BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. PUGET SOUND ENERGY, INC., Respondent.	Docket No. UE-100177 DECLARATION OF ERIC E. ENGLERT IN SUPPORT OF PSE'S MOTION FOR SUMMARY DETERMINATION

1. I, Eric E. Englert, hereby declare under penalty of perjury under the laws of the State of Washington that the following are true and correct:

2. I am the Manager, Regulatory Initiatives & Tariffs for Puget Sound Energy, Inc. ("PSE" or the "Company"). My responsibilities include the management and direction of the preparation of tariff and other regulatory filings and the research and development of regulatory policy and strategy on tariff and other regulatory initiatives. In that role, I have taken an active part in monitoring the development of the conservation potential and biennial conservation targets as they were developed within the public processes and meetings over the course of the past several calendar years. I have personal knowledge of the matters set forth in this Declaration and, as to matters that call for an opinion, state such opinion on information and belief based on my experience in the industry and with the Company.

3. This Declaration provides a brief chronology of the extensive public participation that took place over a two-year period during the development of PSE's ten-year

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conservation potential and biennial conservation target. It then describes the events leading up to the finalization of PSE's conservation metrics based on the Conservation Council's Fifth Power Plan.

4. Since April 2008, PSE has been involved in extensive public discussions regarding the development of PSE's conservation metrics. The discussions have taken various forms, including: public meetings, public Integrated Resource Plan Advisory Group ("IRPAG") meetings, Conservation Resource Advisory Group ("CRAG") meetings, Commission Open Meetings, Commission-hosted public meetings, meetings with Commission Staff, and e-mail correspondence with public interest groups.

5. Discussion regarding the potential methodology for developing the conservation potential began at the April 3, 2008 IRPAG meeting. The methodology was further discussed at subsequent IRPAG meetings on November 20, 2008, January 22, 2009, April 23, 2009, and June 25, 2009. Also on June 25, 2009, PSE convened a CRAG meeting, where the development of conservation targets was discussed.

6. On August 28, 2009 the comment period ended for PSE's 2009 Integrated Resource Plan ("IRP"). PSE presented its 2009 IRP to the Commissioners at an Open Meeting on September 10, 2009.

7. On September 3, 2009 PSE participated in a public meeting hosted by the Commission. In that meeting, the Conservation Council presented over 70 slides describing its methodology, major assumptions, and its target-setting process. Slide number 39 within the Conservation Council’s 78-slide presentation describes how utilities can develop their target; the Conservation Council specifically recommends that: “Utilities can just use the utility target calculator.” Attached hereto as Exhibit A is a true and correct copy of the Conservation Council's slide presentation.

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8. Additional CRAG meetings were held on September 15 and October 14, 2009, during which the development of a conservation target range was discussed. On November 2, PSE e-mailed draft descriptions, budgets, cost-effectiveness, and evaluation plans of PSE's conservation programs for 2010–2011 to CRAG members.

9. On November 17, 2009 PSE personnel traveled to the WUTC's office to discuss conservation potentials with Commission Staff.

10. On November 30, 2009 PSE filed its conservation programs for 2010–2011 with the Commission.

11. On December 15, 2009 PSE convened a public IRPAG meeting, at which time further development of the conservation potential and target range was presented.

12. In an email dated December 23, 2009 Commission Staff requested PSE and other utilities to submit to the WUTC Records Center their ten-year conservation potential prior to January 1, 2010—notwithstanding the January 31, 2010 reporting deadline. PSE notified Staff that the Commission's rules did not require such a submittal. Ultimately, PSE sent an e-mail to the IRPAG and CRAG public interest groups on December 31 identifying PSE's ten-year conservation potential based on the 2009 IRP and based on the Conservation Counsel's Fifth Power Plan. Commission Staff filed the e-mail from PSE.

13. On January 25, 2010 PSE notified interested public parties via e-mail about further refinements to its identification of a biennial target and ten-year conservation potential.

14. On January 27, 2010 PSE convened a meeting to review the finalization of its conservation potential and biennial target. Members of the public and stakeholders participated in this meeting, including representatives from the Conservation Council, Northwest Energy Coalition ("NWEC"), Northwest Energy Efficiency Alliance ("NEEA"),

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Northwest Energy Efficiency Council ("NEEC"), Industrial Customers of Northwest Utilities ("ICNU"), The Energy Project, and PacifiCorp.

15. Finally, on January 29, 2010 PSE filed its Report Identifying PSE's Ten-Year Achievable Conservation Potential and Biennial Conservation Target Pursuant to WAC 480-109-010(3) ("Report"). The Report provides a table documenting the numerous public meetings and communications addressing PSE's conservation potential and biennial target.

16. On February 10, 2010 the Conservation Council adopted the Sixth Power Plan as its current power plan. Prior to February 10, 2010, the Fifth Power Plan was its current power plan.

17. The Company's decision to use the Conservation Council's Fifth Power Plan as the basis for its ten-year achievable conservation potential was driven by four sets of drivers, which have come into sharp focus since December 2009:

- Uncertainty about approval of the Company's 2010–2011 projected level of conservation program expenditures.
- Uncertainty about customer tolerance for upward pressure on rates due to higher conservation program expenditures.
- Uncertainty about the Company's ability to recover lost margins from conservation.
- Uncertainty about the treatment of penalties for failing to achieve the conservation targets.

18. The Company's 2010–2011 conservation program tariffs were presented, along with a preliminary budget, to the Commission for approval at an open meeting on December 23, 2009. Some parties had raised questions about the magnitude and feasibility of the Company's proposal during the comment period on the Company's filing. These questions resulted in the opening of a Commission Staff investigation into the Company's proposed

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conservation expenditures for 2010–2011. This investigation was not concluded until March 25, nearly one-quarter-year into calendar year 2010.

19. The IRP does not address issues with respect to tolerance for rate impacts from conservation expenditures and regulatory issues such as lost margins. The conservation potential reflected in the 2009 IRP was developed without regard to these uncertainties.

20. Therefore, the Company has determined that the most reasonable course of action for complying with Chapter 480-109 WAC and determining the minimum level for its ten-year conservation potential and biennial conservation target to is to use the Conservation Council's Fifth Power Plan.

Executed this 6TH day of April, 2010, at Bellevue, Washington.

E. E. Englert

Eric E. Englert

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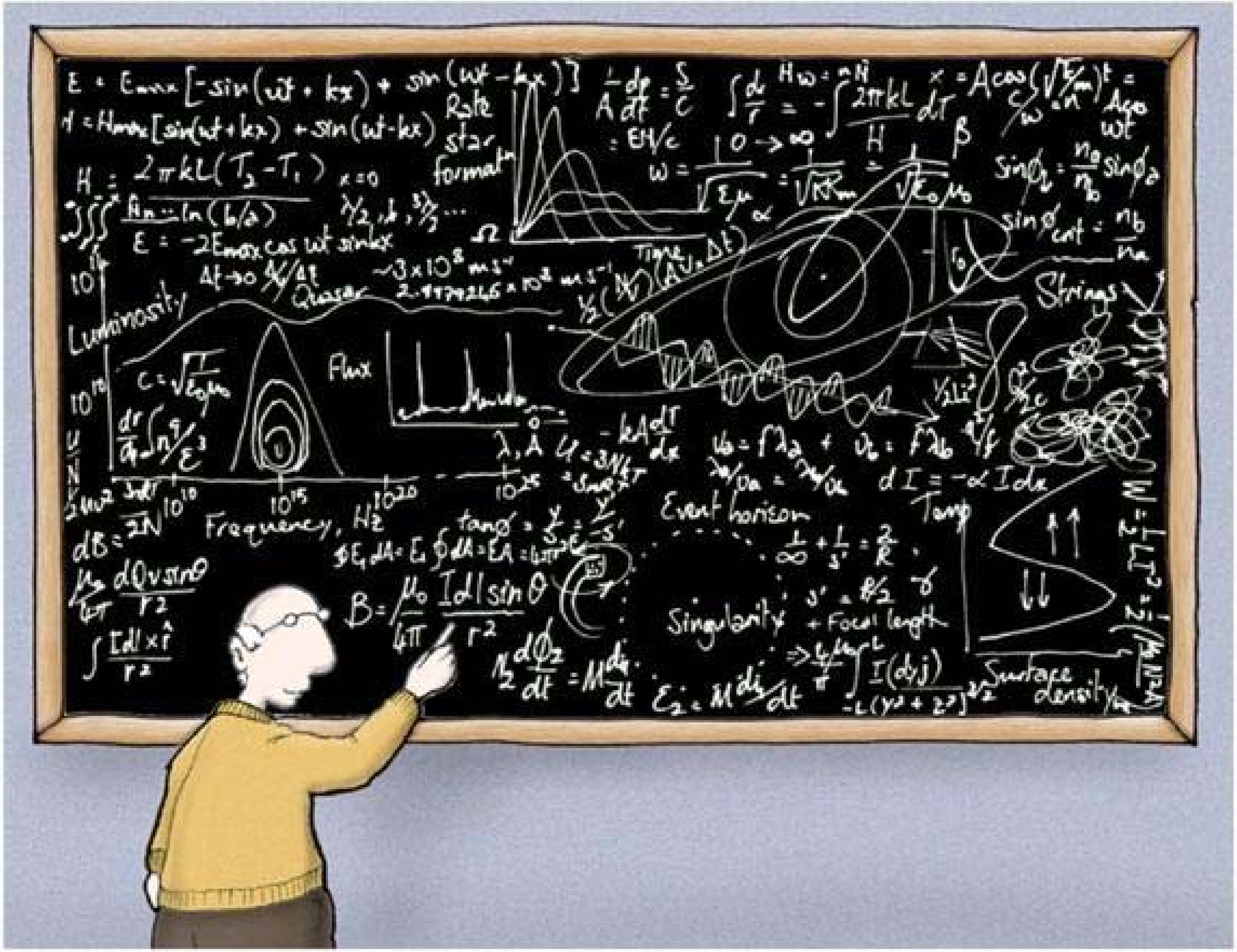
EXHIBIT A

Council Conservation Resource Potential Assessment and Cost-Effectiveness Methodology

Tom Eckman
Manager, Conservation Resources

Washington Utilities and Transportation Commission I-937 Workshop
September 3, 2009

Northwest Power and Conservation Council



How Do We Know How Much is Left To Do?

Web Images Groups Directory News

PNW Efficiency Potential

I'm Feeling Lucky

Google Search

- Advanced Search
- Preferences
- Language Tools

It's _Only_ a Six Step Process

- Step 1 - Estimate ***Technical Potential*** *on a* ***per application*** *basis*
- Step 2 – Estimate ***Economic Potential*** *on a* ***per application*** *basis*
- Step 3 - Estimate number of ***applicable units***
- Step 4 – Estimate ***Technical Potential*** *for* **all** *applicable units*
- Step 5 – *Estimate* ***Realizable Potential*** *for* ***all realistically achievable*** *units*
- Step 6 - Estimate ***Economic Potential*** *for* **all** *applicable units*

Before You Start –
Decide On A Cost-Effectiveness Metric

- Participant Cost Test (PTC)
  - – Costs and benefits to the program participant
- Total Resource Cost (TRC)
  - – All Quantifiable costs & benefits regardless of who accrues them. Includes participant and others' costs
- Utility Cost Test (UTC)
  - – Quantifiable costs & benefits that accrue only to the utility system. Specifically excludes participant costs
- Rate Impact Measure (RIM)
  - – Net change in electricity utility revenue requirements.
    - » Attempts to measure rate impact on all utility customers especially those that do not directly participate in the conservation program
    - » Treats "lost revenues" (lower participant bills) as a cost

Overview of Methodology

- Resource Potentials Assessment
  - Determines technical availability, achievable potential & cost
- IRP Analysis
  - Determines cost-effectiveness level and "targets"
  - Compares all resources
  - Develops low-cost resources first
  - Results in resource acquisition plans
    - » Targets & budgets & programs for conservation

Source for Methodology

- Regional Act
  – and Council interpretation of the Act
- Bottom line
  – Develop cost-effective resources first
- Defines cost-effective conservation
  – "…estimated incremental system cost no greater than that of the least-cost similarly reliable and available alternative measure or resource…"

Northwest Power and Conservation Council

The Basic Formula

Achievable Potential =

Number Units * Cost-Effective kWh per Unit * Market Penetration

Number Homes,
Floor Area of Retail
Number of TVs,
Acres Irrigated,
Pounds Steel

(kWh/Unit at Current Efficiency – kWh/Unit at Cost-Effectiveness Limit of Efficiency)

Current Efficiency is adjusted for adopted codes & standards and stock turnover (Frozen Efficiency)

Cost-Effective Limit of Efficiency is estimated from Portfolio Model Results. It is based on the cost of the next lowest cost resource available to meet load.

Fraction realistically achievable over time

Generic Methodology for Estimating Conservation Resource Potential & Targets

Measure Cost

- Program Data
- Contractor Bids
- Retail Price Surveys

Measure Savings and Load Shape

- End Use Load Research
- Engineering Models
- Billing History Analysis
- Independent Testing Labs

Measure Lifetime

- Evaluations
- Census Data
- Manufacturers Data
- Engineering Estimates

Supply Curves

- Number of eligible units* savings per unit = aMW
- Lost-opportunity resources
- Non-lost opportunity resources

PROCOST Model

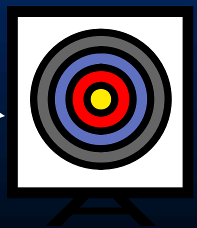
Determines measure and program level "cost-effectiveness" using:
- Measure costs, savings & load shape
- Aurora Market prices
- T&D savings (losses & deferred $)
- 10% Act Credit
- Council Financial Assumptions (e.g. Discount Rate, Administrative costs, etc.)
- Risk Premium adjusted to match Resource Portfolio Model acquisitions

Market Price Model

Provides Forecast of Hourly Avoided Capacity & Energy Costs Under Average Water Conditions

Resource Portfolio Model

Determines NPV of Portfolios with Alternative Levels of Conservation vs Other Resources & Cost-Effectiveness Limit for Conservation



Plan's Targets

Inputs to Resource Potentials Assessment Methodology

- Availability
  - Scope of measures
    - » Technologies
    - » Practices
  - Applicability territory
    - » Number of units
    - » Units savings
  - Achievable over time
    - » Retrofit
    - » Lost-Opportunity

- Costs
  - Materials & labor
  - Annual O&M
  - Periodic Replacement
  - Program Admin
  - Financing costs
  - Externalities
  - Other non-electric

Results of Resource Potential Assessment Methodology

- Summarize availability & cost
  - – Supply Curves
  - – TRC levelized costs
    - » All Costs (net of benefits) per kWh
  - – Lost-Opportunity Supply Curve
  - – Retrofit Supply Curve (Non-Lost-Op)
  - – Availability timeline
- Apples to apples comparison

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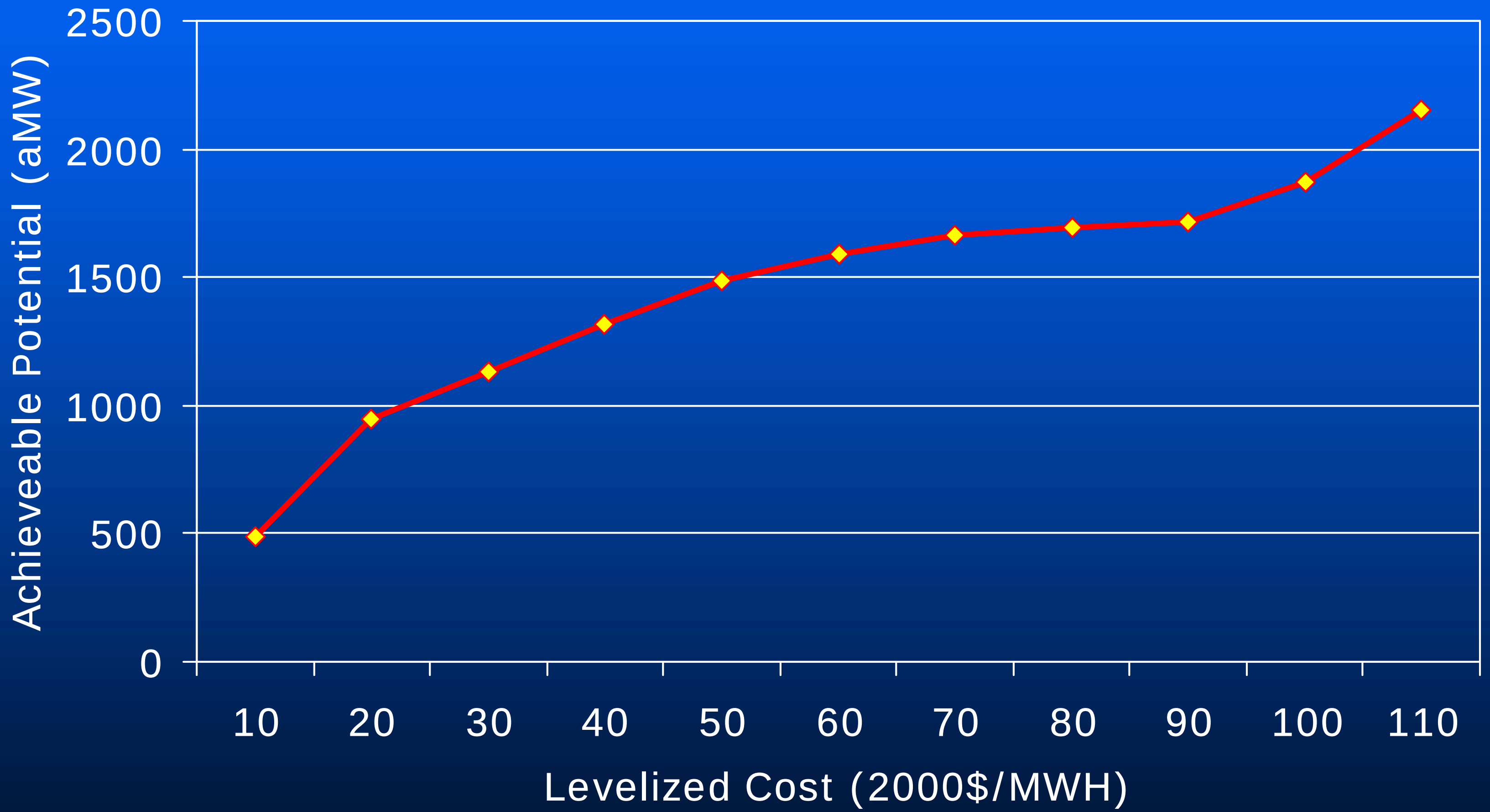
5th Plan's Non Lost-Opportunity Supply Curve



