Northwest **Power** and **Conservation** Council

July 29, 2014

MEMORANDUM

TO: **Council Members**

FROM: **Tom Eckman**

SUBJECT: **6th Plan CO2 Emissions Forecast Compared with EPA's Proposed Emission Limits for Existing Generating Facilities**

At the Council's June meeting staff presented an overview of the Environmental Protection Agency's proposed regulations limiting the CO2 emissions from existing generating facilities. At the July Council meeting PNUCC briefed the Council on the results of its analysis of the carbon footprint of the Northwest's power system. As a follow-up to those presentations, staff will provide a comparison of the projected regional CO2 emissions for four of the scenarios conducted to support the development of the 6th Plan with EPA's proposed regional emissions limits. Staff will also discuss some of the potential implications of the EPA's proposal on the development the Council's 7th Plan.

Background

Unlike most prior EPA air emissions regulations this draft proposal sets limits on CO2 emission rates (lbs/MWh) at the state level rather than for generating facilities themselves. Therefore, unlike prior regulations each state is responsible for developing and administering a compliance plan covering all existing generation in the state. Also unlike prior EPA regulations, under the draft proposal, states can also join together to develop and implement plans that comply with the regulation as a region. This alternative was included primarily to address those region's in the country that have organized power markets (e.g., PJM, MISO, etc.) and to recognize existing regional systems to limit CO2 emissions (e.g., the New England's Regional Greenhouse Gas

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Initiative – RGGI). Nonetheless, other regions of the country could also propose regional compliance plans.

Staff used the EPA's "Technical Support Document (TSD) for the CAA Section 111(d) Emissions Guidelines for Existing Power Plants" and EPA's "State Goal Data Computation" spreadsheet to determine each states CO2 emission rate limits. As was described in the staff's June presentation on the draft 111(d) regulation EPA has proposed two emissions rate limits. The first, "interim" requirement must be met on average between 2020 and 2029. The second, final standard must be met in 2029 and beyond.

Although the EPA documents and worksheets do not provide a "regional" emissions rate standard for the northwest states, staff was able to use the data provided by EPA to derive a regional emissions rate standard that would be equivalent to compliance with the state standards. The following table shows the proposed individual state CO2 emissions targets as well as the regional target derived by staff.

Table 1 – EPA's Proposed CO2 Emission Rate Limits

State	Interim Goal 2020 - 2029 Average (Lbs/MWh)	Final Goal 2030 and Thereafter (Lbs/MWh)
Idaho	244	228
Montana	1,882	1,771
Oregon	407	372
Washington	264	215
Region	649	571

The EPA regulations are based on a single "point forecast" of future loads and plant operation. In contrast, the Council's Resource Portfolio Model (RPM) provides an estimate of the regional CO2 emissions for each of the 750 futures used to test each portfolio. Therefore, staff was able compared both the RPM's estimate of average regional emissions rates across the 750 futures as well as the fraction of the 750 futures where EPA's limits would be exceeded across four of the scenarios reviewed during 6th Plan development.

The four scenarios reviewed were the *Current Policy, Carbon Risk, Coal Retirement and No Additional Conservation* scenarios. These scenarios span the range of the alternatives tested during the 6th Plans development. Each has differing resource mixes and development schedules. For example, the *Current Policy* scenario did not consider actions that were not already in place at the time of the plan's development (2009) to curb carbon dioxide emissions. In contrast the *Coal Retirement* scenario retired approximately fifty percent of the regions existing coal-fired generation by the year 2020. The *Carbon Risk* includes a range of carbon cost risks that ranged from zero to $100 per ton and average to $47 per ton by 2030. The *No Additional Conservation*

scenario assumed that no additional conservation resources would be developed. Table 2 below summarizes the findings.

Table 2 – 6th Plan Scenario CO2 Regional Emissions Rates Compared to Council Estimated EPA Regional Emissions Rate Limits

Scenario	Average Emission Rate 2020-2029 (Est. EPA Limit = 649 lbs/MWh)	Average Emission Rate 2029 (Est. EPA Limit = 571 Lbs/MWh)	Fraction of Futures Compliant 2020-2029	Fraction of Futures Compliant 2029>
Current Policy Scenario	653	584	49%	42%
Carbon Risk Scenario	624	539	83%	72%
Coal Retirement Scenario	650	569	87%	76%
No Conservation Scenario	718	721	4%	4%

The resource strategy set forth in the 6th Plan most closely resembles that of the *Carbon Risk* scenario. Under this scenario most load growth in the region is met with energy efficiency and the requirements of state Renewable Resource Portfolio Standards (RPS) existent at the time the 6th Plan was adopted are satisfied. Therefore, it appears that if the 6th Plan energy efficiency goals and state RPS requirements are met the region is well positioned to meet the EPA's proposed CO2 emission standards. However, it should be emphasized that this observation does not necessarily translate into each state's ability to comply with EPA's proposal.

EPA's proposal is based on certain assumptions that may or not prove problematic in actual implementation. For example, EPA assumes that energy efficiency opportunities within state boundaries are equally accessible, regardless of generation ownership or mix. That is, they ignore utility service area boundaries. In the Northwest, investor-owned utilities own or are served by nearly all of the CO2 emitting generation, but only serve around fifty-five percent of the region's load. EPA proposal assumes that the IOUs will be able to access the energy efficiency potential in public utility service areas in order to meet load growth or reduce their reliance on existing CO2 emitting resources.

Potential Implications for 7th Plan Development

EPA's proposal, if adopted and implemented on schedule, requires that states (or regions) submit compliance plans by June of 2016 and comply the following year. Although this schedule is subject to change as a result of anticipated legal challenges it does appear that some federal regulation of the CO2 emissions from existing (and new) generation is in the offing. The bulk of the 7th Plan's development work will take place prior to EPA's target date for finalizing the 111(d) rule and prior to the required date for submittal of state compliance plans. Therefore, the Council will need address this uncertainty when it identified the policies to be assumed or tested in the 7th Plan development process.

Staff has identified a number of questions related to the proposed EPA CO2 regulations that will need to be addressed in the development of the 7th Plan. These include:

- Should compliance with the proposed EPA 111(d) regulation be assumed as a "hard" constraint" on resource portfolio development options in the 7th Plan?

- How should the cost of compliance with EPA 111(d) be treated in the 7th Plan resource portfolio analysis?

- If compliance with 111(d) regulations is assumed to be a regulatory constraint on resource portfolio development, should the "residual impacts" of CO2 emissions not subject to regulation be considered in some way in the Council's environmental analysis? *

Staff is not proposing that the Council resolve these issues at its August meeting, or even discuss them at length. These and potentially other issues associated with the EPA's proposed CO2 regulation will be brought to the Council for decisions at the appropriate point in the 7th Plan development process. However, due to their potential implications for resource cost development as well as portfolio model development, some of these issues need be resolved early in the Council's 7th Plan development process. In staffs view, the most appropriate point of engagement on these issues will be when the Council considers its methodology for quantification of environmental costs and benefits this fall.

How Does the 6th Plan's Forecast of Regional CO_2 Emissions Compare with the EPA's Proposed Carbon Emissions Rule for Existing Generating Facilities – 111(d)?

