Final Clean Power Plan: Modeling Costs to Consumers

September 3, 2015

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Spencer Fields

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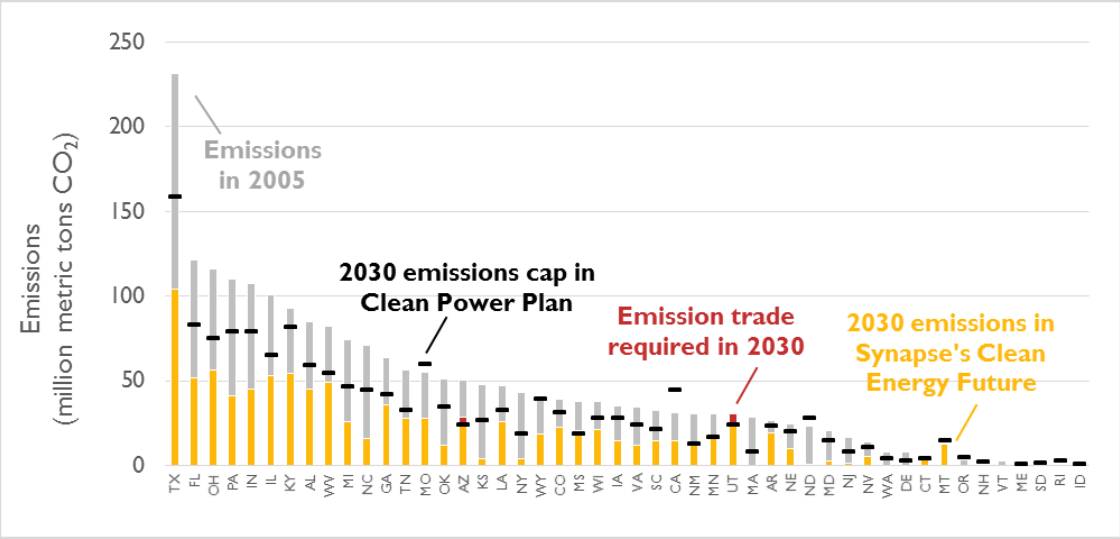
Synapse Energy Economics

- Founded in 1996 by CEO Bruce Biewald
- Leader for public interest and government clients in providing rigorous analysis of the electric power sector
- Staff of 30 includes experts in energy and environmental economics and environmental compliance

Update to Clean Energy Future Analysis

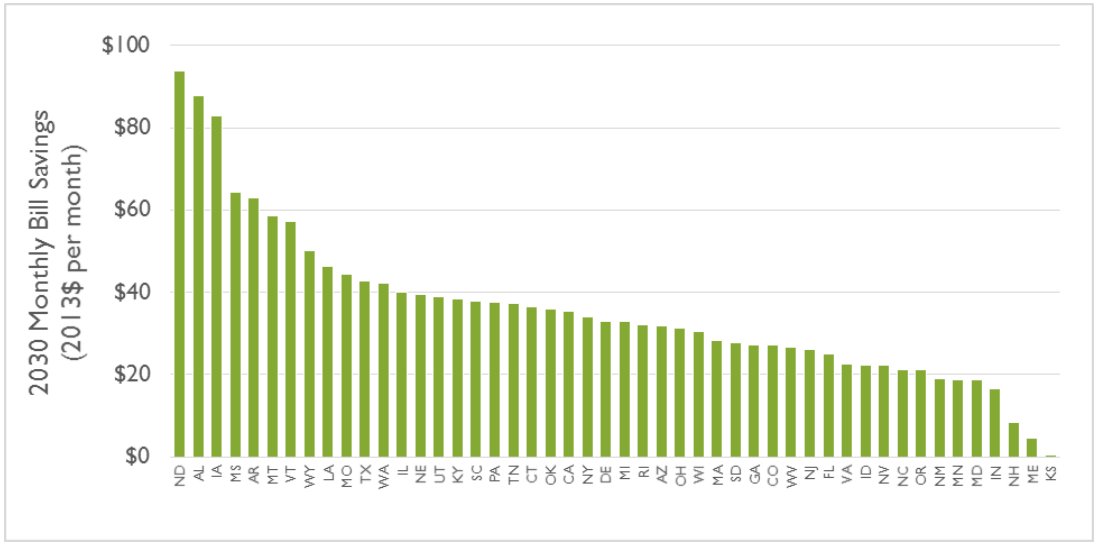
- Original analysis – July 2015
  - Comparing Clean Energy Future against a Reference scenario
- Update takes the final Clean Power Plan into account
  - New analysis confirms our original conclusions
- Addressing interesting issues and potential concerns

Clean Energy Future



Lower Emissions

Bill Savings



Agenda

What is the Clean Energy Future?	Designing the scenarios
How Has the Final Clean Power Plan Affected the Clean Energy Future?	What's new?
How Can Greener Electricity be Cheaper?	Cost trends and avoided costs
Why Haven't We Done It Already?	New dynamics and barriers
Is There a Catch?	Is the modeling comprehensive?

