



**Pasadena Water & Power
2008 Integrated Resource Plan**

**IRP Advisory Group Meeting #1
August 12, 2008**

Call to Order and Introductions

IRP Advisory Group members

- Sid Tyler (Council member) styler@cityofpasadena.net
- Rodolpho Carrasco (Non-profit) rcarrasco@gmail.com
- Don Bremner, (Sierra Club-Pasadena Group) donbremner@earthlink.net
- Don McIntyre (Residential) dfmuac@sbcglobal.net
- George Falardeau (Art Center) george.falardeau@artcenter.edu
- Dr. Carol Carmichael (Environmental Advisory Commission)
carolc@caltech.edu
- Paul Little (Chamber of Commerce) Paul@pasadena-chamber.org
- Bernard Melekian (City Manager) bmelekian@cityofpasadena.net
- Phyllis E. Currie (General Manager, PWP) pcurrie@cityofpasadena.net
Alternate: Eric Klinkner (Assistant General Manager, PWP)
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- Rod Olguin (Planning and Development Dept.) rolguin@cityofpasadena.net

2008 IRP Project Team

- PWP staff

- ♦ Eric Klinkner (Assistant General Manager)
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- ♦ Gurcharan Bawa (Director, Power Supply)
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- ♦ Steve Endo (Principal Engineer, Power Supply)
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- ♦ Ren Zhang (Assistant Engineer, Power Supply)
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- Pace staff

- ♦ Aldyn Hoekstra (VP, Project Director)
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- ♦ David West (Director, Project Manager)
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- ♦ Gary Vicinus (COO, Project Advisor)
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Agenda

- Call to Order and Introductions
- IRP AG Activities and Commitments
- Integrated Resource Planning Process Overview
- Facilitated Discussion
 - ◆ Planning Objectives and Evaluation Criteria
 - ◆ Policy Scenarios
 - ◆ Resource Options
- Wrap-up and Next Steps

IRP AG Activities and Commitments

PWP's commitment to this IRP effort

- Commitments for the 2008 IRP
 - ◆ Ensure alignment with the City's aspirations to be an environmental advocate and leader
 - ◆ Directly address several issues raised in the previous IRP
 - Quantification of environmental impacts (CO₂ costs)
 - Resources options considered (In-city generation, local renewable energy, energy efficiency, fossil-fueled generation)
 - Aggressiveness of policies (RPS)
 - Strategic partnerships with local entities
 - ◆ Conduct a collaborative process for public and stakeholder involvement in the planning process

Public and Stakeholder Participation Commitments

- **Balanced** **Process and outcome should be sensitive to a wide variety of viewpoints**
- **Responsive** **All comments and suggestions should be addressed**
- **Transparent** **Process and analysis should be open and understandable (no “black boxes”)**
- **Educational** **Process should allow for learning and insight**
- **Manageable** **Process should respect timelines and milestones**
- **Cost-effective** **Process should consider limited financial resources**

Public Outreach and Stakeholder Participation

Two primary avenues of public/stakeholder participation:

- **IRP Stakeholder Advisory Group**

- ◆ A working group that will attend monthly half-day sessions reviewing analysis and providing input and suggestions for the IRP analysis

- **Public meetings**

- ◆ Presentations to the public at large to discuss findings and solicit feedback

IRP Advisory Group Role and Responsibility

- Serve as an advisor to PWP staff and its consultants in the development of IRP objectives, policy options and detailed resource plans
- Participate in monthly advisory group meetings to monitor progress and provide feedback
- Identify potential planning objectives, policy goals and resource alternatives to be considered in the IRP process
- Review documents and analysis summarizing IRP analysis and their implications
- Provide input, in the form of both oral and written comments, to guide the IRP development process

IRP Stakeholder Advisory Group and Public Meetings

Monthly

Phase I AG Meetings

AG Meeting # 1

AG Meeting # 2

Phase II

AG Meeting # 3

AG Meeting # 4

Discussion Items

- IRP objectives and evaluation criteria
- Policy scenarios

- Policy & portfolio analysis findings
- Resources for further analysis
- Candidate portfolios

