

Illustrative Example for RSS in Power PUD's Contract

April 24, 2009

Assumptions.

BPA Power Products

- All Resource Support Service (RSS) products are available for Load Following contract holders' Specified Resources. Secondary Crediting Service (SCS), however, is only available for customers' "existing" hydro resources that are already dedicated to load.
- Diurnal Flattening Service (DFS), in combination with the Resource Shaping Charge, converts the resource output to a flat annual block.
- Output of Specified Resources must be applied to the customer's Total Retail Load.
- BPA provides all transmission scheduling services via TSS for Load Following customers if DFS, SCS, or service at BPA's Tier 2 rate(s) is elected.

Customer Details

- Power PUD is a LF PSC holder and an NT contract holder. It is also a directly-connected customer.
- Power PUD is interested in a non-federal resource: 10% of a 60 MW nameplate wind resource in another PUD's service territory with just one other PUD between them (Windy Wind Project)

THWM: ~80 aMW (actually 79.968 aMW)

Above-RHWM (ARHWM) load for FY 2012 = < 1 aMW

ARHWM load for FY 2013 = 1.780 aMW

Forecast ARHWM load for FY 2014 = 2.554 aMW

DFS Planning Process.

Step 1

By November 1, 2009, Power PUD sends BPA a letter electing to serve its FY 2012, 13 & 14 ARHWM load themselves, meaning no Tier 2 purchase from BPA for the 3-year period. In this letter, Power PUD also a) requests to add Windy Wind Project, a new Specified Resource, to its LF contract to meet its ARHWM load beginning in FY 2013; b) requests DFS for Windy; and c) elects to meet any ARHWM load not met by Windy with Unspecified Resource Amounts. Power PUD does not wish to provide those resource amounts in a shape other than the Flat Annual Shape and Flat Within-Month Shape, so no additional election is necessary in that regard.

Illustrative Example for RSS in Power PUD's Contract April 24, 2009

Step 2

By March 31, 2010, Power PUD's contract is updated added to reflect the elections made in the letter referenced in Step 1.

- In section 2 of Exhibit A
 - (1) **Windy Wind Project**
 - (A) **Special Provisions**
[blank]
 - (B) **Resource Profile**

Fuel Type	Date Resource Dedicated to Load	Date of Resource Removal	Percent of Resource Used to Serve Load	Nameplate Capability (MW)
Wind	October 1, 2012		10	60

Statutory Status		Resource Status		DFS or SCS?		Dispatchable?		PNCA?		If PNCA, PNCA Updates?	
5b1A	5b1B	Existing	New	Yes	No	Yes	No	Yes	No	Yes	No
	X		X	X			X		X		

Note: Fill in the table above with "X"s.

(C) Specified Resource Amounts

Specified Resource Amounts													
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	annual aMW
Fiscal Year 2013													
Total (MWh)	1014	836	1498	1584	1506	1858	1610	1092	1604	962	1043	640	1.73
HLH (MWh)	528	435	776	906	858	1108	930	601	844	458	643	309	1.70
LLH (MWh)	486	401	722	678	648	750	680	491	760	504	400	331	1.78
Peak (MW)	6	6	6	6	6	6	6	6	6	6	6	6	

Repeat for all applicable years.

3.1.2 Unspecified Resource Amounts

Power PUD does not have any Unspecified Resource Amounts at this time.

FYI: The above will be replaced with the table below after the **RHWM Process** for WP-14 has concluded if, based on the calculations in that process, Power PUD has Unspecified Resource Amounts to apply to load. Power PUD does not have any ARHWM load in FY 2012 and its new non-federal resource covers its ARHWM load in FY 2013, so it has no Unspecified Resource Amounts at this time. It is included here for illustrative purposes.

Illustrative Example for RSS in Power PUD's Contract April 24, 2009

Power PUD's Unspecified Resource Amounts are listed in the table below.

