Bonneville's Public Engagement for Establishing a Policy Direction on Potential Day Ahead Market (DAM) Participation - Workshop 5.5

May 3, 2024

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Agenda

- Tabletop Scenario Refresh (From Workshop 2)
- Workshop 6 Scenarios

Agenda

- If you have questions regarding the Day Ahead Market Staff Recommendation Letter released on April 4th, please attend the 5/8 Workshop. Staff will not be answering questions related to the letter today.

Tabletop Scenario Refresh

Scenario Overview

- Today's scenarios present a very simplistic overview of how BPA sets up to serve load and meet its obligations and how that operates in bilateral and organized markets
- The scenarios are focused on BPA's Power Services obligations, resources, and purchases
  - Balancing Authority Area (BAA) representations are meant to convey Net Scheduled Interchange (NSI) and basic wholesale marketing with neighbors
- Today's scenarios are meant to describe the basic mechanics of how BPA meets its obligations today and how we could do so in a DAM
  - The DAM mechanics in these scenarios are very generic, and not unique to either EDAM or M+

Scenario Overview Continued

- The scenarios generally describe two different conditions:
  - The FCRPS has ample energy and capacity to meet BPA's demand obligations and to sell surplus into the market, which is reflected by a large bid range and economic bids
  - The FCRPS has sufficient capability to meet its own demand obligations, but its energy and capacity is much more limited, which is reflected by a smaller bid range and less competitive economic bids
- The scenarios show, at a high level, how these conditions manifest in the status quo and how they would in a DAM

Scenario Overview Continued

- Generation and loads are simplified but generally represent how BPA identify capability and obligations
  - Generators represent our Overlapping Resource Aggregates ("ORA") in the EIM, which typically have the most flexibility, as well as the balance of the system ("BOS"), which runs flatter
  - Loads and other demand obligations derive from multiple Regional Dialogue products as well as bi-lateral transactions
    - Though the loads are determined by different methods (e.g. Load Following vs. Block) BPA ultimately has a net load position for which it must secure sufficient generation

Scenario Description

1a: "Base Economic" – BPA self-schedules FCRPS and uses bilateral markets pre-EIM and is then economically dispatched by the EIM to serve load and market intra-hour. The FCRPS bids into the EIM are economic all the way up to their max bid range

1b: "Base w/Purchase" – BPA self-schedules FCRPS and uses bilateral markets pre-EIM and is then economically dispatched by the EIM to serve load and market intra-hour. The FCRPS prices compared to the bilateral market and bids into the EIM are only economic for the first "tranche". BPA purchases from the bilateral market prior to EIM and then is not dispatched in the EIM

Scenario Descriptions Continued

2a: "DAM Economic": BPA sets up the FCRPS and uses bilateral markets prior to the DAM. Then the FCRPS is economically committed and dispatched in the DAM/RTM for load service and surplus marketing. There is a "must run" component of the FCRPS that is a self-scheduled price taker. The FCRPS bids into the DAM/RTM are economic all the way up to their max bid range

2b: "DAM w/Purchase": BPA sets up the FCRPS and uses bilateral markets prior to the DAM. Then the FCRPS is economically committed and dispatched in the DAM/RTM for load service and surplus marketing. There is a "must run" component of the FCRPS that is a self-scheduled price taker. The FCRPS bids into the DAM/RTM are only economic up to the first "tranche". The DAM commits economic deliveries external to the BAA to serve the balance of our demand obligations. No further dispatch in the RTM.

Scenario 1a: Base Economic Setup

- This scenario assumes perfect forecasting of load and generation as well as market depth
- BPA has a net demand of 5000MW. This is comprised of multiple contracts and products
- BPA has 8000MW of potential generation at multiple prices
  - 5000MW of "self-scheduled" generation (min gen) priced at $0
  - 1500MW incremental MW we are willing to generate at $15
  - 1500MW incremental MW we are willing to generate at $35
- Bi-lateral purchases/sales are clearing at $35, with sufficient depth to take all of our incremental capability
- BAA2 is a neighboring BAA in the same RTM, neither BAAs are in a DAM
- BPA can make purchases and sales to other BAAs as well (i.e., 250MW sale)

