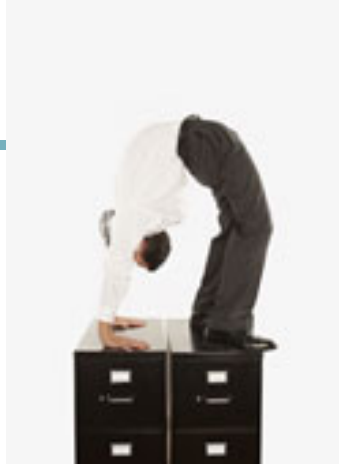
IRP Advisory Group Meeting

Dec 15, 2009

PSE PUGET SOUND ENERGY

The Energy To Do Great Things

Agenda for Today



- Networking: 9:15 – 9:30 a.m.
- Kick Off/Introductions: 9:30 – 9:40 a.m.
- WAC 480-109 Conservation Targets: 9:40 – 10:25 a.m.
- Electric Capacity Need Update: 10:25 – 11:10 a.m.
- OPUC Docket UM 1302: 11:10 – noon

- *Lunch Break: noon – 12:30 p.m.*

- Gearing up for 2011 IRP: 12:30 – 1:15 p.m.
- Acquisition Update: 1:15 – 1:35 p.m.
- Next Steps

WAC 480-109 Compliance

Bill Hopkins, Zac Yanez, Bob Stolarski, & Eric Englert

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WAC Requirements for WAC 480-109 Target

- Target must be at least the 2-year “pro rata” share of 10-year potential
- Conservation potential must be based on one of two sources:
  - Utility’s most recent IRP (consistent with Power Council methodology)

    or

  - Utility share of Power Council’s current regional plan
- Target may be a range

WAC Rules for Conservation Potential

WAC 480-109-010. (1) By January 1, 2010, and every two years thereafter, each utility must project its cumulative ten-year conservation potential.

(a) This projection need only consider conservation resources that are cost-effective, reliable and feasible.

(b) This projection must be derived from and reasonably consistent with one of two sources:

(i) The utility's most recent IRP, including any information learned in its subsequent resource acquisition process, or the utility must document the reasons for any differences. When developing this projection, utilities must use methodologies that are consistent with those used by the conservation council in its most recent regional power plan. A utility may, with full documentation on the rationale for any modification, alter the conservation council's methodologies to better fit the attributes and characteristics of its service territory.

(ii) The utility's proportionate share, developed as a percentage of its retail sales, of the conservation council's current power plan targets for the state of Washington.

WAC Rules for Target

WAC 480-109-010. (2) Beginning January 2010, and every two years thereafter, each utility must establish a biennial conservation target.

(a) The biennial conservation target must identify all achievable conservation opportunities.

(b) The biennial conservation target must be no lower than a pro rata share of the utility's ten-year cumulative achievable conservation potential. Each utility must fully document how it prorated its ten-year cumulative conservation potential to determine the minimum level for its biennial conservation target.

(c) The biennial conservation target may be a range rather than a point target.

WAC 480-109-007. (14) "Pro rata" means the calculation used to establish a minimum level for a conservation target based on a utility's projected ten year conservation potential.

What Is Included As “Conservation”

Any reduction in electric power consumption resulting from increases in the efficiency of:

- Energy Use
  - End use equipment and building efficiency
  - Fuel conversion, electric to high efficiency gas
- Production
  - Customer on-site combined heat & power generation
  - PSE generation facilities on-site energy efficiency
- Distribution
  - Phase balancing
  - Conservation voltage regulation

WAC 480-109-107 (3) "Conservation" means any reduction in electric power consumption resulting from increases in the efficiency of energy use, production, or distribution.

PSE's Compliance Path

- 10-year potential assessment from 2009 IRP is the basis for the target
  - Potential assessment methodology is consistent with the Power Council's
- End Use, Distribution, and Production efficiency are included
- Target is a range
- Public involvement has been through the CRAG & IRPAG processes

PSE Conservation Resource Potential Assessment:

Consistency with Power Council's Methodology

WAC Rule

- **WAC 480-109-010 Conservation resources.**

  (1)(b) This projection must be derived from and reasonably consistent with one of two sources:

  (i) The utility's most recent IRP, including any information learned in its subsequent resource acquisition process, or the utility must document the reasons for any differences. When developing this projection, utilities must use **methodologies** that are **consistent** with those used by the conservation council in its most recent regional power plan. A utility may, with full documentation on the rationale for any modification, alter the conservation council's methodologies to better fit the attributes and characteristics of its service territory.

Draft 6th Plan: "Council Methodology"

- "The Northwest Power Act establishes three criteria for resources included in the Council's power plans: resources must be 1) ***reliable***, 2) ***available*** within the time they are needed, and 3) available at an estimated incremental system ***cost*** no greater than that of the least-cost similarly reliable and available alternative."

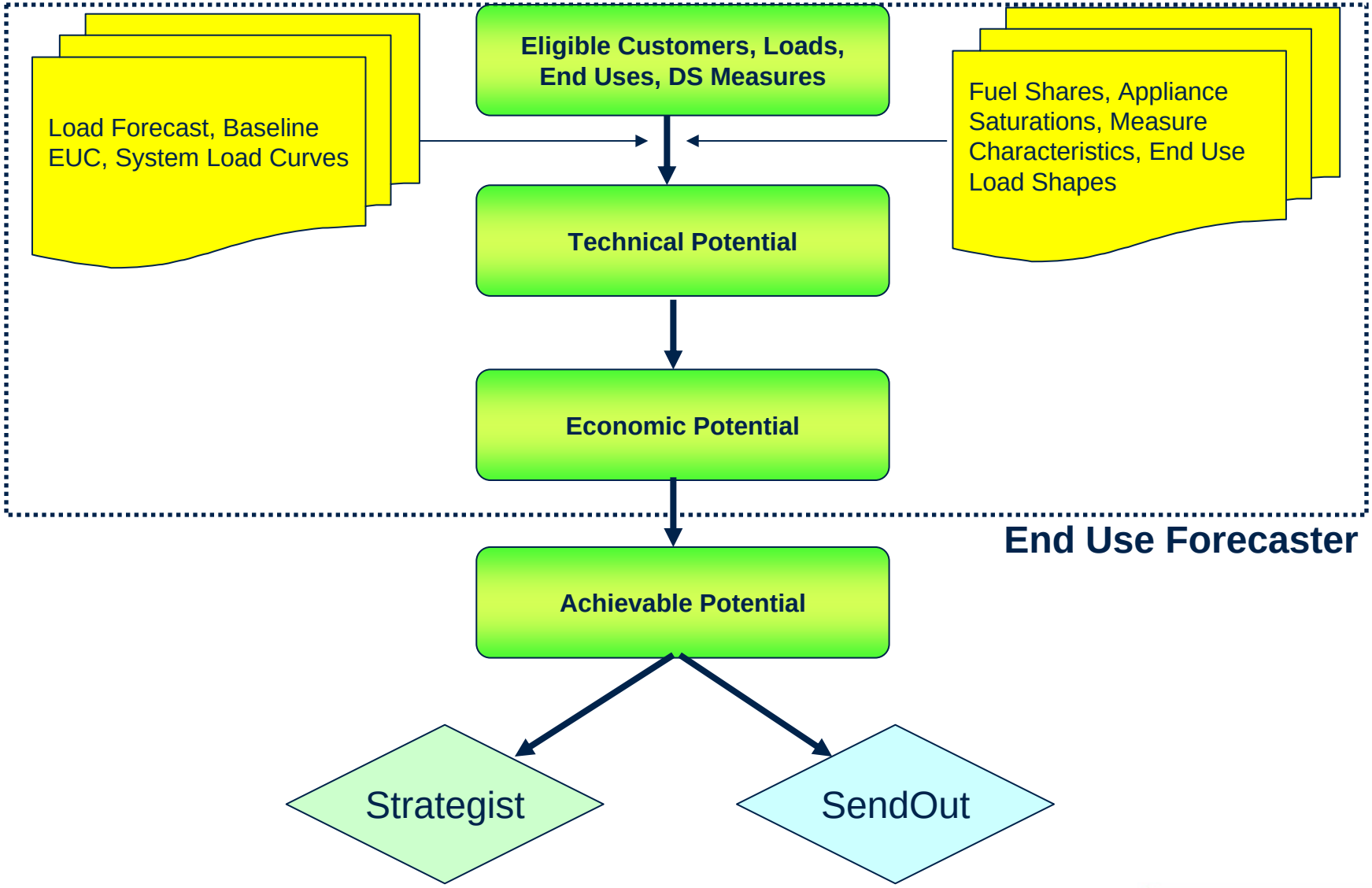
- "Beginning with first Power Plan in 1983, the Council interpreted these requirements to mean that conservation resources included in the plans must be:
  - **Technically feasible (reliable)**
  - **Economically feasible (lower cost)**
  - **Achievable (available)"**

From Chap 4: Conservation Supply Assumptions – page 4-21 "Council Methodology"

