

Making it Happen – The Action Plan

The Council believes it is critical the region act now to help secure an adequate, [affordable efficient](#), economical, and reliable power system. The Council is recommending the following actions over the next three to five years to implement the power plan.

DEVELOP RESOURCES NOW THAT CAN REDUCE SYSTEM COST AND RISK

Conservation

Conservation is the highest priority resource under the Northwest Power Act. The region has developed nearly 2,500 average megawatts of conservation since its passage at an average levelized cost of approximately 2.5 cents per kilowatt-hour. Despite the conservation that has already been achieved, there remains a significant amount yet to be developed, largely as a result of new efficiency technology.

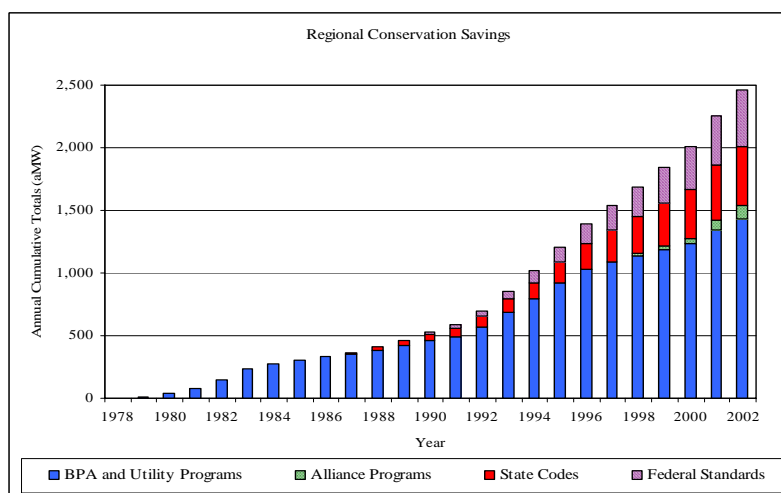


Figure ES-11

Conservation has several characteristics that make it unique when compared to other resources. First, its cost is almost entirely capital, while its operating costs are minimal. This means that unlike a conventional generating unit, there are no operating costs to be avoided when demand is low. Conversely, compared to generating power plants, conservation always produces savings of some value, and it reduces the risk of increases in fuel prices and increases in the cost of electricity. Second, it has no environmental emissions. This means that conservation reduces the risks associated with future environmental controls. Third, some types of conservation resources are “discretionary,” i.e., they can be developed when they are needed. On the other hand, some conservation resources are not discretionary. For these resources, which are termed “lost-opportunity resources,” it is only feasible and/or cost-effective to capture them when, for example, a building is constructed or an appliance is purchased. Fourth, conservation resources come in small increments and have relatively short lead-times for development [compared to generation and transmission](#), assuming the necessary programs and budgets are in place. This means that at least for schedulable conservation, there is some ability to speed implementation up or down in response to prevailing conditions.

Taking these characteristics into account, the Council’s analysis indicates there is value in aggressively pursuing the development of conservation. In fact, developing some additional conservation beyond that indicated by short-run power prices provides additional value in

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mitigating fuel costs, market price, and environmental risks. To achieve this, The Council recommends the following actions:

Increase Regional Conservation Acquisition

The Council recommends that the region target 700 average megawatts of cost-effective conservation acquisitions from 2005 through 2009.¹ The Council recommends that

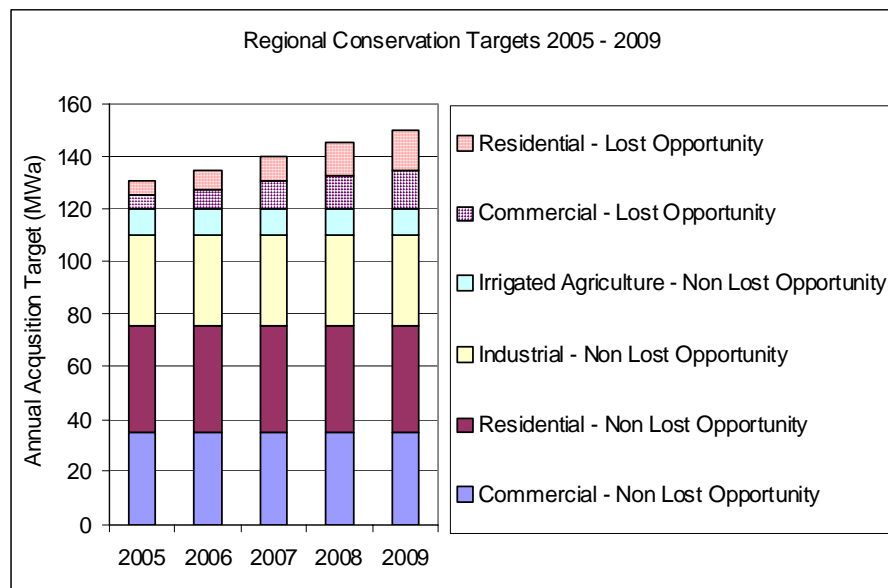


Figure AP-1

conservation resource development be split between “lost opportunity” and “non-lost opportunity” or “discretionary” conservation, and across all sectors. Figure AP-1 shows the Council’s recommended annual minimum targets by sector and resource type.

The Council’s analysis indicates that regional investment in cost-effective conservation at this level is more likely

to lead to a more economical and reliable power system than alternative development policies. The Council’s analysis found the near-term conservation targets set forth in this plan to be consistent across a wide range of future conditions for load growth, electricity market prices and other factors over the 5-year Action Plan period. Lower targets resulted in higher costs and risk.

The Council recognizes that the conservation target represents an increase over recent levels of development. However, the Council’s analysis of the potential regional costs and risks associated with developing lesser amounts of conservation demonstrates that failure to achieve this target exposes the region to substantially higher costs and risks. The development of conservation resources provides a “hedge” against future market price volatility. Developing these conservation resources reduces both net present value system cost and risk.

ACTION CNSV-1²: Ramp up lost opportunity resource acquisitions – Many of the cost-effective lost opportunity resources identified in this power plan are relatively new and do not have established programs or approaches for their acquisition. Utilities, with the support of the regulatory commissions, Bonneville, System Benefits Charge Administrators (SBC Administrators), The Alliance, other program operators and state

¹ The targets set forth in this plan are for cost-effective conservation as defined in the Regional Act. The method for programmatic implementation of cost-effectiveness is set forth in Appendix E, Conservation Cost-Effectiveness Determination Methodology. This methodology takes into consideration that there is not one single cost-effectiveness limit for all conservation measures. Each measure or program has a unique benefit to cost ratio that reflects the value of avoided market purchases based on the when the measure’s energy savings occur, and avoided transmission and distribution costs based on when any capacity savings occur. Many other factors are included in the cost-effectiveness methodology. See Appendix E for details.

² Each action has been given an identifier, e.g., CNSV-1, for ease in future reference.

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and federal standard setting agencies should increase the annual acquisition of lost-opportunity conservation resources. Existing programs should be expanded, new programs initiated, and codes and standards improved so that within twelve years from the adoption of this plan the region is capturing at least 85 percent of the cost-effective lost-opportunity potential available annually.^{3,4} The Council recognizes that near-term lost-opportunity program costs may be relatively high due to start-up costs and initially low penetration rates. However, these resources should be pursued so long as program operators can reasonably anticipate that mature program costs and penetration rates can be expected to provide cost-effective savings.

Because many of these programs are new, the Council expects near-term lost-opportunity program costs may be relatively high due to start-up costs and initially low penetration rates. Near-term high costs should not deter the region from pursuing lost-opportunity targets if mature program costs and penetration rates are expected to provide cost-effective savings.

ACTION CNSV-2: Increase non-lost opportunity resource acquisitions -- Utilities, with the support of the regulatory commissions, Bonneville, SBC Administrators, the Alliance and other program operators should increase the annual acquisition of non-lost-opportunity (discretionary) conservation resources to capture at least 120 average megawatts of regionally cost-effective savings annually within one year of the adoption of the power plan. Efforts should prioritize development of low-cost discretionary measures and programs as those provide greater cost and risk-reduction value than higher cost measures and programs. This level of annual non-lost opportunity resource acquisition should be sustained for at least five years.

Strategically plan conservation and provide adequate regional coordination and administration

Achieving the Council's recommended conservation target will require significant new initiatives, including regional and local acquisition programs, improved energy codes and equipment standards, and market transformation ventures. In addition, the Council believes that acquiring cost-effective conservation in a timely and cost-efficient manner requires thoughtful development of mechanisms and coordination among many local, regional, and national players. The Council recognizes and supports the desire of many public utilities in the region to take greater responsibility for resource development instead of relying on Bonneville. Nonetheless, the Council believes coordinated efforts will be an increasingly necessary ingredient to successfully develop the remaining conservation potential.

The boundaries between direct acquisition approaches, market transformation, infrastructure support, and codes and standards are blurry. In fact, for much of the conservation resource, efforts are needed on all these fronts to bring emerging efficiency measures into common

³ Lost-opportunity potential varies year-to-year depending on the numbers of new buildings constructed, new appliances purchased, and equipment installed. Rates of new installations tend to follow economic cycles, so the Council recommends a maximum penetration rate of 85 percent rather than an energy target. Under medium load growth, an 85 percent penetration rate for lost-opportunities would be about 70 average megawatts per year.

⁴ The Council's estimate of twelve years to reach 85 percent penetration for lost-opportunity measures is based on experience from the last two decades. Several conservation initiatives including residential refrigerators, clothes washers and efficient manufactured homes all exhibit a cycle of 10 to 12 years to reach roughly 85% penetration of the efficiency levels conceived at program inception. The Council expects that the lost-opportunity measures identified in this plan will take similar timeframes to develop. However, some measures will be faster and some slower depending on the success of improving codes and standards, market transformation efforts and technological improvements in measures.

