2010 Integrated Resource Plan: Process and Assumptions

IRP Stakeholders
April 16, 2009

Seattle City Light

Agenda

- Introductions
- Stakeholders Role in 2010 IRP
- Draft Assumptions
  - Demand outlook
  - Conservation
  - New Resources
  - Environmental Impacts

2010 IRP Team

= Returning from 2008 IRP

- **Sarang Amirtabar**, Resource Planning & Forecasting
  Glenn Atwood, Conservation
- **David Clement**, Resource Planning & Forecasting
- **Carsten Croff**, Financial Planning
- **Corrine Grande**, Environmental Affairs
  Eric Espenhorst, Resource Acquisition & Contracts
  Hormoz Roomiany, Resource Planning & Forecasting
- **Mary Winslow**, Resource Planning & Forecasting

Stakeholder Roles

Integrated Resource Plan (IRP)

- An Integrated Resource Plan:
  - Identifies how much, when, and what kind of energy resources are needed
  - Treats conservation as equal to power generation
  - Includes public involvement
  - Is updated often (biennially)
  - Is now required by state law

- City Light Measures Resource Plans By:
  - Cost, Risk, Reliability, and Environmental Performance

Many Public Objectives for SCL's Resource Planning

More Public Oversight

Distributed Generation Incentives

Limit Carbon Tax Exposure

More Wind Power

Political & Policy Impacts

Create Business Opportunities

Reduce Utility Debt

National Environmental Leadership

Sustainability

Preserve Low Cost Power

Demand-Response Programs

More Solar Power

Enhance Power Quality

Create Green Jobs

Stabilize Rates

Fight Climate Change

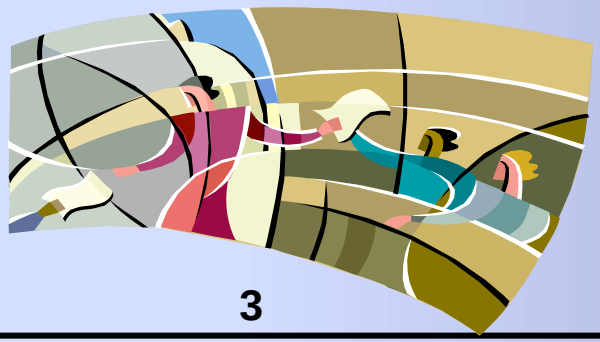
Ensure High Power Reliability

Conservation First

2010 Stakeholder Meetings

Apr. 16	Jun. 25	Sep. 3	Feb. 25	May 20
IRP Process & Assumptions	Resource Needs & 1rst Round Portfolios	1rst Round Results & 2nd Round Portfolios	2nd Round Results & Preferred Portfolios	Preferred Portfolio & Action Plan

Seattle City Light's IRP Input Process



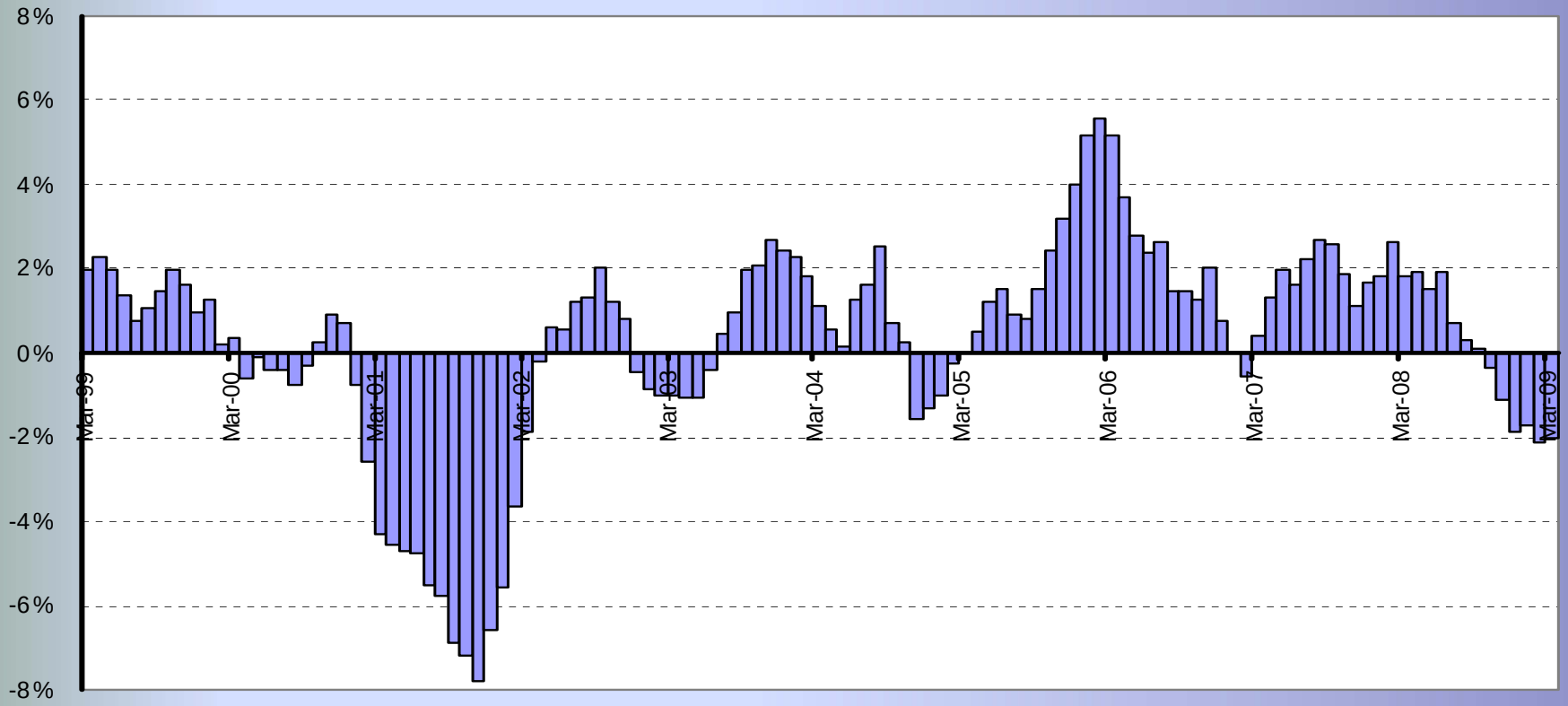
1	2	3	4	5
Process, Assumptions	Resource Needs, Rd. 1 Portfolios	Rd. 1 Results, Rd. 2 Portfolios	Rd. 2 Results, Preferred Portfolios	Preferred Portfolio, Action Plan
IRP Policy Group	IRP Policy Group	IRP Policy Group	IRP Policy Group	IRP Policy Group
IRP Stakeholders	IRP Stakeholders	IRP Stakeholders	IRP Stakeholders	IRP Stakeholders
content →			Advisory Board	Advisory Board
content →		Public Meeting	Public Meeting	Public Meeting
City Council E&T	City Council E&T	City Council E&T	City Council E&T	City Council E&T

