

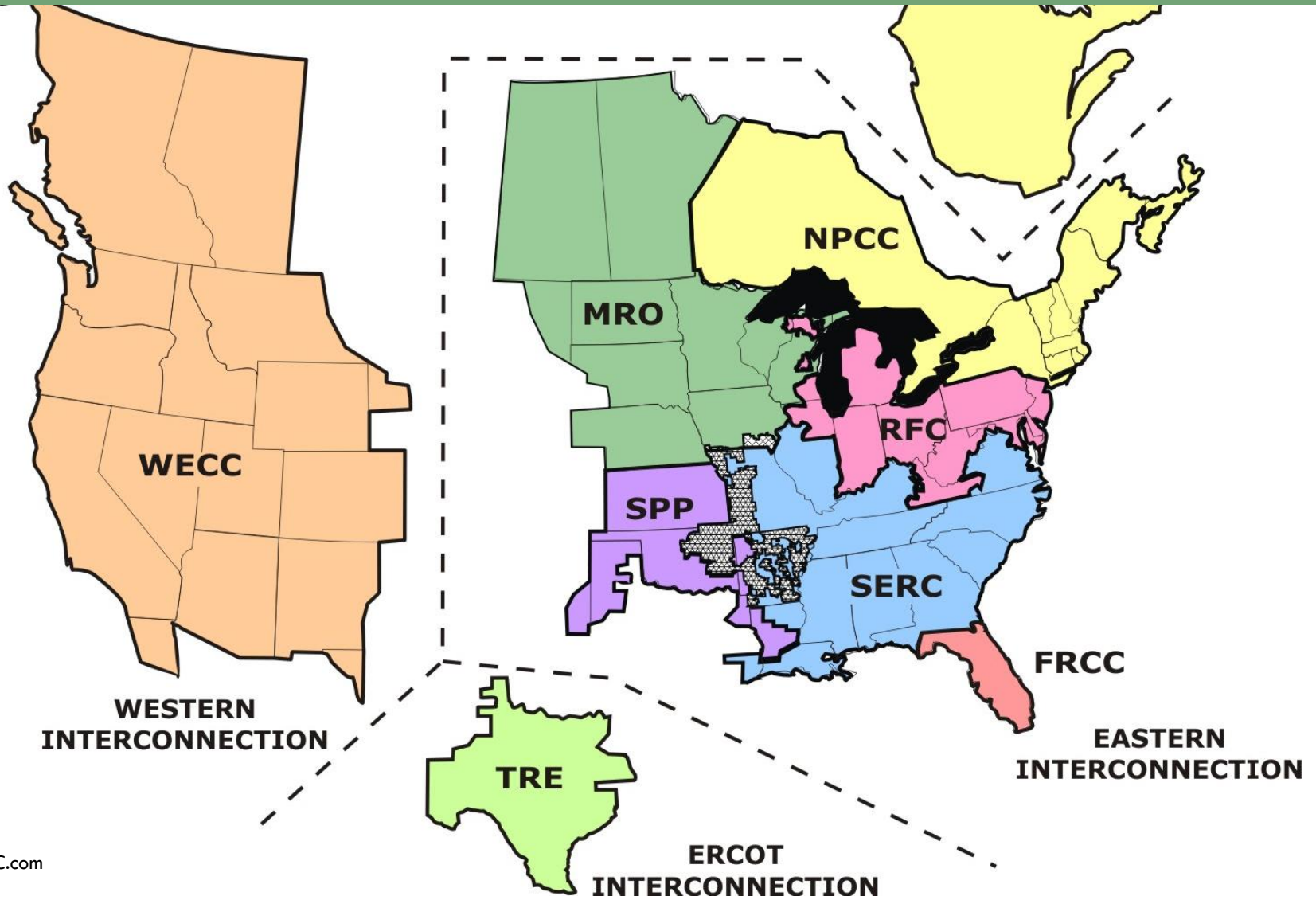
EPA'S CLEAN POWER PLAN: IMPLICATIONS FOR THE WESTERN GRID

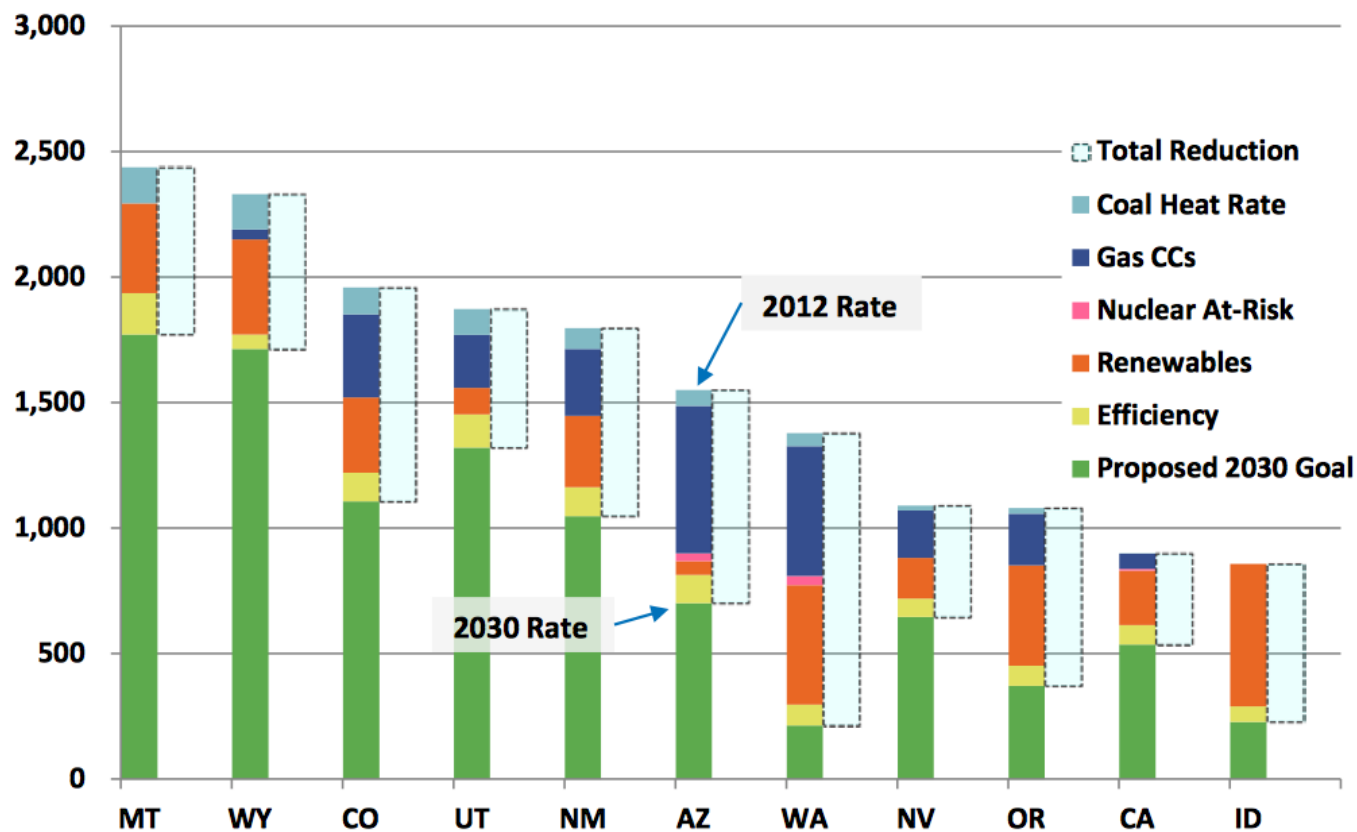


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NERC INTERCONNECTIONS





111(d) State Goals, WECC Region

Proposed carbon emission reductions in pounds per megawatt hour under EPA's proposed building blocks.