- Input data and assumptions
- Alternate portfolios

- Portfolio evaluation
- Cost vs. risk tradeoffs
- Resource plan strategy

Public Meeting # 1

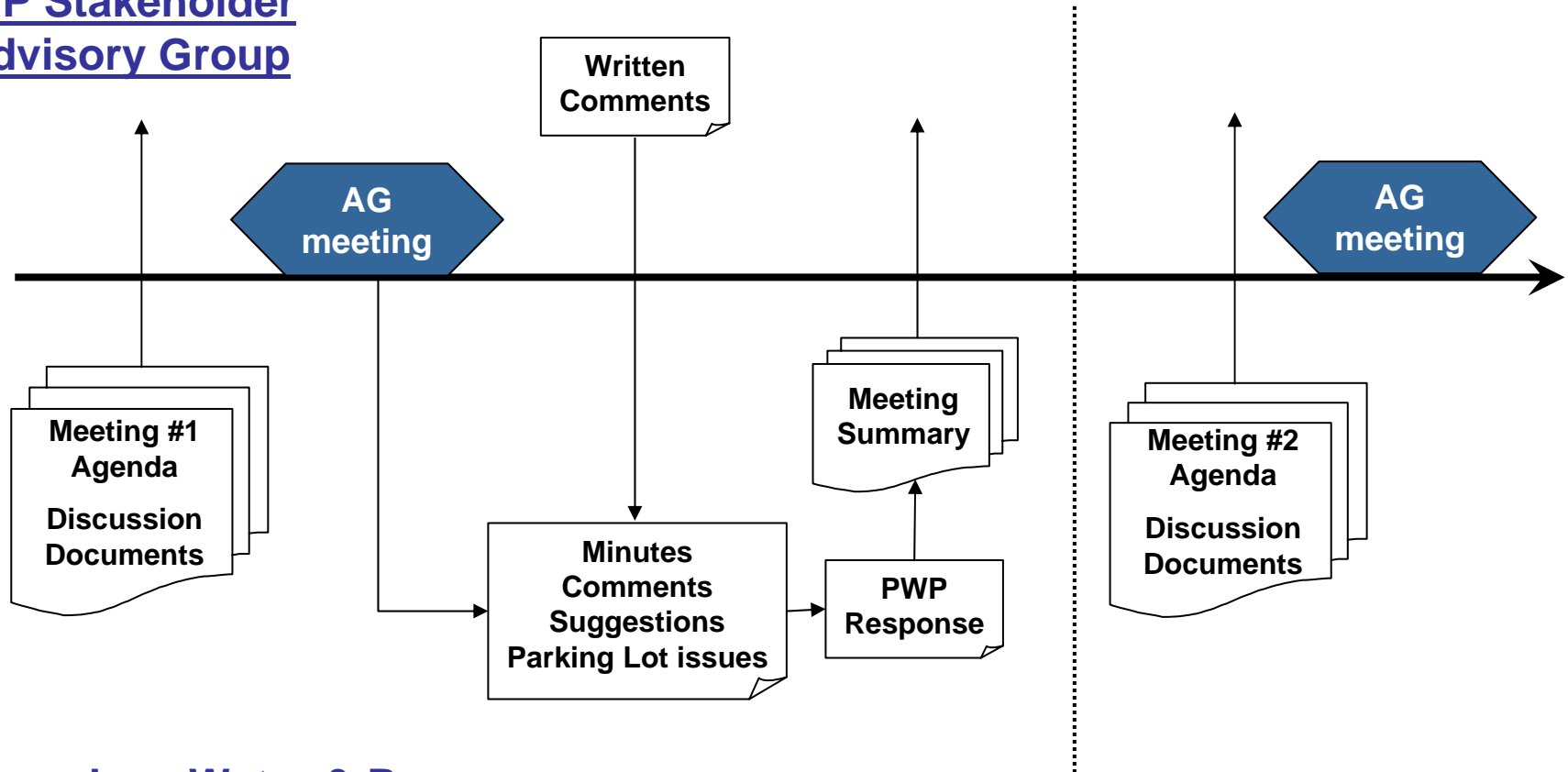
July 2008

Public Meeting # 2

Public Meeting # 3

Integrating the Stakeholder Advisory Group

IRP Stakeholder Advisory Group



Pasadena Water & Power

Integrated Resource Planning Process Overview

Goals for 2008 IRP Process

- **Comprehensive plan** for satisfying PWP's future electricity requirements for supply-side and demand-side resources
- **Systematic approach** to identify all relevant options, evaluate the trade-offs (reliability, cost, environmental) and assess the risks associated with each option
- **Extensive public input and stakeholder review** to ensure that the IRP process reflects the community's needs
- **Action Plan** to identify specific decisions and initiatives that should be implemented to achieve the policy goals of the IRP

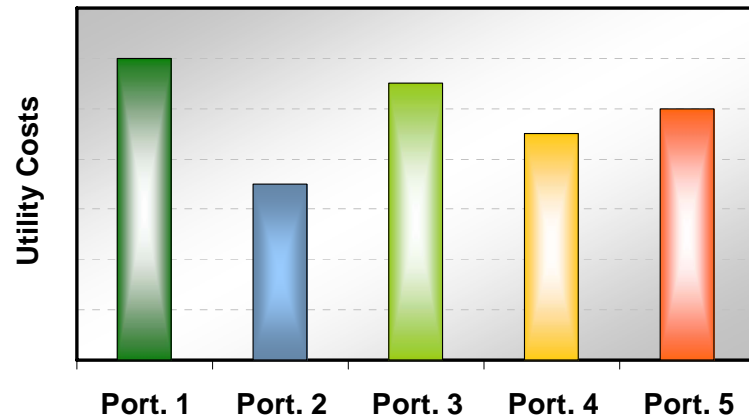
Portfolio Options Assessment

- Phase I Screening will determine which technologies will be evaluated in Phase II
- Portfolios will be constructed from combinations of demand side measures, generation assets, contracts, spot market purchases and hedges that will meet load requirements.
- Each portfolio will be tested against the full spectrum of market and regulatory outcomes.
- Portfolios will be compared to each other and to the original risk profile
- Portfolio that best meets multiple objectives across range of outcomes is selected.
- These are finally tested against game changing events to ensure there are no surprises.

Resource Planning Approach

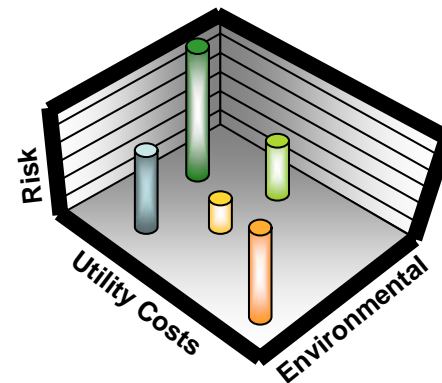
Traditional Approach

- Process focuses on minimizing utility costs
- Portfolio evaluation is one-dimensional



Pace Approach

- Process focuses on the simultaneous evaluation of multiple objectives and tradeoffs
 - Rate Stability
 - Utility Cost Minimization
 - Environmental Stewardship
- Process allows you to think in three dimensions



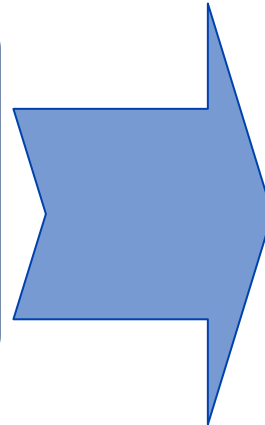
The End Game

A risk-cognizant integrated portfolio plan and action plan/
resource acquisition strategy

Destination

Sample Portfolio Considerations

- **Broadway and Glenarm resolution**
- **Future remote renewable resources**
- **Future PV & distributed generation**
- **Future enhanced EE programs**
- **Transmission options**



Roadmap

Action Plan & Strategy Considerations

- **Policy guidelines (RPS %)**
- **GHG reduction plan**
- **Enhanced EE/DR action plan**
- **Local RE strategy**
- **Renewable acquisition game plan (RFPs)**
- **Plan update process**

PWP Situation Assessment

- Modest incremental load growth expected in the future
- Aggressive energy efficiency goals
- Ongoing need for local generation for reliability
- Aging gas-fired generation inside the city
- Limited interconnection to broader power grid
- Significant reliance on coal-fired power
- Environmental leadership goals that may need refreshing

The City's Current Environmental Commitment



GREEN CITY ENERGY ACTION PLAN

ACTION 1

Increase the use of renewable energy to 10% of the City's peak electric load by 2012

