Resource Support Services

The Basics

❖ What are Resource Support Services?

- At a simplistic level, Resource Support Services (RSS) is the suite of services that allows a customer to apply the actual, variable output of a resource to its load without making other BPA customers better or worse off and without having to guarantee a specific scheduled shape of resource.

- RSS is important because customers are expected to develop a variety of resources during the term of the Regional Dialogue contracts. Some of these resources will have characteristics that reduce the amount of load BPA would otherwise serve in higher value times (e.g. winter HLH) while others may reduce the amount of load BPA must serve in lower value times (e.g. spring LLH).

❖ What services make up the Resource Support Services?

- **Diurnal Flattening Service (DFS)** - a service that makes a resource that is variable or intermittent, or that portion of such resource that is variable or intermittent, equivalent to a resource that is flat within each Monthly/Diurnal period.
  - For example, the DFS can convert the output of a resource, like wind, whose output is highly variable and unpredictable and which provides little dependable capacity, into a firm block by firming and reshaping the energy and adding firm capacity.

- **Forced Outage Reserves Service (FORS)** – a service that provides an agreed-to-amount of capacity and energy to load during forced outages of a qualifying resource.

- **Secondary Crediting Service (SCS)** – a service that provides a monetary credit for the secondary output from an Existing Resource that has a firm critical energy component and a secondary energy component.

- **Transmission Curtailment Management Service (TCMS)** – a service that is now proposed to be included as a feature of the Transmission Scheduling Service (TSS) provided under the load following contract. BPA will provide replacement power for a qualifying resource when a transmission curtailment occurs between such resource and the customer's load.

- What about the Resource Shaping Charge, the Resource Shaping Charge Adjustment, and the Resource Remarketing Service?

  - The **Resource Shaping Charge** is not a service, but rather a credit or charge that adjusts for the difference in value between a resource shape that is flat within each Monthly/Diurnal period (but not necessarily flat when comparing one Monthly/Diurnal period to another) and an equivalently sized flat annual block (flat for all hours of the Fiscal Year). This is calculated before the rate period and fixed.

  - The **Resource Shaping Charge Adjustment** is a very simple end-of-month energy adjustment that ensures neutrality between the forecast and actual generation. The Resource Shaping Charge Adjustment is not a penalty rate and is calculated using the exact same rates used for calculating the Resource Shaping Charge. This will only be applied to resources receiving the DFS.

  - The **Resource Remarketing Service** will be offered through the Firm Power Products and Services (FPS) rate schedule and will be considered and negotiated on a case-by-case basis. The Resource Remarketing Service is designed to help customers manage the "lumpiness" of acquiring resources that are larger than their Above-RHWM load. Customers will receive a credit for the excess power until their load growth catches up to the size of the resource purchased.

❖ Who is eligible to purchase RSS?

- **Load Following Customers:**
  - ➢ DFS and FORS will be available to support all Specified Resources
  - ➢ SCS will be available to support Specified Resources that are Existing Resources (dedicated to load prior to October 1, 2006) and Hydro Resources.
  - ➢ TCMS will be provided as part of TSS to support qualifying Specified Resources and qualifying resources that are applied to meet customer resource obligations for Unspecified Resource Amounts. What constitutes a "qualifying resource" will be to be discussed during an upcoming Exhibit F revision process.

- **Block and Slice/Block Customers:**
  - ➢ DFS and FORS will be available to support Specified Resources that are renewable resources and are New Resources (dedicated to load after September 30, 2006)
  - ➢ SCS and TCMS will not be provided as a requirements service to support Block and Slice/Block customers Specified Resources.

* Specified Resources are resources that a customer is required by statute or has agreed to use to serve its Total Retail Load. Each such resource is identified as a specific resource and is listed in section 2 or 4 of Exhibit A. Specified Resources are a subset of Dedicated Resources.

❖ Timeline to purchase RSS

- **For Specified Resources listed in Exhibit A prior to a Notice Deadline**
  - ➢ By each Notice Deadline below, Customers must commit to purchase RSS from BPA for the corresponding Purchase Period.

Notice Deadline		Purchase Period
November 1, 2009	for	FY 2012 – FY 2014
September 30, 2011	for	FY 2015 – FY 2019
September 30, 2016	for	FY 2020 – FY 2024
September 30, 2021	for	FY 2025 – FY 2028

- **For new Specified Resources added to Exhibit A within a Purchase Period.**
  - ➢ By October 31 of a Rate Case Year (11 months before a Rate Period), Customers must commit to purchase RSS from BPA for the remainder of the current Purchase Period and the following Purchase Period.

General Concept behind the Diurnal Flattening Service

❖ Diurnal Flattening Service – Frequently Asked Questions

- What type of rate will be used for the DFS?
  - The DFS will likely be a formula rate that will produce unique rates and charges based on the generating profile of a resource or a portfolio of resources.
  - The same formula rate will be applied to BPA's resources making up the Tier 2 rates. This is intended to avoid creating an advantage to serving above-RHWM load with either non-federal or power from BPA at Tier 2 rates.

- What data will be used to price the DFS?
  - When available, the generating profile will be constructed using historical scheduled generation. If historical scheduled generation is not available, the historical generating profile of a similar resource will be used until the resource develops its own history.

- Are there any data requirements to receive DFS?
  - Resources receiving DFS must be metered with the meter and schedule information provided to BPA.