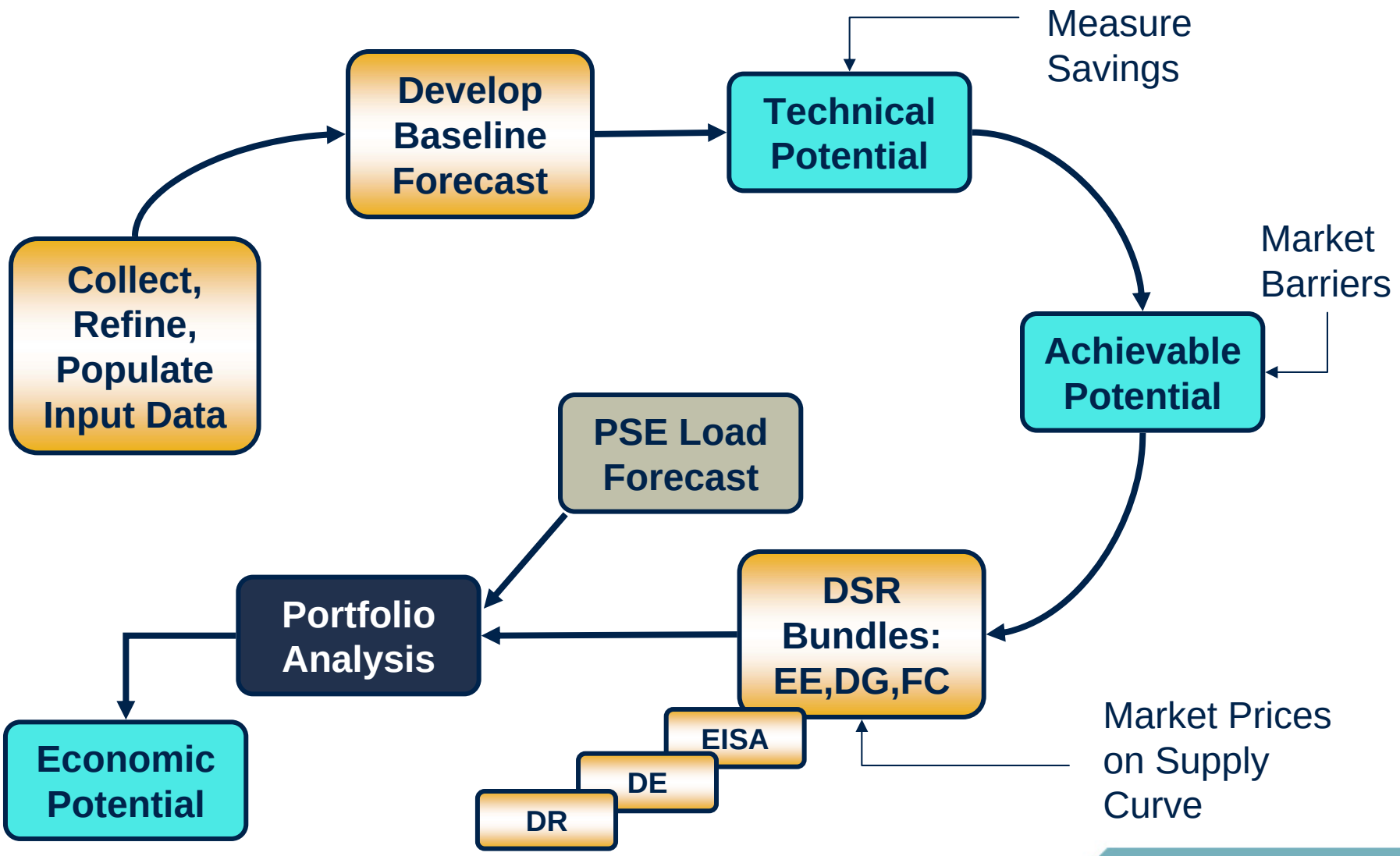
Methodology Comparison

Methodology	NPCC	PSE
1) Resource Definitions	1. Technical Potential 2. Economic Potential 3. Achievable Potential	1.Technical Potential 2. Achievable Potential 3. Economic Potential
2) Technical Resource Potential Assessment	Technically feasibility savings = Number of applicable units * incremental savings/applicable unit	Technically feasibility savings = Number of applicable units * incremental savings/applicable unit
3) Economic Potential - Ranking Based on Resource Valuation	Total Resource Cost (TRC) is the criterion for economic screening - TRC includes all cost and benefits of measure, regardless of who pays for or receives them.	PSE includes all measurable cost and benefits of measure, and assumes the utility pays for them.
4) Achievable Potential	Annual acquisition targets established through Integrated Resource Acquisition Planning (IRP) process (i.e., portfolio modeling)	Annual acquisition targets established through Integrated Resource Acquisition Planning (IRP) process (i.e., portfolio modeling)