ACTION 2

Reduce the City's peak electric load by 10% by 2012

ACTION 3

Reduce greenhouse gas emissions by 25% by 2030

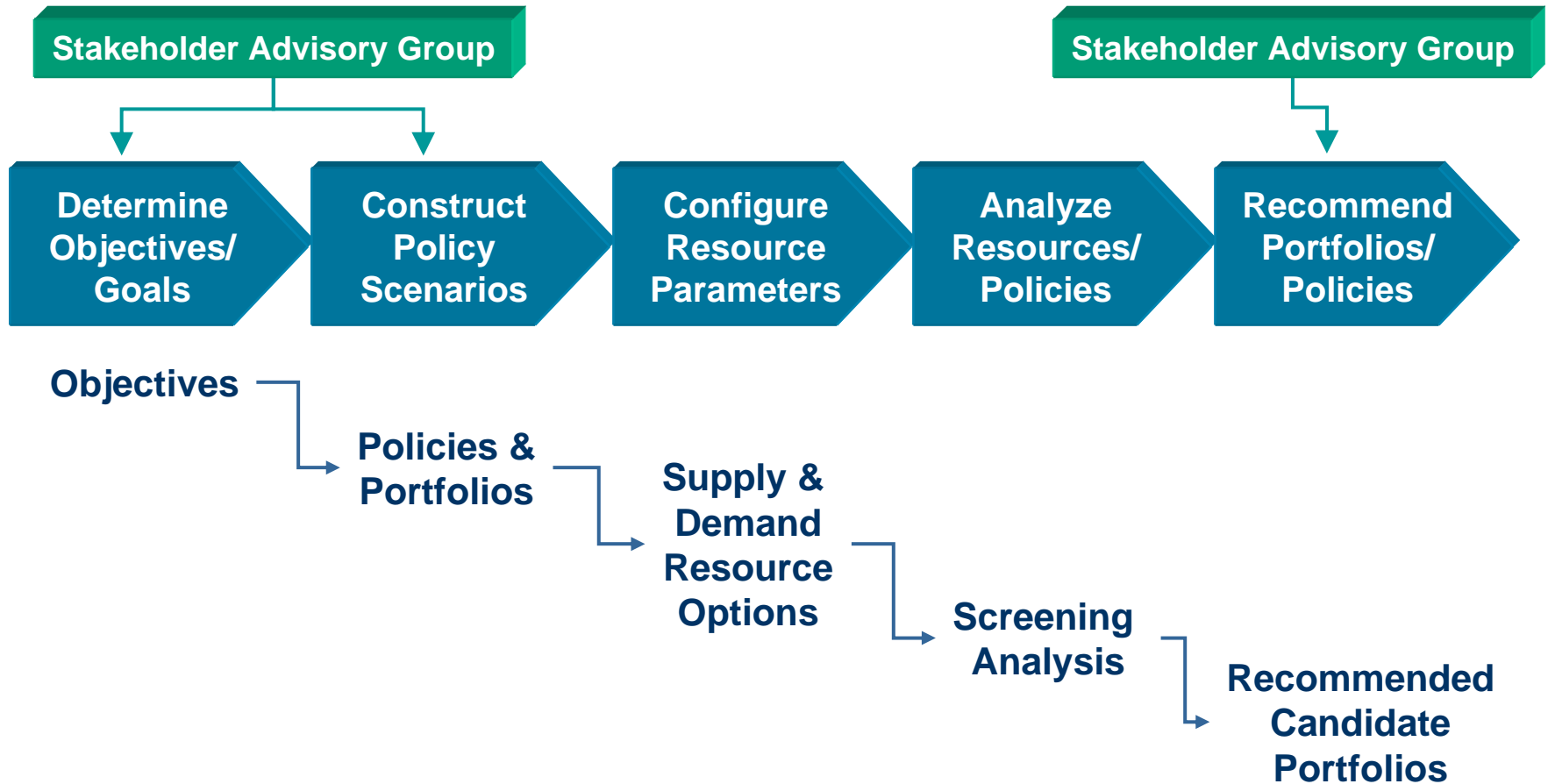
Key Drivers Affecting PWP's IRP Options

- High and volatile fuel and capital costs
- Rising Renewable Portfolio Standards
- Carbon constraints weighing on coal generation
- Significant exposure to potential cost increases
- Evolving regulatory and environmental challenges
- Ongoing technology advances opening new opportunities
- Power supply reliability and local generation requirements

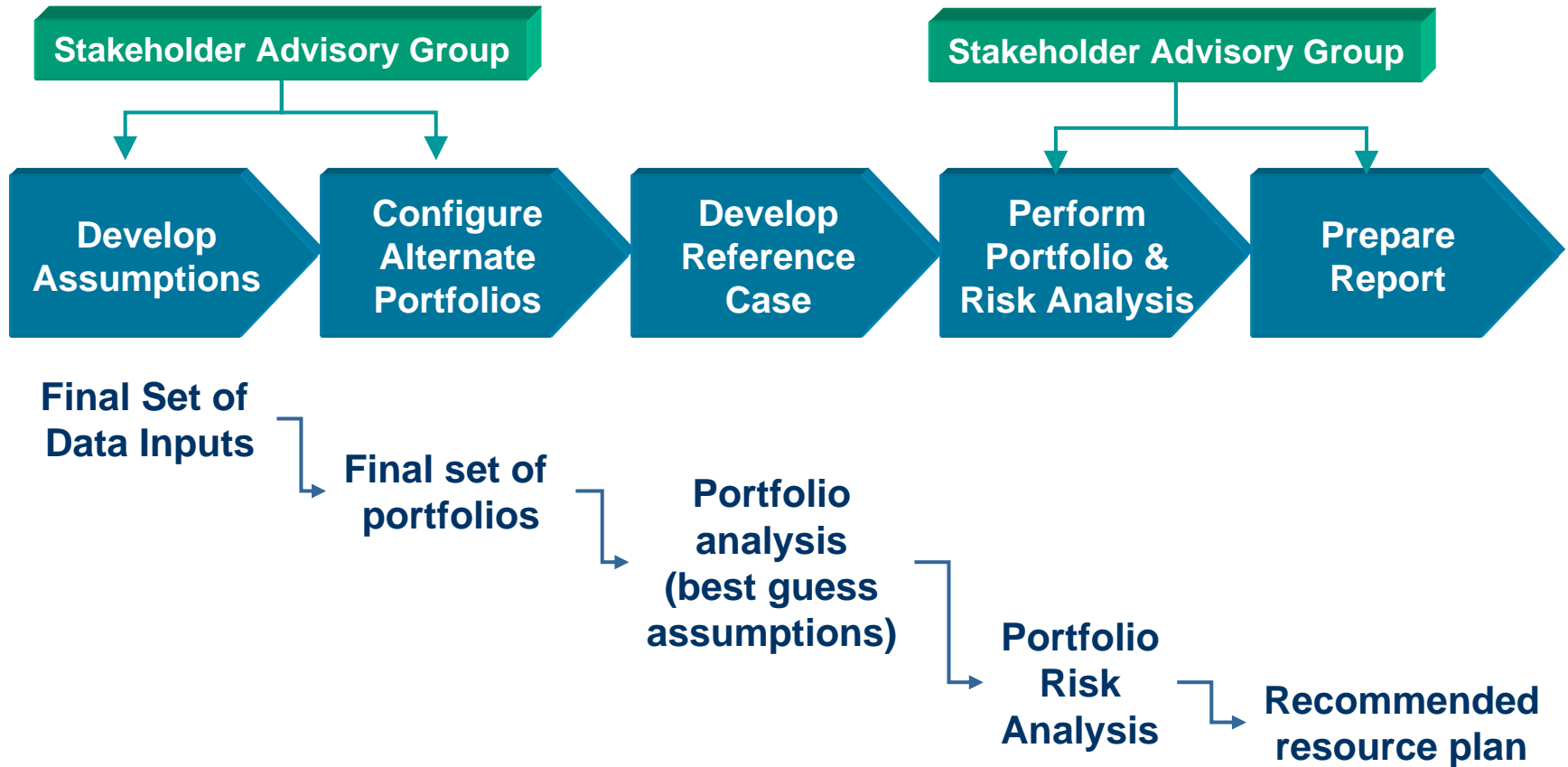
Preliminary List of Resource Policies to be Evaluated

