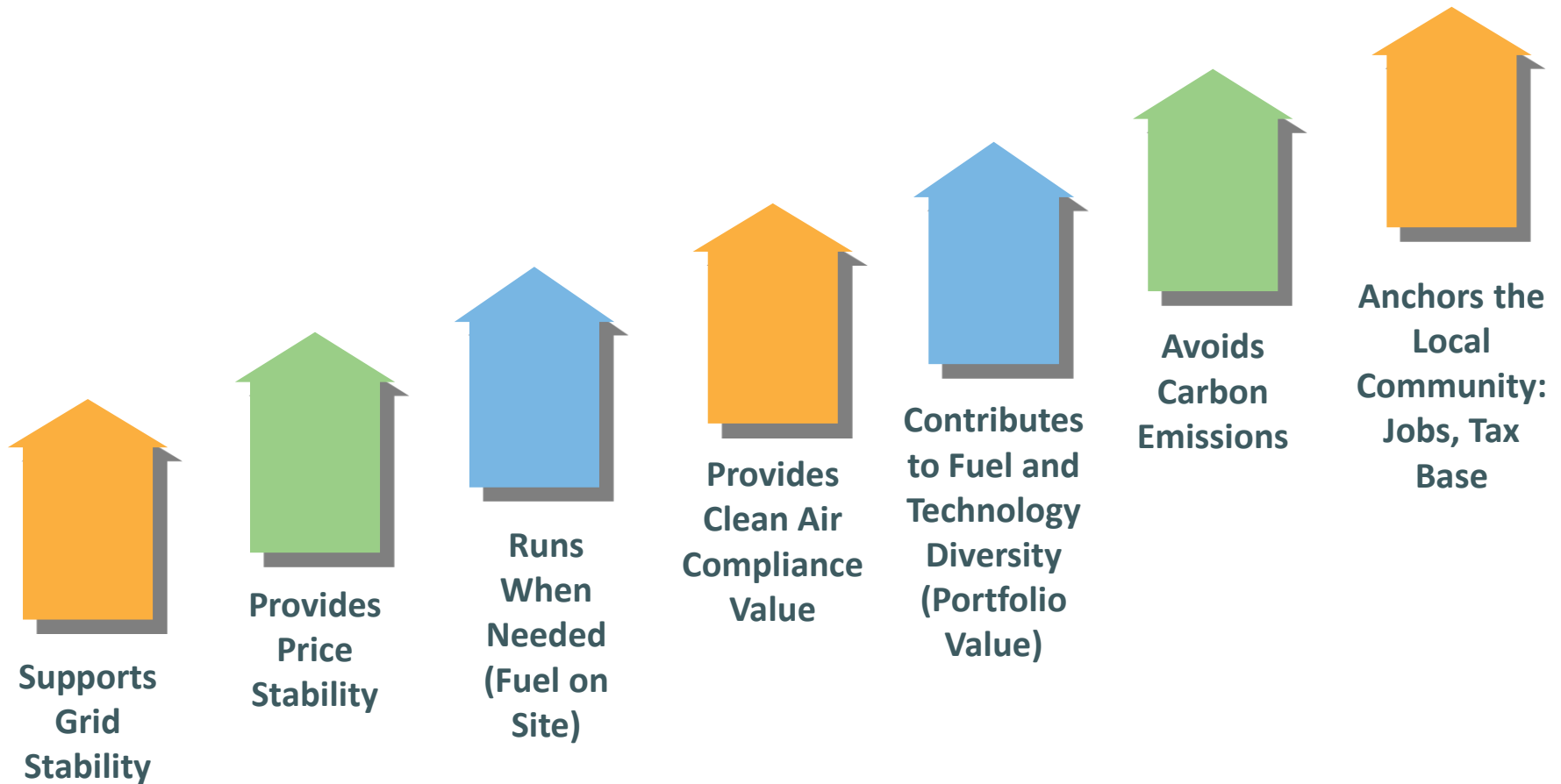


NUCLEAR ENERGY INSTITUTE

nuclear. clean air energy.

Nuclear Energy: A Solid Value Proposition

Safe, Reliable Electricity 24-by-7-by-365 Plus ...



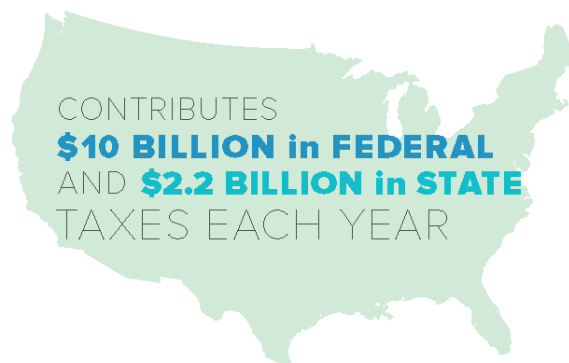
The Value of Nuclear Energy



SUPPORTS
475,000
JOBS



SAVES CONSUMERS
AN AVERAGE OF
6 PERCENT
ON ELECTRICITY BILLS



AVOIDS
OVER
1/2
BILLION
TONS OF
CARBON
EMISSIONS
EACH YEAR



PREVENTS
650,000
TONS
OF **NO_x**
AND
1 MILLION
TONS
OF **SO₂**
EMISSIONS



VALUED AT A
SOCIAL COST
OF
\$33.4
BILLION
ANNUALLY

Source: *The Nuclear Industry's
Contribution to the U.S. Economy*,
The Brattle Group, July 2015

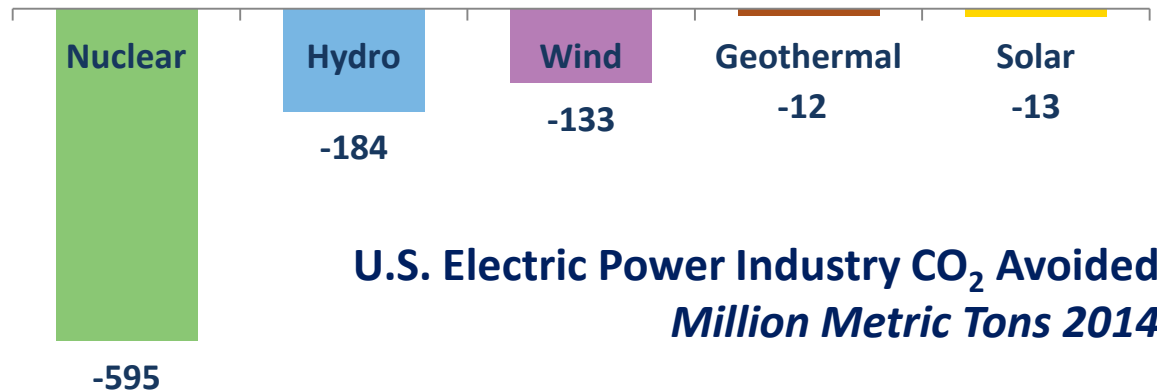


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Spotlight on Nuclear Energy's Value

- Polar Vortex demonstrated value of baseload capacity with firm fuel supply
- EPA Clean Power Plan proposal to reduce CO₂ emissions by 30% by 2030 cannot be achieved and sustained without preserving existing nuclear generating capacity and building new nuclear capacity



U.S. Electric Power Industry CO₂ Avoided
Million Metric Tons 2014

“NARUC urges the EPA ... to adopt final GHG rules and regulations that ... will encourage States to preserve, life-extend, and expand existing nuclear generation....”

– NARUC Resolution, November 2014

Cost of Generating Capacity

2013 \$/MWh

Existing Nuclear	Single Unit	Average	Multi-Unit
	49.69	40.83	34.50

Technology	Capacity Factor (%)	Range of Levelized Costs		
		Minimum	Average	Maximum
Dispatchable				
Gas Combined Cycle	87	68.6	72.6	81.7
New Nuclear	90	91.8	95.2	101
Advanced Coal (IGCC with CCS)	85	132.9	144.4	160.4
Intermittent				
Onshore Wind	35	65.6	73.6	81.6
Utility-Scale Solar PV	25	97.8	125.3	193.3

Sources: New generating capacity costs from Energy Information Administration, *Annual Energy Outlook 2015*; existing nuclear costs are 2013 total generation costs (fuel, O&M, capital) from Electric Utility Cost Group.



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Raj Barua
NRRI



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Modern Utility / Modern Regulation



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Moderator: Hon. Susan Ackerman, Oregon

Hon. Lorraine Akiba, Hawaii

Hon. Carla Peterman, California

Hon. Audrey Zibelman, New York



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**Hon. Lorraine Akiba,
Hawaii**

NARUC 2015

SUMMER COMMITTEE MEETINGS -

Modern Utility / Modern Regulation

Lorraine H. Akiba, Commissioner
Hawaii Public Utilities Commission
July 12-15, 2015

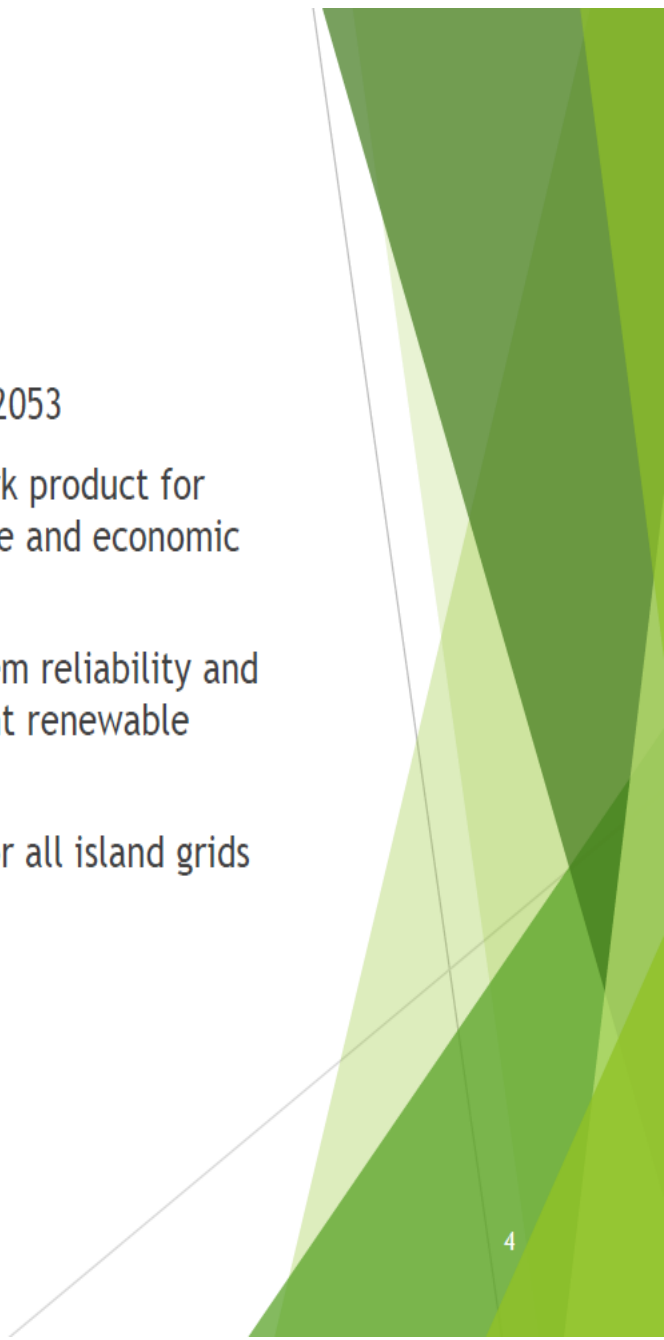


Policy and Regulatory Reforms to Achieve Hawaii's Clean Energy Future

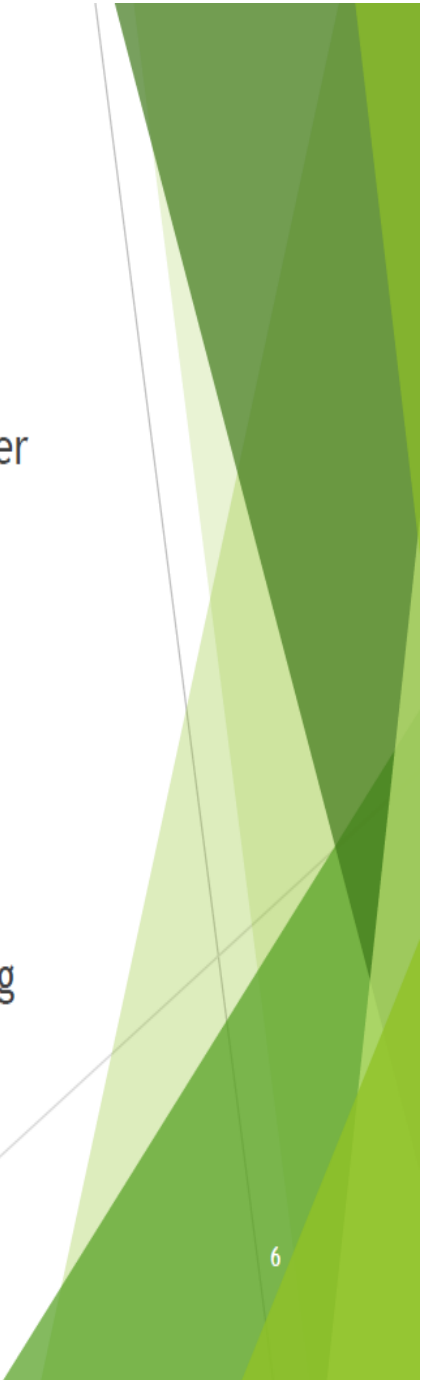
- ▶ Recent directives and orders to Hawaii's utilities to implement new business models to become a world leading operator of a high renewable energy resource grid
- ▶ Regulatory policies and pricing also need to reflect these new business models with new incentives to achieve Hawaii's clean energy future
- ▶ Review and revision of pricing of energy services to reflect new business and technical demands

Recent Major Decisions and Orders to Implement the Integrated Grid

- ▶ Integrated Resource Planning Docket No. 2012-0036, Order No. 32052
 - ▶ White Paper entitled: “Commission’s Inclinations on the Future of Hawaii’s Utilities” which outlines the vision, strategies and regulatory policy changes required to align new utility business models with customer’s changing expectations and state energy policy
 - ▶ Provided specific guidance for future energy planning and review, including strategic direction for capital investments in the integrated grid of the future

- 
- ▶ Reliability Standards Working Group Docket No. 2011-0206 Order No. 32053
 - ▶ Adopted recommendations from the RSWG working group final work product for integrating utility scale and renewable energy resources in reliable and economic manner
 - ▶ Specific directives for actions to lower energy costs, improve system reliability and addressing emerging challenges to integrate additional intermittent renewable energy
 - ▶ Directed the utilities to prepare energy storage utilization plans for all island grids to be included in Power Supply Improvement Plans requirements

- ▶ Policy Statement and Order Regarding Demand Response Programs Docket No. 2007-0341 Order No. 32054
 - ▶ Specific guidance concerning the objectives and goals for demand response programs as distributed energy resources to be used by the utilities as generation resources
 - ▶ Requires integrated demand response portfolio that will enhance system operations and reduce electricity costs to customers
 - ▶ Required utilities to address using distributed energy storage and customer sided storage including electric vehicles for demand response



▶ CUSTOMER CHOICE AND EMPOWERMENT

- ▶ Key policy directive to involve the most important stakeholder - the customer
- ▶ Customers are active partners in the transformation of the utilities of the future
- ▶ Customer side and customer sited technologies including distributed generation, distributed energy storage systems and EVs support the grid of the future
- ▶ “Integrated energy districts” or microgrids directly assist in integration of more cost effective renewable energy onto the grid with DER while providing resiliency and reliability benefits

Envision the Integrated Grid of the Future

- ▶ Hawaii is the living laboratory for the integrated grid of the future
- ▶ Implementing real time DER actions and combining the tools of both traditional central plant and decentralized distributed generation models
- ▶ Implementing new programs to give all customers access to renewable energy
- ▶ On Bill Financing to focus on low income, renters and non profits ability to acquire energy efficiency equipment like solar water heaters and HVAC systems
- ▶ Green Infrastructure Financing program to focus on low income and hard to reach customers in underserved markets and provide ability to acquire distributed PV, energy storage systems and energy efficiency equipment with low cost financing through funding from securitized bonds

