Synapse
Energy Economics, Inc.

HARVARD LAW SCHOOL
Environmental Law Program
POLICY INITIATIVE

Final Clean Power Plan: First Cut

August 5, 2015

Speakers

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Content questions for today's speakers can be directed to
webinar@synapse-energy.com

Photo: Wichita Eagle. Flat Ridge Wind Farm

Webinar Logistics

- The webinar is being recorded and will be circulated to all attendees
- All attendees have been muted on entry and will remain muted throughout the webinar
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- During the Q&A session, the panelists will answer written questions that have been sent to webinar@synapse-energy.com
- Please use the chat feature only to notify the host if you are having a technical issue with the WebEx software

EPA Rules and Documents Released on August 3

1. The Clean Power Plan – final rule
2. Proposed Federal Plan and Proposed Model Rules – proposed rules
3. Carbon Pollution Standards for New, Modified, and Reconstructed Power Plants – final rule
4. Regulatory Impact Analyses
5. Technical Support Documents
6. Draft Evaluation, Measurement, and Verification (EM&V) Guidance for Demand-Side Energy Efficiency

The Big Change in the Final Clean Power Plan

The final rule is premised on nationally uniform, unit-specific performance rates, and not state targets.

The change is motivated in part by EPA's legal defense.

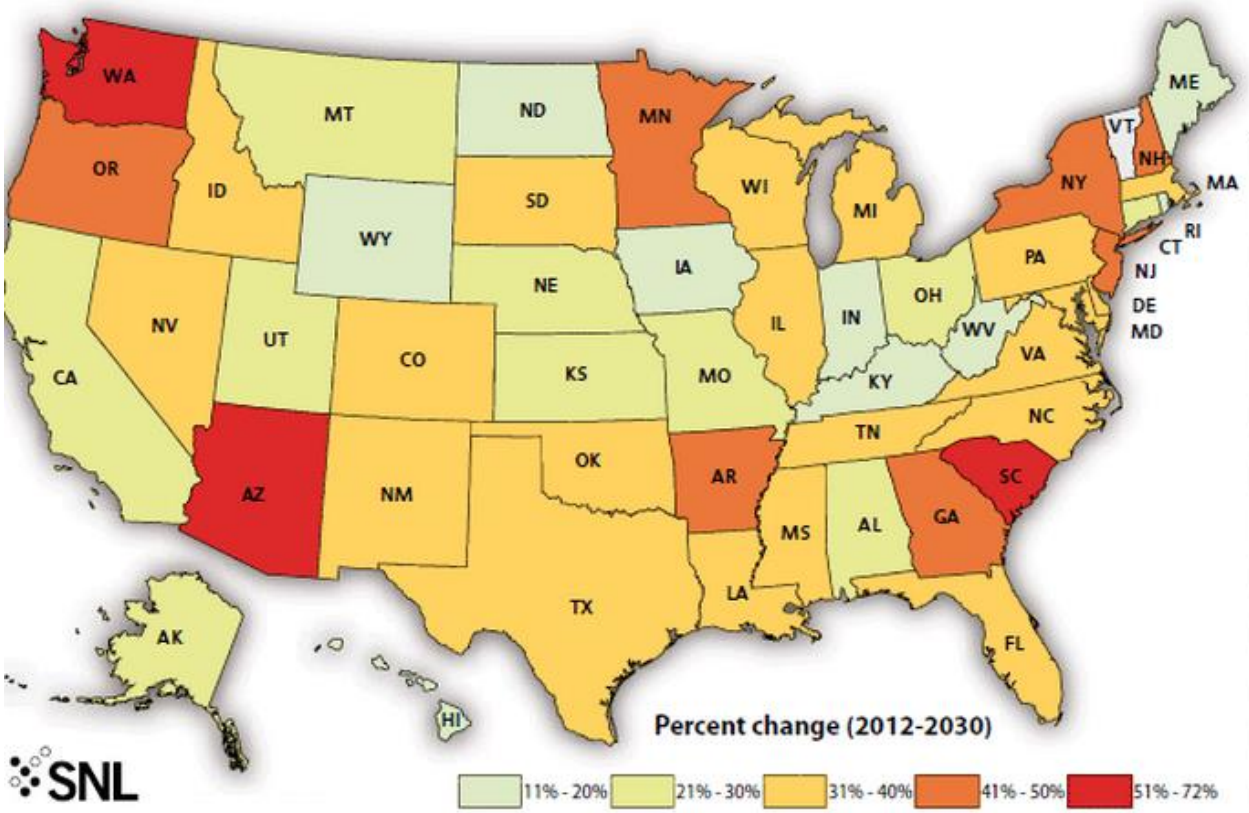
Clean Air Act Section 111

- EPA sets a "standard of performance" for a source category.
- For existing sources, 111(d) provides that each state shall submit a plan to EPA that "establishes standards of performance for any existing source" to which a standard of performance would apply if that source were a new source.
- "**standard of performance** means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of *the best system of emission reduction* . . ."
- There are no court decisions about 111(d) standards.

