



# 2006 Integrated Resource Plan Public Input Meeting

April 20, 2006



# Agenda

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## Update on IRP Inputs, Assumptions, and Studies

- Climate Change Policy Developments
- CO<sub>2</sub> Analysis in the 2006 IRP
- Integrated Gasification Combined Cycle (IGCC) Analysis Update
- Treatment of IGCC in the 2006 IRP
- Long-Term Load Forecast
- Preliminary Load & Resource Balance
- Next Steps



# Climate Change Policy Developments

Cathy Woollums



# Today's Discussion

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- Policy developments
  - International
  - National
  - Regional
- Considerations for analyzing CO<sub>2</sub> impacts for the 2006 IRP

# Kyoto Protocol

- Ratified by 155 countries representing 55% of world Greenhouse Gas (GHG) emissions, the Protocol came into force February 2005 upon Russia's ratification
- Reduce GHG emissions from developed countries by 5.2% from 1990 levels, during 2008-2012
  - Different nations have different targets
- Developing nations not covered by the cap, but can participate through programs such as Clean Development Mechanism (offsets for compliance by developed nations)
- United States did not ratify the Protocol

# Kyoto Protocol – European Union and Canada

- EU committed to 8% reduction from 1990 levels by 2012
- Current European Union (EU) emissions trading scheme not fully reflective of what is to come under Kyoto
  - “Flexibility mechanisms” just ready for substantial activity
  - Russia able to sell “hot air” and potentially depress prices from current levels
  - Clearing price on the European Climate Exchange (ECX) at €24-28/ton (\$29-34/ton) for 2006-2007
- Canada committed to 6% reduction from 1990 levels by 2012
  - Current levels approximately 25% above 1990
  - \$10 billion investment
- New Conservative government in Canada has indicated that Kyoto is potentially “flawed” and that it will re-examine its timetables and compliance plans

# Federal Policy

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- Numerous Congressional proposals to cap GHGs
- None have passed out of either side of Congress
- Some bipartisan interest in Senate to address GHGs
- Bush Administration and House appear opposed to GHG caps
- Method and cost of GHG reductions, rather than questions over science, are now the key issues in Washington

# Congressional Proposals

- Bush Clear Skies
  - Would limit NO<sub>x</sub>, SO<sub>x</sub> and Hg emissions but not CO<sub>2</sub>
  - Stuck in Senate Environmental and Public Works Committee on tied vote
- Bingaman (National Commission on Energy Policy)– Not yet proposed; under development
  - Based on recommendation of bipartisan National Commission on Energy Policy
  - Limits intensity (tons/MWh) and have a cost cap of \$7/ton escalated at 5% annually
  - Has earned potential support of Senate Energy Chair Domenici
- McCain Lieberman
  - Would limit 2010 emissions to 2000 levels
  - Made it out of Committee to Senate Floor
- Carper
  - 2005 levels in 2008; 2001 levels in 2012
  - Introduced into Committee but did not go to markup
- Jeffords
  - 1990 levels in 2007
  - Introduced into Committee but did not go to markup

## Regional/State Efforts — Regional Greenhouse Gas Initiative

- To cover 7 states: Maine, New Hampshire, Vermont, Connecticut, New York, Delaware and New Jersey
  - Massachusetts and Rhode Island have pulled out for now
  - Maryland might join via legislation
- “Smokestack” cap on emissions
  - Caps emissions from plants greater than 25 MW located within states
  - Annual emissions in 2009-2014 capped at 1990 levels
  - Annual emissions in 2015-2018 must drop 10% further
  - Penalty: loss of 3 times the deficit in allowances for next compliance period, plus possible state-specific fines
- Draft “model rule” released recently for comment; for adoption by states via administrative rulemakings

## Regional/State Efforts — Regional Greenhouse Gas Initiative

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- Cost capped at \$10/ton in 2009 with 2% escalator annually
  - Cost of CO<sub>2</sub> must remain at cost cap level for a year to trigger cost cap
  - Cost cap in turn triggers more flexibility for regulated entities (more time, more tools)
- 75% of allowances to be granted to emitters; remainder to be managed to benefit consumers (e.g., sales to emitters to raise funds)

# Regional/State Efforts — Regional Greenhouse Gas Initiative

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- Limited reliance on offsets
  - 3.3% of total reported emissions during a period
  - Limit is raised if cost cap is triggered
  - Specific “direct reduction” offsets permitted (e.g., methane capture, afforestation, oil-fired boiler efficiency)
- 0.3% - 3.2% increase in retail rates in 2015
- Concern about “leakage” of supply to other states not covered by the cap

## Regional/State Efforts — California Load-Based Cap

- In February, CPUC issued decision to apply a “load-based” cap to IOUs and other types of load-serving entities
  - Unlike RGGI “smokestack” approach, California would place requirements on all power consumed by Californians, whether located in or out of California
    - Attempt to address “leakage” problem that RGGI might face
  - Does not cover municipals, though proposed legislation would
- Many details are not yet resolved and await further proceedings
- If fully implemented, it could affect generation across the West if such generation is used to serve California

# California Load-Based Cap — Known Design Elements\*

- Emissions allowances will be based on “tons of CO<sub>2</sub> equivalent”, and over time will include all six major GHGs
- Cap will include provisions for lowering GHG emissions over time relative to a baseline
- Baseline will be established on a historical year basis, with 1990 as the preference year
- Emissions allowances to be allocated administratively
- Preference for allowing alternative compliance payments, as well as sales of excess allowances for shareholder profit

\* Slide content courtesy of Julie Fitch, CPUC

# California Load-Based Cap—Outstanding Issues\*

- Establishment of baseline and cap
  - 1990 Baseline per Kyoto and the Governor's Targets
  - Adjustment and true-up
- Reporting standards and requirements
  - Verification, tracking, and enforcement
  - Emissions factors
  - Inclusion of long-term non-specific source contracts and short-term/spot purchases
- Administrative allocation of allowances
  - Historically-based allocation
  - Partial auction?
- Flexible compliance mechanisms (offsets, trading, banking, penalties, etc.)

\* Slide content courtesy of Julie Fitch, CPUC

# Regional/State Efforts - California

## GHG Performance Standard

- CPUC policy statement in October 2005 and 2005 state Integrated Energy Policy Report
- Would require IOU energy contracts and owned plant to meet GHG emissions levels of a combined-cycle natural gas turbine for all long-term procurement activities (over 3 years)
- Would essentially require coal-fired generation serving CA load to be coal gasification (IGCC) with sequestration
- State anticipates coordinating GHG performance standard with implementation of the load-based cap and other measures such as the CO<sub>2</sub> adder
- CPUC proceedings on details to follow
  - Not enough detail to estimate cost/benefit impacts

# Regional/State Efforts - Oregon

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- 1997 Oregon siting law requires offsetting CO<sub>2</sub> emissions when they rise above a level equal to an 18% reduction from a CCCT
  - Currently set at 85 cents/ton
- Governor Kulongoski convened an Advisory Group to identify additional measures
  - Report available at <http://oregon.gov/ENERGY/GBLWRM/Strategy.shtml>
- A taskforce is examining GHG limits for power and gas sectors