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practice or minimum standard. Of increasing importance is improved coordination between conservation programs operated by local utilities, SBC Administrators, the Alliance, Bonneville, ~~the states, and other local, state and federal conservation entities and others.~~ Improved coordination is needed to assure that the region can target initiatives where they have the most impact acquiring the most savings for the lowest cost.

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The Council believes that in order to efficiently accomplish the conservation targets set forth in this power plan, the region needs to resolve key strategic issues including 1) defining Bonneville's role in conservation implementation; 2) developing a mechanism and funding for regionally administered acquisition and assessment efforts; 3) defining the role, funding, and structure of the Regional Technical Forum; and 4) developing a mechanism and funding for regional conservation research and development.

In addition to resolving these key strategic issues, the development of a strategic plan for conservation should set forth a process and funding to evaluate measure and program performance and to periodically review and revise program focus if necessary. The Council recognizes that its estimates of costs and savings for measures may need to be revised as the future unfolds. The performance of measures, the degree of certainty of costs and savings, program penetration rates, market-driven adoption rates, changing measure costs, the adoption of revised codes and standards and other factors should be considered in determining how programmatic efforts should be strategically targeted to make best use of limited conservation budgets. Furthermore, over the next five years, conservation measures and practices not included in the Council's conservation assessment are likely to emerge. If cost-effective, such measures should be pursued.

ACTION CNSV-3: Develop a strategic plan for conservation acquisition --The Council, with Bonneville, utilities, SBC Administrators, the Alliance, regulators, state energy offices, the efficiency industry, and other stakeholders will convene a forum to develop a strategic plan to achieve the conservation targets set forth in the power plan, including model conservation standards. This strategic plan will establish the implementation role that Bonneville, utilities, SBC Administrators, the Alliance, regulators, State Energy Offices, and the Regional Technical Forum (RTF) will play, ~~and~~ It # will allocate the share of the regional conservation target to be accomplished by each of these major entities and resource development mechanisms. The strategic plan will set forth recommendations for regional coordination, conservation infrastructure development (such as training, education, certification programs, market research, program evaluation), program evaluation and revision and program administration recommendations. The Council will convene the forum within three months of issuing its Fifth Power Plan. The resulting strategic conservation plan should be presented to the Council within one year.

The Council believes any strategic plan will require specific actions and increased efforts in the categories of local acquisition, market transformation, codes and standards, and regional coordination/acquisition. While the Council cannot prejudge the specifics of the

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strategic action plan, recommended actions and approximate budget ranges are set forth here for each of these categories.⁵ More detailed discussion of the conservation acquisition approaches by sector and measure are in Appendix D.

ACTION CNSV-4: Increase local acquisition budgets – ~~Based on historical costs, the Council believes has estimated~~ that an average annual aggregate utility system annual investment of between \$200-215 and \$260-290 million (2004\$), excluding market transformation and regional coordination and acquisition, will be needed to achieve the 700 average megawatt target over the next five years.⁶⁷ The amount each utility or system benefits charge administrator will need to invest to meet its share of the regional target will depend on its customer mix, growth rate, local economic conditions, program designs, and other factors. The Council estimates that Bonneville and Northwest utilities invested just over \$200-215 million (year 2004 dollars) in conservation in 2002. Therefore, the Council anticipates that local conservation acquisition expenditures will need to increase over current levels in order to fully capture conservation's benefits.

ACTION CNSV-5: Expand market transformation initiatives– A portion of the regional conservation target can be acquired most efficiently and effectively through market transformation. The Council's conservation analysis indicates there are additional candidates for new or expanded market transformation ventures. These activities are outlined in Appendix D and include a potential demonstration program for heat pump water heaters, and new or expanded

⁵ The Council sets forth these initial estimates as broad indicators of anticipated utility system expenses. The Council expects the strategic planning process will be used to refine estimates. While the Council expects the sum of conservation budgets of Bonneville, the utilities, the Alliance, SBC administrators, states and others will be in the ranges ~~identified, identified~~, it fully acknowledges budgets needed to acquire the conservation may be more or less. The Council encourages efforts to reduce the utility share of conservation costs to reduce rate impact ~~provided so long as savings targets are met.~~

⁶ ~~The derivation of this budget estimate is described in Appendix D, page D-x. The Council's estimate of the amount of money needed to meet the plan's target is based on the estimated capital cost of discretionary and lost opportunity savings identified in the conservation assessment targeted over the next five years, and the share of those costs expected to fall on the utility system. Total resource costs increase from approximately \$270 million to nearly \$420 million per year over the five year time frame (2000\$). The Council estimates that annual utility system costs would be approximately \$240 million in 2005 and increase to \$300 million by 2009. Of that, approximately \$200 to \$260 million per year would be for local acquisition programs of the utilities and about \$40 million per year may be directed to market transformation and regional coordination and acquisition activities. The estimated utility cost is \$1.9 million per average megawatt over this five year period. To put this into historical perspective, the average utility cost of conservation acquired between 1991 and 2002 was \$2.2 million (2000\$) per average megawatt. However, the average cost of utility acquired conservation, including savings from Alliance programs since 1997, is \$1.4 million (2000\$) per average megawatt. The range of utility program costs estimated here is based on two methodologies. The high range of the estimate is based on \$2.2 million per average megawatt saved, the 1991-2002 utility program cost average. This method yields a five year average annual estimate of about \$300 million, of which as much as \$40 million could be for market transformation and regional acquisition activities. That leaves a high estimate of about \$260 million per year over five years for local utility program expenditures. This is thought to be the high end of the range. Utility program costs per average megawatt have been lower since 1995, about \$1.5 million per average megawatt. But historical performance may not be a good indicator of future costs. The future measures are different and there are new lost opportunity programs to be developed. The low range of the utility program cost estimate is based on utility costs being a fraction of the total resource cost of the lost opportunity measures in Council's conservation assessment. This method takes into account that there are different measures and programs going forward. For the second methodology the Council assumed utility costs are expected to be at or above 100 percent of the total resource cost of the lost opportunity measures due to expected high initial start up costs for new programs. For discretionary measures, the Council assumed about 65 percent of the total resource cost of the measures would be needed in utility incentives and program costs. This second method yields a five year annual average utility cost estimate of about \$240 million. Again assume as much as \$40 million per year could be for market transformation and regional acquisition activities. That yields a low end estimate of about \$200 million per year for local utility program costs not including market transformation and regional acquisition activities. In 2002 Bonneville, the utilities and the SBC administrators spent about \$200 million on local programs not including the Alliance.~~

⁷ ~~The Council's estimate of the amount of money needed to meet the plan's target is based on the estimated capital cost of discretionary and lost opportunity savings identified in the conservation assessment targeted over the next five years, and the share of those costs expected to fall on the utility system. Total resource costs increase from approximately \$270 million to nearly \$420 million per year over the five year time frame (2000\$). The Council estimates that annual utility system costs would be approximately \$240 million in 2005 and increase to \$300 million by 2009. Of that, about \$40 million per year may be directed to market transformation and regional coordination and acquisition activities. The estimated utility cost is \$1.9 million per average megawatt over this five year period. To put this into historical perspective, the average utility cost of conservation acquired between 1991 and 2002 was \$2.2 million (2000\$) per average megawatt. However, the average cost of utility acquired conservation, including savings from Alliance programs since 1997, is \$1.4 million (2000\$) per average megawatt.~~

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programs for new efficient multi-family homes, gravity film heat exchangers, residential compact fluorescent lighting, AC/DC power converters, high-performance commercial lighting, packaged commercial refrigeration equipment, efficient fume hoods, evaporative assist cooling, commercial roof-top HVAC repair& optimization, and others. While the Council anticipates that market transformation acquisition expenditures will need to increase significantly over current levels in order to fully capture conservation's benefits, -it believes that the level of investment in regional market transformation initiatives should be resolved during the development of the strategic plan for conservation acquisition.

ACTION CNSV-6: Revise and adopt state and federal energy codes and efficiency standards that capture all regionally cost-effective savings – Codes and standards are the most effective method to capture some of the lost-opportunity conservation potential identified in this power plan. In order to achieve the savings from new and revised codes and standards, actions must be taken by federal and state government, utilities, SBC Administrators, and the Alliance. Specifically:

- The states should adopt efficiency standards identified in this power plan for appliances and equipment not pre-empted by federal law including, but not limited to, commercial refrigerators, freezers, icemakers, power transformers, and AC/DC power converters.
- The U.S. Department of Energy should adopt or revise standards identified in this power plan for residential clothes washers, dishwashers, refrigerators and freezers, and other appliances and equipment currently covered by federal law.
- The U.S. Department of Housing should revise its efficiency standards for new manufactured homes so that these standards satisfy the Council's Model Conservation Standards.
- Bonneville, Utilities, SBC Administrators, and the Alliance should implement the Council's Model Conservation Standards for New Residential and Commercial Buildings Programs within the next five years.
- State and local code authorities should revise their existing energy codes so that these codes provide savings equivalent to the Council's Model Conservation Standards for New Residential and Commercial Buildings on their next state building code update cycle.
- The Alliance, utilities, SBC Administrators, and states should provide ongoing annual funding, technical, and political support of timely adoption of federal standards to capture cost-effective savings identified in the power plan.

The Council will provide assistance to states and their stakeholders in the development and passage of improved energy codes and standards and will work through the relevant federal processes to advocate for improved codes and standards.

