Synapse
Energy Economics, Inc.

Utility Regulation and Coal

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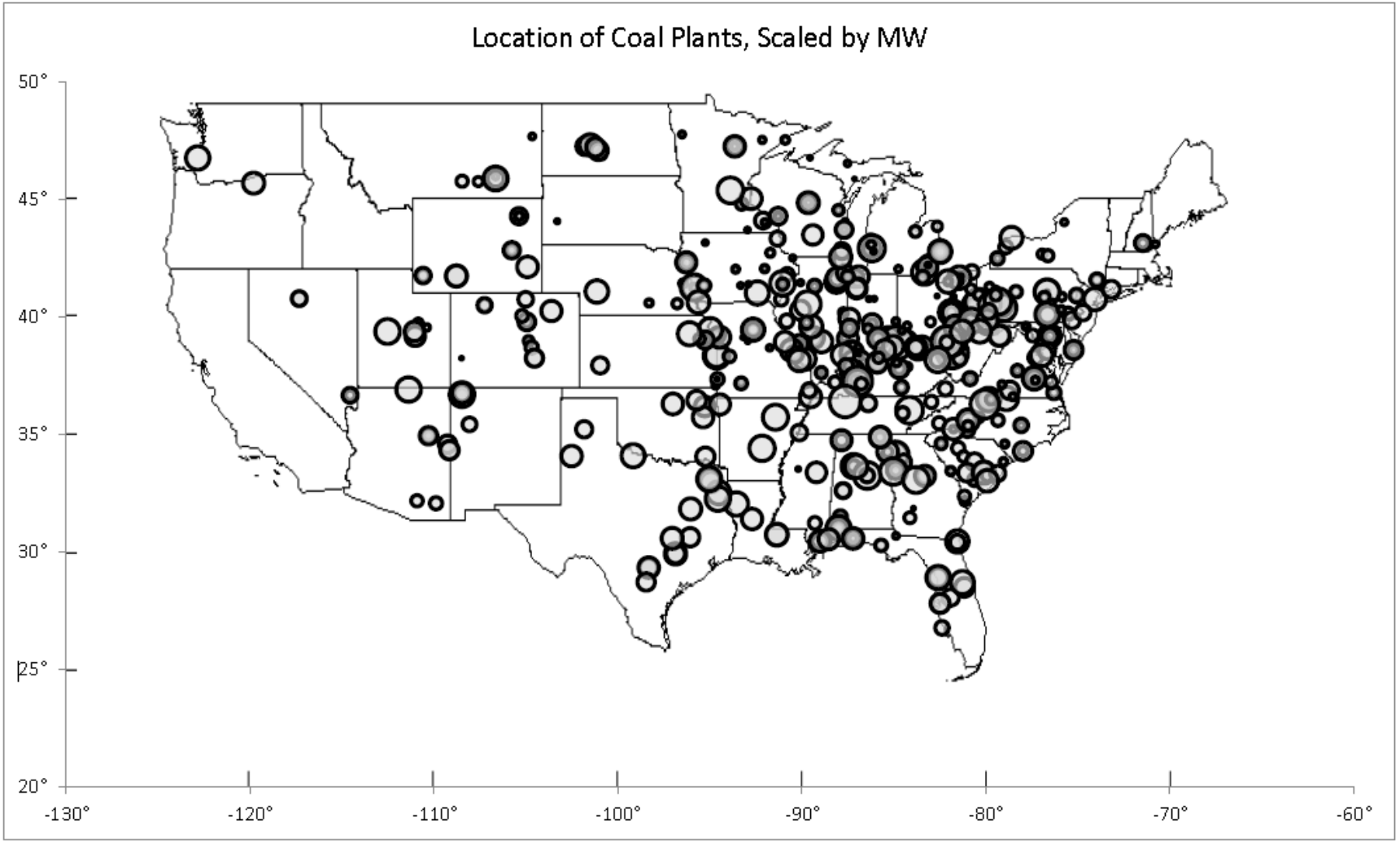
Utility regulation and coal: today's discussion

1) U.S. coal-fired power is important
2) Opportunity to retire and replace uneconomic coal plants
3) The owners have problematic incentives
4) The solution includes intervening effectively at state public utility commissions

