Draft 2008 Integrated Resource Plan: Overview and Round 1 Results

Public Meeting
May 20, 2008

Seattle City Light

Agenda

- What is an IRP?
  - How does it affect Seattle?
- Round 1 results
  - Which portfolios of resources performed best?
- Seeking your input…
  - Preferred resources and resource portfolios?
  - Should some measures be valued more than others?
    - Cost?, risk?, environmental performance?

What is an Integrated Resource Plan (IRP)?

How Can it Affect Customers?

Not Distribution Reliability…

Not Transmission Reliability…

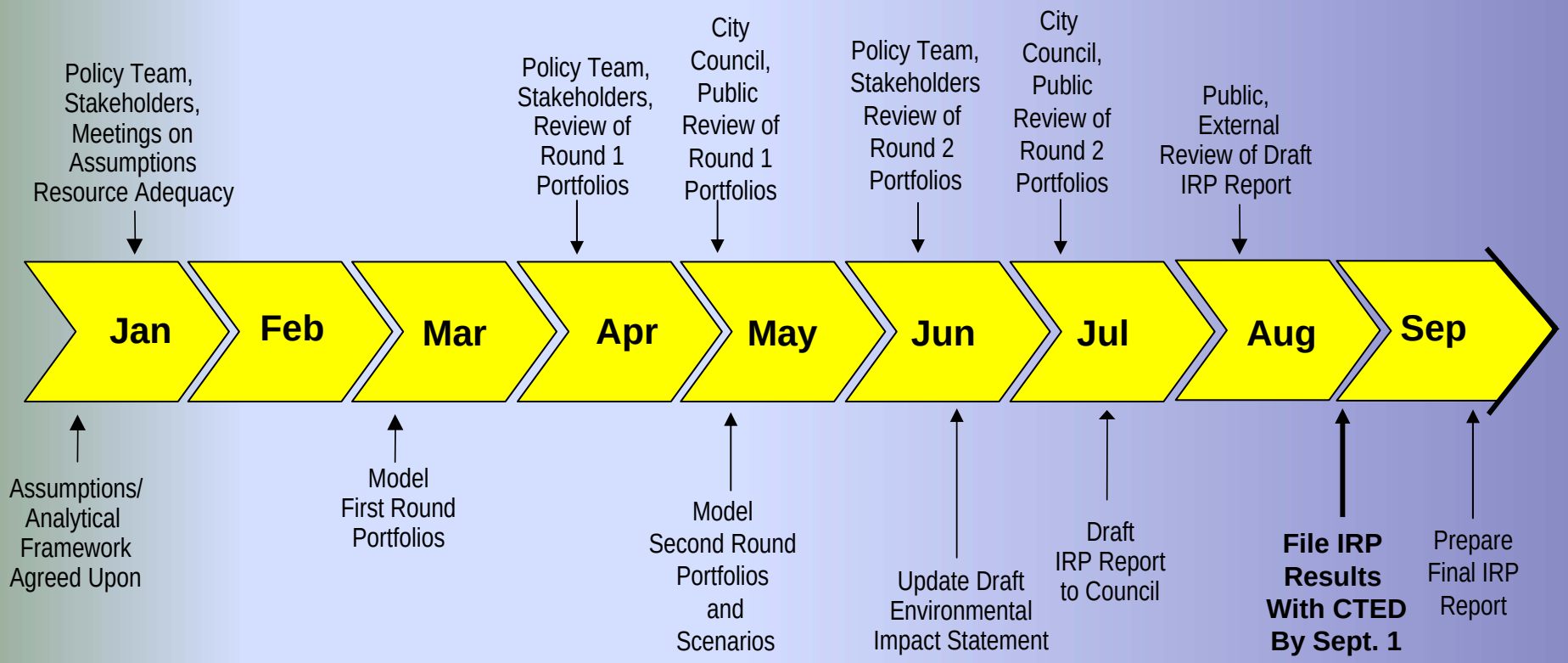
Power Supply Reliability!

Integrated Resource Planning

- An Integrated Resource Plan:
  - Identifies how much, when, and what kind of energy
  - Treats conservation as equal to power generating resources
  - Includes public involvement
  - Is updated often (every 2 years)
  - Sets a course for conservation and resource acquisition
    - Action plan
  - Is a snapshot in time of a continuous process
    - New information often limits “shelf life”

