Distributed Energy Resources: Impacts on Business Models

AGA State Affairs Fall Committee Fall Meeting
Chicago, IL

October 11, 2016
### The Backdrop...

**What Drives the Current Business Model?**

#### Business Model

<table>
<thead>
<tr>
<th>Market and Customer Set</th>
<th>Key Activities</th>
<th>Technical Competencies</th>
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</thead>
<tbody>
<tr>
<td>The key activities that determine how a company:</td>
<td>The skills, practices, processes, and innovations that are essential to serve customers and markets, perform the activity system well, and animate the business model</td>
<td></td>
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<tr>
<td>- Does business</td>
<td>- Obligation to serve</td>
<td>- The key activities that determine how a company:</td>
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<tr>
<td>- Creates value</td>
<td>- Universal service</td>
<td>- Does business</td>
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<tr>
<td>- Sustains an advantage</td>
<td>- Least cost</td>
<td>- Creates value</td>
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<tr>
<td></td>
<td>- Exclusive franchise territory</td>
<td>- Sustains an advantage</td>
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<tr>
<td></td>
<td>- Natural monopoly</td>
<td>- Technical Competencies</td>
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#### Traditional Utility Role

- Obligation to serve
- Universal service
- Least cost
- Exclusive franchise territory
- Natural monopoly

#### Rate-Based Cost-of-Service Recovery Utility Earnings

- Return on rate base assets – cost of debt plus a reasonable return on equity, commensurate with risk
- Recovery of prudently incurred operating costs, depreciation and taxes
- Pass-through of fuel costs
- “Below-the-line” revenues from business activities:
  - In which utility shareholders bear the primary risk
  - Do not leverage ratepayer assets without compensation or, where applicable, fair opportunity provided to non-affiliates
Distributed Energy Resources: The New Imperative

Utilities face the challenge of managing both the traditional supply portfolio and the new paradigm of distributed energy resources to optimize the enterprise.
What’s Really Out There?

Decentralized Generation Grew by Nearly a Third in 2014

Solar Photovoltaic (PV) Capacity Is 1.7 Times All Other Decentralized Generation Combined

- How much: Year-end 2014 DG totaled 14.4 GW, nearly doubling since 2011. This remains a relatively small portion of the 1,164 GW of nameplate capacity in the United States.
- Where: The top five states—CA, NJ, NY, FL and AZ—account for more than half of DG capacity in the United States. California alone accounts for 26% of all DG.

NOTES:
The grid-synchronized category includes commercial and industrial generators less than 1 MW in capacity that are grid connected and grid synchronized. The C&I standby category includes commercial and industrial generators less than 1 MW in capacity that are not connected nor synchronized to the grid. The net metered category refers to residential, commercial, and industrial generators that are less than 2 MW in capacity and maintain a net-metering agreement with the local utility. Due to the nature of the data, it is possible some systems may be double counted. Figures are from 2014, the most recent data available.
Changing Regulatory Models

Implications Of An Evolving Model

Two Approaches

Stroke of the Pen Changes
- Regulatory and public policy objectives
  - What we are solving for, in some cases, is very different from the “givens”

“Fits and Starts” Evolution
- Enabling technologies
- Customer tastes and preferences
- Market ecosystem(s)

Call into Question

Utility Role
- Obligation to serve
- Universal service
- Least cost
- Exclusive franchise territory
- Natural monopoly
## What is Needed as Business Models Evolve?

