Northwest Power and Conservation Council

Wednesday, April 28, 2010

MEMORANDUM

TO: Council Power Committee

FROM: Michael Schilmoeller

SUBJECT: Conservation Performance Uncertainty

In the Sixth Power Plan, resource portfolio assessments assumed the future cost and availability of conservation measures was known with certainty. The draft Plan had scenarios where discretionary conservation ramp rates differed from the base assumption of 160 MWa per year. These sensitivity studies, however, still assumed certainty. Comments received in response to the draft Plan encouraged the Council to consider uncertainty in the region's ability to acquire the targeted levels of conservation. This presentation describes recent work to address the uncertainty issue. No action or decision is required.

The study concludes there is negligible effect on the preferred conservation acquisition policy. The average amount of conservation developed in the least-risk plan is also about the same as in the case with conservation certainty. The preferred level of wind generation optioned by the model, however, increases.

The explanation of this conclusion stems from how the acquisition policy is stated, as a market adder for cost-effectiveness thresholds. With variation in performance, the conservation acquired still has the same cost in dollars per megawatt, relative to the market, that the deterministic case has. The principal difference due to the performance variation is the ***amount*** of conservation acquired across futures, expressed in average megawatts. Conservation acquisition by the end of these 20-year studies typically varies about 23 percent when we do not consider conservation performance uncertainty. The range is primarily due to variations in wholesale market prices for electricity. The range of acquisition in this analysis, however, is around 51 percent. Consequently, more non-conservation resources may be preferred in futures where *less* conservation is cost-effective. In futures where *more* conservation is cost-effective, the non-conservation resources can be postponed or cancelled. This results in higher levels of optioning for non-conservation resources.

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370

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Conservation Performance Uncertainty

Power Committee Meeting

Tuesday May 11, 2010

Sources of Conservation Uncertainty

Source of Uncertainty	Example
• **Input Materials Cost**	Steel, glass, insulation, electronics, rare-earth phosphors
• **Input Labor Cost**	Skilled and unskilled labor
• **Cost of Capital**	If conservation is financed
• **Existing Baseline Condition**	How may new dishwashers are better than federal standard in the base case assumption?
• **Technological Progress**	When will today's measure be superseded by a much better or cheaper idea? Progression of Linear Fluorescent Efficacy.
• **Future Penetration**	How many houses are left to insulate? How many can we just never get to?
• **Future Stock Estimate**	How many TVs will be purchased? What size? Plasma or LCD?

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Sources of Conservation Uncertainty

Source of Uncertainty	Example
• **Future of End Use**	Will remotely hosted dumb terminals replace smart business PCs? Will people quit TV in favor of iPOD?
• **Future of Industry**	Intel, Boeing, Freightliner, Wine
• **Measure Performance**	Will forecast savings be realized in the field?
• **Customer Acceptance**	For how many applications will occupancy sensors be too annoying?
• **Health and Safety Interactions**	Will new health standards for more ventilation eliminate savings potential from less ventilation? Will house tightening increase radon exposure?
• **Program Performance**	Will program design be ineffective? Or we will get more savings than anticipated because we put the measure in code?