U.S. coal plants

Existing coal generating capacity

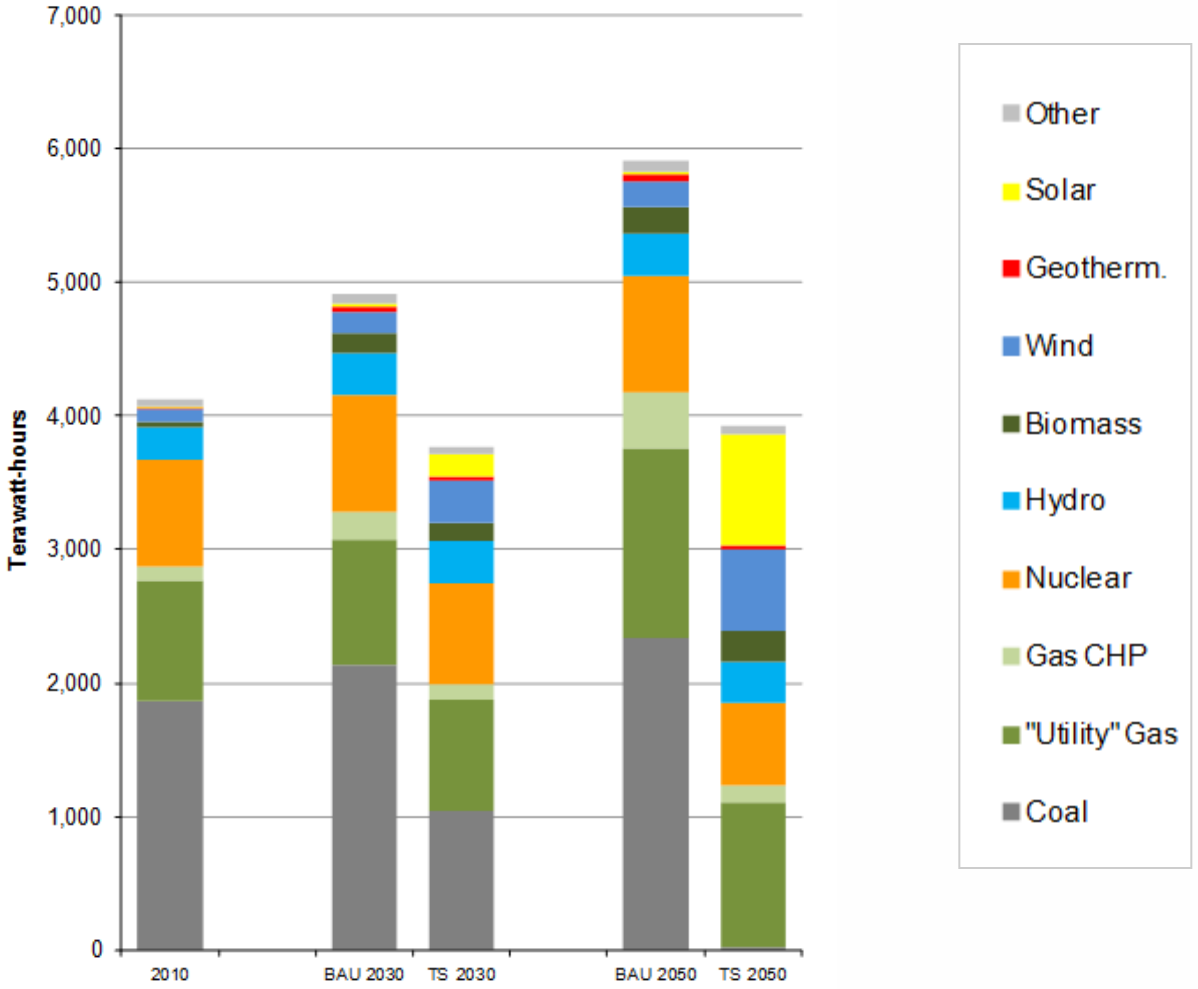


Source: Synapse, 2012.

US electric power CO_2 emissions

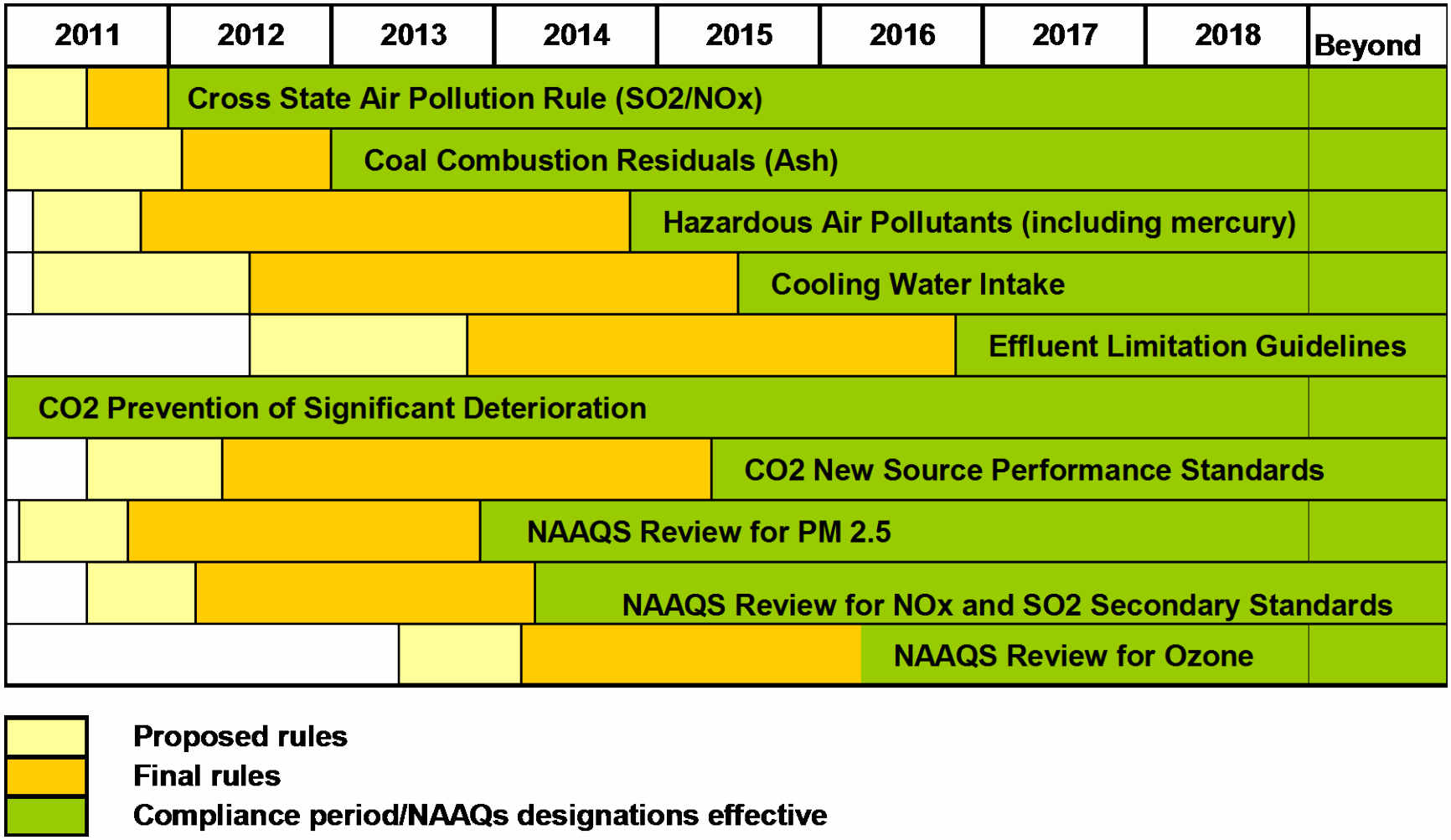
- U.S. CO_2 Emissions ≈ 22% of World Total
- U.S. Electric Sector ≈ 40% of U.S. Total
- U.S. Electric Sector ≈ 9% of World Total