<table>
<thead>
<tr>
<th>Some Key Issues With Adjustment of Regulatory Paradigms from Cost-Based Regulation to Other Models</th>
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<tbody>
<tr>
<td><strong>Behavioral Shifts and Customer Acceptance</strong></td>
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<tr>
<td>- While regulatory and financial incentives can play a significant role in behavior, conservation and efficiency require longer-term shifts in those incentives</td>
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<tr>
<td>- Incentives must be transparent and linked temporarily and directly to desired actions</td>
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<td>- Customers may have difficulty with paying as much or more on their utility bill while consuming less</td>
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<td>- Customers’ stated preferences (e.g., efficiency) may be belied by actual responses</td>
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<tr>
<td><strong>Stranded Investment</strong></td>
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<td>- Switching regulatory models will undoubtedly lead to some stranded investment, which will require debate over what losses should be compensable, how much should be awarded, and how to recover those costs</td>
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<td><strong>Time Horizon</strong></td>
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<td>- Current system and regulatory framework were developed over decades; unwinding or transitioning will likewise take time</td>
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<td><strong>Proving the Counterfactual</strong></td>
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<td>- Performance-based regulation (PBR) frequently involves judging utility performance versus what it would have been without PBR, which invites contentious interpretations if costs are not what advocates believe they “should” be</td>
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<tr>
<td><strong>Free Riders</strong></td>
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<td>- In isolation, one could have some incentives under a new model, while possibly leaning on adjacent systems still under the traditional model for reliability, supply adequacy, and cost containment—this will be more difficult if widespread regulatory changes occur</td>
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<td><strong>Accountability</strong></td>
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<td>- Unclear whether and how common concepts applicable to regulated utilities—obligation to serve, used and useful, just and reasonable rates, prudence, etc.—translate equitably to all players in some new regulatory models</td>
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<td><strong>Level Playing Field</strong></td>
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<td>- Depending upon the regulatory model (i.e., degree of third party vs. utility service competition) utility may have incumbency, affiliate, and brand advantages that need to be accounted for</td>
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Ratemaking solutions will be key to support this industry evolution
Changing Regulatory Models

Different Regulatory Constructs Matter

<table>
<thead>
<tr>
<th>What It Is</th>
<th>Central Planning</th>
<th>Technology Focus</th>
<th>Incentive Subsidies</th>
<th>Infrastructure Incentives</th>
<th>Market-Based</th>
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<tbody>
<tr>
<td>Regulators establish comprehensive regulatory framework and compact that defines utility roles, responsibilities, and financial incentives</td>
<td>Legal or regulatory requirements are established that put a “finger on the scale” for certain technologies</td>
<td>Special tariffs or other subsidies (incl. tax credits) are established to encourage certain types of resources or utility behaviors</td>
<td>Programs and mechanisms to promote development of certain kinds of energy infrastructure are established</td>
<td>Market and competitive forces are relied upon to allocate resources, select technologies, and compensate market participants</td>
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**Some Examples (States)**

- **Central Planning**
  - Utilities as platforms for technology (NY)
  - Demonstration projects (NY)
  - Fundamental redesign of ratemaking process (NY)
  - Distribution-level demand response programs (NY)
  - Community choice aggregation (NY)

- **Technology Focus**
  - Aggressive renewable portfolio standards (CA)
  - Solar carve-out in RPS (MN, NJ)
  - Smart grid requirement (CA)
  - Storage requirement (CA)
  - Tariff for customer-sited generation (CA)

- **Incentive Subsidies**
  - Value of solar tariff (MN, TN)
  - Applicable retail rates for solar gardens (MN)
  - Federal subsidies (tax and other)/loan guarantees
  - Net metering (various)
  - Voluntary RPS cost recovery and potential increased rate of return (VA)

- **Infrastructure Incentives**
  - Energy-tech venture fund (IL, NY)
  - Performance-based formula rates (IL)
  - Special (IL) or accelerated (MA) infrastructure cost recovery programs
  - Grants for projects to increase resiliency (MD)
  - Time-varying rates (MA)
  - Electric vehicles (CA, WA, et al.)

- **Market-Based**
  - Highly market-driven environment (TX, GA)
  - Few permitting requirements (TX)
  - Minimal subsidies and mandates (TX, GA)
  - Direct access/retail choice for industrial customers (TX)
Changing Regulatory Models

