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April 30, 2008

MEMORANDUM

TO: Power Committee

FROM: Michael Schilmoeller, Senior Power Systems Analyst

SUBJECT: Introduction to Decision-Making Under Uncertainty

As the Sixth Power Plan is developed, staff will be communicating a sequence of presentations dedicated to familiarizing the Power Committee members with the processes, models, inputs, and decisions integral to creating resource plans. The purpose of this sequence is to inform the members about the computer modeling concepts and data that will eventually support the Council's decision of a recommended resource plan, which staff expects to present in spring of 2009. These presentations will introduce the regional portfolio model, describe key uncertainties (such as electricity and fuel prices), outline how the model represents various types of resources, and finally present preliminary findings for the Draft Sixth Plan.

The selection of a resource plan requires consideration of where we are, where we want to go, and how we are going to get there. The resource plan is a means to the goal of an adequate, efficient, economical, and reliable power supply for the region. The presentations will address some of the considerations and decisions the Council will undertake to identify the best choice for a resource plan.

This first presentation introduces the Council's regional portfolio model; a computer model for evaluating resource plans under uncertainty and used to prepare the recommended resource strategy for the Sixth Power Plan. I will explain the similarities between the approach to resource planning employed in the portfolio model with more familiar examples of decision-making under uncertainty, for example military planning and purchasing a new car. I will also outline a sequence of the proposed presentations for Power Committee meetings taking place over the next year.



Decision-Making Under Uncertainty

Michael Schilmoeller
Power Committee Presentation
May 13, 2008

Overview

- Outline of the council's resource decisions
- Roadmap for presentations
- Introduction to decision-making under uncertainty



Council's Resource Decisions

- Where are we now?
- Where do we want to go?
- How are we going to get there?



Presentations

- **May 13-15, Walla Walla: General discussion of decision making under uncertainty**
- **Aug 12-14, Spokane: Introduction to the regional portfolio model**
- **Sep 16-18, Astoria: Initial representation of uncertainty in the regional portfolio model**
- **Oct 15-16, Missoula: Regional portfolio model resource representations**
- **January 2009: Final data and modeling for the draft Plan, including revised representations of uncertainty**
- **March 2009: Draft Resource Plan Results. (Wash, rinse, repeat.)**



Introduction To Decision-making Under Uncertainty

- Resource planning under uncertainty is not that different from other forms of decision making under uncertainty
- Modeling should help the Council describe their risk concerns and identify a plan that has the flexibility to address those



A Military Example



A Purchase Decision



Significance to Resource Planning

	This Example?	Resource Planning?
Objectives	✓	✓
Reduce size and likelihood of bad outcomes	✓	✓
... but cannot eliminate risk	✓	✓
Cost – risk tradeoff	✓	✓
Imperfect Information	✓	✓



Significance to Resource Planning

	This Example?	Resource Planning?
Use of scenarios	✓	✓
Resource allocations reflect likelihood of scenarios	✓	✓
... even if "we cannot assign probabilities"	✓	✓
Resource allocations reflect severity of scenarios	✓	✓
Decisions to use options are deferred	✓	✓



Significance to Resource Planning

	This Example?	Resource Planning?
Choices depend on circumstances	✓	✓
No "do overs", stuck with consequences	✓	✓
Emphasis on developing options and alternatives	✓	✓
A plan may be predominantly about options	✓	✓
Issue: How much of each resource to use?	✓	✓



The Council's Approach to Resource Planning

- Incorporates this perspective on resource planning under uncertainty
- Differs from that of most utilities
 - Plans assume perfect foresight and do not (need to) adapt
 - Risk measures don't measure bad outcome
- Enables detailed exploration and testing



Next time

- The regional portfolio model
- How the regional portfolio model incorporates this perspective on risk

