2012 BPA Rate Case
Customer Workshop

Generation Inputs/Wind Balancing Service

September 16, 2010

Agenda

Parking Lot Issues

Parking Lot Issues

	WIND/GENERATION INPUTS PARKING LOT TOPICS	
1	Persistent Deviation Penalty ▪ Relative to DSO 216	Covered in 12 May and 27 May 2010 workshops
2	DSO 216 – Experience to date	Covered in 12 May 2010 workshop
3	Generation Imbalance relationship to within-hour balancing	Covered in 12 May 2010 workshop
4	Incentive for scheduling accuracy	Covered in 19 August workshop
5	Use of 120-hour peaking capacity for costing methodology vs. use of instantaneous capacity for reserve requirement calculation	Covered in 14 April 2010 workshop
6	Review of BPA's five services/protocols related to wind integration for duplication and consistency, esp. with regard to Persistent Deviation Penalty	Covered in 12 May 2010 workshop
7	Explore whether, and to what extent, BPA can set aside wind reserves on an incremental and flexible basis over the rate period (to enable incentive-based rate design)	Covered in 19 August workshop
8	Tiered wind integration rate structure based on whether customers are committed to scheduling on a ½ hour basis	Covered in 19 August workshop
9	Modify BPA's intra-hour scheduling policy to allow for incremental changes in wind schedules as well as the decremental changes currently allowed	Refer topic to Wind Integration Team (WIT) Quarterly Review
10	Formula rate for wind	Covered in 15 July 2010 workshop
11	Charge imbalance portion of the wind integration rate on a basis that reflects schedule accuracy – i.e., proportionate to the schedule imbalances.	Covered in 19 August workshop

Parking Lot Issues (continued)

	WIND/GENERATION INPUTS PARKING LOT TOPICS	
12	Scaling methodology – revisit	Covered in 14 April 2010 and 17 June 2010 workshops
13	Timeline for decisions re. assumptions	See Workshop Schedule Each workshop
14	▪ Timing for: -Self-supply -Within-hour scheduling	See Workshop Schedule
15	Wind experience to date	Covered in 12 May 2010 workshop
16	Periodic presentations from the WIT to provide updates on WIT projects over the rate period	See Workshop Schedule
17	Marginal pricing for capacity sold as ancillary and control area services	Not covered in workshop
18	Inclusion of Energy Shift costs in the variable cost component of Gen Input costs.	Covered in 12 May 2010 workshop
19	Take a pro-rata reduction in reserves from wind during a feathering/curtailment rather than taking the full amount.	Refer topic to Wind Integration Team (WIT)
20	If default on self-supply, what is the rate impact to them?	Covered in 12 May 2010 workshop
21	New Persistent Deviation design for the next rate case that meets the objective.	Covered in 27 May 2010 and 19 August workshops
22	Look at different times of the year in setting up Persistent Deviation design	Not covered in workshop
23	If a project leaves BPA during the rate period, can a failed self-supplier take over the reserve allocation?	Covered in 19 August workshop
24	Redispatch: Review of current FY actual redispatch and inter-business-line payments	Covered in 19 August workshop

Thermal Generators Proposal

Thermal Generator Balancing

- As we have discussed at previous workshops, the balancing reserves requirements study for FY 2012-2013 rates allocated 69 MW incremental (*inc*) and 86 MW decremental (*dec*) balancing capacity to non-federal thermal generation based on actual schedules and generator output during the test period (10/1/07 through 9/30/09).

- The use of Balancing Capacity occurs from 3 primary causes
  - Station Control Error during start-up
  - Changes in facility output outside of ramp periods
  - Station Control Error during shut-down

Thermal Generator Balancing (continued)

- We have discussed the use of Balancing Capacity with several thermal generating customers. Based on those discussions, we believe customers can avoid some use of Balancing Capacity by changing scheduling and operations protocols. However, some use is unavoidable and is related to timing and effects on power output from balance of plant components and controls.

- Our objectives with regard to thermal generator use of Balancing Capacity are :
  - Rates should result in full cost recovery for any capacity held in reserve or deployed to provide a service.
  - Rates should be based on cost-causation.
  - Rate design or penalty rates should discourage controllable, excessive use of balancing capacity.
  - Penalties should incentivize the right type of behavior.