2010 IRP Assumptions

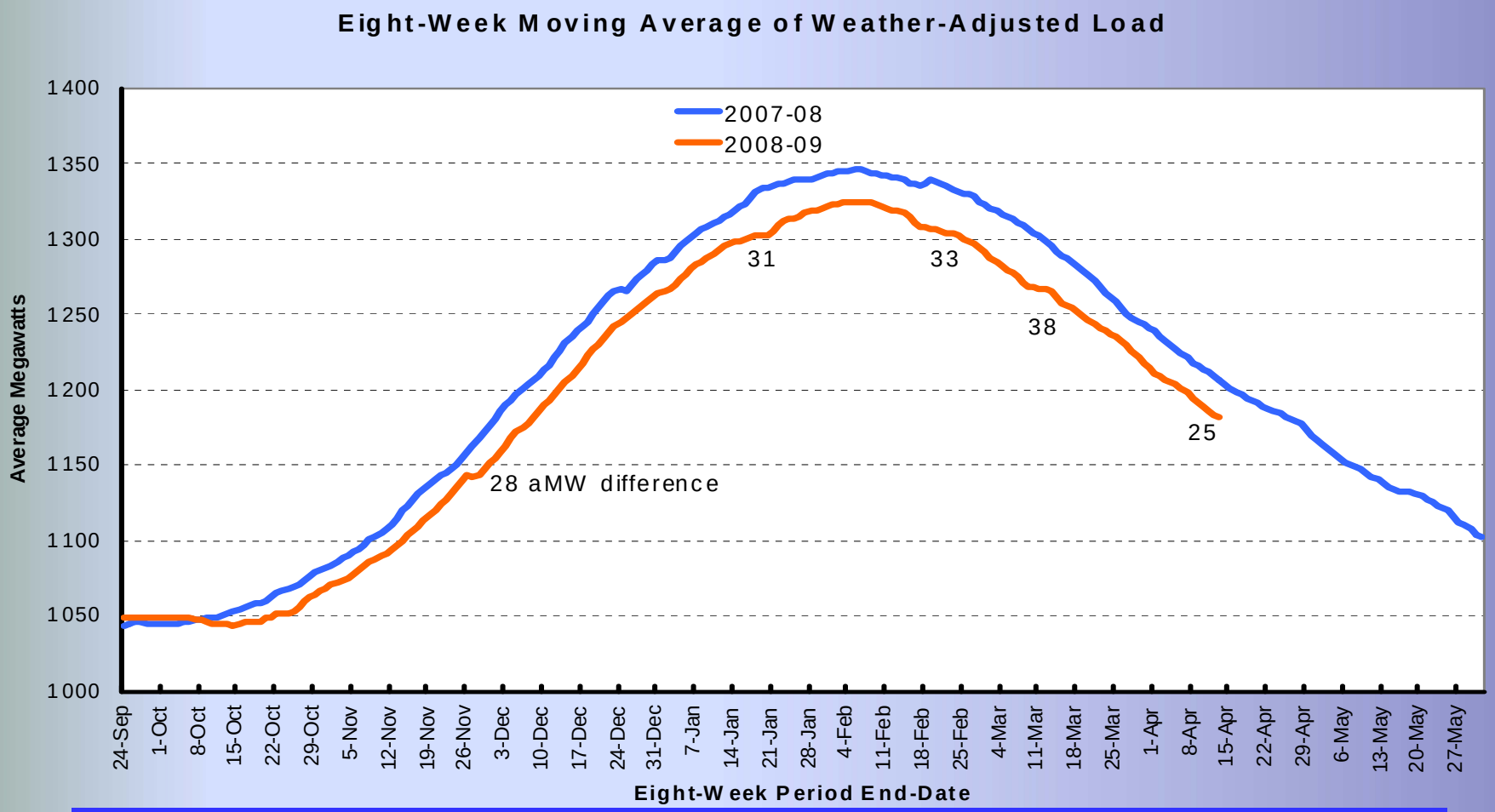
Load Forecast

Declining Load

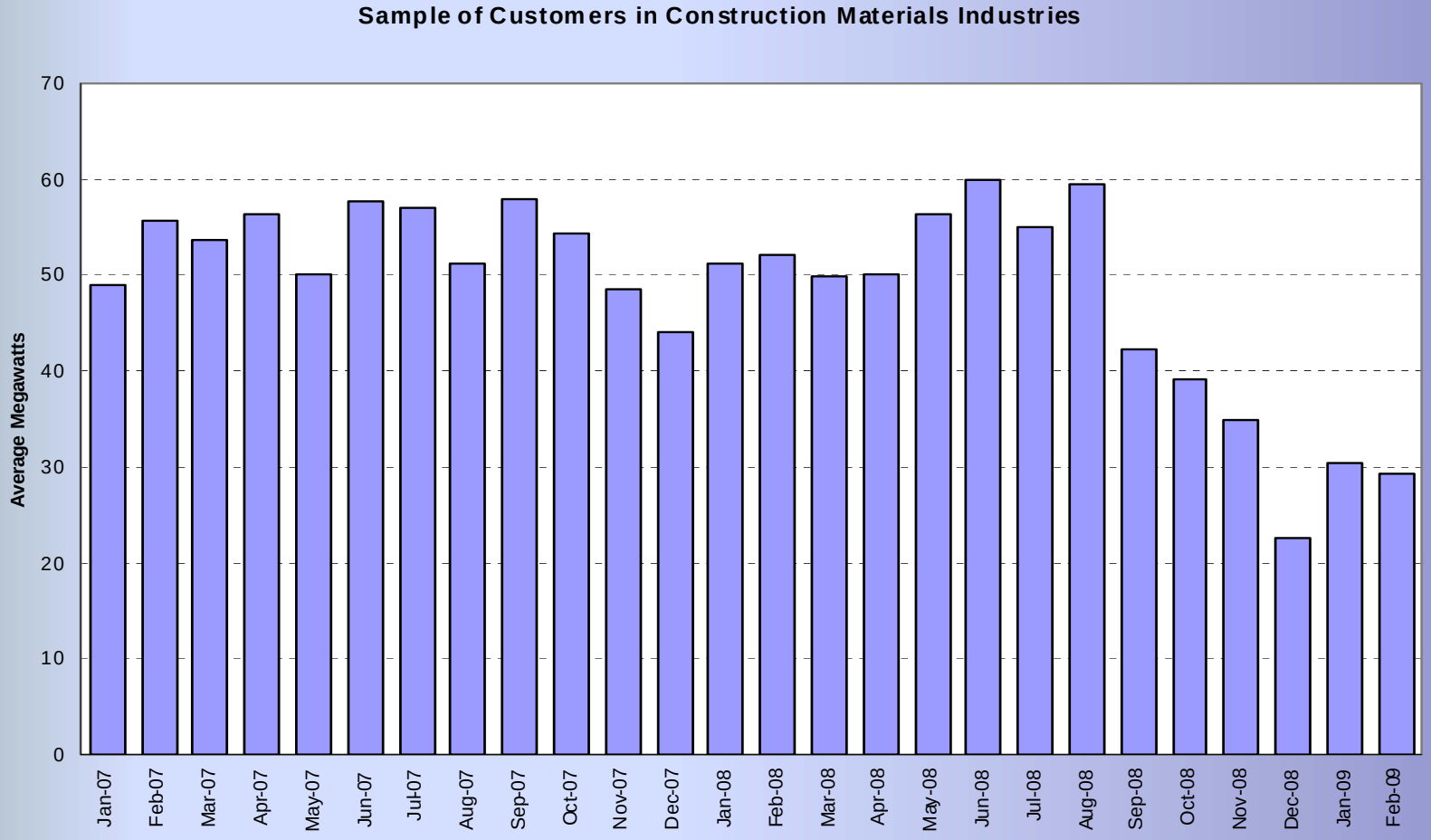
Percent Change in System Load
Year-Over-Year 3-Month Moving Average



