Northwest Power and Conservation Council

January 6, 2010

MEMORANDUM

TO: Power Committee Members

FROM: Terry Morlan, Director; Power Planning Division
John Fazio, Senior Systems Analyst

SUBJECT: Utility Perspective Needs Assessment vs. Resource Plan Adequacy

One of the comments received from Northwest utilities (PNUCC) is that the final plan should begin with an assessment of the region's need for power. In response to this comment, staff has added a section to Chapter 3 entitled "Assessment of Needs - Utility Perspective" and a section in Chapter 14 entitled "Utility Perspective on Resource Adequacy." At the January 8th Power Committee Web Conference, staff will discuss the utility perspective and how it compares and relates to the Council's resource planning methodology.

Historically, utilities have only used firm resources measured against expected load, averaged over an entire year, to get an indication of new resource need. Of course, utilities don't rely solely on this metric. Each uses a more sophisticated method to assess new resource needs and to prepare their integrated resource plans. However, this simple metric is still very useful to many utilities in terms of providing a quick and easy assessment of need.

Staff will present charts (see the attached PowerPoint presentation), showing firm resources compared to firm load forecasts, that are intended to portray the utility perspective for annual energy needs and for both winter and summer peaking needs. This assessment is then compared to the resource acquisition strategy detailed in the draft power plan. From the utility perspective described above, the Council's resource strategy appears to over-acquire resources; however, there are many other factors that the utility perspective does not address. Minimizing the risk posed by future uncertainties, such as electricity and demand growth, fuel prices, and carbon penalties, makes acquisition of certain amounts and types of resources, including conservation, cost-effective even if they exceed the amount needed to simply meet load.

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Adequacy and Reliability of the Sixth Power Plan

Power Committee Web Conference

January 8, 2010

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Purpose

- Discuss additional material on utility perspective adequacy
- Compare to Council's regional planning perspective
- Illustration of long-term plan adequacy versus short-term power system adequacy

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Outline

- Utility perspective figures
- Interpretation from planning perspective
  - Why an energy and capacity surplus?
    - 3 Reasons for building above the medium forecast
  - Is there really a surplus on a planning basis?
    - Looking at individual futures
      - Factors other than loads that lead to resource additions
      - Problem of looking at averages

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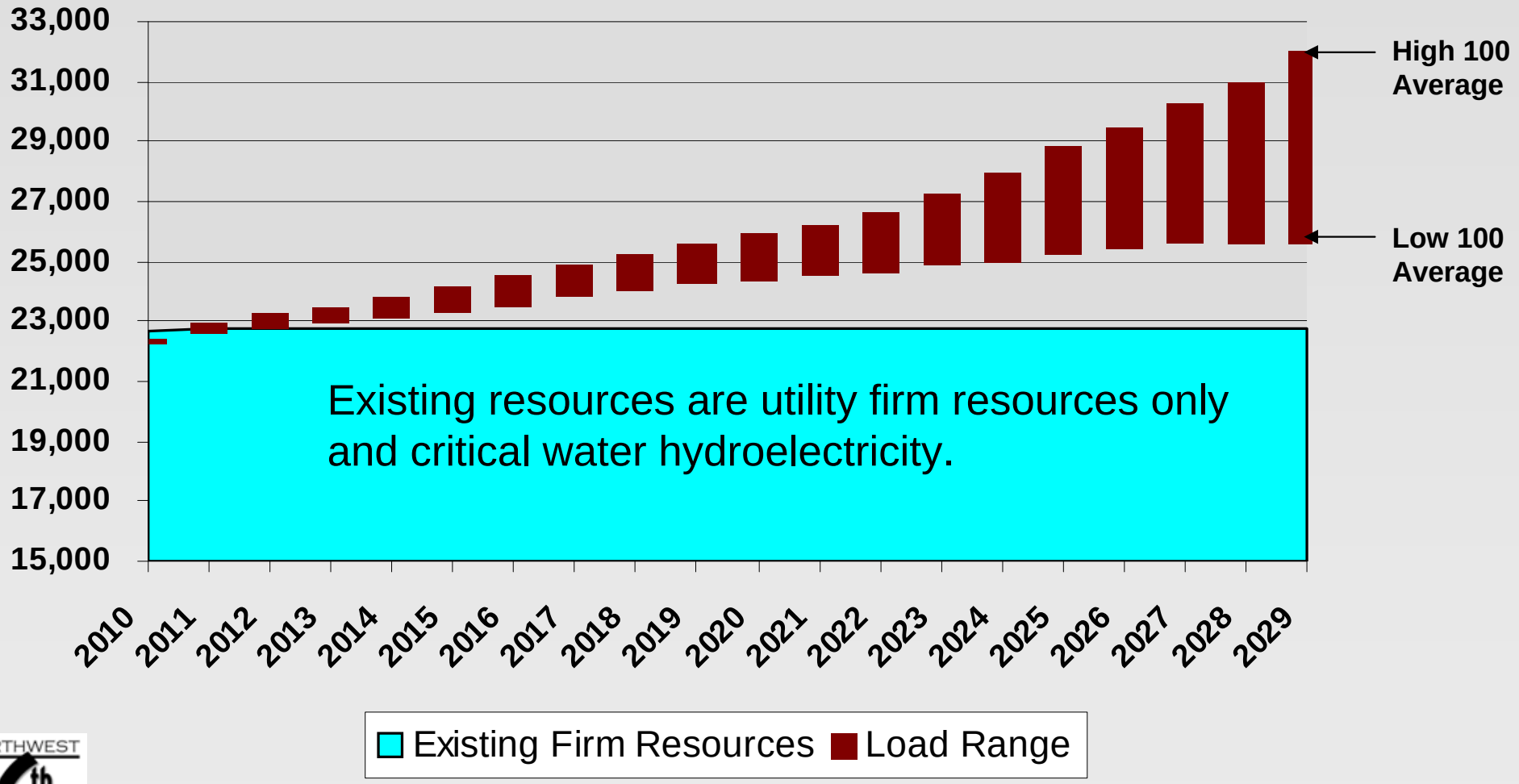
Utility Firm Resource Needs



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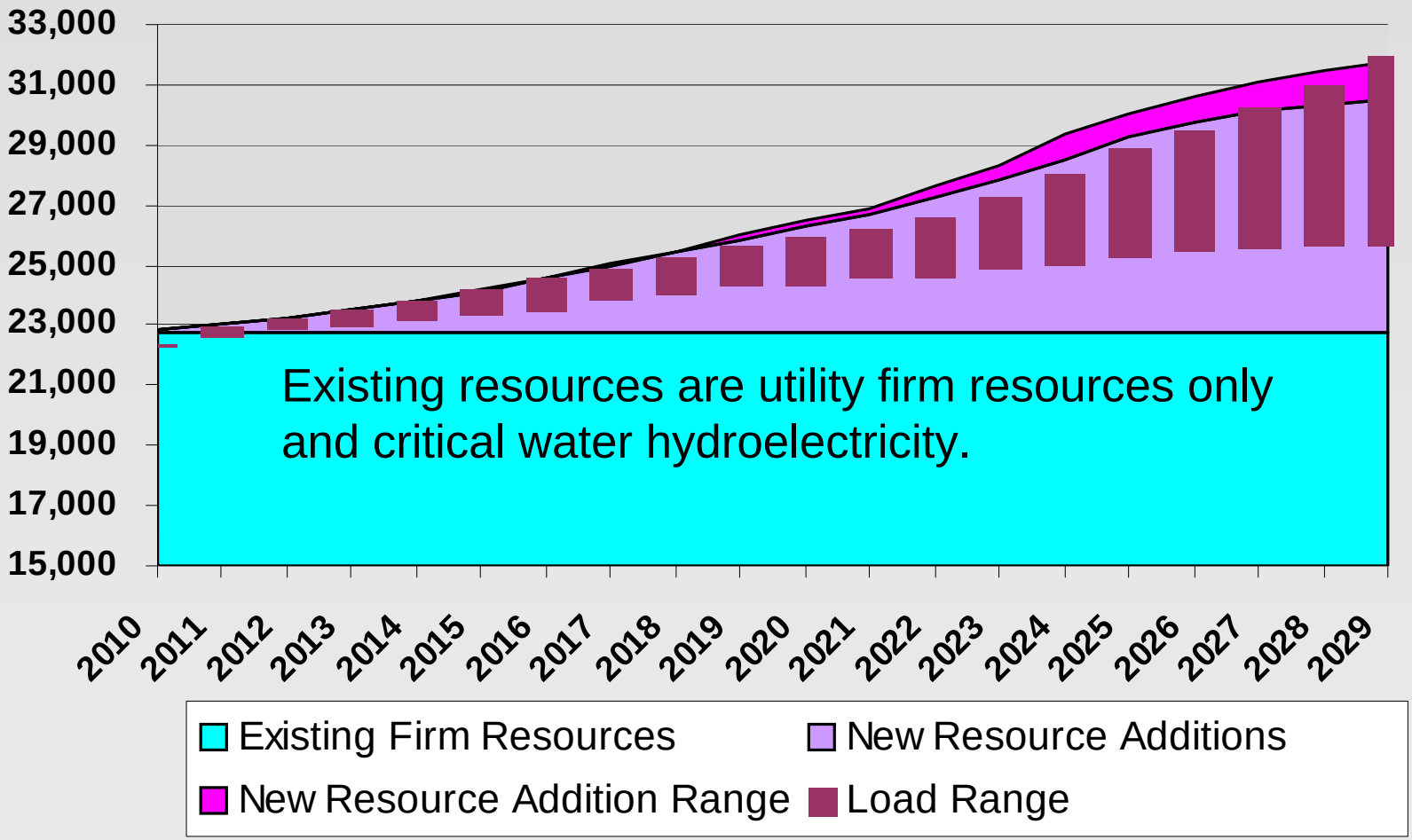
Energy From Utility Perspective



