

## Distributed Energy Resources

October 6, 2017

# Housekeeping

## Welcome

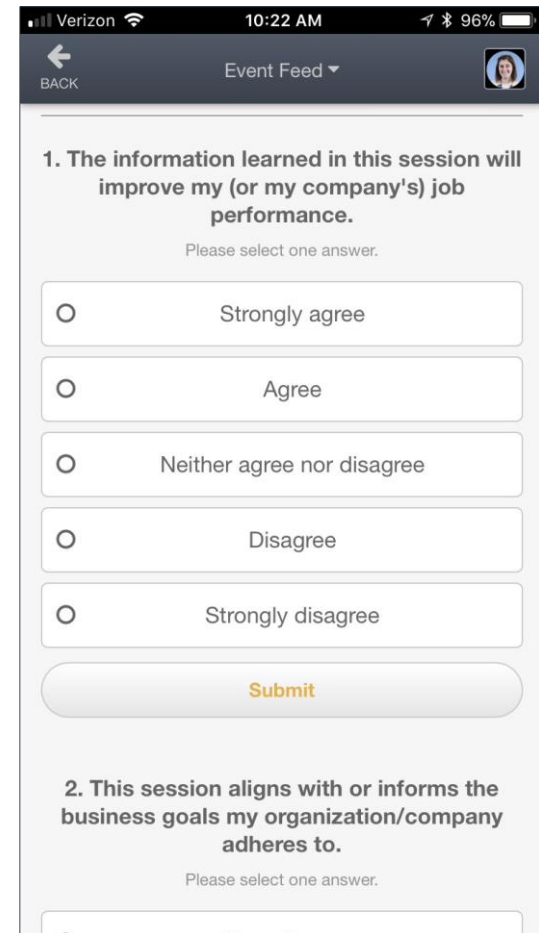
- Safety
- Bathrooms
- Cell phones



# Session Survey Instructions

At the end of each session, you will be given 5 minutes to complete the session survey.

1. Open the “HEF2017” app
2. Navigate to “Agenda” and select the session
3. Scroll down to “Session Feedback”
4. For each question, select answer and hit “Submit”
5. Show completed survey to BetterBuiltNW rep to earn points
6. Prizes awarded Friday to the top point earners
  - See “Challenge” section in the app for activities
7. Assistance available at the BetterBuiltNW table



The screenshot shows a mobile app interface for a survey. At the top, the status bar displays "Verizon", "10:22 AM", and "96%". The app header includes a "BACK" button, "Event Feed", and a user profile icon. The main content area displays a survey question: "1. The information learned in this session will improve my (or my company's) job performance." Below the question, it says "Please select one answer." and provides five radio button options: "Strongly agree", "Agree", "Neither agree nor disagree", "Disagree", and "Strongly disagree". A "Submit" button is located below the options. The second question is partially visible at the bottom: "2. This session aligns with or informs the business goals my organization/company adheres to." with the instruction "Please select one answer."

# Agenda and a word...

- DERs and Duck Curves
- Hot in Market Demand
- Hot in Utility needs
- How WE fit in
- Building Value Propositions



# Popular



# Reality





# Why are we here today?

When can we cost-effectively impact homes?

- *New Construction*
- *Major Remodels*
- *Incentivized interventions*
- *Motivated stakeholders*

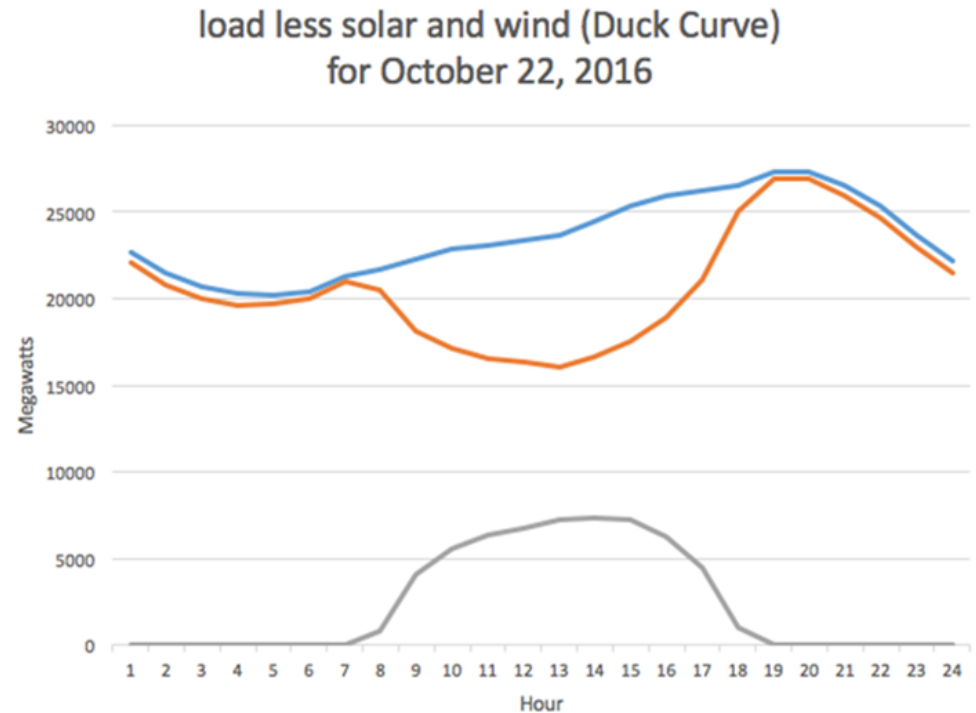


# Outlook



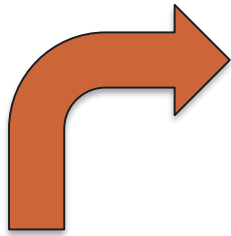
# What is the duck curve anyway?

