



# CALFLEXHUB 2026 Symposium

APRIL 15, 2026 | 8 a.m. – 6 p.m. | Hybrid – Berkeley, CA & Online

## Research Spotlight: Mapping the Load Flexibility Landscape



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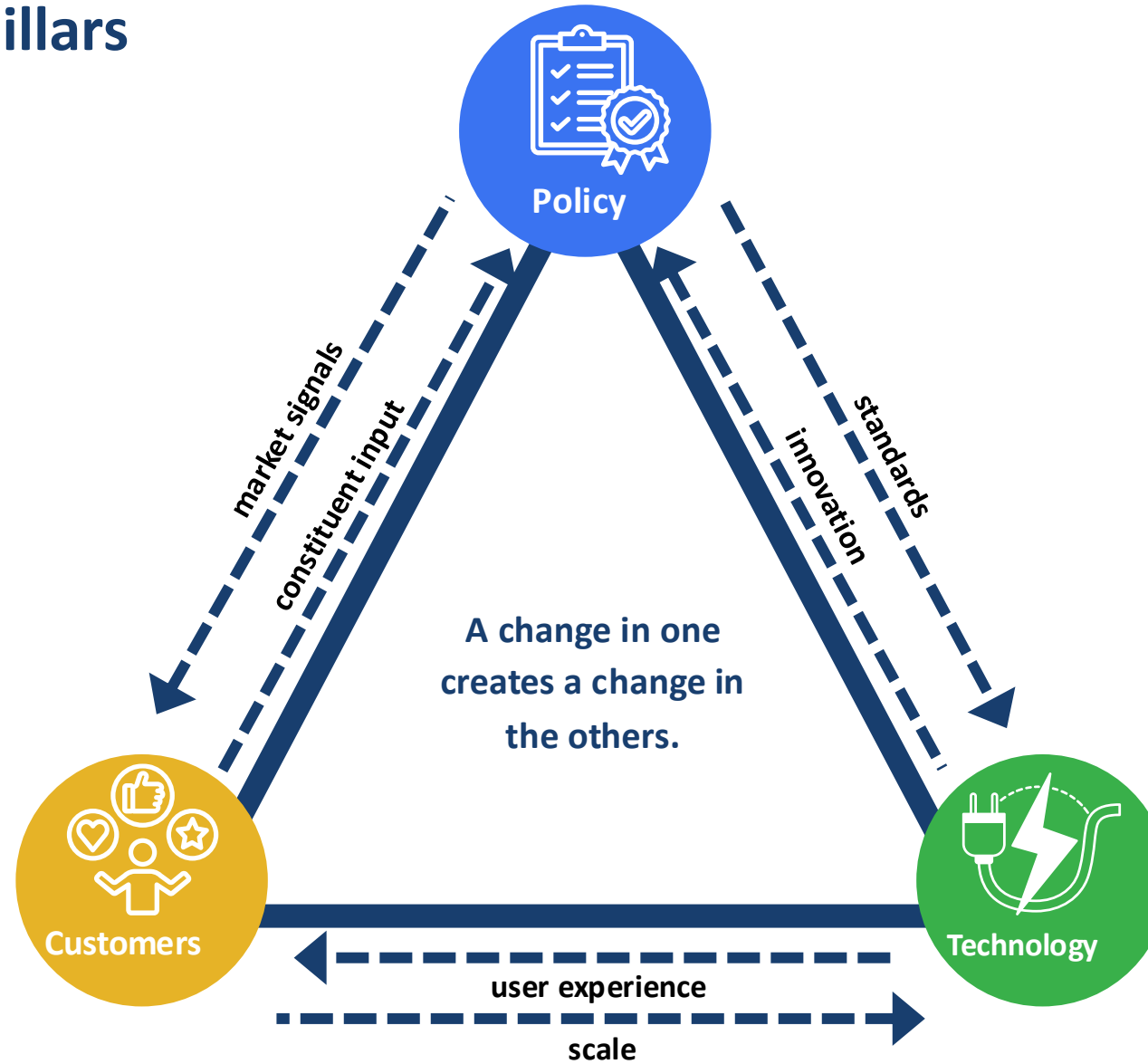
# Mapping the Load Flexibility Landscape: Market Signal & Stakeholder Insights

