

# The Opportunities & Challenges of DER & Renewables for Utilities

TEA Energy Symposium

Tanuj Deora

March 3, 2017



Smart Electric  
Power Alliance

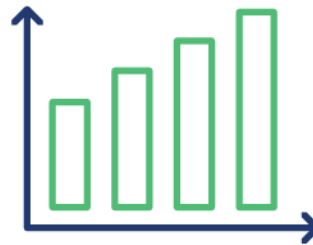
# About Us



Smart Electric Power Alliance's mission is to facilitate the utility industry's smart transition to a clean energy future through education, research, and collaboration.



COMMUNITY



DATA



INSIGHTS

# Who We Are



## Membership

- 570 Utilities (IOU, Coop, Muni, PMA)
- 381 Corporate (Technology Providers, Developers, Consultants)
- 156 Other (Gov't Agencies, Commissions, Universities, Labs, NGOs)

## Board

- PG&E
- PSEG
- CPS Energy
- NYPA
- SMUD
- TVA
- Siemens
- STEM
- EnergyHub
- FirstSolar
- SunPower

## Advisory Council

- Edison Int'l
- Nest
- PJM
- ISO-NE
- Duke Energy
- BGE
- Nexant
- DTE
- Navigant
- Southern Co

# What does "smart" meant to you?

 When poll is active, respond at [PollEv.com/sepapower2017](https://PollEv.com/sepapower2017)

Wave of the  
future!

42%

Reasonable  
marketing-speak.

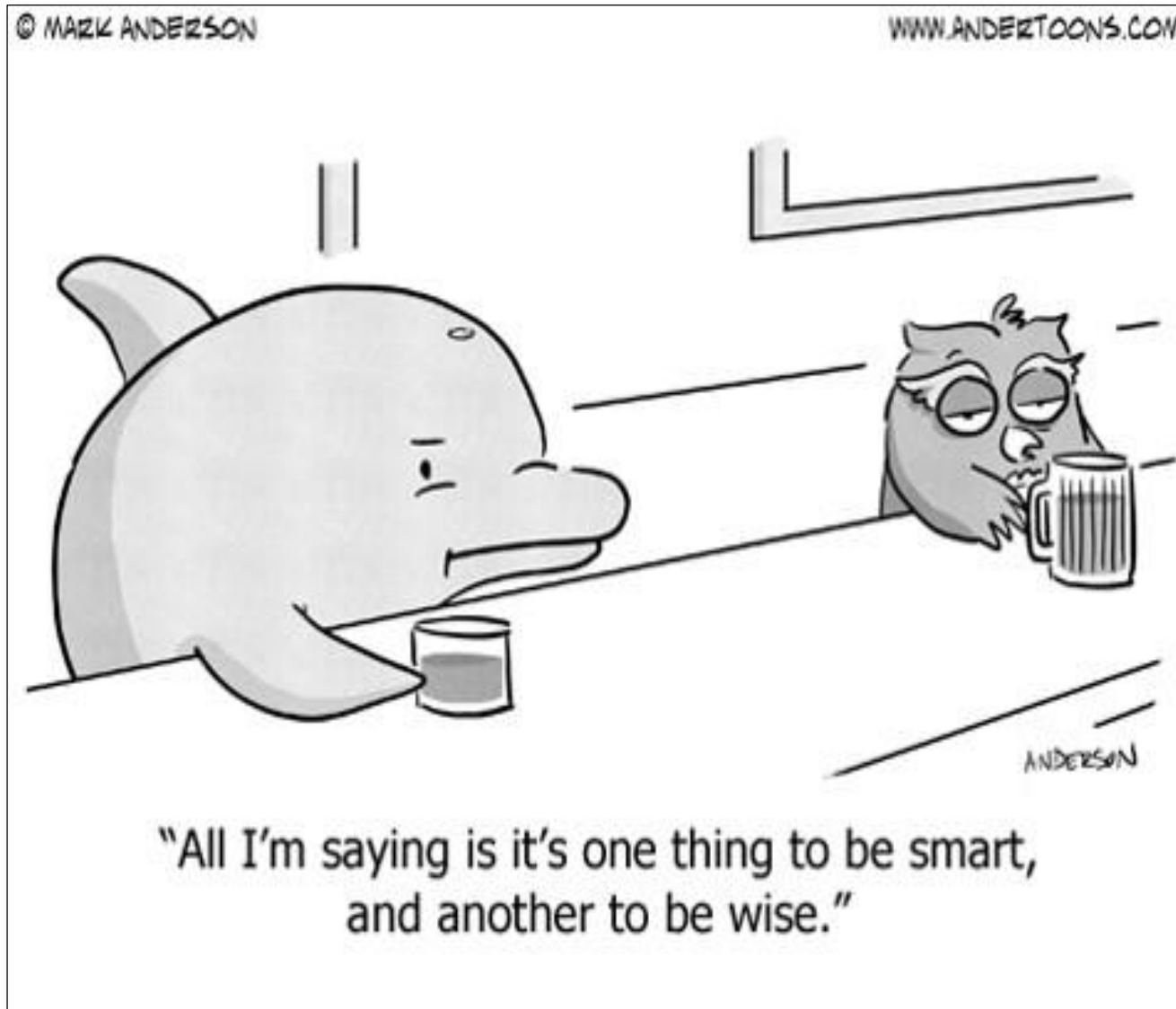
55%

Didn't we try this  
already?

