



Provider of Choice Workshop

April 9 -10, 2024

PROVIDER OF CHOICE

POST
2028





Slice/Block Product

Objectives

Provide a forum to discuss
Slice/Block product design with
customers and interested parties.

Share foundational elements for
Bonneville's Slice/Block product
design focus.



Overview of Today

1. Slice/Block: Setting the Stage
2. Slice Today
3. Slice in the Future
4. Slice Design Parameters
5. Bid Curves
6. Discussion

Setting the Stage

- The Policy states that BPA will **design products to be market compatible**, regardless if BPA joins a Day-ahead market.
- Slice design is impacted by many factors including:
 - Uncertainties around commitment to join a market, timing and design of a future day-ahead market, and compatibility with two markets.
 - Product design complexity creates an inherent risk in implementing a functioning product that is of value to customers (Systems and Contracts).
 - More limited hydro flexibility and future energy and capacity obligations.
 - Capacity required to support the current slice product flexibility into real-time is a significant burden on the federal system.
 - Results in uncertain and likely unknowable value shifts between products - By holding back energy or settling against adjusted offer prices.
 - Bonneville and customers have limited time to focus on Slice product foundational elements and redesign.

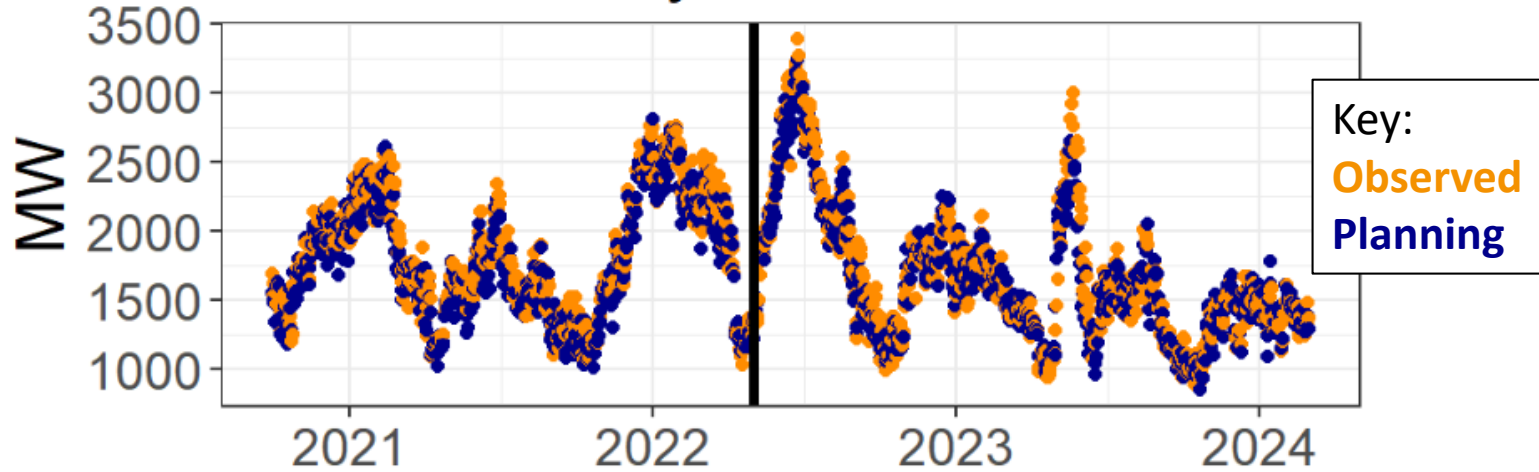
Slice Today

- The **number and complexity of FCRPS operational constraints** have increased over the course of Regional Dialogue and are likely to grow over time.
 - Operations (CRSO EIS, Flex Spill, litigation Stay agreements, Dec 14 Settlement agreement).
 - EIM (Ops implementation complexity).
 - Slice creates added **complexity to new planning obligations** such as WRAP. Bonneville must consider how **WRAP obligations** would be reflected in a simulated environment.
 - Increases in variable generation and new technologies.
- Slice also **creates greater planning uncertainty until near real time.**