- No solar, loads grow throughout day
- Solar production peaks around mid-day
- Impact is a “duck” shaped curve
- Impact to utility generation?





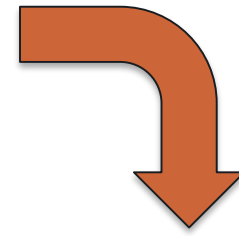
# Demand Response



Plane seats 85 people



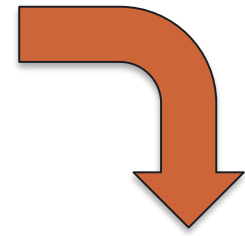
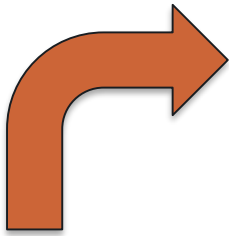
100 people want to fly to Hawaii



Airline pays 15 people to take later flight

Credit: Peak Load Management Alliance

# Demand Response



The grid has 85 MW



The people need 100 MW of power



Utility pays people to use 15 less MW or use it at different times

Credit: Peak Load Management Alliance

# Then what are DERs?

- Distributed generation
- Distributed storage
- Time of use efficiency
- Two way metering
- Interactive platforms



A photograph of two construction workers on a building site. The worker on the left is wearing a white hard hat and a light blue shirt, pointing towards the wooden framing of a building. The worker on the right is wearing a blue shirt and jeans, with a tool belt. The background shows the wooden skeleton of a building under construction against a clear blue sky. A dark grey rectangular box with the text 'Market Influences' is overlaid on the center of the image. To the left of this box is a solid orange square.

# Market Influences



# Technology implementation

- Field perspective on implementation of relevant technologies
- How this tech relates to wider DER marketplace
- Renewable generation (solar)
- Smart controls



