



# Reliable & Resilient The Value of Our Existing Coal Fleet

**An Assessment of  
Measures to Improve  
Reliability and  
Efficiency While  
Reducing Emissions**

**National Association  
of State Energy Officials  
NASEO Energy Policy Outlook Conference  
Washington, DC  
February 5, 2015**



# National Coal Council

Celebrating 30 years ~ 1984|2014

**The National Coal Council  
provides advice and recommendations  
to the Secretary of Energy  
on general policy matters  
relating to coal and the coal industry.**



**NCC is a Federal Advisory Committee  
organized under FACA legislation.**



Members are appointed to  
serve by Secretary of Energy  
120-125 members

More than 30 studies conducted  
for the Secretary of Energy  
Prepared by NCC members at no  
cost to DOE

- **Industry –**  
coal suppliers, utility & industrial consumers  
& coal transportation
- **Support Services –**  
engineering firms, vendors, consultants &  
attorneys
- **Academics**
- **NGOs –**  
environmental & trade association reps
- **Government –**  
PUC & state energy officials

#### **Extensive Range of Topics**

Carbon Management  
Clean Coal Technologies  
Coal & Coal Technology Exports  
Coal Conversion  
Coal's Image  
Utility Deregulation  
Climate & Clean Air Regulations  
Building New Coal Power Plants  
Industrial Coal Use  
Externalities  
Interstate Transmission  
CCUS for EOR  
**Fossil Forward – Revitalizing CCS**



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Study Conducted January-May 2014  
Approved by NCC Members ~ May 14, 2014



# Secretary Moniz's Request

“What can industry and the Department of Energy, separately and jointly, do to facilitate enhancing the capacity, efficiency and emissions profiles of the existing coal generation fleet in the United States through application of new and advanced technology? Such a study would also address the jobs implications of modification and addition of equipment at existing coal fired power plants.”



January 31<sup>st</sup>, 2014

# Study at a Glance

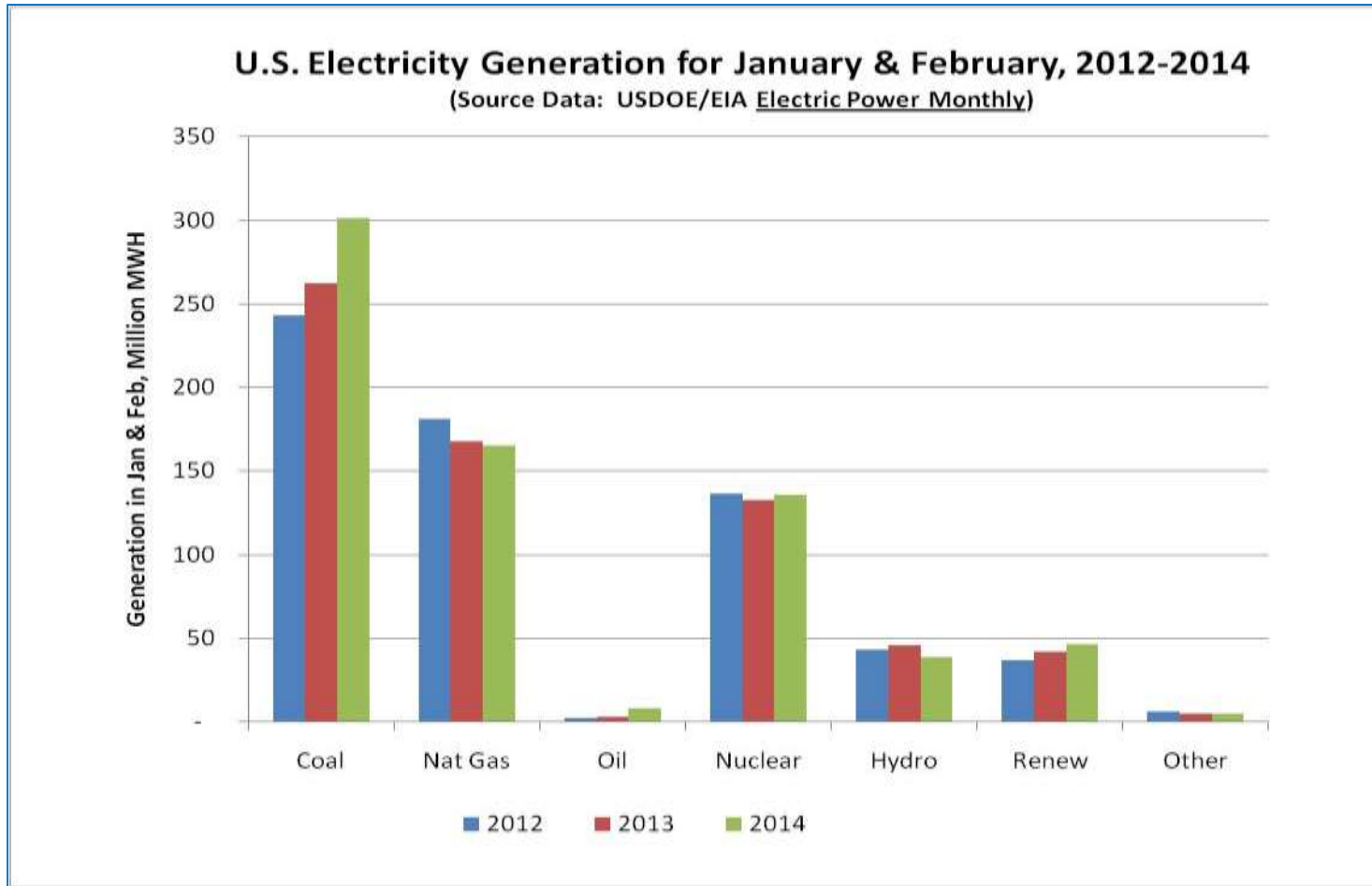
- A. Executive Summary
- B. The Role/Benefits of the Existing Coal Fleet
- C. Changes that Could Impact Future Benefits from the Existing Coal Fleet
- D. Technology Responses to Maximize Future Benefits to Society
  - Reliability & Flexibility
  - Efficiency
  - Emissions Reductions