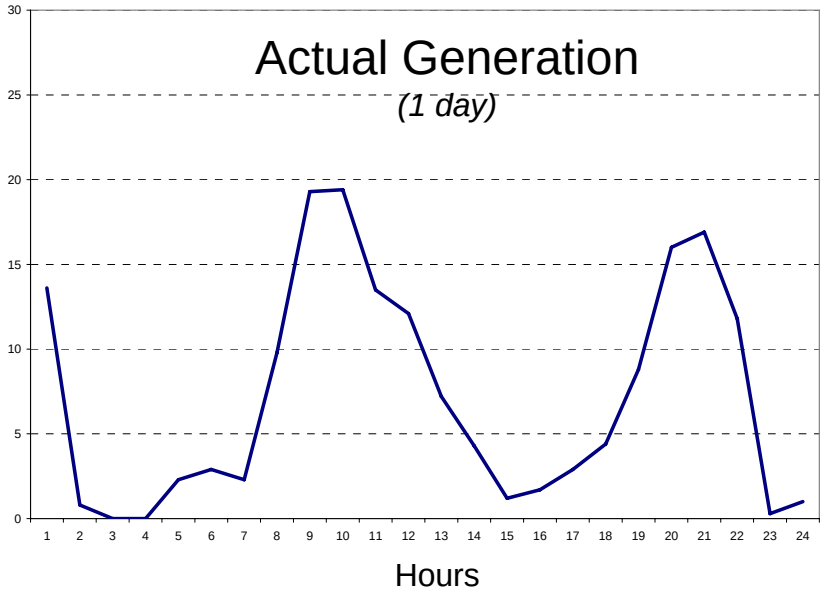
- Are there any transmission requirements to receive DFS?
  - A Load Following customer with a BPAT NT agreement must purchase Transmission Scheduling Services from BPA in order to qualify to purchase DFS.
  - Resources located outside the BPA BA must be scheduled on Firm Transmission, except if the resource is a "Renewable Resource."

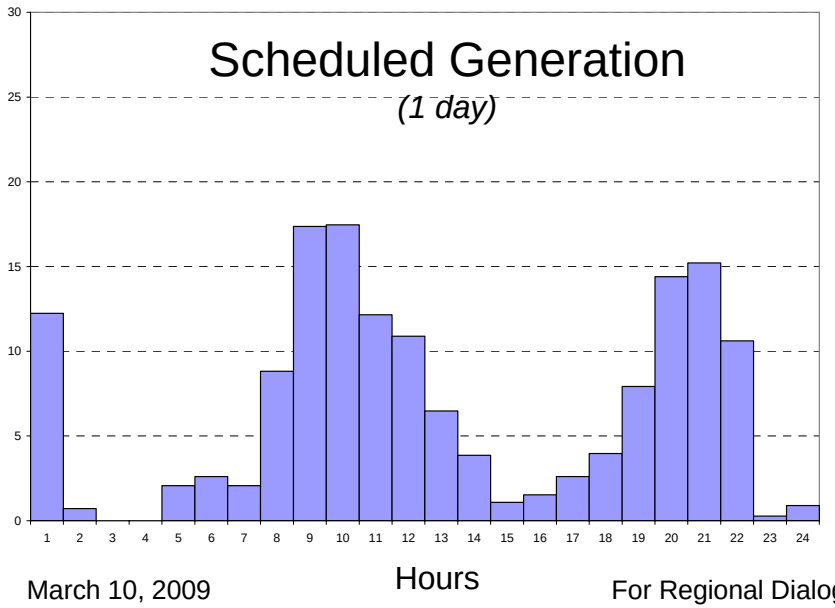
- How will DFS work for customers with transfer service?
  - There are special circumstances presented by some customers served by transfer that present particular challenges for the provision of RSS. BPA has not resolved all of these issues, but intends to continue working on them, so that if possible, all Load-Following customers will have access to these services in the most cost-effective manner.

❖ Pricing Components of DFS

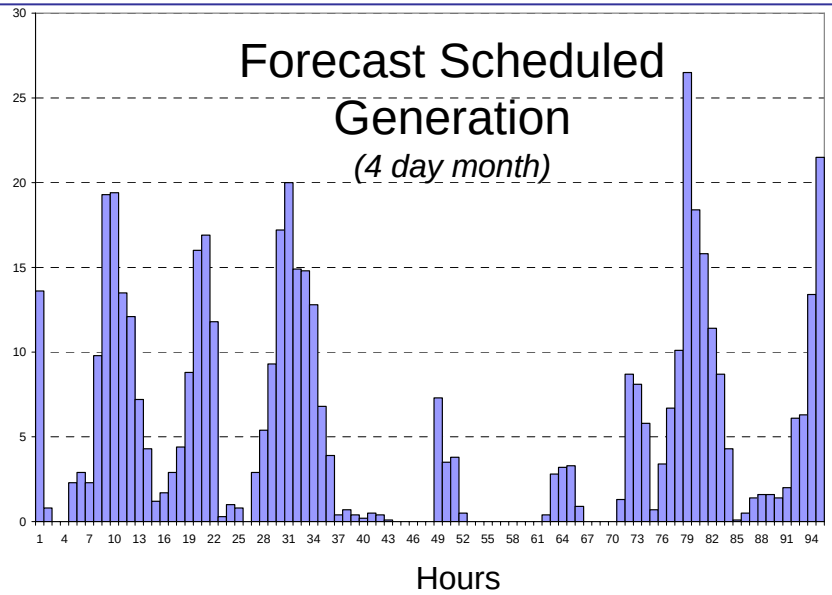
- The capacity charge attempts to capture the capacity shortfall of a variable/intermittent resource when compared to a flat annual block of power. A capacity rate is then applied to the amount of capacity the resource is short of a flat annual block. This is expected to be paid as a fixed $/month charge.