4%

0% 10% 20% 30% 40%

# SEPA's transition from “Solar” to “Smart”

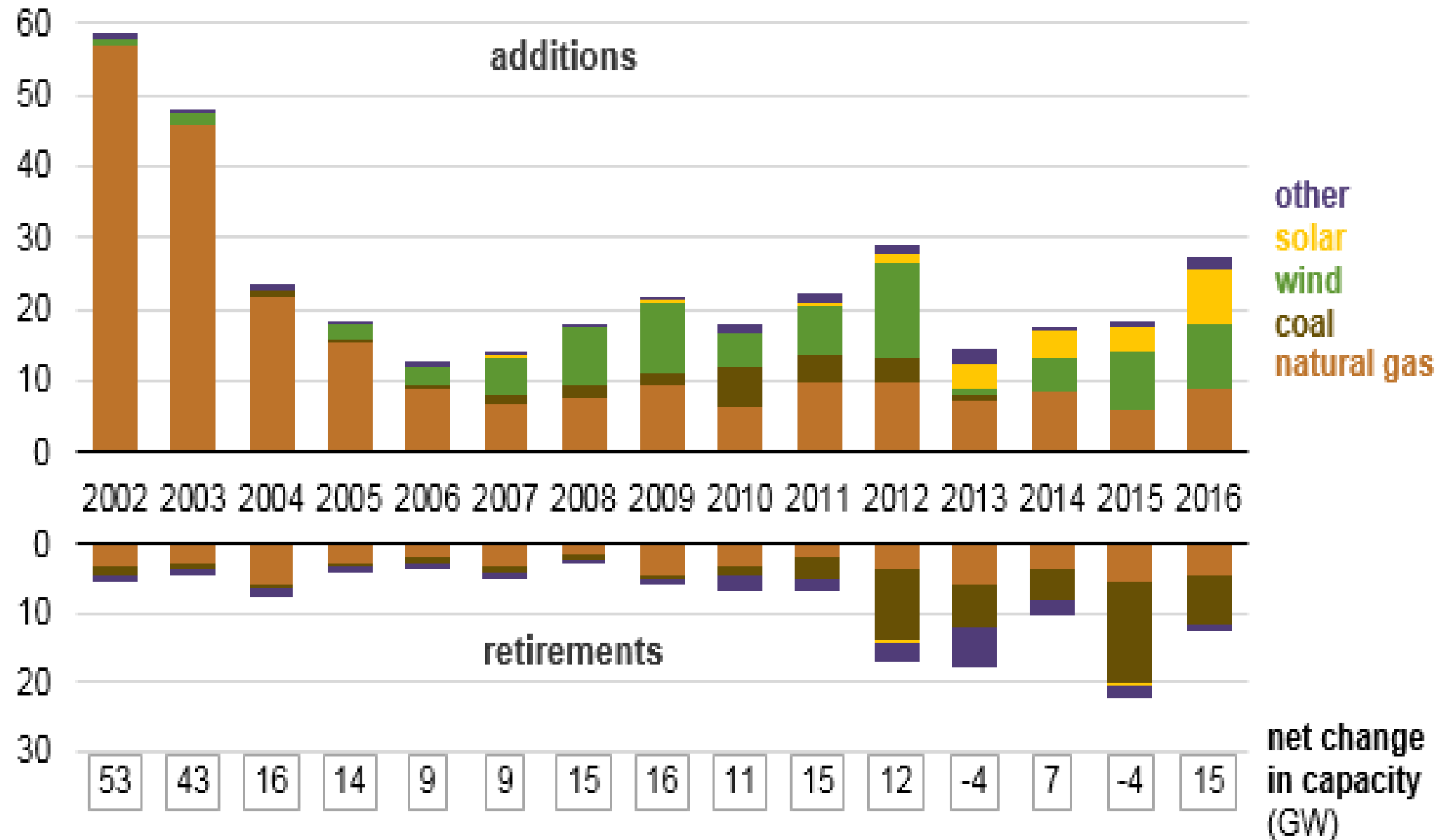


1. What's the deal with solar?

# U.S. utility-scale electric capacity additions and retirements (2002-16)

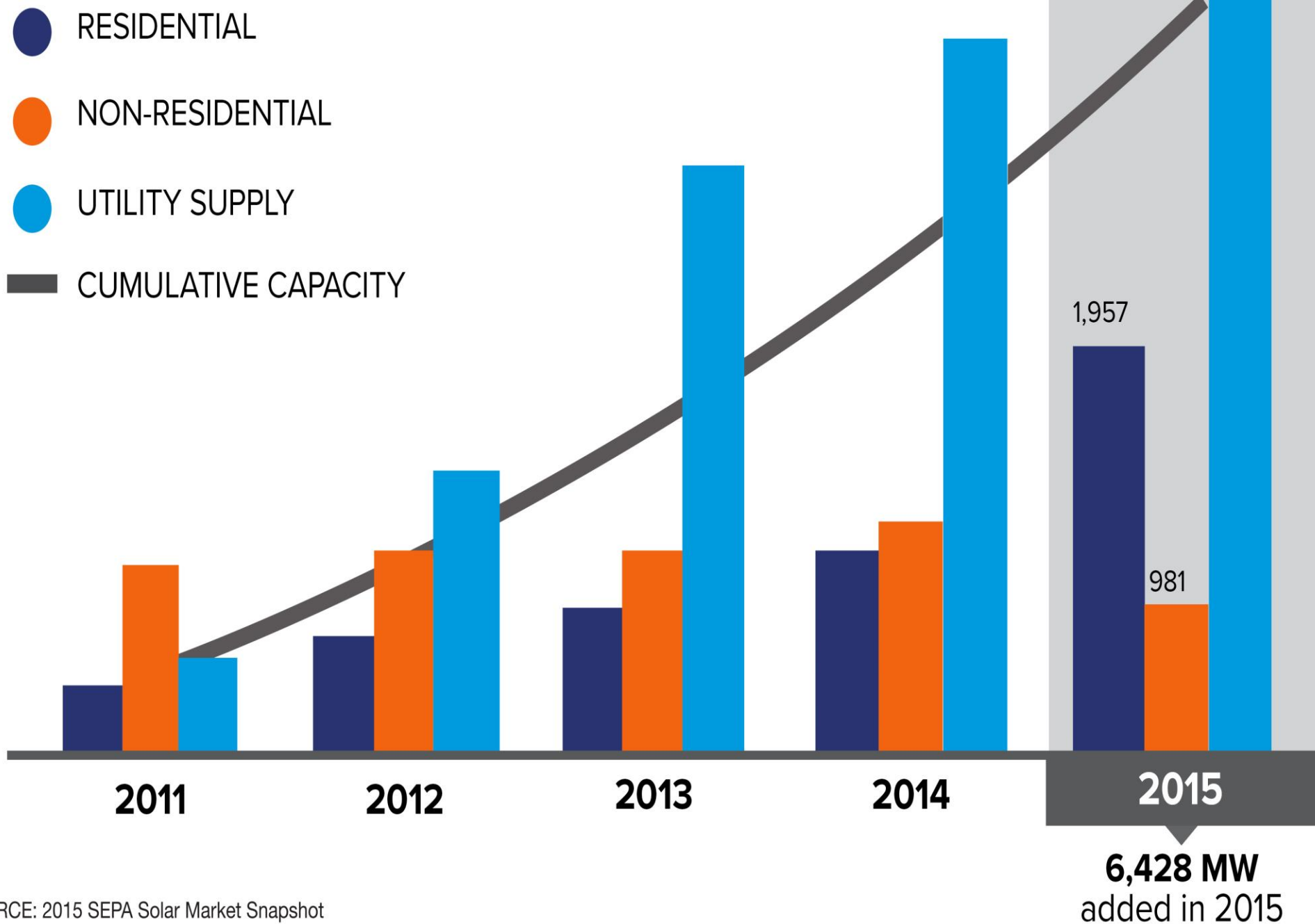


gigawatts



# U.S. SOLAR CAPACITY

MEGAWATTS BY YEAR, 2011–2015

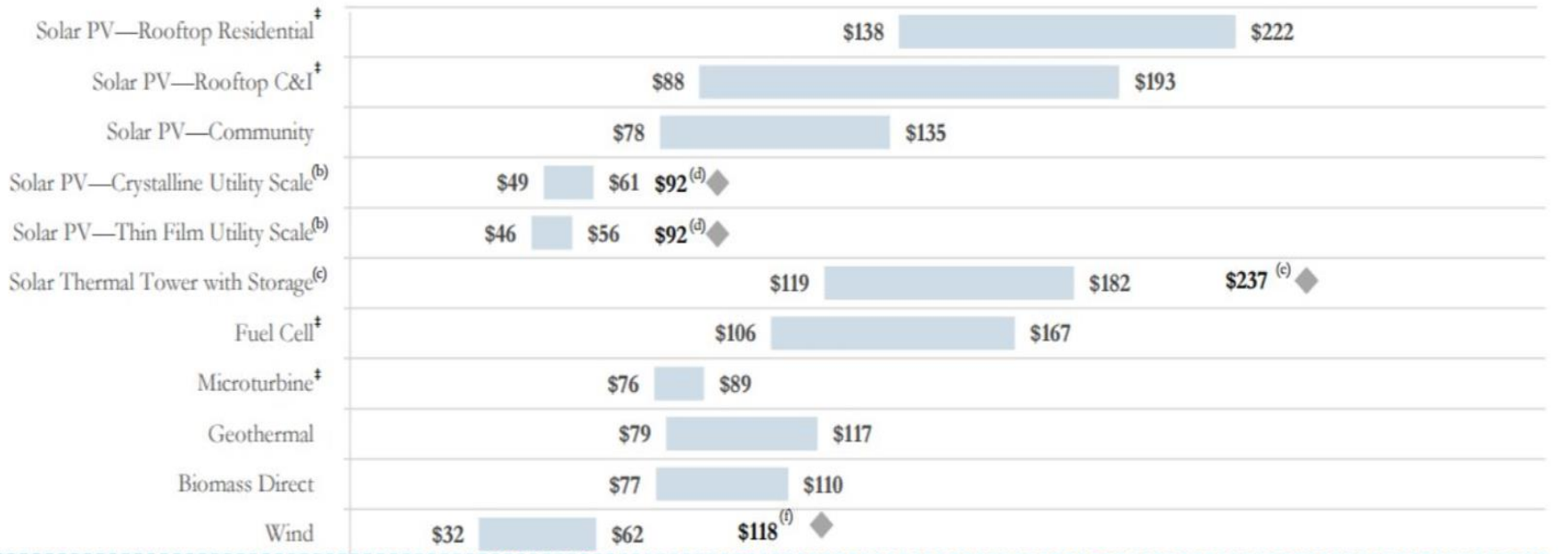




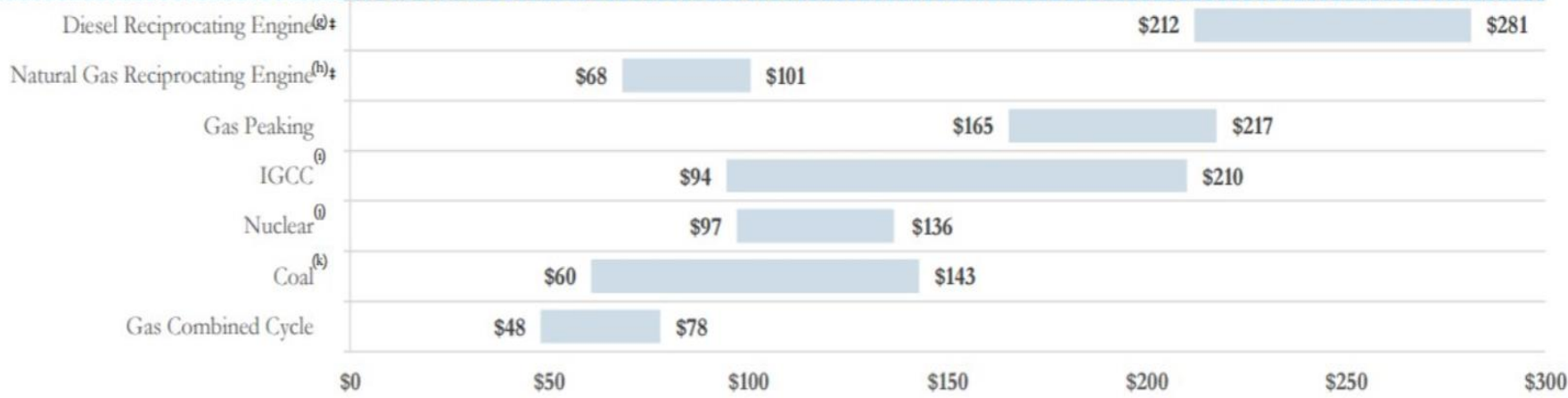
# Unsubsidized Levelized Cost of Energy Comparison

Certain Alternative Energy generation technologies are cost-competitive with conventional generation technologies under some scenarios; such observation does not take into account potential social and environmental externalities (e.g., social costs of distributed generation, environmental consequences of certain conventional generation technologies, etc.), reliability or intermittency-related considerations (e.g., transmission and back-up generation costs associated with certain Alternative Energy technologies)

ALTERNATIVE ENERGY<sup>(a)</sup>



CONVENTIONAL



Levelized Cost (\$/MWh)

# C&I Markets

## MGM Resorts, Wynn planning to leave NV Energy

16 Comments



By Daniel Rothberg (contact)

Thursday, May 19, 2016 - 10 p.m.

Updated: May 20, 2016 2:38 p.m.

Las Vegas Sands Corp., one of three gaming companies that filed regulatory applications to purchase energy on the open market, is ending a formal effort to leave NV Energy but indicated its intention to



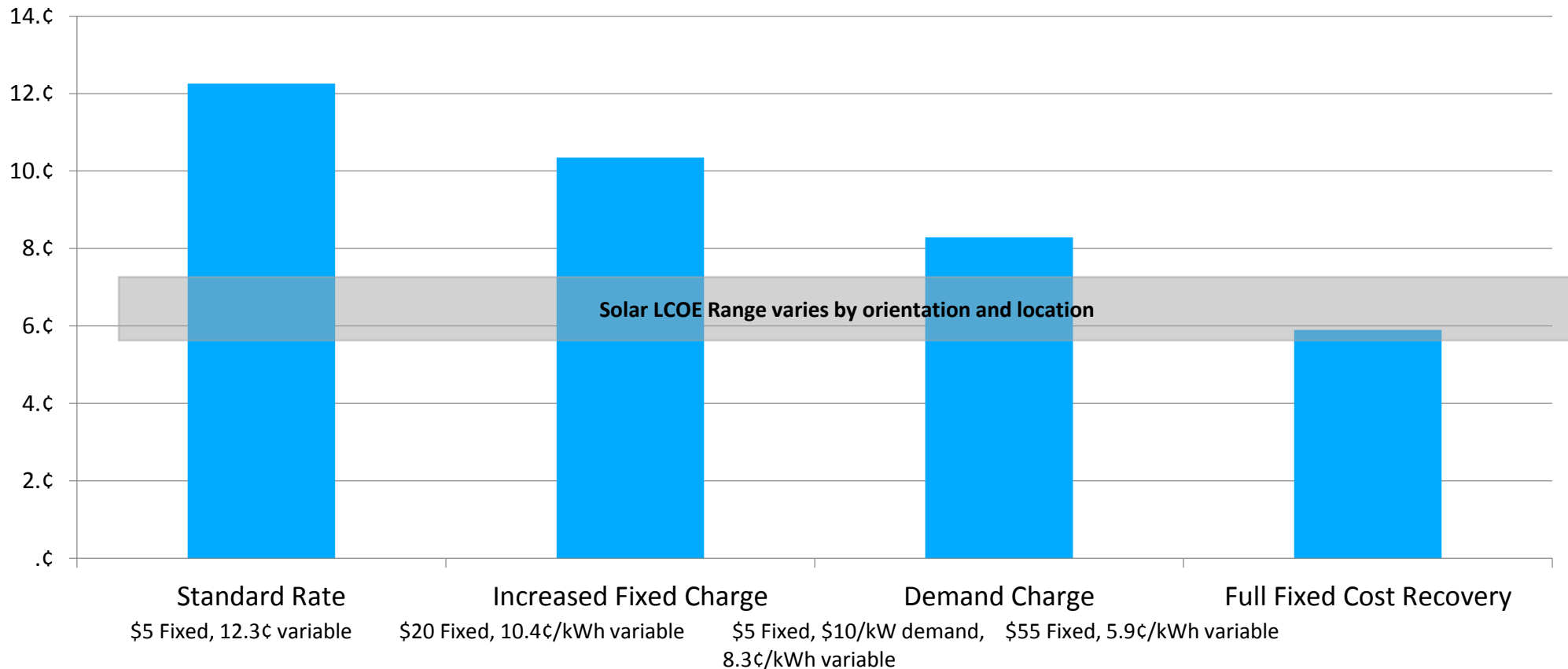
- \$86.9mm exit fee to leave NV Energy
- Represents 5% of NV Energy's load
- Motivation: customers' desires for "green vacations"

