

# SLICE IN ORGANIZED MARKETS

Presented by  
Slice Customer Markets Working Group

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BPA Provider of Choice Planned Products Workshop

November 14, 2023



# Slice Customer Markets Working Group

- **Small working group of the RD Slice Implementation Group (SIG).**
  - Comprised of staff from Snohomish PUD, EWEB, and TEA.
  - Expertise in existing Slice product and organized markets.
- **Formed in early 2023 to investigate, explore and brainstorm how the existing RD and a future POC Slice product would interface with market formation efforts underway.**
  - In response to rapidly moving market development efforts initiated by CAISO for EDAM and SPP for Markets+.

# Goal, Intent & Mindset

- **Goal – Provider of Choice Slice product concept that is compatible with future organized markets and maintains the value and risk sharing of the current slice product for BPA and customers.**
  - Value of organized markets for FCRPS is linked very closely to market dispatch of flexible resources into most valuable periods; flexible elements of planned products should be dispatchable through the market.
  - Product design must preserve the ability for BPA and customers to meet market obligations.
- **Intent – Collaboratively develop and evaluate feasible options and identify a mutually beneficial approach for Slice participation in organized markets, as part of a broader Provider of Choice Slice framework.**
- **Mindset – Leverage what we know today about Slice and markets to adapt product offerings to day-ahead market functions and features.**
  - Maximize use of existing systems, processes and features in Slice and markets – We do not need to re-invent the wheel.
  - Potentially pursue opportunities for market design to recognize certain features of BPA’s planned products, if needed.

# Slice Characteristics & Value

- With anticipated regional load growth and resource retirements, Slice flexibility allows customers to take direct responsibility to integrate clean resources and serve load, placing less of this burden on BPA:
  - Flexibility to integrate existing and new non-federal resources, especially managing the uncertainty of variable energy resources.
  - Flexibility to serve Tier 2 PF loads and non-PF loads (load growth, NLSL, etc).
  - Greater autonomy and flexibility over long-term resource planning.
- Utilize storage flexibility consistent with utility outlook on market prices and net position.
- Effectively manage the price and volumetric risk of FCRPS generation.
- Revenue from surplus energy sales flows directly to customers.
- Knowledge of wholesale market dynamics and operations gained through direct participation informs future market design efforts.

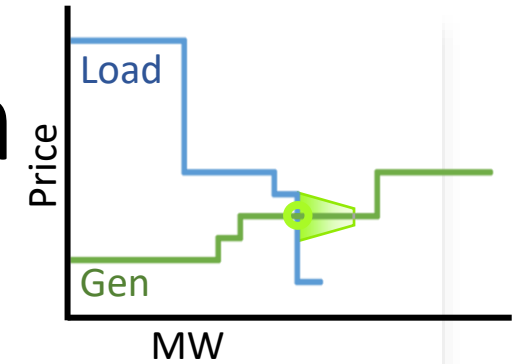
# Slice Risk Sharing

- **Fixed % Share of the Tier 1 System Capability at Fixed % Share of the Tier 1 System Cost.**
  - Customer assumes all volumetric risk of Tier 1 System output – Annual, Seasonal, Daily and Hourly.
  - Slice product is essentially “unit contingent” **AND** “fuel contingent” up to the hour of delivery.
  - BPA’s “perfect hedge” on Slice portion of the Tier 1 System is built into the product, no additional tools are needed to achieve this level of risk coverage → Customer assumes all water-year risk of generation availability and financial market price risk on secondary sales.
  - Diversifies BPA’s firm obligations to Preference customers across months with significant system risk.
- **Existing Slice Water Routing Simulator (SWRS) ensures customer is receiving their “fair share” of the Tier 1 System capability.**
  - “Reasonable Representation” modeling standard of SWRS provides transparent and verifiable mechanism to demonstrate Slice customer is getting no more or no less than their contract share of the system output

# Value Streams of Organized Markets

- More efficient dispatch of energy (shape water to highest priced periods)
  - Flexibility of FCRPS in organized market expected to be very efficient at integrating variable renewables
- More granular pricing (hourly and at each gen and load node)
- Flexibility Reserve products
- Congestion revenues
- Directly interface/settle with organized market
  - Increased visibility on charge types
  - Opportunities to increase market value on non-federal generation
  - Modify offer strategies in response to current market conditions
  - Monetize all generator attributes in offer strategies (not just Slice)

