# MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

Rely on us.

TO: Commissioners Simpson, Brown, Helgeson, Manning and Mital

FROM: Erin Erben, Power and Strategic Planning Manager and Sibyl Geiselman, Energy Resource Analyst

DATE: April 9, 2012

SUBJECT: IERP Update Executive Summary and Recommended Reading

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**Issue**

EWEBs integrated electric resource plan (IERP) was a two year process that began in 2010, wherein EWEB evaluated its current and forecasted need for new generating resources and worked with a public stakeholder group of 13 to develop a plan for how EWEB would meet any future resources needs (looking out over a 20 year period). As an outcome of that process, EWEB identified key actions that would help to meet the EWEB customer demand for electricity over the next five years. Previous to this IERP, EWEB had been in an acquisition mode in accordance with the prior IERP and its subsequent update. The findings of the 2011 IERP were that EWEB had no immediate need for new resources, and that it would use its robust energy efficiency programs to meet future customer load growth over the five year period. The only instance in which EWEB was forecast to have a potential supply shortage over the 20 year period evaluated, was in the instance of an extreme (1 on 10) weather event.

Much has changed since the IERP analysis was completed in 2011, but the robust analysis that was incorporated into the plan and resulting action items has allowed EWEBs strategy to be adaptive and prudent given the circumstances. This update serves to refresh key planning assumptions that drove the resource plan decisions, and summarize how these assumptions impact the actions recommended in the IERP. The IERP action items include meeting load growth with conservation, working with our customers to avoid peaking power plants, continuing to cultivate regional partnerships, enacting a new large load strategy if needed, and annual updates of key planning assumptions. This update serves to confirm that these action items are still valid and applicable given current market and utility realities. In addition, management recommends accelerating its pilot work on demand-side peak management strategies to help prepare EWEB for the possibility of a future sale of a generation asset and to address the extreme peak scenario identified in the IERP.

**Background**

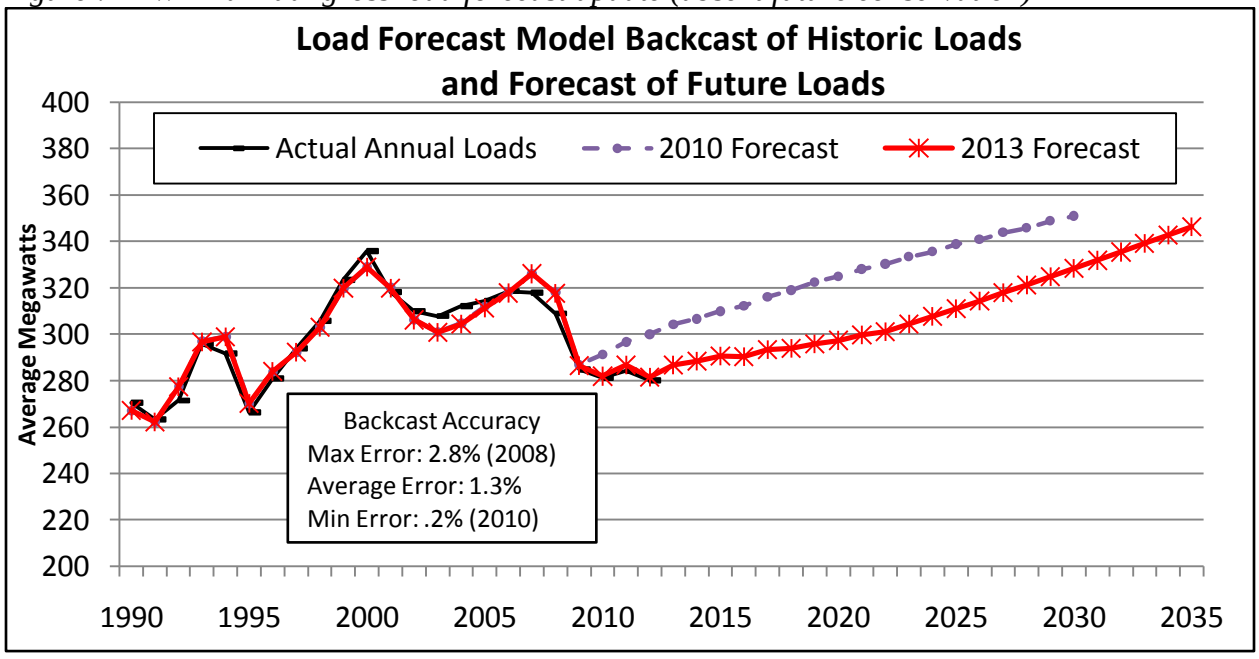
This background provides a summary of the current regional landscape and how it has changed since the IERP analysis as well as recent changes that are unique to EWEB. This summary provides refreshed context for the IERP strategies and how they are being implemented.