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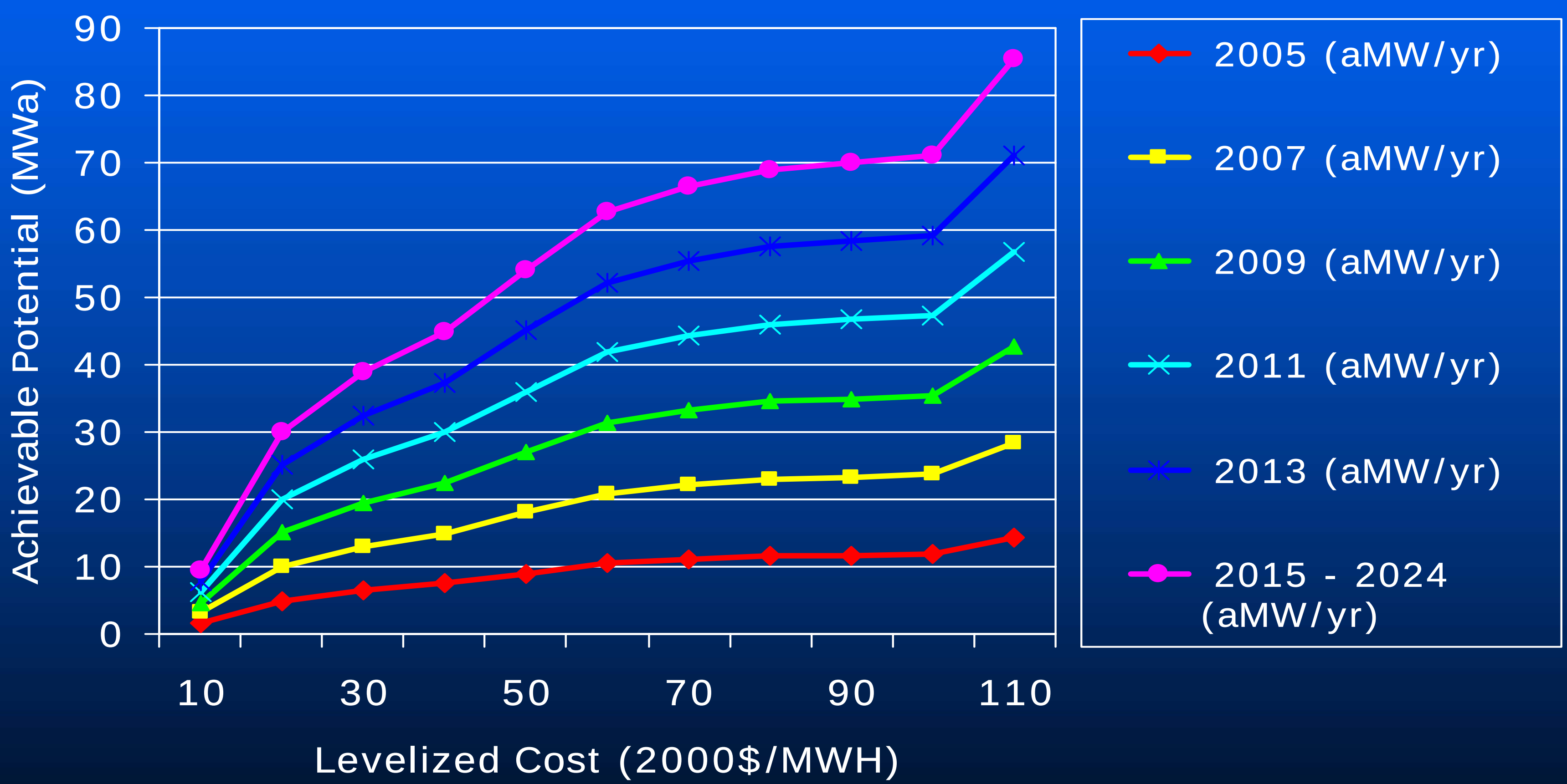
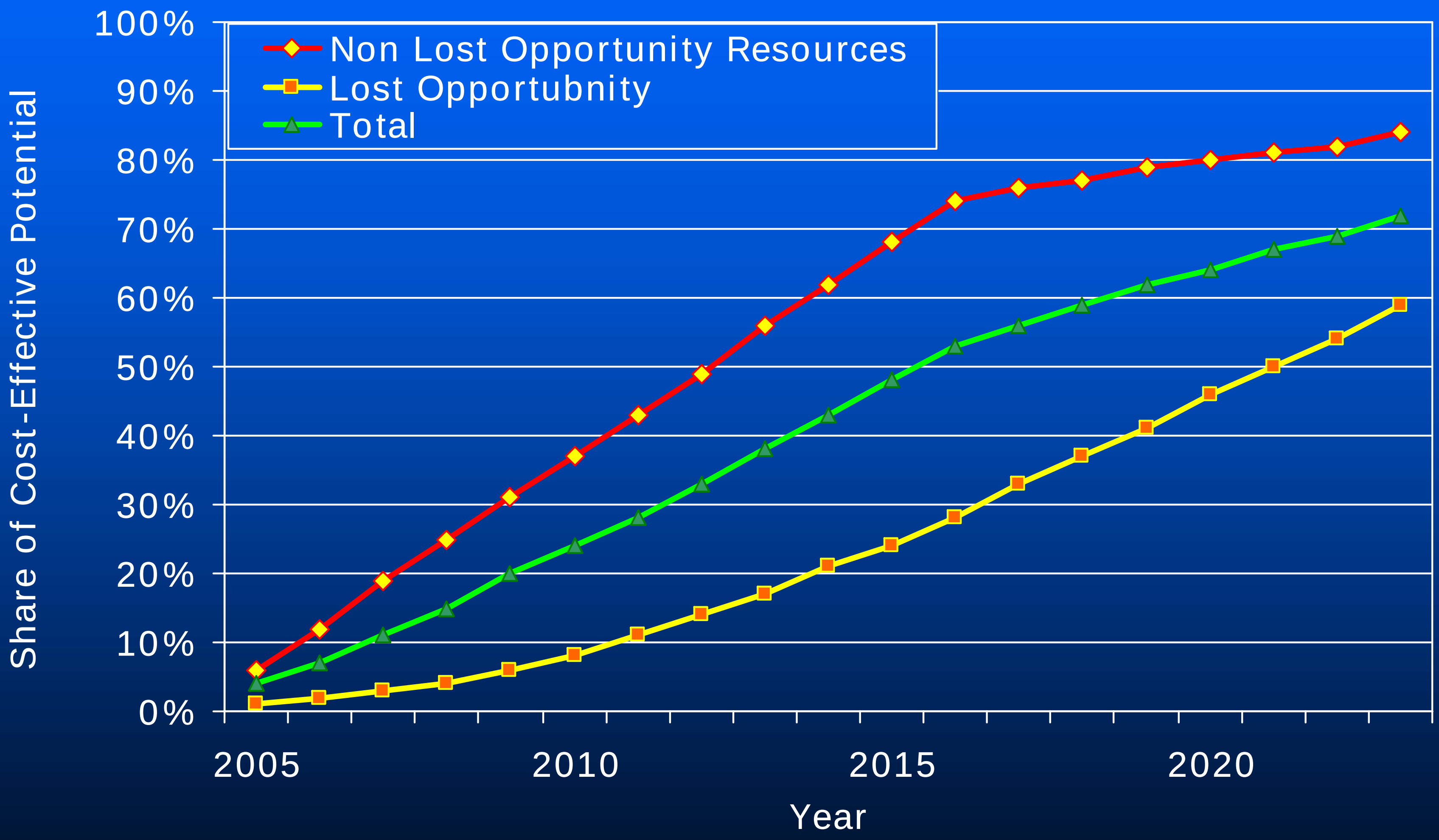
5th Plan's Lost-Opportunity Supply Curves



5th Plan's Achievable Potential



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Annual Conservation Acquisitions in 5th Plan

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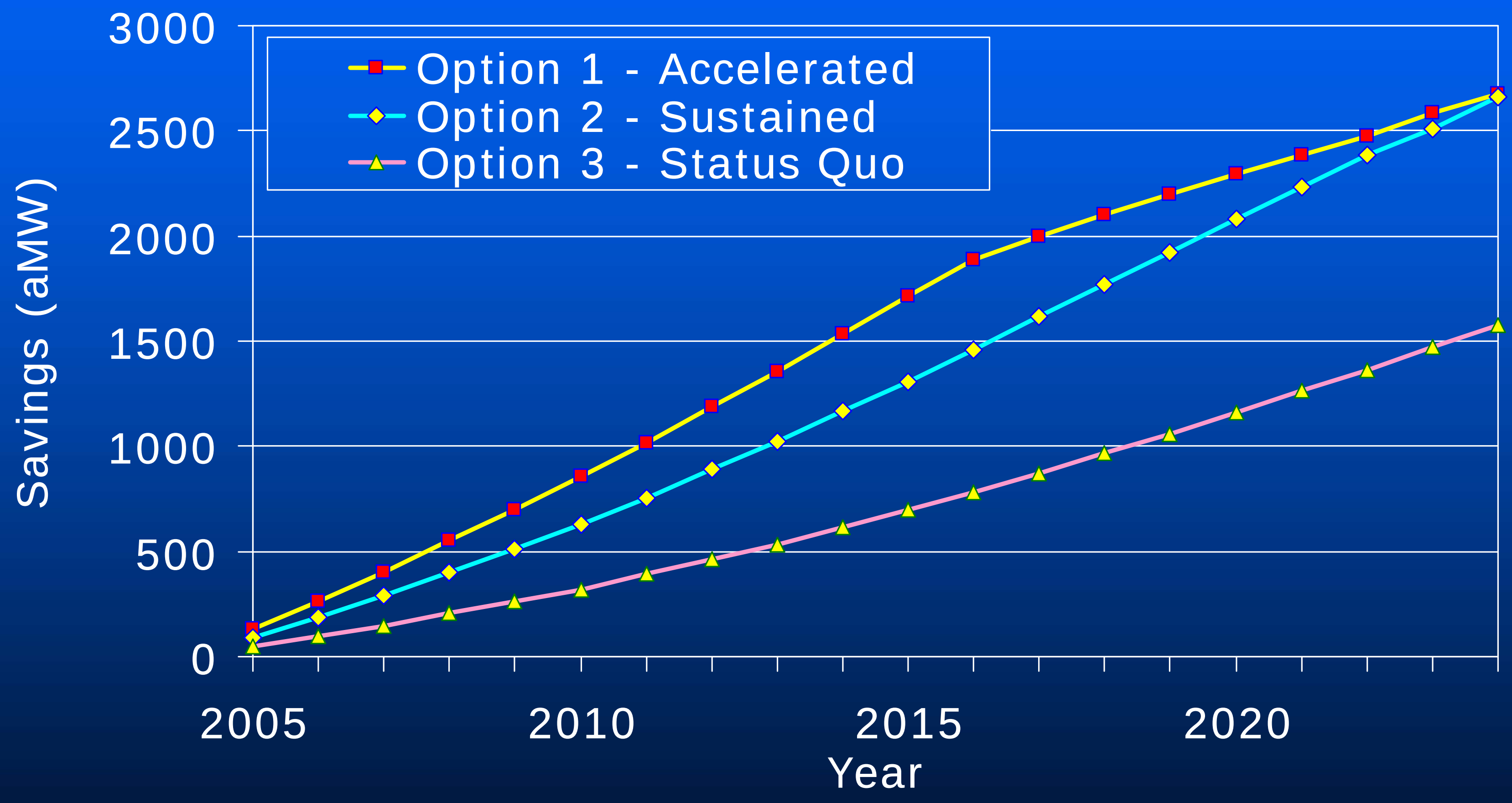
Pace of Conservation Deployment Matters



Developing 6th Plan Achievable Penetration Rates

Two Approaches

- Historic Perspective
  - Recent Regional Performance
- Forward-Looking
  - Build from Bottom Up
  - Measure-by-Measure Penetration Rates

Near-Term Achievability

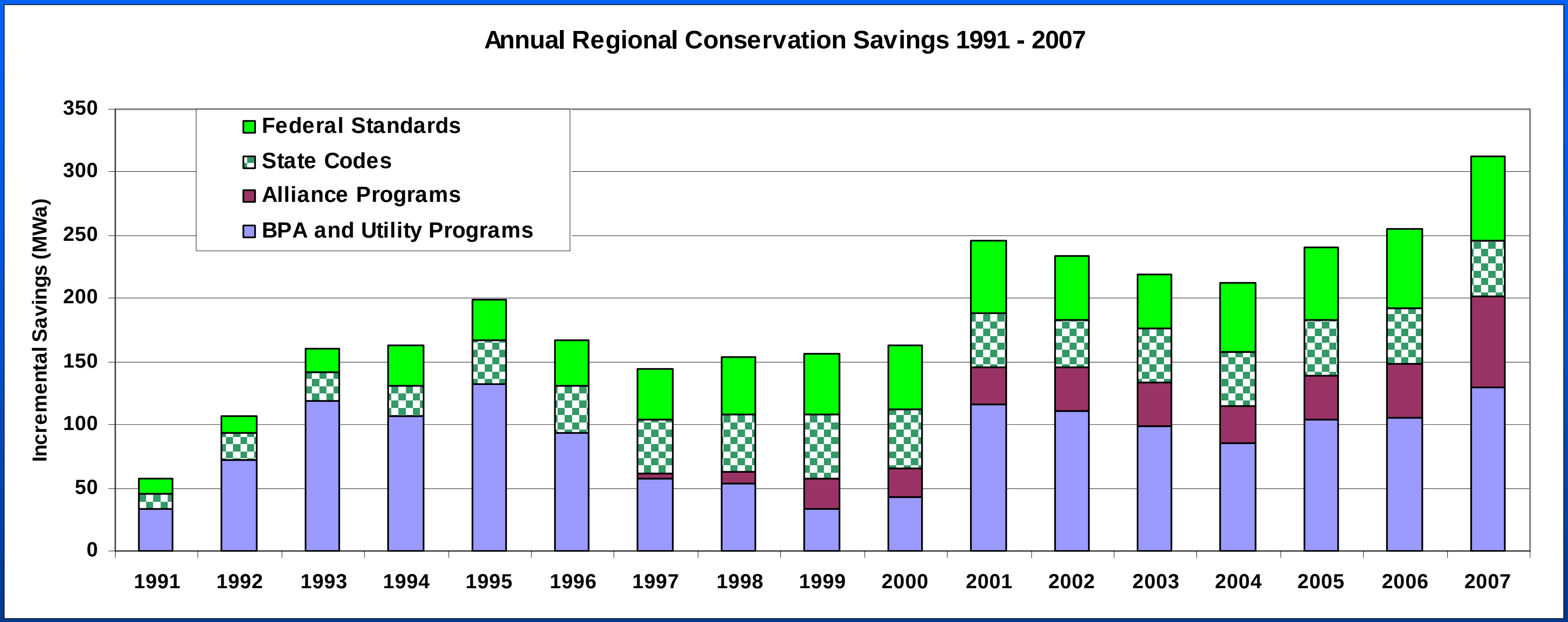
Historic Perspective

- Program Performance
- Pace of Codes & Standards
- Periodic Survey of Current Stock

Forward Looking

- Considers Character of Measures
- Implementation Strategies
- Size & Cost
- Physical Availability of Equipment
- Training & Education Requirements

Historic Perspective



BPA, Utility & NEEA Programs

- Averaged 150 MWa per year since 2001
- Over 200 MWa in 2007
- Probably >200 MWa in 2008
- At $40-50 /MWh Avoided Costs

Codes & Standards

- One third of Savings since 1991
- Large Long-Term Potential
- Near-Term Impact Limited by New Stock Additions & Turnover Rates

