Northwest Power and Conservation Council

Friday, September 2, 2005

MEMORANDUM

TO: Council Members

FROM: Charlie Grist

SUBJECT: Avista Integrated Resource Plan

ACTION: This is an information item. No Council action is required.

Clint Kalich, Manager of Resource Planning and Power Supply Analyses for Avista Corporation, will brief the Council on Avista's recently filed Integrated Resource Plan. The executive summary of Avista's plan is attached. The full plan is available at Avista's web site: http://www.avistautilities.com/resources/plans/documents/Avista_2005_IRP_Final.pdf

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EXECUTIVE SUMMARY

The Company's 2005 Integrated Resource Plan (IRP) identifies a strategic resource portfolio that meets future load requirements, promotes environmental stewardship and satisfies regulatory obligations. A series of robust analyses are used to evaluate resource options based on expected value and levels of market volatility over the next 20 years. These analyses assist in comparing resource portfolio options, guiding the Company in the selection of a Preferred Resource Strategy (PRS). The PRS provides a balance between the objectives of low cost, reliable service and reasonable future rate volatility.

Avista's management and stakeholders in the Technical Advisory Committee (TAC) play a key role and have a significant impact in guiding the plan to its final conclusions. TAC members include customers, commission staff, consumer advocates, academics, utility peers, government agencies and other interested parties. The TAC provides important input on modeling, planning assumptions and the general direction of the planning process.

The Company has made significant progress in resource acquisitions since the last IRP. The Company demonstrated the need to acquire 75 megawatts (MW) of wind and 140 MW of combined-cycle combustion turbine generation in the 2003

Section Highlights

- Avista has added 35 MW of wind generation, 140 MW of gas-fired generation and 8 MW of conservation to its portfolio since the 2003 IRP.
- Energy and capacity deficits begin in 2010 and 2009, respectively, growing to 640 aMW and 901 MW by the end of the study in 2026.
- Electricity sales are forecast to grow 2.1 percent annually through 2026.
- Avista uses AURORA^{XMP} to model the entire Western Interconnect; market conditions outside the Northwest affect Mid-Columbia market prices.
- Conservation acquisition is 50 percent higher than in the 2003 IRP.
- Acquiring additional transmission is critical to Company plans.
- The PRS strikes a reasonable balance between keeping average costs and variation in year-to-year costs low.
- The 2016 PRS includes 400 MW of wind, 250 MW of coal, 80 MW of biomass, 52 MW of plant upgrades and 69 MW of conservation.
- Over half of future energy needs are met with renewables, plant upgrades and conservation.

IRP. Avista contracted with PPM Energy for 35 MW of wind capacity from the Stateline project in 2004. Upgrades were completed at Cabinet Gorge Unit 2 in 2004, bringing seven MW of new capacity and three average megawatts (aMW) of energy. The Company also reacquired the second half of the natural gas-fired Coyote Springs 2 plant from Mirant Corporation in January 2005.

Incremental upgrades to existing resources are forecast in this plan to provide additional energy and capacity at costs lower than acquiring new generation assets. The Company's upgrade plans for the Clark Fork River project forecasts 45 MW of capacity gains by 2012. Planned upgrades to Colstrip Units 3 and 4 in 2006 and 2007 will boost Avista's output share by 8 MW.

Resource Needs

Recent resource purchases, plant upgrades and conservation acquisition are inadequate to meet all future load growth. Annual energy deficits begin in 2010, with loads exceeding resource capability by 40 aMW. Energy deficits rise to 360 aMW in 2016 and 640 aMW in 2026. The Company will be short 5 MW of capacity in 2009. In 2016 and 2026 capacity deficits rise to 508 MW and 901 MW, respectively. Table 1 presents Company positions between 2007 and 2026.

Increasing deficits are a result of forecasted 2.1 percent annual average load growth and expirations of some long-term contracts. Figure 1 provides a graphical synopsis of the Company's load and resource balances over the next 20 years.