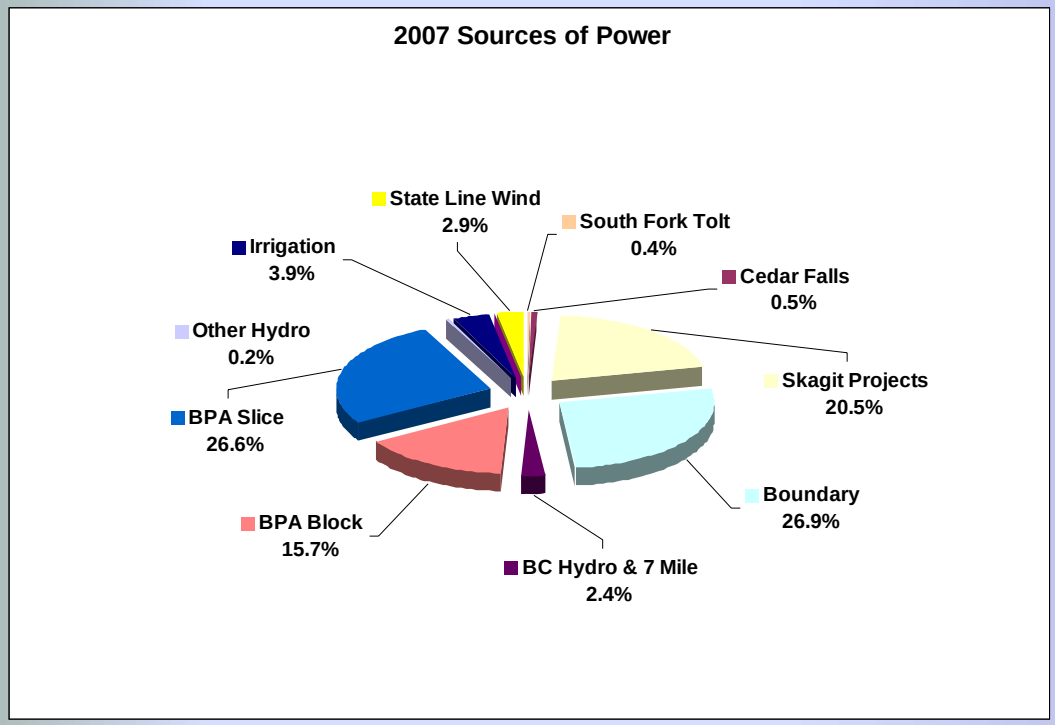
2008 IRP Calendar

Public Input & Review



IRP Team Tasks

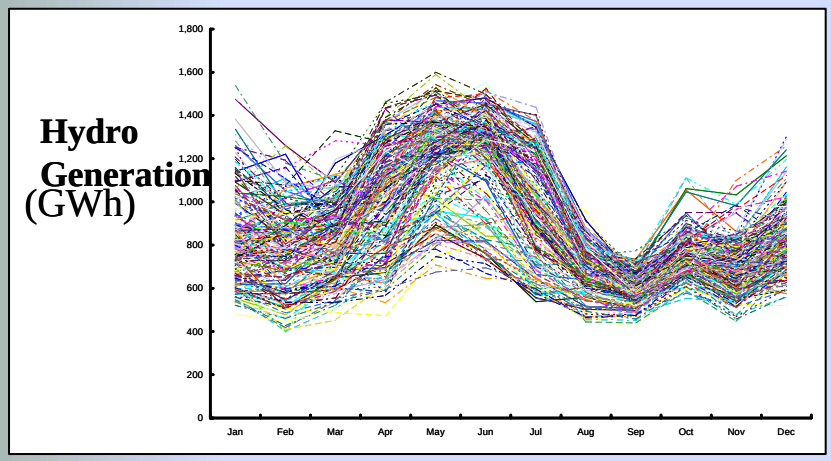
Seattle's 2007 Resources: "Net Zero" Carbon Emissions

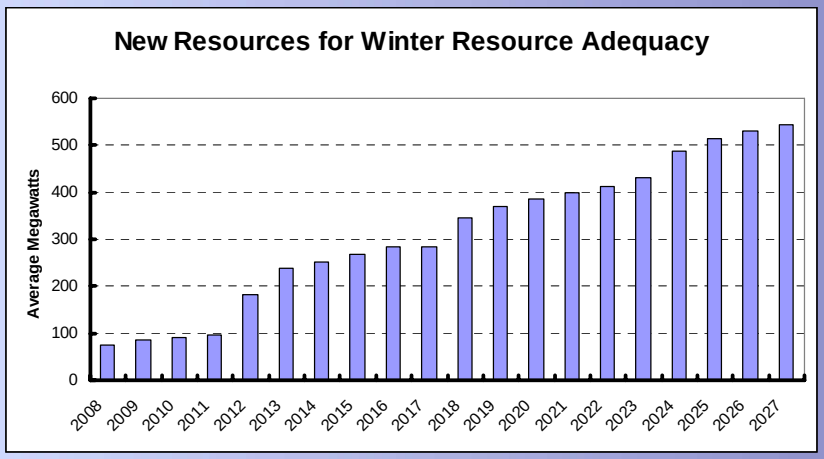


Generation Type	*Percentage*
Hydro	89.8%
Nuclear*	4.6%
Wind	3.5%
Natural Gas*	1.1%
Coal*	0.9%
Other*	0.1%

*From BPA Contract and Market Purchases. These and other operations-related GHG emissions are offset.