The key drivers of the findings from the IERP including EWEB and regional customer load growth, EWEB and regional supply availability, natural gas prices, regulatory constraints and implications such as REC and carbon price assumptions, and emission controls. These factors impact the regional market prices that EWEB receives when it sells or buys from the wholesale market. EWEB's own load-resource balance determines what EWEB has available to sell or needs to purchase.

***Economic Recovery and Loads***

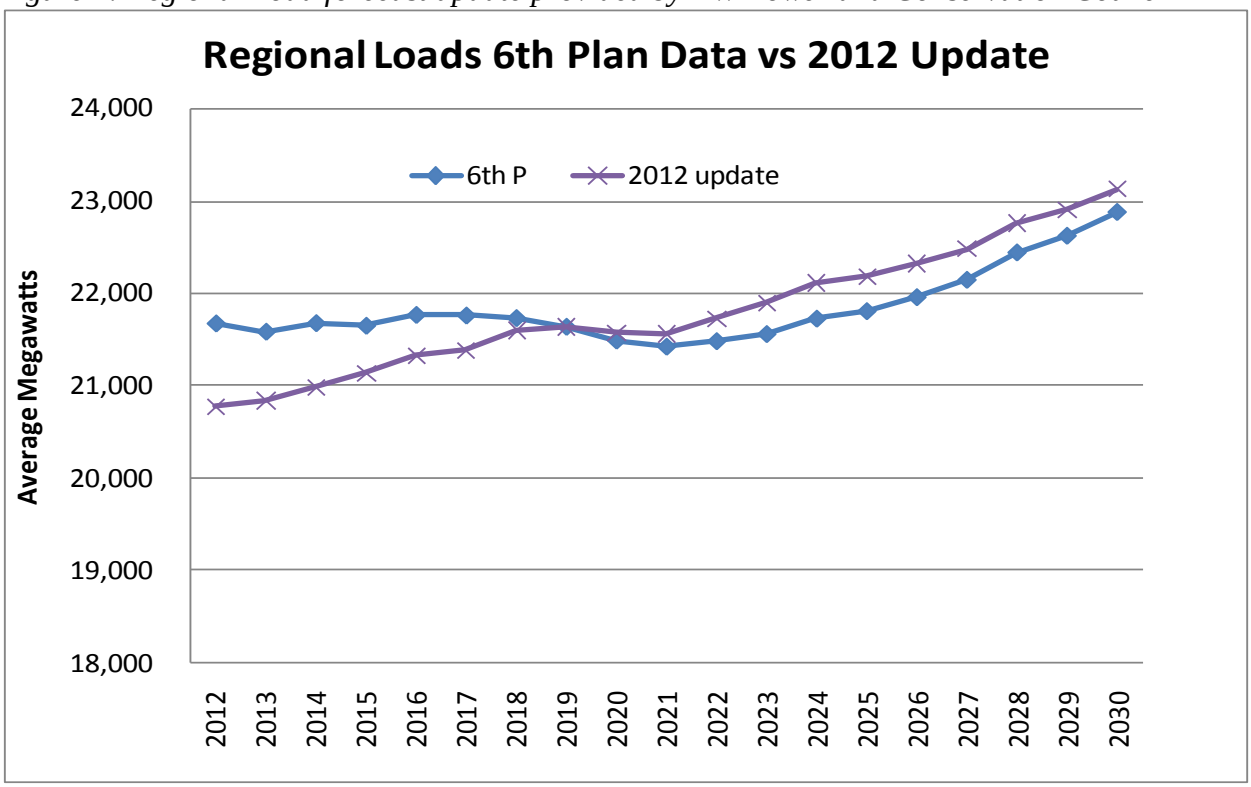
The regional economic recovery has been slower than expected, and new, less energy intensive industries are growing faster than older, higher consumption industries in the region. Eugene in particular has had a slower than expected economic recovery indicated by employment rebounds and population growth that are both lower than statewide and national averages and what was forecast in the IERP. These economic indicators are important drivers of local and regional load growth. The resulting updated load forecast is much lower than what was evaluated in the IERP, and forecast growth is slower in the near term than what was analyzed previously. The charts below demonstrate EWEB and Regional load forecast updates from what was evaluated in the IERP.