- **Aggressive expansion of energy efficiency programs**, including the potential for zero or negative load growth
- **Increasing renewable supplies**, including assessment of a 100% renewable portfolio
- **Options for in-city power plants**, including repowering of Broadway and Glenarm stations
- **Transmission Upgrades**, in order to enhance reliability and reduce power import constraints
- **Reductions of fossil fueled generation**, including the displacement of existing coal and gas resources
- **Local renewables and distributed generation**, including solar photovoltaics, advanced metering and combined heat and power applications

Phase I Process – Narrowing the range of possibilities



Phase II Process – Evaluating environmental, cost and risk tradeoffs



Preliminary Schedule

Task	Month										
	Apr08	May08	Jun08	Jul08	Aug08	Sep08	Oct08	Nov08	Dec08	Jan09	
PHASE I			■								
PHASE II				■							
IRP Advisory Group Meetings					◆	◆		◆	◆		
Public Meetings				◆			◆			◆	

◆ Approximate meeting date

Facilitated Discussion

Discussion topics

- 2007 IRP issues and suggested approach
- Planning objectives and evaluation criteria
- Resource options
- Policy scenarios

2007 IRP Issues and Suggestions

2007 IRP – Findings and Suggestions

<u>EAC Finding</u>	<u>Suggested 2008 IRP Process Approach</u>	<u>Advisory Group Comments & Suggestions</u>
<p>1. The IRP analysis may not adequately weigh environmental impacts</p>	<ul style="list-style-type: none"> • Consider a range of CO2 and other air emissions cost scenarios • Find the breakeven cost of CO2 – at what cost does the resource decision change? • Directly assess the costs associated with environmental guardianship beyond current goals 	
<p>2. Potential opportunity cost associated with investment of approximately \$131 million in fossil fuel technology as opposed to investing locally in renewable energy sources is a concern.</p>	<ul style="list-style-type: none"> • Process will systematically evaluate portfolios with a number of different renewable and fossil-fuel resource options • Explicitly quantify the cost differences and tradeoffs associated with each portfolio 	
<p>3. The City's renewable portfolio standard goals are not aggressive and are limited to procurement of renewable energy from remote generation facilities. IRP activities associated with promoting local generation capacity (predominately residential solar energy incentives) do not consider the potential for local generation from city, commercial, and other institutional properties in the City.</p>	<ul style="list-style-type: none"> • Evaluate a wide range of policy scenarios including varying levels of RPS • Assess the potential for local generation at customer sites including renewable energy 	

2007 IRP – Findings and Suggestions (cont'd)

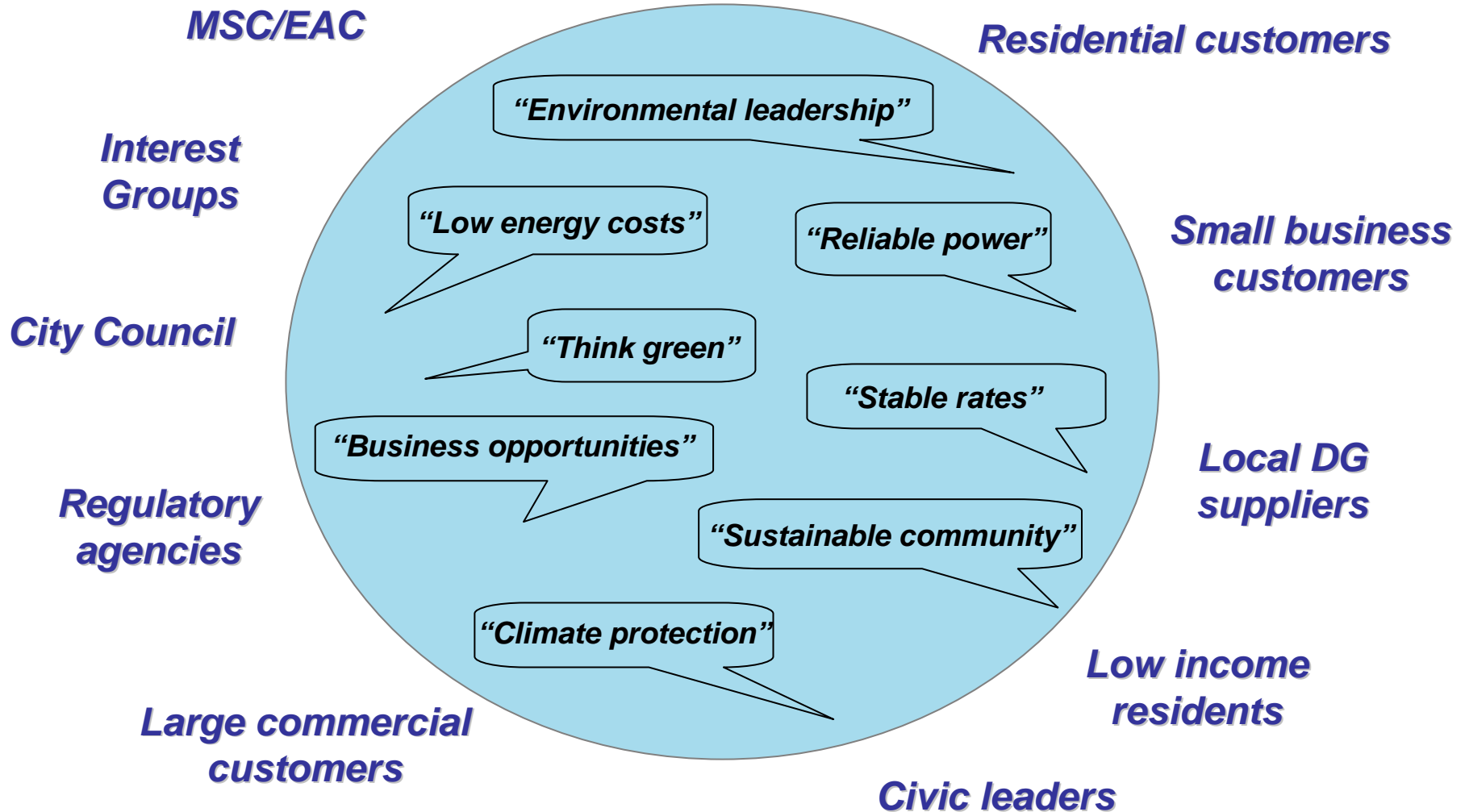
<u>EAC Finding</u>	<u>Suggested 2008 IRP Process Approach</u>	<u>Advisory Group Comments & Suggestions</u>
<p>4. Concern about a predominant focus of PWP's energy efficiency efforts on residential customers (~50,000). The benefit of focusing on large commercial customers should be evaluated.</p>	<ul style="list-style-type: none"> • Directly evaluate energy efficiency programs for commercial customers 	
<p>5. Form meaningful, strategic partnership with JLP, Caltech, and other technological leaders to take advantage of innovative green and clean power solutions for the benefit of our community and our future.</p>	<ul style="list-style-type: none"> • Work with the AG to identify partnerships that may provide innovative solutions 	
<p>6. Provide resources to support a study of the renewable energy goals for the City, including an examination of the potential for local renewable energy generation from City, residential, commercial, and other institutional properties, and for procurement of renewable energy from remote sources as apart of the RPS goals for PWP.</p>	<ul style="list-style-type: none"> • Assess the potential for modular renewable energy applications within the City • Develop actions plans for the procurement of local and remote RE resources 	
<p>7. Research, analysis, and planning be conducted to identify the benefits of increased energy efficiency efforts.</p>	<ul style="list-style-type: none"> • Assess the costs and benefits of expanding current energy efficiency programs 	