August 5, 2014

Purpose of Presentation

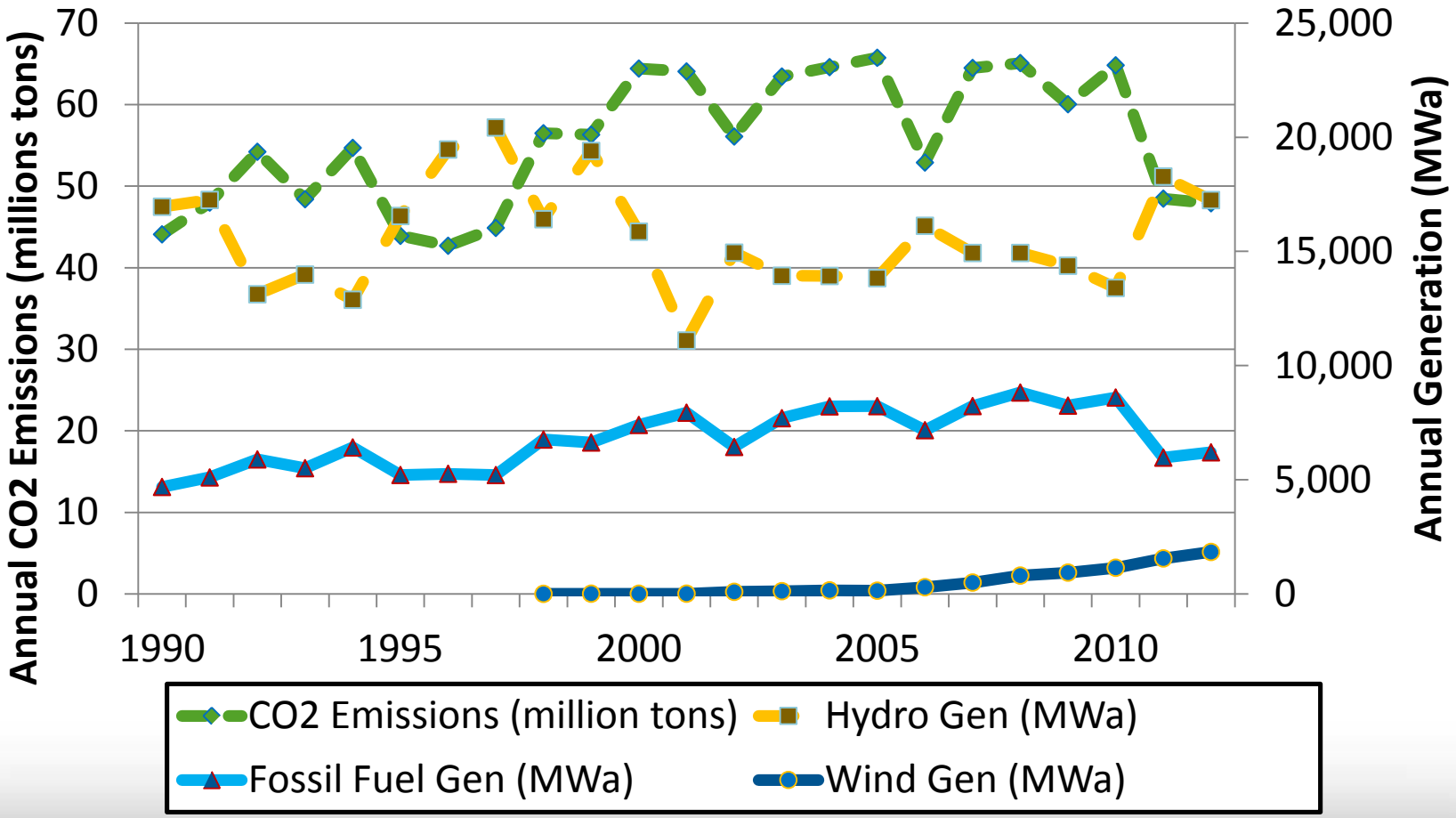
- Assess how projected carbon emissions rates for the 6th Plan's Resource Portfolio compare to EPA's proposed emissions limits for existing power generation facilities *at the regional level*
- Discuss relationship between findings from the 6th Plan's portfolio sensitivity studies and EPA's proposed compliance paths
- Discuss potential implications of EPA's 111(d) regulation for development of the 7th Plan

What This Presentation Isn't About

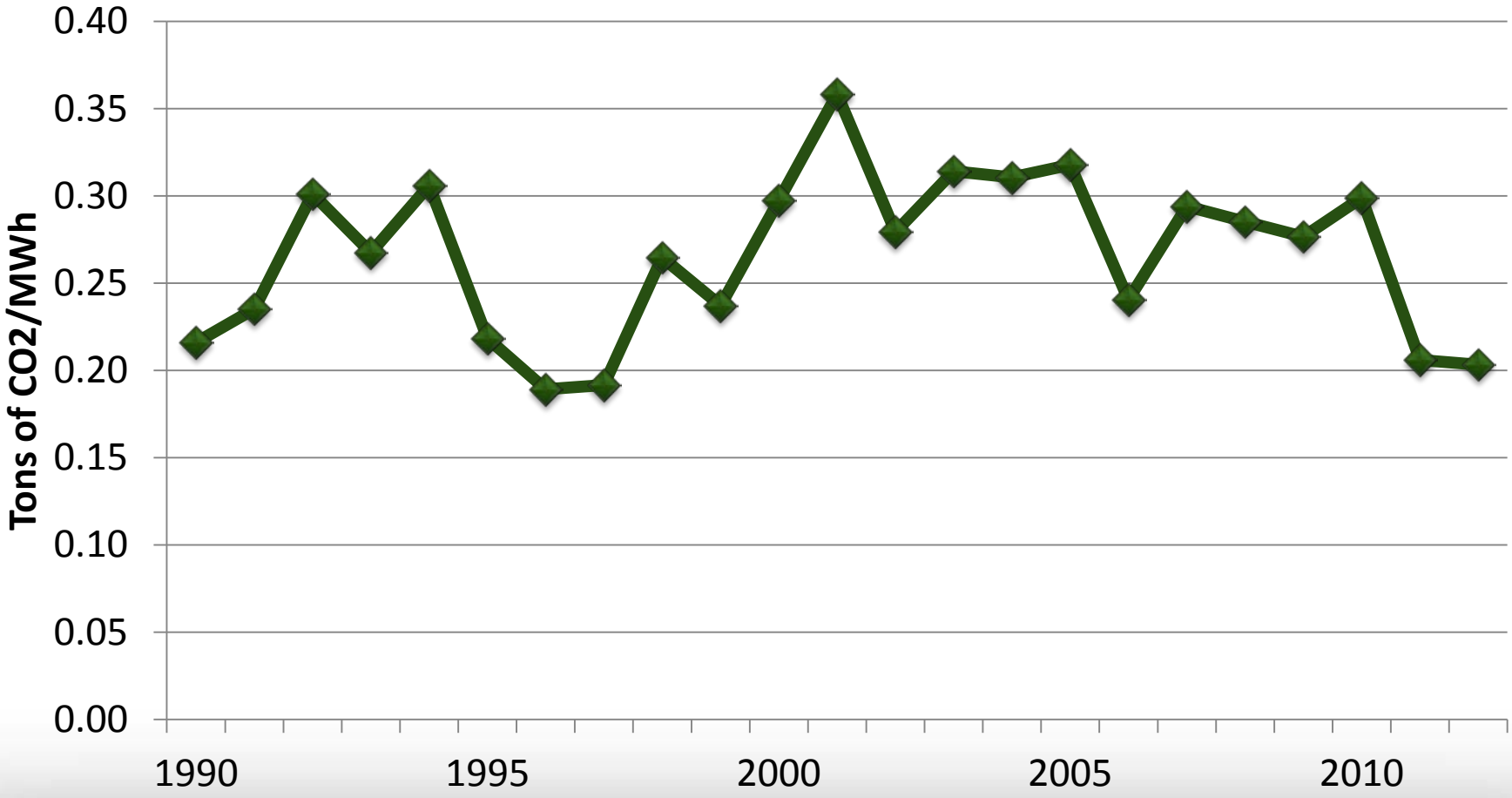
- The cost or feasibility of *individual state* level compliance with EPA's proposal
- A critique of the timing or levels of CO2 emissions reduction proposed by EPA
- A recommendation that states seek a regional solution rather than state compliance plans

The Starting Point

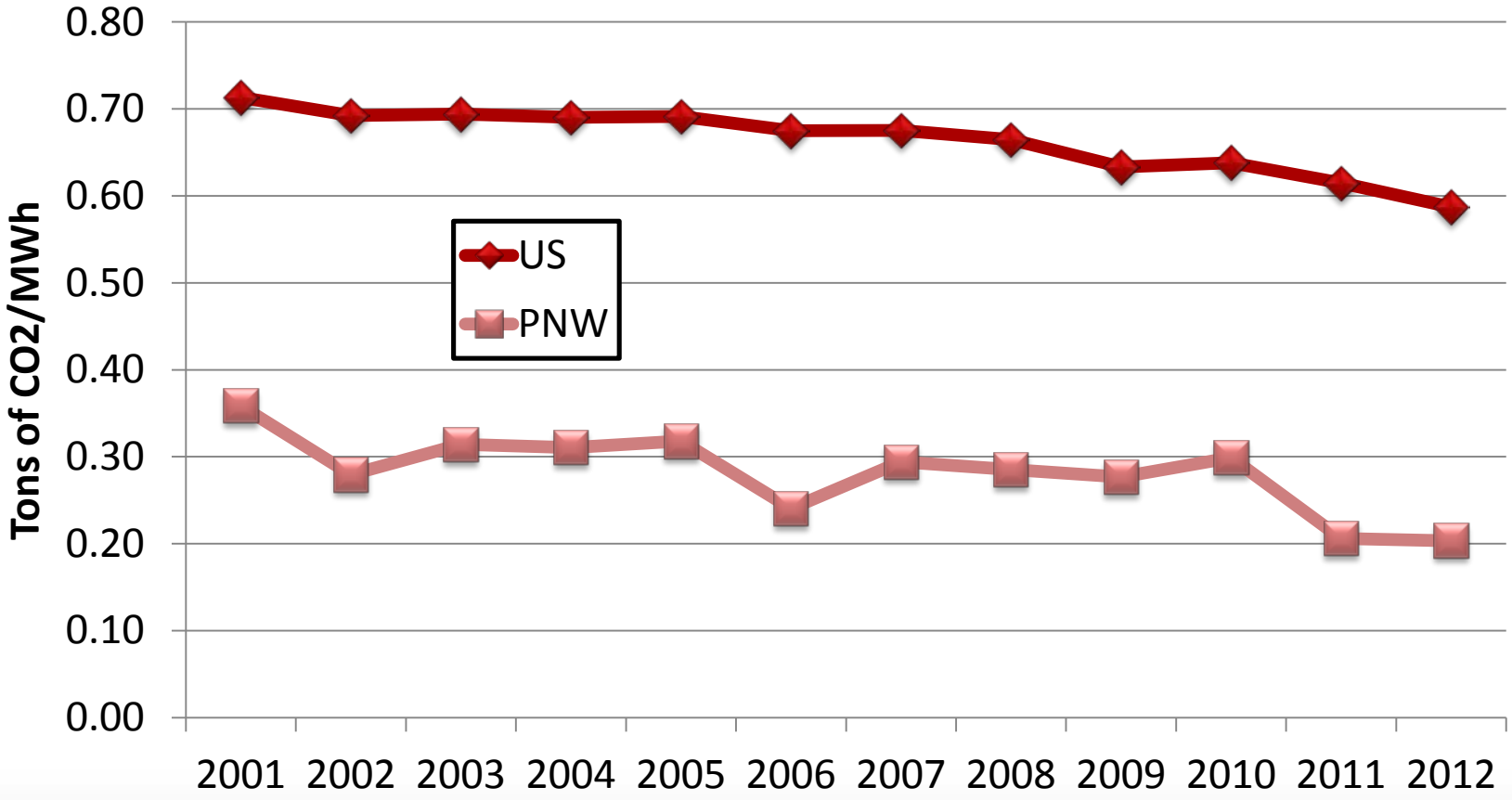
PNW ***Total*** Power System Carbon Emissions



