

# Fuel Risk and Integrated Resource Planning

## *A Diversified View*

*Presentation for the Utah CEA*

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# Gas Demand and Supply

WECC additions use natural gas fuel

- » 18,200 MW added since 2001, 92% gas
- » 15,400 MW under construction, 94% gas

NA additions use natural gas fuel

- » 110,000 MW added since 2001, 96% gas
- » 84,000 MW under construction, 93% gas

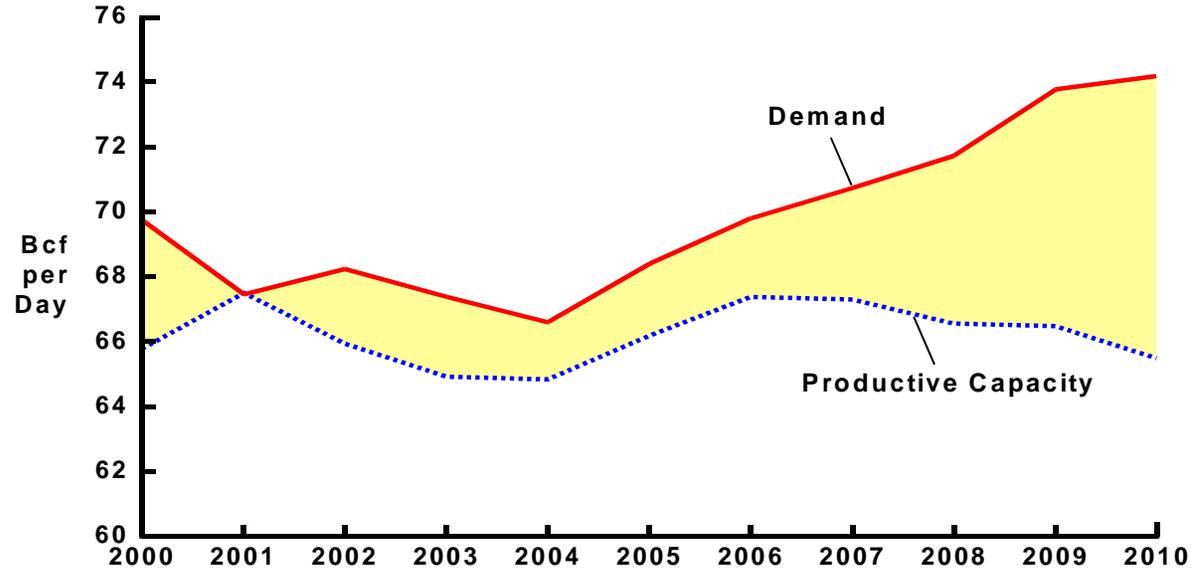
WECC scenarios to 2020

- » 28% of capacity in 2000 fueled by natural gas
- » 50-70,000 MW added, 66%-90% gas fueled
- » 40%-45% of capacity fueled by gas by 2020

NA scenarios to 2020

- » 36% of capacity in 2000 fueled by natural gas
- » 240-340,000 MW added, 70%-90% gas fueled
- » 46%-48% of capacity fueled by gas by 2020

## North American Gas Supply Gap



- » Power sector accounted for:
  - 16% of NA natural gas demand in 1995, 8.7 b/d
  - 25% of NA natural gas demand in 2000, 14.4 b/d
- » Power sector grows to 36-41% of NA natural gas demand in 2020, 25-34 b/d

# Current Gas Supply

## NA supply is challenged

- » 2002 production down 3% from 2001, at 50.7 b/d
- » Current production rates 4% below year ago, despite prices at 250% of year ago
- » Winter 2003 gas storage at record low level - 623 bcf

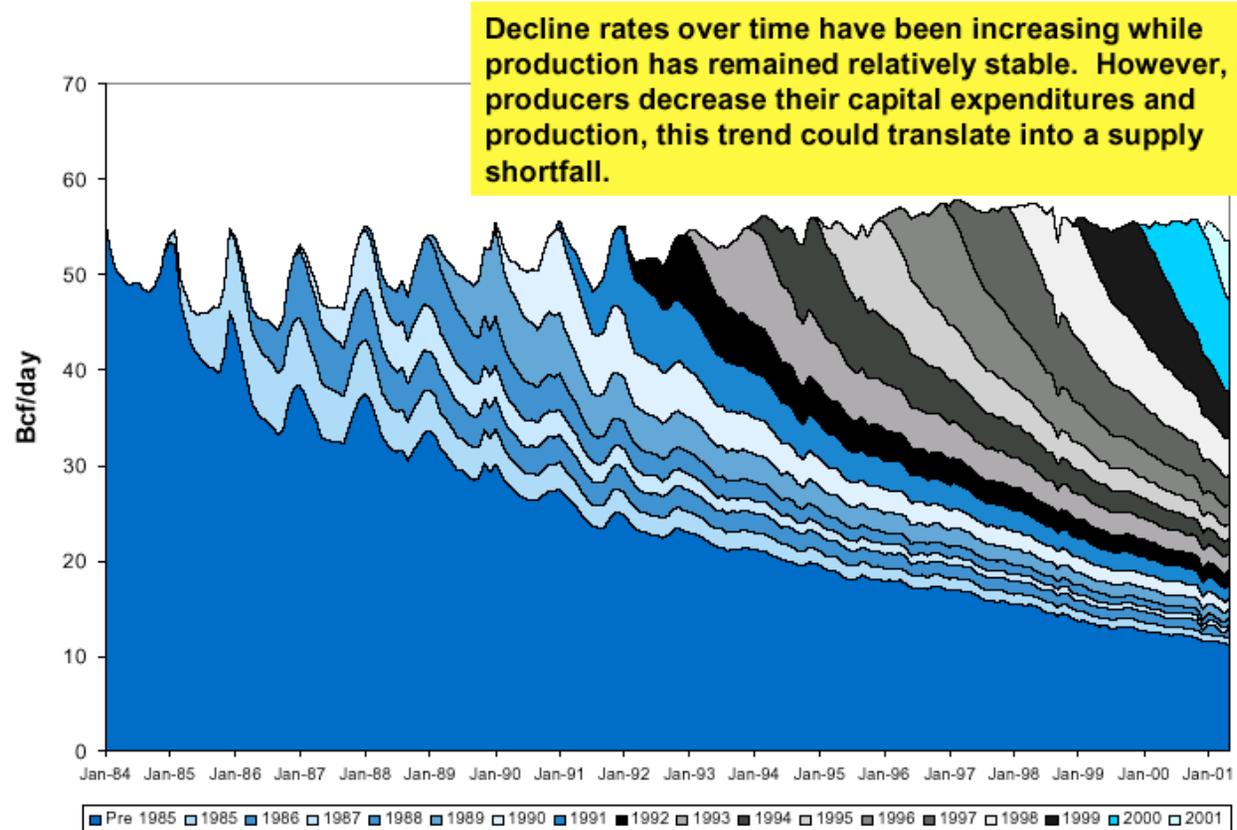
## Production challenges

- » Decline rates from existing wells
- » Declining production in mature US regions and Western Canada
- » Rig counts stagnant
- » Wyoming coal bed methane bright spot