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Considerations

- Range covers about 75% of future 2030 load forecasts range
  - Lower end of bar is average of lowest 100 futures;
  - Upper end of bar is average of highest 100 futures
- Resources represent capability as counted by PNUCC NRF; not actual dispatch to serve load
- Resources developed are based on portfolio strategy which depends on entire range of uncertainties
- Several other factors besides load growth affect resource choices and development (energy prices, CO2 price, RPS, hydro, capital cost)

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Considerations - 2

- Resources are chosen partially to minimize the cost of surplus developed to minimize risk
- Resources built to meet peak loads may generate surplus energy capability as counted by the NRF, but the resources may not be dispatched to the extent of their capability

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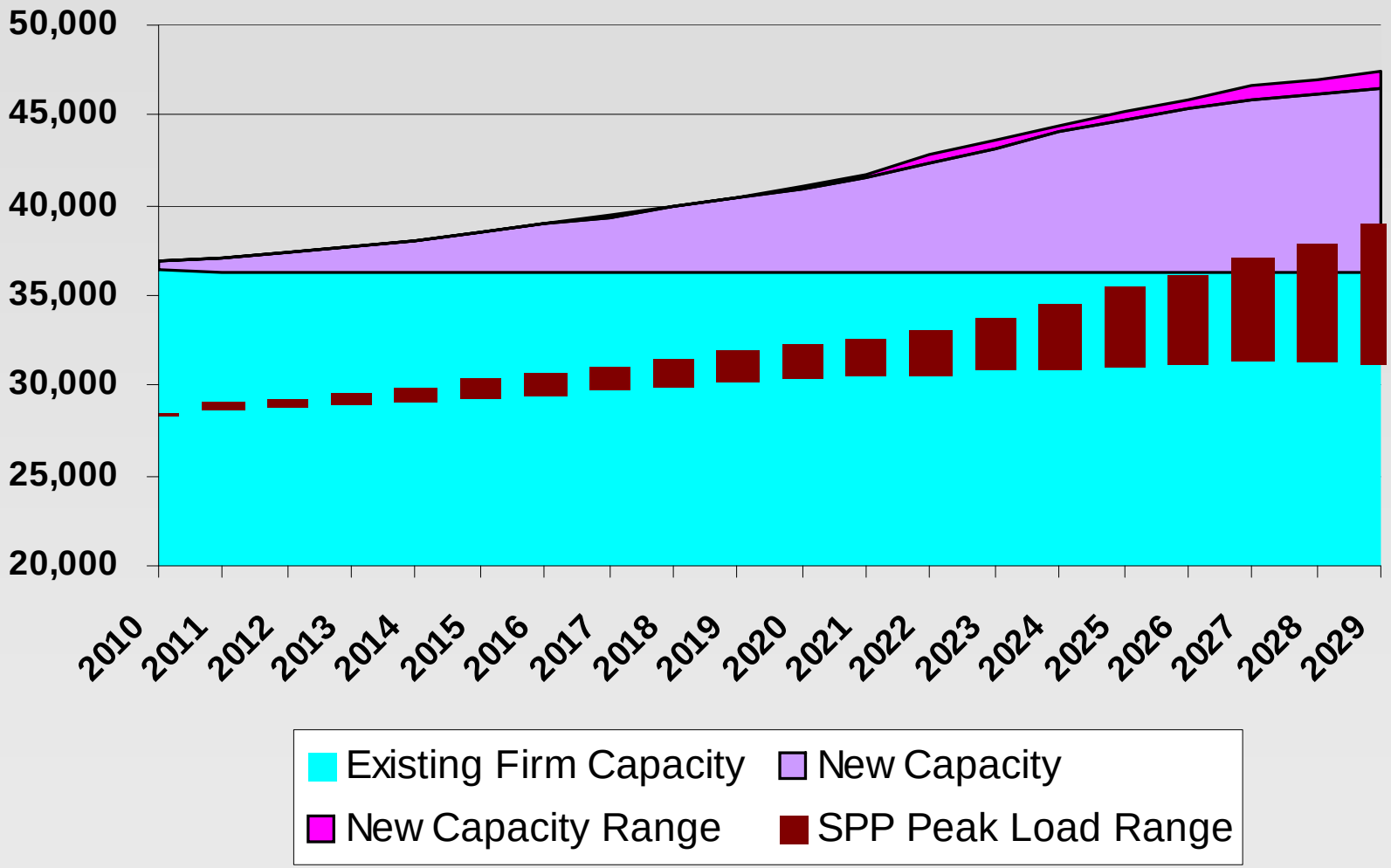
January Peak (18-Hour Sustained)



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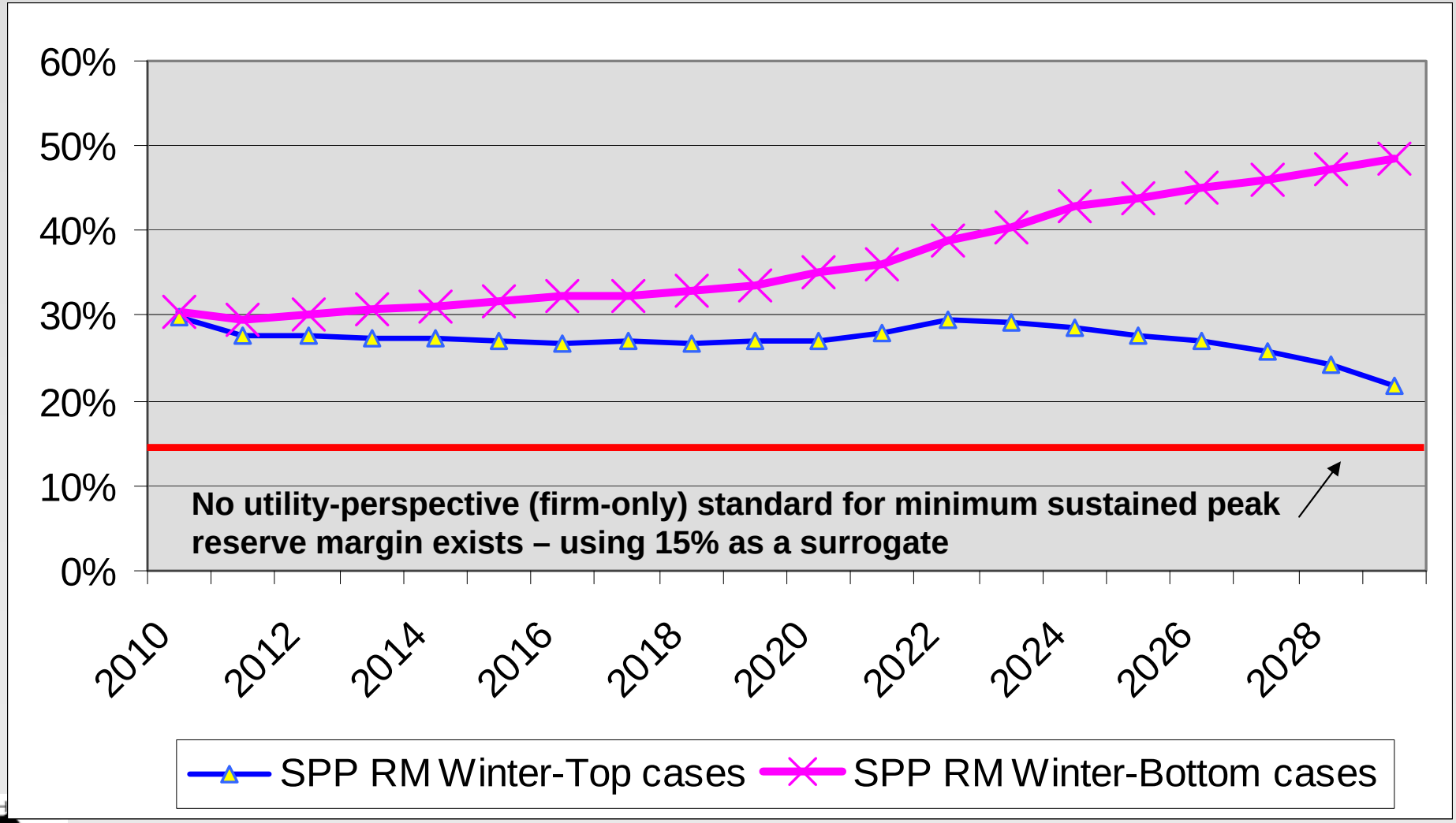
January Reserve Margins