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April 15, 2026 | 9:45am-10:00am

# Load flexibility pillars



# Overview of stakeholder, user and market research

## Stakeholder Interviews



**95**  
interviews

- Technology providers
- Energy service providers (IOUs, CCAs, etc.)
- Large commercial customers
- Energy/Enviro interest groups

## User Assessments



**73** surveys &  
interviews  
across  
**10** field tests

- Smart t-stats
- Heat Pumps
- 120V HPWH
- Commercial EMS
- Smart fans
- MPC for res HPWH
- MPC for RTU
- MPC for chiller plant

## Customer Surveys



**1,011**  
household  
surveys

- Residential energy customers
- Qualtrics panel
- Diverse sample reflecting CA population

## Market Studies



**6**  
market studies

### LF devices:

- Air-source HPs
- HPWHs
- MFHPs

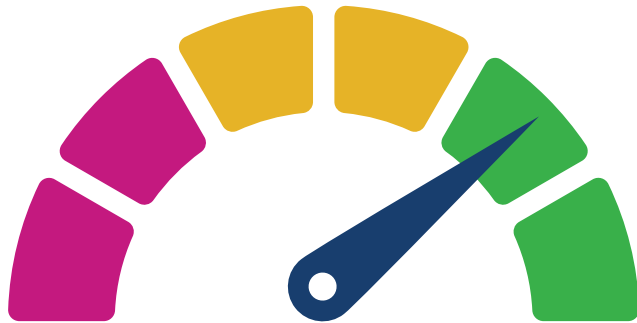
### LF enabling controls:

- Smart t-stats
- EV charging load shifters
- Flexible EV charging load dispatching

# Near-term implementation challenges

## The vision

- "Ambitious" and "bold"
- "The right direction"
- "Critical"



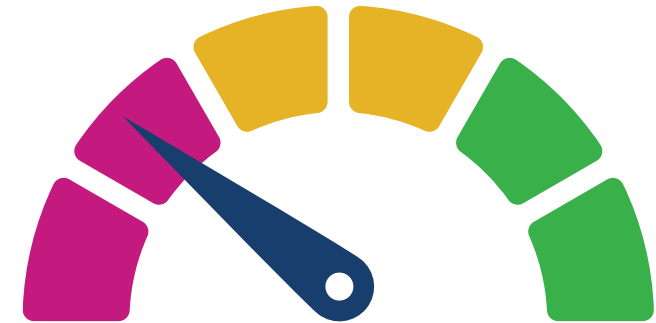
Ambition

*"It's good to see things starting to look like they're really moving, right? So I think we welcome it and look forward to it"*

*"It's technically way, way, way beyond the capabilities of current market players"*

## The reality

- "Messy and painful"
- Tech & infrastructure challenges
- Requires coordination across policymaking entities
- Tension with other energy goals?