## Price Implications

- » Higher price environment
- » Higher price volatility

US Natural Gas Production by Vintage Year

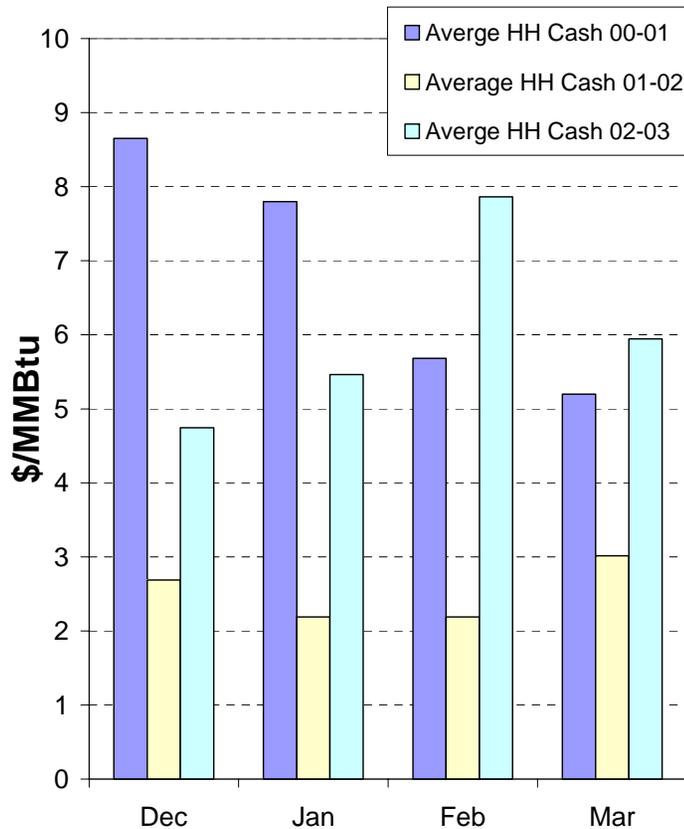


Source: Goldman Sachs Research and IHS Energy

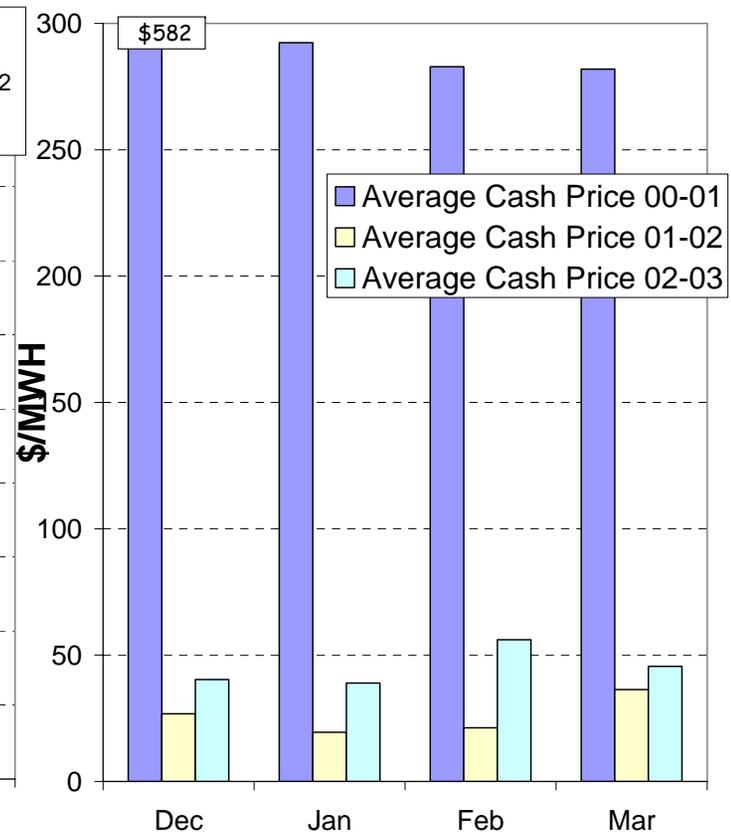
# Natural Gas and Electricity Prices - the rubber meeting the road

- » Long term natural gas supply
- » Long term natural gas demand
- » Precipitation and streamflow
- » Weather
- » Economy
- » Thermal and nuclear generation performance
- » Market regulation
- » Environmental regulation
- » Hydrolicensing costs
- » Transmission availability
- » Transmission regulation
- » Ethical behavior by market participants