EPA's 2014 Proposal

- The Best System of Emission Reduction (BSER) *applied to each state's fleet of generators* and consisted of:
  1. Heat rate improvements to coal-fired plants;
  2. Shifting utilization from coal-fired plants to NGCCs;
  3. Displacing emitting generation with renewables; and
  4. Increasing end-use energy efficiency.

EPA's 2014 Proposal



State	Final emissions rate goal (2030+)	State	Final emissions rate goal (2030+)
Alabama	1,059	Montana	1,771
Alaska	1,003	Nebraska	1,479
Arizona	702	Nevada	647
Arkansas	910	New Hampshire	486
California	537	New Jersey	531
Colorado	1,108	New Mexico	1,048
Connecticut	540	New York	549
Delaware	841	North Carolina	992
Florida	740	North Dakota	1,783
Georgia	834	Ohio	1,338
Hawaii	1,306	Oklahoma	895
Idaho	228	Oregon	372
Illinois	1,271	Pennsylvania	1,052
Indiana	1,531	Rhode Island	782
Iowa	1,301	South Carolina	772
Kansas	1,499	South Dakota	741
Kentucky	1,763	Tennessee	1,163
Louisiana	883	Texas	791
Maine	378	Utah	1,322
Maryland	1,187	Virginia	810
Massachusetts	576	Washington	215
Michigan	1,161	West Virginia	1,620
Minnesota	873	Wisconsin	1,203
Mississippi	692	Wyoming	1,714
Missouri	1,544		

Legal and Practical Critiques Of EPA's 2014 Proposal

- State goals
- Non-Emitters
- Building Block 4
- Timing

EPA's Solutions in the Final Rule

- Set uniform emission guidelines for Fossil Steam (coal and O/G) and NGCC units.
- Make EGUs the only entities with federally enforceable requirements, while providing states with flexibility.
- Remove end-use energy efficiency from BSER but allow it to be used for compliance, primarily as a credit-generating mechanism.
- Push compliance period to 2022.

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Differences in BSER

$$\text{Proposed 111(d) Emission Rate} = \frac{\text{Fossil Fuel Emissions (lbs of } CO_2\text{)}}{\text{Fossil Fuel Generation (MWh)} + \text{Nuclear Generation (MWh)} + \text{Renewable Generation (MWh)} + \text{Energy Efficiency (MWh)}}$$

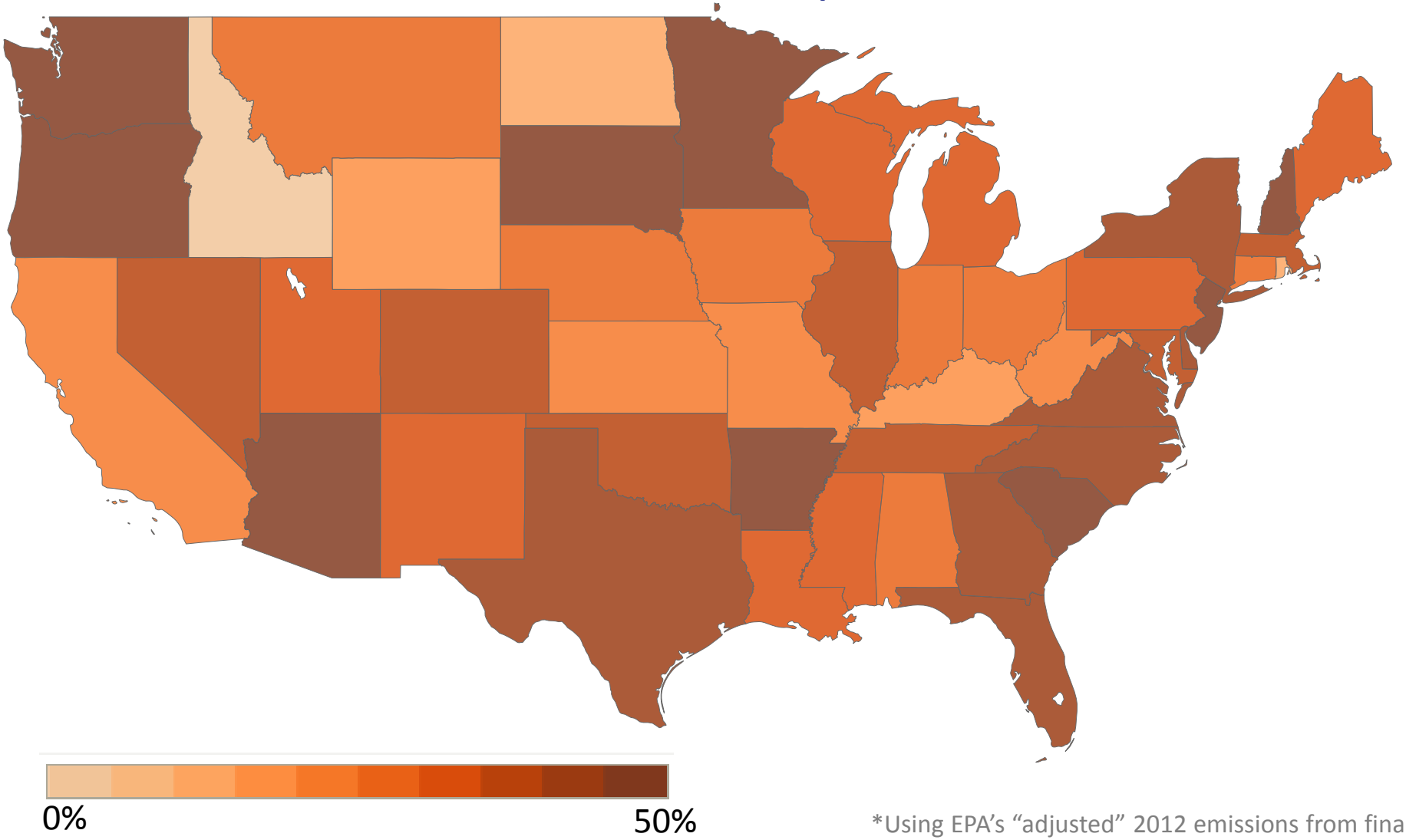
$$\text{Final 111(d) BSER Emission Rate for Fossil Steam} = \frac{\text{Fossil Steam Emissions (lbs of } CO_2\text{)}^1 + \text{NGCC Incremental Emissions (lbs of } CO_2\text{)}}{\text{Fossil Steam Generation (MWh)} + \text{NGCC Incremental Generation (MWh)} + \text{Renewable Generation (MWh)}^2}$$