# Distributed rooftop price vs. retail price in 2020

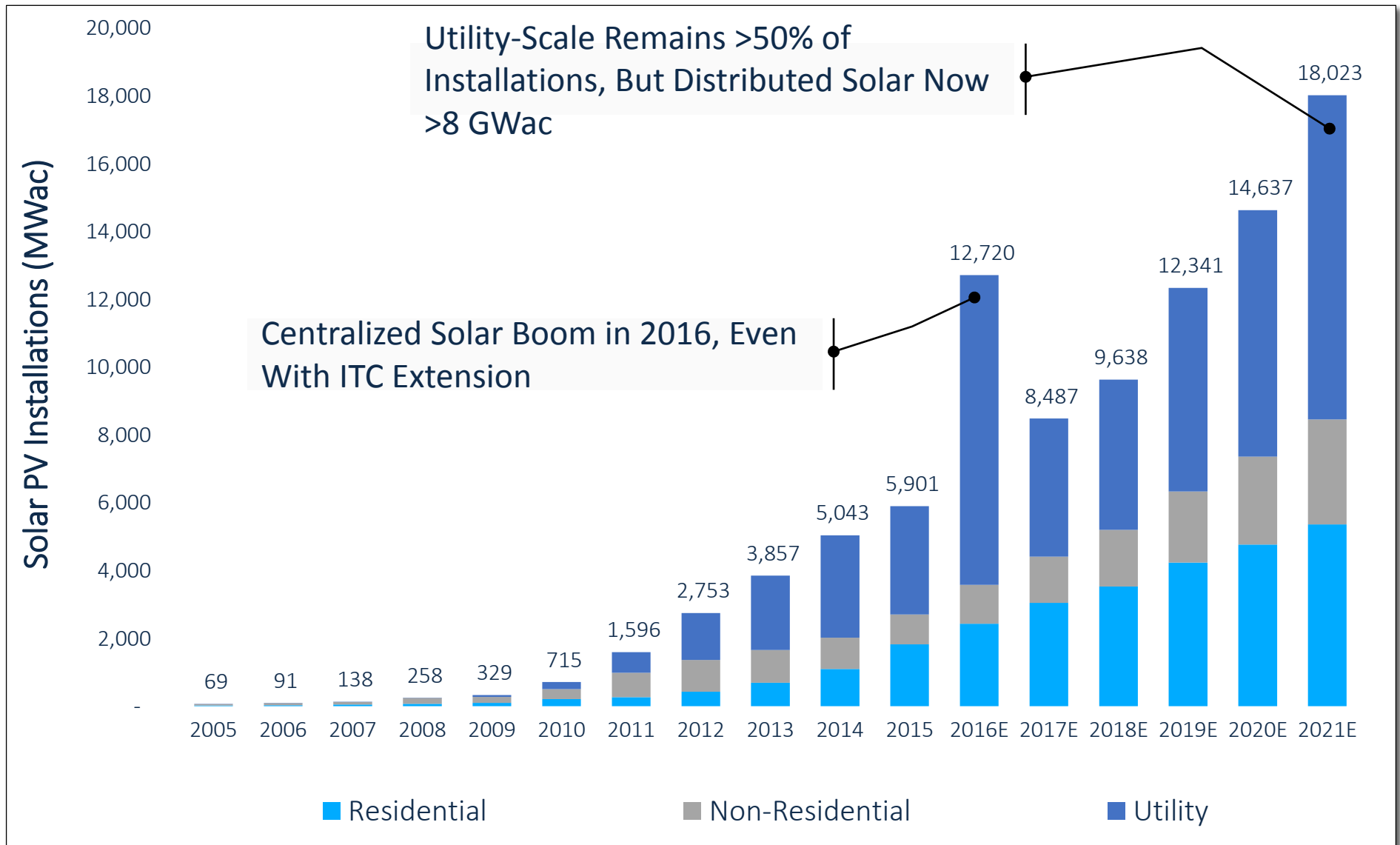


## Solar Efficacy in 2020 - ITC

Assumes \$1.5/watt rooftop install cost & rate inflation at utility retail rate average from 1990-2013

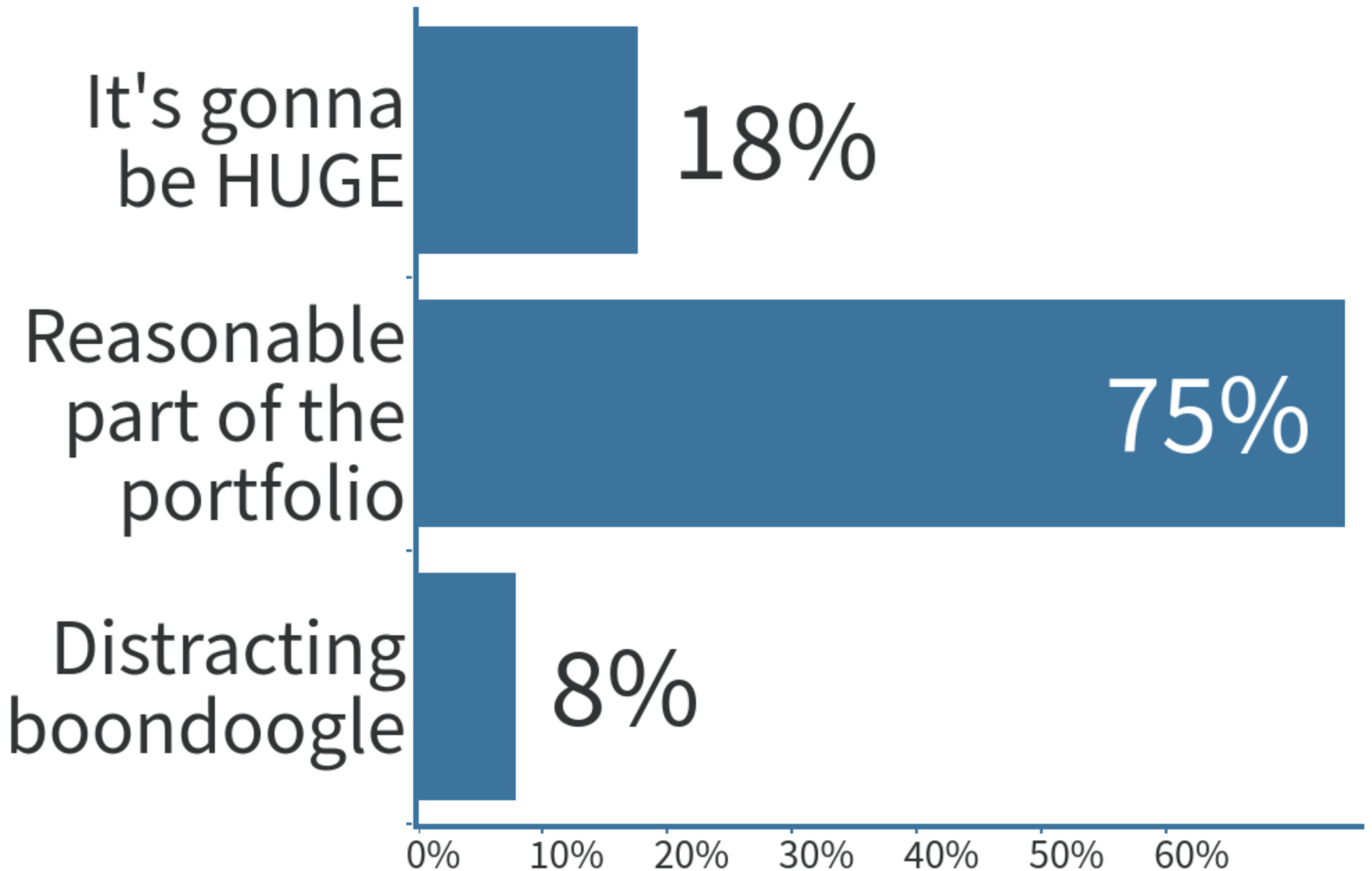


# Despite policy headwinds, growth continues

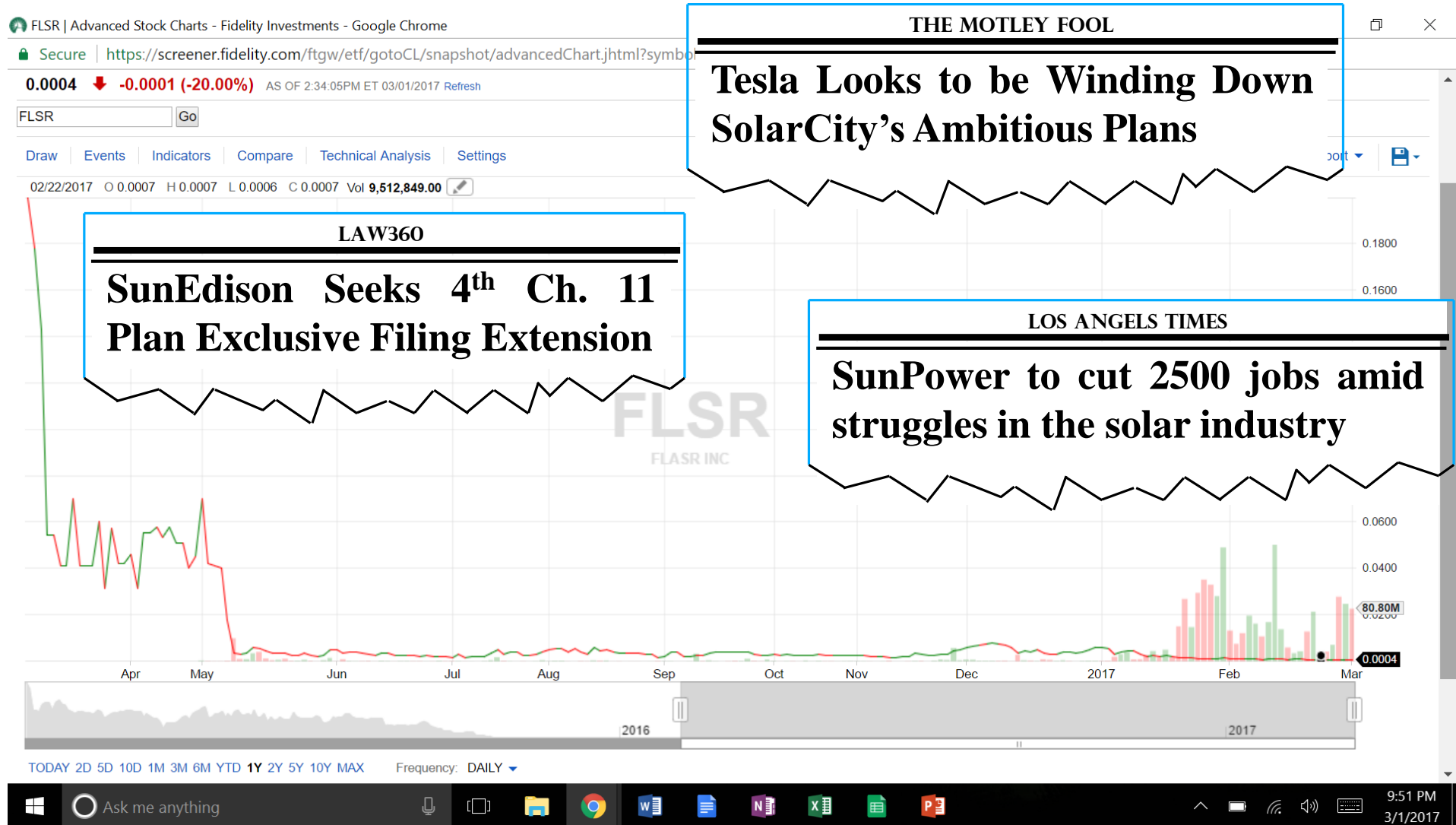


# What is the right role for solar in the future?

When poll is active, respond at [PollEv.com/sepapower2017](https://www.poll-ev.com/sepapower2017)



# The solar folks are in worse pain than utilities

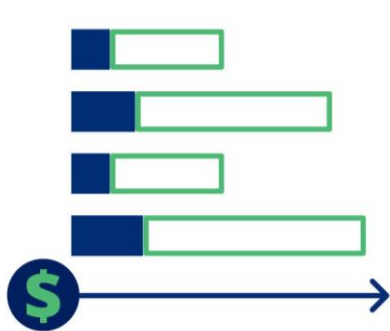


2. What's the opportunity  
for utilities?

(let's focus on DER)