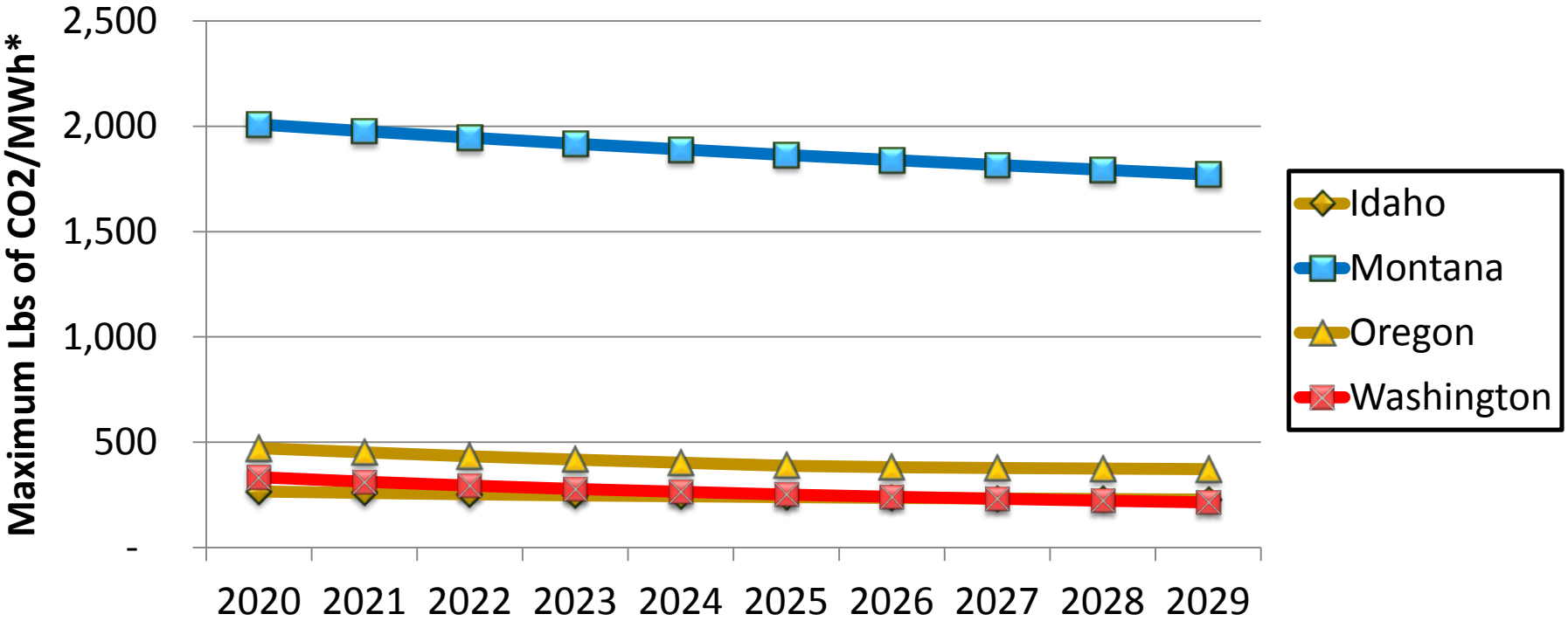
Northwest Power System CO2 Emission ***Rate*** Trends



Trends in PNW and US Power Sector CO2 Emission Intensity per Unit of Electricity Production

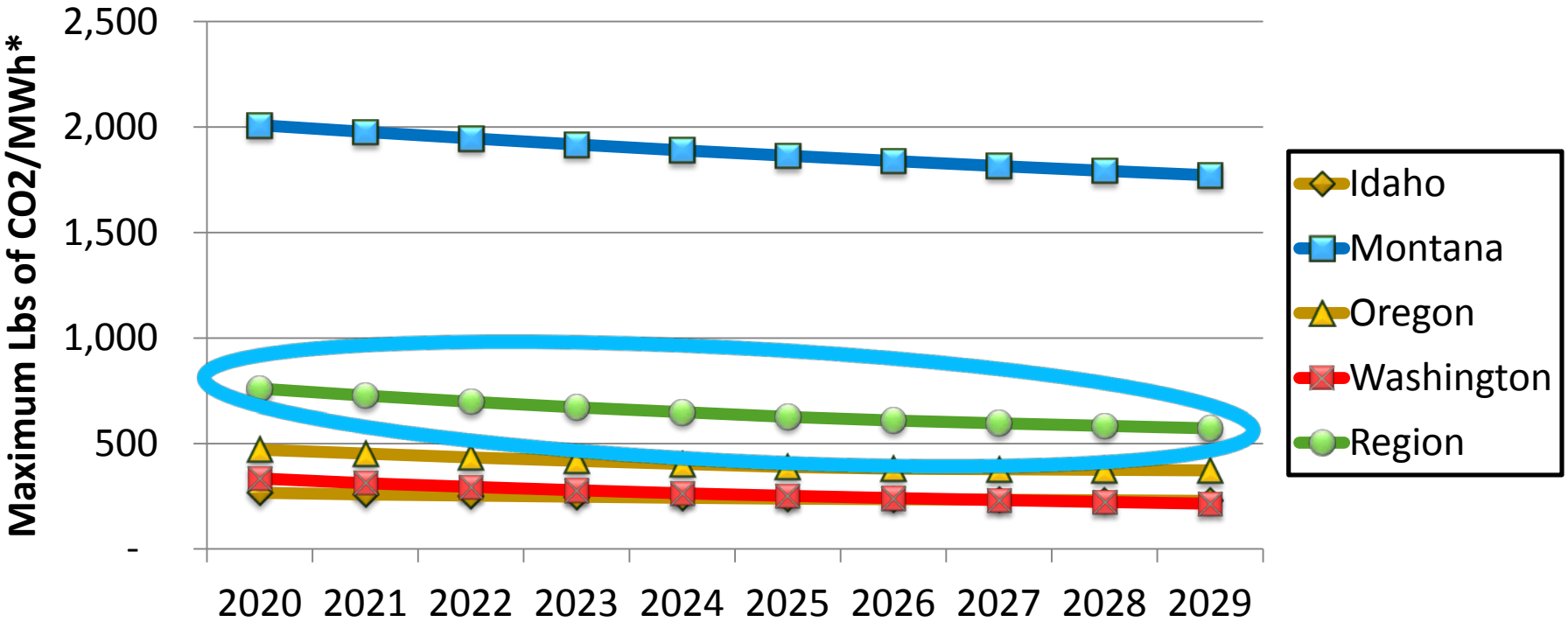


EPA's Clean Air Act Section 111(d) Proposed Rule Limits CO2 *Emissions Rates* for Individual States



EPA's Proposed rule sets an interim standard that is the average of the 2020 – 2029 emissions rates. State or regional level compliance plans are acceptable.

EPA's Clean Air Act Section 111(d) Proposed Limits CO2 Emissions Rates Can Also Be Met By Regional Compliance Plans



EPA's Proposed rule sets an interim standard that is the average of the 2020 – 2029 emissions rates. State or regional level compliance plans are acceptable.