$$\text{Final 111(d) BSER Emission Rate for NGCC} = \frac{\text{NGCC Emissions (lbs of } CO_2\text{)}^3}{\text{NGCC Generation (MWh)}^3 + \text{Renewable Generation (MWh)}^2}$$

[1] Fossil Steam emissions adjusted for heat rate improvements
[2] Renewable generation is the amount of renewables that displace either Fossil Steam or NGCC
[3] NGCC emissions and generation include all NGCC generation and emissions, including the incremental pieces

Proposed Rule Reductions

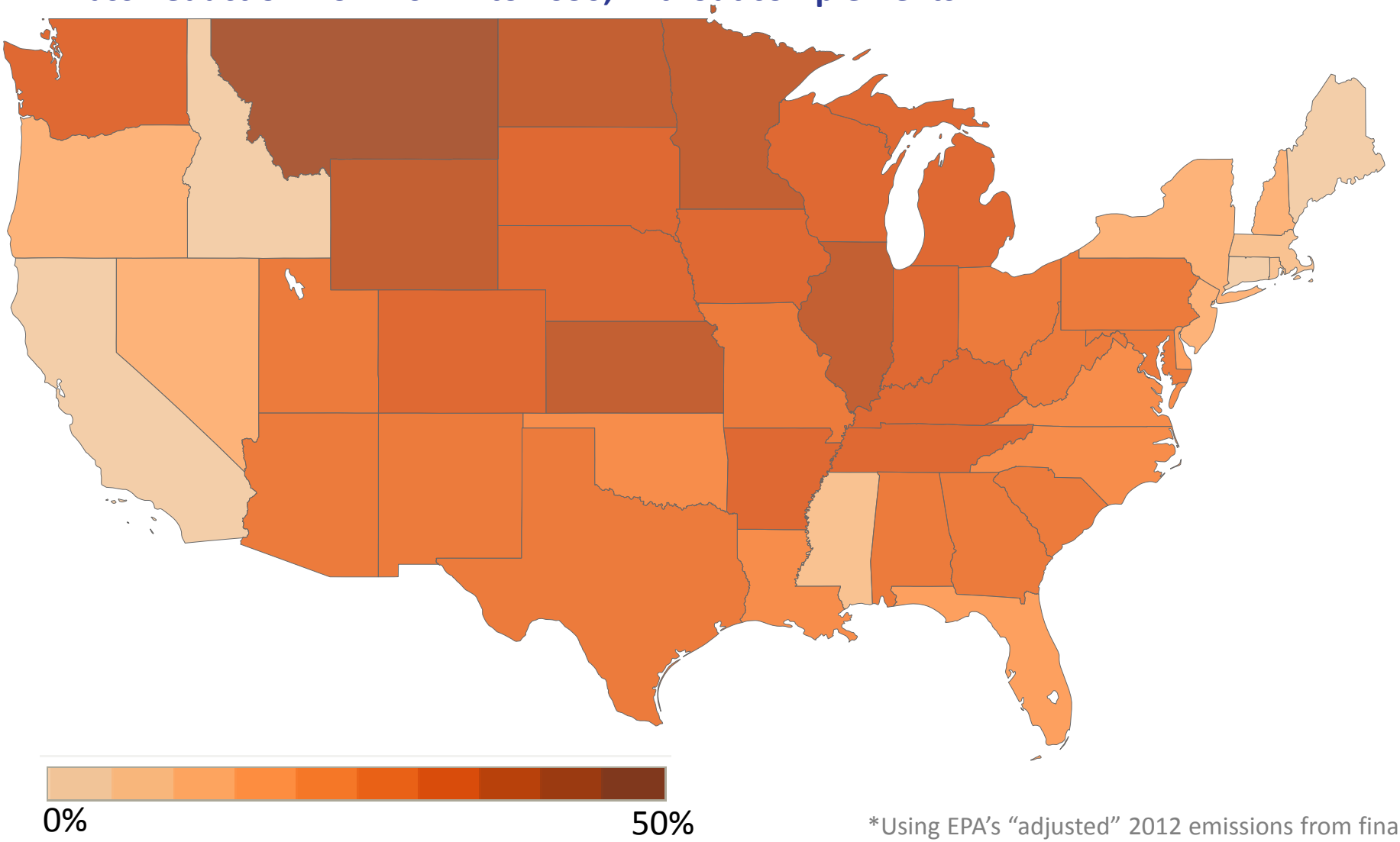
Mass Reduction from 2012* to 2030; without complements



