Northwest Power and Conservation Council

May 31, 2006

MEMORANDUM

TO: Power Committee

FROM: John Fazio, Senior System Analyst

SUBJECT: Resource Adequacy - Economic Risk
(June 13, 2006 Power Committee)

Based on suggestions from several commenters, the Council is exploring the need for an "economic" adequacy standard, which would complement the newly adopted "physical" adequacy standard. In its Fifth Power Plan, the Council developed a resource strategy that went beyond the physical needs of the region, in part, to minimize exposure to future electricity price spikes. The Resource Adequacy Forum has integrated the Council's work in its development of potential economic standards.

The physical standard is defined to be a resource portfolio that yields a winter loss of load probability (LOLP) of 5 percent. The resultant annual average load/resource balance is about 1,500 average megawatts deficit. The Council's plan calls for greater resource development, which raises the average cost of the power supply but minimizes the likelihood of an extremely high cost year. The resource strategy in the Fifth Plan would have the region develop about 3,000 megawatts more resource, yielding a winter LOLP closer to zero and a load/resource balance of about 1,500 average megawatts surplus.

Having even more resources than called for in the plan would minimally reduce the economic risk but would substantially increase the average cost. So, it is equally important for the region to not build too few or too many resources. In addition, building the wrong types of resources would also increase the cost without decreasing the economic risk.

The proposed concept is to have both a physical and an economic target. A "green" zone would be established above the economic target, a "yellow" zone between the economic and physical targets and a "red" zone below the physical target.

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Resource Adequacy Economic Target

Power Committee

June 13, 2006

Boise, Idaho

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Objectives

- What do we mean by “physical” adequacy?
- Review of the current energy standard.
- What is “economic” adequacy?
- Defining an economic target.

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Defining Physical Adequacy

- Significant problem = Lose 1,200 MW for one day
- Goal = No more than 5% likelihood of significant problems for future winters (5% LOLP)
- Assessment = Simulate many future winters and count how many have significant problems.
- Solution = Plan sufficient resources to attain a 5% LOLP.

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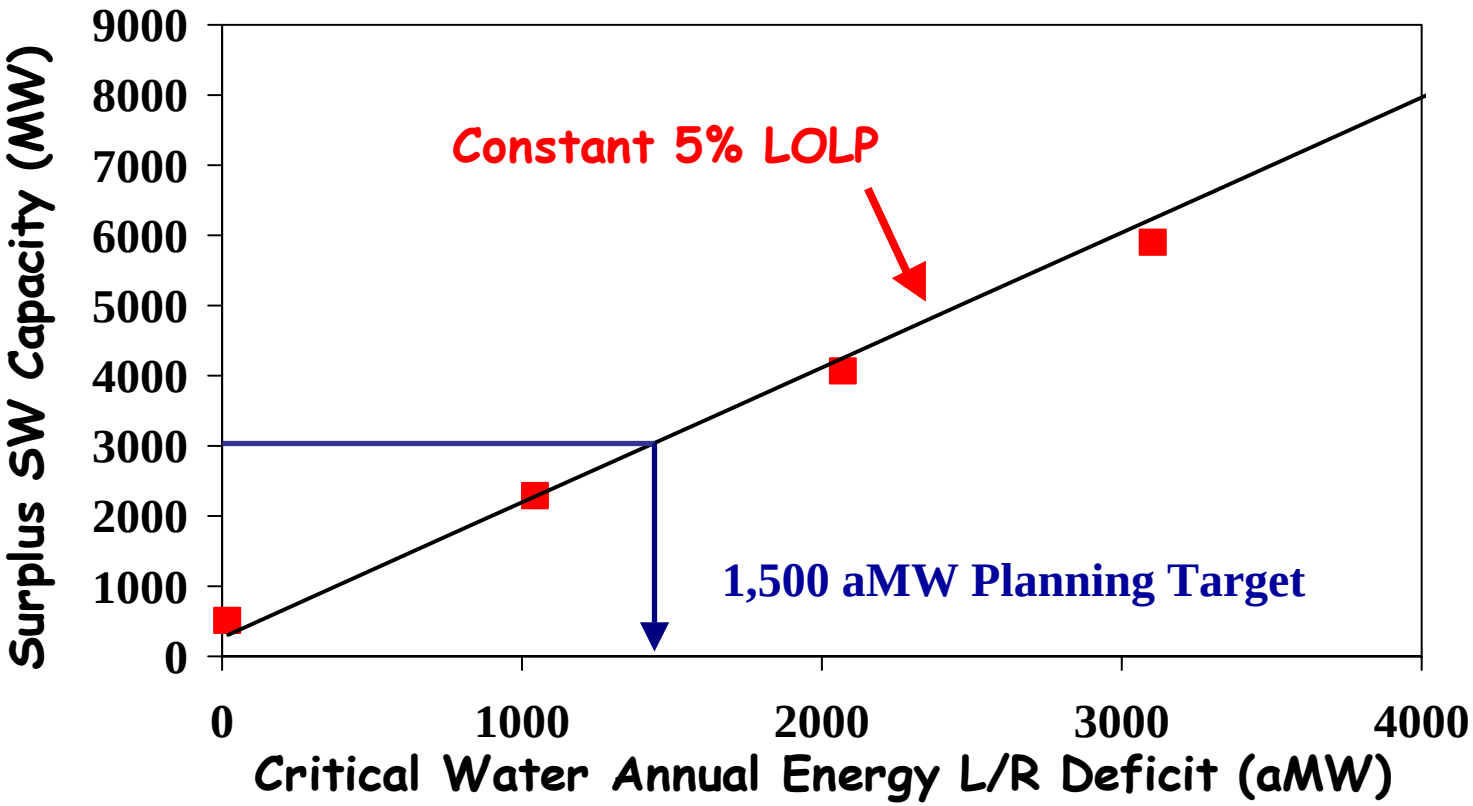
Linking LOLP and L/R Balance



