

# Planning for and Responding to Overgeneration Events

BPA Public Workshop  
Friday, December 3



## Overgeneration Workshop Overview

- Welcome
- Security reminder
- Review agenda
- Conference call procedures
- Purpose and objectives



**BPA Response to the Overgeneration  
Management Ideas  
Suggested at the October 12, 2010  
Public Workshop**



## BPA Response to the Overgeneration Management Ideas Suggested at the October 12, 2010 Public Workshop

### ***Suggested power operations or marketing actions we are reviewing, considering or taking (in addition to extensive standard actions):***

- Do provisional hydro drafts ahead of high water, backed up by options to replace energy from other sources if high runoff does not materialize. Seek more flexibility on use of Canadian storage. **(Power Operations)**
- Increase diversions to replenish irrigation aquifers. This would take water out of the river and create additional pumping load. **(Power Operations)**
- Reduce inc reserves for wind as well as dec reserves. **(Power Operations)**
- Get irrigators to pump more or time-shift their pumping load. This would potentially require changes in BPA rates to avoid a disincentive due to demand charges. It could also require change in retail rate structures by local utilities. **(Power Operations)**
- Do some advance collaborative arrangements for coal displacement, since it appears that lots of coal was running when BPA was offering zero-cost energy. Consider information exchange, bulletin boards/communication to allow advance arrangements to displace coal. **(Power Marketing)**

## BPA Response to the Overgeneration Management Ideas Suggested at the October 12, 2010 Public Workshop (continued)

### ***Suggested transmission operations or marketing actions we are reviewing, considering or taking (in addition to extensive standard actions) :***

- Improve use factor of transmission interties. **(Transmission Operations and Marketing; Transmission Utilization Group [TUG] efforts)**
- Resolve the current disconnect between the lead time for CAISO nominations (90 minutes before the delivery hour) and the BPA deadline for releasing transmission capacity (50 minutes before the delivery hour). **(Transmission Operations and Marketing; Transmission Utilization Group [TUG] efforts)**
- More advance coordination on release of transmission rights. **(Transmission Operations and Marketing; Transmission Utilization Group [TUG] efforts)**
- Look at algorithms and protocols for assigning transmission to avoid inadvertent flow seizing intertie. **(Transmission Operations and Marketing; Transmission Utilization Group [TUG] efforts)**
- Automate RAS. **(Transmission Operations)**
- Improve north to south intertie efficiency by, for example: Figure out how to bring operating transmission capacity up when Klamath Falls is not running, which it is generally not during excess generation periods, and / or add capacitors or make other physical improvements. **(Transmission Operations - LT potential, BPAT may consider over the long term)**
- Use the southern Oregon to Wyoming line to send excess power east to displace coal. **(Transmission Operations - LT potential, BPAT may consider over the long term)**

## BPA Response to the Overgeneration Management Ideas Suggested at the October 12, 2010 Public Workshop (continued)

### ***Other suggested actions we are reviewing, considering or taking:***

- Establish a work group to develop an environmental redispatch mechanism. **(Yes; addressed in Environmental Redispatch Criteria/Procedures section of the 12/3/10 agenda)**
- Consider adding an environmental dispatch requirement to interconnection agreements. **(Yes; addressed in C. Ehli / M. Jackson section of the 12/3/10 agenda)**
- Pursue legislative REC modification and possibly PTC. **(Yes; addressed in D. Marker section of the 12/3/10 agenda)**

## BPA Response to the Overgeneration Management Ideas Suggested at the October 12, 2010 Public Workshop (continued)

### ***Actions we are NOT doing or considering at this time:***

- Pay wind generators to reduce their generation or buy options from wind generators in advance that give you the right to displace them. **(PTC and REC cost shift issue)**
- Improve coordination with Idaho Power. **(Unclear; but there are several grid and power action items that may address aspects of this suggestion)**
- Consider whether differential arrangements/costing should apply to new loads coming on to the system or additional wind. **(Unclear; but environmental redispatch mechanisms and/or interconnection requirements may address this suggestion.)**
- Increase BPA's water heater pilot many-fold. **(BPA is pursuing a water heater pilot. The LT potential for this type of solution depends on the pilot results and pace of Smart Grid systems development.)**
- Seek or create district heating load that could absorb excess generation off-peak. **(LT potential linked to water heater pilots and Smart Grid future efforts)**
- Look at what it costs just to dump the energy. The Chief Joseph breaker can absorb 1,200 MW for ½ second. Small scale hydro facilities routinely build in dummy loads. **(Power and Transmission Operations did a quick review = cost and grid operations issues. Not being pursued)**
- Get rights to reshape municipal water pumping. **(Prioritization/Staffing work load issue)**