Unspecified Resource Amounts													
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	annual aMW
Fiscal Year 2014													
Total (MWh)													
HLH (MWh)													
LLH (MWh)													
Fiscal Year 2015													
Total (MWh)													
HLH (MWh)													
LLH (MWh)													

Note: Fill in the table above with megawatt-hours rounded to whole megawatt-hours and with annual Average Megawatts rounded to three decimal places.

- Section 2.1 of Exhibit C

Zero Tier 2	Purchase Period
X	FY 2012 - FY 2014
	FY 2015 - FY 2019
	FY 2020 - FY 2024
	FY 2025 - FY 2028

- Exhibit D: DFS language is added. Certain specific sections are shown below:

2.3.5.1 List of Specified Resources

Resource Name	Resource Location	Resource Transmission
Windy Wind Project	BPA BAA	Secondary NT

**Illustrative Example for RSS in Power PUD's Contract
April 24, 2009**

2.3.5.2 Monthly Operating Minimums and Planned Amounts

«Windy Wind Project»'S OPERATING MINIMUMS												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Rate Period Year 1												
HLH MW	0	0	0	0	0	0	0	0	0	0	0	0
LLH MW	0	0	0	0	0	0	0	0	0	0	0	0
Rate Period Year 2												
HLH MW	0	0	0	0	0	0	0	0	0	0	0	0
LLH MW	0	0	0	0	0	0	0	0	0	0	0	0

Note: The amounts in the table above shall be rounded down to the nearest whole megawatts.

«Windy Wind Project»'S PLANNED AMOUNTS												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Rate Period Year 1												
HLH aMW												
LLH aMW												
Total aMW												
Rate Period Year 2												
HLH aMW	1.222	1.133	1.865	2.178	2.145	2.663	2.236	1.445	2.110	1.101	1.546	0.773
LLH aMW	1.558	1.190	2.201	2.067	2.189	2.294	2.237	1.497	2.375	1.537	1.220	1.034
Total aMW	1.363	1.160	2.013	2.129	2.164	2.501	2.236	1.468	2.228	1.293	1.402	0.889

Note: The amounts in the table above shall be rounded to the nearest three decimal places

Step 3

Prior to October 31 of the Rate Case Year for WP-12, Power PUD provides any updates to the resource information used to develop the resource amounts in Exhibit D listed above.

Illustrative Example for RSS in Power PUD's Contract April 24, 2009

Step 4

Prior to September 30 of the Rate Case Year (Sep 2011) for the FY 2012/13 Rate Period BPA updates section 2.3.5.2 if necessary and fills in the section 2.3.5.3 of Exhibit D:

2.3.5.3 DFS Charges and Rates

DFS CAPACITY CHARGE	
Rate Period	\$/month
2012 – 2013	15,309.49
2014 – 2015	
2016 – 2017	
2018 – 2019	
2020 – 2021	
2022 – 2023	
2024 – 2025	
2026 – 2027	
2028	
DFS ENERGY RATE	
Rate Period	\$/MWh
2012 – 2013	6.01
2014 – 2015	
2016 – 2017	
2018 – 2019	
2020 – 2021	
2022 – 2023	
2024 – 2025	
2026 – 2027	
2028	

Step 5

- Prior to September 30, 2011, BPA updates Exhibit F with the Transmission Scheduling Service provisions.

Illustrative Example for RSS in Power PUD's Contract

April 24, 2009

Hourly Scheduling & Delivery.

Power PUD provides Windy generation forecasts to BPA through a computer-based customer portal in accordance with Exhibit F. Subsections of that exhibit follow:

4.1 Prescheduling

Power PUD shall submit a delivery schedule to Power Services for its Dedicated Resources for delivery to its Total Retail Load which shall include information such as the source, the point of receipt, any OASIS reservation reference numbers needed for the delivery of non-federal power, the daily megawatt profile and all purchasing selling entities in the path. This delivery schedule shall be submitted to Power Services before the earliest of:

- (1) 0800 hours Pacific Prevailing Time (PPT) on preschedule day, or
- (2) one hour prior to the earliest of the transmission prescheduling deadlines associated with **Power PUD's** transmission agreement(s) delivery of power to **Power PUD's** Total Retail Load.