Develop mechanisms and funding for regional coordination and limited regional acquisition

The Council believes that a significant share of the savings identified in this power plan can be more effectively and efficiently acquired through regionally administered programs or, at a minimum, will require a regional scope to achieve economy of scale or market impacts. These actions may not qualify as market transformation as currently defined. They include regional coordination and potential acquisition payments for efficient AC/DC power converters, commercial refrigerators and freezers, residential heat-pump water heaters, and Energy Star manufactured homes and could cost \$5 to \$10 million annually over the next five years. In the

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past, Bonneville has played a similar role and could do so in the future if the region so decides.⁸ The Alliance could also coordinate such activities if its market transformation mission were expanded. The Council intends to use the strategic planning process identified earlier to resolve this problem.

ACTION CNSV-7: Within 12 months, the Council, regulators, Bonneville, utilities, SBC Administrators, the states, and the Alliance establish a mechanism and funding to develop regional coordination and acquisition not under the category of market transformation -- The options to be considered include using Bonneville, expanding the mission and budget of the Alliance, creating another mechanism to target actions best administered regionally, or using some combination of these three options. As with market transformation, care should be taken to insure that a regional organizational framework of utilities, contractors, and government agencies is in place in order to successfully carry out the day-to-day acquisition activities..

Track regional conservation accomplishments

This power plan places considerable reliance on conservation. It will be essential to track regional accomplishments.

ACTION CNSV-8: Within six months of the adoption of the power plan, the Council, regulators, Bonneville, utilities, SBC Administrators, the states, and the Alliance should establish a mechanism and funding for the annual reporting and tracking of regional conservation investments and accomplishments -- The Regional Technical Forum or the state energy agencies should be considered as potential vehicles for accomplishing this tracking. State government agencies could add conservation data to the data already collected from utilities. It is essential that sufficient resources, financial and otherwise, be committed to this activity.
Estimated costs for reporting and tracking should be developed as part of the strategic plan for conservation acquisition.-

Address important barriers

Utility implementation of conservation has historically faced several barriers. New barriers may emerge if changes like those proposed for the Bonneville Power Administration take effect. Efforts should be made to remove these barriers.

ACTION CNSV-9: Regulators and local boards and commissions should establish criteria and processes for evaluating and reflecting the value of conservation as a hedge against future risks -- This should be accomplished in time to be incorporated in subsequent utility integrated least-cost plans. The Council will offer its assistance in these efforts.

ACTION CNSV-10: If revenues lost as a result of conservation remain as significant barriers to implementing the cost-effective conservation targeted in this plan, state and local regulators and utilities should consider developing and implementing strategies to mitigate conservation impacts on cost recovery -- Utilities should not be penalized financially for reduced retail sales. Cost-effective energy efficiency investments should be at least as attractive from a utility perspective as the avoided investments in generation and grid infrastructure. To eliminate a significant financial disincentive for utilities' energy efficiency initiatives, state and local regulators should consider adopting simple true-up mechanisms that eliminate an unintended linkage between utilities' retail kilowatt-hour sales and their ability to recover

⁸ For example, Bonneville administered the Manufactured Housing Acquisition Program (MAP) on behalf of all of the region's public and investor-owned utilities.

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authorized fixed costs. An important step in this direction is a simple system of modest true-ups in electricity rates, which corrects for any annual fluctuations in a utility's retail electricity sales that regulators did not expect when they set the rates initially. Alternatively, rate designs could be modified to reduce the fixed costs recovered in the per kilowatt-hour charges combined with carefully designed increasing block rates. Options to be considered would include modifying rate design to reduce the fixed costs recovered in per kilowatt-hour charges combined with carefully designed increasing block rates. Alternatively, mechanisms to separate revenues from kilowatt-hour sales should be considered provided that the separating is limited to the effects of conservation.

ACTION CNSV-11: Consider financing conservation investments -- Because conservation costs are all capital, and because they are often expensed, they tend to have short-term rate impacts. The increase in conservation acquisitions identified in the power plan will require an increase of less than one percent of total electric system revenue requirements over that spent in 2002. Nonetheless, cash-flow constraints and competitive pressures on their rates often limit utilities. Financing conservation in the same way that other resources are financed can mitigate these short-term rate impacts, although at some expense of increasing long-run costs. However, the fact that conservation is not a physical asset that the utility owns can be a barrier. This can be reduced, if not overcome, if the states adopt legislation defining conservation investment as a guaranteed regulatory asset~~non-resource regulatory asset~~. Such an asset would be ~~would be backed-created by the~~ guaranteeing the ability of the utility to recover its costs~~ability to guarantee cost recovery~~. This instrument could be available to system benefit charge administrators as well as to utilities.

ACTION CNSV-12: Low Income Housing Weatherization—Cost-effective conservation acquired as a result of low-income housing weatherization programs has proven to be a useful addition to the region's conservation portfolio. Bonneville and utilities should continue to provide support for this activity where cost-effective savings are achieved. The Council acknowledges that there are non-energy benefits of low-income weatherization that have not been quantified in its analysis. Bonneville and utilities should consider these non-energy benefits when determining whether to support low-income weatherization. However, utility system support for low-income housing weatherization that is not cost-effective when its non-energy benefits are taken into consideration should not reduce the funding available for acquiring the cost-effective conservation targeted by this Plan.

ACTION CNSV-13: System Benefits Charges – Two Northwest states have established system benefits charge approaches to conservation. In a system benefits charge approach, conservation is funded by a charge on all customers' bills and an administrator, usually other than the utility, disperses funds for conservation acquisition. Other states have adopted similar approaches. But these systems are new and have a limited track record. If utility disincentives seriously impede utility investment in conservation, consideration should be given to a system benefits charge approach to conservation funding and acquisition. The Council will review the performance and effectiveness of Oregon, Montana, and other SBC systems around the country by 2008.

ACTION CNSV-14: As the Bonneville Power Administration's role in power supply is altered, avoid or remedy disincentives to utility conservation – The effort to alter Bonneville's role in power supply is likely to involve an allocation of power from the existing federal system to qualifying customers. Customers are concerned that the allocation could create a disincentive

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to conservation. Bonneville should design and implement allocation methodologies and net requirements calculations to avoid disincentives to utility conservation acquisition.

Demand Response

Demand response ~~is~~ an appropriate, voluntary change in the level of electricity use when electricity supply is tight. Although technically not a resource under the definition in the Act, it is a practical means of reducing power system costs and reducing the need for investment in more expensive generating resources. Demand response can be accomplished by a variety of approaches, which can be generally grouped in two categories: price mechanisms and demand “buybacks.” While the Council believes there are some benefits to price mechanisms that deserve to be more fully explored, for this power plan the Council’s analysis was limited to voluntary buybacks similar to those employed by several regional utilities during the 2000-2001 electricity crisis.

~~This is the first power plan in which demand response is treated as a resource.~~ The region has limited experience with demand response, but that experience has demonstrated that it offers substantial potential benefits in terms of limiting high price excursions and the ability to exercise market power in tight markets. The size and value of this resource, however, are somewhat uncertain. For the portfolio analysis, it was conservatively estimated that 2,000 megawatts of demand response could be developed by 2020. Its “operating” cost is ~~assumed estimated~~ to be \$150 per megawatt-hour, with a fixed cost of \$5,000 per megawatt-year for the first year and \$1,000 per megawatt-year thereafter (2004\$). The portfolio analysis ~~further~~ suggests that if the region fails to implement demand response, the potential increase in expected system cost could be in the \$1~~5000~~ million (net present value) range while system risk would increase by ~~\$500~~ 235 million (2004\$). Demand response provides benefits in the form of greater system reliability—utilities have a better idea about what loads they can easily shed in an emergency—and these reliability benefits can be included in the price utilities may offer to these customers for the right to reduce load.

The Council’s recommended actions are designed to build on the region’s recent experience, to expand the region’s understanding of the demand response resource, and to guide future policies affecting demand response. Specifically:

ACTION DR1: Expand and refine existing programs – Bonneville and utilities, with regulators’ approval, should maintain, and begin to expand and refine the demand response programs they have developed in the past few years. This should begin immediately. For example, utilities should maintain their ability to buy back demand when conditions warrant, and should work to expand participation in these programs. The utilities should work to reduce the transaction costs of these programs by streamlining recruitment of participants, notification of buyback opportunities, and verification of, and compensation for, demand reductions.

ACTION DR2: Develop cost-effectiveness methodology for demand response – Regional parties including, but not limited to Bonneville, utilities, regulators, and the Council should develop a clear cost-effectiveness methodology for demand response no later than 2006. While the general principle of avoided cost is well accepted, there are practical difficulties in calculating avoided cost in our power system because of its large hydroelectric component and very substantial transmission links to other regions. A clear and widely accepted methodology would

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ease the development and adoption of demand response programs. The Council could serve as the convener of such an effort, if necessary.

ACTION DR3: Incorporate demand response in integrated resource plans -- Regulators should require utilities to incorporate demand response fully into utilities' integrated resource plans (IRPs) starting with the next round of IRPs. Utilities have made a beginning, but more needs to be done. This work should include refining estimates of the size of the resource, its cost and availability. ~~which This~~ is likely to require pilot programs and further analysis.

ACTION DR4: Evaluate cost and benefits of improved metering and communication technologies -- Utilities, with participation by regulators, should evaluate the costs and benefits of improved metering and communication equipment. The lack of such equipment is an obstacle to securing the participation of many customers in demand response programs. Over time, this equipment has become cheaper and more capable. Evaluations of cost-effectiveness of demand response should use the net cost of the necessary metering and communication equipment, after the equipment's other benefits have been taken into account.