# “Typical” Resource Participation in Organized Day-ahead Markets



## Resource submits day-ahead offer curve to the market

- Offer curve: up to 10 price/MW pairs (offer segments) – for hydro resources price is likely based on forecasted opportunity cost
- Resource also communicates other operating constraints to the market (e.g. ramp rates, min/max generation, daily energy limits, etc.)
- Resource can “self-schedule”, but will be a price taker

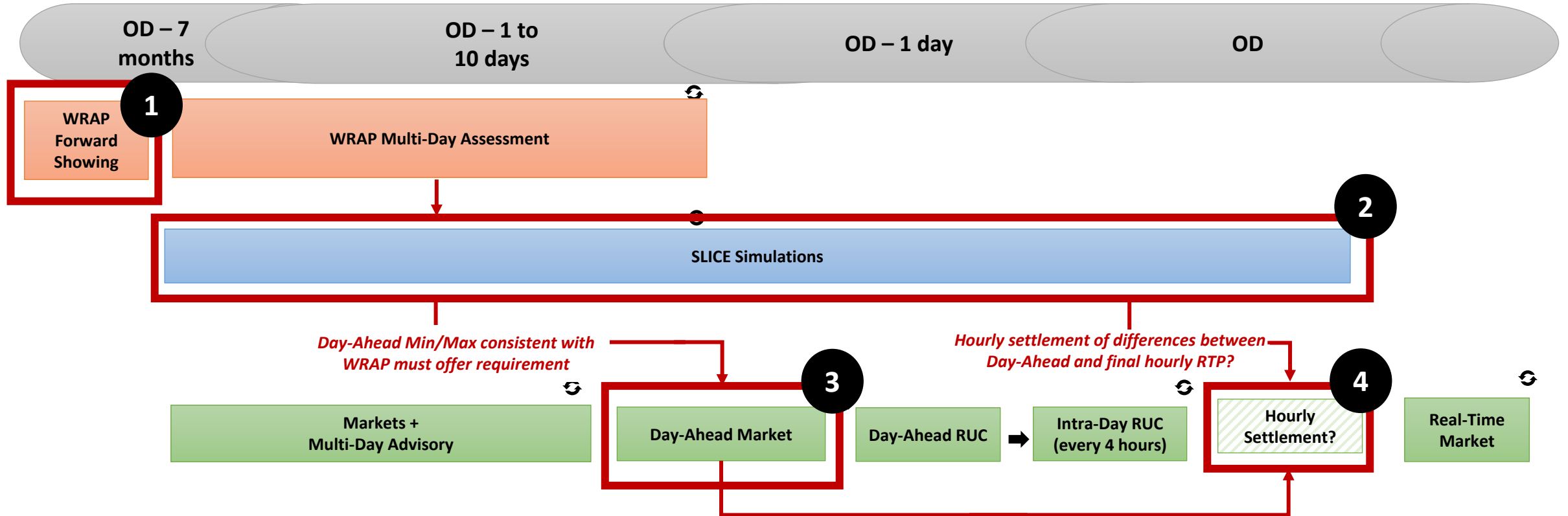
## Day-ahead market will determine least cost set of resources to meet bid-in load – subject to constraints

- All cleared resources receive market clearing price: cost to serve one additional MW of demand
- Resource won't be dispatched if offer is above clearing price

## Resources can adjust offers in real-time market

- Resources may get dispatched up or down in real-time based on updated offers, changing supply/demand conditions, etc.
- Resources may also self-commit (price taker) their day-ahead award in real-time

# Market Participation Timing & Framework Components



- 1 Resource Adequacy
- 2 Multi-Day Ahead Slice Simulation
- 3 Day-Ahead Market Participation
- 4 Hourly Settlement



# Gaps for Slice Participation in Organized Markets

Today, Slice can participate like any other resource in the bilateral market. Ideally, the same would be true as we move to organized markets, but some gaps exist that would need to be addressed.