4.2 Real-Time Scheduling

Power Services shall accept megawatt adjustments to **Power PUD's** Dedicated Resource schedule(s) up to the earliest of 45 minutes prior to the hour of delivery or 25 minutes prior to the earliest of the transmission real-time scheduling deadlines associated with delivery of power to **Power PUD's** Total Retail Load.

Power PUD shall submit all required real-time scheduling information in a format specified by Power Services.

Illustrative Example for RSS in Power PUD's Contract

April 24, 2009

Illustration

Load Following customers located in the BPA Balancing Authority Area acquiring a non-federal resource sourced within the BPA Balancing Authority Area, purchasing BPA's DFS. Assumes customer is taking TSS (which includes TCMS).

Prerequisites:

- Customer enters non-federal generation forecast through Regional Dialogue Scheduling System portal
- Load forecast entered by customer through RDSS portal or received from other, internal BPA load forecasting system
- Existing transmission, if any, from OASIS is stored in RDSS/TSS database
- Resource profile stored in RDSS database would include type, generation peak, POR
- Load profile stored in RDSS database would include PODs
- Customers ARHWM requirement stored in RDSS database from contract (can change every two years)
- Customer profile includes types of RSS purchased (can change every two years)

End State

- BPA Power Services creates one schedule and tag for non-fed resource to customer load on customers' NT.
- Non-schedule & no tag required for Fed system to customer load. Non-federal system energy delivery will be adjusted in real-time to

Illustrative Example for RSS in Power PUD's Contract April 24, 2009

accommodate changes to the customer's non-federal generation schedule.

- Purchase secondary NT on all transmission systems during times of curtailments.

Rates and Billing.

The associated RSS charges for the provision of DFS in this example will include a variable DFS Energy Charge and Resource Shaping Charge Adjustment based on actual power generation. They will also include the DFS Capacity Charge and Resource Shaping Charge based on the planned generation.

The amount of planned DFS and RSC charges in \$/MWh for this customer's resource in FY 2013 are:

DFS and RSC Charges	\$/MWh
DFS Capacity Charge	12.05
DFS Energy Charge	6.01
Resource Shaping Charge	0.27
Total Price (\$/MWh)	18.34

This customer does not pay Forced Outage Reserves for this wind resource because it is already paying for the capacity.

The customer's resource charges above were based on the planned generation in the first month (October) of FY 2013. The resource actually performed differently and is captured below:

Illustrative Example for RSS in Power PUD's Contract April 24, 2009

In total monthly kWh amounts:

	Planned		Actual		Delta	
	LLH kWh	HLH kWh	LLH kWh	HLH kWh	LLH kWh	HLH kWh
Oct	486,000	528,000	321,000	654,000	165,000	(126,000)
Nov	401,000	435,000	589,000	418,000	(188,000)	17,000
Dec	722,000	776,000	622,000	665,000	100,000	111,000
Jan	678,000	906,000	655,000	942,000	23,000	(36,000)
Feb	648,000	858,000	712,000	871,000	(64,000)	(13,000)
Mar	750,000	1,108,000	862,000	1,006,000	(112,000)	102,000
Apr	680,000	930,000	456,000	945,000	224,000	(15,000)
May	491,000	601,000	665,000	456,000	(174,000)	145,000
Jun	760,000	844,000	654,000	734,000	106,000	110,000
Jul	504,000	458,000	444,000	566,000	60,000	(108,000)
Aug	400,000	643,000	668,000	786,000	(268,000)	(143,000)
Sep	331,000	309,000	436,000	238,000	(105,000)	71,000
Total	6,851,000	8,396,000	7,084,000	8,281,000	(233,000)	115,000
	Grand Total	15,247,000	Grand Total	15,365,000		

The RSS Flattening Services charge will be applied to resources based on their *actual* total monthly generation (see green highlighted amounts above). The RSC Adjustment reflects the cost difference between the planned and actual average monthly HLH and LLH resource generation amount.