## BPA Response to the Overgeneration Management Ideas Suggested at the October 12, 2010 Public Workshop (continued)

### ***Actions we are NOT doing or considering at this time:***

- Seek or create dual-fuel loads that can switch to electric on short notice. **(Prioritization/Staffing work load issue)**
- Examine fuel switching to electric to create more demand similar to mid-1980s BPA program for interruptible service to ship electricity to gas and oil-fuel boilers, district heating, things with faster response than a coal plant. **(Prioritization/Staffing work load issue)**
- Work with appliance manufacturers to put control chips in appliances to reduce demand-side cost. **(Prioritization/Staffing work load issue)**
- Create electrolysis load to make hydrogen to use to run cars. **(Currently cost prohibitive, infrastructure issue, LT possibility)**
- Collaborate with fish interests on things such as temporary relief from maximum turbine efficiency operation and TDG. Start a broader collaborative dialogue on dissolved gasses and how to manage them with NOAA Fisheries, CRITFC, Canada, etc. Include operating levels of storage, use of Canadian water. **(No BiOp in place, recent 1% Turbine Efficiency exceedences have been an issue, OR and WA have recently considered TDG limits)**
- Take out the lower Snake River dams. **(Not a practical near term action.)**
- Add operations staff in Power or Transmission. **(Not planned other than as stated in the 2012/2013 IPR)**



# FCRPS Operations

## Follow-up on Over-Generation Suggestions

Generation Asset Management  
Power Services



# Suggestions for Minimizing TDG

## *Additional or time-shifted irrigation pump load*

- Discussions are taking place with multiple utilities for possible 2011 implementation.
  - Intent is to provide nighttime load when over-generation is most severe.
  - Likely would start small (likely not more than 50 MW) and grow concept if it works for BPA, our customers, and their farm customers.
  - It is not clear how significant a contribution this action can make.

# Suggestions for Minimizing TDG

## *Increase diversions to replenish irrigation aquifers*

- Initiated conversations with Bureau of Reclamation and Idaho Department of Water Resources.
  - Very little potential for 2011 due to limited infrastructure
  - Longer term potential may be on the order of 5 kcfs.
  - Additional coordination necessary to ensure diversions result in lower flows from the Hells Canyon complex

## *Dump the energy/dummy loads*

- A quick assessment indicated that costs could be prohibitive and large dummy loads may create issues on the grid.
  - Voltage control, system losses and path loading impacts could be an issue if dummy loads are not located at the wind sites.

# Suggestions for Minimizing TDG

*Seek more flexibility on use of Canadian storage*

*Reduce inc reserves for wind as well as dec reserves*

- These are standard actions taken by BPA, COE and BOR to minimize system TDG.
  - Reduce generation of the Columbia Generating Station nuclear plant to the lowest level possible without risking its ability to return to full power.
  - Cancel or delay non-essential generating unit outages and transmission control maintenance.
  - Shape upstream reservoirs' generation as much as possible into heavy load hours.
  - Coordinate with B.C. Hydro any possible reduction in flows at Arrow Dam.
  - Reduce wind balancing reserves (both INC and DEC in 2011).
  - Lack of market spill up to 120% TDG.
  - Sell power at zero cost.
- These actions will continue to be taken to minimize system TDG.

# Suggestions for Minimizing TDG

*Provisional hydro drafts ahead of high water, backed up by options to replace energy from other sources if high runoff does not materialize*

- High-priority FCRPS objectives (Biological Opinion, Clean Water Act, flood control) will continue to take precedence over power production.
  - Decisions on reservoir operations during the Spring are not discretionary decisions made by BPA.
  - Spring reservoir operations are coordinated in a regional process that attempts to balance the high-priority objectives.
- When high flows are forecasted in the spring, reservoir outflows may increase prior to the event in order to manage refill.
  - When there are no high flows forecasted, holding space in reservoirs below flood control requirements may be contrary to Biological Opinion flow objectives.
- BPA will continue to work with other Federal agencies and stakeholders to access FCRPS flexibility.

