



Synapse
Energy Economics, Inc.

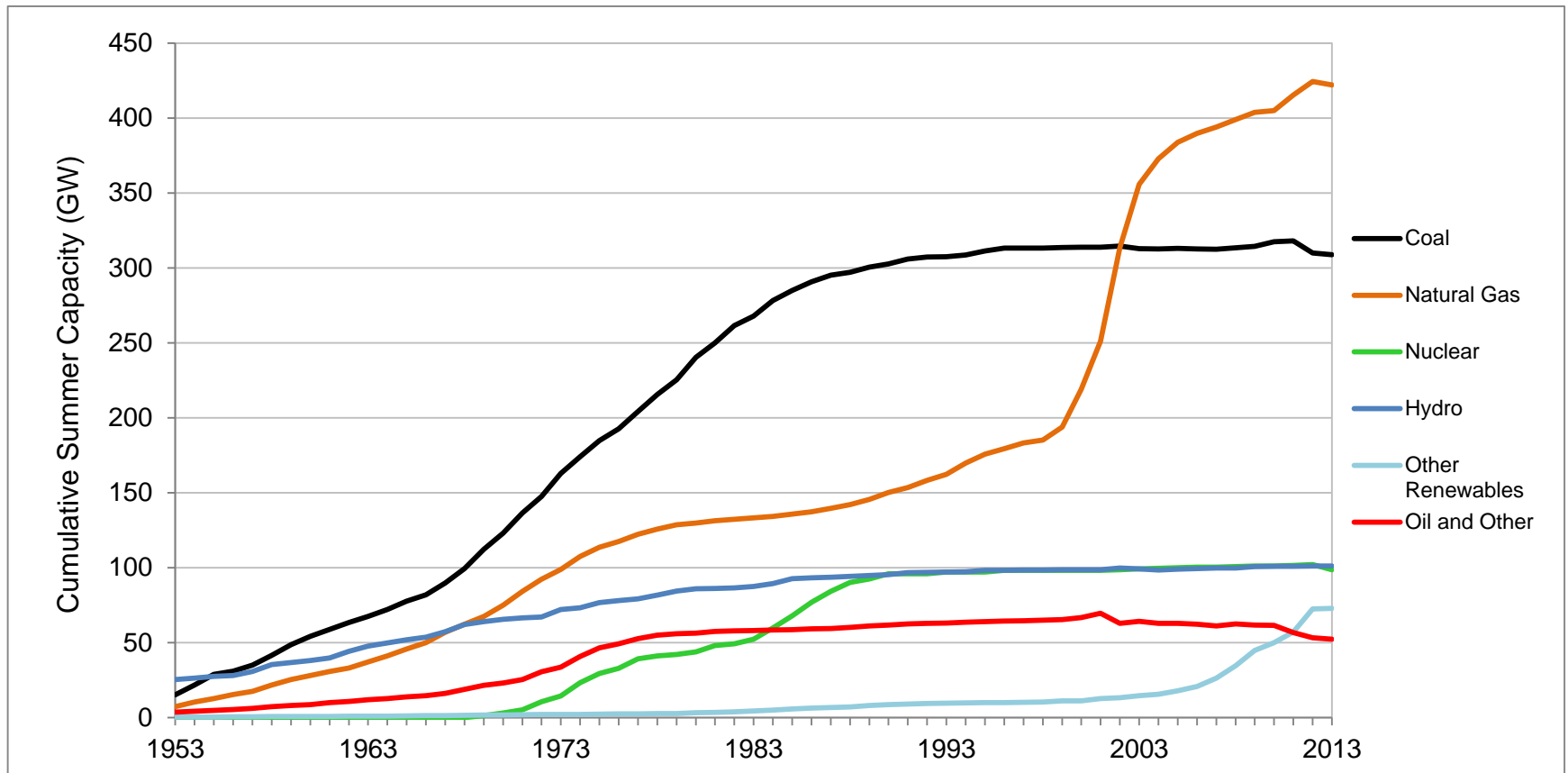
The Case for Coordination

Stemming the Tide of Imprudent Investment

October 16, 2013