Thermal Generator Balancing (continued)

- Staff believes that given the non-uniform distribution of balancing capacity use by different thermal generators, extending costs-causation down to the specific facility level would be appropriate and provide an incentive for individual generators to minimize their use of Balancing Capacity.

- To achieve these objectives, we expect our initial proposal will include a rate based on proportional use of reserved Balancing Capacity and a Penalty Rate for excessive use of that capacity.

Thermal Generator Balancing (continued)

- **For the Rate:**
  - Reserve Requirement – We plan to initially propose the reserve requirement identified in the reserve requirement study. We will re-evaluate thermal generator's use of Balancing Capacity prior to the Final Proposal. We may reduce the reserve requirement if we see significant reductions in use of balancing capacity.
  - Generation Input Pricing - The per MW price for Reserves held would be similar to the per MW price for reserves held for Variable Energy Resource.
  - Billing Determinant - Allocation of the monthly revenue requirement for the Balancing Capacity we will hold for thermal generators could be based on a facility-specific application of the ISD (Incremental Standard Deviation) approach used for the reserve requirements studies or on some other allocation algorithm that results in a billing determinant that reflects the facilities' proportional use of capacity.

Thermal Generator Balancing (continued)

- **For the Penalty**:
  - The reserve requirements study excluded the tail events of the distribution of reserves use (0.25 percent of the hours on both sides). Thermal generators are not currently subject to DSO 216 to limit their use of reserves, so to provide an incentive, we plan to propose a penalty for excessive station control error.
  - We are still considering alternatives for the structure of the penalty, but it could be constructed so that the billing factor would be the absolute value of the maximum MW capacity used that exceeds 50% of the reserves allocated to all thermal generators in any 10-minute period. For example, if we hold 80 MW of *dec* capacity, and a single facility uses more than 40 MW in a ten-minute period, the penalty would apply to the amount that exceeds 40 MW. The penalty rate could be a multiplier of the hourly per-unit cost of capacity.

Provisional Balancing Service Proposal

Provisional Balancing Service

- **Background**
  - Provisional Balancing Service is a new Control Area Service proposed for FY 2012-2013 Rates. This service cannot be requested but is offered to generating customers subject to within-hour balancing service rates if
    - they cannot meet the requirements to continue self-supplying one or more elements of balancing service (Regulation and Following, Imbalance), or
    - the generator had an expected interconnection date after the FY 2012-2013 rate period (facility not included in reserve forecasts) and the customer accelerates the interconnection date into the FY 2012-2013 rate period.
  - The Balancing Authority Area does not increase the maximum incremental and decremental balancing reserves when this service is taken, but there will be an increase in deployment of those reserves.

Provisional Balancing Service (continued)

BPA has received several questions about the proposed service. We offer the following responses as our leaning for the Initial Proposal.

Question: Failure to Self-Supply Reserves

A generating customer's Balancing Plan for self-supply of balancing reserves requires Dynamic Transfer Capability (DTC) for the resources in the Balancing Plan. Customers have expressed concerns that if they elect to self-supply and have received a sufficient allocation of DTC for the rate period, BPA may recall the DTC during the rate period and force the customer to rely on Provisional Balancing Service for the remainder of the rate period.

Provisional Balancing Service (continued)

- **Proposed Resolution**
  - **Short-term Reductions of DTC:**
    - BPA does not plan to terminate a generating customer's self-supply status during the FY 2012-2013 rate period when the customer fails to perform to self-supply standards due to real-time system conditions that cause BPA to reduce availability of DTC for the resources in a customer's Balancing Plan.
  - **Longer-term Reduction of DTC Allocation:**
    - BPAT does not expect to recall allocated DTC during the FY 2012-2013 rate period. However, it is conceivable that DTC could be recalled for the remainder of the rate period for unforeseen reasons. The customer will assume the risk of long-term failure to perform to self-supply requirements and will default to Provisional Balancing Service if DTC is recalled to the extent that the customer cannot continue to self-supply.

Provisional Balancing Service (continued)

Question: Access to "Abandoned" Within-Hour Balancing

Customers have asked whether a customer that is taking Provisional Balancing Service can take over the "abandoned" capacity when another customer taking within-hour balancing service leaves the Balancing Authority by dynamic transfer.

