

# EPA Analysis of the Clean Power Plan

Clean Power Plan Technical Group Meeting  
Washington Dept. of Commerce

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# Clean Power Plan Impacts & EPA Analysis

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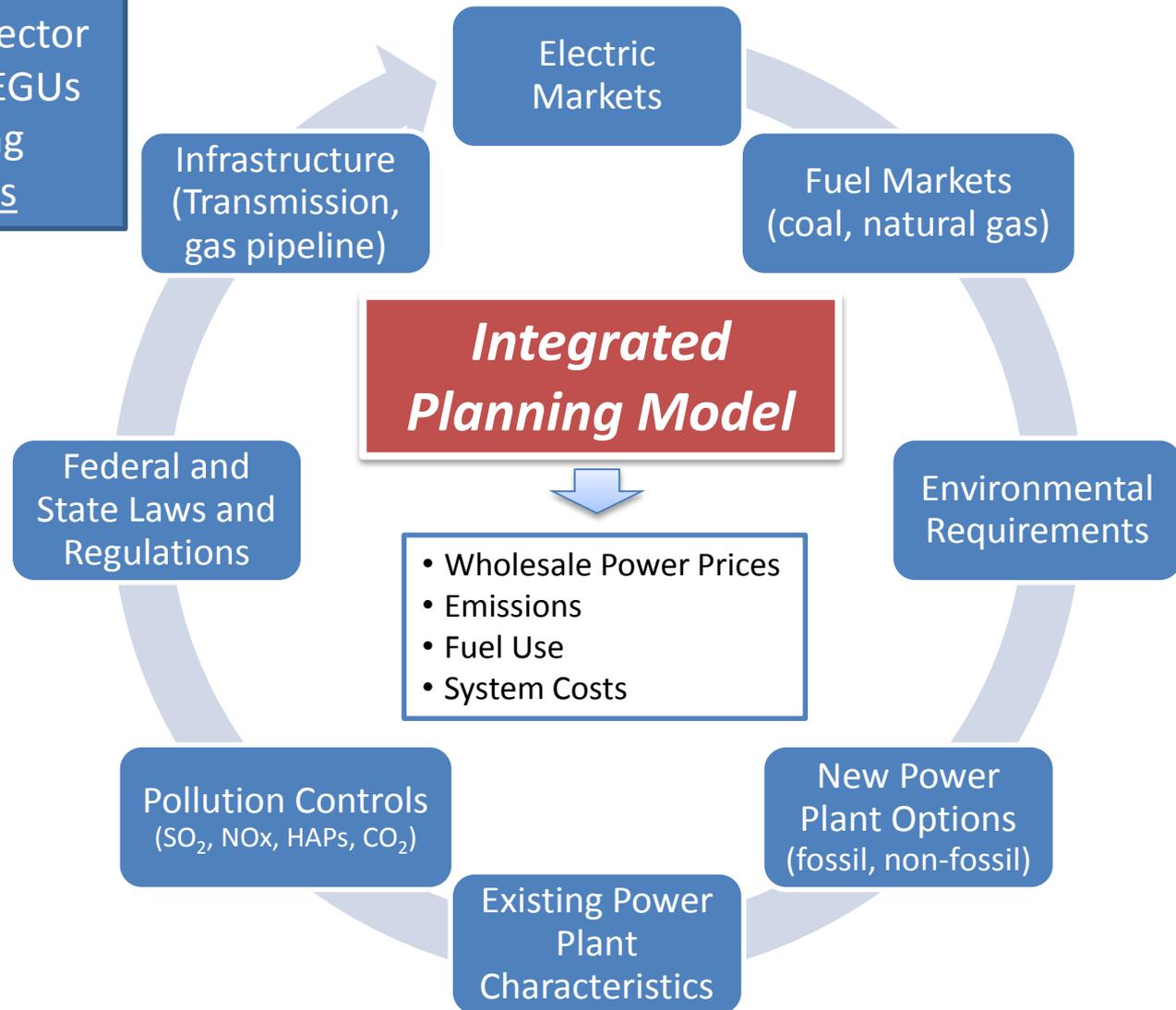
- ▶ EPA is statutorily mandated to conduct economic analysis of the costs and benefits of its actions
- ▶ The analysis for CPP can be found in the Regulatory Impact Analysis (RIA), which can be found at <http://www.epa.gov/cleanpowerplan>
- ▶ The analysis supporting the CPP does not answer all the questions states might have; it is intended to be illustrative and show the larger, longer-term picture of compliance (cost to industry and ratepayers, and public benefits)
- ▶ States have considerable flexibility to design a compliance pathway that might lead to different outcomes (vs. EPA's analysis)
- ▶ EPA's assessment reflects a reasonable assessment of possible CPP compliance

Do I need analysis for state plans?