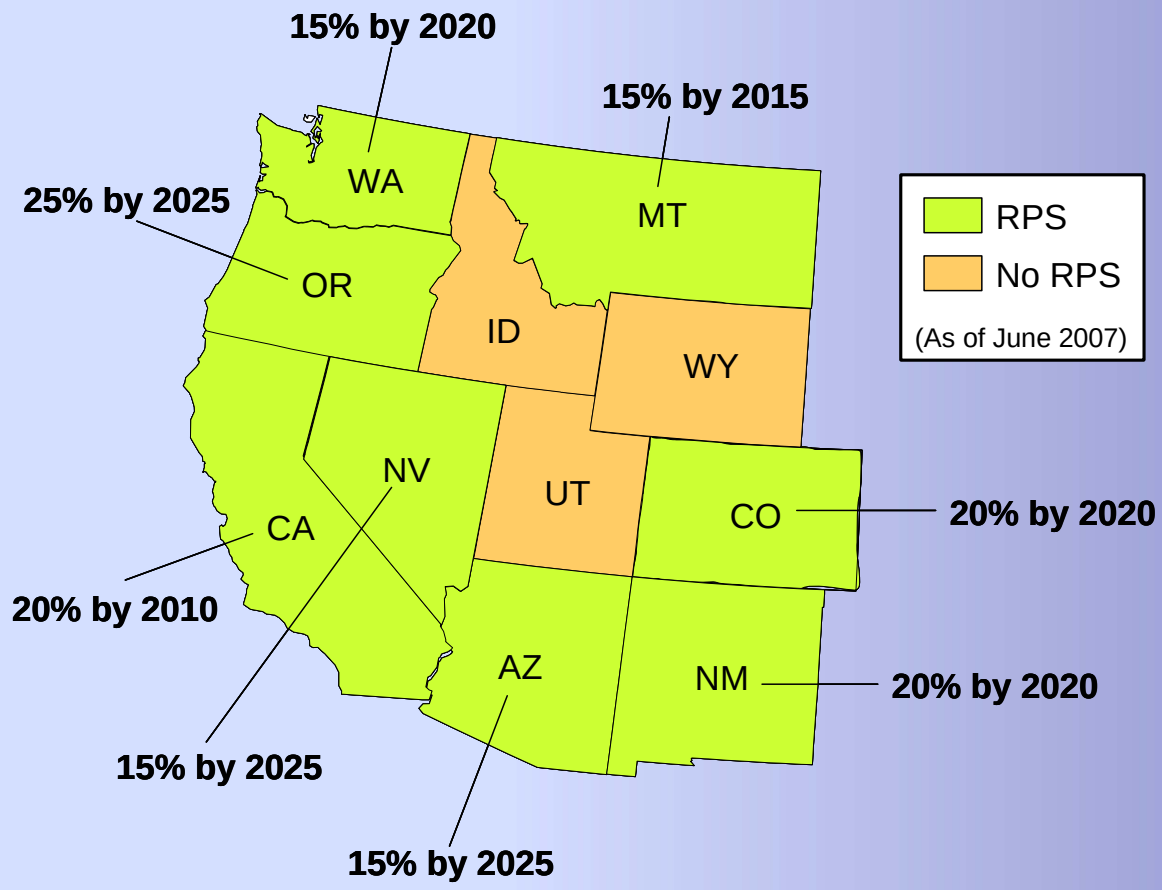
Volatility in Hydro and Temperatures Create Risks for Electric Reliability