Proposed Resolution

Generating customers must elect to take within-hour balancing service for the entire rate period if they have not met the qualifications for self-supply or do not have a sufficient allocation of Dynamic Transfer Capability to move the resource to another Balancing Authority Area. BPA will not release a customer from the obligation to take elected service during the rate period, so the likelihood of having unused "abandoned" capacity is low. If for some reason there is abandoned capacity that becomes available, BPA will reduce the reserves held accordingly and not make that capacity available to customers taking Provisional Balancing Service.

Allocation of Wind Integration Team Costs

Wind Integration Team

- Purpose of Wind Integration Team (WIT)
  - BPA has chartered a cross-agency Wind Integration Team (WIT), involving some key staff, to resolve “wind integration” issues for the interconnecting of wind generation in a manner that allows the continued highly reliable operation of the federal power and transmission systems.
- Brief History of WIT
  - Created as a result of the FY 2009 Wind Integration Rate Settlement
  - In June 2009, BPA and the region developed a WIT Work Plan for FY 2010 and FY 2011:
    - Implement Dispatcher Standing Order DSO 216
    - Intra-Hourly Scheduling
    - Wind Forecasting
    - Dynamic Transfer Limits Study
    - Customer-Supply of Generation Imbalance

Wind Integration Team in FY 2012-2013

- Funding of the WIT in FY 2009 - 2011
  - Funded at $2 million per year for FY 2009-2011 from BPA's Renewables facilitation funds, with additional funding from Transmission Services
- Funding of the WIT in FY2012 and beyond
  - As discussed in the Integrated Program Review public process,
    - The WIT funding of $2 million per year from Renewables facilitation will end in FY 2011.
    - Power Services' expenses for the WIT will be funded by surplus green energy premiums in FY 2012 and FY 2013.
- In the FY 2012-2013 rate period BPA staff proposes to allocate cost of Wind Integration Team, not covered by green energy premiums, to the Wind Balancing Service rate.

Wind Integration Team (WIT) Budget for FY 2012 and FY 2013

BPA Wind Budget Funding Sources	FY12	FY13
Total Power Wind Integration Budget	$1,589,500	$1,589,500
Available from Renewables Facilitation (RF) Budget	$0	$0
Available from Green Energy Premiums (GEP)	$1,589,500	$1,589,500
Power Budget Amount Not Covered by RF or GEP	**$0**	**$0**
Total Corporate Strategy Wind Integration Budget	**$141,000**	**$141,000**
Available from Renewables Facilitation (RF) Budget	$0	$0
Available from Green Energy Premiums (GEP)	$70,500	$70,500
Corporate Strategy Budget Amount Not Covered by RF or GEP	**$70,500**	**$70,500**
Total Legal Wind Integration Budget	**$280,000**	**$280,000**
Available from Renewables Facilitation (RF) Budget	$0	$0
Available from Green Energy Premiums (GEP)	$140,000	$140,000
Legal Budget Amount Not Covered by RF or GEP	**$140,000**	**$140,000**
Total Technology Innovation Budget	**$2,319,000**	**$921,000**
Available from Renewables Facilitation (RF) Budget	$0	$0
Available from Green Energy Premiums (GEP)	$2,319,000	$921,000
Technology Innovation Amount Not Covered by RF or GEP	**$0**	**$0**
Total Transmission Budget	**$3,959,625**	**$4,048,777**
Available from Renewables Facilitation (RF) Budget	$0	$0
Available from Green Energy Premiums (GEP)	$0	$0
Transmission Budget Amount Not Covered by RF or GEP	**$3,959,625**	**$4,048,777**
Total BPA Wind Budget	**$8,289,125**	**$6,980,277**
Available from Renewables Facilitation (RF) Budget	$0	$0
Available from Green Energy Premiums (GEP)	$4,119,000	$2,721,000
Total BPA Wind Budget Amount Not Covered by RF or GEP	**$4,170,125**	**$4,259,277**

Wind Integration Team Cost Assignment to Wind Balancing Service Rate

	FY12	FY13
Total BPA Wind Budget	$8,289,125	$6,980,277
Available from Green Energy Premiums (GEP)	-$4,119,000	-$2,721,000
BPA Wind Budget Amount Allocated to Wind Balancing Service Rate	$4,170,125	$4,259,277

WIT Expense Impact on Wind Balancing Rate

- The General and Administrative category of the embedded costs contains expenses for Power Marketing Sales & Support, Power Scheduling, Generation Oversight, Corporate Expense and ½ Planning Council.

