

Discussion Paper for RSS in the RD Slice/Block Contract April 10, 2009

Slice/Block DFS Product Design Concepts

- DFS is available only for new renewable intermittent Specified Resources
- DFS flattens the resource output to a flat annual block
- Output of Specified Resources must be applied to customers Total Retail Load (true for Load Following and Slice/Block)
- Only applies to Above RHWM Load
- Provide DFS to Slice/Block customers in a manner comparable to Load Following.
- Slice customer is responsible for all transmission and scheduling requirements. (BPA provides all transmission and scheduling services via TSS for Load Following customers).

Background Information

Slice/Block Data for "Slice PUD"

Slice Percentage: 1%

FY 2012/13 forecast requirements load = 145 aMW

FY 2012/13 forecast RHWM = 140 aMW

FY 2012/13 forecast Above RHWM Load = 5 aMW

FY 2012/13 assumed Tier 1 System Capability = 7,000 aMW

FY 2012/13 FY2012 Critical Slice Amount = 70 aMW

FY 2012/13 Tier 1 Block Amount = 70 aMW

DFS Planning Process

Step 1

Prior to November 1, 2009 SLICE PUD elected to serve it's FY 2012, 13 & 14 Above RHWM Load themselves, meaning no Tier 2 purchase from BPA for the 3 year period.

Step 2

Prior to November 1, 2009 SLICE PUD elected to add a new intermittent renewable Specified Resource to its Slice/Block agreement. BPA added the following resource information in section 2 of Exhibit A

Resource Name: Very Windy #2
Fuel Type: Wind
Nameplate Capability: 15 MW

Step 3

Prior to November 1, 2009 SLICE PUD elected to purchase Diurnal Flattening Service for the new intermittent renewable Specified Resource Very Windy #2. BPA notes DFS election in the Very Windy #2 resource profile in section 2 of Exhibit A and in the appropriate new Exhibit D and F RSS specific language. BPA then lists the resource in section 2.3.5.1 of Exhibit D as shown below.

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2.3.5.1 List of Specified Resources Very Windy #2

Step 4

Prior to June 1 2011, BPA completes the FY2012 and FY2013 information for the Very Windy #2 resource in section 2 of Exhibit A. For Very Windy #2 BPA also determines all resource attributes necessary to provide DFS.

Step 5

Prior to September 30 of the Rate Case Year (Sep 2011) for the FY 2012/13 Rate Period BPA completes section 2.3.5.2 as follows:

| CAPACITY AMOUNTS | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
| Rate Period Year 1 | | | | | | | | | | | | |
| Total MW | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Rate Period Year 2 | | | | | | | | | | | | |
| Total MW | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Note: The amounts in the table above shall be rounded to whole megawatts. | | | | | | | | | | | | |

| OPERATING MINIMUMS | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
| Rate Period Year 1 | | | | | | | | | | | | |
| Total MW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rate Period Year 2 | | | | | | | | | | | | |
| Total MW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Note: The amounts in the table above shall be rounded to whole megawatts. | | | | | | | | | | | | |

| PLANNED AMOUNTS | | | | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
| Rate Period Year 1 | | | | | | | | | | | | |
| Total aMW | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Rate Period Year 2 | | | | | | | | | | | | |
| Total aMW | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Note: The amounts in the table above shall be rounded to whole average megawatts | | | | | | | | | | | | |

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Step 6

Prior to September 15, 2011 BPA determines SLICE PUD's Annual Net Requirement for FY2012 and updates information in Exhibit A, C and I as shown below:

Exhibit A section 1.2

Annual Net Requirement = 140 annual aMW

Exhibit I

- Adjusted Annual RHWM Tier 1 System Capability = 7,000 aMW
- Annual Critical Slice Amount = 70 aMW

Exhibit C section 1.1

- Annual Tier 1 Block Amount = 70 aMW

Exhibit C section 1.1

- Using SLICE PUD's Monthly Shaping Factor the October FY 2012 Tier 1 Block Amount is 51,336 MWh
- Assume Tier 1 Block Amount scheduled as flat as possible is 69 MW for each hour of the October FY 2012.