**Winter Natural Gas Prices**



**Winter Northwest Power Prices**

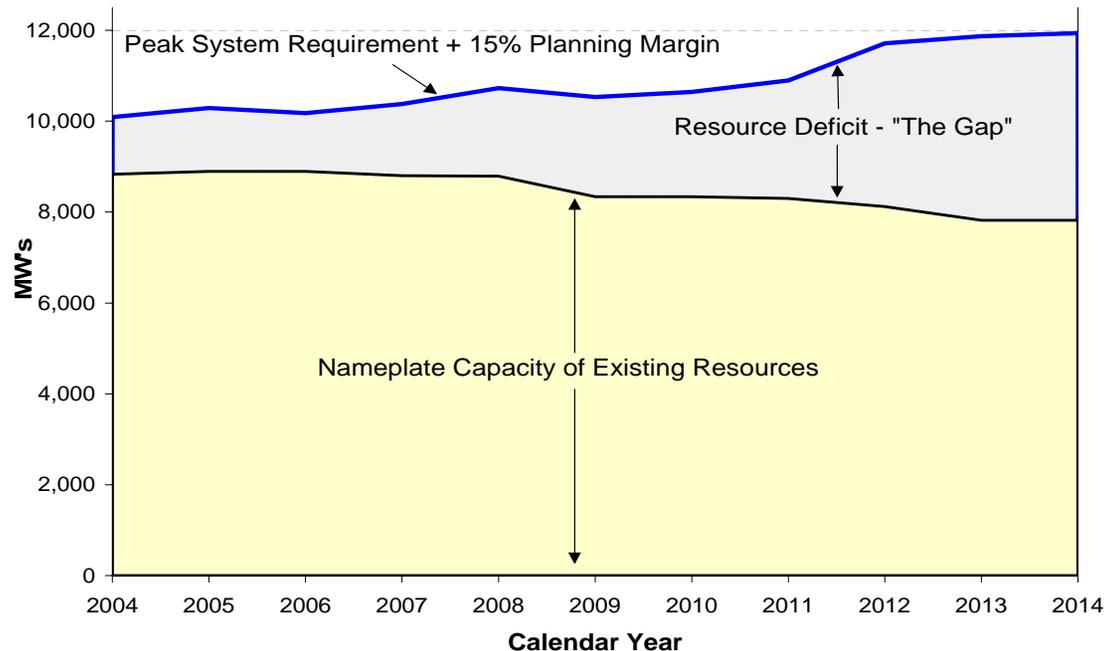


# Analysis of Current Position

## Results of Analysis

- » Over the ten years, net contract expirations equate to a loss of ~ 1,300 MW, and there is ~ 1,000 MW of plant retirements scheduled
- » Load growth equates to ~ 1,000 MW
- » A 15% planning margin was used to provide sufficient resources to cover forced outages, provide operating reserves, regulatory margin, and demand growth uncertainty

- » PacifiCorp's current position reveals a substantial need for new resources
- » Anticipate need of about 4,000 additional megawatts of capacity
  - Needs of existing and new customers
  - Potential increased reserve requirements
  - Making up lost capacity (aging plant, reduced output, expiring contracts)



# Inputs to the IRP Process

## Overview of IRP Process:

- » The inputs varied from internal and external sources to existing and future resources
- » A wide range of scenarios were also inputs to this process, such as market price fluctuations, plant outages, and emissions targets
- » Many considerations were taken into account with new resources: environmental impact, size, timing, availability, and operational characteristics

Regulators & Intervenors



Strategy & Planning



Hydro



Renewables



Financial Products



Forecasts



Transmission



Thermal



DSM



Environmental



- » **Forecasts** - electric price, gas price, load, hydro availability, etc.
- » **Supply-Side Resources** - existing and proposed hydro, thermal and renewable resources
- » **Demand-Side Management (DSM) Resources** - energy-reducing DSM programs modeled by type
- » **Financial Products** - swaps, futures, call options
- » **Strategy & Planning** - Company's view on outcome of future shifts in operations, such as environmental and renewable legislation
- » **Regulators & Intervenors** - feedback received from regulators and intervenors on all process inputs

# IRP Issues - Demand Growth

## Demand Growth Update:

- » Recently updated load forecast.
- » Results illustrate diversity of state jurisdictions.
- » Recently reviewed economic and demographic assumptions with State economists/ revenue forecasters.
- » Strongest growth in Utah driven by strong economics and demographics.

<b>Projected Sales Growth Rates</b>			
	FY 2004	FY 2005	20-Year
OR	2.4%	3.3%	1.6%
WA	2.0%	2.8%	1.8%
CA	0.1%	2.6%	1.4%
UT	3.3%	5.0%	3.5%
ID	3.7%	0.0%	0.9%
WY	-3.5%	0.0%	1.8%
<b>Total</b>	<b>1.9%</b>	<b>3.2%</b>	<b>2.5%</b>

# IRP Issues - Demand Growth

## Utah in Detail:

- » Short-term still in gradual recovery from recession.
  - » Longer-term outlook shows business climate attractive to diversifying business sector.
- » Employment declined by 1.3% in 2002 (Global Insights)
    - Manufacturing has not increased since 1997
    - Only government and services gained during 2002
  - » Employment growth resumes during 2003. (Economy.com)
  - » Non-Manufacturing starts increasing during 2003. (Global Insights)
  - » Manufacturing starts gaining jobs during 2004 (Global Insights)
  - » Mining does not reach bottom until 2006. (Global Insights)
  - » Short-term drags (Economy.com)
    - Over-building of residential and non-residential structures
    - Drop off of net in-migration
  - » Several Longer-term “pluses” which result in being above national trend (Economy.com)
    - Young, growing, well-educated population
    - Relatively low exposure to decline in Manufacturing
    - Diversified high-tech industry & growing dependence on business out-sourcing
    - Below average cost of doing business

# IRP Issues - Demand Growth

## Utah in Detail:

- » Commercial and residential sectors show strongest growth.
- » Longer-term outlook shows business climate attractive to diversifying business sector.
- » Growth in Utah peak driven by growing AC saturation.

<b>Projected Utah Growth Rates</b>			
<i>Sales</i>	FY 2004	FY 2005	20 Year
Residential	3.3%	4.3%	4.0%
Commercial	7.2%	7.5%	3.4%
Industrial	-0.4%	3.3%	3.2%
Total	3.3%	5.0%	3.5%
<i>Peak Demand</i>			5.1%

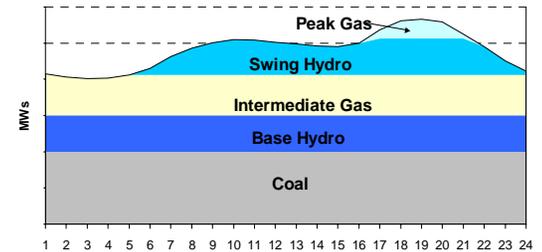
# Outcomes of the IRP Process

## Overview of IRP Process:

- » A long-term cooperative vision for serving customers' future needs for a safe, reliable, low-cost, low-risk supply of energy
- » The IRP solution needs to remain adaptable to changing course, as uncertainties evolve and are resolved