U.S. generating fuel mix in two scenarios



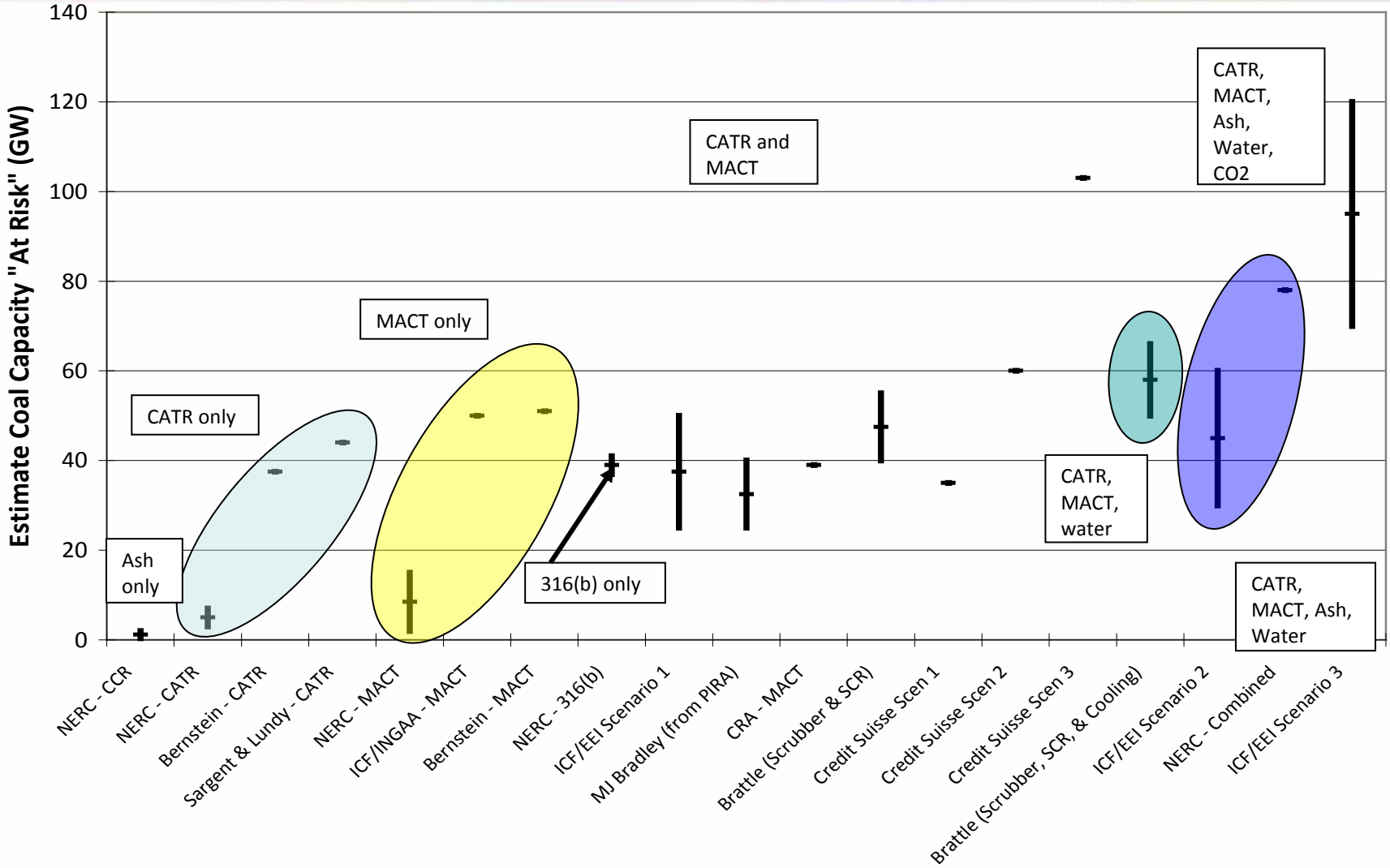
Source: Synapse. *Toward a Sustainable Future for the U.S. Power Sector: Beyond Business as Usual 2011.* 2011.