RESOURCE MIX IN U.S. PORTION OF THE WESTERN INTERCONNECTION

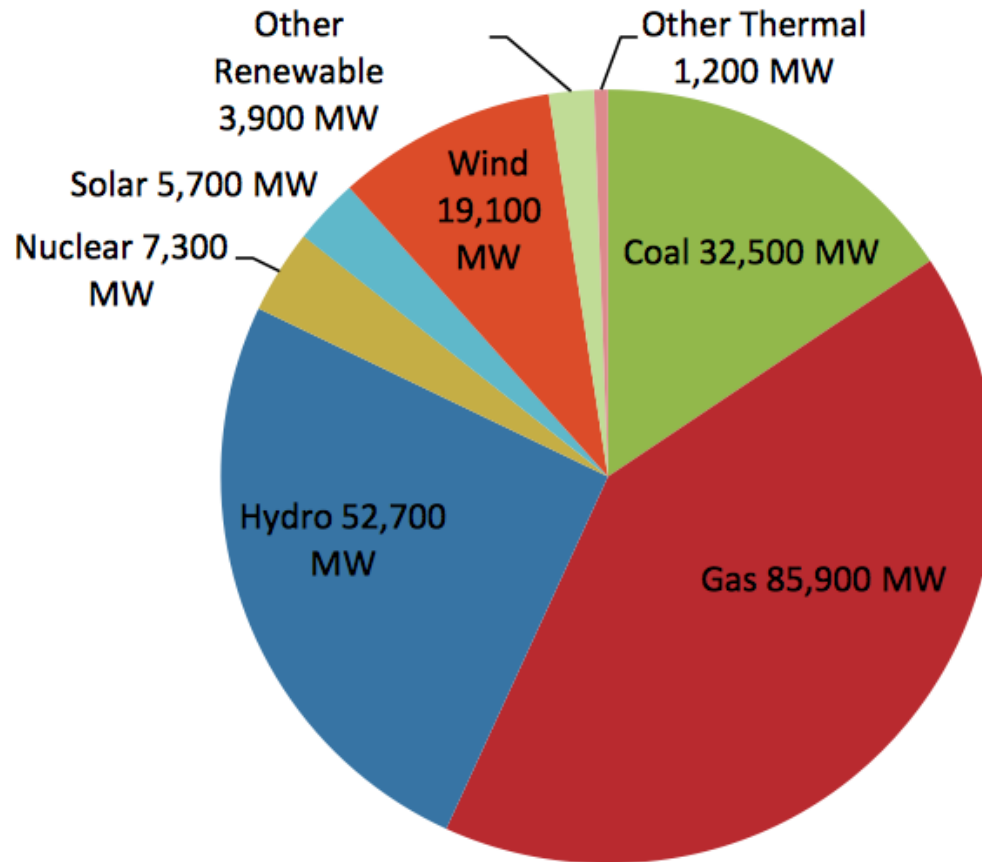
Gas: 41%

Hydro: 25%

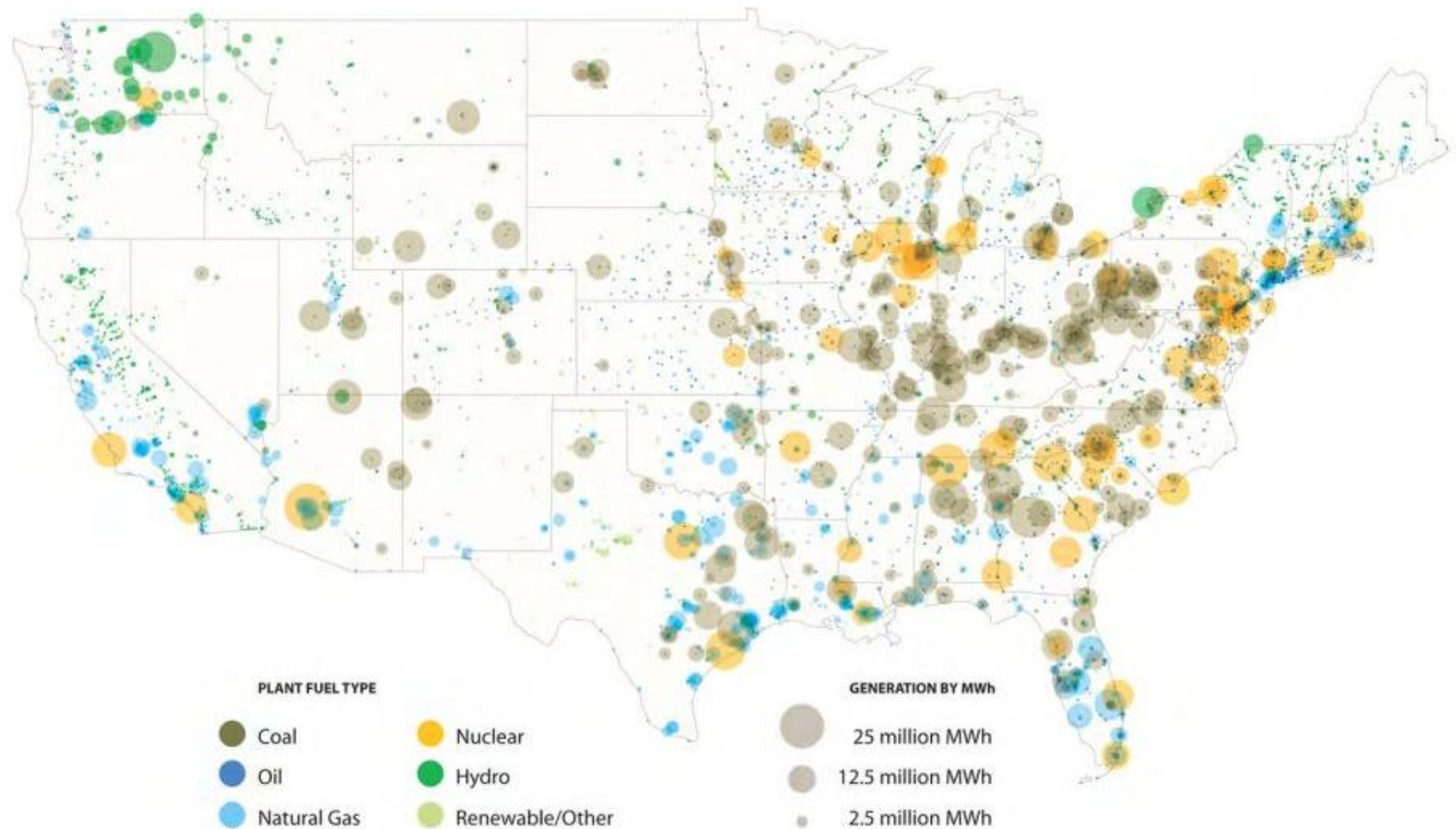
Coal: 16%

Renewables:
13%

Nuclear: 4%



LOCATION AND RELATIVE SIZE OF U.S. POWER PLANTS BY FUEL TYPE



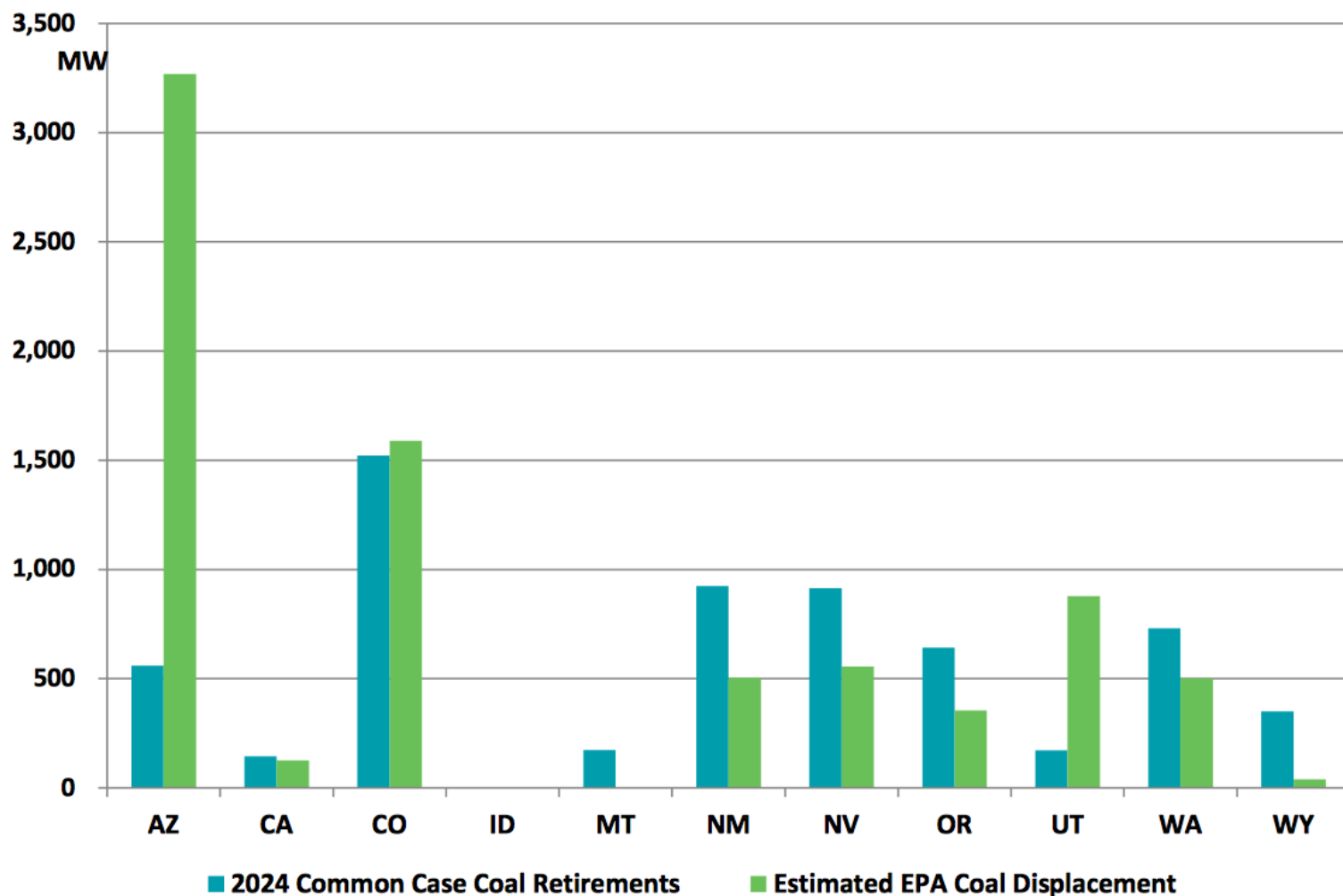


WESTERN TRANSMISSION GRID