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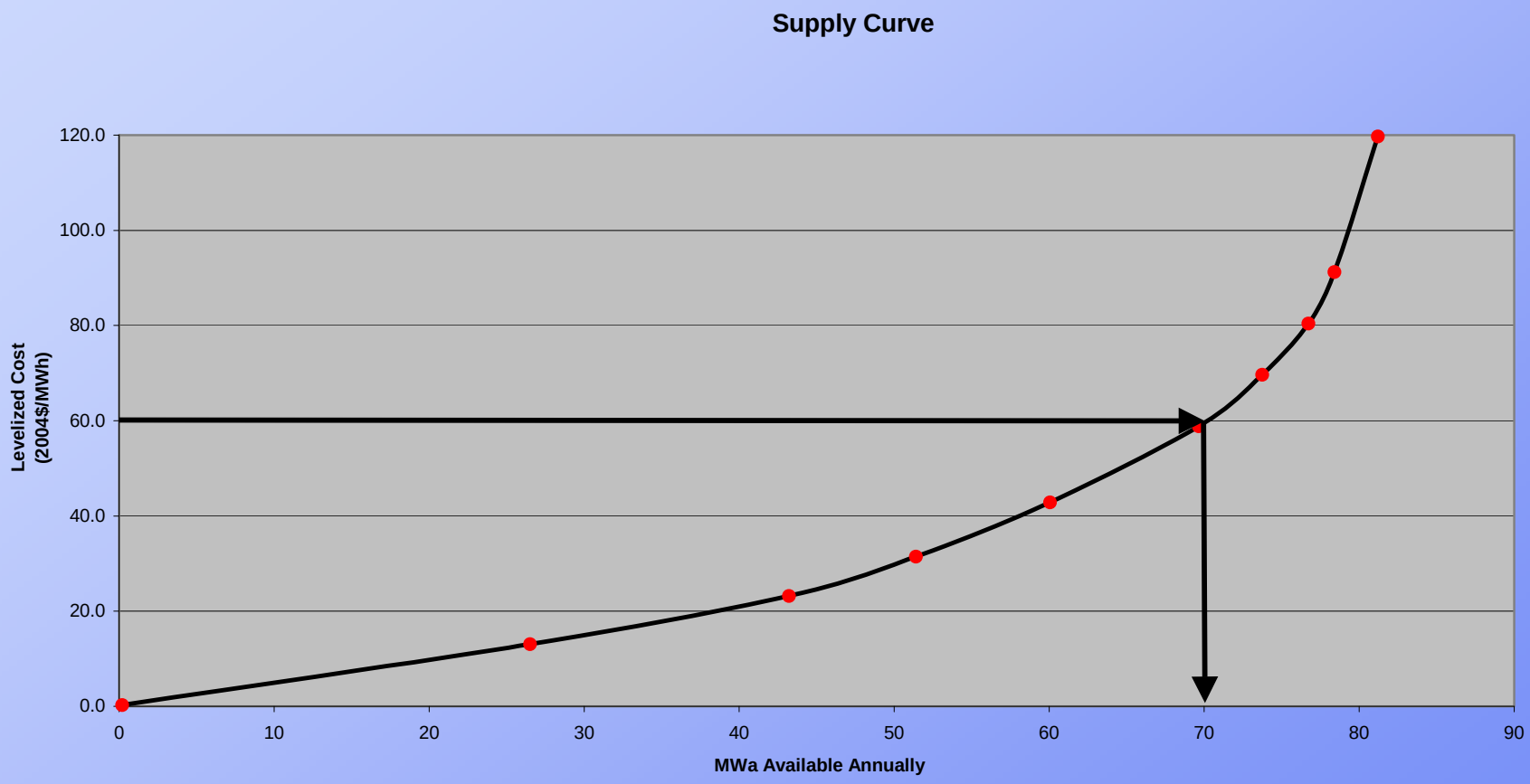
Effect on the Supply Curve



