SPP’s Proposed Ramp Product

INITIAL RECOMMENDATIONS FOR MAXIMIZING THE BENEFITS OF A RAMPING PRODUCT

PRESENTED TO
Holistic Integrated Tariff Team
Previously Presented to SPP MWG Meeting on 9/11/18

PRESENTED BY
Johannes Pfeifenberger
Kathleen Spees
John Tsoukalis
Judy Chang

October 23, 2018

THE Brattle GROUP
Overview: Ramping Products Could Offer Significant Benefits to the SPP Region

We support SPP staff and MMU recommendations to introduce a market-based “ramp” product to help manage increases in net load variability and ramp scarcity events.

We offer a number of recommendations for maximizing the benefits of ramping products by:

1. Developing **ramping product definitions** that are driven by underlying system needs.
2. Establishing **efficient price formation** based on the **willingness to pay** for varying quantities of ramping reserves.
3. Enabling **technology-neutral, market-based** procurement.
4. Ensuring that ramp products are **aligned with other design elements and potential reforms**.

Adapted from our full paper: *Initial Comments on SPP’s Draft Ramp Product Report*
# Ramping Products Are Needed to Manage Growing Net Load Variability

Ramp products are needed to manage a distinct new system need that is not yet managed by any other market product:

<table>
<thead>
<tr>
<th>Product</th>
<th>Needed for:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ramp</strong></td>
<td>Manage increasing ramping and net load variability between dispatch intervals (i.e. capability to meet net load ramps over 10 min, 30 min, or 1+ hours)</td>
</tr>
<tr>
<td>Contingency Reserves</td>
<td>Respond to generation and transmission outages</td>
</tr>
<tr>
<td>Regulation</td>
<td>Manage net load variability within a 5-minute dispatch interval</td>
</tr>
<tr>
<td>Energy</td>
<td>Meeting customer demand</td>
</tr>
</tbody>
</table>

- **Ramp Up & Down, Possibly Multiple Timeframes**
- **Contingency Reserves Spinning & Supplemental**
- **Regulation Up & Down**
- **Energy**
Ramping capability procured in the current interval ensures the ability to meet **expected** and **unexpected** ramping needs in future intervals.

**Example: MISO’s Ramp Product**

- **Ramp Up:** holds back sufficient “headroom” to meet load in upcoming intervals & avoid scarcity events.
- **Ramp Down:** mitigates the potential for minimum generation events.

...Ensures ability to meet **expected** net load (plus an **unexpected** ramp uncertainty margin) at 8:20.

(No ramp-down is needed in this interval.)

We support the MMU’s five recommended ramp product design principles as presented in the 2017 SOM Report:

- **Two products*** ramp capability up and ramp capability down
- **Co-optimization** with energy and other products to ensure the most economical solution
- **Opportunity cost** basis for pricing
- **No limitations** on resource type as long as the resource can reliably provide the required ramp
- Consideration of both **expected and unexpected** ramping needs

In **our comments**, we also present a number of additional recommendations to maximize the benefit that ramp products can provide to the SPP market and its participants

* We agree that there should be at least two products for ramp-up and ramp-down, but recommend evaluating whether there is a need for additional ramping products to meet ramping needs at multiple forward timeframes
Additional Recommendations (1)

Design Should be **Driven by System Needs**

The design of the ramping product should be tailored to address SPP’s unique patterns of net load variability and ramp-driven shortages:

- Meet **multi-interval load following needs** that are not already met by other market products such as regulating reserves
- Possibly include several **ramp products for different time horizons** as distinct ramping requirements emerge (start with the already-identified need for a 5-10 min product)
- Meet both **expected and unexpected** ramping needs
- Ramp products should be **procured on a day-ahead basis** with adjustments in the real-time market
- Consider **lessons learned** and product design from other markets including MISO and CAISO; but ensure that the design recognizes how **SPP differs from other markets**
Efficient price formation can ensure that ramping needs are achieved cost-effectively via:

- **Co-optimization** with energy and other products and opportunity cost basis for pricing

- Alignment with **proper scarcity pricing** in energy and ancillary services markets
  
  *If real-time prices are applied to unresponsive ramp-dispatch, scarcity pricing will provide proper performance incentives*
  