- » **Fulfilling our obligation to serve** including assuring the right amount of supply is available to meet customers' energy needs
- » **Delivering economic solution to customer and shareholder**, including continued analysis of factors that could change
- » **Reducing commodity risk** includes balancing cost and risk, assuring PacifiCorp insulates customers from volatility such as fuel costs and spikes in market prices while keeping costs under control
- » **Earning the allowed rate of return** means making prudent investments on behalf of PacifiCorp's customers that provide the the ability to recover costs and continue to assure the company's health and ability to make investments to serve customers' needs

## Fulfill Customer Obligation



## Deliver Economic Solution to Customer & Shareholder



## Reduce Commodity Risk



## Earn Allowed Rate of Return



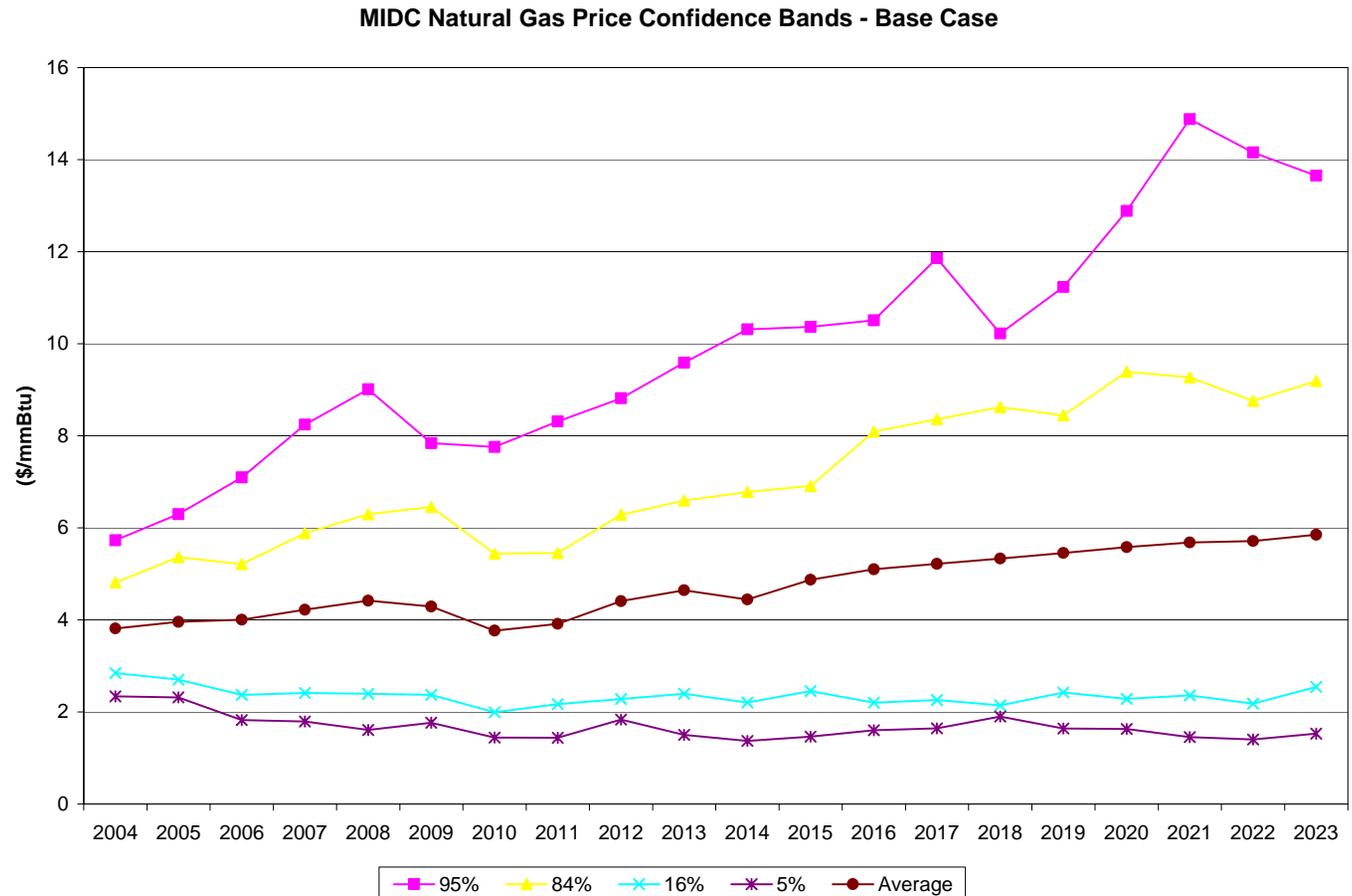
# Portfolio Analysis

- » Portfolio - collection of resource options, existing and new, designed to meet the expected position
  - » Key performance indicators for the deterministic analysis included PVRR, capital costs, emissions, market sales and purchases, existing and new capacity factors
  - » 100 variations in load, natural gas and electric prices, hydrogeneration and outages were simulated in the stochastic analysis
  - » More than 40 portfolios tested deterministically and stochastically
  - » 13 stress tests (CO<sub>2</sub>, wind, hydro relicensing, direct access, planning margin) run on top portfolios
- » Four portfolios emerged from the process lowest in both cost and risk
    - The differences in PVRR among the four ranged from 0.2% to 0.7% above the least-cost portfolio
    - The four contained a diversified mix of resources
  - » Analysis indicated that Diversified Portfolio I was the least cost, low risk portfolio
    - 1,400 MW Renewables
    - 1,200 MW Peakers
    - 2,100 MW Base Load
    - 450 MWa DSM
    - 700 MW Shaped Products
  - » Diversified approach fits the need to achieve a low cost, low risk and highly reliable source of energy for our customers while balancing social and environmental concerns