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Pacific NW Energy Standard

- Metric – Annual average Load/Resource balance
  - Load = annual average load
  - Resource = thermal resources + firm hydro
    + 1,500 aMW planning adjustment
- Target – Zero

- Meeting this standard yields a 5% LOLP

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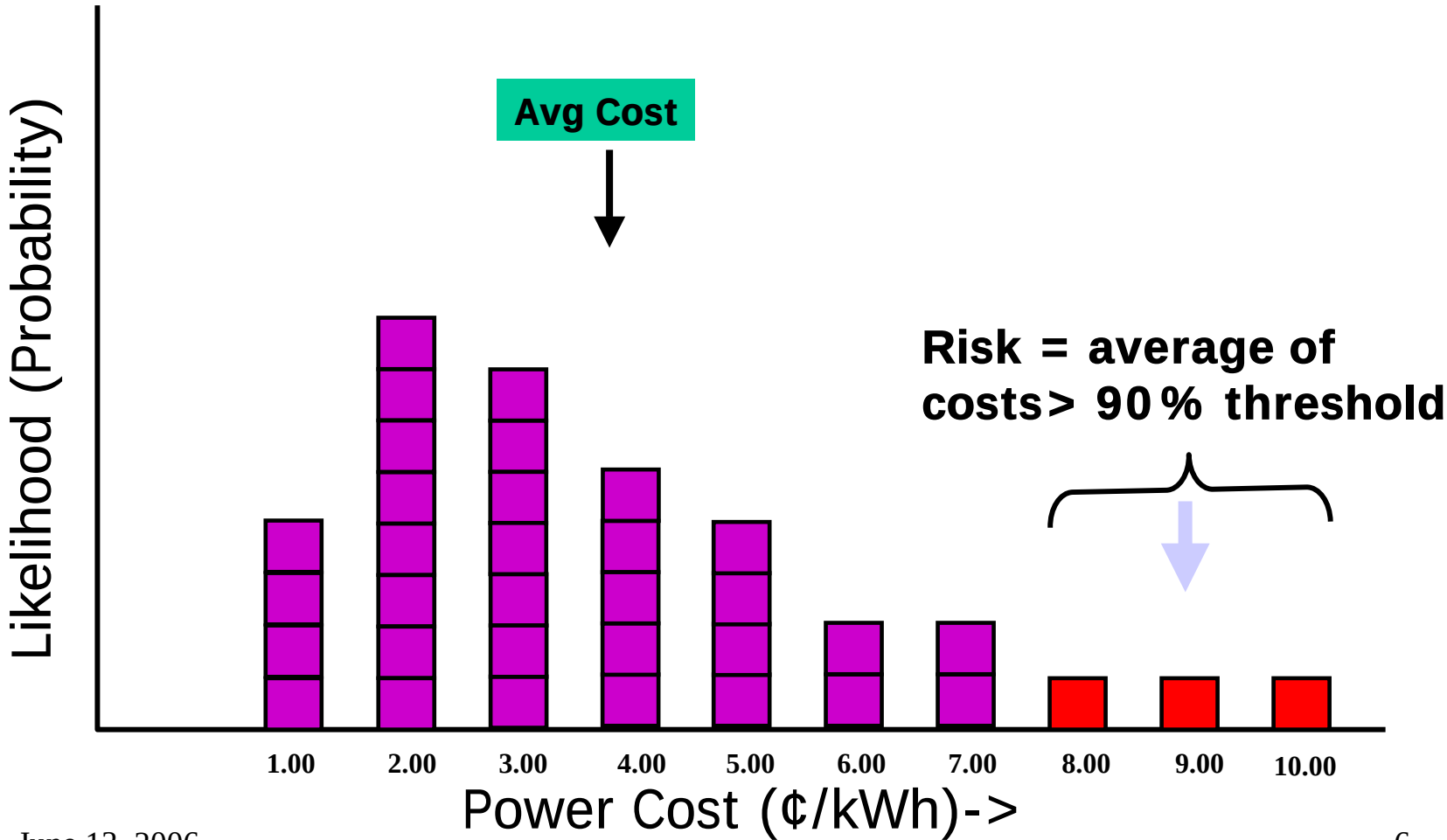
Balancing Cost and Risk