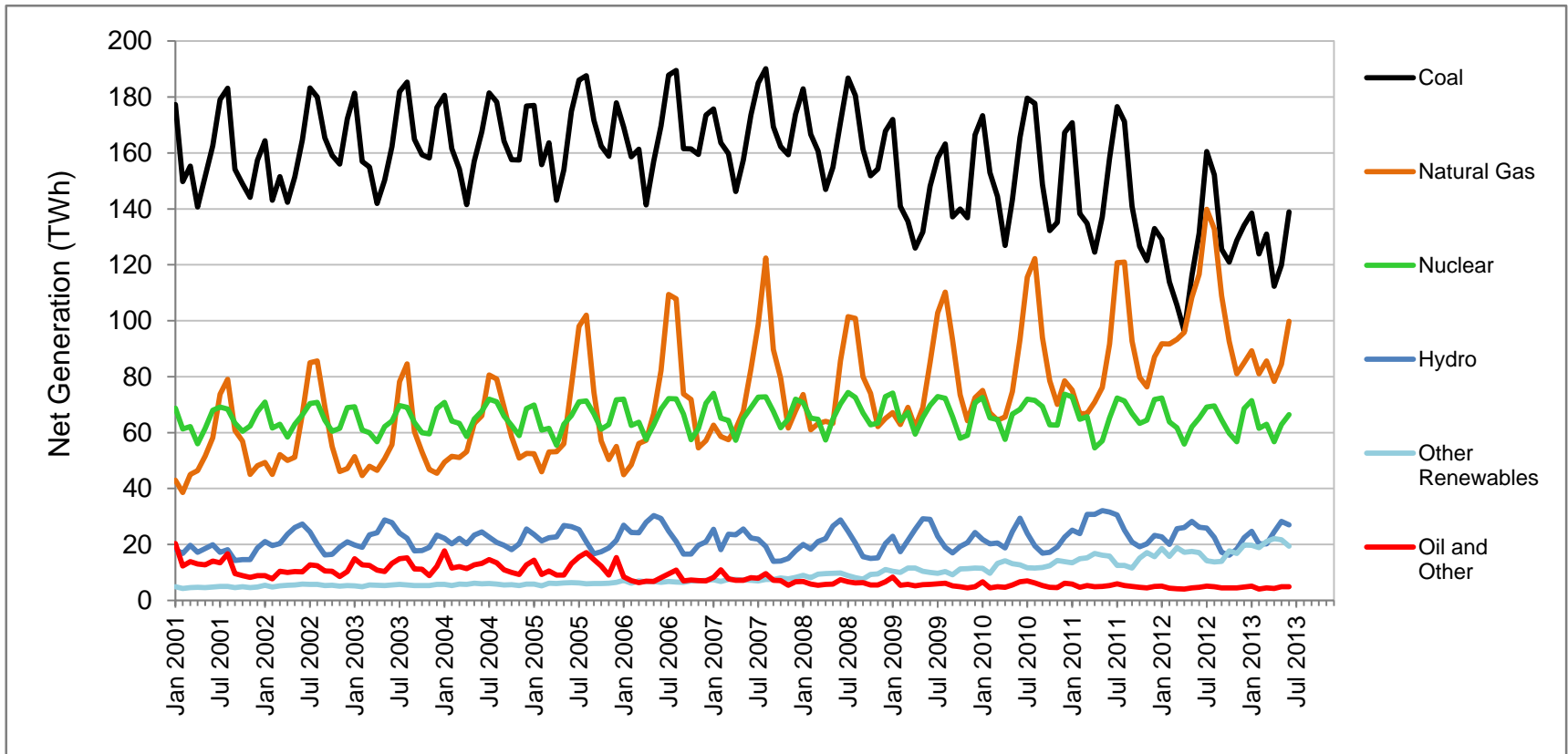
Bruce Biewald

U.S. generating capacity by type



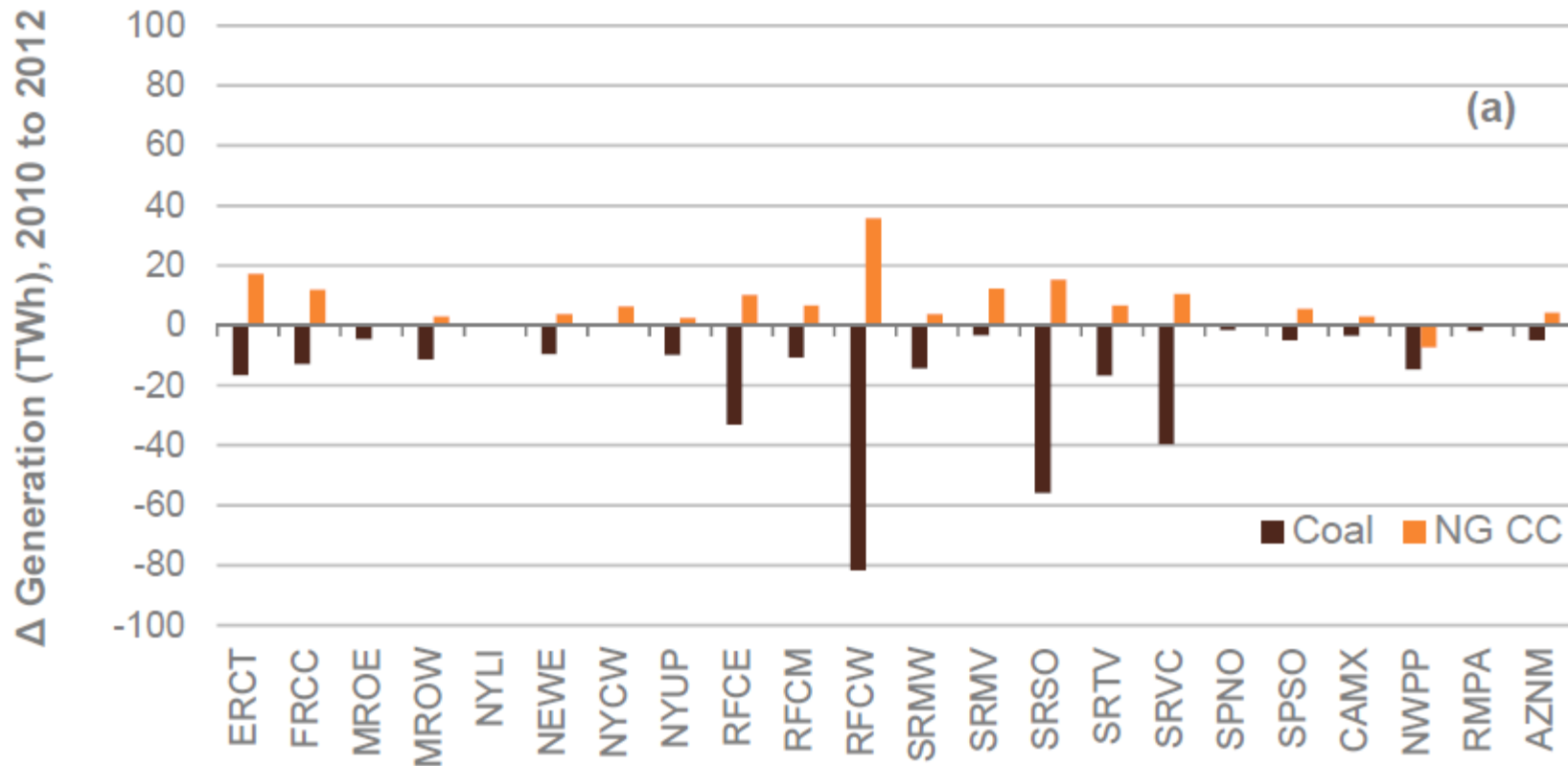
Source: EIA Form 860, 2001 – 2012, Electric Power Monthly