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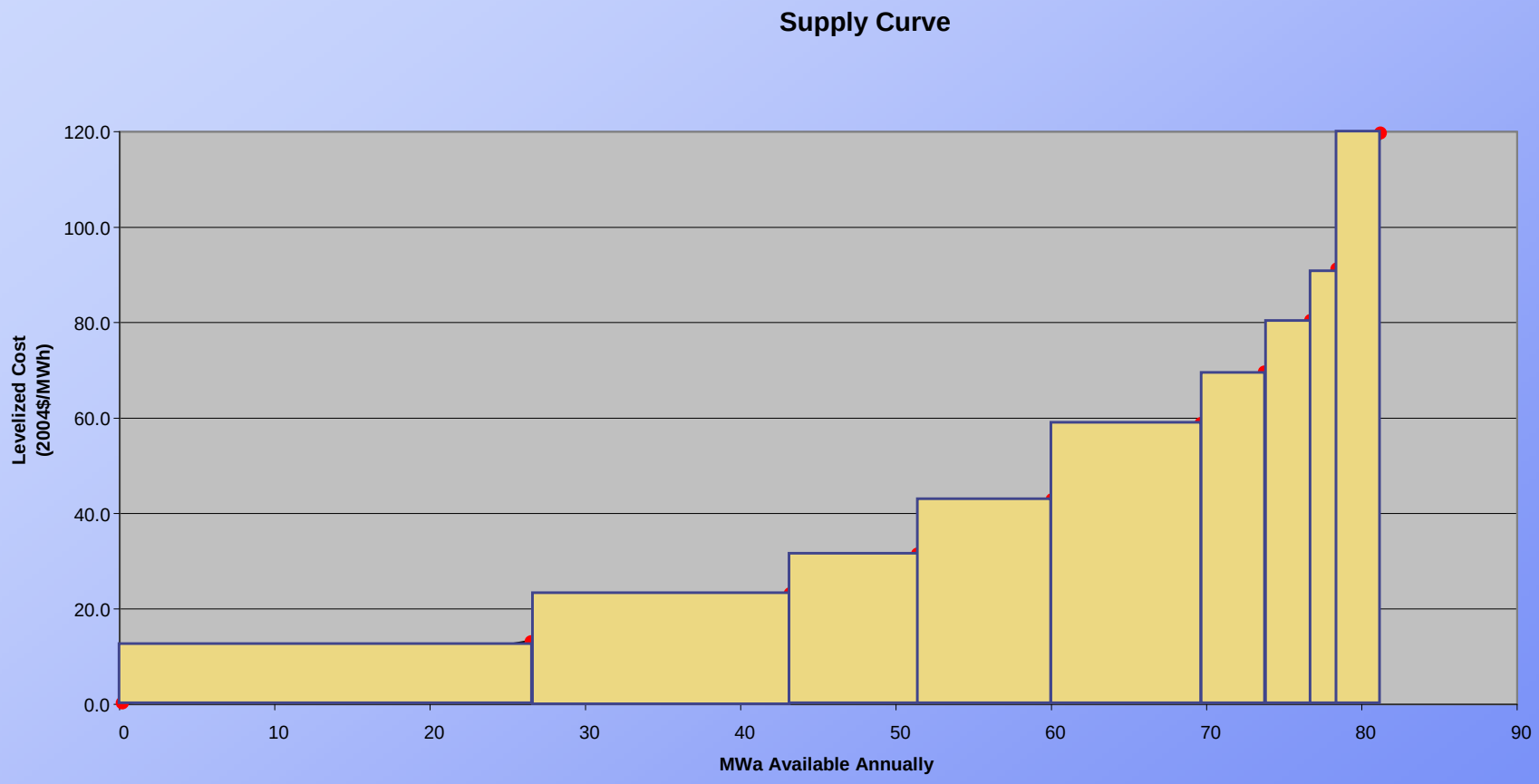

