2006 Integrated Resource Plan

Proposed Resource Portfolios

Public Meeting
November 14, 2006

Seattle City Light

Tonight

- Introductions
- Where We Are in the IRP Process
- Summary of Results
- Analysis
- What's Next
- How You Can Participate

Key IRP Findings for the Near Term

- No Immediate Need for City Light to Acquire New Generating Resources
- Continuing to Acquire Cost-Effective Conservation Helps to Defer the Need for New Generation
- The Need to Acquire New Generating Resources Can Be Pushed Further Into the Future by Reshaping the Seasonal Profile of City Light's Existing Resources

Nearing the End of the 2006 IRP

- Eighteen months of scoping, data collection, analysis, drafting, and review
  - Three public meetings and seven stakeholder meetings
  - Forecasting electricity demand for electricity 2007-2026
  - Analyzing resource adequacy standards and need for resources
  - Used sophisticated planning model to evaluate cost, risk, reliability and environmental impacts of candidate portfolios
  - Portfolio analysis using four different scenarios of the future
  - Preparing draft environmental impact statement (DEIS) and holding a public open house to discuss

Near Term
2007-2009

- Continuing Commitment and Ability to Acquire Cost-Effective Conservation Through 2026
  - 142 aMW of cost-effective conservation potential remains
  - City Light will begin a new study to evaluate conservation acquisition and accelerating conservation

- Improving the Seasonal Balance of Existing Resources Can Delay Need for New Generating Resources
  - The 2008 IRP results will be available before the need for new generating resources
  - I-937 rulemaking will occur in 2007, before the 2008 IRP

Intermediate Term
2010-2015

- Meeting Initiative 937 Requirements
  - Portfolios designed to acquire 3% renewables in 2012, 9% in 2016, and 15% in 2020, plus cost-effective conservation
  - Received input on portfolios from stakeholders
  - Today we will discuss two portfolios that meet I-937

Long Term
2016-2026

- Long Term Plan Focuses on Renewable Resources That Best Fit the Evaluation Criteria
  - Combinations of wind, geothermal, and biomass

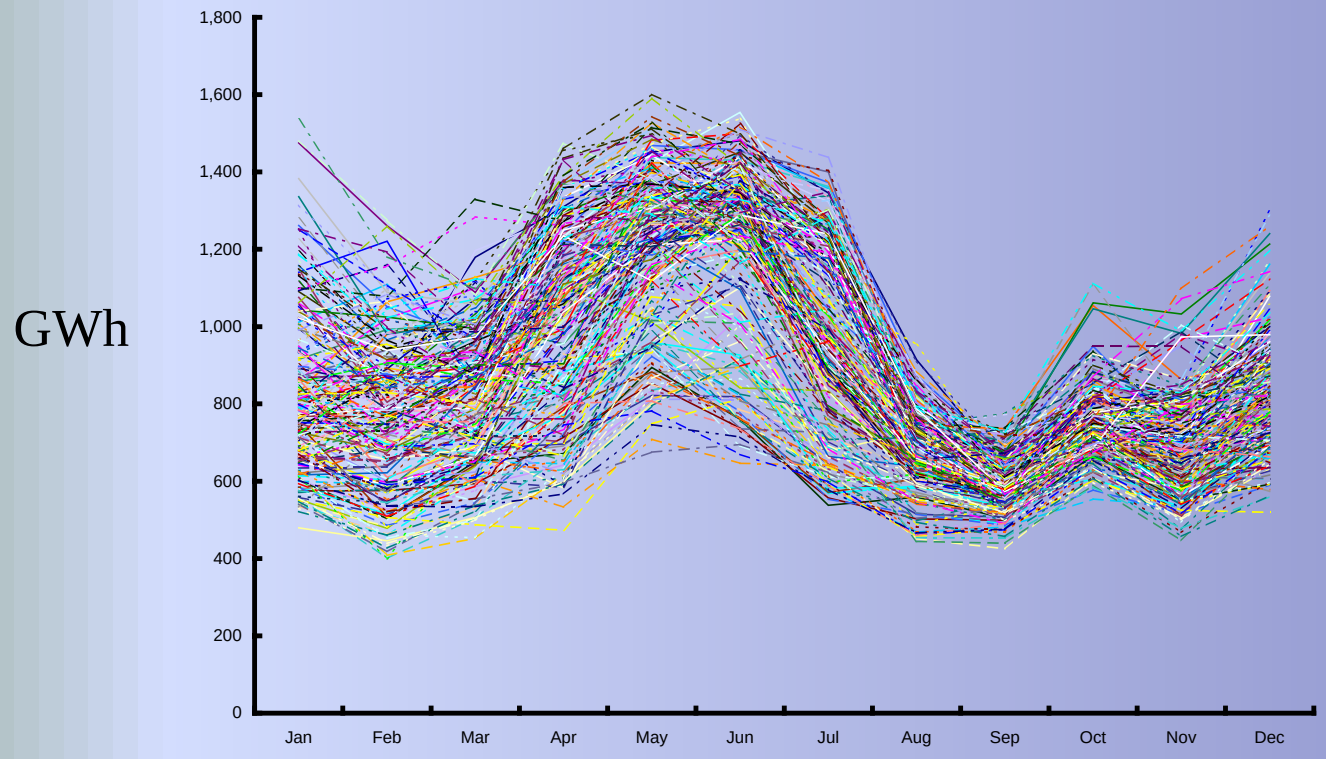
- Five More IRPs Will Be Completed Before the Long Term