Forward-Looking

Use a Bottom-Up Approach to Estimate Penetration Rates

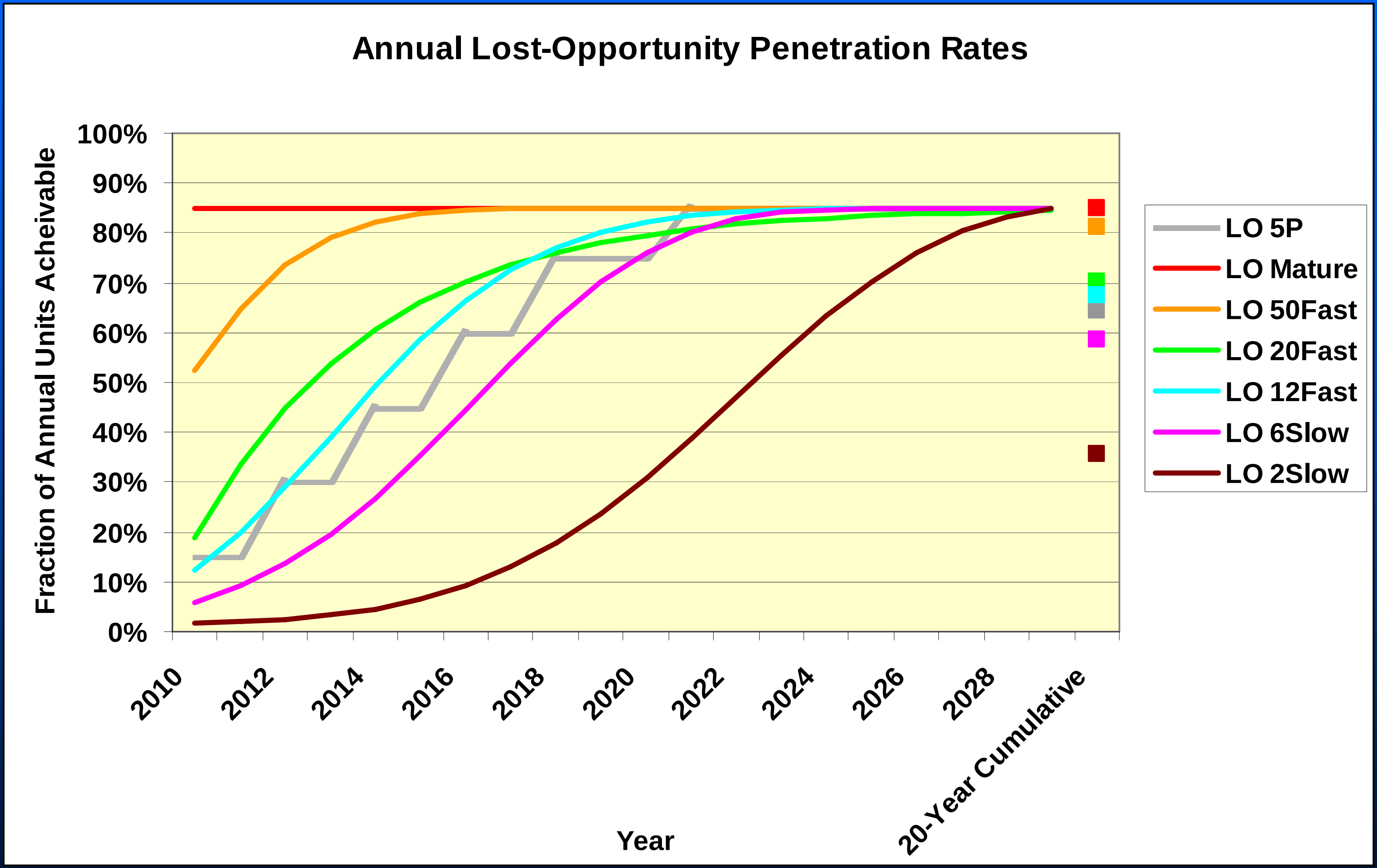
- Estimate Annual Penetration Rates by Measure Bundle
- Distinguish Features that Impact Penetration Rate
  - Complexity of Measures
  - Delivery Mechanisms & Decision Makers
  - Current Market Saturation
  - Equipment & Infrastructure Availability
  - Subject to Code or Standard
  - Size & Cost
- (Annual Penetration Rate) x (Annual Units) x (Unit Savings)

- Then Sum of All Measure-Level Supply Curves by Year & Levelized Cost bin

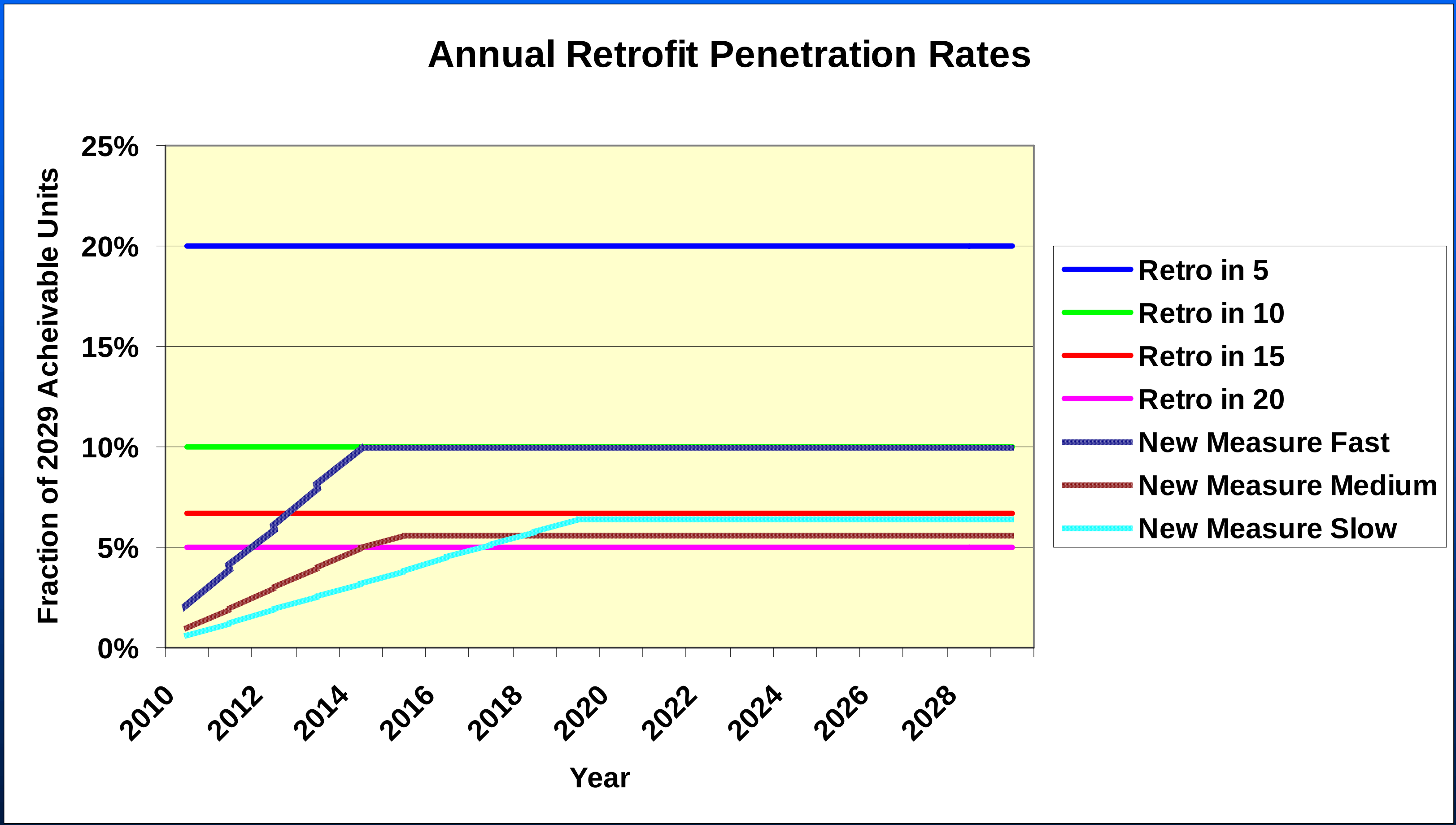
Penetration Rate "Families"

- Lost-Opportunity
  - Emerging Technology
  - LO Slow
  - LO Medium
  - LO Fast
- Retrofit
  - New Measure
  - In 20 Years
  - In 10 Years
  - In 5 Years

Family of Lost-Opportunity Penetration Rates



Family of Retrofit Penetration Rates



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Residential Lost-Opportunity

Achievable Penetration Rate Themes

LO Slow

- Refrigerators
- Freezers
- Cooking
- Heat Pump Upgrades
- Elec Furnace to HP Conversions

About 540 MWa by 2029

LO Medium

- Clothes Washer
- Dishwasher
- Clothes Dryer
- Shell & Window Measures
- Window AC Units

About 340 MWa by 2029

LO Emerging Technology

- Heat Pump Water Heater
- Gravity Film Heat Exchanger

About 600 MWa by 2029

Residential Retrofit
Achievable Penetration Rate Themes

Retro in 5 Years

- Showerheads
- Lighting

About 240 MWa by 2029

Retro in 15 Years

- Weatherization
- HVAC Conversions

About 750 MWa by 2029

New Measure Ramp-Up

- Solar DHW
- Solar PV

About 610 MWa by 2029

Commercial Lost-Opportunity
Achievable Penetration Rate Themes

LO Fast
- Lighting Power Density
- Lighting Controls
- Premium HVAC Equipment
- Variable-Speed Chillers
- Glass – New & Replacement
- Simple HVAC Measures – New
- Package Refrigeration Equip
- Exterior Building Lighting
- Street & Roadway Lighting - New

About 740 MWa by 2029

LO Medium
- Integrated Building Design
- Daylighting
- Complex HVAC Measures
- Street & Roadway Lighting - Repl
- Parking Lighting
- Signage

About 180 MWa by 2029

Commercial Retrofit
Achievable Penetration Rate Themes

Retro in 10 Years

- Lighting Power Density
- Lighting Controls
- Glass – Retrofit
- Simple HVAC Measures
- Insulation
- DCV Restaurant Hoods
- Computer Servers & IT

About 180 MWa by 2029

Retro in 20 Years

- Controls Commissioning Complex
- Complex HVAC Measures
- Grocery Refrigeration
- Network PC Controls
- Sewage Treatment
- Water Supply

About 350 MWa by 2029

Industrial Lost-Opportunity

Achievable Penetration Rate Themes

LO Fast

- Lighting Power Density
- Lighting Controls

About 70 MWa by 2029

LO Medium

- Material Handling
- Motor Rewind

About 60 MWa by 2029

Industrial Retrofit

Achievable Penetration Rate Themes

Retro in 10 Years

- Compressed Air Measures
- Centrifugal Fans
- Belts
- Transformers
- Refrigeration & Food Storage
- Chip Fab Measures

About 250 MWa by 2029

Retro in 20 Years

- Fan & Pump Optimization
- Premium Fan & Pump Equip
- Pulp & Paper Equipment

About 170 MWa by 2029

New Measure Ramp-Up (?)

- Plant Energy Management
- Energy Project Management
- Integrated Plant Energy Management

About 250 MWa by 2029

Agriculture Retrofit
Achievable Penetration Rate

Retro in 10 Years

- Scientific Irrigation Systems
- Irrigation Hardware
- Dairy

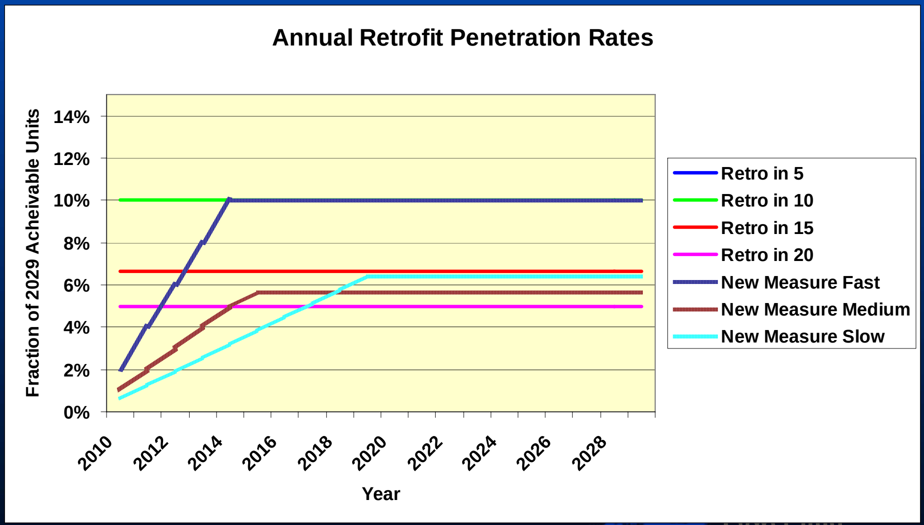
About 110 MWa

Distribution System Retrofit
Achievable Penetration Rate

New Measure Ramp-Up Medium

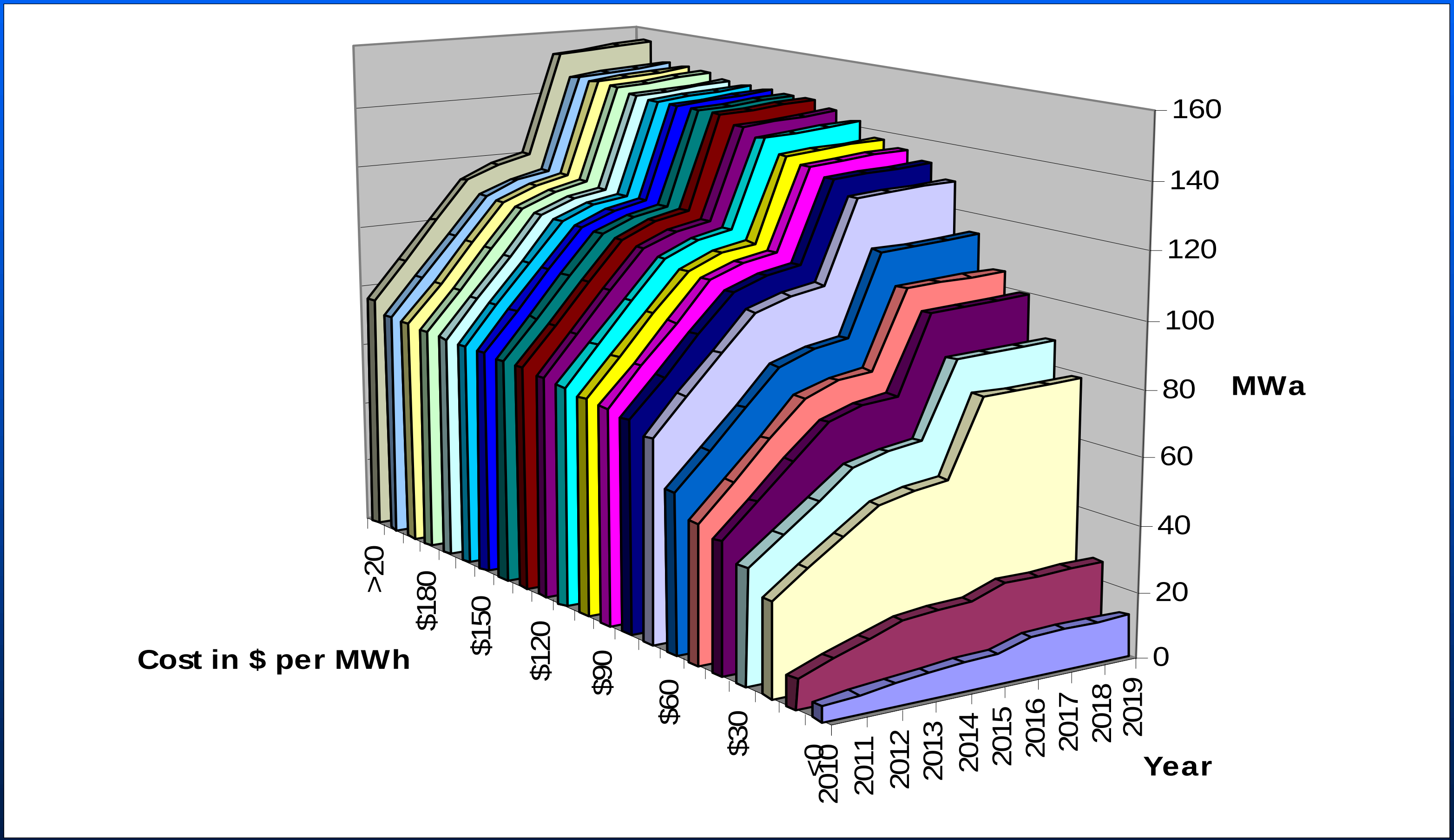
- Line Drop Compensation
- VAR Management. Phase Load Balancing, & Feeder Load Balancing
- Substation Voltage Regulators & Select Re-Conductoring
- End-of Line Voltage Control Regulators

