Why?

Why do you do Energy Efficiency?

Let’s think about this as we discuss
Agenda and a word…

• DERs and Duck Curves
• Hot in Market Demand
• Hot in Utility needs
• How WE fit in
• Building Value Propositions
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?
100 people want to fly to Hawaii

Plane seats 85 people

Airline pays 15 people to take later flight

Credit: Peak Load Management Alliance
Demand Response

The people need 100 MW of power

The grid has 85 MW

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
- Demand Response
Market Influences
Technology implementation

• Field perspective on implementation of relevant technologies
• How this tech relates to wider DER marketplace

Let’s look at two technologies with this lense
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 in Existing Homes

![Graph showing the trend of photovoltaic install cost from 2007 to 2016. The install cost decreases over the years.](image-url)
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

Number of Projects

- Solar Electric
- Solar Ready

Year:
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
Challenges/Opportunities

• Integration into production model
• Builder/installer relationships
• The local marketplace Tax Credits
• 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 Home Technologies
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

- NW AC Market
- 100% Solar
- Baseline Capacity
Capacity with and without DR

Capacity by day

NW AC Market

DR Flattened
How DERs play a role over time

Credit: Peak Load Management Alliance
Is Residential the likely answer?

DR Growth Trajectory of the Portfolio

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

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

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 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

More control and reduced reliance on “the grid/the man”

- 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/
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

Source: Bloomberg New Energy Finance
Bringing it back together...

• The reasons why align with reasons for EE

• Engage local utilities and programs

• Find the value propositions for your buyers

• Adopt future grid considerations into core business model
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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Find us on LinkedIn!