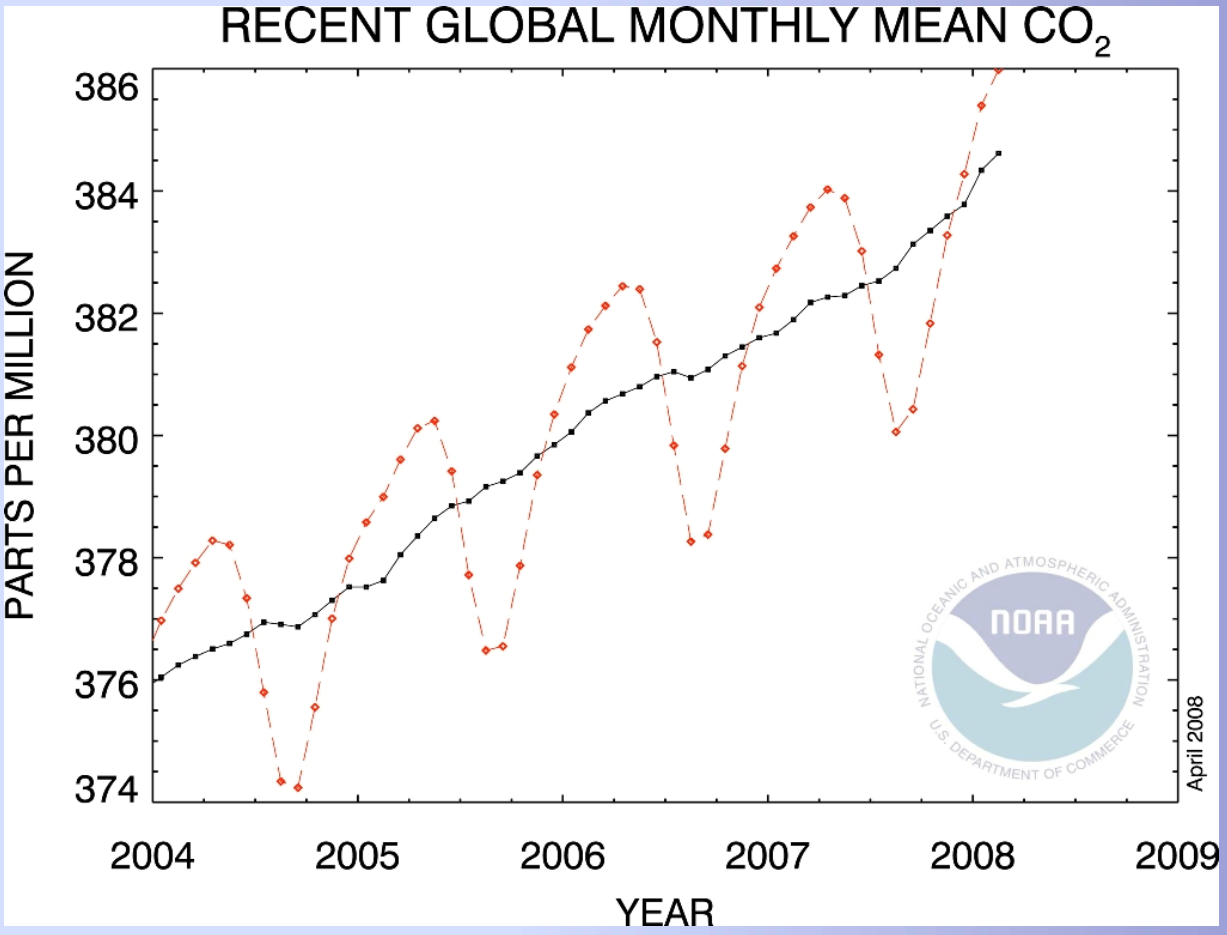


Under normal temperatures and average hydro conditions City Light is surplus on an annual basis for many years to come;
but it is the low hydro years with cold winters that we worry about

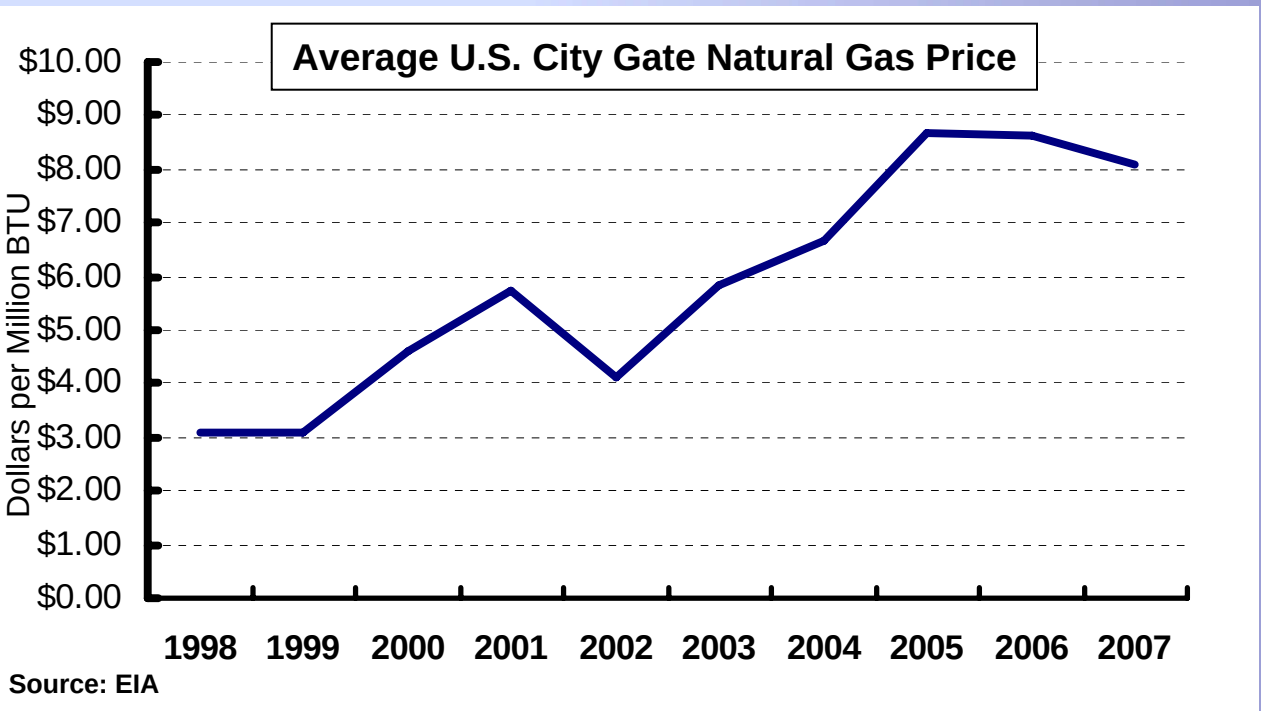
Renewable Portfolio Standards in Western States