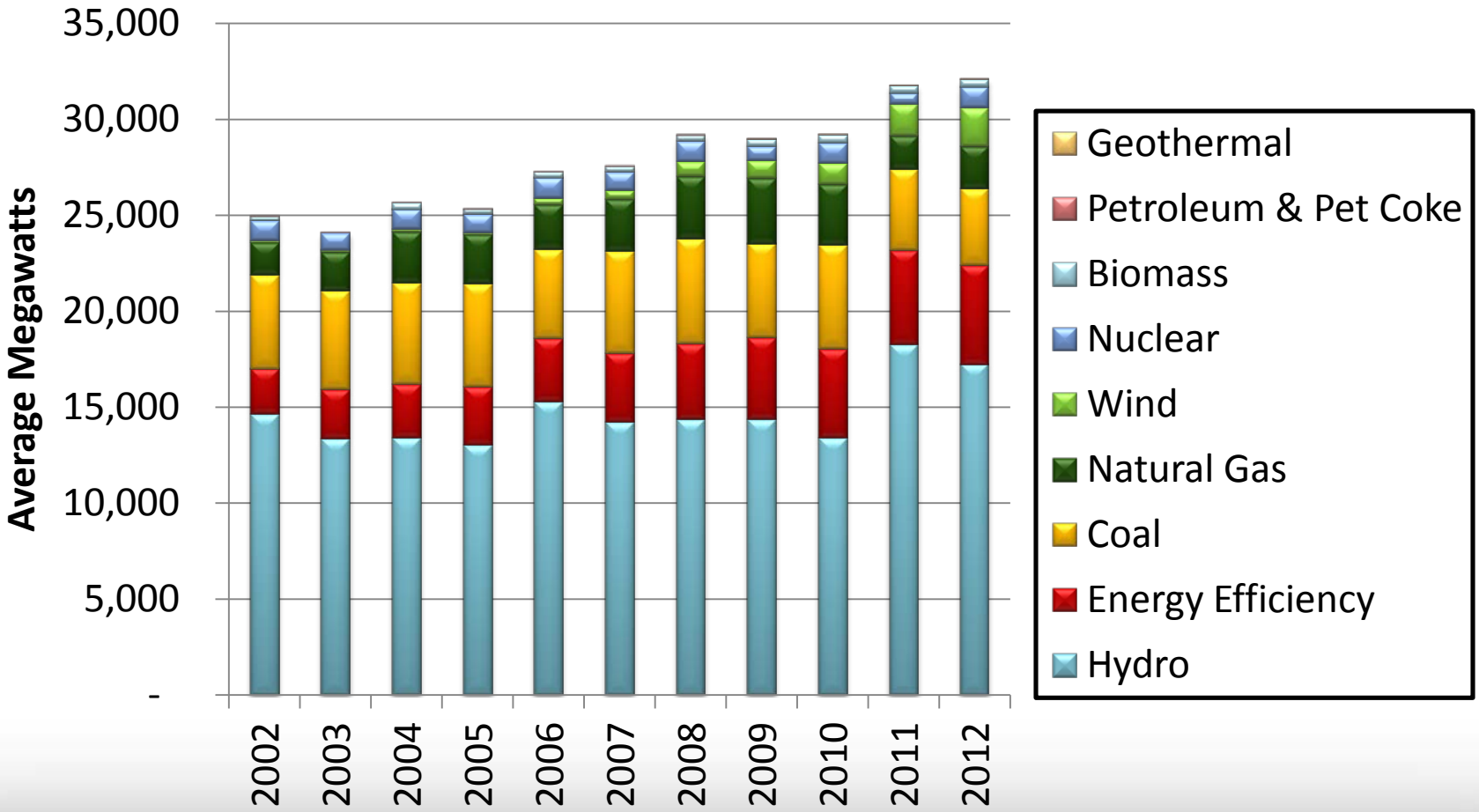
EPA Compliance Options Calculations

- Emissions rates are calculated on "in-state" resources, and ignore import/exports
- Energy efficiency savings potential is estimated based on a percent of "in-state" retail sales or "in-state" generation, whichever is smaller (e.g., Idaho's EE potential is assumed to be based on approximately 45% of the state's retail sales)
- Existing hydro-electric resources are excluded from the calculation.

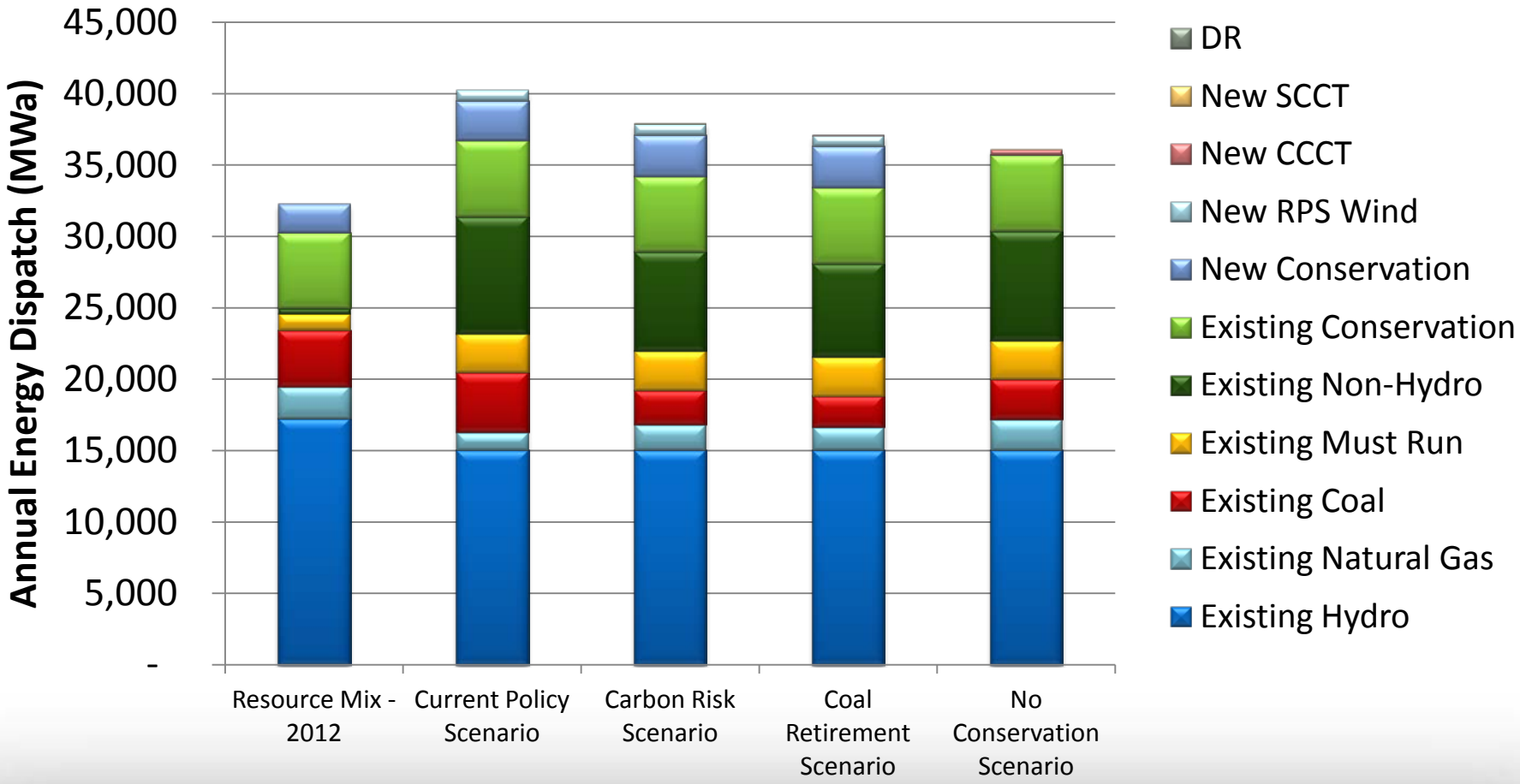
Scenarios from the 6th Plan Selected for Comparison

- **Current Policy**
  - Existing (circa 2009) renewable portfolio standards (RPS)
  - Existing new plants emissions standards and and renewable energy credits,
  - No carbon control or carbon cost in the future .
- **Carbon Risk**
  - The carbon- cost risk includes a range of carbon prices from zero to $100 per ton, which average to $47 per ton by 2030.
  - All resources are available for development/dispatch
  - Existing (circa 2009) RPS, RECS and new plant emissions standard
- **Coal Retirement**
  - Roughly half of the existing coal-fired generation in the region is phased out between 2012 and 2019.
  - With and without carbon-cost risk
  - Existing (circa 2009) RPS, RECS and new plant emissions standards
- **No Conservation**
  - Conservation is not available to meet future electricity needs or reduce carbon emissions.
  - Carbon cost risk is included
  - Existing (circa 2009) RPS, RECS and new plant emissions standards