U.S. quarterly generation by fuel type



Source: EIA Form 923, 2001 - 2013

Change in coal and natural gas CC generation by region



Source: EPA Air Markets Program Data, 2010-2012

Source: Knight, Patrick, Bruce Biewald, and Joe Daniel, August 12, 2013, "Displacing Coal: An Analysis of Natural Gas Potential in the 2012 Electric System Dispatch," prepared by Synapse Energy Economics for the Energy Foundation.

Uneconomic U.S. coal capacity compared to market purchases

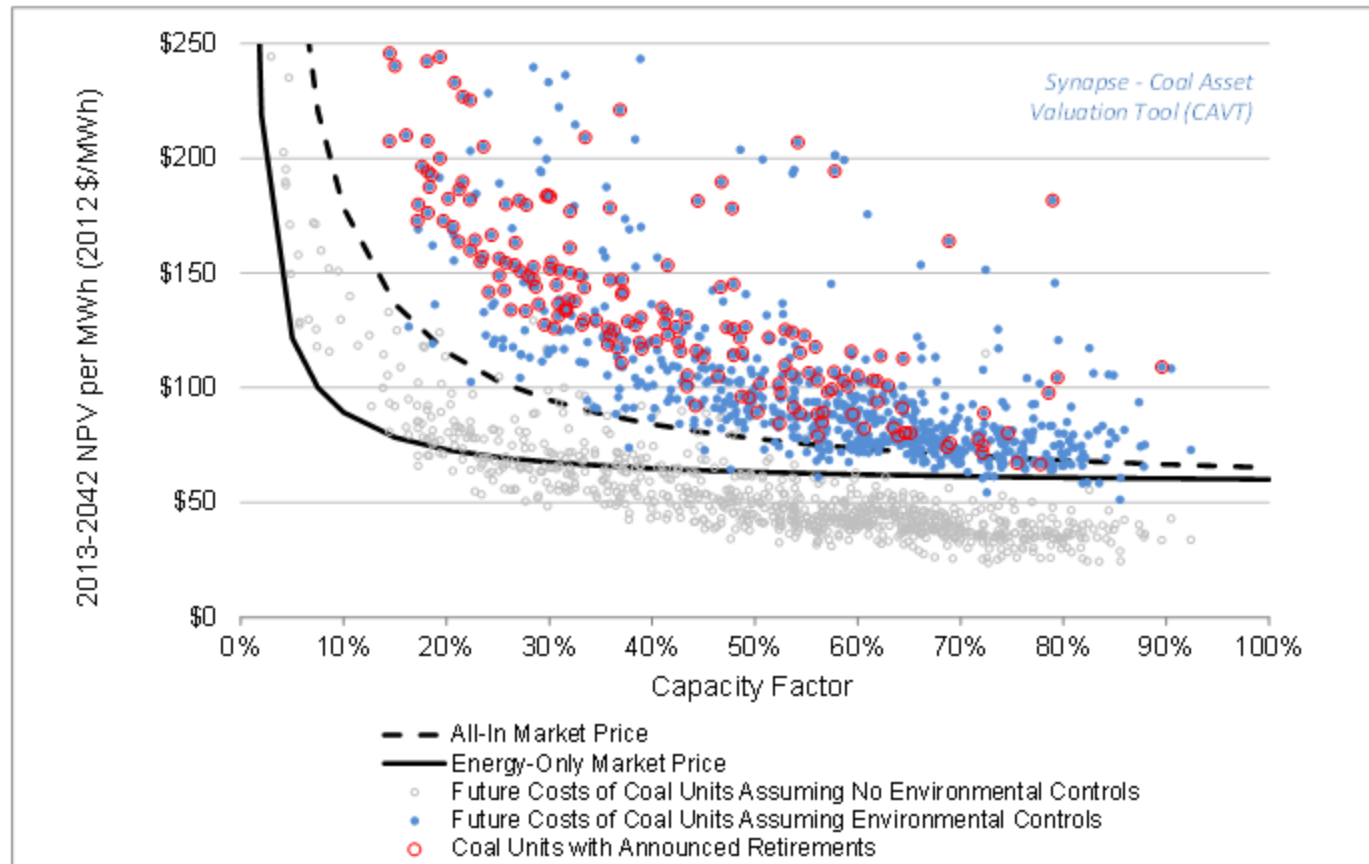
Uneconomic Coal Capacity Compared to All-In Purchases (GW)

		Environmental Retrofit		
		Lenient	Mid	Strict
Natural Gas Price	High	63 (20%)		230 (74%)
	Mid		228 (73%)	
	Low	101 (33%)		274 (88%)

Note: Percentages indicate the share of the capacity of the uneconomic units compared to total coal capacity.

