



POWER MARKET OUTLOOK – GRID TRANSFORMATION AND THE IMPACT OF DISTRIBUTED ENERGY RESOURCES

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Smart. Focused. Done Right.®

Introduction

- The influx of Distributed Energy Resources is changing the way utilities operate
- There is tremendous interest in “the utility business model” and what changes mean for all aspects of the utility
- This talk will focus on:
 - What the changes are
 - Impacts to utilities
 - The continuum of regulatory responses
 - What this means for supply chain

The Hype and the Headlines

Business Models Are Changing (Forever! Today!)

Utilities Are Facing a Death Spiral, a Mortal Threat!

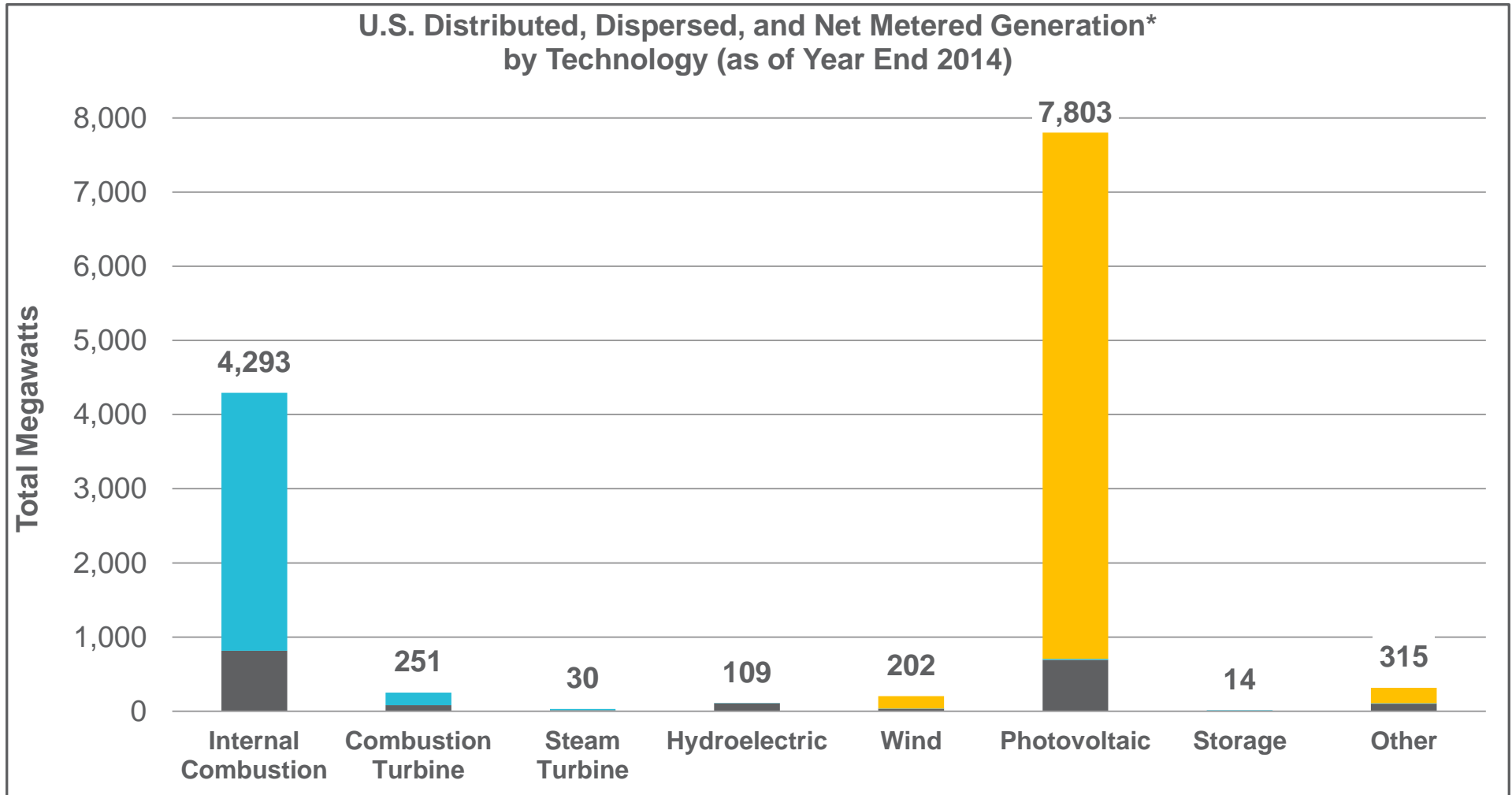
Solar Panels and a Battery in Every Home

DSO – COMING TO A NEIGHBORHOOD NEAR YOU!