*Using EPA's "adjusted" 2012 emissions from final

Final Rule Reductions

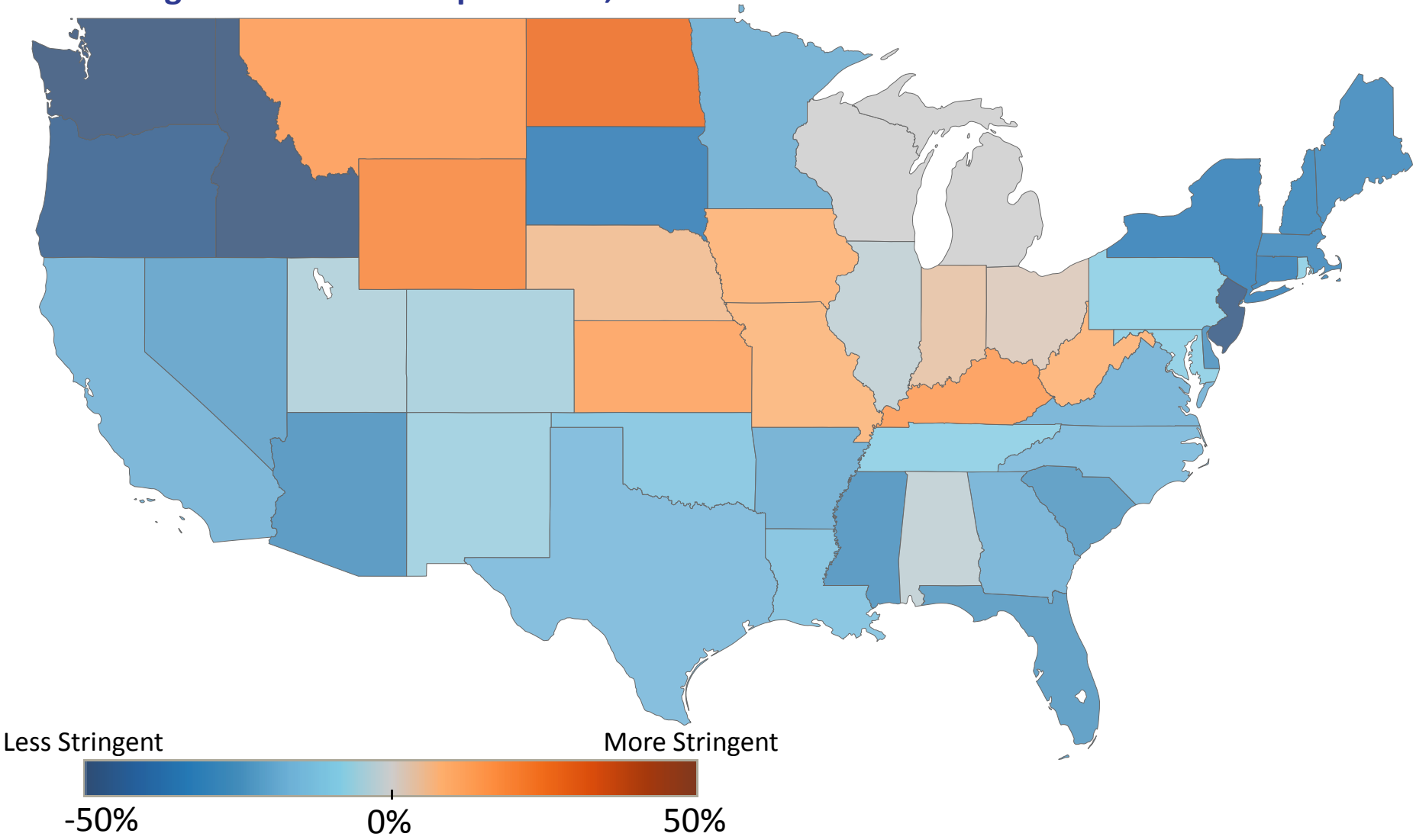
Mass Reduction from 2012* to 2030; without complements