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Hourly Scheduling & Delivery

Using the planning information from above BPA, through the Tier 1 Block Amounts or firmed flat annual output of the DFS resource, makes available to SLICE PUD the following amounts of power for every hour of October:

| | | |
|----------------------------|---|-------------|
| Hourly Tier 1 Block Amount | = | 69 MW |
| Hourly DFS Planned Amount | = | <u>5 MW</u> |
| Hourly Firm Federal Power | | 74 MW |

Illustrative Example 1

BPA firms the DFS resource and makes 74 MW of firm federal power available to SLICE PUD for every hour of October by:

- Hourly deliveries are scheduled from Very Windy #2 to BPAP designated sink using SLICE PUD transmission rights
- BPA then makes DFS planned amount available at BPAP system
- SLICE PUD takes receipt of the DFS planned amount and uses their transmission rights to deliver DFS planned amount to their TRL.
- SLICE PUD takes receipt of the Tier 1 Block Amount and uses their transmission rights to deliver Tier 1 Block Amounts to their TRL.

| | | | |
|---|----|----|----|
| Very Windy #2 scheduled generation | 0 | 5 | 15 |
| Very Windy #2 power delivered to BPAP designated sink | 0 | 5 | 15 |
| DFS Flattened power delivered to TRL | 5 | 5 | 5 |
| Tier 1 Block Amount | 69 | 69 | 69 |
| Hourly Firm Federal Power | 74 | 74 | 74 |

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Illustrative Example 2

BPA firms the DFS resource and makes 74 MW of firm federal power available to SLICE PUD for every hour of October by:

- Hourly deliveries are scheduled from Very Windy #2 to SLICE PUD TRL (as the sink) using SLICE PUD transmission rights.
- BPA makes Tier 1 Block Amounts available at the BPAP system; SLICE PUD takes receipt of the Tier 1 Block Amount and uses their transmission rights to deliver Tier 1 Block Amounts to their TRL.
- For Very Windy #2 scheduled generation amounts are less than the Very Windy #2 planned amount, BPA makes available power equal to the difference between the Very Windy #2 planned amount and the Very Windy #2 scheduled generation; SLICE PUD takes receipt of this DFS flattened power amount at the BPA system and uses their transmission rights to deliver the firm federal power to their TRL.
- For Very Windy #2 scheduled generation amounts greater than the Very Windy #2 planned amount, SLICE PUD delivers to the BPA system power amounts equal to the difference between the Very Windy #2 scheduled generation and the Very Windy #2 planned amount; SLICE PUD is responsible for delivering this power to a BPAP designated sink using their transmission rights.

| | | | |
|--|----|----|----|
| Very Windy #2 scheduled generation | 0 | 5 | 15 |
| Very Windy #2 power delivered to TRL | 0 | 5 | 15 |
| Tier 1 Block Amount | 69 | 69 | 69 |
| DFS power delivered to TRL by BPAP | 5 | 0 | 0 |
| DFS power delivered by SLICE PUD to BPAP designated sink | 0 | 0 | 10 |
| Net power delivered to TRL | 5 | 5 | 5 |
| Hourly firm federal power | 74 | 74 | 74 |

Illustrative Example 3

BPA firms the DFS resource and makes 74 MW firm federal power available to SLICE PUD for every hour of October by:

- Hourly deliveries are scheduled from Very Windy #2 to SLICE PUD TRL (as the sink) using SLICE PUD transmission rights.
- BPA firms Very Windy #2 output to the DFS planned by allowing SLICE PUD to vary the hourly Tier 1 Block Amount
- SLICE PUD takes receipt of the Tier 1 Block Amount and uses their transmission rights to deliver Tier 1 Block Amounts to their TRL.

| | | | |
|--------------------------------------|----|----|----|
| Very Windy #2 scheduled generation | 0 | 5 | 15 |
| Very Windy #2 power delivered to TRL | 0 | 5 | 15 |
| Tier 1 Block Amount | 74 | 69 | 59 |
| Hourly firm federal power | 74 | 74 | 74 |