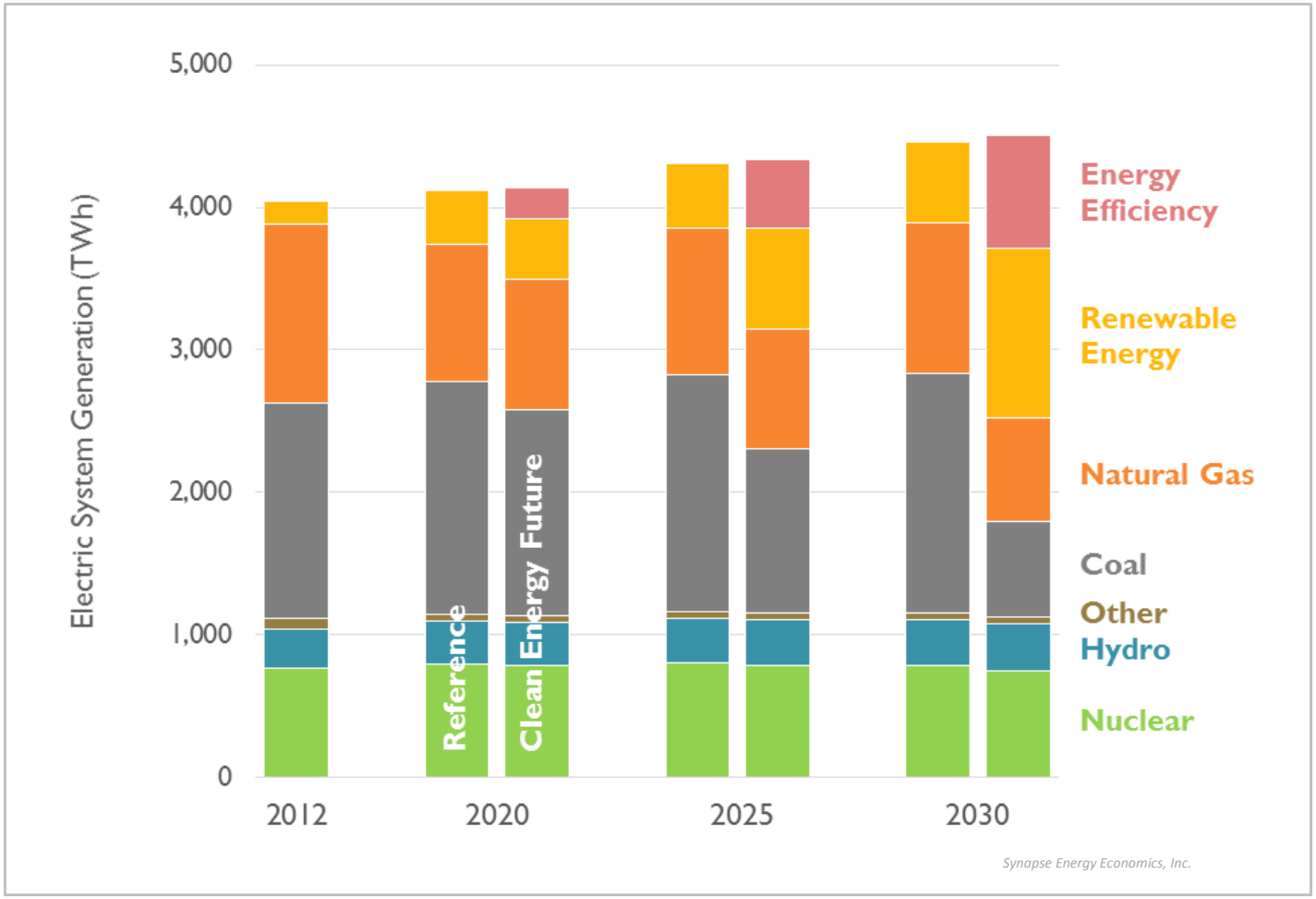
Clean Energy Future

Designing the Clean Energy Future Scenario

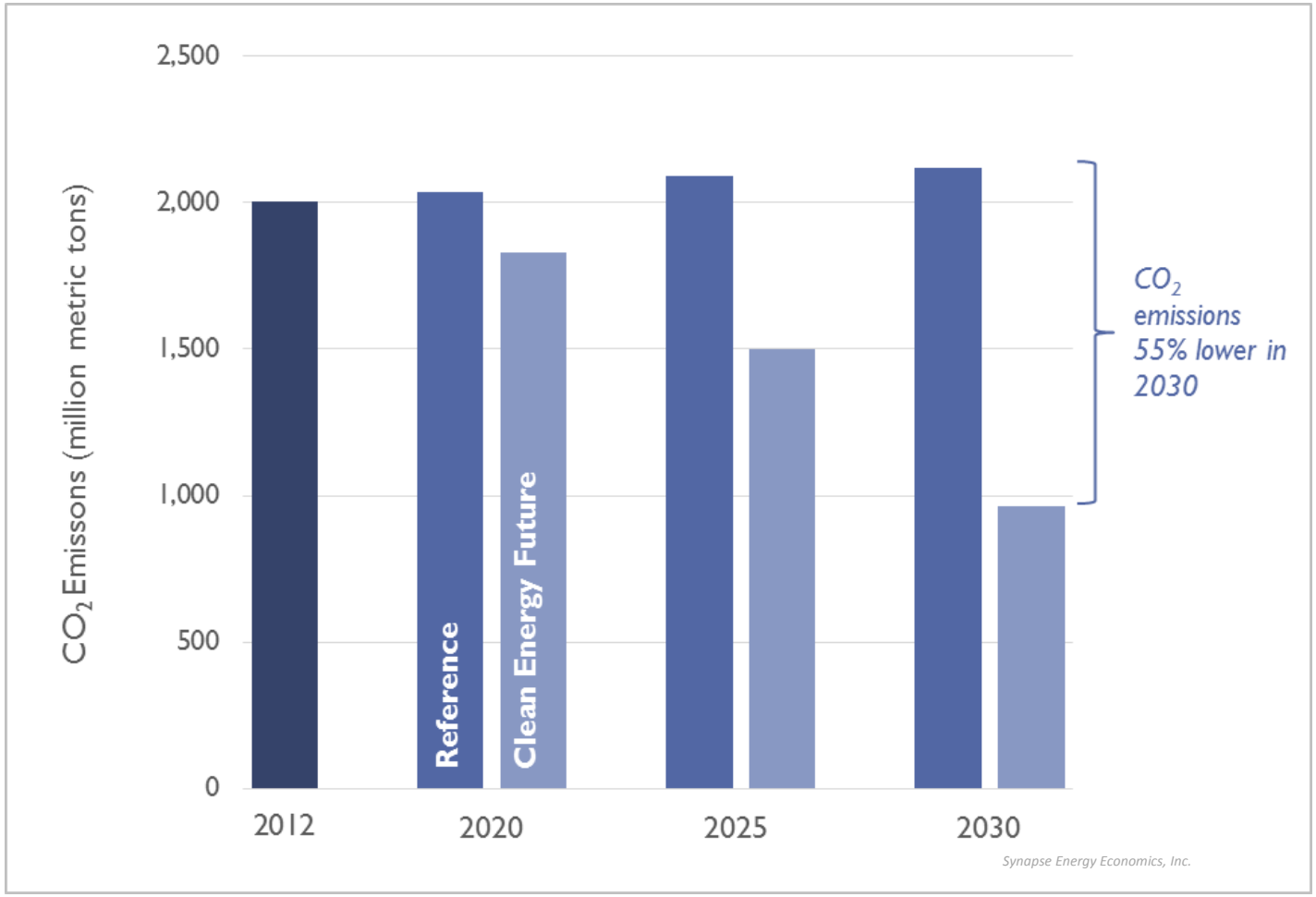
- A “no regrets” cost scenario: Costs are lower than the Reference scenario
- Assumptions based on current-day examples and reputable studies