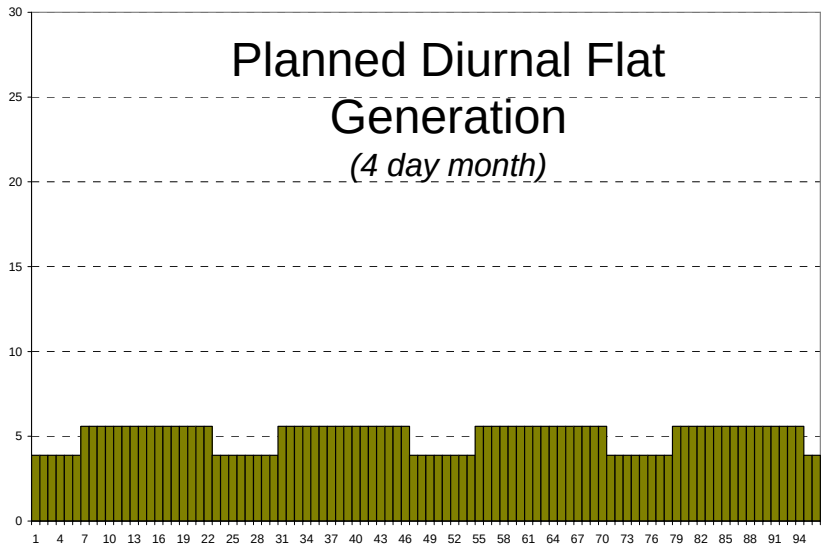
- The energy charge attempts to capture the cost of smoothing the variable/intermittent energy generation into flat Monthly/Diurnal blocks. This is expected to be paid as a $/MWh rate based on actual generation.





The Diurnal Flattening Service provides hour-to-hour support and **not within-hour support**. The either the customer self provides these services or the Balancing Authority where the resource is located provides the within-hour flattening through integration charges and generation imbalance charges.





The **Diurnal Flattening Service** provided by Power Services will financially flatten the resource in the 24 HLH and LLH periods of the year.

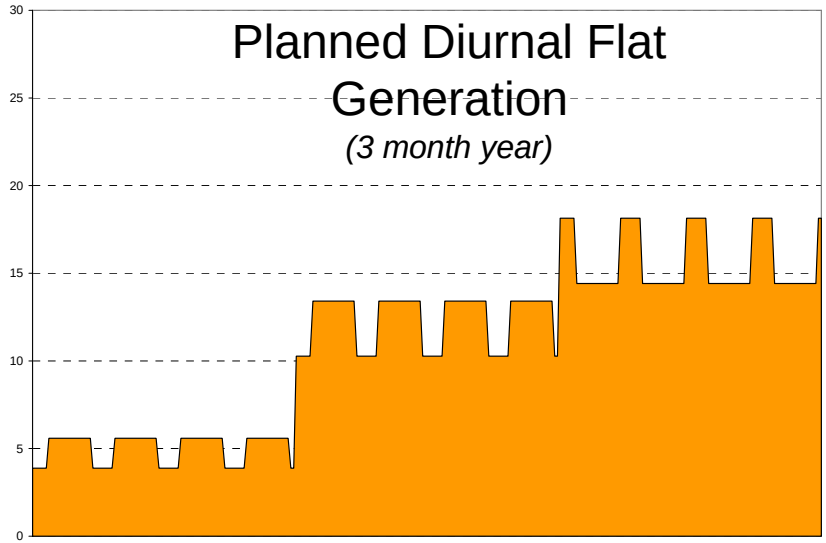
Resource Shaping Charge

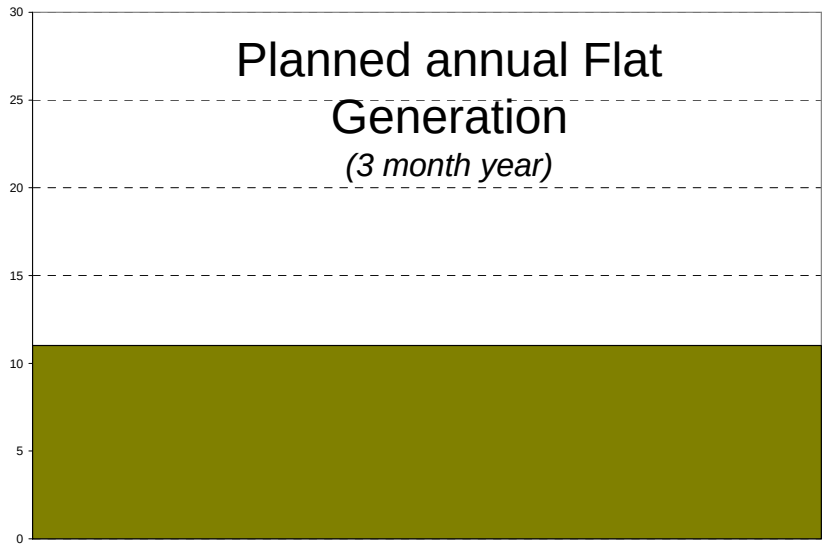
❖ Resource Shaping Charge

- The Resource Shaping Charge is applied to:
  - Load Following customer's New Resources (resources dedicated to load after September 30, 2006); and/or
  - Any resource receiving the Diurnal Flattening Service

- The point of the Resource Shaping Charge is to financially **credit** or **charge** for the value difference between a Monthly/Diurnal flat resource and a flat annual block (a flat annual block is the equity benchmark shape as determined through the Regional Dialogue).

- The market forecast rates used to determine the Resource Shaping Charge are proposed in the TRM to be equal to the Load Shaping Charge. This is important because it effectively means a Load Following customer is financially indifferent between applying the Resource Shaping Charge to the resource or applying the Load Shaping Charge to the net load.