About 420 MWa by 2029



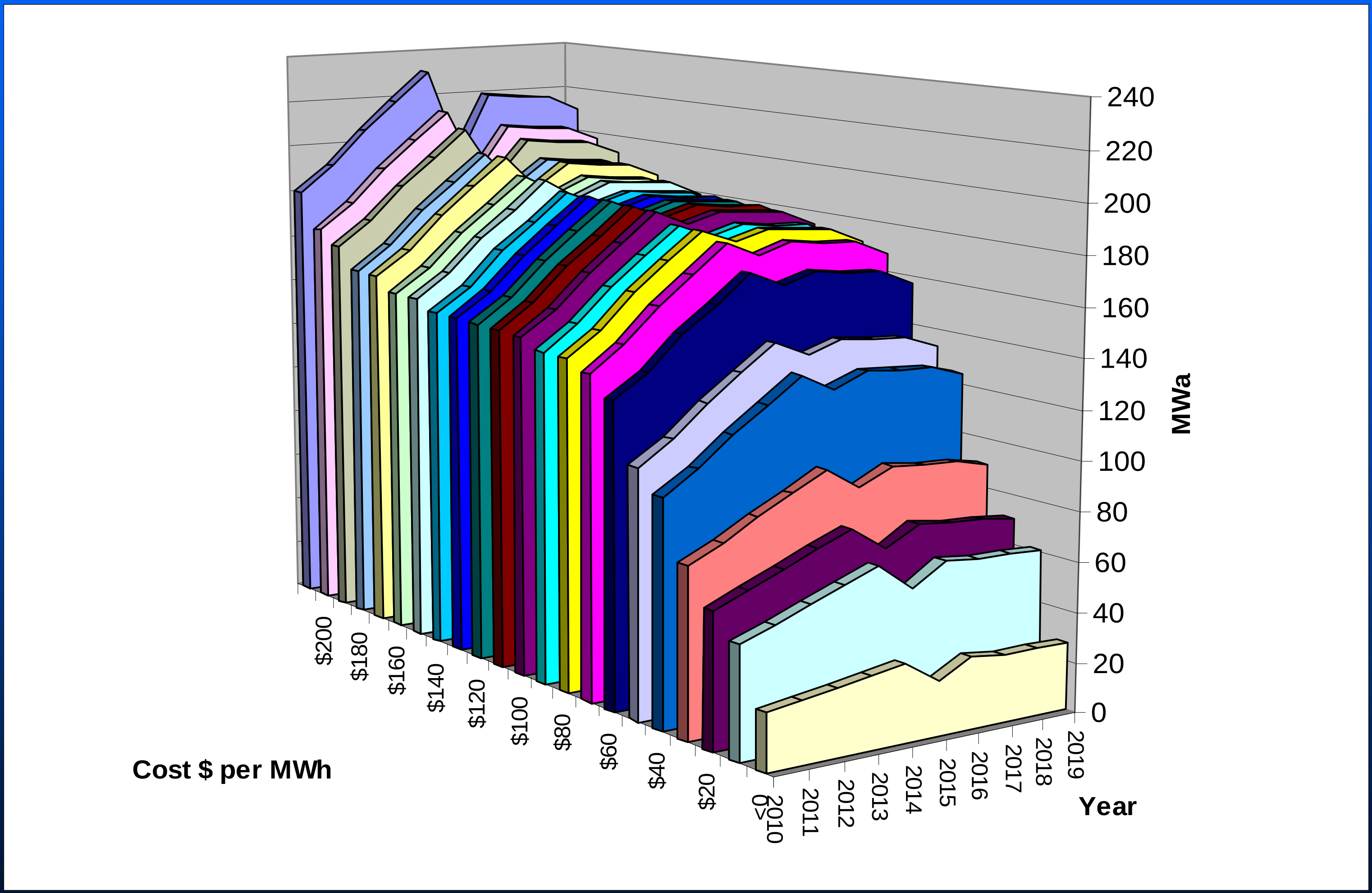
Conservation Council

Initial Results
Bottom Up Lost-Opportunity Supply Curve
2010-2019



Northwest Power and Conservation Council

Initial Results: Bottom Up Retrofit Supply Curve 2010-2019



Northwest Power and Conservation Council

IRP Methodology

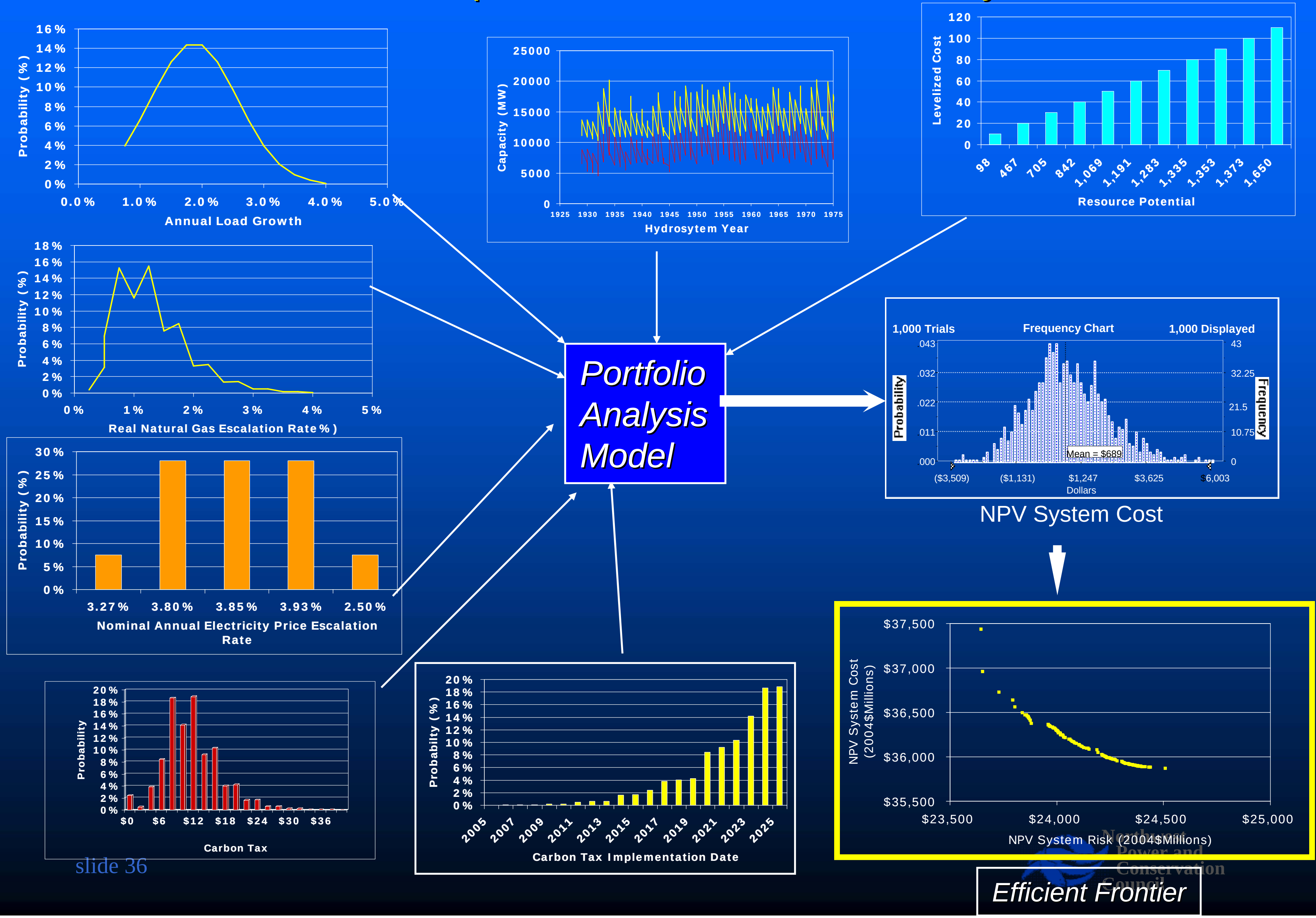
- Supply Curves delivered to Portfolio Model
- Portfolio Model finds least cost & risk Plans
  - Plan is resource acquisition & option schedule
  - Includes both conservation & generation
  - Amounts & timing of acquisitions & options
- For conservation this includes
  - » Lost-Opportunity schedule
  - » Non-Lost-Opportunity schedule
  - » A Cost-effectiveness threshold

Conservation Program Implementation

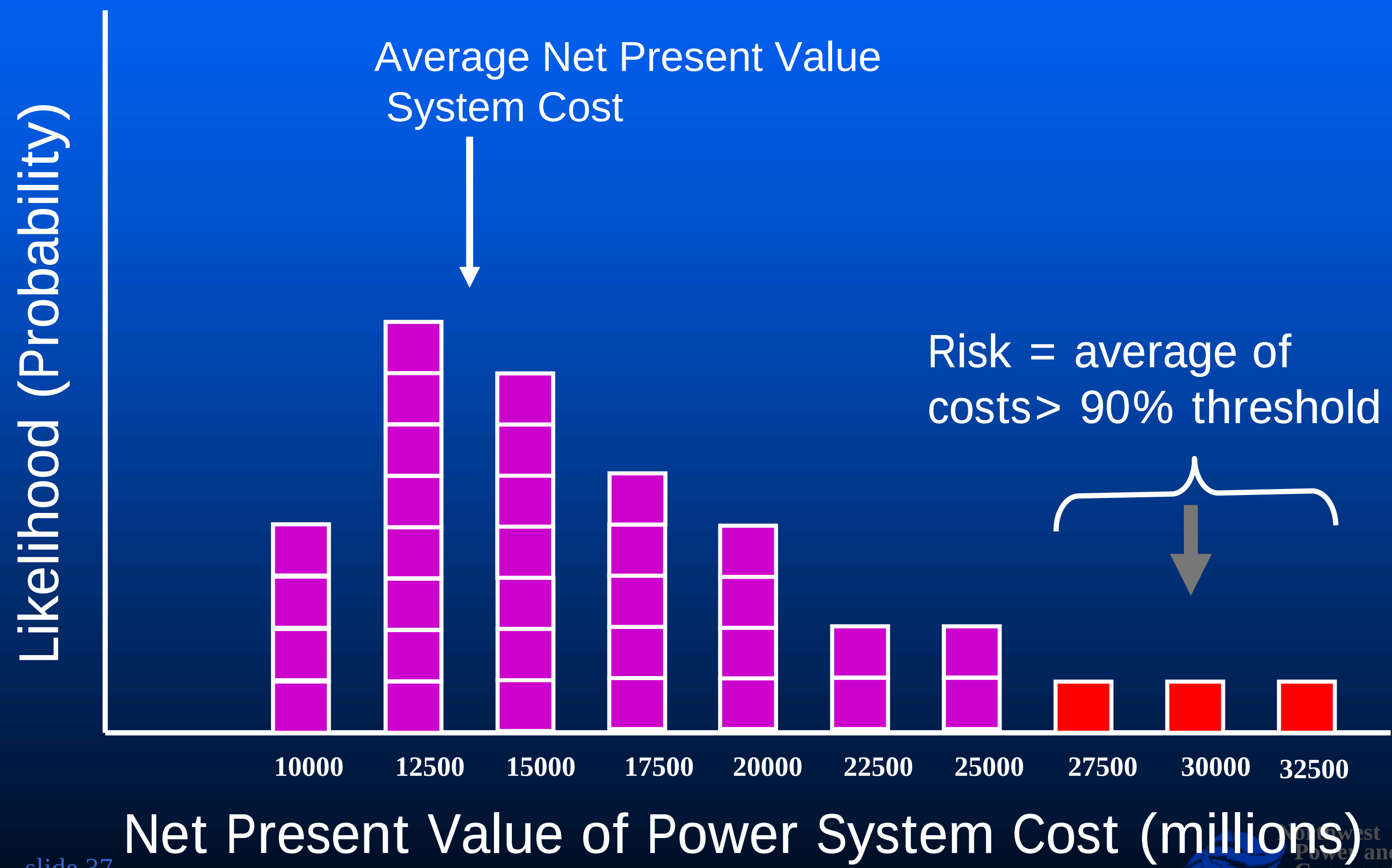
IRP Methodology

- Test thousands of potential "planned portfolios"
- Against 750 futures
- Found Plans with low cost & risk
- Tested Alternative Conservation Deployment Schedules
- Regional Conservation Targets
  - Derived from Plans on low-cost low-risk front

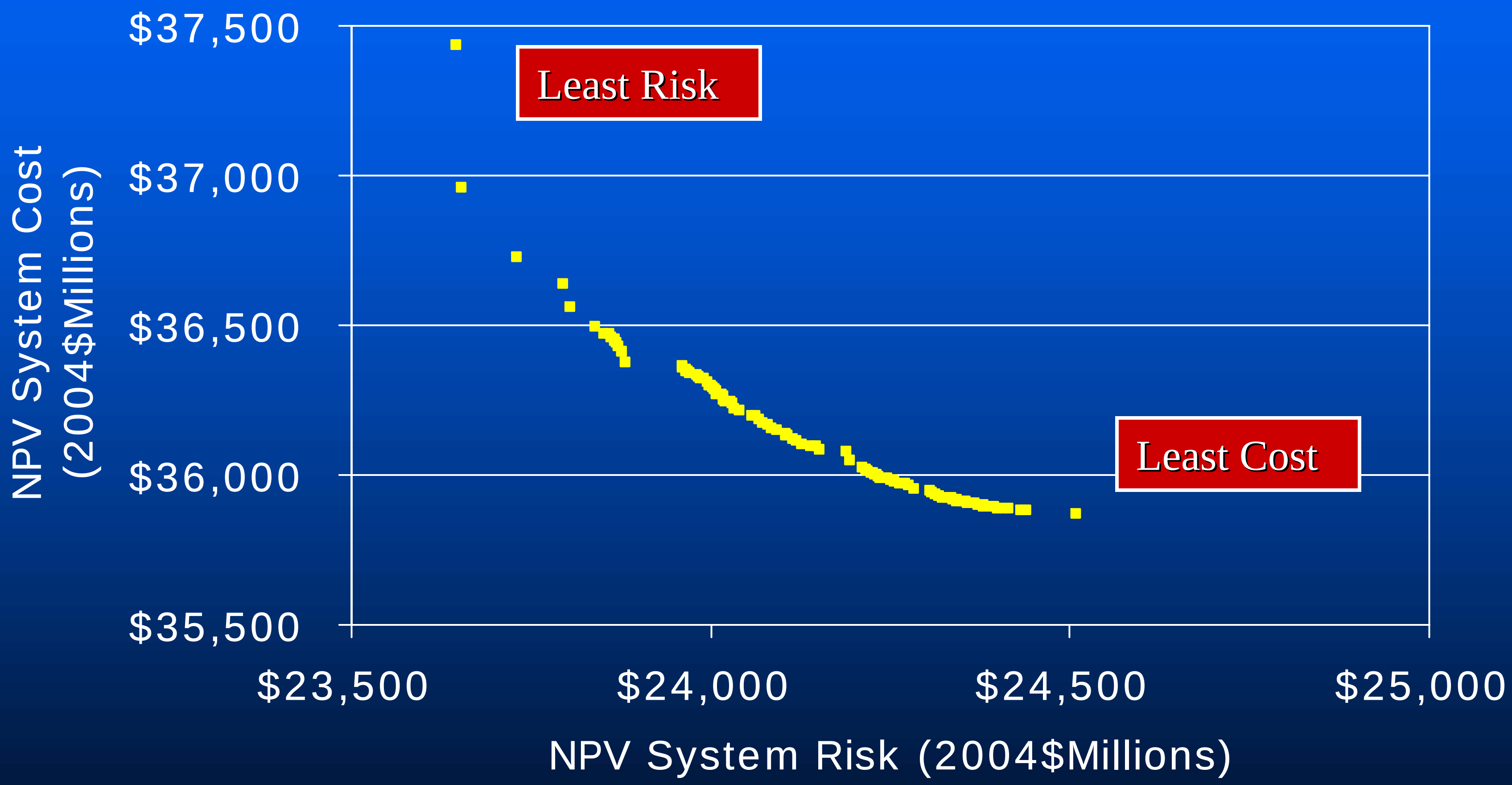
Portfolio Analysis Determines How Much Energy Efficiency to Develop in the Face of Uncertainty



Portfolio Model Calculates Risk and Expected Cost Associated With Each Plan Across 750 “Futures”



Plans Along the Efficient Frontier Permit Trade-Offs of Costs Against Risk



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Or . . .
Utilities Can Just Use the Utility Target Calculator

http://www.nwcouncil.org/energy/UtilityTargetCalc_v1_7.xls

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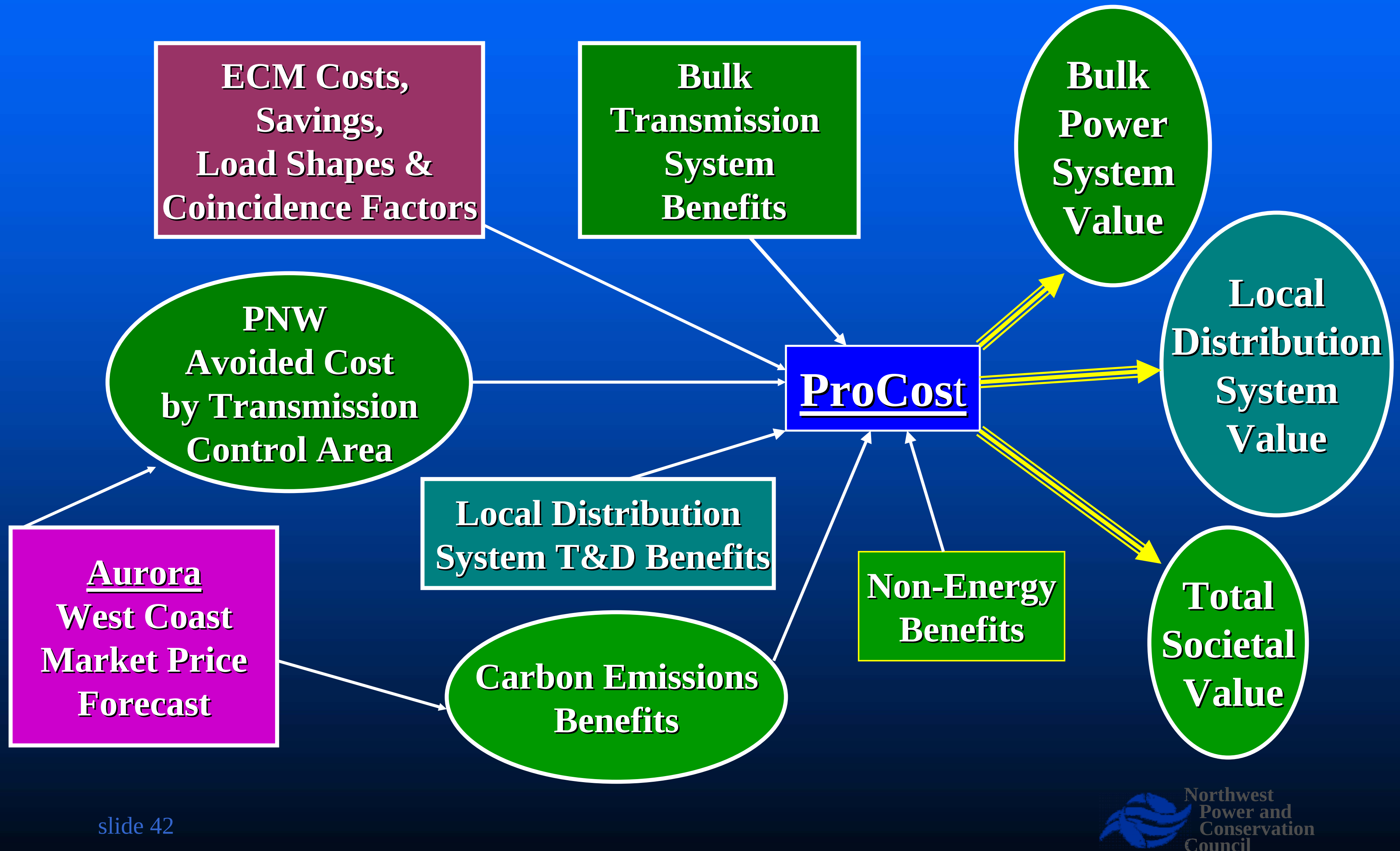
Background Slides

Regional Act Cost-Effectiveness

Conservation Measure Cost-Effectiveness "Inputs and Outputs"



What's A kWh Saved Worth?