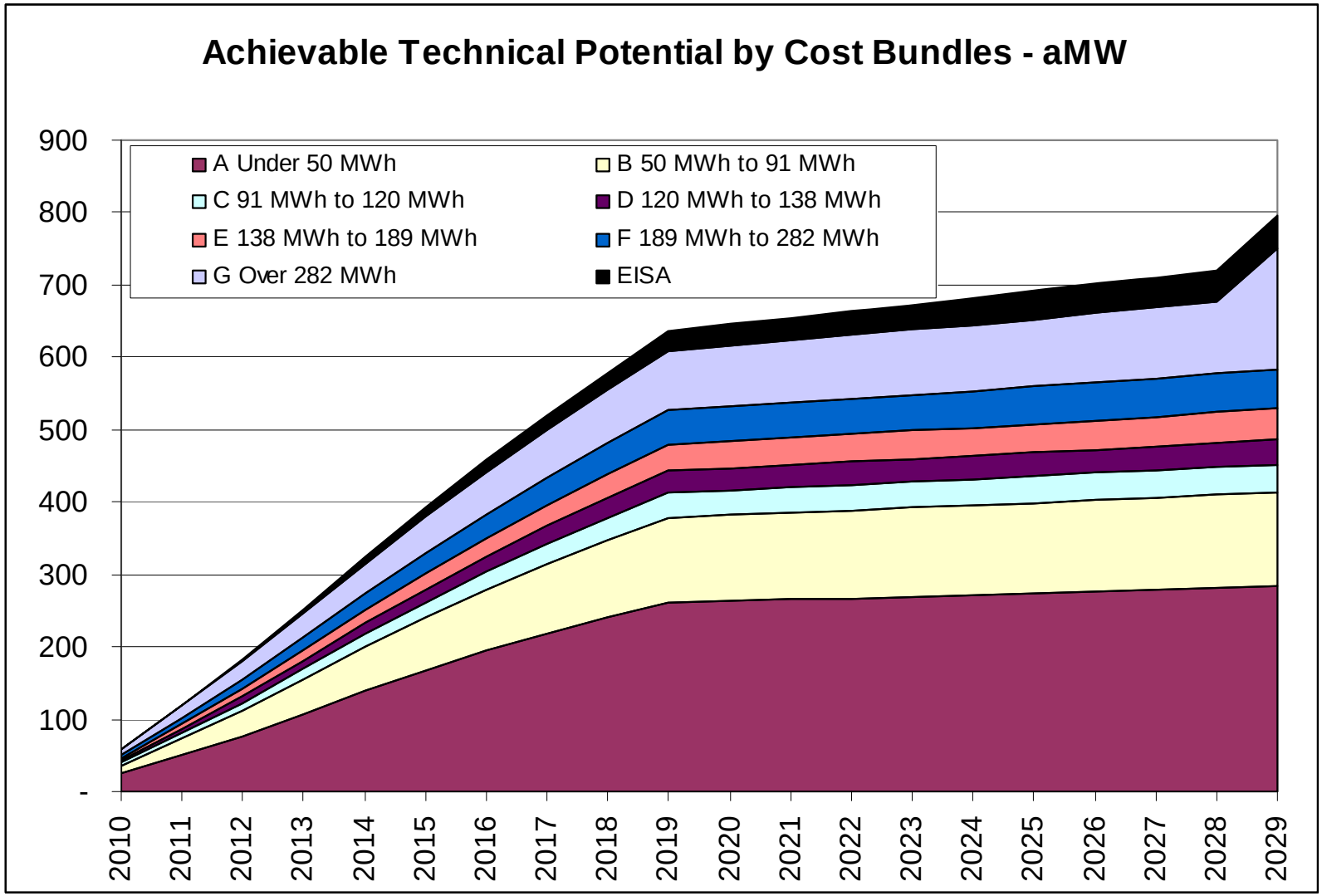
Demand-Side Resource Screening Tools



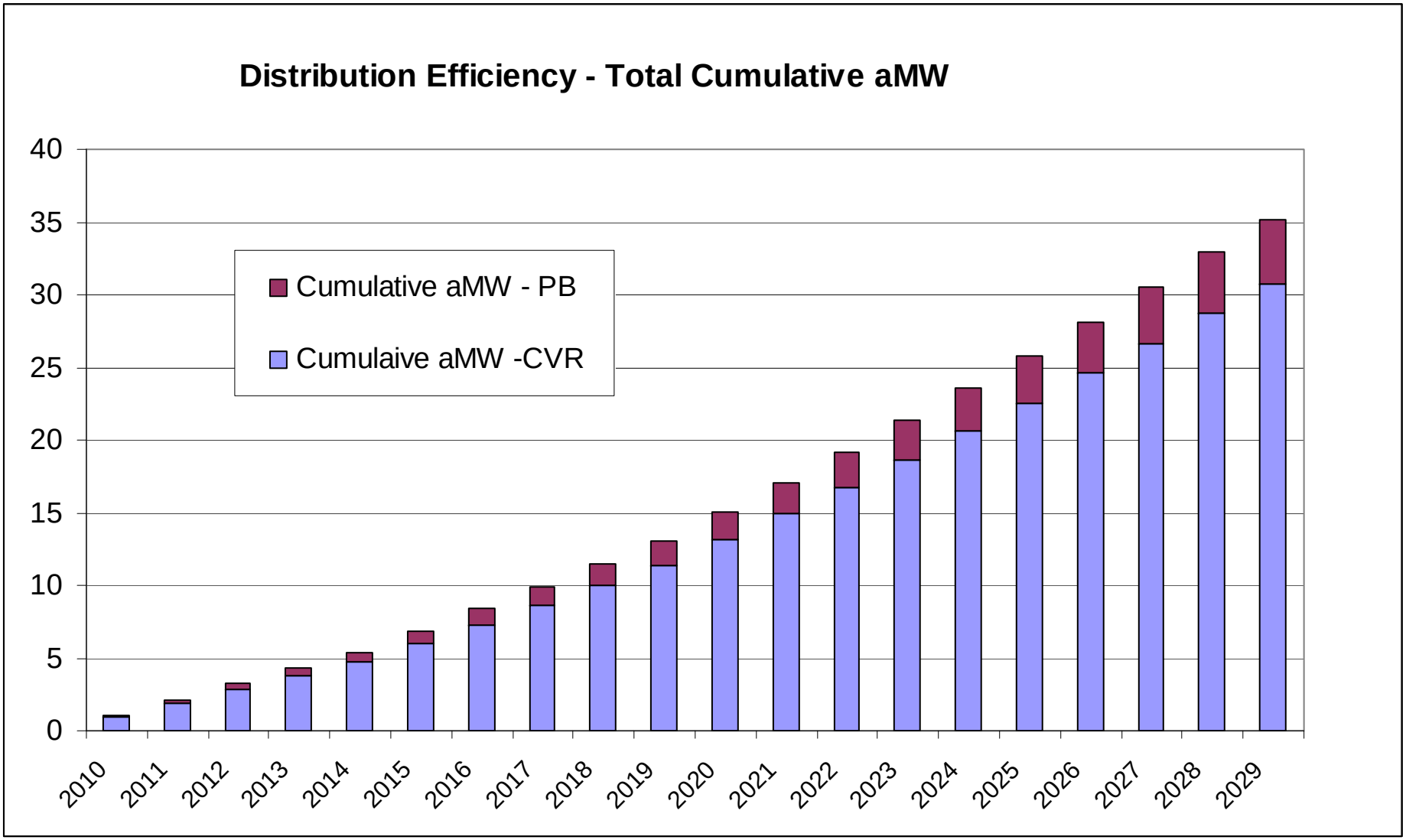
Outline of DS Resources Analysis *2009*



Bundles: Achievable Tech. Potential – Elect.

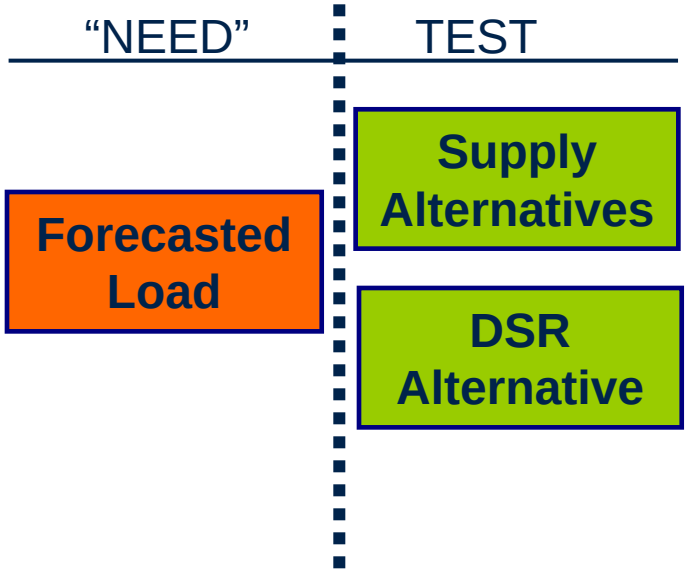


Bundles: Achievable Tech Potentials – DE



Economic Achievable Potential

- Portfolio Analysis
  - Identify Available Resources
    - DSR Measure Bundles
  - Create Optimal Integrated Portfolios for each Scenario
    - Add DSR Bundles to Min. NPV
    - Select Lowest Cost Portfolio => **Economic Achievable Potential**
  - Evaluate Costs and Risks
    - Monte Carlo and PSM II
  - Strategist® - Electric
  - SendOut® - Gas



Bundle D38

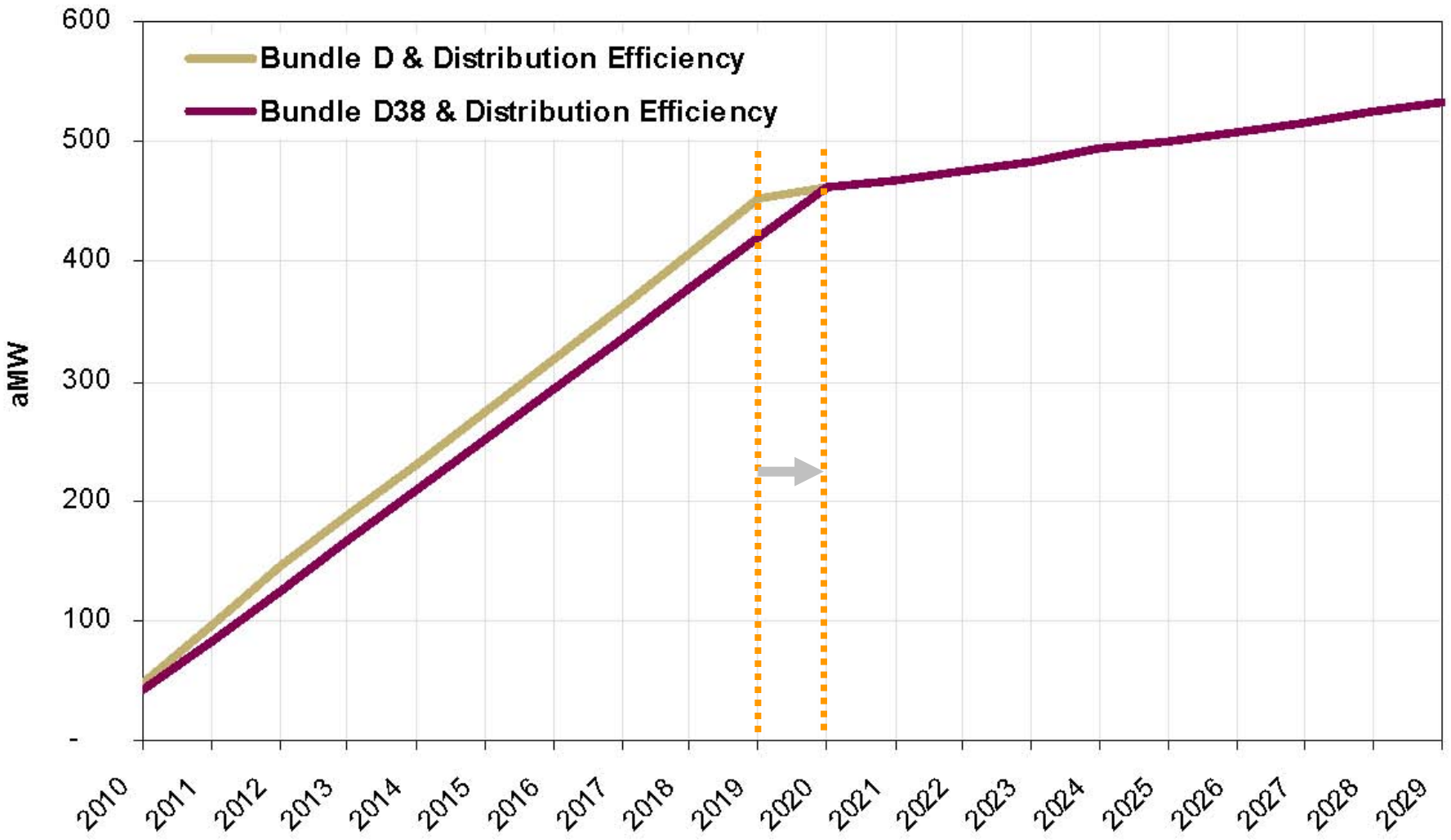
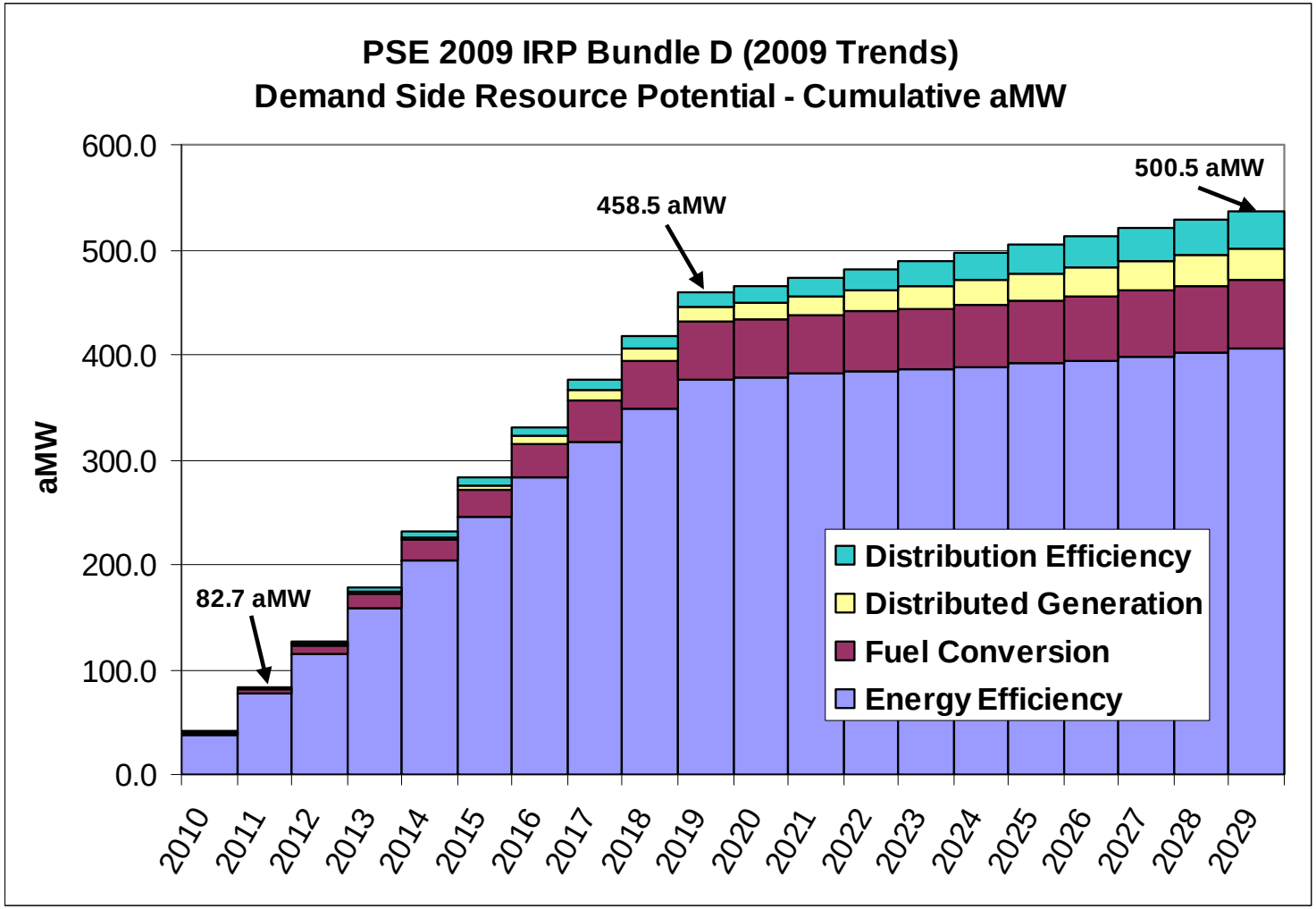