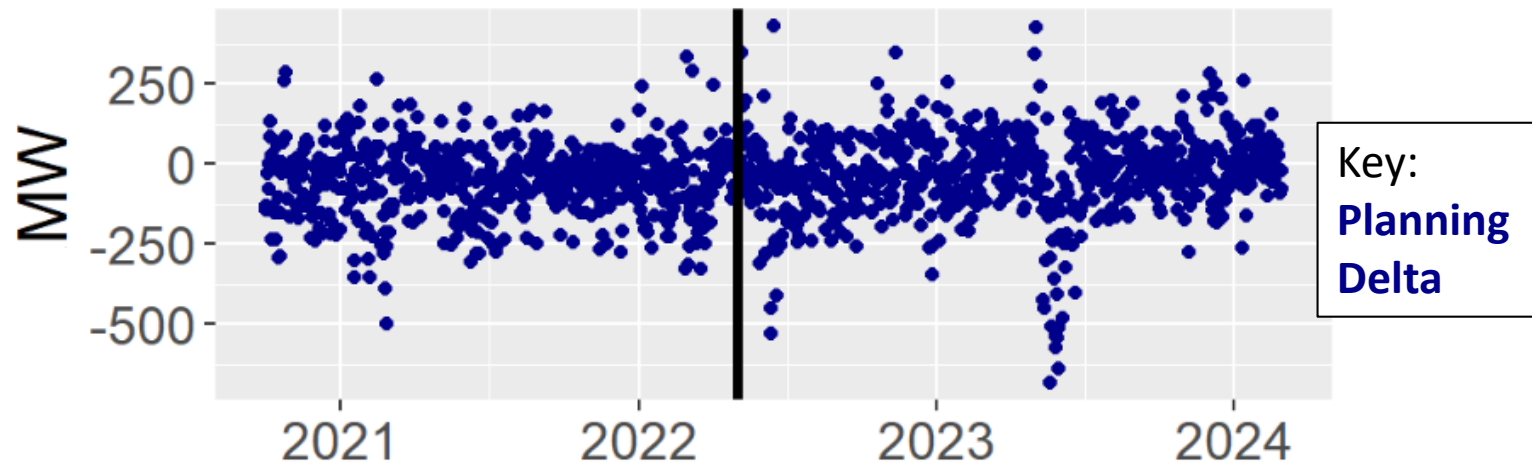
Operational Uncertainty from Slice

- Bonneville assesses its load/resource balance and hydraulic constraints to inform day-ahead marketing and set up real time operations.
- Bonneville uses projected Slice elections from the Slice Computing Application (SCA) to inform day-ahead marketing.
- Observed (actual) Slice take may differ by 750 MW.