- Value of a kWh of savings depends
  - Cost of power in the wholesale market during the time of day, day of week, month of the year and the year it is saved
  - How many years it lasts

Plus ...
Other Values of Conservation

- Quantifiable Non-Energy Benefits
  – Water savings, maintenance labor
- Distribution system expansion deferral
  – Poles, wires, transformers, substations
- Transmission system expansion deferral
  – Bigger poles & wires
- Externalities: Like CO_2 production
- Regional Act Credit of 10% to conservation

Northwest Power and Conservation Council

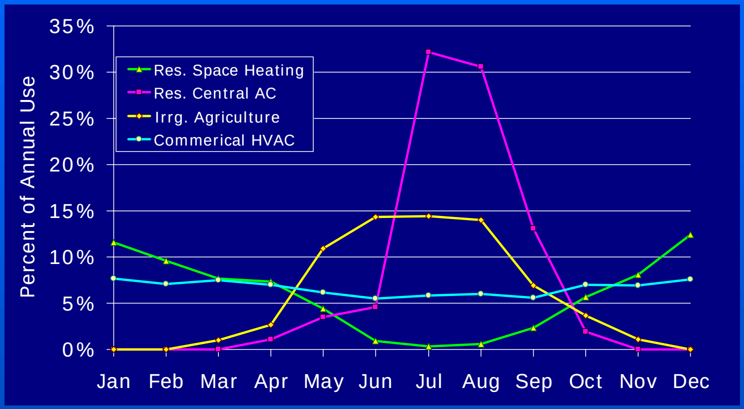
Why Value Conservation at Wholesale Market Prices?

- Price paid to buy <u>or sell</u> the marginal kWh, or "run" the marginal resource
- At any given time, the marginal resource may or may not be a new power plant
- Conservation often displaces older generation out of the region
- Conservation defers new coal, wind, solar and gas generation

Timing-Based Value

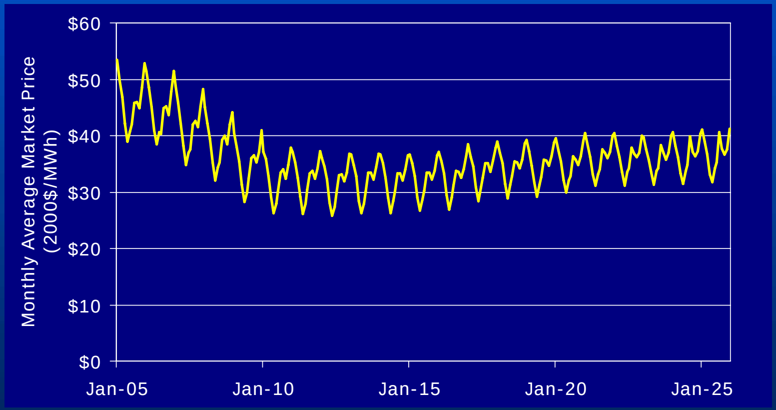
Shape of Savings

*



Value of Wholesale Power

=



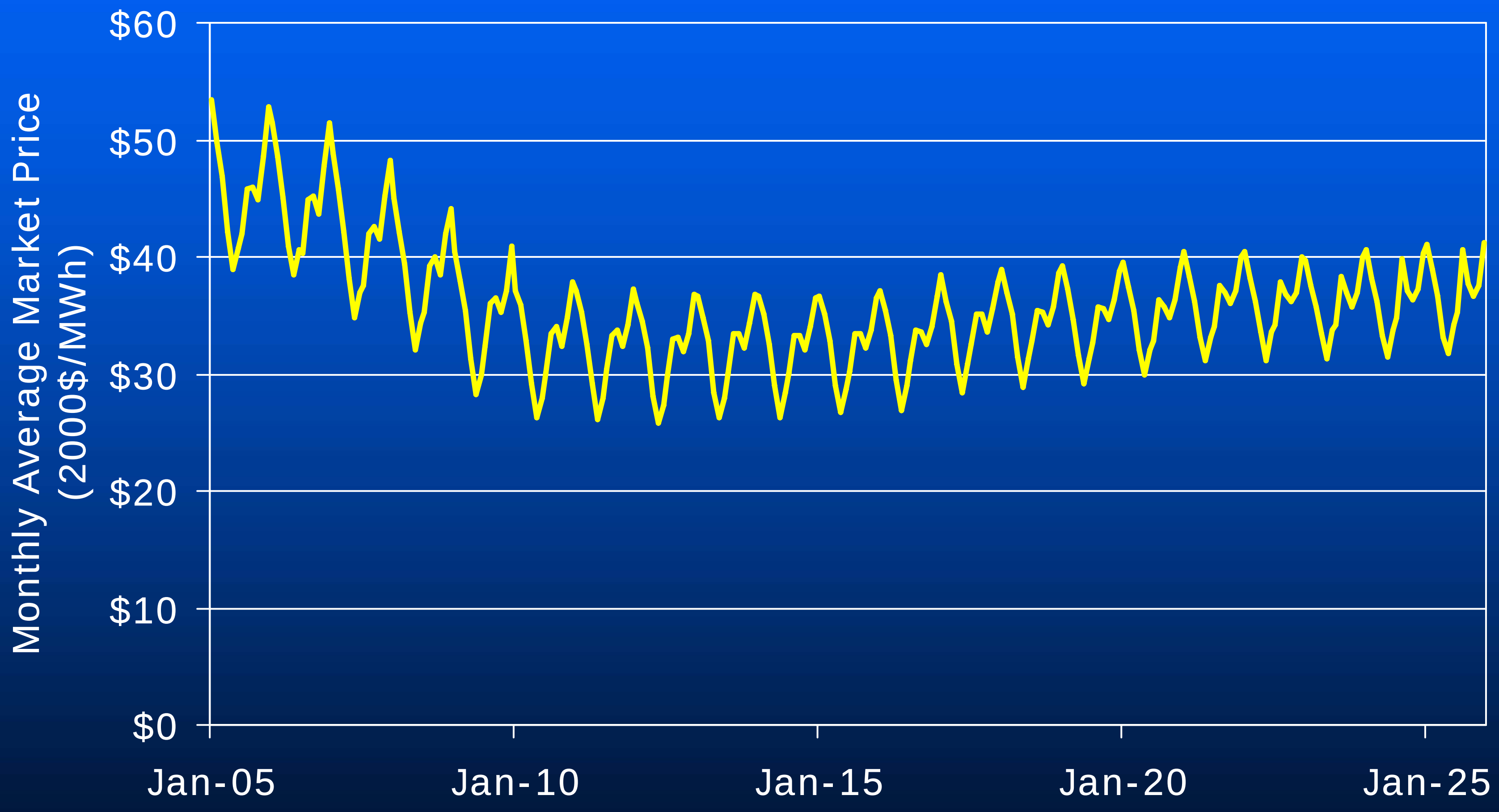
Value of kWh Saved

$

Northwest Power and Conservation Council

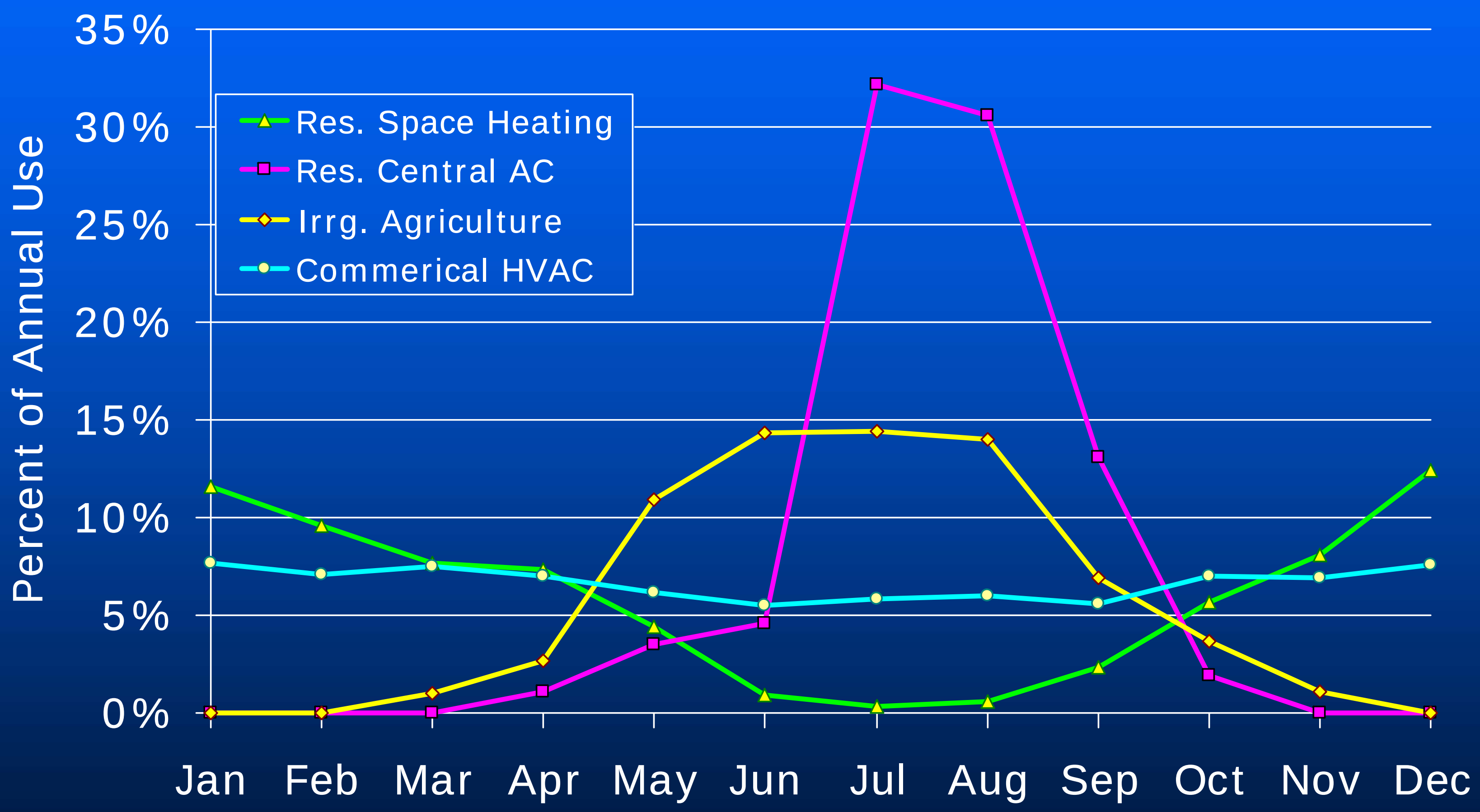
Council 5th Plan Forecast of Future Average Monthly Market Prices

(Mid C-Trading Hub)



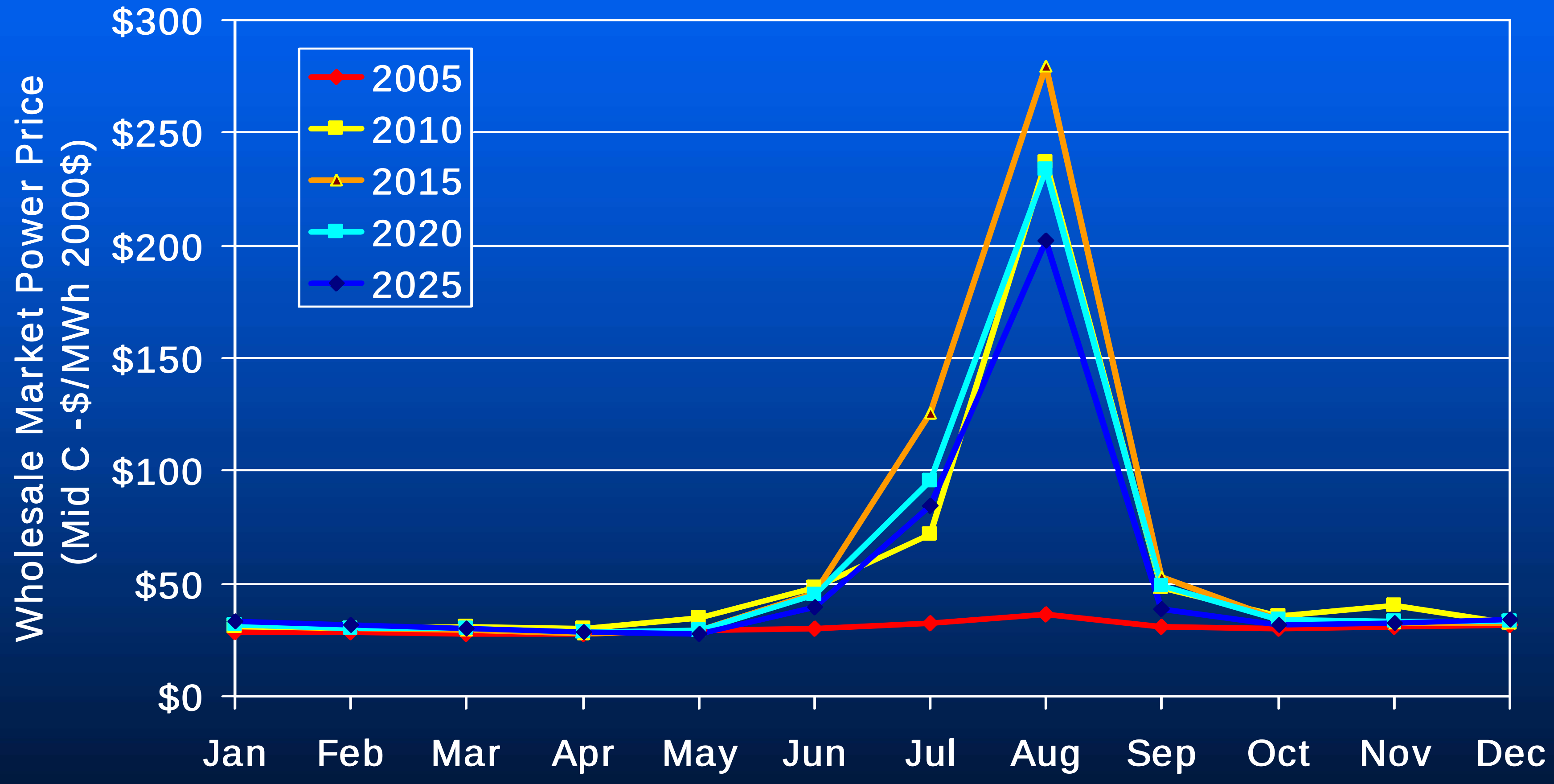
Northwest Power and Conservation Council