Upcoming EPA rules



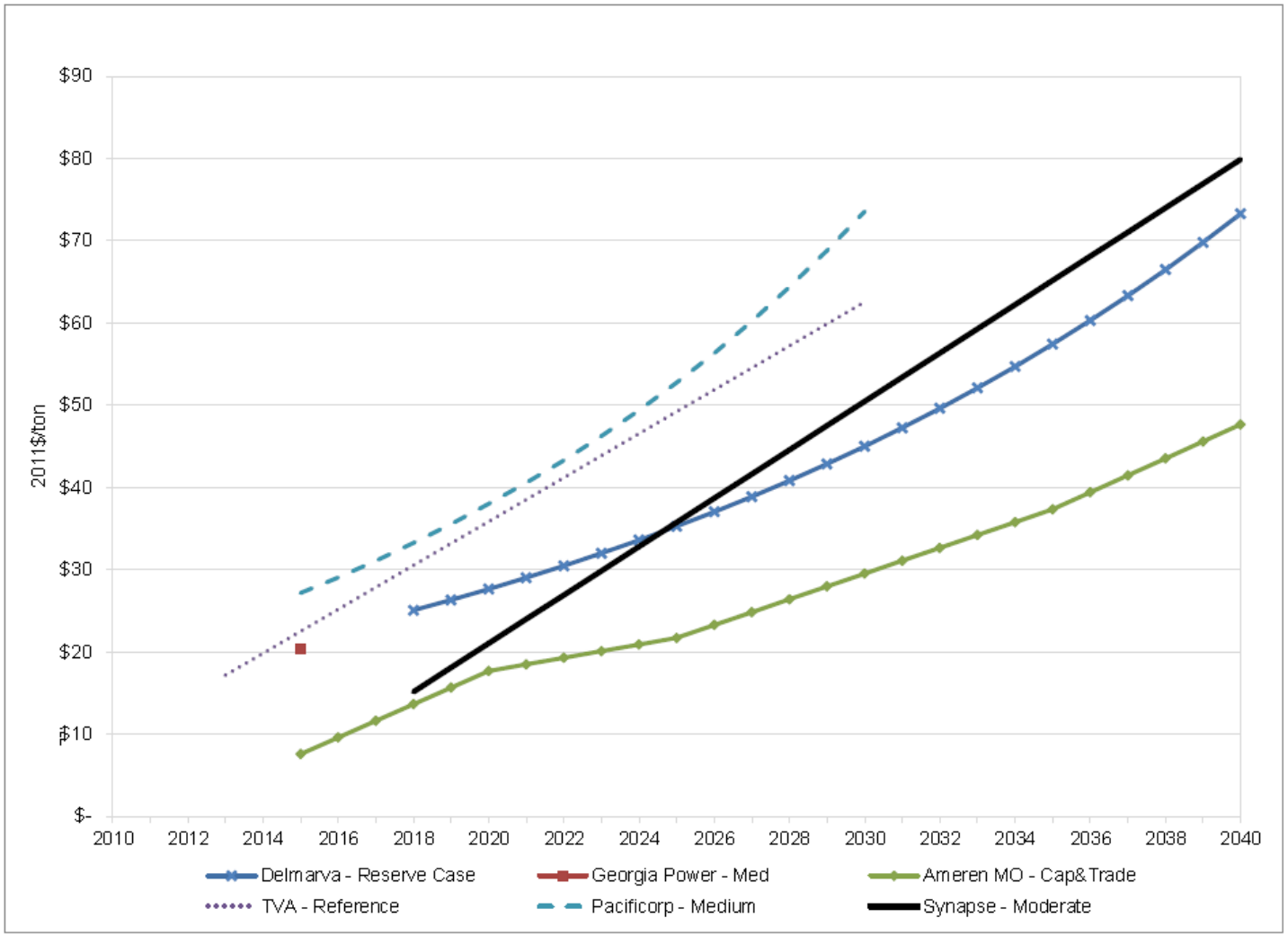
Source: Synapse. *Economics of Existing Coal Generation and Opportunities for Clean Energy*. 2011.

Projected coal capacity "at risk" under various regulatory policies



Source: Synapse. *Economics of Existing Coal Generation and Opportunities for Clean Energy*. 2011.

Utility reference case carbon dioxide prices (2011 $/ton)