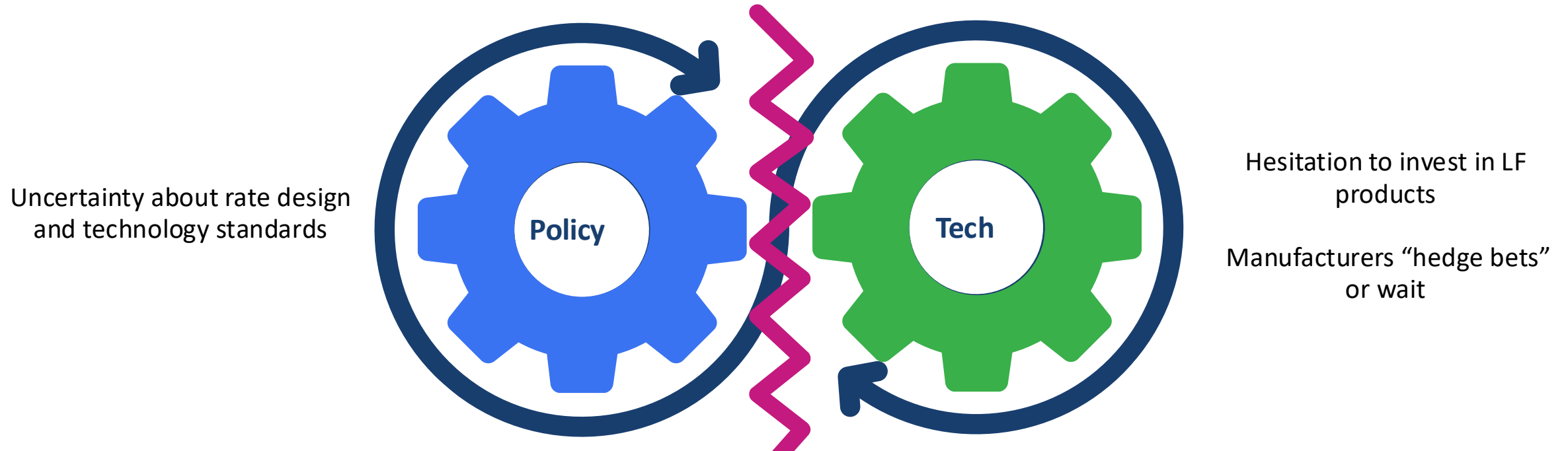


Implementation capacity

\*Stakeholder interviews (n= 95)

# The “chicken and egg” dilemma

Policymakers wait for available technology to finalize structures; technology providers wait for finalized structures to build the technology.





Early-stage financial incentives to support manufacturers could help break the loop and stimulate the market.

\*Stakeholder interviews (n= 95)

# Customer enrollment



Achieving necessary grid impact requires broad participation, but there's no easy answer.

	 <b>Voluntary (Opt-in)</b>	 <b>Default (Opt-out)</b>
<b>Scale potential</b>	<p>Low</p> <p>Unlikely to garner broad customer enrollment</p>	<p>High</p> <p>Defaults are sticky</p>
<b>Political risk</b>	<p>Low</p>	<p>High</p>
<b>Ethical risks</b>	<p>Reduces the chance of inadvertent penalties, but may limit benefits to those able to participate</p>	<p>Risks penalizing inflexible customers through increased bill volatility</p>

\*Stakeholder interviews (n=95)

# Customer diversity

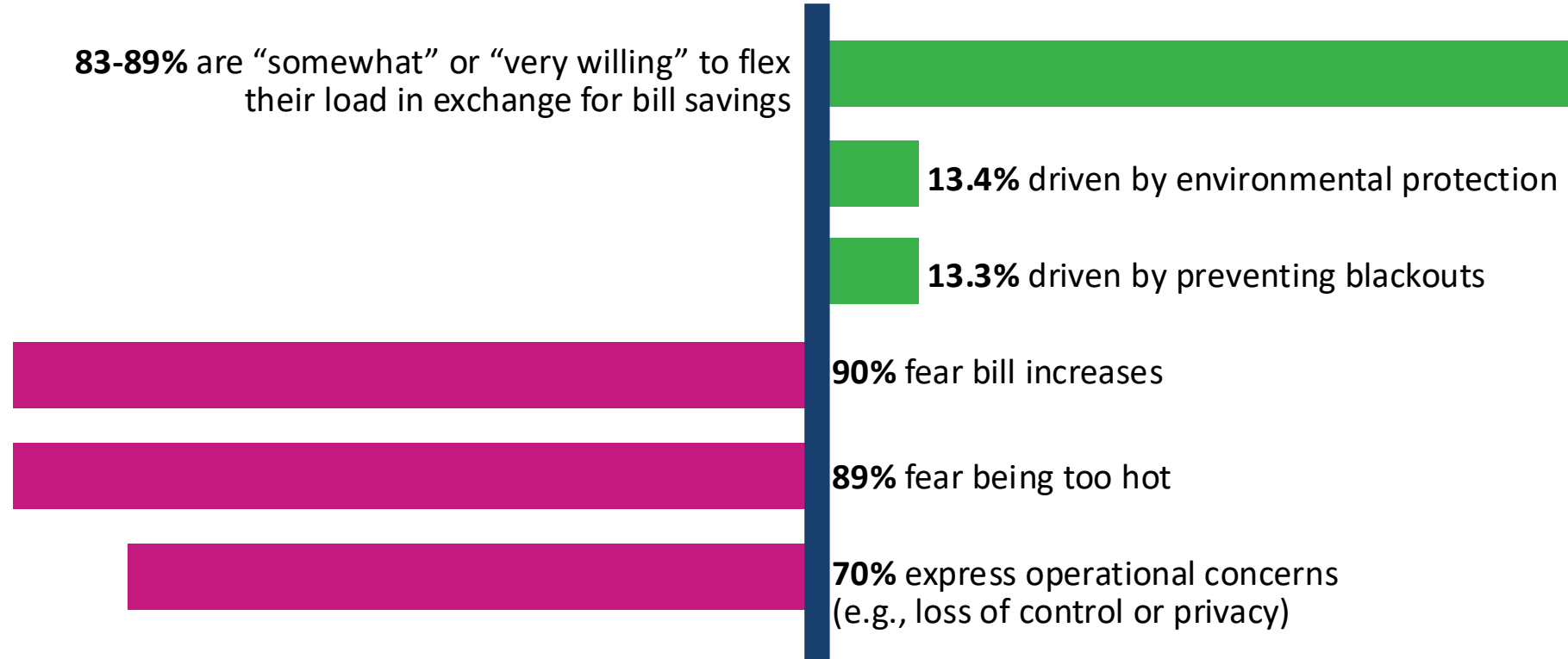
Two sectors with fundamentally different motivations and barriers.