Modeling and Results

The Company used a multi-step approach to develop its Preferred Resource Strategy. The process began by identifying potential new resources to serve future demand across the West. A Western Interconnect-wide study was performed to understand the impact of regional markets on Avista. We believe that the additional efforts to develop this study were necessary given the significant impact other western regions can have on the Northwest electricity marketplace. Existing resources were combined with the present transmission grid to simulate hourly operations for the Western Interconnect from 2007 to 2026.

Table 1: Net Position Forecast

Year	Energy Position (aMW)	Capacity Position (MW)	Year	Energy Position (aMW)	Capacity Position (MW)
2007	82	118	2011	-157	-256
2008	50	71	2016	-360	-508
2009	12	-5	2021	-491	-673
2010	-40	-75	2026	-640	-901

Cost-effective new resources and transmission were added as necessary to meet growing loads. Monte Carlo-style analysis varied hydro, wind, load and gas price data over 200 iterations of potential future conditions. The simulation results were used to estimate the Mid-Columbia electric market. The iterations collectively formed the Base Case for this IRP.

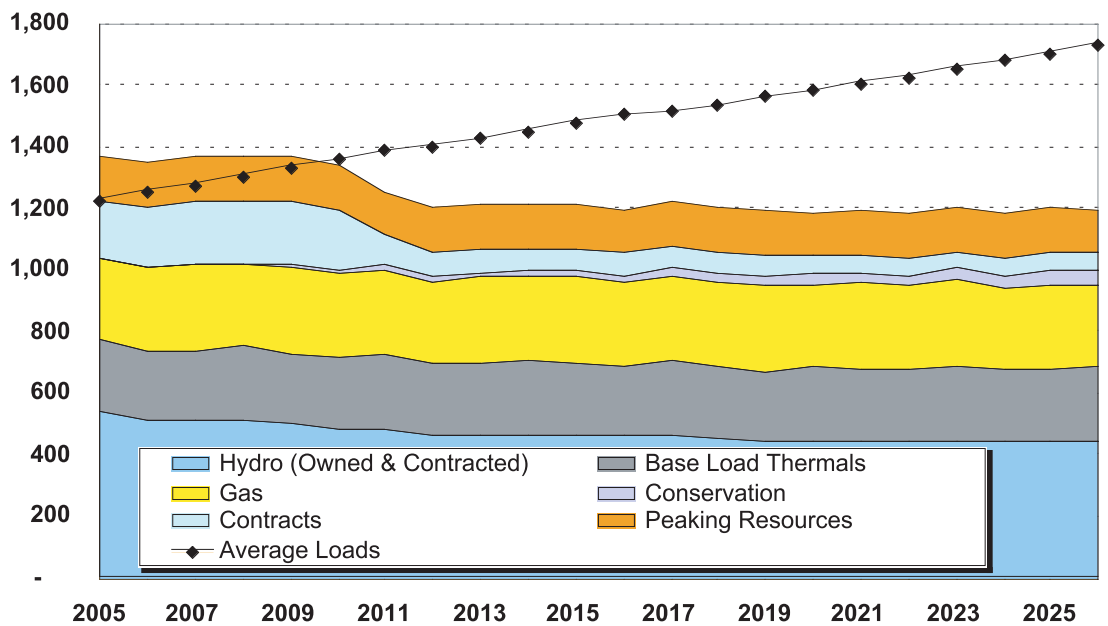
Estimated market prices were used to analyze potential conservation initiatives and available supply-side resources to meet forecasted Company requirements. Each new resource option was valued against the Mid-Columbia market to identify the future value of each asset to the Company, as well as its inherent risk (e.g., year-to-year volatility). Future market values and risk were compared with the capital and fixed operation and maintenance (O&M) costs that would be incurred.

The Company's Linear Programming model then assisted in selecting the PRS for serving future load. The selection of the PRS was based on forecasted energy and capacity needs, resource values and limiting power supply expense variability.