- ▶ Generally speaking, a State does not need to conduct analysis if it adopts the CPP emission standards or statewide rate or mass goals at or below the levels established by EPA
- ▶ A State must conduct analysis and projections only if it selects the emission standard approach, either rate or mass, and sets a standard that is above the levels established for sources in the CPP
- ▶ Also, a state must do analysis and provide projections under the State Measures approach to demonstrate how the State goal will be achieved

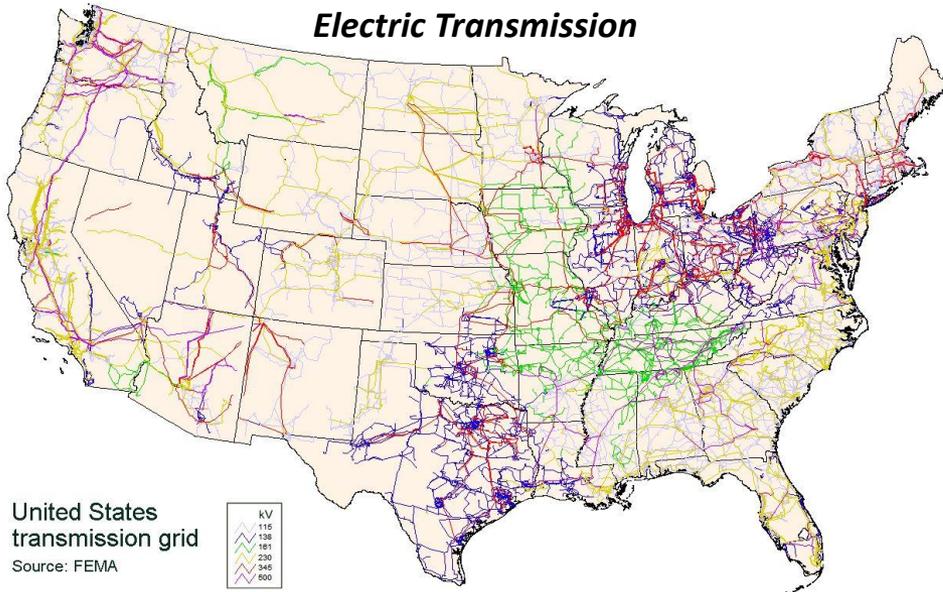
# Detailed Modeling Framework and Assessment

IPM is a detailed model of the U.S. power sector and represents all EGUs in the country, along with their emissions