Average Cost and Economic Risk for a Resource Plan



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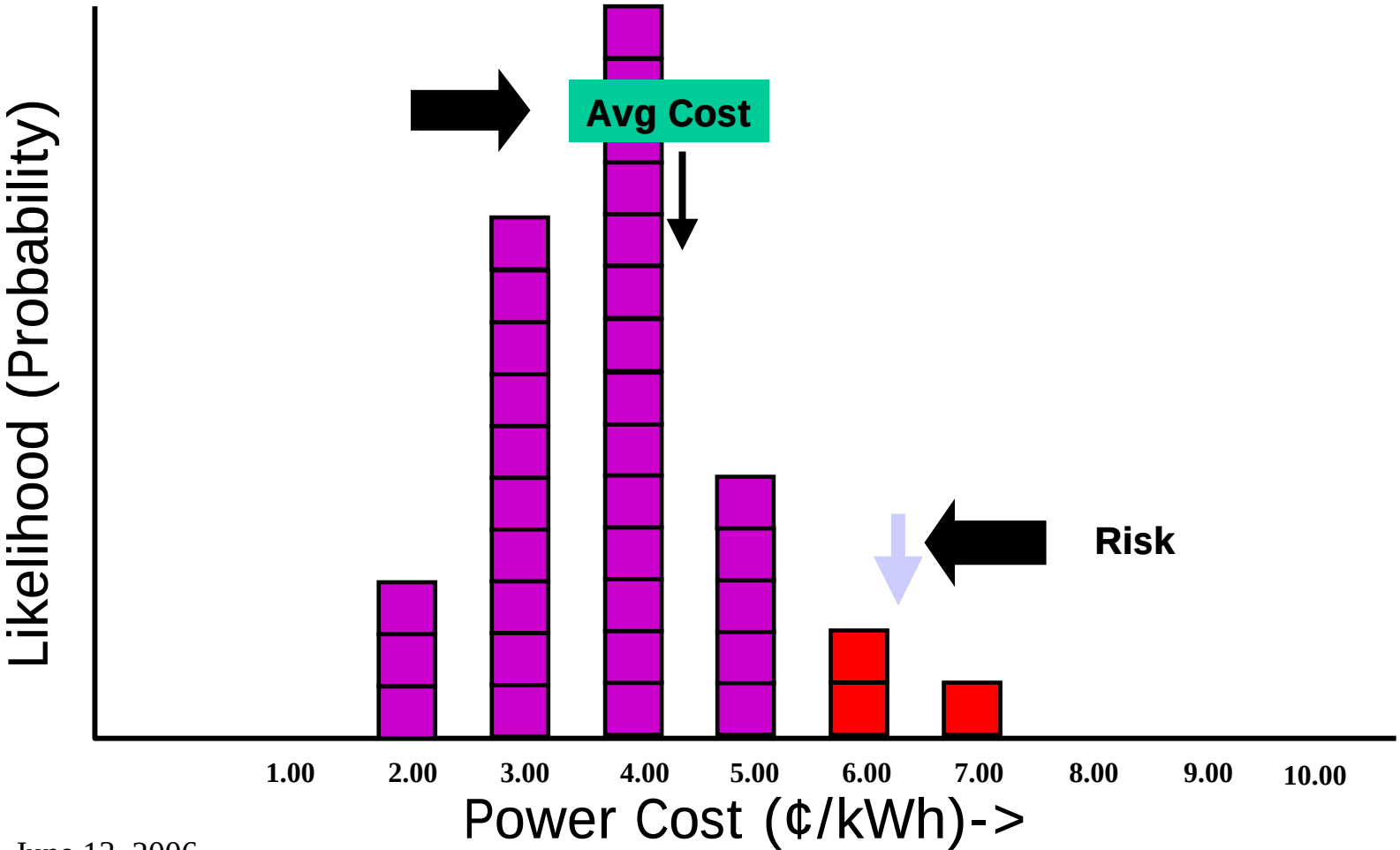
A Different Plan: The Trade-off Higher Avg Cost but Lower Risk