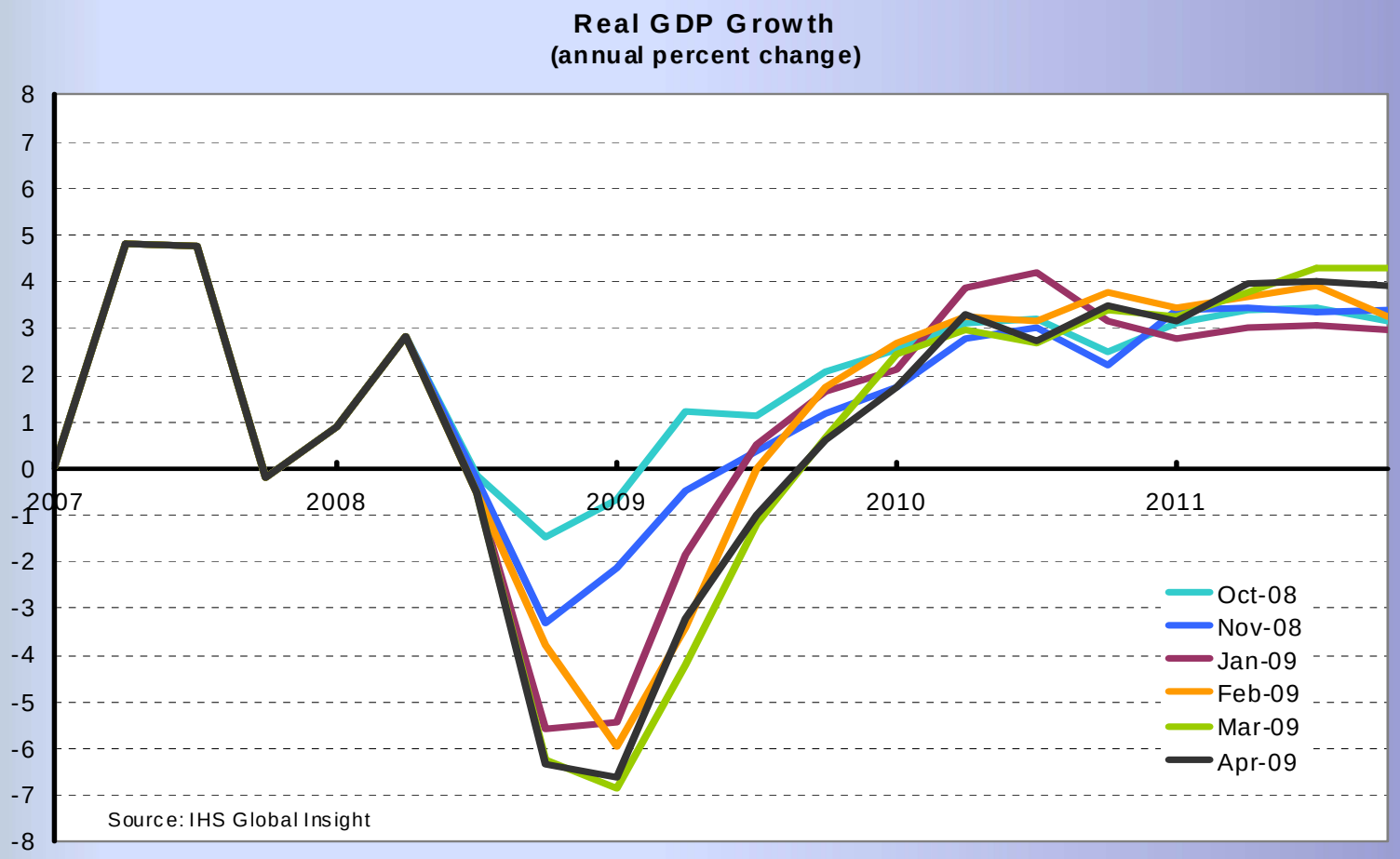
Effect of the Recession on Load



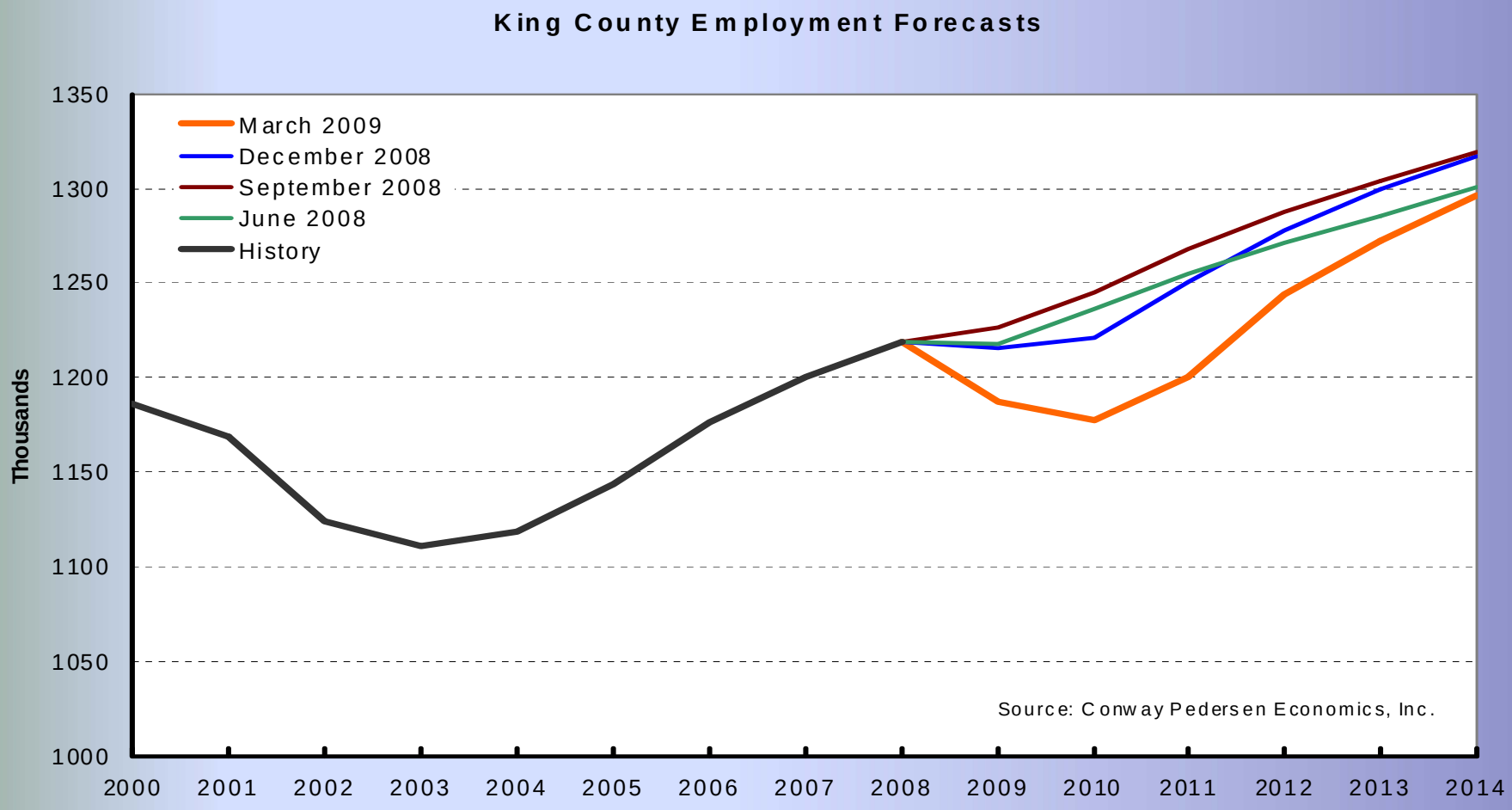
Hard-Hit Industrial Customers



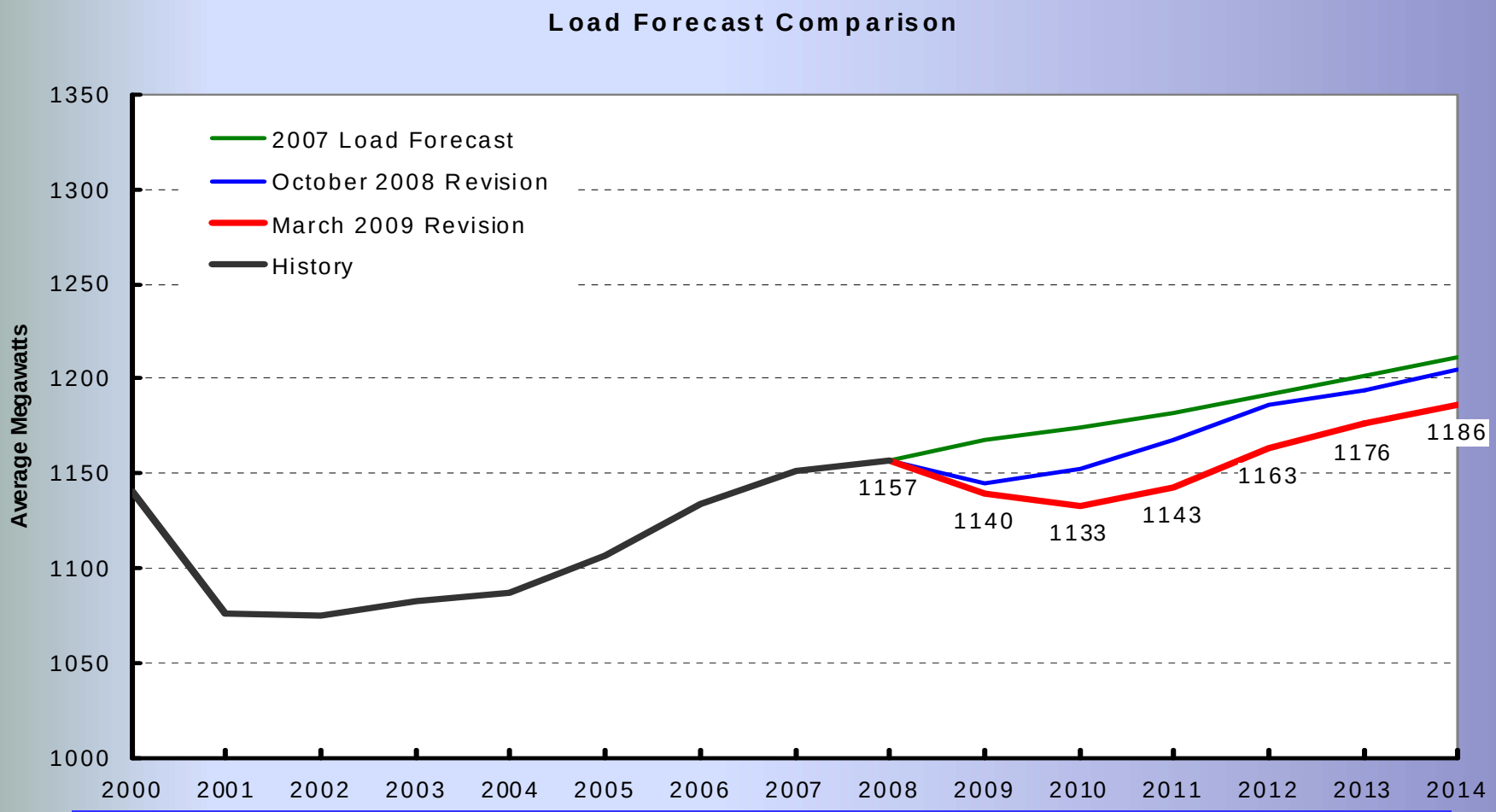
National Economy – GDP Forecasts



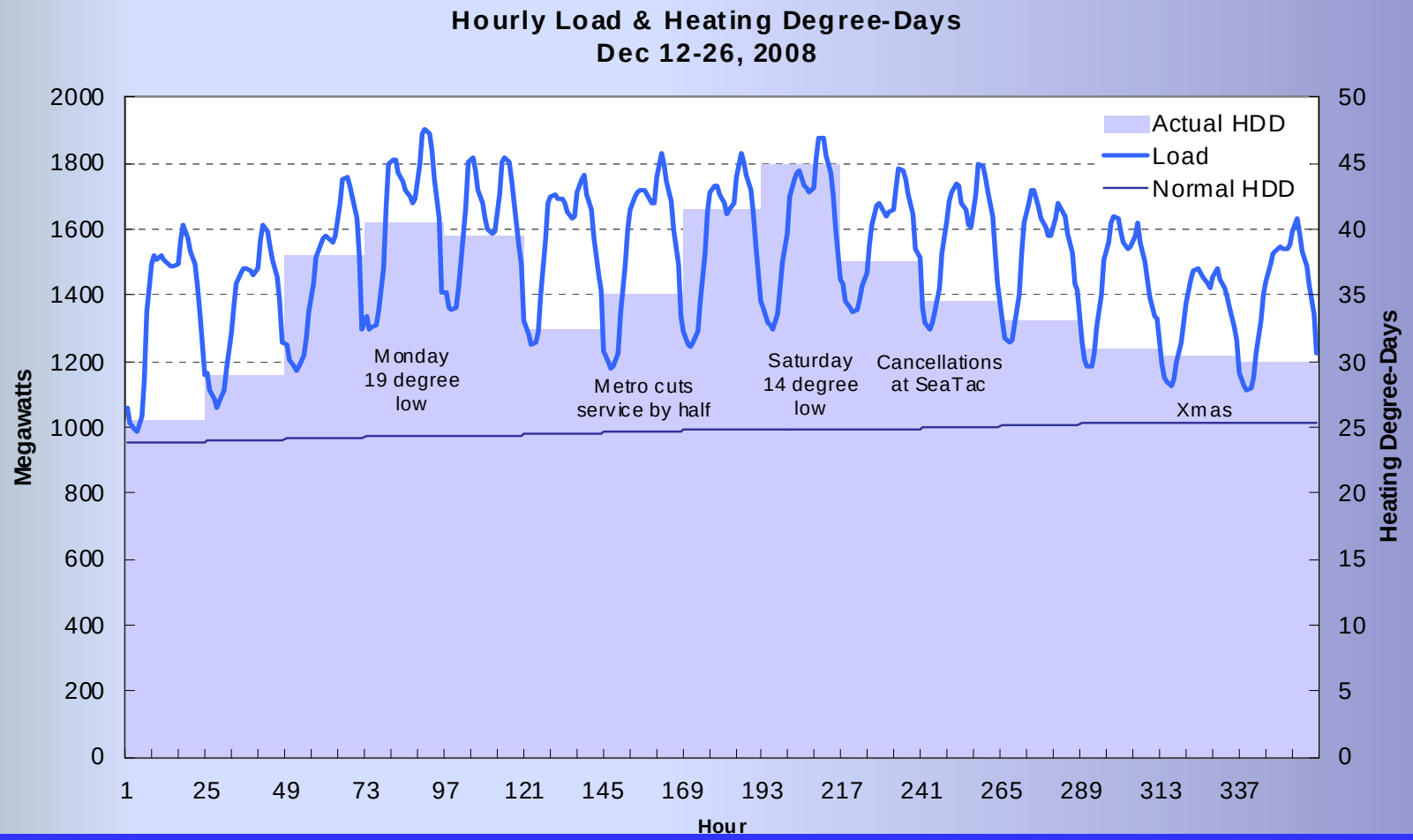
Local Economy – Employment Forecasts