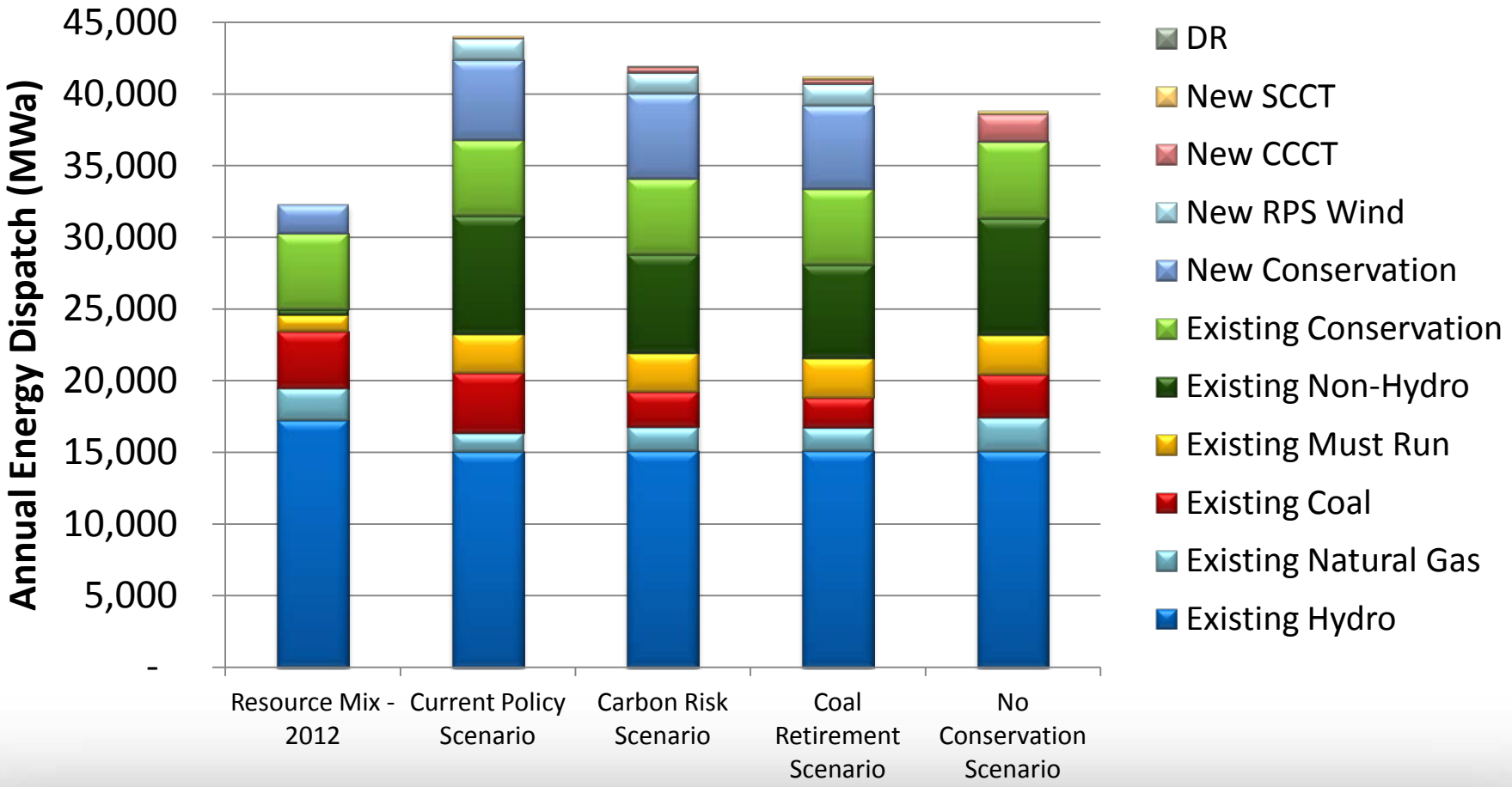
Annual Northwest Resource Mix Since 2002



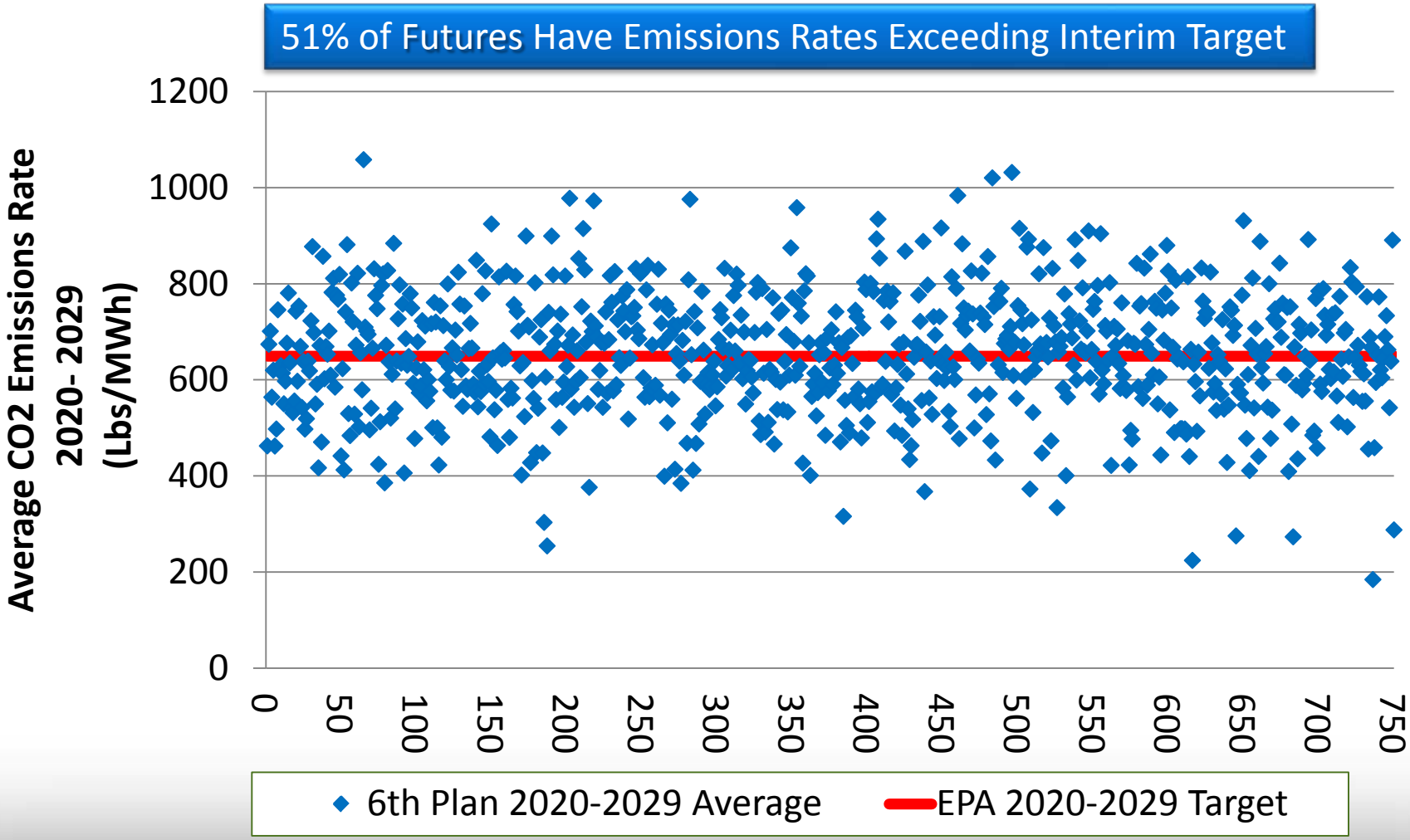
Average Resource Mix in 2020 for 6th Plan Scenarios



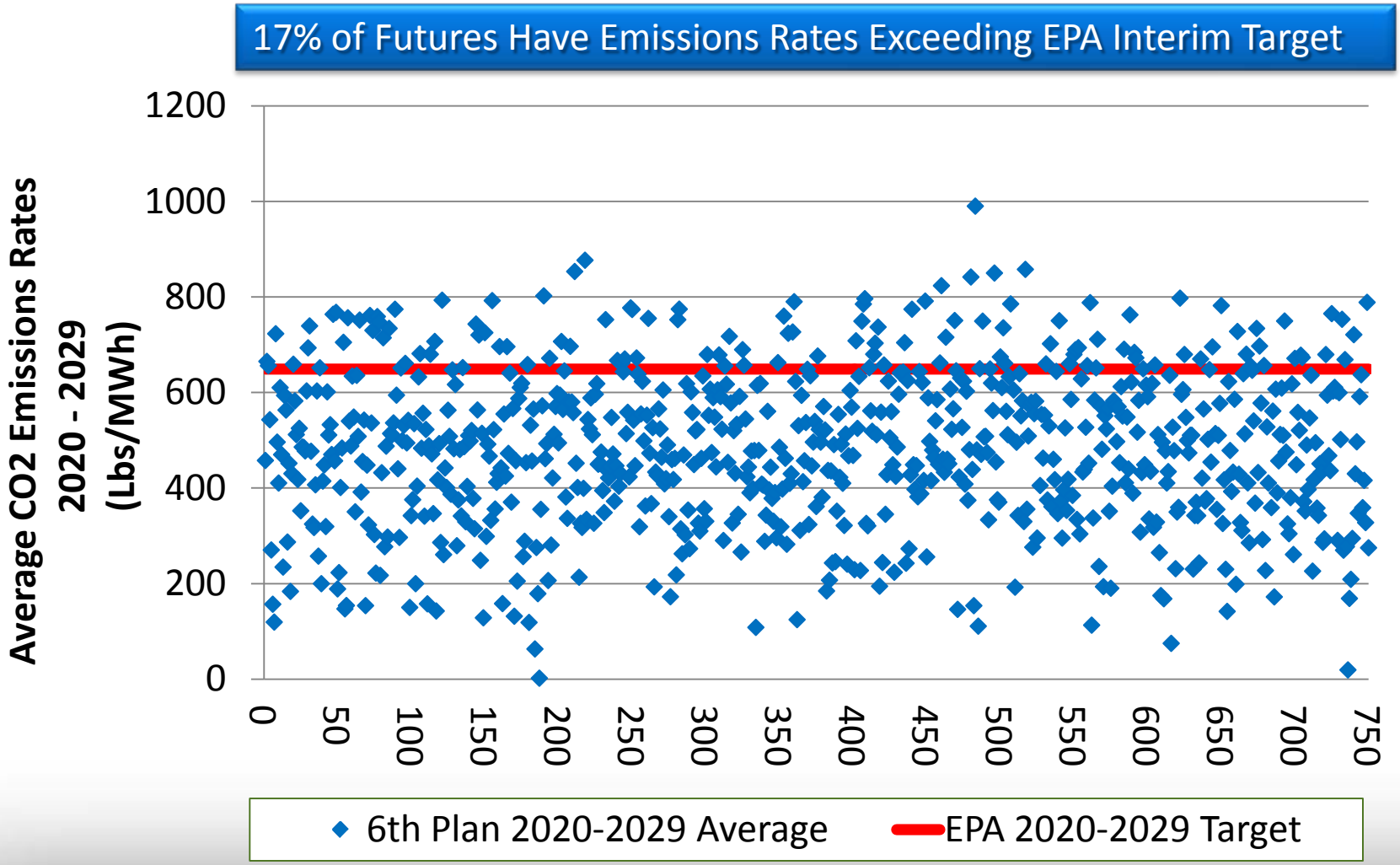
Average Resource Mix in 2029 for 6th Plan Scenarios