Figure 8-8, PSE 2009 IRP

IRP Optimized Conservation Guidance



Savings are at the customer meter, excluding line losses

PSE Production Facility Efficiency Potential

- Hydro and Thermal Plants included
  - Wind plants and Snoqualmie Falls excluded
- Energy audit performed
  - Detailed feasibility analysis needed
  - Implementation plans to be developed and proposed
- Efficiency upgrades to all energy consuming equipment considered
  - O&M practices not included
- 27,224,000 kWh savings potential

Facility	Measure	Energy Savings
Upper Baker	Lighting Upgrade	24,601 kWh
	Pumping Station Motors	45,000 kWh
	Pumping Station Transformers	51,000 kWh
	Pumping Station Controls	150,000 kWh
Lower Baker	Lighting Upgrade	59,300 kWh
Electron	Lighting Upgrade	20,061 kWh
Encogen	Lighting Upgrade	37,692 kWh
	VFD Air Compressor	127,000 kWh
Fredrickson	Lighting Upgrade	15,000 kWh
Fredonia	Lighting Upgrade	9,800 kWh
Mint Farm	Supply Gas Pressure Increase	19,000,000 kWh
	Lighting Upgrade	54,000 kWh
	Air Compressor Upgrade	77,709 kWh
	Exterior Sensors	6,900 kWh
	Cooling Tower	2,500,000 kWh
	Feedwater Pump	2,349,900 kWh
Goldendale	Lighting Upgrade	25,600 kWh
	Cooling Tower	2,520,000 kWh
	Compressed Air	35,000 kWh
Sumas	Lighting Upgrade	30,000 kWh
	Compressed Air	70,000 kWh
Whitehorm	Lighting Upgrade	15,000 kWh
	Totals	27,223,563 kWh
		3.1 aMW

Setting the Biennial Target

WAC Rules for Target

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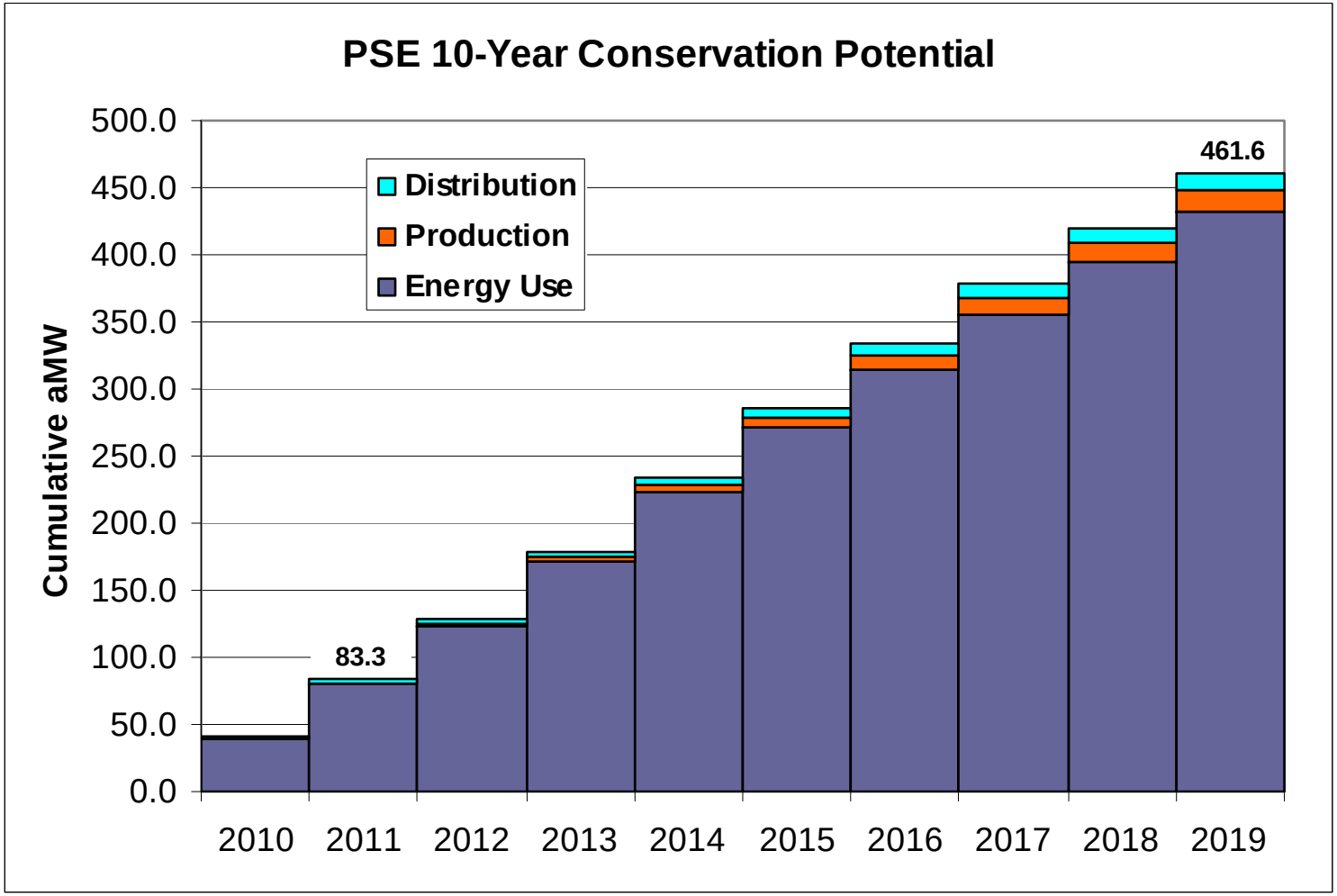
10-Year Cumulative Potential



Savings are at the customer meter, excluding line losses

Target Range

- 593,052 MWh – 729,708 MWh (67.7 aMW – 83.3 aMW)
  - Prorating criteria:
    - Acceleration of retrofit end use efficiency
    - Short-term market infrastructure ramp-in
    - Business environment uncertainty

	2-yr aMW	
Total Conservation Potential	83.3	IRP Bundle D end use efficiency plus distribution & production efficiency
Less: Market Feasibility	-4.3	Delivery infrastructure needs to ramp up (IRP D38)
Less: Uncertainty Factors		
Industrial Eff. (50%)	-1.4	Schedule 258 timing -- 4 year window, customer controlled
New Construction (50%)	-4.1	New WA bldg code, continued slow construction mkt.
Fuel Conversion (75%)	-2.8	PSE program behind target -- low demand/slow economy
Distributed Gen (100%)	-0.2	PSE had no success with CHP porjects in previous RFPs
Distrib. Sys. Eff. (100%)	-2.2	Implementation feasibility & plan must be developed
Gen. Efficiency (100%)	-0.62	Implementation feasibility & plan must be developed
Total Minus Mkt. & Uncertainty	67.7	

Compliance Report

WAC 480-109-010 Compliance Report

Introduction

Section 1 - Ten-year achievable conservation potential

PSE's projection of its cumulative ten-year conservation only needs to consider conservation resources that are cost-effective and reliable and feasible.

PSE's projection is derived from and reasonably consistent with PSE's most recent IRP. Description of technologies, data collection, processes and assumptions used to develop projection.

PSE used methodologies that are consistent with those used by the conservation council in its most recent regional power plan.

Section 2 - Biennial conservation target range

Target range incorporates all achievable (feasible) conservation acquisitions.

Target range is not lower than a pro rata share of PSE's ten-year cumulative achievable conservation potential.

Section 3

Outline of public and commission staff participation on development of the potential and the target range.