# IRP Issues - Risk Analysis

## Risk Taxonomy:

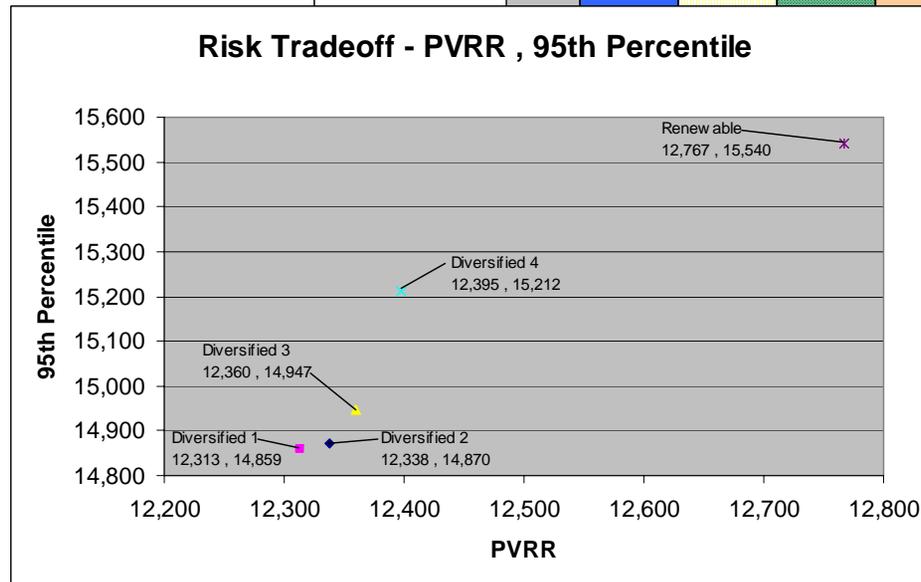
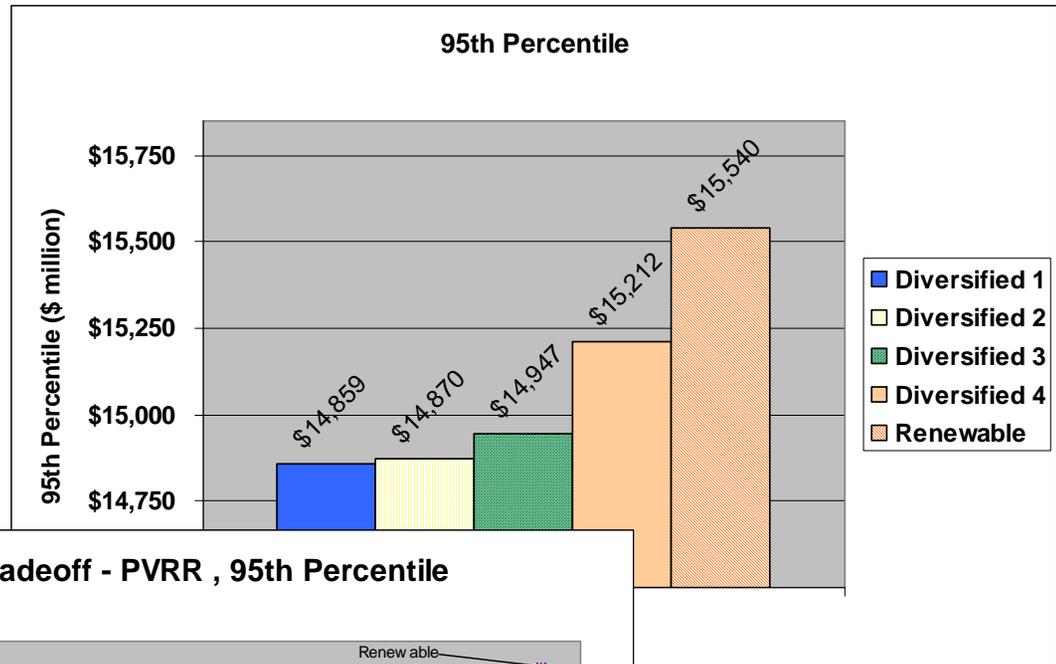
- » **Stochastic risks** (natural gas prices, wholesale electric prices, thermal performance, hydro generation and demand growth) are simulated probabilistically.
- » **Scenario risks** (CO<sub>2</sub> costs and hydro relicensing impacts) are quantified in specific sensitivities
- » **Paradigm risks** are not quantifiable, but are discussed subjectively. Changes in regulation and market structure such as RTO evolution addressed in this fashion.



# IRP Issues - Risk Analysis

## Stochastic Results:

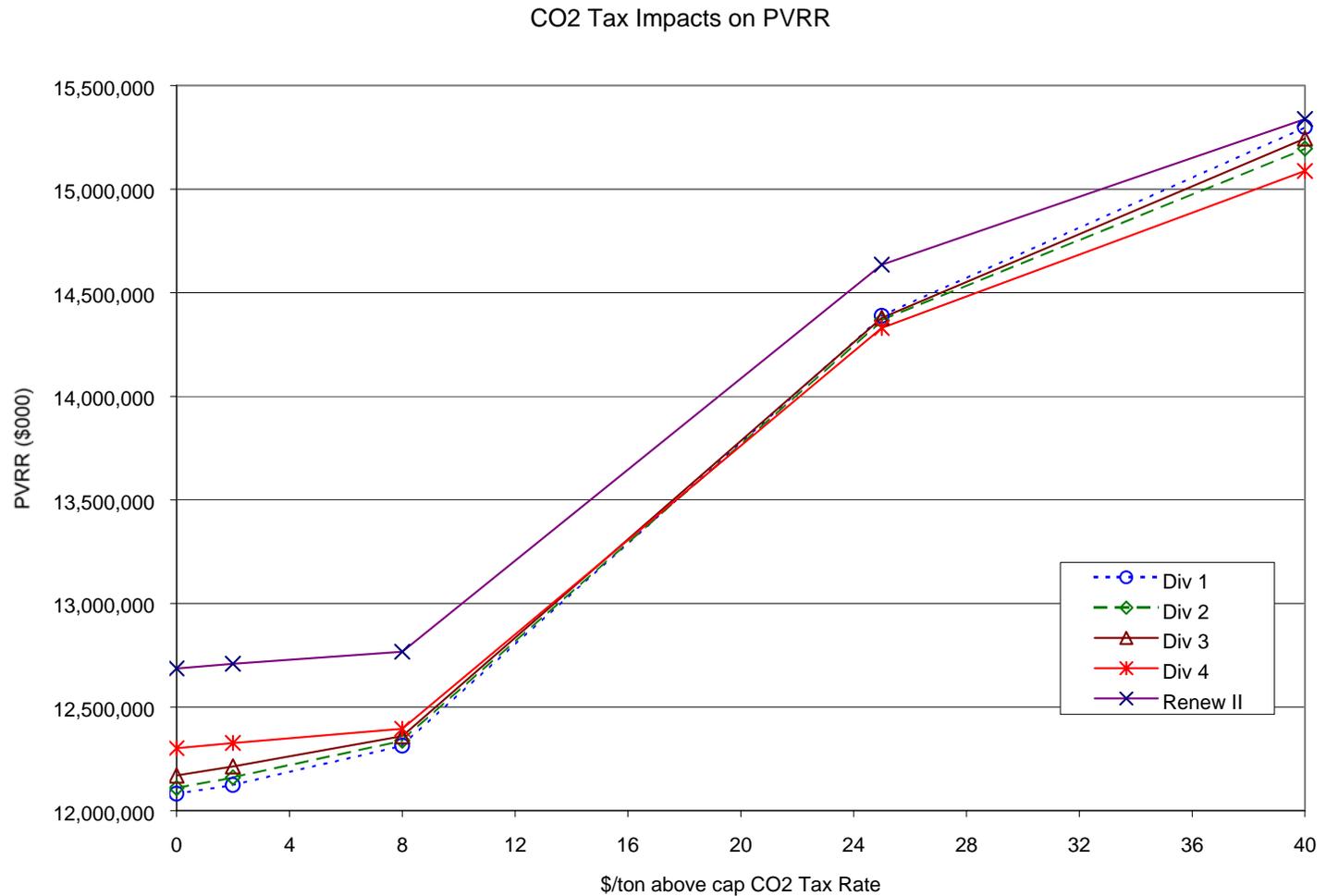
- » Illustrate the relative riskiness of resource portfolios and highlight any tradeoffs between expected performance and exposure to adverse outcomes.
- » These results tended to highlight effect of heavy reliance on gas generation, which showed deviation from expected costs (as natural gas prices move) when demand growth was also above expectations.