ACTION DR5: Monitor cost and availability of emerging demand response technologies -- The Council, Bonneville, and utilities should monitor emerging demand response technologies. For example, intelligent appliances that can cycle in response to system frequency have potential to significantly reduce the cost of maintaining system stability.

ACTION DR6: Explore ways to make price mechanisms more acceptable -- Regional parties, including, but not limited to, utilities, regulators, and the Council should explore ways to make price mechanisms more acceptable as a potential means of achieving demand response. In many cases, price mechanisms offer significant advantages compared to buybacks, such as lower transition costs and wider reach. However, concerns such as fairness and price stability have prevented much adoption of price mechanisms in our region. It is worth a serious effort to see if these legitimate concerns can be met while achieving some of the advantages of price mechanisms. This should be carried out by 2006. The Council could serve as the convener of such an effort, if necessary.

ACTION DR7: Transmission grid operators should consider demand response for the provision of ancillary services, on an equal footing with generation -- It seems likely this will be facilitated by the development of a formal market for ancillary services, but even if that formal market does not develop, demand response should be able to compete to provide ancillary services.

ACTION DR-8: The Council will host several workshops to identify and coordinate efforts to accomplish the above action items -- The Council will enlist participation by utilities, regulators, environmental groups and other interested parties. The first workshop will be held in the first quarter of 2005.

Cost-effective ~~lost opportunity~~ renewable and cogeneration generating resources

Regionwide, major bulk power generating resources appear unlikely to be needed until early in the next decade. However, opportunities for the development of economic renewable energy and combined heat and power projects are likely to surface occasionally during this period. They could include industrial or commercial combined heat and power (cogeneration) projects,

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landfill, animal waste or wastewater treatment plant energy recovery projects, hydropower renovations, forest residue energy recovery, and remote photovoltaics. The opportunity to economically develop these projects is often transient, created by needs not directly related to electric power production, such as a waste disposal problem, equipment upgrading or replacement, or new commercial and industrial development. Utilities, entities administering resource development incentives, and others able to facilitate resource development should establish procedures to identify, evaluate, and secure these opportunities as they arise. Barriers to the development of small-scale renewable and cogeneration projects should be removed.

ACTION GEN-1: Utilities, with the support of ~~the regulatory~~their boards or commissions, and entities administering resource development incentives should identify cost-effective renewable and cogeneration ~~potential projects~~ – Identification of potential projects is a precursor to the acquisition of cost-effective projects. One way of identifying such projects is for utilities to conduct inventories when developing Integrated Resource Plans. Other approaches include all-source Requests for Proposals and open windows for unsolicited proposals. These efforts should be tailored to identify potential lost opportunity projects. This should be accomplished by 2007.

ACTION GEN-2: Utilities with ~~commission~~the support their boards or commissions, and entities administering resource development incentives should establish current, accurate, and comprehensive procedures and criteria for the evaluation of renewable and cogeneration projects – The evaluation of renewable and CHP projects should be based on an accurate assessment of project costs and benefits. Criteria for evaluating resource cost-effectiveness should be current, and accurately reflect all significant costs and benefits of acquiring the resource. This includes the energy value, possible value of capacity and other ancillary services, offset transmission and distribution costs and losses, and environmental effects. Cost effectiveness criteria should account for significant risks and uncertainties. This should be accomplished by 2007.

ACTION GEN-3: Utilities, with ~~the support~~their boards or commissions~~commission support~~, should remove disincentives to utility acquisition of power from projects owned or operated by others – The inability of an investor-owned utility to receive a return on risk for funds associated with power purchase agreements, or an investment in generation owned or operated by others may create an economic disincentive for securing these resources. Utilities and commissions should work to reduce or remove these disincentives where present. This should be accomplished by 2007.

ACTION GEN-4: Utilities, with ~~the support~~their boards or commissions~~commission support~~, should adopt uniform interconnection agreements, technical standards, and accurate and equitable standby tariffs – Uniform interconnection standards and fair and equitable standby tariffs will facilitate development of cost-effective customer-side generation. Utilities, with the support of their commissions where applicable, should adopt uniform interconnection agreements and technical standards, consistent with FERC jurisdiction. Standard agreements should be transparent, free of unnecessary complexity, and expeditiously processed. Standby tariffs should accurately and equitably reflect the costs and benefits of customer-side generation. This should be accomplished by 2007.

ACTION GEN-5: Utilities, with ~~the support~~their boards or commissions~~commission support~~, and entities administering resource development incentives, should acquire cost-effective lost opportunity renewable and cogeneration projects -- Utilities should acquire

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cost-effective renewable and cogeneration projects, either by power purchase or investment. This should be in effect by 2006.

ACTION GEN-6: Utilities, with the support their boards or commission ~~commission~~ support, should facilitate the sale of excess power from customer-side generation – The economics of cogeneration and other customer-side generation can be improved by the ability to market power in excess of customer needs. Utilities, with the support of their commissions where applicable, should facilitate the sale of excess customer-generated power. Possible means include the expansion of eligibility for net metering agreements and accurate and equitably priced distribution system access for sale of excess power. Because the seasonal and hourly variation of the value of power is expected to become more pronounced, credits should reflect significant seasonal and hourly variation in the value of customer-side generation. ~~Possible means include the expansion of eligibility for net metering agreements and offering accurate and equitably priced distribution system access for sale of excess power. Because the seasonal and daily variation of the value of power is expected to become more significant in the future, net metering should be based on time of day metering. This should be accomplished by 2007.~~

PREPARE TO CONSTRUCT ADDITIONAL GENERATING RESOURCES WHEN NEEDED

~~Meeting the~~ The conservation goals of this power plan, - in addition to generating plants currently under construction⁹ and the expected acquisition of 1100 megawatts of wind or other renewable resources by system benefit charge programs, is are expected to defer the need for ~~major new additional~~ generating resources ~~on a regionwide basis~~ until after the end of the decade ~~2013 under most likely conditions.~~ The plan foresees a possible need for additional wind capacity in-service beginning in 2011¹⁰, leading to as much as 5000 megawatts of new wind capacity by the end of the 20-year plan¹⁰. Wind incorporated in this plan plays this major role for several reasons: the probability of more aggressive policies to reduce carbon dioxide production; an abundant high quality resource; expectations of continued wind plant cost reduction and performance improvements; relatively low integration costs; and the timely availability of electrical transmission service at promising wind resource areas. Wind development in excess of that included in the plan is thought to be more expensive than other resource alternatives because of lower resource quality, transmission expansion requirements and higher integration cost (Chapter 5).

The plan foresees the need for 425 megawatts of coal-gasification power generation capacity to supplement wind power development to be in-service as early as 2016. Coal gasification combined-cycle technology offers economic power generation from coal with less environmental impact than conventional coal-fired power generation. Coal is also less susceptible to price volatility than generation based on natural gas. Moreover, gasification technology has the potential for economic separation of carbon for sequestration.

The Council has analyzed both conventional pulverized coal-steam and coal gasification generation. The analysis indicates that use of coal gasification technology would lower expected

⁹ The Port Westward project plus several small projects.

¹⁰ In addition to an estimated 1100 megawatts of wind or equivalent renewable or cogeneration resources expected to be acquired under system benefit charge programs.

system cost and risk and has lower emissions of pollutants, including carbon dioxide. A factor leading to the lower cost and risk associated with use of coal gasification is a shift in the earliest need for a new coal resource from 2013 for conventional coal to 2016 for coal gasification¹¹. The analysis is predicated on continued commercialization of coal gasification technology. However, if commercialization of coal gasification technology fails to advance as forecast, 400 megawatts of conventional coal-fired capacity may be needed as early as 2013.

The Council recognizes that individual utilities may find it necessary to acquire additional generation prior to the schedule set forth in the portfolio analysis. Commitment to coal gasification technology for near-term resource acquisition may be premature.

The increasing probability and magnitude of carbon dioxide penalties lead to the conclusion that natural gas combined-cycle plants may become the resource of choice during the latter portion of the 20-year plan. The lead-time for these resources is such that preparatory actions are not required during the 5-year action plan period. Many of the futures analyzed need 400 megawatts of coal-fired generation in service by 2013. Later completions are observed in many cases, but the power plan requires that capacity be capable of service by the earliest observed date. Completion of coal-fired capacity in 2013 would require construction to start by early 2010. This will require the availability of at least 400 megawatts of fully permitted potential capacity, including transmission interconnection by 2009. The pre-construction development of coal-fired capacity is estimated to require up to three years. This implies that pre-construction development of potential coal-fired projects should commence no later than 2006.

Maintain an inventory of ready-to-construct projects

Permitting and other pre-construction project development activities are is a time consuming, but relatively inexpensive portions of the project development process. Construction lead-time and exposure to the risks of shortage and electricity market price volatility can be reduced at low cost by maintaining an inventory of ready-to-develop projects (“options”). The Council recommends development and maintenance of a regional inventory of ready-to-construct projects, sufficient to meet possible needs under the least risk plan and plausible deviations from that plan.

The portfolio analysis, described in Chapter 7, concludes that 100 megawatts of wind capacity may be needed by early 2011 and an additional 1400 megawatts by early 2013. Completion of 100 megawatts wind capacity by early 2011 would require construction to start in 2010. Pre-construction activities will typically require two years (less if development efforts are underway, as they are at present). This implies that pre-construction development for the first increment of wind power should commence by early 2008 so project construction could occur, if needed during 2010.