Get Paid to Save Energy! See How Much You Can Save!

A Microgrid on Every Campus; In Every Community!

Distributed Energy Resources

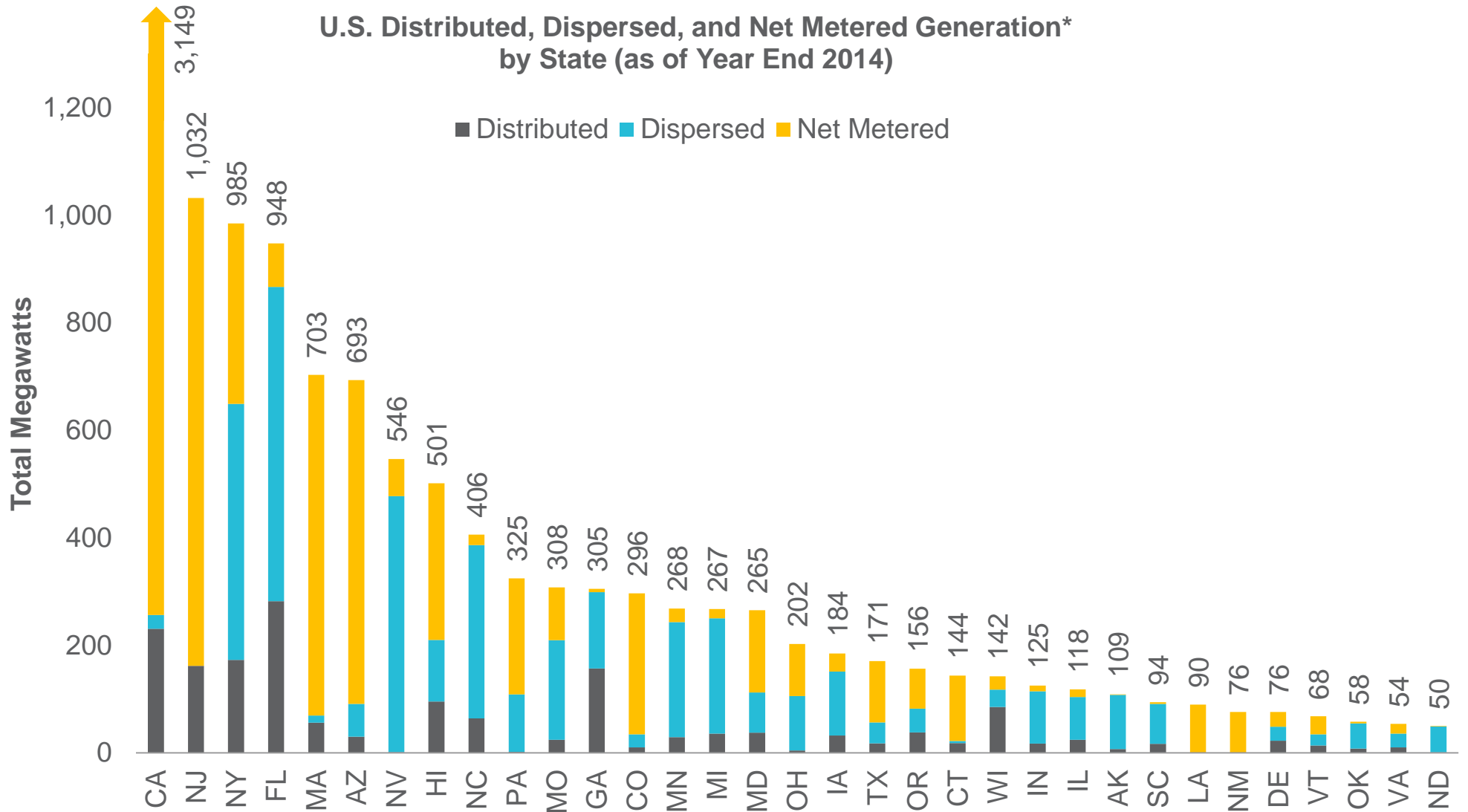


2014 U.S. Decentralized Capacity: 13,018 MWs
2013 U.S. Electric Generating Capacity (Summer): 1,060,064 MWs

Notes: *Distributed and dispersed includes commercial and industrial generators <1 MW; net metered refers to residential, commercial, and industrial generators <2 MW. Distributed and net metered are grid connected and grid synchronized; dispersed generators are not