- To the extent the WIT costs are normally included in this category, certain adjustments need to be made to avoid double-counting.

- For the Corporate and Power expenses listed above for embedded cost, Finance will deduct the amounts before prorating the General and Administrative category in setting the revenue requirement for balancing reserves.
  - Allows the WIT expenses for Corporate and Power to be added to embedded cost without any duplication
  - Transparency with the Integrated Program Review

Formula Rate Design Proposal

Variable Energy Resource Balancing Service Formula Rate

- The formula rate will recover costs incurred for the purchase of balancing reserves if BPA determines that the Federal Columbia River Power System (FCRPS) cannot supply the amount of balancing reserve determined in the rate case.
- BPA believes it can supply the required reserves during the FY 2012-2013 rate period; however, there could be situations in which the FCRPS cannot supply the amount of reserves determined in the rate case and BPA needs to replace forecasted capacity for reserves.
- The formula rate reflects BPA's intention to assign the costs of acquired reserves to Variable Energy Resource Balancing Service rate.
- Recovery of reserve acquisition cost over the remaining rate period.

Who Pays?

- Customers subject to the VER Balancing Service rate will pay directly for the reserve acquisitions through the formula rate.
- Power customers do not pay the cost of reserve acquisitions.
- Power customers pay for the Following Reserves through the PF rate, not the Balancing Service rate.
- To the extent that federal system costs are not recovered through the VER Balancing Service formula rate (net cost approach below), financial reserves could be affected. The formula rate is only intended to mitigate the impact of additional unforecasted reserve purchases.
- Under the net cost approach formula, preference customers bear the risk associated with the loss of system capability.

Cost Approach

- BPA is leaning toward a formula rate proposal based on a net cost approach
  - Substituting the cost of the reserve acquisition for the cost of the same amount of reserve from the federal system.

- The other option that BPA has identified is the total cost approach
  - Balancing service customers bear the cost of the federal system originally allocated to the service for an amount of reserves that it is no longer capable of providing in full, plus the full cost of the acquired reserves.

Net Cost Approach

- Approximates what rate would have been if we had forecasted a need to acquire reserves.
- The total reserve acquisition cost is allocated to the VERBS rate.
- Net cost ($/MW) = Adjusting the VERBS rate substituting the per-unit cost of acquisition for the Federal system reserve cost
- Adjustment to VERBS = Acquired reserves ($/MW) – BPA Balancing cost ($/MW)
- If BPA had anticipated the unforecast reserve acquisition, this would have been what the VERs would have paid for VERBS, and the cost that would have been collected through rates. This approach "corrects" the rate calculations.
- To the extent that the VERs are no longer paying for a portion of reserves from federal system resources, power customers bear a portion of the cost.

Consultation Process

- Prior to acquiring reserves, if possible, or otherwise, prior to including the cost in the formula Imbalance Reserves rate, BPA would:
- Hold a customer meeting to provide an explanation of the need for additional reserves
  - Customers would have opportunity to comment of BPA's proposal to acquire reserves.
- Prior to issuing an adjusted VERBS rate, BPA will provide customers with a draft calculation of the revised rate and hold a meeting to explain and answer questions about the calculation.

Consultation Process (continued)

- Normal Conditions
  - When revised BPA forecasts show the need to make a reserve purchase to meet future needs, customers will be informed prior to the acquisition.
- Emergency Conditions
  - When near-term system conditions dictate emergency actions, BPA will make reserve purchases subject to the formula rate calculation without customer notification.
  - Customers will be informed after-the-fact of the specifics of the transaction and the associated formula rate calculation.