# IRP Issues - Risk Analysis

## Scenario Results:

- » Illustrate the sensitivity of resource portfolios to possibility of future CO<sub>2</sub> costs at different \$/ton levels.
- » CO<sub>2</sub> costs at \$24 per ton or higher tended to favor all gas generation portfolios over portfolios that included new coal generation.



# Wind Won a Large Place in the Portfolio

Approximately 1,400 MW of Renewable Resources (mostly wind) planned over the next ten years

Renewable resources, specifically wind and geothermal resources, performed well primarily due to:

- » Technological improvements
- » Economies of scale
- » Incentives for wind development

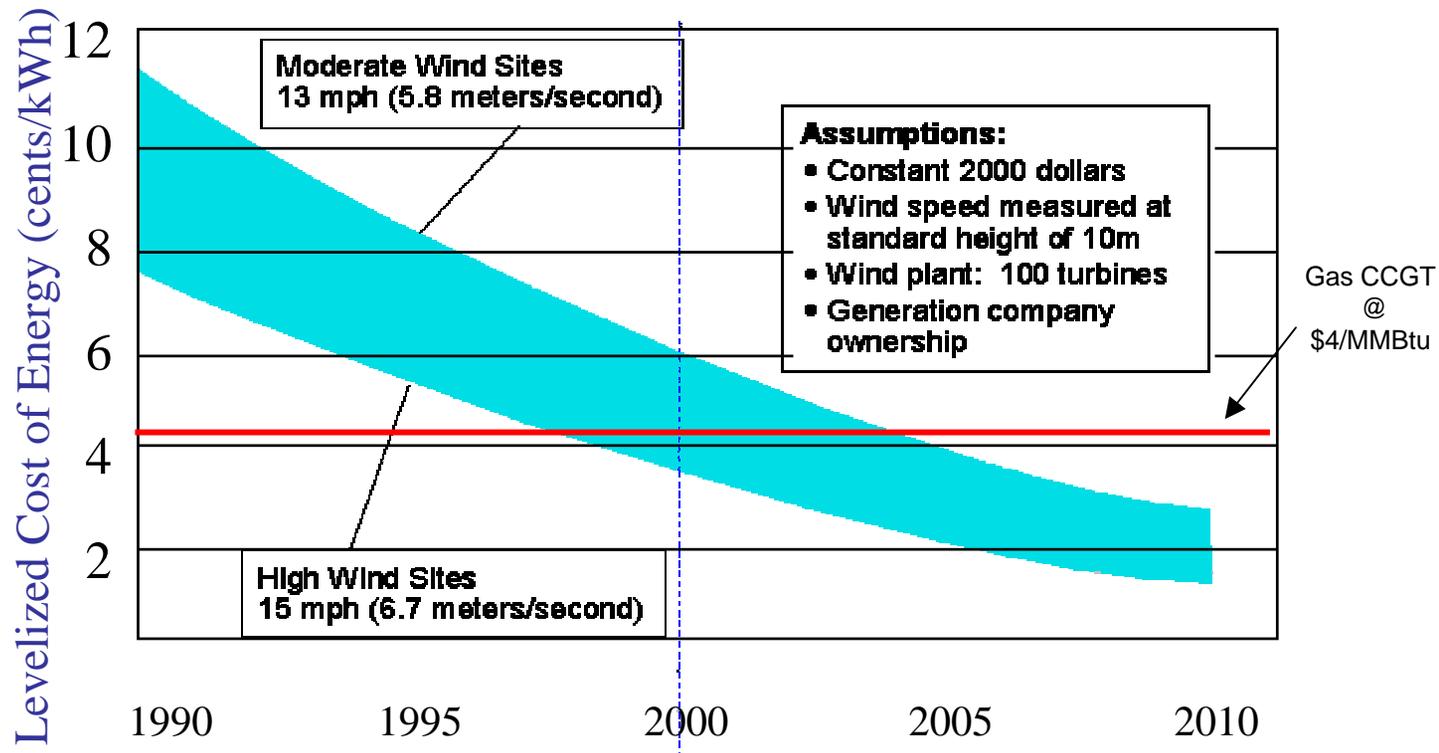
Low fuel-cost volatility

Learning more in short term about performance with other resources, transmission

No capacity value given to wind resources

More analysis needed

## Wind is a Declining Cost Resource



# Demand-Side Management (DSM)

## Action Plan

- » There are 450 MWa of cost effective non-dispatchable DSM and 100 MW of dispatchable and buydown DSM planned over the next 10 years
- » Studies are being undertaken to further determine the feasibility of 450 MWa of DSM in the PacifiCorp territory over the next ten years