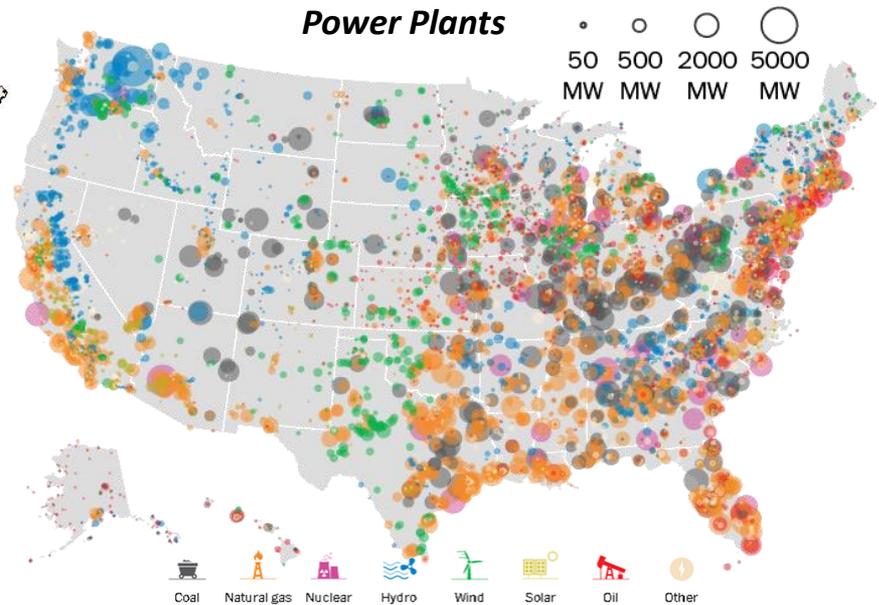


# Representing the Electric Power System

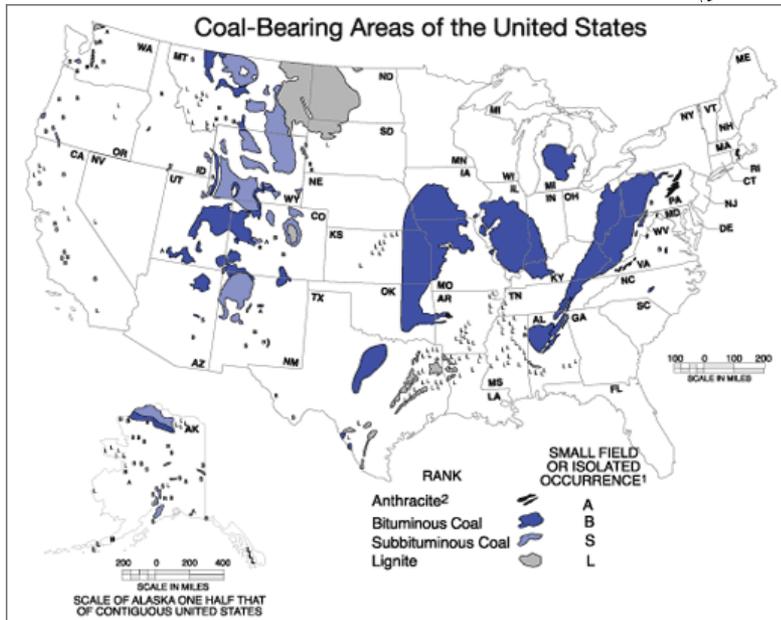
**Electric Transmission**



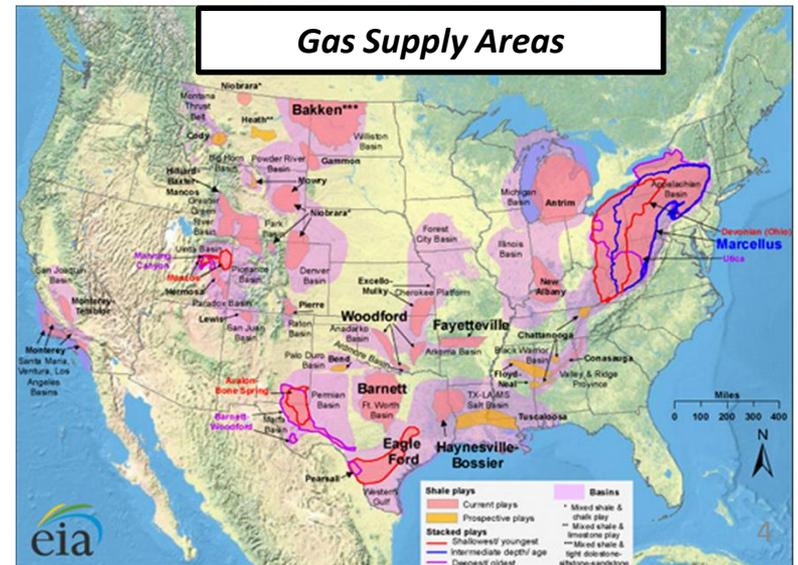
**Power Plants**



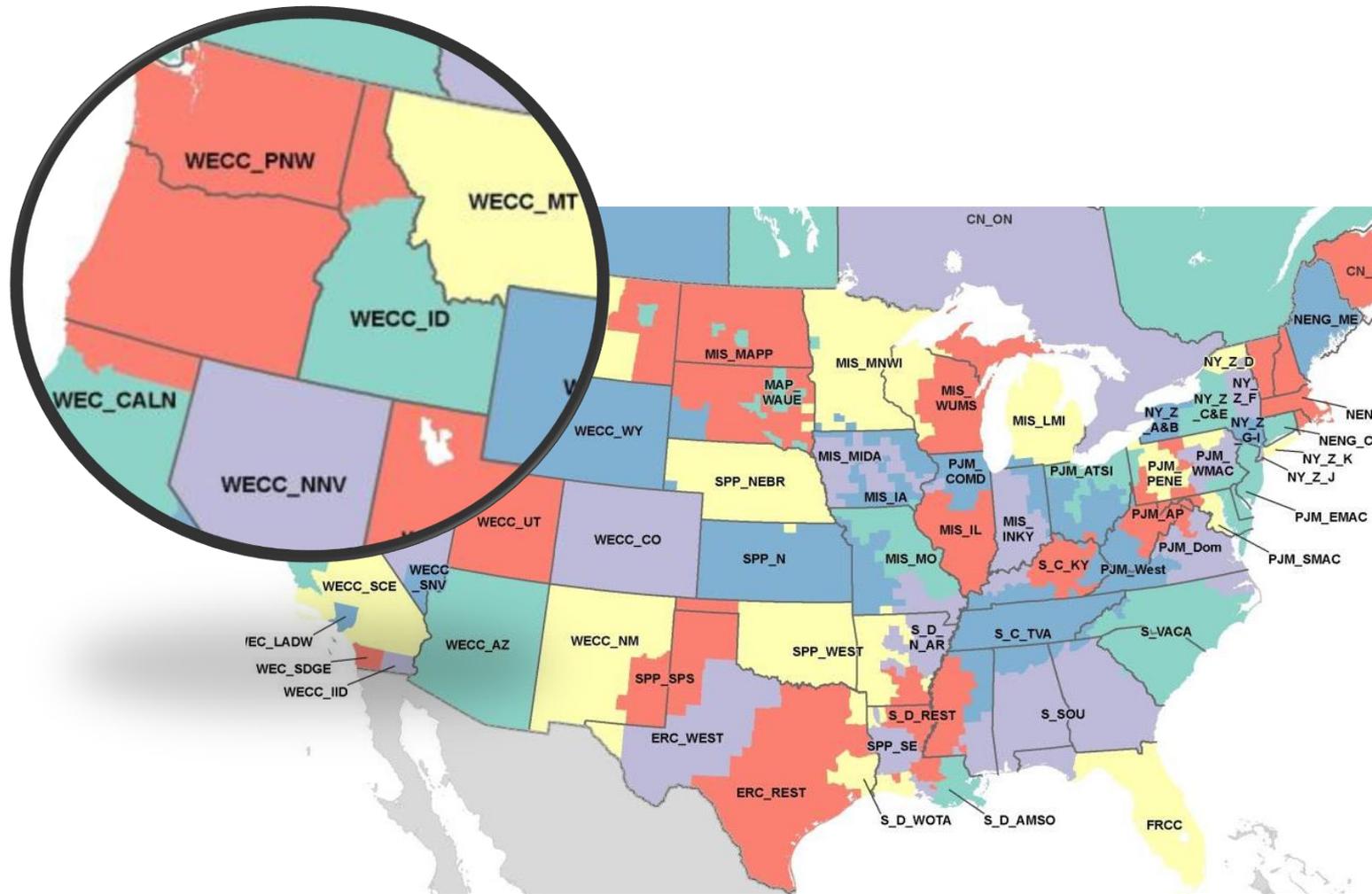
**Coal-Bearing Areas of the United States**



**Gas Supply Areas**



# IPM Regions



# State Information – CPP & Washington

## Washington's Interim (2022-2029) and Final Goals (2030)

WASHINGTON			
	CO <sub>2</sub> Rate (lbs/Net MWh)	CO <sub>2</sub> Emissions (short tons)	
2012 Historic <sup>1</sup>	1,566	7,360,183	
2020 Projections (without CPP)	634	3,827,287	
	Rate-based Goal	Mass-based Goal (annual average CO <sub>2</sub> emissions in short tons)	Mass Goal (Existing) & New Source Complement
Interim Period 2022-2029	1,111	11,679,707	12,211,467
Interim Step 1 Period 2022-2024 <sup>2</sup>	1,192	12,395,697	12,649,388
Interim Step 2 Period 2025-2027 <sup>3</sup>	1,088	11,441,137	12,074,804
Interim Step 3 Period 2028-2029 <sup>4</sup>	1,021	10,963,576	11,759,581
Final Goal 2030 and Beyond	983	10,739,172	11,563,662

1. EPA made some targeted baseline adjustments at the state level to address commenter concerns about the representativeness of baseline-year data. These are highlighted in the CO<sub>2</sub> Emission Performance Rate and Goal Computation TSD.