Source: Knight, Patrick, Elizabeth A. Stanton, Jeremy Fisher, and Bruce Biewald, October 11, 2013, "Forecasting Coal Unit Competitiveness: Coal Retirement Assessment Using Synapse's Coal Asset Valuation Tool (CAVT)."

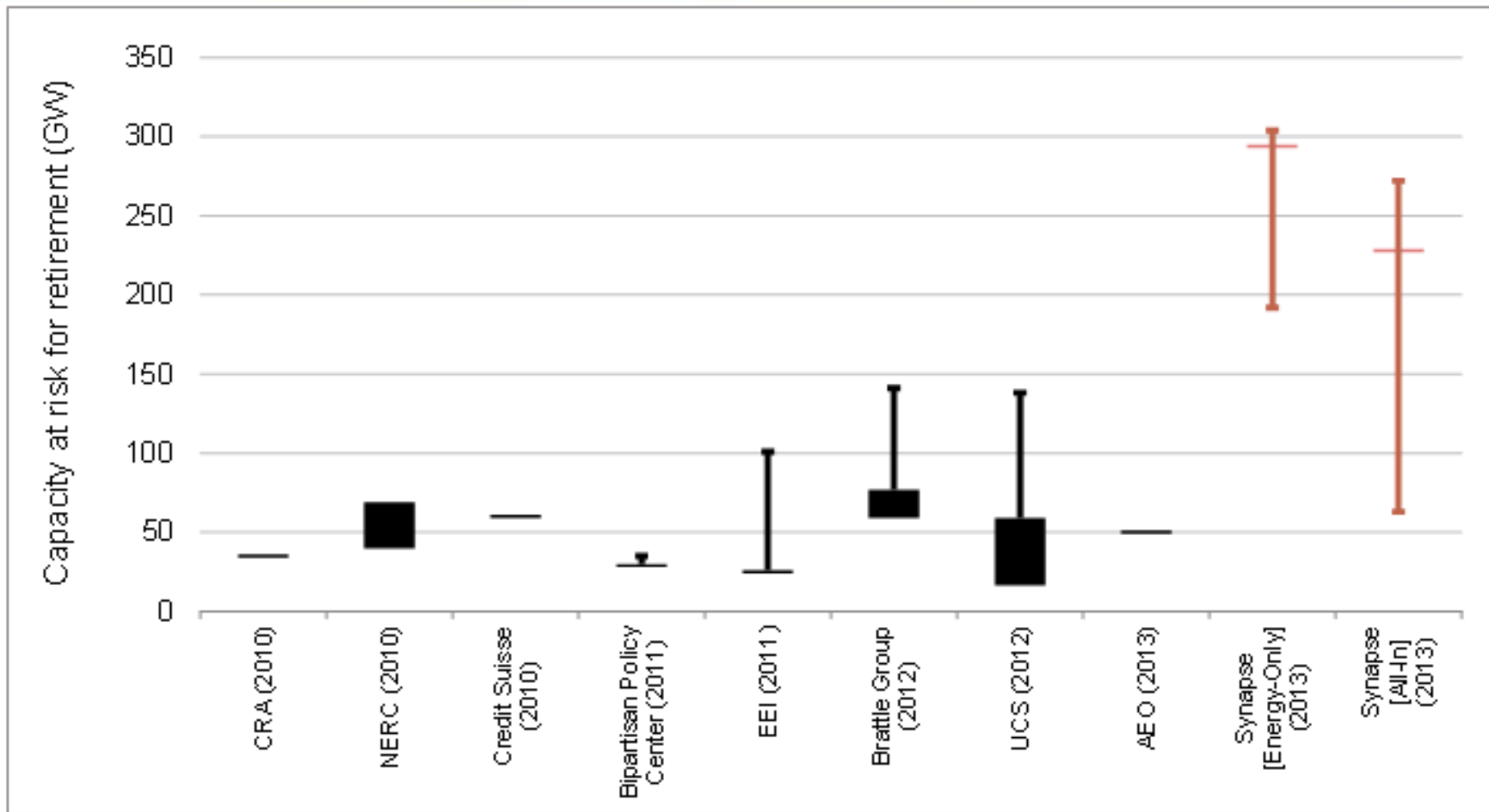
Projected net present value of coal units assuming environmental retrofits, compared to typical national market electricity prices, 2013-2042



Note: The y-axis in Figure 2 is truncated at \$250/MWh; some units with capacity factors of 15 percent or less have net present value costs that are higher than \$250/MWh when assuming new environmental controls.

Source: Knight, Patrick, Elizabeth A. Stanton, Jeremy Fisher, and Bruce Biewald, October 11, 2013, "Forecasting Coal Unit Competitiveness: Coal Retirement Assessment Using Synapse's Coal Asset Valuation Tool (CAVT)."

Comparison of coal retirement projection ranges



Note: Each projection uses different assumptions for environmental retrofits, natural gas prices, and CO₂ prices.

