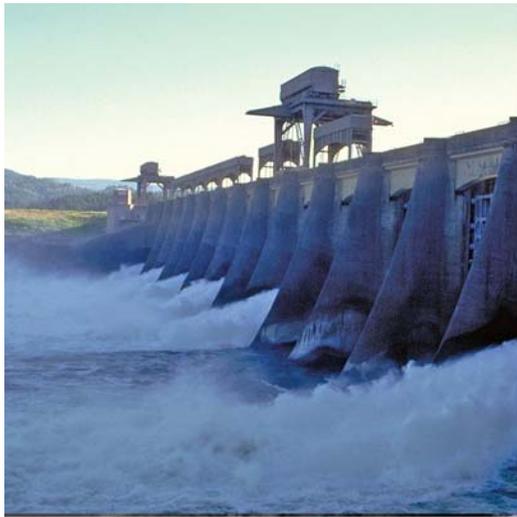


2009 Draft Resource Program

EXECUTIVE SUMMARY

September 2009



Cover photo of Klamath Cogeneration combustion turbines courtesy of Iberdrola Renewables

**Draft Resource Program
Executive Summary
October 2009**

BPA has prepared a draft Resource Program to evaluate whether and what resources it may need to acquire to meet its power supply obligations, primarily to customers under Regional Dialogue contracts. It also supplies information to our customers about resources available to meet their needs. The planning horizon for the draft Resource Program extends through 2019.

In addition to examining annual energy needs, the draft Resource Program assesses BPA's needs for monthly/seasonal Heavy Load Hour energy, 18- hour capacity for extreme weather events and hourly balancing reserves through 2019. These multiple analyses have provided a much clearer and more specific picture of BPA's needs. This is a big step forward in our resource planning. It's not yet perfect, but it's highly informative, and we plan to improve these techniques.

The Needs Assessment shows that recent events, including the current recession, have diminished BPA's near-term resource need. As a result, BPA expects to satisfy much of its expected supply needs through 2013 with conservation and short-term power purchases from the wholesale power market. In 2019, deficits are substantially greater but continued conservation efforts may not be sufficient in all load scenarios. BPA is committed to meeting the public power share of the Northwest Power and Conservation Council's conservation targets in its final Sixth Power Plan. (The Council's draft Sixth Power Plan is now out for comment.)

How much more power supply, if any, BPA will need to secure after achieving conservation targets will depend in large part on the outcome of a number of uncertainties about loads that BPA may or may not serve:

- Preference customer choices of power supplier(s) for their above-High Water Mark load.
- Long-term service to the region's direct-service industries.
- Potential formation of new public or tribal utilities that can place load on BPA.
- Increased load service to the U.S. Department of Energy at Richland, Wash.
- The growth of the wind power fleet in the BPA balancing authority area and the magnitude and source of supply for reserves to support wind power integration to the BPA system.

Additional uncertainties that also could affect BPA's need for resources include the amount and timing of long-term regional economic growth, the rate and timing of forecast long-term load growth, fish requirements that impact hydro generation, success of conservation efforts and others. Some of these uncertainties may be resolved over the next few months.

Depending on the outcomes of these uncertainties, BPA's largest and likeliest power needs after conservation are for:

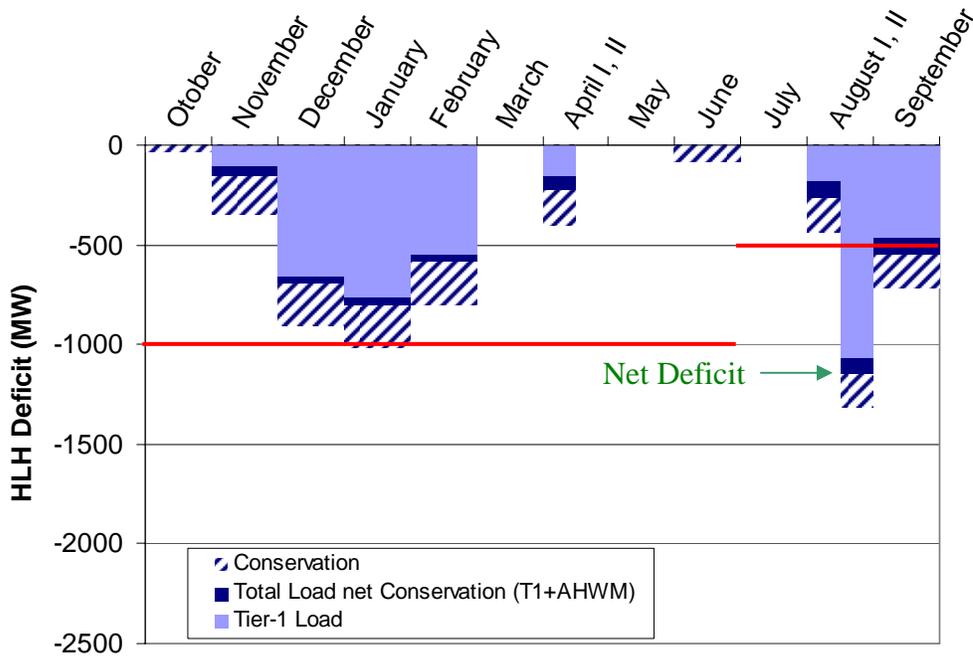
- Annual energy for above-High Water Mark load on BPA and/or if other uncertain loads such as new publicly owned utility loads and continuing direct-service industry loads materialize.
- Energy for seasonal and monthly Heavy Load Hour power demands in winter and late summer.
- Balancing reserves to replace flexibility that has been lost in the system and to help support variable resources such as wind power.

If customers placed all above-High Water Mark on BPA, the agency would face an annual energy deficit of 250 average megawatts in 2013 and 950 average megawatts in 2019. These estimates assume that conservation savings would continue at past levels. Additional conservation suggested in the Council's draft Sixth Power Plan would reduce these deficits. Conversely, if conservation trends fall off and/or if loads grow due to DSI service, new public utilities or additional DOE-Richland load, deficits could increase.

The graphs below show BPA's seasonal/monthly Heavy Load Hour supply needs after incorporating conservation based on the public power share of the Council's draft Sixth Power Plan and market purchases. The light-shaded areas represent BPA's obligations if it does not serve above-High Water Mark load. The dark-shaded area adds above-High Water Mark load if BPA serves all of that load after public power's share of the Council's targets for conservation are met according to the draft Sixth Power Plan.

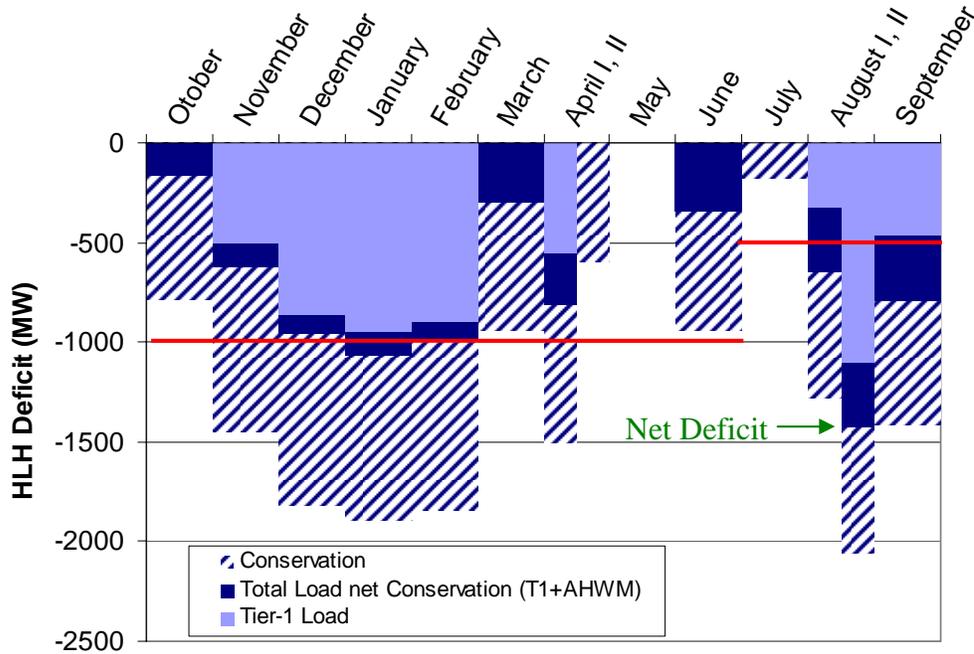
2013 BPA Heavy Load Hour energy need at the 10th percentile

The horizontal lines at -1,000 megawatts and -500 megawatts (summer) reflect a tentative threshold for long-term (greater than three-year) advance power purchases on the wholesale power market. Deficits less than this threshold may be met by shorter-term purchases. The range for additional conservation achieved by 2013 over and above levels assumed in the load forecast is roughly 160 to 200 average megawatts.