	Reference Scenario	Clean Energy Future Scenario
Energy Efficiency	Existing federal appliance and building standards, minimal state efficiency policies	Incremental efficiency savings of 2% each year by 2029
Renewables	Renewables comply with existing state laws	70% of generation from renewable resources by 2040
Gas	Net 24 GW new gas-fired capacity built by 2040	Net 78 GW gas-fired capacity retired by 2040
Coal	Coal plant retirements limited to announcements to date	All coal plants built before 2005 retired by 2040
Other	No electric vehicles integrated as electric-grid storage	25% of cars and trucks integrated as electric-grid storage by 2040
	Demand response reaches 10% maximum sales by 2040	Demand response reaches 15% maximum sales by 2040
	13 GW new storage resources by 2040	51 GW new storage resources by 2040
Hydro	10 GW new run-of-river and improved capture of hydro resources by 2040	18 GW new run-of-river and improved capture of hydro resources by 2040
Nuclear	All nuclear units operate for 60-year lifetimes	All nuclear units operate for 60-year lifetimes

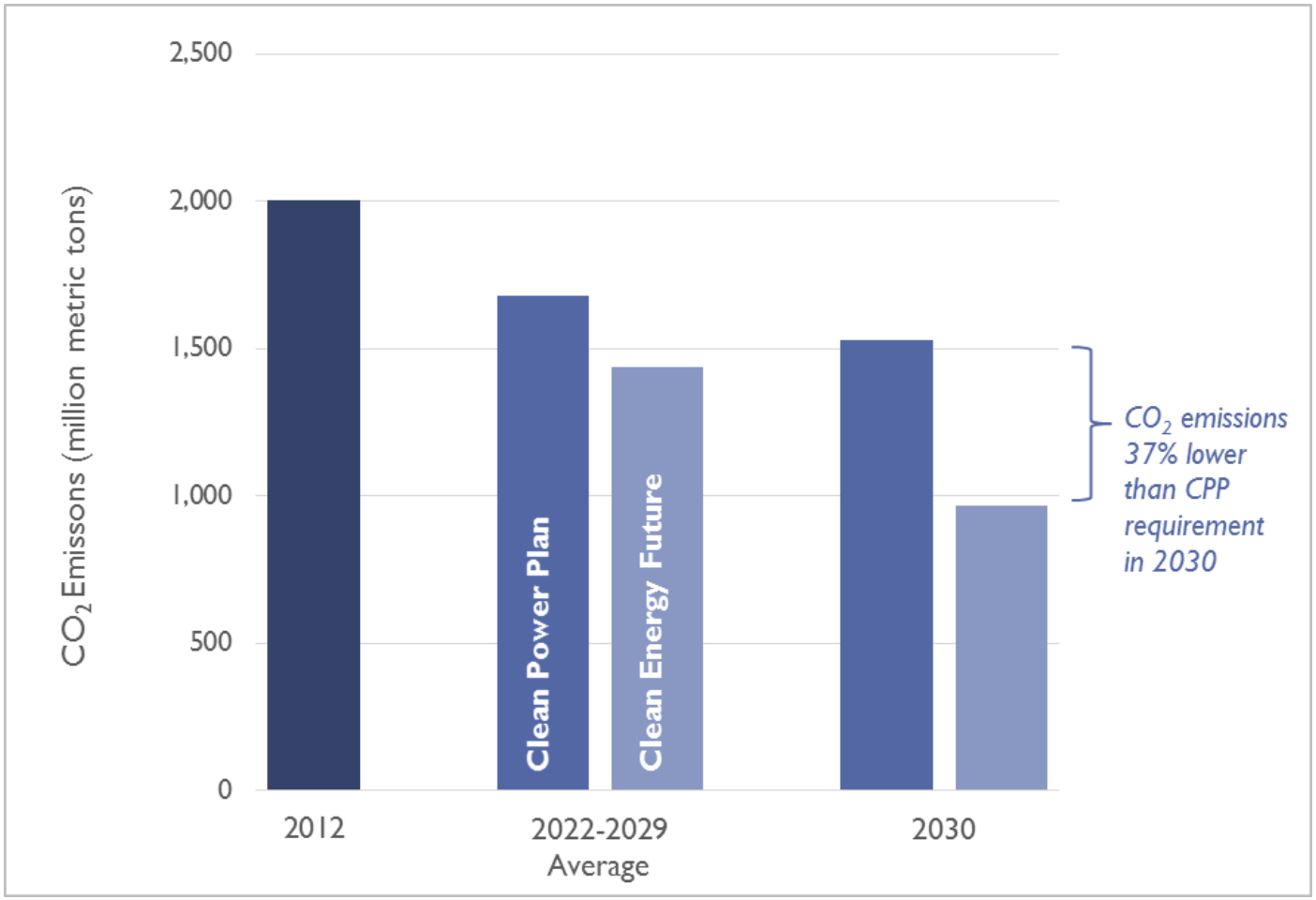
Changes in Electric Generation



Changes in CO_2 Emissions



Clean Power Plan Results

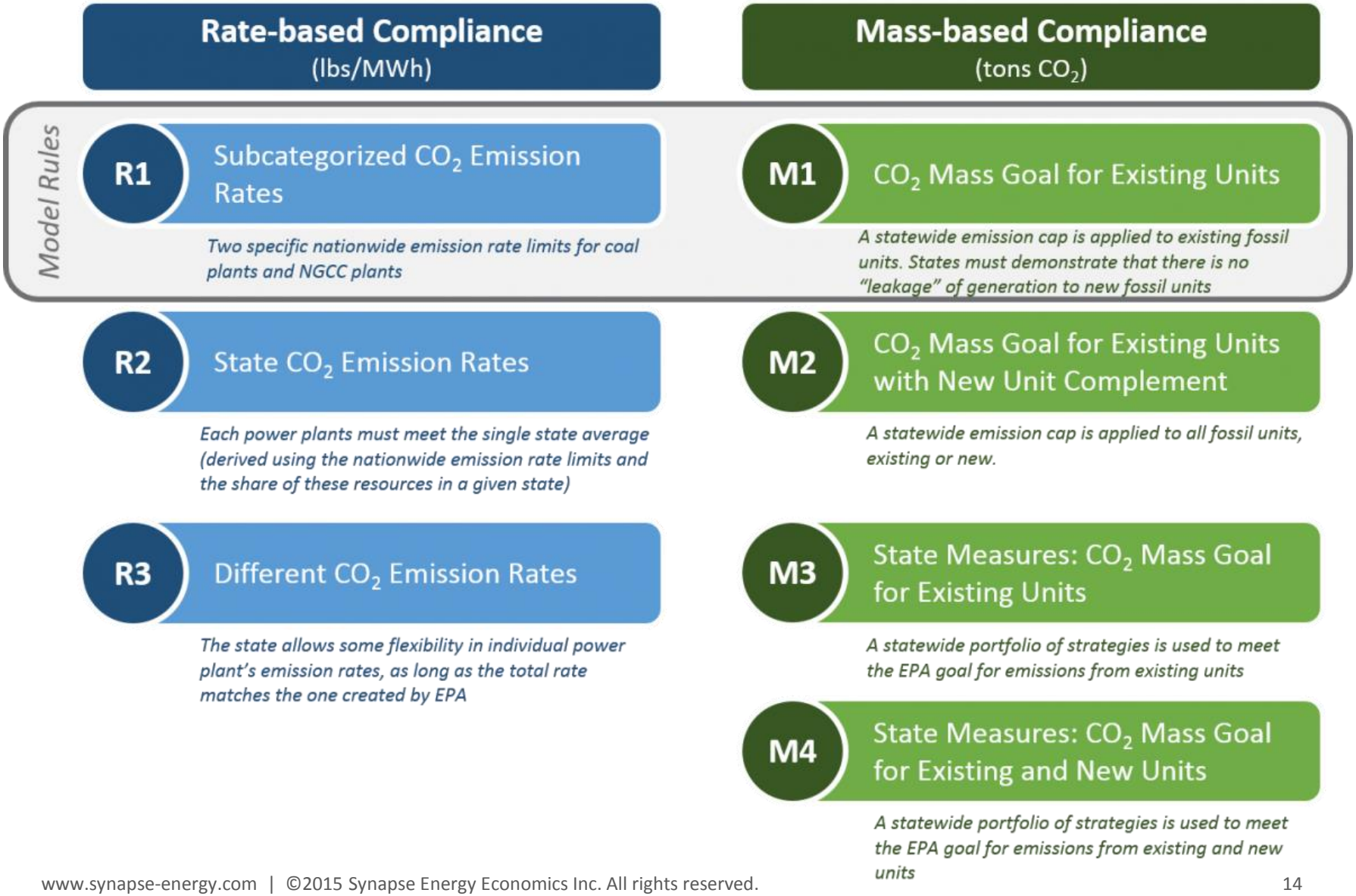


What's New in the Final Clean Power Plan?

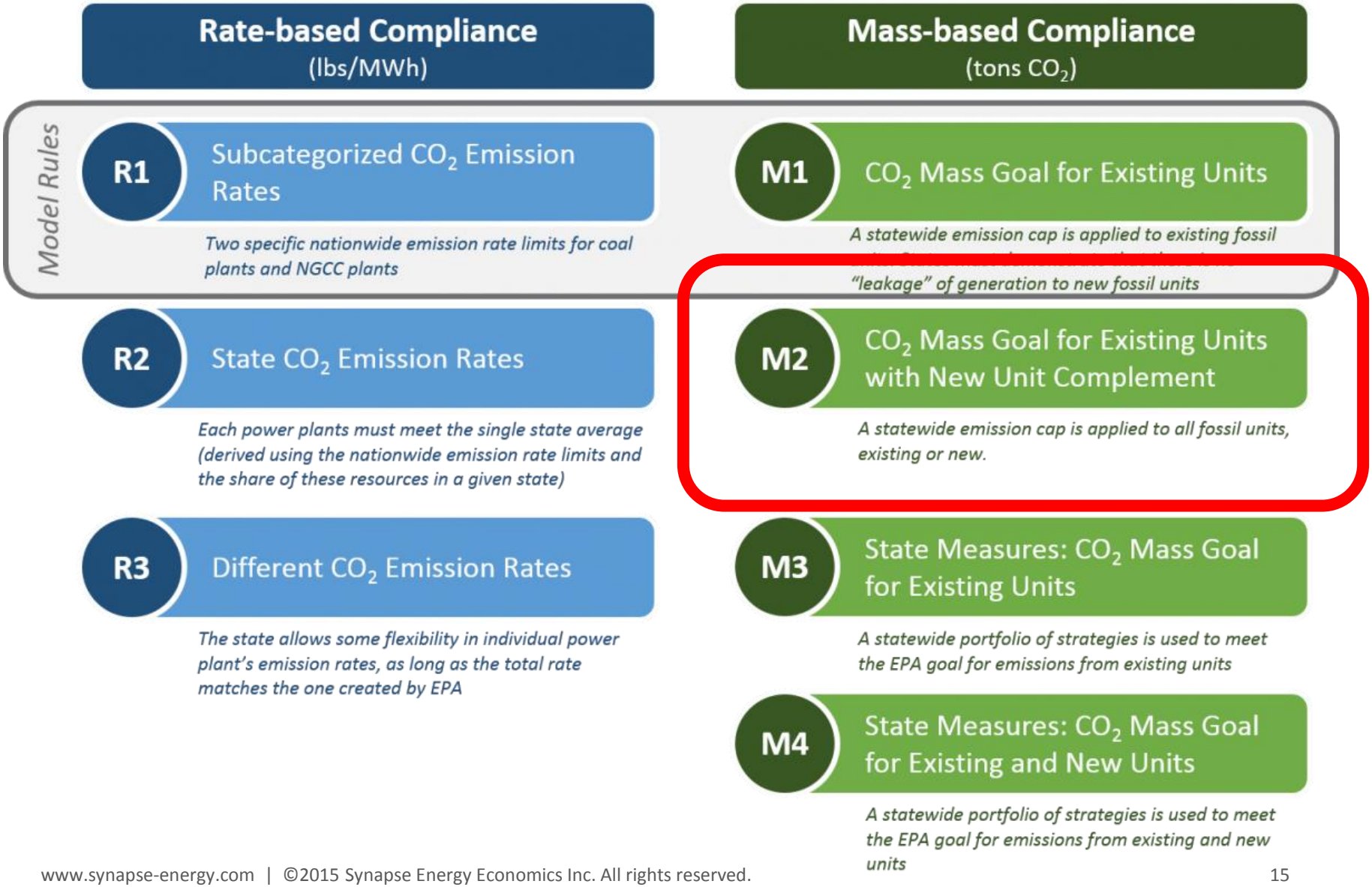
What's New in the Final Clean Power Plan?