*Figure :1 EWEB annual gross load forecast update (absent future conservation)*[1]




[1] Power planning forecasts loads absent future conservation to establish goals for conservation acquisition for meeting the IERP recommendation. The 2013 forecast is an average of 22aMW lower that the 2010 forecast, ~7aMW from conservation that was acquired since the IERP, and ~15aMW from other drivers including population growth, unemployment rates, system rates, and weather. The backcast is included to demonstrate goodness of fit of model.

*Figure 2: Regional Load forecast update provided by NW Power and Conservation Council*[2]

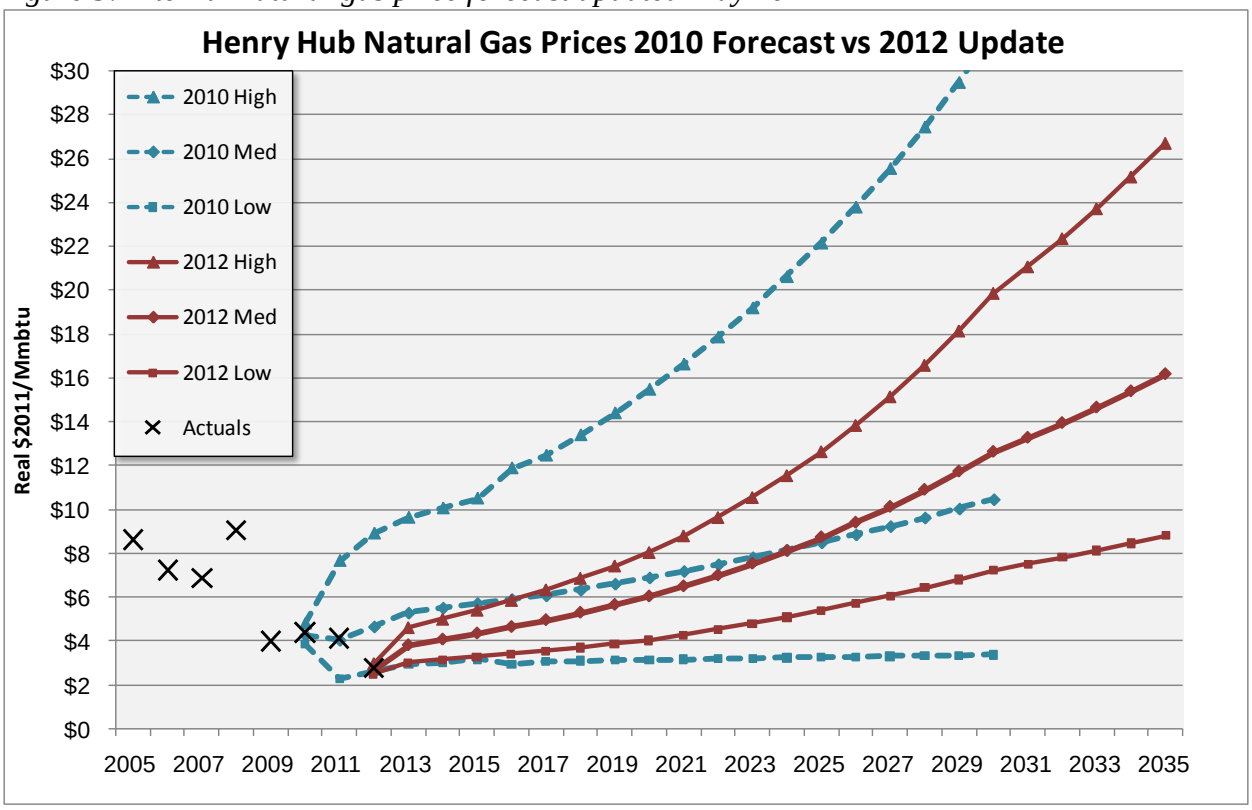



***Natural Gas Prices***

EWEB staff finalized the analysis assumptions in late 2010, in order to facilitate the IERP public process that began in early 2011. At this time, the region was coming out of a period of volatile and historically high natural gas prices. Hydraulic fracturing for natural gas extraction was a new technology with yet unknown impacts. Two years later, it is clear that this new technology has revolutionized natural gas exploitation and set the US on a new course in terms of energy supply. With record low natural gas prices in 2012 and updated environmental control requirements on coal plants, natural gas has now reached market parity with older coal units that need new retrofits to continue operating. Natural gas displacement of coal strengthens future demand for natural gas, while the US natural gas supply seems to be ever deepening. Though much uncertainty remains going forward, near term price forecasts have been reduced significantly to reflect the fracking phenomenon, which results in lower wholesale market price forecasts. Robust analysis of a range of natural gas prices and potential impacts of changes in supply and demand continues to be a key component of strong resource planning analysis going forward. Figure 3 below compares the range of natural gas prices that were evaluated under the IERP to the new forecast of low, medium, and high natural gas prices.