# Residential Solar

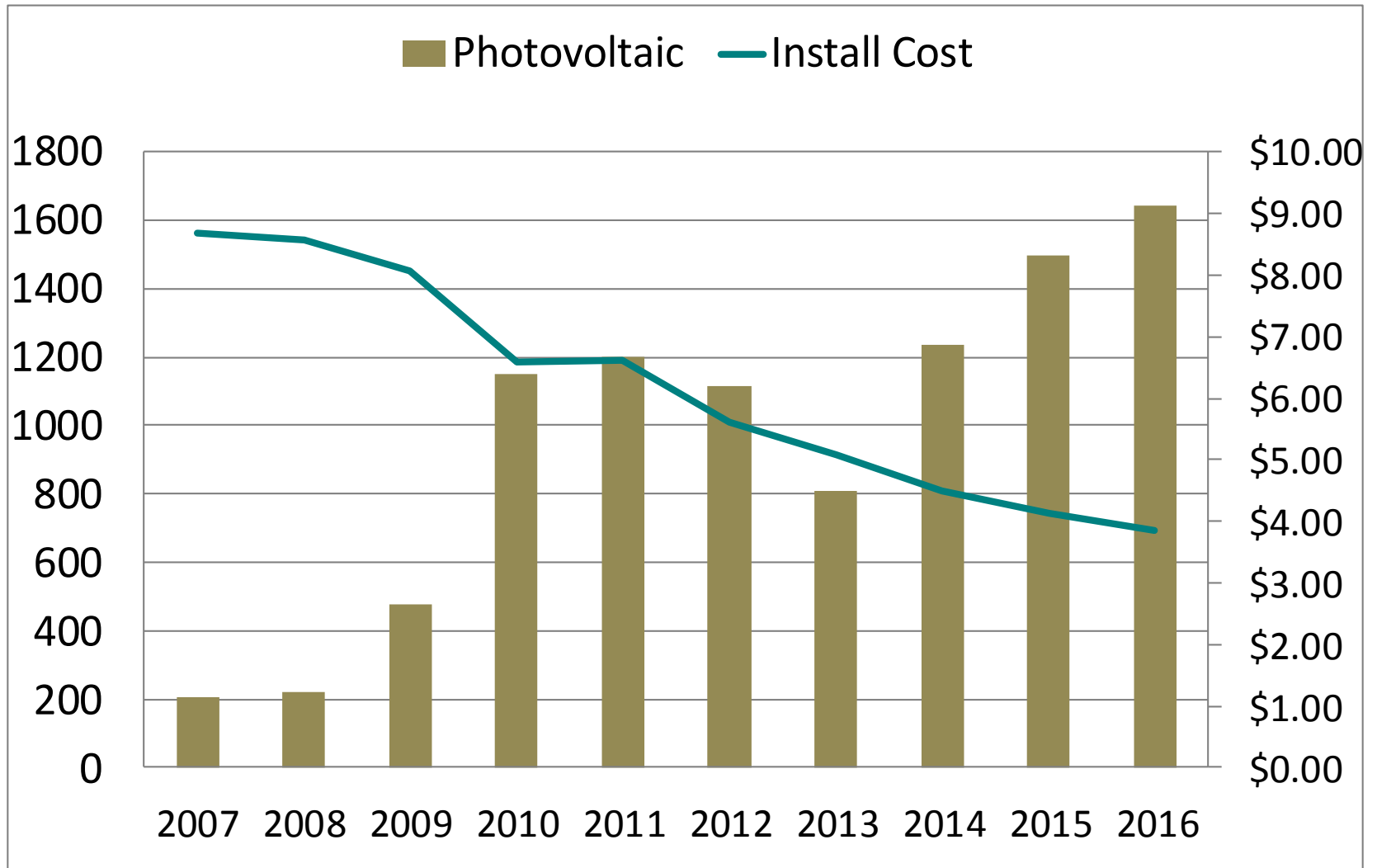


# Solar in the residential marketplace

- Growth as costs continue to decline
- Wide appeal
- Variety of ownership models, accessible
- New technologies driving increased outputs, monitoring and analytics



# Residential solar installations

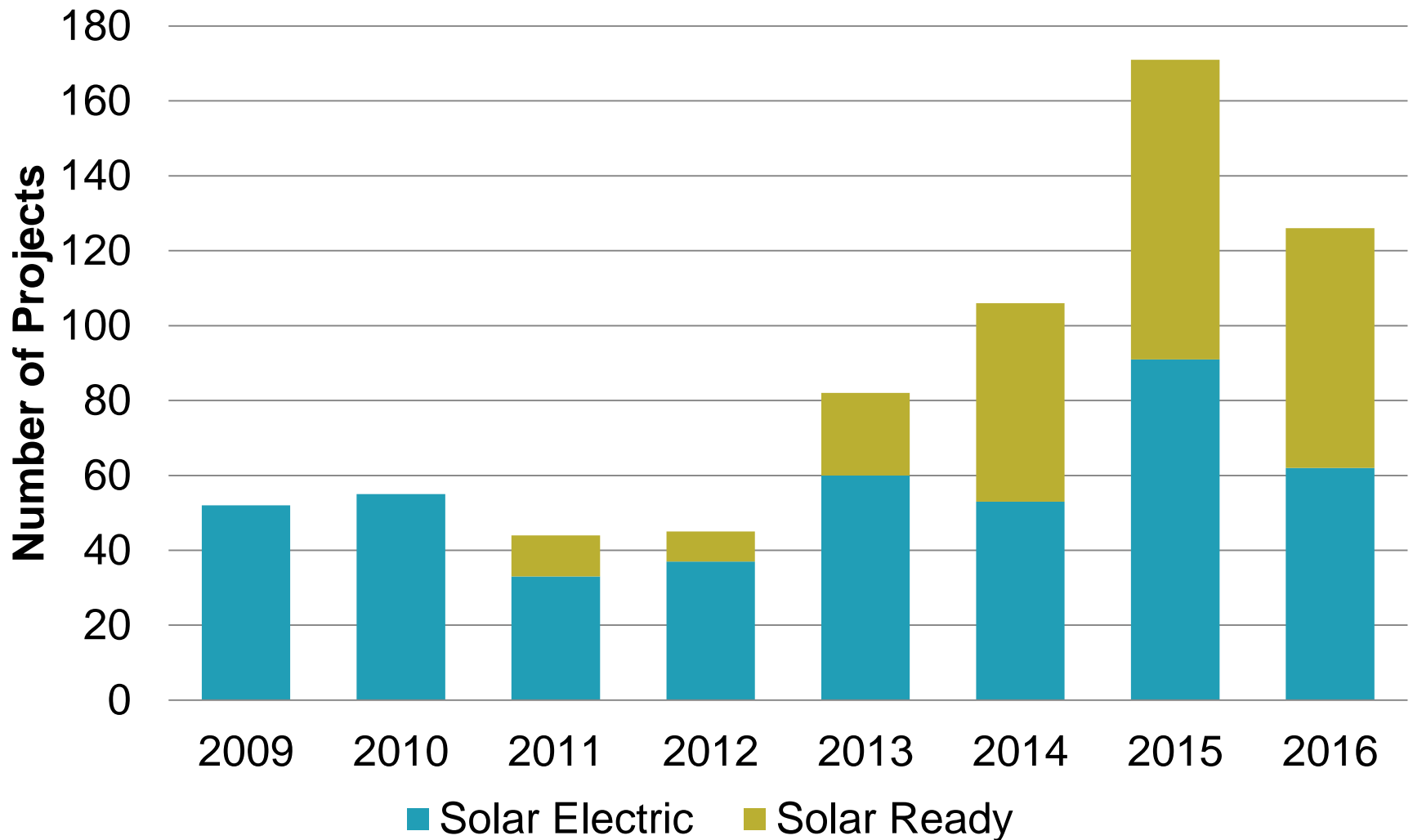


# Solar and new construction

- Solar as a viable building product
- Consumer interest vs. builder interest
- Solar as a *standard* or as a *standard option*
- Designing for solar