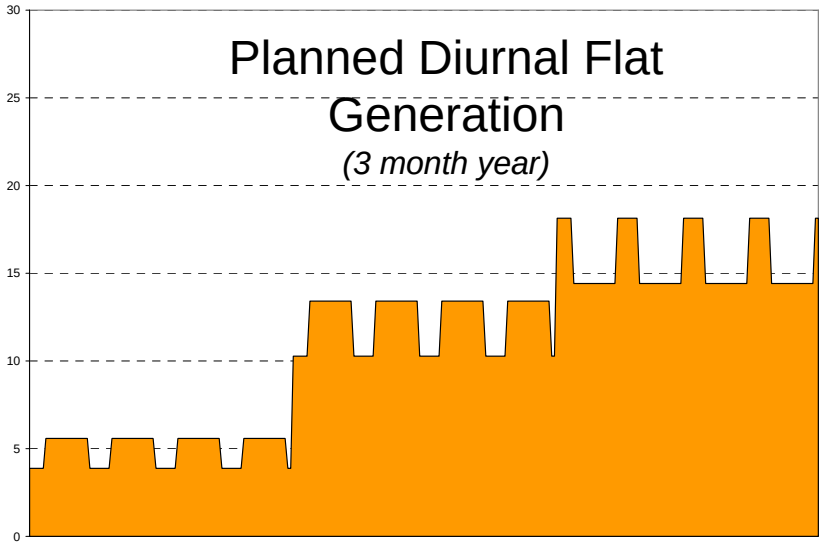


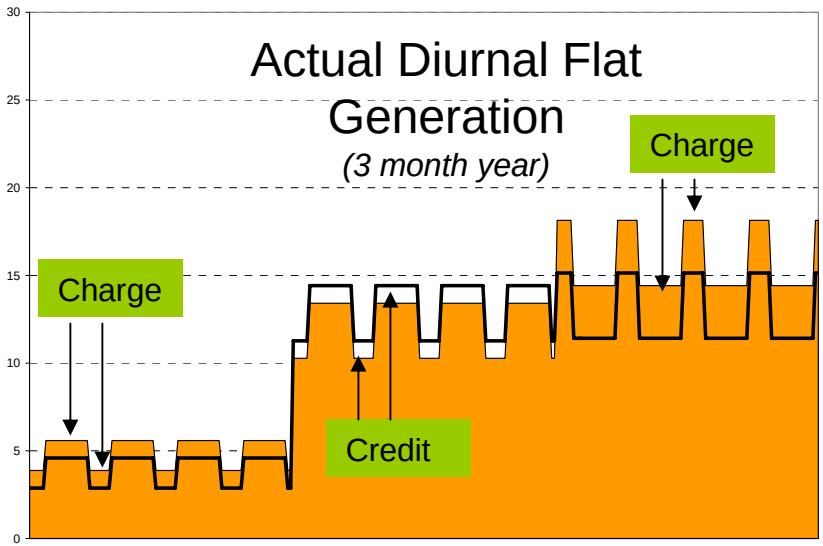


The **Resource Shaping Charge** calculated off planned generation will financially flatten a resource that is flat within the 24 HLH and LLH periods of the year to a resource that is annually flat.

❖ Resource Shaping Charge Adjustment

- Unlike Unauthorized Increase (UAI), the Resource Shaping Charge Adjustment is not a penalty rate, it simply adjusts for forecast error.
- Is calculated using the same posted forecast market rates that were used when calculating the Resource Shaping Charge.
- Calculated each month based on that month's actual generation.
- Energy in excess of expected amount will be credited at the forecast market prices used for the Resource Shaping Charge.
- Energy amounts below expected generation will be charged at the forecast market prices used for the Resource Shaping Charge.





The **Resource Shaping Charge Adjustment** will compare the planned diurnal flat generation to the actual diurnal average generation of the resource. Generation above will be credited and generation below will be charged.

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	ΣRHWM aMW = 7,327.232
	above RHWM (aMW) =	2.181	TOCA = 1.09138%

April Tiered Rate Bill

Sched	Service Descriptor	Quantity	Unit	Rate	Amount
Tier 1	Composite Charge	1.09138	1% @	1,792,247	$1,956,023
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	-907,296			
Tier 1	Energy HLH	30,907,610			
Tier 1	HLH SSL	28,195,560			
Tier 1	HLH Load Shaping	2,712,050	kWh @	0.04716	$127,900
Tier 1 + Non Fed	Energy LLH	19,218,112			
Non-Fed	Energy LLH	-663,024			
Tier 1	Energy LLH	18,555,088			
Tier 1	LLH SSL	20,445,274			
Tier 1	LLH Load Shaping	-1,890,186	kWh @	0.04056	($76,666)
Tier 1 + Non Fed	Demand CSP	121,444			
Non-Fed	Flat Block (per hour)	-2,181			
Tier 1	aHLH	-74,297			
Tier 1	CDQ	-34,036			
Tier 1	Demand Charge	10,930	kW @	7.41	$80,990
RSS	DFS Energy Actual HLH + LLH	1,477,000	kWh @	0.00625	$9,231
RSS	DFS Capacity	1	Mo @	19,112	$ 19,112
RSS	RSC	1	Mo @	5,840	$ 5,840
RSS	RC Forecast Non-Fed HLH	689,104			
RSS	Actual Non-Fed HLH	880,000			
RSS	HLH RSC Adjustment	-190,896	kWh @	0.04716	($9,003)
RSS	RC Forecast Non-Fed LLH	788,434			
RSS	Actual Non-Fed HLH	597,000			
RSS	LLH RSC Adjustment	191,434	kWh @	0.04056	$7,765
Total					$1,615,655