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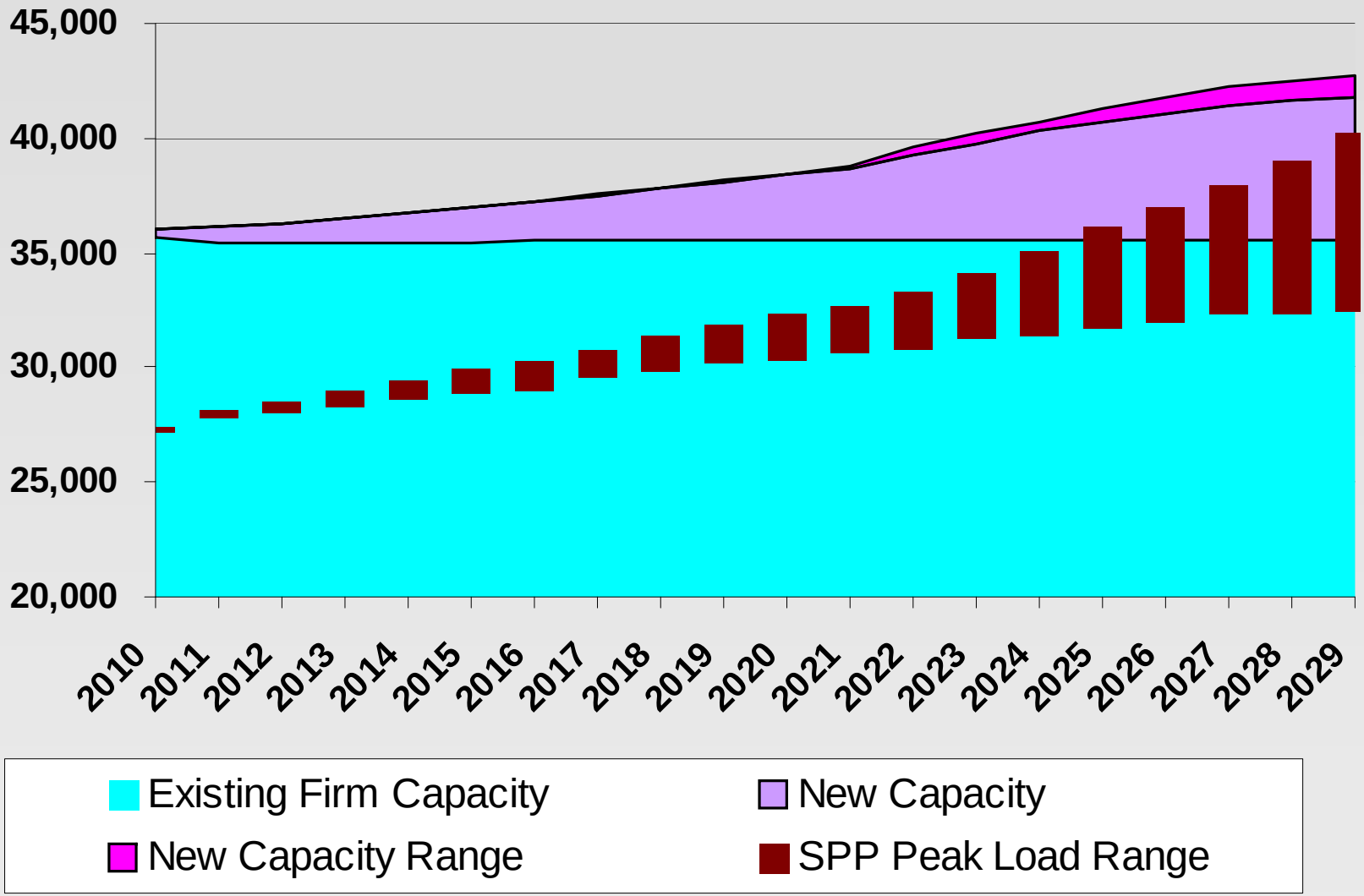
July Peak (18-Hour Sustained)



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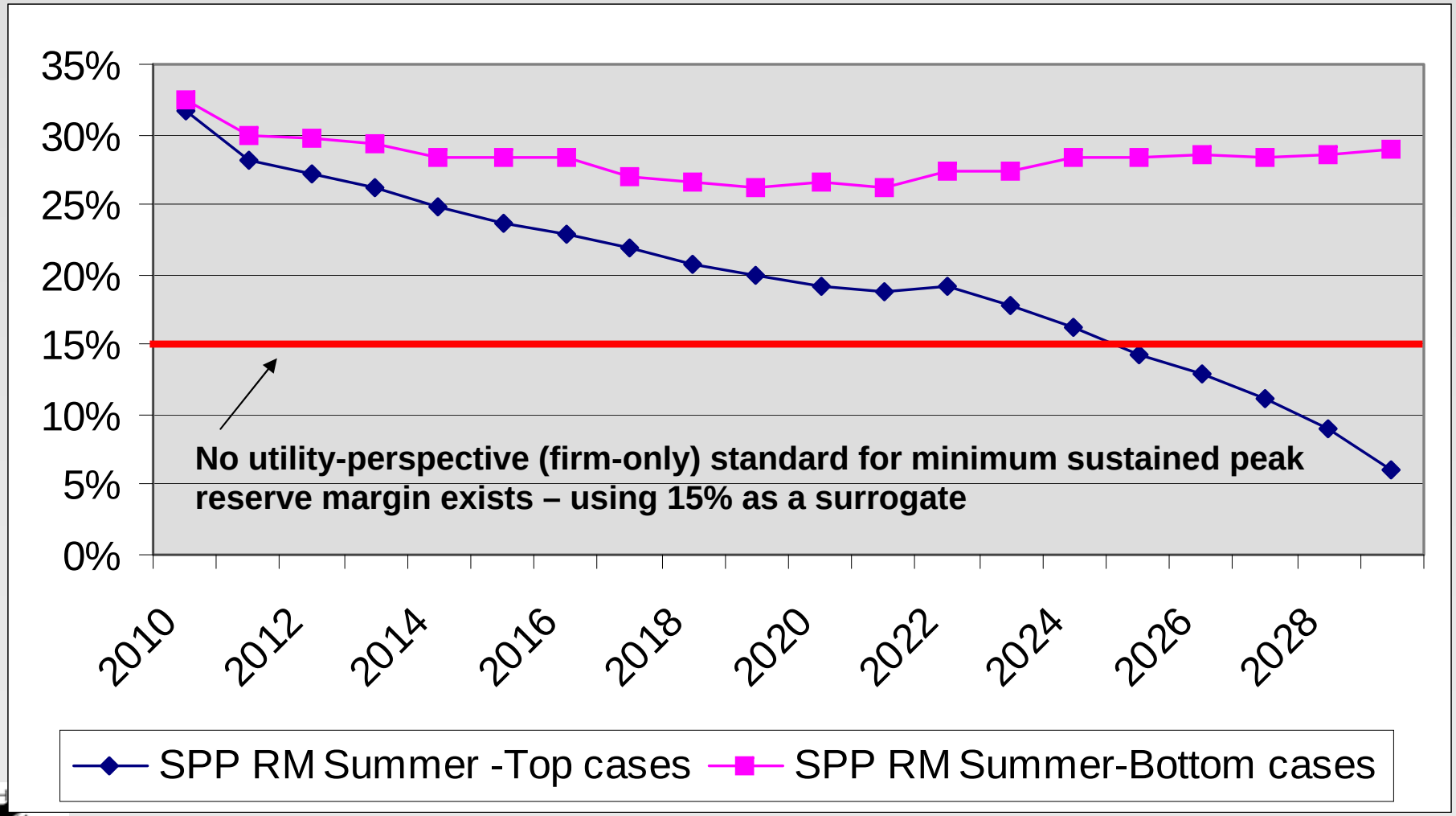
July Reserve Margins