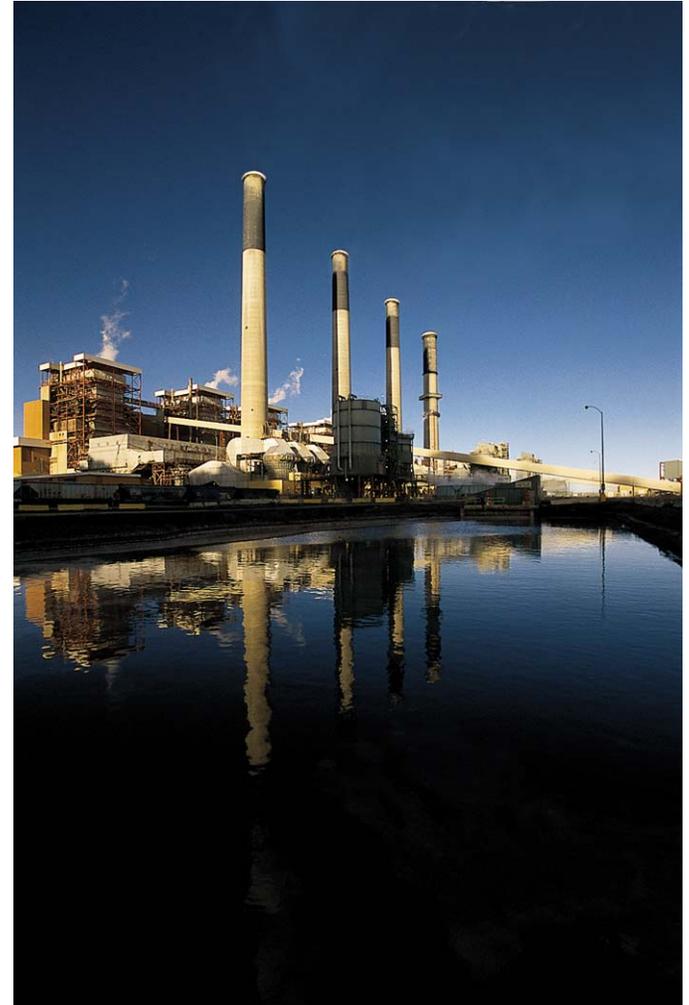
- » DSM plays an increasingly important role in the sustainability of the business. Example Include:
  - Active load control
    - ⇒ AC and irrigation control, interruptible
  - Technological change
    - ⇒ Appliance, lighting replacement
  - Voluntary
    - ⇒ Curtailable
  - Others where cost-effective and possible



# Base Load Capacity

## Action Plan

- » Approximately 2,100 MW of Base Load capacity are planned over the next ten years
  - » Prior to a commitment to build any of these assets, PPAs or other asset purchase opportunities will be reviewed and compared for economic benefits, risk reduction and long term optionality
- » Large, efficient generation that operates continuously
    - Coal or gas
  - » Three base loads in the East (in service 2008, 2009, 2012) and one unit in the West (in service 2007)
  - » More analysis required before any decision made
  - » Will compare build options with Power Purchase Agreement (PPA) options

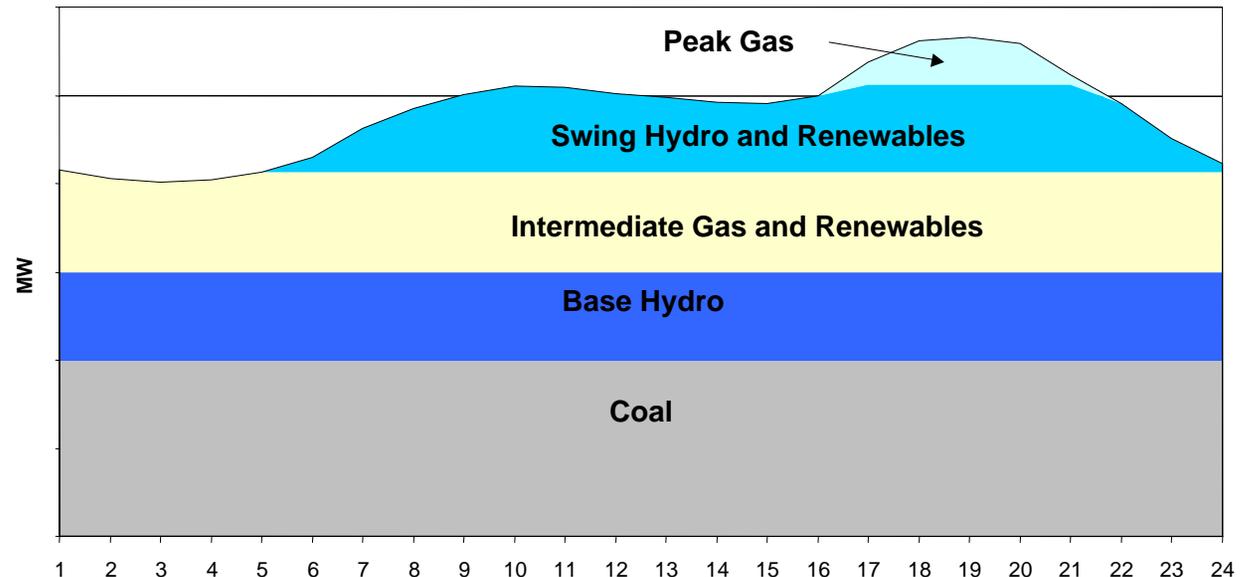


# Peaking Resources

## Action Plan

- » Approximately 1,200 MW of Peaking Resources are planned over the next ten years
- » Planning margin assumptions will be modified as the requirements of FERC's Standard Market Design becomes clearer
- » Prior to a commitment to build any of these assets, PPAs or other asset purchase opportunities will be reviewed and compared for economic benefits, risk reduction and long term optionality