Federal Climate Change Legislation Likely as CO_2 Rises Faster

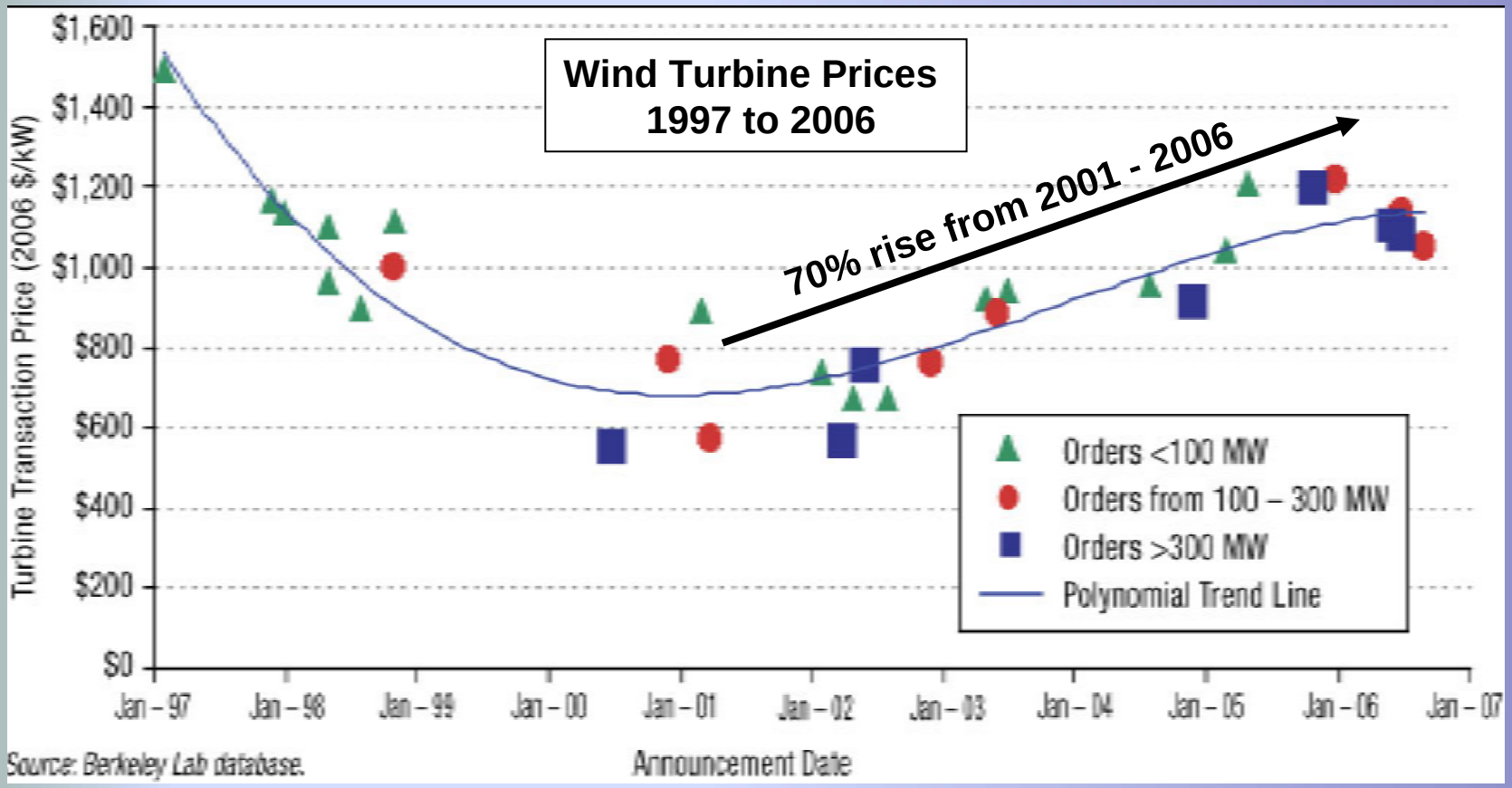


Natural Gas Prices and Power Prices Have Been Climbing

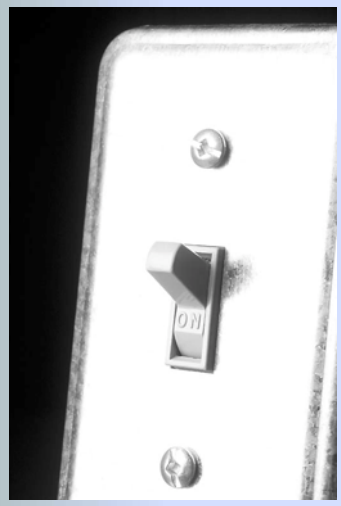


Source: EIA

Prices for Renewable Resources Growing Too



How Can the IRP Affect Customers?