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Council Planning Strategy

- Answers question of what should you do given that the future is unknown
- Includes consideration of economic dispatch to meet uncertain loads, under other uncertain future conditions

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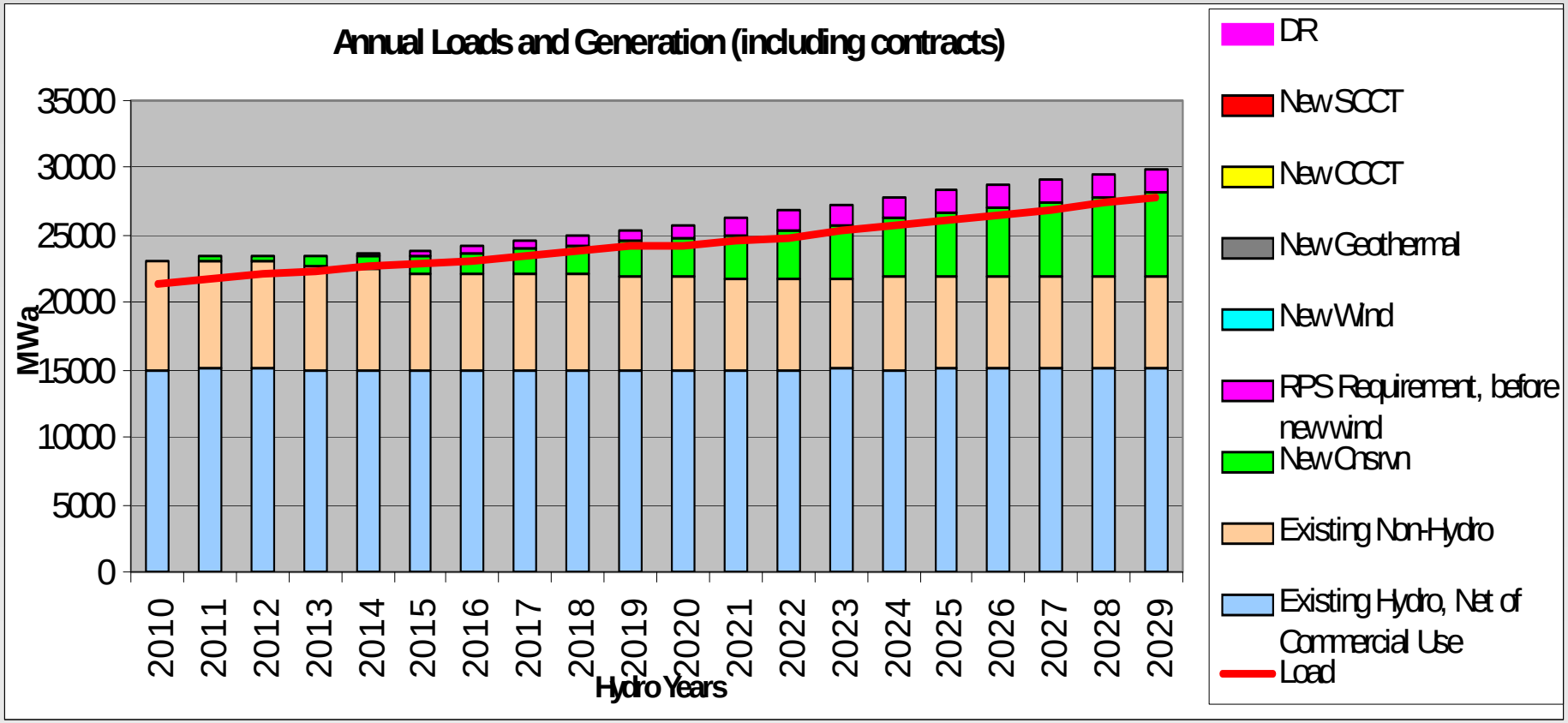
Average Loads and Dispatched Generation: (over 750 Futures)



This shows resources dispatched, not availability. Assumes average hydro. 1,900 MWa are exported from region.

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Why 2000 MWa Surplus

- Rough calculations based on load growth and resource additions
- No carbon policy case – 616 MWa surplus
  - Price, demand, hydro, capital cost risk
- Current policy case – 1,373 MWa surplus
  - Additional 757 MWa for forced build of RPS
- "Plan" case – 2,159 MWa surplus
  - Additional 786 for carbon risk

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Some Specific Futures

- Averages hide some of the important dynamics behind the resource strategy
- Below some specific futures from the 750 evaluated in the RPM are shown

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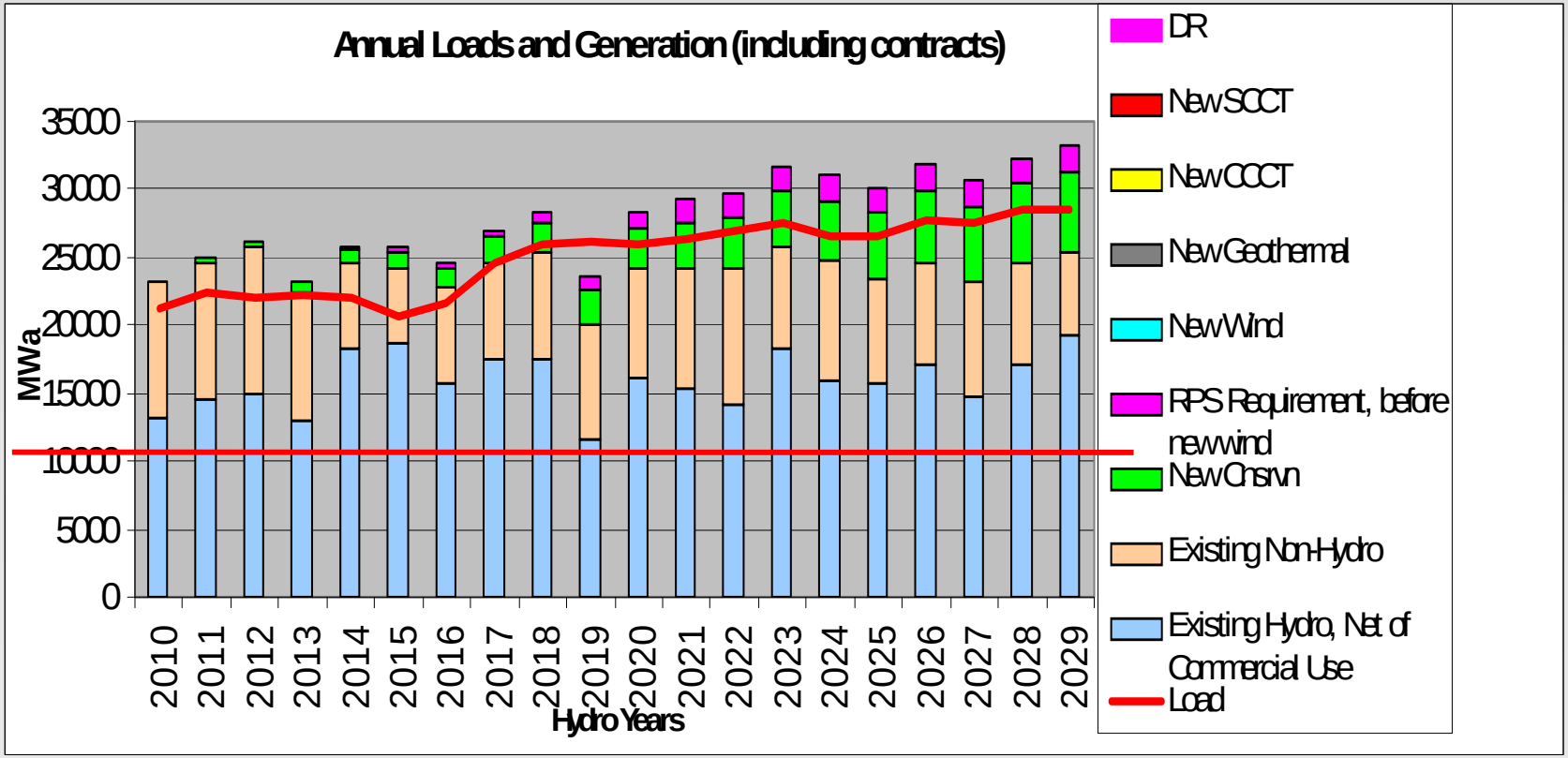
A Future With 2030 Loads Equal to the Average of the Highest and Lowest 2030 Future Loads