Conclusion

Compliance checklist

Attachments/Appendices

Chapter 5, 2009 IRP

Chapter 8, 2009 IRP

Appendix I, 2009 IRP

Appendix L, 2009 IRP

2009 IRP Planning Group

Electric Capacity Need Update

Dec 15, 2009

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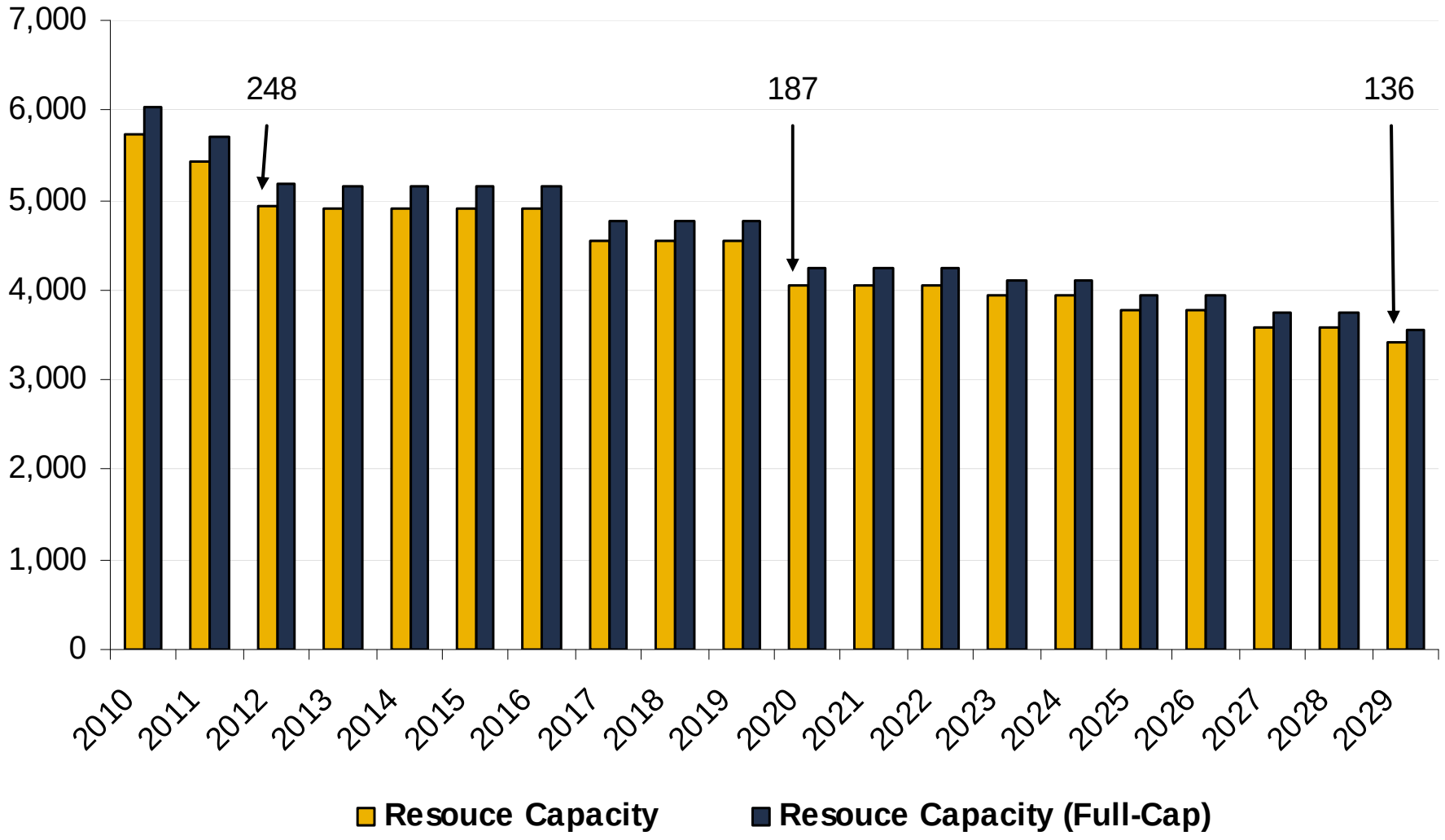
Capacity Need Update

- Refresher: 2009 IRP conclusions/action plan
- Update: How we refined analysis
- Conclusion
  - Results support draft IRP Need
  - + ~250 MW by 2012 from final resource plan

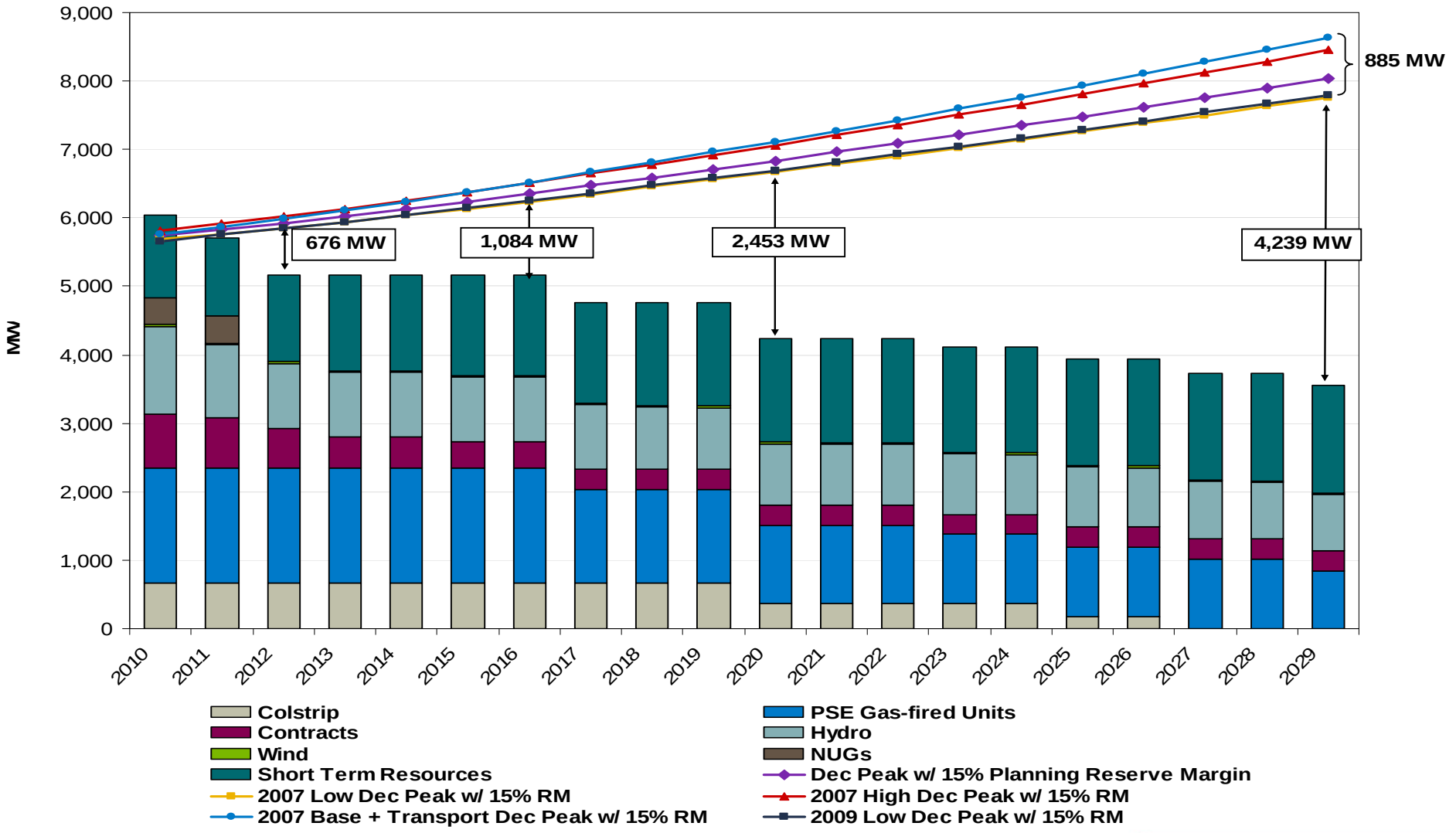
IRP Action Item

- In the 2009 IRP PSE identified two alternative ways to account for Operating Reserves when using a LOLP analysis to set a planning standard
- These alternative methods lead to different level of resource need.
- For the IRP PSE Selected the most Conservative method but included the following action item
  - “we will continue to refine the resource need assessment pertaining to the 5% loss of load probability and interaction of operating and planning reserve margins.”

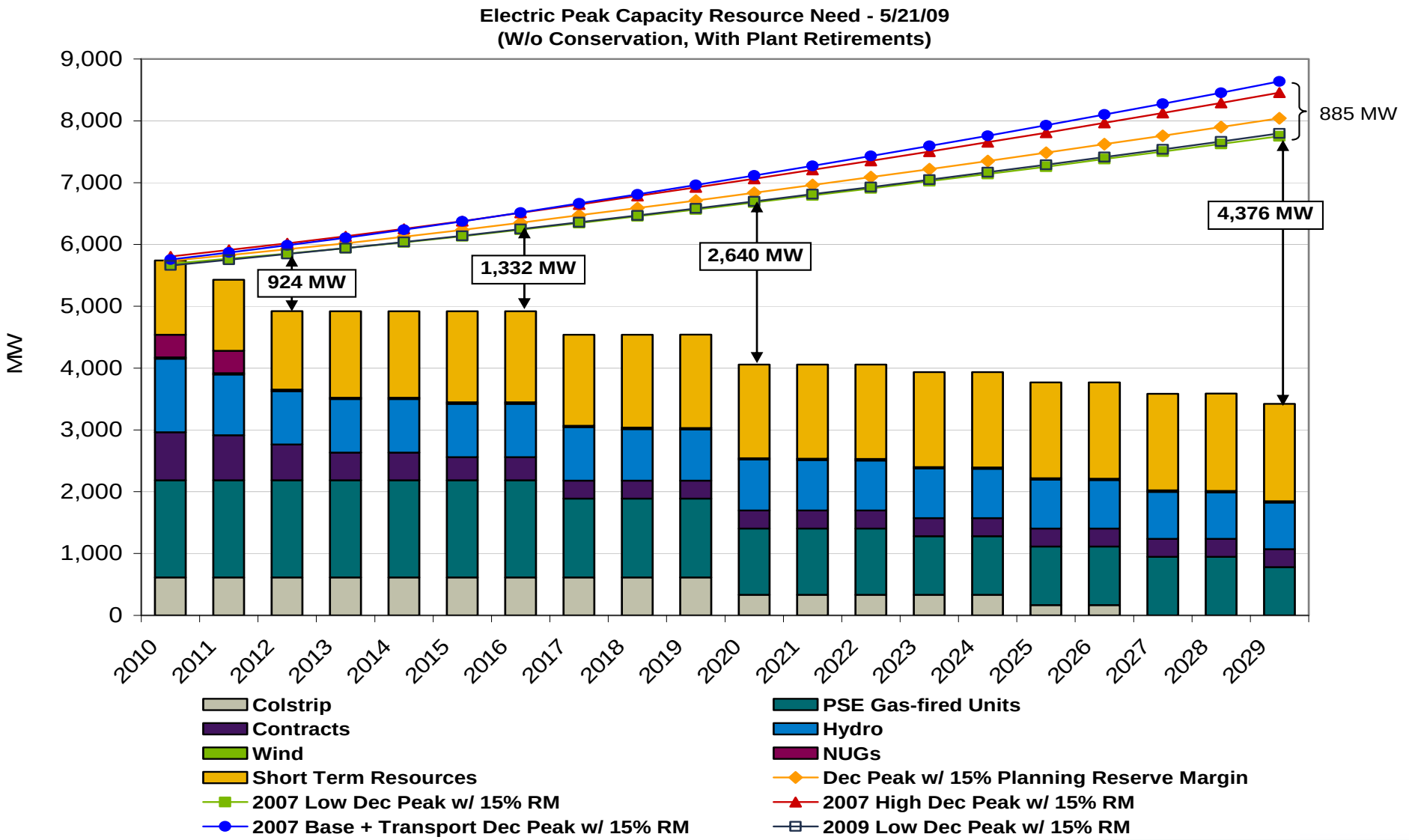
Effects of Operating Reserves on Resource Stack