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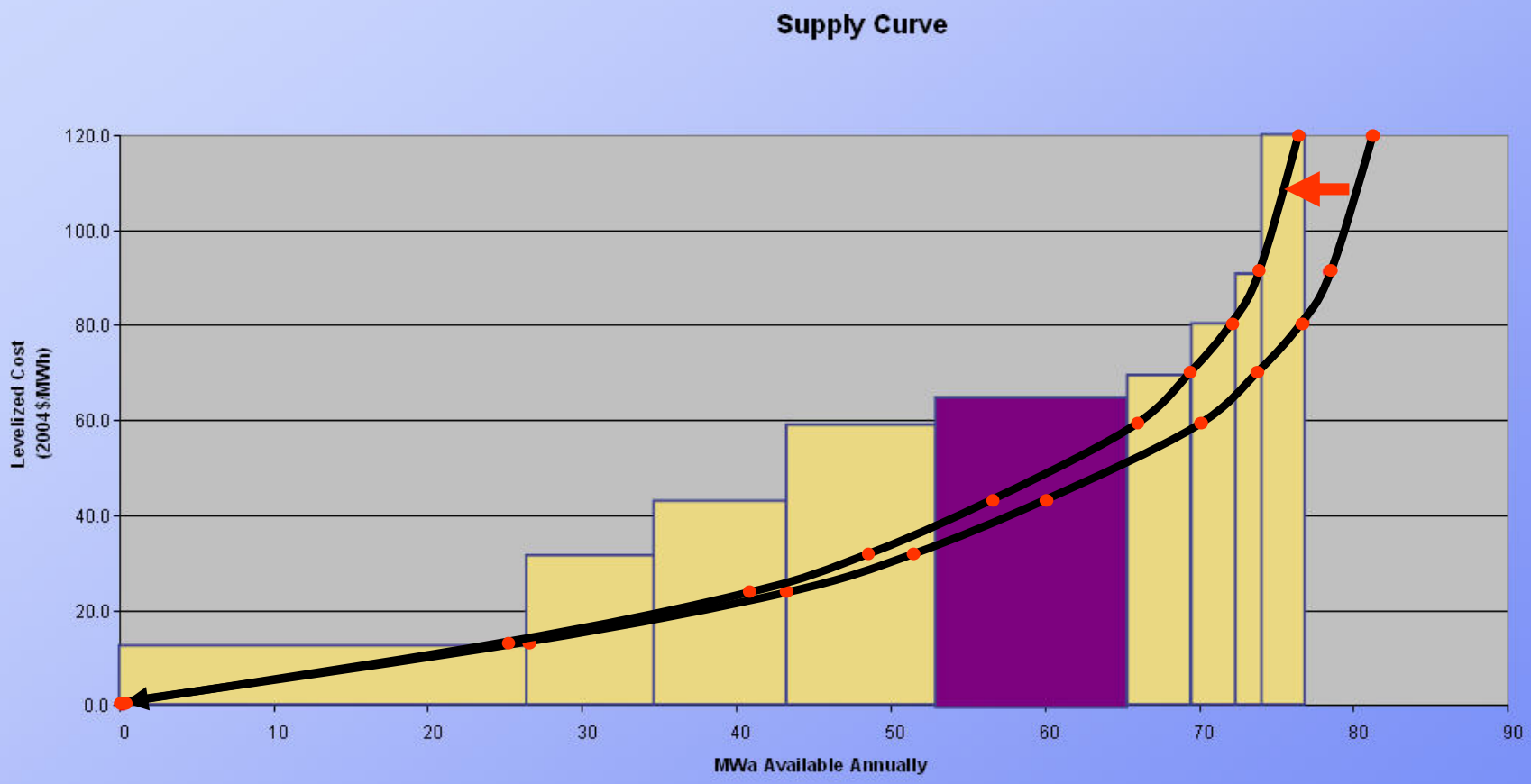

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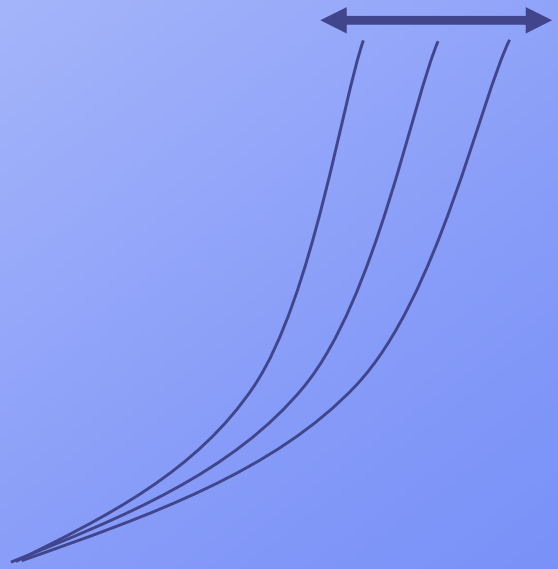
Performance of Conservation

- Capture performance uncertainty with proportional adjustment of the supply curves
- Distribution of performance not skewed
- Performance varied by 30 percent. (Triangular distribution with mode at 1.0, minimum at 0.7, and maximum at 1.3)
- Performance not correlated with construction cost uncertainty



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Results

- Conservation market adders were unchanged
- Average acquisition of conservation over the 20-year study period was unchanged
- Additional wind generation was optioned