A Continuum of Responses

<table>
<thead>
<tr>
<th>Least Change</th>
<th>Most Change</th>
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<tbody>
<tr>
<td>Pure Dereg Market</td>
<td>Business Model Redesign</td>
</tr>
<tr>
<td>Texas</td>
<td>New York, California, and Hawaii</td>
</tr>
<tr>
<td>45 States* and DC</td>
<td>Maryland, New Hampshire, and Virginia</td>
</tr>
<tr>
<td>Pay for DG</td>
<td>Grid Modernization</td>
</tr>
<tr>
<td>Market Decides</td>
<td>Upgrade for the Future</td>
</tr>
<tr>
<td>- Market determines products; economics is king</td>
<td>- Upgrade T&amp;D for current and future needs</td>
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<tr>
<td>- Pay for DG</td>
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<tr>
<td>- Customers get paid for net excess generation</td>
<td></td>
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<tr>
<td>- Rates differ (full retail, avoided cost)</td>
<td></td>
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<tr>
<td>- Alternatives (value of solar)</td>
<td></td>
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<tr>
<td>Try Some Things…</td>
<td>- Integrate distributed resources</td>
</tr>
<tr>
<td>- Investigation of alternatives</td>
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</table>
| - Focus areas include:
  - Solar
  - Battery storage
  - Electric vehicles
  - DG |
| Change the Game |
| - Distributed system operators |
| - Expand revenue streams |
| - Enable “transactive” marketplace |

* Includes 4 states with statewide DG compensation rules other than net metering.
What's Changing?

Key Questions

**Stakeholders**
- Who gets a say?
- For what issues?

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

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

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

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

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

**Revenue Generation**
- How does the utility make money?
## What Are Some Future Potential Models?

<table>
<thead>
<tr>
<th>State/Initiative</th>
<th>Key Features</th>
<th>Distinguishing Characteristics</th>
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</table>
| New York Reforming the Energy Vision (REV) | Reinvention of utility role – distribution system platform providers  
“Animate” market forces – many providers expected  
Large-scale plans for efficiency, distributed system (investment)  
Utility revenue opportunities through platform services, but not Distributed Energy Resource (DER) ownership | PUC-driven market construct – a D-level “RTO” with opportunities and constraints for utility offerings  
Significant re-design of rates and regulatory approach  
• Market-based earnings (MBE)  
• Earnings incentive mechanisms (EIM)  
• Rate-base earnings |
| California Distribution Resource Plans (DRPs) | Assessment of utility system ability to accommodate DERs  
Required utility investments in distribution automation, grid reinforcement, and technology platforms  
Demonstration and deployment projects  
Not currently creating a distribution-level market | Investments/recoveries within rate case construct  
Leveraging CAISO for DER aggregation and bidding  
Phased rollout of project, DRP updates  
Coordination among other proceedings – long-term procurement, transmission planning, etc. |
| Minnesota e21 | Re-examining traditional rate-base rate-of-return model to:  
• Allow customers more options for energy sources and timing  
• Move from kWh sales-based, rate-based asset model  
Proposed framework includes:  
• Performance-based ratemaking  
• Customer option and rate design reforms  
• Planning reforms  
• Regulatory process reforms  
Utilities submit business plans; integrated resource analyses instead of rate cases | Multi-stakeholder collaborative invited by incumbent utility  
Performance-based, forward-looking approach to rate making and incentives focused on societal objectives vs. current cost-by-cost accounting to determine whether paying right amount |
California Section 769 vs. NY REV – Background and Stated Objectives

- To promote the increased deployment of DER in support of **achieving California’s 2020 and 2050 GHG reduction targets**
- To **modernize the electric distribution system** to accommodate two-way flows of energy and energy services
- To enable **customer choice** of new technologies
- To animate opportunities for DER to realize benefits through the **provision of grid services**

- To enhance **customer knowledge** and tools and support effective management of their total energy bill
- To **animate markets and leverage ratepayer contributions**
- To enhance **system wide efficiency**
- To promote **fuel and resource diversity**
- To **enhance system reliability** and resiliency
- To reduce carbon emissions

Though the stated goals are similar, the implementations differ; California is **not** establishing a distribution-level market in this proceeding.