Two coal-fired power plants are located in circled area:

- Four Corners Plant, 2,100 MW
- San Juan Plant, 1,600 MW

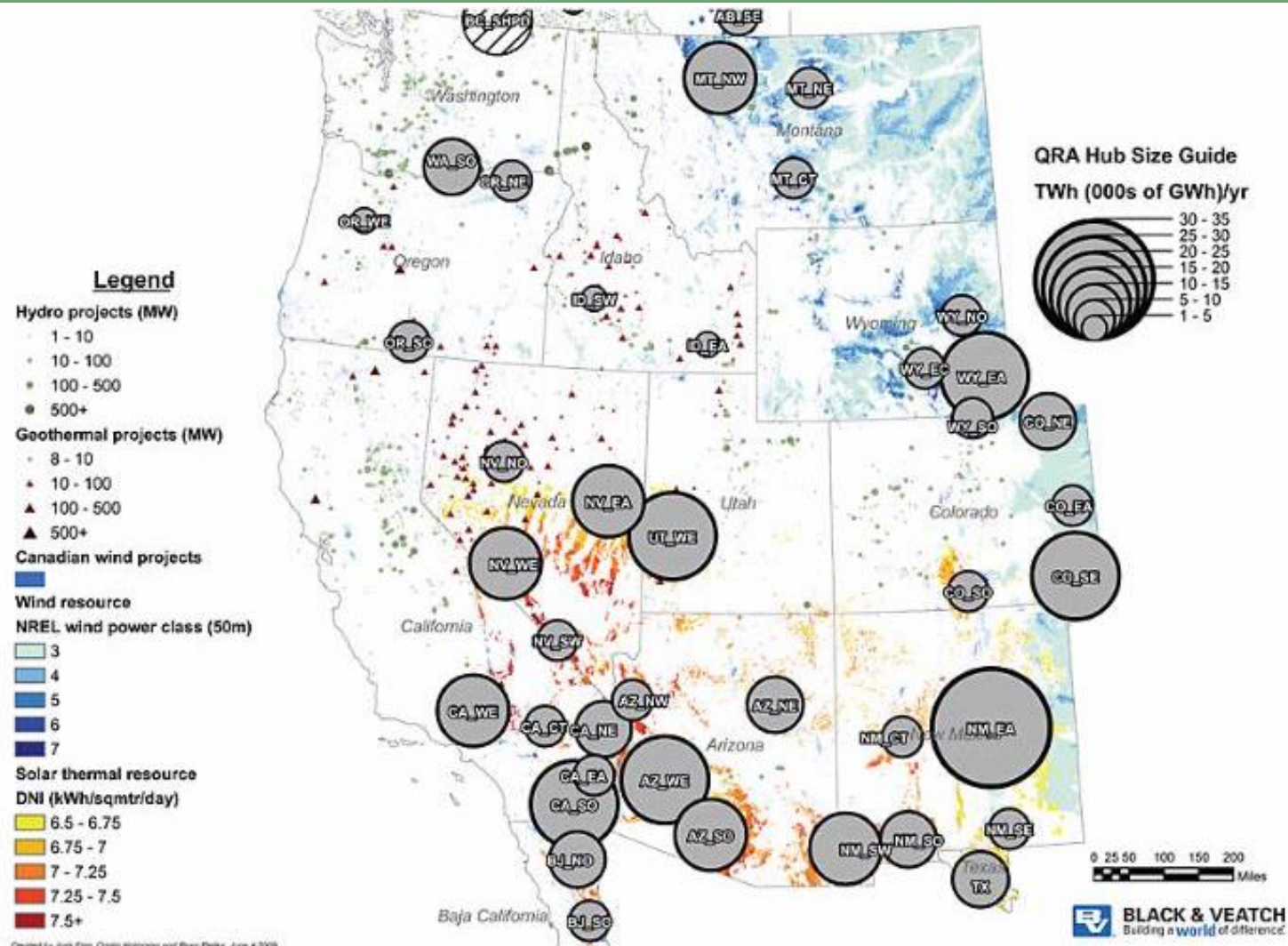
PROJECTED COAL RETIREMENTS BY STATE, 2010–2024