Futures and scenarios were used to identify performance of the PRS under conditions beyond the Base Case. Futures are stochastic studies using a Monte Carlo approach to quantitatively assess risk around an expected mean outcome.[1] This time-intensive and multi-variable approach is the most robust method used for risk assessment. Two futures were modeled for the 2005 IRP: the Base Case, and a High Gas Volatility case with increased natural gas price variability.

1 Stochastic studies use a statistical approach using probability distributions (i.e., means and standard deviations) to forecast variables into the future.

Figure 1: Load Resource Balance–Energy (aMW)

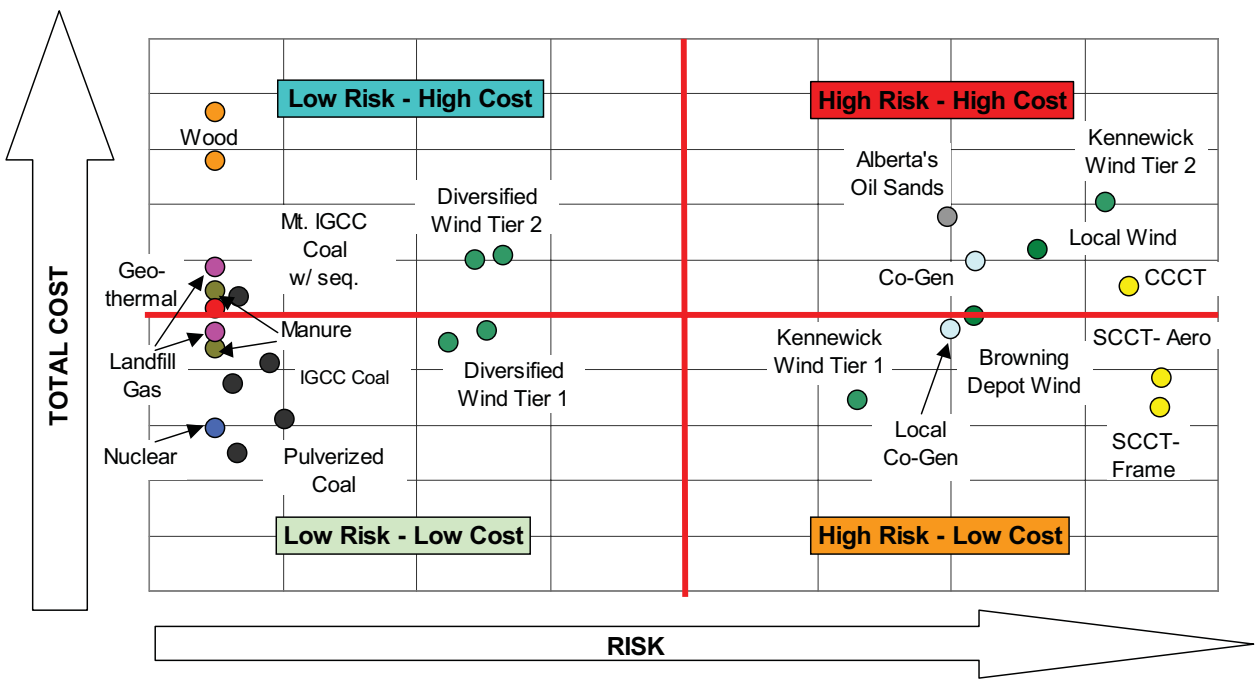


A scenario is a deterministic study that changes one significant underlying assumption to assess the impact of that change. Scenario results are easier to understand and require less analytical effort than futures, but they do not quantitatively assess the variability or risk around the expected outcome. Eighteen scenarios were modeled for the 2005 IRP, including high and low natural gas prices, carbon emission taxes and the loss of major hydroelectric generation projects.

This IRP values potential resource options by considering their costs, defined as expected incremental power supply expenses.[2] Financial risk—variability measured as the standard deviation of the incremental power supply expense—is also considered. Figure 2 plots the costs of various resource options against their inherent risks. Resources using natural gas and wind are riskier than those using fuels with more stable prices and availability, such as coal, nuclear, biomass and geothermal. The information in Figure 2 does not attempt to quantify potential risks beyond operational risk. For example, the potential for construction cost overruns and nuclear waste disposal risks are not considered. A geographically diversified wind portfolio, with ownership across the Northwest and into eastern Montana, appears to reduce some of the financial risk created by intermittent wind availability.