- The final Clean Power Plan relies on a completely different target-setting calculation
  - Calculated at the interconnection level for two different types of generators (Fossil Steam and NGCC)
  - No more energy efficiency or nuclear (in the target setting)
  - Displacement from renewables at fossil units now being accounted for
- EPA is now much more explicit about multi-state compliance, trading mechanisms, and compliance deadlines
- EPA is much more comprehensive about the different approaches states can take to meet Clean Power Plan compliance

Compliance Paths



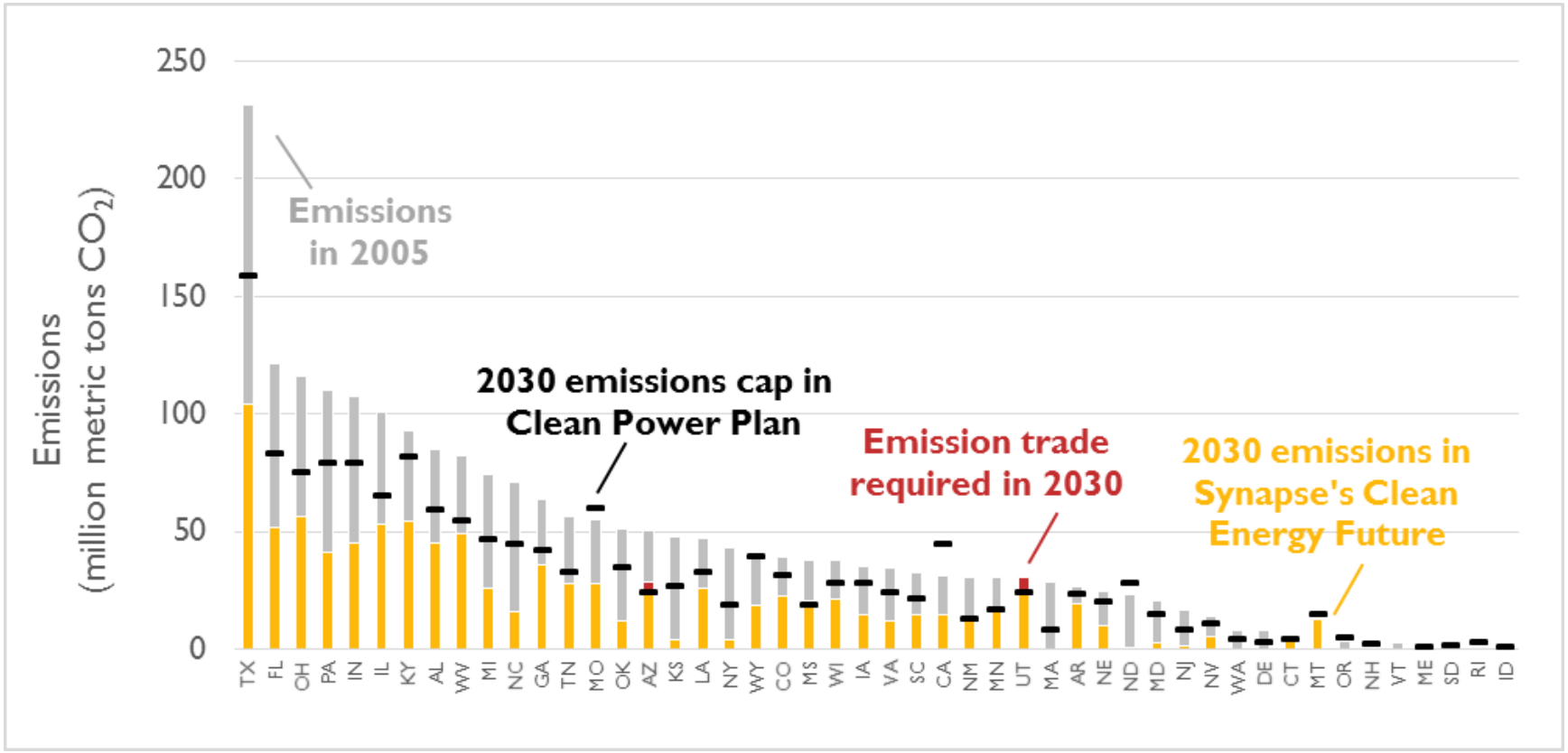
Compliance Path Modeled in Clean Energy Future Analysis