Hawaii Electric Systems

4 electric utilities; 6 separate grids

Kauai Island Utility Cooperative

27 MW PV (24 MW in development)

System Peak: 78 MW

Customers: 32,700

Kaua'i

O'ahu

Hawaiian Electric

221 MW PV / 100 MW Wind /
69 MW WTE

System Peak: 1,100 MW

Customers: 300,000

Moloka'i

Maui

Lana'i

Hawai'i

Maui Electric

Maui: 60MW PV / 72MW Wind

System Peak: Maui 200 MW

Lana'i: 1MW PV

System Peak: Lana'i: 5 MW

Moloka'i: 1.2 MW PV

System Peak: Moloka'i: 5.5 MW

Customers: 68,000

Hawaii Electric Light

39 MW PV / 30 MW Wind /

38 MW Geothermal / 16 MW Hydro

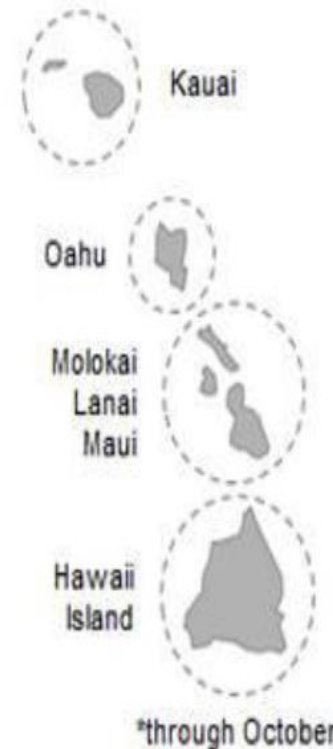
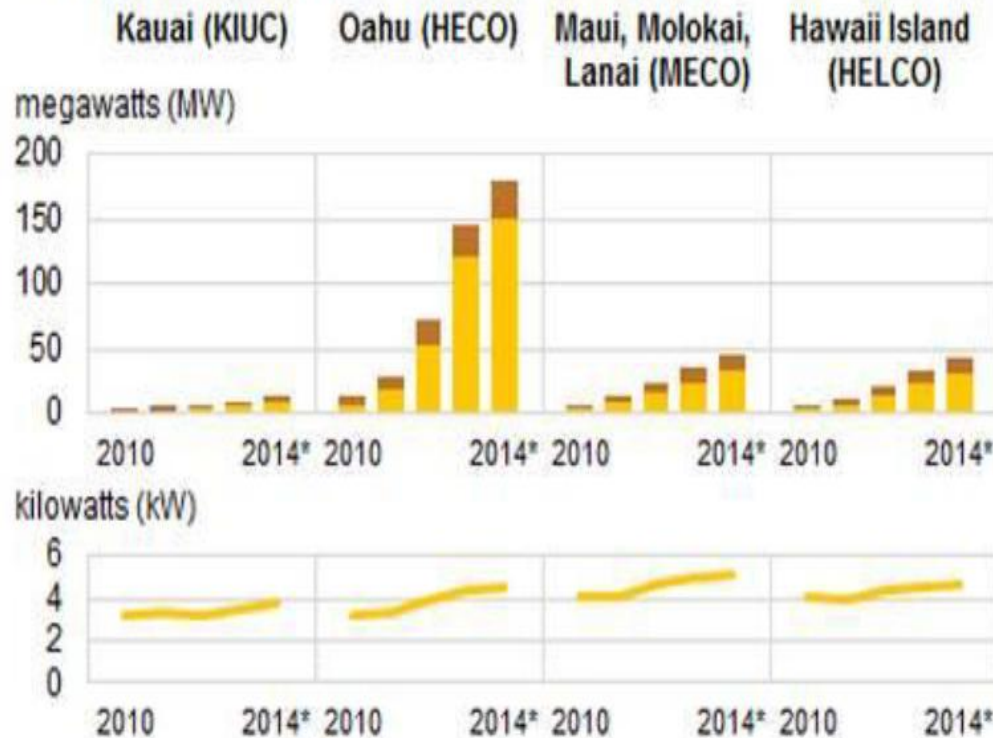
System Peak: 190 MW

Customers: 81,000



UNIVERSITY of HAWAII
MANOA

Residential (■) and commercial (■) net-metered solar PV capacity in Hawaii;
average residential solar PV system size (—)



Source: U.S. Energy Information Administration, [EIA-861](#) and [EIA-826](#)

Note: Average residential solar photovoltaic (PV) system size calculated by dividing total installed capacity by number of meters. [HECO](#), [MECO](#), and [HELCO](#) are subsidiaries of Hawaiian Electric Industries Inc.; [KIUC](#) is an independent electric cooperative.

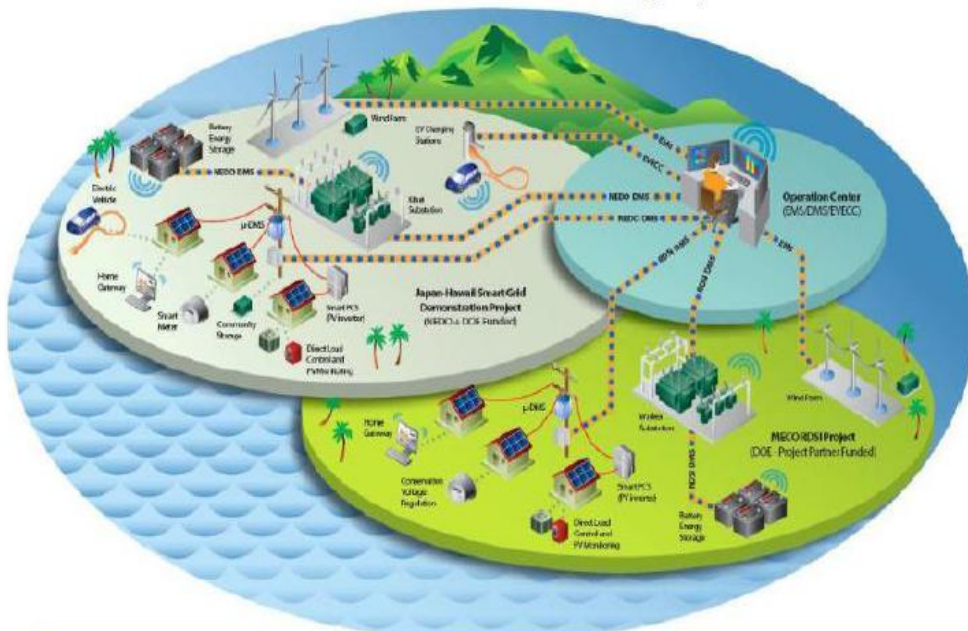
Hawaii Battery Energy Storage System (BESS) Projects; RFPs

Title	MW	MWh	Date
Kauai Island Utility Cooperative Koloa BESS	1.5	1	2011
Kauai Island Utility Cooperative Port Allen BESS	3	2	2012
Lanai La Ola Solar ... for 1.2 MW PV (solar) on 5 MW grid	1.125	0.5	2011
Kaheawa Wind I ... 1 st (30 MW) wind on 200 MW grid	1.5	1	2009
Auwahi Wind ... 2 nd (22 MW) wind on 200 MW grid	11	4.4	2012
Kaheawa Wind II ... 3 rd (22 MW) wind on 200 MW grid	10	20	2012
Maui Electric / USDOE Smart Grid BESS ... Wailea	1	1	2013
Hawi Substation ... for high wind penetration circuit	1	0.25	2012
HELCO Battery Energy Storage System ... utility owned	(2) 0.1	(2) 0.25	2012
Kauai Island Utility Cooperative Anahola BESS 6MW/4 MWh system; targeted for Fall 2015 completion			
HECO Energy Storage RFP ... 60 to 200 MW for Oahu. Finalists selected; targeted for 2017 completion			

Outline of JUMPSmart Maui



In Maui, large scale renewable energy (72MW of wind and 40+ MW of distributed PV) has been introduced. In addition, EV high penetrations are expected soon.



Issues

- Excess Energy
- System Frequency Impact
- Distribution Line Voltage Impact

Solutions

- Integrated DMS
- μDMS & Smart PCS
- EV charger control
- Battery system
- Direct Load Control
- ICT Platform

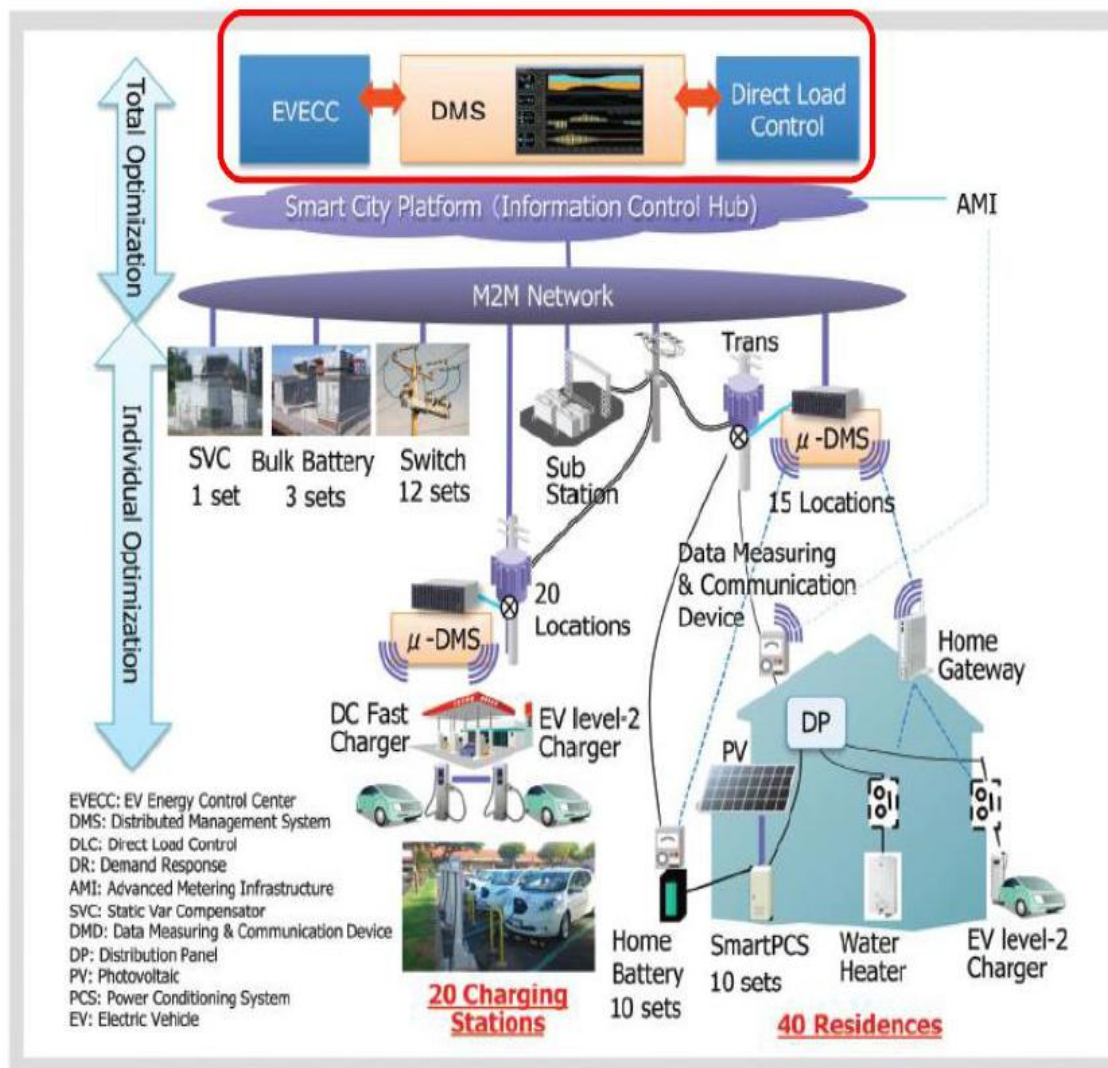
Basic Policy for Demonstration

Maximize Utilization of Renewable Energy (RE)

Stable Supply of Electric Power

Solution for Impact of EV & PV High Penetration

Overall View of System Configuration



Mahalo!

For any questions, please contact:

Lorraine.H.Akiba@hawaii.gov

(808) 586-2020

Lorraine H. Akiba, Commissioner
Hawaii Public Utilities Commission





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Consumer Advocates Respond



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**Moderator: Hon. Susan Ackerman,
Oregon**

**David Hepinstall, Assoc. for Energy
Affordability**

Bill Malcolm, AARP

**Sonny Popowsky, Former Consumer
Advocate of
Pennsylvania**



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**Text Questions
to
202-596-1708**



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Real Data About Customer Wants and Needs



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Moderator: Hon. Susan Ackerman, Oregon

Ken Black – ESource

Patty Durand, Smart Grid Consumer Coalition

Elin Katz, Connecticut Consumer Counsel

Denise Senecal, PEPCO Holdings, Inc.

Bradley Berson, American Electric Power



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Ken Black

ESource

2015 NARUC Summer Committee Meeting

Patty Durand, Executive Director
Smart Grid Consumer Collaborative



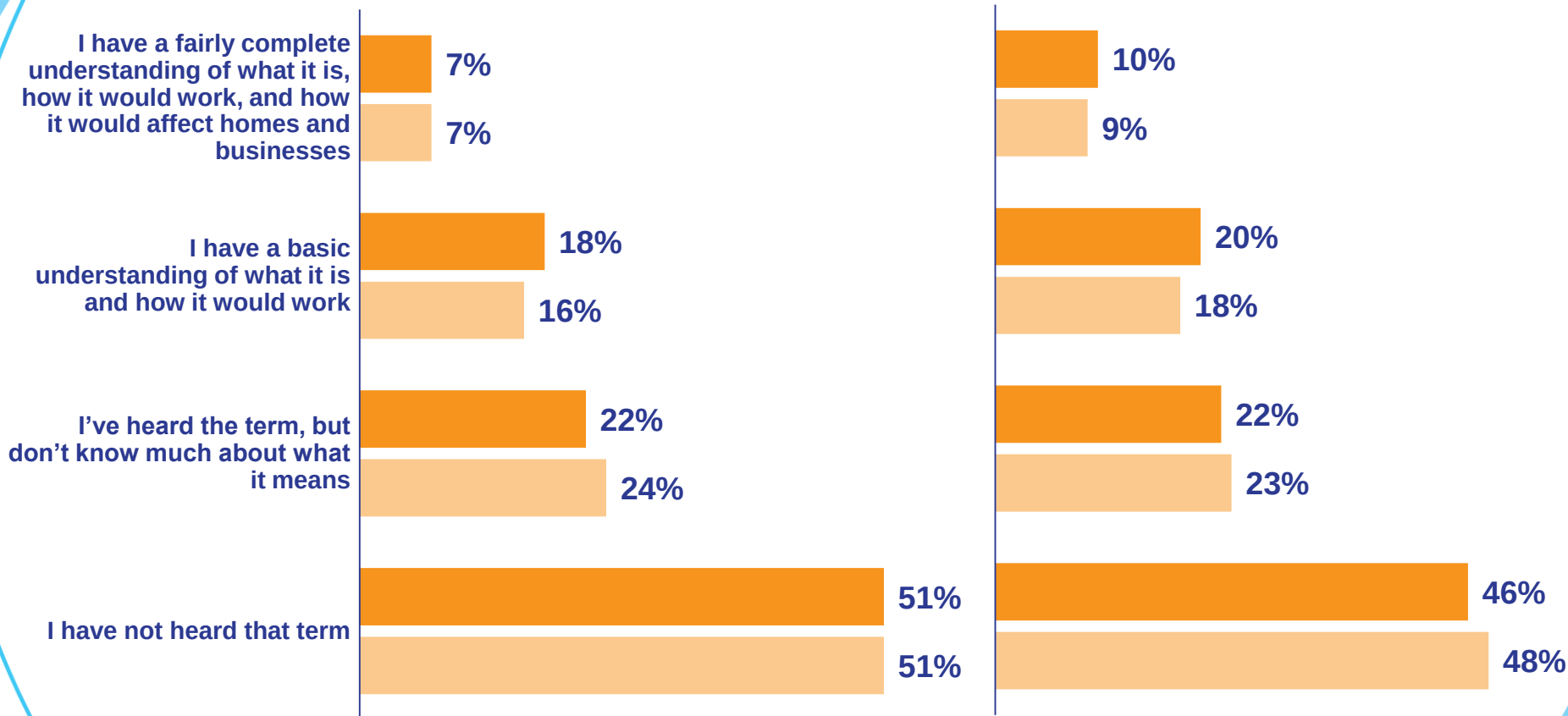
Consumer Pulse and
Market Segmentation
Study – *Wave 5*

Have heard the term “Smart Meter” and “Smart Grid”

Current Level of Knowledge of...