Summary of the Analysis

- Modeled Risk Associated with Existing Resource Portfolio and Energy Required to Eliminate Most Risk
- Evaluated a Wide Range of Resource Portfolios
- Identified Resources that Perform Better From a Financial and Environmental Perspective
- Developed a Draft Environmental Impact Statement on a Wide Range of Resources
- Narrowed the Focus of Resources for Round 2

Analyzing Variability and Risk

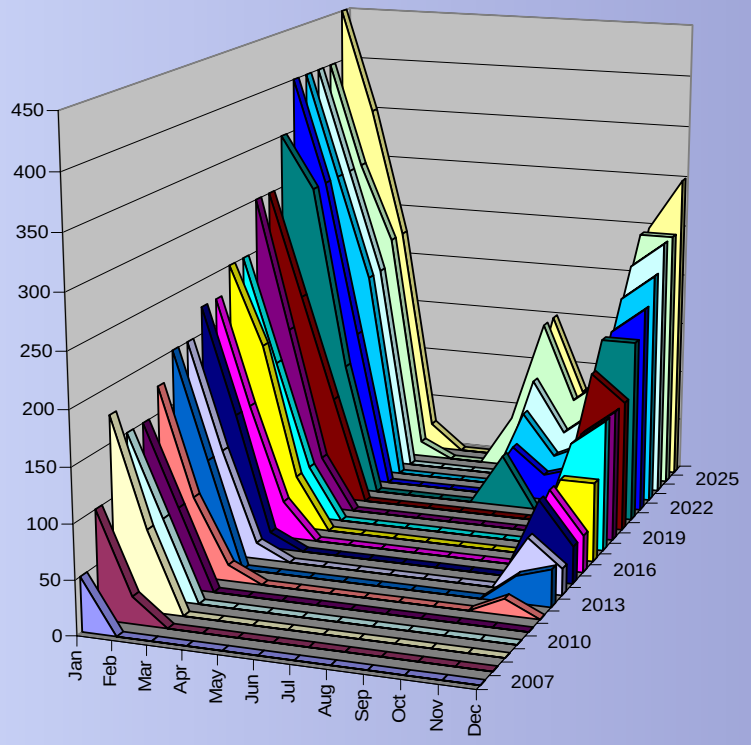
Simulating Hydro Generation



Resource Additions for a 95% Confidence Level

Covering Risk, Load Growth, and Power Contract Expiration

aMW



Resource Additions by Round 1 Portfolio: 2007 to 2026

Capacity in Megawatts

	Rely on Market	Renew-ables	Hydro, Wind, & Gas	Div-erse	Gas-Fired	50:50 Block/ Slice	100% Block	IGCC and Wind	Coal and Gas
Conservation		140	140	140	140	140	140	140	140
Exchange		100	100	100	100	*100*	100	100	100
Call Option*		*70*	*50*	*50*			*100*	*70*	
Hydro		60	60						
Wind		750	150	450		150		450	
Geothermal		25							
Landfill Gas		25	25	25					
Biomass		25		50					
CHP (co-gen.)			25						
CC Turbine			150	100	150	350	600		225
SC Turbine			50	50	200		50		
IGCC - Coal								300	
Conv. Coal									150
2026 Total	**0**	**1,125**	**750**	**915**	**590**	**640**	**890**	**990**	**615**

Energy Scenarios for the U.S.