Reliability

Electricity Bills

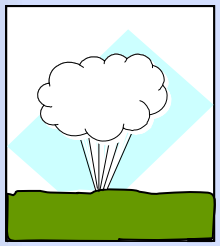
Environmental "Footprint"

Draft 2008 Integrated Resource Plan (IRP)

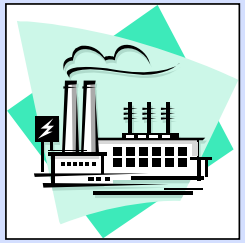
Round 1 Results

Resources in the 2008 IRP

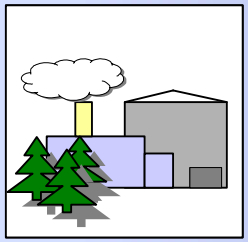
Conservation



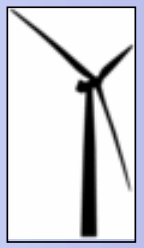
Geothermal (Binary)



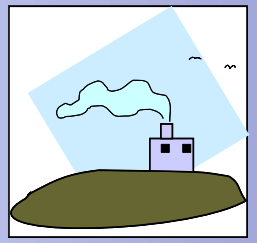
Natural Gas Turbines



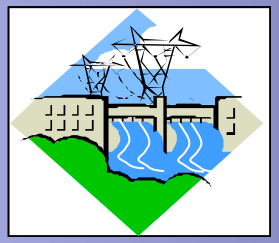
Biomass (Wood)