Completion of 1400 megawatts wind capacity by 2013 would require construction to start by early 2012. This is a very large block of capacity for development within a single year and it is more practical to plan for phasing this capacity over the two-year period following the first increment. Therefore, pre-construction activities for an increment of 700 megawatts of wind power should commence by early 2009 so project construction could occur, if needed, during 2011 for completion by 2012. Pre-construction activities for a another increment of 700

¹¹ Other factors equal, deferral of resource development will lower cost and risk.

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megawatts should commence by early 2010 so project construction could occur, if needed, during 2012 for completion by 2013.

Completion of 425 megawatts of coal gasification combined-cycle capacity by early 2016 would require construction to start during 2012. Because pre-construction development of coal-fired capacity is estimated to require up to three years, pre-construction development should commence by early 2009 so project construction could begin, if needed, during 2012 for completion by 2016.

However, if commercialization of coal gasification technology fails to advance as forecast, 400 megawatts of conventional coal-fired capacity may be needed as early as 2013. This would require preconstruction development to commence by mid-2006 so construction could begin, if needed, as early as 2009 for completion by 2013¹². To provide for this contingency, the Council will issue an assessment of the commercial progress of coal-gasification combined-cycle technology by 2006. If commercialization has not progressed as forecast in this plan, siting and permitting of 400 megawatts of conventional pulverized coal steam generation should begin in 2006.

ACTION GEN-7: ~~Permitting agencies and project~~ developers working with permitting agencies and other participants, should ~~prepare~~ develop and maintain an inventory of ready-to-develop projects (options) for possible future needs – The following inventory of project optionsBy 2009, a minimum of 400 megawatts of coal-fired capacity should be sited and permitted, with preliminary design complete, transmission requirements identified, and otherwise ready to construct as needed. This inventory is in addition to the renewable generating capacity planned to be acquired with system benefit charge funds. ~~consistent with the possible need to postpone construction until needed.~~

- 100 megawatts of wind power capacity by early 2010
- 700 megawatts of wind power capacity by early 2011
- 700 megawatts of wind power capacity by early 2012
- 425 megawatts of coal gasification power plant capacity by early 2012

ACTION GEN-7A: The Council will issue an assessment of the commercial progress of coal gasification combined-cycle technology by 2006. If commercialization has not progressed as forecast in this plan, siting and permitting of 400 megawatts of conventional coal steam generation should begin by mid-2006, in lieu of the 425 megawatts of coal-gasification combined-cycle capacity called for in Action GEN-7. The 400-megawatt option for conventional coal-fired generating capacity should be complete by early 2009.

Resolve uncertainties associated with large-scale wind development

The plan foresees the construction of up to 5,000 megawatts of wind capacity in the Northwest over the next 20 years in addition to expected acquisitions supported by system benefit charges. ~~Wind plays this major role for several reasons: the probability of more aggressive policies to~~

¹² Preconstruction activities for a conventional coal-fired power plant are estimated to require 36 months. Construction is estimated to require 42 months if immediately following completion of preconstruction activities.

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~~reduce carbon dioxide production; an abundant quality resource; expectations of continued wind plant cost reduction and performance improvements; relatively low integration costs; and the timely availability of electrical transmission service at promising wind resource areas.~~

Uncertainties associated with these assumptions on which this estimate is based must be resolved to confirm the potential role and facilitate future large-scale development of wind power when needed.

The intermittent output of wind projects must be shaped to service utility loads. In the Northwest, the most economical shaping resource is the energy storage capability of the hydropower system. Preliminary studies indicate that several thousand megawatts of wind capacity can be economically shaped, largely using the federal and non-federal hydropower system. Though these studies have not suggested that other operations of the hydropower system, including fisheries operations, would be impaired by wind shaping operations, conclusive studies to this effect have not been undertaken. Specific studies of the possible effects of shaping large amounts of wind power on other functions of the hydropower system are needed.

ACTION GEN-8: Utilities, developers, Bonneville, and entities administering resource development incentives should confirm cost-effective large-scale wind power development capability -- An effective way to resolve the uncertainties regarding large-scale development of wind generation is to develop commercial-scale pilot wind power projects at promising wind resource areas. While ~~not necessarily cost-effective when somewhat expensive~~ if developed in advance of need, actual projects appear to be a more certain approach to resolving these uncertainties than work in the abstract as recommended in earlier plans. Construction, ~~on average, of one commercial-scale project per year, on average, over the course of five years with a minimum of 500 megawatts of capacity could, if located at diverse geographic areas, of one commercial-scale project per year over the course of five years could~~ confirm up to five promising resource areas, and provide information needed to help resolve the ~~principal~~ uncertainties associated with subsequent large-scale development of the resource. ~~A viable commercial-scale project is about 50 to 100 megawatts in capacity.~~ Projects developed through the efforts of system benefit charge administrators and by utilities planning the near-term acquisition of wind power should be sufficient to achieve this objective. Accomplishing this will require that project selection, development, and operation be designed to support the objectives of this action. Data required to assess ~~issues such as~~ the cost of integration and the benefits of geographic diversity must be available to researchers.

When developing the first project at an undeveloped promising wind resource area, the acquiring entity (utilities, Bonneville, or system benefit charge administrators), working with the project developer, should seek to: (1) Assess the development potential of the resource area as a whole, including the wind resource, environmental issues, and transmission and other infrastructure requirements; (2) Establish long-term wind monitoring capability where none exists for the site; (3) Monitor wind power cost and performance trends; (4) Assess the cost of firming and shaping, including the possible benefits of geographic diversity; (5) Improve the understanding of the capacity value of wind; (6) Secure the permits, to the extent feasible, for development of the ultimate potential of the resource area; and (7) Strengthen regional wind development infrastructure. ~~The Council will monitor and support these efforts.~~

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Action GEN-8A: The Council will develop a Wind Confirmation Plan -- Regional coordination will be needed to achieve these objectives. The Council, working with Bonneville, utilities, SBC administrators, applicable state agencies, the wind industry and other stakeholders will convene a forum to develop a strategic plan for accomplishing the objectives of Action GEN-8. The plan will include operational definitions of the objectives, approaches and schedules for achieving the objectives, roles and responsibilities, funding requirements and possible sources of funding, procedures for information exchange, follow-on coordination and monitoring requirements and such other agreements as may be needed to achieve these objectives in a timely manner. The strategic plan will be completed within one year of adoption of the Fifth Power Plan.

ACTION GEN-9: The Council will undertake an assessment of the effects of shaping wind power on other functions of the hydropower system – A better understanding of the possible effects on the hydropower system of shaping large amounts of wind capacity is essential to correctly valuing shaping services and to establishing possible operational limits on those services in order not to adversely affect other hydropower system operations. The Council will take the lead in devising and conducting an assessment of these effects. Bonneville, the Corps of Engineers, utilities having hydropower resources suitable for shaping wind energy and other stakeholders are encouraged to participate in this assessment.

ACTION GEN-910: Utilities and Bonneville should develop products for the firming and shaping of wind – A competitive slate of firming and shaping products will facilitate the timely and economic development of wind power. The Council encourages Bonneville, utilities, and others that have resources suitable for providing shaping and firming services to aggressively develop and market these products.

Encourage use of state-of-the-art generating technology when siting and permitting projects

The five-year period of the action plan will see continued advance in generating technologies. Within the past year, for example, construction has begun in the Northwest on a gas-fired combined-cycle power plant incorporating advanced gas turbine technology (Port Westward). During the same period, industry developments have propelled coal gasification combined-cycle power plants to the point of commercialization. Advanced technologies will offer improved efficiency, economics and environmental characteristics likely to provide a reduction in system cost and risk worth the possible cost and uncertainty associated with early adoption. Under the power plan, construction of new bulk generating capacity is unlikely to commence prior to 2010. During the interim, advanced generating technologies offering improved cost and performance characteristics are expected to become commercially available. Examples are expected to include coal gasification combined cycle power plants and advanced gas turbines. These technologies may provide a reduction in system cost and risk worth the possible cost and uncertainty associated with their use.

ACTION GEN-1011: Project developers, federal, state and local permitting agencies, utilities with the support of their commissions, architect-engineering firms, and financing entities should seek the use of state-of-the-art generating technology for new power plant construction –Project developers, state and local permitting agencies, utilities, commissions, architect-engineering firms, and financing agencies are encouraged to routinely consider state-of-the-art generating technologies for new power plant construction. The costs and benefits of these technologies should be evaluated using state-of-the-art risk analysis techniques.

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Plan for needed transmission

Transmission planning and construction can be the longest lead-time item in power plant development. Efforts should continue to identify the transmission requirements to connect load to areas of likely power plant development, and to undertake preliminary planning.

ACTION TX--1: ~~The Council will work with Bonneville, and other transmission providers, permitting agencies, and project developers should to plan for long-distance transmission needs to support the resource development called for in the power plan --~~ The Council ~~supports the current efforts of will work with~~ the Northwest Transmission Assessment Committee (NTAC) ~~and similar organizations to improve the integration of resource and transmission planning. This will include the incorporation of the results of transmission planning assessments into the Council's power plan. undertake such planning. This should be a priority function for any regional transmission entity that may be formed. Transmission planning should specifically address the needs of wind and other location-bound resource development.~~

Improve utilization of available transmission capacity

Some regional transmission paths are physically underutilized although they have little available contractual transmission capacity. The result is an inefficient use of transmission that can be an impediment to developing needed resources. Bonneville has undertaken some efforts to improve the utilization of transmission capacity within its control area. This effort, while helpful, is necessarily limited by the fact that it cannot encompass the larger Northwest grid, and by the existing scheduling rules for transactions that cross control area boundaries. Dealing with this problem across the wider regional grid should be a priority for any regional transmission operator that may be formed.