[2] Source: NW Power and Conservation Council. IERP used data based on 6th NW Power Plan analysis, 2012 update is from preliminary analysis for 7th NW Power Plan.

*Figure 3: Internal natural gas price forecast updated May 2012*[3]




***Regional Supply and New Renewable Resources***

To further dampen wholesale markets in the near term, the region has experienced incredible growth in new renewable technology, adding to the pool of resources that have almost no variable costs because of zero cost "fuel". Resources in this category include hydro, wind, and solar. Zero variable cost resources that receive production tax credits or have forward REC sales, or that must run because of operational constraints (such as flows for fish) can drive the dispatch cost of a resource[4] and serve to force spot market prices down, even causing cause negative prices at times. The rapid install of renewable resources in the region, ahead of mandatory standards and to serve California markets, has also negatively impacted Renewable Energy Credit (REC) values.

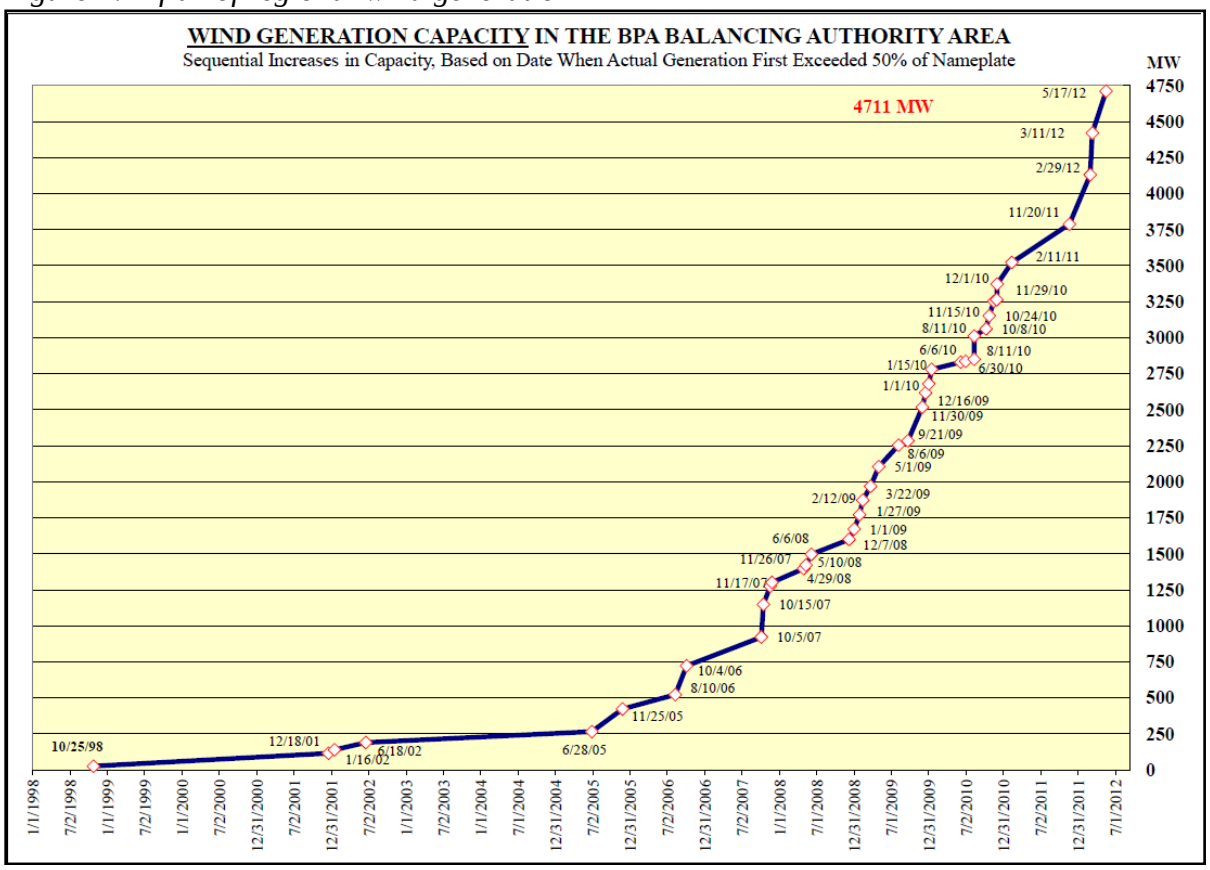
These "must run" resources also add to operational constraints and contribute to the need for resource flexibility and considerations of capacity rather than energy going forward. The need for flexibility is difficult to incorporate into planning with no capacity market to signal a price, and with weak energy prices, new capacity resources (including demand response) can be hard to justify economically. Soft prices also impact the cost recovery capability of existing resources by reducing sales revenues. Flexibility in the supply side resources base is generally added by the