2007 IRP – Findings and Suggestions (cont'd)

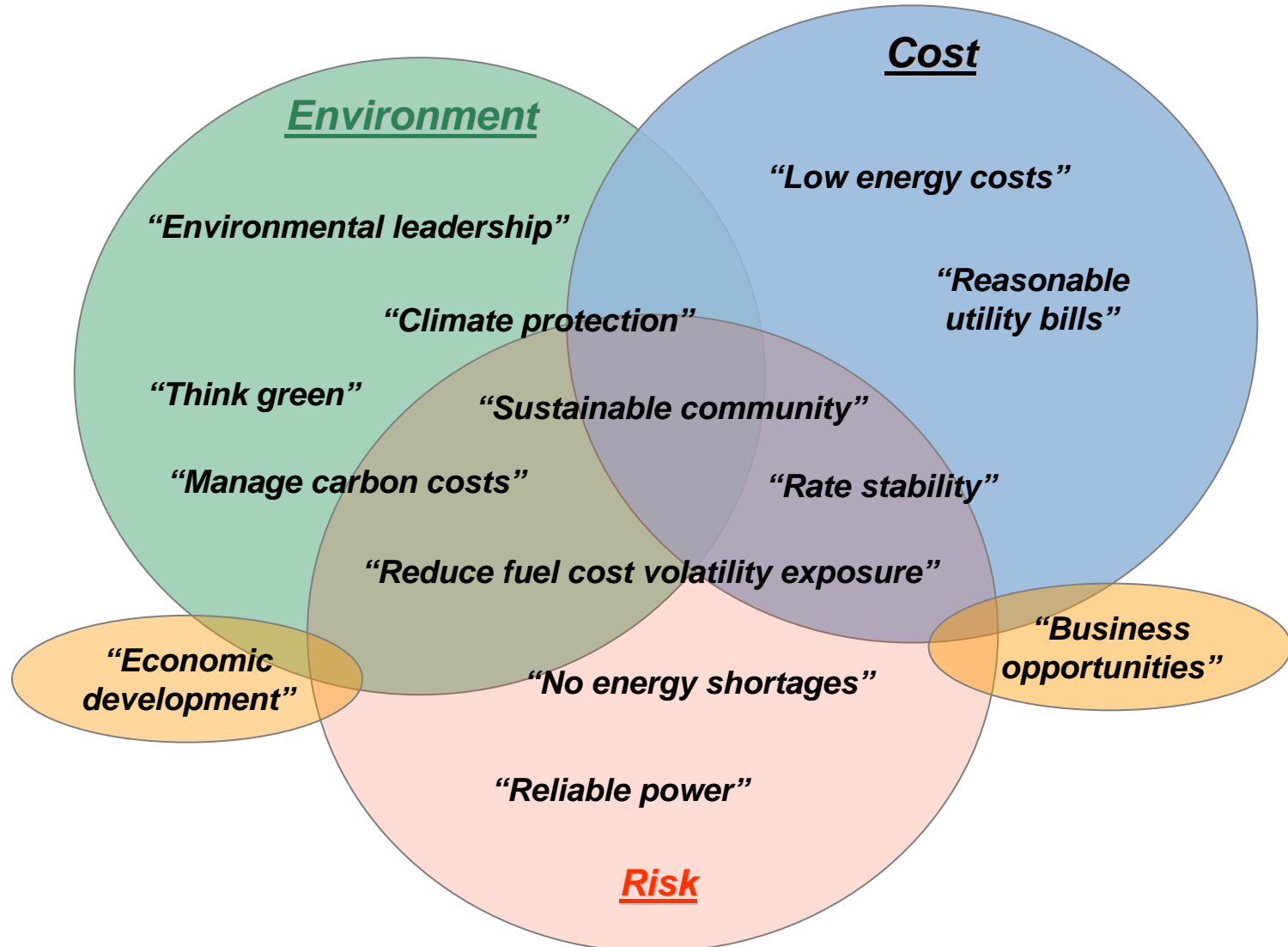
<u>EAC Finding</u>	<u>Suggested 2008 IRP Process Approach</u>	<u>Advisory Group Comments & Suggestions</u>
<p>8. Research, analysis, and planning be conducted...to identify any feasible options that may be exercised regarding the City's long-term contracts for fossil fuels, with the goal of reducing reliance on this form of energy.</p>	<ul style="list-style-type: none"> • Evaluate portfolios that phase-out fossil-fueled resources • Quantify the costs and tradeoffs associated with these portfolios 	