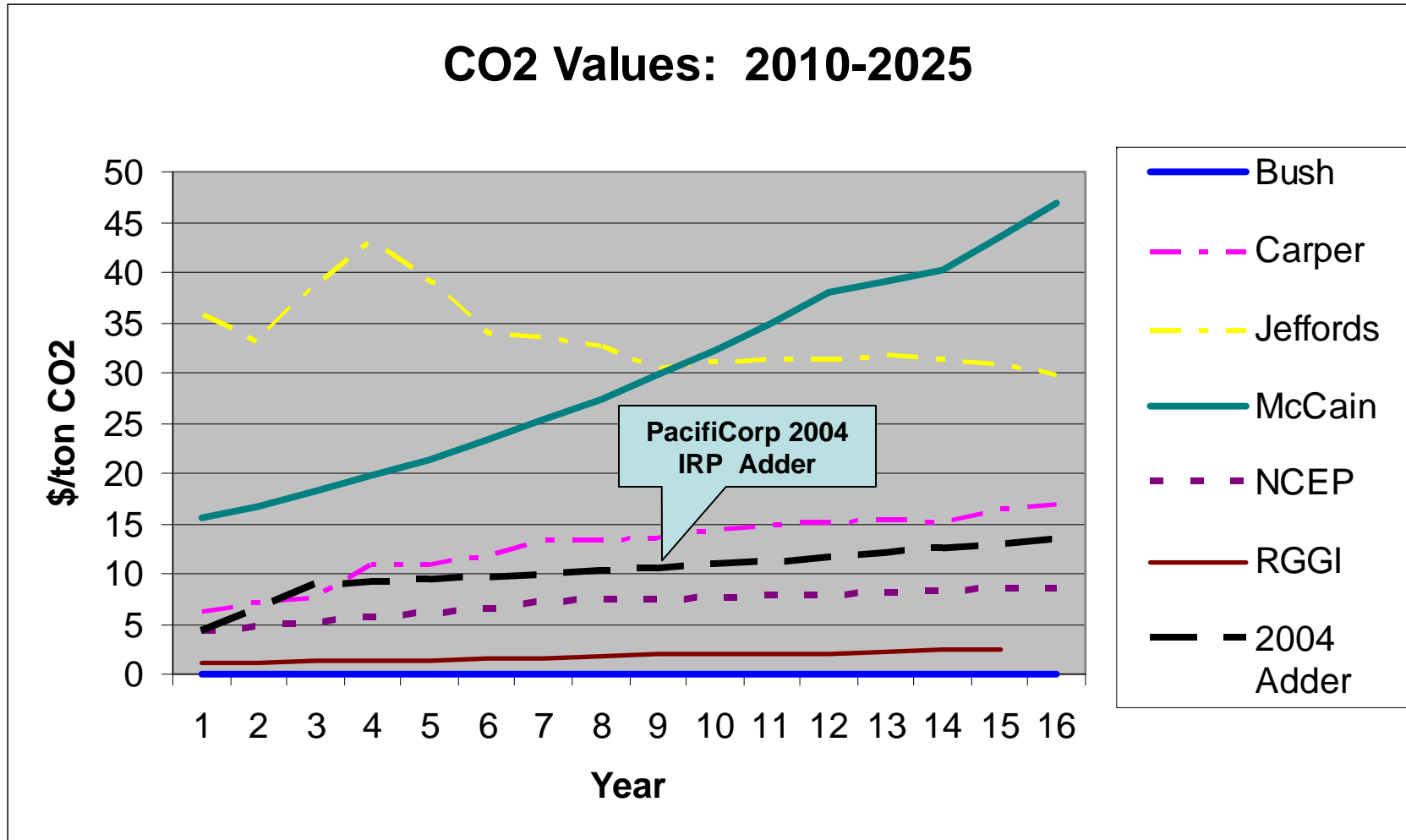


# CO<sub>2</sub> Analysis in the 2006 IRP

Greg Duvall



# 2004 Adder Compared to Federal Proposals and RGGI



# Historic Approach to CO<sub>2</sub> Risk Assessment in the IRP

- From the early 1990s, the company's Integrated Resource Plan has included analysis of CO<sub>2</sub> risk, using \$0, \$10, \$25, and \$40/ton in its scenario analyses
- In the 2003 and 2004 Integrated Resource Plan, the company included an inflation-adjusted CO<sub>2</sub> adder of \$8.00/ton (2008\$)
- This value was determined by the company, and was intended to represent a reasonable carbon tax future given considerable uncertainty concerning future costs

# Assessment of CO<sub>2</sub> Risk in the 2006 IRP

- A review of the current federal, regional and state initiatives on CO<sub>2</sub> continues to imply significant uncertainty over the future cost impacts of CO<sub>2</sub> emissions on customers
- Given this uncertainty, the company will use a range of CO<sub>2</sub> values to assess cost sensitivity and risk
  - The Washington Utilities and Transmission Commission, in their 2004 IRP acknowledgement order, also requested a cost impact analysis of early CO<sub>2</sub> adder adoption assuming that regulations come much later than expected, or not at all
- PacifiCorp intends to continue using the \$8.00/ton adder value as a base case assumption
- In addition, the company will compare the relative CO<sub>2</sub> emission rates of each portfolio. Combined with their respective Present Value Revenue Requirement (PVRR) values, the value of CO<sub>2</sub> required to switch portfolio will be determined