[3] The Aurora model analyzes a range of possible futures that vary from year to year based on historic volatility. The low, medium, and high forecasts shown represent the 90th, 50th, and 10th percentiles of prices, respectively, in any given year. None of these specific scenarios was analyzed in the 180 games because they do not show the sort of volatility that actual natural gas prices have demonstrated historically, they merely represent the range of possibilities analyzed.

[4] The minimum price at which a resource will continue operating, even in absence of demand.

addition of gas-fired turbines, which can be more readily turned on and off than other generation options. In some more progressive regions, demand response is increasing being relied upon as an alternative to meet this need for flexibility to follow changes in customer demand from hour to hour. BPA forecasts that its own hydro system will likely begin to run out of operating reserves (one measure of available flexibility) to serve the region in the 2014-2016 time frame. Figure 4 demonstrates the incredible growth of wind generation capacity in the BPA balancing authority area.

*Figure 4: Influx of regional wind generation*[5]



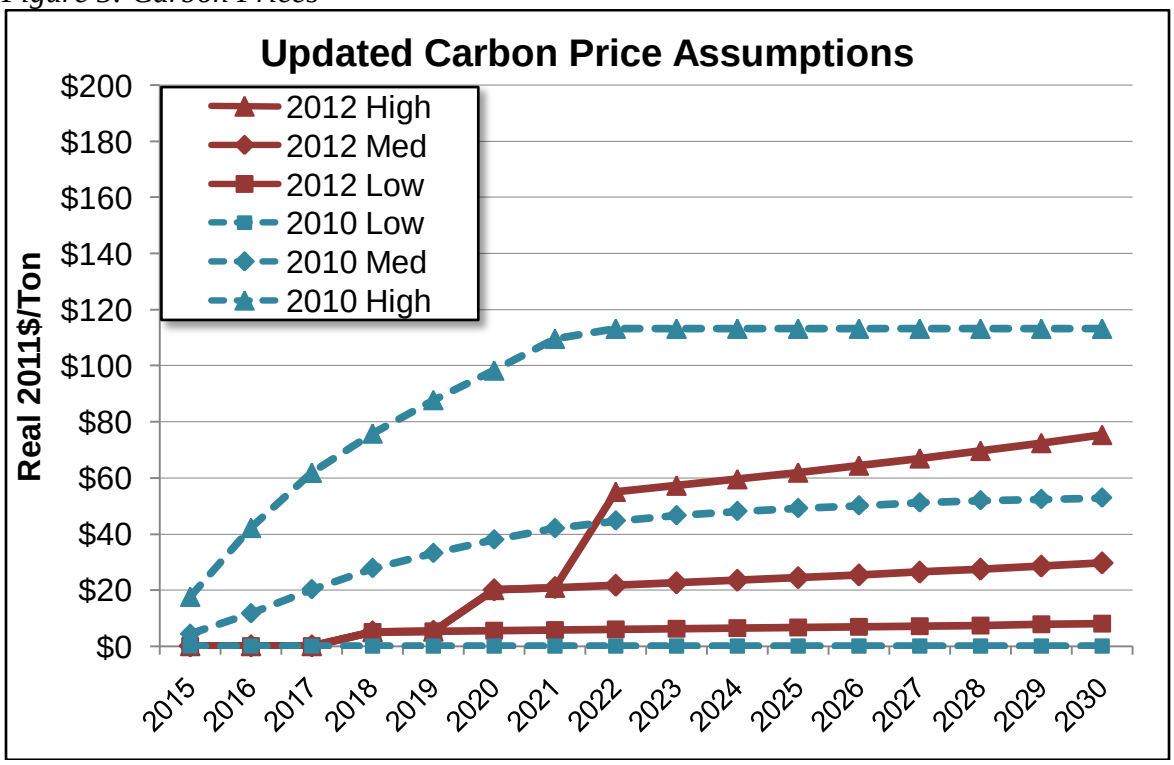

***Carbon Pricing and Emission Controls***

Another key driver of wholesale market prices that was evaluated in the IERP was carbon pricing. In 2010 there was significant regional and national momentum towards addressing climate change through comprehensive carbon policy. The IERP evaluated a wide range of carbon price scenarios starting as soon as 2014. Clearly, this momentum has waned at a federal level, and carbon price forecasts have been revised accordingly (See Figure 5, below). At present, other policies are driving towards some of the same goals. California and British Columbia have both implemented a state/province-wide carbon pricing mechanism, and the EPA has developed new emissions standards for coal units resulting in switching to lower toxin, lower carbon natural gas. As a precursor to actionable policy, many utilities are also following stricter emissions reporting protocols.

[5] Source: BPA website.

Though federal carbon pricing does not look likely in the next couple of years, EWEB continues to evaluate portfolio decisions based on the possibility of a carbon price, which also serves to monetize the environmental impacts of various resource choices in resource planning analysis. EWEB is also exploring other avenues for carbon pricing such as pursuing options at a local or regional level rather than waiting for federal legislation. In the near term, the lack of comprehensive carbon policy has reduced the value of EWEBs existing low carbon resources, and further diminished any business case for new renewable resources.