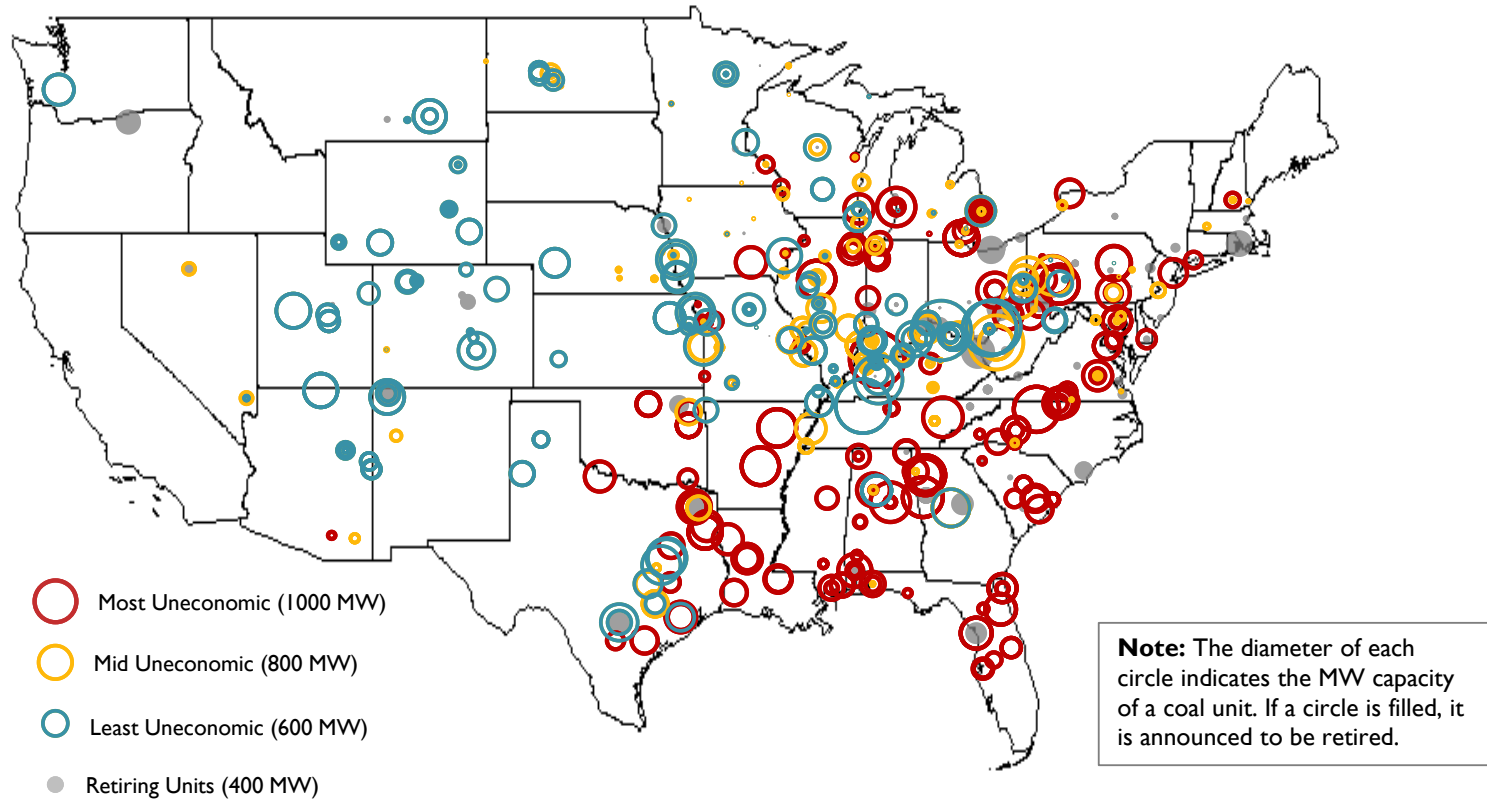
Source: Knight, Patrick, Elizabeth A. Stanton, Jeremy Fisher, and Bruce Biewald, October 11, 2013, "Forecasting Coal Unit Competitiveness: Coal Retirement Assessment Using Synapse's Coal Asset Valuation Tool (CAVT)."

Environmental retrofit and natural gas assumptions

Natural Gas Price	Very High	Natural gas prices grow at 130% of the AEO 2012 Reference Case rate of change
	High	Natural gas prices grow at the AEO 2012 Low Estimated Ultimate Recovery Case rate of change
	Mid	Natural gas prices grow at the AEO 2012 Reference Case rate of change
	Low	Natural gas prices grow at the AEO 2012 High Estimated Ultimate Recovery Case rate of change
Environmental Control Requirements	Strict	FGD, SCR, Baghouse, ACI, Impingement Controls and Recirculating Cooling on units with intakes > 125 MGD, Coal Combustion Residual (Subtitle C), Effluent Regulatory Option "4a," "Synapse Mid" CO ₂ Price
	Mid	FGD, SCR, Baghouse, ACI, Impingement Controls and Recirculating Cooling on units with intakes > 125 MGD, Coal Combustion Residual (Subtitle D), Effluent Regulatory Option "3," "Synapse Mid" CO ₂ Price
	Lenient	Baghouse, ACI, Impingement Controls, Effluent Regulatory Option "3a," "Synapse Low" CO ₂ Price