* Impacted utilities are required to file Distribution Resources Plans (DRP) in CA and Distributed System Implementation Plans (DSIP) in NY.
What Specifically Is California Asking For? Distribution Resource Plans

The California Public Utilities Commission (CPUC) has asked the utilities to provide the following information as part of their Distribution Resource Plans (DRPs):

- Three different analyses:
  - Geospatial readout of Integrated Capacity Analysis (ICA)
  - Locational Net Benefits Methodology (LNBM)
  - Implications of DER growth scenarios
- Plans for demonstration and deployment projects to validate and refine the required analyses as defined by CPUC
- Utility third-party bi-directional data-sharing policies
- Relevant tariffs and contracts for modification
- Readout of relevant safety considerations for greater DER penetration
- Barriers to greater DER deployment and realization of benefits
- Required utility investments and links to general rate cases
- Coordination of the analyzed and forecasted distribution planning and the California Energy Commission’s Integrated Energy Policy Report (IEPR), CPUC’s Long-Term Procurement Plan (LTPP), and CAISO’s Transmission Planning Process (TPP)
- Proposed phased rollout projects and DRP updating process

Of significance is what the Commission is not asking for, “Some Parties would like this proceeding, and the DRPs, to serve as platforms for reinventing the existing utility distribution services model... That is not the focus of this proceeding.”

# Case Studies: California

## Building Blocks

<table>
<thead>
<tr>
<th>Distribution Resources Plans (R.14-08-013)</th>
<th>Integrated Demand-Side Management (R.14-10-003)*</th>
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<tbody>
<tr>
<td>Storage Procurement (R.15-03-011)**</td>
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<tr>
<td>Net Energy Metering (R.14-07-002)</td>
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<td>Alternative Fueled Vehicles (R.13-11-007)</td>
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<tr>
<th>Residential Rate Reform (R.12-06-013)</th>
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<tr>
<th>General Rate Cases</th>
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</table>

*Now including DERs.  
**1,325 MWs through 2020.
| Align an economically viable utility model with state and federal public policy goals. | Provide universal access to electricity services, including affordable services to low-income customers. | Provide for just, reasonable, and competitive rates. |
| Enable delivery of services and options that customers value. | Recognize and fairly value grid services and DER services. | Assure system reliability, and enhance resilience and security, while addressing customer privacy concerns. |
| Foster investment that optimizes economic and operational efficiency of the system as a whole. | Reduce regulatory admin costs and resources (e.g. results in fewer rate cases or reduces the burden of the regulatory process). | Facilitate innovation and implementation of new technologies. |
Xcel Energy’s Reform Principles

- Role of the Utility
- Cost-causation in rate design
- Value of the grid
- Cost-effective emissions reductions
- Managing the transition
Overview of Phase II

New Utility Compensation Model

TO: Revenue tied to performance, value & customer options.
Revenue aligned with:
- Policy
- System needs, and
- Utility performance

New Distribution Planning + Evolve IRP to Integrated System Plan
I.D. ways to reduce costs by reducing peak & improving efficiency of entire system.
Realize max. value from DER (e.g., “locational value mapping”).
Plan for supply- & demand-side resources.

Multi-year Regulatory Model
Multi-year Rate Plan tied to specific outcomes
Collaborative processes in advance of formal proceedings.
Proactive exploration of issues.
Fewer rate cases, but with same protections.

New Customer Options, More Predictable Rates
Ability to choose generation type & manage energy use.
Rates reflect value of DER and the Grid.
Fair & just allocation of costs; competitive rates.
Clearer price signals.
• Shift to a more performance-based compensation framework, where some portion of the utility earnings are linked to their performance on outcomes valued by customers and supportive of state energy policies.

• Revise the traditional approach of the 15-year Integrated Resource Planning regime by focusing more attention on the five-year Action Plan and streamlining regulatory review of the later years of the resource plan (beyond the action plan period).

• Recommends a transparent, forward-looking process for modernizing the grid that includes identifying how to achieve a more flexible distribution system that can efficiently and reliably integrate cost-effective DERs and pursuing opportunities to reduce customer costs by improving overall grid efficiency and better utilizing existing system assets.
What is REV?