# IGCC Analysis Update

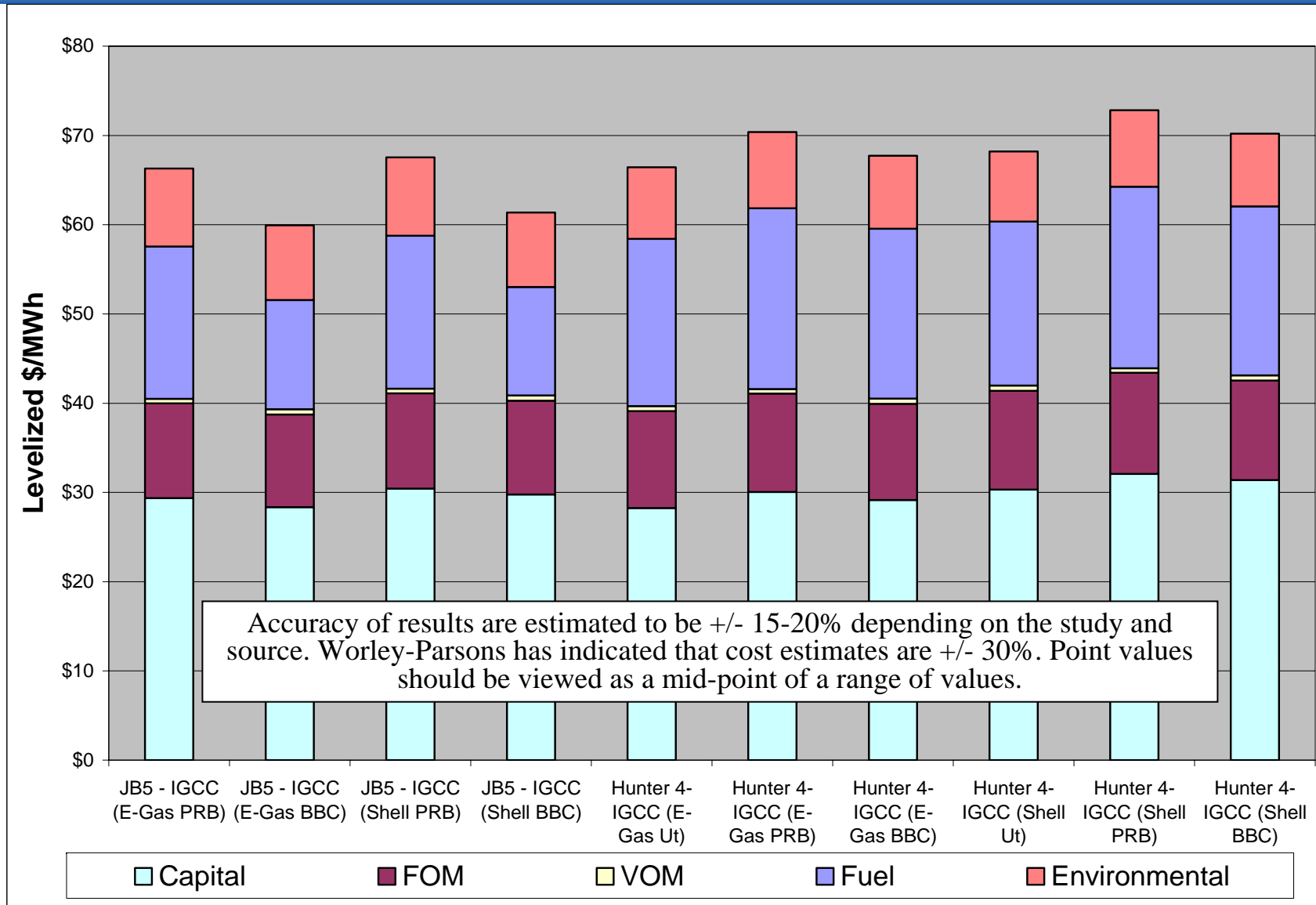
Ernie Wessman / Ian Andrews



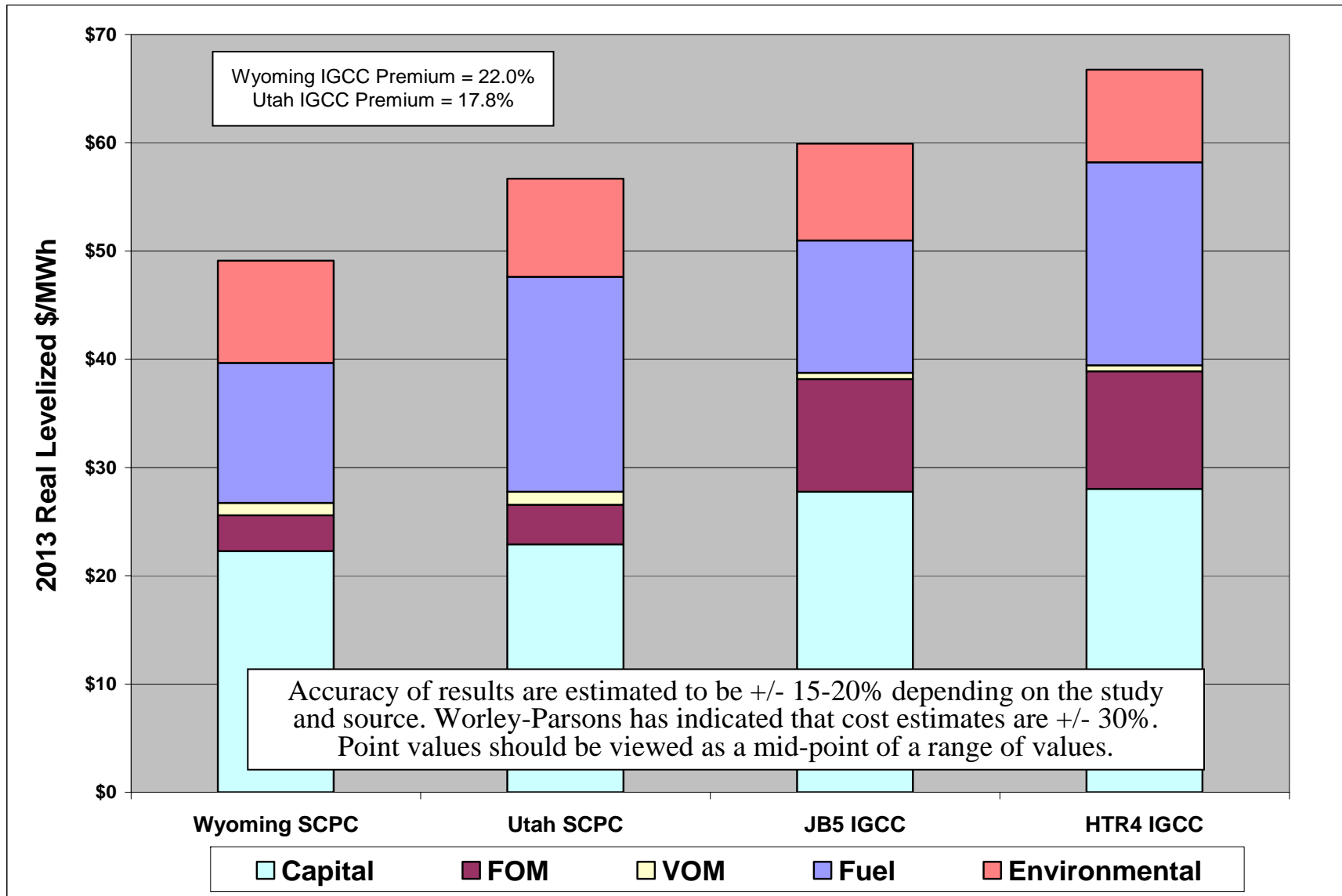
# Baseline Proxy IGCC Assumptions

- EPRI “Coal Fleet” User Design Basis Specification (UDBS) used as Reference Case:
  - Spare gasifier assumed to achieve 90% capacity factor (except for Shell gasifier)
  - UDBS Design 2 Standard (Selective Catalytic Reduction assumed for additional NO<sub>x</sub> removal & deeper sulfur removal)
  - Wet cooling
  - Natural gas available for startup and backup
- “Reference Plant IGCC” 2x1 configuration using GE 7FB gas turbines.
- Standard provisions for “Carbon Capture Ready” - Design includes space for additional equipment, balance of plant, & site access to install carbon capture equipment at a later date. Carbon capture capability to be evaluated as an incremental cost to base case for evaluation purposes.
- Financial Assumptions:
  - 10 Yr Modified Accelerated Cost Recovery System (MACRS) depreciation for Gasification Equipment, and 20 Yr MACRS for Power Island
  - Typical assumptions (Company weighted average cost of capital, 40-year economic life, ad-valorem taxes, etc)
- Results from recent Worley-Parsons (WP) study to be used to develop lowest cost IGCC at proxy PacifiCorp brownfield sites (Jim Bridger & Hunter). WP study results adjusted to include Owner’s costs & contracting assumptions not included in the consultant analysis.

# Estimated Site Specific IGCC Costs of Energy based on 2006 Worley Parsons Study (Excludes Transmission) - Preliminary



# Estimated Coal-based Resource Costs of Energy (Excludes Transmission) - Preliminary



# WP Expanded Study Summary Conclusions to date

- Based on preliminary evaluation, the results indicate that there is a substantial spread (15-25%) between supercritical, coal-fired options and IGCC depending on location, gasifier technology, coal type, assuming target availability levels are achieved.
- Accuracy of current results are estimated to be +/- 15-20% depending on the study and source. Worley-Parsons has indicated that cost estimates are +/- 30%. Point values should be viewed as a mid-point of a range of values.
- IGCC resources located in SW Wyoming are expected to be lower cost than Utah-based IGCC resources
- Gasifier technology has an impact on Cost of Energy
- Additional effort will focus on evaluating ITC/financing benefits, spare gasifier tradeoff, CO<sub>2</sub> capture & sequestration, Engineer, Procure, & Construct cost & “wraps,” turbine type, etc. Results will be provided to the IGCC Working Group.



# Treatment of IGCC in the 2006 IRP

Peter Warnken



# Major Analysis and Modeling Steps

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- Specifying IGCC proxy resources
- Evaluate IGCC proxy resources for inclusion in candidate portfolios on a comparable basis with other supply and demand-side resources using the Capacity Expansion Model (CEM)
- Use scenario analysis to evaluate tradeoffs between IGCC and other types of resources
- Update IRP analyses with information from IGCC Working Group if significant new information becomes available and time permits

# Specifying IGCC Proxy Resources

- Develop a manageable number of IGCC proxy resources (< 5) that capture key distinguishing cost, benefit, and risk characteristics of IGCC vs. comparable alternatives
- Potential technology configuration assumptions
  - Availability: single gasifier vs. two gasifiers
  - Carbon-capture-ready/sequestration design
- Potential financial incentive assumptions
  - ITC availability
  - Loan guarantees
- Address technology risks & uncertainty of cost estimates
- Use WorleyParsons Expanded Study and EPRI Technical Assessment Guide (TAG®) “reference plant” information to develop IRP resource costs and characteristics

# Candidate Resource Evaluation

- Evaluate IGCC proxy resources for inclusion in candidate portfolios on a comparable basis with other supply and demand-side resources using the Capacity Expansion Model (CEM)
  - Use specified IGCC proxy resources
  - Determine earliest, realistic IGCC in-service dates based on current assessment of technology maturity, procurement, and permitting timelines and associated risks
  - Conduct portfolio optimization studies using scenarios that reflect alternative futures; portfolio selection will be based on relative cost performance of portfolio resources across the range of modeled futures
  - Include the impact of capital cost uncertainty in the risk assessment; i.e., incorporate distributions of potential capital costs in the PVRR analysis
  - For coal resource evaluation, include both subcritical and supercritical pulverized coal along with IGCC
- Perform detailed deterministic and stochastic simulations of candidate resource portfolios using the Planning and Risk (PaR) model; candidate portfolios will consist of screened resources from the CEM optimization studies

# Scenario Analysis

- Use scenario analysis to evaluate tradeoffs between IGCC and other types of resources
  - Start with Preferred Portfolio resources
  - Replace a large baseload proxy plant in the Preferred Portfolio with the IGCC proxy plant
  - Proxy IGCC resource includes carbon capture and sequestration cost estimates
  - Determine the stochastic Present Value Revenue Requirement (PVRR) impact relative to the Preferred Portfolio using the Planning and Risk (PaR) model
  - Use the difference in PVRR between these two portfolios to evaluate the tradeoffs between IGCC and the resource it replaced in this scenario analysis

# Analysis Updates

- Update IRP analyses with information from IGCC Working Group if significant new information becomes available and time permits
  - The IRP Team will be informed by the IGCC Working Group and other sources on progress with respect to the IGCC parameters
  - To the extent that favorable developments with respect to IGCC procurement are significant enough to justify a resource portfolio modeling study—and can be accommodated in the overall planning process and schedules—the IRP Team can conduct a CEM evaluation of the Preferred Portfolio with an updated IGCC resource
    - Purpose is to determine if there is an impact on procurement decisions with respect to Preferred Portfolio resources (i.e., amount, type, and timing)
    - As part of the overall information-sharing effort, would be used to inform the IGCC Working Group on IGCC status as a viable future resource for PacifiCorp