# Marketing Solutions

Trading Floor  
Power Services



# Marketing

- BPA Power Services Trading Floor is actively contacting counterparties throughout WECC
- Hurdles include:
  - Limited Available Transmission Capacity
  - Inelastic Thermal Maintenance Schedules
  - Regional Thermals often supply BA required
    - Voltage Support
    - Balancing Reserves
    - Ancillary Services
  - “Cold Start” HLH capacity concerns hinder aggressive LLH displacement
- Advancements include:
  - Positive and collaborative communication with counterparties has improved the region’s understanding of the problem and is generating valuable short term and long term solutions we will continue to pursue.
  - Improved internal market liquidity forecasting efforts
  - Improved internal Transmission portfolio management
  - Increased emphasis on non-standard products to deal with volatile Spring run-off scenarios
- Feel free to contact the BPA Power Services Trading Floor with your comments and suggestions:
  - Alex Spain (Trading Floor Manager) Tel : 503-230-5780
  - Dan Le (Trader) Tel: 503-230-3144
  - Brenda Anderson (Trader) Tel: 503-230-5610

# Transmission Solutions

Transmission Marketing and  
Transmission System Operations



# Transmission Utilization

**A number of potential transmission related solutions have been suggested to alleviate the over supply of generation:**

1. Improve use factor of transmission, interties.
2. Resolve the current disconnect between the lead time for CAISO nominations (90 minutes before the delivery hour) and the BPA deadline for releasing transmission capacity (50 minutes before the delivery hour).
3. More advance coordination on release of transmission rights.
4. Look at algorithms and protocols for assigning transmission to avoid inadvertent flow seizing intertie.
  - A number of Northwest and Southwest transmission providers are studying current use of the California-Oregon Intertie (COI), looking for ways to increase its use. This Transmission Utilization Group (TUG) is completing an initial study. It is reviewing historical data and engaging intertie users to identify market barriers to greater use, such as scheduling and reservation timeline differences between transmission providers.
  - The TUG expects to issue a report and findings of this study early in 2011.
  - This report will inform BPA and other COI owners and users to consider ways to make better use of the intertie.

# Other transmission-related solutions

## Other transmission-related solutions:

- Increasing scheduling limits (capacity) on Interties and on transmission east to Wyoming, includes looking at existing/additional infrastructure and generation dispatch
- Automating Remedial Action Schemes (RAS)
  - May require significant technical analysis and study to determine the benefits and may require physical equipment investments.
  - BPA will continue to examine these suggestions as potential long-term solutions.

# Outage Coordination

- Internal: cancel or delay non-essential FCRTS maintenance activities which limit export/import capabilities on Paths/flowgates during anticipated over supply of generation periods.
  - “No Touch” – issue no touch declaration which restricts maintenance activities that have a remote possibly of forcing elements out of service i.e. Set 1 relay work when Set 2 still in-service not allowed due to possibility of inadvertent operation.
- External: Work with neighboring BAA/TOPs to modify planned maintenance activities that derate Paths/flowgates during anticipated over supply of generation periods.
  - Regional assistance
    - WECC Reliability Coordinator
    - Neighboring BAA/TOP
    - NWPP

# BAA Gen/RAS Coordination

- Remedial Action Schemes (RAS)
  - Coordination of facilities/elements to maximize nomogram driven System Operating Limits for all operating hours.
  - Automation (long term) real time SCADA driven algorithms which optimize armed gen drop.
- Gen Drop coordination
  - Low Gen drop – coordination/communication with Hydro Scheduling to anticipate reduced COI support from FCRPS.
    - Reduce COI scheduling limits for all hours
  - PDCI Gen drop – increased flexibility with 2013 RAS DC upgrade
- Wind Generation
  - Increased communication PGS/IPP
    - Reduce wind balancing reserves

# Environmental Redispatch\*

\*This is a preliminary high level draft of procedures and processes for Environmental Redispatch. There are a number of customer and internal BPA issues to resolve that will impact the final implementation.



# Spill

- The Corps establish spill discharge levels ('spill caps') that equate to different total dissolved gas levels ('gas caps') at each Federal project on the Columbia and Snake Rivers.
- The quantity of spill associated with spill caps varies depending on flow, spill pattern, temperature and other environmental conditions.
- Gas levels are monitored continuously at the projects and spill caps are changed as required. The Corps updates spill caps using observations and modeling. These typically occur daily, but can change multiple times per day if conditions are in flux.
- Therefore, the amount of 'spillable' hydro generation short of the gas caps is a variable.
- Other variables include river flows, loads, available turbines, transmission limitations and curtailments, and balancing reserve usage.