credit: WECC Clean Power Plan Phase I Report, fig. 5 (2014)

WESTERN RENEWABLE ENERGY ZONES

IDENTIFIED BY WESTERN GOVERNORS ASSOCIATION AND U.S. DEPARTMENT OF ENERGY



credit: Western Governors Association, Renewable Resources and Transmission in the West (2012)

PRIMARY CHALLENGES

▣ TRANSMISSION INFRASTRUCTURE

- How can we connect remote renewable energy hubs to major load centers?

▣ GRID INTEGRATION

- How can we replace coal and integrate variable energy resources onto the grid?

▣ COORDINATING COMPLIANCE

- How can we develop a 111(d) compliance structure that enables western states to achieve emission goals economically and efficiently?

OBTACLES AND CHALLENGES: INTERSTATE TRANSMISSION

- Demonstrating public need and benefits of interstate transmission facilities
- Siting difficulties and uncoordinated regulatory requirements
- Cost allocation and recovery limitations

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 - Must show clear need and public benefits that exceed costs
 - Focus is on in-state needs and benefits
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 - Projects may require uncoordinated authorizations from local, state, and federal regulators
- Cost allocation and recovery limitations
 - Participant funding approach does not allocate costs between beneficiaries
 - Incentivizes “free riders”

OBSTACLES AND CHALLENGES: GRID INTEGRATION

Increases in variable renewable power



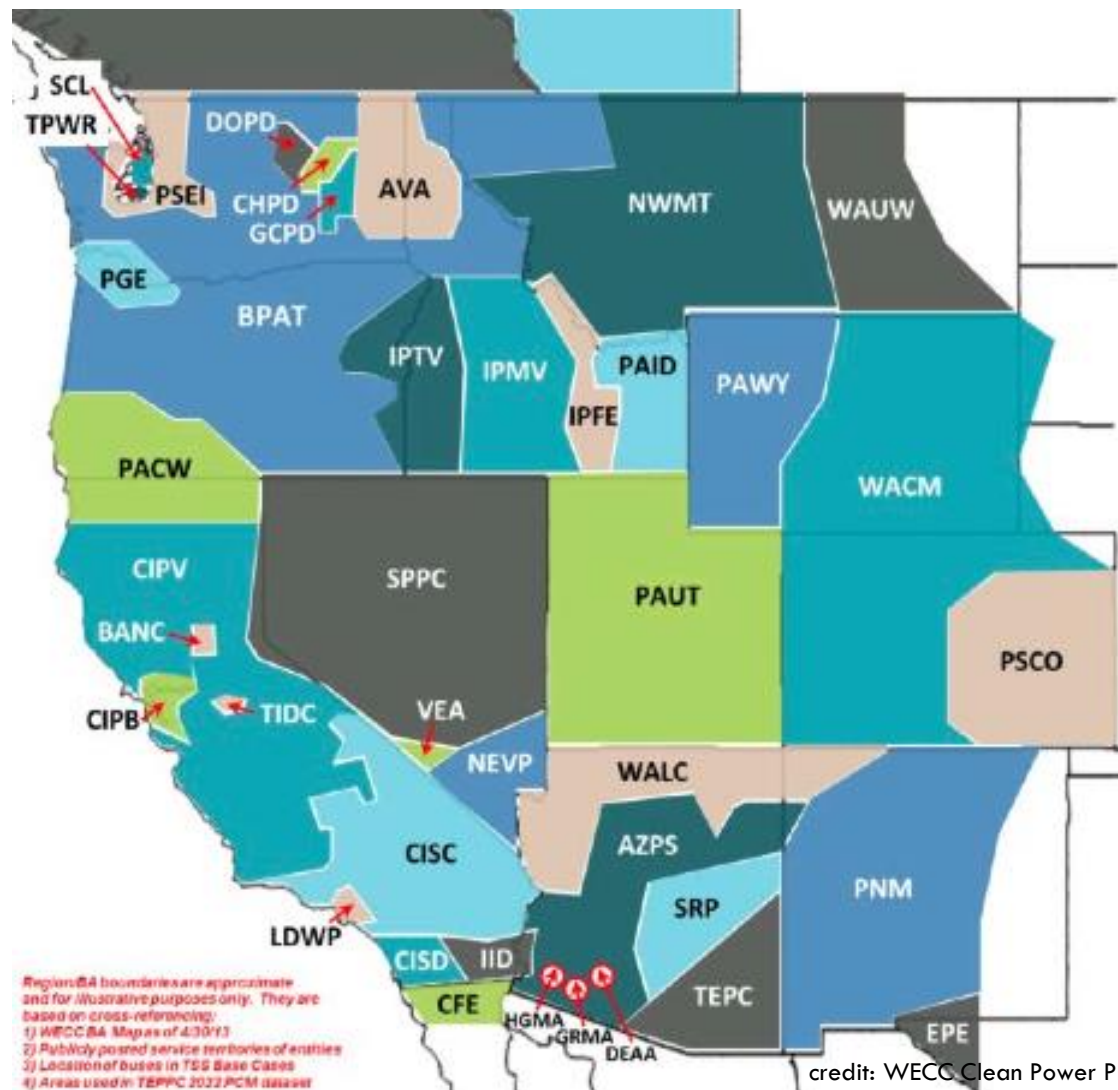
Decreases in baseload coal-fired power



COORDINATING 111(D) IMPLEMENTATION IN THE WESTERN INTERCONNECTION

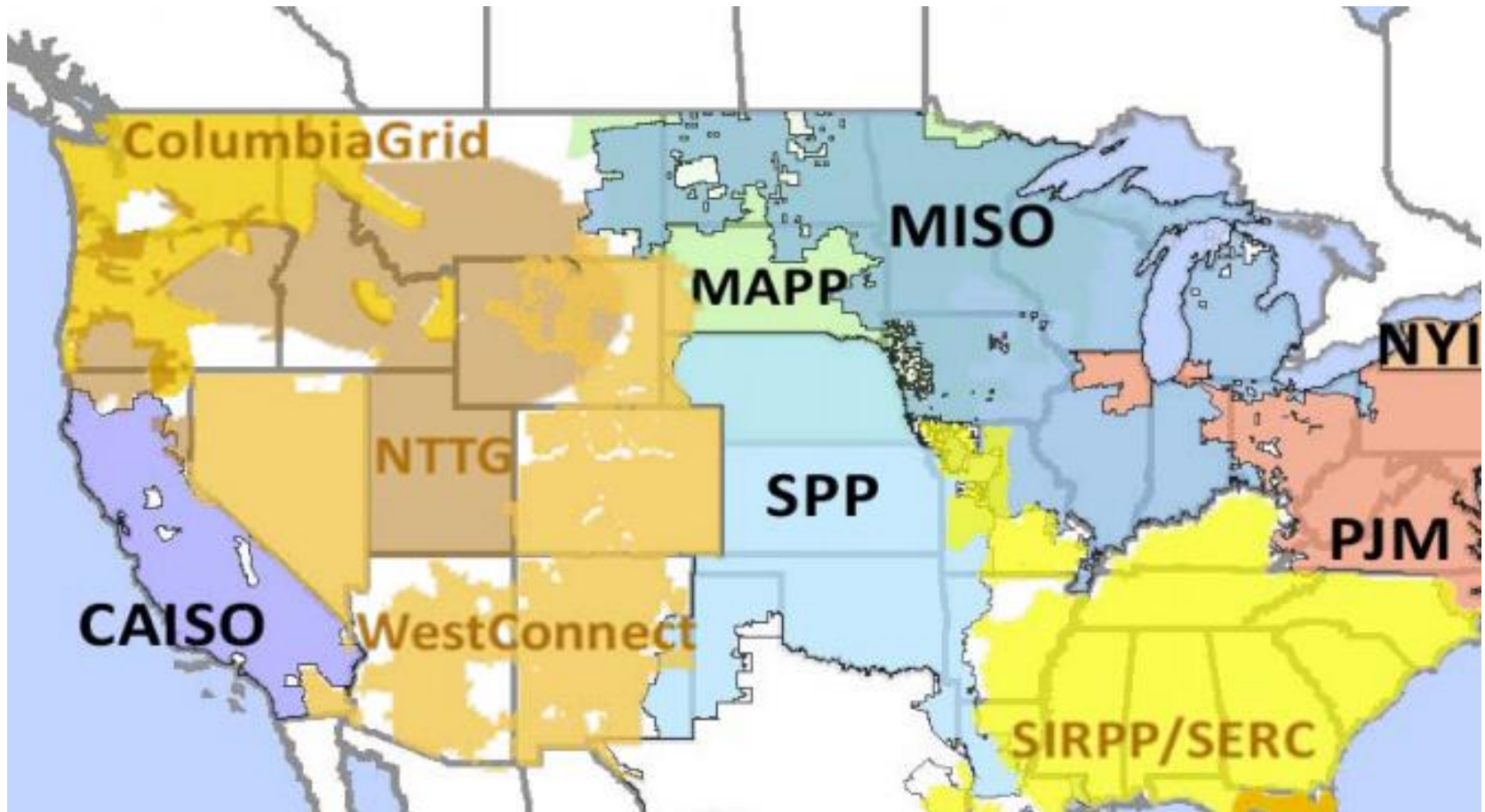


BALANCING AUTHORITIES

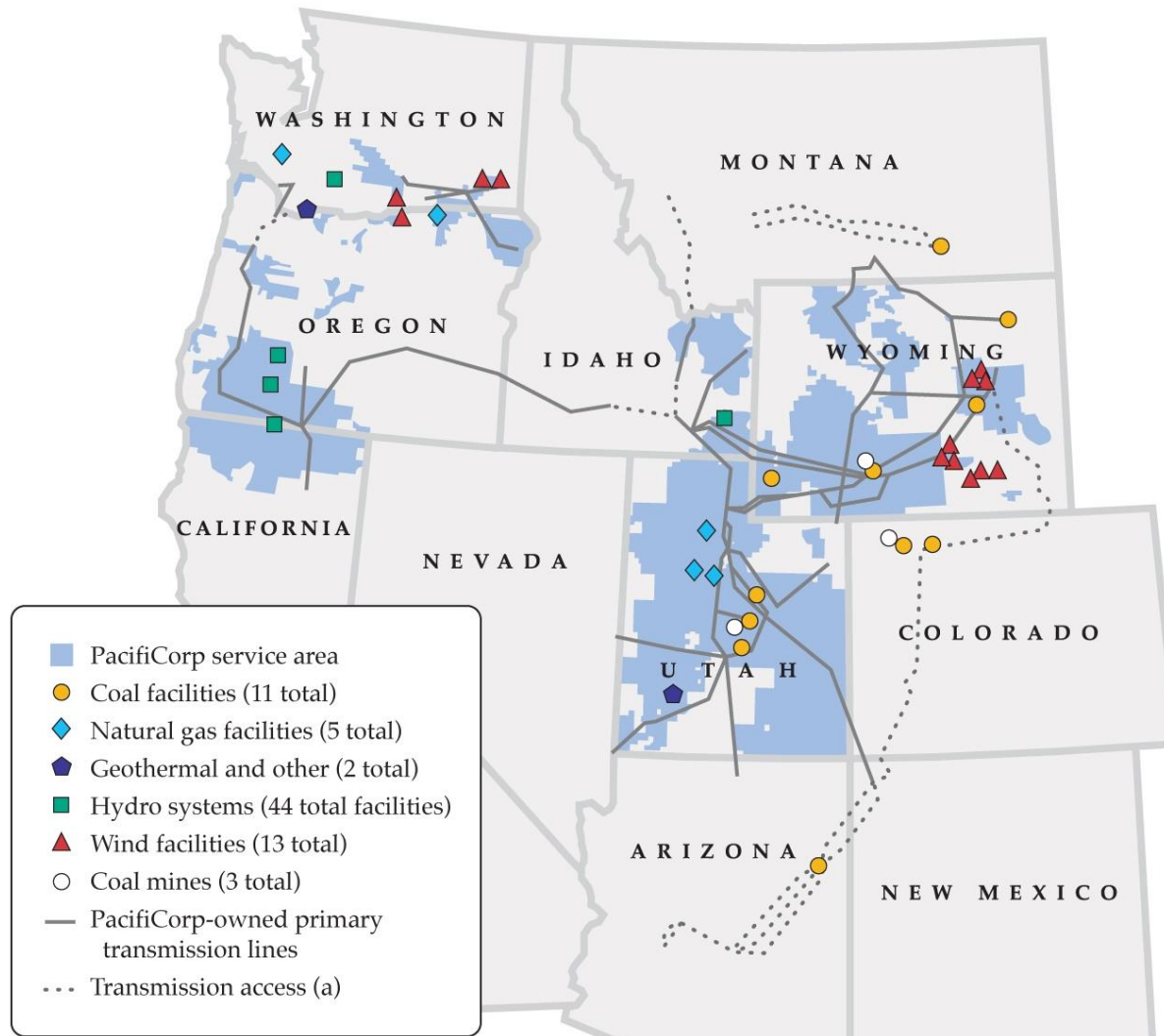


credit: WECC Clean Power Plan Phase I Report, fig. A-2 (2014)