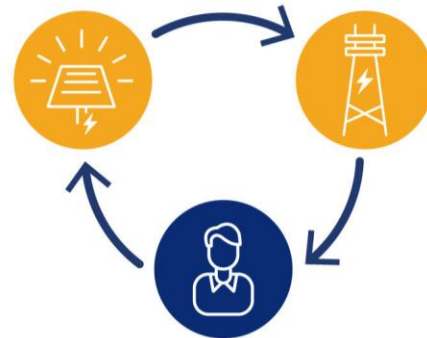


# Utility DER Approaches



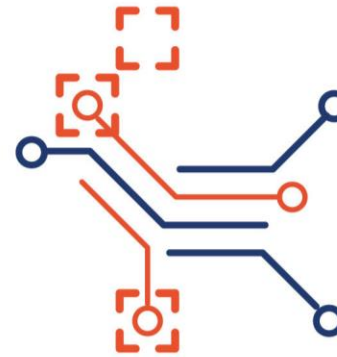
## RATE REFORM

Volumetric vs  
Fixed/Demand  
Time-Varying  
Market-Based/  
Transactive



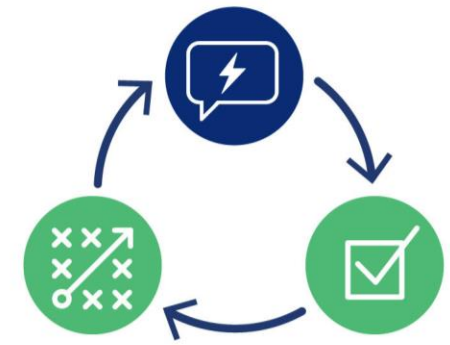
## NEW CUSTOMER OFFERINGS

Community Solar  
Rooftop Solar  
& Storage  
Holistic DER  
Solutions



## GRID MODERNIZATION

Community  
Networks  
Advanced  
Metering  
Data & Analytics



## DER INTEGRATION

Grid Services  
Resource  
Planning  
Program Design



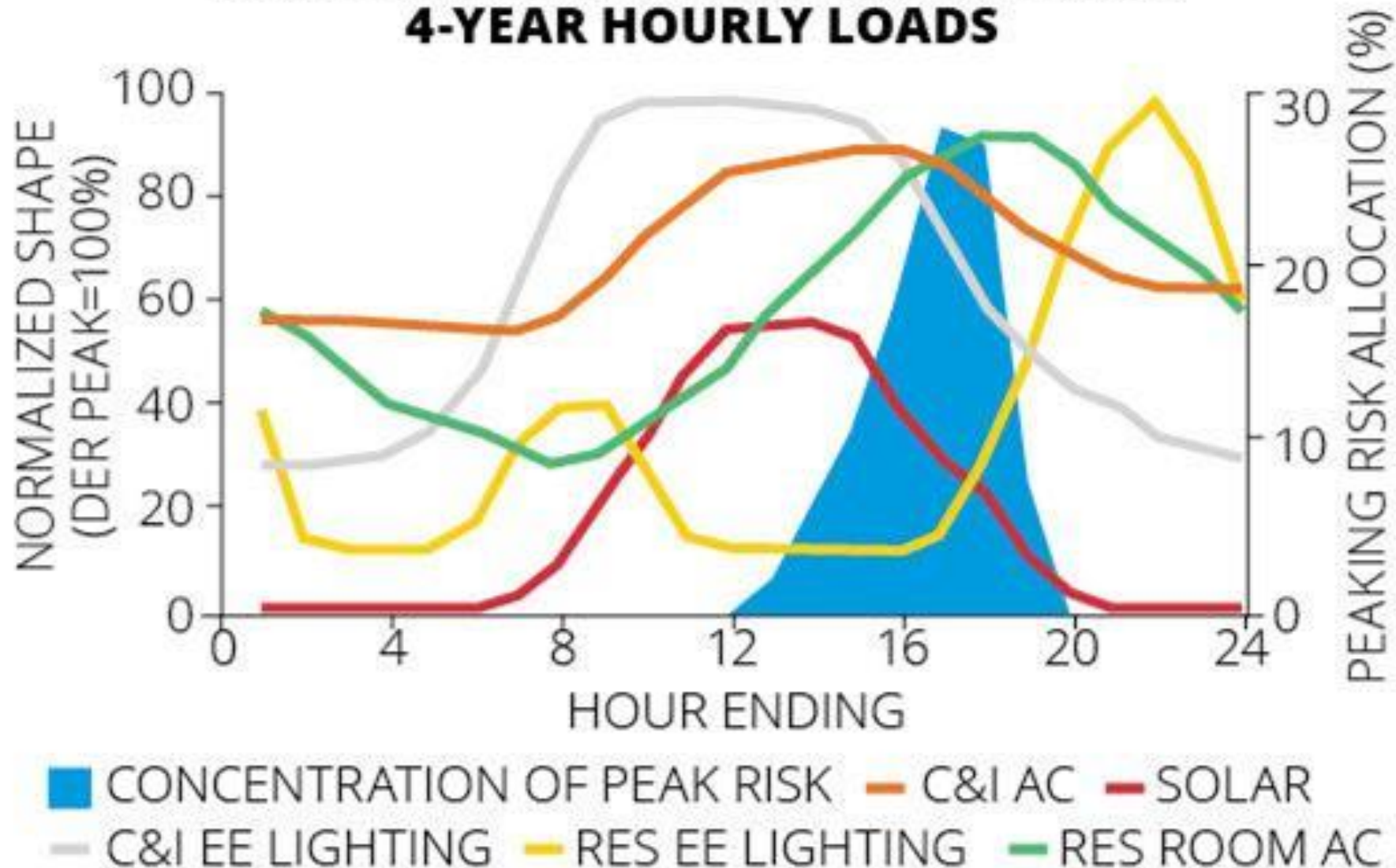
**FIGURE 1: DER CAPABILITIES MATRIX**

TECHNOLOGIES	ENERGY	GENERATING CAPACITY	DISTRIBUTION CAPACITY	VOLTAGE REGULATION	FREQUENCY REGULATION	LOAD FOLLOWING	BALANCING	SPINNING RESERVES	NON-SPINNING RESERVES	BLACK START
<b>DISTRIBUTED SOLAR</b>	Energy Generator							No	No	No
<b>DISTRIBUTED SOLAR + ADVANCED INVERTER FUNCTIONALITY</b>	Energy Generator							No	No	No
<b>BATTERY STORAGE</b>	Energy Storage							Yes	Yes	Yes
<b>INTERRUPTIBLE LOAD</b>	Load Shaping							Yes	Yes	No
<b>DIRECT LOAD CONTROL</b>	Load Shaping							Yes	Yes	No
<b>BEHAVIORAL LOAD SHAPING</b>	Load Shaping							No	No	No
<b>ENERGY EFFICIENCY</b>	Reduce Load							No	No	No

- Unsuitable for reliably performing the specified service.
- May be able to perform a service, but is not well suited or can provide partial support.
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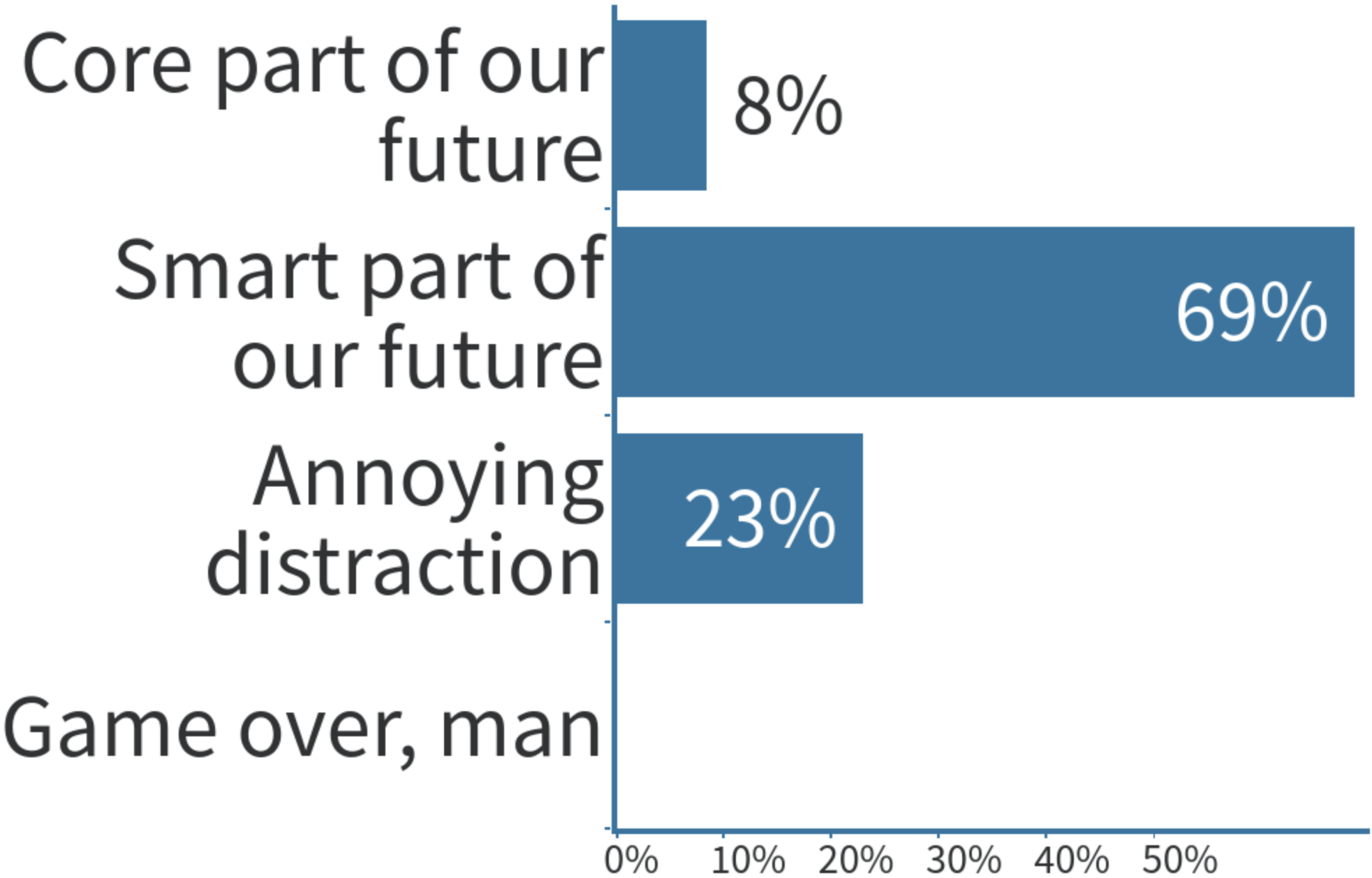
# FIGURE 1: ALIGNMENT OF DERS WITH HIGHLY CONCENTRATED PEAKING RISK

**BASED ON LOCAL PEAK DAYS ACROSS 4-YEAR HOURLY LOADS**



# What's the DER opportunity for your organization?

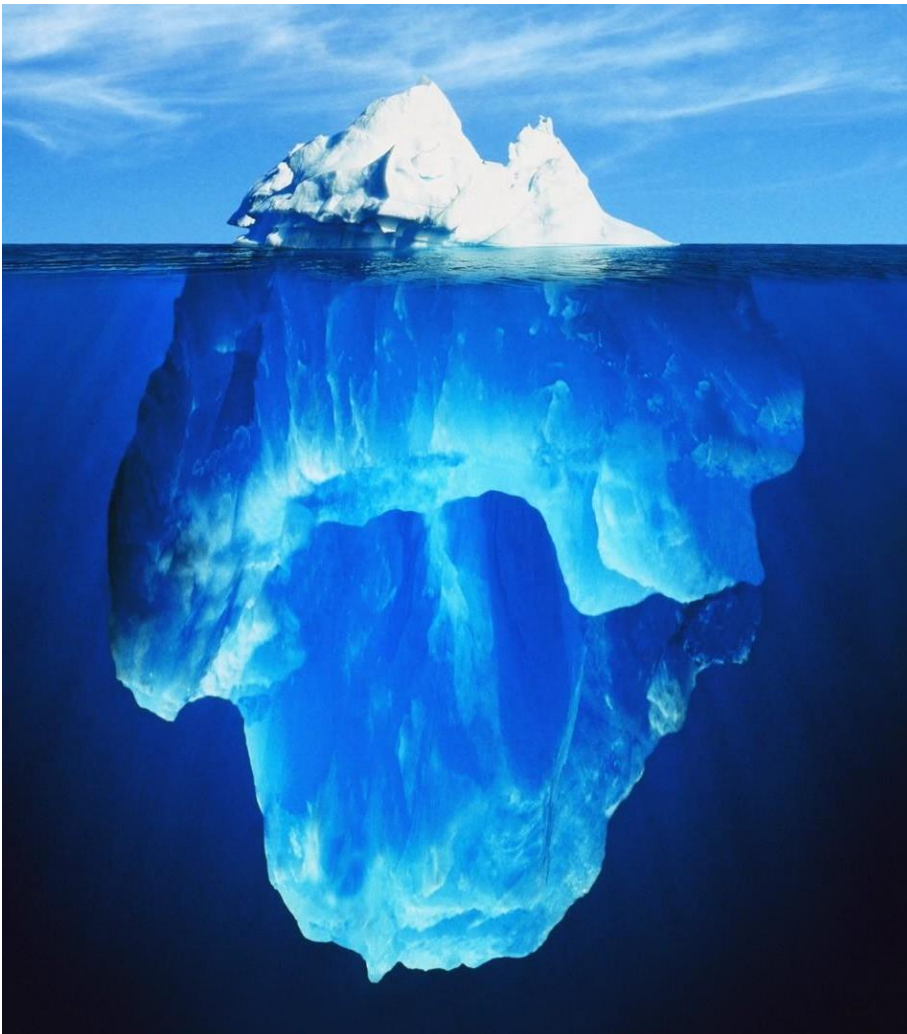
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3. Where is this leading?