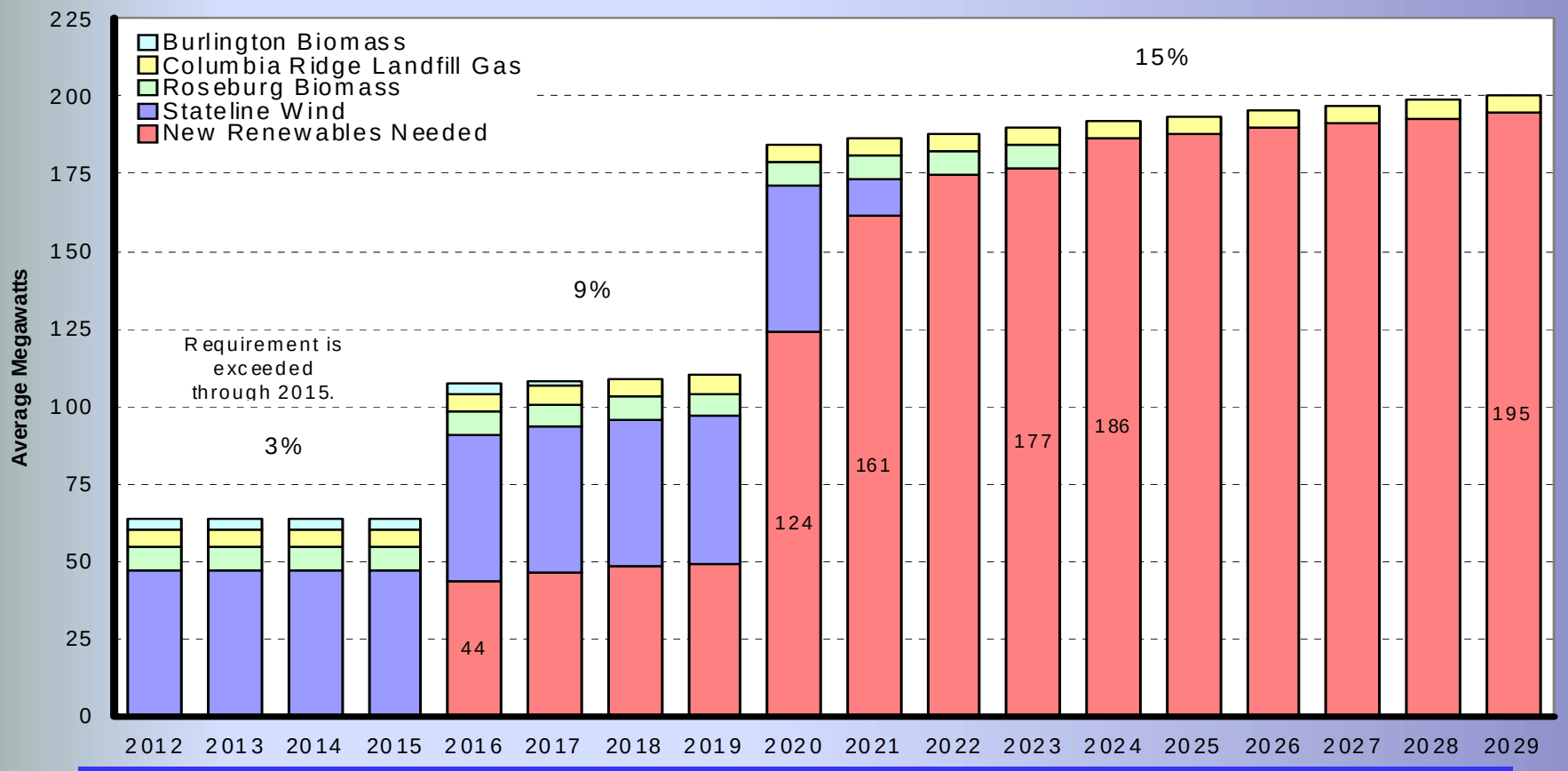
Forecast Revisions



Load Stress on Resource Adequacy



I-937 Requirements



Summary

- Load is driven by economic activity.
  - Declining load in near-term.
  - Eventual recovery, but timing is uncertain.

- Load forecast & IRP
  - Forecast is an input to Resource Adequacy calculation.