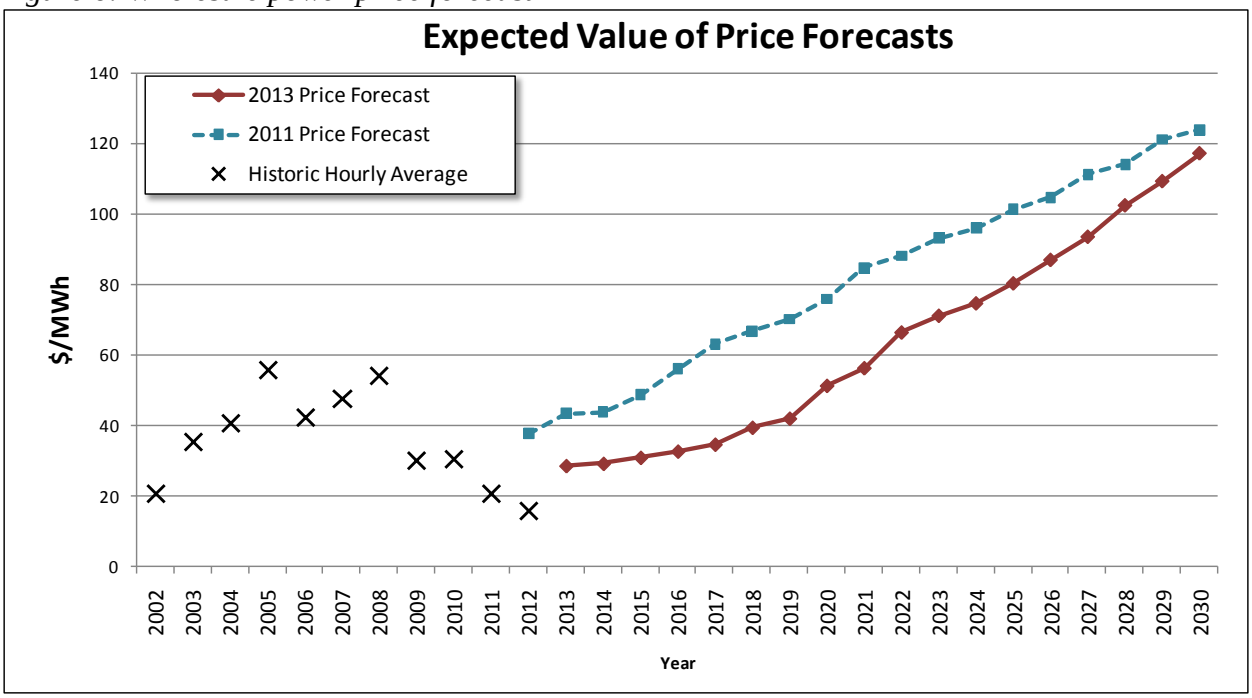
*Figure 5: Carbon Prices*




***Wholesale Market Prices and Impacts on Utilities***

A lack of direct and consistent carbon prices, slow economic recovery leading to reduced demand, low natural gas prices, and an abundant supply of energy resources have all contributed to low wholesale prices in the near term and a reduced market forecast on an expected basis (Figure 6). While low market prices persist, they negatively impact hydro dominated utilities such as EWEB and BPA through reduced surplus sales revenues. In the past, EWEB and BPA were able to use surplus sales revenue to help offset rate increases and to contribute to fixed costs. The old market reality also contributed to an "anything goes" conservation mentality because as long as conservation and retail rates were lower than wholesale power prices, the utility and our customers could actually be better off selling additional surplus to the market rather than to local customers. The fundamental shift in the market to below retail rates and often below the cost of new conservation has forced the utility to re-examine this mentality. This change has reduced the value of existing resources and increased the risk associated with over-supply and over-achieving on conservation targets.

*Figure 6: Wholesale power price forecast*




**Discussion**

How is EWEB incorporating the changing regional landscape into the resource plan implementation? The resource plan recommendations are still valid even when considering the shifting regional and local landscape that we are currently experiencing. Each action item has adaptability that aids in adjustment for meeting customer needs in as agile a manner possible. Below is a summary of each IERP action item and how it is impacted by the changes discussed.

***Pursue conservation to meet all forecast load growth***

Near term growth has been slower than expected leading to lower annual targets than what were anticipated in the IERP. EWEB is still learning how to make conservation programs adaptable to ramping up and down and also for how to incorporate larger industrial energy efficiency projects into the lower annual targets while maintaining the benefits of smaller residential, general service, and low income programs. Comprehensive program evaluation and a new focus on meeting peak demands will hopefully lead to more effective conservation acquisition going forward. Rebalancing the conservation acquisition targets and program offerings to incorporate peak analysis will hopefully reposition EWEB as a regional leader in conservation, energy efficiency, and demand response.