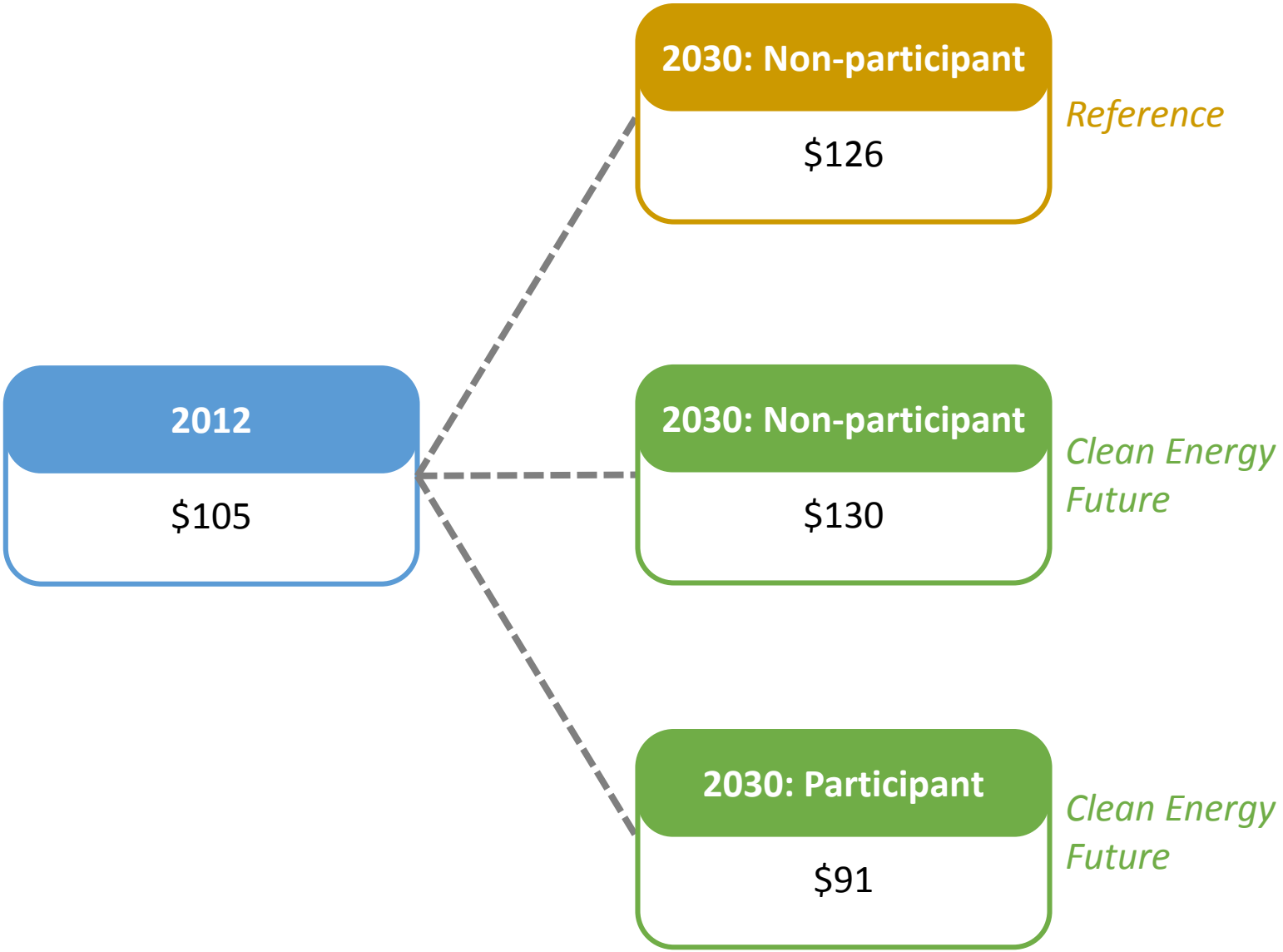
Why "M2" for All States?

- We model a compliance approach in which all states use the same pathway to compliance
- Largest number of trading partners for allowances
- Including "new sources" in state plans for compliance is likelier simpler to administer from the states' perspectives
- Our analysis looks at 2030 and the 2022-2029 period
- Again, the CEF was not designed to specifically meet Clean Power Plan compliance or to find the cheapest way to do so
- CEF is a "no regrets" scenario in terms of costs; Clean Power Plan compliance is a side benefit

How Does the Clean Energy Future Compare to the Clean Power Plan?



How Does This Impact Monthly Bills?



How Does This Impact Monthly Bills?