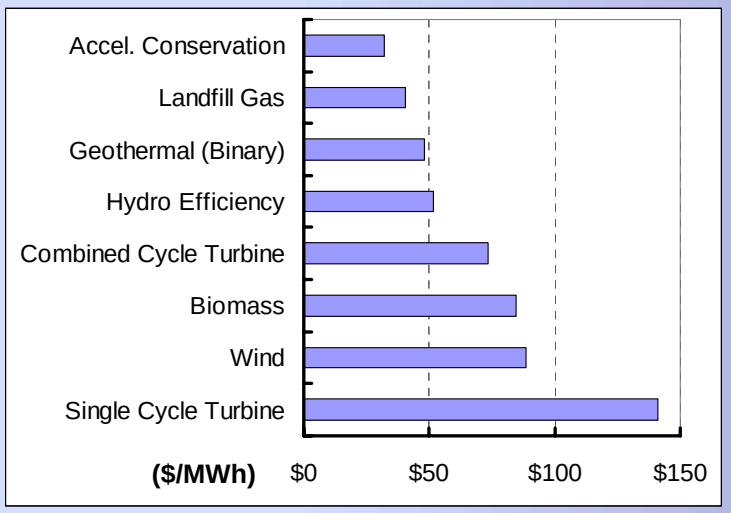
Wind



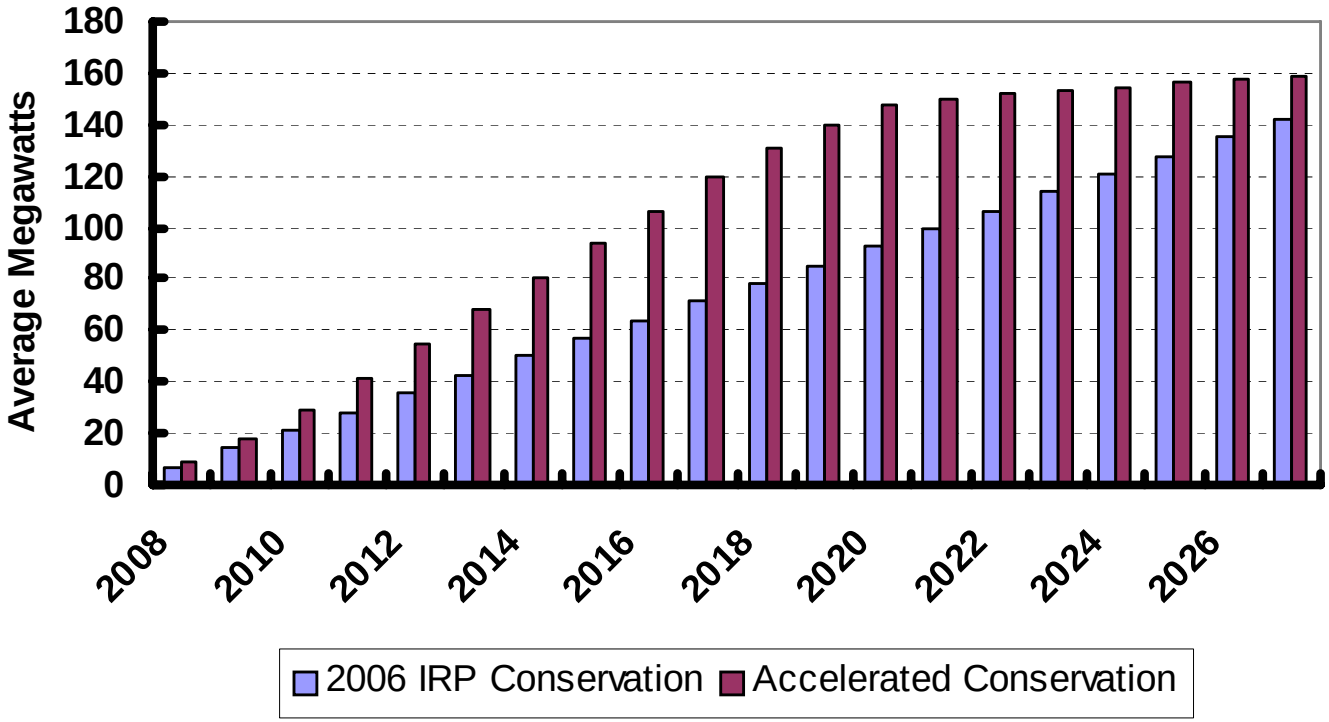
Landfill Gas



Efficiencies at Hydro Plants



Accelerated Conservation in Round 1 Portfolios



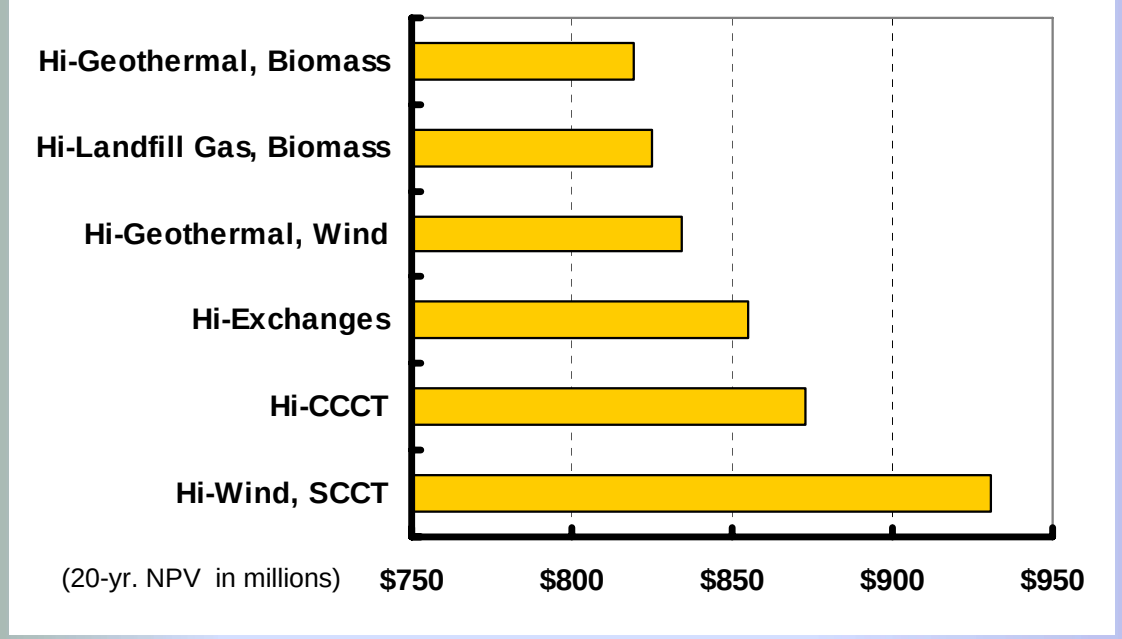
Round 1 conservation would provide 36% of new resources by 2020

Round 1 Portfolios in Year 2027
Total Average Megawatts

Portfolios / Resources	Hi-LFG/ Biomass	Hi-Geo	Hi-Wind	Hi-CCT	Hi-Exch.
*Accel. Conservation**	159	159	159	159	159
*Exchanges**	100	100	100	100	145
*Capacity Contracts**	20	5	10	5	20
Gorge Tunnel	13	13	13	13	13
Landfill Gas	32	22	22	22	22
Geothermal	100	125	0	45	125
Biomass	125	125	0	60	25
Wind	0	0	140	40	40
Comb. Cycle Turbine	0	0	0	100	0
Simple Cycle Turbine	0	0	100	0	0
Total aMW	**549**	**549**	**544**	**544**	**549**