***Partner with customers to avoid new peaking power plants***

In the reorganization effort of 2011, a new team was created and tasked with researching and developing new customer facing programs that help the utility to avoid peaking power plants. These programs include 1) demand response initiatives designed to target load in just the peak hours, 2) rate design initiatives such as time of use rates that can help modify the overall shape of customer demand, and 3) the benefits from combining energy efficiency and demand response measures that target peak time periods, or allow for some level of utility control over when

energy savings occur, but take advantage of the improved economics through concurrently implementing energy efficiency measures. Developing a better understanding of customer interest and willingness to participate in these programs, as well as the ultimate demand reduction benefits of the programs, are critical pieces of knowledge sought through these efforts that provide additional customer choice, benefit and control; will better position EWEB to be a utility of the future; and enable the community to take full advantage of an AMI system.

***Continue to rely on and expand regional partnerships***

As many regional utilities and BPA face similar cost pressures, advocating for our needs and finding allies in the region becomes ever more important. As Oregon's largest public utility, EWEB has an important role of advocating for our customer owners in the region and working with BPA to preserve the regional legacy of resources. Staying involved in regional planning efforts and maintaining awareness of other utility's positions on issues will help EWEB to steer the region in a direction that reduces risk to our customers and where possible, adds benefit.

Regional partnerships are critical to understand address support and concern for changes that will impact our business, such as RPS, FIT and carbon taxes. They are also critical for proceeding with demand response activities. EWEB has already cultivated a variety of regional and local partnerships for successful research and initial programs to date, savings a significant amount of money for EWEB customers as compared to trying to conduct these pilot programs on our own. These partnerships have helped with cost effectiveness, enabled knowledge sharing, helped us understand where we align with others in the region, and allow EWEB to continue to be engaged with regional efforts that will impact our customers in the future.

***Pursue new large load strategy, if needed***

The loss of Hynix as a customer has left Eugene with a prime site for a potential new large customer. Key accounts has kept power planning staff updated of potential interested parties for the site, and a cross functional team did some follow up analysis of rate design principles that would work to hold the existing customer base harmless should a new large load join EWEBs service territory. This risk/opportunity will continue to be monitored closely.