6th Plan Current Policy Scenario
Northwest Regional Power Sector CO2 Emission Rate



6th Plan Carbon Risk Scenario
Northwest Regional Power Sector CO2 Emission Rate



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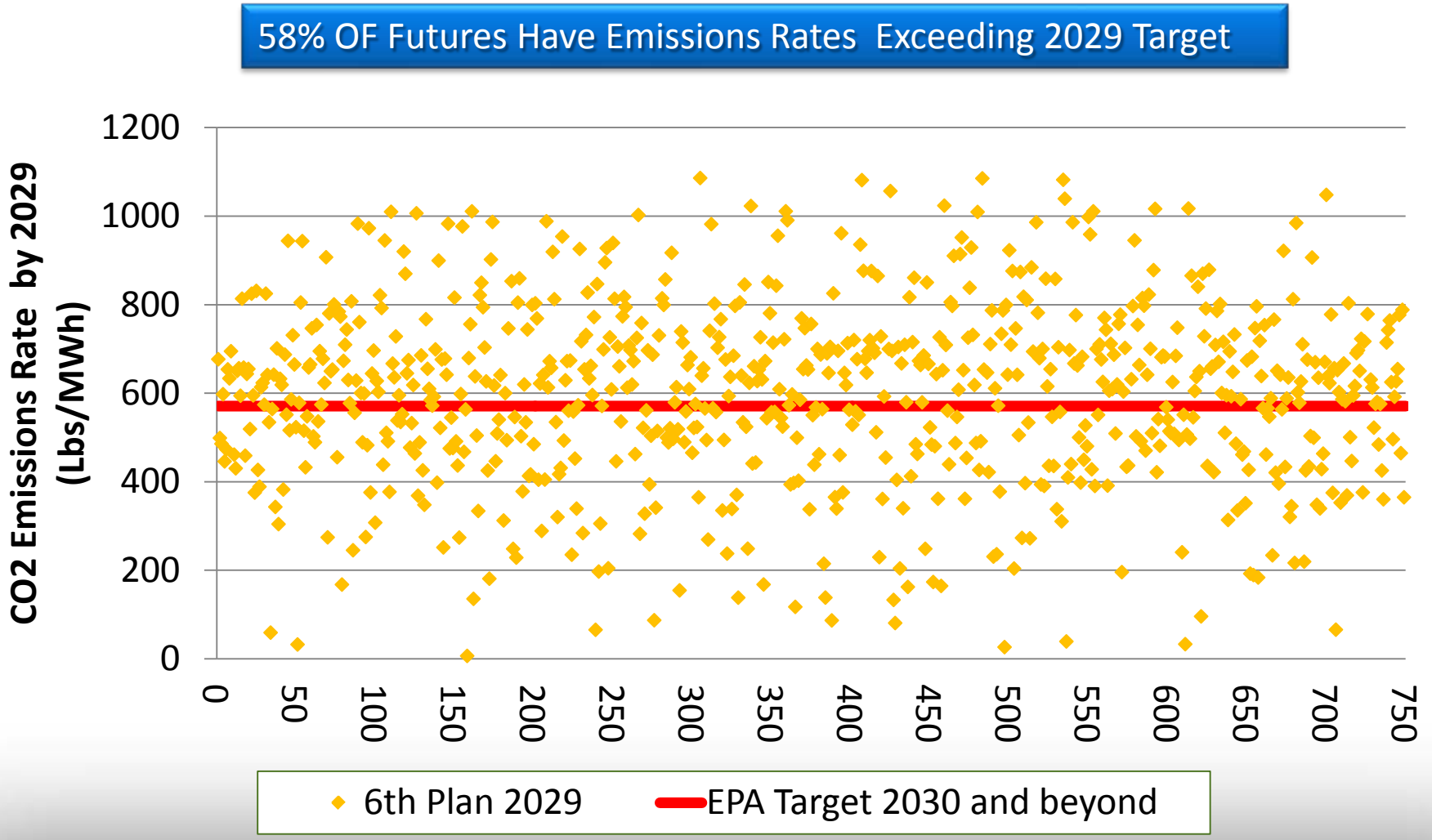
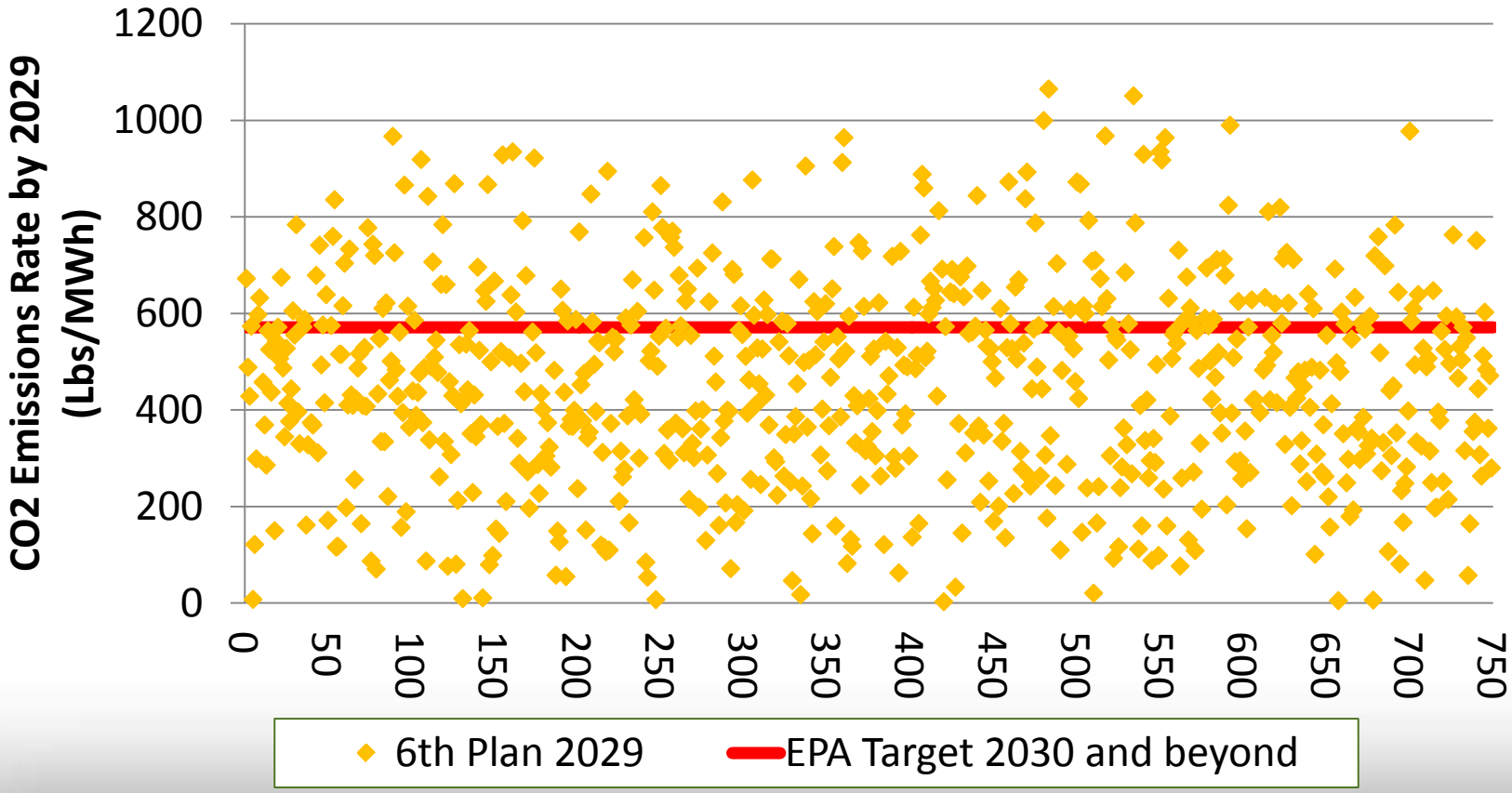