*Using EPA's "adjusted" 2012 emissions from final

Change in Stringency from Proposal to Final

Change in Reduction Requirement, Relative to 2012

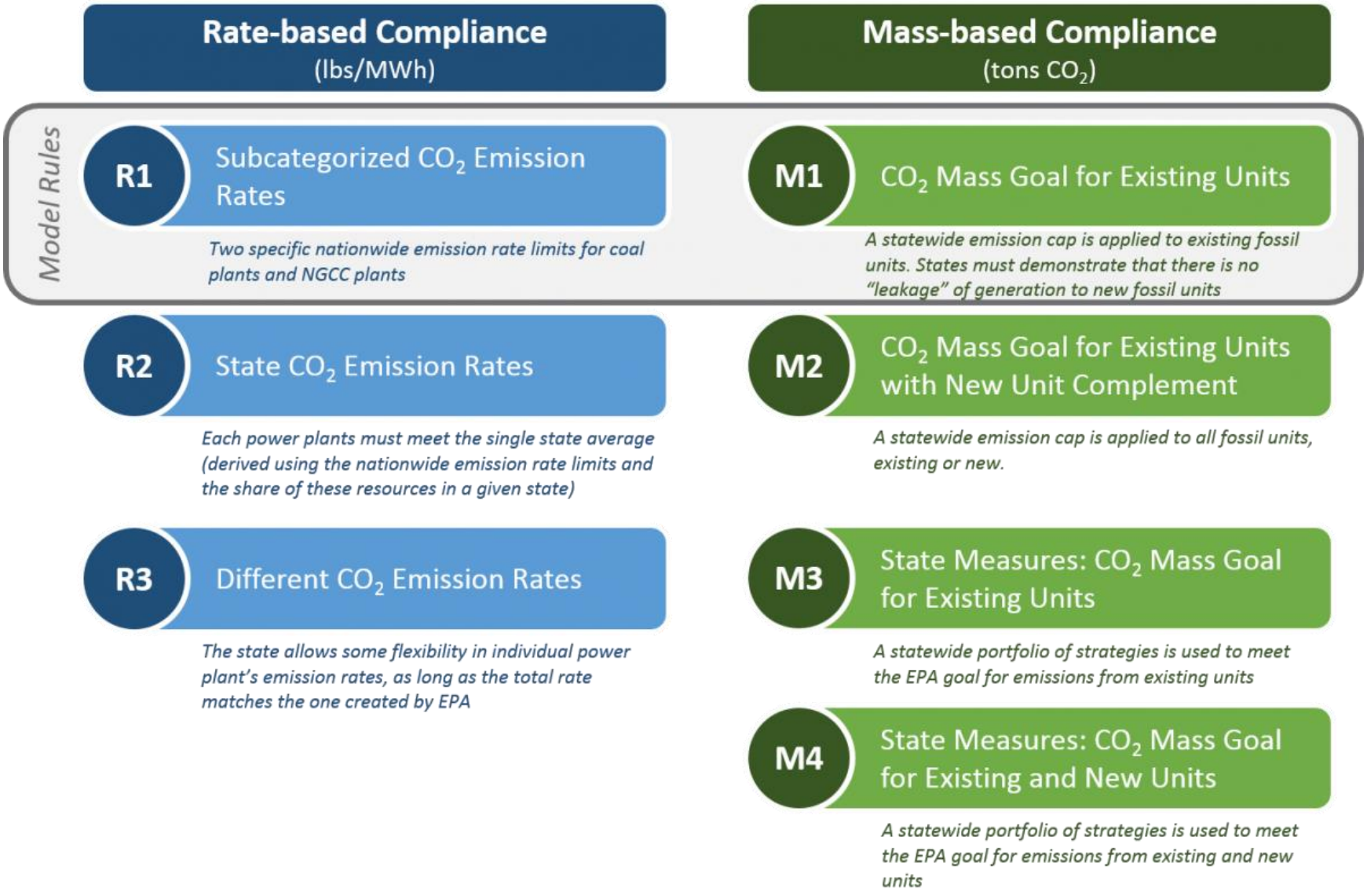


U.S. Reductions from 2012 to 2030

without New Source Complements

	Existing Sources Only	Existing and New Sources
Proposed Reduction	748 million tons	509 million tons
	34%	23%
Final Reduction	587 million tons	547 million tons
	26%	25%

Compliance Pathways



Emission Rate Credits

- Emissions Rate Credits (ERCs)
  - Unit of trade for rate-based states, produced in MWh
  - Are not RECs, but similar structure to unbundled RECs
  - For low or no emissions resources

    or
  - Affected unit generation below subcategory rate

    or
  - Incremental NGCC generation above baseline ("gas-shift ERCs")
- Emissions Rate Credits generated by any low or no emissions resource installed in 2013 or thereafter.
  - Credits only accrue after 2022
  - ERCs can be banked indefinitely.
  - Gas-shift ERCs can only be used in subcategory rate states for fossil steam compliance

Emission Rate Credits

- ERCs can be issued to
  - Renewable energy (wind, solar, geothermal, hydro, wave, tidal)
  - Qualified biomass
  - Waste-to-energy (biogenic portion)
  - Nuclear
  - Non-affected CHP
  - Energy efficiency
  - Transmission & distribution improvements
  - Other approved resources
- ERCs cannot be issued to
  - Energy storage
  - New stationary sources
- ERCs cannot be issued from mass-based states to rate-based states unless the producer holds a power purchase agreement with the rate-based state

Trading Mechanisms

Mass-Based Trading

- Allowance-based system
- Traditional cap-and-trade
- States establish allowance system, subject to EPA approval.