Planning Objectives and Evaluation Criteria

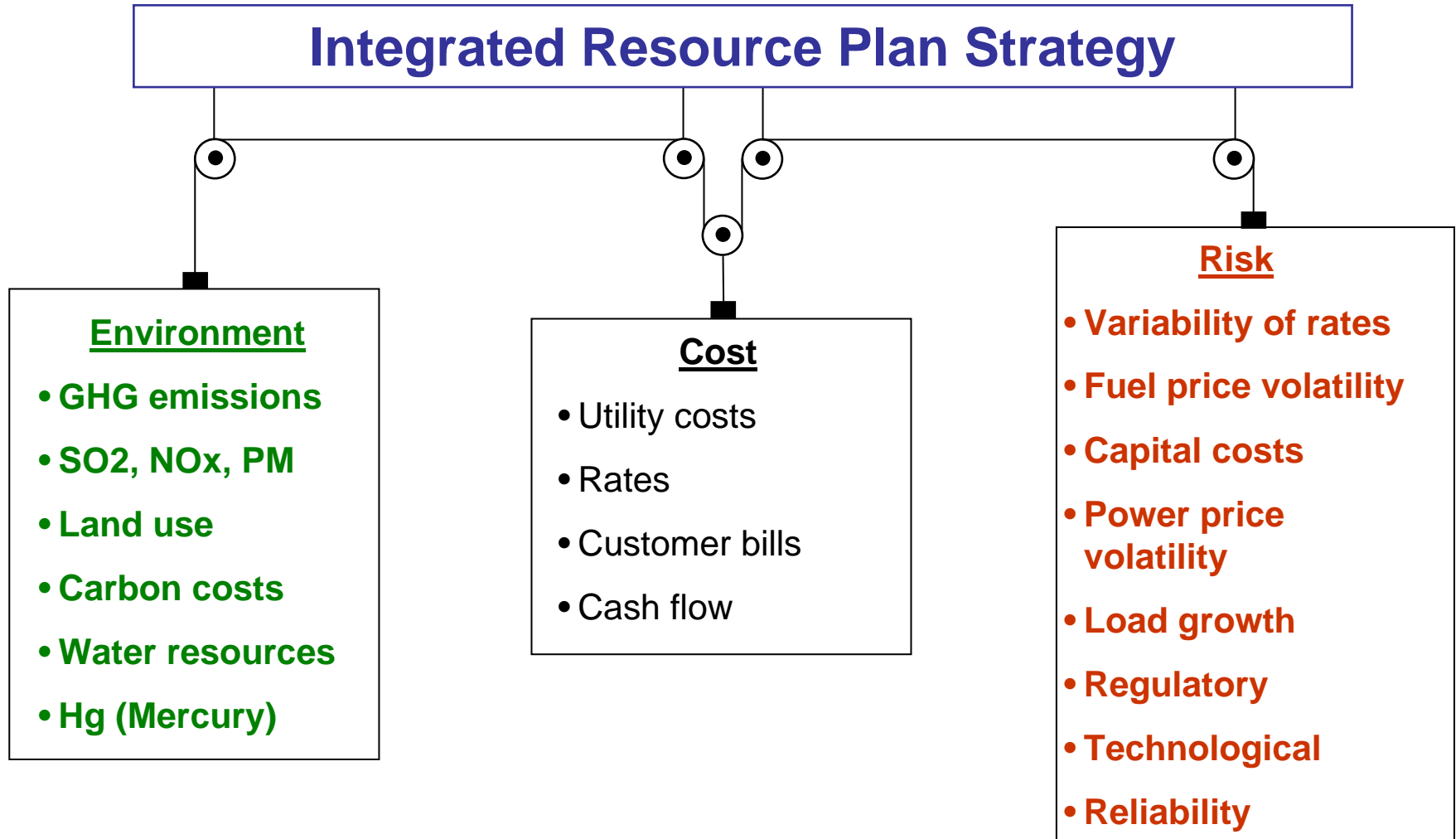
Stakeholders Have Different Objectives



Defining Objectives and Their Relationships is a Critical Element

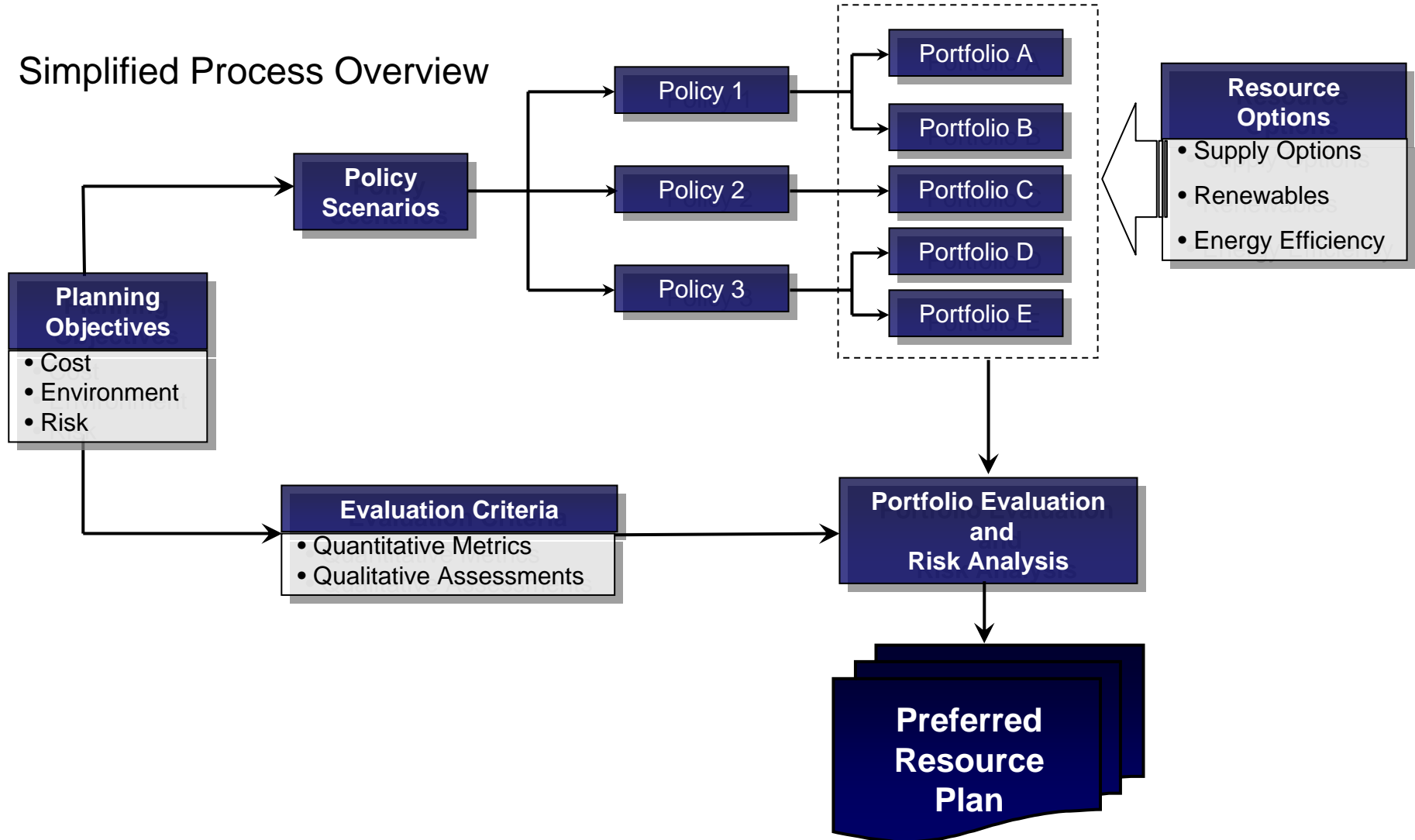


Finding the Right Balance Depends on Priorities of Competing Objectives



Planning Objectives Drive The Entire IRP Process

Simplified Process Overview



Examples From Other Utilities – Seattle City Light

Criteria	Measures
Provide Reliable Service	Occurrence of unserved customer energy need.
Minimize Costs to Customers	20-Year net present value of portfolio costs.
Manage Risks	Volatility of portfolio costs (net revenue).
Minimize Environmental Impacts	Air emissions of CO ₂ , SO ₂ , NO _x , mercury, and particulates. Impacts on land use, surface and groundwater, soils and geology, plants and animals, employment, aesthetics and recreation, environmental health, and cultural and history were also evaluated in the EIS.

Example Objectives – Madison Gas & Electric

Planning Objectives	Evaluation Criteria
Rate stability	Standard deviation of revenue requirements
Environmental stewardship	Total CO2 emissions
Cost competitiveness	Present Value of Revenue Requirements (PVRR)