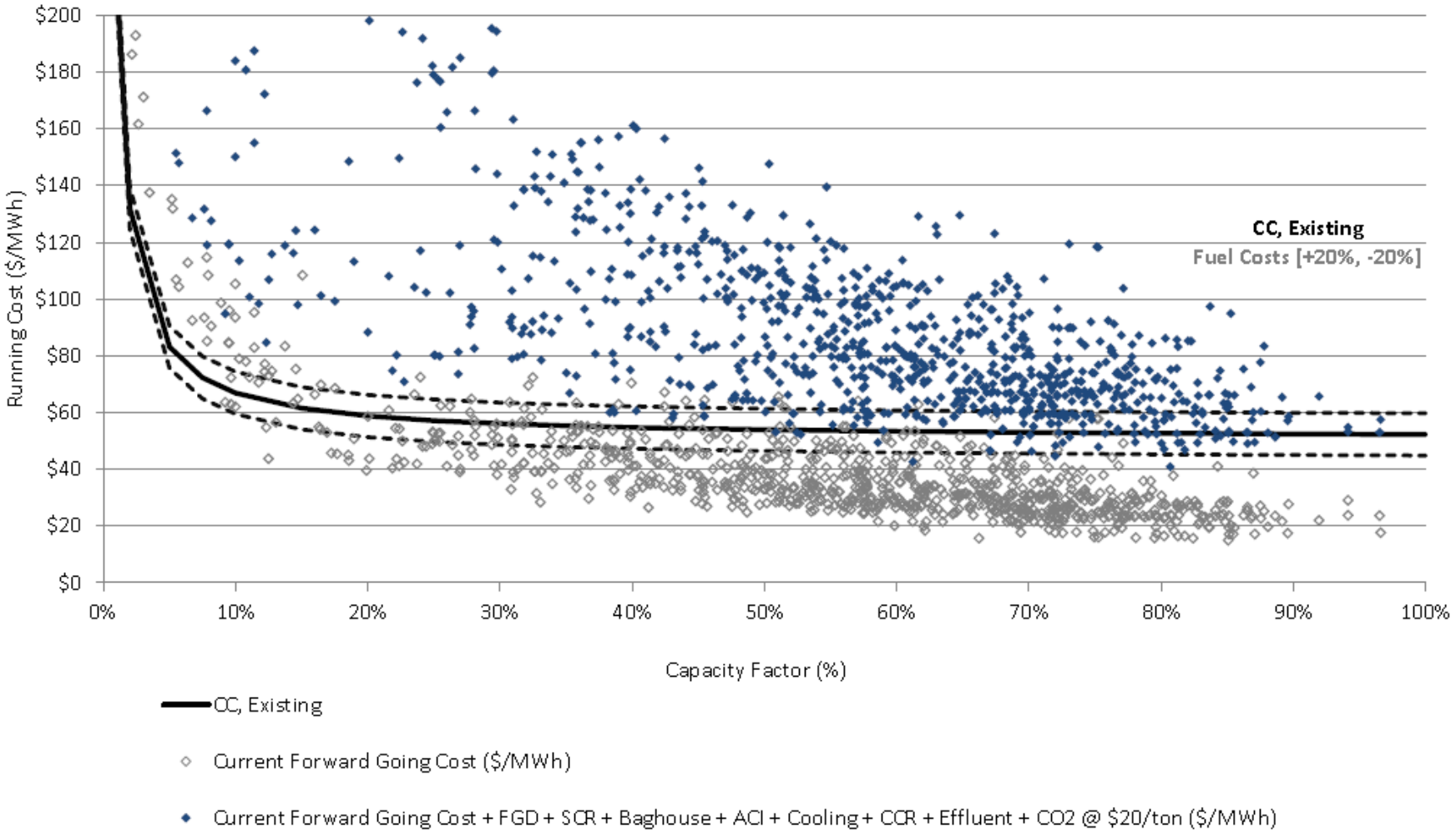


Source: Synapse, 2012.

Utility ratemaking

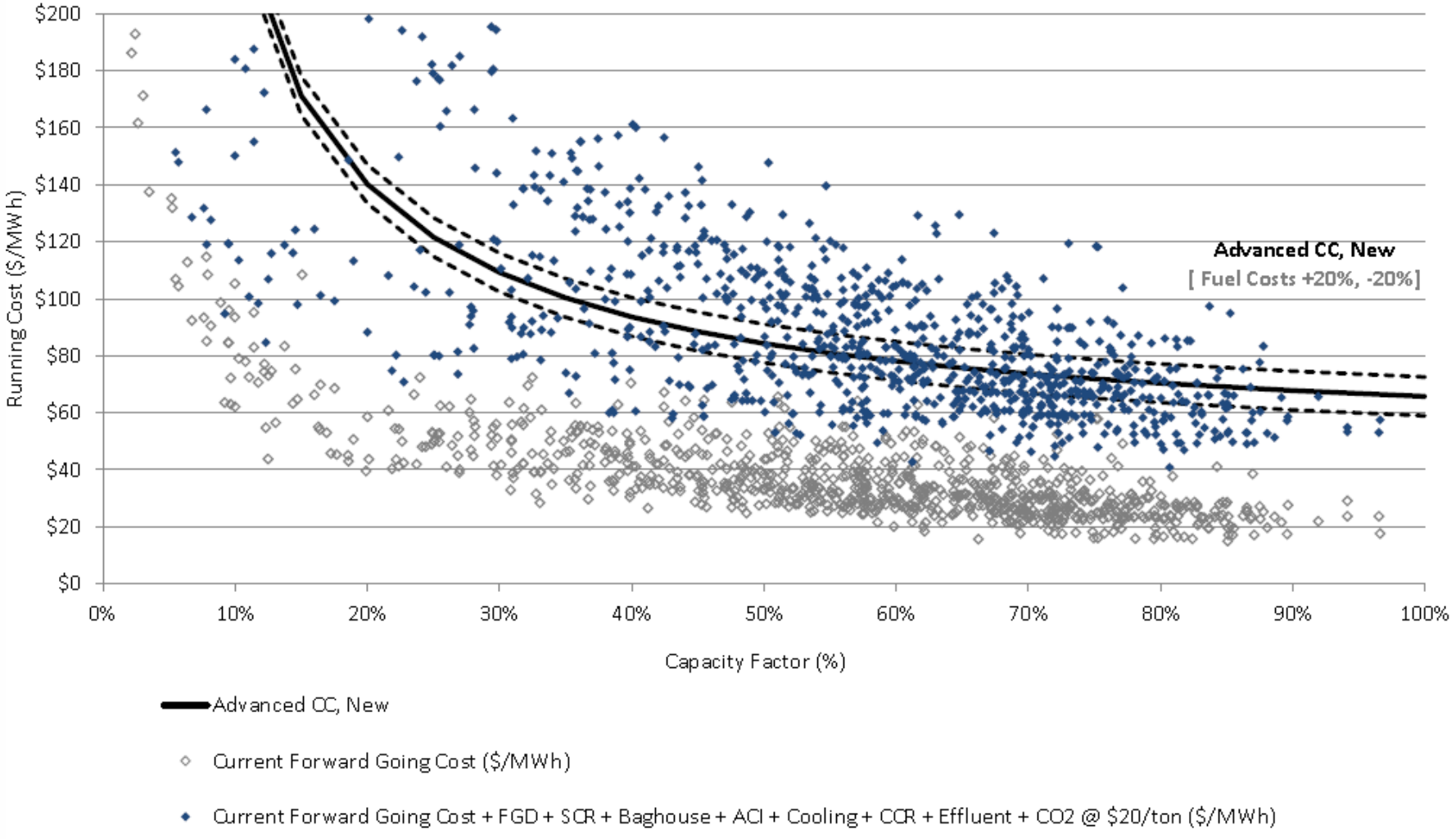
- Regulated Monopoly Economics
- Electric utility prices are not set by “the market.” They are set by state public utility commissions in “rate cases.”
- Fuel, O&M, purchased power and administrative costs are passed through as expenses.
- Power plant investments are put into “ratebase” and recovered over time with an allowed administratively determined return on equity.
- Plant investment that is not prudently incurred should be removed from rates.
- Plant investment that is not “used and useful” should be removed from rates.

Running costs of existing U.S. coal units by capacity factor ($/MWh), relative to estimated cost of *existing* natural gas combined cycle unit



Source: Synapse, 2012.