2, 3, 4. Note that states may elect to set their own milestones for Interim Step Periods 1, 2, and 3 as long as they meet the interim and final goals articulated in the emission guidelines. In its state plan, the state must define its interim step milestones and demonstrate how it will achieve these milestones, as well as the interim goal and final goal. See section VIII.B of the final rule preamble for more information.

► <http://www2.epa.gov/cleanpowerplantoolbox/clean-power-plan-state-specific-fact-sheets>

# Modeled Scenarios, Analytical Years (2020, 2025, and 2030)

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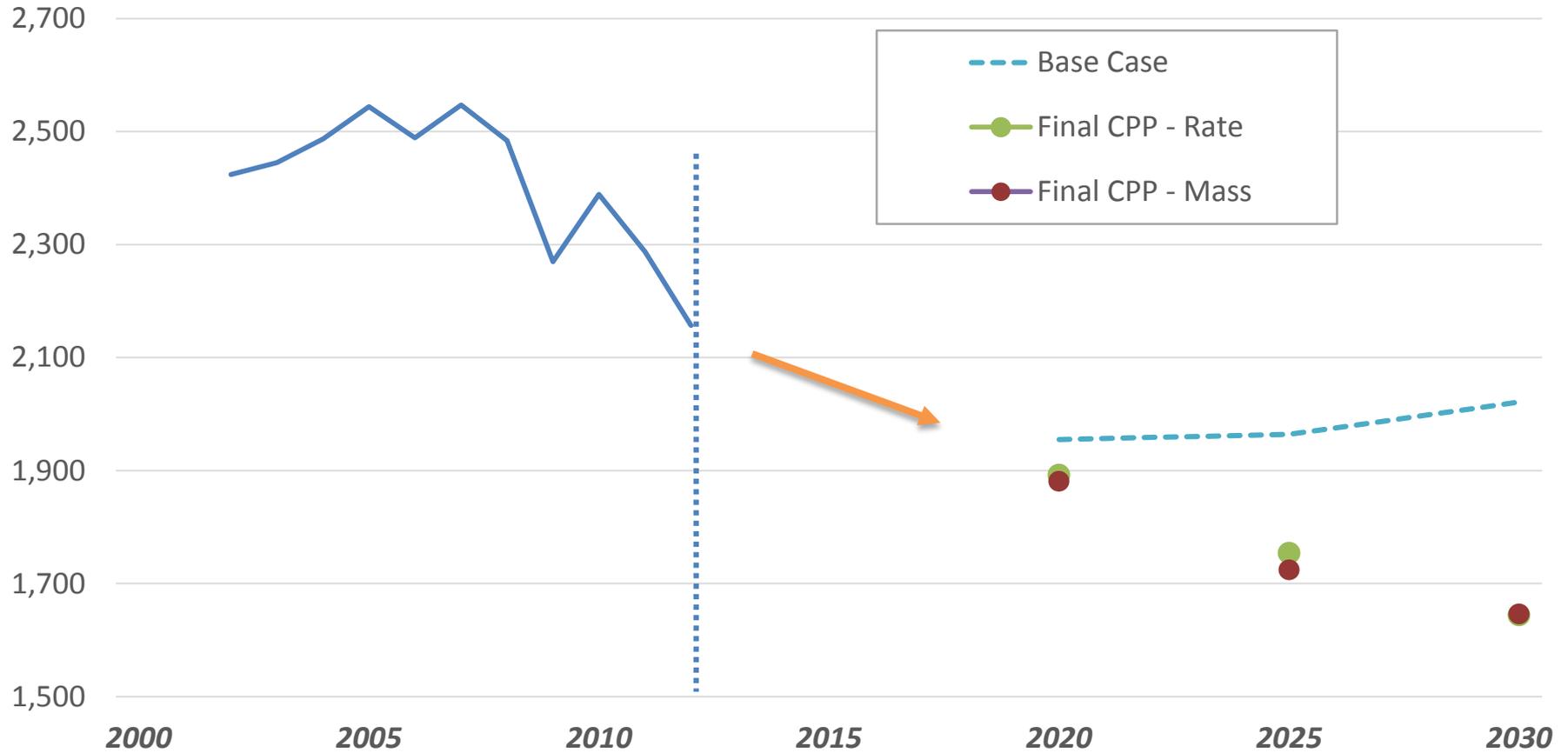
**Baseline (“Base Case”)** – Business as usual, reflects laws and regulation currently on the books using electric demand forecast from the Annual Energy Outlook from the Energy Information Administration