# Societal Concerns



- **Political Dynamics**  
Cost, Choice, Environment, Jobs
- **Base Expectations**  
Safety, Reliability, Affordability
- **Existing Statute & Regulations**  
State & Federal Compliance
- **Economic Development**  
Rates, X-subsidies, Jobs
- **Definitions of “Fairness”**  
Inherent Conflicts
- **The “Regulatory Compact”**  
How to and to Whom to Apply It?

# Utilities' Practical Considerations

**Policy & Regulatory Uncertainty**  
(Environmental, Markets, Rates)

**Cost Dynamics**  
(Fuel, Capital)

**Demand Growth**  
(Organic Growth, DER, EE,  
New Sources of Load)

**Technology Advances**  
(Generation, DER, Hardware,  
Software, Data Analytics)

**Customer Expectations**  
(Control, Options, Cost)

**Reliability & Resiliency**  
(Threats, Resource Adequacy,  
System Coordination)



# Putting it Together


## Societal Goals



- Political Dynamics**  
Cost, Choice, Environment, Jobs
- Base Expectations**  
Safety, Reliability, Affordability
- Existing Statute & Regulations**  
State & Federal Compliance
- Economic Development**  
Rates, X-subsidies, Jobs
- Definitions of "Fairness"**  
Inherent Conflicts
- The "Regulatory Compact"**  
How to and to Whom to Apply It?

Source: www.sepapower.org


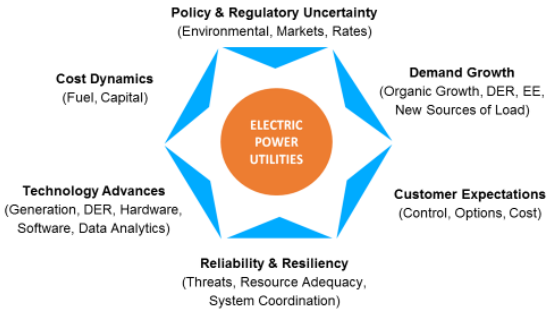
## Incentive Mechanisms



- Traditionalist Approaches**
  - Expansion of investment opportunities
  - Rate restructuring to ensure cost recovery
  - Stand-by fees
- Adjustment Mechanisms**
  - Capitalizing key expenses
  - Performance trackers
  - Stand-by Fees
- Incremental / Supplemental**
  - Decoupling
  - Shared savings
  - Return on capital avoided
  - Revenue from DER sales
  - Premium offerings
- Transformative Models**
  - Return on "TotEx"
  - Performance-based regulation (PBR)
  - Transaction fees, market access
  - Revenue from data sales
  - Selling services, not commodity

Source: NGA, SEPA  
www.sepapower.org

## Practical Considerations

**Policy & Regulatory Uncertainty**  
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**Demand Growth**  
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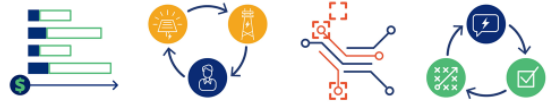
**Reliability & Resiliency**  
(Threats, Resource Adequacy, System Coordination)

**Technology Advances**  
(Generation, DER, Hardware, Software, Data Analytics)

**Cost Dynamics**  
(Fuel, Capital)

www.sepapower.org

## Utility DER Approaches

- RATE REFORM**  
Volumetric vs Fixed/Demand  
Time-Varying  
Market-Based/  
Transactive
- NEW CUSTOMER OFFERINGS**  
Community Solar  
Rooftop Solar & Storage  
Holistic DER Solutions
- GRID MODERNIZATION**  
Community Networks  
Advanced Metering  
Data & Analytics
- DER INTEGRATION**  
Grid Services  
Resource Planning  
Program Design

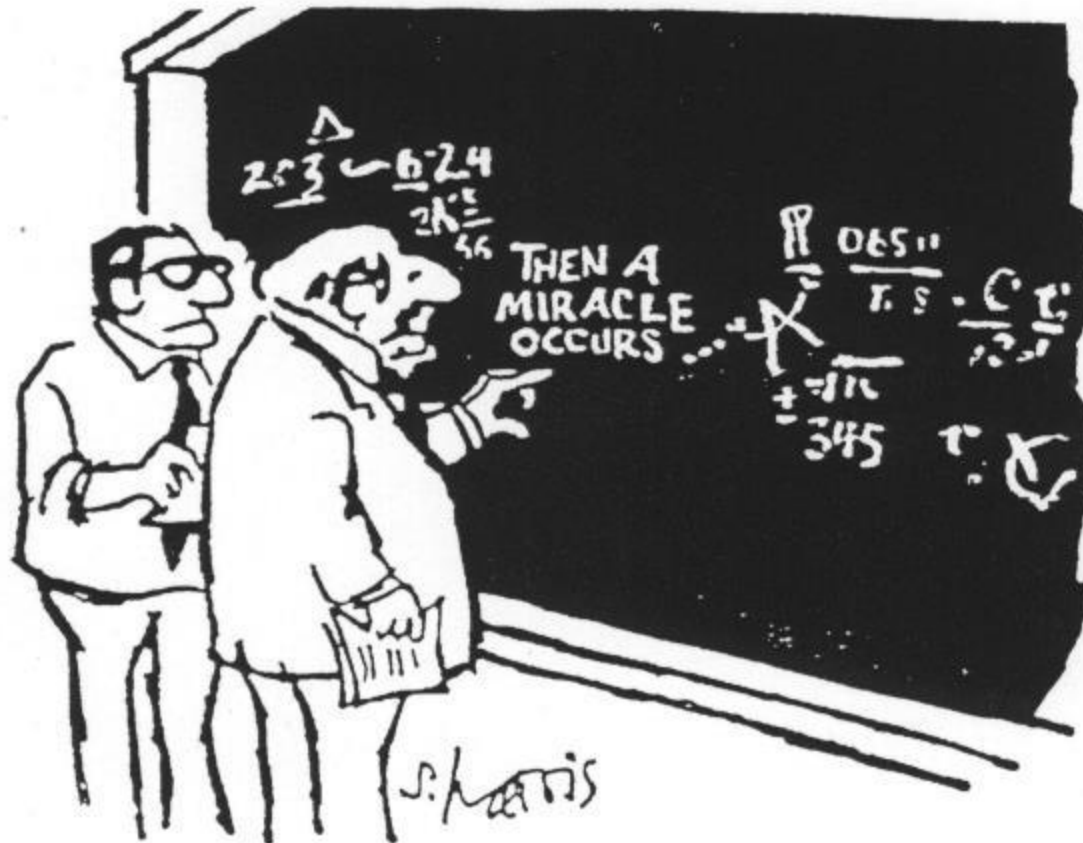
www.sepapower.org

### FIGURE 1: DER CAPABILITIES MATRIX

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BATTERY STORAGE	Energy Storage	●	●	●	●	●	●	Yes	Yes	Yes
INTERRUPTIBLE LOAD	Load Shaping	●	●	●	●	●	●	Yes	Yes	No
DIRECT LOAD CONTROL	Load Shaping	●	●	●	●	●	●	Yes	Yes	No
BEHAVIORAL LOAD SHAPING	Load Shaping	●	●	●	●	●	●	No	No	No
ENERGY EFFICIENCY	Reduce Load	●	●	●	●	●	●	No	No	No

● Unsuitable for reliably performing the specified service.  
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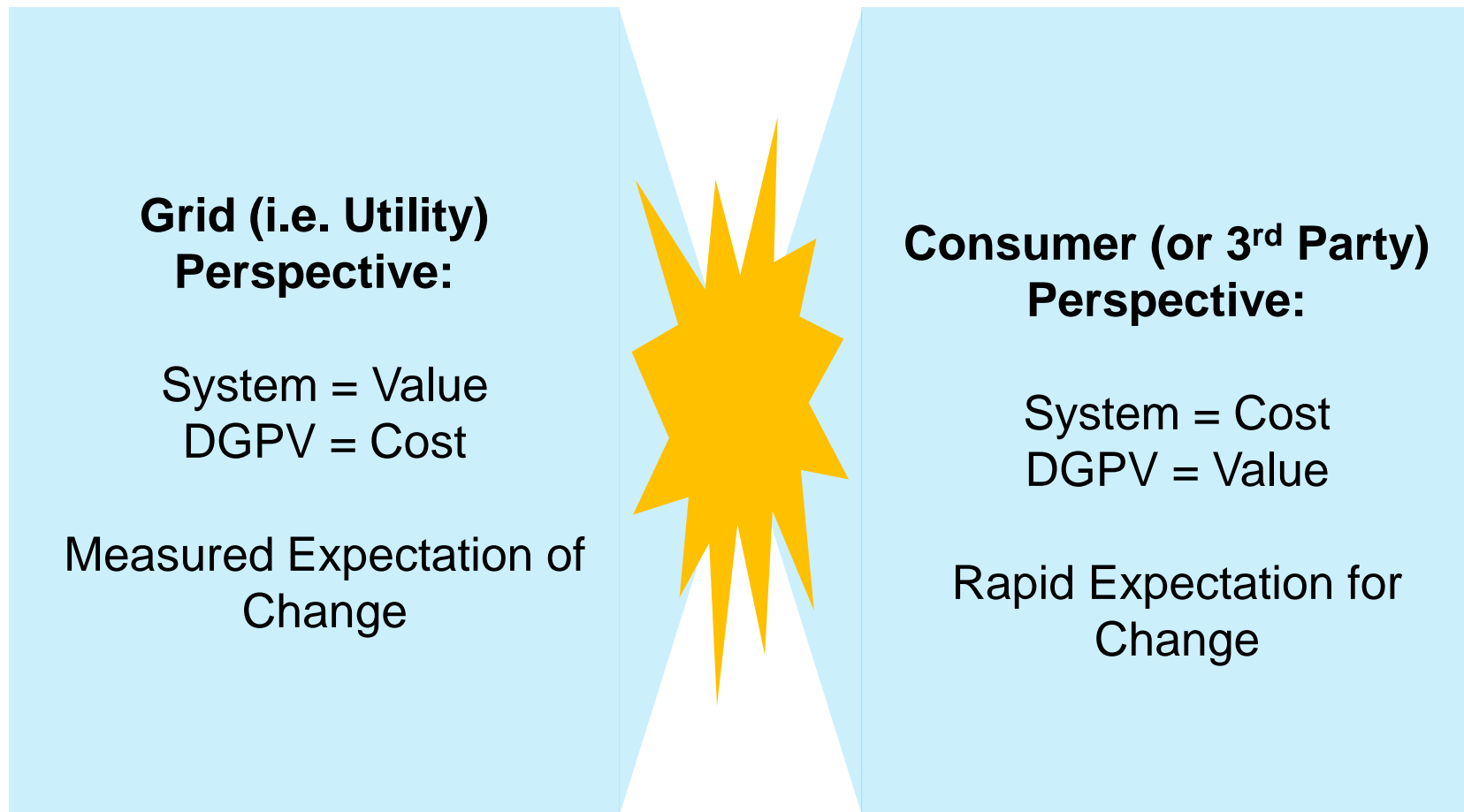
# “It’s complicated...”