ACTION TX--2: Bonneville and other transmission providers should work to improve utilization of available transmission capacity -- Dealing with this problem across the wider regional grid should be a priority for any regional transmission entity that may be formed. Should this effort fail, transmission providers and control areas should work cooperatively to improve utilization of transmission capacity across the regional grid. This should be completed by 2007. A useful but limited first step could be broader participation in WestTTrans. This OASIS site provides a broader mechanism for facilitating a secondary market in transmission capacity than do single provider OASIS sites. WestTTrans could begin to address the discrepancy between physical capacity and contract path limitations by developing a common ATC calculation. Bonneville and other Northwest transmission owners should participate in this initiative.

Develop cost-effective generating resources when needed

Construction of new bulk electrical generating resources may be needed on a regionwide basis as early as 2010. Individual situations may require individual utilities to acquire new generation prior to this time. When new resources are needed, the Council encourages utilities to consider all available options, and to consider the effects risk and uncertainty have on a resource's cost-effectiveness using the best available analytical techniques.

ACTION GEN-121: Utilities, with the support of their commissions, should acquire the best available generating resources when needed – Utilities, when seeking additional

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generation, should ensure that non-generation alternatives, of equal or lesser cost, are available to meet their needs; that all feasible options are considered; that alternatives are evaluated using state-of-the-art methods of assessing costs and benefits; and that all significant risks and uncertainties are considered over the anticipated life of the project. Other considerations equal, the generating resource priorities of the Northwest Power Act should apply.

CONFIRM THE AVAILABILITY AND COST OF ~~ADDITIONAL-NEW~~ RESOURCES WITH COST AND RISK MITIGATION BENEFITS

Coal Gasification Power Generation with Carbon Sequestration

Coal gasification power generation offers the opportunity for improving the economic and environmental aspects of generating electricity from coal, an abundant and low-cost energy resource readily available to the region. Recent developments, including announced plans for several commercial coal gasification combined-cycle projects and industry actions enabling provision of whole-plant design, construction and warranties indicate that coal gasification power generation technology is entering the early-commercial stage. Though the technology will undoubtedly improve over the coming years, coal-gasification combined-cycle power generation appears to be available with respect to the power plan and is included in the recommended resource portfolio.

Coal gasification technology also offers the potential for economic separation of carbon for geologic or ocean sequestration. If perfected, this would help resolve the fundamental conflict between reduction of greenhouse gas production and continued reliance on coal as a primary energy resource. Though non-power generating coal gasification plants with separation, pipeline transportation and injection of carbon dioxide have successfully operated¹³, long-term reliable operation of coal gasification power plants with carbon separation has not been demonstrated. A key issue is reliable long-term operation of a utility-scale gas turbine combined-cycle plants on the high-hydrogen content synthetic fuel produced by a coal gasification plant equipped with carbon separation. Limited short-term testing has confirmed that F-class gas turbines can operate on 100 percent hydrogen fuel. However, long-term reliable operation of gas turbines on pure hydrogen will require resolution of problems including hydrogen embrittlement, flashback, hot section material degradation and NOx control.

A second issue for the Northwest is confirmation of the carbon sequestration potential of promising geologic formations. The most promising are deep saline aquifers and unmineable coal seams underlying much of eastern Montana. In addition, deep ocean disposal and mineral trapping in the basalt formations that underlie much of eastern Washington and Oregon and southern Idaho have been proposed as possible candidates for carbon dioxide sequestration.

The coal gasification power plant called for in Action GEN-7 provides the opportunity to further develop coal gasification power generation technology and the technology of carbon separation and sequestration. The feasibility of augmenting the proposed coal gasification power plant with technology demonstration features without compromising the underlying power generation mission of the plant should be investigated.

¹³ The Great Plains Synfuels Plant in Beulah, North Dakota.

ACTION GEN-13: The Council, the states, Bonneville, utilities and other interested organizations should investigate the feasibility of developing the proposed coal-gasification combined-cycle power plant of Action GEN-7 with advanced coal gasification technology demonstration capability including carbon separation and sequestration. The objectives of the project could include demonstration of extended gasifier operation on the full variety of regional coals and lignites, testing of gas turbine operation on high hydrogen fuels, testing and confirmation of bulk carbon sequestration in suitable regional geologic formations and testing of equipment and process improvements designed to improve the economics of gasification, carbon separation, transport and injection, co-product production or other aspects of coal gasification power plants. Demonstration activities could not compromise the basic power production mission of the plant. The availability of federal or other supplementary funding to help cover the cost of the additional investment associated with the demonstration role of the project, or to justify advancing the timing of the Action GEN-7 development should be investigated.

ACTION GEN-14: In coordination with Action GEN-13, the Council, states, and utilities should support and monitor efforts to develop carbon sequestration technology appropriate for Northwest application – Efforts such as the Northern Rockies and Great Plains Regional Carbon Sequestration Partnership, led by Montana State University, charged with identifying and cataloging promising geologic and terrestrial storage sites and helping define carbon-sequestration strategies should be monitored and supported.

Oil Sands Cogeneration

The oil sands of Northern Alberta contain the largest petroleum deposits outside the Middle East. The resource is in the form of highly viscous bitumen. Large quantities of steam are required to recover the bitumen, which is then processed into a synthetic crude oil. The steam can be produced using gas-fired boilers. However, it is more efficient to produce the steam with cogeneration of electricity. Though several hundred megawatts of cogeneration capacity is operating in the oil sands region, additional cogeneration development is constrained by the ability to transmit electricity from the oil sands region to electrical load centers. A proposed 2,000 megawatt DC transmission line from the oil sands areas in Alberta to Celilo would open the oil sands region to additional cogeneration development and provide a new generating resource option to the Northwest. Preliminary cost estimates suggest that this resource, which could be available about 2011, is competitive with new natural gas combined-cycle and coal-fired power plants located within the Northwest. Moreover, the high thermal efficiency of cogeneration somewhat insulates these plants from gas price uncertainties and the possible impacts of climate control policy. Furthermore, it is possible to fuel the cogeneration plants with synthetic gas produced by gasification of byproducts of the bitumen refining process.

ACTION GEN-152: Bonneville and other regional transmission providers should support efforts to refine the design and cost estimates for a transmission intertie from the oil sands region to the Northwest -- Efforts are currently under way to refine the design and cost estimates for a transmission intertie from the oil sands region to the Northwest. The intertie

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would provide a potentially attractive resource opportunity to the Northwest, and possibly strengthen the Northwest transmission grid. Though the initiative is private, the potential benefits of the proposal warrant the cooperation of Bonneville and other Northwest transmission providers and potential participants in providing constructive review of the proposal.

Coal Gasification

Coal gasification power generation offers the opportunity for improving the economic and environmental aspects of electricity from coal, an abundant and low-cost energy resource readily available to the region. Gasification technology can also provide the opportunity for economic separation of carbon dioxide for geologic sequestration. Though demonstration coal gasification power plants are successfully operating, initial startups have been lengthy and fraught with reliability problems. Overall, plant performance warranties have been lacking, precluding financing. Also, experience with Western sub-bituminous coals is limited. Recent developments, including acquisition of rights to the Chevron-Texaco gasification process by General Electric and the announcement by AEP of its intent to construct one or more 1,000-megawatt coal gasification power plants, indicate that the technology is approaching commercialization. While resolution of the remaining barriers to the commercialization of coal gasification power generation technology are national in scope, the region should be supportive of federal and other efforts to commercialize coal gasification power generation.

~~**ACTION GEN-13: The Council, states, and utilities should monitor and support efforts to commercialize coal gasification power generation.**~~

Carbon Sequestration

Geologic sequestration of carbon dioxide may offer a means of reducing carbon dioxide release to the atmosphere while enhancing the ability to use coal and other fossil resources for power generation. However, suitable geologic sites need to be identified and tested. Geologic formations potentially suitable for carbon dioxide sequestration are found in eastern Montana and southern Idaho.

~~**ACTION GEN-14: The Council, states, and utilities should support and monitor efforts to develop carbon sequestration technology appropriate for Northwest application—**~~Efforts such as the Northern Rockies and Great Plains Regional Carbon Sequestration Partnership, led by Montana State University, charged with identifying and cataloging promising geologic and terrestrial storage sites and helping define carbon sequestration strategies should be supported.

Energy Storage Technologies

Emerging energy storage technologies such as regenerative fuel cells offer potential to firm and shape solar and wind generation and to support peak period demand.

ACTION GEN-16⁵: Bonneville, the Council, states, and utilities should support and monitor efforts to perfect energy storage technologies with Northwest application potential. Storage systems should be evaluated based on potential for demand and energy charge reductions and for shaping the output of wind and other intermittent resources, as well as distribution system voltage capabilities and transmission voltage applications based on ancillary service tariffs.

Demonstration of Renewable and High Efficiency Generation with Northwest Potential

Routine commercial financing of new technologies and applications requires the successful development, construction, and operation of commercial-scale demonstration projects. Commercial demonstration of promising resource and technology applications with potentially cost-effective Northwest application would confirm their viability in the region. These could include various niche biomass energy recovery, forest residue energy recovery, industrial and commercial cogeneration, wave energy conversion, cogeneration, and photovoltaic applications. Successful completion of these projects will assist engineering, permitting, and financing of subsequent development.

ACTION GEN-1617: Utilities, with the support of their regulatory commissions, states, system benefit charge ~~admisistrators~~administrators, equipment vendors, and project developers should support demonstration of standardized renewable energy and cogeneration applications with extended near-term Northwest potential.