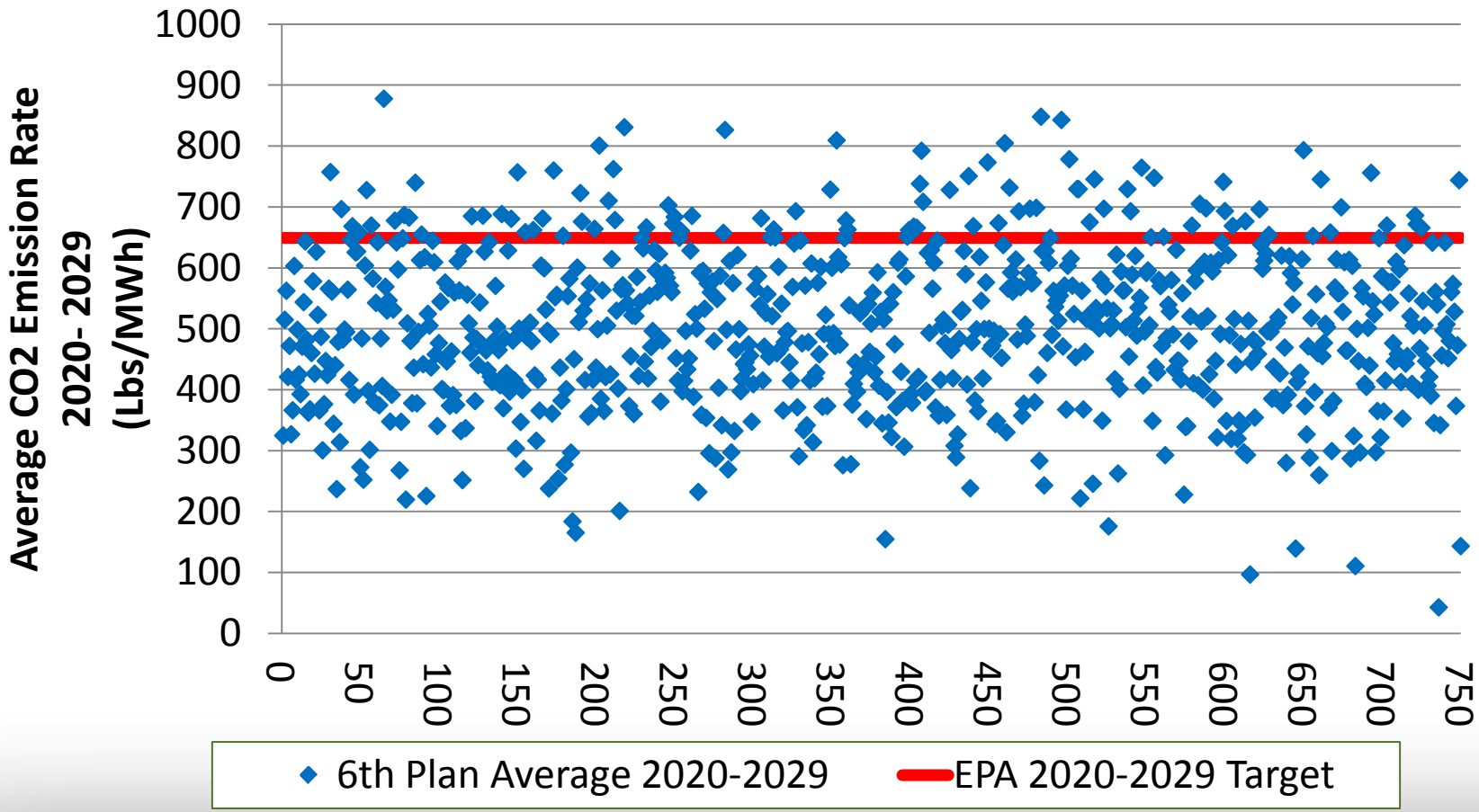
6th Plan Carbon Risk Scenario
Northwest Regional Power Sector CO2 Emission Rate

28% of Futures Have Emissions Rates Exceeding EPA 2029 Target

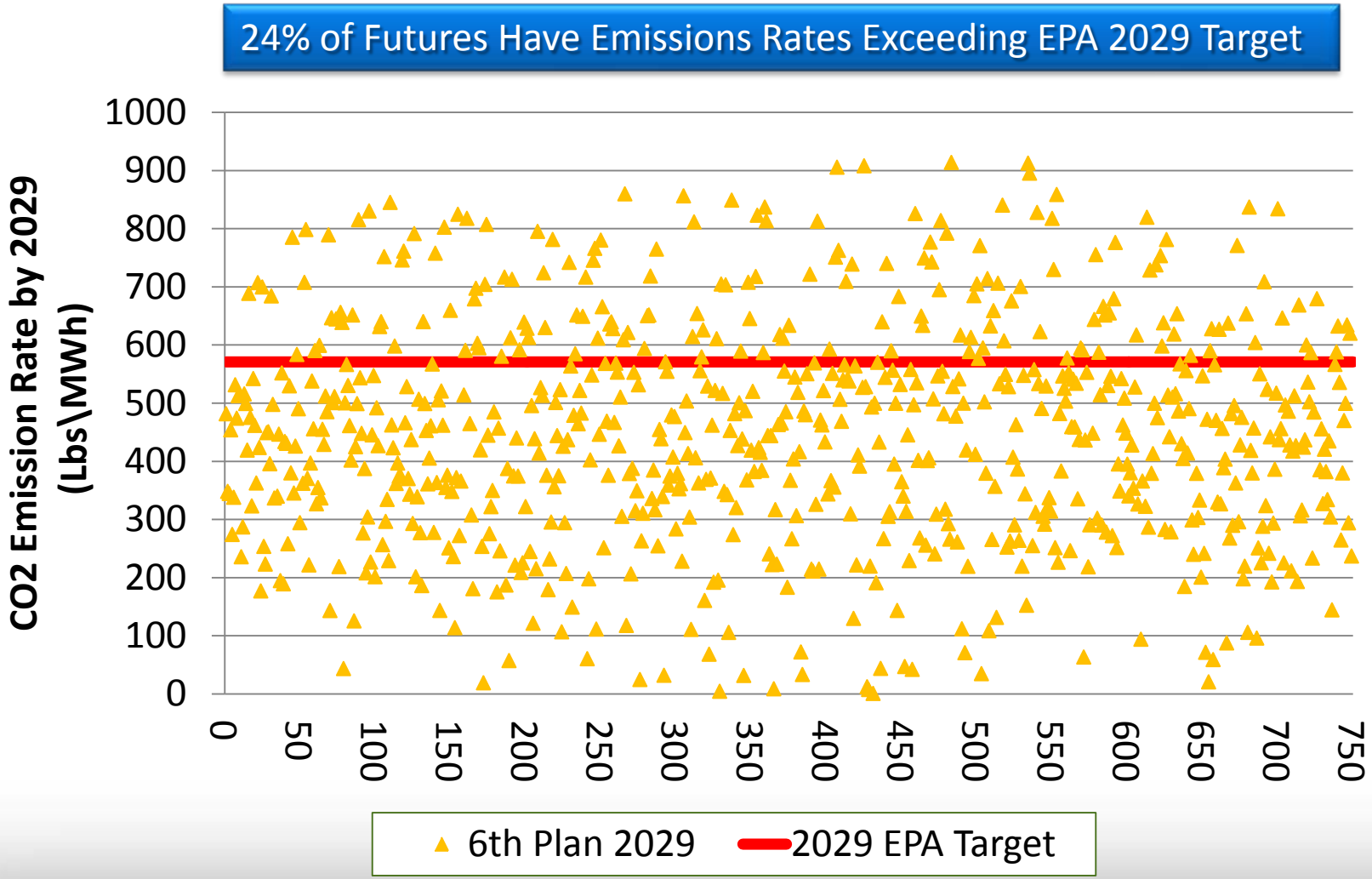


6th Plan Coal Retirement Scenario
Northwest Regional Power Sector CO2 Emission Rate