2012

$105

2030: Non-participant

$126

Reference

2030: Non-participant

$130

Clean Energy Future

2030: Participant

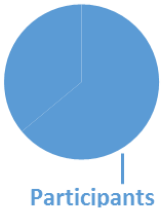
$91

Clean Energy Future

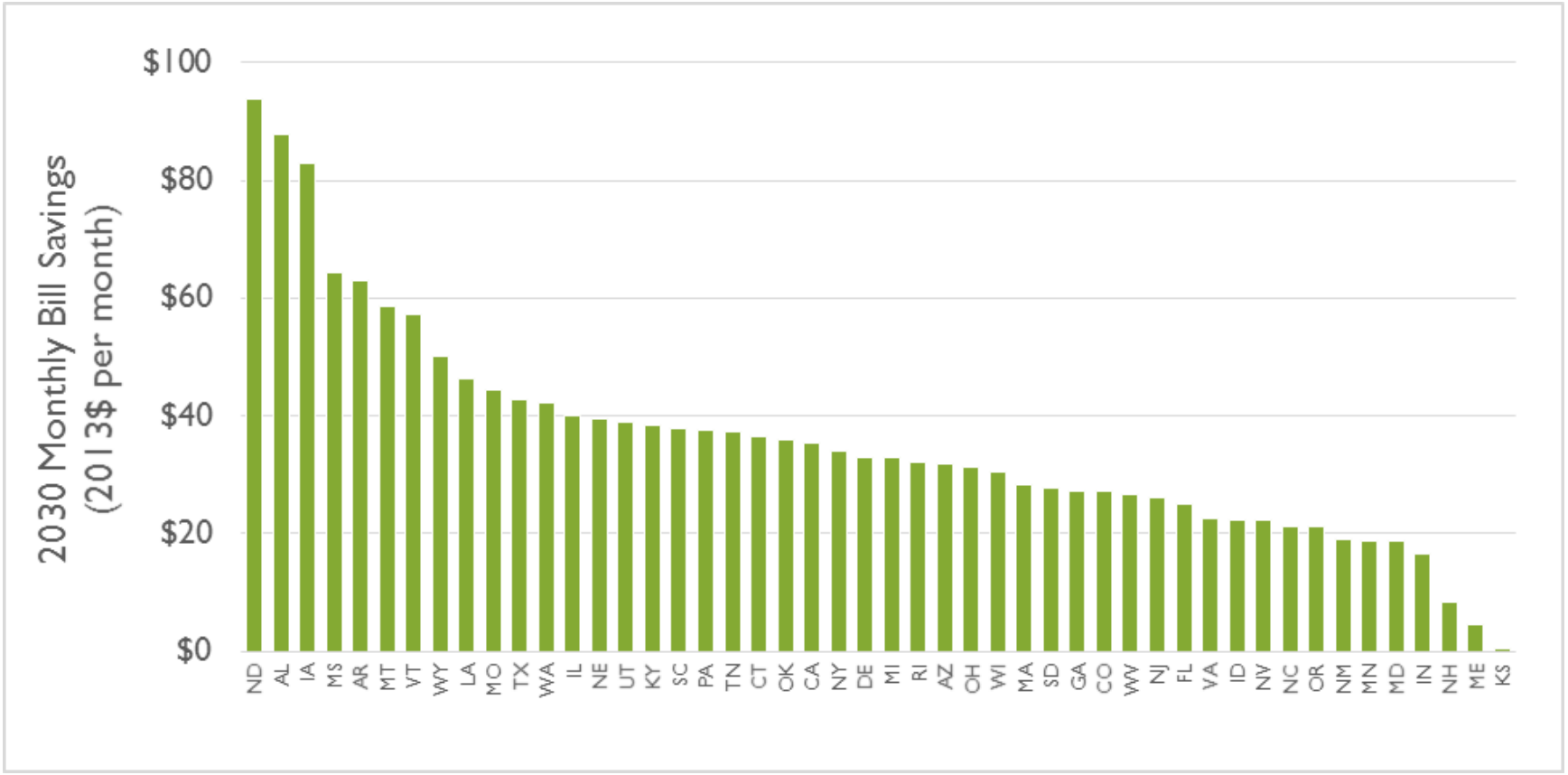
2030: Participant

$105

Clean Energy Future



Monthly Bill Savings for Efficiency Participants



Bill savings compare Clean Energy Future EE participants versus Reference scenario

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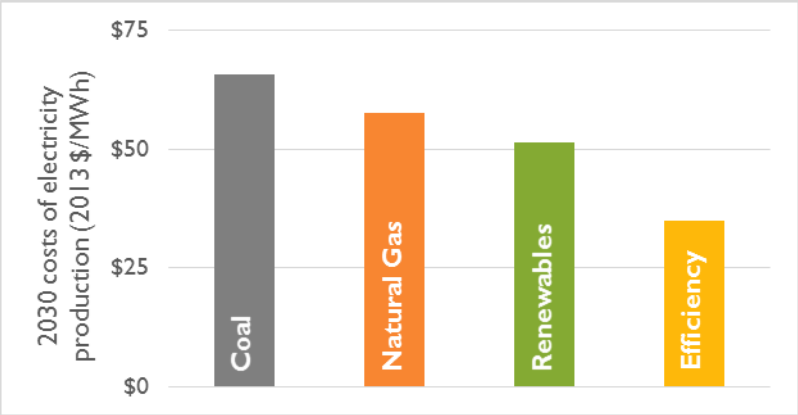
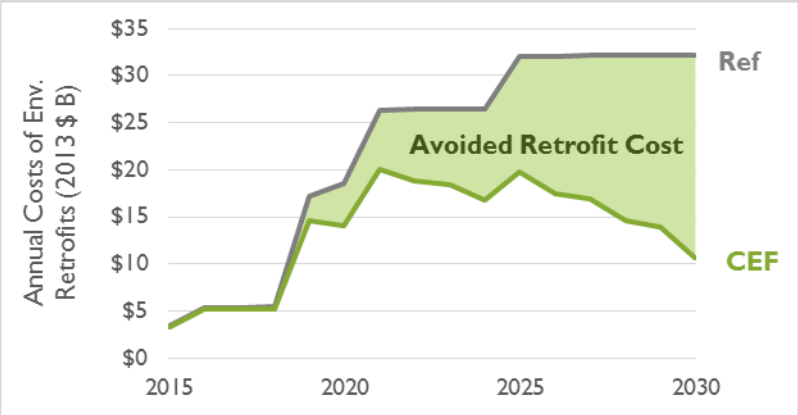
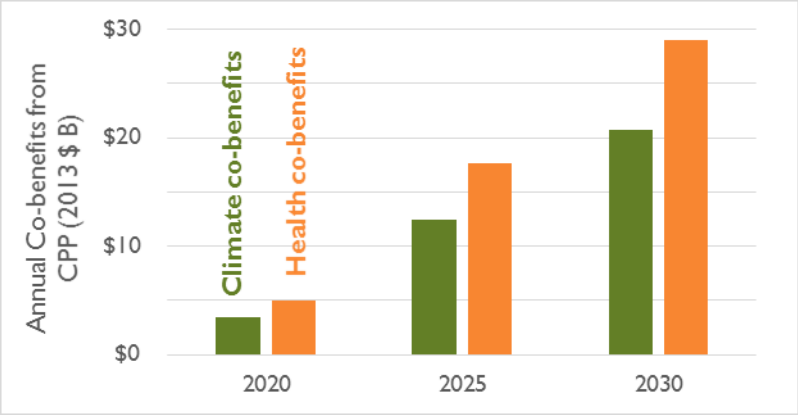
How Can Greener Electricity Be Cheaper?







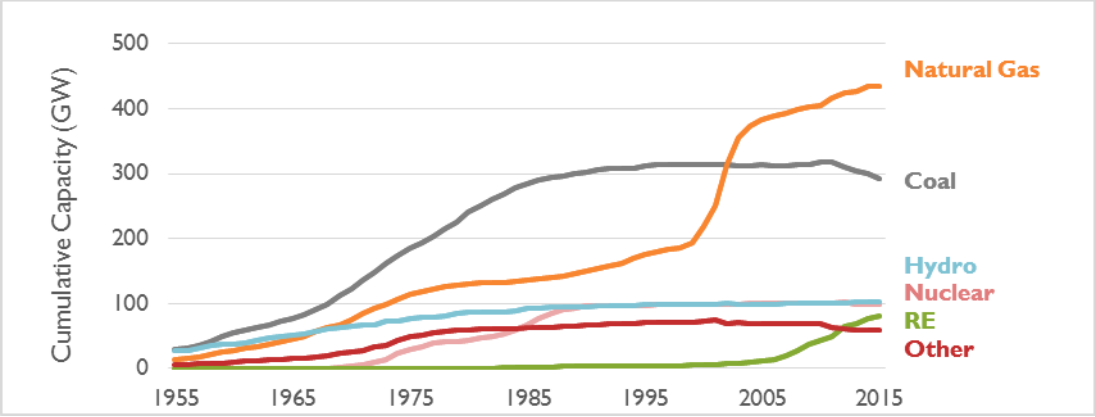
Cheaper, Green Electricity

- Cheaper renewables and energy efficiency
- Even without the Clean Power Plan, coal plants require costly upgrades and retrofits, which are avoided in the Clean Energy Future
- This doesn't even account for climate and health co-benefits, estimated to be $50 billion in 2030 in the Clean Power Plan

Why Haven’t We Done It Already?