connected or synchronized to the grid. Figures include both actual and estimated and both utility and customer-owned generation. Due to nature of the data, it is possible some systems may be double counted.

Sources: EIA Form 860 and 861 data; ScottMadden analysis.

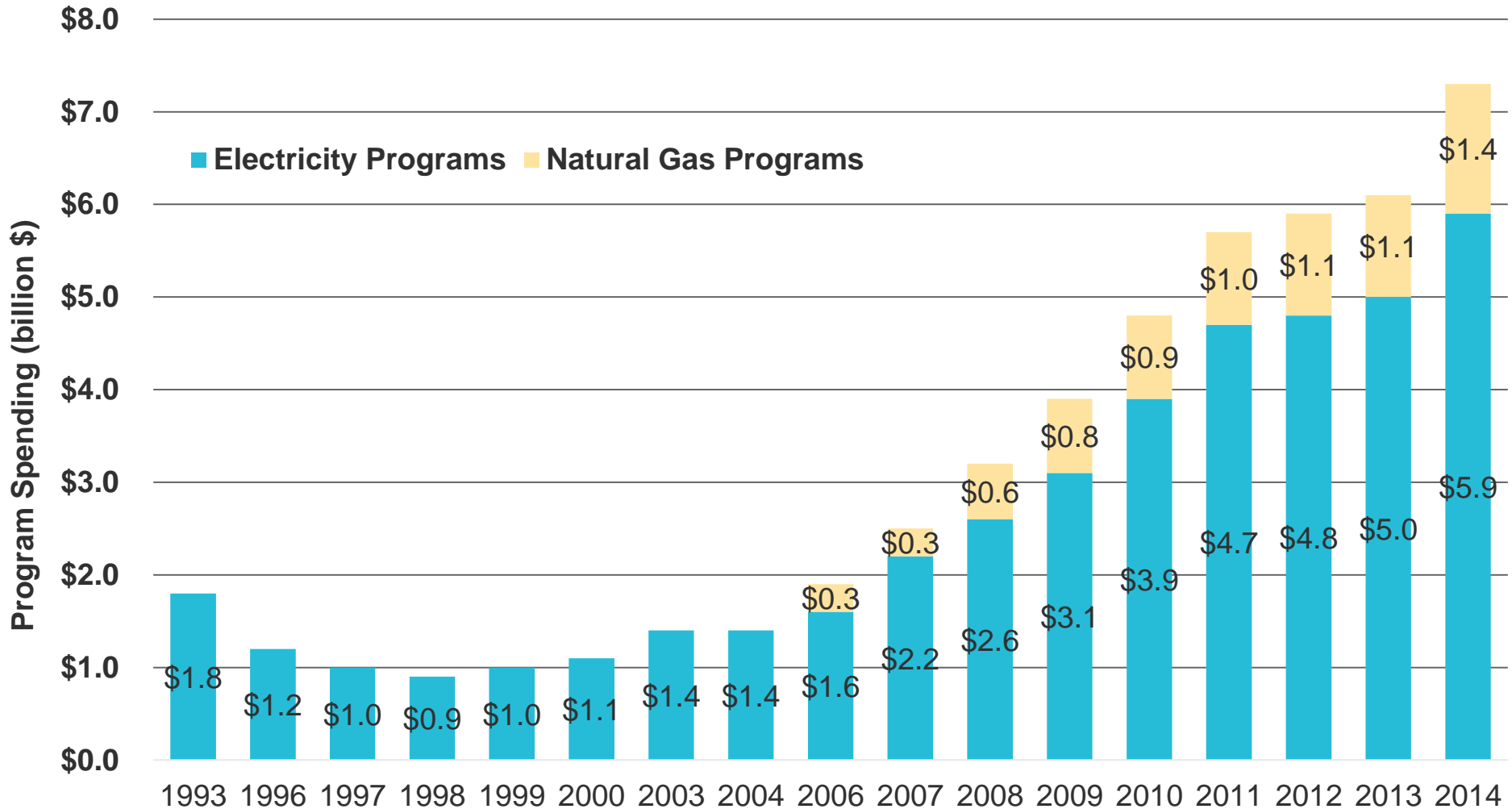
Distributed Energy Resources



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Energy Efficiency Programs



Annual electric and natural gas energy efficiency program spending. Natural gas spending is not available for the years 1993–2004.