Smart Grid

Smart Meter

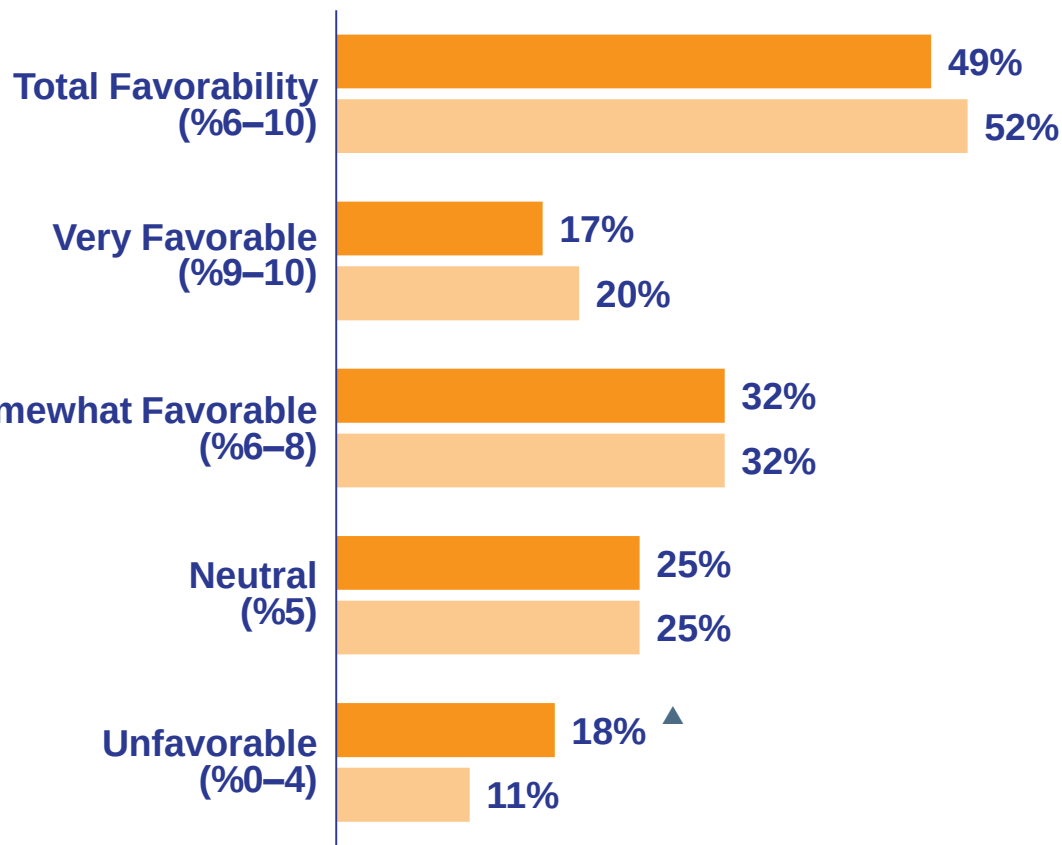


n =
Wave 5 1,004
Wave 1 1,234

Overall Favorability of the terms “Smart Grid” and “Smart Meter”

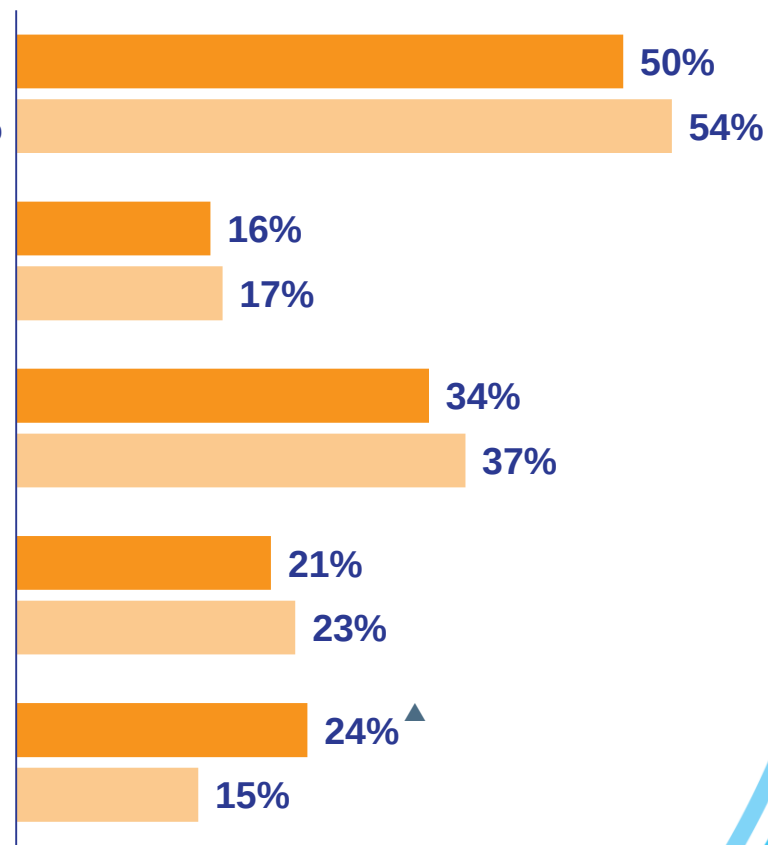
Overall Favorability

Smart Grid



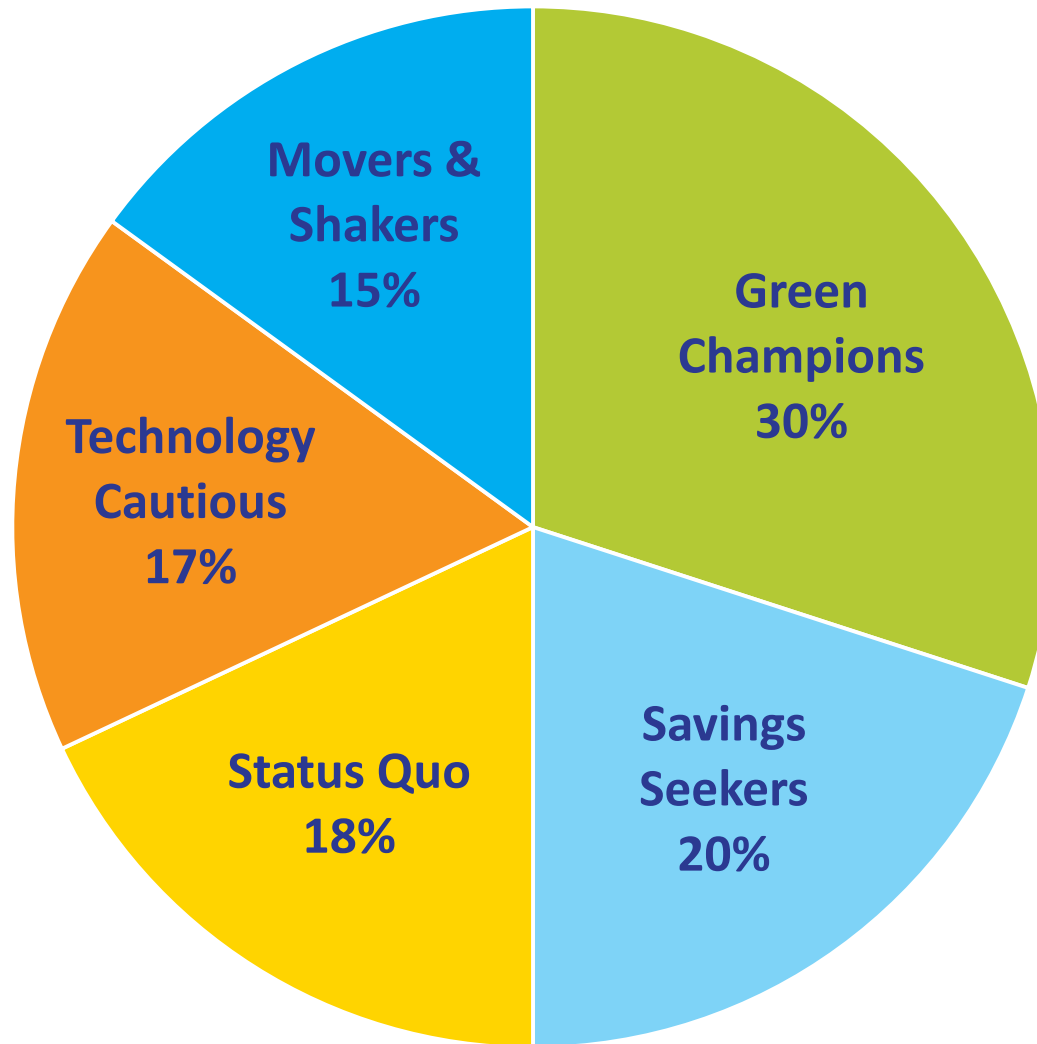
Wave 5 n = 472
Wave 1 n = 584

Smart Meter



Wave 5 n = 519
Wave 1 n = 628

The U.S. Population by Segment



Green Champions

“Smart energy technologies fit our environmentally aware, high-tech lifestyles.”



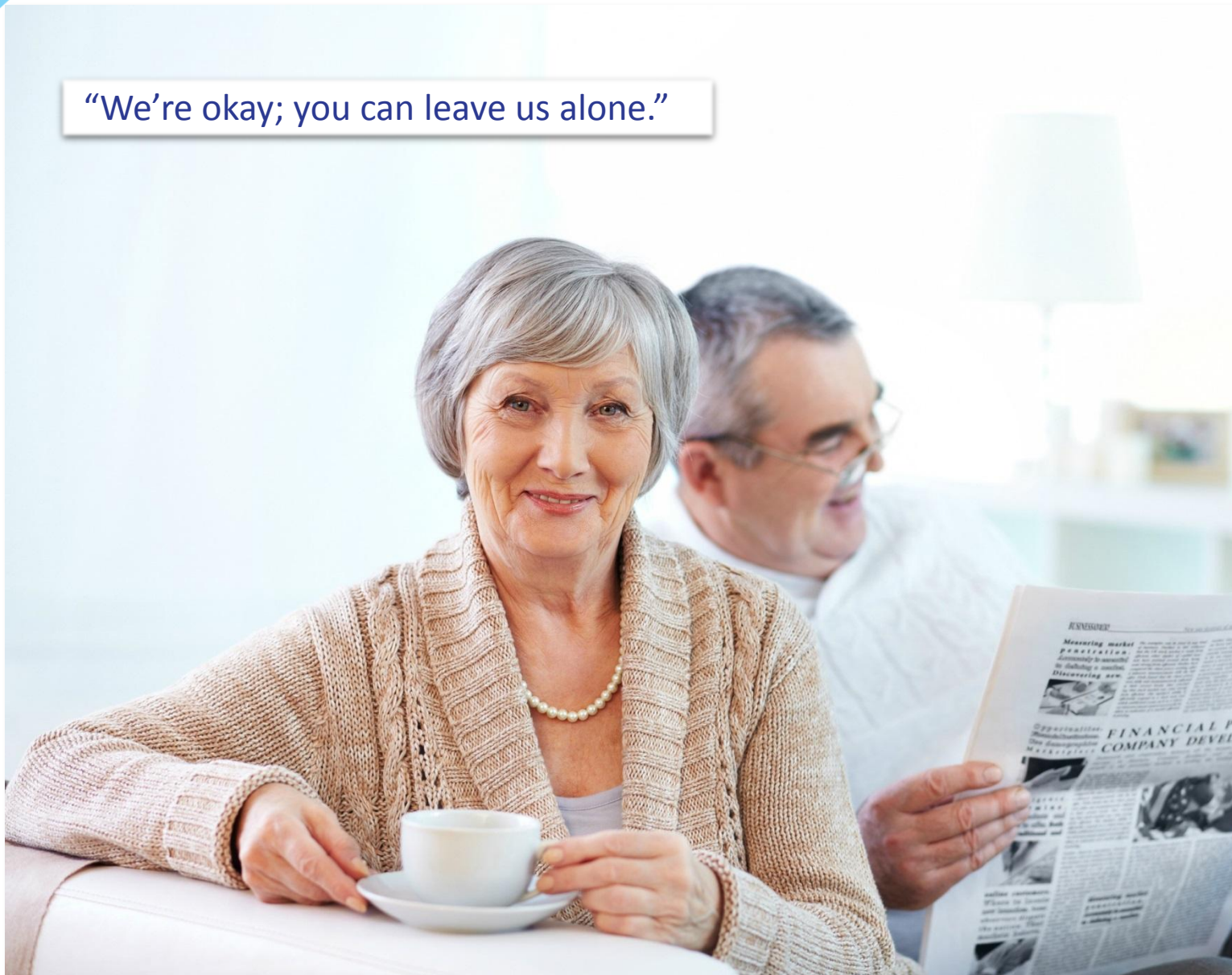
Saving Seekers

“How can smart energy programs help us save money?”



Status Quo

“We’re okay; you can leave us alone.”



Technology Cautious

“We want to use energy wisely, but we don’t see how technologies can help.”