Billing Determinant

Background
Outline of Presentation

- Big Picture: Investigating ways to allow wind balancing service bills to vary with use of capacity
- How allocation might work
- Fixed vs. Variable Allocation
- Several methods investigated so far

How Allocation Might Work

- **Revenue Requirement:** Fixed cost forecast over rate period required to be collected over rate period. Amount to be collected varies by fleet nameplate – more capacity needed implies more to be collected.
- **Use Based Allocation:** Calculate each customer's share of capacity used during a shorter period (monthly, quarterly, ?) based on some measure. Several choices presented here as examples only.
- **Billed Amount** = Revenue Requirement times Use Based Allocation

Adding a Fixed and Variable Expense Allocation

- **Revenue Requirement:** Could be broken into fixed (x%) and variable costs (1-x%), but still fixed during rate case based on fleet nameplate. How to do this is not yet determined.
- **Fixed Portion:** Calculate each customer's share of fixed capacity based on some non-varying allocation measure (nameplate seems most likely.) Allocate the Fixed Revenue Requirement on this basis.
- **Varying Portion:** Calculate each customer's share of variable capacity costs with their usage (such as ISD, MASCE or other). Allocate the Variable Revenue Requirement on this basis.

Three Allocation Methods Tested

- Nameplate (Status Quo)
- Incremental Standard Deviation (ISD)
  - One-minute SCADA data
    Standard deviation over monthly periods
- Mean Absolute Station Control Error (MASCE)
  - One-minute avg SCADA data, one-hour avg SCADA data
    Averaged over quarterly periods

Implementation Issues

- **Calculation**
  - **Any method** would require staff and customer comfort with math
- **Customer Bill Interdependence**
  - Different customer's bill can interact if each relies on total wind fleet capacity used
- Which portion of bill is fixed vs. moving with usage, for example, could set at x% fixed, (1-x%) variable.

Current Leaning

- Continue to use nameplate for Initial Proposal.
- Continue to explore with customers use of alternative billing determinants.

Summary of Generation Inputs
BPA Staff Recommendation

Summary of Generation Inputs
BPA Staff Recommendation

- Decisions for Initial Proposal have not been made yet.
- The product formerly known as Wind Balancing Service would be re-named Variable Energy Resource Balancing Service (VERBS) to cover non-dispatchable resources such as wind and solar.
- VER Balancing Service covers the balancing service capacity needed to balance variable energy resources within the hour.
- The VERBS contains regulating, following and generation imbalance components. The rate would be separated into two components: regulating/following rate and a generation imbalance rate.
- BPA will rely on Dispatcher Standing Order 216 to not exceed the balancing reserve limits.
- BPA staff is not planning to include in the initial proposal an option to increase balancing reserve capacity in lieu of Firm Contingent tagging.
- Base case will be at 99.5% probability level. A case at the 99.7% level will be presented as an option to be commented on by parties. If it is not adopted for the final proposal, it may be retained so that the Administrator could make a Mid-Rate Period Adjustment under certain circumstances.

Summary of Generation Inputs
BPA Staff Recommendation

- Reserve forecast methodology assumptions for base case
  - 99.5% probability level for setting *inc* and *dec* limits by month
  - Scaling methodology for forecasting the output of future wind farms to begin operation in the FY 2012-2013 rate period used an enhanced data set.
  - Same load forecast as used in the hydro studies
  - Wind scheduling accuracy assumption of 30 minutes persistence
  - Refined reserve allocation methodology that forecasts all balancing reserve amounts together then allocates these amounts to uses rather than forecasting for each use and summing the amounts. The refined method yields a lower reserve amount.

Summary of Generation Inputs
BPA Staff Recommendation

- Cost Allocation – embedded cost
  - Embedded cost methodology similar to the WP-10 rate case.
  - 120-hour peaking capability on average water plus the reserves as the allocation factor as the reasonable amount of reliable monthly sustained capacity available for operational planning purposes.
  - Wind Integration Team costs, adjusted for the Green Energy Premium reinvestment, added to the VERBS reserve cost.

Summary of Generation Inputs
BPA Staff Recommendation

- Cost Allocation – variable cost
  - Variable costs methodology similar to WP-10 rate case with some refinements.
  - Generation and Reserve Dispatch (GARD) model forecasts variable costs.
  - Variable costs in two categories
    - Stand Ready
      - Energy shift, efficiency loss and base cycling losses
      - Energy shift inc costs not included in initial proposal
    - Deployment
      - Response losses, incremental cycling losses, incremental spill, incremental efficiency loss
  - Risk-adjusted market prices from Market Price Forecast study
  - GARD model and manual posted for customer information

Summary of Generation Inputs
BPA Staff Recommendation

- Operating Reserve
  - Assumptions
    - 5% for hydro and wind and 7% for thermal
    - Firm Contingent tagging reduction in operating reserve forecast
    - Embedded and variable costs methodologies similar to WP-10
    - Embedded cost based on Federal hydro projects in the BPA Balancing Authority

Summary of Generation Inputs
BPA Staff Recommendation

- Persistent Deviation (PD)
  - Plan to retain PD penalty in Generation Imbalance/Energy Imbalance rate schedules.
  - Will likely tighten up PD somewhat. Provided examples of some possible changes in previous workshop.