  - Forecast is used to calculate future renewables acquisition under I-937.

Conservation

Overview

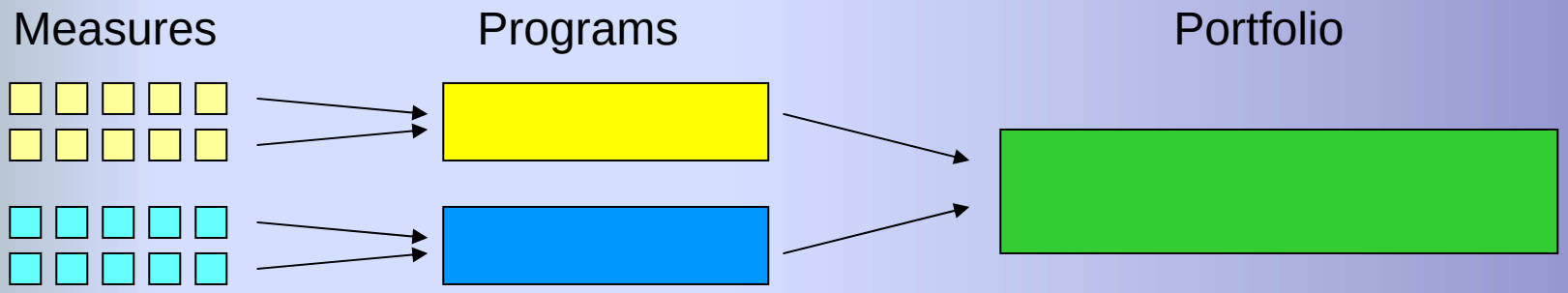
- Background
- Round 1 Approach
- Conservation Portfolios
- Conservation Potential Assessment
- I-937 & 6th Power Plan

Background

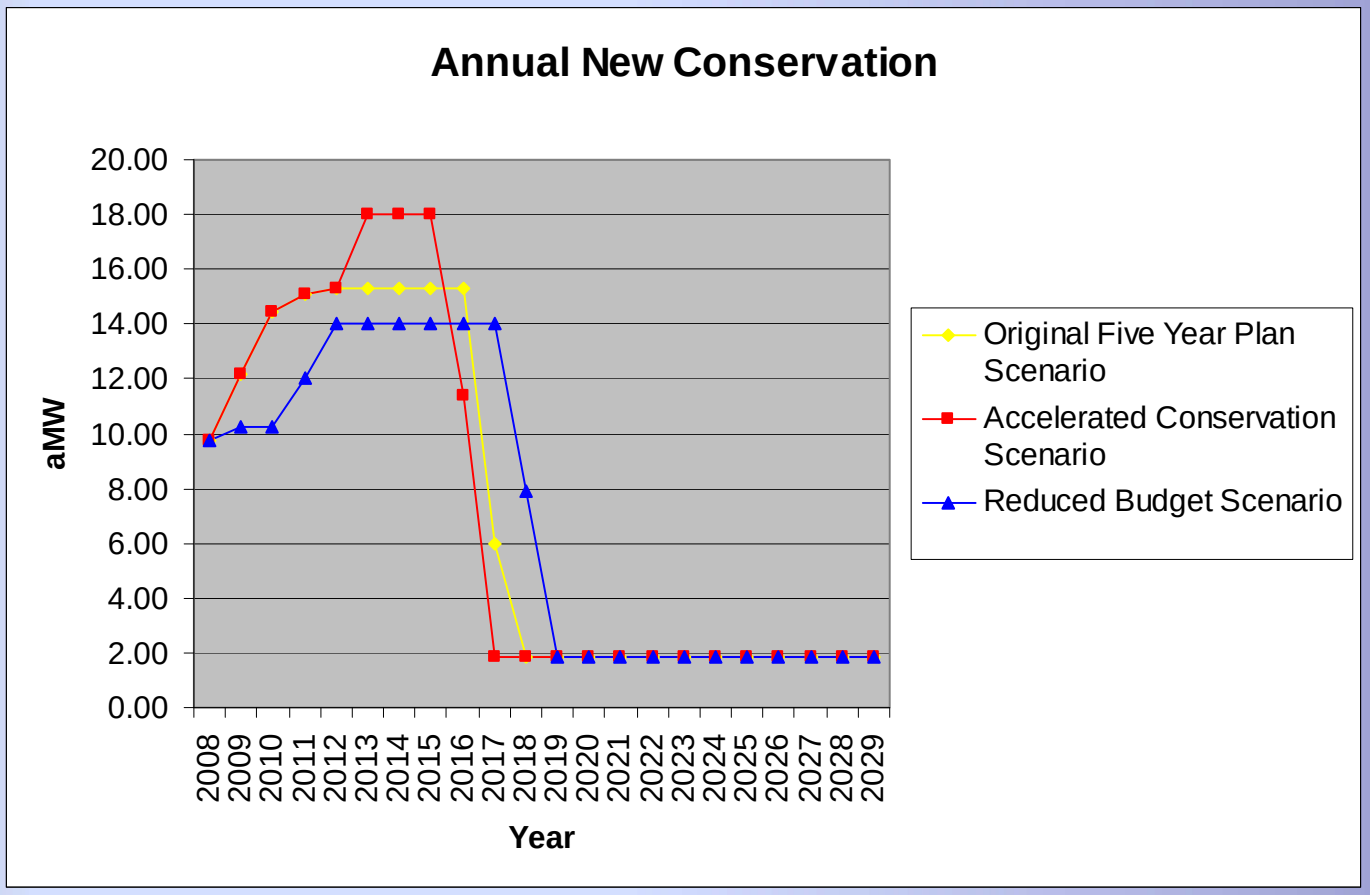
- Energy Conservation SCL's First Priority Resource
  - Least Cost
  - Least Environmental Impact
  - Least Risk
- Implementing Programs Since 1977
- Energy Savings through 2008 = 115 aMW, 8% of load
- Achievements about 7 aMW 2005 – 2007 increasing to 10.3 aMW in 2008
- Conservation Five Year Plan: Doubling of Energy Savings by 2012