2 Incremental power supply expense is defined as variable O&M expenses and fuel for existing Company resources and fixed and variable O&M and capital recovery costs for new resources.

Figure 2: Resource Cost Versus Resource Risk



The IRP further enhances portfolio analysis by identifying an "Efficient Frontier." The Efficient Frontier is a financial theory that develops a curve of optimal portfolio returns based on the level of risk an investor is willing to accept. Figure 3 illustrates the Efficient Frontier developed for the 2005 IRP. This figure shows the PRS, along with other portfolios formed for the 2005 IRP, and its position relative to the Efficient Frontier.

Resource portfolios in the Efficient Frontier are subject to coal and wind limitations; hence some unrestricted portfolios, like All-Coal, theoretically can outperform the Efficient Frontier. The exercise was limited to 400 MW of wind and 250 MW of coal in 2016, and 650 MW of wind and 550 MW of coal in 2026. The wind limitation reflects Company agreement with the Northwest Power and Conservation Council (NPCC) that a limited amount of economically viable wind potential exists in the Northwest. The NPCC estimates Northwest wind potential to be 5,000 MW. Avista serves approximately five percent of Northwest loads; the prorated Company share is 250 MW. Therefore, the 650 MW target by 2026 is substantially higher than the Company's share of Northwest wind potential. The coal limitation is based on the Company's desire to acquire a cost effective and diverse fuel mix, and the risks of future carbon tax legislation.

Electricity and Natural Gas Market Forecasts

Our analyses explain that natural gas and Mid-Columbia electricity market prices are becoming increasingly correlated because of the increase in gas-fired plant construction across the Western Interconnect. Figure 4 represents the Company's electric and natural gas price forecasts. 2003 IRP forecasts are provided for reference.

Figure 3: Avista Efficient Frontier ($millions)