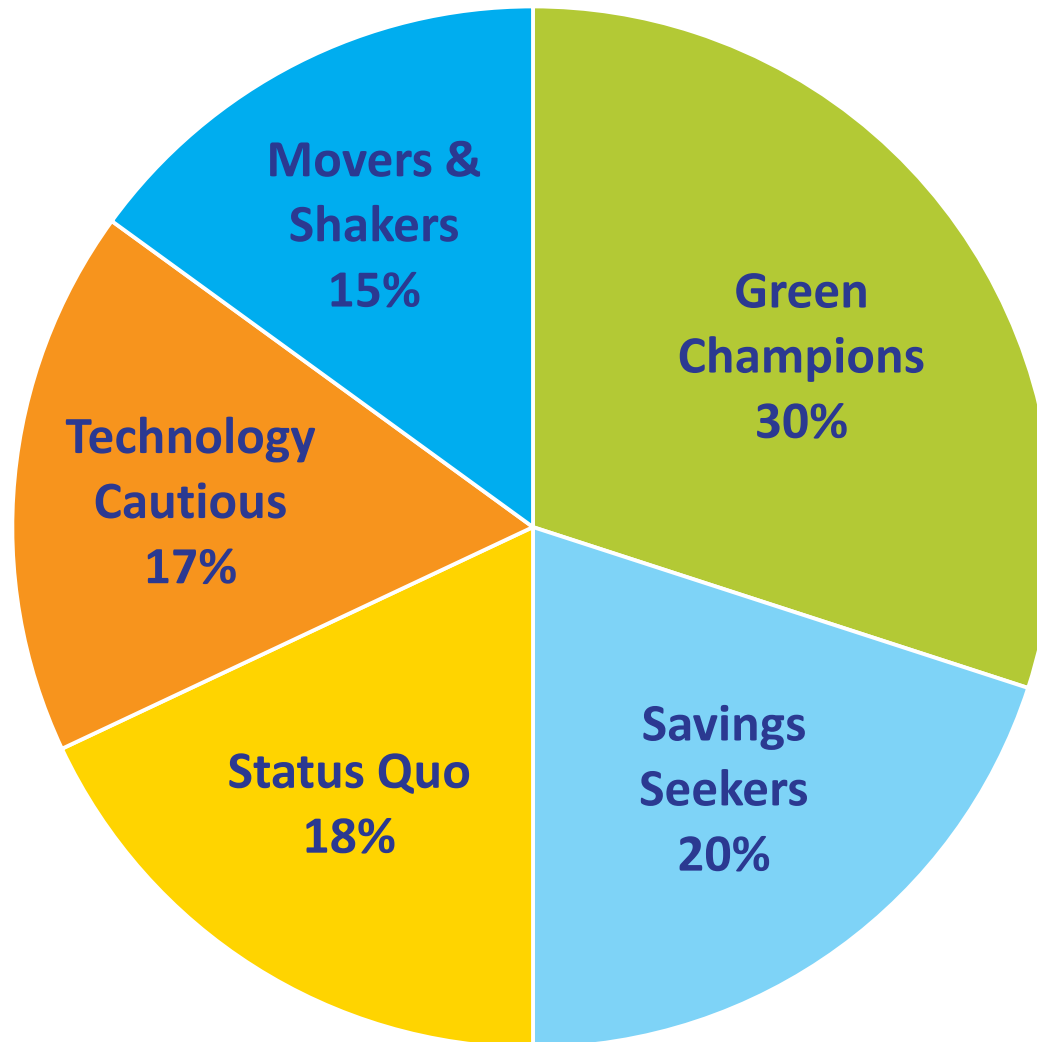


Movers and Shakers

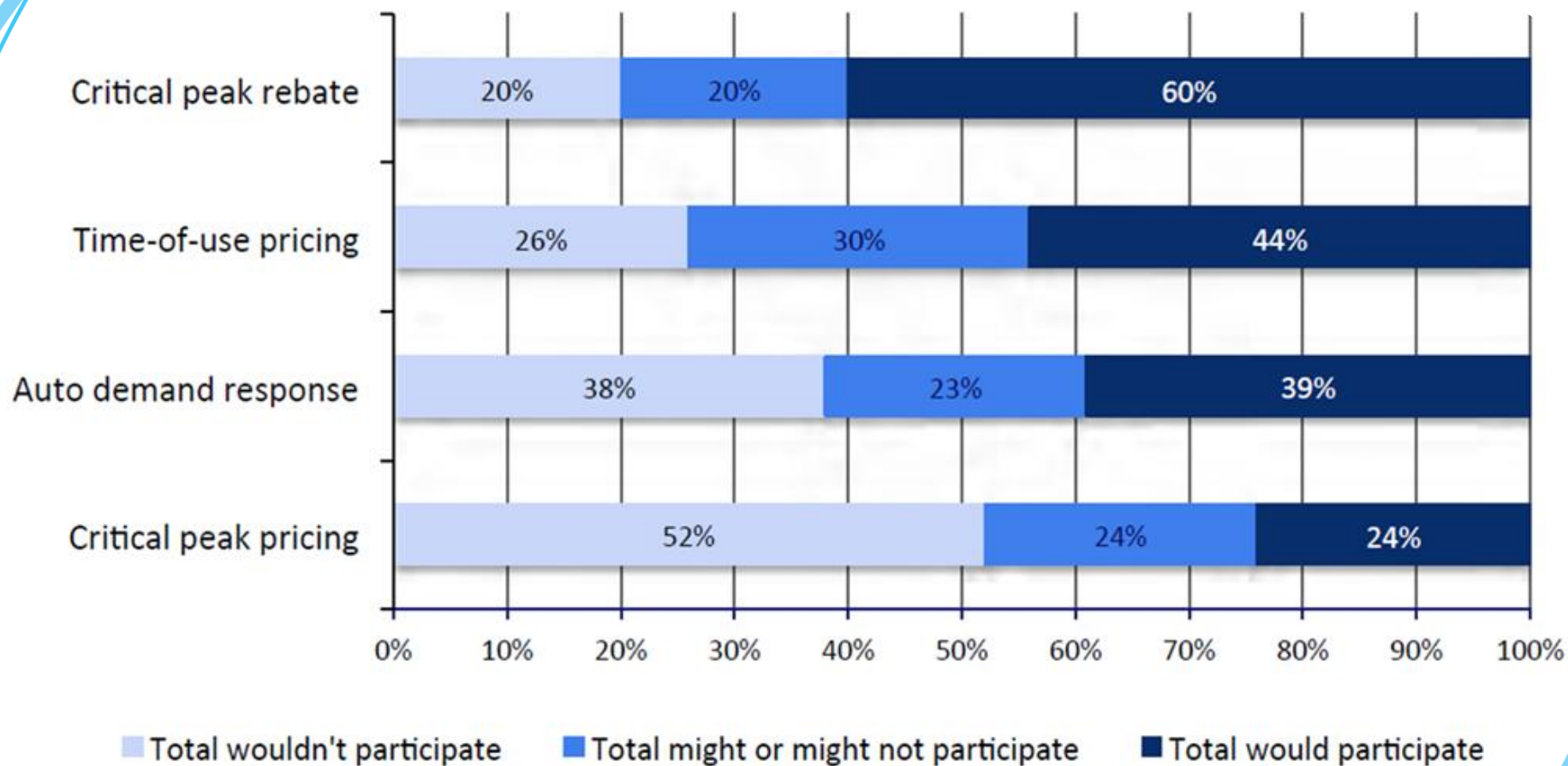
“Impress us with smart energy technology and maybe we will start to like the utility more.”



The U.S. Population by Segment



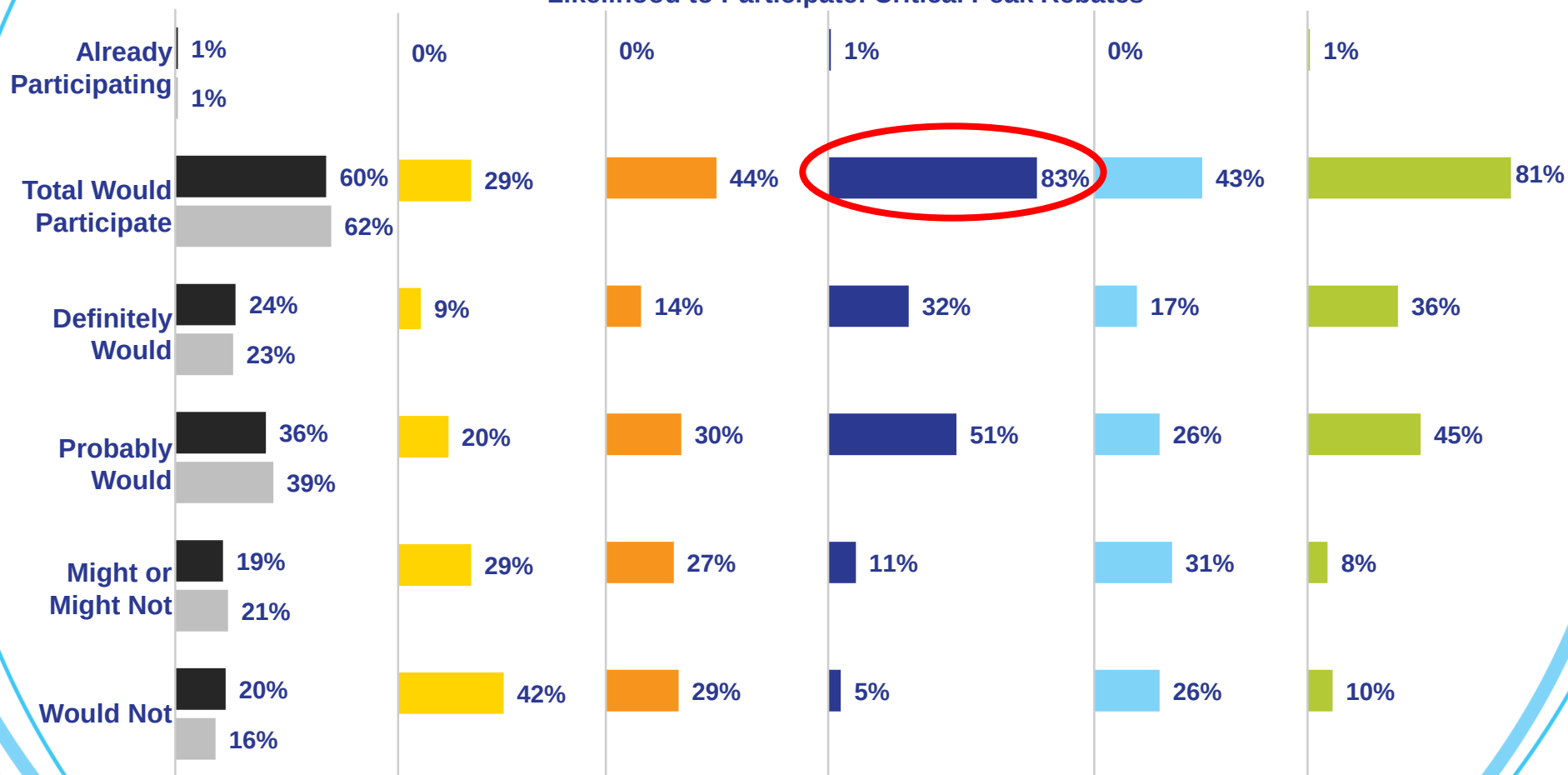
Demand Response Program Interest



Critical Peak Rebates

Total	Status Quo (A)	Technology Cautious (B)	Savings Seekers (C)	Movers and Shakers (D)	Green Champions (E)
n=1,004/1,234 W5/W1	220	206	201	168	209

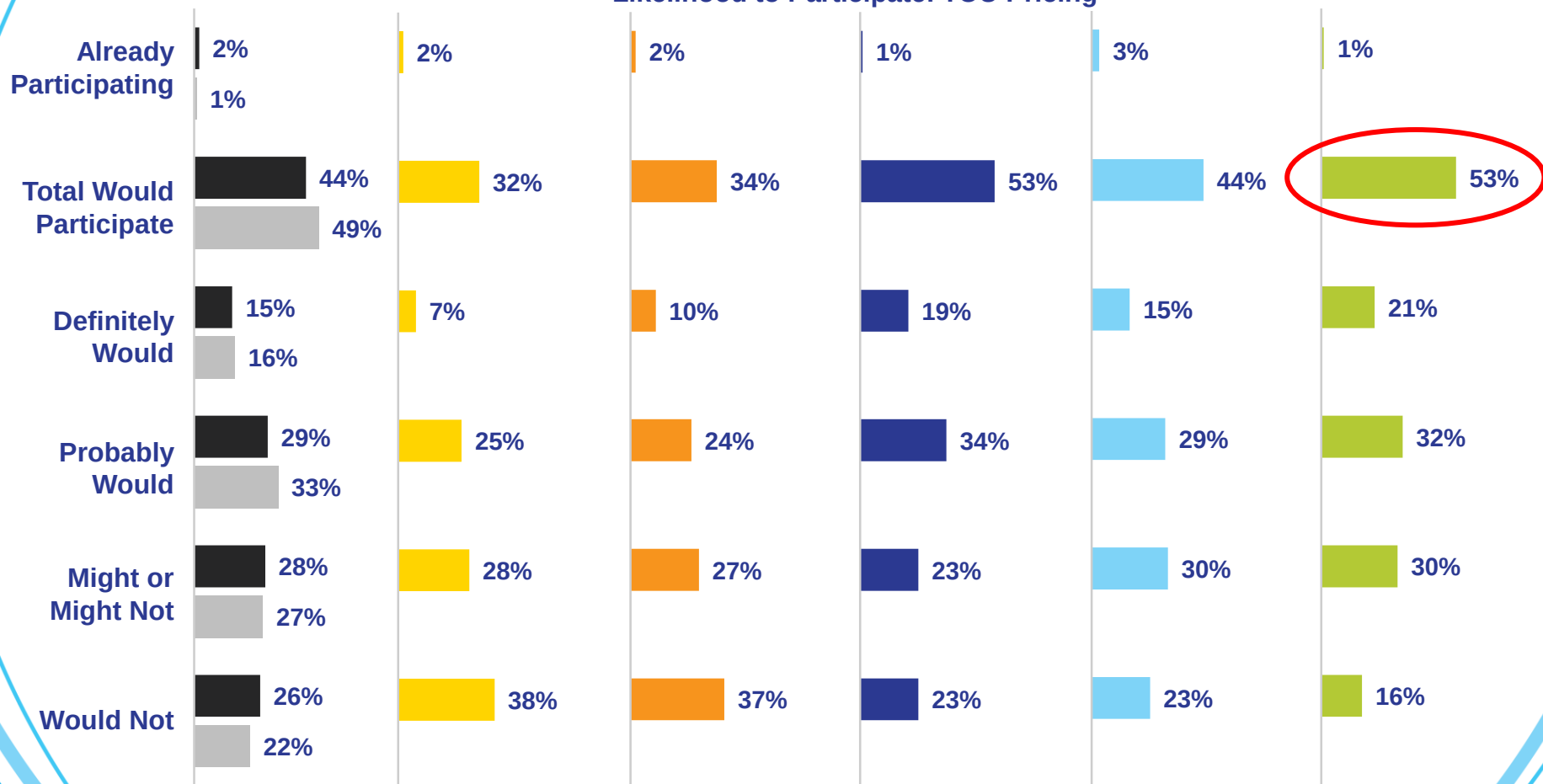
Likelihood to Participate: Critical Peak Rebates



Time-Of-Use Pricing

Total	Status Quo (A)	Technology Cautious (B)	Savings Seekers (C)	Movers and Shakers (D)	Green Champions (E)
n=1,004/1,234 W5/W1	220	206	201	168	209

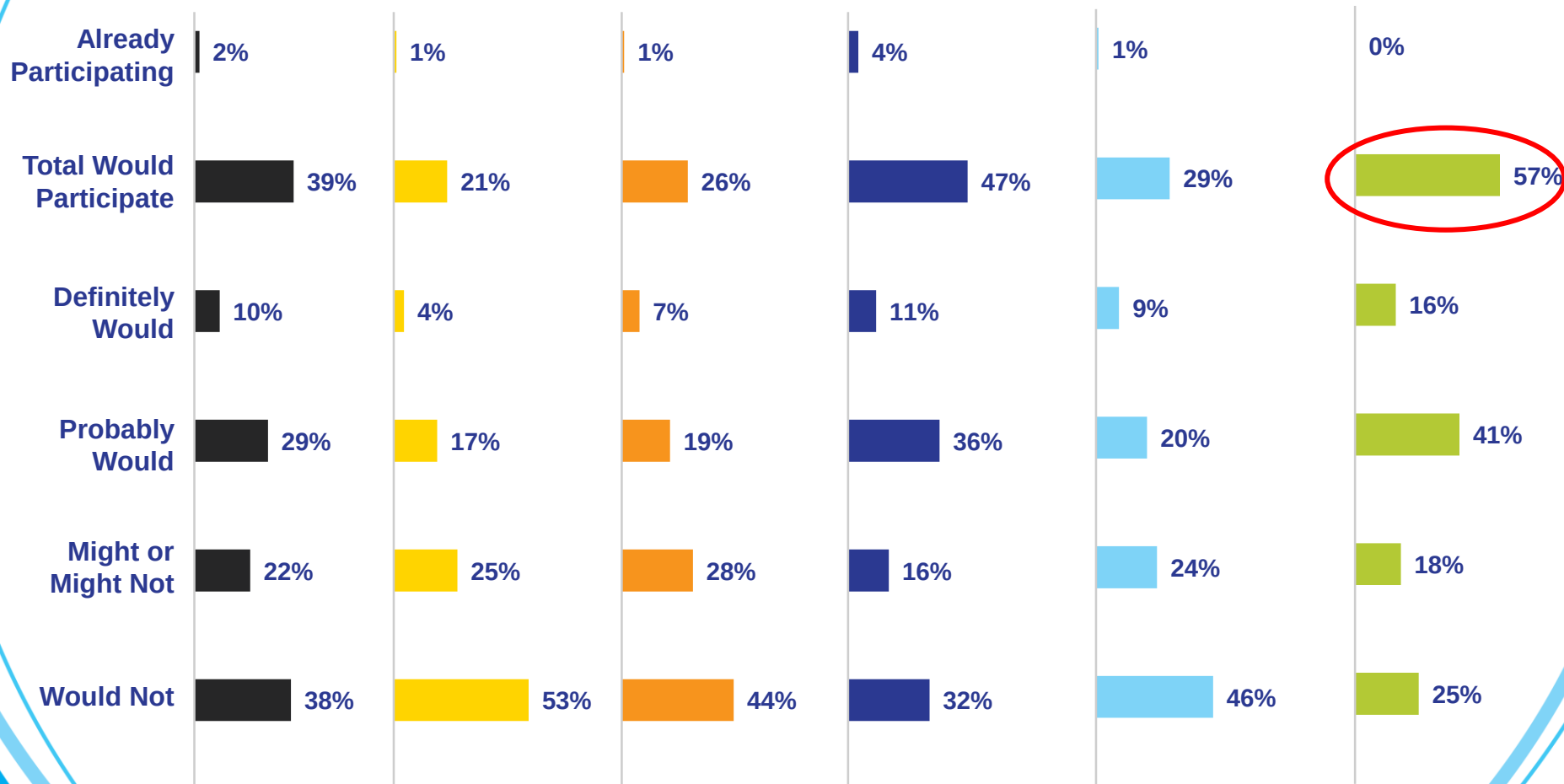
Likelihood to Participate: TOU Pricing



Demand Response Pricing

Total	Status Quo (A)	Technology Cautious (B)	Savings Seekers (C)	Movers and Shakers (D)	Green Champions (E)
n=1,004	220	206	201	168	209