# New home solar installations



# Challenges/Opportunities

- Integration into production model
- Builder/installer relationships
- The local marketplace post-RETC (OR Res. Energy Tax Credit)
- Regulatory/policy concerns
- Real estate valuation



# Challenges/Opportunities

- Exploring paired storage and advanced battery systems
- Simultaneous installation with smart thermostats
- Solar as part of community design





# Smart Controls

# Residential smart thermostats

- Popular and available *everywhere*
- Consumer-facing incentives
- 1-2.5% Increased whole home efficiency
  - Incentives vs. incremental costs
- Missed opportunities for builders



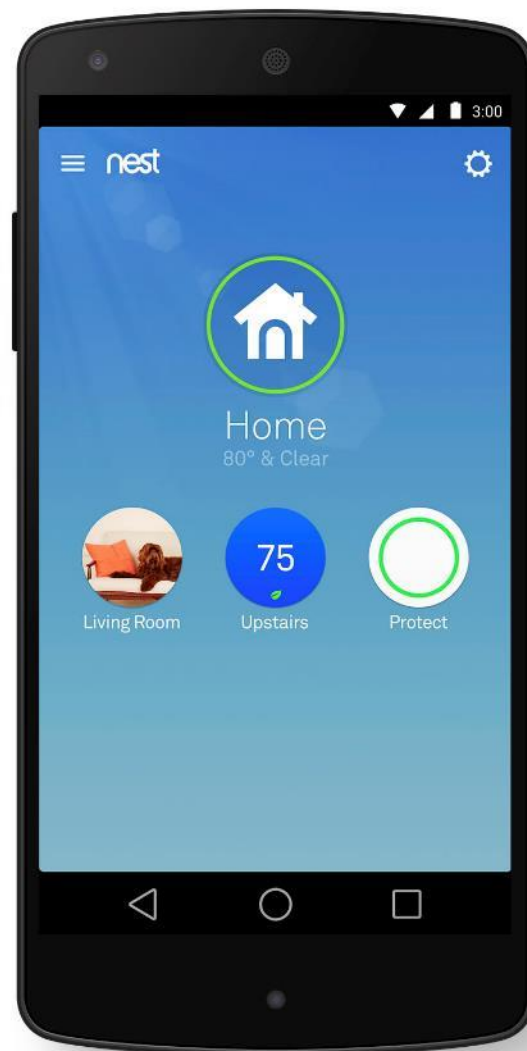
# Smart t-stats as a distributed resource

- Smart thermostat aren't just smart, they're *connected*
- Smart T-stats as a platform for demand response and optimization
  - Utility programs for customers
  - Utility ↔ customer interactivity



# Smart thermostats are a first step

- DR utility offerings may be customizable
- Smart home 'ecosystem'
- Smart homes can be marketed
- Smart homes are a part of smart communities