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End

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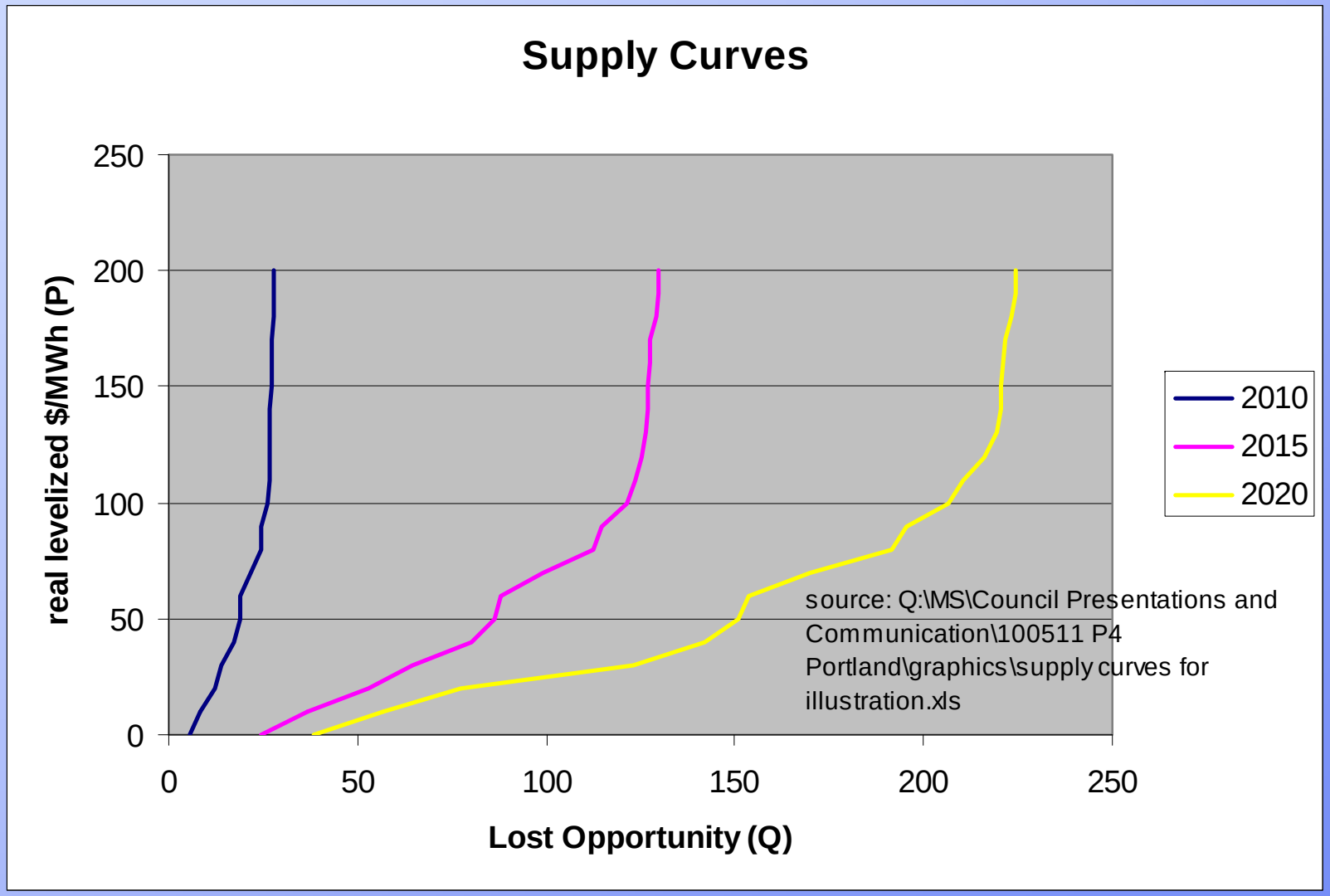
Inelastic Response of Lost Opportunity Conservation