# Long-Term Load Forecast Highlighting 2007-2017

Reed Davis



# National Economic Outlook

## Global Insights Macro Forecast of February 2005

| Indicator         | 1994 – 2004 | 2005 | 2006 | 2007 - 2017 |
|-------------------|-------------|------|------|-------------|
| <b>GDP</b>        | +++         | +++  | ++   | +++         |
| <b>Employment</b> | +           | ++   | +    | +           |
| <b>Population</b> | +           | +    | +    | +           |

Legend

0 to 1.5 +

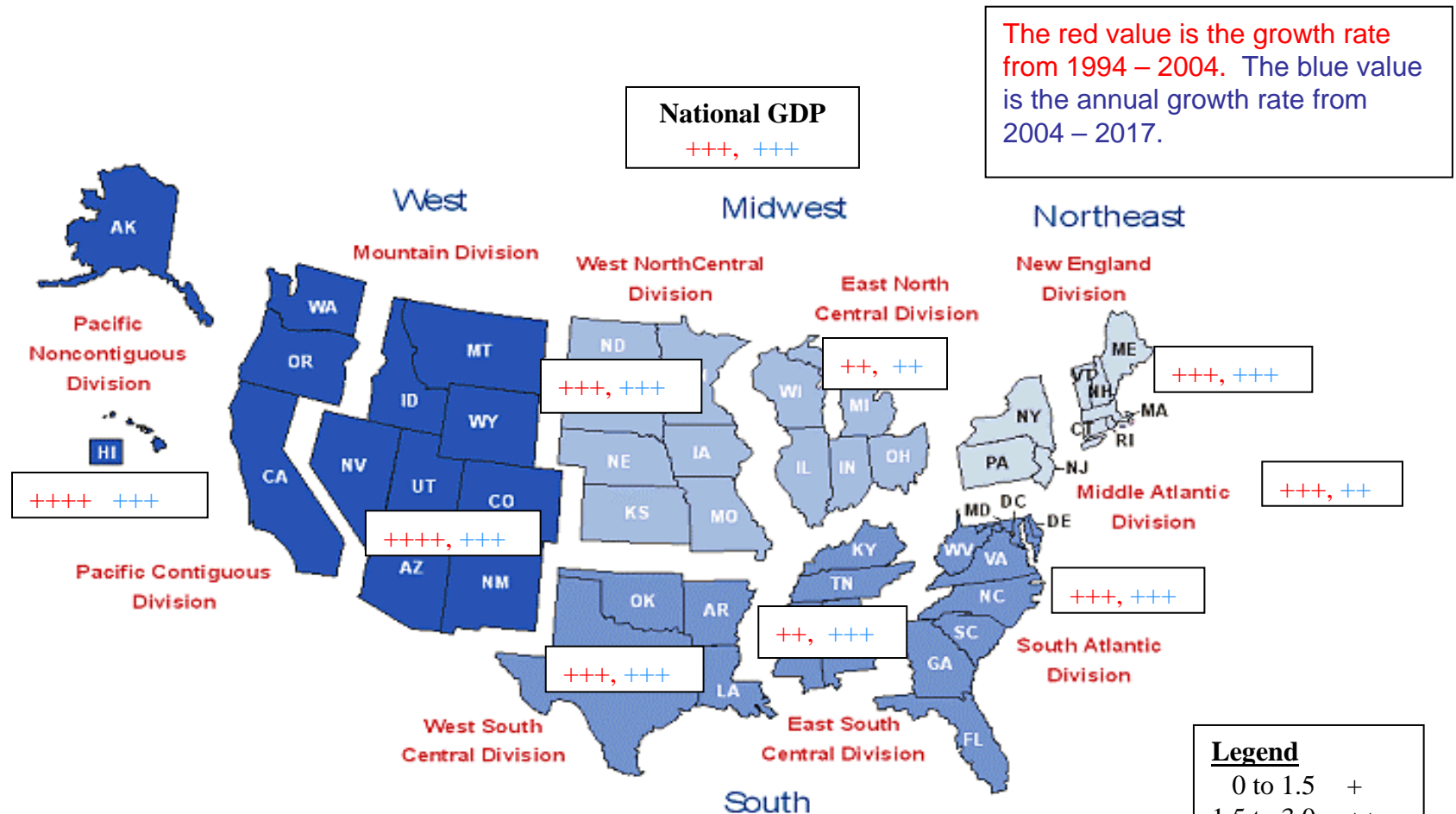
1.5 to 3.0 ++

3.0 to 4.5 +++

> 4.5 ++++

- GDP growth is lower in the forecast horizon than for the last 10 years
  - Slower population growth (especially in the working age population) will lead to slower employment growth.
  - Slightly lower productivity growth.
- Annual productivity growth at 2.2% per year
- Slower growth of the Housing stock
- Unemployment gradually reaches 4.8%

# Regional Gross State Product Growth



- Pacific and Mountain Regions
  - Grow faster than national average
  - Grow as fast or faster than other regions

| <b>Legend</b> |      |
|---------------|------|
| 0 to 1.5      | +    |
| 1.5 to 3.0    | ++   |
| 3.0 to 4.5    | +++  |
| > 4.5         | ++++ |

# Total Sales Forecast Summary

| <u>Energy (GWh)</u> | <b>Average Annual Growth Rates</b> |                   |
|---------------------|------------------------------------|-------------------|
|                     | <u>1994 to 04</u>                  | <u>2005 to 17</u> |
| Total Company       | 1.38 %                             | 2.41 %            |
| Residential         | 1.95 %                             | 2.20 %            |
| Commercial          | 3.43 %                             | 3.12 %            |
| Industrial          | -0.20 %                            | 2.09 %            |
| Utah                | 3.17 %                             | 3.31 %            |
| Oregon              | 0.00 %                             | 1.19 %            |
| Wyoming             | 0.30 %                             | 3.06 %            |
| Washington          | 0.90 %                             | 1.01 %            |
| Idaho               | 0.97 %                             | 1.43 %            |
| California          | 0.98 %                             | 1.40 %            |

- The eastern portion of the system continues to lead the growth in the service territory
- Wyoming growth significantly changes due to oil & gas activity
- Commercial growth lower than historical levels
- Decline in many industries or loss of large customers is not expected to continue



# State Sales Forecasts



# Oregon Sales Summary

|                        | <u>Actual</u> | <u>Forecast</u> | <u>Average Annual Growth Rates</u> |                   |
|------------------------|---------------|-----------------|------------------------------------|-------------------|
|                        | <u>2005</u>   | <u>2017</u>     | <u>1994 to 04</u>                  | <u>2005 to 17</u> |
| <b>Residential</b>     |               |                 |                                    |                   |
| Energy (GWh)           | 5,374         | 6,203           | 0.86 %                             | 1.20 %            |
| Customers (Thousands)  | 447           | 513             | 1.39 %                             | 1.14 %            |
| Use per Customer (kWh) | 12,016        | 12,100          | -0.53 %                            | 0.06 %            |
| <b>Commercial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 4,614         | 5,547           | 2.52 %                             | 1.55 %            |
| Customers (Thousands)  | 72            | 87              | 2.08 %                             | 1.55 %            |
| Use per Customer (kWh) | 63,920        | 63,880          | 0.44 %                             | 0.00 %            |
| <b>Industrial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 2,957         | 3,146           | -3.78 %                            | 0.52 %            |

# Oregon Items of Note

## Residential

- Saturations are declining where there is a preference for gas
- Cooling is increasing as real income increases, real prices decrease, square footage grows and high expectations for AC among those migrating into the state

## Commercial

- Growth expected in professional and information services employment leading to growth in Offices and Retail businesses
- Office Equipment is growing through Offices, Health Services, and Retail businesses

## Industrial

- Increased sales to specialty foods manufactures and exports
- Other sectors (e.g., metals and glass) have strong economic outlooks in Oregon and the Nation
- Lumber & Wood Sector helped by a small number for lumber firms finding growing niche markets
- Large drop in Paper Products in past due to loss of Ft James and Pope & Talbot at Halsey

# Utah Sales Summary

|                        | <u>Actual</u> | <u>Forecast</u> | <u>Average Annual Growth Rates</u> |                   |
|------------------------|---------------|-----------------|------------------------------------|-------------------|
|                        | <u>2005</u>   | <u>2017</u>     | <u>1994 to 04</u>                  | <u>2005 to 17</u> |
| <b>Residential</b>     |               |                 |                                    |                   |
| Energy (GWh)           | 5,707         | 8,518           | 3.89 %                             | 3.39 %            |
| Customers (Thousands)  | 646           | 870             | 2.88 %                             | 2.51 %            |
| Use per Customer (kWh) | 8,916         | 9,793           | 1.01 %                             | 0.88 %            |
| <b>Commercial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 6,775         | 11,224          | 4.82 %                             | 4.30 %            |
| Customers (Thousands)  | 70            | 101             | 3.99 %                             | 3.09 %            |
| Use per Customer (kWh) | 97,011        | 111,571         | 0.79 %                             | 1.17 %            |
| <b>Industrial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 6,944         | 9,169           | 1.56 %                             | 2.34 %            |