+ Bonus Section – The 2014 Polar Vortex

< 90 pages



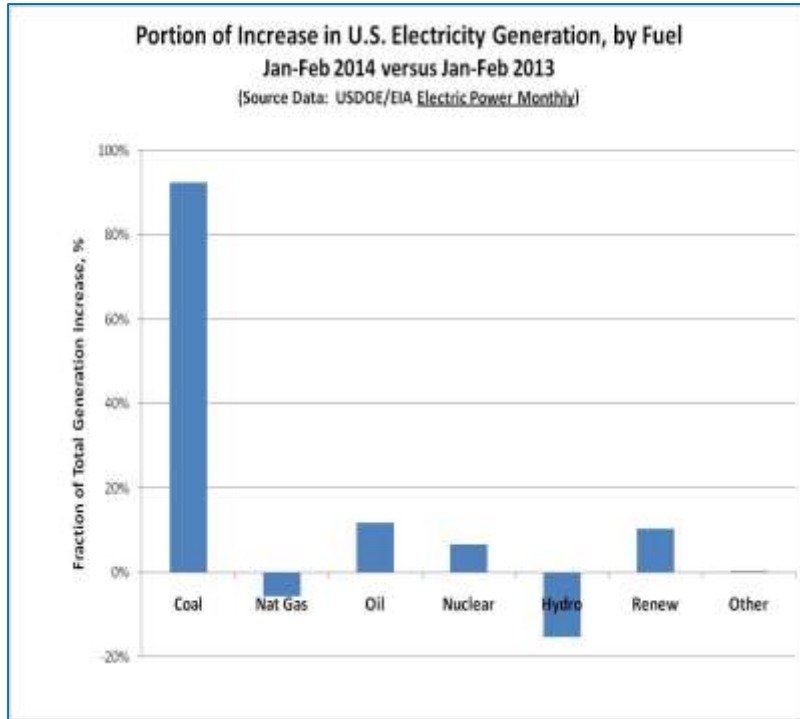
# Polar Vortex 2014



**“This country did not just dodge a bullet  
– we dodged a cannonball.”  
Nick Akins, CEO, American Electric Power**



# Polar Vortex 2014



**The value of the existing coal fleet is not an abstract concept. At a time of great stress on power demand in Jan/Feb 2014, coal produced 92% of the increase in U.S. electricity generation, relative to Jan/Feb 2013.**

~ “89% of our coal capacity slated for retirement in mid-2015 is called upon and running. Natural gas delivery is challenged.”

Nick Akins, CEO, AEP

~ At least 75% of Southern Company’s coal power plants scheduled to soon close was need to meet consumer demand.