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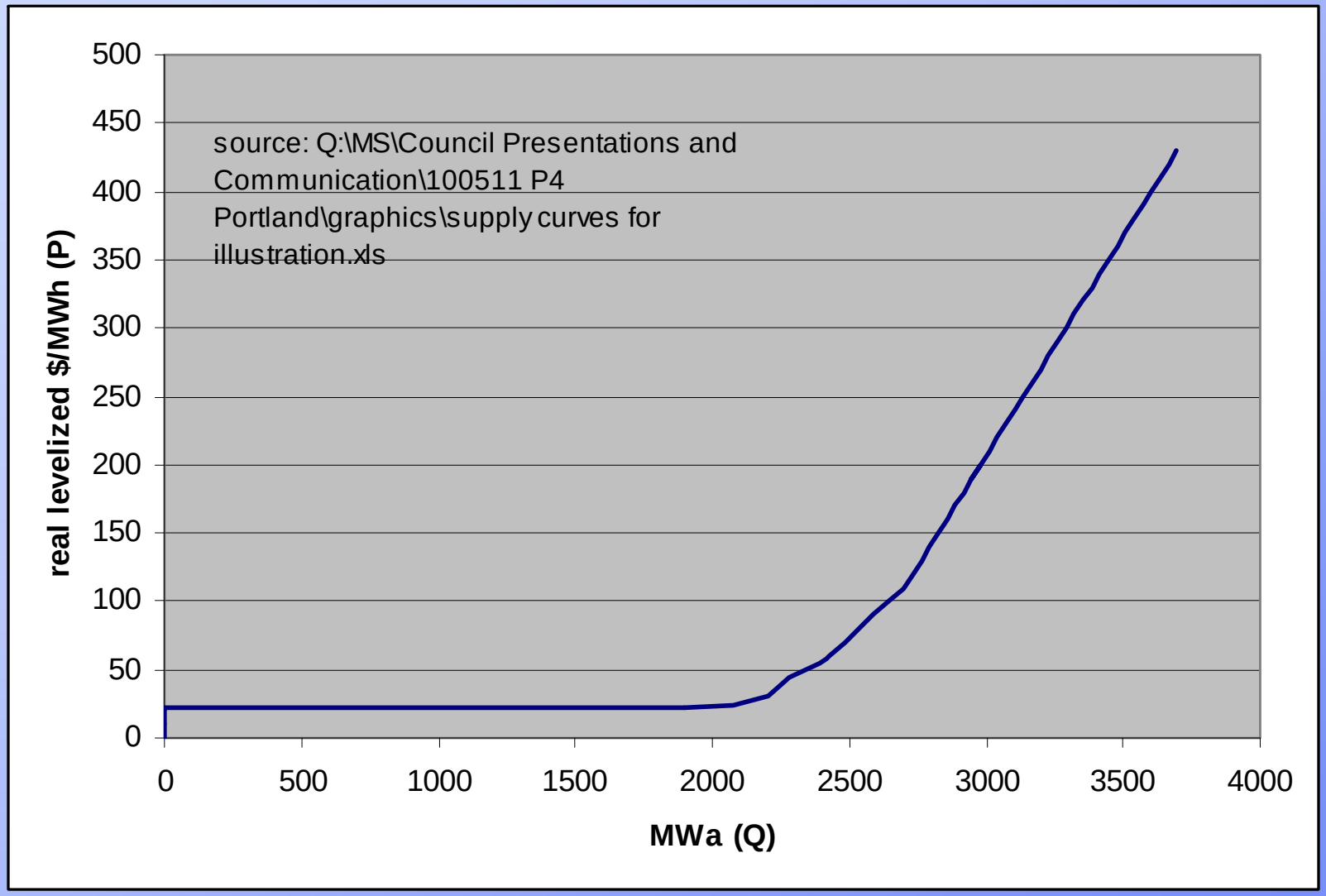
Relative Elasticity of Discretionary Conservation