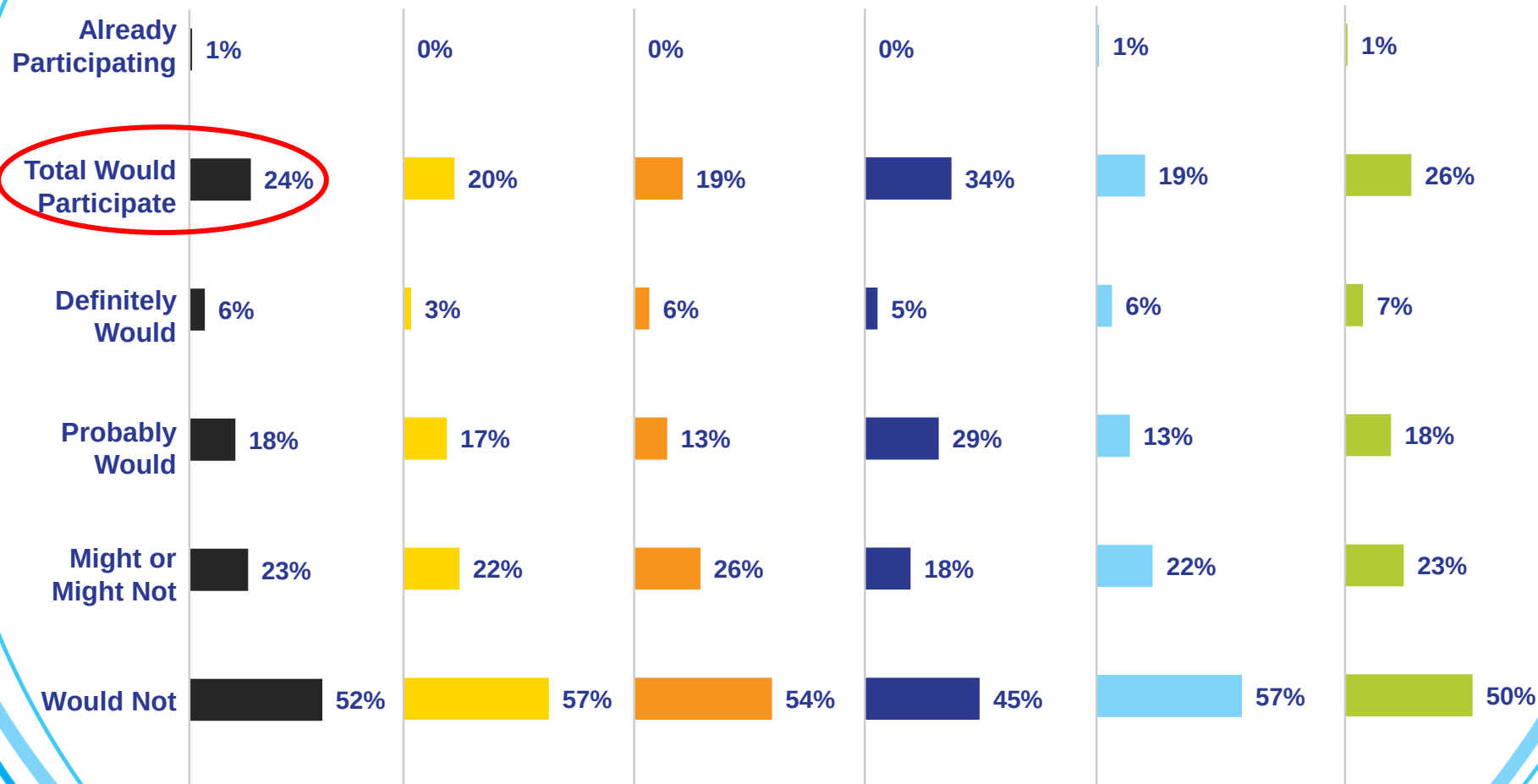
Likelihood to Participate: Demand Response Pricing



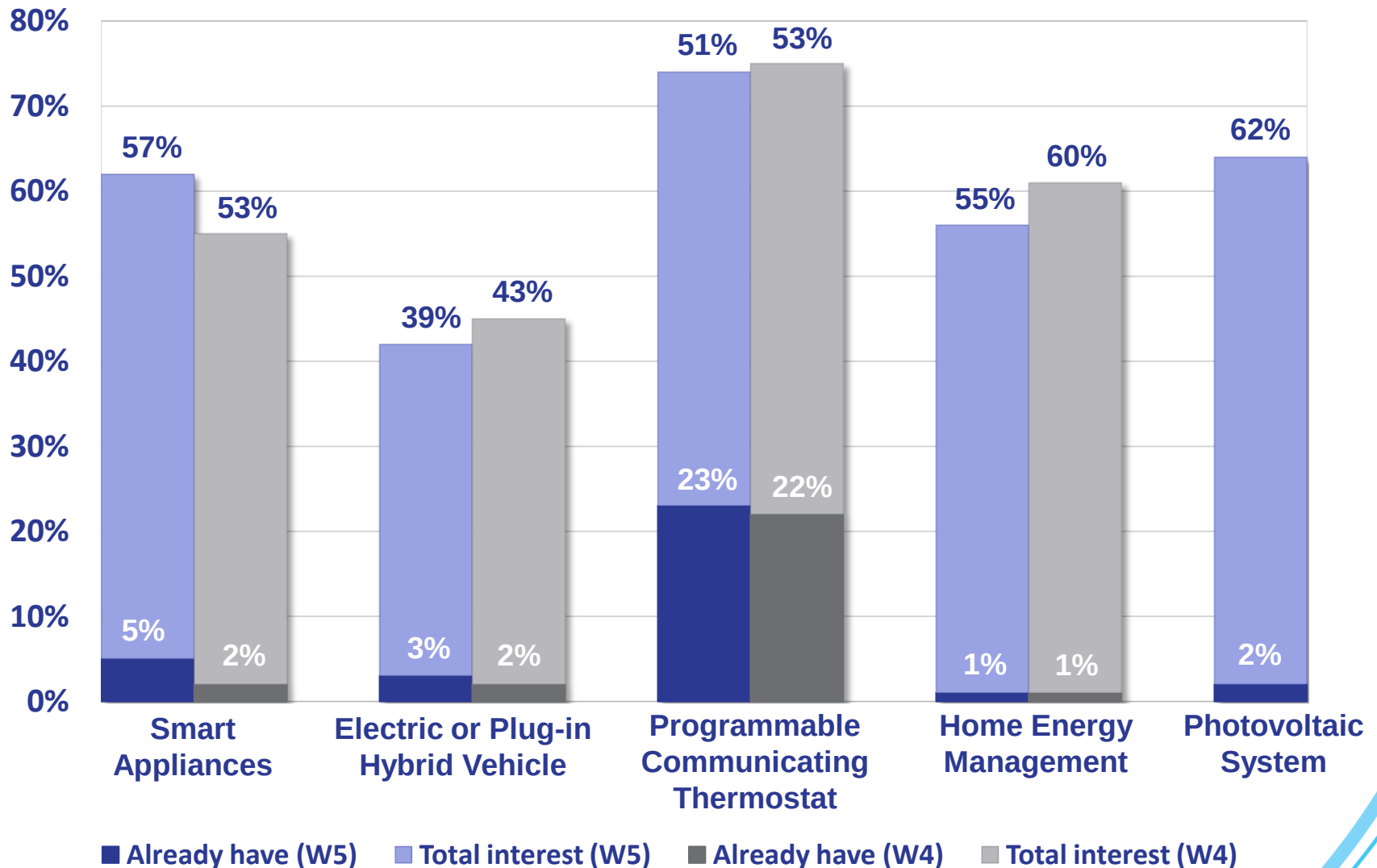
Critical Peak Pricing

Total	Status Quo (A)	Technology Cautious (B)	Savings Seekers (C)	Movers and Shakers (D)	Green Champions (E)
n=1,004	220	206	201	168	209

Likelihood to Participate: Critical Peak Pricing



Technology Adoption and Interest



Top Takeaways

- 1. Citizens are the priority stakeholder***
- 2. Consumers know very little about the smart grid***
- 3. Consumers tell us they care about energy***
- 4. Consumers tell us they want technology and choice***
- 5. Segmentation helps us understand consumers***



**SmartGrid
consumer
collaborative**

listen, educate, collaborate



Smart Grid Consumer Collaborative *Consumer Engagement for the Smart Grid*

PATTY DURAND, Executive Director
Patty.Durand@SmartGridCC.org
[@PattyDurandSGCC](#)
678-467-0148



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**Elin Katz,
Connecticut Consumer
Counsel**

The New Energy Crisis: **The Escalating Cost of Electricity and the Growing Number of Customers Who Can't Pay Their Bills**

Elin Swanson Katz, Consumer Counsel
Connecticut Office of Consumer Counsel

“Real Data About Customer Wants and Needs”
Electricity Committee

NARUC Summer Meeting
July 2015





What's on customers' minds?

- The rising cost of electricity
- The increasing share of household budgets taken up by energy bills
- How can they reduce their energy bills/electricity usage



Headlines in New England

NPR: “New England Electricity Prices Spike As Gas Pipelines Lag” - November 05, 2014

“Utilities in New England have announced electricity rates hikes on the order of 30 percent to 50 percent, making prices some of the highest in the history of the continental United States.”



Comparison of all sector electric prices (Winter 2015)

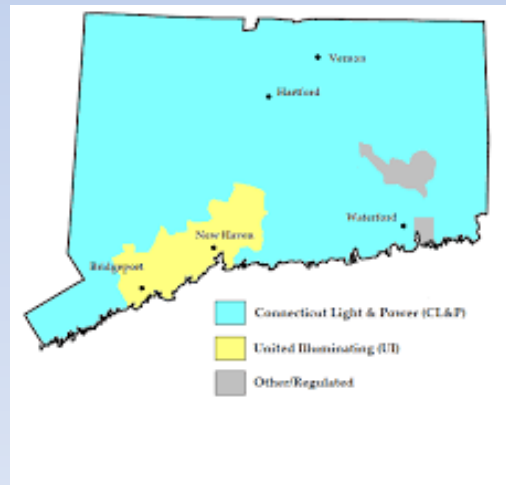
Connecticut	18.44 cents/kWh.
New England	17.34 cents/kWh
Mid-Atlantic (NY, NJ, PA)	12.81 cents/kWh

(Source: EIA)



The Connecticut Example

- Two regulated electric utilities
 - **Eversource** (formerly Connecticut Light & Power), with 1.2 million customers
 - **United Illuminating**, with 325,000 customers



(Source: EnergyBrokerNetwork.com)



The Human Cost of Unaffordable Energy

Hardship Customers

Connecticut Utility Company	Number of Hardship Customers (2014)	Hardship Customers with Payment Plans	Hardship Customers without Payment Plans, subject to shut-off	Total Delinquent Balance (Rounded)
Eversource	90,000	35,000	55,000	\$50 million
United Illuminating	24,000	200	23,800	\$38 million

(Source: Eversource/CL&P and UI Annual 16-262c reports to the CGA)



The Connecticut Story: *Non-hardship Customers*

Year	Eversource/CL&P Non-hardship Customers making payment arrangements	Delinquency Total (Rounded)
2012	53,869	\$15 million
2013	98,232	\$24 million
2014	218,850	\$50 million

(Source: Eversource/CL&P and UI Annual 16-262c reports to the CGA)



The Connecticut Story: United Illuminating *Non-hardship Customers*



Year	United Illuminating Non-hardship Customers with outstanding balances that were written off	Delinquency Total (Rounded)
2014	54,266	\$5.7 million



What does this mean?

- For Eversource, 218,850 non-hardship customers were on payment plans – over 1/6 of their 1.1 million residential customers.
- United Illuminating wrote off the balance of over 54,000 non-hardship customers – over 1/6 of their 300,000 residential customers.

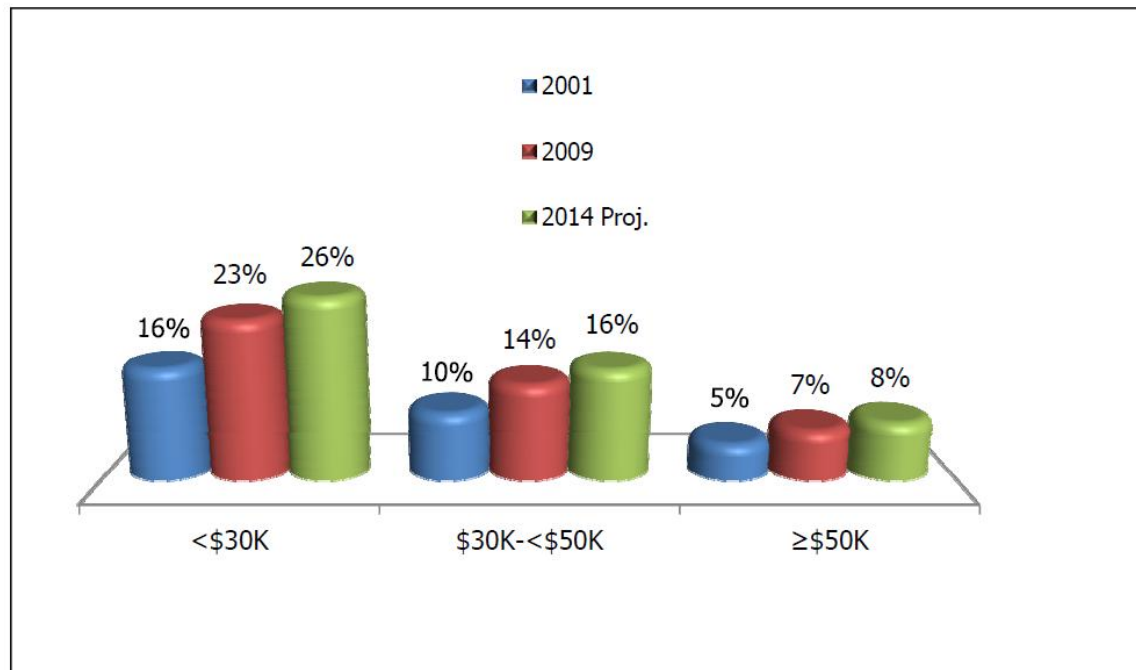
The New Energy Crisis

- Eversource: Hardship Customers + Non-hardship Customers on payment plans = 310,000 customers had significant difficulty paying their bills in 2014 – *one in four* residential customers.
- UI: Hardship Customers + Non-hardship Customers on payment plans = 78,000 customers with payment difficulty – *one in four* residential customers



Connecticut is not alone.

Energy Cost Impacts on American Families,
2001-2014



Energy Costs as Percentage of Nominal After-Tax Household Income



(Source: AmericasPower.org)

The Home Energy Affordability Gap continues to grow....

- The Affordability Gap is currently \$5.7 billion dollars in the United States.
 - Some examples of state Affordability Gaps in 2014:
 - CT: \$ 799,127,248
 - FL: \$2,317,610,164
 - TX: \$3,909,597,949
 - WA: \$ 356,558,640
 - CA: \$2,955,813,901
 - MT: \$ 107,246,351

(Source: HomeEnergyAffordability Gap.com)



My Conclusions

- Reducing energy costs and electric bills is of central importance to many, many consumers.
- The number of consumers facing life-altering problems paying their energy bills is growing.
- There is not enough dialogue around this issue and the human cost of unaffordable energy.
- Any “re-imagining” of the grid must keep affordability for all as a central focus.