Running costs of existing U.S. coal units by capacity factor ($/MWh), relative to estimated cost of *new* natural gas combined cycle unit

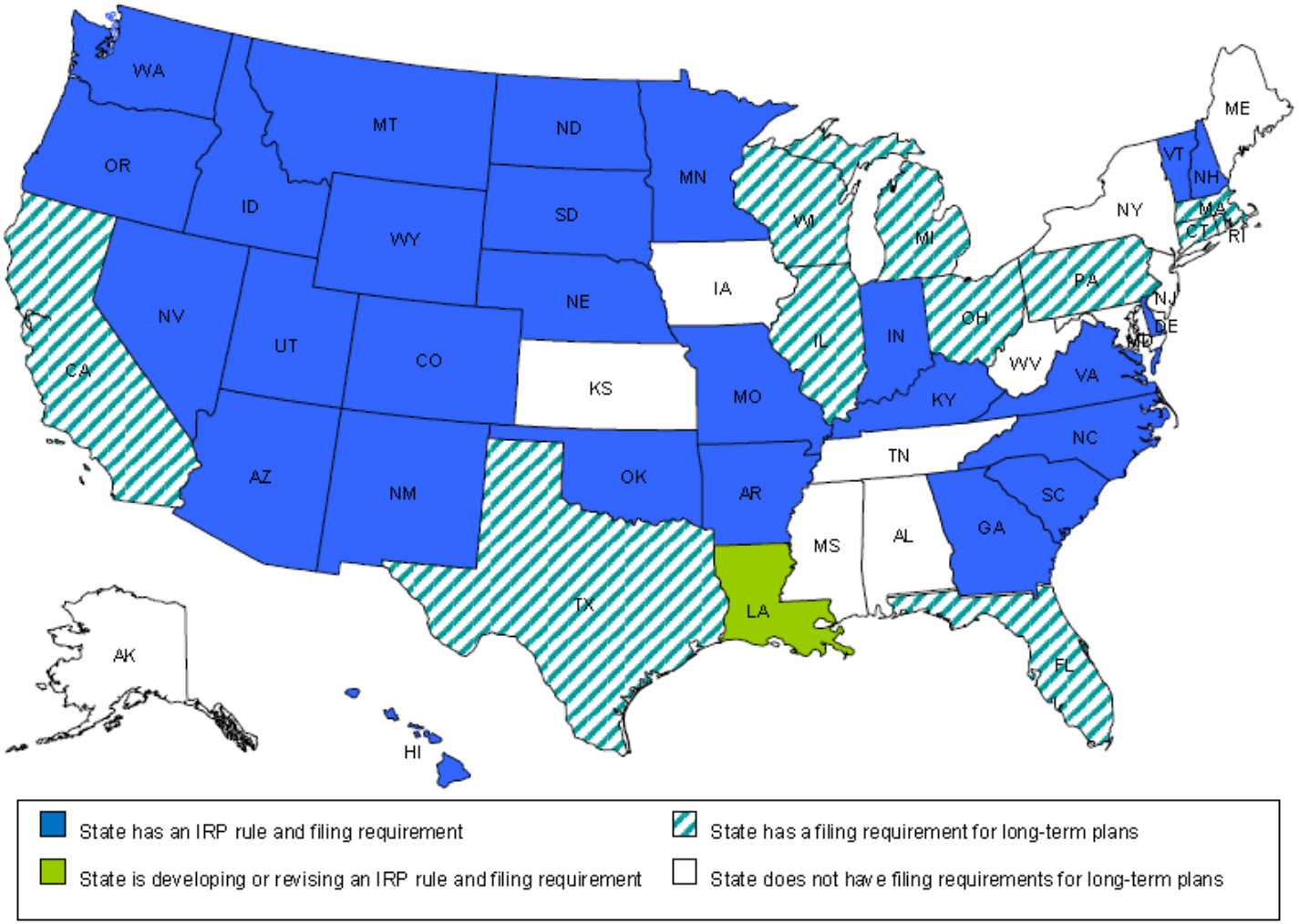


Source: Synapse, 2012.

Utility Integrated Resource Planning (IRP)