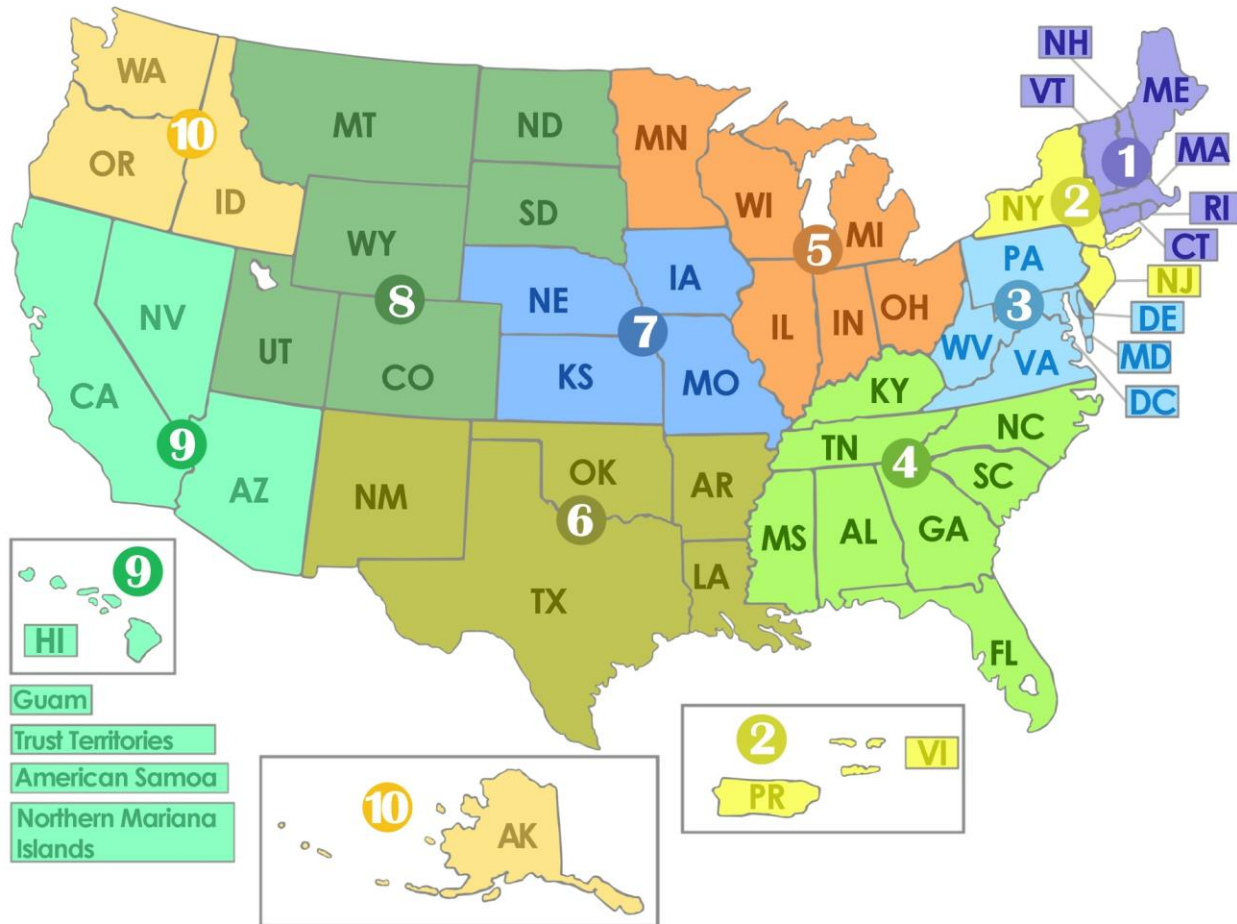
FERC PLANNING REGIONS



PACIFICORP'S SERVICE TERRITORY



EPA REGIONS



POLICY SOLUTIONS: FERC'S ORDER 1000

- Requires regional and interregional transmission plans produces through regional transmission planning processes
- Must consider transmission needs driven by public policy requirements
- Removes federal right of first refusal for regional transmission development
- Improves coordination between neighboring planning regions for new interregional transmission facilities
- Planners must establish methods to allocation costs of new transmission facilities between all beneficiaries

POLICY SOLUTIONS: TRANSMISSION PLANNING

1. Conduct coordinated, comprehensive transmission planning
2. Consult stakeholders early and often
3. Avoid and mitigate conflicts
4. Expand on Western Renewable Resource Zone process
5. Maximize use of existing infrastructure and evaluate transmission alternatives
6. Identify and prioritize transmission needs driven by public policy requirements
7. Link transmission planning and cost allocation processes

POLICY SOLUTIONS: TRANSMISSION POLICY

- ▣ NEED

- ▣ SITING

- ▣ COST ALLOCATION

POLICY SOLUTIONS: TRANSMISSION POLICY

▣ NEED

1. Consider additional public interest factors
2. Quantify regional transmission benefits
3. Revise definition of “used and useful”

▣ SITING

▣ COST ALLOCATION

POLICY SOLUTIONS: TRANSMISSION POLICY

▣ NEED

1. Consider additional public interest factors
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3. Revise definition of “used and useful”

▣ SITING

1. Establish one uniform, coordinated siting process
2. Consider interstate compacts to harmonize interstate transmission siting

▣ COST ALLOCATION

POLICY SOLUTIONS: TRANSMISSION POLICY

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▣ SITING

1. Establish one uniform, coordinated siting process
2. Consider interstate compacts to harmonize interstate transmission siting

▣ COST ALLOCATION

1. Allocate costs between those who benefit from new transmission facilities, in proportion to the benefits received
2. Consider benefits relating to grid reliability, reserve sharing, congestion relief, production cost reductions, and achieving policy goals

POLICY SOLUTIONS: INTEGRATING VARIABLE RENEWABLES

▣ OPTIMIZE GRID OPERATIONS

1. Improve forecasting
2. Intra-hour scheduling
3. Dynamic transfers between balancing areas
4. Improved reserve sharing

▣ IMPLEMENT ADVANCED TECHNOLOGIES

1. Smart grid-enabled demand response
2. Dynamic line rating systems

▣ CONSIDER A MARKET-BASED APPROACH

1. Energy Imbalance Market

HARMONIZING 111(D) IMPLEMENTATION

- Consider how potential implementation plans or compliance frameworks will impact the grid.
- State 111(d) implementation agencies should collaborate with regional transmission planning groups to ensure that 111(d) implementation plans are compatible with regional and interregional transmission plans.
- WECC should conduct a comprehensive interconnection-wide assessment of 111(d) implementation plans to assess their impacts on the western grid.