ESTABLISH THE POLICY FRAMEWORK TO ENSURE THE ABILITY TO DEVELOP NEEDED RESOURCES

Resource Adequacy

One of the most important policy issues facing the region is resource adequacy. One of the factors behind the Western electricity crisis of 2000-2001 was resource inadequacy. The Council's analysis suggests there are two kinds of resource adequacy. Physical adequacy means having sufficient resources to prevent the involuntary loss of load. However, economic adequacy is a higher standard that requires sufficient resources to reduce the risk of exposure to unacceptably high power prices. The region needs to address both. If Bonneville's role in meeting the region's load growth is reduced, additional entities that have not had direct responsibility for assuring adequate resources will play an important role. This is not merely a regional issue, because the Northwest is part of an interconnected Western system. This means the region must work with other interests in the West to develop a system that will assure adequacy; recognize the legitimate differences within the West; and ensure that all responsible entities bear their share of the responsibility. The region has some time to address these issues, but we must make sure that time is not wasted. To assure adequacy the region needs to:

ACTION ADQ-1: Establish regional and West-wide reporting standards for the assessment of adequacy – It is essential that there be accurate, consistent, and transparent information by which the adequacy of the power supply can be judged. The Council will continue to work with such entities as the Northwest Power Pool (NWPP), the Western Electricity Coordinating Council (WECC), and the Committee on Regional Electric Power Cooperation to establish the necessary measures of resource adequacy and reporting standards. ~~no later than July of 2005.~~

ACTION ADQ-2: Carry out a process to establish ~~voluntary~~ adequacy ~~targets-standards~~ – The Council will establish a Northwest Resource Adequacy Forum. This forum will examine alternative adequacy metrics and standards for the Northwest and how they would

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“mesh” with west-wide standards being developed by the WECC and others. The forum should consist of utility policy makers, regulatory commission representatives and other relevant parties who will help to develop standards and support their implementation. A technical subgroup of this forum will have the function of providing policy makers viable options for both metrics and standards for the Northwest. The objective would be to reach agreement on appropriate adequacy metrics and standards by the end of 2005. In addition, the Council will continue to work through the WECC and other forums toward west-wide adequacy metrics and standards.

~~Mandatory adequacy standards could be established if the North American Electric Reliability Council is given the necessary authority. However, it is far from certain that will happen. More immediately, the Council will work with such entities as the NWPP, the WECC, and the Committee on Regional Electric Power Cooperation to establish voluntary adequacy targets and reporting requirements. These targets must be appropriate for the Northwest and sub-regions within the Northwest, and compatible with targets or standards established elsewhere in the Western Interconnection. This should be accomplished no later than January of 2006.~~

ACTION ADQ-3: Improve consideration of risk in integrated resource planning – Ensuring adequacy will be an easier proposition if load serving entities adequately account for risk in their integrated resource plans. The Council will convene workshops on treatment of risk in integrated resource planning during 2005. State and local regulatory entities should require an accounting of risk in the integrated resource plans they oversee. States should consider legislation to require that all utilities that are responsible for developing their own resource portfolios write integrated resource plans on a periodic basis.

Transmission

A key element of the regional power system is transmission. If the power supplies that are recommended in this power plan are to be realized, additional requirements will be placed on the transmission system. The region’s power system is not currently organized to plan, expand, operate, and manage the regional transmission system as effectively and efficiently as necessary. There has been growing recognition of problems such as:

- Difficulty in managing unscheduled electricity flows over transmission lines leading to increased risks to electric system reliability;
- Lack of clear responsibility and incentives for planning and implementing transmission system expansion, resulting in inadequate transmission capacity;
- Inadequate consideration of non-construction alternatives to transmission;¹⁴
- Inability to effectively monitor the wholesale electricity market, identify market power abuse, or provide mitigation and accountability;
- Difficulty in reconciling available physical transmission capacity with capacity available on a contractual basis, resulting in the inefficient use of existing transmission and generation capacity, and limitations on access for new resources to the existing grid;
- Transaction and rate pancaking, i.e., contracting and paying for the fixed costs of multiple transmission segments on a volumetric basis to complete a power sale, resulting in inefficient utilization of generation; and

¹⁴ Non-construction alternatives involve consideration of demand management, conservation, distributed generation, and so on to relieve transmission bottlenecks and defer construction of transmission upgrades.

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- Competitive advantage of control area operators over competing generation owners resulting in the inefficient use of generation, and a potential proliferation of control areas with greater operational complexity.

In response, there has been a “bottoms-up” regional effort through the Regional Representatives Group (RRG) of Grid West (Formerly RTO West) to address these problems in a more comprehensive, yet incremental, Northwest grid-wide approach. In addition to the actions already identified regarding better utilization of existing transmission capacity and planning for transmission enhancements, the following actions should be pursued:

ACTION TX-3: It should be a high priority for regional interests to work through the Grid West RRG process to address emerging transmission issues ~~within the next two years~~ – While success is not assured, the RRG’s regional proposal offers a framework for addressing these problems. However, the Council is concerned that the time to address these issues is growing short. The RRG/Grid West process has important decision milestones ~~in the next several months. If any of these decisions are negative the Grid West process fails at any of these decision points, the Council is committed to working with the region in seeking alternative means of resolving regional transmission issues. If the interests are unable to come to agreement within the RRG framework, workable alternatives should be developed.~~

ACTION TX-4: Bonneville and other transmission providers should expand efforts to identify and implement non-construction alternatives to transmission expansion – The Bonneville Power Administration has been carrying out an innovative effort to identify and implement non-construction alternatives to transmission expansion with positive results. This effort should be incorporated as a basic element of transmission planning.

Fish and Power

The Columbia River Basin hydroelectric system is a limited resource that is unable to completely satisfy the demands of all users under all circumstances. Conflicts often arise that require policy decisions to allocate portions of this resource as equitably as possible. In particular, measures developed to aid fish and wildlife survival often diminish the generating capability of the hydroelectric system. Conversely, “optimizing”¹⁵ the operation of the system to enhance power production can have detrimental effects on fish survival.

Fish and power are inextricably linked in the Northwest. Ensuring the adequacy of resources for the power system minimizes not only the risk of electrical shortages and high prices but also minimizes the risk of emergency interruptions to fish operations. Similarly, designing fish and wildlife measures to be as cost-effective as possible can reduce the impact on the power system and the region’s consumers. The Council intends that its decisions about program expenditures are made carefully and that the projects that implement the program are efficient and scientifically credible.

For the region to achieve both an adequate, efficient, economical and reliable power supply, and healthy populations of fish and wildlife, it is important to coordinate planning and decision-

¹⁵ “Optimizing” here means that energy production is maximized, limited by other than fish and wildlife constraints, such as flood control, irrigation, navigation, etc.

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making for both power production and fish and wildlife. Outside of the Council, however, no clear process exists for integrated long-term planning for both fish and power.

ACTION F&W-1: The Council will work with the federal agencies, the states, tribes, and others to broaden the focus of the forums created to address issues surrounding fish and wildlife operations, especially those related to long-term planning – The forums should broaden their focus by including “expertise in both biological and power system issues,” and by directly addressing longer-term planning concerns, not just weekly and in-season issues. This Action is consistent with actions specified in the Council’s current Fish and Wildlife Program.¹⁶

Future Role of the Bonneville Power Administration in Power Supply

On at least two occasions over the last decade, the Bonneville Power Administration has found itself financially and, as a consequence, politically vulnerable. Bonneville’s financial vulnerability arises in part from its dependence on a highly variable hydroelectric base and the effects of a sometimes very volatile wholesale power market. Another source of vulnerability arises from the uncertainty created by the nature of the relationship between Bonneville and many of its customers, and how Bonneville has historically chosen to implement its obligations. These vulnerabilities are exacerbated by Bonneville’s high fixed costs for its debt on the Federal Columbia River Power System and the three nuclear plants that were undertaken, with Bonneville backing, by the Washington Public Power Supply System, now Energy Northwest.¹⁷ At times, these vulnerabilities can cause Bonneville to incur high costs that must be passed on to customers and ultimately to the region’s consumers. If those costs are not passed on to customers, Bonneville risks being unable to make its payments to the U.S. Treasury. Rate increases cause economic hardship in the region; not making a Treasury payment risks a political backlash from outside the region that could cause the Northwest to lose the long-term benefits of power from the federal system.

The Council and others in the region have been working to develop alternative ways in which Bonneville can meet the requirements of the Northwest Power Act with greater financial stability, while reducing the uncertainty surrounding responsibility for serving load growth and preserving the benefits of the federal system. The Council has recommended that Bonneville implement these changes through new long-term contracts to be offered by 2007. The key elements of those recommendations are the following:

ACTION BPA-1: Bonneville should sell electricity from the existing Federal Columbia River Power System to eligible customers at its cost. Customers that request more power than Bonneville can provide from the existing federal system would pay the additional cost of providing that service – This would clarify who would exercise responsibility for resource development; it would result in an equitable distribution of the costs of growth; it would provide clear signals of the cost of new resources, and it would prevent the value of the existing federal system from being diluted by the higher costs of new resources. This should be established in Bonneville policy and implemented through new long-term (preferably 20-year) contracts and

¹⁶ “Fish and Wildlife Program,” Northwest Power Planning Council, Council Document 2000-19, pp.28, and “Mainstem Amendments to the Columbia River Basin Fish and Wildlife Program,” Northwest Power Planning Council, Council Document 2003-11, pp.28-29.

¹⁷ Of the three plants, only one, Columbia Generating Station, is operating. The other two were terminated before construction was complete. However, Bonneville still has responsibility for paying off the debt incurred during construction.

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compatible rate structures. This should be accomplished well in advance of the expiration of the current contracts in 2011.

