NEW BUSINESS MODELS AT THE DISTRIBUTION EDGE

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RMI. Creating a clean, prosperous, and secure energy future.™
Rocky Mountain Institute works across industries on challenging energy issues to drive the efficient and restorative use of resources with market-based approaches.

e’Lab brings together leading electricity sector actors to solve regulatory, business, and economic barriers to the deployment of distributed resources.
Topics for today

• The need for new business models
• A roadmap for creating solutions
• Discussion of types of solutions
• One example: community solar + demand response program
Dramatic PV cost reductions have helped to drive rapid market growth in the U.S.

**Total installed cost for commercial PV systems (10–100 kW)**


**Distributed PV capacity installed in US**

Models designed for an historically centralized system are misaligned with distributed resource characteristics.
What should the roadmap to new types of business models look like?

1. **Establish Clear Foundation of Value**
   - Identify and evaluate DER benefits and costs to the grid
   - Assess system operations implications
   - Ensure accountability, transparency, and verifiability for future stakeholder engagement

2. **Align Pricing to Reflect Value**
   - Integrate value foundation into pricing models that provide clearer signal to customers and fair compensation

3. **Develop Business Model Opportunities**
   - Leverage the combined strengths of utilities and third-party service providers to reduce total cost and increase benefits
   - Identify opportunities to capture increased value while creating positive outcomes for utilities, service providers, and customers
Efficiency and other distributed energy resources create real value in a variety of ways

**ENERGY**
- energy
- system losses

**CAPACITY**
- generation capacity
- distribution capacity
- transmission capacity

**GRID SUPPORT SERVICES**
- reactive supply & voltage control
- regulation & frequency response
- energy & generator imbalance
- synchronized & supplemental operating reserves
- scheduling, forecasting, and system control & dispatch

**FINANCIAL**
- fuel price hedge

**SECURITY**
- resiliency

**ENVIRONMENTAL**
- CO₂ emissions
- criteria air pollutants (SOₓ, NOₓ, PM₁₀, etc.)
- water

**SOCIAL**
- economic development
There is significant opportunity to increase the value of distributed energy resources.

**Total resource benefits and costs**

[$/kWh]

<table>
<thead>
<tr>
<th>Costs</th>
<th>Benefits</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline costs</td>
<td>Increased benefits w/ optimized production</td>
<td>Baseline value</td>
</tr>
<tr>
<td>Cost savings</td>
<td>Effect of optimized production</td>
<td>Increased value</td>
</tr>
<tr>
<td>Effect of cost savings</td>
<td>Baseline benefits</td>
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**Ex:** Reduce the cost of customer acquisition

**Ex:** Target locations where the grid is constrained

Capturing these opportunities will provide increased value to customers and the system.
Collaboration between utilities and third parties will be critical to further reducing project costs

Key opportunities to reduce costs include:

- **Site identification**
  Share key data to make process much simpler, faster, and less-expensive

- **Customer acquisition**
  Leverage utility access to customers and brand strength to improve marketing and decrease customer concerns

- **Permitting, inspection, and interconnection**
  Streamline application process, co-develop clear equipment standards, and exchange interconnection information

- **Financing**
  Extend low-cost financing to broader customer segments

- **Billing**
  Improve customer experience and reduce administrative costs of billing systems
Opportunities to increase benefits

**Optimize for capacity value:**
Strategic project design can defer new capacity investments by:
- Increasing correlation of production with load
- Targeting locations where the system is constrained

**Provide additional grid services:**
Add advanced inverters to offer additional grid support services, potentially increasing value by reducing operating costs and/or the need for other infrastructure

**Integrate complementary technologies and programs:**
Project bundling can maximize operational benefits by strengthening existing capabilities, and/or by providing additional grid services
Solutions to better capture value should seek to provide “win-win-win” solutions

**Customers**
- Bill savings
- Financing and capital access
- Simple and convenient transactions
- Renewable energy procurement
- Education

**Utility**
- Earnings and revenue stability
- Lower system costs for all ratepayers
- Recovery of necessary fixed costs
- Improved planning and operations
- Customer satisfaction

**Solar Industry**
- Access to customers and market
- Sales and revenue stability
- Lower overall risk
- Job creation
# The spectrum of solutions for capturing value

<table>
<thead>
<tr>
<th>Description</th>
<th>Pricing and Realignment</th>
<th>Bridge Business Models</th>
<th>Regulatory and Business Model Reform</th>
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<tbody>
<tr>
<td>Design pricing models that align customer incentives with the benefits and costs DERs provide</td>
<td>Adapt business models to increase and capture value within the existing regulatory paradigm</td>
<td>Redesign regulatory and business models to provide a platform for the economic and operational integration of DERs</td>
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### Examples

- **Pricing and Realignment**
  - Time of use pricing
  - Energy + capacity pricing
  - Distribution “hot spot” credits
  - Real-time pricing
  - Attribute-based pricing
  - Distribution locational marginal pricing

- **Bridge Business Models**
  - Increased access to DERs
  - Optimized deployment of DERs onto the grid
  - Technology bundles that provide energy services

- **Regulatory and Business Model Reform**
  - Energy services utility
  - Smart integrator
  - Independent distribution system operator
  - Resource finance aggregator
Bridge business models: creating win-win-win solutions

BUILDING BLOCKS FOR BRIDGE BUSINESS MODELS

Distributed Solar PV as a Grid Resource

Proactive deployment to capture potential value that is currently being missed by optimizing:
- production timing
- interconnection location
- services provided

Increased Access for Distributed Solar PV

Make DPV accessible to a much broader customer base, including the large portion of customers for whom on-site solar is not an option

Distributed Solar PV in Technology Bundles

Use solar adoption to increase uptake of other distributed energy resource (DER) technologies, creating greater value by leveraging complementary technologies and making myriad DER choices more consumer friendly
Steele-Waseca Electric Cooperative: The Sunna Project

Program Description
- Customer enters contractual agreement for up to 20 years and receives credits for generation
- A member who joins SWCE’s water heating load control program can purchase 1 panel for $170 ($0.41/W). SWCE offers water heaters at no cost.
- Additional panels cost $2.99/W.

Benefits
- Increases member satisfaction while minimizing cross-subsidization among members
- Provides SWCE with substantial load flexibility
- Expects 2/3 of participants will be adding electric load
Next steps for developing and supporting new DER business models

- Assess current abilities to identify value and customer needs

- Develop a transparent, multi-stakeholder process to create a standardized methodology, evaluate value, and share results

- Determine approaches for optimizing and capturing value

- Assess pilots and refine solutions
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Pricing realignment: Unbundling along three spectrums can unleash innovative products and services

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<th>Attribute Unbundling</th>
<th>Temporal Granularity</th>
<th>Locational Granularity</th>
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Today’s block pricing is fully bundled, with no time- or location-based differentiation

**Time-of-Use Pricing** represents a viable near-term solution that represents greater temporal granularity…

…while **Real-Time Pricing** represents a subsequent option with even greater temporal granularity

**Energy + Capacity Pricing** (Demand Charges) represents a viable near-term solution for attribute unbundling…

… and **Distribution Hot Spot Credits** represent a viable near-term solution for locational granularity

There are multiple viable near-term solutions, as well as more sophisticated longer-term options
Emerging models of more fundamental regulatory reform

- Performance-based regulation
- Independent distributed network operator/distributed system platform
- Energy services utility
- Smart integrator
- Resource finance aggregator