TRM April Rate Schedule

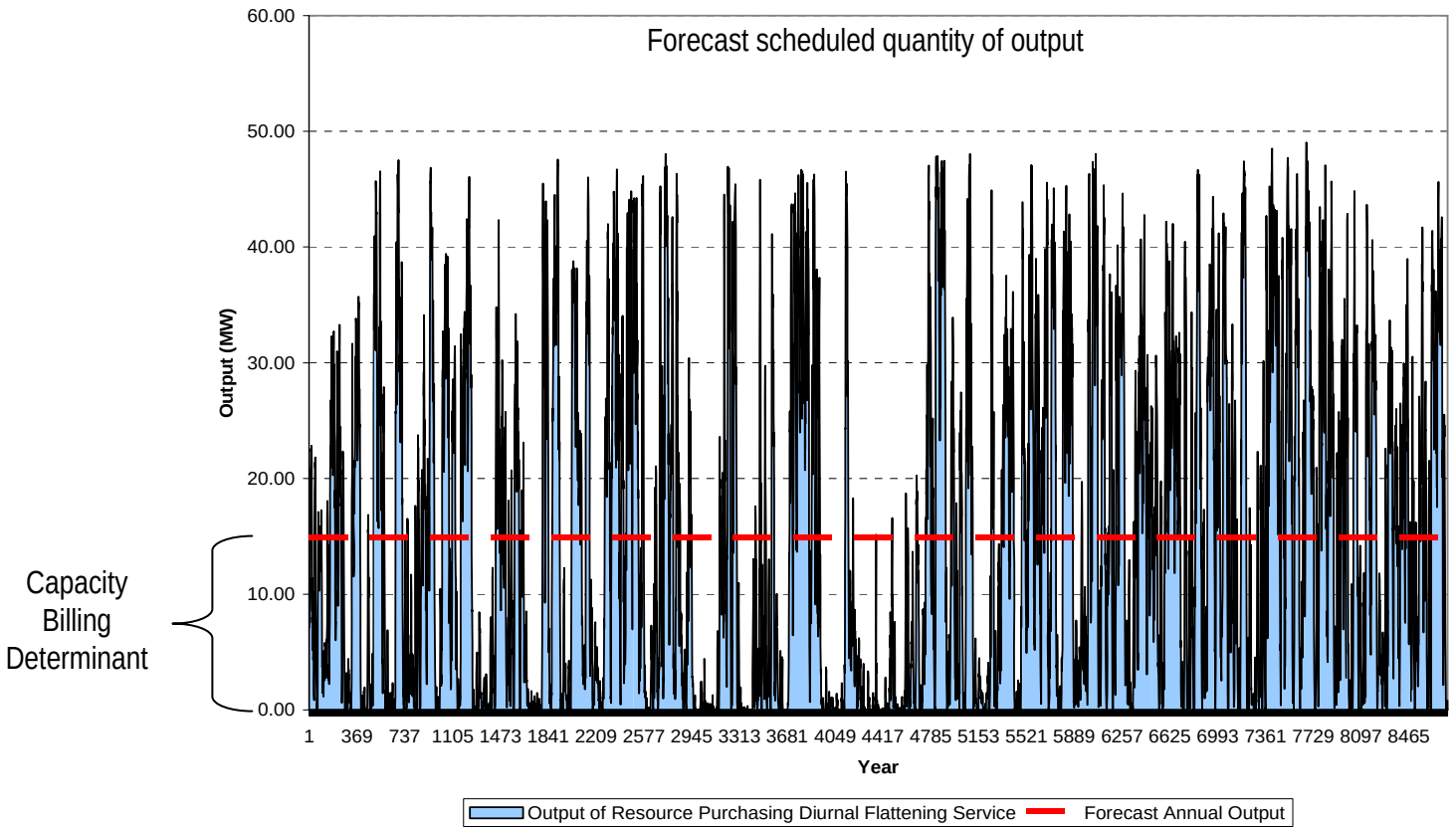
Composite ($ per 1%)		1,792,247
Non-Slice ($ per 1%)		-463,209
T1SR HLH Gen (kWh)		2,583,477,791
LS HLH (mills/kWh)		47.16
System Shaped Load (SSL) is calculated by multiplying a customer's TOCA by the posted output of the Tier 1 System Resources (T1SR) for the corresponding monthly/diurnal period.		
T1SR 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 ($/kW-mo)		7.41
Variable DFS Energy (mills/kWh)		6.25
Fixed DFS Capacity ($/month)	$	19,112
Fixed RSC ($/month)	$	5,840
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

Detailed Look at BPA's **Preliminary** Diurnal Flattening Service Pricing Methodology

- The exact pricing methodology for DFS will be determined in each Rate Case 7(i), with the first being the FY2012 Rate Case. The concepts in this presentation represent a starting spot for conversation until the actual methodology is developed in each Rate Case 7(i).