Example Objectives – Hawaiian Electric Company

Planning Objectives	Evaluation Criteria
Protect the environment	Total emissions (tons) for 6 air pollutants; land, marine, water impacts
Economical electricity	PVRR; Total Resource Cost; average rate and bill impacts; impacts to economy
Power Quality and Reliability	LOLP; Generation mix; power quality
Energy security and sustainable future	DSM & CHP penetration; system heat rate; fuel oil usage; RPS
Minimize potential negative social and cultural impacts	Land use; community lifestyle compatibility; employment
Increase plan flexibility	Resilience under various load growth sensitivities; inclusion of short lead time, modular resources
Utility financial integrity and competitiveness	Total capital expenditures; PVRR over 1 st 10 years; rate impacts – 1 st 10 years

Prioritizing planning objectives

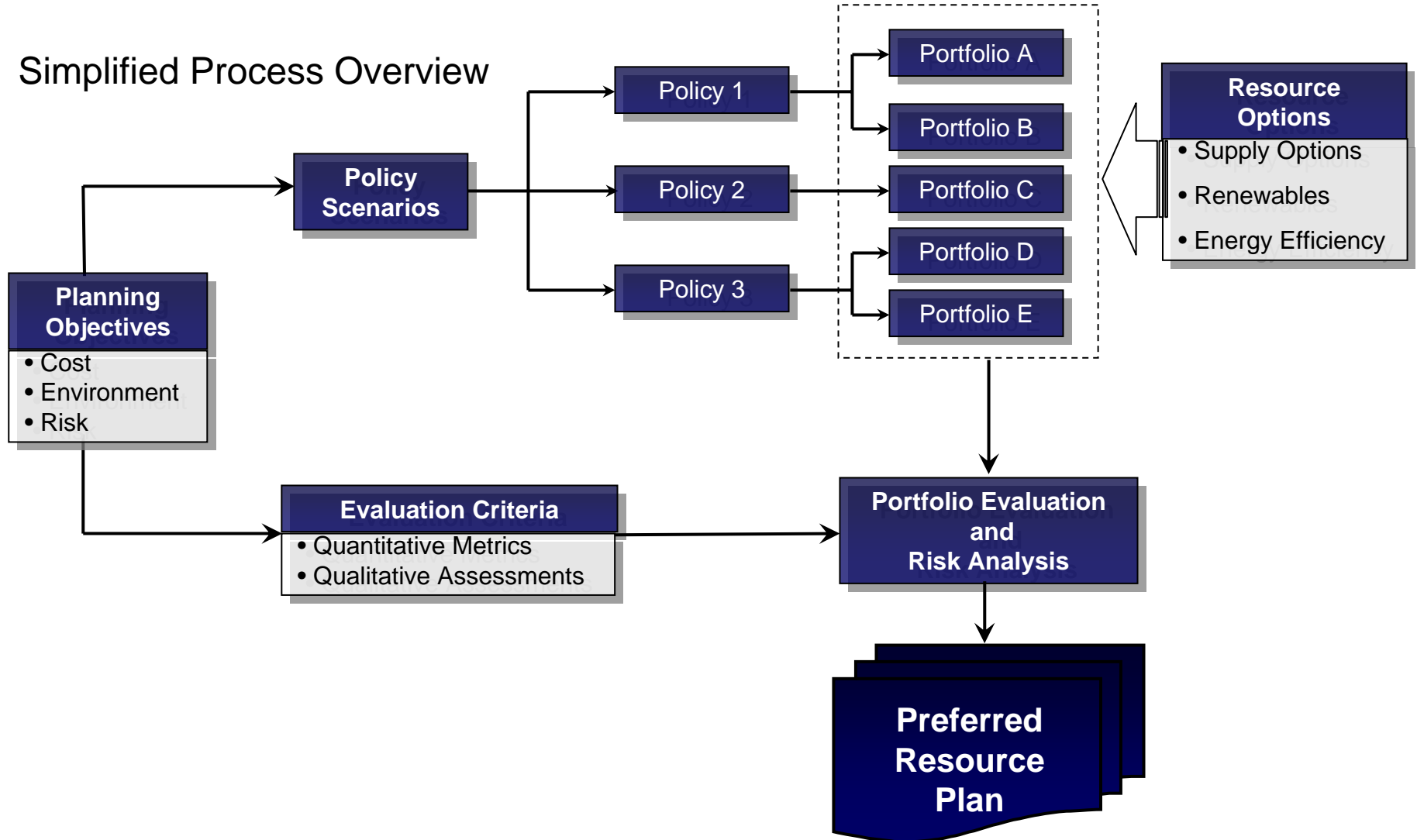
Advisory Group Members

Possible Planning Objectives	Don Bremner	Dr. Carol Carmichael	Rodolpho Carrasco	Phyllis E. Currie	George Falardeau	Paul Little	Don McIntyre	Bernard Melekian	Rod Olguin	Sid Tyler
Achieve Environmental Goals										
Deliver Reliable Service										
Maintain Competitive Rates										
Maintain Stable Rates										
Manage Market Risks										