- **Slice is not a physical right to the FCRPS yet Slice right to power (RTP) is based on the physical characteristics of the system.**
  - Typically, physical owner of resource offers into the market
  - Would need a market mechanism to offer Slice RTP (range?) into the market and tie to physical FCRPS.
- **The FCRPS is not a specific unit, but a system.**
  - Today, Slice represents a share of the entire FCRPS, but physical resources are offered into the market from specific units or an aggregation of units (if electrically similar).
- **Today, Slice is an hourly product.**
  - Participation in day-ahead market typically implies participation in real-time market, but there is typically no hourly real-time organized market. The real-time market is sub-hourly (15- and/or 5-minutes).
  - Hourly flexibility allows customers to manage the same load and variable generation uncertainty that future markets will manage through optimization of flexible resources.
  - While EIM today is also sub-hourly, the hourly bilateral market still exists today, which may be substantially diminished in a day-ahead market.
  - Need a mechanism to preserve the value and risk sharing between BPA and customer of hourly Slice schedules.

# Potential challenges with Slice as a pre-Day-Ahead Market product

- **Slice customers recognize BPA concerns about product complexity, but do not believe that should be the only consideration. Challenges exist with BPA's proposal.**
- **Appears to reduce value proposition to Slice customers of BPA joining a day-ahead market.**
- **Requires Slice to be a market price-taker.**
  - Eliminates value proposition of optimized day-ahead market by requiring Slice customers to effectively self-schedule into market, regardless of market prices.
  - Does not accommodate individual customer load, supply, and price risk preferences.
- **Potentially incompatible with market rules.**
  - Must-offer obligations in both DA and RT timeframes.
  - Potential requirements to provide flexible capability to the market
- **Reduces ability of Slice customers to use market to integrate renewables at a time when new clean supply is needed by the region.**
- **Shifts full risk of changes in water supply between day-ahead and real-time to BPA.**
- **Customer offers of Slice product into market may reduce BPA's exposure to market power mitigation.**
- **Reduction in ability to use market to match product flexibility to load variation may create larger gaps from BPA product and load service.**

# Consideration for Planned Products of Selected Provider of Choice Draft Policy Goals

Provider of Choice Policy Goal	Consideration for Planned Products
Goal 3: Product and Service Offerings are Equitable.	If Load Following is served through full market dispatch, it will provide a more complete market integration of that product than flexible Planned Products, and access to market benefits.
Goal 4: Contracts offer customers flexibility to invest in and integrate non-federal resources.	Organized markets provide non-federal resource integration. Limiting the market integration of flexible Planned Products will impact the economics of non-federal resources and will reduce regional renewable integration.
Goal 5: Contracts support customers meeting national and regional objectives.	Flexible products dispatched before a DAM run will reduce the value of DAMs for flexible Planned Product customers, negatively impacting regional efforts on DAM formation.

# Potential Options for Slice in Day-Ahead Market

- **There are several feasible options for how slice can work in an organized day-ahead market, which should be explored.**
- **Illustrative examples:**
  - Northern California Power Agency approach: customers submit offers to BPA; BPA aggregates or otherwise uses to inform own offers into market.
  - Develop modeled representation of Slice resource in the market based on physical capabilities of FCRPS.
  - Utilize existing market participation models intended for resources that are contracted to multiple parties.  
Options include:
    - Slice customers and BPA each bid in share of resources subject to overall physical capabilities (potentially suitable for upper/lower Columbia aggregations).
    - BPA bids resources and slice customers take share of market costs/revenues (potentially suitable for BOS resources)

# Recommended Approach – POC Slice Product Working Group

- **Stand up a collaborative working group with representation from BPA and customers.**
  - All BPA customers are welcome, but for expediency customers with product interest should participate.
  - Experts in Slice and markets are needed with expectations of working through technical details.
- **Scope of work**
  - Do not start with predetermined outcome (step back from BPA's current proposal).
  - Identify gaps and issues that may exist between current slice product and anticipated day-ahead market participation.
  - Develop options that address identified gaps – working group should be open to new ideas.
  - Evaluate pros and cons for BPA, for Slice customers and for non-Slice customers.
  - Help BPA and customers coalesce around a shared vision for Provider of Choice Slice Product implementation.
- **All options to be shared with the large customer group, in detail, at regular intervals.**