2019 BPA Heavy Load Hour energy need at the 10th percentile

The range for additional conservation in 2019 is roughly 600 to 800 average megawatts.



Before accounting for energy conservation that meets the Council’s targets and market purchases, BPA faces significant deficits for Heavy Load Hour energy in 2013 during winter months in the driest 10 percent of years. Monthly deficits are below 1,000 megawatts in January whether or not BPA serves above-High Water Mark loads. In the second half of August, deficits exceed 1,000 megawatts even if BPA does not serve above-High Water Mark loads. For 2019, deficits for the winter and late summer are significantly larger than in 2013. Additional load could increase these forecast deficits.

The picture for needed balancing reserves is less clear. We have made substantial progress in the last year in creating techniques that assure adequate transmission services while reducing needs for additional power resources to provide balancing reserves. We also will continue put a high priority on creating new techniques that increase the flexibility of transmission grid operation to support variable power resources’ needs for balancing reserves. However, BPA could need additional balancing reserves by 2013 if wind power develops as expected and efforts to have others outside the BPA balancing authority provide balancing services prove unsuccessful.

Given this range of resource needs and uncertainties and the large contribution energy conservation is expected to make to fill these needs, BPA’s first priority will be to achieve the public power share of the Council’s energy conservation targets. In addition, BPA proposes to:

- Continue to rely on short-term power market purchases to some extent.
- Continue to place a high priority on current efforts that have the potential to diminish future generating resource requirements. These include initiatives to increase the flexibility of transmission grid operation to accommodate wind and other variable generation, such as the projects in [BPA's Wind Integration Team Work Plan](#).
- Support development of renewable and high-efficiency resources. We will assess and identify cost-effective small-scale renewable and cogeneration resources in the Northwest, considering customer interests where doing so will fill a corresponding BPA resource need.
- Track, evaluate and appropriately pursue availability of pumped storage and natural gas-fired resources such as combined-cycle combustion turbines and/or reciprocating engines to provide seasonal heavy load hour energy and/or balancing reserves.
- Continue to support emerging technologies that may provide cost-effective alternatives to new generation, including Smart Grid and demand-response technologies and transmission technologies that could improve grid efficiency, such as the Western Electricity Coordinating Council's synchrophaser initiative.

BPA does not foresee the need to acquire any major long-term resources at this juncture. We do see the need to begin rebuilding our ability to acquire resources so that BPA can be ready to move quickly to acquire power resources that turn out to be needed as the current load uncertainties are resolved.

BPA has been coordinating closely with the Council in development of its draft Sixth Power Plan and BPA's draft Resource Program. BPA will submit comments to the Council on its draft Sixth Power Plan, and continue to work with them as they complete their plan. BPA will issue its final Resource Program in 2010 after the Council's final Sixth Power Plan is completed. BPA will consider comments on the draft Resource Program received by Nov. 30, 2009.

Action Plan

Most of BPA's incremental energy needs for the next several years can be reduced by meeting the conservation targets proposed in the Council's draft Sixth Power Plan and through short-term market purchases. BPA may also face some additional needs for annual energy and likely will face additional needs for seasonal Heavy Load Hour energy and balancing reserves.

The scope of BPA's resource needs beyond those to be supplied from conservation and market purchases will depend in large part on the outcome of current uncertainties in customer load placement and power supply preferences, carbon regulation, economic growth and other unknowns. This uncertain situation adds greater impetus to actions that can help BPA prepare to meet a wide range of possible outcomes at lowest economic and environmental cost.

BPA proposes to undertake the actions listed below. This listing indicates how BPA would propose to respond to actions called for in the Action Plan of the Council's draft Power Plan.

Conservation

Partner with customers and regional stakeholders to achieve all cost-effective conservation measures necessary to meet public power's share of the Council's Sixth Power Plan regional conservation targets. Continue to work with customers to determine the most effective approach to structuring BPA's conservation programs and financing under Regional Dialogue contracts to foster successful attainment of conservation targets and measure and verify progress toward those targets. Transition to new structure in summer of 2011 and complete transition by October 2011 when Regional Dialogue power sales begin.