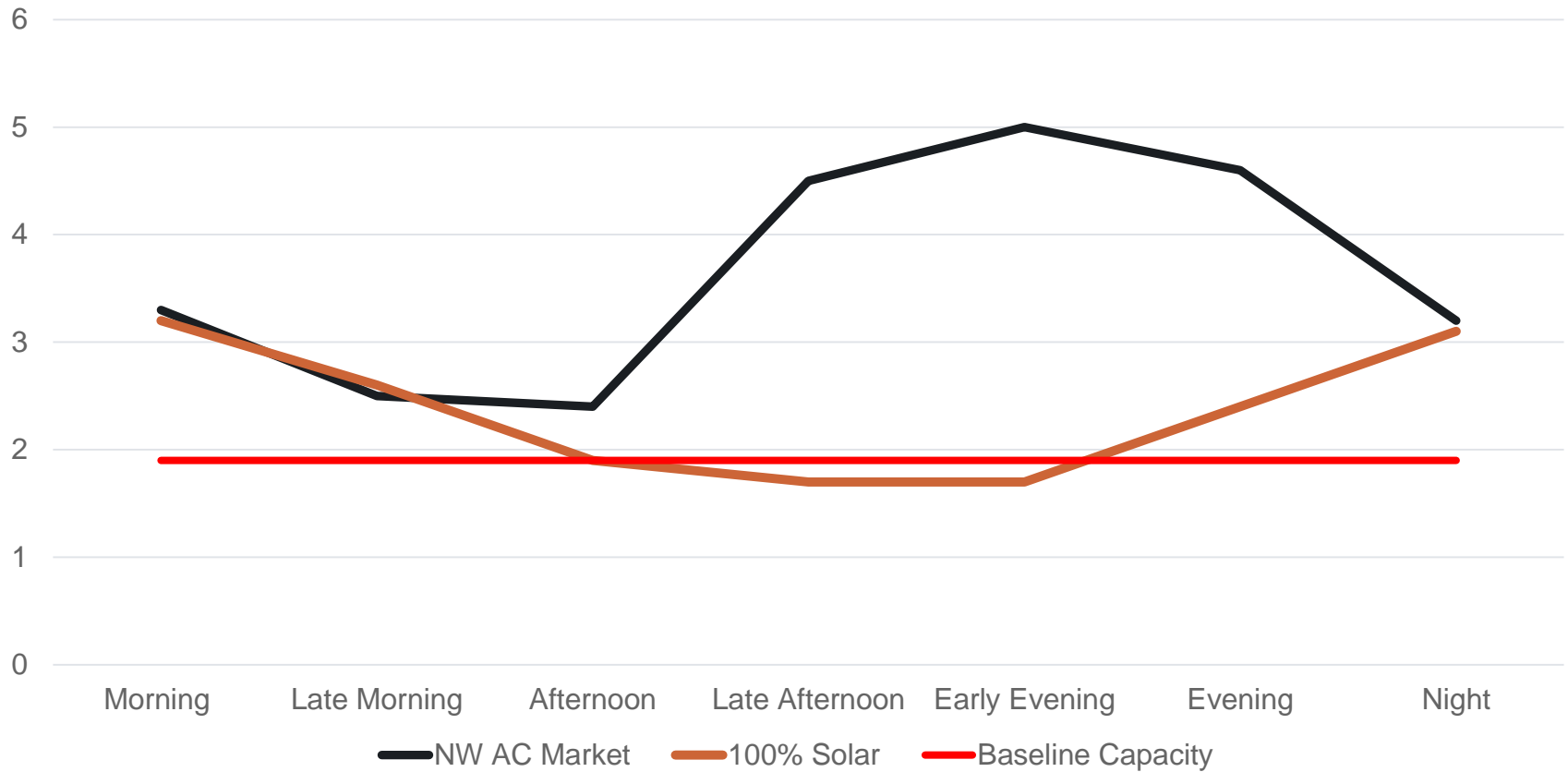




# Utility Needs

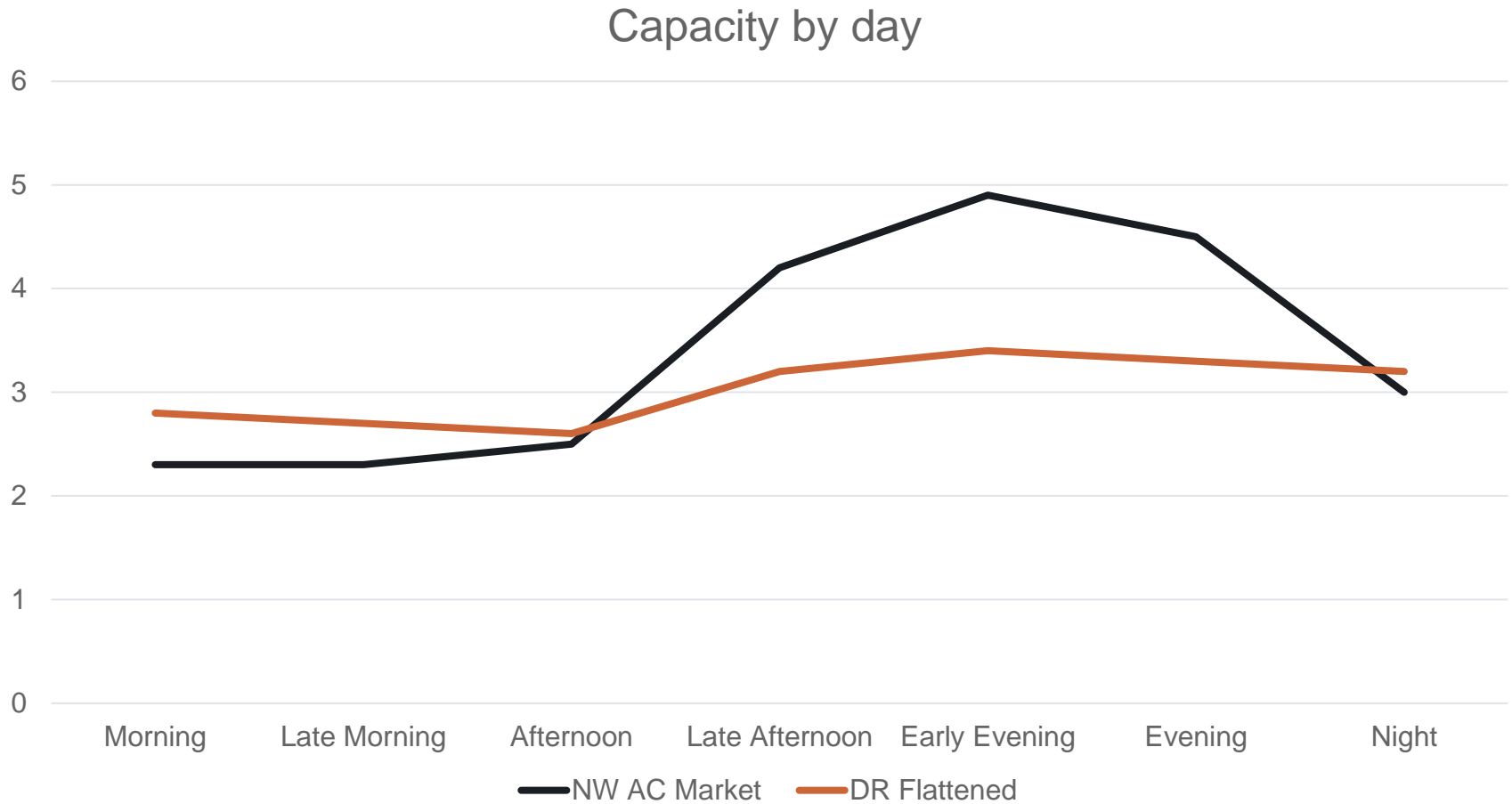
# Capacity with and without Solar

Capacity by day

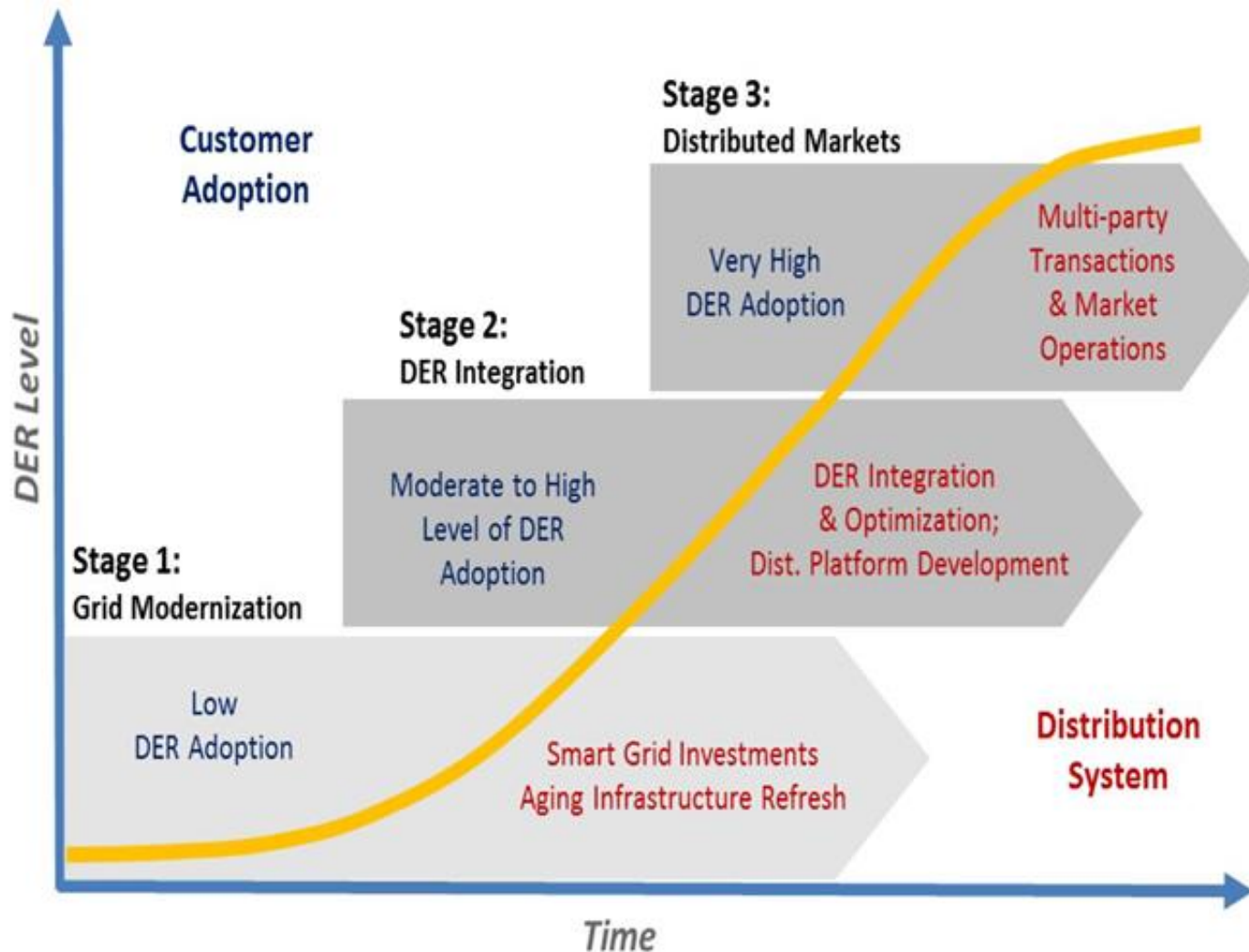




# Capacity with and without DR



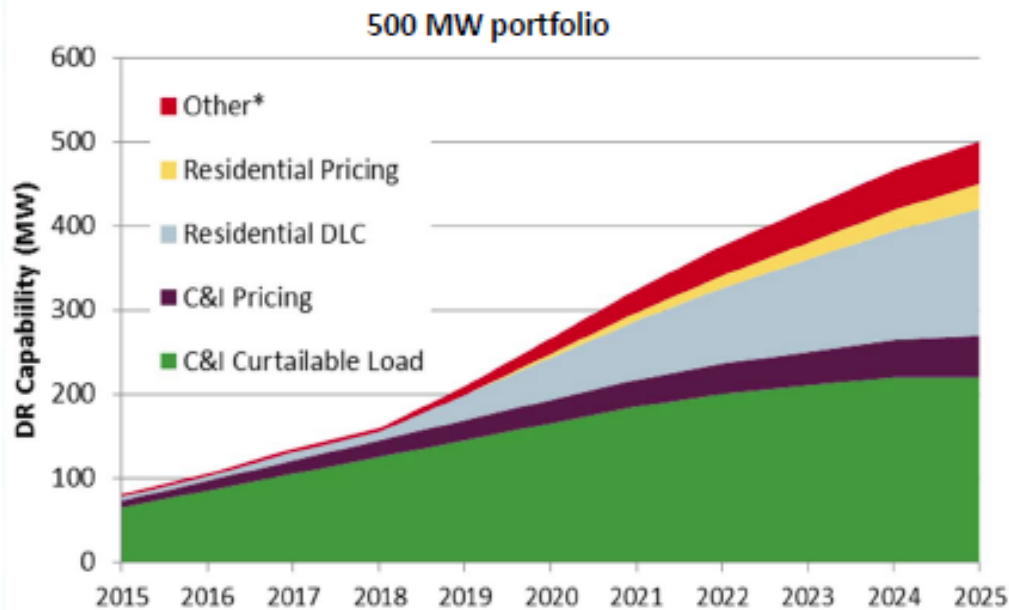
# How DERs play a role over time



Credit: Peak Load Management Alliance

# Is Residential the likely answer?

## DR Growth Trajectory of the Portfolio



\* Examples of "Other DR" programs include electric vehicles, industry-specific (e.g., agriculture) and generator programs, etc.

- Existing programs continue to grow, or phase out
- Some programs may reach maturity/saturation quickly
- Pricing may be contingent on AMI

Source: Confidential Utility DR Strategy Team