Global Energy Decisions

	Reference Forecast	Terrorism & Turmoil	Green World	Nuclear Resurgence	Return to Reliability
Economic Growth	Medium	Slow	Medium	High	Medium
Gas Supply	LNG arrives (6 new US plants)	LNG constrained; N. Amer. growth	Tight supplies followed by LNG	LNG constrained N. Amer. growth	LNG constrained; N. Amer. growth
Gas Price	Normal	Higher mid-term	Higher long term	High, then lower after 2022	Normal
Environmental Regulation	No new	No new	Four pollutants, fast compliance	Four pollutants by 2020	No new
Coal Generation	No new before 2015 in US West	No new before 2015 in US West	Retires 466 GW by 2025	Retire coal by 2015	Adds coal over Reference levels
Transmission	Existing levels	Existing levels	Increase capacity by 1%	Increase capacity by 5% by 2020	Increase capacity by 20%
Nuclear Build	0 plants	0 plants	2 plants	42 1,000 MW plants by 2026	2 plants

Round 1 Portfolio Performance Summary

	Total Cost	Environ-mental Impacts	Cost Risk	Market Risk	Revenue Less Cost ($5/ton for CO2)	Revenue Less Cost ($25/ton for CO2)
1. Rely on Market-No Action						
2. Renewables						
3. Gas, 100% Block						
4. Gas, Wind, 50% Block						
5. Gas, Wind, Hydro						
6. Gas, Biomass, Wind						
7. Gas						
8. Gas, Coal						
9. Wind, IGCC						

	Best Performing
	Mid Performing
	Worst Performing

Identified Resource Impacts in DEIS

Elements of the Environment	Landfill Gas	Wind	Gas - SCCT	Gas - CCCT	Coal - Pulver-ized	Coal - IGCC	Trans-mission	Geother-mal	Biomass	Hydro Gorge Tunnel	Conser-vation	Market Trans-actions
Soils and Geology												
Construction	L	M	M	M	H	H	M	H	L	M	N/A	0
Operation	0	L	M	M	H	H	L	H	M	0	0	M
Air Quality												
Construction	L	L	L	L	L	L	L	L	L	L	N/A	0
Operation	L	L	M	M	H	H	L	L	M	L	L	H
Surface and Groundwater												
Construction	L	L	L	L	L	L	M	L	L	L	N/A	0
Operation	L	L	M	M	H	H	M	M	M	0	0	M
Plants and Animals												
Construction	L	M	M	M	H	H	M	H	M	L	N/A	0
Operation	L	M	L	L	H	H	M	M	M	0	0	M
Energy and Natural Resources												
Construction	L	L	L	L	M	M	M	L	L	L	N/A	0
Operation	+	0	H	H	H	H	M	L	L	+	+	H
Environmental Health												
Construction	0	L	L	L	M	M	H	M	M	L	N/A	0
Operation	+	M	M	M	H	H	L	M	M	0	L	M
Land Use												
Construction	L	M	M	M	H	H	H	M	M	L	N/A	0
Operation	L	M	M	M	H	H	H	H	H	L	0	M
Aesthetics and Recreation												
Construction	L	M	M	M	M	M	M	H	M	M	N/A	0
Operation	L	H	M	M	H	H	H	H	H	L	0	M
Cultural Resources												
Construction	0	M	M	M	M	M	L	M	M	L	N/A	0
Operation	0	M	M	M	H	H	M	L	L	0	L	M
Economy												
Construction	+L	+L	+M	+M	+M	+M	+L	+L	+L	+L	+H	0
Operation	+L	+L	+L	+L	+M	+M	+L	+L	+L	+L	+L	+L
	L	= Low impact		M	= Moderate impact		H	= High impact		+, +L, +M	= Positive impact	
	0	= No impact		N/A	= Not applicable							

Public Comment

- Public Comments Incorporated in the IRP Included:
  - Non-energy benefits of conservation
  - Extending production tax credit for renewables
  - Cogeneration
  - Call options
  - 32% capacity factor for new wind plants
  - Not weighting evaluation criteria in rankings of portfolios
  - Portfolio costs as purchased power agreements
  - Geothermal
  - Scenarios including carbon taxes

What Was Learned in Round 1?

- Round 1 Suggested a Focus in Round 2 on:
  - Conservation
  - Improving seasonal balance of existing resources
  - Dispatchable resources
  - Resources not requiring large transmission investments
  - Resources with low air emissions
  - Closely matching size of resource additions with need

Questions?