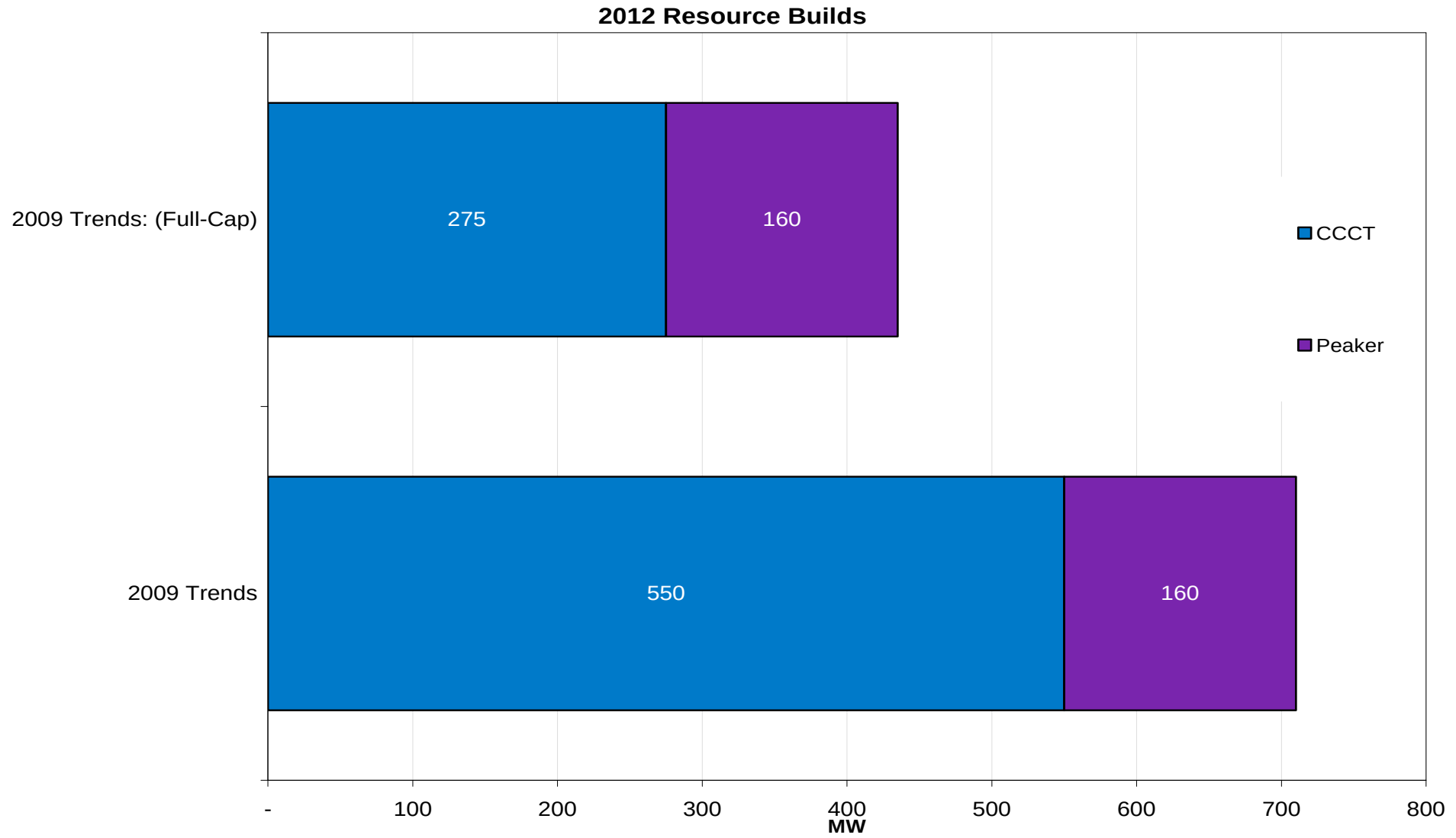
2009 IRP Need (Full Cap)



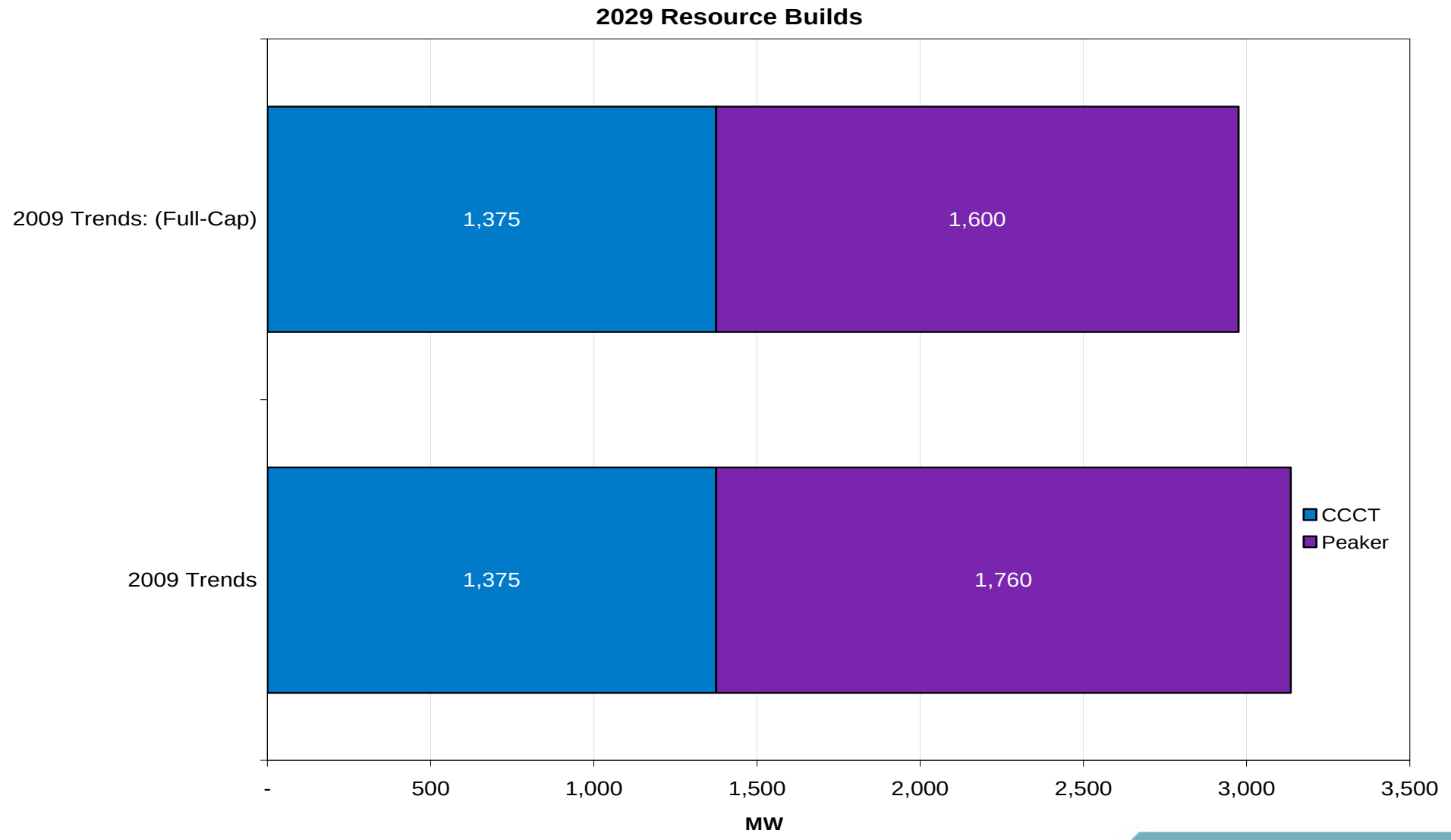
2009 IRP Need (Resource less Op Res)