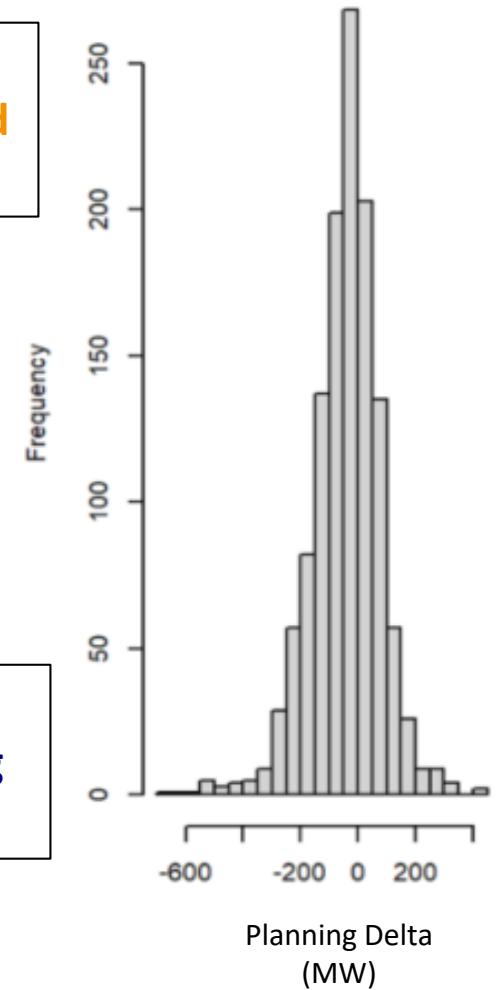
Slice Delivery



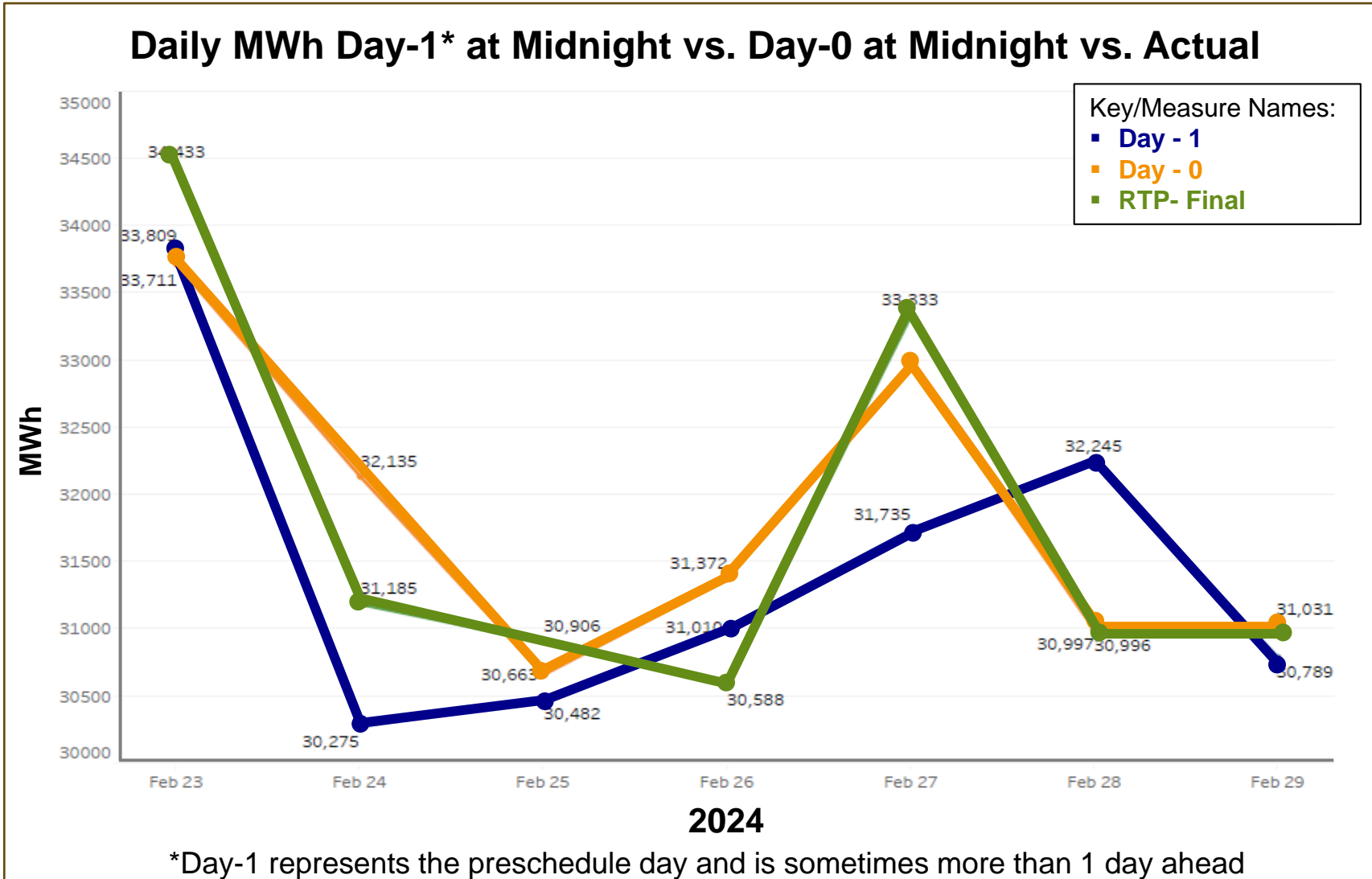
Slice Delivery Planning Delta



Histogram of Slice Deltas



Slice Take May Fluctuate Before RT



This graph shows daily Slice load (MWh) for a recent, normal week in three snapshots.

- Start of Preschedule Day
- Start of Day - 0 (midnight)
- Actual Slice load

Slice load fluctuates hourly, up and then down, causing uncertainty that Bonneville must account for in operating the system.

Bonneville Balances Whole System

- Bonneville is responsible for ensuring the system meets all constraints such as Grand Coulee max drawdown limits, Flood Risk Management (FRM) and fish elevation and flow constraints, and April 10 GCL elevation.
- Bonneville must manage all sources of uncertainty (loads, resources, and hydrology such as forebay bounces or changes in outflows from non-federal dams upstream).