Scenario 1a: Base Economic Status Quo

Submission to Market:

Generator Supply	Offer	Min MW	Max MW	$
ORA1	Self-Schedule	0	3250	$0
	Range 1	3251	4000	$15
	Range 2	4001	5000	$35
ORA2	Self-Schedule	0	500	$0
	Range 1	501	750	$15
	Range 2	751	1000	$35
ORA3	Self-Schedule	0	250	$0
	Range 1	251	750	$15
	Range 2	751	1000	$35
Balance of System (BOS)		0	1000	$0
Bilateral Market Price				$35

Total Generation: 8000 MW
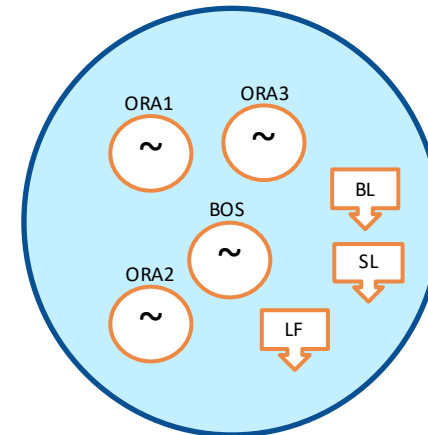**Total Self-Schedule:** 5000 MW
Totals Purchases and Sales
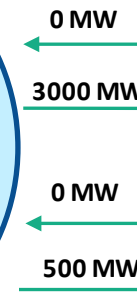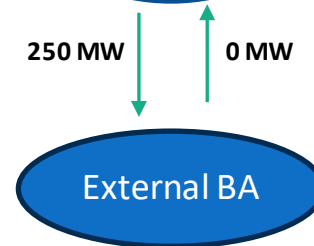- $105,000
  - 3000MW sales at $35

Net Scheduled Inter
- BA1: NSI = +3750
- BA2: NSI = -3500

Transmission Service Provider 1
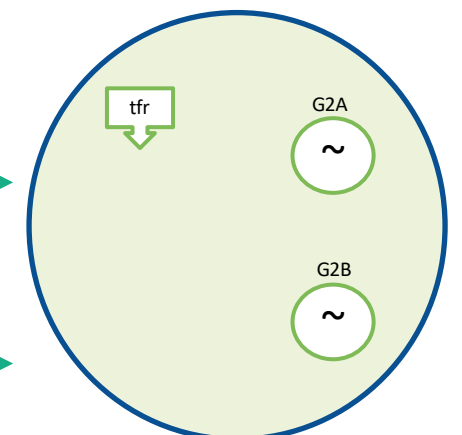
Transmission Service Provider 2

ORA1   ORA3
~   ~

BOS
~   BL

ORA2   SL
~

LF

0 MW
3000 MW
0 MW
500 MW

tfr   G2A
~

G2B
~

250 MW   0 MW

External BA

ORA: Overlapping Resource Aggregate
BL: Block
LF: Load Following
SL: Slice
BOS: Balance of System
TFR: Transfer Services Customer
G: Generator

1a Outcomes

- BPA commits the FCRPS for its 5000MW of load
- BPA makes and additional 3000MW of bilateral sales at $35 of $105,000
- These sales become Base Schedules in the EIM
- Absent any load or generation changes (assumed to not occur in this example) there are no additional transactions

Scenario 1b: Base w/Purchase Setup

- This scenario assumes perfect forecasting of load and generation as well as market depth
- BPA has a net demand of 5000MW. This is comprised of multiple contracts and products
- BPA has 6000MW of potential generation at multiple prices
  - 3500MW of "self-scheduled" generation (min gen) priced at $0
  - 1000MW incremental MW we are willing to generate at $15
  - 1500MW incremental MW we are willing to generate at $45
- Bi-lateral purchases/sales are clearing at $35, with sufficient depth to take all of our incremental capability
- BAA2 is a neighboring BAA that is in the same RTM, neither BAAs are in a DAM
- BPA can make purchases and sales to other BAAs as well (i.e., 250MW sale)

Scenario 1b: Base w/Purchase Status Quo

Submission to Market:

Generator Supply	Offer	Min MW	Max MW	$
ORA1	Self-Schedule	0	2000	$0
	Range 1	2000	2500	$15
	Range 2	2501	3000	$45
ORA2	Self-Schedule	0	300	$0
	Range 1	301	500	$15
	Range 2	501	1000	$45
ORA3	Self-Schedule	0	200	$0
	Range 1	201	500	$15
	Range 2	501	1000	$45
Balance of System (BOS)		0	1000	$0
Bilateral Market Price				$35

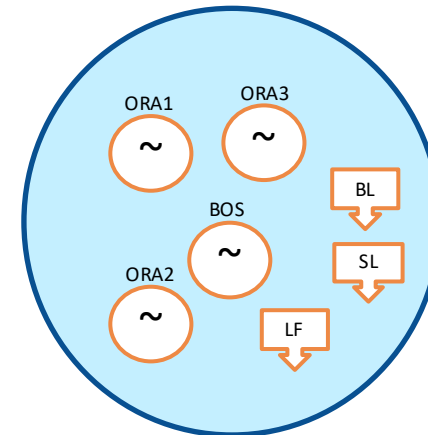**Total Generation:** 6000 MW
Total Self-Schedule: 5000 MW
Totals Purchases and Sales
- -$17,500
  - 500 at $35
  - Avoided cost $5,000 (($45-$35)*500MW)

Net Scheduled Inter
- BA1: NSI = +250
- BA2: NSI = 0

Transmission Service Provider 1 — ORA1, ORA3, ORA2, BOS, BL, SL, LF
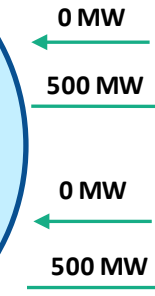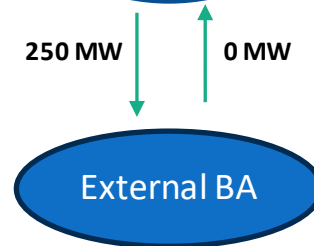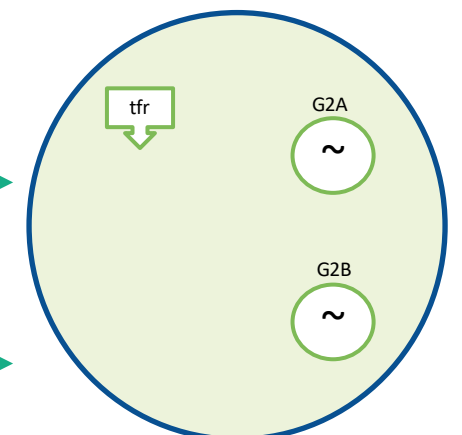
Transmission Service Provider 2 — tfr, G2A, G2B

0 MW, 500 MW, 0 MW, 500 MW

250 MW, 0 MW

External BA

ORA: Overlapping Resource Aggregate
BL: Block
LF: Load Following
SL: Slice
BOS: Balance of System
TFR: Transfer Services Customer
G: Generator

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1b Outcomes

- BPA commits the FCRPS for its 4500MW of load ($0 and $15 tranche)
  - BPA has sufficient FCRPS capability to serve load, but 1500MW would have used water as fuel at a price that was uneconomic
- BPA makes a bilateral purchase of 500MW at $35 for $17,500
  - If BPA had used the FCRPS for the entirety of load service it would have incurred an incremental cost of $5,000
- These self-commitments and purchases become Base Schedules in the EIM
- Absent any load or generation changes (assumed to not occur in this example) there are no additional transactions

Scenario 2a DAM Economic Setup

- BPA has the same load and generation position as in scenario 1a

- Instead of utilizing the bilateral market in the day-ahead timeframe BPA makes its generation available to the DAM
  - BPA has the same min/max gen and bids as well

- BAA2 is a neighboring BAA that is in the same DAM/RTM

- BPA can make purchases and sales to other BAAs as well (i.e., 250MW sale)

Submission to Market:

Generator Supply	Offer	Min MW	Max MW	$
ORA1	Self-Schedule	0	3250	$0
	Range 1	3251	4000	$15
	Range 2	4001	5000	$35
ORA2	Self-Schedule	0	500	$0
	Range 1	501	750	$15
	Range 2	751	1000	$35
ORA3	Self-Schedule	0	250	$0
	Range 1	251	750	$15
	Range 2	751	1000	$35
Balance of System (BOS)		0	1000	$0
Bilateral Market Price				$35

Total Generation: 8000 MW
Total Self-Schedule: 5000 MW

Net Scheduled Inter
- BA1: NSI = +3750
- BA2: NSI = -3500

DAM Footprint Pre-DA

Transmission Service Provider 1

Transmission Service Provider 2

0 MW
0 MW
0 MW
500 MW

ORA1 ORA3
BOS
BL
SL
ORA2
LF

tfr G2A
L G2B

250 MW 0 MW

External BA

ORA: Overlapping Resource Aggregate
BL: Block
LF: Load Following
SL: Slice
BOS: Balance of System
TFR: Transfer Services Customer
G: Generator
L: Load

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Scenario 2a: DAM Economic Setup

Submission to Market:

Generator Supply	Offer	Min MW	Max MW	$
ORA1	Self-Schedule	0	3250	$0
	Range 1	3251	4000	$15
	Range 2	4001	5000	$35
ORA2	Self-Schedule	0	500	$0
	Range 1	501	750	$15
	Range 2	751	1000	$35
ORA3	Self-Schedule	0	250	$0
	Range 1	251	750	$15
	Range 2	751	1000	$35
Balance of System (BOS)		0	1000	$0
Bilateral Market Price				$35

Total Generation: 8000 MW
Total Self-Schedule: 5000 MW
Totals Purchases and Sales
- MP1 Cost: -$175,000
- MP1 Revenue: +$280,000
- MP1 Net: $105,000

Net Scheduled Inter
- BA1: NSI = +3750
- BA2: NSI = -3500

DAM Footprint DAM/RT

ORA: Overlapping Resource Aggregate
BL: Block
LF: Load Following
SL: Slice
BOS: Balance of System
TFR: Transfer Services Customer
G: Generator
L: Load

Scenario 2a(i): DAM Economic Setup

Submission to Market:

Generator Supply	Offer	Min MW	Max MW	$
ORA1	Self-Schedule	0	2250	$0
	Range 1	2251	4000	$15
	Range 2	4001	5000	$35
ORA2	Self-Schedule	0	500	$0
	Range 1	501	750	$15
	Range 2	751	1000	$35
ORA3	Self-Schedule	0	250	$0
	Range 1	251	750	$15
	Range 2	751	1000	$35
Balance of System (BOS)		0	1000	$0
Bilateral Market Price				$35