- » Necessary component of every portfolio, and serve two purposes:
  - Meet the load shape requirements for the system
    - ⇒ Meet spikes in need, typically caused by weather
    - ⇒ Meet need as it occurs, without expense of operation when resource is not needed
  - Meet the capacity requirements of the 15% planning margin

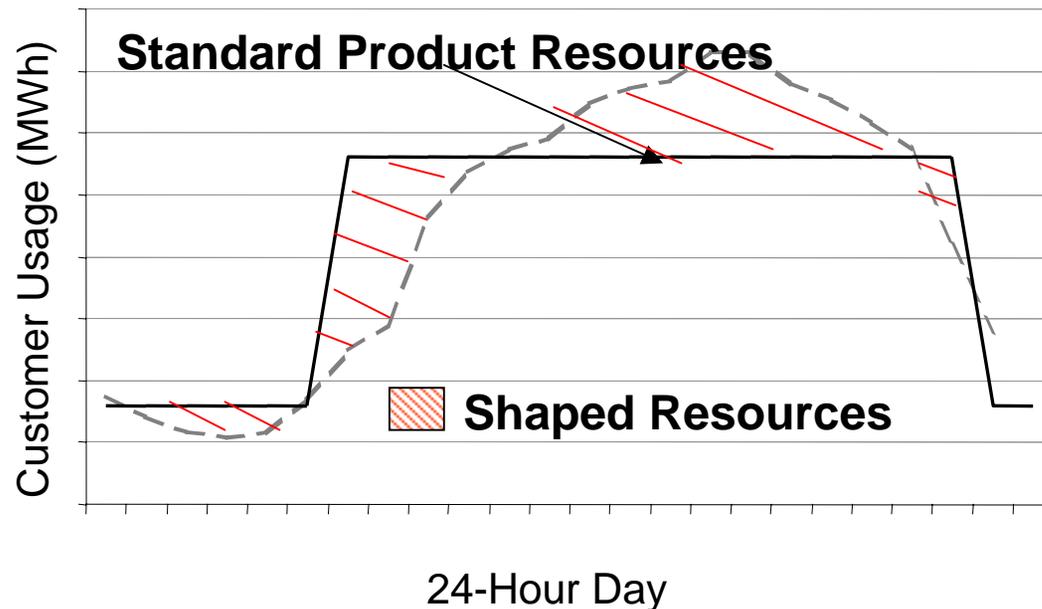


# Shaped Resources

## Action Plan

- » Approximately 700 MW of Shaped Resources are planned over the next ten years
- » These products will fill short term needs prior to assets being built, and will supplement the building of assets in the long term

- » Contracts (sales and purchases) or resources that fill specific needs
- » Likely power purchase agreements
  - Optimize physical assets
  - Reduce cost



# Implementation Risks

## Implementation Risks

- » PacifiCorp classifies most of the implementation risks as 'Paradigm Risks' because they cannot be reasonably represented by a number
- » The assessment of Paradigm risks is usually qualitative rather than quantitative
- » The IRP must remain flexible to respond these uncertainties

The following issues could impact PacifiCorp's ability to implement part or all of the IRP:

- Multi-state process to resolve issues of recovery
- Structural changes in industry
  - ⇒ FERC's Standard Market Design
  - ⇒ Regional Transmission Organization
- Deregulation/restructuring by states
  - ⇒ SB1149
- Hydro relicensing
- Comprehensive Air Initiative

# Whither RTO - What Will Happen?

## RTO West Milestones

- » Revised TOA Filed - Early Summer
- » TOA Approved - Fall
- » Independent Board - Late 2004
- » Operation - Mid 2006

## RTO West Challenges

- » Gain Needed FERC Approvals
- » Gain States Support
- » Ensure Level Playing Field with Non-Jurisdictionals
- » Staying the Course, Continuing to Develop a Regional Solution

- » More efficient transmission eliminates the need for “some” generation
- » Net WECC generation additions (2001-2003)
  - Capacity additions totaling 18,200 MW ( 11.3 % of WECC generation capacity)
  - Additional 15,400 MW under construction with commercial operation expected by 2004 ( 8.7 %)
  - Compare to 8,000 MW added 1999 -2000 ( 5.4 %)
- » Net WECC transmission additions (2001-2003)
  - Net additions of 630 circuit-miles at 115 kV or higher (<1% of WECC transmission)

# Next Steps in the IRP Process

## Next Steps:

- » The updated action plan will provide the Company an opportunity to inform stakeholders about changes in the IRP Action plan due to updated inputs and assumptions prior to the next IRP filing
- » IRP Action Plan to be updated no less frequently than annually

- » Filed the IRP in all six states on January 24, 2003
  - California: filed for an exemption
  - Oregon: Commission decision scheduled for July 22
  - Idaho: Received acknowledgement
  - Utah: Received acknowledgement
  - Washington: Commission decision scheduled for August
  - Wyoming: Informational filing only
- » Continue Communications with IRP Public Input Participants:
  - Held Public Input Meeting to on May 19
  - Load Forecasting Technical Workshop held on June 30
  - Next Public Input Meeting scheduled for July 21
- » File an update to the IRP Action Plan in all states in October 2003
- » Consolidate and refine planning process
- » Begin new IRP cycle in December 2003

# Next Steps in the RFP Process

## Next Steps:

- » RFP Timeline:
  - Issuance of RFP 2003-A on June 5
  - Pre-Bid Conference - June 20
  - Initial Bids Due - July 22
  - Evaluation Complete - August 6
  - Short List Announced - August 13
- » RFP 2003-A calls for:
  - Summer 2005 peaker (200MW)
  - Summer 2007 baseload (570MW)
  - Summer 04/05/06/07 Superpeak (225MW)

## » **RFP 2003-A**

- Three supply-side RFPs issued on June 5, responses due July 22.
- Navigant has been selected as the Independent Consultant to oversee the RFP process.
- 43 Letters of Intent were received from Counterparties on June 27.

## » **Currant Creek**

- In house build alternative 2005/2007 alternatives located at Mona substation
- Hired Shaw (Stone & Webster) to determine schedule and cost.
- PacifiCorp will file the Notice of Intent for Currant Creek by the end of July.

## » **Demand-side RFP**

- Includes Class 1 and Class 2
- Target is at least 100MWa over 10 years
- RFP was issued on June 26
- Responses due Aug 18