Sources: Nadel, Kubo, and Geller 2000; York and Kushler 2002, 2005; Eldridge et al. 2007, 2008, 2009; CEE 2012, 2013, 2014, 2015; Gilleo et al. 2015.

What the Heck Does That Mean??

A working definition:

- The changes driven by the emergence of **distributed energy resources (DER)** in **all major functions** of electric utilities

Distributed Energy Resources (DER)

Energy Efficiency
Demand Response
Distributed Generation
Storage
Electric Vehicles
Microgrids

All Major Functions of Electric Utilities

Regulatory
Operations
System Planning
Customers
Stakeholder Management
Revenue Generation
Pricing
Supply Chain

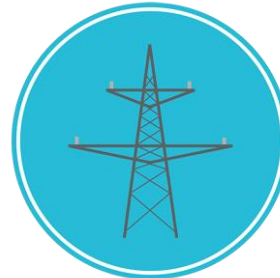
The degree of impact to these major functions driven by DER varies significantly by state and region.

Complexity and Uncertainty



Stakeholders

- Who gets a say?
- For what issues?



System Planning

- What resources will be where, when?
- How do I know it will be reliable?



Operations

- Who operates what, where, when, and how?
- What's actually out there anyway?



Pricing

- How do we price the products we offer?
- What are customers willing to pay?



Regulatory

- What are the rules?
- How and when will they change?



Customers

- What do they *really* want?
- What services?
- How much control?
- How much information?



Revenue Generation

- How does the utility make money?

A Continuum of Responses



Market is King



What this means:

- Utility scale renewables (wind and solar) have grown as they have been able to compete effectively in the ERCOT market
- Retail energy service providers create products that customers will buy in IOU territories; mainly compete on price with limited DER offerings
- Munis and coops have led the state in innovation providing utility scale and DER alternatives; largely because they retain the connection to the customer and can provide holistic offerings to customers

Key Characteristics:

- **Complete wholesale deregulation for IOUs:** wires companies that earn an ROE on T&D
- **Munis and Coops:** remain fully integrated

Reforming the Energy Vision: Tracks 1 and 2

Track 1

- Demonstration Projects
- Distributed Systems Implementation Plan (DSIP)
- Benefits Cost Analysis (BCA) Framework
- Energy Efficiency Transition Implementation Plan (ETIP)
- Non-Wires Alternatives (NWA)
- Interconnection Processes
- Microgrid Configurations
- Consumer Protections
- Consolidated ESCO Billing

Track 2

- Earnings Impact Mechanisms (EIMs)**
New performance incentives that are tied to desired outcomes; initially, positive only or symmetric only
- Market Based Earnings (MBE)**
Opportunities for utilities to increase revenue by acting as the platform to supplement rate-based revenue
- Rate Design and DER Compensation**
Determining the value of D (LMP + D), continuing net energy metering, and modifying existing rate designs
- Scorecard Mechanisms**
Metrics that are to be tracked but not monetized at this time; to be considered as future EIMs