	 Commercial customers	 Residential customers
Core motivations	Mission-driven “You want to make sure your freezers are never gonna go down.”	Bill savings Comfort Convenience
Implementation challenges	Intra-organizational coordination Time-sensitive, inflexible processes	Concerns about bill volatility Access to LF devices
Opportunities	Sophisticated staff Existing energy management systems	High willingness to participate

\*Stakeholder interviews (n= 95); household surveys (n= 1,011)

# Residential customers' appetite for LF

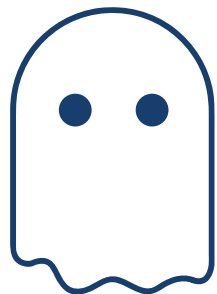
Show them the money and address their values and concerns.



\*Household survey (n= 1.011)

# LF Automation

Field tests dispel the myth of ‘invisible’ automation. Users feel impacts, necessitating a “human-in-the-loop” approach.



## “Invisible” automation (zero touch)

Fully automated background processing.

**Reality:** Unfeasible.

Users notice temperature and operational shifts, leading to frustration if unmanaged.



## “Engaged” automation (high touch)

Users set parameters, receive notifications, and track rebound effects.

**Reality:** Necessary for trust, but may not appeal to many customers. Should not be a condition of participation, as that would undermine the purpose of automation.