# Utah Items of Note

## Residential

- Utah customer growth driven mainly by household formation, with some net in-migration
- Use per customer mainly driven by increasing incomes and house square footage
- Air conditioning continues its steady increase, led by central A/C, as income rises and consumer preferences change

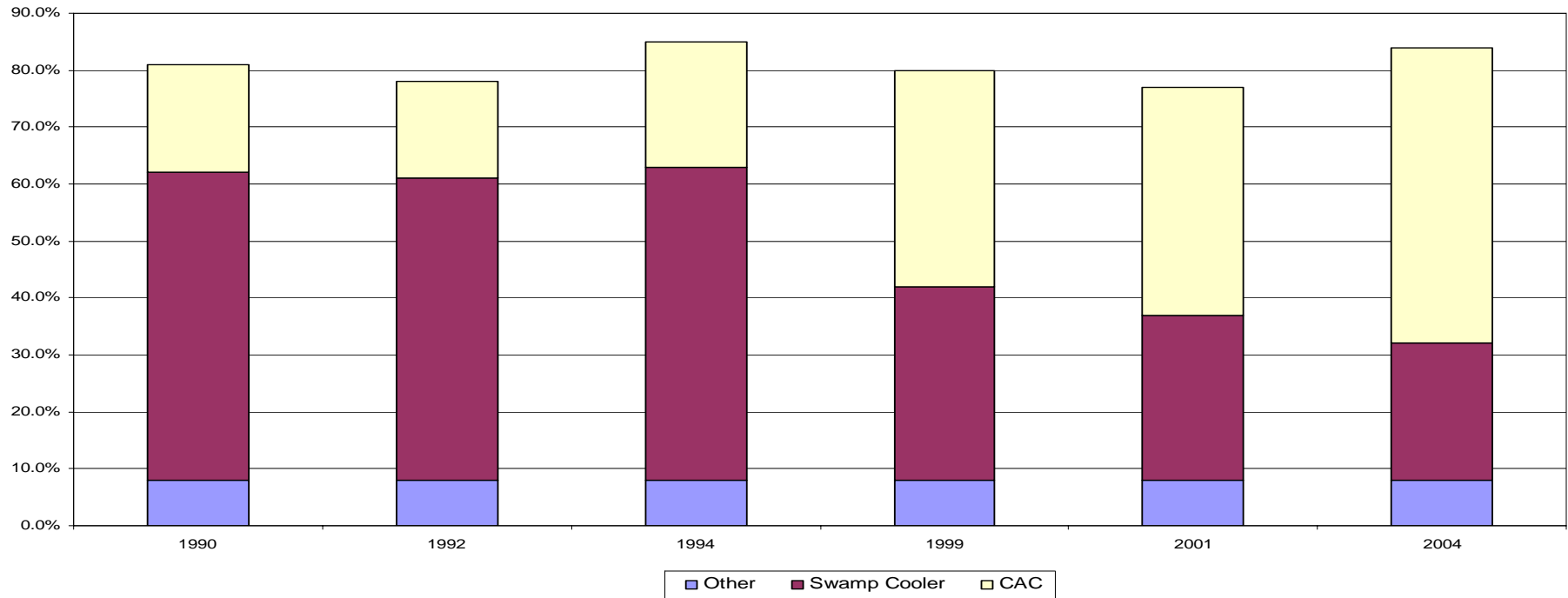
## Commercial

- Higher residential customer growth in the state creates a stable higher growth rate
- Healthy growth in the office and health sectors

## Industrial

- Without new additional companies, load growth rate nearly equal to historical
- Micron – expected to grow to 50 MW into 2007
- Oil & Gas growth expected by Kerr McGee near Vernal

# Utah Cooling Equipment Changes



- Central Air Conditioning continues to penetrate into the Residential class
- Customer moving into the state have a preference for Central Air Conditioning
- We expect to see a continuation of this trend in the coming years as well as additional customers choosing to Air Condition

# Wyoming Sales Summary

|                        | <u>Actual</u> | <u>Forecast</u> | <u>Average Annual Growth Rates</u> |                   |
|------------------------|---------------|-----------------|------------------------------------|-------------------|
|                        | <u>2005</u>   | <u>2017</u>     | <u>1994 to 04</u>                  | <u>2005 to 17</u> |
| <b>Residential</b>     |               |                 |                                    |                   |
| Energy (GWh)           | 939           | 1,190           | 1.25 %                             | 2.00 %            |
| Customers (Thousands)  | 101           | 114             | 0.70 %                             | 0.99 %            |
| Use per Customer (kWh) | 9,279         | 10,455          | 0.55 %                             | 1.00 %            |
| <b>Commercial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 1,290         | 1,928           | 2.60 %                             | 3.41 %            |
| Customers (Thousands)  | 22            | 25              | 1.50 %                             | 1.12 %            |
| Use per Customer (kWh) | 59,847        | 78,239          | 1.10 %                             | 2.26 %            |
| <b>Industrial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 5,756         | 8,348           | -0.28 %                            | 3.15 %            |

# Wyoming Items of Note

## Residential

- PacifiCorp's Wyoming customer growth is faster than the state population growth because of decreasing persons per household
- Use per customer is driven by increasing per capita income growth giving bigger home sizes and appliance levels
- Energy sales are driven by customer growth and increasing use per customer

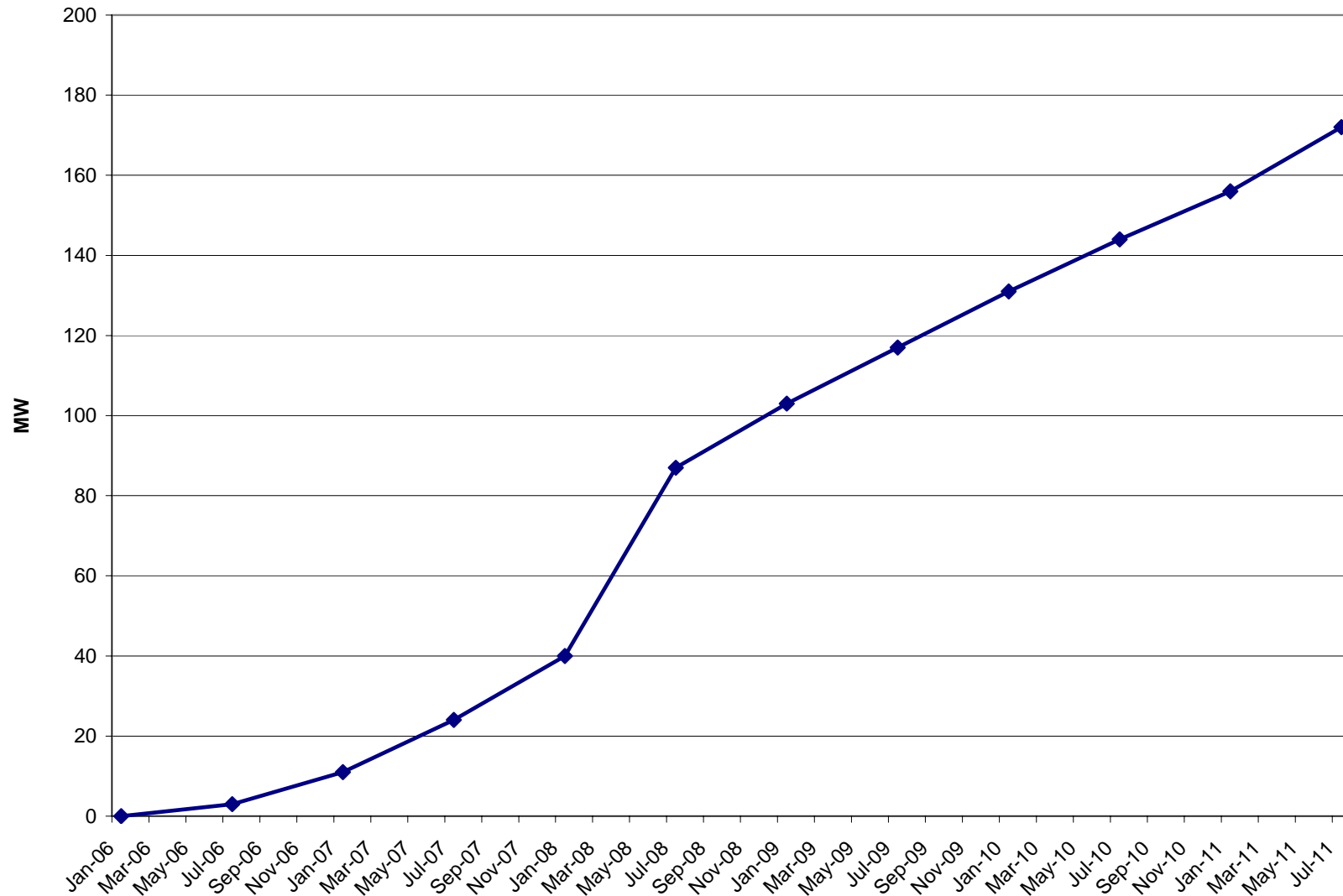
## Commercial

- Higher residential customer growth will drive more commercial growth
- Additionally increasing growth in the office, schools, and health sectors