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Summer Committee Meetings

**Denise Senecal,
Market Research
Manager, PEPCo**



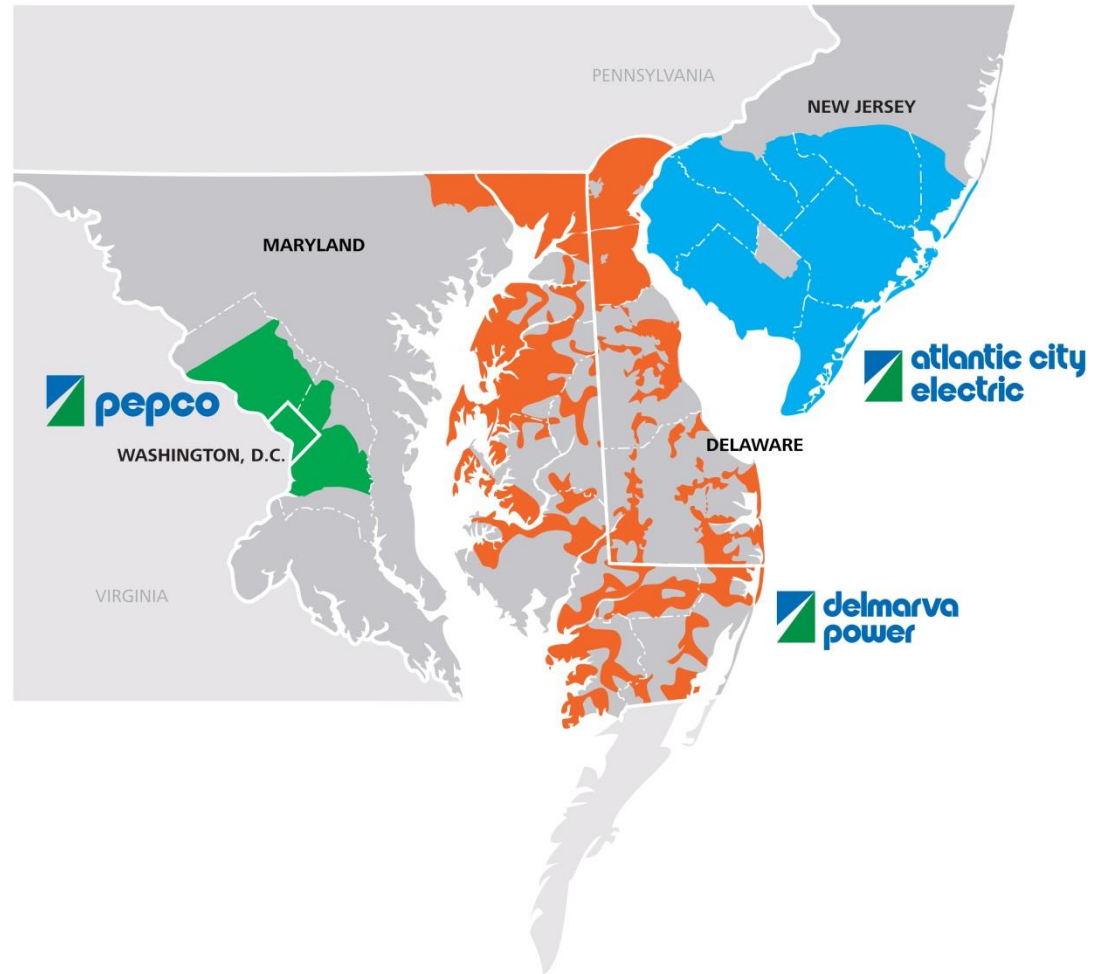
Meeting Customer Needs



Presented by: Denise Senecal, Market Research Manager
July 2015

Pepco Holdings, Inc. Quick Facts

- Incorporated in 2002
- Service territory:
8,340 square miles
- Customers served
 - Atlantic City Electric:
 - 545,000 – electric
 - Delmarva Power:
 - 503,000 – electric
 - 125,000 – natural gas
 - Pepco:
 - 793,000 – electric
- Total population served:
5.6 million



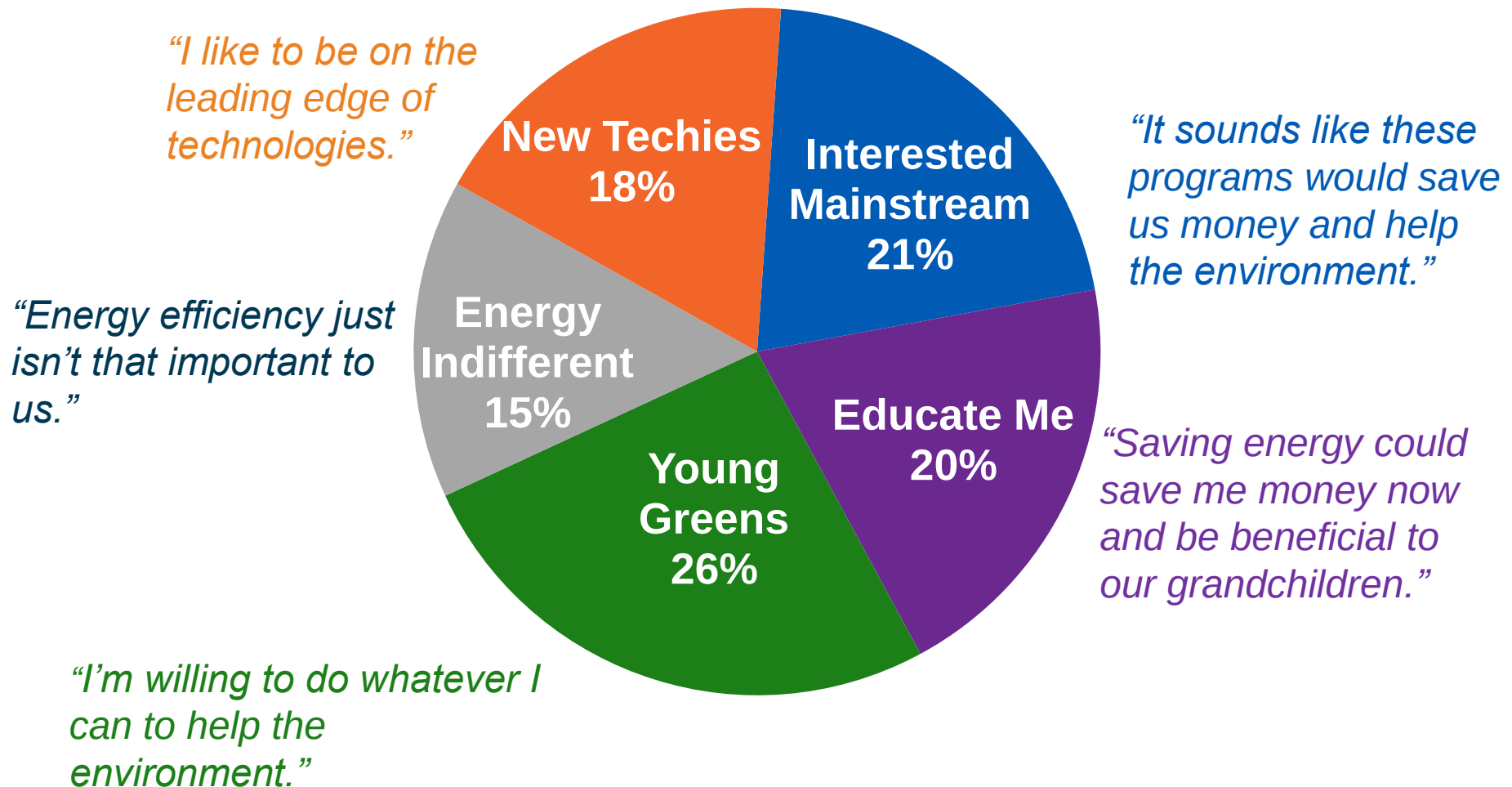
Customers Want a Variety of Channels for Communications and Transactions

- Issue is choices – customers want to have transactions and information available when they need them.
- Preferences may change based on situation
- Examples:
 - Social media: Customers look for information during storms and major outages but don't interact much for energy efficiency information
 - Communications: customers are split between email and direct mail/bill inserts, but percentages vary on a regional basis
 - High bill season: both calls to call center and visits to budget billing webpage increased dramatically

Use Of Segmentation to Understand Customer Needs

- Segments developed based on surveys related to energy use, interest in saving energy, attitudes towards saving energy, technology use and interest, and media preferences
- Some segments have a higher concentration of older customers
- Two examples in our service territory:
 - In MD, we have a segment of older customers who are less concerned about the environment and more focused on potential cost savings. They have higher income and currently are not focused on energy efficiency, and need to be convinced they can be both comfortable and save energy.
 - In DC, we have a segment of older customers who are interested in saving energy for cost savings, but want more information on the cost/benefits of different steps they can take.

Washington DC Customer Segments



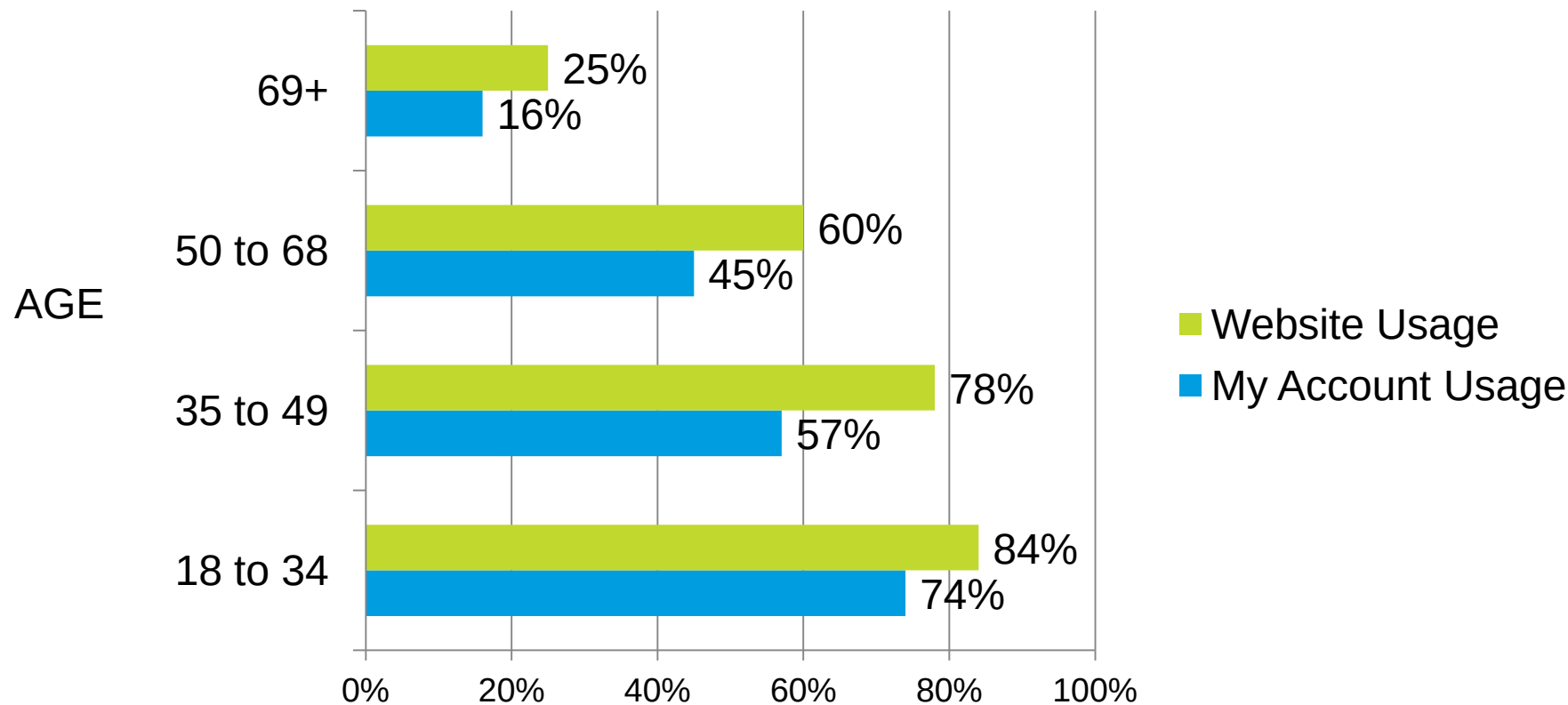
Information Can Provide Customers with Greater Control

Regardless of segment, more information gives consumers a better understanding of their energy usage, but they can decide what to do with it.

- Customers want easy access to information during outages:
 - Can report outage via mobile app, online at website, through IVR or via call center and get updated restoration time when available
 - Information received through any of these channels is consistent
- Customer service:
 - New website with updated information
 - Self-service channels can help improve satisfaction – outages and billing
- Customers want programs to help them save energy:
 - Strong desire for more information but many don't want to sacrifice comfort
 - Confusion over highest impact changes

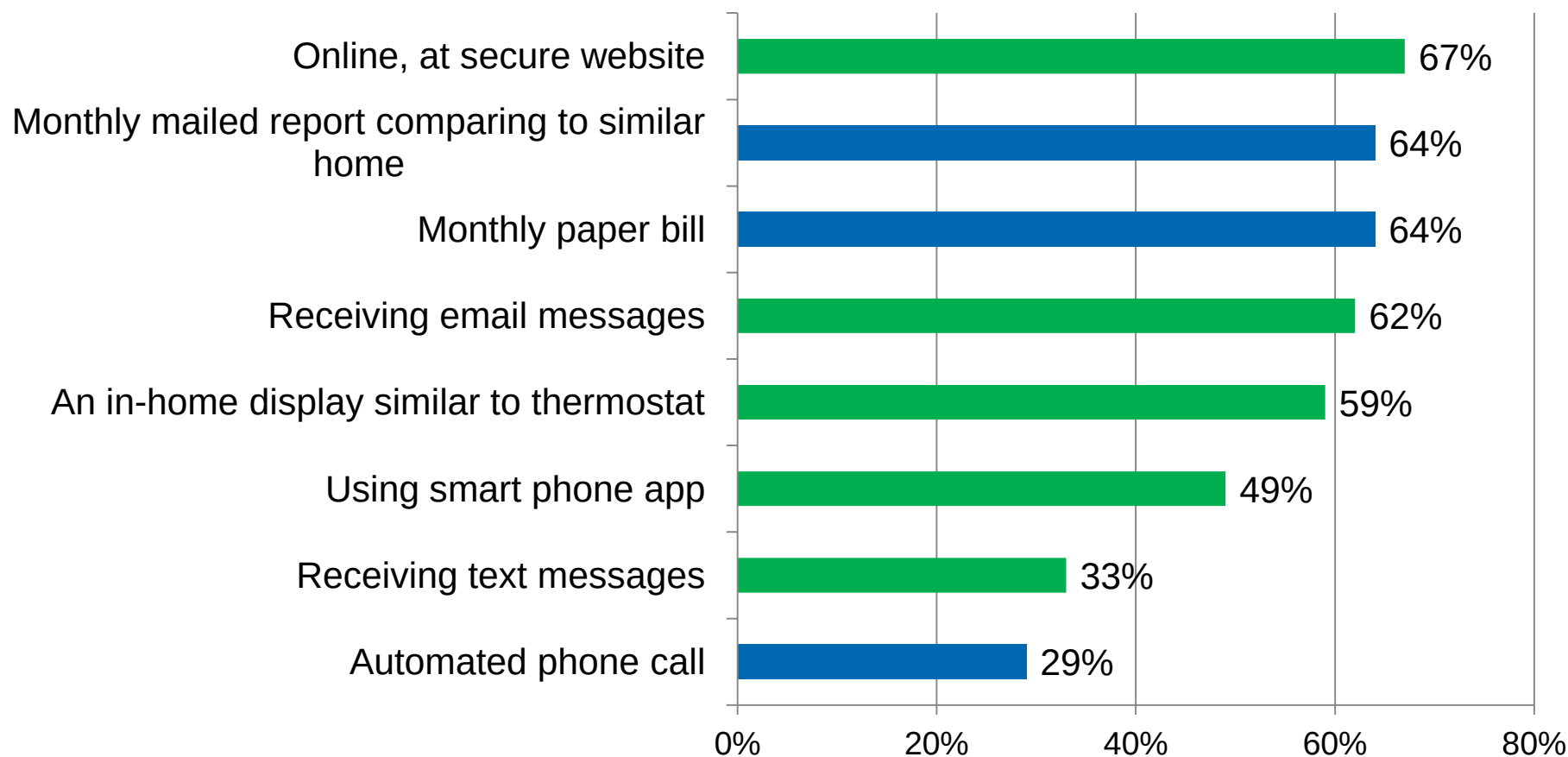
Customers are going online for transactions and information, but preferences vary

- While Millennials are more likely to use online access, significant proportions of Gen Y and Baby Boomers are using My Account
- Devices used may be different