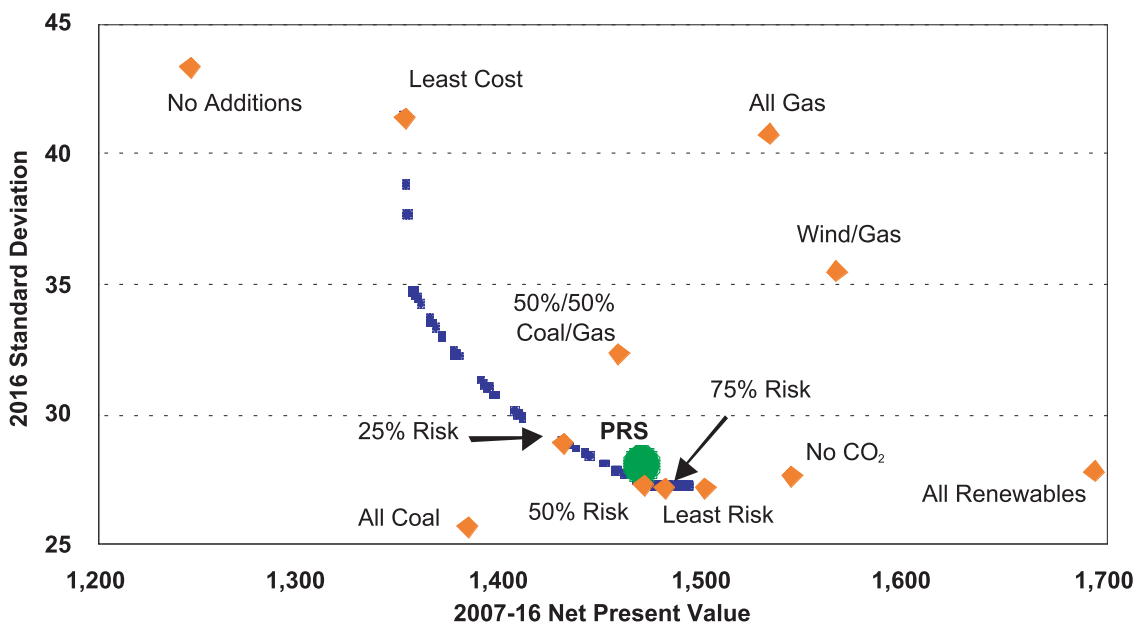


Figure 4: Nominal Electricity and Gas Prices

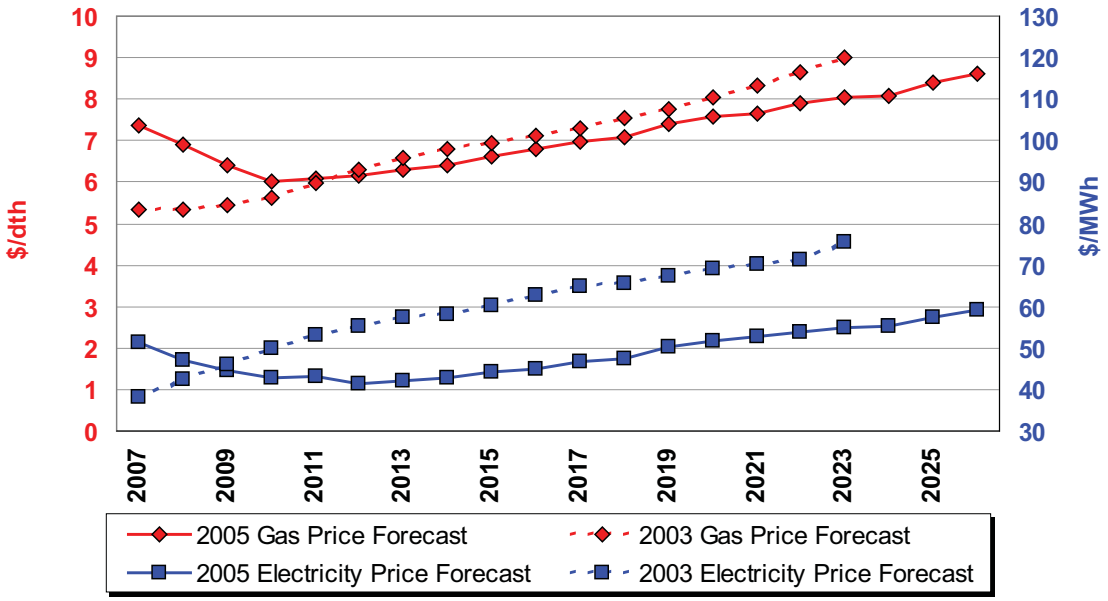
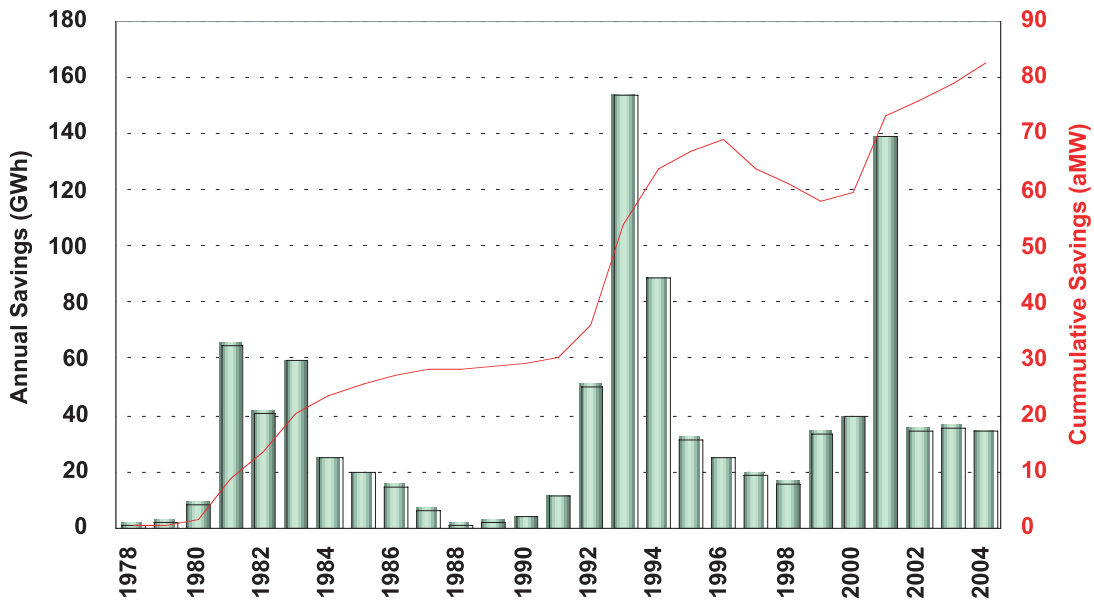