I think you should be a little more specific, here in Step 2



# The Wrong Way to Simplify





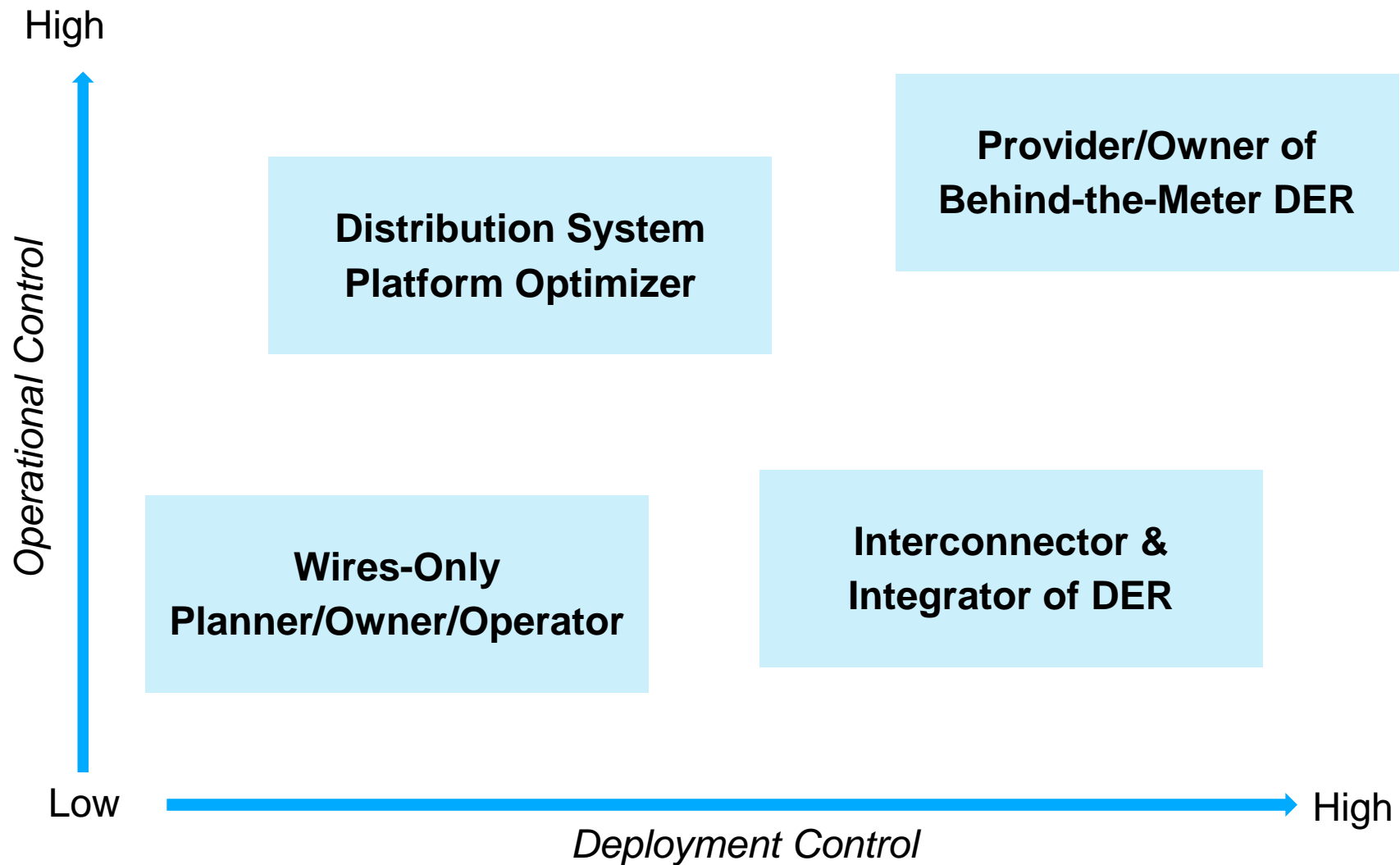
“SEPA has really taken the reigns on an evolving conversation about evolving the power grid.”

- 51<sup>st</sup> State Summit Participant 2016

“51<sup>st</sup> State is my favorite industry initiative”

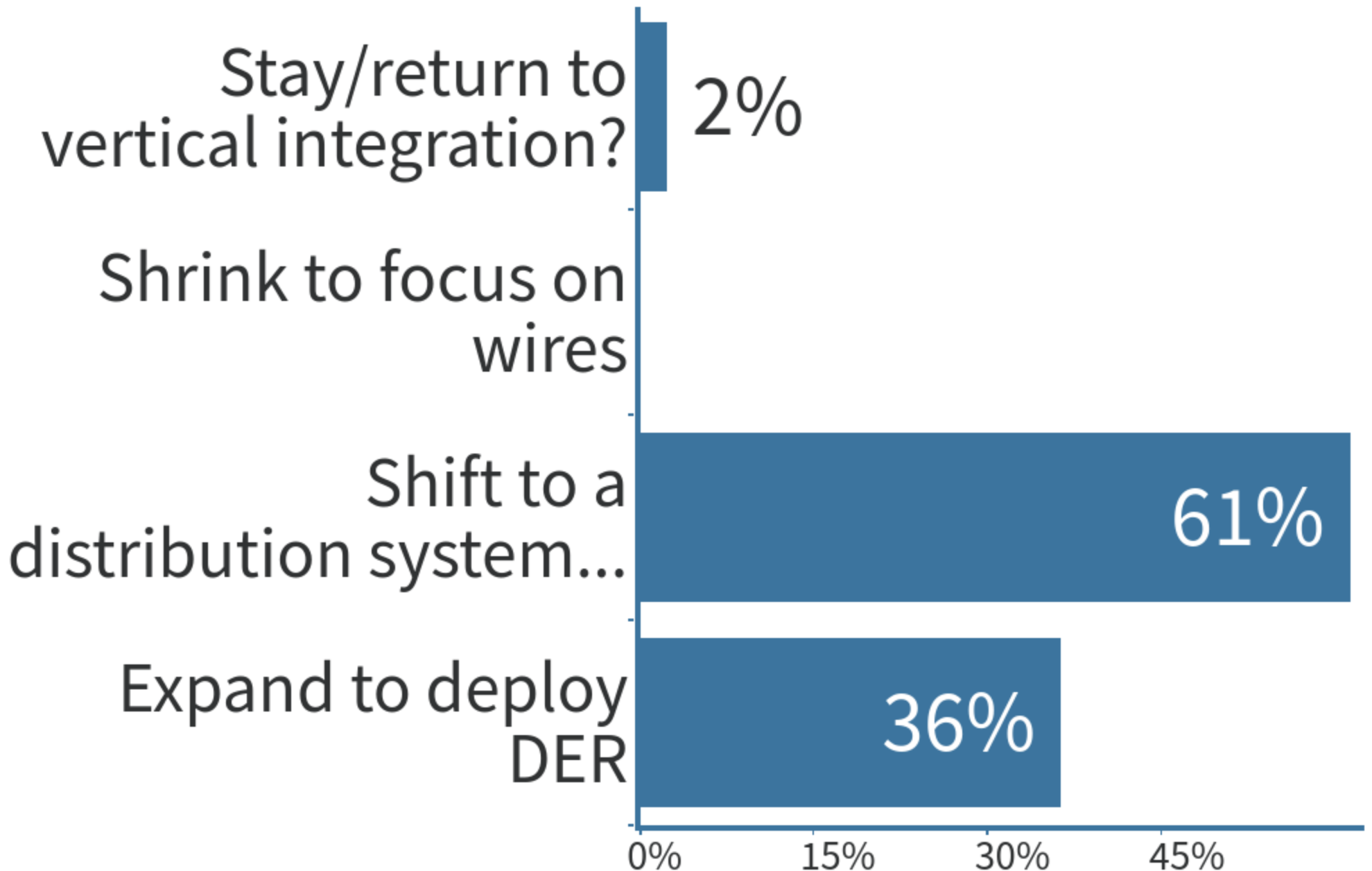
- Regulatory Support Executive

# Potential Distribution Utility Business Models



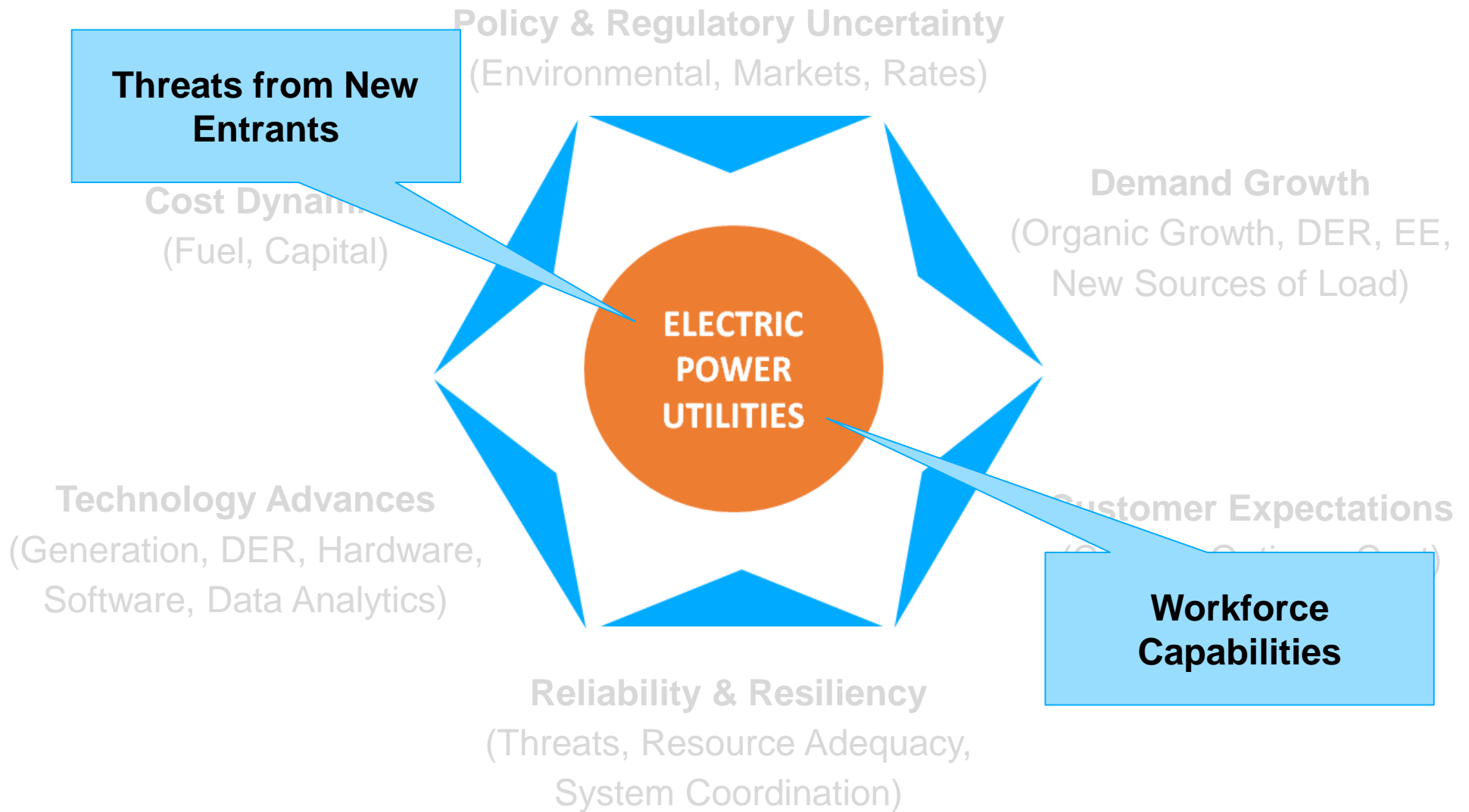
# What's the right future utility business model?