Participate in and support conservation infrastructure development. The Council included new Model Conservation Standards in its draft Sixth Power Plan. It also calls for continued market transformation efforts and development of additional conservation measures ranging from computer monitors to commercial outdoor lighting to distribution system efficiency. BPA will continue to actively support market transformation, adoption of energy efficient construction and expansion of the menu of cost-effective conservation. BPA will support widespread adoption of these measures through its participation in the Northwest Energy Efficiency Alliance, the Regional Technical Forum and other regional venues and by sponsoring research and development and pilot projects. In addition, BPA will collaborate with the region to implement Northwest Energy Efficiency Taskforce recommendations.

Conduct demand response pilot programs and technology demonstrations. In the draft Sixth Power Plan, the Council calls on utilities to engage in "research pilot programs" that explore areas that have not been tried before and "development and demonstration programs" that are designed to test acquisition strategies and facilitate full-scale

deployment. BPA is actively pursuing research pilot programs in the commercial and residential sectors. The results will inform the expansion of these pilots into demonstration programs.

Support improved data acquisition techniques for conservation measure verification to ensure valid long-term measure verification at lowest cost and with least intrusion on the time and privacy of participants in conservation programs.

Renewable resources and cogeneration

Renewable resource integration

Complete existing Wind Integration Team Work Plan projects. These projects will allow BPA to continue to integrate wind power into its transmission system and will begin to move BPA and other Northwest balancing authorities toward more flexible power scheduling and joint provision of balancing services.

Develop a long-term wind integration strategy in cooperation with the Council and with the participation of all interested entities through the Northwest Wind Integration Forum. Planning for this effort is in progress, and a forum workshop is scheduled for Oct. 29, 2009.

Pursue further evaluation of potential benefits associated with cooperative, collaborative and/or joint balancing authority functions such as cooperative sharing of control signals through the Joint Initiatives of ColumbiaGrid, WestConnect and the Northern Tier Transmission Group.

Actively participate in Western Electricity Coordinating Council west-wide transmission and power planning efforts and in development of North American Electric Reliability Corporation national adequacy standards for variable generation.

Renewable resource and cogeneration acquisition

Preserve and enhance the performance of the hydroelectric generating capability of the Federal Columbia River Power System. Invest in maintenance and capital asset improvements, upgrades and replacements for the existing federal hydropower resources. Specific actions are conceived and reviewed through the FCRPS Asset Management Strategy, which is vetted publicly through BPA's Integrated Program Review. Capital investment decisions are made collaboratively by representatives from all three FCRPS operating agencies and reviewed by BPA's agency-level asset management processes.

Explore and assess small-scale, cost-effective renewables such as waste heat and bioresidue energy recovery, biomass generation, co-generation, geothermal and new small hydro. Additionally, identify opportunities for incremental improvements in efficiency and generation of non-federal hydro facilities, consistent with action plan item GEN-11 of the Council's draft Sixth Power Plan.

Be prepared to address customer interest in Renewable Portfolio Standards-qualifying resources such as wind, geothermal and biomass, and stand ready to acquire such resources under a Tier 2 Vintage rate structure where doing so would fill a corresponding BPA resource need.

Market purchases

Continue to consider the relative reliance on short-term market transactions to meet low-probability within-year seasonal needs as an alternative to committing to long-term resource acquisitions. BPA will continue to monitor and evaluate its market-purchase guidelines in light of evolving wholesale market conditions. Reliance on these short-term markets will be closely considered in light of the significant uncertainties BPA faces in terms of future requirements.

Continue to consider longer-term market purchases to meet emerging seasonal and annual needs as an alternative to long-term resource acquisitions. BPA will continue to consider use of longer-term market transactions to manage needs in advance of committing to long-term resource-based acquisitions. BPA will continue to evaluate the relative financial risks of longer-term market purchases compared to acquisition of output from specific resources. BPA will explore methods to enhance its ability to provide and obtain credit support for such transactions.

Natural gas-fired generation

Further evaluate natural gas-fired flexible resources: Single-cycle combustion turbines and reciprocating engines perform well economically compared to other generating resource options as sources of flexibility, reserves and seasonal Heavy Load Hour energy. However, they also produce carbon emissions. BPA will continue to track and evaluate the economic and environmental tradeoffs associated with the capability of single-cycle combustion turbines and/or reciprocating engines to provide balancing reserves and seasonal energy and, depending on siting, to reduce transmission requirements.