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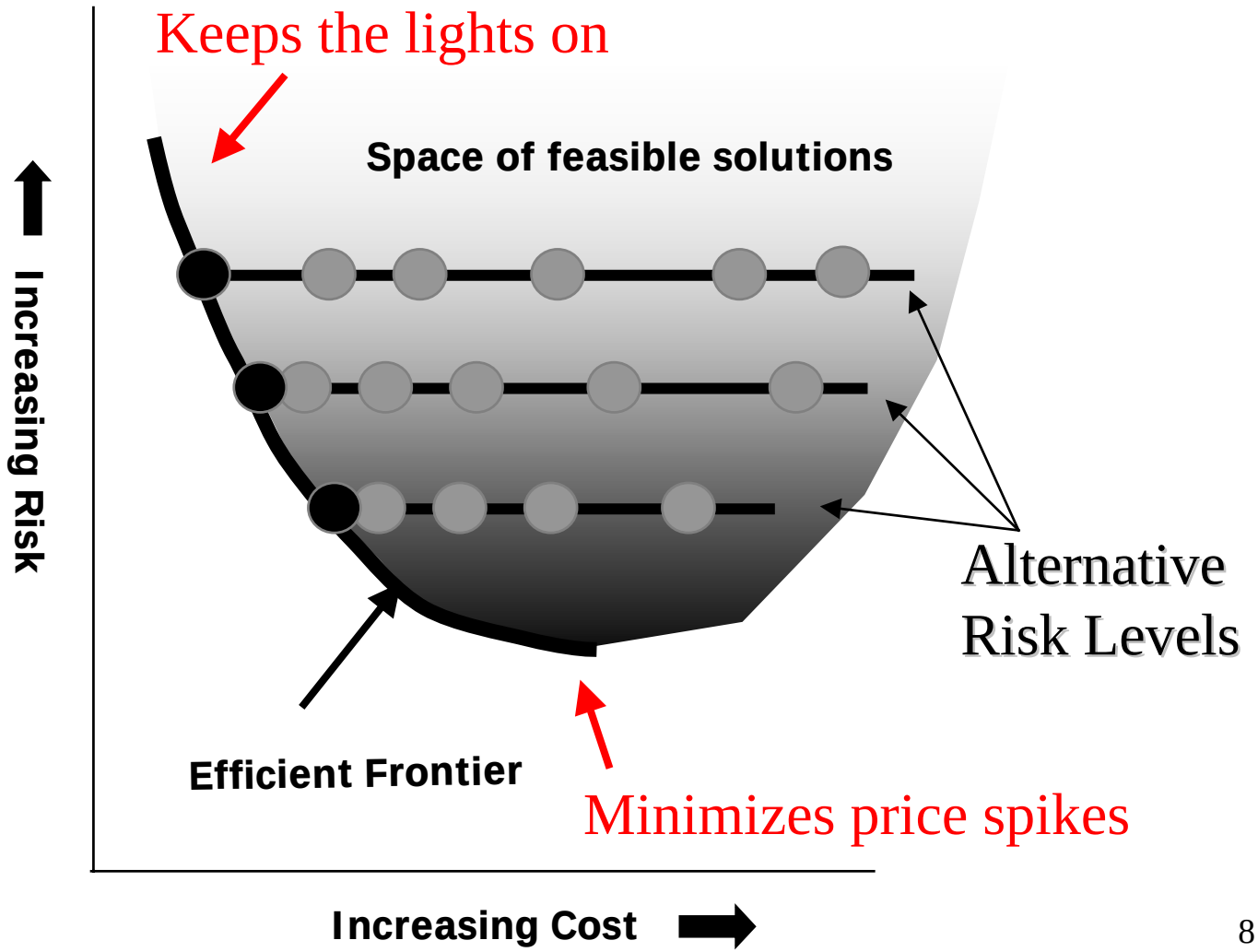
Efficient Frontier