Conservation: IRP Round 1 Approach

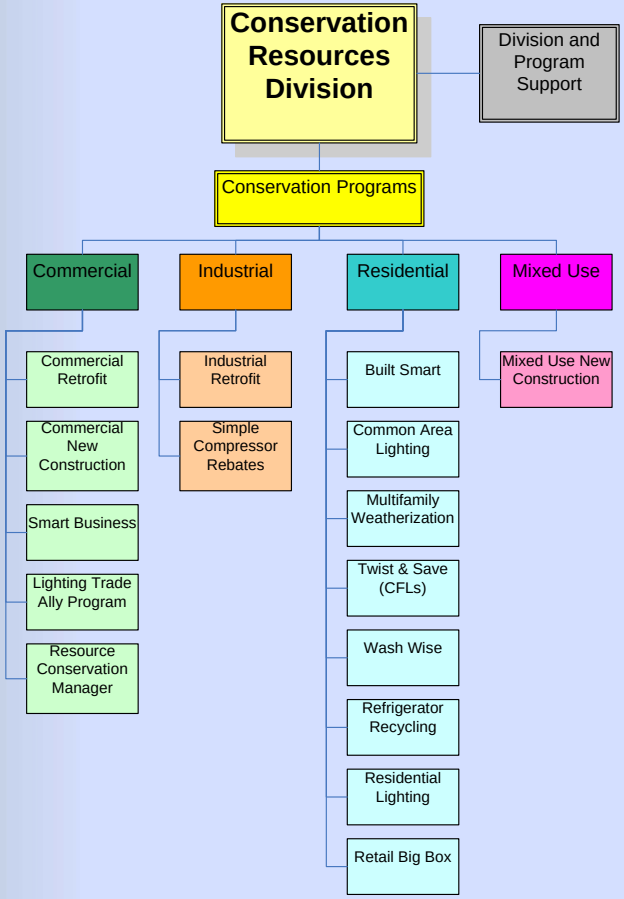
- Three conservation portfolios constructed:
  - 5 Year Plan
  - Base Case = Reduced Budget
  - Accelerated
- Based on Five Year Plan Program Assumptions, scaled to 2006 Conservation Potential Assessment
  - Updated to reflect accomplishments from 2006-2009
  - Costs based on actual program expenses
- Main assumptions
  - $80/MWh avoided cost threshold
  - Achievable potential consistent with I-937 and NWPCC guidelines



Conservation Portfolios



Conservation Savings



- New savings acquired through 16 programs
  - 5 commercial
  - 2 industrial
  - 8 residential
  - 1 mixed use
- Pilot programs and new technologies not included in IRP analysis
- Expiring measures are renewed at end of life to maintain savings
- Avg. cost = $49.43/MWh

Conservation Potential Assessment

New for Round 2 Analysis, September

Market Inputs:

- Customer Forecast
- End Use Saturation
- Fuel Shares
- Baseline Consumption

Measure Inputs:

- Savings
- Costs
- Lifetimes

Characterize Market and Energy Efficiency Measures

↓

Potential of energy efficiency measures in all technically feasible applications

Estimate Technical Potential

↓

Potential of energy efficiency measures with market constraints applied

Estimate Achievable Potential

↓

Resource bundles by customer group, end use, and price point

Integrated Resource Portfolio Analysis

Other Drivers: I-937 Conservation Targets & NWPCC 6th Power Plan

- I-937 requires City Light to submit and meet biennial conservation target starting in 2010
  - Maximum 2010-2011 targets based on NWPCC Calculator:
    - 2010: 9.47 aMW
    - 2011: 9.85 aMW
  - Utility option to conduct CPA to establish targets
- NWPCC 6th Power Plan
  - In process of finalizing assumptions
  - Likelihood of higher regional conservation targets for 2012 and beyond
    - Higher avoided costs
    - Voltage regulation and distribution system upgrades included in conservation target
    - Emerging technologies with significant energy savings included

Summary

- Round 1: Three alternative conservation portfolios
  - Reduced Budget, Five Year Plan, Accelerated
- Updated CPA for Round 2
- I-937 and 6th Power Plan requirements could have significant effects on conservation beginning in 2012