  *Real-time price volatility will increase as more intermittent generation is added, but real-time market is only 0.05% to 1.5% the size of day-ahead settlements*

- **Cost-effectiveness** ensured via economic analysis of:
  
  *The value proposition of ramp up (to avoid scarcity events and out-of-market unit commitments) and ramp down (to avoid wind curtailments and minimum generation events)*
  
  *An appropriate willingness to pay for varying quantities of ramp (which can be incorporated into the day-ahead and real-time market)*
Ramping can be an effective in-market tool for meeting systemvariability needs from a broad set of resources, by:

- **Ensuring all resource types can participate** (thermal, demand response, storage, renewables, hydro)
  
  - Technical requirement and qualified MW is based on the ability to contribute to meeting system ramping needs within the relevant timeframe (e.g. within the 5-10 minutes)

- **Enabling non-spinning quick-start resources and demand response** to participate as long as they can respond within the necessary timeframe
Additional Recommendations (4)
Ramp Should Align with Other Design Elements and Potential Reforms

The new ramping product will use a transparent, market-based product, reduce reliance on non-priced and manual interventions. To best align with other design elements, the ramp product can:

— **Integrate with SPP’s Instantaneous Load Capacity (ILC) process** to reduce the need for (unpriced) procurement of headroom to address intra-hour ramping needs

— **Reduce reliance on RUC, ST-RUC, and manual RUC processes** that tend to suppress market prices and introduce out-of-market uplift costs

— **Recognize that ramp products and look-ahead real-time dispatch optimization are complementary** (if that is ultimately implemented by SPP)
### How Ramp Can Complement Other Elements of SPP’s Market Design

Market-based ramp products will enhance the performance of the existing market design and future enhancements.

#### Ramping Products Will Better Support Existing Market Systems
- Reduce reliance on ILC, RUC, and ST-RUC for unit commitments (which are not reflected in market prices)
- Reduce out-of-market uplift payments
- Reduce the frequency and severity of contingency and regulating reserve shortages and scarcity pricing events
- Reduce the frequency of minimum generation events
- Reduce the quantity of wind curtailments

#### Ramp Product Will Be Complementary to Potential Reforms
*But there is no need to implement other reforms at the same time as introducing ramp products.*
- Look-ahead real-time SCED
- Enhanced scarcity pricing
- Refined ancillary service products that may be needed to support other types of system needs
Takeaways

Ramp products have the potential to offer significant reliability and economic benefits to the SPP region

- Reduce frequency and magnitude of ramp-related scarcity events
- Co-optimization increases overall market efficiency, reduced total costs, and results in better pricing
- Reduce out-of-market operational actions that distort market prices

Benefits can be maximized if the design is driven by best practices:

- Driven by underlying system needs
- Efficient price formation
- Technology-neutral participation of all resource types
- Alignment with existing design elements and potential reforms
The views expressed in this presentation are strictly those of the presenter and do not necessarily state or reflect the views of The Brattle Group.
Our Practices and Industries

**ENERGY & UTILITIES**
- Competition & Market Manipulation
- Distributed Energy Resources
- Electric Transmission
- Electricity Market Modeling & Resource Planning
- Electrification & Growth Opportunities
- Energy Litigation
- Energy Storage
- Environmental Policy, Planning and Compliance
- Finance and Ratemaking
- Gas/Electric Coordination
- Market Design
- Natural Gas & Petroleum
- Nuclear
- Renewable & Alternative Energy

**LITIGATION**
- Accounting
- Analysis of Market Manipulation
- Antitrust/Competition
- Bankruptcy & Restructuring
- Big Data & Document Analytics
- Commercial Damages
- Environmental Litigation & Regulation
- Intellectual Property
- International Arbitration
- International Trade
- Labor & Employment
- Mergers & Acquisitions Litigation
- Product Liability
- Securities & Finance
- Tax Controversy & Transfer Pricing
- Valuation
- White Collar Investigations & Litigation

**INDUSTRIES**
- Electric Power
- Financial Institutions
- Infrastructure
- Natural Gas & Petroleum
- Pharmaceuticals & Medical Devices
- Telecommunications, Internet, and Media
- Transportation
- Water
Our Offices

BOSTON

NEW YORK

SAN FRANCISCO

WASHINGTON

TORONTO

LONDON

MADRID

ROME

SYDNEY