Resource Options

Planning Objectives Drive The Entire IRP Process

Simplified Process Overview



Demand-side Resource Options (preliminary)

- Energy efficiency programs
 - ◆ Energy monitoring and information systems
 - ◆ Residential efficiency programs (lighting, appliances, Energy Star® homes)
 - ◆ Commercial efficiency programs (lighting, process, HVAC, etc.)
- Load control/demand response
 - ◆ Automatic metering
 - ◆ Water heater and air conditioner cycling
 - ◆ Commercial load curtailment
 - ◆ Commercial load shifting - thermal energy storage (Hill Library project)
- Distributed Generation
 - ◆ Rooftop photovoltaic applications (Solar PV)
 - ◆ Solar water heater systems
 - ◆ Small wind applications

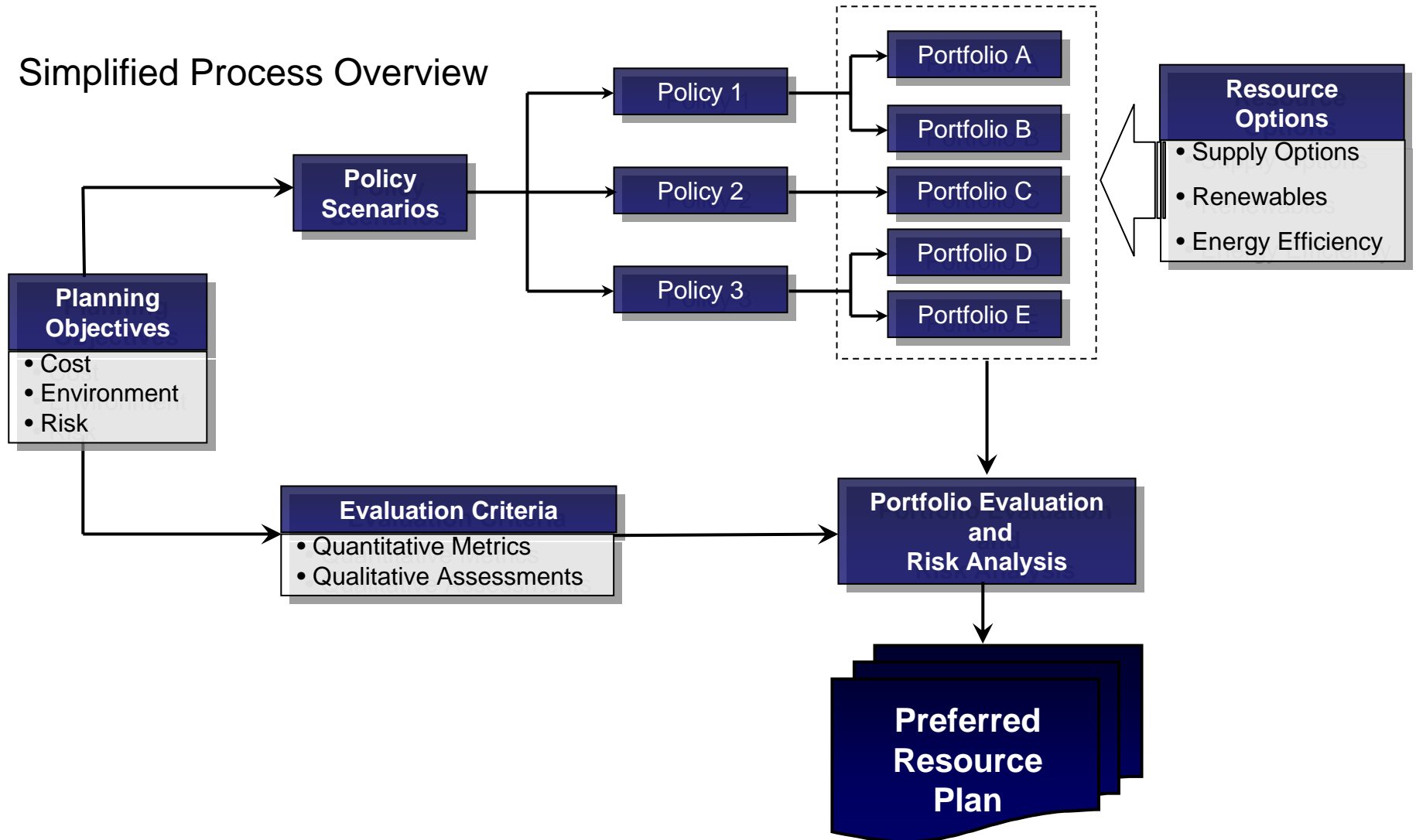
Supply-side Resource Options (preliminary)

- Renewable resources
 - ◆ Remote utility scale wind & solar thermal applications
 - ◆ Biomass (crops, landfill, wood waste)
 - ◆ Small hydro
 - ◆ Geothermal
- Fossil fuel resources
 - ◆ Gas unit repowering
 - ◆ New combined cycle
 - ◆ Purchase contracts
- Non-GHG emitting resources
 - ◆ Large Hydro
 - ◆ Nuclear
 - ◆ IGCC with carbon sequestration
- Transmission options
 - ◆ Expanded import capability
 - ◆ New interconnection points

Policy Scenarios

Planning Objectives Drive The Entire IRP Process

Simplified Process Overview



Preliminary List of Policy Scenarios to be Evaluated

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Wrap-up and Next Steps

Next Steps

- Please send in any additional comments you have by 8/18
- PWP will prepare a written record of this meeting along with an explanation of how your comments and suggestions will be incorporated
- Next AG meeting – 9/16
 - ◆ Proposed objectives and evaluation criteria
 - ◆ Proposed policy scenarios and plan concepts
 - ◆ Key drivers and primary assumptions
 - ◆ Indicative screening analysis