- ▶ Captures known and announced power plant retirements
- ▶ Includes current trends in clean energy, to a certain degree
  - Robust gas supplies
  - Competitive costs of new RE technologies

## **Clean Power Plan Compliance:**

- ▶ Two illustrative state plan approaches were analyzed alongside one another without preference
  - ▶ Rate-based
  - ▶ Mass-based
- ▶ Both approaches assume state-by-state compliance:
  - ▶ No trading or partnership across states, but flexibility *within* each state to achieve the goals
  - ▶ For rate-based scenario, the modeling assumes the ability to procure resources (renewable energy and energy efficiency) from out of state
  - ▶ The modeling captures the inherent flexibility across the system to respond in the least cost manner
- ▶ Assumed energy efficiency levels and costs same for both approaches

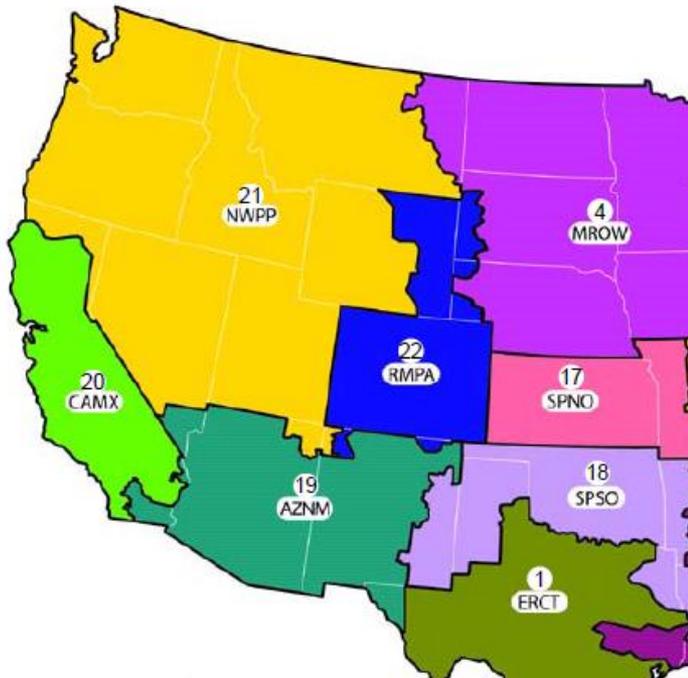
# Nationwide Power Sector CO<sub>2</sub> Emissions