Critical Water

#335: Zero CO2 Cost, Moderate NG and EL prices, Cost $54.4
Without CO2 penalty existing coal is dispatched, efficiency and RPS create larger surplus, but efficiency provided low-cost insurance

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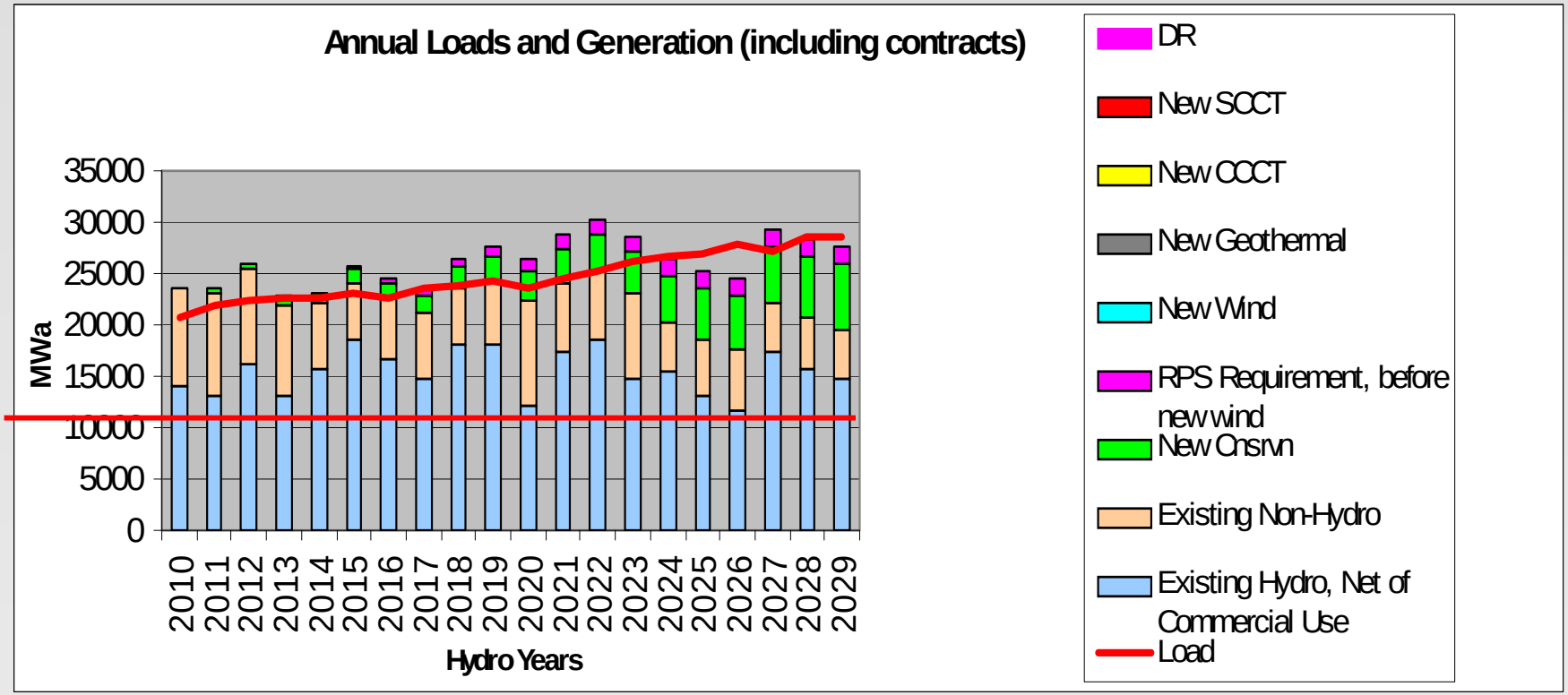
Another Average Load Future



Critical Water

#318: Low NG price, moderate EL price, $80 Co2 in 2014, Cost $77.8
Note the change in existing non-hydro dispatch and reduced surplus

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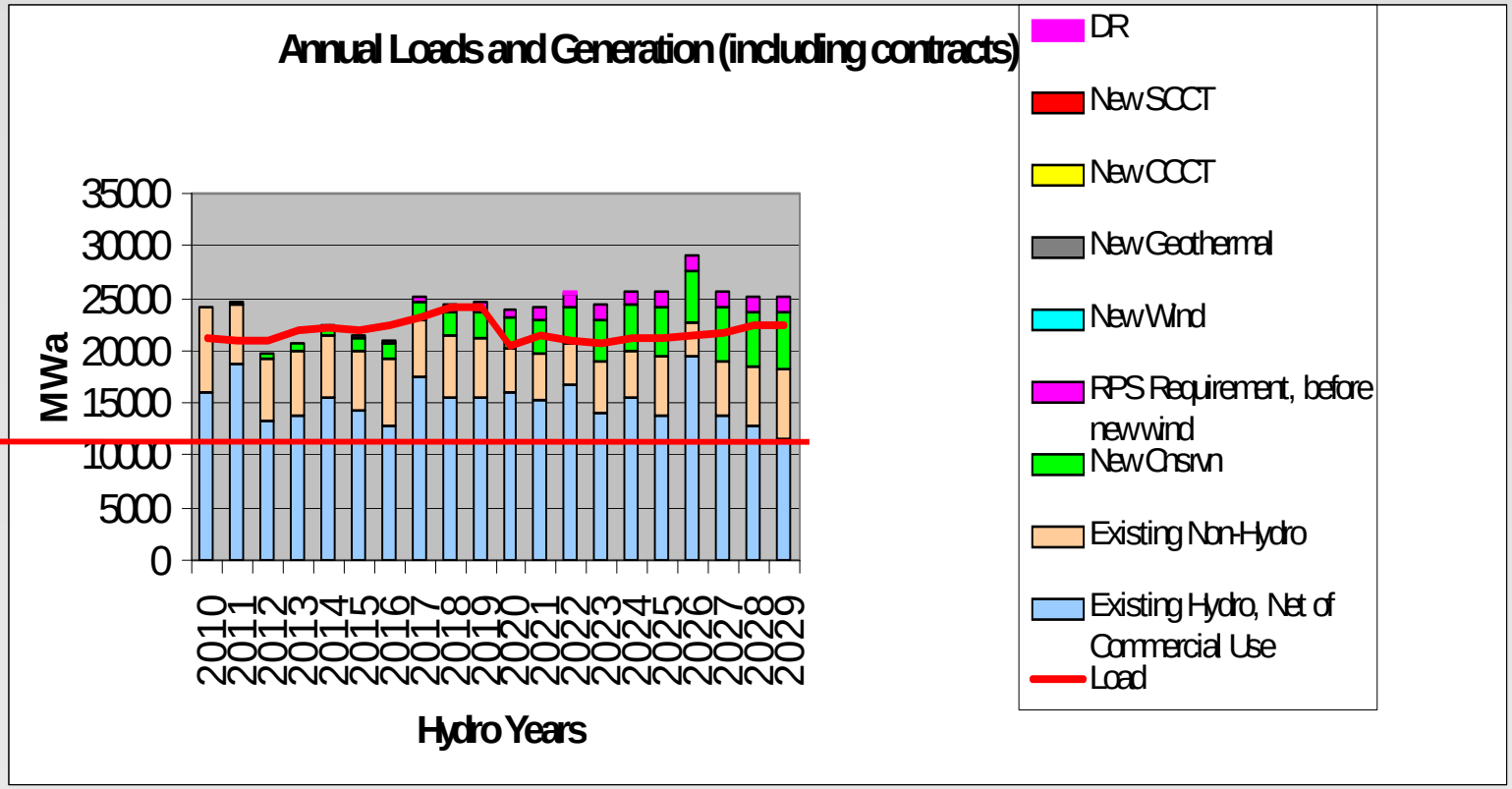
The Lowest 2030 Load Future

Critical Water



#683: Very low energy prices, $40 CO2 Price in 2012, Cost $51.1
Sudden load drop creates surplus, coal remains dispatchable, low cost conservation reduces cost of the surplus.