ERC Trading

- ERCs can be traded through central system (to be established) or bilateral trades
- States responsible for EM&V on ERCs

Rate-Based Trading

- Requires common rate standard (i.e. multi-state plan) or subcategory-specific emission rates
- States establish crediting system, subject to EPA approval

Multi-State Issues

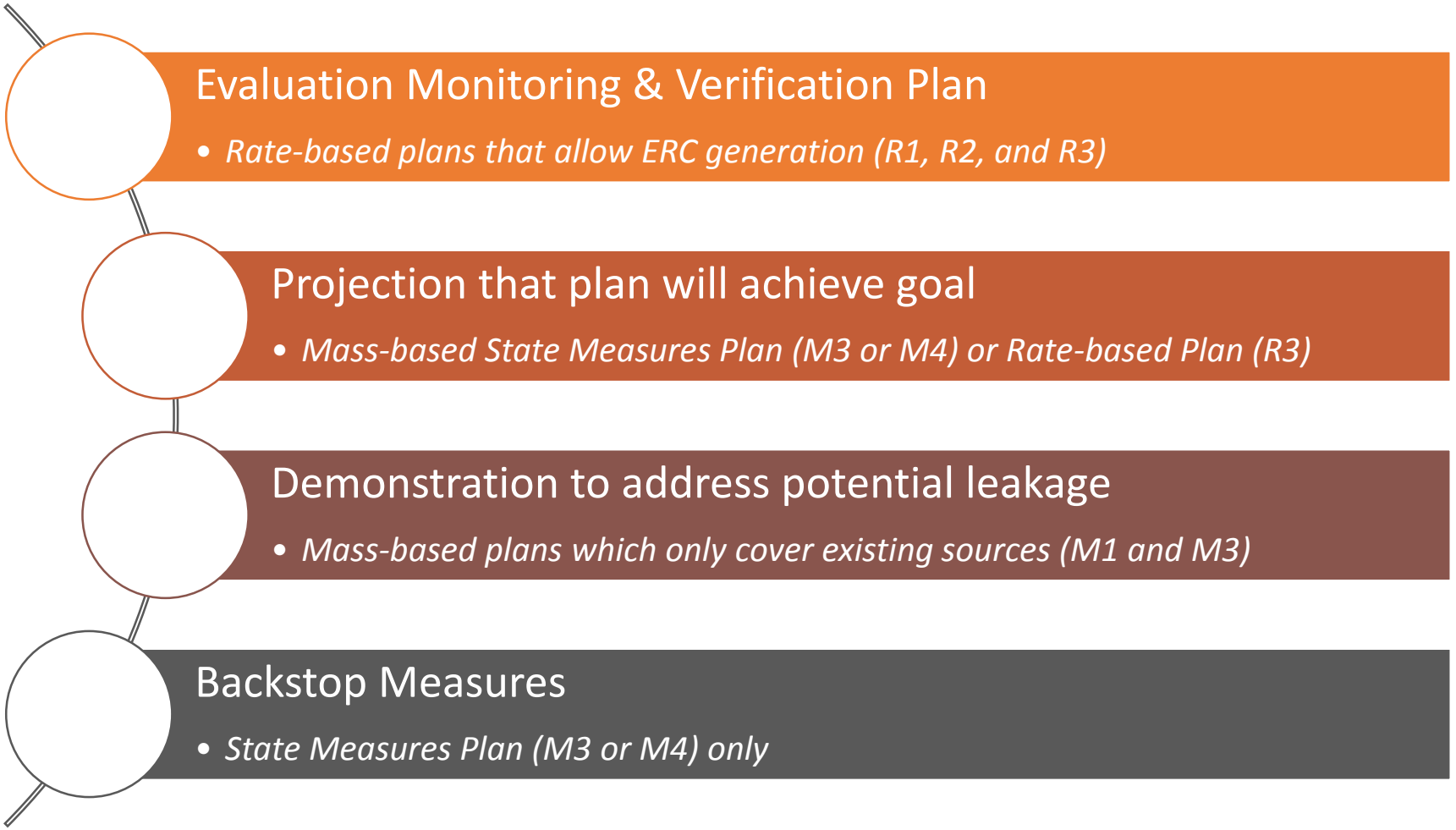
Multi-State Plans

- States may submit multi-state plans
  - Mass: aggregate total CO_2 targets
  - Rate: Weighted average emissions rate (based on 2012 generation)
- Advantages
  - Facilitates rate-based trading
  - Assures uniform treatment of ERCs (rate)
  - Not as critical under final as in proposal

Leakage

- EPA concerned about leakage from existing sources to new sources under mass approach
  - Specific demonstration of no-leakage, or
  - Allowance allocation to advantage existing sources
- EPA concerned (less) about ERC leakage to mass-based states
  - Mass-based states may not produce ERCs unless a PPA is in place for generating units

Plan Components



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Compliance Periods

Interim Period: Jan. 1, 2022 – Dec. 31, 2029, comprised of three interim steps:

- Step 1: Jan. 1, 2022 – Dec. 31, 2024
- Step 2: Jan. 1, 2025 – Dec. 31, 2027
- Step 3: Jan. 1, 2028 – Dec. 31, 2029

Final Period: Jan. 1, 2030 and every year thereafter

Final Reporting Period: A two-year increment of plan performance within the Final Period; first reporting period is Jan. 1, 2030 – Dec. 31, 2031.