- No changes in methodology for
  - Synchronous Condensing
  - Generation Dropping
  - Redispatch
  - Segmentation of Corps of Engineers and Bureau of Reclamation Transmission Facilities

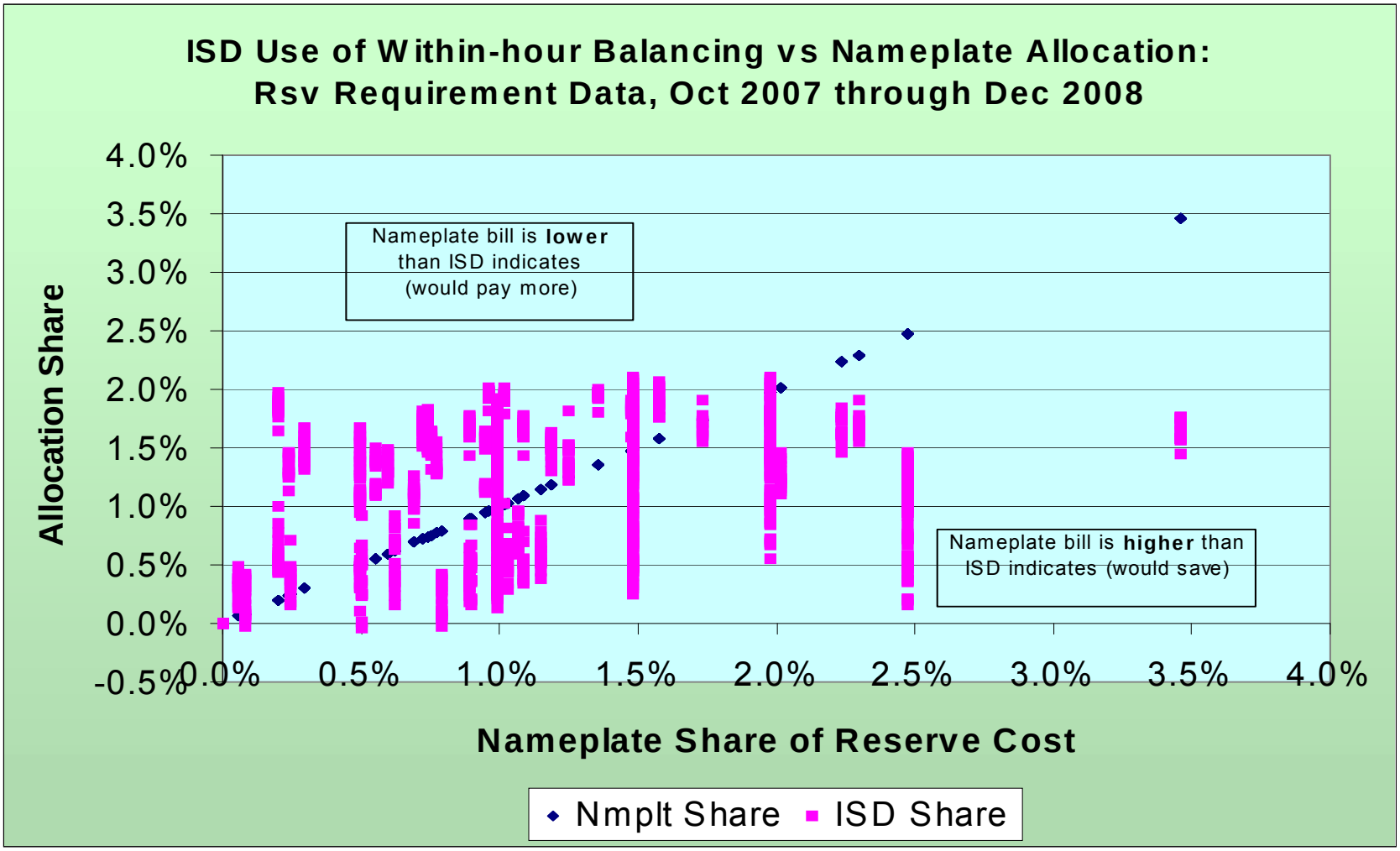
- Small change in methodology for Station Service
  - Add 1.9% transmission losses to the station service energy forecast