Typical “On-Peak” Load Profiles

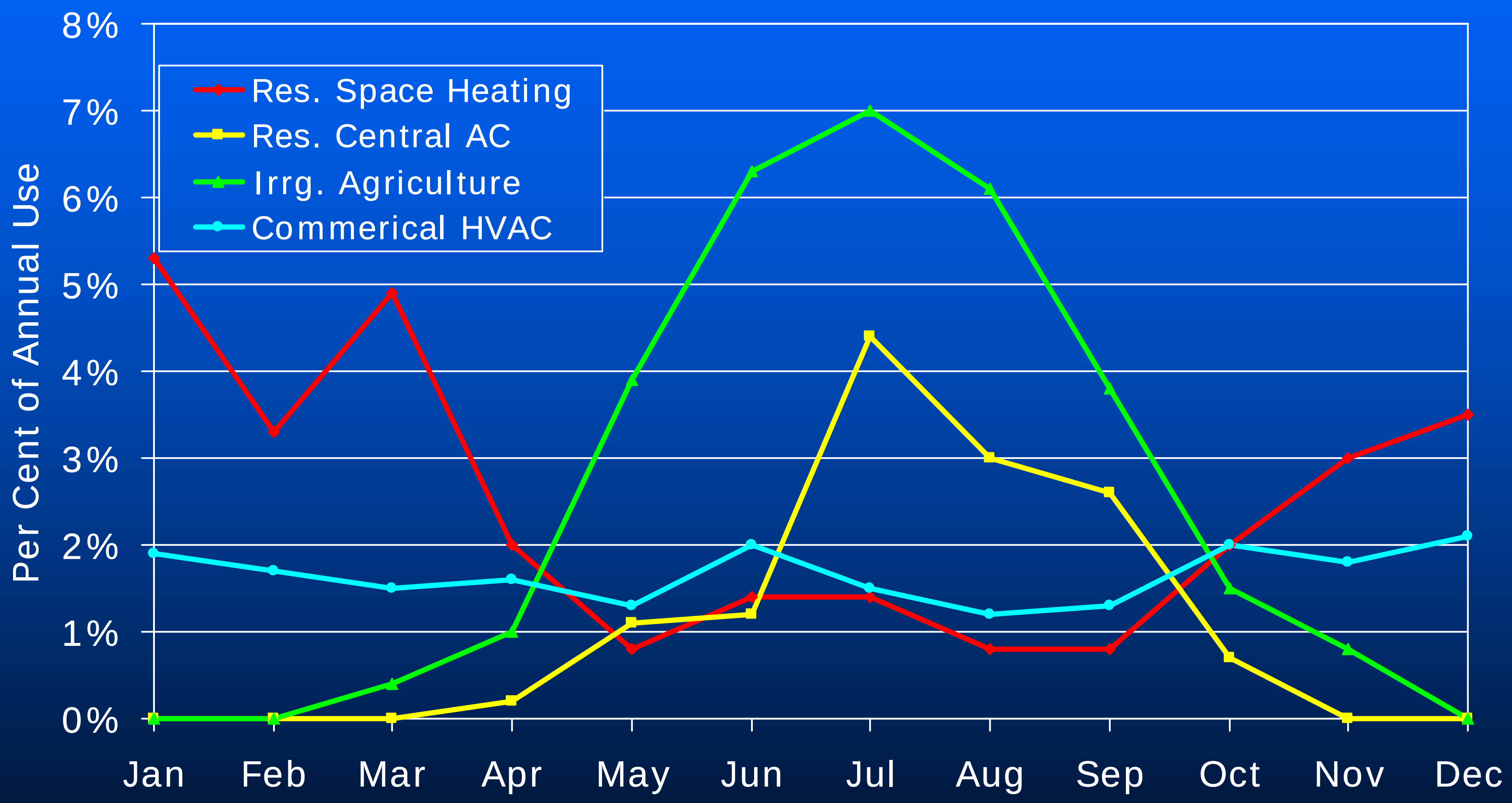


Northwest Power and Conservation Council

Forecast On-Peak Market Power Prices by Month and Year



Typical Off-Peak Load Profiles



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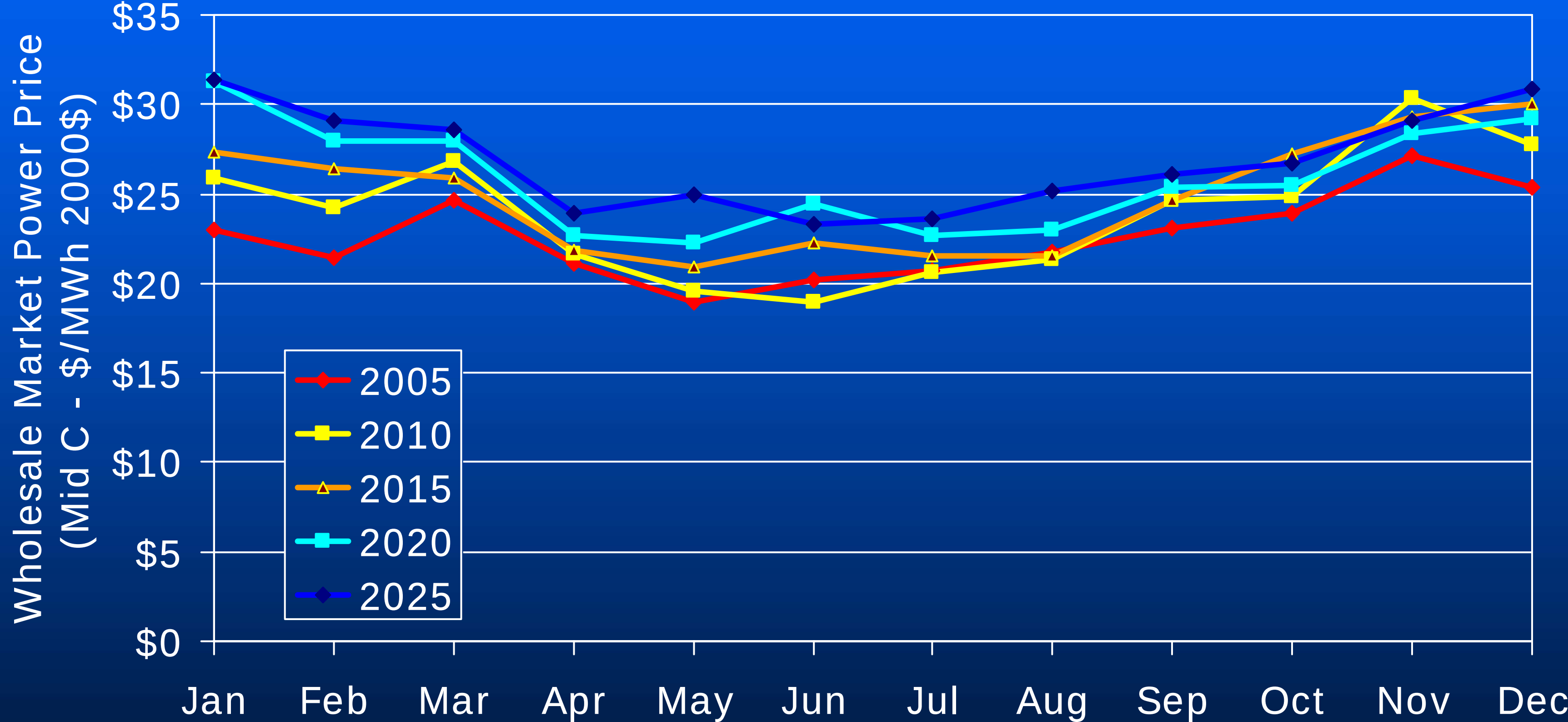
Forecast Off-Peak Market Power Prices by Month and Year



The Council's Conservation's Cost-Effectiveness Analysis Compares Savings with Forecast Market Prices *at the time the savings occur*

- *Four "Load Segments" are used to compute the value of savings:*
  - *Weekday "Peak" Load Hours*
  - *Weekday "Ramp Up/Ramp Down" hours and "Weekend Peak" Load Hours*
  - *Weekday and "Weekend Off-Peak" hours*
  - *Weekend and Holiday "Very-Low"*

Definition of Load Segment Hours								
Hour	Monday	Tuesday	Wednesda	Thursday	Friday	Saturday	Sunday	Holiday
1	3	3	3	3	3	4	4	4
2	3	3	3	3	3	4	4	4
3	3	3	3	3	3	4	4	4
4	3	3	3	3	3	4	4	4
5	2	2	2	2	2	2	2	4
6	2	2	2	2	2	2	2	3
7	2	2	2	2	2	2	2	3
8	2	2	2	2	2	2	2	3
9	1	1	1	1	1	2	2	2
10	1	1	1	1	1	2	2	2
11	1	1	1	1	1	2	2	2
12	1	1	1	1	1	2	2	2
13	1	1	1	1	1	2	2	2
14	1	1	1	1	1	2	2	2
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18	1	1	1	1	1	2	2	2
19	2	2	2	2	2	2	2	3
20	2	2	2	2	2	2	2	3
21	2	2	2	2	2	2	2	3
22	2	2	2	2	2	2	2	4
23	3	3	3	3	3	4	4	4
24	3	3	3	3	3	4	4	4

Each Conservation Measure Has a Different "Cost-Effectiveness" Limit Based on When It's Savings Occur

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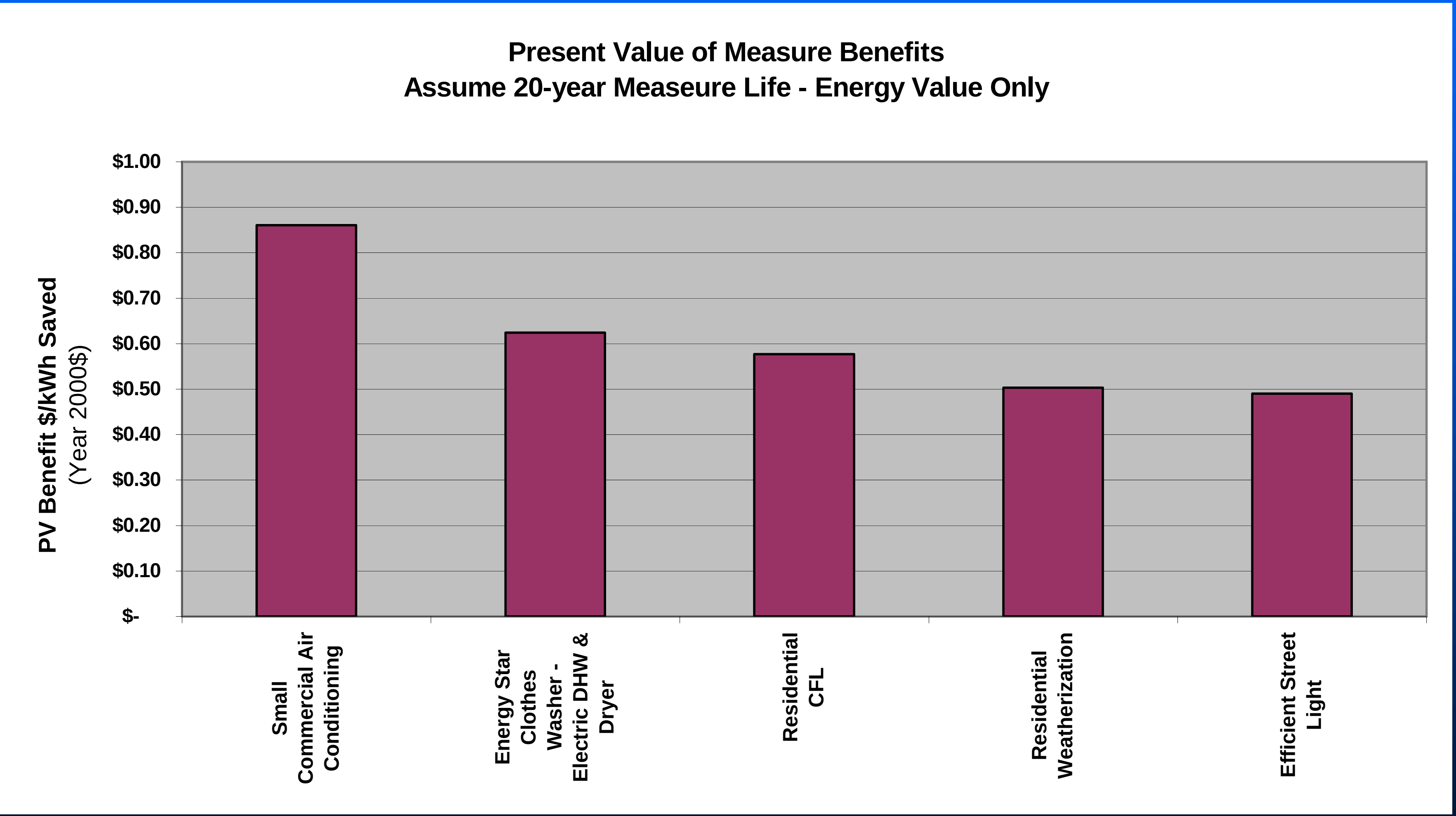
Value Depends on Shape of Savings

Present Value of One kWh Energy Saved
Assuming a 20-Year Measure Life



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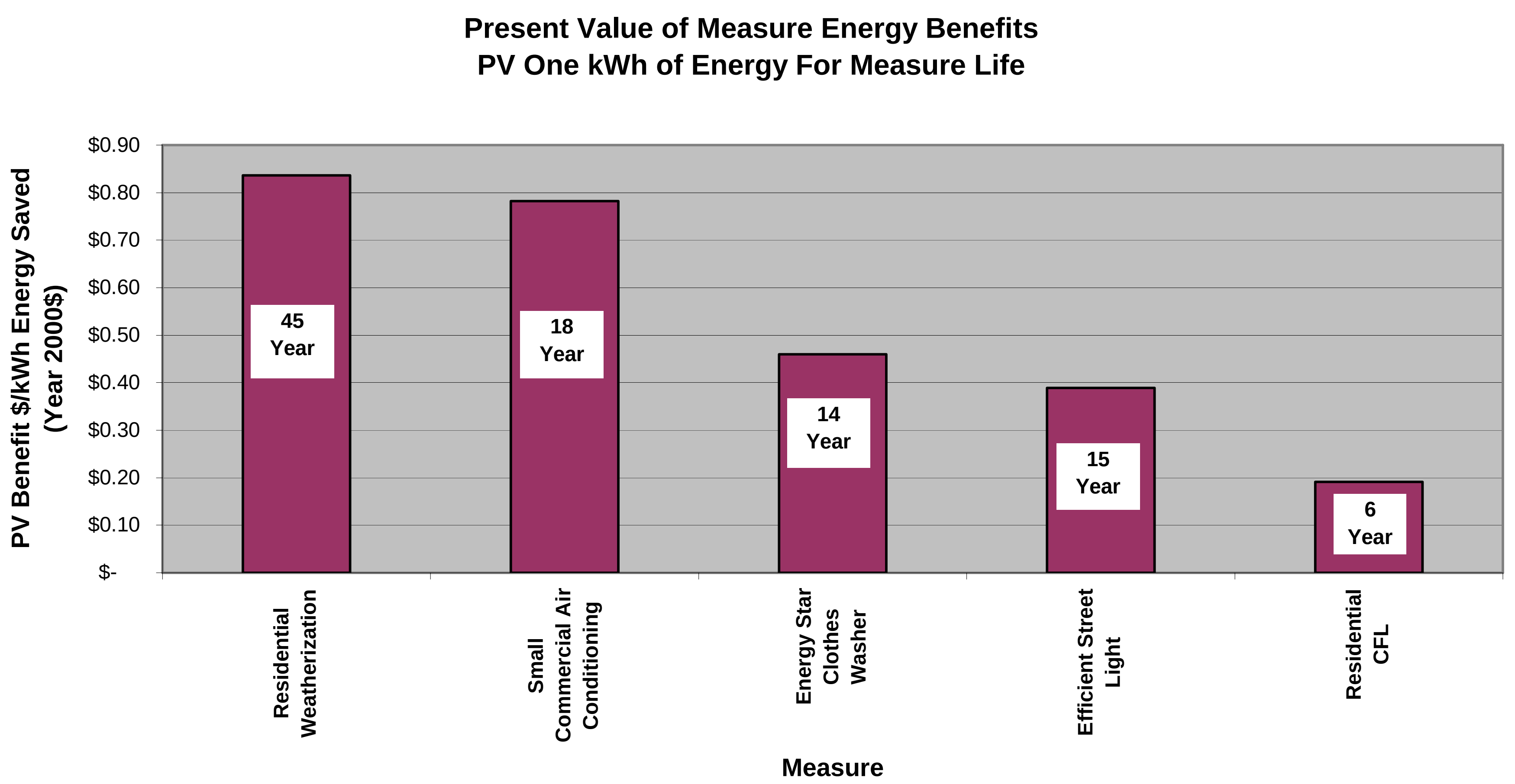
But …