13% of Futures Have Emissions Rates Exceeding EPA Interim Target

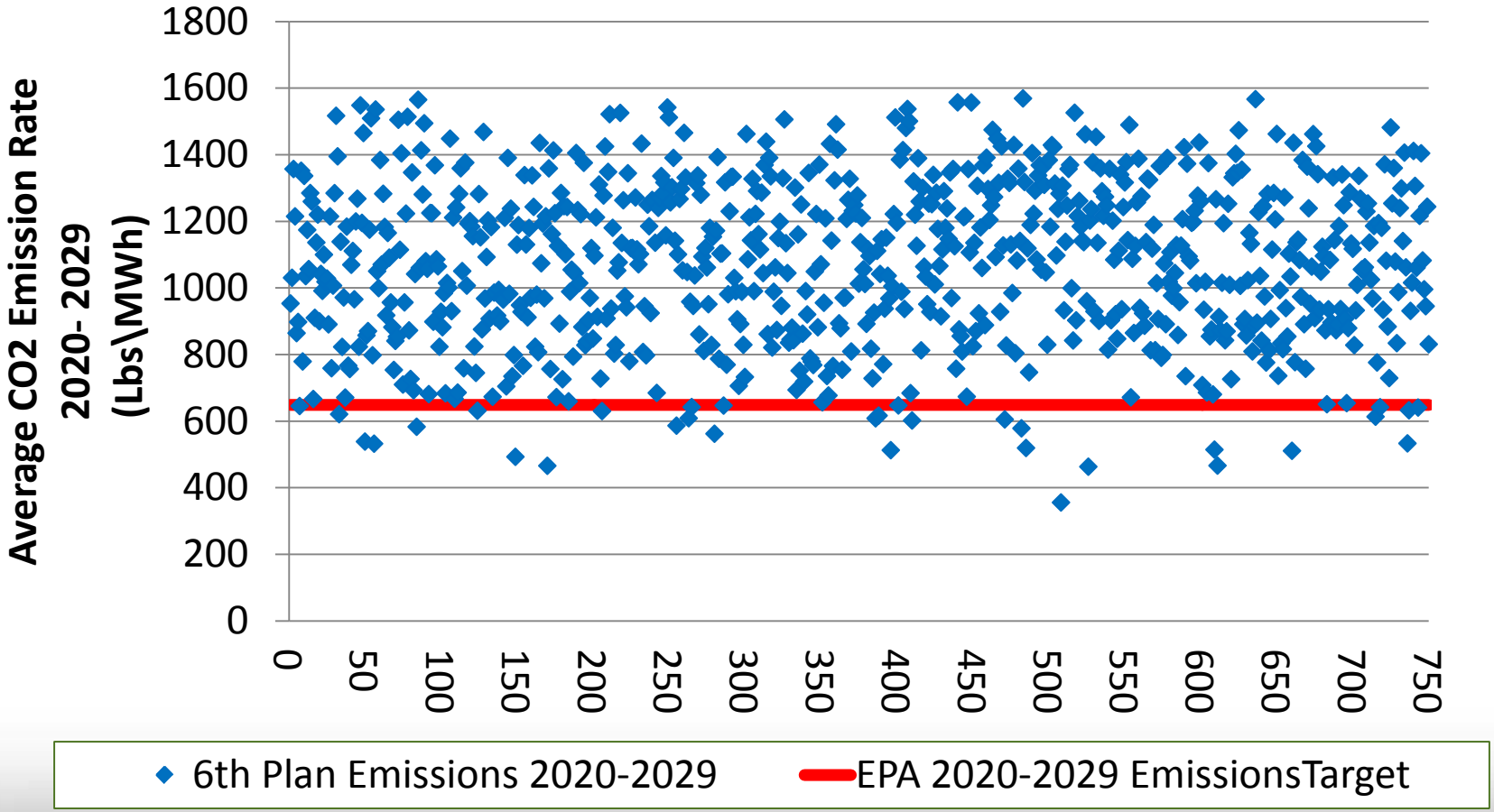


6th Plan Coal Retirement Scenario
Northwest Regional Power Sector CO2 Emission Rate



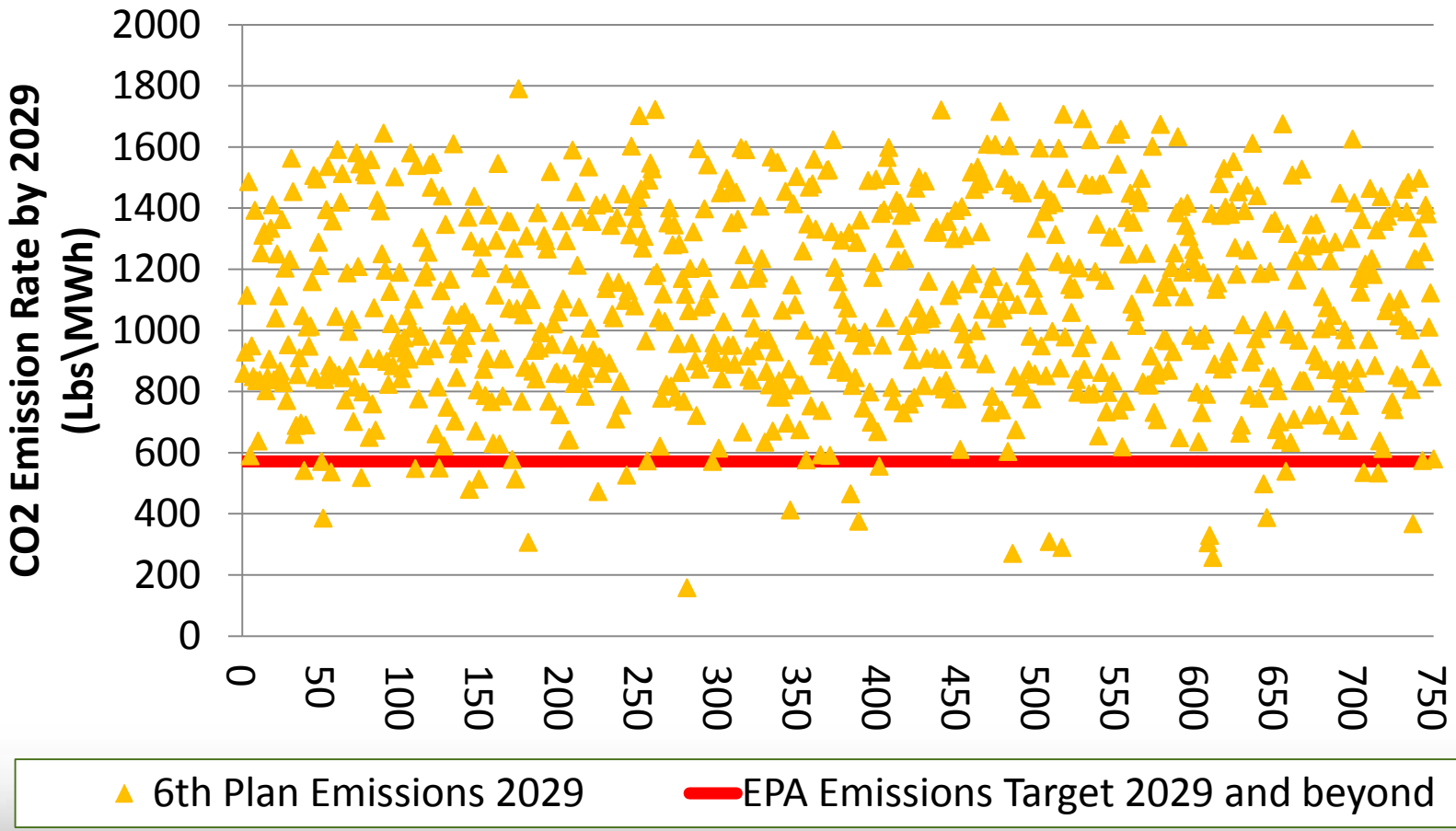
6th Plan No Conservation Scenario
Northwest Regional Power Sector CO2 Emission Rate

96% of Futures Have Emissions Rates Exceeding EPA Interim Targets



6th Plan No Conservation Scenario
Northwest Regional Power Sector CO2 Emission Rate

96% of Futures Have Emissions Rates Exceeding EPA 2029 Target



Observations

- The 6th Resource Portfolio has high probability of meeting EPA's proposed Section 111(d)CO2 emissions regulations *at the regional level*.
  - If the region achieves of the 6th Plan conservation targets and satisfies existing RPS, *the region* meets EPA's 111(d) interim targets in over 80% of the futures tested and EPA's final targets in over 70% of the futures tested

- Failure to achieve the 6th Plans conservation goals significantly reduces the probability of meeting the EPA's proposed Section 111(d) CO2 emissions regulations *at the regional level*

- Strategies that produce "zero carbon" load service (e.g., energy efficiency and renewable resources) have a much larger impact on meeting EPA's proposed requirements than re-firing/replacing existing fossil fuel generation with lower emitting fuels (i.e., natural gas)

Potential Implications for 7th Plan Development

- Should compliance with the proposed EPA 111(d) regulation be assumed as a "hard" constraint" on resource portfolio development options? If so, at what level and on what schedule.
- How should the cost of compliance with EPA 111(d) be treated in resource portfolio analysis? Council practice in past plans has been to include all regulatory compliance cost in the estimated cost of all resources, whether existing or new.
- If compliance with 111(d) regulations is assumed to be a hard constraint on resource portfolio development, should the "residual impacts" of CO2 emissions still be included in the Council's environmental cost and benefits analysis? *

*CO2 emissions from new facilities are regulated under Section 111(a) and existing facilities under Section 111(d) of the Clean Air Act