Illustrative Example for RSS in Power PUD's Contract April 24, 2009

metered	April
CSP kW	121,444
Proxy GSP kW	109,300
HLH kWh	31,814,906
LLH kWh	19,218,112
Proxy CDQ kW	34,036

Purchaser -	xxxxxxx
Example Load Following Bill with RSS	
Hours	416
	Net Req (aMW) = 82.149
304	Min(NR,RHWM) (aMW) = 79.968
	above RHWM (aMW) = 1.780
	ΣRHWM aMW = 7,327.232
	TOCA = 1.09138%

April Tiered Rate Bill

Sched	Service Descriptor	Quantity	Unit	Rate	Amount
Tier 1	Composite Charge	1.09138	1% @		1,792,247 \$
Tier 1	Non-Slice Charge	1.09138	1% @		-463,209 (\$505,537)
Tier 1 + Non Fed	Energy HLH	31,814,906			
Non-Fed	Energy HLH	-740,480			
Tier 1	Energy HLH	31,074,426			
Tier 1	HLH SSL	28,195,560			
Tier 1	HLH Load Shaping	2,878,866	kWh @	0.04716	\$135,767
Tier 1 + Non Fed	Energy LLH	19,218,112			
Non-Fed	Energy LLH	-541,120			
Tier 1	Energy LLH	18,676,992			
Tier 1	LLH SSL	20,445,274			
Tier 1	LLH Load Shaping	-1,768,282	kWh @	0.04056	(\$71,722)
Tier 1 + Non Fed	Demand CSP	121,444			
Non-Fed	Flat Block (per hour)	-1,780			
Tier 1	aHLH	-74,698			
Tier 1	CDQ	-34,036			
Tier 1	Demand Charge	10,930	kW @	7.41	\$80,990
RSS	DFS Energy Actual HLH + LLH	1,401,000	kWh @	0.00601	\$8,420
RSS	DFS Capacity		1 Mo @	15,309 \$	15,309
RSS	RSC		1 Mo @	349 \$	349
RSS	RC Forecast Non-Fed HLH	930,000			
RSS	Actual Non-Fed HLH	945,000			
RSS	HLH RSC Adjustment	-15,000	kWh @	0.04716	(\$707)
RSS	RC Forecast Non-Fed LLH	680,000			
RSS	Actual Non-Fed LLH	456,000			
RSS	LLH RSC Adjustment	224,000	kWh @	0.04056	\$9,085
Total					\$1,627,978

TRM April Rate Schedule	
Composite (\$ per 1%)	1,792,247
Non-Slice (\$ per 1%)	-463,209
TISR HLH Gen (kWh)	2,583,477,791
LS HLH (mills/kWh)	47.16
System Shaped Load (SSL) is calculated by multiplying a customer's TOCA by the posted output of the Tier 1 System Resources (TISR) for the corresponding monthly/diurnal period.	
TISR LLH Gen (kWh)	1,873,341,468
LS LLH (mills/kWh)	40.56
Load Shaping (LS) billing determinant is calculated by subtracting SSL from Tier 1 energy.	
Contract Demand Quantity is found in contract.	
Demand (\$/kW-mo)	7.41
Variable DFS Energy (mills/kWh)	6.01
Fixed DFS Capacity (\$/month)	15,309
Fixed RSC (\$/month)	349
RSS charges are resource specific. The example here was created from a wind resource.	
RSC HLH (mills/kWh)	47.16
Resource Shaping Adj (RS) billing determinant is calculated by subtracting Actual generation from Forecast generation.	
RSC LLH (mills/kWh)	40.56

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