Longer-Lived Measures Have More Value

Present Value of One kWh Saved

For Life of Measure - Energy Value Only



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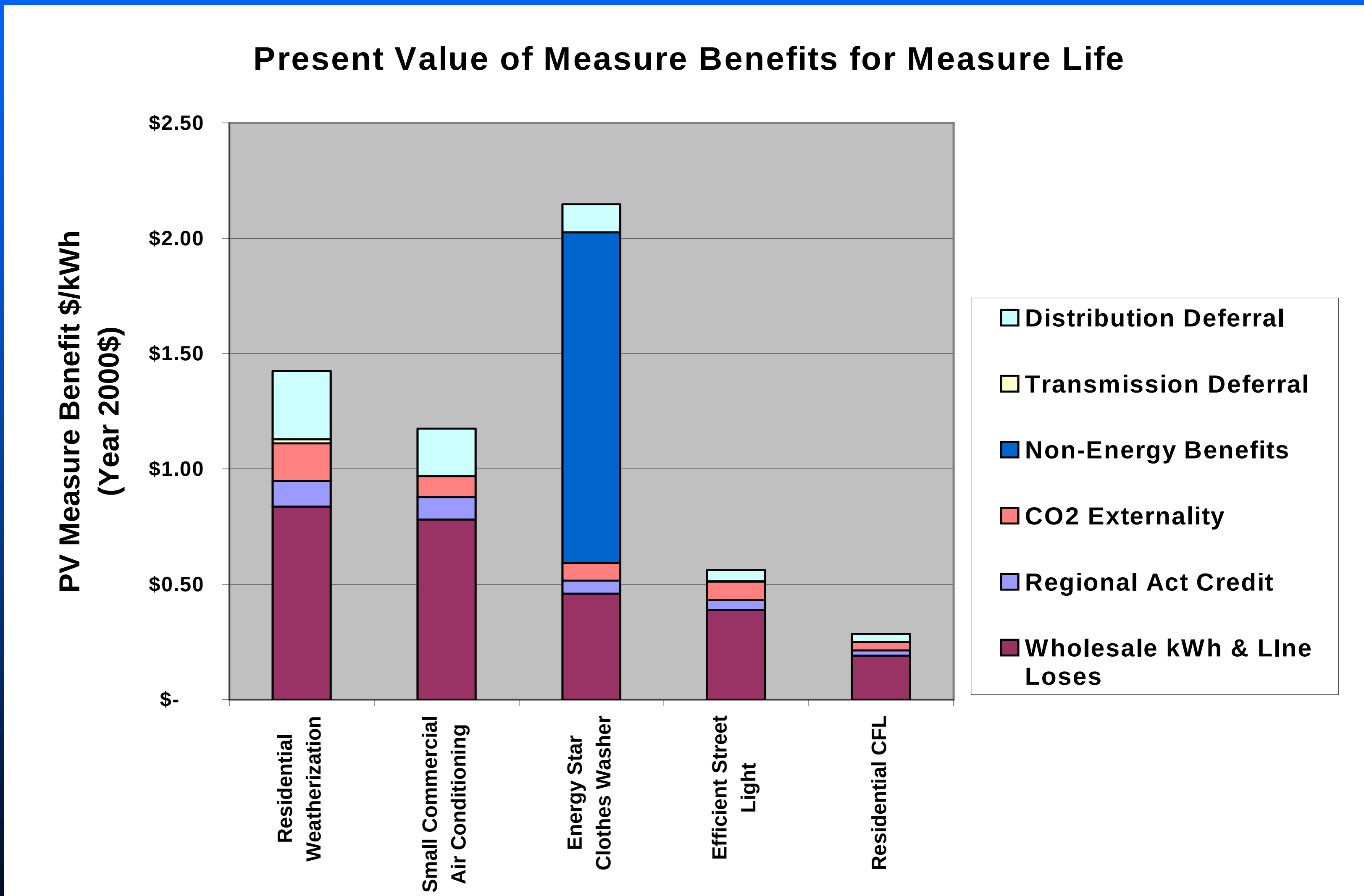
Present Value of One KWh Saved Considering All Benefits



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Benefit/Cost Ratio

B/C Ratio = $\dfrac{\textbf{Present Value All Benefits}}{\textbf{Present Value All Costs}}$

- Incorporates all benefits
  - Shape of saved kWh, life of savings, transmission & distribution deferrals, non-energy benefits, quantifiable externalities
- Incorporates all costs
  - Capital & labor, O&M, periodic replacement, pogram admin & non-energy costs
  - Regardless of who pays
- Incorporates time value of money for both
- Good when greater than 1.0

Why We Use Benefit/Cost Ratio to Measure Conservation Cost-Effectiveness

- B/C ratio because timing of savings matters
- There is no single cost against which resources are measured**
- All resources must now "compete" for development against the West Coast wholesale market price
- That price varies dramatically by time of day and season of the year

■**Levelized cost was useful when we estimated the avoided cost as a single generating plant

Why Cost-Effectiveness?

- Conservation reduces system costs when it is less expensive than alternative supplies
  - The bigger the difference the greater the value
  - No economic benefit to conservation that costs the same as alternative supplies
- Conservation reduces risk relative to some alternatives
  - It carries no risk of fuel or climate change cost
  - Reduces variability of loads
  - Has value even when market prices are low

The Act defines regional cost-effectiveness as follows:

- "Cost-effective", when applied to any measure or resource referred to in this chapter, means that such measure or resource must be forecast to be reliable and available within the time it is needed, and to meet or reduce the electric power demand, as determined by the Council or the Administrator, as appropriate, of the consumers of the customers at an estimated incremental system cost no greater than that of the least-cost similarly reliable and available alternative measure or resource, or any combination thereof." (Emphasis added).

Under the Act the term "system cost" means:

- "An estimate of all direct costs of a measure or resource over its effective life, including, if applicable, the cost of distribution and transmission to the consumer, waste disposal costs, end-of-cycle costs, and fuel costs (including projected increases), and such quantifiable environmental costs and benefits as are directly attributable to such measure or resource"

Act Interpretation

- The Council has interpreted the Act's provisions to mean that in order for a conservation measure to be cost-effective the discounted present value of all of the measure's benefits should be compared to the discounted present value of all of its costs.
- This interpretation was adopted in the Council's 1983 Plan and <u>*has not been modified*</u>

Why Limit Utility Investments to Cost-effective Measures?

- ***It's Immoral*** – Unless payments are limited by Rate Impact Measure/Test non-participant's rates go up to subsidize others for savings that aren't cost-effective
- ***It's Uneconomic*** – Both the utility system and society could serve the same needs at a lower cost and money spent on non-cost effective measure reduces the amount available to secure these energy services from lower cost options
- ***It's Illegal*** – Bonneville is restricted by the Act and both BPA and the region's utilities are constrained by the Council's model conservation standards for BPA and utility programs

Comparing Costs of Conservation & Alternatives

- Levelized Cost
  - Compare alternatives with different lifetimes & cash flow streams
- Benefit/Cost Ratio
  - Compare stream of benefits & costs
  - Use NPV to capture time value of costs & benefits
- Perspectives
  - Total Resource Cost Perspective (TRC)
  - Utility Perspective (UPC)
  - Bonneville Perspective
  - Customer Perspective

Resource Assessment Methods (Availability & Cost)

- Scope of measures
  - Review known measures & practices
  - Over 130 measures & practices 5th Plan
  - New measures (technology)
  - Old measures die (codes supplant some)
- Technical potential is
  - Number of applicable units * Incremental savings per unit

Determine Measure Applicability
Account for territory-specific factors

- Fuel saturations (electric vs gas water heat)
- Building characteristics (size, vintage, insulation)
- Building use (retail, office, school … single-family, multi-family, mobile home)
- System saturations (heat pump, zonal or gas heat)
- Equipment saturations (36 lamps per house)
- Current measure saturations (4 cfls/house)
- Measure life (stock turnover cycle)
- Measure substitution or overlap (either seal ducts on FAF ***<u>OR</u>*** convert FAF to HP and seal ducts)

Determine "Incremental" Savings per Applicable Unit

- Estimated kW & kWh savings
  - – By time-of-day, day of week & month of year
- Savings over baseline efficiency
  - – Baseline set by codes/standards or current practices
- Climate-sensitive
  - – Heating & cooling degree days & solar
- Measure interactions estimated
  - – Lighting & HVAC
  - – Order of measures applied

Developing Costs

- Costs
  - Materials & labor
  - Financing costs
  - Annual O&M
  - Periodic Replacement
  - Program Admin
  - Externalities
  - Other non-electric

From programs, bids, published sources

If financed use sponsor's cost

Lamp & ballast replacement costs

Marketing, staff,

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The Basic Formula

g1

Achievable Potential = Number of Applicable Units X (Energy Use @ Frozen Efficiency - Energy Use @ Cost Effectiveness Limit) X Expected Market Penetration

Where :

Frozen Efficiency Use = Current efficiency adjusted for stock turnover and adopted changes in codes and standards.

Cost Effectiveness Limit = Cost of next similarly available and reliable resource (represented by future wholesale market prices) adjusted for T&D cost deferrals, environmental costs & risks (fuel price, carbon control, etc.) – *Estimated from Portfolio Model Results*

Slide 70

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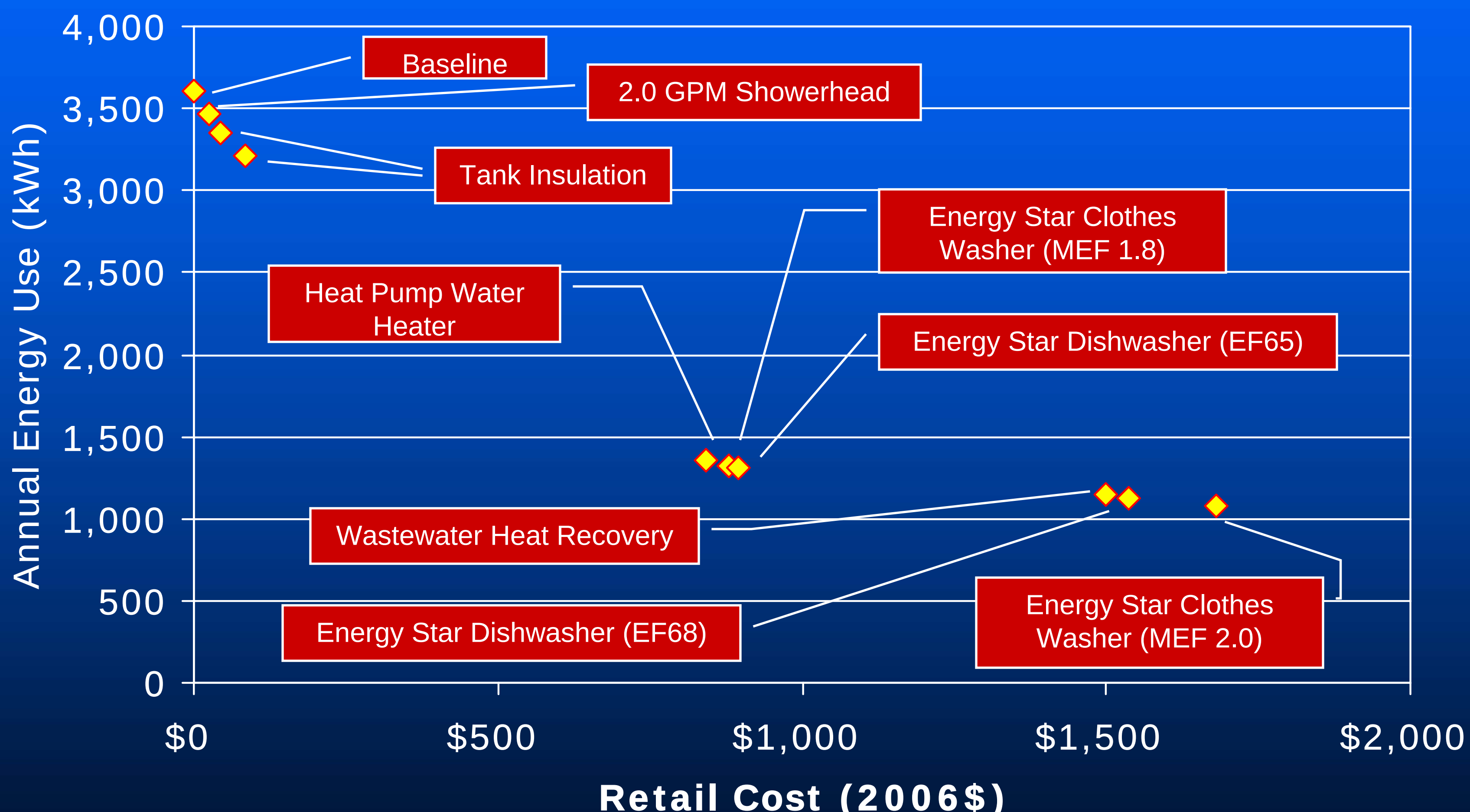
g1 Too complicated for P4. See if my version on the next slide is simpler.
grist, 5/28/2008

Retail Cost and Efficiency Trade-off Curve
Electric Water Heating



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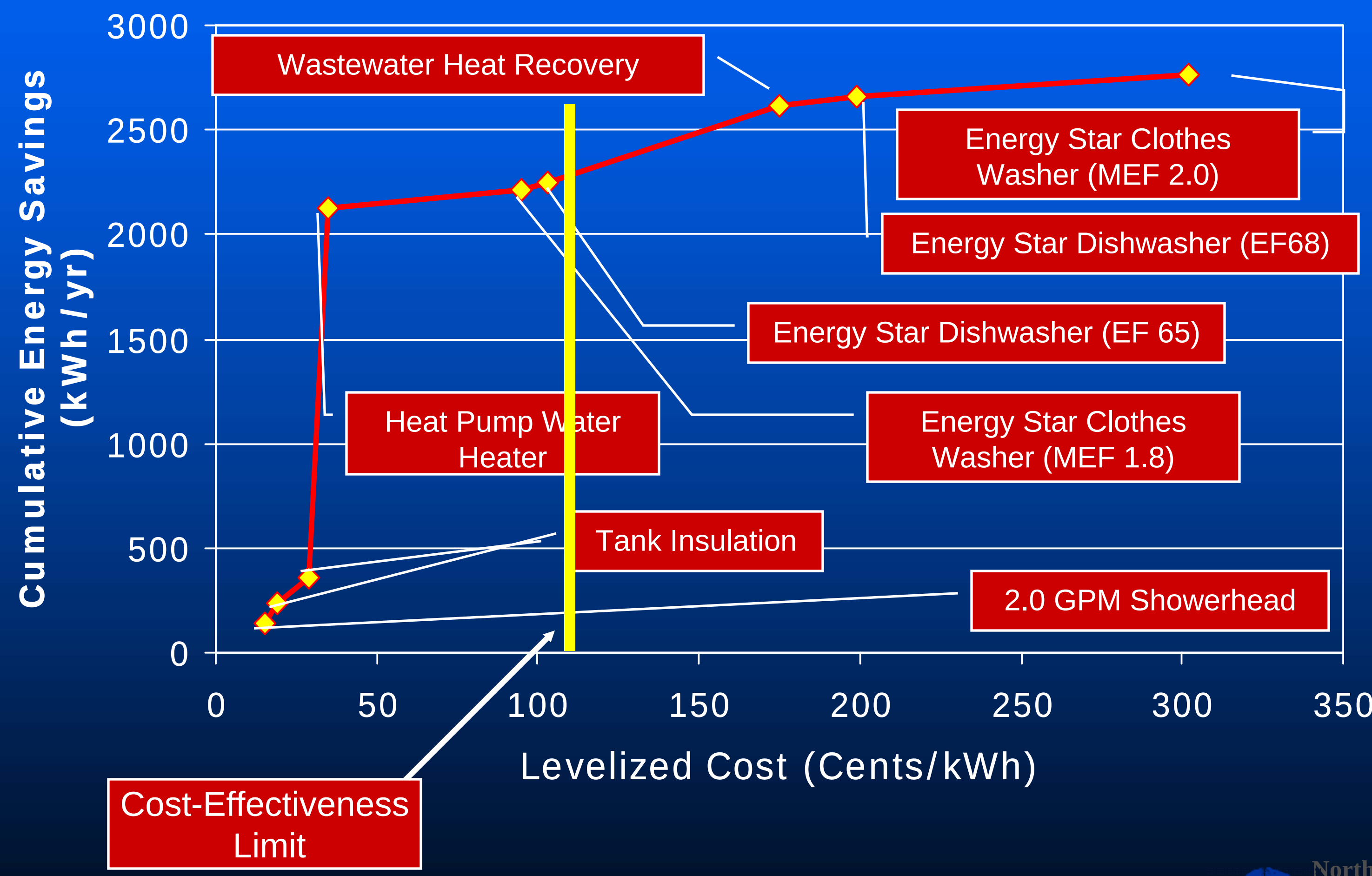
Residential Hot Water Heating Dwelling Unit Supply Curve



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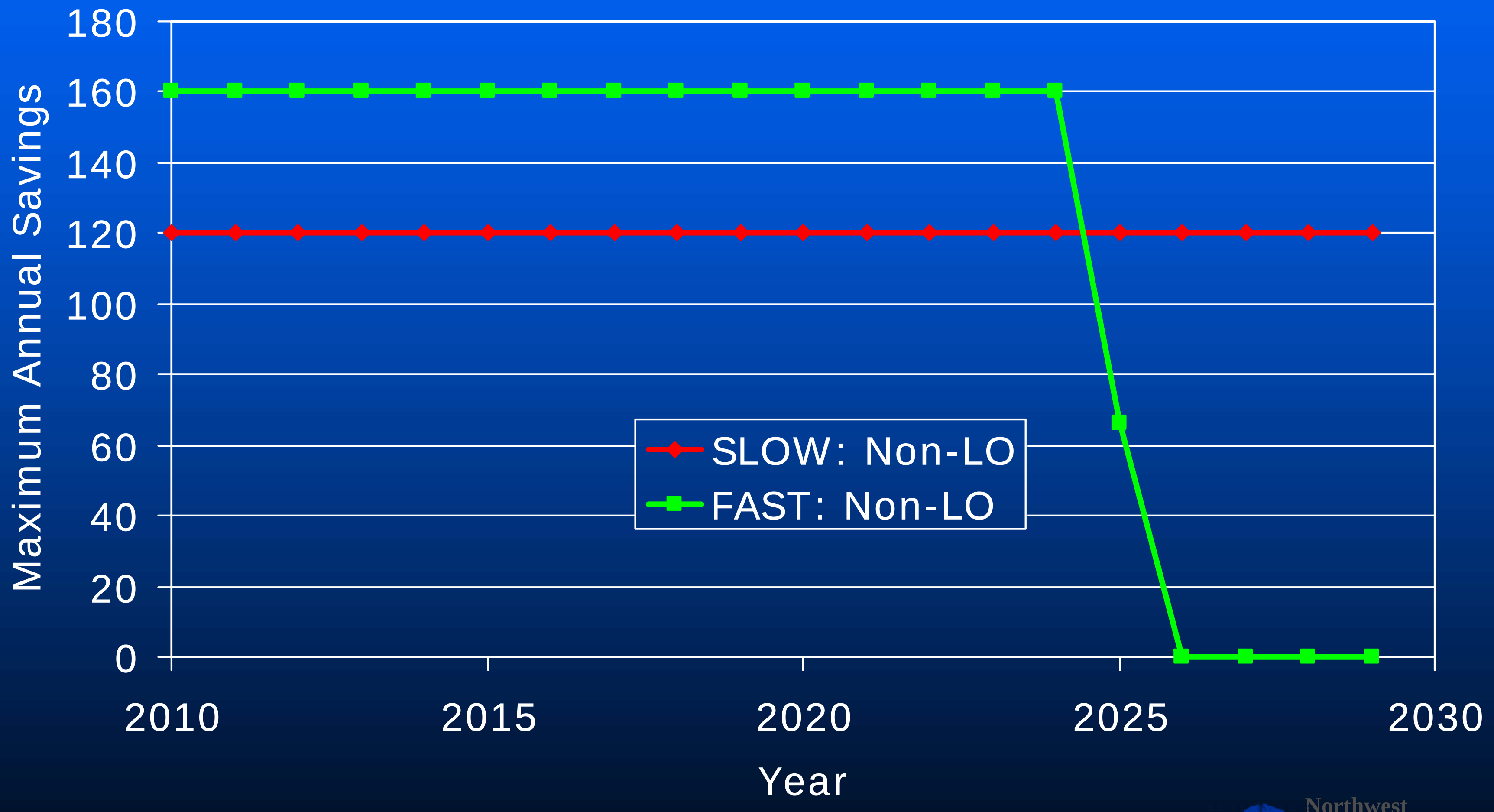
Annual Deployment Rates for Non-Lost Opportunity Resources