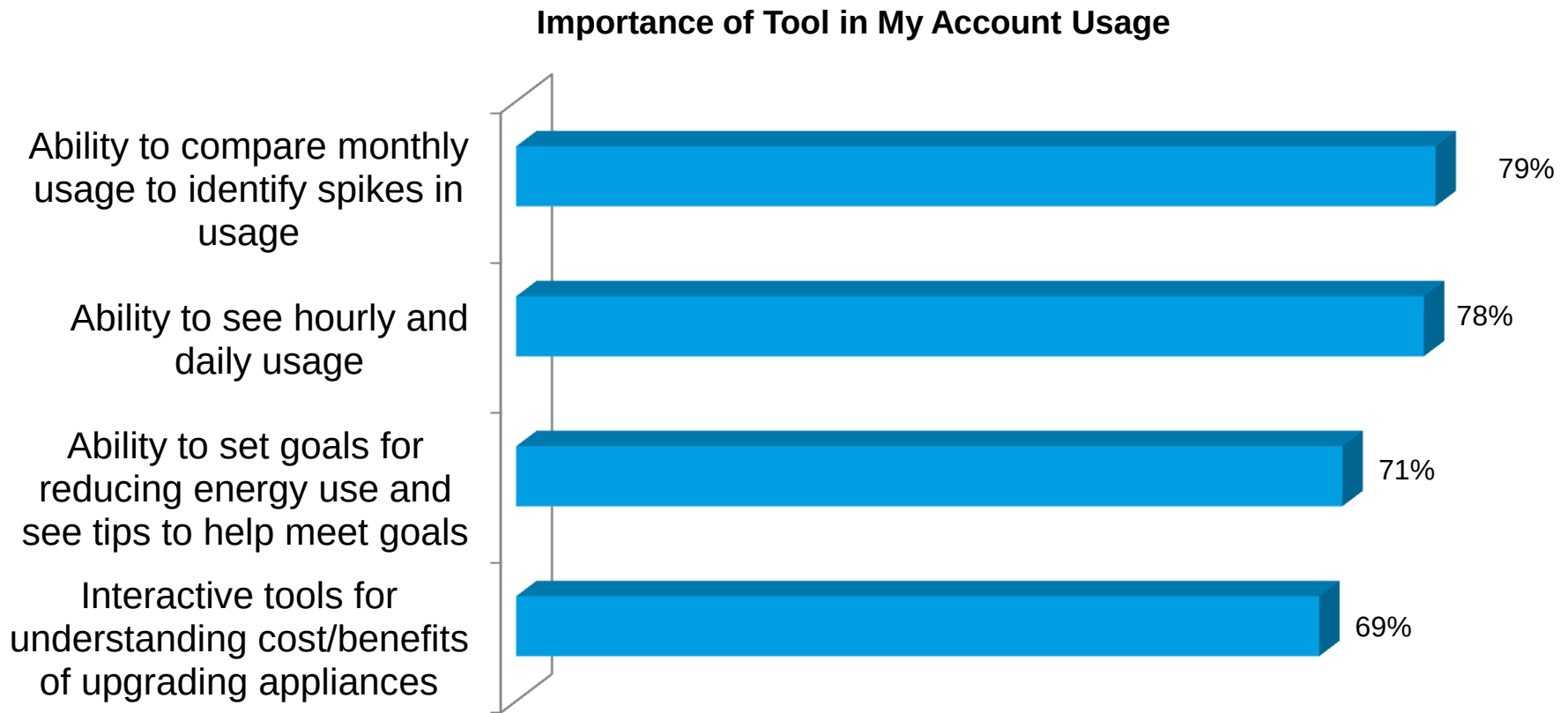
Preferences for Obtaining Energy Use Information

Customers are interested in viewing their energy use data (from the smart meter) in a wide variety of ways.



New Tools Add Value but Need to Increase Awareness

Customers do not necessarily want to view their energy use frequently, but for it to be available when they need it.



Scale of 0 to 10 where 0 means not at all important and 10 means extremely important.

Energy Information Channels

Energy Information Class in partnership with DC Library



TAKE CONTROL OF YOUR ENERGY USE.

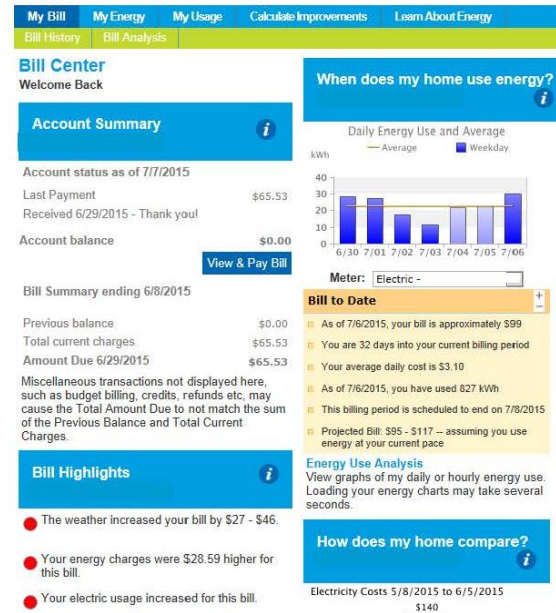
Introduction to Energy Management.

The DC Public Library and Pepco are working together this summer to present a new class to help you save money on your energy bill. In this class you'll:

- Get tips to help you save money and energy
- Design a custom energy management plan for your home
- Learn how to use tools on Pepco's My Account
- Receive a complimentary, reusable gift bag with tools to help you save



Website



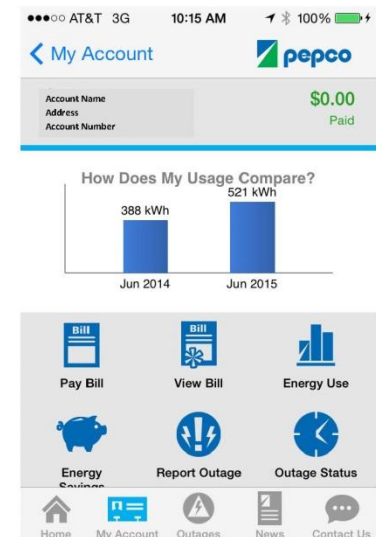
Paper Reports



Telephone:

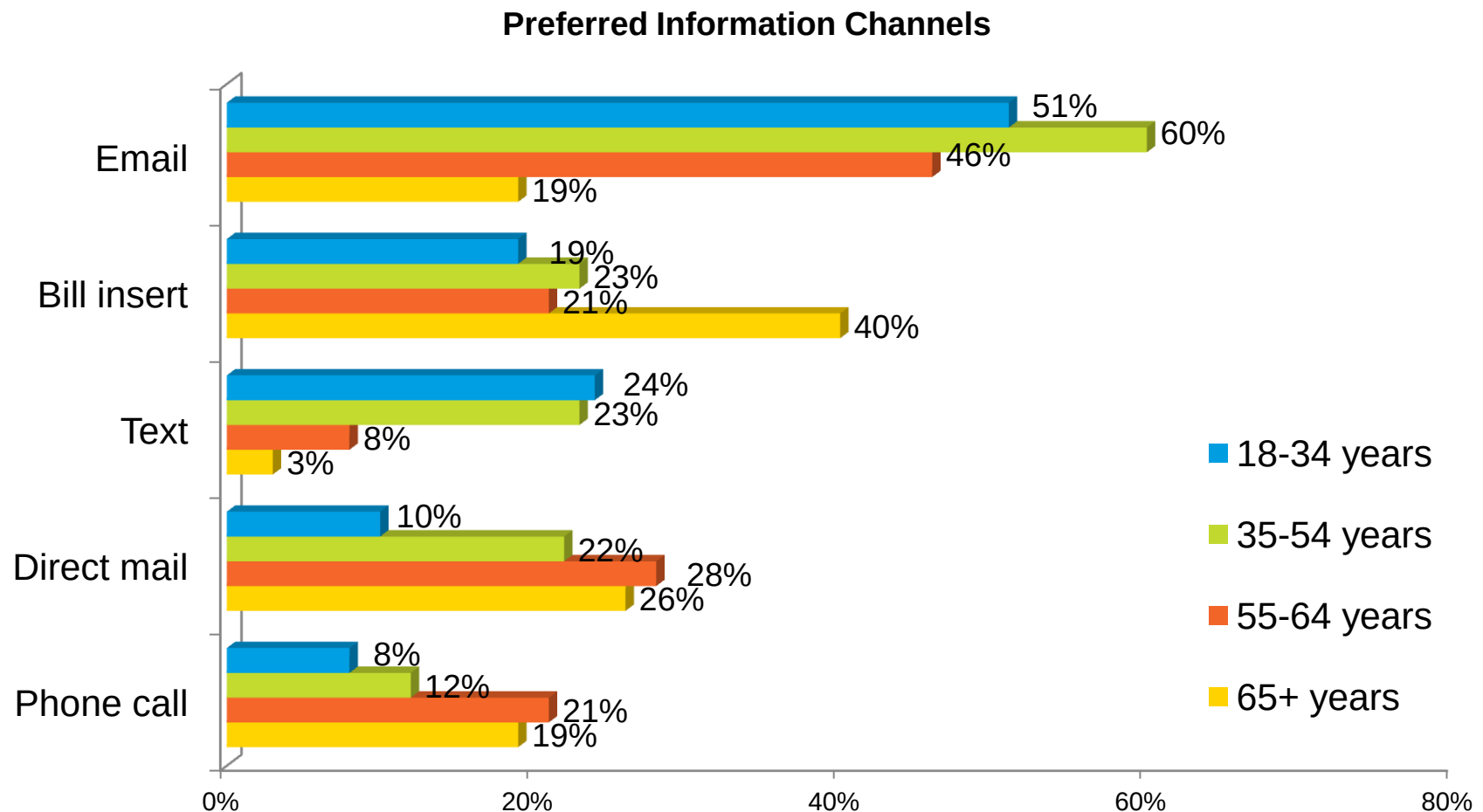
CSRs or Energy Advisors can go through daily/hourly usage with customers on the phone

Smartphone App



Preferred information channels also vary based on customer age and regionally.

- Customers who are 18-54 years of age prefer an email.
- Older customers prefer bill inserts or direct mail.



Uncovering What Customers Really Want

Based on our research:

- ✓ Both qualitative and quantitative research can be critical to understanding consumer tradeoffs and decision-making
 - Consumers sometimes see the equation as comfort vs. cost
 - Education continues to be important
- ✓ Customer interests and needs varies regionally
 - Terminology
 - Images
 - Channels
- ✓ All segments don't want to interact with you in the same way
 - For certain types of transactions, customers prefer the phone
- ✓ Expectations are changing, but need to focus on the goal - processes may be behind service expectations
 - Customer expectations for instant service with online applications may not be always be met, unless full process changes

Questions?

Contact information:

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Summer Committee Meetings

Bradley Berson, American Electric Power

Real Data About Customer Wants and Needs



NARUC Summer Committee Meetings New York City - July 13, 2015

**Bradley S. Berson, Principal Analyst
Performance Management & Financial Planning
Customer Services, Marketing and Distribution Services
American Electric Power**

What Most Impacts Satisfaction?

Key Drivers of Overall Satisfaction

- **Reliability/Restoration/Power Quality.**
- **Price**
- **Billing/Payment**
- **Communications**
- **Customer Service**
- **Corporate Identity/Citizenship**

Sources: Market Strategies International, 2014 AEP Survey Data

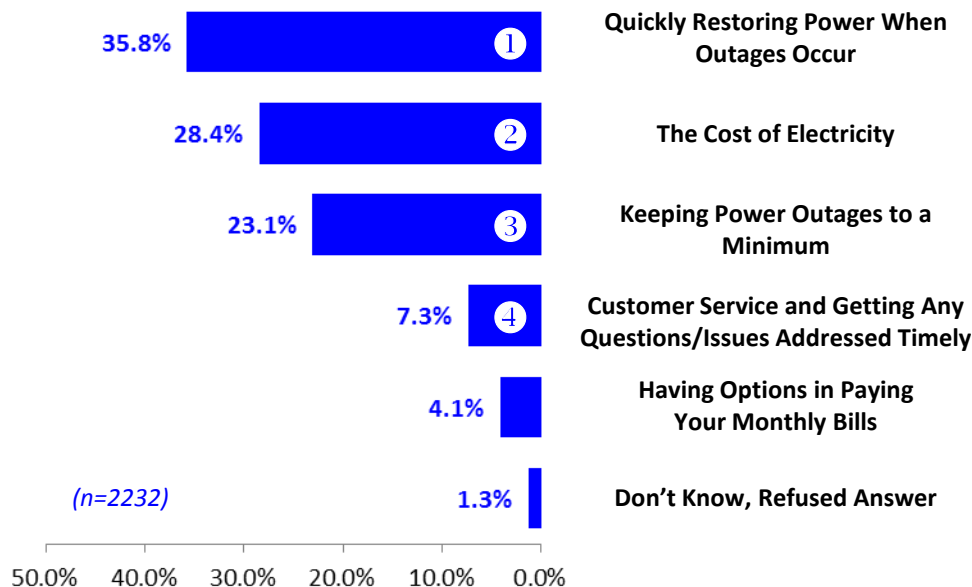
J.D. Power 2015 Electric Utility Residential Customer Satisfaction Study



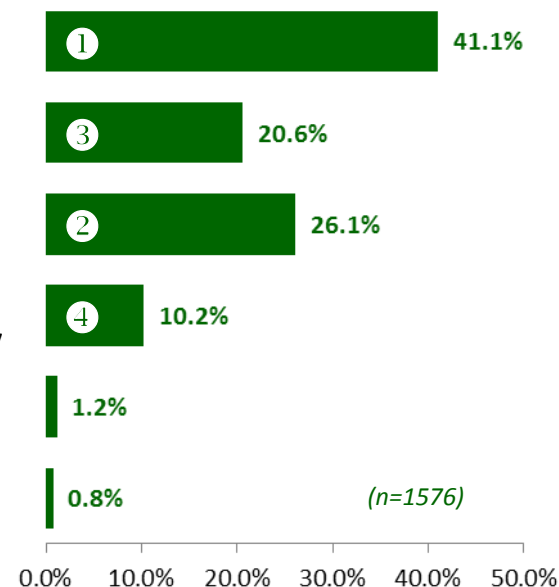
What is Most Important?

“Next, when thinking about the service you receive from AEP, please tell me which one of the following statements is the most important to you as a customer?”

Residential Customer Survey Data



Commercial Customer Survey Data



Source: Market Strategies International, 2014 AEP Survey Data



What Else Do Customers Want?

“What service or services does AEP not currently offer to customers that your (household/business) would like to see them offer in the next five years?” (OPEN ENDED)

2014 Residential Customer Survey Data (n=1770)			
Don't Know	32.1%	(33.8%)	
Refused Answer	1.7%		
Nothing/None	21.5%	(27.1%)	
Satisfied As Is	5.6%		
Lower Prices/Discounts	12.4%		
Improved Reliability/Maintenance	4.9%		
Other	3.8%		
Renewable/Clean Energy	3.7%		
Better Billing/Payment Options	3.1%		
Underground Power Lines	2.0%		
EE Programs/Usage Info	1.9%		
Internet/Cable/Phone	1.7%		
Improved Customer Service	1.6%		
Better Response Time	1.0%		
Offer Natural Gas	1.0%		
Smart Meters	0.6%		
Better Service	0.5%		
Portable Power Generators	0.4%		
Local Representatives/Offices	0.4%		
More Community Involvement	0.2%		

2014 Commercial Customer Survey Data (n=1038)			
Don't Know	26.0%	(29.5%)	
Refused Answer	3.5%		
Nothing/None	33.7%	(39.4%)	
Satisfied As Is	5.7%		
Lower Prices/Discounts	9.9%		
Improved Reliability/Maintenance	3.2%		
Better Billing/Payment Options	3.4%		
Other	3.0%		
Renewable/Clean Energy	2.6%		
Improved Customer Service	2.0%		
Local Representatives/Offices	1.7%		
EE Programs/Usage Info	1.5%		
Better Response Time	0.9%		
Internet/Cable/Phone	0.8%		
Smart Meters	0.6%		
More Community Involvement	0.6%		
Better Service	0.4%		
Portable Power Generators	0.4%		
Underground Power Lines	0.2%		
Offer Natural Gas	0.0%		

Source: Market Strategies International, 2014 AEP Survey Data

Preferred Communication Channels

“How would you most prefer that AEP communicate with your (household/business) when you have a question or an issue that needs to be addressed?” (OPEN ENDED)