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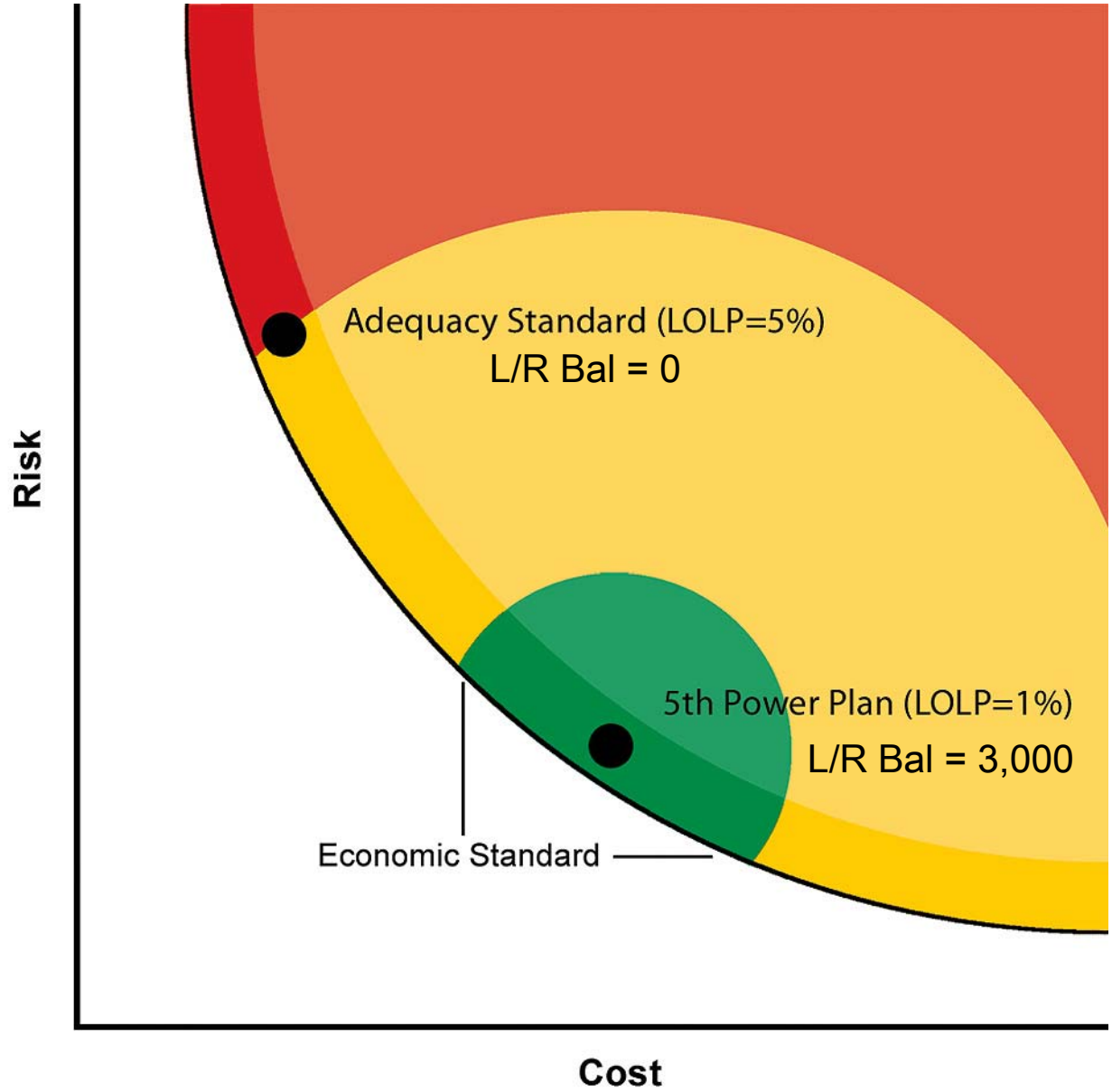
Resource Adequacy Target "Bulls Eye"



Current L/R Bal ~ 4,500 aMW

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Deviating from the Economic Target

There are many resource plans that provide a physically adequate supply but do not minimize the risk of high-cost futures, i.e. plans with:

- Too few resources
- Too many resources
- Wrong kind of resources

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Resource Adequacy Target "Bulls Eye"