Slice in the Future

- Bonneville understands there are various ways to approach the future of Slice, including the potential to not offer the product.
- Bonneville proposed a shift for the Slice product to move from real-time to day-ahead in the November 14, 2023, workshop.
- Bilateral markets and real-time markets are fundamentally shifting with the formation of day-ahead markets.
- While it is possible to envision a flexible Slice product, there are substantial tradeoffs and risks Bonneville has considered.

Slice in the Future (Cont'd)

- The FCRPS today is more constrained than it was in the past.
 - Constraints on the federal system have resulted in more need to use the existing flexibility to meet Bonneville's load obligations, leaving less flexibility for surplus sales.
 - The value proposition (economics) for the existing Slice product is less certain considering growing loads and developing markets (DAM) and resource adequacy programs (WRAP).
- Must now narrow the scope of product design to address current and future uncertainties.

Foundational Design Parameters

- Slice/Block product operational implementation is **compatible with how Bonneville would participate in a day-ahead market.**
- The product **does not require unique market design or exceptions.**
- Product **can be offered to all customers** including:
 - Customer in same BA as Bonneville.
 - Customer in a different BA to Bonneville and in same market.
 - Customer in a different BA to Bonneville and in different market.
- Redesign **does not create additional complexity. BPA recognizes that a redesign may shift where complexity exists** under Regional Dialogue.

Slice Redesign Roadmap

Issue	Issue Type	Workshop Date
1. Static right to power vs. generation bid curves.	• BPA Decision	• April 10
2. Ability to change Slice right-to-power within day.	• BPA Decision	• April 25
3. Financial true up of benefits and risks for Slice customers based on day-ahead-market operations.	• Discussion • Design	• April 25 • May
4. Confirm a minimum threshold to offer the Slice/Block product.	• BPA Decision	• May
5. Administration of the RSO test in a day-ahead market.	• Alternatives • Design	• May • June
6. Firm Commitment from customers prior to BPA offering a Slice product.	• BPA Decision	• June
7. Slice operations within a fixed system size.	• Alternatives • Design	• TBD



Bid Curves

Slice Design: Generation Bid Curves

Context: A bid curve is a commitment to sell a quantity of Energy at a specific price, consisting of multiple price/quantity pairs across the available range of a resource.

Issue: Should the Slice product provide customers the ability to offer generation bid curves to a day-ahead market for the slice portion of the product?

Decision: Since the Policy release, Bonneville has decided that the Slice product will not be designed to allow customers to submit generation bid curves.

Discussion: See next slides.

Generation Bid Curve Discussion

- Bonneville evaluated whether to offer bid curves compared to a static right to power. Each bid curve scenario BPA considered ultimately created **increased uncertainty and complexity for Bonneville**, as well as **increased implementation risk**.
- The slice product does not give customers a right to a portion of the FCRPS. It is a contract for the sale of power and any thing beyond that would violate Bonneville's statutes.
- Bonneville concluded **offering the Slice customers the ability to submit bid curves for their slice portion into a day-ahead market is prohibitively complex**. It would require **significant resources to design, develop and contract**.
 - Managing multiple bid curves and/or truing up a customer bid curve with the market.
 - Results in uncertain and likely unknowable value shifts between products - By holding back energy or settling against adjusted offer prices.

B O N N E V I L L E P O W E R A D M I N I S T R A T I O N

Generation Bid Curves Alternatives Considered

1. Static Slice Right to Power (RTP) (BPA Decision)

Slice/Block customers submit their Slice right to power as a static day-ahead value.

- Customers would submit 24 hourly values to Bonneville ahead of the day-ahead market run.
- Customers would submit hourly values that include both their firm requirements load and any surplus that may be available in this time frame.
- Bonneville would require they submit their requests ahead of the day-ahead market run to incorporate the requests into Bonneville's market run.

2. Slice with Bid Curve (Not Chosen Alternative)

Slice/Block customers bid their Slice right to power as a resource in the day-ahead market.

- Customers would provide Bonneville with 24 hourly bid curves ahead of the day-ahead market run.
- Customers would be allowed to bid a range that identified a min and max generation and associated price steps.