ACTION BPA-2: Bonneville and the region's utilities should work to resolve the issue of benefits for the residential and small-farm customers of investor-owned utilities (IOUs) for a significant period – The necessary characteristics of a settlement can be defined. A settlement must be equitable to all participants, it must provide certainty, it must be transparent, and it must not be subject to manipulation. This must be accomplished in time to support the offering of new contracts in 2007.

ACTION BPA-3: Bonneville and the region's utilities should continue to acquire the cost-effective conservation and renewable resources identified in the Council's power plans -- Bonneville should employ mechanisms similar to the current Conservation and Renewables Discount (C&RD) program and provide essential support activities to encourage and facilitate utility action. Bonneville's role will be substantially reduced to the extent that customers can meet these objectives. But if necessary, Bonneville must be prepared to use the full extent of its authorities to ensure that the cost-effective conservation and renewables identified in the Council's power plan is achieved on all its customers' loads. provide a backstop mechanism to ensure that the conservation objectives are met.

ACTION BPA-4: Bonneville should continue to fulfill its obligations for fish and wildlife -- Those obligations will be determined in a manner consistent with the requirements of the Northwest Power Act and the Council's Columbia River Basin Fish and Wildlife Program, and are not affected by the recommended changes in Bonneville's role.

ACTION BPA-5: Bonneville should develop a policy to implement long-term contracts and compatible rate structures, and should include the process and time schedule for resolving the issues in the Council's recommendations on the *Future Role of the Bonneville Power Administration in Regional Power Supply*, Council Document 2004-5-- Bonneville policy must be responsive to concerns among customer utilities that the scope of the policy will include sufficient process detail to guide utility decisions in long-term resource planning; to include provisions by which Bonneville intends to extend assurances of contract durability and enforcement in areas such as Bonneville cost control, dispute resolution, continuation of Bonneville's role in conservation and renewable resource acquisition, allocation of the existing federal power system, and fish and wildlife mitigation.

ACTION BPA-6: Bonneville should consider alternative policy processes, if necessary -- Should activities undertaken in response to future Bonneville policy prove inadequate to meet the schedule established for resolution of regional issues leading to the development, offering, and acceptance of new contracts by October 2007, then alternative means of resolving outstanding issues should be considered. Before considering legislation as an alternative, the Council recommends that Bonneville and the Council work jointly to determine if substantive rulemaking under the Federal Administrative Procedure Act can be a vehicle for issue resolution.

MONITOR "KEY INDICATORS" THAT COULD SIGNAL CHANGES IN PLANS

Load-Resource Situation

The power plan performs well for the majority of the futures examined. However, were the region to sustain high rates of load growth near upper extremes of the forecast growth rates

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during the first several years of the planning period, or should there be a significant loss of resources, the recommended plan could incur high costs unless adaptations are made to changing conditions. Obviously, it will be necessary to track loads and resources closely, along with market conditions, to ensure an adequate system and to accelerate development plans, if necessary. The status of independent power producers in the region should be monitored for any indications the availability of IPP generation to the region may be reduced.

ACTION MON-1: The Council will monitor and periodically report on the regional load-resource situation and indicate whether there is a need to accelerate or slow resource development activities.

~~Pace of Conservation Development~~not developed at recommended pace

The plan includes significant development of conservation at an average rate for 140 average megawatts per year during the next five years. While the region has developed conservation at this rate at some times during the past, the rate of acquisition has frequently sometimes been much less – as little as 50 average megawatts. If conservation were to be developed at this rate, the average cost to the region over the planning period could be almost \$2.5 billion more and the risk \$32.5 billion greater (2004\$). These cost and risk increases are the result of two factors: the need to accelerate the development of more expensive generation, and the exposure of additional load to periods of higher market prices for electricity.

The region could also fall short of the plans conservation goals if the conservation proves to be less available or more expensive than estimated in this plan. In either event,

New generating capacity may be needed earlier if conservation goals are not met. Sensitivity analyses of rates of conservation acquisition less than recommended led to the need for 100 megawatts of wind in early 2009, followed by an additional 100 megawatts in 2010, and 800 megawatts in 2012, in addition to the coal capacity of the base case. (numbers to be revised)

ACTION MON-2: The Council will monitor regional conservation development -- If conservation is not being developed at the recommended levels, efforts should be made to accelerate conservation development. If that cannot be achieved, actions will need to be taken to secure substitute generating resources. The Council will monitor the performance and effectiveness of the conservation measures recommended in the plan and implemented in programs developed throughout the region. The Council will also monitor the emergence of cost-effective measures not identified in this plan. Programmatic conservation activities may need to be modified as a result this monitoring activity.

~~Wind power unavailable at estimated cost or quantity~~Wind Power Cost and Availability

The power plan anticipates development of large amounts of wind capacity. Though current regional wind projects have been successful, uncertainties remain with respect to the ability to develop the much larger amounts of wind the Council recommends. A key recommendation of this plan is the resolution of these uncertainties. If the future cost of wind power is greater, or the availability less than assumed for the plan, other resources may have to be substituted. A

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sensitivity analysis in which wind power costs did not decline as assumed, did not change the plan. However, the cost and risk of the plan increased. If wind costs do not decline, resource choices should be reevaluated with updated information.

ACTION MON-3: The Council will monitor efforts to resolve uncertainties associated with large-scale wind development -- If these efforts indicate that wind power is unlikely to be available at the cost and quantities of this plan, resource choices should be reevaluated using the updated information on the cost and performance of alternatives.

Commercialization of Coal Gasification Generation

Coal gasification generation plays a significant role in the plan. However, realizing that role depends in part on continued advancement of commercialization of that technology. If the projected advancement of commercialization does not occur, it may be necessary to switch to conventional coal generation in time to initiate construction as early as 2010.

ACTION MON-4: The Council will monitor the commercialization of coal gasification generation technology. The Council will issue an assessment of the commercial progress of coal gasification combined-cycle technology by 2006. If commercialization has not progressed as forecast in this plan, siting and permitting for 400 megawatts of conventional coal steam generation should begin by mid-2006

Climate change science and policy

Both coal-fired power plants and gas-fired combustion turbines are present in this power plan. However, in scenarios in which significant penalties on carbon dioxide emissions are implemented relatively early in the planning period, these resources are not developed. If this were to appear likely, the plan should be reconsidered. Conversely, if there are significant reductions in the costs of carbon offsets or improvements in efficiency and emissions characteristics of generation using carbon-based fuels, these technologies could play a larger role.

ACTION MON-45: The Council will monitor climate change science and policy -- If the uncertainty surrounding climate change science and policy is reduced, and with it the likelihood of future carbon emissions control requirements, the role of carbon-fueled generation will be re-examined. Similarly, if there are advances in high efficiency coal generation technology, carbon sequestration, or the availability and cost of carbon offsets, the role of carbon based fuel generation should be re-examined.

Demand response not available at level estimated

If demand response is not available, or is can not developed at the levels and costs estimated, the result will be a somewhat more costly and risky portfolio and could require that additional combined and/or single cycle generation be developed.

ACTION MON-56: The Council will monitor the development of the demand response resource.

Implementing the Power Plan: Sections 4(c)(9), 4(i) and 4(j) of the 1980 Northwest Power Act

The resource acquisitions of the Bonneville Power Administration are to be consistent with the Council's power plan. It is the responsibility of the Council to ensure that they are.

ACTION MON-67: The Administrator and other federal agencies, to the extent authorized by other provisions of law, shall furnish the Council all information requested by the Council as necessary for the performance of its functions, subject to such requirements of law concerning trade secrets and proprietary data as may be applicable -- The Council intends to be vigorous in its review and tracking of Bonneville's actions to ensure they are consistent with the power plan. The Council assumes this responsibility under provisions of the Northwest Power Act, with full recognition of the need for reciprocal cooperation between Bonneville and the Council.

Biennial Monitoring Report

It is the intent of the Council that the plan be a flexible and living document. One use of the Council's plan is as a source of information regarding current and projected loads, resources and resource characteristics, fuel prices and so on. To ensure that this information is timely, it should be reviewed at least biennially and updated as necessary. If changes in these parameters or other factors are, in the Council's judgment, sufficient to require revisions in the power plan, the Council should initiate a revision.

ACTION MON-8: The Council will prepare a biennial monitoring report, to be published every other December beginning in 2006. The data in the monitoring report will be considered the Council's current official data. The report will include a determination by the Council as to whether the data or other factors merit a revision of the power and, if so, a declaration by the Council initiating a revision.

Review of Bonneville and Council policy regarding Section 6(c) of the Northwest Power Act

In 1986, Bonneville and the Council undertook a joint policy-making exercise to develop their respective policies for implementing Section 6(c) of the Northwest Power Act. Section 6(c) calls on Bonneville to review a variety of actions associated with the acquisition of major resources, as defined by the Act, for consistency with the Council's power plan. The same section also gives the Council the option of reviewing such a Bonneville proposal. If either agency finds the proposal inconsistent with the power plan, Bonneville must get express authorization from Congress to proceed with the proposed action. In 1993, the two agencies enlarged their respective policies to cover all the actions related to the acquisition of a major resource set forth in the Act. Bonneville and the Council are also committed to reviewing their respective policies at least every five years. That review has not been undertaken over the years. The Council believes that in light of changes in the utility industry--and in how Bonneville now acquires additional resources, and may be expected to acquire resources in the future--it is time to re-examine the agencies' respective policies.

ACTION MON-79: The Council calls on Bonneville to enter into a joint policy-making exercise to review the agencies' respective policies for implementing Section 6(c) of the Act.

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This should be accomplished in a time frame consistent with Bonneville's offering of new power sales contracts.

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