Staff brought to the Board its thoughts on options for pricing such a new load should a special contract be negotiated, as is often requested. This is important to our overall resource strategy because the amount of length in supply or reserve of excess RECs that we hold will be a direct function of our anticipated need. If we have a policy that says new large customers much pay market-based prices and secure their own REC obligations, EWEB does not carry the risk of securing, building and providing actual resources to serve such a large load. If it does not, we continue to bear the risk and uncertainty of needing to secure or maintain resources to serve such a new load.

***Review progress and key assumptions annually***

Power planning staff has updated all of its key planning assumptions at least once since the IERP, and continues to monitor them for use in resource planning analysis such as asset sales evaluation and relicensing work. The key planning assumptions include: EWEB and regional loads, natural gas prices, renewable generation, hydro generation, and carbon tax policy. These variables are combined to generate a distribution of possible market price futures that can be

used for resource planning and risk analysis. Forecasts of our own load and resources are used to develop an understanding of our load resource balance. The board can look forward to another IERP update in 2014.

**TBL analysis**
Triple Bottom Line analysis was included in the decision making process for advising the strategies that were recommended in the IERP. Though much has changed, the IERP included looking at risk and uncertainty and discussed the value of adaptive strategies that could be molded in light of current conditions. Each strategy is still valid and actionable even given the change that has occurred since the analysis. For further reading on the tradeoffs that were discussed in the IERP and the official TBL analysis for the strategies please see the IERP document.

**Recommendation**
This background is for information purposes only. Staff recommends the following reading for more information on the topics presented herein.

*EWEB 2011 Integrated Resource Plan*
http://www.eweb.org/public/documents/ierp/2011ierpfinaldraft.pdf

- Executive Summary (p.6)
- Guidelines and Recommended Strategies for the 2011 IERP (p.44)
- Conclusion (p.47)

*Sixth Power Plan Mid-Term Assessment Report*
http://www.nwcouncil.org/media/6391355/2013-01.pdf

- Executive Summary (p.4)
- Situational Scan Narratives on:
    - Natural Gas Markets and Prices (p.8)
    - Emissions Regulations and Impacts (p.8)
    - Wholesale Power Markets and Prices (p. 11)
    - The Regions Utilities Face Varying Circumstances (p.12)
    - Renewable Resources Development (p.15)
    - Shifting Regional Power System Constraints (p.16)
- Candidate Topics for the Seventh Northwest Power Plan (p.52)

**Requested Board Action**
None at this time.

## APPENDIX 1: Resource Planning Key Terms and Definitions

**Integrated Resource Plan-** Document and public process completed every 5 years and as needed to guide EWEB's strategies for how best to supply customers power needs. Strategies can include both supply and demand side resources.

**Average Megawatt (aMW) -** One MW averaged over a longer time frame, usually a year or 8760 hours. Example: EWEB 2013 Forecast Load= 285 aMW. In some hours it may reach 500 MW in others it may be as low as 150 MW but across the year the load adds up to 2,496,600 MWh. 2496600MWh/8760 hours per year = 285 aMW.

**Load-** EWEB customer usage at any time. Load can be reflected in MW (instantaneous) or MWh (1 MW of demand for 1 full hour) or aMW.

**Peak Load-** Total EWEB customer usage during the single highest hour of the year.

**Resource Portfolio-** EWEB's owned and contracted electricity generating assets.

**Firm Generation-** Generation that can be relied on even in the driest hydro years, lowest wind years, and with a conservative rate of thermal forced outages. This energy can be relied on for planning purposes because it does not change from year to year. From a reliability standpoint we would not plan to go very far below having a "firm power supply" sufficient to meet expected loads.

**Expected Generation-** Generation from the resource portfolio in a year with average hydro, average wind, and normal thermal forced outage conditions.

**Surplus Energy-** Any energy above Firm. In an average year the Surplus Energy is the difference between the "Expected Generation" and the "Firm Generation." Surplus energy changes from year to year depending on conditions such as precipitation, snowpack, and wind speeds.

**Firm Length-** Firm generation above expected load in a given time period. On an annual basis for 2014, EWEB's firm length is ~45 aMW. This is higher and lower during different times of the year.

**Demand Side Resources-** Energy production or savings that come from working with customers to change (usually reduce) load through behavior changes and technology.