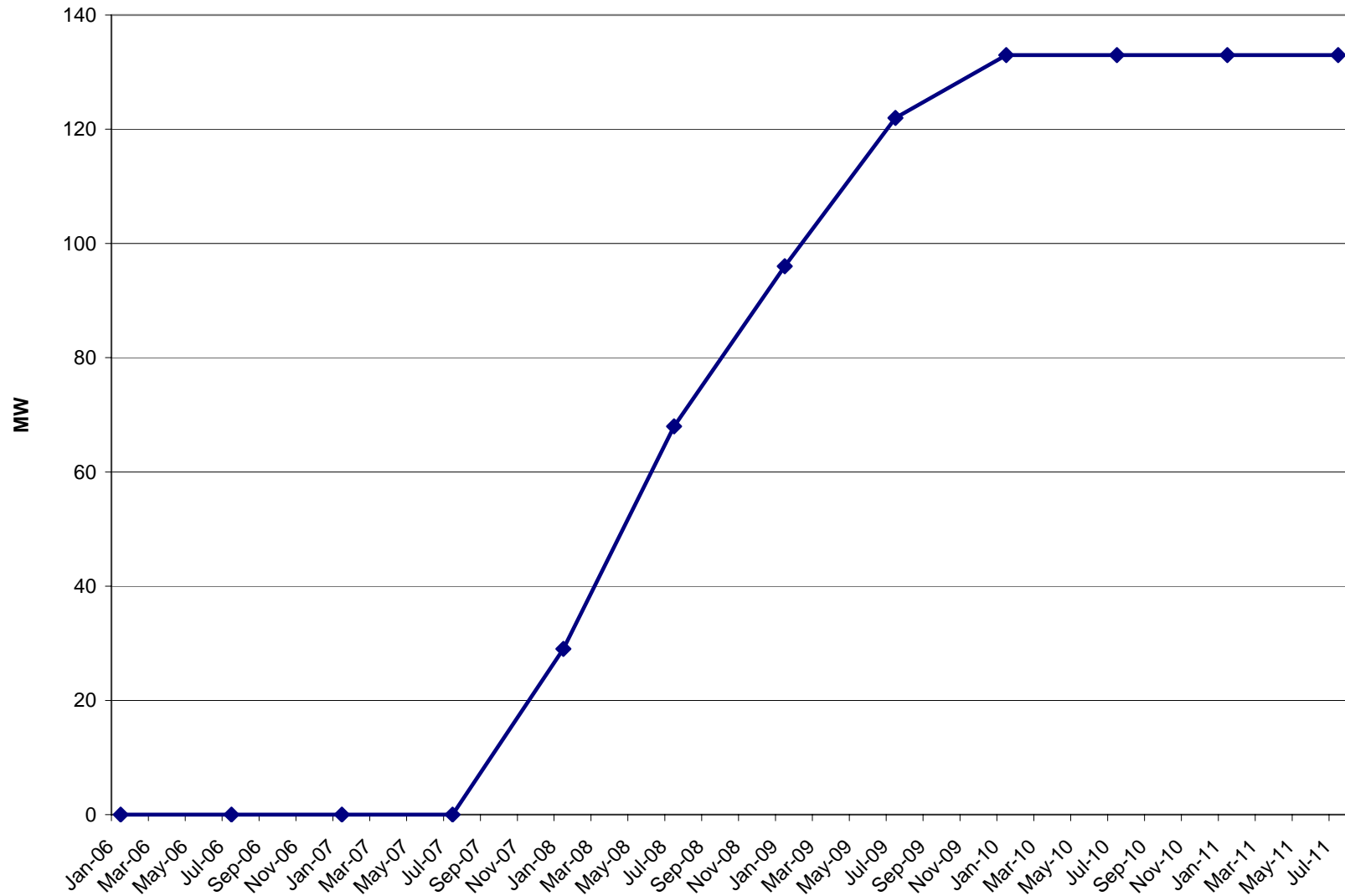
## Industrial

- Sales are dominated by the petroleum and natural gas production industries. Forecasted to be the fastest growing sector.
- Approximately 280 MW over next five years of new growth in the petroleum and natural gas sector is included

# Eastern Wyoming – New Large Oil & Gas Forecast



# Western Wyoming – New Large Oil & Gas Forecast



# Idaho Sales Summary

|                        | <u>Actual Forecast Average Annual Growth Rates</u> |             |                   |                   |
|------------------------|--|-------------|-------------------|-------------------|
|                        | <u>2005</u>  | <u>2017</u> | <u>1994 to 04</u> | <u>2005 to 17</u> |
| <b>Residential</b>     |  |             |                   |                   |
| Energy (GWh)           | 652  | 878         | -0.22 %           | 2.51 %            |
| Customers (Thousands)  | 51   | 57          | 2.25 %            | 0.93 %            |
| Use per Customer (kWh) | 12,710   | 15,320      | -2.47 %           | 1.58 %            |
| <b>Commercial</b>      |  |             |                   |                   |
| Energy (GWh)           | 382  | 622         | 5.11 %            | 4.15 %            |
| Customers (Thousands)  | 7  | 9           | 2.98 %            | 1.91 %            |
| Use per Customer (kWh) | 61,643   | 68,697      | 2.13 %            | 2.20 %            |
| <b>Industrial</b>      |  |             |                   |                   |
| Energy (GWh)           | 1,650  | 1,722       | 0.82 %            | 0.35 %            |

# Idaho Items of Note

## Residential

- Idaho customer growth driven by household formation and net migration
- Use per customer is driven by increasing home size which is driven by per capita income growth and relatively high number of people per household.

## Commercial

- Higher residential customer growth will drive more commercial growth
- Additionally increasing growth through in the office, schools, and health sectors
- Increase in the Rexburg area from growing university

## Industrial

- Industrial sales dominated by few sectors:
  - Chemical and Allied Products – 92% of Sales
  - Food & Kindred Products – 5% of Sales
- Little growth in these two sectors

# Washington Sales Summary

|                        | <u>Actual</u> | <u>Forecast</u> | <u>Average Annual Growth Rates</u> |                   |
|------------------------|---------------|-----------------|------------------------------------|-------------------|
|                        | <u>2005</u>   | <u>2017</u>     | <u>1994 to 04</u>                  | <u>2005 to 17</u> |
| <b>Residential</b>     |               |                 |                                    |                   |
| Energy (GWh)           | 1,587         | 1,792           | 0.86 %                             | 1.02 %            |
| Customers (Thousands)  | 99            | 112             | 0.56 %                             | 1.02 %            |
| Use per Customer (kWh) | 15,982        | 15,984          | 0.30 %                             | 0.00 %            |
| <b>Commercial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 1,345         | 1,657           | 1.45 %                             | 1.31 %            |
| Customers (Thousands)  | 17            | 20              | 1.71 %                             | 1.41 %            |
| Use per Customer (kWh) | 84,722        | 83,754          | -0.26 %                            | -0.10 %           |
| <b>Industrial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 1,054         | 1,170           | 0.68 %                             | 0.87 %            |

# Washington Items of Note

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## Residential

- Energy sales are driven by customer growth
- Use per customer remains flat. Increases from larger house sizes and rising real income offset by increasing natural gas penetration and increasing efficiencies

## Commercial

- Increasing growth in the office, schools, and health sectors

## Industrial

- Port of Walla Walla Refrigerated Rail Project helps Agriculture
- Housing will continue to influence Lumber and Wood Products