CPP State Submission Timelines

- **Aug. 3, 2015:** EPA issued final rule
- **Sept. 6, 2016:** State plan/initial submittal deadline
- **Sept. 6, 2017:** Update for states submitting in 2018
- **Sept. 6, 2018:** Deadline for state, multi-state plans
- **July 1, 2023:** Deadline for 1st annual **state measures** report (becomes biannual in final period)
- **July 1, 2025:** Deadline for 1st interim step report
- **July 1, 2028:** Deadline for 2nd interim step report
- **July 1, 2032:** Deadline for first final period report

Initial 2016 Submissions

States can submit a final plan in 2016. Or, States can make an initial submission which must:

- Identify final plan approaches being considered by the state;
- Justify needing additional time to submit;
- Describe public comment, engagement opportunities;
- Include non-binding statement of intent to participate in the "early credit" Clean Energy Incentive Program

Initial submissions are considered granted unless EPA notifies a state within 90 days of receipt.

Failure to submit will trigger the "FIP Process."

2017 Reports

If a state was granted an extension after filing an initial submission, it must file a report in 2017.

The 2017 report must:

- Summarize the status of each component of the final plan
- Commit to a plan approach
- Include a comprehensive roadmap with a schedule and milestones for completing the final plan
- Include non-binding statement of intent to participate in the "early credit" Clean Energy Incentive Program

Final Plans

A final plan must:

- Identify affected EGUs, and the emission standards and compliance periods;
- Identify applicable monitoring, reporting, and recordkeeping requirements;
- Describe reporting obligations, timelines; and
- Require implementation of corrective measures, if triggered

If the plan relies on state measures, the plan must:

- Demonstrate the measures will achieve compliance and
- Describe a federally enforceable backstop

Enforcement of State Plans

- A state can enforce EGU emission standards or state measures.
- EPA can enforce EGU emission standards, EGU false material statements in compliance reports or failure to submit reports, and falsification of monitoring data.
- Citizens can enforce EGU emission standards but not state measures (citizens groups can enforce the backstop).

Requirements for Emission Standards, Credits, and Allowances in State Plans

Each EGU emission standard (whether based on the unit's emissions, allowances, or ERCs) and each state measure must be:

- Quantifiable: reliably measured in a replicable manner;
- Non-duplicative: not already incorporated in another state plan;
- Permanent: persists for a compliance period;
- Verifiable: adequate monitoring, recordkeeping and reporting requirements are in place; and
- Enforceable: specifies a clearly defined, technically accurate limitation or requirement, time period for compliance, methodology for determining compliance, and there is sufficient legal authority.

Proposed Federal Plan

- EPA will promulgate a federal plan only in the states that did not submit an approvable state plan or did not receive an extension in 2016.
- EPA has proposed two types of federal plans – a mass-based trading program and a rate-based trading program – but intends to use a single type of plan for every state that gets a federal plan.
- EPA has proposed that the federal plans' rules could be used by states to implement trading programs in their plans.
- The mass-based federal plan is similar to the Clean Air Mercury Rule (2005).

Synapse Clean Power Plan Resources

Synapse Clean Power Plan Toolkit: http://synapse-energy.com/CleanPowerPlan

Consumer Costs of Low-Emissions Futures Factsheets and Reports: http://synapse-energy.com/project/consumer-costs-low-emissions-futures