Figure 5: Cumulative Conservation Acquisitions



Conservation Acquisition

Figure 5 shows how conservation has lowered Company requirements by approximately 83 aMW since programs began in the 1970's.[3] With additional funding recommended by the IRP, the Company expects conservation to lower load growth in its service territory by 6.9 MW per year, totaling 138 MW over 20 years. The 2005 IRP conservation acquisition schedule is approximately 50 percent higher than what was included in the 2003 IRP.

Preferred Resource Strategy

The Company's Preferred Resource Strategy is defined by five resource categories: conservation, upgrades to existing generation facilities, wind, other small renewables and coal. In total, conservation, plant upgrades and renewables provide more than half of new load requirements over the IRP time frame. The 2003 IRP included more coal-fired generation to meet requirements. Both the 2005 and 2003 IRPs provide similar insulation from price volatility. In 2016 newly installed capacity includes 400 MW of wind, 250 MW of coal and 80 MW of other small renewable projects. Resource requirements are 69 MW lower because of conservation measures, and plant upgrades reduce requirements by an additional 52 MW.

By 2026 new capacity installations equal 1,332 MW: 650 MW of wind generation, 450 MW of coal-fired generation, 180 MW of other renewable generation and 52 MW of plant efficiency upgrades. Resource needs are 138 MW lower because of conservation. Figure 6 illustrates the Company's PRS.

A portion of the PRS requires construction of new transmission capacity. The Company will continue to work with regional entities and other utilities to identify low cost solutions to move power across the Northwest. Without new transmission, the Company's future resource portfolio likely will be different than presented herein.

Carbon Emissions

Two carbon emission scenarios were developed for the 2005 IRP. The National Commission on Energy Policy study, completed in late 2004, provided the basis for the first carbon emission scenario.[4] The second looked to an Energy Information Administration study of the McCain-Lieberman Climate Stewardship Act.[5] These scenarios illustrate the potential risk inherent in relying too heavily on traditional coal-fired technologies.

Table 2 explains how the 2005 plan includes more non-carbon emitting resources relative to the 2003 IRP. The 2005 plan endeavors to acknowledge and reduce greenhouse gas emissions by building significantly more renewable resources than recommended in the 2003 IRP. Acquisition of the second half of the Coyote Springs 2 gas plant fulfilled much of the 2003 IRP gas goal displayed in the table.

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3 Actual energy savings total nearly 111 aMW; however, due to expected degradation of historical measures (16-year average measure life), cumulative savings are estimated at 83 aMW.