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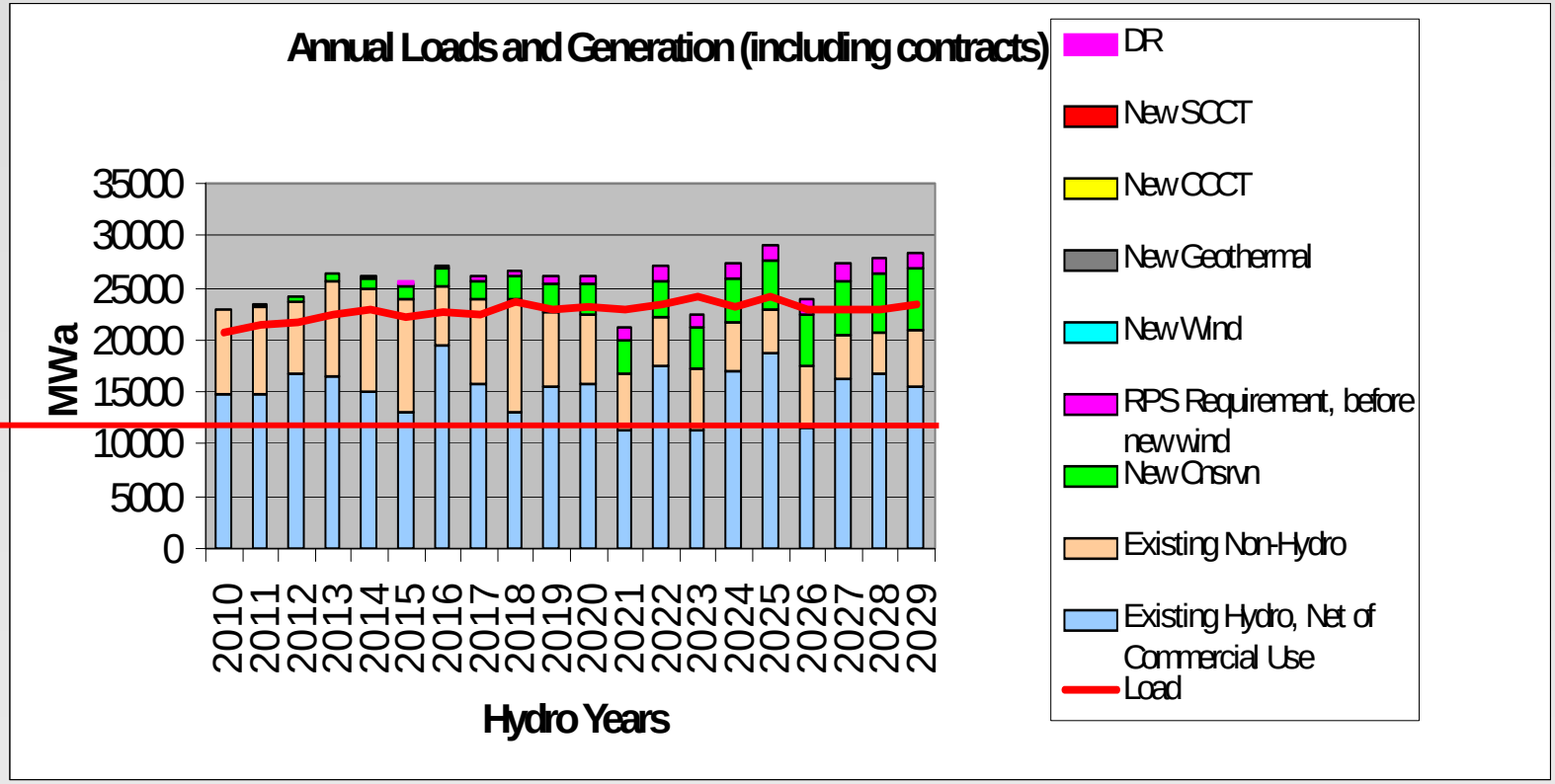
Another Low Load Future



Critical Water

#654: Moderate NG price, moderately high EL price, $100 CO2 in 2021, Cost $66.4, reduced use of existing non-hydro. Poor water years still create need for market purchases

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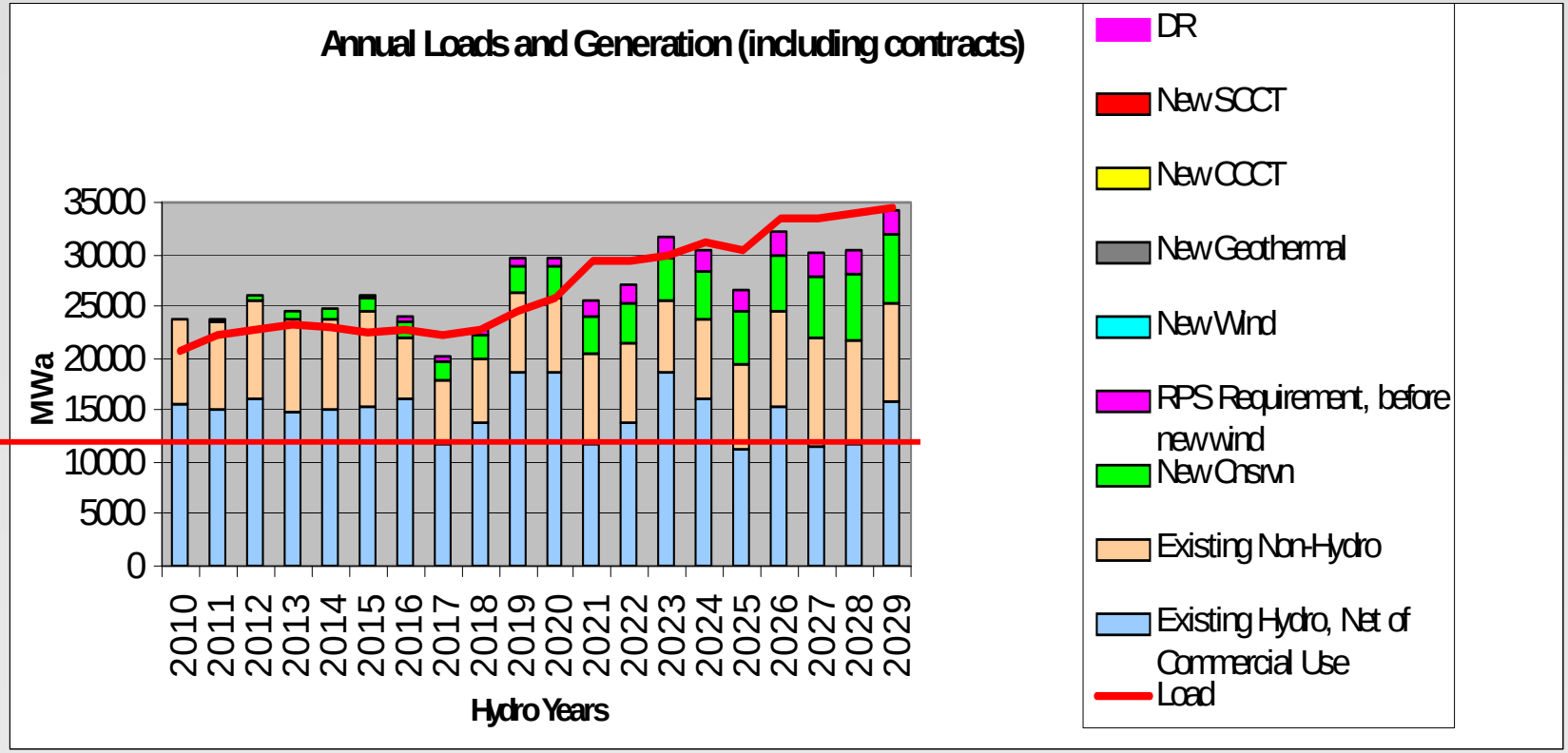
The Highest 2030 Load Future



Critical Water

#150: Extremely high energy prices, $100 CO2 price in 2016, several poor water years, Cost $168.1, Emissions increase (use of existing non-hydro high and market purchases, in spite of costs, needed to meet load)