# Triggering Events/Actions

- BPA regularly performs studies to manage these variables and determine how to meet hydraulic objectives over time. When studies project a mismatch between required flows and generation BPA seeks to address the situation.
- Actions BPA would evaluate prior to Environmental redispatch (ER) include:
  - Sales through bilateral marketing
  - Cutting prescheduled PNCA storage
  - Deferring scheduled generation maintenance activities
  - Deferring scheduled transmission maintenance activities
  - Increased pumping into Banks Lake at Grand Coulee
  - Seeking flow reductions with BC Hydro
  - Positive bias under hourly coordination with Mid-Columbia Hydro Projects
  - Seeking access to additional reservoir storage space at Federal Projects
  - Generation Reductions at Columbia Generating Station
  - Requesting adjustments to mutually agreeable transactions
  - Operating hydro projects inefficiently and at speed-no-load
  - Implementing additional spill at FCRPS projects per USACE spill priority list within gas standards.
  - Reduce available Balancing Reserves to maximize turbine flows
- Actions that are available and effective for the circumstances would be instituted to mitigate conditions.
- If BPA predicts that these actions collectively will be insufficient to manage spill past unloaded turbines BPA would initiate ER.

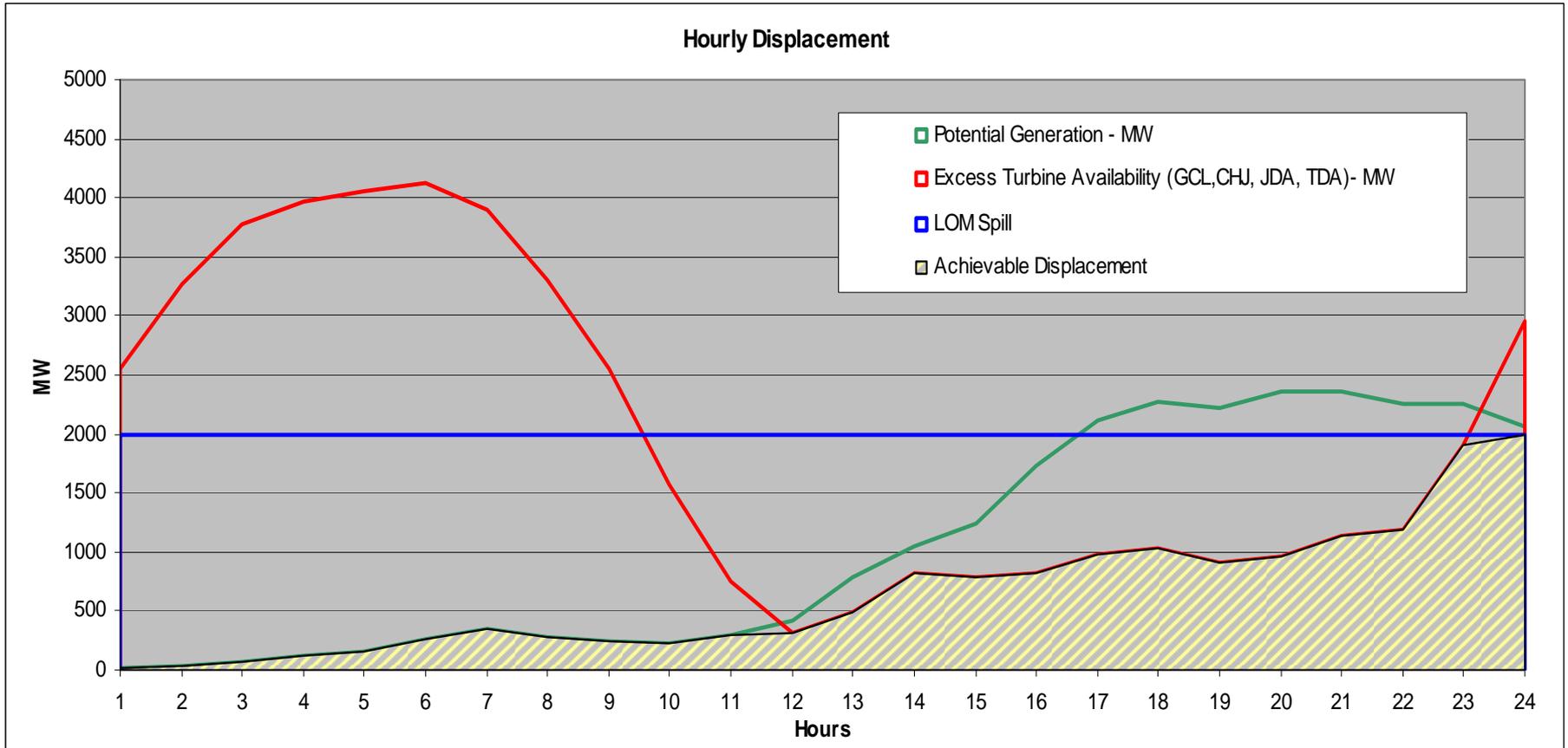
# ER Duration

- Primary exposure to ER is during spring runoff periods
- Overgeneration conditions and unloaded turbine spill is more likely to occur in light load hours and shoulder periods when regional loads are lower.
  - During heavy load hours hydro turbines may be loaded to full capacity due to other actions taken to avoid ER.
- BPA would match the period of redispatch with the expected duration of the conditions and the ability of hydro resources to provide redispatch.
  - This would be a minimum of several hours.
  - Could extend for days depending on severity of the event and the configuration of hydro resources.