Builds using both needs in IRP



Builds using both needs in IRP



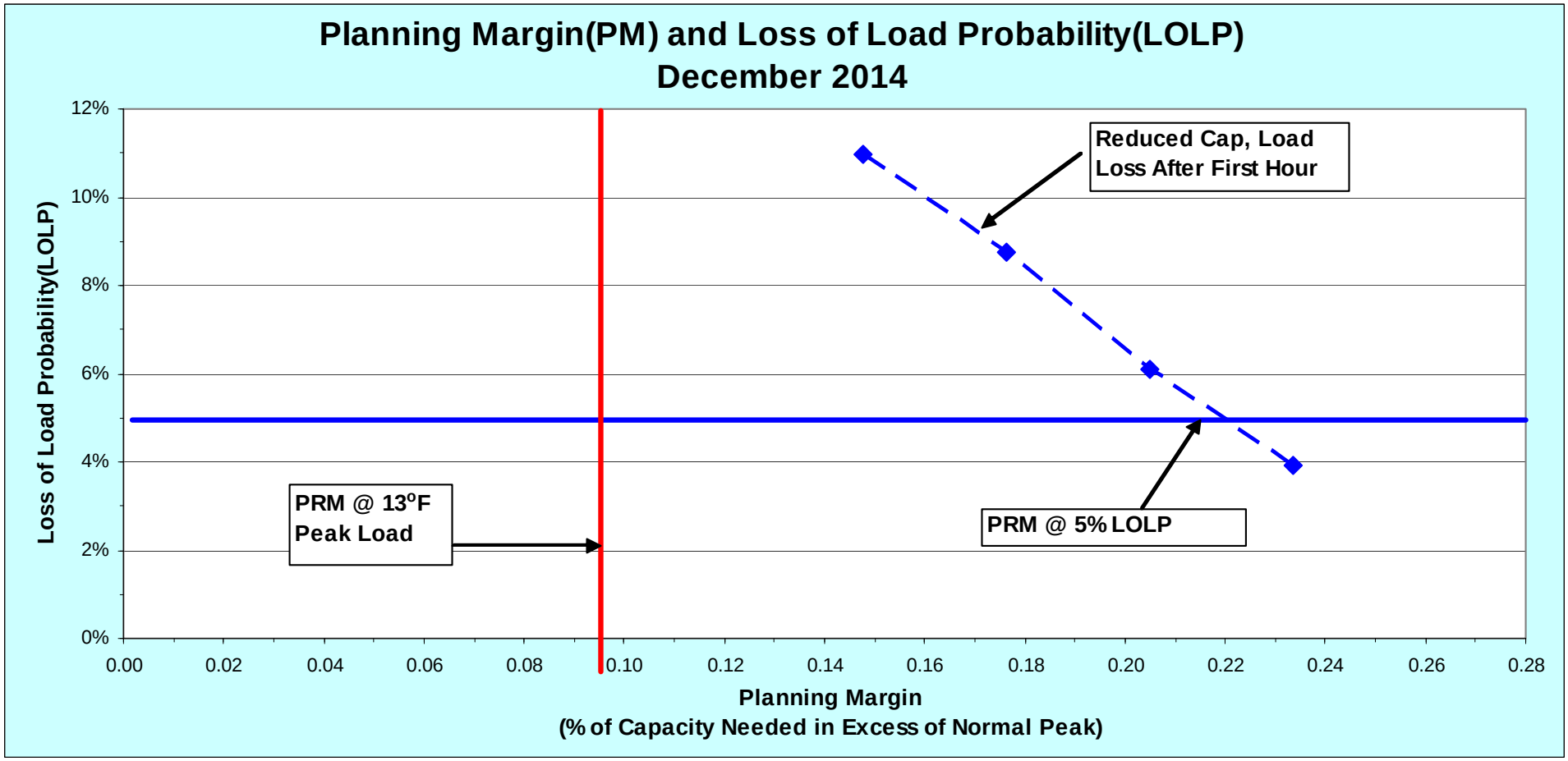
Updates to Analysis

- Refined Loss of Load Probability Analysis
  - Likelihood that load will exceed resources
  - Uncertainty: temperature/load, forced outages, duration of forced outages, low hydro
  - 3000 simulations--hourly for a year
- Recalculated Planning Margin
  - Amount of resource above normal peak day to achieve targeted reliability level (5% LOLP)
- Applied Updated Planning Margin

Refined Loss of Load Probability Analysis

- Operating Reserve Costs: LOLP now reflects operating reserve obligations
  - Contingency Reserves: 5% hydro/7% thermal
  - Regulating Reserves: 35 MW
- Operating Reserve Benefits: LOLP now reflects operating reserve benefits
  - First Hour: Reserve sharing agreement covers forced outage
  - After 1st Hour: Must get to load/resource balance

As Capacity Increases LOLP Falls



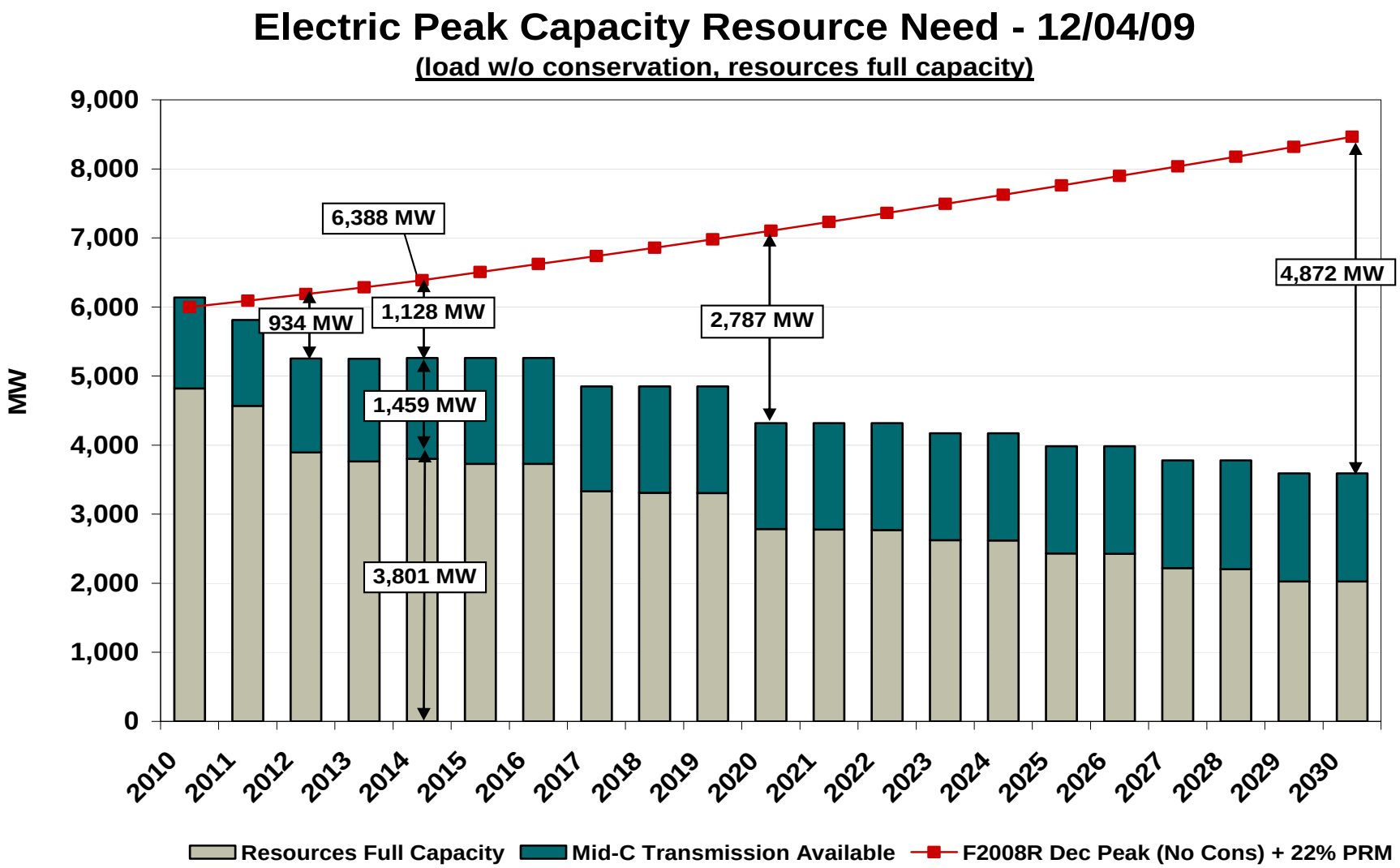
Detailed Planning Margin Calculation

PRM and LOLP for December 2014 - Load Loss After First Hour

Normal Pk Load-MW	Exist Resource Capacity-MW	Mkt Purchases (Avail Transx)	Incremental Capacity-MW	Total Capacity-MW	Operating Reserves-MW	Total Cap Less Reserves-MW	Planning Margin	Net Plan Margin	LOLP
a	b	c	d	e=b+c+d	f	g=e-f	h=(e/a)-1	i=(g/a)-1	j
5236	3801	1459	0	5260	250	5010	0.5%	-4.3%	55.9%
5236	3801	1459	150	5410	261	5149	3.3%	-1.7%	38.2%
5236	3801	1459	300	5560	271	5289	6.2%	1.0%	23.5%
5236	3801	1459	450	5710	282	5428	9.0%	3.7%	17.4%
5236	3801	1459	600	5860	292	5568	11.9%	6.3%	13.9%
5236	3801	1459	750	6010	303	5707	14.8%	9.0%	11.0%
5236	3801	1459	900	6160	313	5847	17.6%	11.7%	8.8%
5236	3801	1459	1050	6310	324	5986	20.5%	14.3%	6.1%
5236	**3801**	**1459**	**1125**	**6385**	**329**	**6056**	**21.9%**	**15.7%**	**5%**
5236	3801	1459	1200	6460	334	6126	23.4%	17.0%	3.9%
5236	3801	1459	1350	6610	345	6265	26.2%	19.6%	2.6%
5236	3801	1459	1500	6760	355	6405	29.1%	22.3%	0.8%

Normal Peak	5236
Net Capacity	6056
Operating Reserves	329
Total Resources	6385
Net Planning Margin	15.7%
Operating Reserves	6.3%
Planning Margin	21.9%

Updated Capacity Need



Conclusion

- **Capacity need closer to Draft IRP**
- **Update capacity need for RFP**
- **Expectations…continuous refinement**

Review of OPUC UM-1302

Dec 15, 2009

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Four Components of UM-1302

- Different Carbon Regulation Schemes
- Least Cost in Each Scheme + Plant Lives
- Trigger Point Analysis
- “Compliance” Portfolio

Carbon Regulation Schemes

- Consider hard cap in 2011 IRP?
- Other possible regulatory schemes to consider?