Evaluation Criteria for This Issue

Static Right to Power vs. Bid Curve

- 1. Operational Risk**
- 2. Financial & Market Risk**
- 3. Within-Day and SCA**
- 4. Contract**
- 5. Customer Impacts**

1. Operational Risk

Criteria	Static RTP (BPA Decision)	Bid Curve (Not Chosen Alternative)
<p>Operational Risk under Day Ahead</p>	<ul style="list-style-type: none"> • Less complex to design and administer. • Greater operational certainty for BPA. • Should function similarly in EDAM and SPP Markets+ • Customer would be planning and submitting hourly static amounts for following day. • Constraints limited to hydro and generation availability. • Hydro and generation risk from DA to real-time are managed by BPA. • Obligations are established in advance of real-time. 	<ul style="list-style-type: none"> • More complex to design and administer. • Reduced operational certainty for BPA. • Extremely difficult to develop for two markets. • Customers would provide up to 24 hourly bid ranges for the following day. • Same constraints plus greater uncertainty to ensure adequate generation is held for Slice obligation . • Real-time risk managed by customer. • Bonneville obligation remains uncertain beyond the day-ahead market run which could result in cost shifts among customers.

2. Financial and Market Risk

Criteria	Market Type	Static RTP (BPA Decision)	Bid Curve (Not Chosen Alternative)
Financial & Market Risk	Day Ahead	<ul style="list-style-type: none"> • BPA has greater certainty about how much generation it can bid into DAM to optimize service and revenue for all customers. • Limits uncertainty Bonneville must consider in its own bidding strategy • Greater planning certainty for Bonneville <ul style="list-style-type: none"> ○ FCRPS capacity available for market submittal with no hold back 	<ul style="list-style-type: none"> • Increases BPA’s and non-Slice financial risk if operational constraints limit bid range and BPA must pay out to customer’s bid range. • Provides BPA with less planning certainty (flexibility) <ul style="list-style-type: none"> ○ Under some conditions BPA must hold back to ensure Slice obligation is satisfied • Introduces statutory risk
	Real-time	<ul style="list-style-type: none"> • Bonneville would be taking on more within-day generation and hydro risk. <ul style="list-style-type: none"> ○ There may be potential for the market to serve any shortfalls. • Financial outcomes based on supply and market would be similar for all customers. <ul style="list-style-type: none"> ○ Less financial settlement 	<ul style="list-style-type: none"> • Slice customer retains within-day generation and hydro risk.

3. Within Day/SCA and 4. Contract

Criteria	Static RTP (BPA Decision)	Bid Curve (Not Chosen Alternative)
With-in Day/SCA	<ul style="list-style-type: none"> Bonneville would have load certainty going into real time and no longer need to hold back capacity due to right to power being locked into the day ahead time frame. 	<ul style="list-style-type: none"> BPA would need to design a mechanism for BPA and/or the market to account for Slice bid ranges, greater system complexity. Right-to-power and energy would have to be updated to enable subsequent market runs and there would likely need to be a true up for the last hour. RTP would not be a static value until closer to real-time, but a range, which may add more load uncertainty depending on the design.
Contract	<ul style="list-style-type: none"> Less complex to design and draft. Could add contract complexity through financial settlements. May increase cost to administer. RSO or similar mechanism required. 	<ul style="list-style-type: none"> More complex and uncertain. Additional complexity could be added by financial settlements. Additional administration cost. Staff resource and implementation risk. RSO or similar mechanism required. Need to evaluate any value shifts over time.

5. Customer Considerations

Criteria	Static RTP (BPA Decision)	Bid Curve (Not Chosen Alternative)
<p>Customer Considerations</p>	<ul style="list-style-type: none"> • Customers will see a reduction in the flexibility of how they manage their Slice. • Customers retain the ability to bid non-federal resources into the market. • Customers will be price takers and would need to determine settlement approach with BPA instead of market solution. 	<ul style="list-style-type: none"> • Customers have ability to set prices in bid range for their advanced sale of surplus in an emerging market. • Increases flexibility for market participation when coupled with customers' non-federal resources. • Market solutions may be possible for settling bids.

Agency Risk

How does risk to BPA factor into Slice/Block product?

- Bonneville acknowledges that under the current product design Slice/Block dampens some of the financial impact of water year variability.
- Slice/Block is just one tool in Bonneville's risk mitigation suite.
- Rate Case Risk – reduces forward looking modeled financial risk in proportion to the slice percentage, but operating year risk continues to be present.

What's next...

- **Day Ahead Markets**
 - DAM Letter (Released April 4)
 - Final decision expected on whether to join a DAM, and which one, in November 2024
- **April Workshop Topics**
 - Real-time Access
 - Financial True Up
- **May Workshop Topics**
 - TBD
- **BP-26 Product Change (June 30 Notice Deadline)**

Discussion & Wrap Up