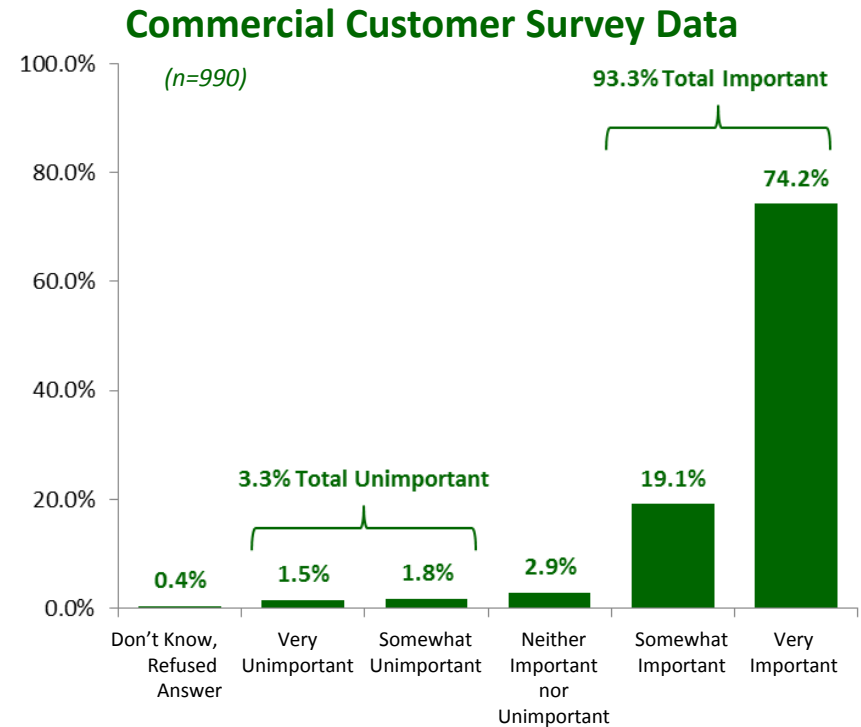
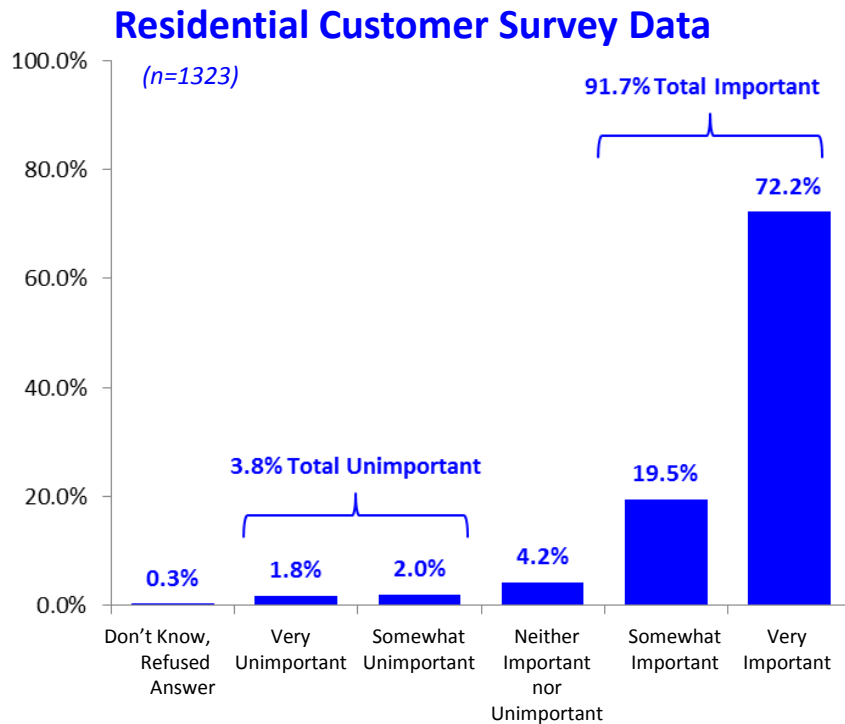
2014 Residential Customer Survey Data (n=2231)	
Phone Calls (AEP Cust. Service Rep)	66.6%
Email	10.5%
Regular Mail	9.5%
Phone Calls (Interactive Response)	3.1%
Phone Calls (Recorded Messages)	2.4%
Bill Inserts	2.2%
Don't Know, Refused Answer	2.2%
In Person	1.6%
Text Message	0.9%
AEP's Website	0.5%
Another Way	0.3%
Social Media Sites	0.2%
Smartphone App	0.1%
Prefer No Communications At All	0.1%

2014 Commercial Customer Survey Data (n=1576)	
Phone Calls (AEP Cust. Service Rep)	68.6%
Email	16.4%
Regular Mail	6.0%
Phone Calls (Interactive Response)	2.2%
In Person	1.7%
Don't Know, Refused Answer	1.5%
Phone Calls (Recorded Messages)	1.3%
Bill Inserts	0.9%
Another Way	0.4%
Text Message	0.3%
AEP's Website	0.3%
Social Media Sites	0.3%
Smartphone App	0.1%
Prefer No Communications At All	0.1%

Source: Market Strategies International, 2014 AEP Survey Data

Importance of Outage Communications

“How important is it for you to receive information from AEP such as informing you of approaching storms, communicating with you during power outages about the cause and expected length of the outage, and letting you know when power has been restored? Would you say it is...”

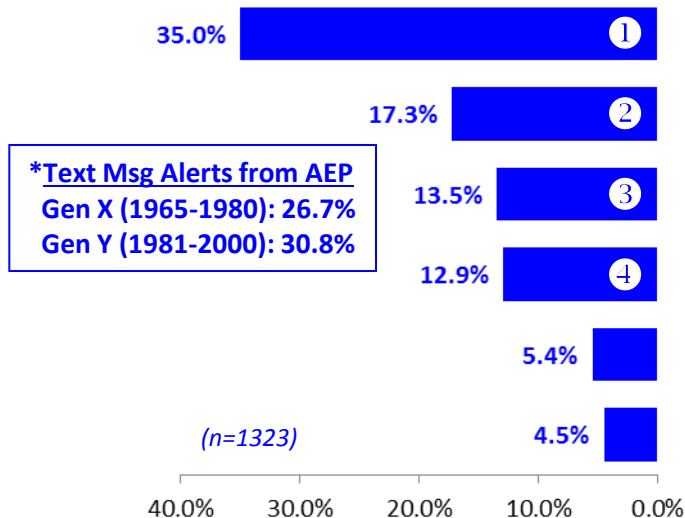


Source: Market Strategies International, 2014 AEP Survey Data

Preferred Outage Communication Channels

“What would be your (household/business)'s preferred method for receiving those types of weather and outage-related communications from AEP?” (OPEN ENDED)

Residential Customer Survey Data



Top Six Mentions

Live Phone Calls with an AEP Representative

Automated Phone Calls from AEP

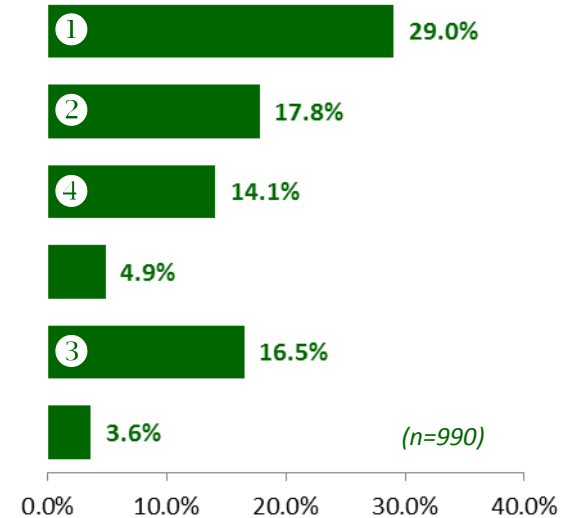
Text Message Alerts from AEP*

TV News

Email from AEP

Radio News

Commercial Customer Survey Data



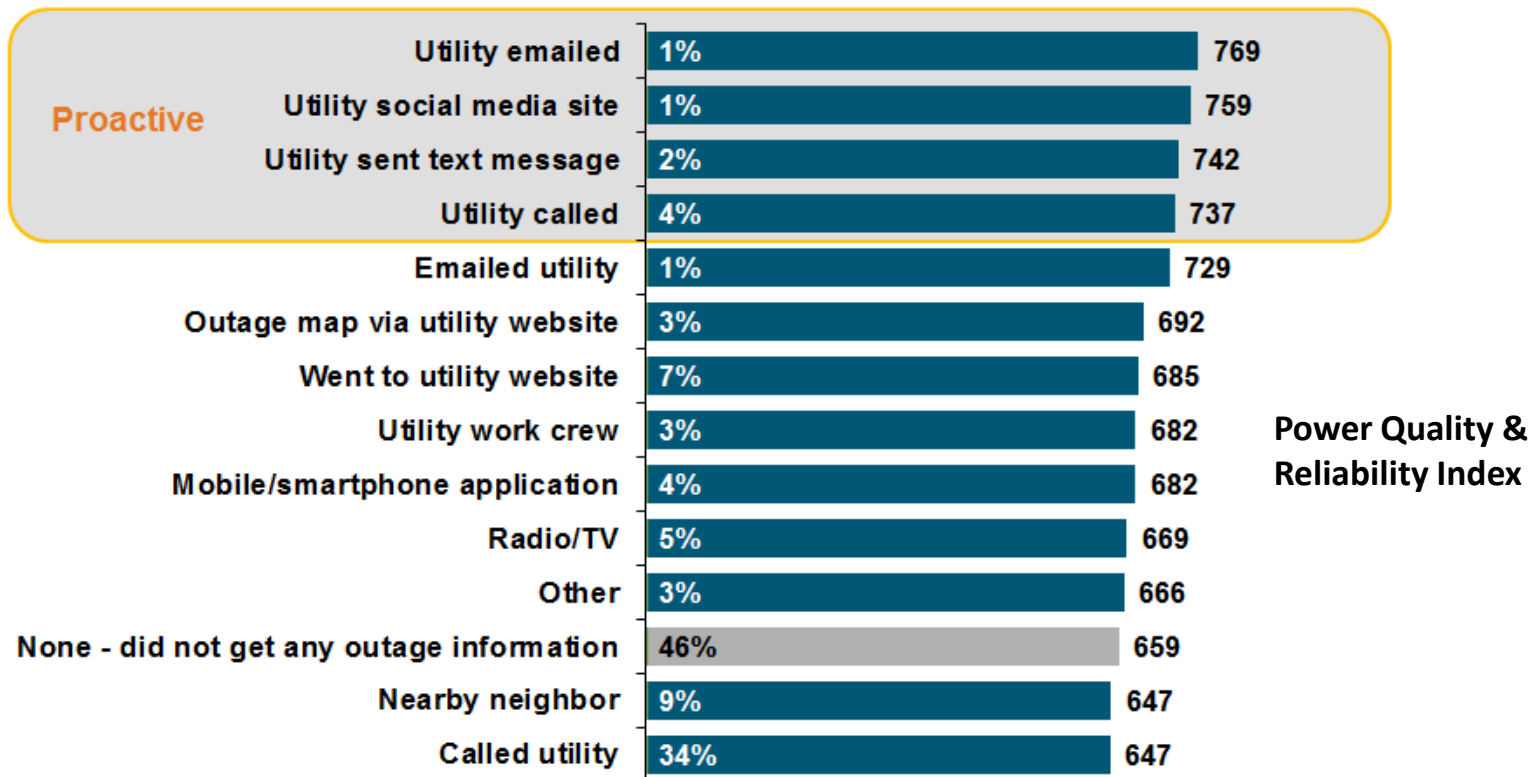
Other Mentions: AEP's Website (Personal or Tablet Computer), Social Media, Mail, Other, None, Don't Know

Source: Market Strategies International, 2014 AEP Survey Data



Impact of Outage Communication Channels

“Now we would like you to think specifically about the most recent outage you experienced. Which sources did you rely on to get information about your most recent outage?”



J.D. Power | Electric Residential Study | © 2014 J.D. Power and Associates, McGraw Hill Financial. All Rights Reserved. CONFIDENTIAL AND PROPRIETARY—For Internal Use Only



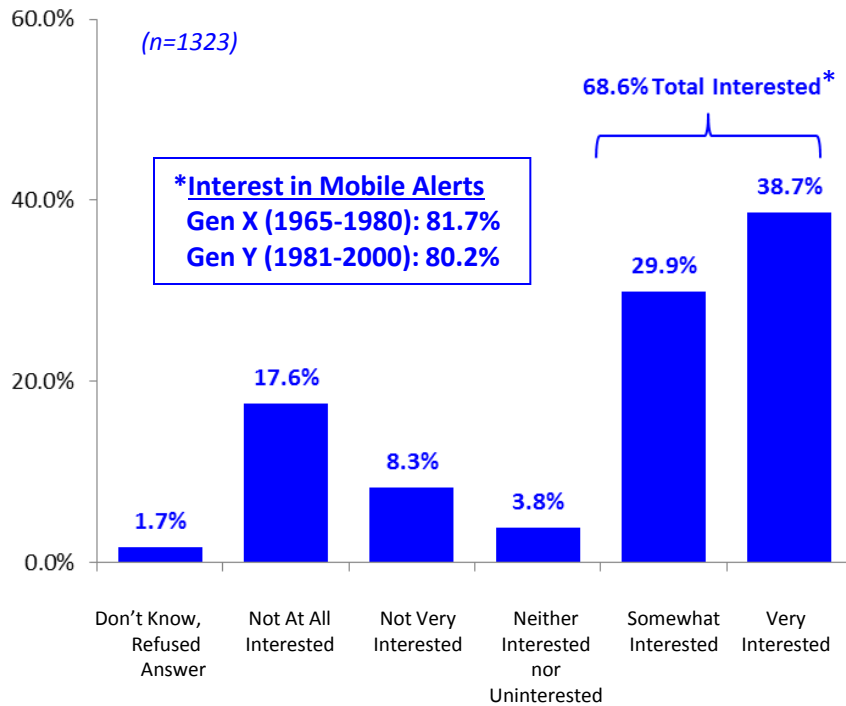
Source: J.D. Power 2014 Electric Utility Residential Customer Satisfaction Study



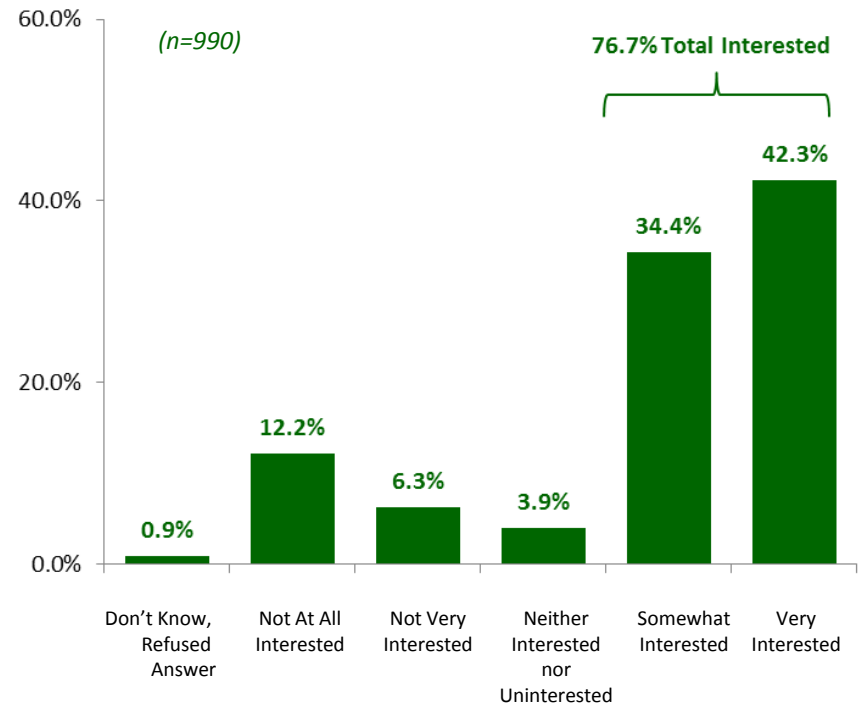
Interest in Outage Alerts

“If AEP was to offer customers mobile alerts, how interested would you be to sign up to receive these types of messages? Would you say you would be...?”

Residential Customer Survey Data



Commercial Customer Survey Data



Source: Market Strategies International, 2014 AEP Survey Data

Future Customer Expectations

Customer Wants:

- **Consistency**
- **Convenience**
- **Personalization**
- **Collaboration**
- **Flexibility/Agility**

Utility Offerings Should Have:

- **Benefit/Value to the Consumer**
- **Customer Control**
- **Timely Data Availability**
- **Proactive Communications**
- **Upping the Value Proposition**
- **Benefit/Value to the Utility**

Actionable Insights for the New Energy Consumer: Accenture End-Consumer Observatory 2012
www.accenture.com/sitecollectiondocuments/pdf/accenture-actionable-insights-new-energy-consumer.pdf

“Some people say “Give the customers what they want.” But that’s not my approach. Our job is to figure out what they’re going to want before they do. I think Henry Ford once said “If I’d asked customers what they wanted, they would have said ‘A faster horse!’” People don’t know what they want until you show it to them.”

Steve Jobs, Apple



Thank You!

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NARUC

Summer Committee Meetings

Committee On Electricity