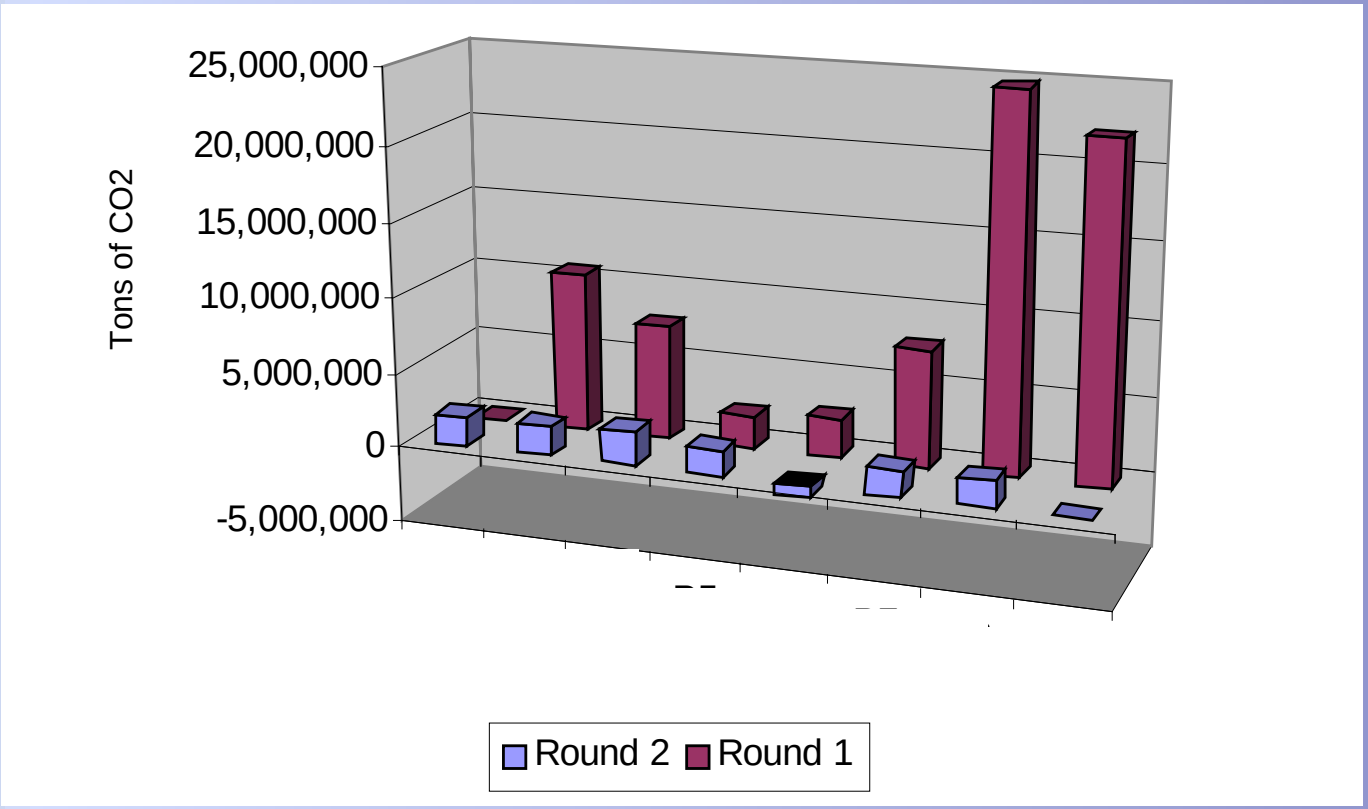
Round 2 Portfolios

First 5 Years of Round 2 Portfolios

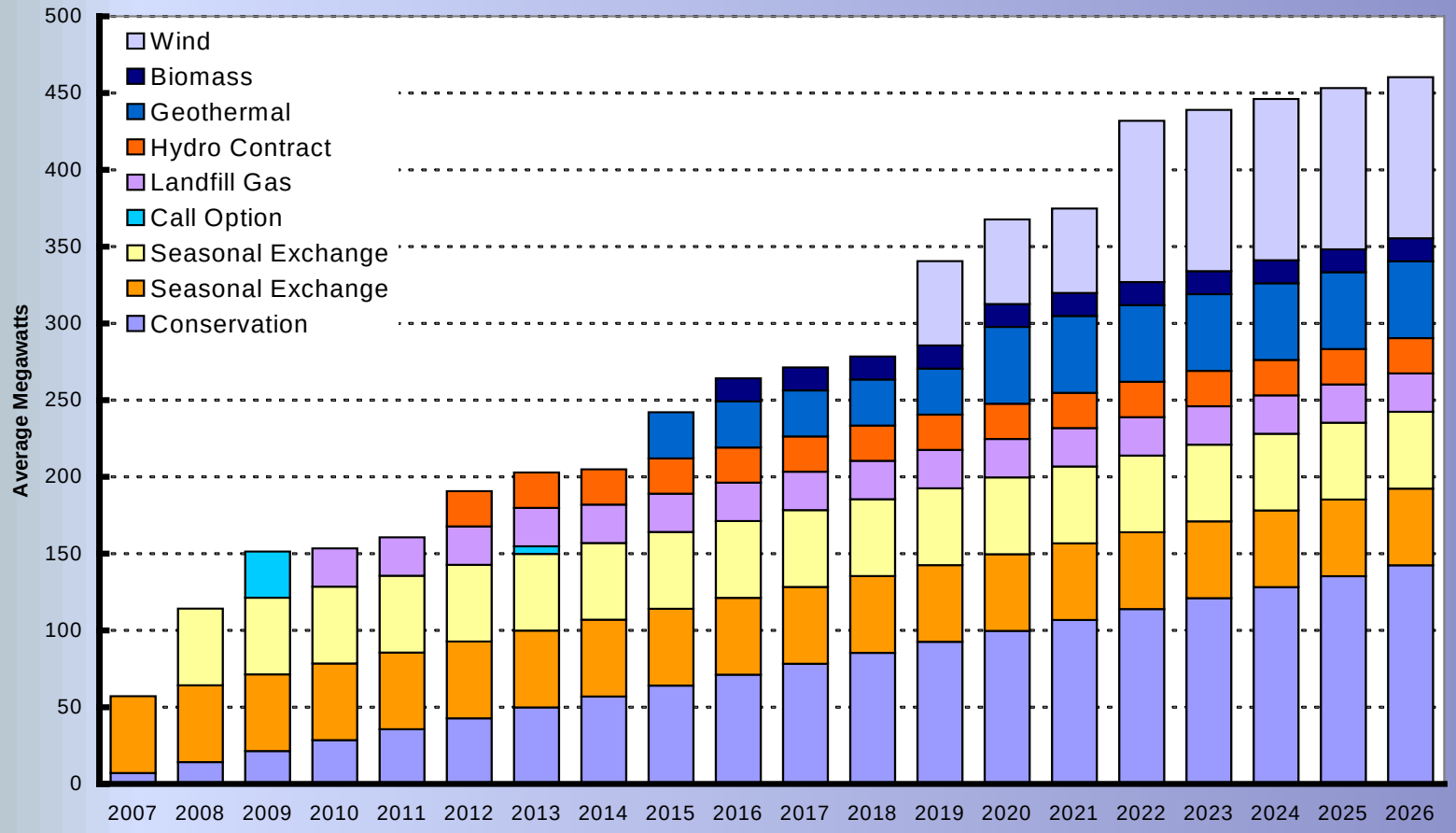
- Focus is on Low Cost and Low Environmental Impact Resources to Meet Reliability Criteria
  - Add conservation, exchanges, seasonal contracts (call options) first
  - Next is landfill gas
  - Next is a hydro contract