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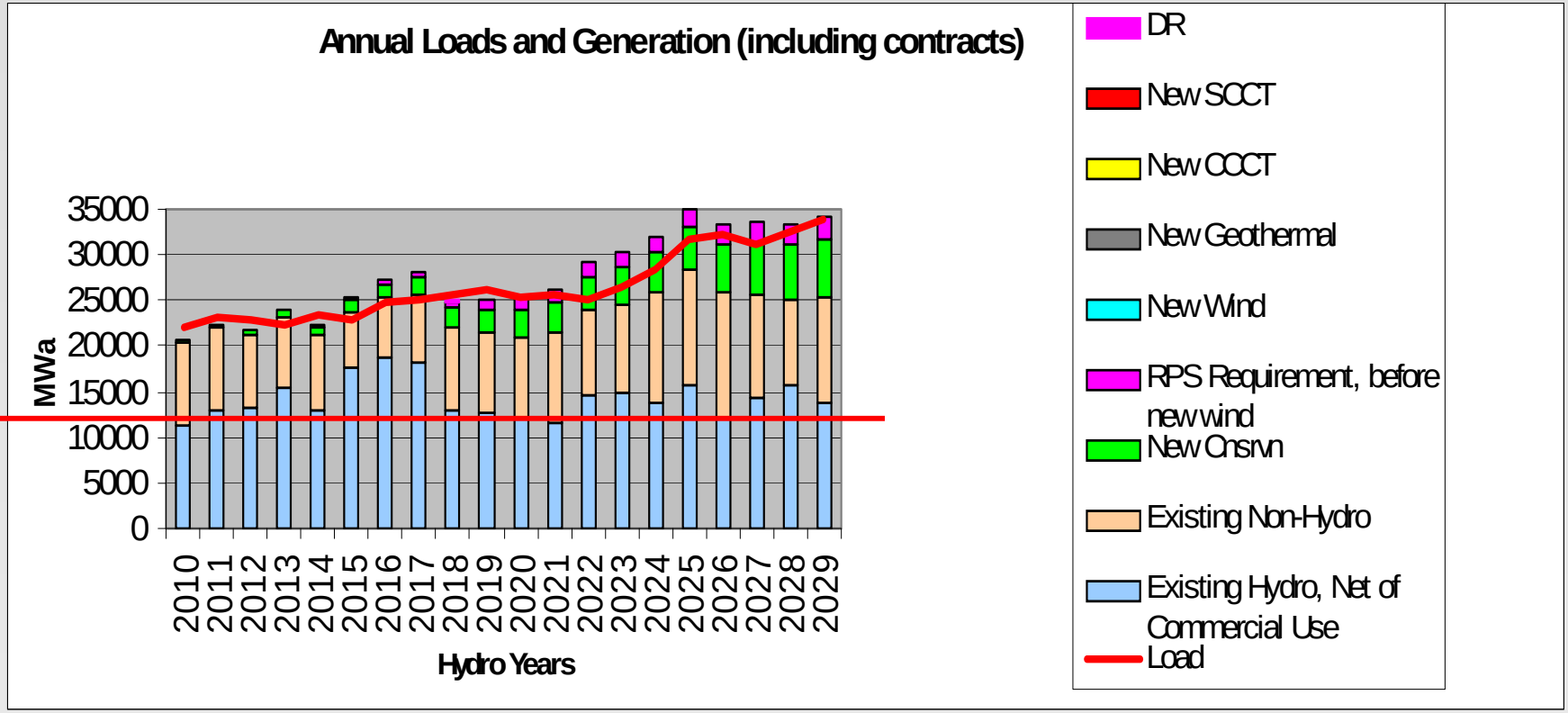
Another High Load Future



#281: Low energy prices, $14 CO2 Price in 2012, Cost $77.2, continued reliance on existing non-hydro generation. Continued viability of coal provide adequate capability even with critical hydro.

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Conclusion

- Simply adding up energy capability compared to forecast loads provides a useful quick check on adequacy.
- But it does not provide a good basis for determining a minimum cost and risk resource strategy in the face of uncertain future conditions.

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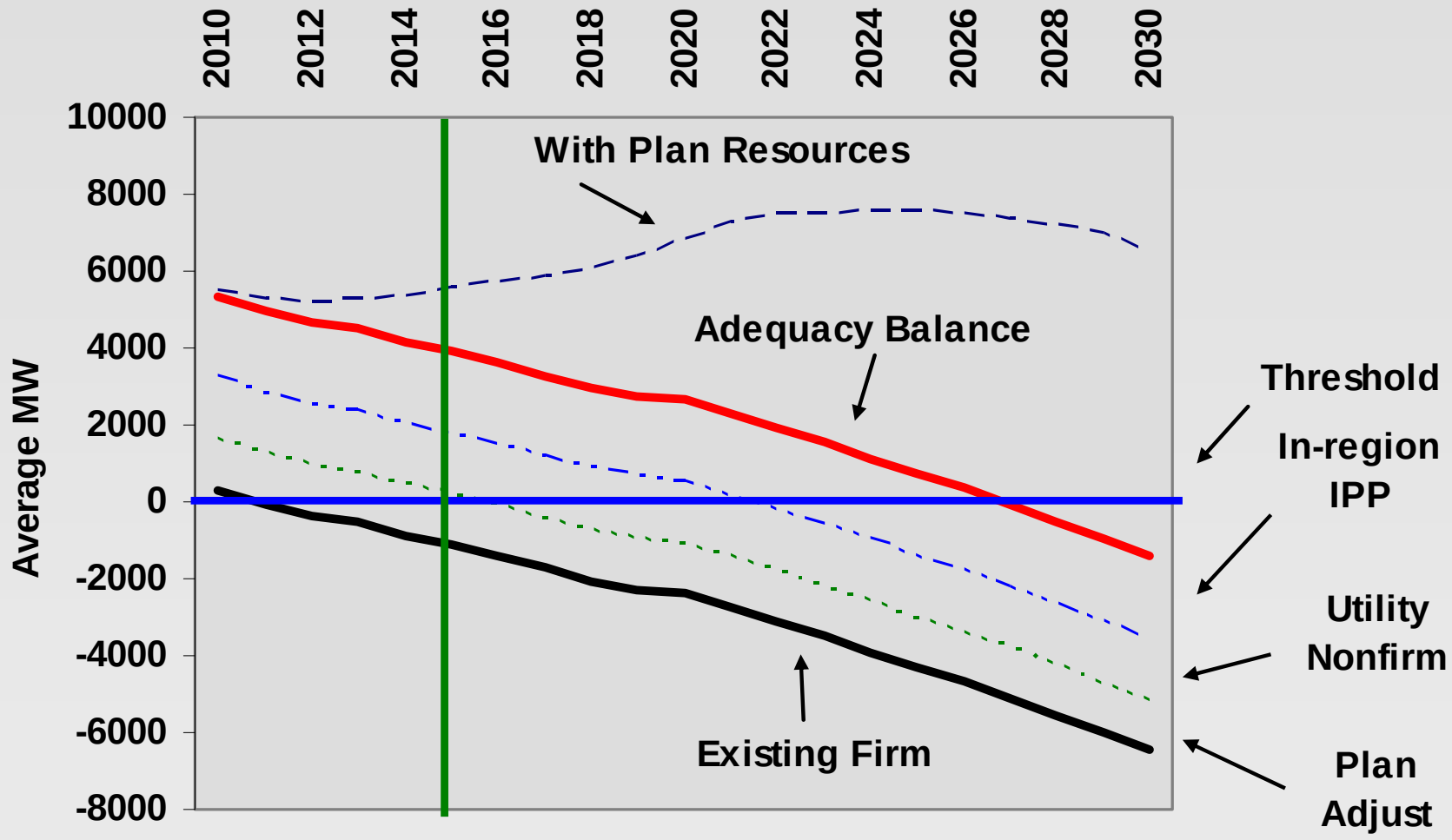
Additional Slides