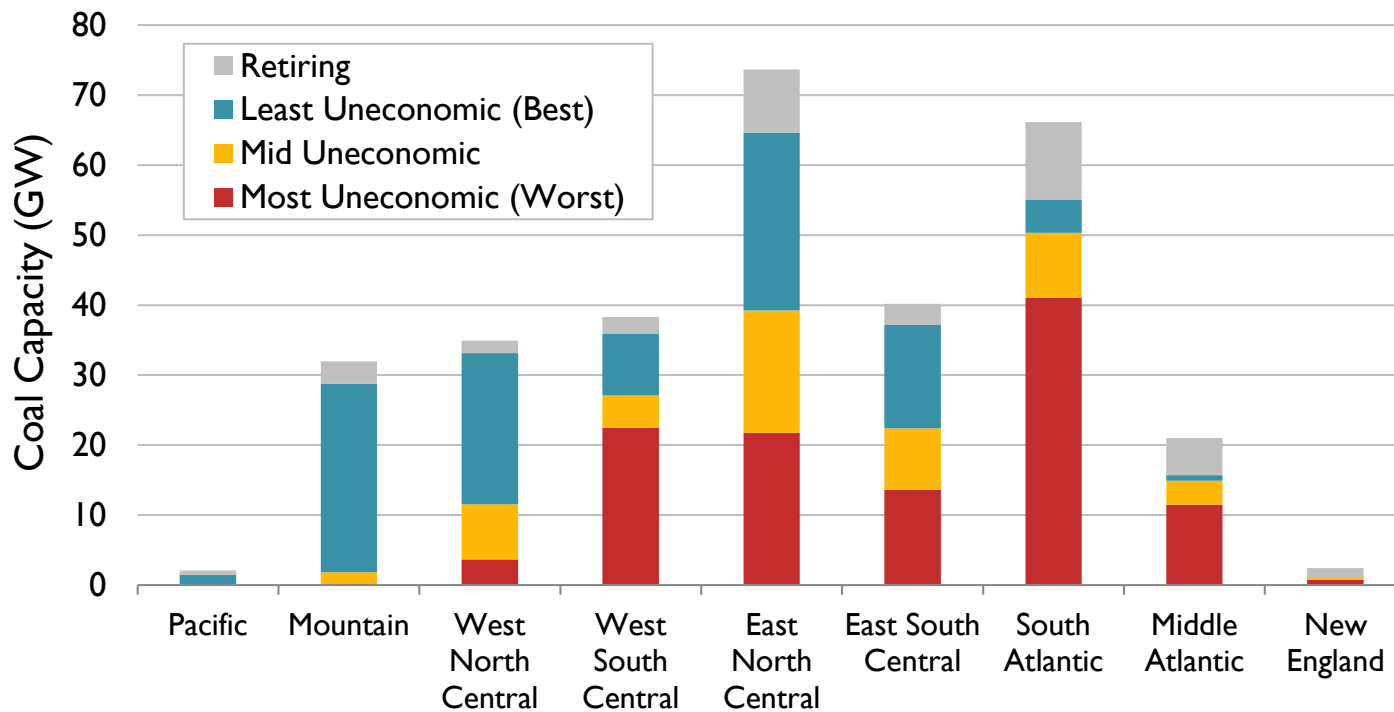
Source: Knight, Patrick, Elizabeth A. Stanton, Jeremy Fisher, and Bruce Biewald, October 11, 2013, "Forecasting Coal Unit Competitiveness: Coal Retirement Assessment Using Synapse's Coal Asset Valuation Tool (CAVT)."