New Resources

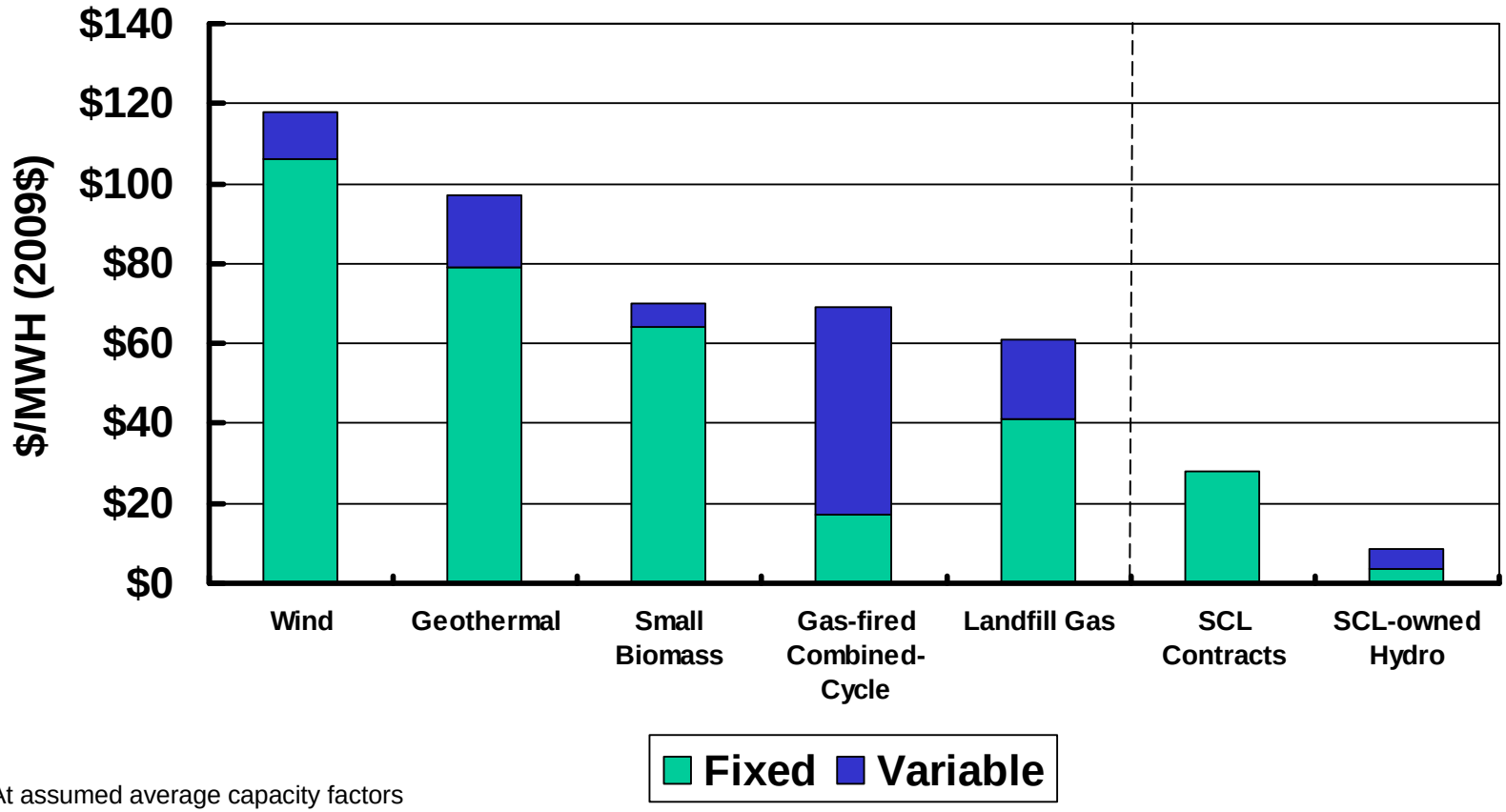
Generic Supply Options

- Geothermal
- Wind
- Small biomass (fuel on-site)
- Landfill gas
- Wastewater treatment plant gas
- Hydroelectric
- Solar photo-voltaic
- Solar thermal
- Wave or tidal
- Engineered geothermal systems

Supply Options in the IRP

- Time horizon: 2010-2029
- Regulatory compliance
- New resources should complement existing resources
- Evaluation criteria include:
  - Reliability,
  - Cost,
  - Environmental impact,
  - Availability, and
  - Risk

Relative Cost Example
(Before Incentives, Transmission, and CO_2 Costs)



*At assumed average capacity factors

Market and Policy Uncertainties

- Price of natural gas
  - Varied from $12/MMBTU to $4/MMBTU over the past 12 months
  - $7/MMBTU levelized price 2010-2029 (2009$)
  - Affects short term and long term market price for electricity
- Reasons why actual power plants may cost more or less than generic examples
  - Developer experience
  - Site quality
  - Transmission availability
  - Economic conditions
- Federal or state greenhouse gas emission limits
- Taxes and incentives
  - Production tax credits, investment tax credits, and other federal programs may lower prices
  - These programs have conditions and are time-limited

More Uncertainties

- SCL as a buyer
  - Used to be a buyer's market
  - Today, it's a seller's market, so SCL is competing with all other utilities
  - Expect to pay comparable prices, 8-12+ cents/kWh
- Reduce risk to ratepayers
  - Bring public power benefits to SCL's ratepayers
  - SCL has transmission to bring power to customers
- Capture opportunities to provide long term value to SCL customers

Environmental Impacts

State Environmental Policy Review

- Environmental Analysis Documentation:
  - Environmental Impact Statement in 2006
  - Addendum in 2008
  - Addendum likely for 2010
- Impacts covered (primarily qualitative):

  Soils and Geology, Air Quality, Surface and Groundwater, Energy and Natural Resources, Environmental Health, Land Use, Aesthetics and Recreation, Cultural Resources, Employment

Air Emissions

- CO2, SOx, NOx, Mercury, Particulates
- Include quantitative analysis in Model
  - Emission Rate (tons per MWh)
  - Price ($ per ton of air pollutant)
- Price based on forecast compliance cost
  - *continuing uncertainty in federal regulations*
- Price also serves as proxy to quantify environmental externalities from residual emissions
- Price is applied to *all emissions* from <u>existing</u> and <u>new</u> power plants

CO2

- CO2 is the main cost component, since it is created in much larger amounts than other air emissions
- High likelihood of some form of cost on CO2: cap and trade or tax
- Issues that impact potential cost of CO2: level of cap, allocation, auction, trading boundary, offsets
- NWPCC: average CO2 price numbers for 6th Power Plan similar to SCL's 2008

Recommended CO2 Costs

- 2010: $9/ton
- 2029: $65/ton

Issue:

- CO2 costs increase the revenues the model calculates for surplus sales, thereby potentially over estimating the value of adding resources beyond SCL's load and the value of renewables

Climate Change

- 2008 IRP: UW work for NPCC 5th Plan
- 2010 IRP: continuing work with UW, also working with LLNL and PNNL
- Will track efforts of NPCC (for 6th Plan and beyond) and BPA
- Focus of work: Downscaling models to watershed level, glacier melt and snowpack patterns impacts at Skagit

Questions?

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