Credit: Peak Load Management Alliance

# Translating to DR solutions

## Duke Energy Florida's EnergyWise Home Program

- **418,000 participating customers** and 550,000 Direct Load Control switches installed
- **653 MW load management**
- Controlling water heaters more than **140 times per year**, on average



Credit: Peak Load Management Alliance

# Translating to DR solutions

## Pacific Gas and Electric Company's Smart AC Program

- *150,000 customers* with one-way paging load control devices that provide peak period **load reduction of ~ 80-100 MW**
- Lead a consortium of utility reps and vendors to reconfigure using Smart Grid-based, two-way load control switches



Credit: Peak Load Management Alliance

# Translating to DR solutions

## National Grid

- Combined technologies and strategies to achieve DR through *dynamic prices*, *direct load control*, and *behavioral energy efficiency*
- Provides customers with *smart thermostats*, *load control devices*, *web apps*, and *in-home displays* to deliver real-time energy use and compelling messages



Credit: Peak Load Management Alliance

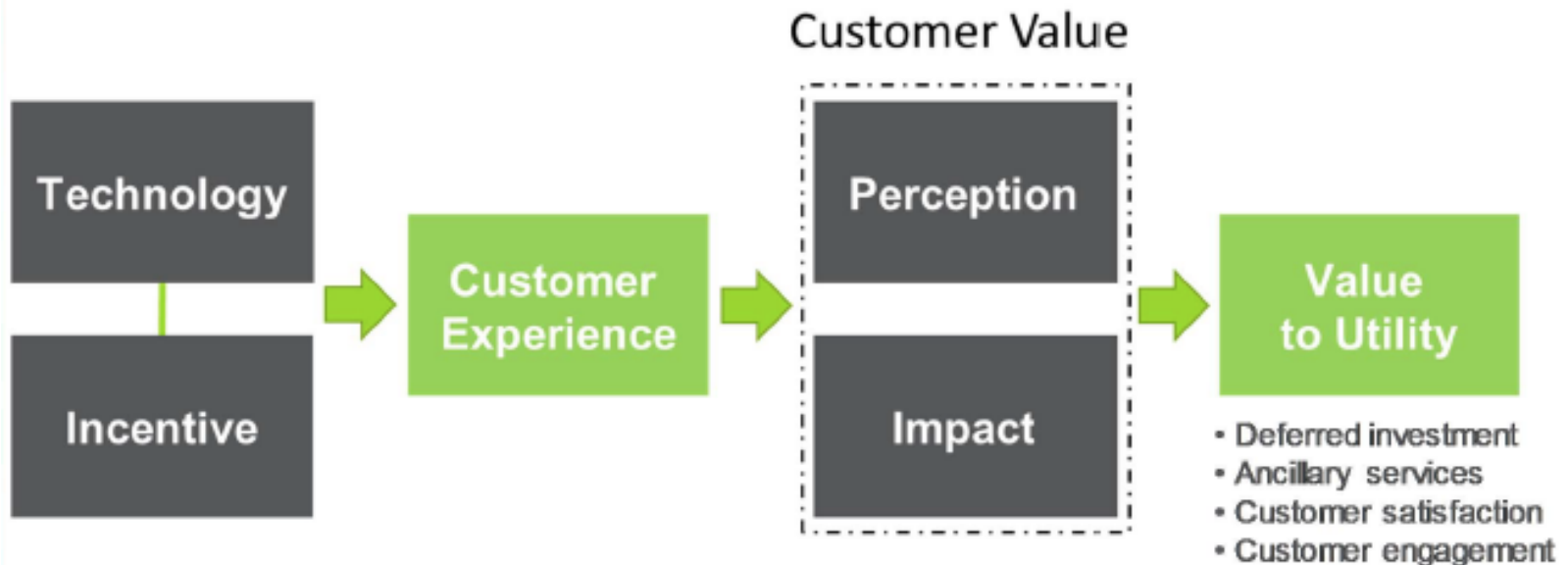




# **Builders, Raters, and Key Stakeholders**

# Value Propositions

## Customer Experience Drives Utility Value



Source: Navigant

# Value Proposition #1

Low-carb, gluten-free, less-hassle, earth friendly power usage

- Partnering DERs in construction can lead to less reliance on fossil fuel powered peaker generators
- Partners well with Energy Efficiency efforts