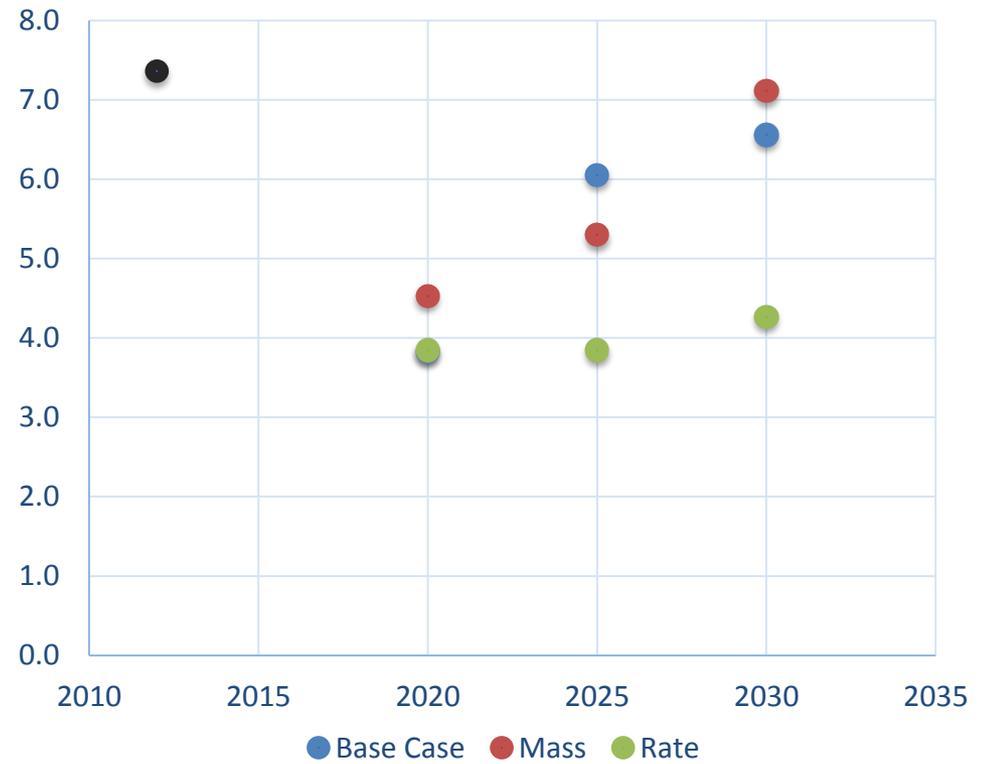
Note: Historical data from EPA's GHG inventory, projections from IPM.

# Electric Prices and Emissions - Washington

- ▶ Projected retail electricity price increase in the range of 2.1% to 3.2% across the NW (varies by year from 2020 to 2030)