Adequacy Forum Perspective
Energy Assessment



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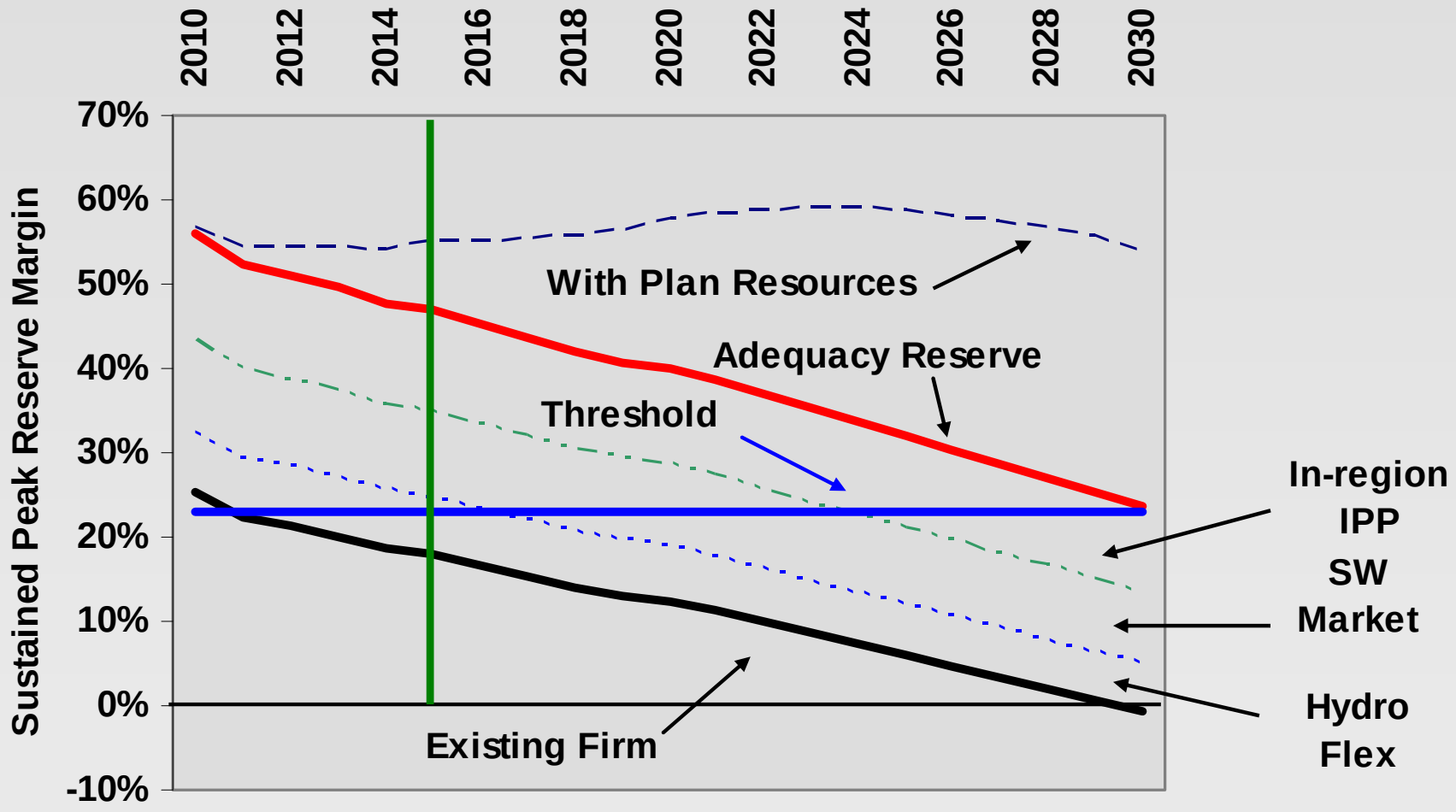
Adequacy Forum Perspective
January Sustained Peak Assessment



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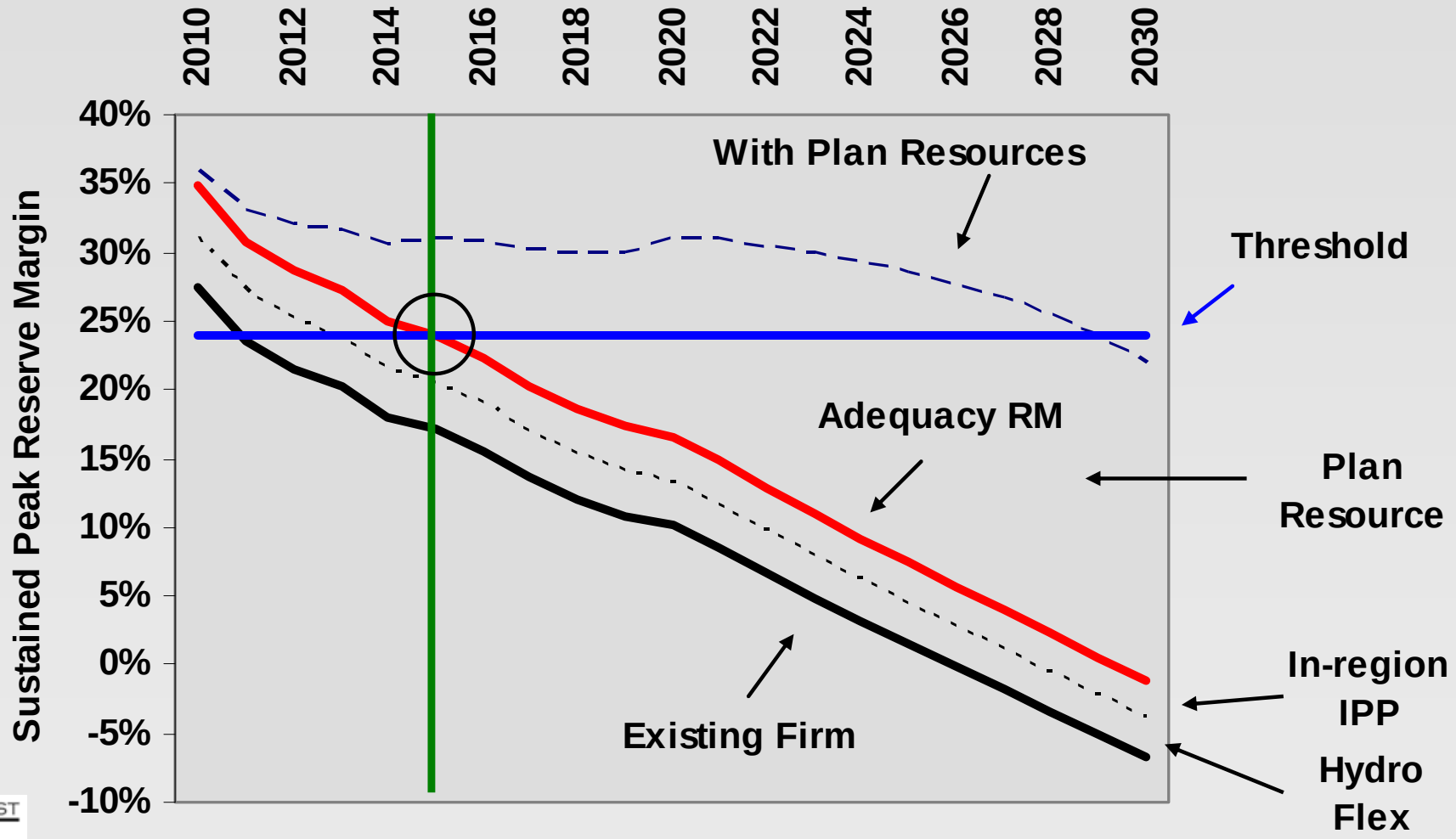
Adequacy Forum Perspective
July Sustained Peak Assessment



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Adequacy Violation Dates
(3 and 5 years out are 2012 and 2014)

- Energy ——————→ 2025 **OK**
- January Peaking ——→ 2030 **OK**
- July Peaking ——————→ 2014 Yellow Alert

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Adequacy Status - Yellow

When \ How	Economic Standard		Physical Standard	
	Pass	Fail	Pass	Fail
5th Year Out	Green	Yellow	Green	Yellow
3rd Year Out	Green	Yellow	Green	*RED*

- Regional status = Yellow Light Warning
- July capacity inadequacy 4 years out

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Implementation Actions

- ✓ **Green**
  - Proceed with normal planning activities
  - Compare results with other regional reports
- ✓ **Yellow**
  - Regional report
  - Forum review of data and assumptions
- ✓ **Red**
  - Regional conference
  - Regional review of data and assumptions
  - Identify inadequate utilities

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Current Activities

- RPS legislation is pushing wind development
- Utilities are actively pursuing new resource acquisition
- Power plan resources maintain July capacity adequacy through 2028
- Forum will review data and methodology

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