**These resources do not add new generation capacity*

Net Power Costs by Round 1 Portfolio



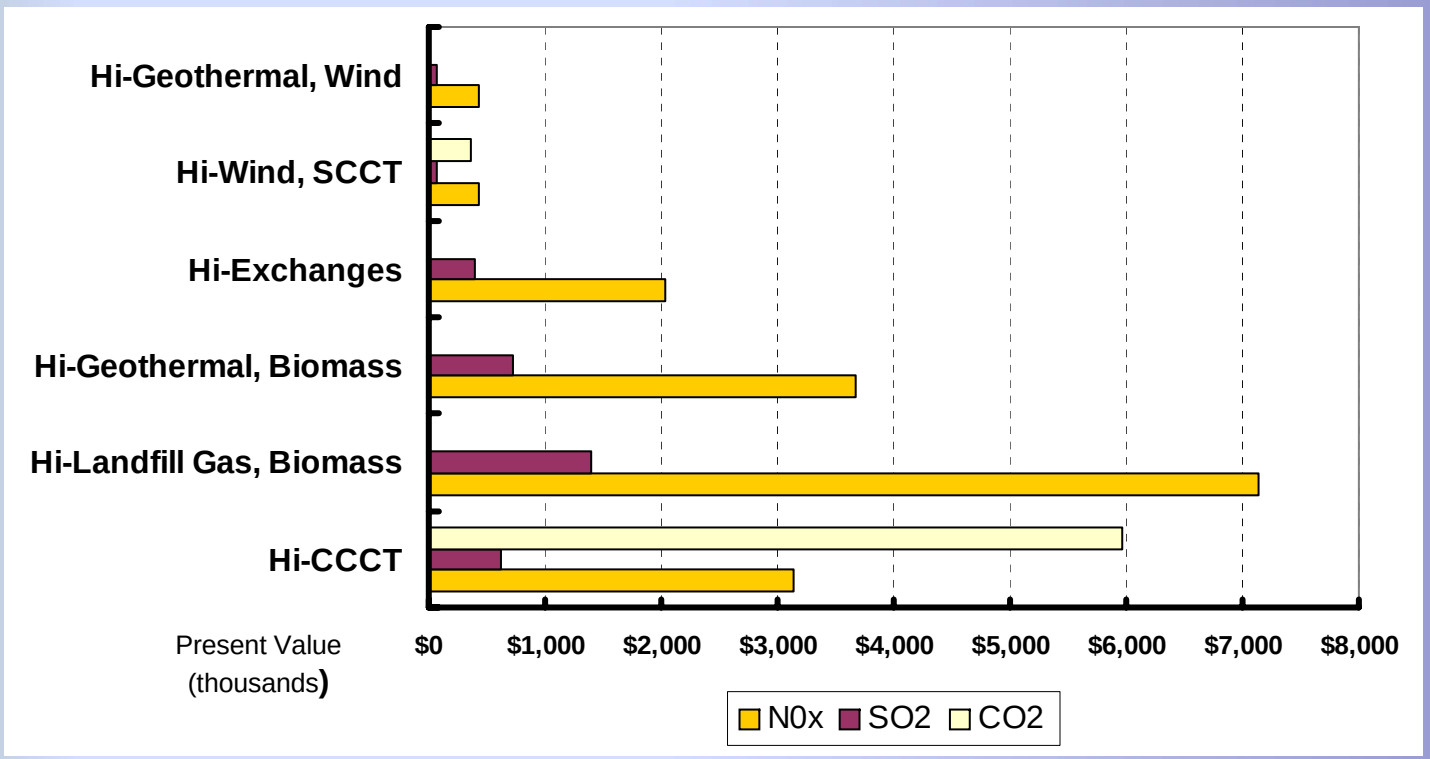
- NPV of Power Costs
  - Includes resource costs, contract purchases, contract sales, market purchases, market sales

Risk by Portfolio

Portfolios	Risk	Rank
HI-GEOWIND	1.82E-44	1
HI-EX	1.27E-40	2
HI-WINDSCCT	2.83E-37	3
HI-GEO, BIO	4.31E-37	4
HI-CCCT	6.12E-37	5
HI-LFGBIO	8.87E-36	6

- Generalized Variance in NPV
  - A probabilistic measure of risk for each portfolio
  - Here a function of hydro, fuel, and demand
  - Uses historical volatility at the 97% quantile

Environmental Costs by Round 1 Portfolio



*Does not yet reflect market purchases and sales

Summary of Round 1
Rankings of Portfolios By Measure

Top Third
Middle Third
Bottom Third

*Resources only. Does not yet include market purchases.

		Power Cost	Risk	*Environment
	Hi-Landfill Gas, Biomass	○	●	●
★	Hi-Geothermal, Biomass	○	◒	◒
	Hi-Wind, SCCT	●	◒	○
	HI-CCCT	●	●	●
★	Hi-Geothermal, Wind	◒	○	○
★	Hi-Exchanges	◒	○	◒

Summary of Round 1 Findings

- Trade-offs are necessary; no portfolio performs well on all measures
- Portfolios with geothermal, wind, and exchanges tend to perform well
  - Yet, the Hi-Exchange portfolio did not perform as well as expected
- The range of Net Power Costs between the most costly and least costly portfolio of resources was 12%
- A much wider range on risk measures than costs
  - Suggests risk should receive strong consideration in Round 2
  - Diversification of resources brings measurable benefits for portfolio risk

Next Steps

- Redesign portfolios for Round 2, aiming to improve performance
- Employ more risk measures to better distinguish types of portfolio risk
- Prepare scenarios and test portfolios
- Identify a preferred portfolio based upon performance measures
- Prepare Action Plan, IRP documents, and EIS for the Mayor and City Council to review
- File with CTED by September

Questions?

IRP Website Address:
http://www.seattle.gov/light/news/issues/irp/
E-Mail: SCL.IRP@Seattle.gov

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