❖ Resource Capacity Charge

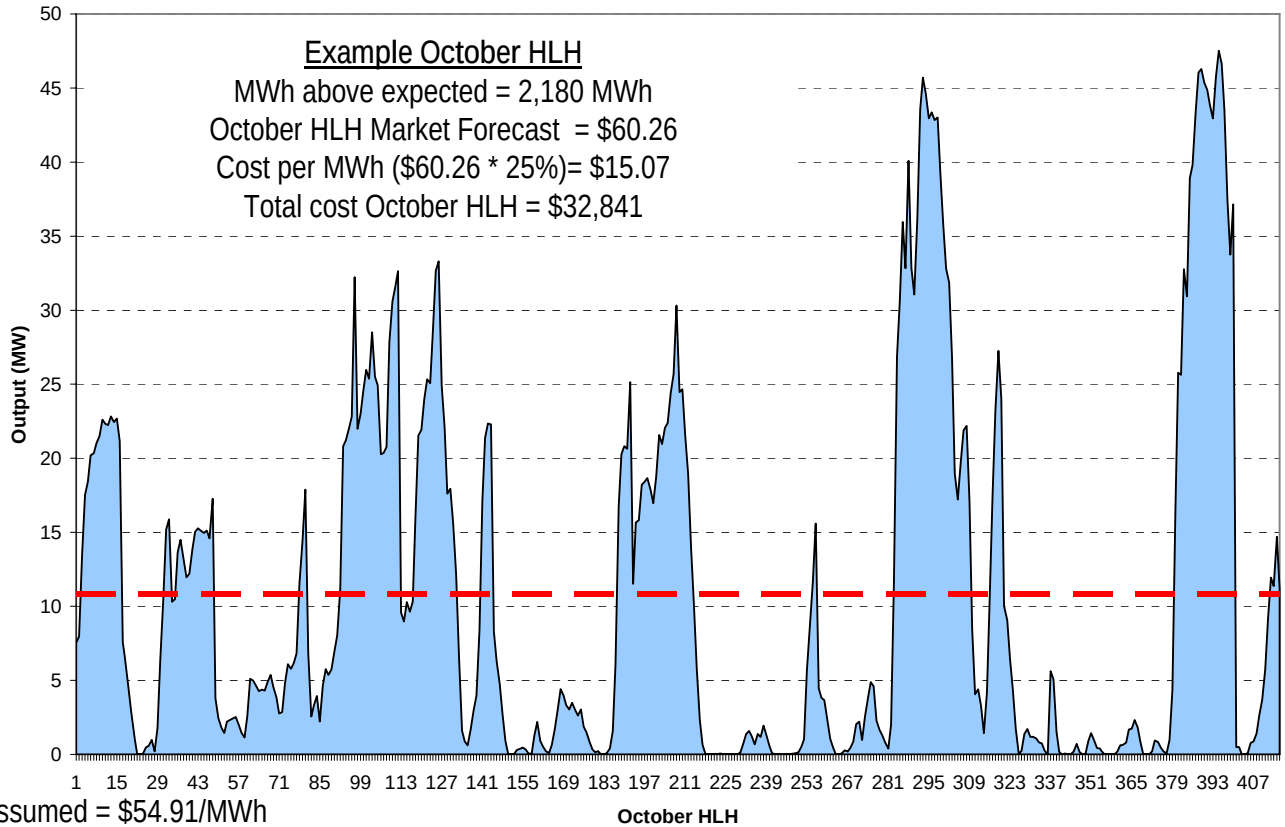
- Capacity cost based on the fixed capital costs of the rate case defined capacity resource – same that is used for the Tier 1 demand charge.
- Billing determinant will be the resource's expected annual generation minus the amount of capacity provided by the resource.



❖ Resource Energy Charge

- Based on generation above the supported resources expected output in each monthly diurnal period of the year (24 each year).
- Billing Determinant will be the sum of MWhs that are generated above the resource's expected monthly diurnal generation (forecast October aHLH in the below graph).

MWh above expected output in a diurnal period = Energy Billing Determinant



Note:
Annual Average HLH price assumed = $54.91/MWh
Annual Average LLH price assumed= $48.01/MWh

❖ Preliminary Price Comparison

Wind#1 Capacity Factor = 32.59%			
DFS Capacity Charge $/MWh [A]	**DFS Energy Charge $/MWh [B]**	Resource Shaping Charge [C}	Amount Billed to Resource $/MWh [A+B+C]
12.08	**5.57**	0.80	18.44
Wind#2 Capacity Factor = 27.31%			
DFS Capacity Charge $/MWh [A]	**DFS Energy Charge $/MWh [B]**	Resource Shaping Charge [C}	Amount Billed to Resource $/MWh [A+B+C]
12.08	**6.28**	0.85	19.22
Wind#3 Capacity Factor = 29.01%			
DFS Capacity Charge $/MWh [A]	**DFS Energy Charge $/MWh [B]**	Resource Shaping Charge [C}	Amount Billed to Resource $/MWh [A+B+C]
12.08	**5.72**	1.52	19.32
Portfolio Capacity Factor = 30.46%			
DFS Capacity Charge $/MWh [A]	**DFS Energy Charge $/MWh [B]**	Resource Shaping Charge [C}	Amount Billed to Resource $/MWh [A+B+C]
12.08	**5.10**	1.05	18.23

BPA has included in the TRM a provision to allow groups of resources to be aggregated for purposes of pricing the RSS service. This allows the pricing methodology to capture the benefits of a diversified resource pool. This benefit can be observed through the preliminary pricing methodology of the three wind farms. If priced individually, the price is higher for all farms than if priced as a group.

Data used was based on actuals for three different wind farms. Both capacity factor and energy shape are different between the three farms.

❖ Preliminary Price Comparison

- RSS can be provided for many different types of resources, not just wind resources – preliminary pricing for a hydro resource and a wood waste resource:

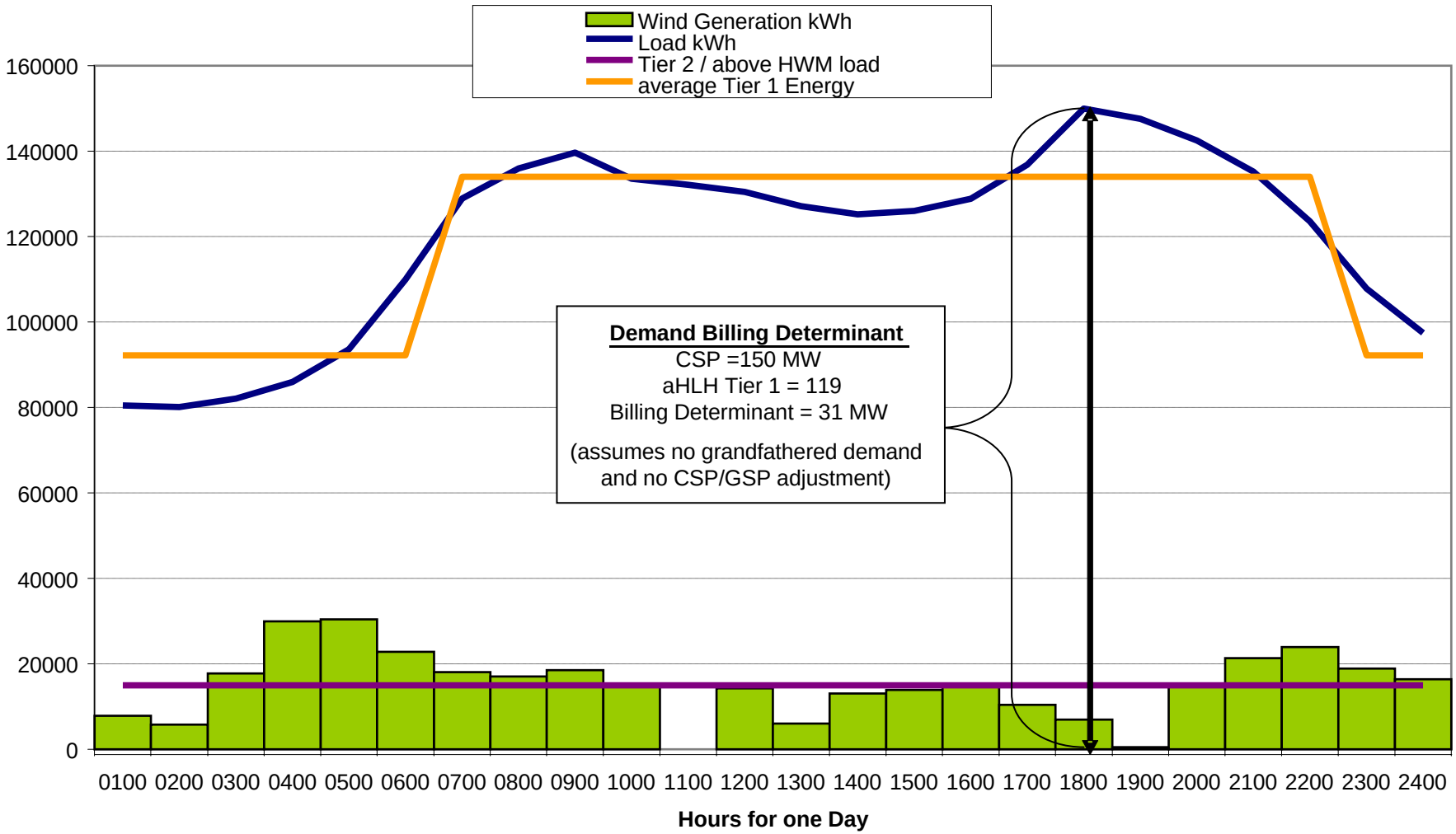
Hydro **Capacity Factor = 90.7%**			
DFS Capacity Charge $/MWh [A]	**DFS Energy Charge $/MWh [B]**	Resource Shaping Charge [C}	Amount Billed to Resource $/MWh [A+B+C]
0.39	**0.38**	0.91	1.68
Wood Waste **Capacity Factor = 86.62%**			
DFS Capacity Charge $/MWh [A]	**DFS Energy Charge $/MWh [B]**	Resource Shaping Charge [C}	Amount Billed to Resource $/MWh [A+B+C]
1.16	**0.67**	0.21	2.04