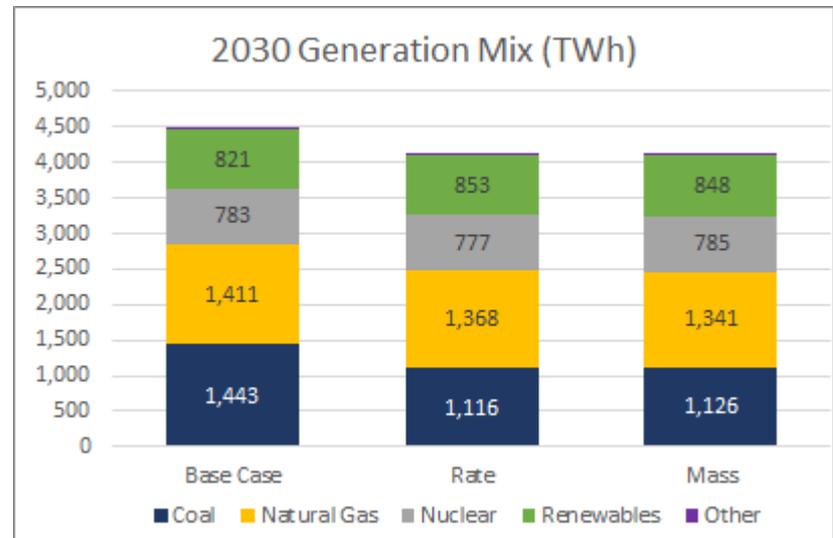
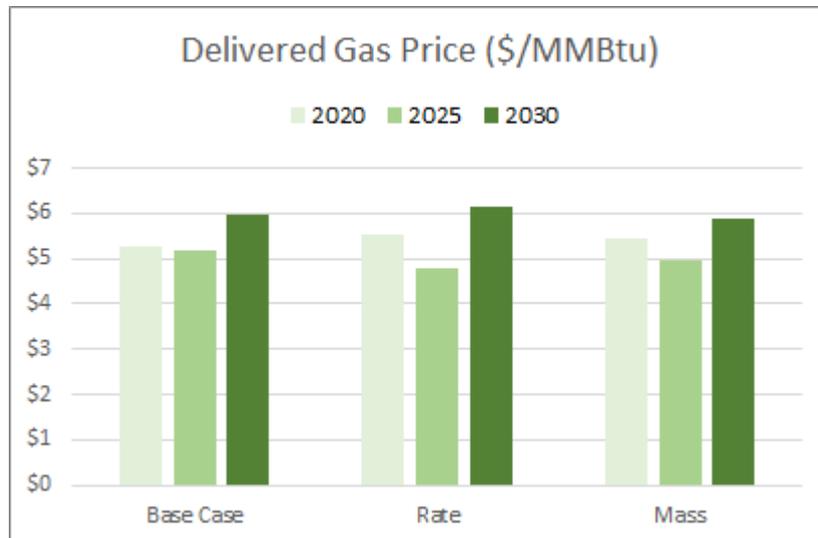
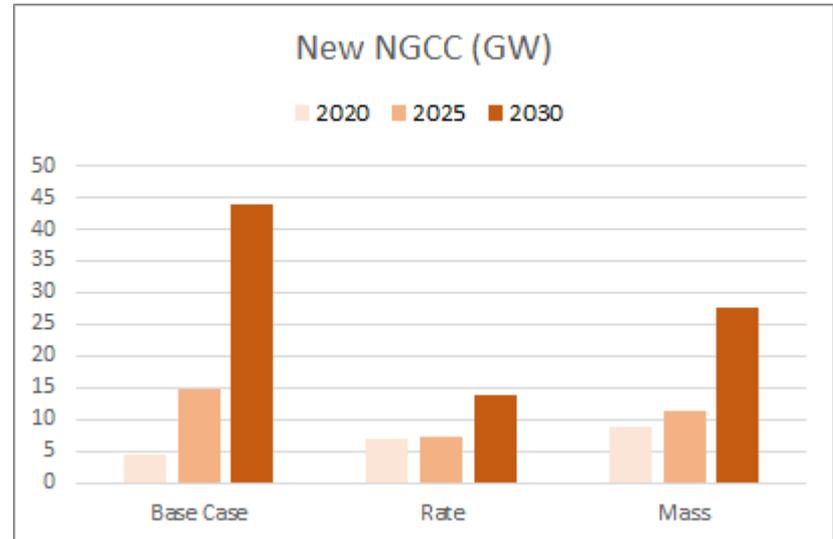
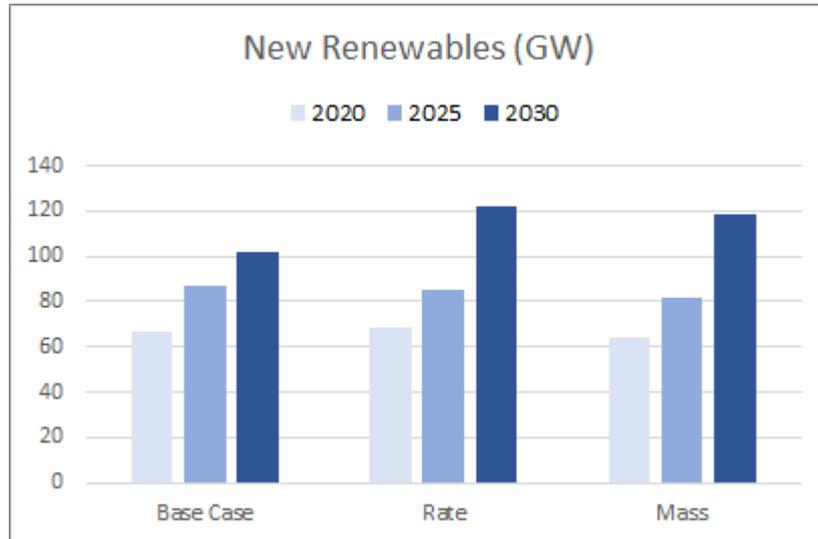
**Projected Emissions in the Base Case and CPP for Washington (million short tons CO<sub>2</sub>)**



*Emissions shown are from affected EGUs*

# Other Power Sector Impacts

*New RE capacity levels are from 2012 installed baseline*



# Many CO<sub>2</sub> Reduction Opportunities

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- Heat rate improvements
- Fuel switching to a lower carbon content fuel
- Integration of renewable energy into EGU operations
- Combined heat and power
- Qualified biomass co-firing and repowering
- Renewable energy (new & capacity uprates)
  - Wind, solar, hydro
- Nuclear generation (new & capacity uprates)
- Demand-side energy efficiency programs and policies
- Demand-side management measures
- Electricity transmission and distribution improvements
- Carbon capture and utilization for existing sources
- Carbon capture and sequestration for existing sources