# Value Proposition #2

## Self reliance and less dependence on the grid

- Building homes with storage, generation, and complete controls speaks to desire for more control
- App controls for devices, lighting, and appliances control regardless of where you are



# Value Proposition #3

## Grid and National Energy Security

- Reduce dependence on foreign fuel sources
- Stabilize the reliability of the grid
- The military is pioneering advancements in micro-grids!





# What do we propose as a response?

Smart Homes are a no brainer

- Low cost of entry
- High customer interest
- Possibility for energy efficiency and demand response





# Pre-wire, plumb, frame, and ready homes for Solar



<https://www.silkroadenvironmental.com/products>

# Consider your water heaters

Tanks are nice thermal batteries

HPWHs are cutting edge and provide savings

Newest units come with smart controllers and apps

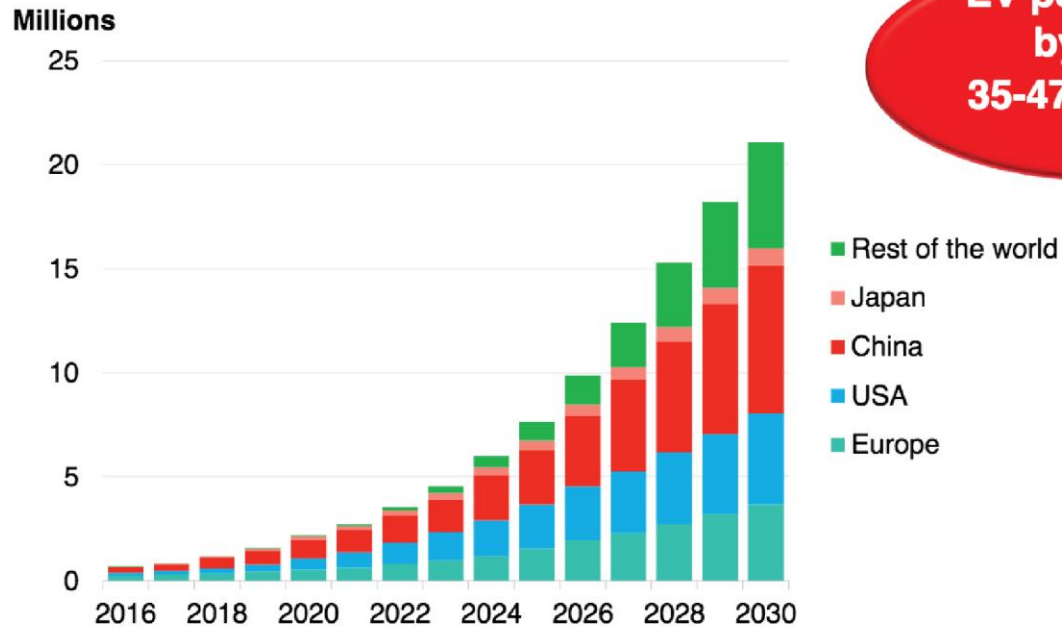


[http://www.rheem.com/products/water\\_heating/tank/hybrid/](http://www.rheem.com/products/water_heating/tank/hybrid/)

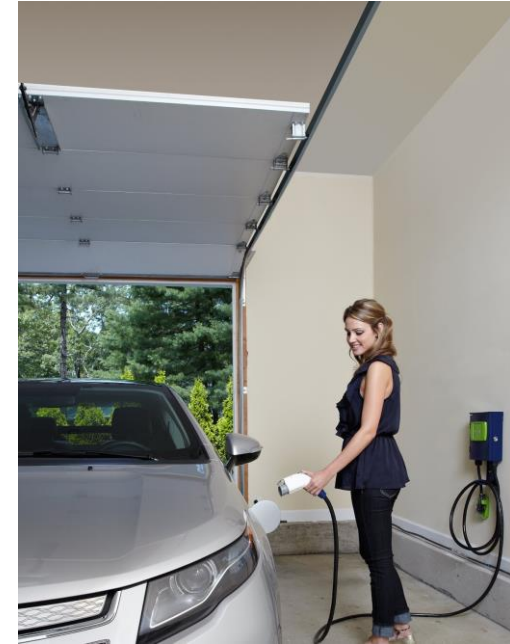
# Install or wire for charging stations

## The Rise of Electric Cars

BNEF sees more than 20 million sales by 2030



EV penetration  
by 2040  
35-47% of new  
cars



# Our questions for YOU!

- What are you seeing in the New Con market around DERs?
- What barriers are you seeing on technology adoption?
- What are you seeing/hearing with Utilities?
- What technologies or equipment has you excited?
- What value propositions do you see?



# Thank You

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