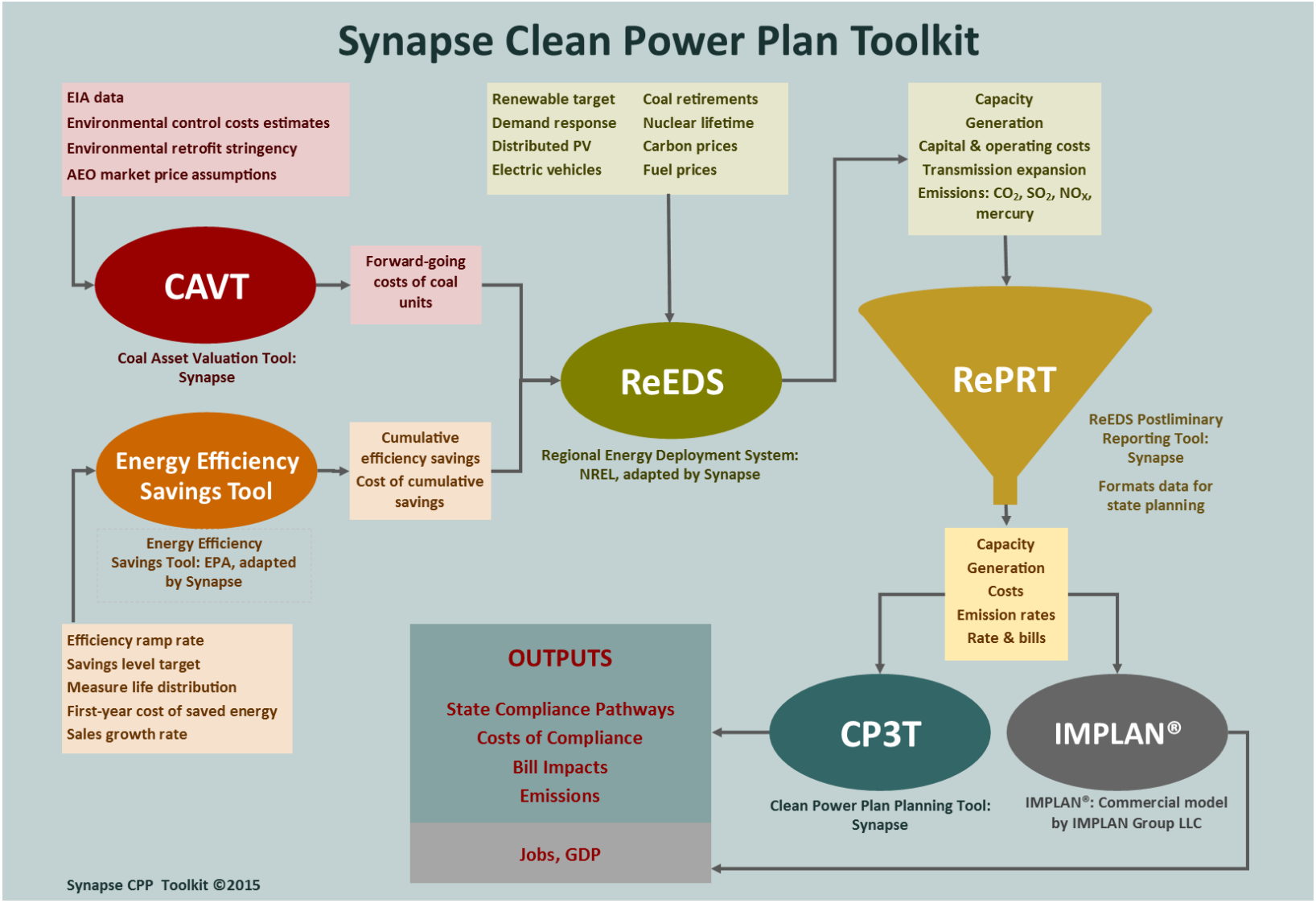
Clean Power Plan Reports and Outreach for National Association of State Utility Consumer Advocates: http://synapse-energy.com/project/clean-power-plan-reports-and-outreach-national-association-state-utility-consumer-advocates

Past Clean Power Plan Webinars (Synapse YouTube Channel):
https://www.youtube.com/channel/UCjkmjf7Lb34WvCXkV2XUvWw

Entering the Matrix: Compliance Options under the Final Clean Power Plan: http://synapse-energy.com/about-us/news/entering-matrix-compliance-options-under-final-clean-power-plan

Eight Things You Need to Know about the Clean Power Plan: http://synapse-energy.com/about-us/news/eight-things-you-need-know-about-clean-power-plan

Synapse Clean Power Plan Toolkit



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Stay Tuned!

Synapse is offering a series of webinars related to the final rule, updates to our compliance model, and impacts of the rule on consumer bills.

August 11: "Displacing Emissions and the Clean Power Plan"

August 18: "Final Clean Power Plan: In Detail"

August 26: "Integrating Renewables onto the Grid"

September 1: "Updates to Synapse's CP3T"

September 15: "Brief #3: Modeling the Final Rule"

Please remember to send any questions on content to **webinar@synapse-energy.com**

Extra Slides

Approach	Trading Notes	Multi-state Notes	Compliance Determination
R1. Subcategorized CO2 emission rates	"Out-of-the-box" trading system will be set up by EPA for all states that use this approach	Multi-state plan is necessary only if you want to ensure your state can trade ERCs through a special trading system	EGUs must show that they meet the technology-specific performance rates (either for NGCCs or for Fossil Steam)
R2. State CO2 emission rates	Trading systems likely only allowable within a state, or within a joined set of states	Multi-state plan required (?) to allow trading between the set of joined states	EGUs must show that they meet the state-specific emission rate
R3. Different CO2 emission rates	Trading systems likely only allowable within a state	I'm not sure multi-state compliance is possible or useful here.	EGUs must show that they meet the state-specified emission rates, which in aggregate, equal the EPA-created state-specific emission rate
M1. CO2 mass goal for existing units	"Out-of-the-box" trading system will be set up by EPA for all states that use either of these two approaches	Multi-state plan may be allowable if states wish to merge emission standards (this is just PK hypothesizing)	EGUs must show that they hold allowance permits for each ton of CO2 emitted. The total number of allowance permits made available by the state may not exceed the EPA-created mass-based goal for existing units.
M2. CO2 mass goal for new and existing units			EGUs must show that they hold allowance permits for each ton of CO2 emitted. The total number of allowance permits made available by the state may not exceed the EPA-created mass-based goal for existing and new units.
M3. State Measures: Existing units	Trading systems likely only allowable within a state, or within a joined set of states	Multi-state plan required (?) to allow trading between the set of joined states	States must show that the total number of emissions in their state does not exceed the EPA-created mass-based goal for existing units.
M4. State Measures: Existing and new units	Trading systems likely only allowable within a state, or within a joined set of states	Multi-state plan required (?) to allow trading between the set of joined states	States must show that the total number of emissions in their state does not exceed the EPA-created mass-based goal for existing and new units.