Load Benefits of DFS/RSC

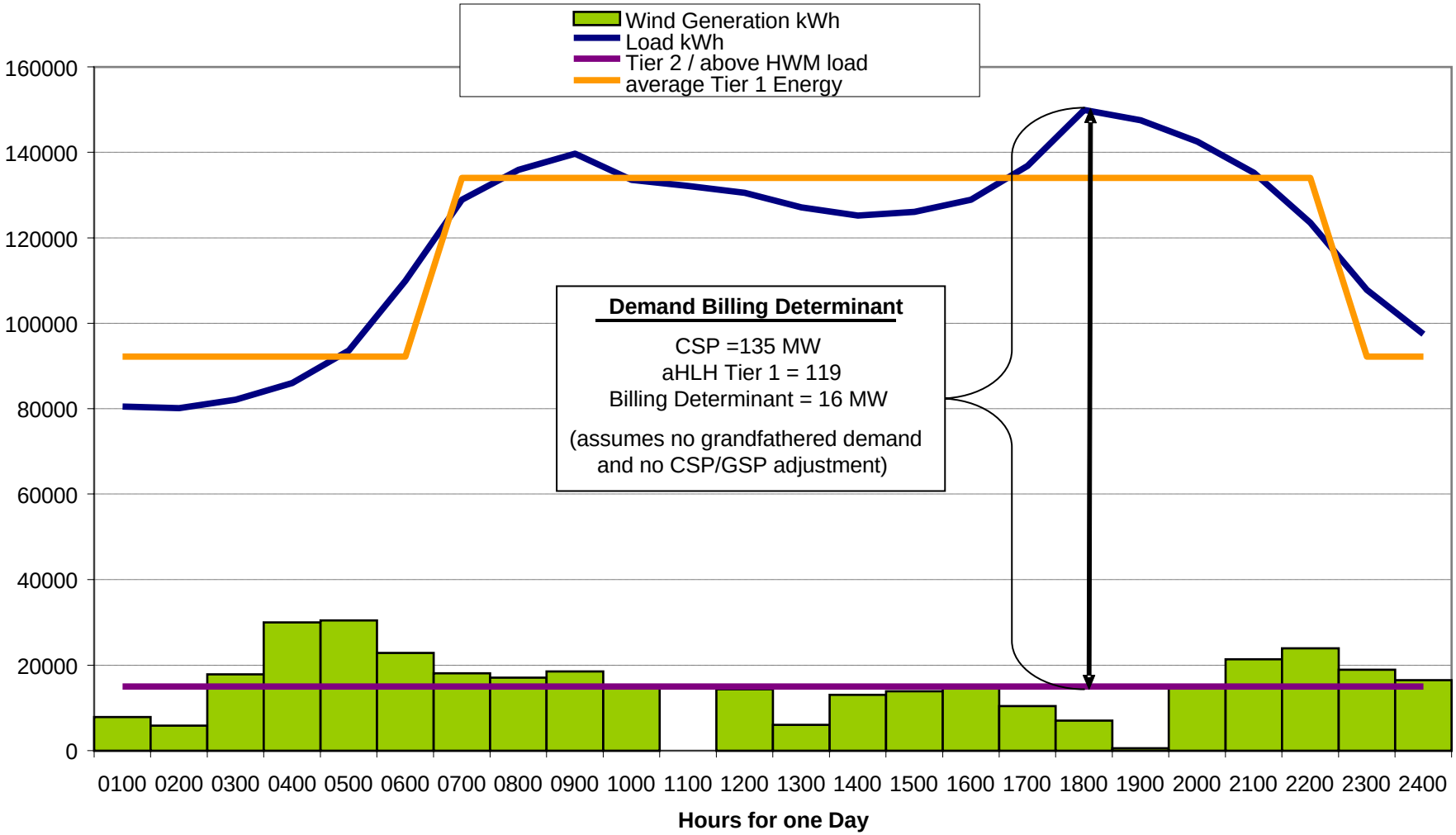
❖ Capacity Benefit

- Firm capacity is created through the DFS.
- BPA proposes to treat firm capacity purchased through the DFS the same as firm capacity brought by a customer resource.
  - ➢ Consistent treatment between self, third party, and BPA-provided RSS
- See following graphs.

Current Treatment of Wind Showing the Hourly Load Profile and the Demand Billing Determinant



Proposed Treatment of Wind with RSS Showing the Hourly Load Profile and the Demand Billing Determinant



- Energy Benefit
  - The Load Shaping Charge is calculated by netting the flat annual block of power, not the planned or actual resource generation shape – In other words, there is no double billing.

Example 1: RSC and LSC

Step 1 -- Forecast resource output and apply Resource Shaping Charge - done prior to the start of the

	Q1	Q2	Q3	Q4	Average/Total
Planned Resource Generation	1	3	3	1	2
Resource Shaping Rate ($/MWh)	$45	$85	$40	$70	Total
Value of Shaped Resource	$45	$255	$120	$70	$490
Resource Shaping Billing Determinant	1	-1	-1	1	Total billed RSC
Monthly Resource Shaping Credit/(Charges)	$45	-$85	-$40	$70	-$10
Planned Flattened Resource Shape	2	2	2	2	
Value of Flattened Resource	$ 90	$ 170	$ 80	$ 140	$480

Step 2 - Compare actual scheduled resource generation to planned resource generation

	Q1	Q2	Q3	Q4	Average/Total
Actual Non-Federal Generation	4	0	0	4	2
Value of Actual Resource Generation	$ 180	$ -	$ -	$ 280	$460
Planned Resource Generation	1	3	3	1	2
Resource Shaping Charge Adj. Billing Determinant	-3	3	3	-3	
Resource Shaping Rate ($/MWh)	$45	$85	$40	$70	Total billed RSC Adj
Resource Shaping Charge/(Credit) Adjustment	-$135	$255	$120	-$210	$30

Step 3 - Calculate Load Shaping Charge

	Q1	Q2	Q3	Q4	Average/Total
Actual Total Retail Load (TRL)	12	14	14	12	13
Planned Flattened Resource Shape	2	2	2	2	2
TRL Net of Planned Flattened Resource Shape	10	12	12	10	11
SSL (TOCA * Critical)	11	11	11	11	11
Load Shaping Billing Determinant	-1	1	1	-1	
Load Shaping Rate ($/MWh)	$45	$85	$40	$70	Total billed LSC
Load Shaping Charge (Credit)	-$45	$85	$40	-$70	$10

RSC + RSC adjustment + LSC Grand Total $30

Example 2: No RSC, Only LSC

Step 1 - Net actual Resource from Load and charge Load Shaping Charge

	Q1	Q2	Q3	Q4	Average/Total
Actual Total Retail Load (TRL)	12	14	14	12	13
Actual Non-Federal Generation	4	0	0	4	2
TRL Net of Planned Flattened Resource Shape	8	14	14	8	11
SSL (TOCA * Critical)	11	11	11	11	11
Load Shaping Billing Determinant	-3	3	3	-3	
Load Shaping Rate ($/MWh)	$45	$85	$40	$70	Total billed LSC
Load Shaping Charge (Credit)	-$135	$255	$120	-$210	$30

LSC Grand Total $30

Customer gets charged the exact same under both methods. There is no double counting. We could have had Load Shaping handle both the resource and load but decided the true cost of the resource would be more transparent if we took the extra steps to separate load and resource shaping costs.

❖ Next Steps

- **Workshops**—During 2009, BPA will conduct workshops to vet RSS approaches and draft contract language.
- **RSS Election**—By November 1, 2009, customers will make their first election regarding RSS for the first purchase period (FY 2012-2014).
- **WP-12 Pre-Rate Case Workshops**—During FY 2010, BPA will conduct pre-rate case workshops to develop its pricing proposal for the different RSS products.
- **WP-12 Rate Case**—During FY 2011, BPA will conduct the rate case setting the pricing methodology and formula rate for the RSS products applicable in the FY 2012 and 2013 rate period.