Wrap Up

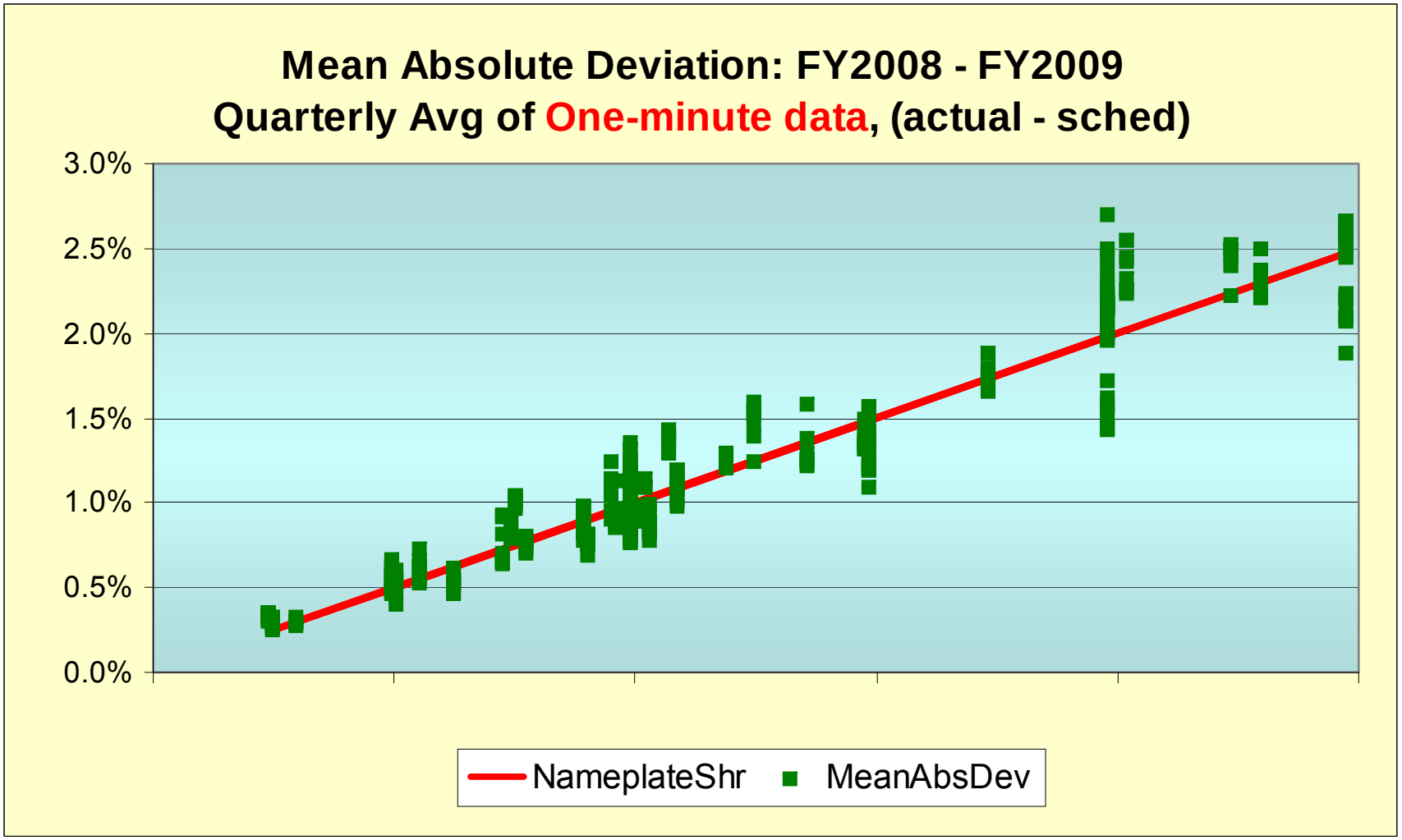
- BPA would like to continue to receive your feedback regarding the topics we discussed today.
- Share your view today or feel free to submit a written response to:
  - techforum@bpa.gov.
  - Please state “2012 Rate Case” in the subject line.