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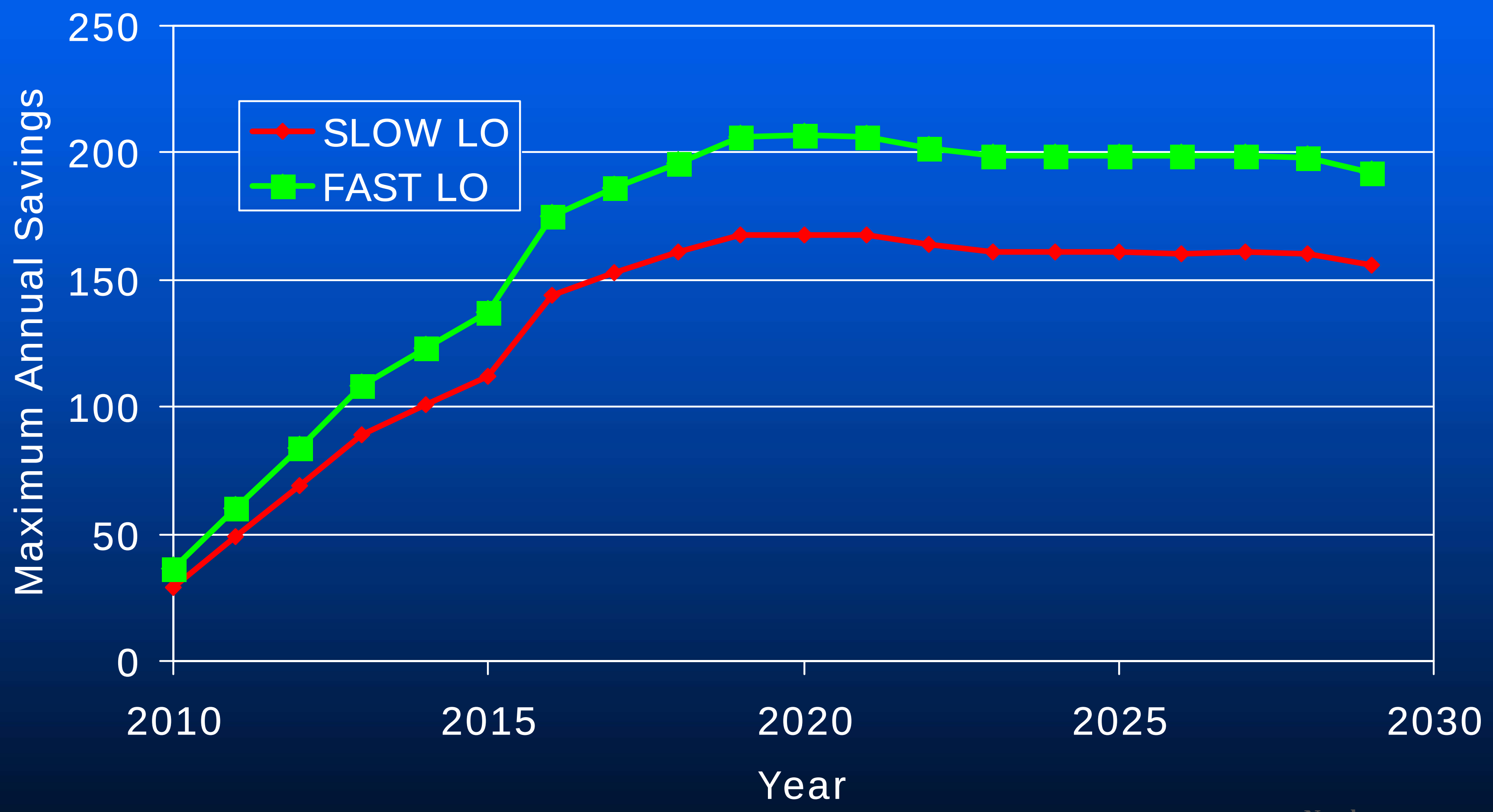
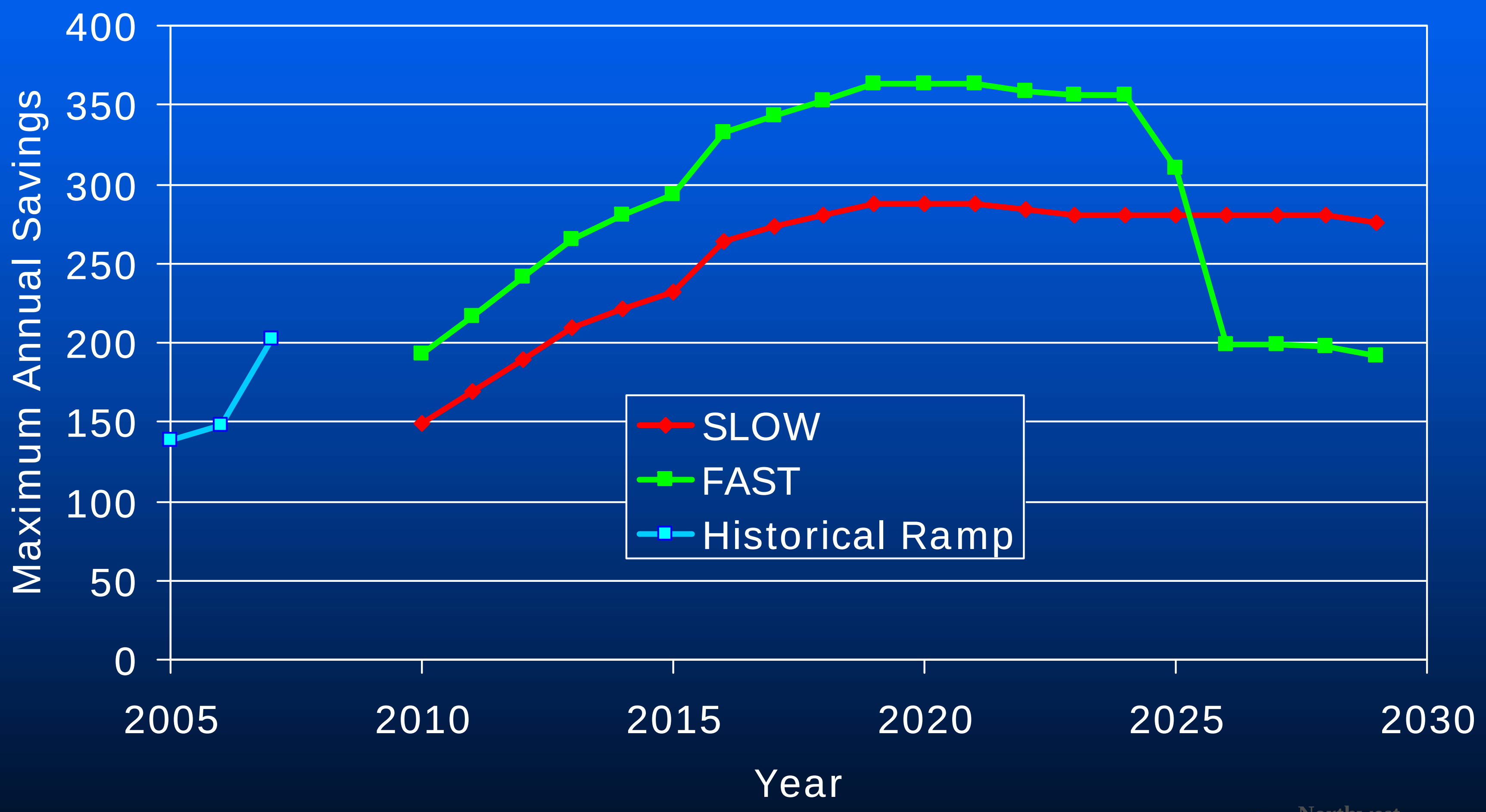
Annual Deployment Rate for Lost Opportunity Resources



Annual Deployment Rates for All Conservation Resources



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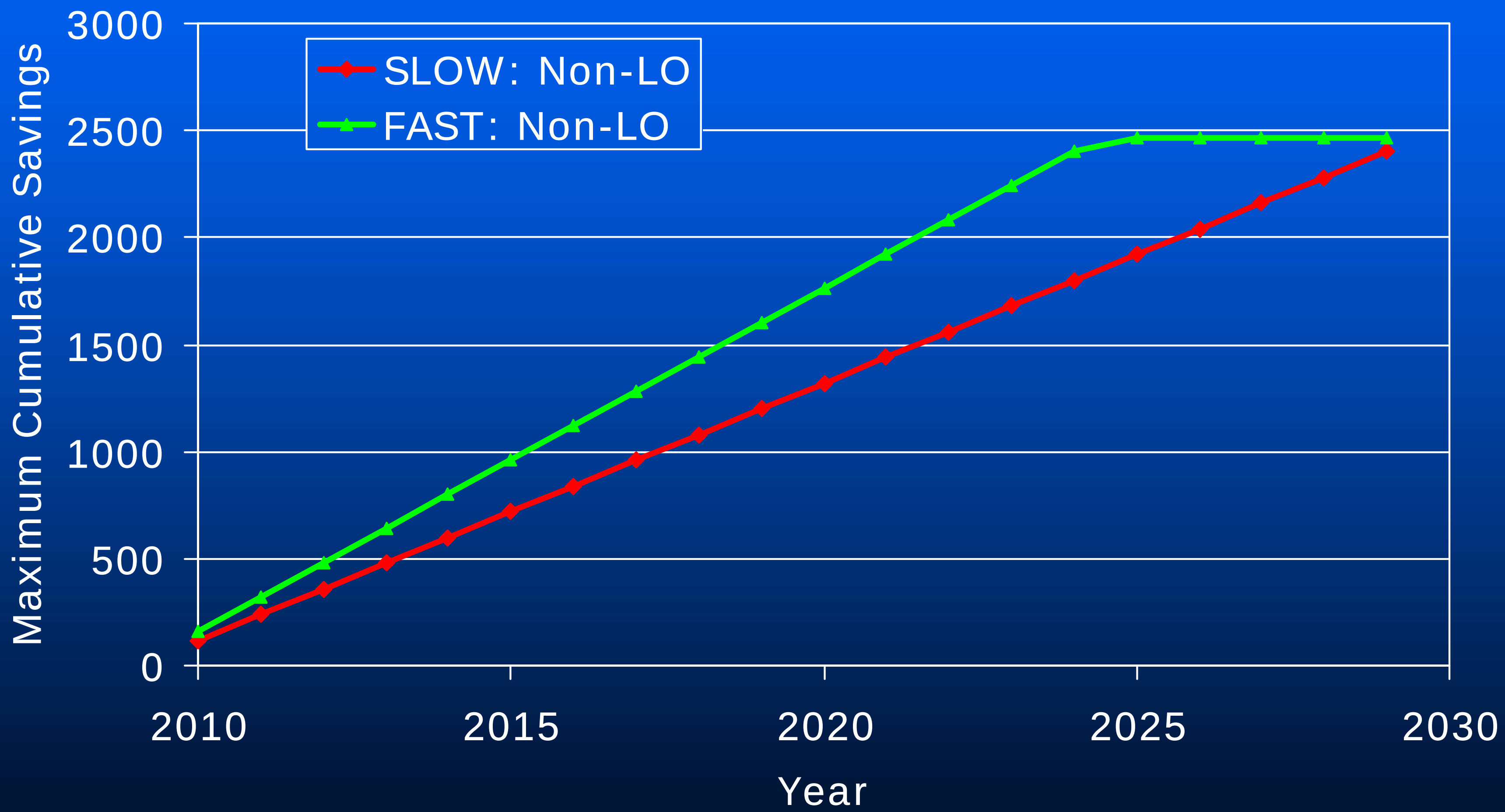
Cumulative Deployment Rate for Non-Lost Opportunity Resources



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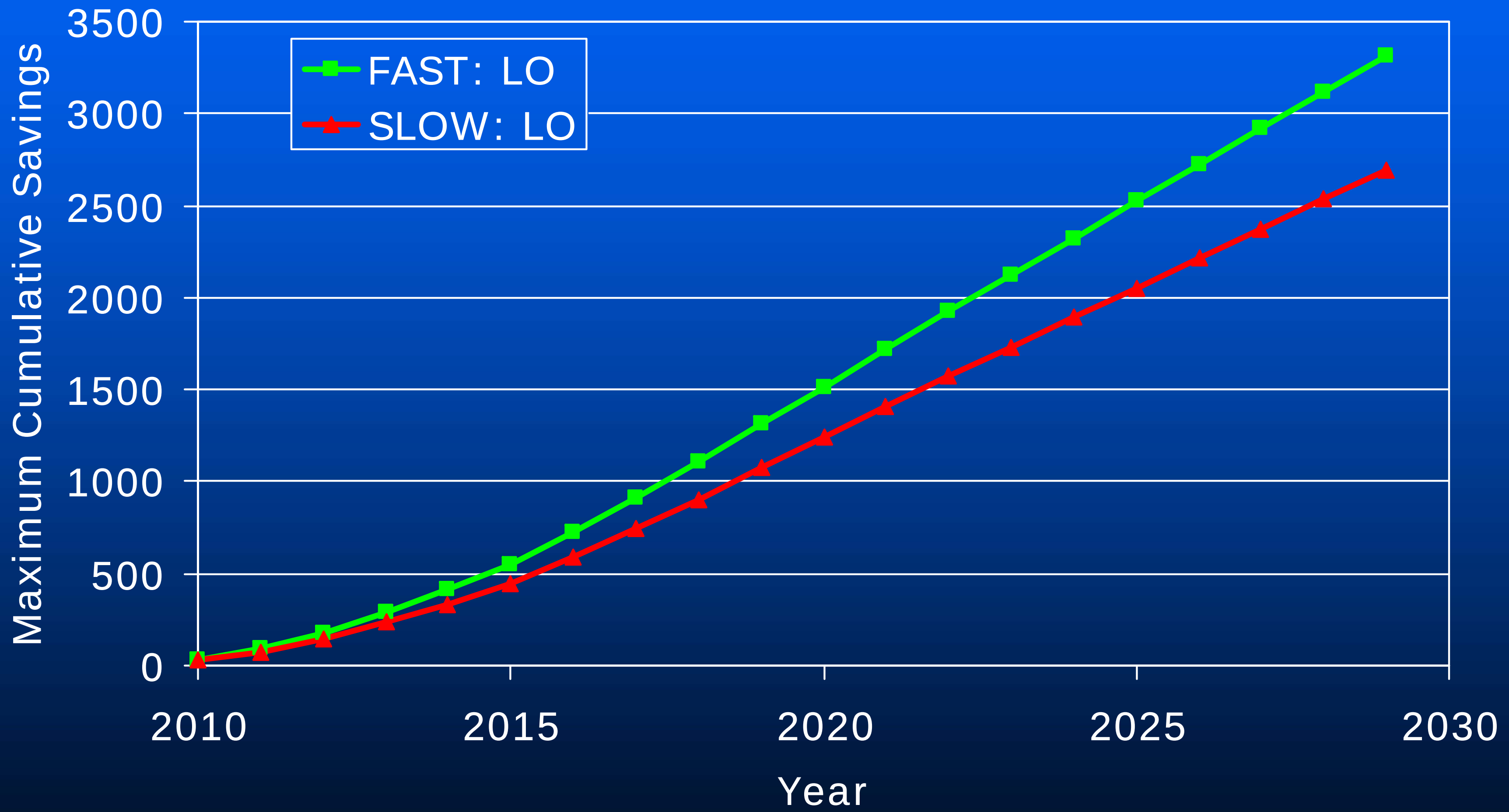
Cumulative Deployment Rate for Lost Opportunity Resources



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Cumulative Deployment Rate for All Resources