U.S. coal units by economic viability



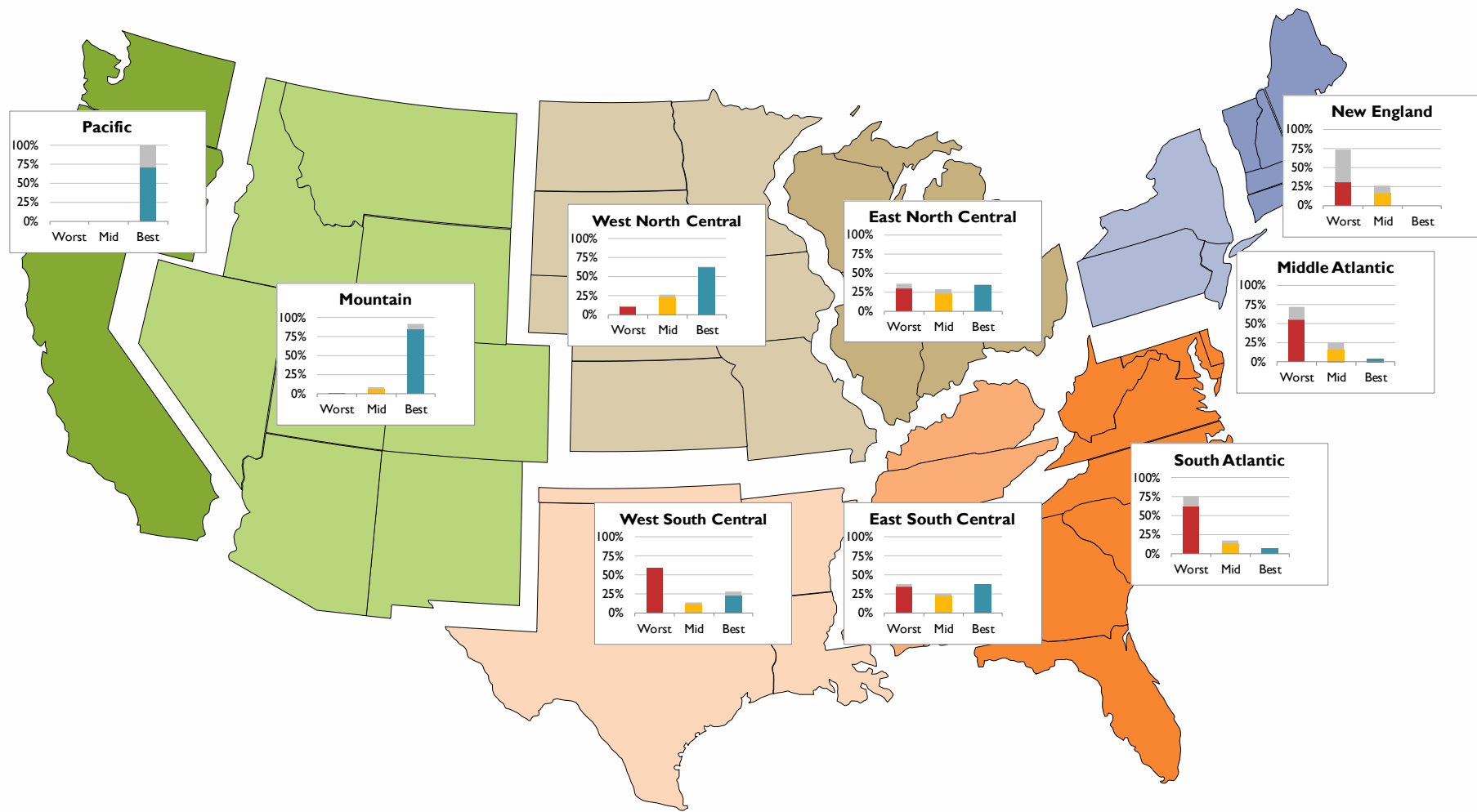
Source: Synapse CAVT Analysis

U.S. coal capacity by economic viability and region

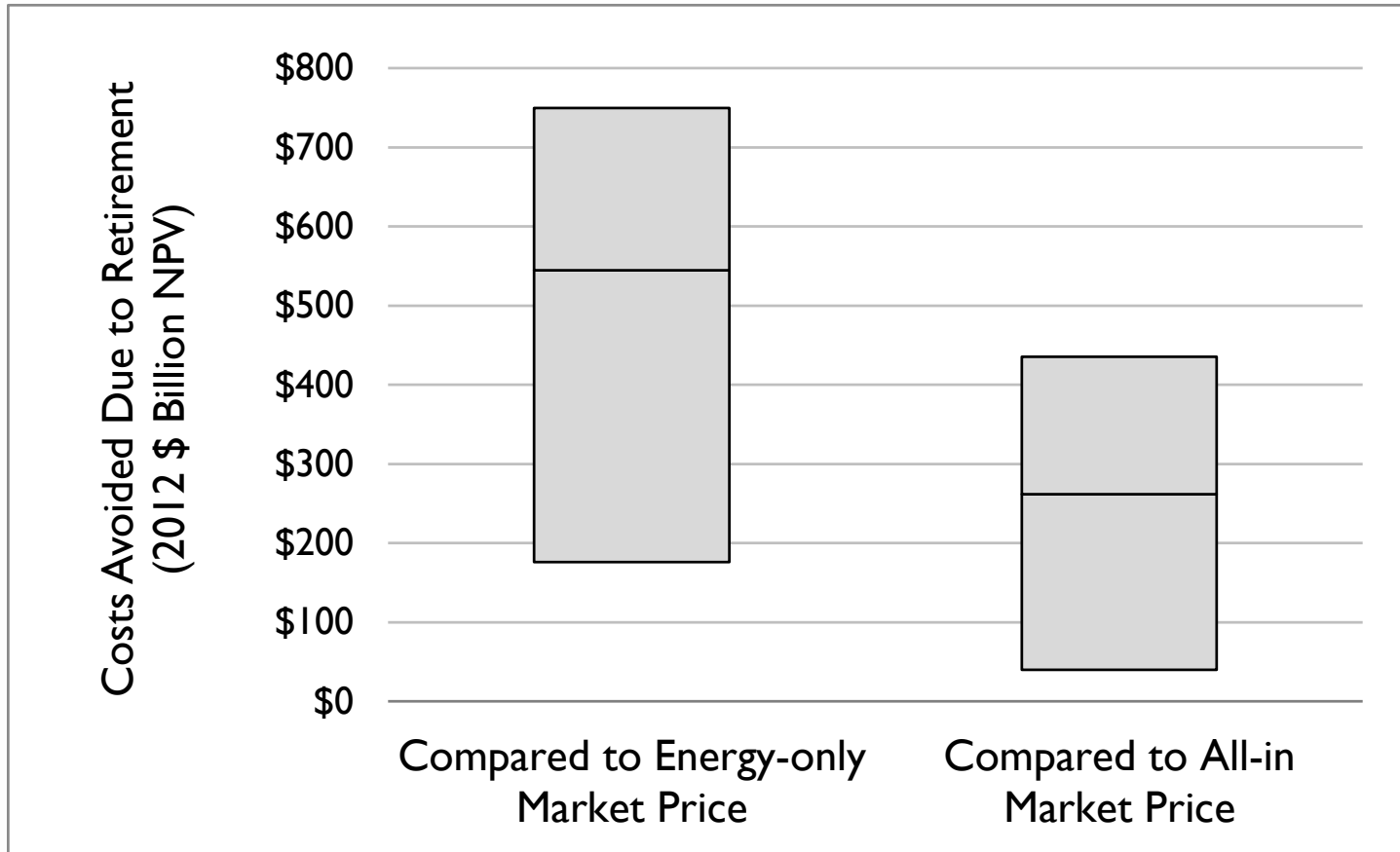


Source: Synapse CAVT Analysis

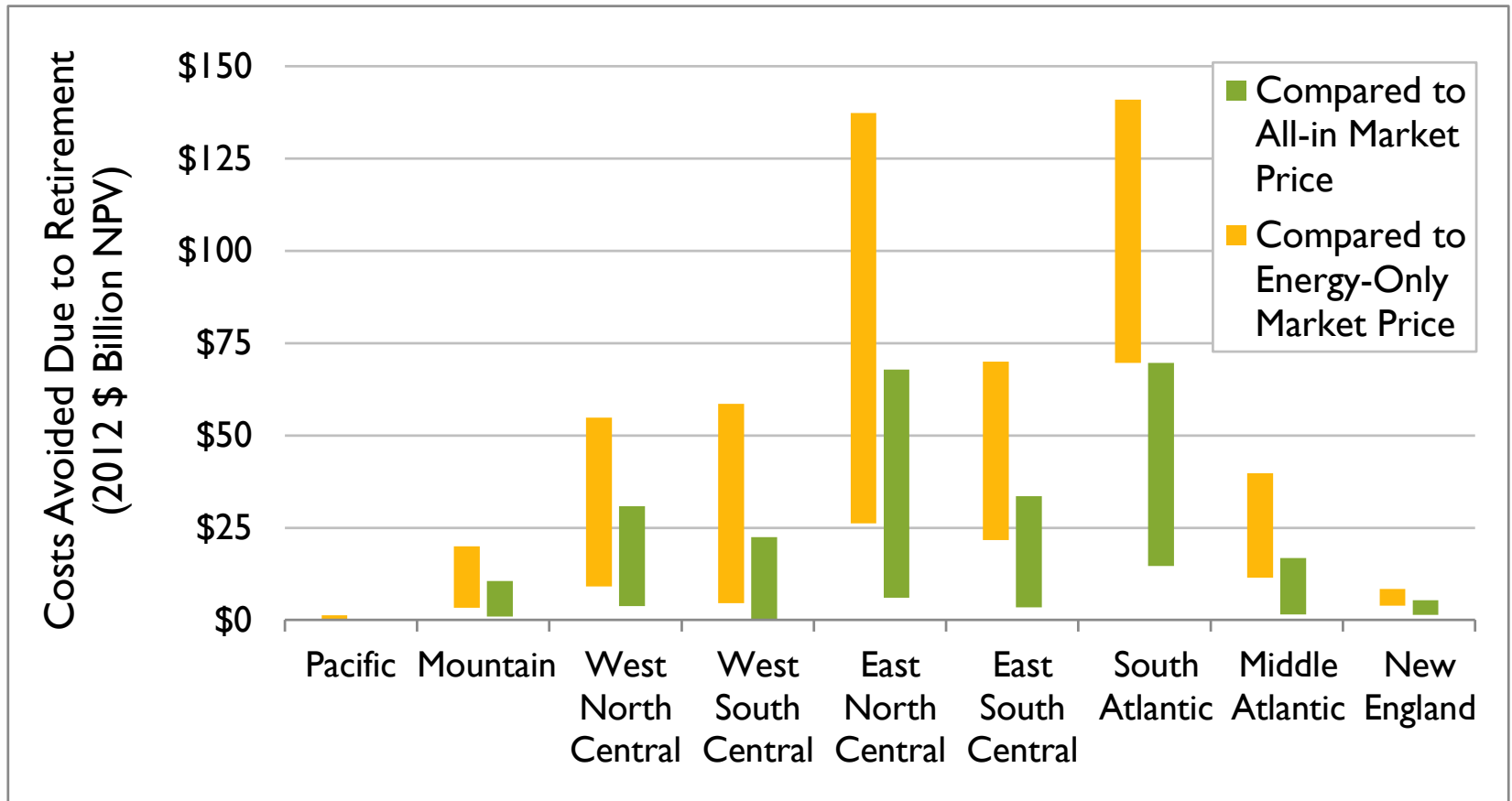
U.S. coal capacity by economic viability and region



Costs avoided due to retirement



Costs avoided due to retirement by region



What should be done?

- **Utilities** should save their customers money by retiring the coal units that are uneconomic on a forward-cost basis.
- Prudent utility system planners must:
 - collect current and relevant information (don't wait for information to come to you)
 - anticipate reasonably expected market conditions and environmental regulations (not piecemeal or head-in-the-sand approach)
 - consider a reasonably wide range of resource options

- **Regulators** should:
 - insist on prudent planning
 - open comprehensive compliance planning dockets
 - include retrofit versus retire analysis in all planning dockets
 - consider prudence and "used and useful" in rate cases
 - disallow imprudently incurred costs
 - disallow costs that are not used and useful, unless there's good reason not to disallow

- **Consumer and environmental advocates** should:
 - encourage the utilities and regulators to do their jobs (see previous slides)
 - insist on retirement of uneconomic plants
 - argue for disallowance of imprudently incurred retrofit investment(s)
 - argue to remove from rate base existing plant that is not "economically used and useful" (whether or not the plant is operating)