Appendix
Billing Determinant Examples

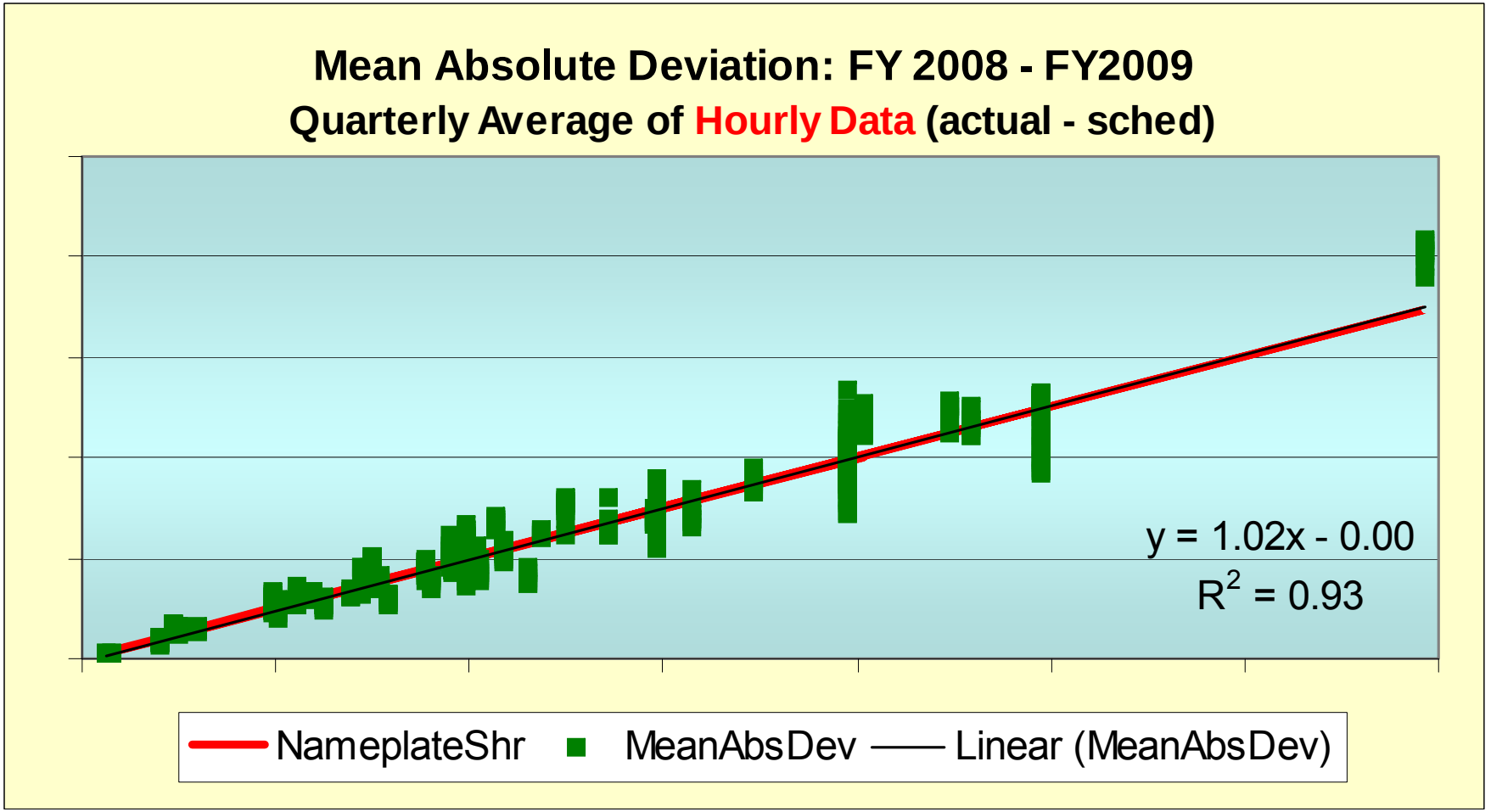
Nameplate vs ISD



Nameplate vs MASCE (One-minute)



Nameplate vs MASCE (Hourly)



Nameplate vs. MASCE
One-minute minus Hourly