# Determination of ER Amounts

- Potential ER resources would include:
  - Thermal resources operating without ancillary service or system reliability obligations or impacts
  - Forecasted variable generation
  
- Need to determine if a true up with actual output potential for variable resources would be necessary and how to best estimate.

# ER Quantities



# ER Quantities and Allocation

Step 1: determine the quantities of generation needed to maintain TDG levels and the capability of hydro resources (Federal and Non-Federal) to increase turbine loading

Step 2: determine the quantity of generation potentially available for Environmental Redispatch.

If 1 is greater than 2, then all available generation would be displaced to minimize the TDG exposure. Redispatch would meet deliveries.

If 2 is greater than 1, current thinking is that generation would be prioritized as follows,

- Resources with neither REC nor PTC
- Resources without PTC
- All other resources

Redispatch would meet this subset of deliveries

# ER Quantities and Allocation

The redispatch plan would also need to be assessed for transmission feasibility.

- To avoid transmission reliability problems resources may be skipped or moved up based on this assessment.
- This step could be performed prospectively based on potential redispatch patterns or when a preliminary redispatch stack is prepared.
- Need to determine process based on availability of information, staffing and timing with upstream and downstream implementation.

BPA would expect to restrict available balancing reserves under these conditions (reductions in balancing reserves also frees up hydro capacity to better manage TDG, minimizing the need for ER).

- Taking whole non-federal resources off wherever possible could help minimize balancing reserve demand during the restricted period, reducing DSO 216 events.

# ER Timing – Day Ahead or Within Day

## ■ Day Ahead

- Advance Notice
- Potential to define delivery shape
- Lower implementation risk
- Could miss late breaking changes

## ■ Within Day

- Lower forecast uncertainty
- Hour to Hour quantities
- More difficult to ensure overall success

# Notification and Communications

- Exploring existing communications via Generation Advisor as the primary pathway to implement redispatch down instructions.
- Resources without Generation Advisor may require manual phone calls, at least initially.
- Examining reviving and modifying “immediate spill energy” process to allow non-federal resources to participate if they are experiencing high TDG at their projects.



# How Contract Modifications May Help



## Modification of Interconnection Agreements & the OATT

- BPA proposes to amend Generation Balancing Authority and Interconnection Agreements to clarify its authority for the environmental displacement of non-Federal generation:
  - Modify appendix C of the LGIA for both existing and future agreements,
  - Modify appendix 5 of the SGIA,
  - Modify related provisions of BAASAs and COMAs
- BPA may also modify the body of its Open Access Transmission Tariff (OATT) to clarify its authority for displacing transmission schedules from generation within our BAA.



# Legislative Approaches

BPA Regional Relations



## Concept to qualify replacement hydro for federal and state renewable incentives

- Spill conditions approaching gas levels prohibited under Clean Water Act for protection of species listed under the Endangered Species Act
- Hydroelectric generation cannot be marketed for \$0 or more
- Hydro replacements in such circumstances could qualify for federal and state production incentives to keep producers whole

## Replacement hydro would qualify for PTCs and RECs

- Federal tax code provides Production Tax Credit (PTC) – expires 12/31/12
- PTC financing applies to a subset of wind development in the Pacific Northwest – most since 2009 should get Investment Tax Credits that don't rely on plant output
- Federal grants available if construction starts by 12/31/10
- State laws define eligibility for Renewable Energy Credits (RECs). California rules under active discussion

# Issues

- Risk of opening federal or state policy
- Timing for legislative/regulatory action
- Amount of PNW wind generation reliant on PTCs and RECs
- Applicability to other balancing authorities with ESA protection requirements
- Can replacement hydro be demonstrably delivered and accounted for as replacement for qualifying generation?

## BPA Contacts

- Doug Marker  
[drmarker@bpa.gov](mailto:drmarker@bpa.gov)  
503-230-3549



# Wrap-up and Next Steps