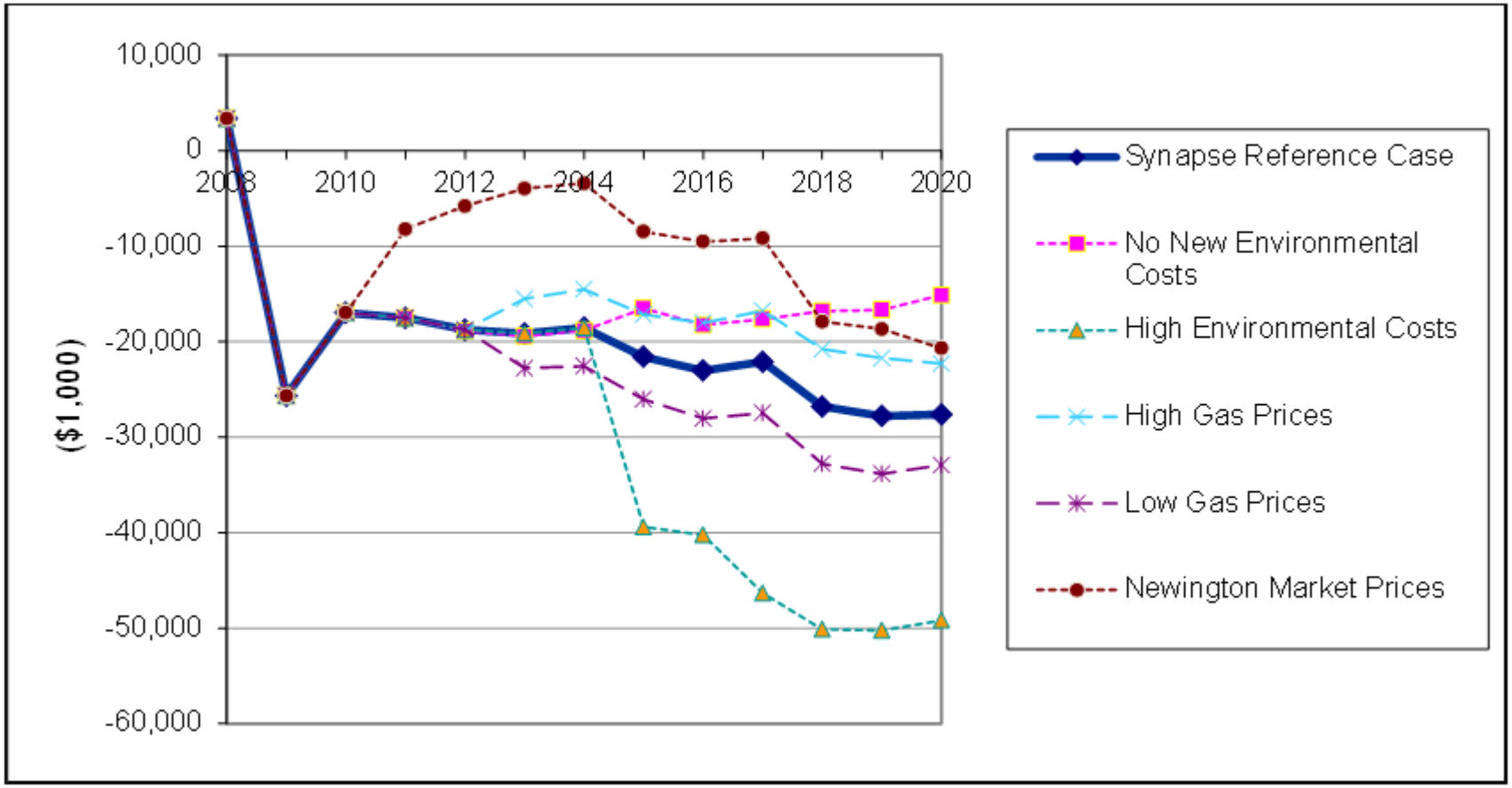
- What is an IRP, and what is it for?
- State IRP rules
- Energy prices and environmental compliance planning
- Restructured markets
- Ratemaking and cost recovery

Presence or absence of state IRP rules and procurement plan filing requirements



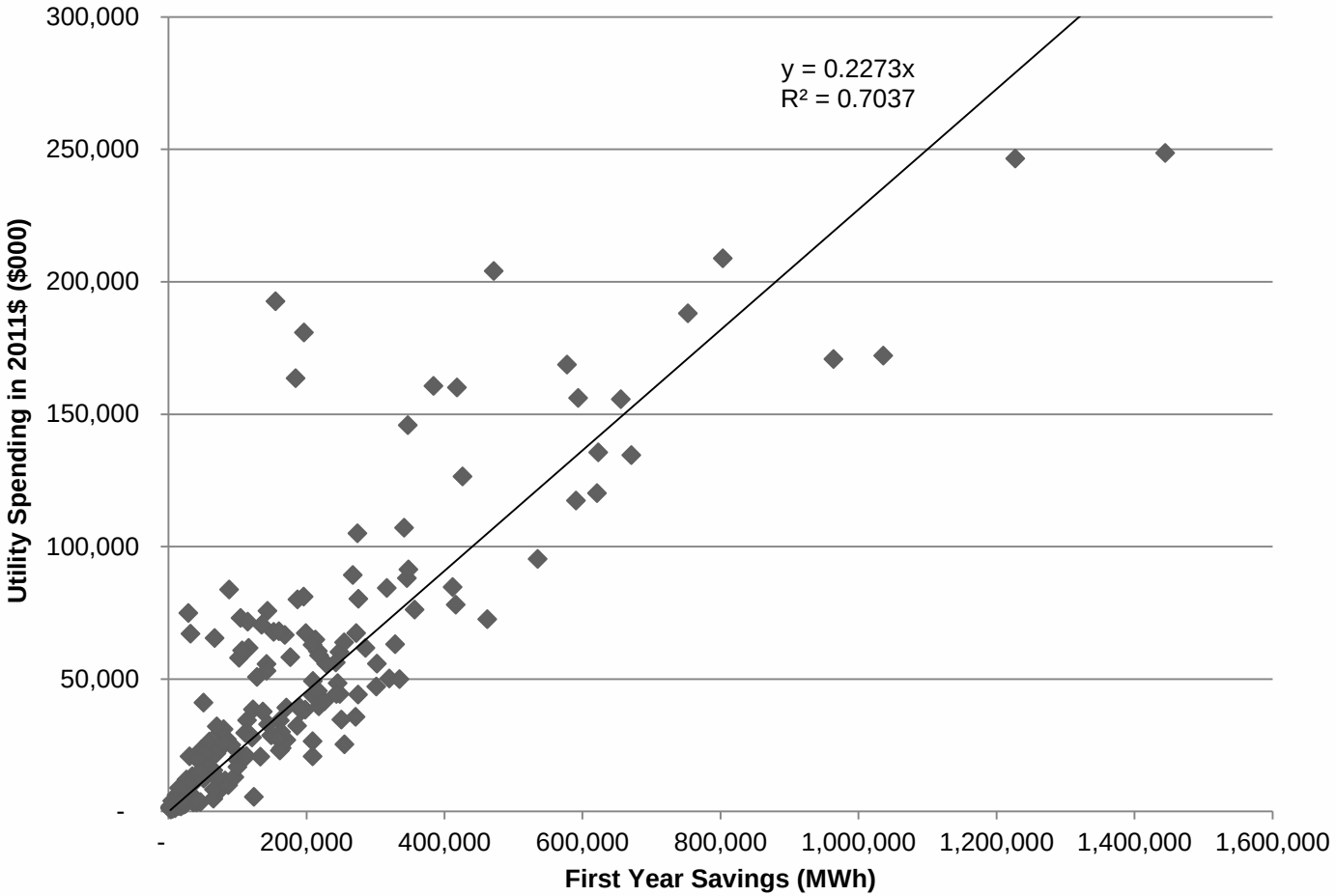
Source: Synapse. *A Brief Survey of State Integrated Resource Planning Rules and Requirements*. 2011.