New Price Dynamic

- While EE may be cheaper than centralized fossil generation, and renewables are getting there, the traditionally slow-moving electric sector is experiencing a lag time in responding



- As investors acclimate to the new market landscape, the shift to clean energy is likely to accelerate

Barriers to Renewable Energy

- Inconsistent policies and incentives across states and over time
  - Addressed by the Clean Power Plan
- Insufficient transmission of renewable energy from where it's produced to where it's needed
- System planners are innovating techniques for integrating variable-output renewables (like wind and solar) onto a grid dominated by inflexible traditional generation
  - Geographical distribution
  - Energy imbalance markets

Barriers to Energy Efficiency

- The Clean Energy Future models high, but not unknown, levels of energy efficiency
  - Several states, such as Massachusetts, California, Rhode Island, Vermont, and Arizona are all achieving levels of EE modeled in the Clean Energy Future, and have been doing so for several years
- Utility rate structure
  - If utilities invest in EE, sales go down, and so does utility revenue
  - Methods such as decoupling help to disconnect utility revenues from sales, although many incentives are possible

Is There a Catch?

Is the Clean Energy Future Comprehensive?

EE participation

- In the Clean Energy Future, households with strong participation can see savings up to $35 per month on bills. Even if savings were distributed across every single household, bills would still be lower than in the Reference case by $21 per month, on average.

First mover advantage

- We found that states who shift away from traditional generation sooner become net exporters in future years as fossil generation becomes increasingly uneconomic.

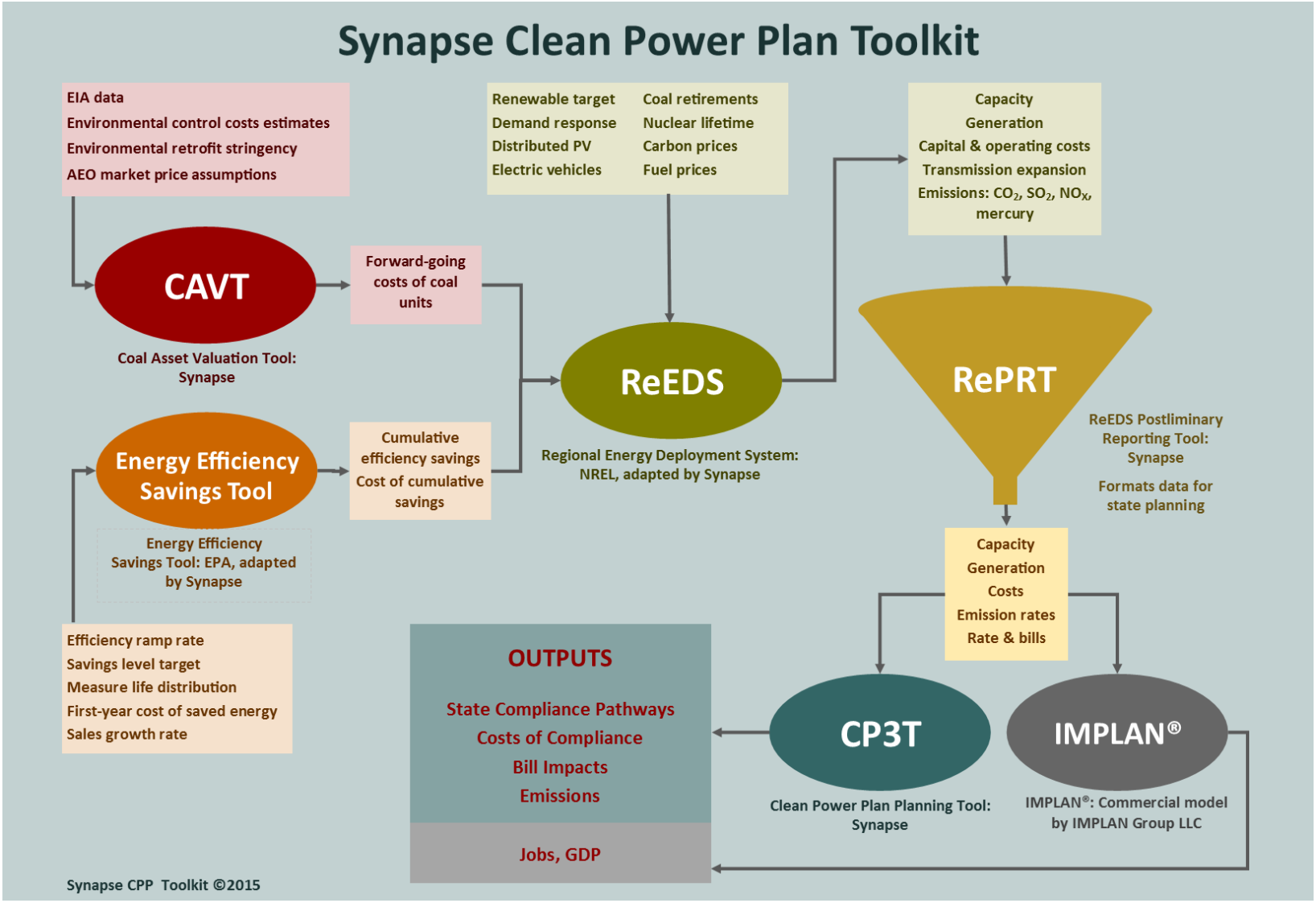
Stranded assets

- "Stranded assets," or investments made in fossil fuel plants that are made uneconomic and retire early in the Clean Energy Future, are assumed to be paid for 100 percent by ratepayers in the Clean Energy Future and the Reference case.
- It is likely that at least some of these costs would be shared between ratepayers and shareholders, reducing the costs in an actual Clean Energy Future.

Up-front payments for energy efficiency

- To better match current methods of paying for energy efficiency, we modeled the bill impacts of paying for EE as an up-front investment.
- Contrast this with annualizing costs, the typical method for comparing EE costs with traditional generation resources for planning and economic analyses

Synapse Clean Power Plan Toolkit



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Related Resources

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

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

Past Clean Power Plan Webinars: http://synapse-energy.com/synapse-projects-and-webinars-related-clean-power-plan

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

Synapse Blog Posts on Clean Power Plan: http://synapse-energy.com/tags/clean-power-plan

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