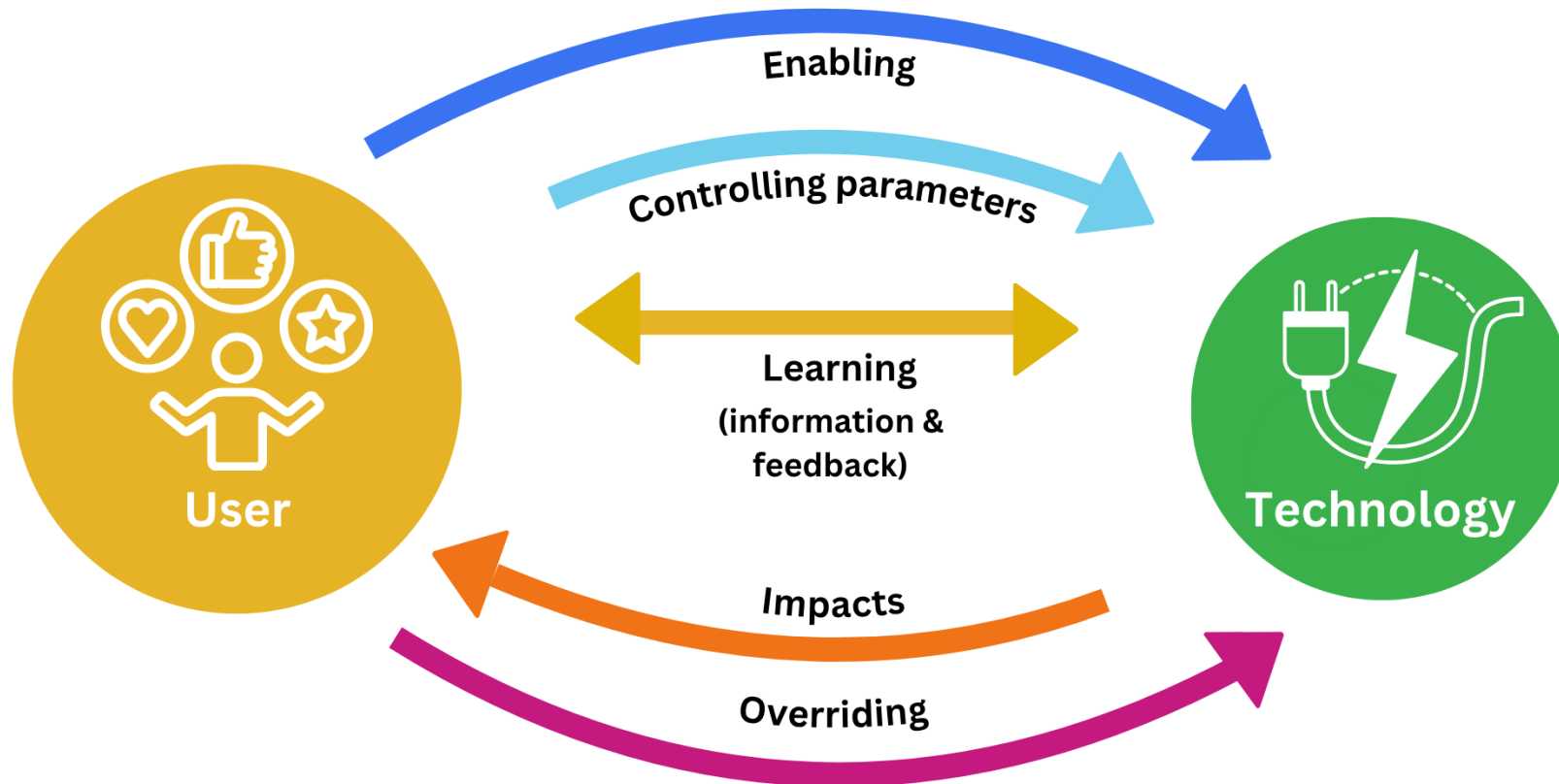
Customers fall along a spectrum.

Technologies should provide options for both high and low engagement.

\*User interviews & surveys (n=73)

# Control and feedback

Providing users the right level of control and feedback can address concerns.



## Override capabilities

Users should retain ultimate control to mitigate comfort fears and other risks.

## Parameter setting

Users can establish boundaries (e.g., charge durations, departure times).

## Impact feedback

Engaging and compelling feedback on meaningful outcomes drives program retention.

\*User interviews & surveys (n=73)

# Rate design

Rate design must strike a balance between inclusion and protection, such that all customers can derive benefit.



Large rate differentials are needed to send a strong market signal

Aggressive dynamic pricing would attract and reward participation.



Protecting the inflexible

Many customers lack LF infrastructure, “flexibility capital,” and ability to absorb bill shocks.

Rate design will drive bill savings, large or small.

Customers fear devastating bill spikes for those unable to flex. But small rate differentials won't entice many customers.

\*Stakeholder interviews (n= 95)

# Strategic road map

Several elements need to align, which requires threading the needle...

**Broad participation** through device access, significant bill savings and strategic messaging

**Dynamic rate design** that offers opportunities and benefits to all

**Device performance** through controls, installation and integration, and workforce

**Robust roster** of products through clear market signals and incentives

**Standardized specifications** of dynamic price-ready devices and testing procedures





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# Thank you!

Questions? Comments?

Feel free to reach out:  
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