Environment
Round 2 Portfolio Design Impacts

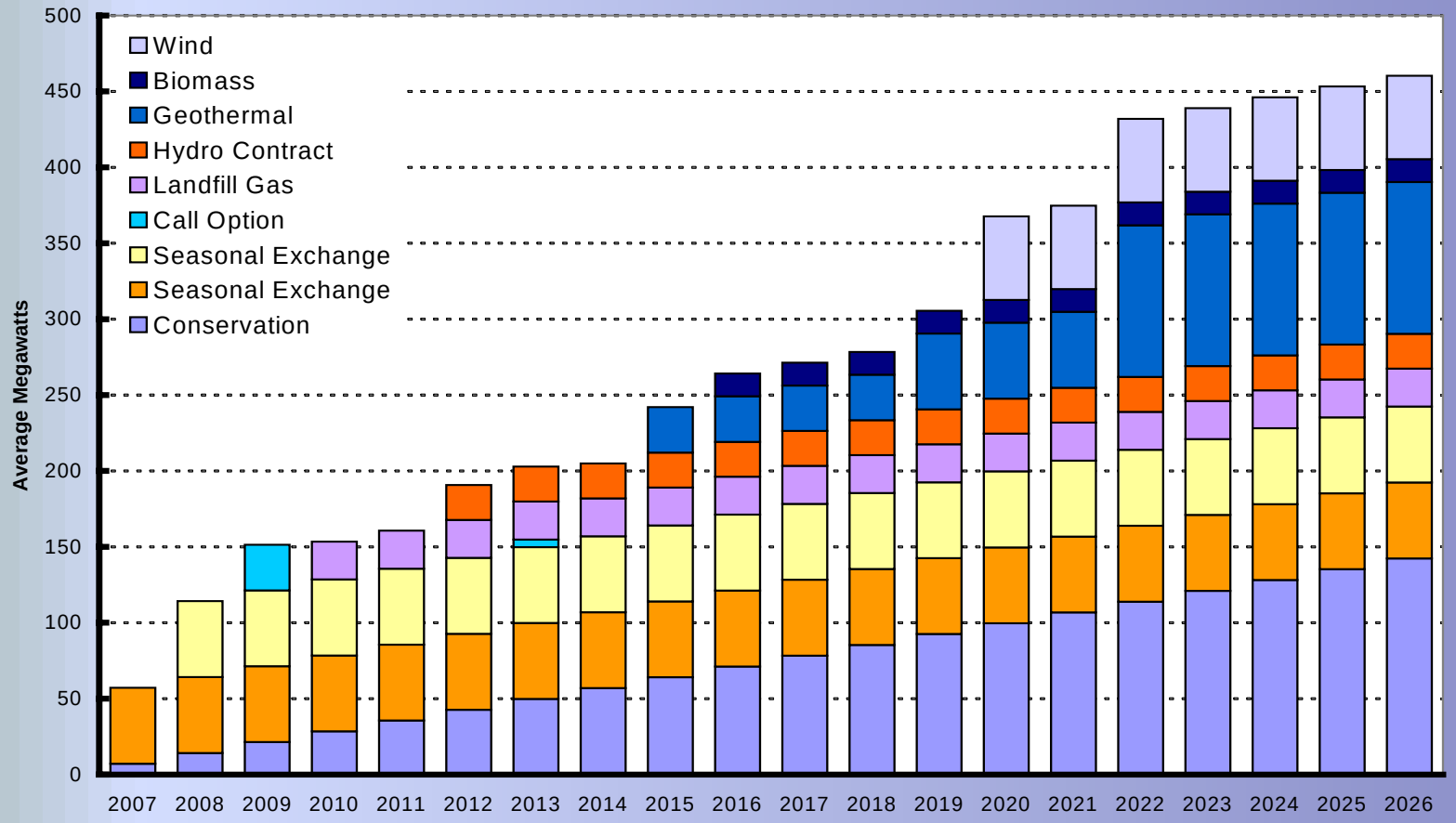
20-Year Total Carbon Dioxide Emissions by Portfolio



Portfolio 7
More Wind



Portfolio 8
More Geothermal



Differences in Portfolios

- In Total, Portfolio 8 Costs About $50 Million Less Than Portfolio 7 in Today's Dollars
  - About $2.5 million each year in 2006 dollars
- Risk is Slightly Less for Portfolio 8 Than Portfolio 7
  - Both for range of costs and range of revenues
- Environmental Impacts
  - No distinguishing difference
    - Both portfolios use renewable resources

What Have We Learned So Far in Round 2?

- Accelerating Conservation Should be Studied Further
- Reducing the Amount of Resources in Portfolios Improves Performance
- Superior Environmental Performance in Round 2 Portfolios
- No Major Differences in Risks or Reliability of Round 2 Portfolios
  - All are relatively low risk, high reliability portfolios

Questions
&
Discussion

Integrated Resource Planning

- SCL's Integrated Resource Planning is an Ongoing Process, not a Singular Event
  - Defines a strategy
  - Establishes an action plan

Example 2-Year Action Plan

- Study increasing the pace of conservation
- Work to expand PNW transmission capacity, allowing more exchanges and access to renewables
- Pursue City Council approval for physical call options
- Pursue summer for winter exchanges for 2007 and 2008 as needed
- Pursue landfill gas opportunities
- Investigate geothermal resources, distributed generation, and new renewable technologies
- Study cost-effectiveness of hydro efficiency projects
- Investigate costs and benefits of a hydro contract
- Participate in wind study groups

Remaining Schedule

November 14: IRP Public Meeting (City Hall)
November 28: Briefing the Mayor on Analysis
December 13: Briefing the Energy & Technology Committee on Analysis

Questions?

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

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