Schiller 4 and 6 net revenue



Source: Synapse. *Economic Analysis of Schiller Station Coal Units*. 2011.

Utility energy efficiency program annual spending and savings



The sample represents 199 program-years of data, for 28 different companies delivering programs in the 2000 to 2010 timeframe.

Poor electric system planning practice

- Passive attitude toward information
- Rely on out-of-date construction cost estimates
- Consider only "existing" environmental regulations
- Ignore CO_2 price, or treat it "at the end" as a sensitivity case
- Assume existing plants continue to operate
- Overly constrain alternatives such as renewables and energy efficiency

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Good electric system planning practice

- Actively seek out relevant information
- Rely on up-to-date and realistic construction cost estimates
- Anticipate reasonably likely future environmental regulations
- Include reasonable CO_2 price forecast in the reference case, and analyze high and low sensitivities
- Evaluate continued operation vs. retirement options for existing plants
- Include full consideration of alternatives

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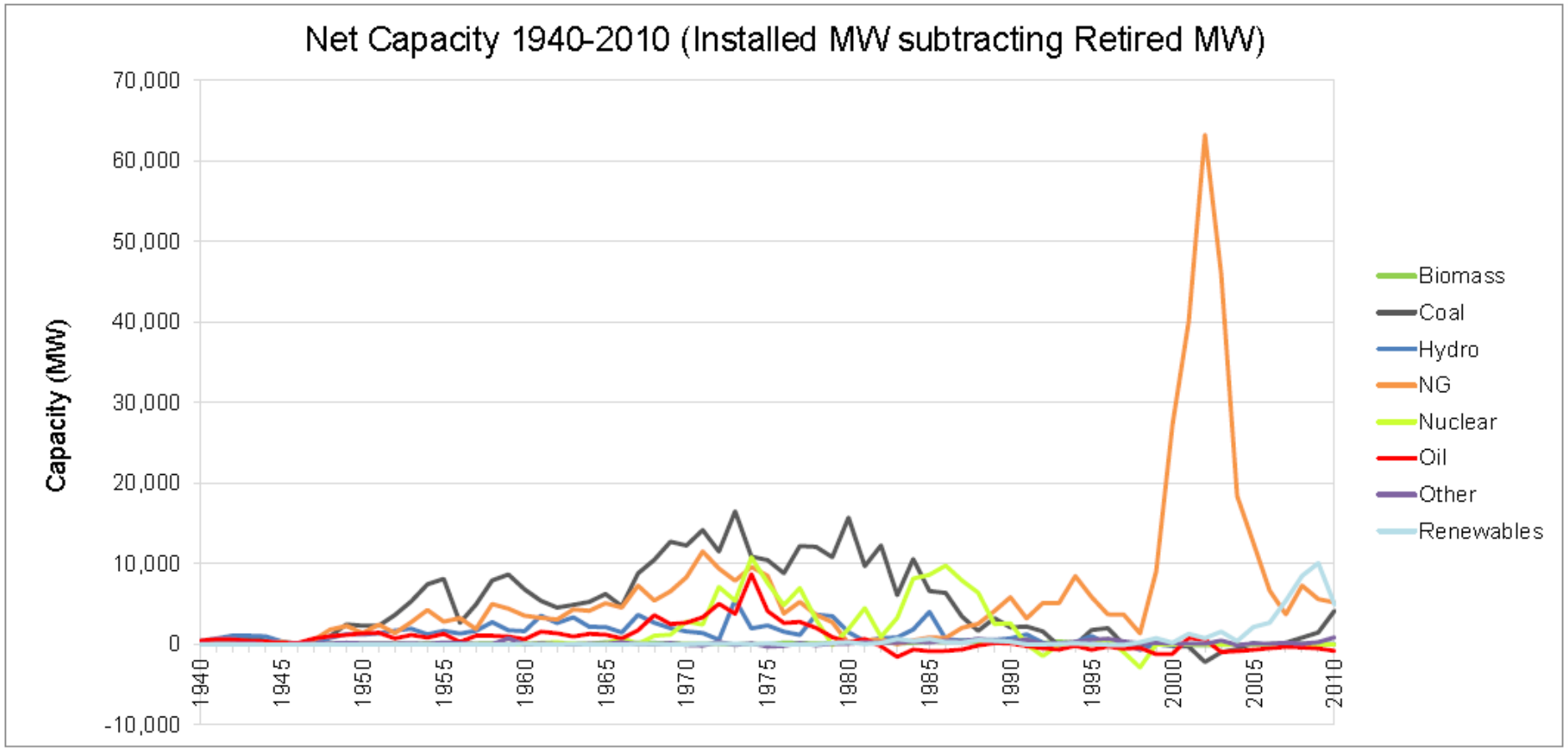
U.S. generating capacity additions by vintage and fuel type



Source: Synapse, 2012.

Reference List

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- Peterson, P. and R. Wilson. *A Brief Survey of State Integrated Resource Planning Rules and Requirements.* 2011. Synapse Energy Economics.
- White, D., D. Hurley, and J. Fisher. *Economic Analysis of Schiller Station Coal Units*. 2011. Synapse Energy Economics.