When poll is active, respond at [PollEv.com/sepapower2017](https://PollEv.com/sepapower2017)



4. Is it really that simple?

# Can Utilities React Quickly Enough?





- Wind & solar are insufficient to meet our needs due to intermittency
- Wind & solar's short run marginal cost advantage will run other gen out of the market
- This will also destroy returns for wind & solar
- Cheap storage may make this worse, not better

# Say what?

"While sufficient at the outset of competitive markets, I believe **the IPP model is now obsolete** and unable to create value over the long term,"

"Changes in fuel mix, consumer preference, technological innovation and increased distributed generation have put pressure on the traditional IPP model, particularly as commodity markets continue to weaken"

*Mauricio Gutierrez*  
President and CEO, NRG  
March 2017

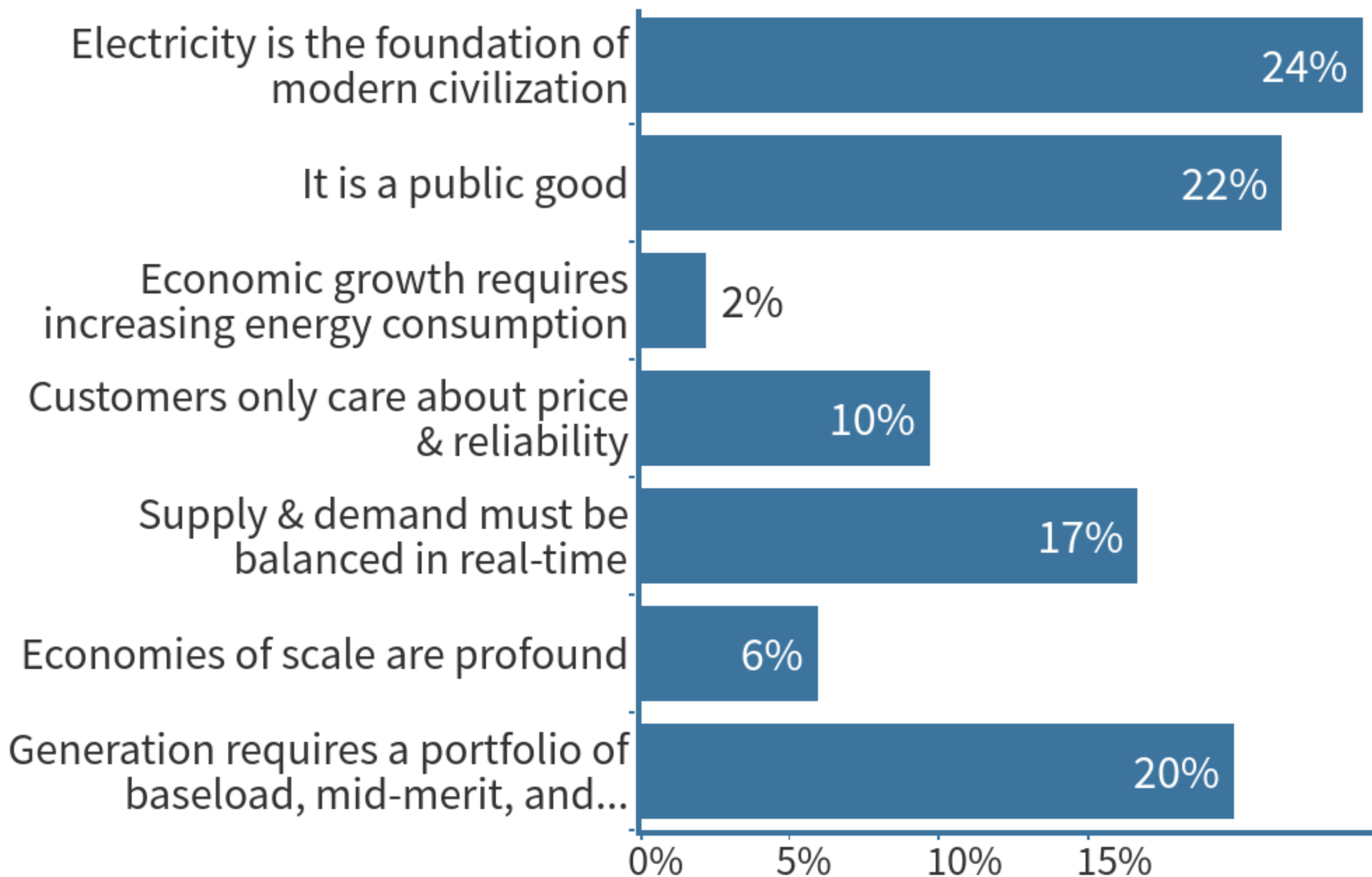


# Our traditional assumptions

1. Electricity is the foundation of modern civilization
2. It is a public good
3. Economic growth requires increasing energy consumption
4. Customers only care about price & reliability
5. Supply & demand must be balanced in real-time
6. Economies of scale are profound
7. Generation requires a portfolio of baseload, mid-merit, and peakers

# Which of these assumptions are still valid today?

When poll is active, respond at [PollEv.com/sepapower2017](https://www.poll-ev.com/sepapower2017)



# A new paradigm?

1. Electricity is the foundation of modern civilization
2. It is a public good



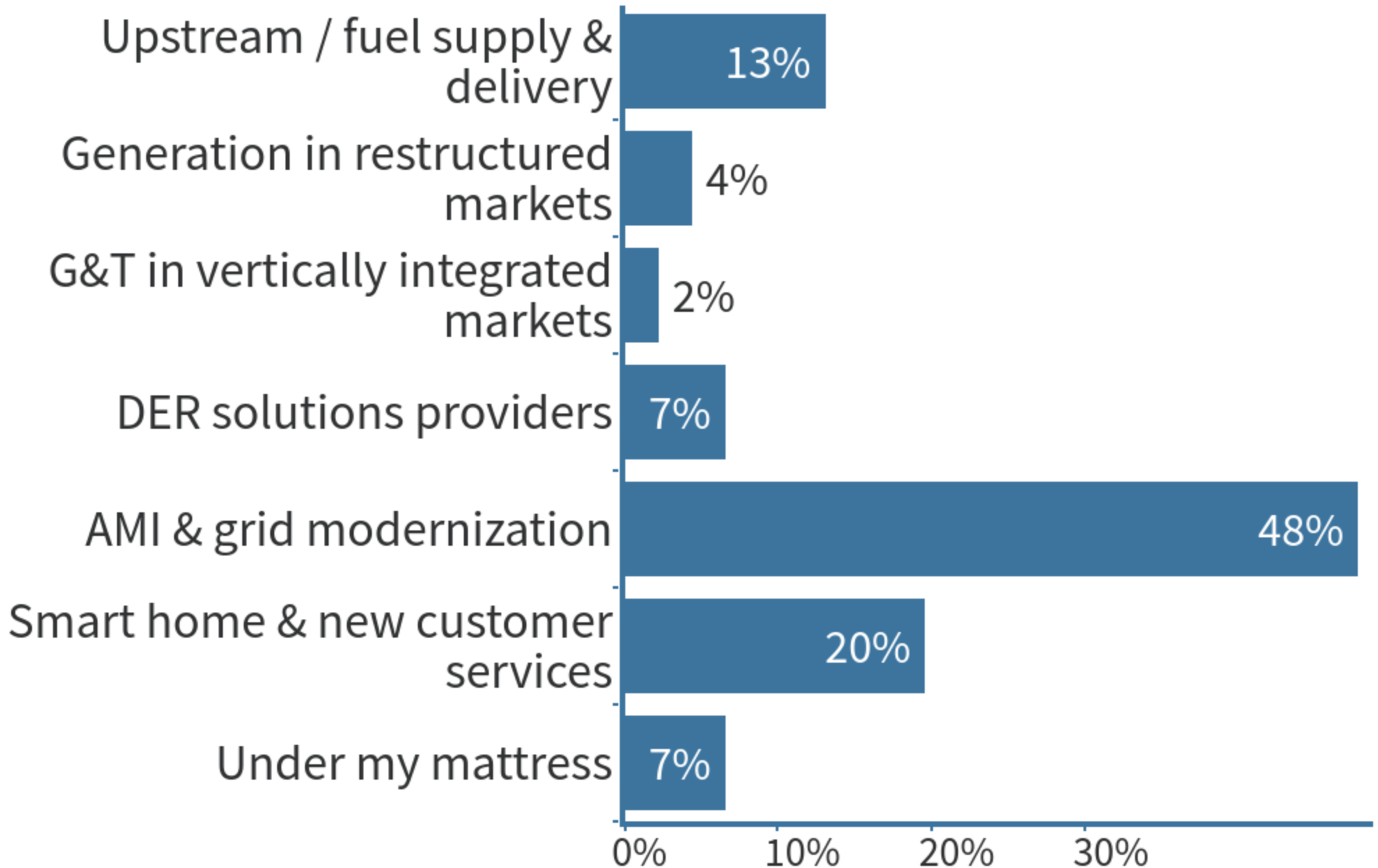
Plus...

1. The utility role as the natural monopoly, allowed monopoly, and market player is uncertain
2. Monopoly roles need a clearly sustainable revenue model
3. Rate design must be transparent
4. Customers will demand a manageable, easy to understand set of choices

5. So now what?

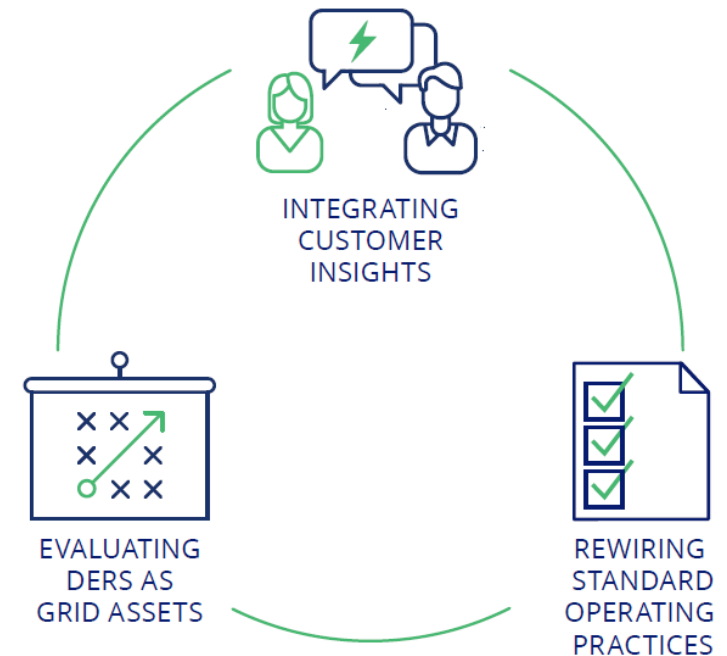
# Where do you invest that incremental utility dollar?

Respond at [PollEv.com/sepapower2017](https://www.poll-ev.com/sepapower2017)



# “Least regrets” moves for utilities

- Understand DER capabilities
- Get smarter about your customers
- Evaluate and improve your organization’s capacity for change
- Move forward with grid modernization investments
- Get ready for more disruption



# Continue the Conversation...

Events



**UTILITY**  
CONFERENCE

SEPA

Smart Energy. Practically Applied.

Smart Energy. Practically Applied.