Total Generation: 8000 MW
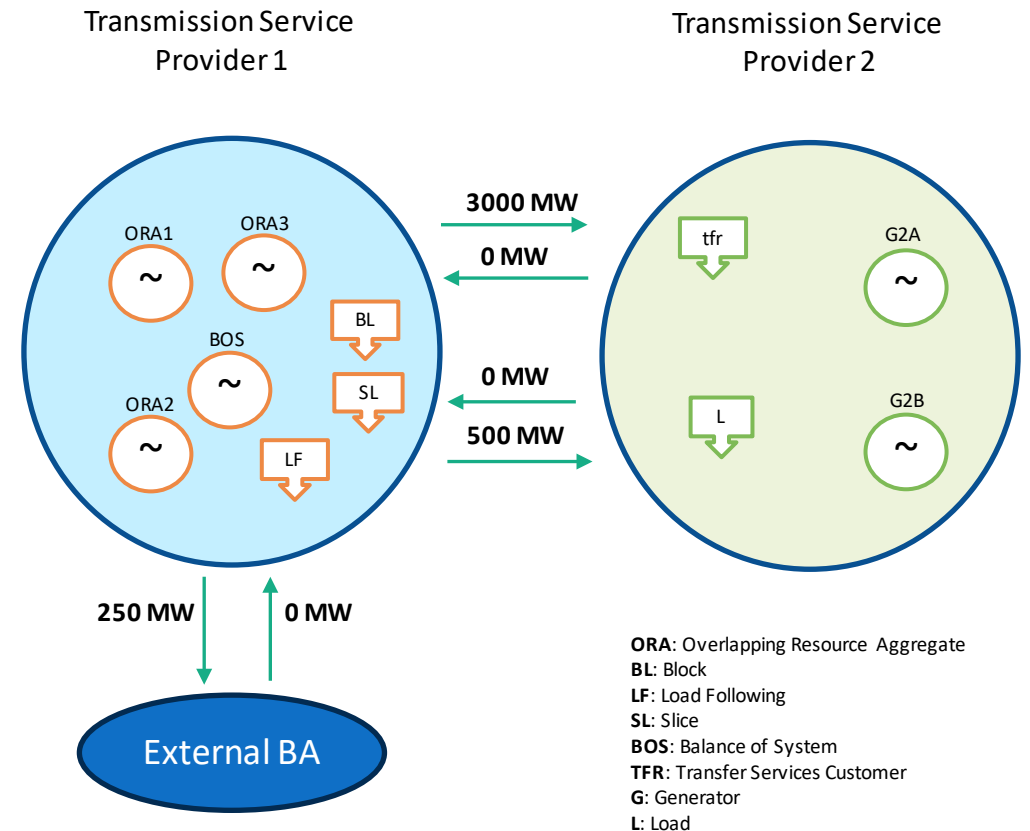**Total Self-Schedule:** 5000 MW
Totals Purchases and Sales
- MP1 Cost: -$175,000
- MP1 Revenue: +$280,000
- MP1 Net: $105,000

Net Scheduled Inter
- BA1: NSI = +3750
- BA2: NSI = -3500

DAM Footprint DAM/RT

Transmission Service Provider 1

Transmission Service Provider 2

ORA1   ORA3

3000 MW

0 MW

BOS

BL

SL

0 MW

ORA2

500 MW

LF

tfr   G2A

L   G2B

250 MW   0 MW

External BA

ORA: Overlapping Resource Aggregate
BL: Block
LF: Load Following
SL: Slice
BOS: Balance of System
TFR: Transfer Services Customer
G: Generator
L: Load

2a Outcomes

- BPA commits the FCRPS for its 5000MW of load
- BPA makes an additional 3000MW of generation available, all of which is priced at $35 or lower
- BPA Power Services nets $105,000
  - BPA's load purchases 5000MW of power at $35 for a total cost of $175,000
  - BPA generation clears 8000MW of sales at $35 for a total of $280,000
- Absent any load or generation changes (assumed to not occur in this example) there are no additional transactions

Scenario 2b: DAM w/Purchase Setup

- BPA has the same load and generation position as in scenario 1b
- Instead of utilizing the bilateral market in the day-ahead timeframe BPA makes its generation available to the DAM
  - BPA has the same min/max gen and bids as well
- BAA2 is a neighboring BAA that is in the same DAM/RTM
- BPA can make purchases and sales to other BAAs as well (i.e., 250MW sale)

Scenario 2b: DA & RT Purchase Setup

Submission to Market:

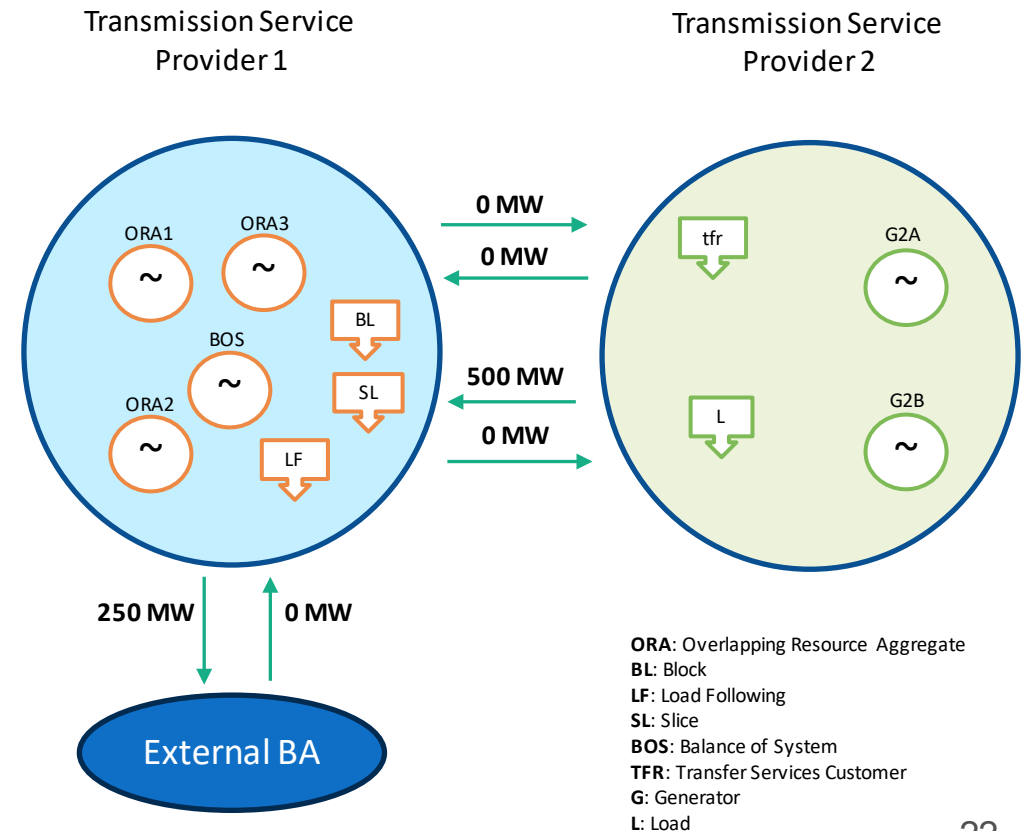| Generator Supply	Offer	Min MW	Max MW	$
ORA1	Self-Schedule	0	2000	$0
	Range 1	2000	2500	$15
	Range 2	2501	3000	$45
ORA2	Self-Schedule	0	300	$0
	Range 1	301	500	$15
	Range 2	501	1000	$45
ORA3	Self-Schedule	0	200	$0
	Range 1	201	500	$15
	Range 2	501	1000	$45
Balance of System (BOS)		0	1000	$0
Bilateral Market Price				$35

Total Generation: 6000 MW
Total Self-Schedule: 5000 MW

Net Scheduled Inter
- BA1: NSI = +750
- BA2: NSI = -500

DAM Footprint Pre-DA

ORA: Overlapping Resource Aggregate
BL: Block
LF: Load Following
SL: Slice
BOS: Balance of System
TFR: Transfer Services Customer
G: Generator
L: Load

Scenario 2b: DA & RT Purchase Setup

Submission to Market:

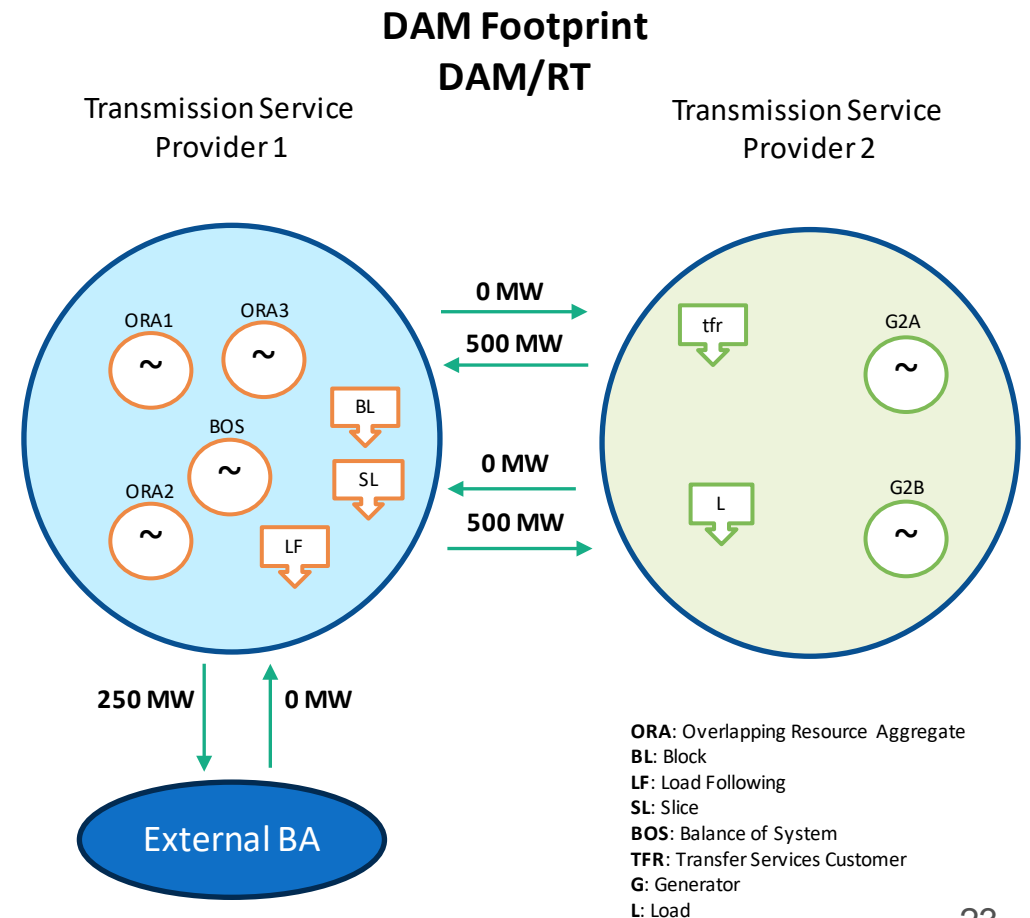| Generator Supply	Offer	Min MW	Max MW	$
ORA1	Self-Schedule	0	2000	$0
	Range 1	2000	2500	$15
	Range 2	2501	3000	$45
ORA2	Self-Schedule	0	300	$0
	Range 1	301	500	$15
	Range 2	501	1000	$45
ORA3	Self-Schedule	0	200	$0
	Range 1	201	500	$15
	Range 2	501	1000	$45
Balance of System (BOS)		0	1000	$0
Bilateral Market Price				$35

Total Generation: 6000 MW

Total Self-Schedule: 5000 MW

Totals Purchases and Sales
- MP1 Cost: -$175,000
- MP1 Revenue: +157,000
- MP1 Net: -$17,500
  - Avoided cost (($45-$35)*500MW) $5,000

Net Scheduled Inter
- BA1: NSI = +250
- BA2: NSI = 0

**DAM Footprint
DAM/RT**

Transmission Service Provider 1

Transmission Service Provider 2

0 MW

500 MW

0 MW

500 MW

250 MW   0 MW

External BA

ORA: Overlapping Resource Aggregate
BL: Block
LF: Load Following
SL: Slice
BOS: Balance of System
TFR: Transfer Services Customer
G: Generator
L: Load

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2b Outcomes

- BPA commits the FCRPS for its 3500MW of load
  - An additional 1000MW is economic
  - An additional 1500MW is uneconomic
- BPA generation clears 4500MW of sales at $35 for a total $157,500
- BPA Power Services nets -$17,500
  - BPA's load purchases 5000MW of power at $35 for a total cost of $175,000
  - BPA generation clears 1500MW of sales at $35 for a total of $157,500
  - BPA also *avoided -$5000* by purchasing 500MW of economic power to serve load (i.e. FCRPS at $45)
- These self-commitments and purchases become Base Schedules in the EIM
- Absent any load or generation changes (assumed to not occur in this example) there are no additional transactions

Upcoming Workshop 6 Scenarios

Upcoming Workshop Scenarios

- Workshop 6 Topics:
  - Summary of the April 4th Day-Ahead Market Staff Recommendation Letter.
    - For any questions regarding the Recommendation Letter, please attend the May 8th Workshop.
  - High-level baseline scenario that walks attendees through the DAM process, various inputs/outputs, roles/responsibilities and market requirements.

Wrap Up

- Please submit comments on this workshop by June 8th

- Please send comments to <u>techforum@bpa.gov</u> (with "DAM Participation Evaluation" in the subject heading)
  - All formal feedback received will be posted to the BPA.gov page for BPA's DAM Participation Evaluation