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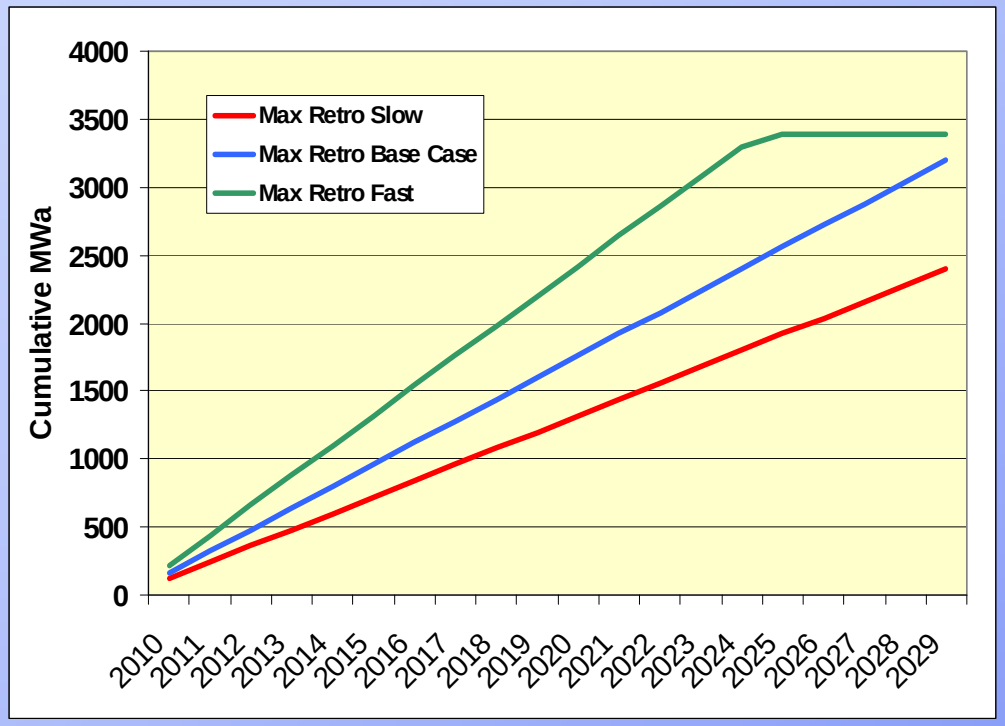
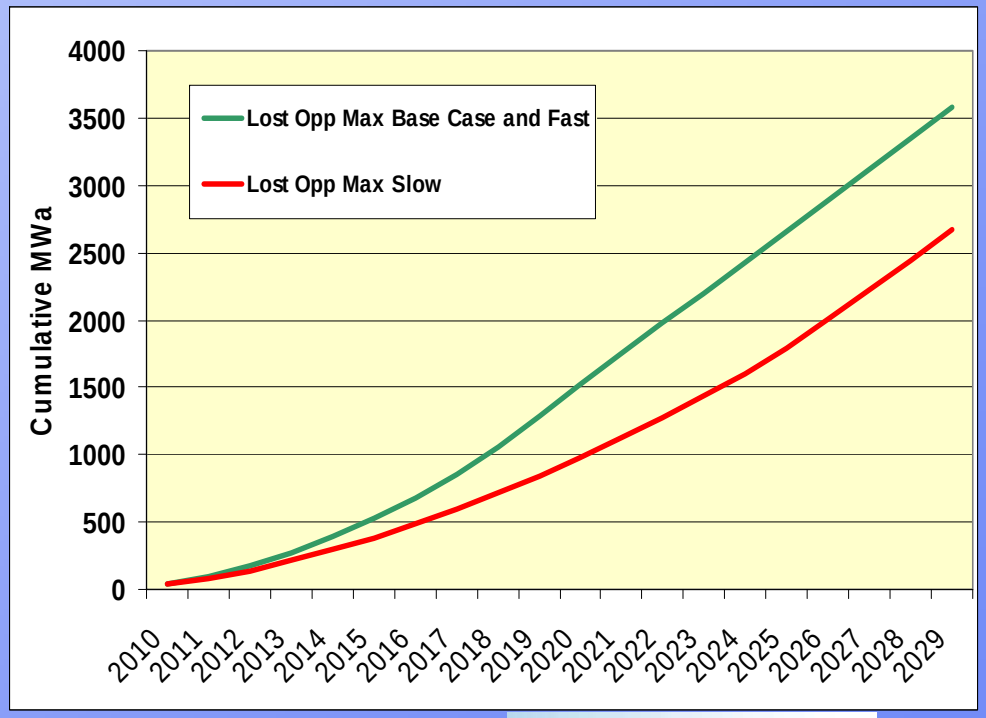
Sensitivity Analysis for Discretionary Conservation Ramprate

- Value of going faster
  - Retrofit 220 MWa/Year & Lost-Opp 12-Year Ramp Up
- Cost of going slower
  - Retrofit 100 MWa/Year & Lost-Opp 20-Year Ramp Up





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