# California Sales Summary

|                        | <u>Actual</u> | <u>Forecast</u> | <u>Average Annual Growth Rates</u> |                   |
|------------------------|---------------|-----------------|------------------------------------|-------------------|
|                        | <u>2005</u>   | <u>2017</u>     | <u>1994 to 04</u>                  | <u>2005 to 17</u> |
| <b>Residential</b>     |               |                 |                                    |                   |
| Energy (GWh)           | 391           | 443             | 0.69 %                             | 1.04 %            |
| Customers (Thousands)  | 35            | 40              | 0.56 %                             | 1.33 %            |
| Use per Customer (kWh) | 11,359        | 10,974          | 0.13 %                             | -0.29 %           |
| <b>Commercial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 290           | 382             | 2.27 %                             | 2.31 %            |
| Customers (Thousands)  | 7             | 9               | 1.25 %                             | 1.21 %            |
| Use per Customer (kWh) | 39,205        | 44,673          | 1.02 %                             | 1.10 %            |
| <b>Industrial</b>      |               |                 |                                    |                   |
| Energy (GWh)           | 64            | 74              | -2.33 %                            | 1.18 %            |

# California Items of Note

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## Residential

- Customer growth driven by steady birth rate and in-migration.
- Use per customer decreasing due to natural gas penetrations

## Commercial

- Use per customer showing extra increase from restaurants and lodging increases

## Industrial

- Sales to California industrial customers dominated by the lumber and wood products production. This sector has been declining; expect growth in future as niche marketing expands.



# System Peak Demand



# Coincidental Peak Demand by State

State Historical and Forecasted Growth Rates

|              | Weather Adjusted<br>Summer Peak<br>Demand | Summer<br>Peak<br>Demand | Weather<br>Adjusted Load | Load        |
|--------------|---|--------------------------|--------------------------|-------------|
| Jurisdiction | 1994-2004                                 | 2005-2017                | 1994-2004                | 2005-2017   |
| California   | 1.0%                                      | 0.8%                     | 0.7%                     | 1.3%        |
| Idaho        | 0.3%                                      | 2.6%                     | 0.2%                     | 1.3%        |
| Oregon       | (0.2%)                                    | 0.8%                     | (0.4%)                   | 1.2%        |
| Utah         | 4.0%                                      | 4.3%                     | 3.1%                     | 3.3%        |
| West Wyoming | (5.2%)                                    | 4.1%                     | (5.4%)                   | 4.1%        |
| Washington   | 1.0%                                      | 0.9%                     | 0.9%                     | 1.3%        |
| East Wyoming | (0.2%)                                    | 2.9%                     | (0.2%)                   | 2.8%        |
| <b>Total</b> | <b>1.6%</b>                               | <b>2.9%</b>              | <b>0.9%</b>              | <b>2.4%</b> |

- Utah's gain reflects increased central air conditioning primarily in residential and continued commercial air conditioning.
- California, Washington and Oregon increase in peak demand is less than energy increase which reflects continued energy efficiency.
- Idaho summer peak demand increase reflects irrigation (low year in 2005; high year in 2017).
- Wyoming growth reflects increased industrial activity.



# Preliminary Load & Resource Balance

Mark Klein



# Preliminary L&R Assumptions

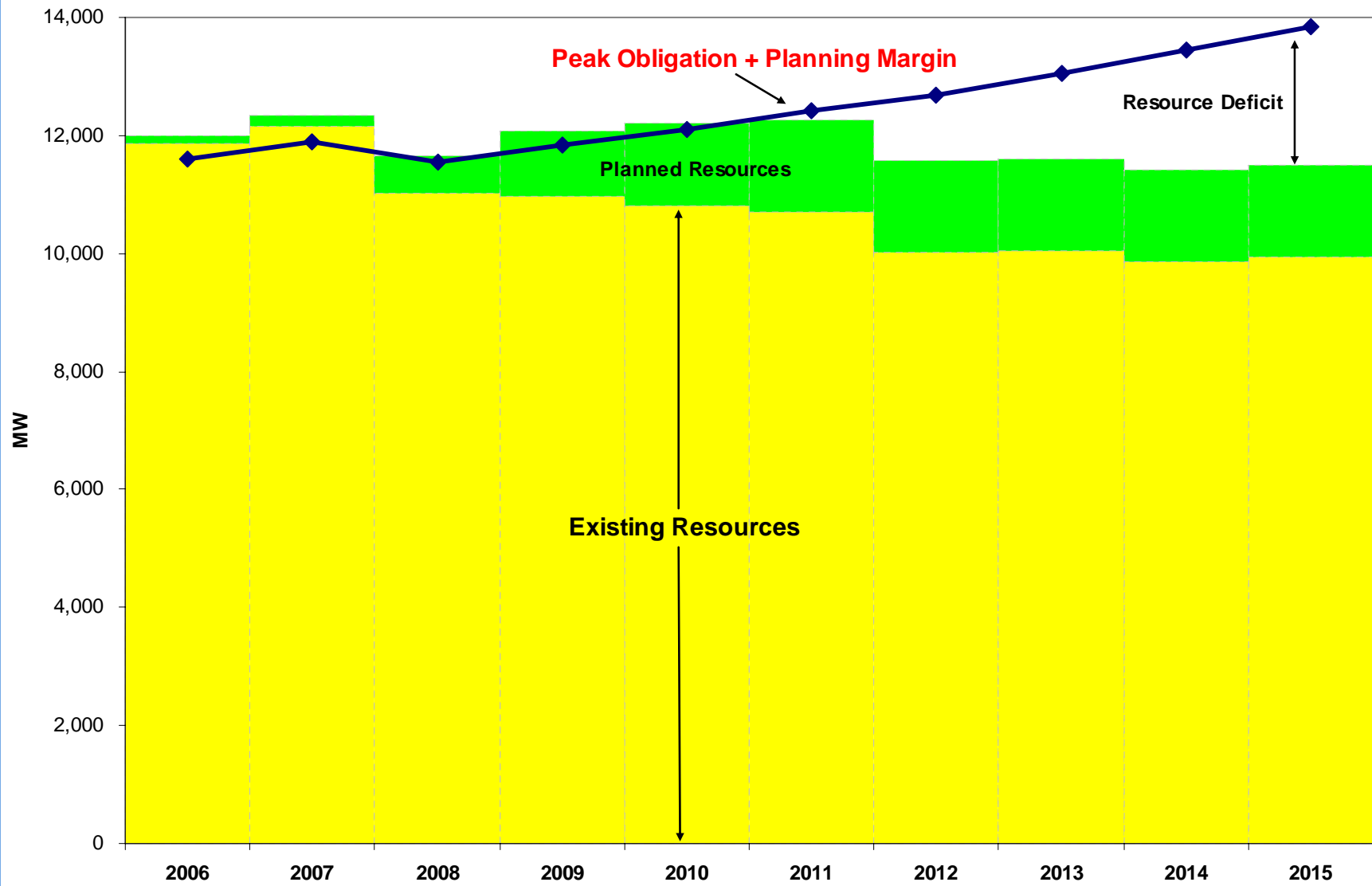
- Includes:
  - 15% planning reserve margin
  - All contracts that exist as of 4/1/2006
  - Blundell geothermal upgrades
  - Cove Fort geothermal plant
  - Path C upgrade
  - Expiring Qualifying Facilities and Interruptibles extended until the end of study period
- Does not include:
  - Renewal of the TransAlta agreement
  - Renewal of the BPA Peaking contract
  - West Valley extension