In April 2014 in New York, Governor Andrew Cuomo and the NY PSC initiated the Reforming the Energy Vision (REV) proceeding with the stated goals of:

- Reforming the electric distribution system to increase the utilization of distributed energy resources (DER)
- Increasing the efficiency of energy conservation and renewable energy programs
- Integrating innovative technologies into the distribution system
- Creating a competitive market for DER
- Enhancing customer knowledge and tools and to support effective management of their total energy bill

### REV Related Proceedings

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>Community Net Metering</td>
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<tr>
<td>Individual Utility Rate Cases</td>
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<tr>
<td>Clean Energy Standard</td>
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<td>Clean Energy Fund</td>
<td>Clean Energy Fund</td>
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<tr>
<td>Low to Moderate Income</td>
<td>Low to Moderate Income</td>
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<tr>
<td>Community Choice Aggregation</td>
<td>Community Choice Aggregation</td>
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<td>Clean Energy Advisory Council</td>
<td>Clean Energy Advisory Council</td>
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<tr>
<td>Distributed Sys. Implementation Plans</td>
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<td>Retail Access</td>
<td>Retail Access</td>
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<td>Utility Code of Conduct</td>
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<td>Clean Energy Fund</td>
<td>Clean Energy Fund</td>
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<tr>
<td>Benefit Cost Analysis Framework</td>
<td>Benefit Cost Analysis Framework</td>
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<tr>
<td>Value of DER</td>
<td>Value of DER</td>
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<td>NY Green Bank</td>
<td>NY Green Bank</td>
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<tr>
<td>Standardized Interconnection Requirements</td>
<td>Standardized Interconnection Requirements</td>
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What Specifically Is New York Asking For? Track 1

- Established utilities as **Distributed System Platform** providers
- Requires utilities to file **demonstration projects** to test:
  - Potential market-based earnings
  - Rate design alternatives
  - Value of DER and animation of markets
- Requires utilities to file **DSIPs** to plan for increasing DER penetration
  - Includes but is not limited to: forecasting, integrated planning, technology platforms, operating standards, market design
- Establishes a **BCA framework** to provide a common and transparent methodology for evaluating the locational value of DER (included in the DSIP)
- Provides for enhancement of **Interconnection** processes

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**Track 1 Order***

- 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

*Though not part of the REV proceeding, Community Net Metering is closely aligned with REV initiatives and is proceeding under a separate docket.

Initial DSIP filed: June 30th
Supplemental due: Nov 1st
REV Track 2 Order was issued on May 19, 2016, the focus of this decision is to create a modern regulatory model that challenges utilities to take actions to better align shareholder financial interests with consumer interests.

**Platform Service Revenues (PSRs)**
New forms of utility revenues associated with the operation and facilitation of distribution level markets

- Example:
  - Customer origination
  - Data analysis
  - Co-branding

**Rate Design**
Adopted principles for rate design and directed further study & demonstrations

- Principles:
  - Cost causation
  - Encourage outcomes
  - Policy transparency
  - Decision-making

  - Fair value
  - Customer-orientation
  - Stability
  - Access
  - Gradualism

For study & demonstration:
- Study to analyze impacts of mass market rate reform scenarios (TOU, demand charges)
- Promotion of TOU
- Standby rates – filing describing detailed cost allocation
- Smart home rate demonstrations
- LMP+D separate proceeding

**Earnings Adjustment Mechanisms (EAMs)**
New performance incentives that are oriented toward near-term measures to create customer savings and to develop market-enabling tools

- System efficiency
- Energy efficiency
- Interconnection
- Cost effective achievement of CES goals

**Scorecard Mechanisms**
Metrics that are to be tracked but not monetized at this time; to be considered as future EAMs

- Examples:
  - System utilization
  - DER penetration
  - TOU rate efficacy
  - Market development
  - Market based revenues
  - Carbon reduction
  - Conversion of fossil fuel end uses
  - Customer satisfaction
  - Customer enhancement

**Earnings opportunities as defined in the Order**
REV Perspectives

Many Interlocking Pieces

Track 1: Role of distribution utilities in enabling market-based deployment of DERs

- Demonstration Projects
- Benefit Cost Analysis
- Distributed System Implementation Plans (DSIP)
- Energy Efficiency Transition Implementation Plans (ETIP)
- Non-Wires Alternatives
- Interconnection Processes
- Microgrid Configurations
- Consumer Protections
- Consolidated ESCO Billing
- Earnings Adjustment Mechanisms
- Platform Service Revenues
- Scorecard Metrics
- Rate Design

Track 2: Changes in regulatory, tariff, and market designs and incentive structures

- Clean Energy Standard
- LMP+D
- Rate Cases
- AMI
Questions?

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