Rate Cases

AMI

Building Blocks

**Distribution Resources Plans
(R.14-08-013)**

**Integrated Demand-Side
Management
(R.14-10-003)***

**Storage
Procurement
(R.15-03-011)****

**Net Energy
Metering
(R.14-07-002)**

**Alternative
Fueled Vehicles
(R.13-11-007)**

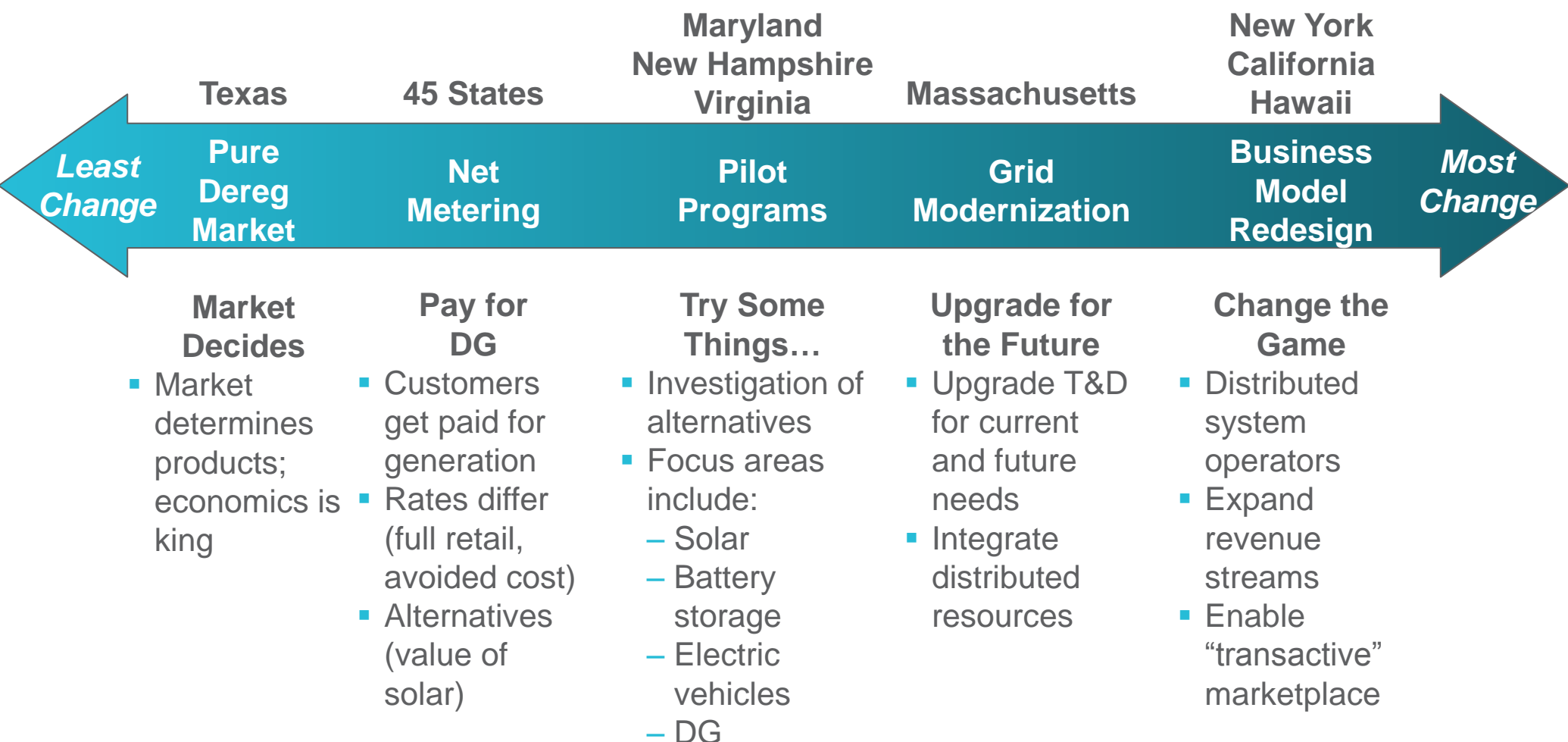
**Energy
Efficiency
(R.13-11-005)**

**Renewable
Portfolio
Standard
(R.15-02-020)**

Residential Rate Reform (R.12-06-013)

General Rate Cases

A Continuum of Responses



Grid Transformation's Impact on Supply Chain

Several forces will conspire to pressure supply chain organizations to adapt and incorporate a more sophisticated approach. Supply chain organizations will face **complex sourcing** requirements and multi-step RFP solutions, such as Qualifications-Based Selection (QBS).



- The number of parties supply chain will have to interact with
will increase
- Sophisticated contracting needs
will increase
- Pace of change
will increase
- Specialization of programs
will increase
- Switching costs
will increase
- Unclear variables that influence pricing
will increase

These are characteristics of complex markets and indicate that alternative sourcing mechanisms should be considered.

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