# Preliminary L&R Assumptions cont.

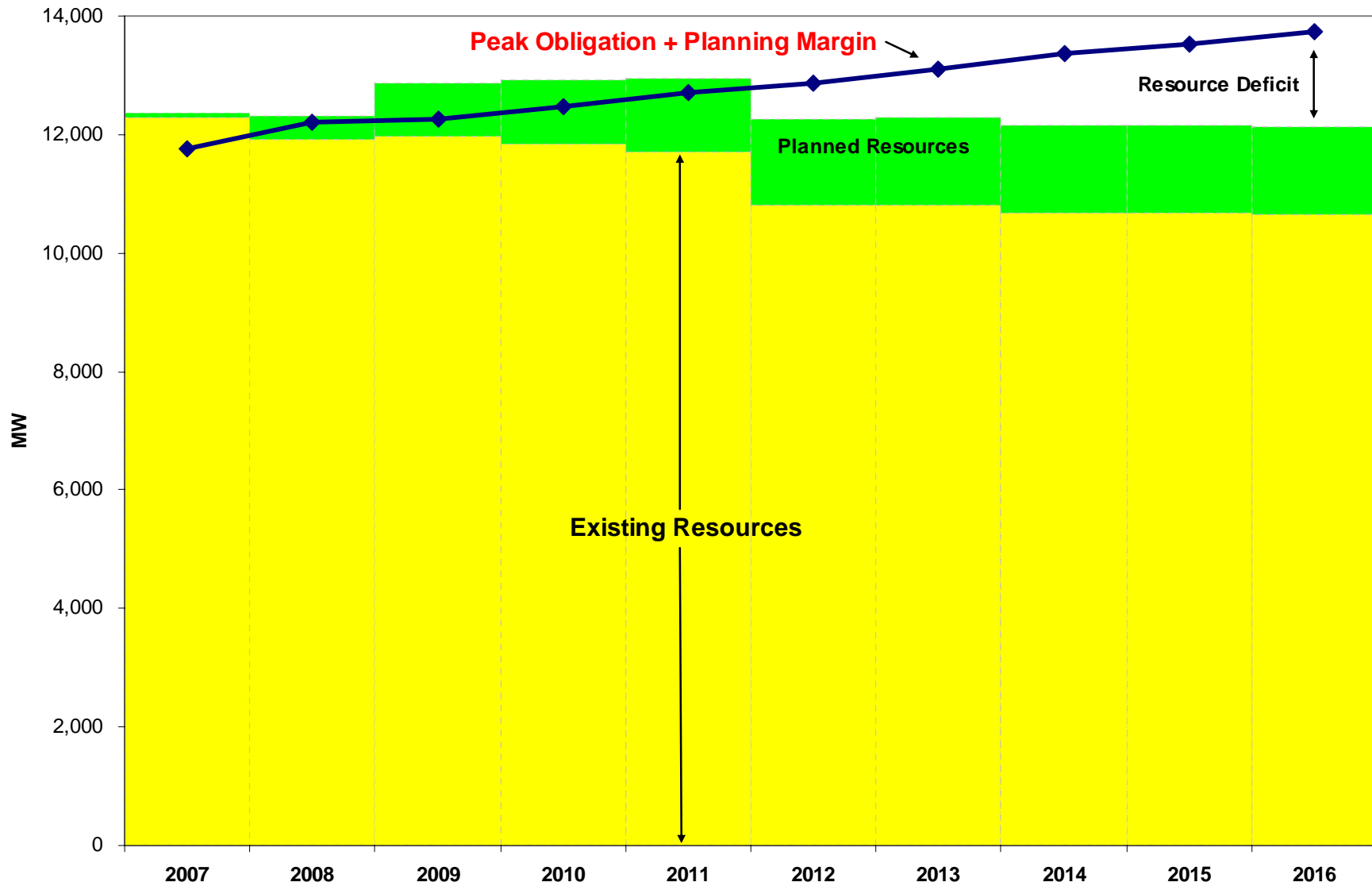
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- Definitions
  - Peak Obligation = Retail Load + Wholesale Sales
  - Planning Margin = (Peak Obligation – Firm Purchases) \* 15%
  - Existing Resources = Thermal + Hydro + Dispatchable Load Control + Renewable + Purchases + Qualifying Facilities + Interruptible

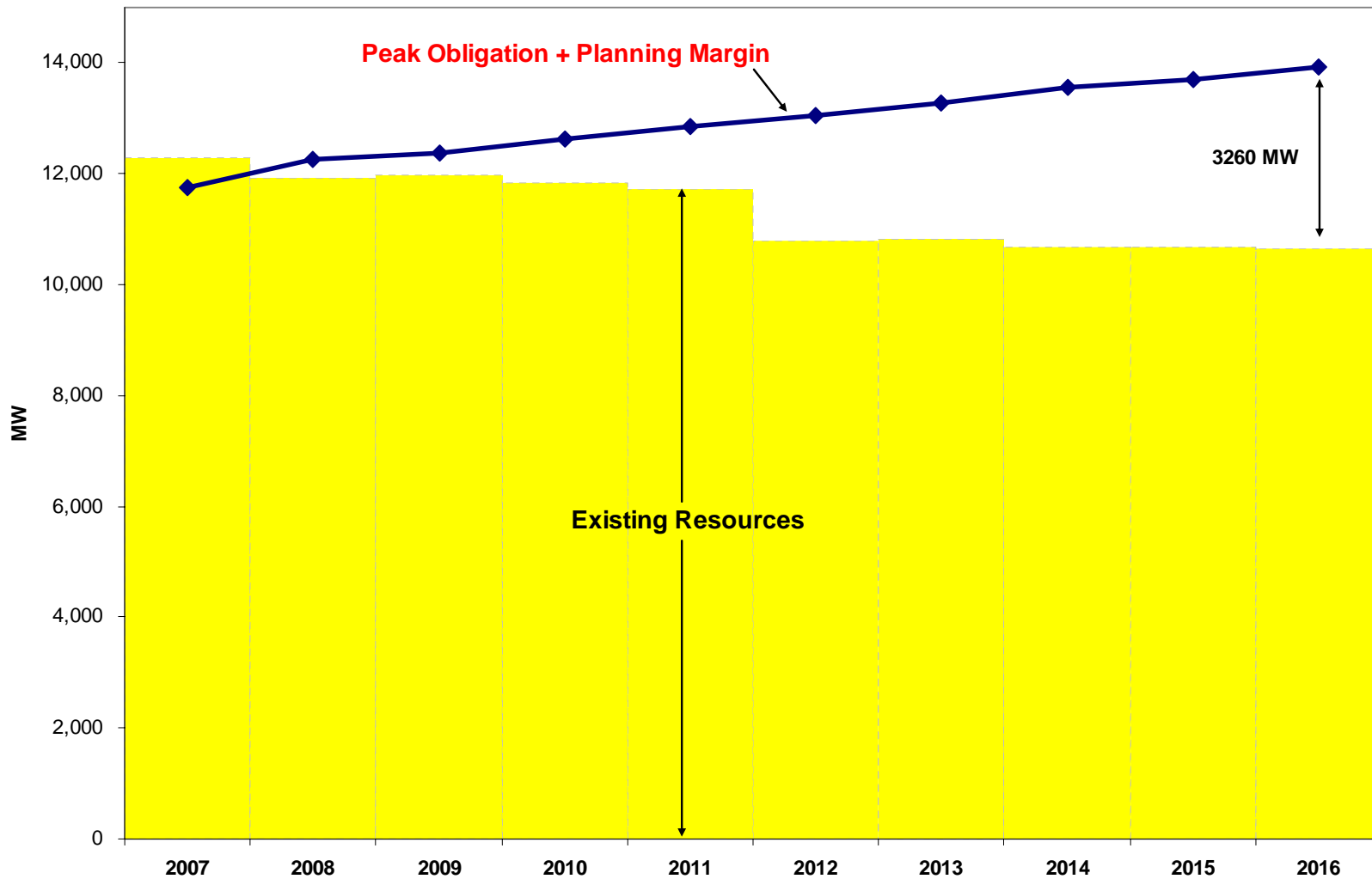
# System Capacity Chart: 2004 IRP Update L&R



# System Capacity Chart: Preliminary 2006 L&R



# System Capacity Chart: Preliminary 2006 L&R Excluding Planned Resources\*



\* Planned Resources consist of Front Office Transactions and 1,300 MW Wind Commitment

# Preliminary Observations: L&R without Planned Resources

- Resource deficit starts at 328 MW in 2008
  - Termination of West Valley option
  - Expiration of TransAlta purchase
  - Increased load of 419 MW from 2007 to 2008 (4.5% growth)
- Deficit increases to 2,255 MW in 2012
  - Expiration of BPA Peaking contract
  - Reduction of Mid-Columbia contracts
  - Increased load of 1,189 MW from 2007 to 2012 (2.4% ave. annual growth)
- Deficit increases to 3,259 MW in 2016
  - Increased load of 2,077 MW from 2007 to 2016 (2.2% ave. annual growth)

# PacifiCorp's Position on Addressing Capacity Needs for the 2006 IRP

- This is the company's Integrated Resource Plan, and we are taking full responsibility in putting forward the appropriate least cost/risk balanced plan for our customers
- We are seeking and want public input; but in the end the company has the responsibility for delivering the right plan for all of our customers
- The company needs to determine whether continued reliance on long term Front Office Transactions is in the best interests of our customers
- Therefore ALL transactions will be evaluated on a comparable least cost/risk balanced approach



# Next Steps

Peter Warnken



# Next Steps

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- IRP Meeting Schedule
  - May 10<sup>th</sup> – Currently Scheduled
  - June 7<sup>th</sup> – New Date
  - July 19<sup>th</sup> – Currently Scheduled
  - October 17<sup>th</sup> – Currently Scheduled