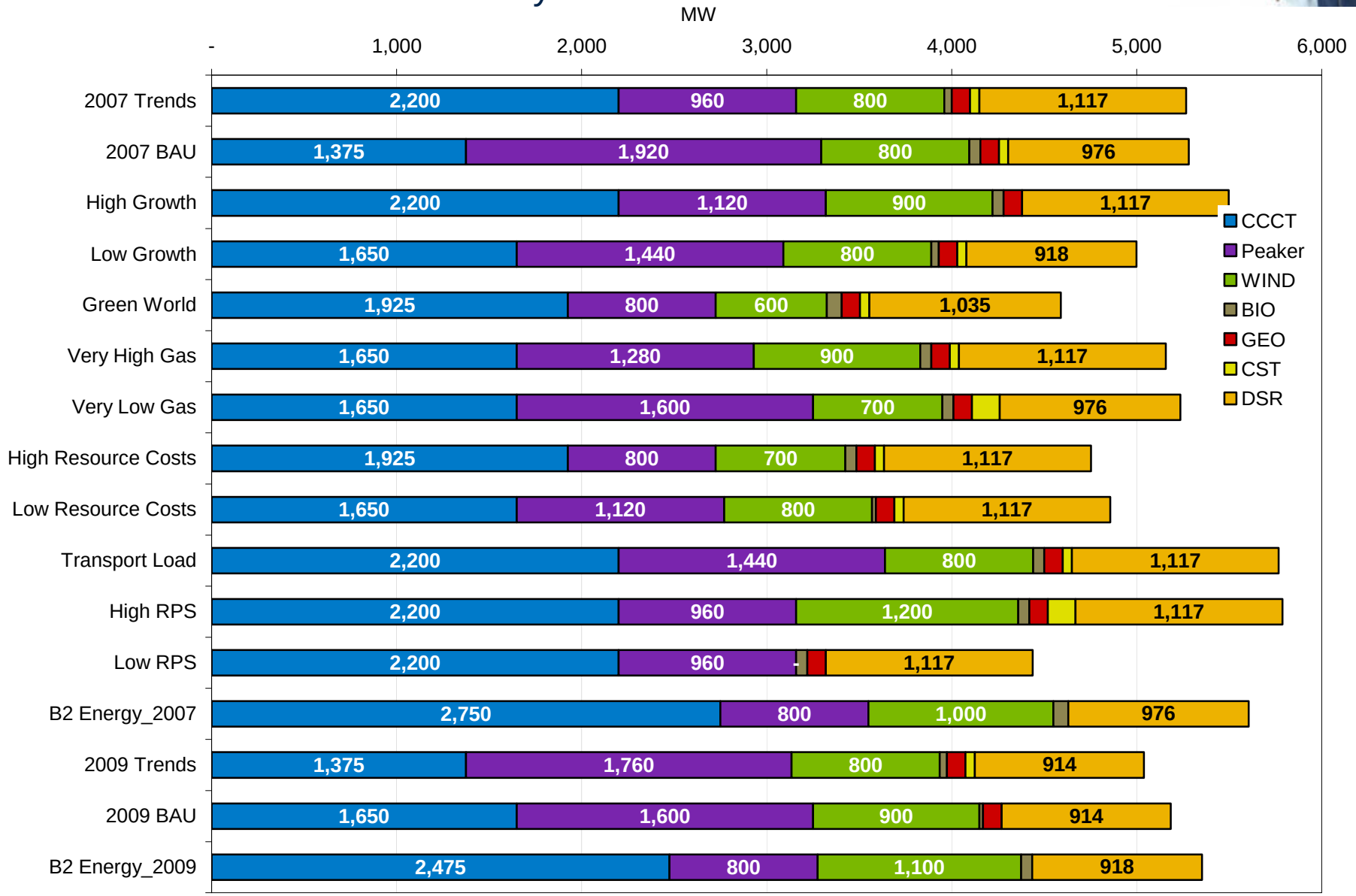
Least Cost per CO_2 Scheme + Plant Lives

- Uncertain Cost of Changing Plant Lives

- Other Pollutant Regulation Schemes

Trigger Points for Changes in Plan

Builds by 2029 Across Scenarios

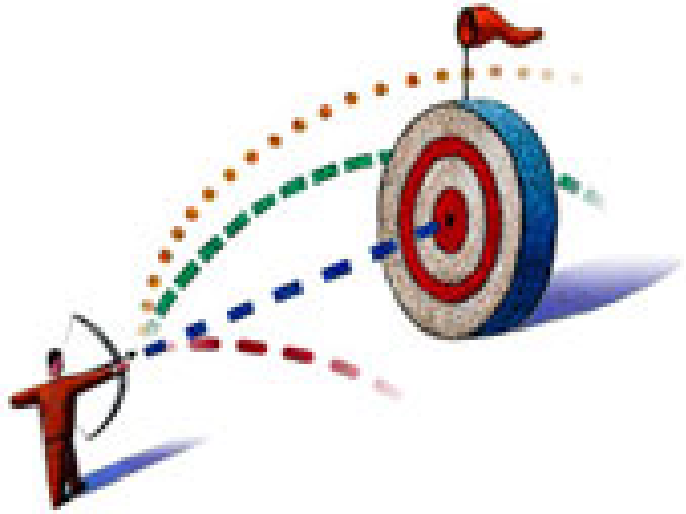


Consistency with Policy Requirements?

Policy Requirement

IRP Analysis

Plan
Consistent with
Policy Requirements



Conclusion: Some Good Ideas

Gearing up for 2011 IRP

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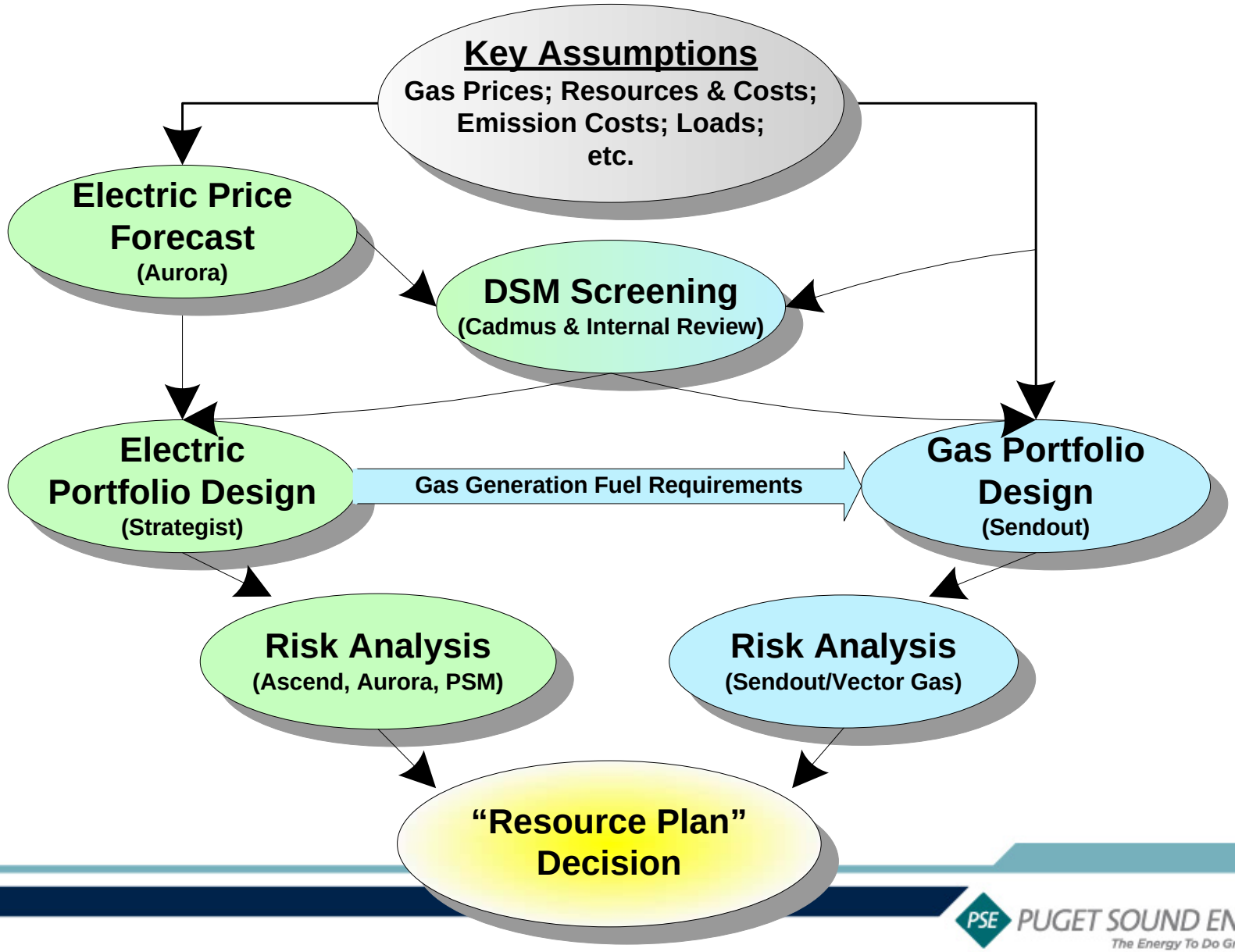
Gearing Up for 2009 IRP

- Analysis/Modeling Refinements

Feedback on 2009 Process

- Questions to Consider

PSE Resource Planning
Analytical Process Summary



Acquisition Update

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Thank You