Continue to track, evaluate and appropriately pursue combined-cycle natural gas-fired generation for future seasonal/monthly and annual energy needs and reserves, should the high end of BPA's potential load obligations materialize and BPA finds it requires resources beyond available cost-effective conservation and renewable energy supplies. Combined cycle gas turbines provide the lowest cost and lowest emission profile of thermal baseload resources that are now widely available in large quantities to meet annual energy needs.

Sources of flexibility and energy storage

Evaluate flexibility augmentation options. The Council calls for a regional assessment of the relative availability, reliability and cost effectiveness of resources that can augment the balancing capability of the Northwest power system, including pumped storage,

compressed air energy storage, battery, Smart Grid and demand-side options. This effort will augment and dovetail with other items in this draft Resource Program Action Plan for variable resource integration. It may also produce new means of providing seasonal Heavy Load Hour energy at lower economic and environmental cost than some other options. BPA concurs with the Council that the Northwest Wind Integration Forum is the appropriate venue for this regional assessment.

Pursue pumped storage and other energy storage options. Pumped storage is widely used elsewhere to help accommodate variations in load. Pumped storage, compressed air energy storage or other storage technologies could prove valuable for firming variable generation and/or providing diurnal reserves and/or Heavy Load Hour energy. BPA is conducting an evaluation of pumped storage potential; the initial evaluation is slated for completion in mid-2010. BPA will explore opportunities to test and begin using large-scale power storage technologies to increase system flexibility, improve reliability and to provide Heavy Load Hour energy and balancing reserves.

Emerging technologies

As with cell phones, personal planners, media players and the internet, a convergence is underway in the power industry among conservation, power generation, transmission and end-use consumption. Smart Grid transmission technologies involve active participation by end-use consumers and make use of sensors inside home appliances in transmission grid management. Conservation measures shave peaks off power demand, lowering capacity requirements as well as saving energy. Demand response technologies and strategies can shift load off peak. The lowest-cost source of balancing reserves for variable generators may not be a power source at all, but new institutional arrangements among transmission owners.

In this quickly evolving environment, traditional distinctions between transmission planning, conservation program development, resource planning and load forecasting are blurring. BPA's Resource Program will evolve with changes in the underlying technologies.

Monitor progress in development of relevant technologies for potential application to future Resource Programs. Monitoring will include demand response technologies as well as emerging generating resources such as tidal and wave energy and enhanced geothermal.

Continue to support research, development and demonstration projects to foster technologies that may improve FCRPS cost-effectiveness, including new conservation and demand response techniques and methods to encourage consumer participation. For example:

- Smart Grid. BPA is among the 12 utilities participating in the Battelle Northwest Smart Grid test bed proposal to the Department of Energy that would implement a number of demand response programs through participating utilities.

- Demand response technologies: BPA is leading demand response pilot projects in the Northwest to test the ability of emerging technologies to address dual peaking systems and the automation of demand response strategies.
- Transmission technologies: BPA is participating in regional efforts that have the potential to improve grid efficiency, such as the Western Electricity Coordinating Council's synchrophaser initiative.

Improving methodologies

Continue to further develop tools and analytical methods to enhance BPA's capability to evaluate system needs and resource options. This is the first Resource Program BPA has produced since 1992. The nature of BPA's system needs has evolved considerably and continues to do so, necessitating development of new tools to analyze both need and the effectiveness of various resources to meet it. BPA will:

- Work with its customers, the Council and others to improve models and analytical techniques for load forecasting, needs assessment, resource adequacy assessment, comparative resource analysis and evaluation of technologies such as storage and demand management needed to integrate variable generation.
- Focus on improving techniques to discern the relative value of non-traditional means of meeting loads, such as demand response programs, Smart Grid technologies and changes in transmission protocols.
- Continue to work with regional utilities, Northwest states, the Western Energy Renewable Zones initiative and Western Electricity Coordinating Council to improve techniques for evaluating the relative merit of resources that require construction of new long-distance transmission compared to within-basin alternatives.
- Work with the Council to reestablish regular periodic assessments of resource availability, cost and performance to support the Council's Power Plan and BPA's Resource Program.