4 See www.energycommission.org

5 See www.eia.doe.gov

Figure 6: Preferred Resource Strategy–Capacity (MW) [6]

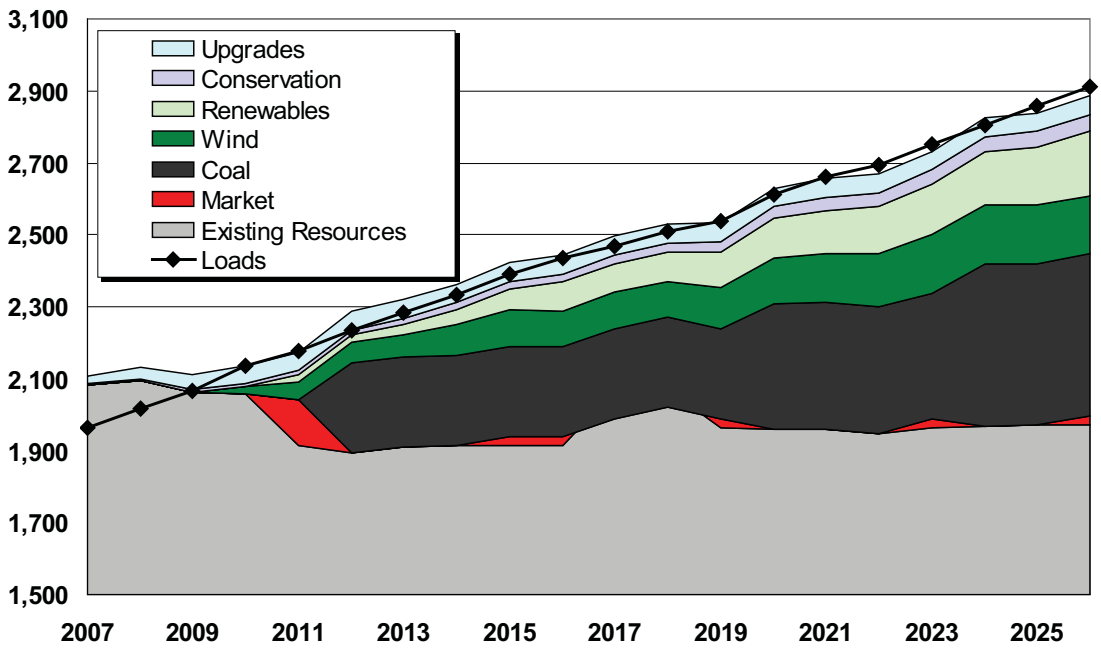

Table 2: 2005 to 2003 IRP Comparison

Time Period	Resource Type	2005 IRP	2003 IRP
2007-2016	Coal	215	350
	Wind	122	25
	Gas	121	178
	Other Renewables	65	0
	Conservation and Plant Upgrades	105	46
2007-2026	Coal	388	770
	Wind	188	25
	Gas	121	178
	Other Renewables	145	0
	Conservation and Plant Upgrades	174	92

6 Wind capacity is shown at its contribution to meeting system peak demand. Wind is assumed to contribute 25 percent of nameplate capacity to peak loads. See "Wind Contribution to Meeting System Peaks" in Section 5 for further discussion.

This acquisition is shown in the 2005 IRP column for comparative purposes.

PRS Acquisition

The PRS is very capital intensive. It will require outlays of approximately $1.5 billion by 2016. This level equals more than 80 percent of the utility's present depreciated book value. The Company might explore power purchase agreements with third parties that include options to acquire the underlying asset as a way to manage the financial impacts. Medium and short-term market purchases also are expected to fill in modest gaps between resource acquisitions and load requirements.

The Company believes that acquiring the amount of wind and biomass included in the PRS will be challenging, especially in light of our preference to acquire smaller portions of geographically diverse projects. Wind and biomass acquisitions therefore might begin as early as 2007. In the 2005 IRP Action Plan, the Company commits to continuing its research into wind and biomass potential, clean coal technologies, transmission solutions and conservation. Each of these aspects will be critical to successful implementation of the Preferred Resource Strategy.

Action Items

The Company's 2005 Action Plan outlines the activities developed by the Company's staff with advice from its management and the Technical Advisory Committee that will be undertaken to support the PRS and improve the planning process over the next two years. The Action Plan is found in Section 8, *Action Items*. Action Item categories include renewable energy and emissions, modeling enhancements, transmission modeling and research, and conservation. Progress on 2005 action items will be monitored, and the results will be reported in Avista's 2007 IRP.