**GRID EVOLUTION**  
SUMMIT

SEPA

A National Town Meeting

A National Town Meeting

Resources

The collage features three documents from the Smart Electric Power Alliance:

- Microgrids: Expanding Application and Implementation Business Structure** (December 2014)
- BEYOND THE METER SERIES: Distributed Energy Resources Capabilities Guide Executive Summary**
- IS THERE A PERFECT ELECTRICITY RATE FOR ALL TECHNOLOGIES?** (October 2016)



**Smart Electric  
Power Alliance**

# Thank You!

For more information:

Tanuj Deora

Chief Strategy Officer

[tdeora@sepapower.org](mailto:tdeora@sepapower.org)

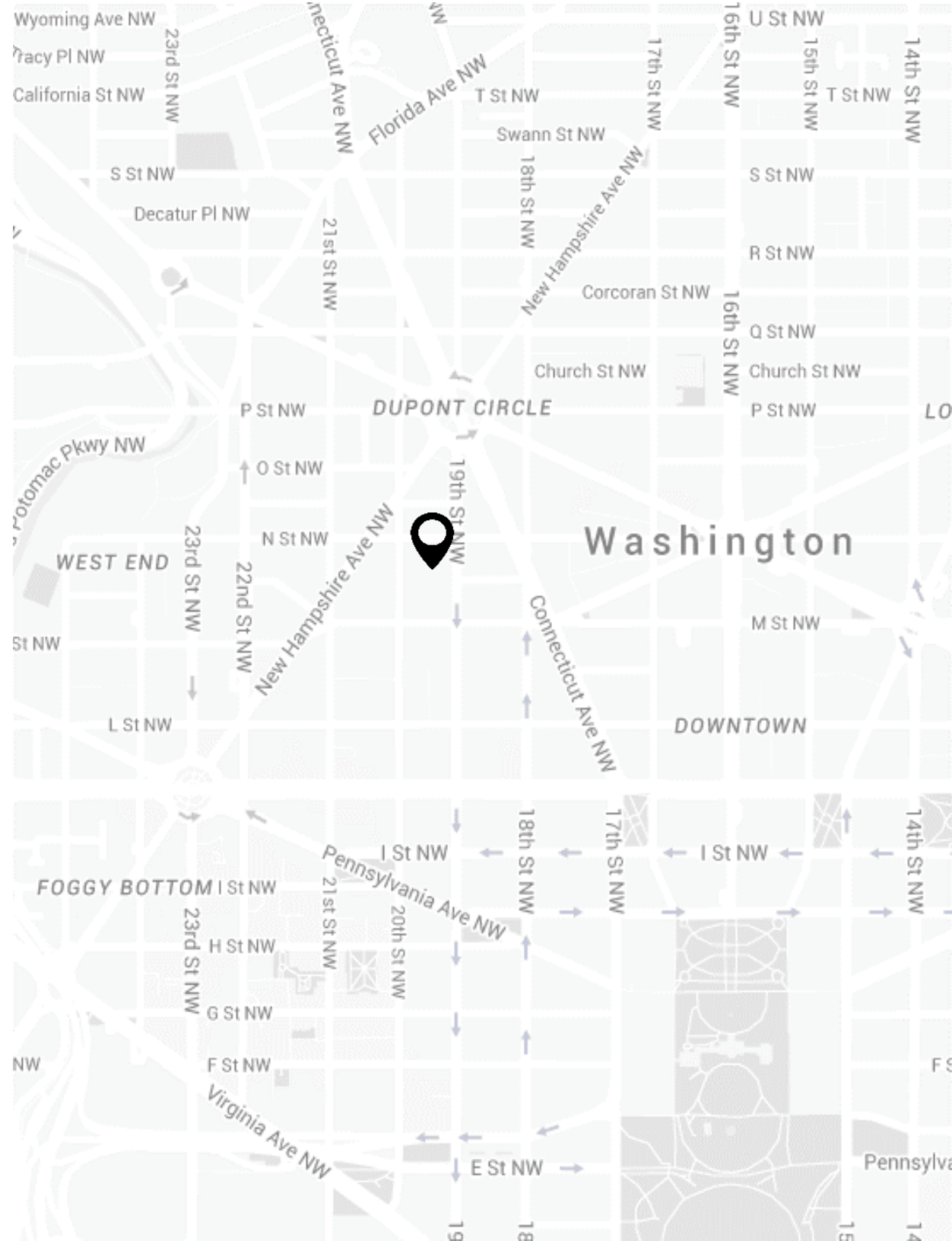
202-552-4411

1220 19<sup>th</sup> St NW, Suite 800

Washington, DC 20036

[www.sepapower.org](http://www.sepapower.org)

@sepapower





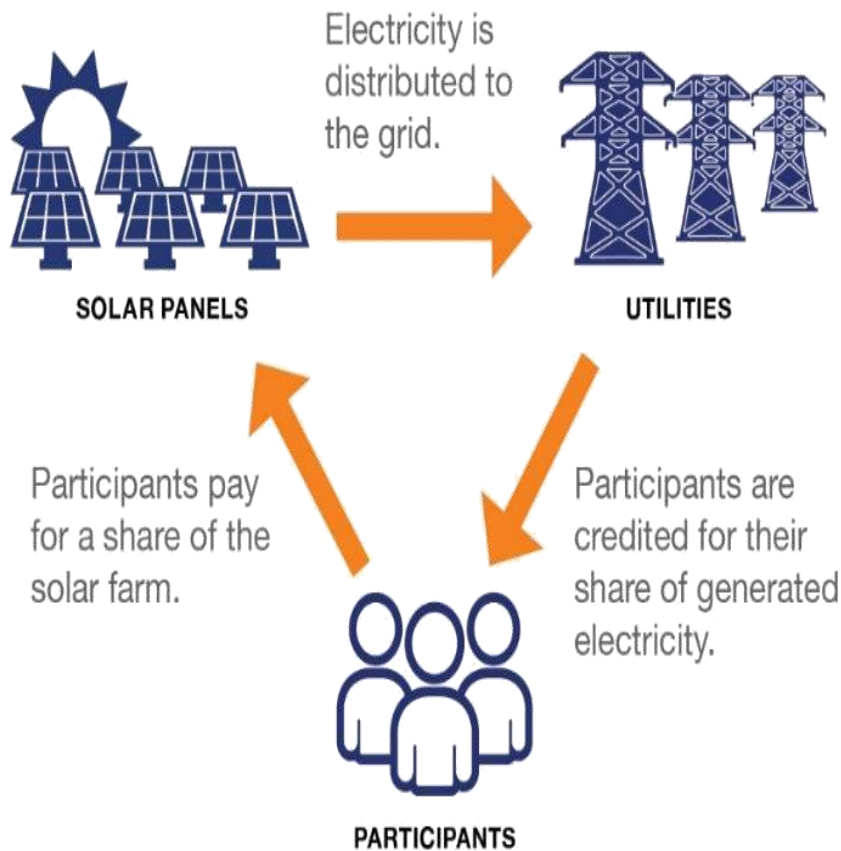
## PROPOSED/ENACTED RESIDENTIAL RATE CHANGES AND PRICE SIGNALS

Rate Change	Intention	Example
Increase Energy Rates	Utility production and distribution costs have increased	Many utility rate cases
Change to Time of Use Rate	Change from a flat rate to provide a time varying price signal on daily production cost variation	<a href="#">Xcel Energy - CO</a>
Adjust Export Rate	Price signal to size solar relative to real-time, monthly or annual consumption with lower export rates or fees	<a href="#">California NEM 2.0</a>
Change to Technology Rate	Purchasing technology output separately from consumption	<a href="#">Austin Energy</a>
Minimum Bill	Require a minimum electricity bill to ensure recovery	<a href="#">Massachusetts</a>
Increase Fixed Charge	Extract fixed costs from and lower energy rate to increase recovery certainty	<a href="#">Various Minnesota Cooperatives</a>
Add Demand Charge	Extract peak demand related fixed costs from and lower energy rate to increase recovery certainty	<a href="#">Arizona Public Service</a>
Add Technology Charge	Recover fixed cost or stand-by costs from technology generators	<a href="#">City of Provo (UT)</a>
Prevent Export	Limit export to the electric grid to facilitate fast-track interconnection in high solar penetration areas	<a href="#">Hawaiian Electric Company</a>

 = kilowatt-hour rate changes,

 = non-kilowatt-hour changes

# What is community solar?



## Customer Benefits

- Increase customer access
- Ability to hedge costs
- Portability within utility service area
- Leverages economies of scale

## Utility Benefits

- Can be strategically sited
- Proactive customer engagement
- Support the local PV industry
- Opportunity to gain understanding of solar resource

# Green solutions for key accounts

UTILITY DIVE

**FERC greenlights Apple's  
petition to sell electric power**

**VS.**

GREENTECH MEDIA

**Amazon and Dominion Power  
Forge a New Renewable  
Energy Path in Virginia**

***Proactive utility responses  
include:***

- Green riders
- Sleeved transactions
- Bespoke generation projects
- Bundled EPC approaches

# Incentive Mechanisms

## Traditionalist Approaches

- Expansion of investment opportunities
- Rate restructuring to ensure cost recovery
- Stand-by fees

## Adjustment Mechanisms

- Capitalizing key expenses (“regulatory assets”)
- Performance trackers
- Stand-by Fees

## Incremental / Supplemental

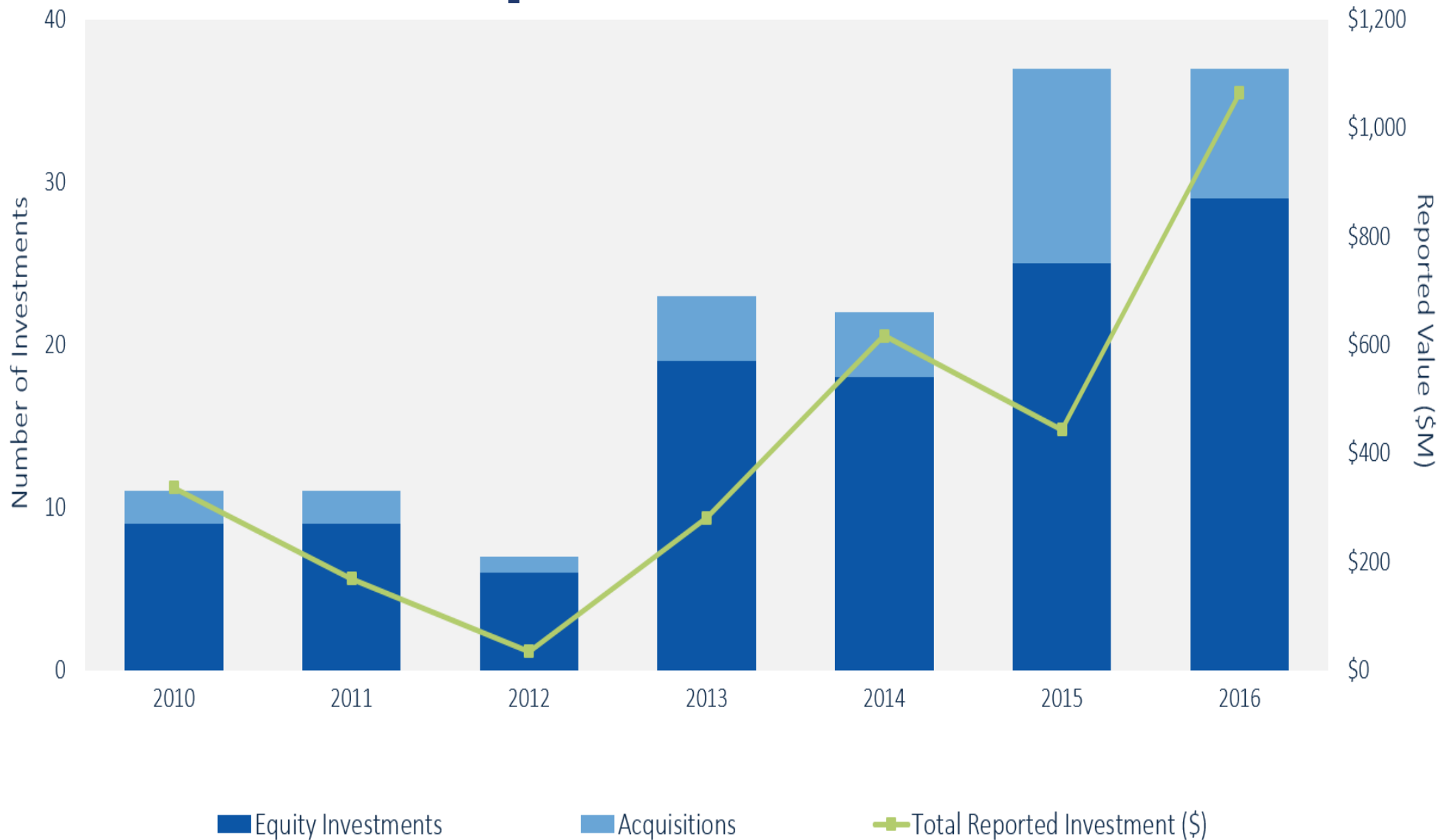
- Decoupling
- Shared savings
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- Revenue from DER sales
- Premium offerings

## Transformative Models

- Return on “TotEx”
- Performance-based regulation (PBR)
- Transaction fees, market access
- Revenue from data sales
- Selling services, not commodity

Source: NGA, SEPA

# IOUs making investments in DER companies



# Dangers of Group Think



“What I saw was group think. What I saw were individuals who were alike, therefore had the same experiences, and so therefore didn’t have a full-sum picture of what was going on. **They had that false comfort of agreement.**”

*Sallie Krawcheck*

Former President Investment Management, BoA  
February 2017