~ At one point about 75% of New England’s gas generating capacity was not operating due to lack of supply or high prices.

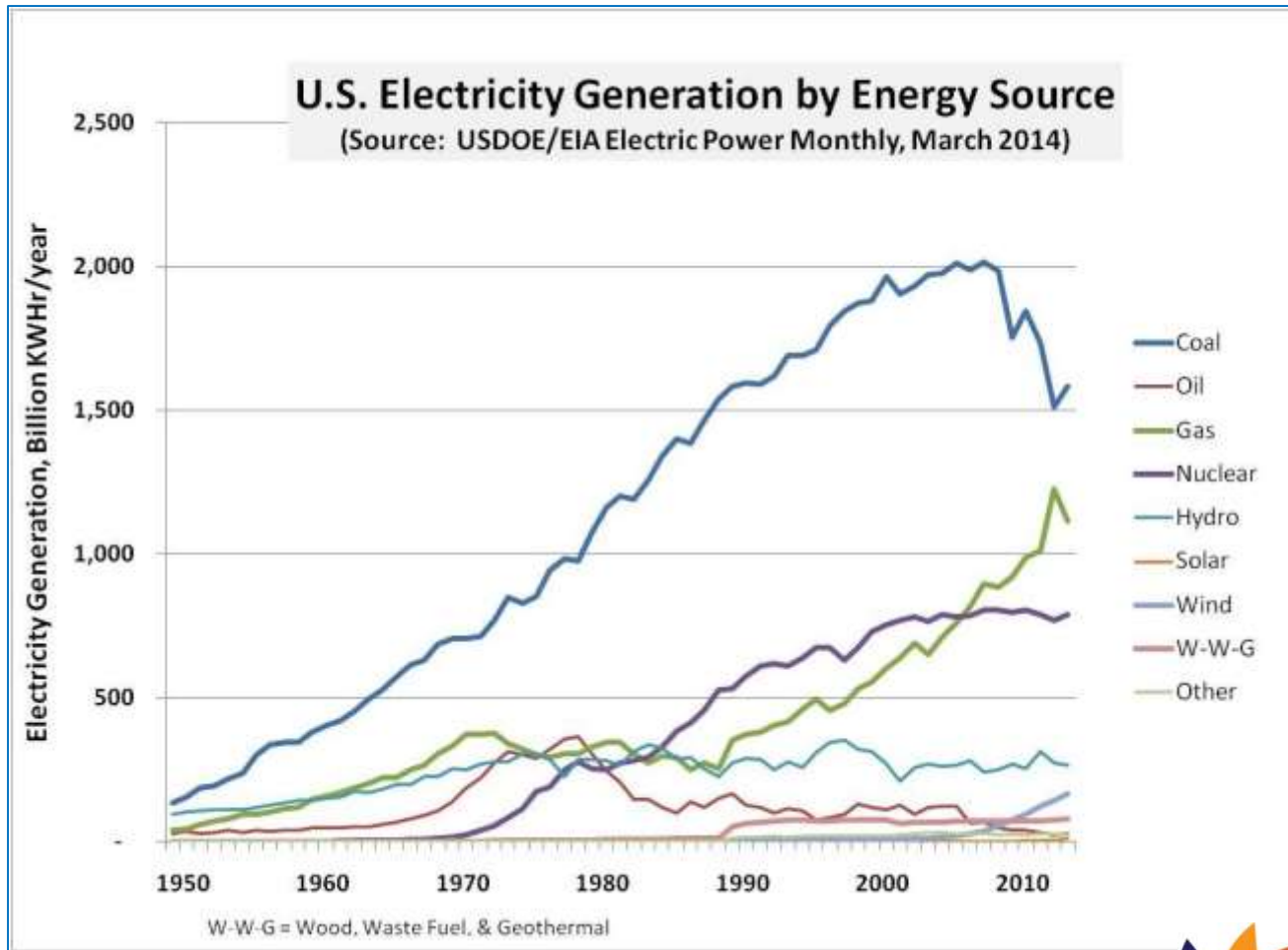
~ The TVA set new records for electricity demand at the same time that many of its coal-fired units are scheduled for closure.

~ “We really counted on a combination of coal and gas and nuclear and pump storage and hydro, we needed every bit of it.”

Lynn Good, CEO, Duke Energy



# Profile of Existing Coal Fleet



Profile of the Existing Fleet – 310 GW

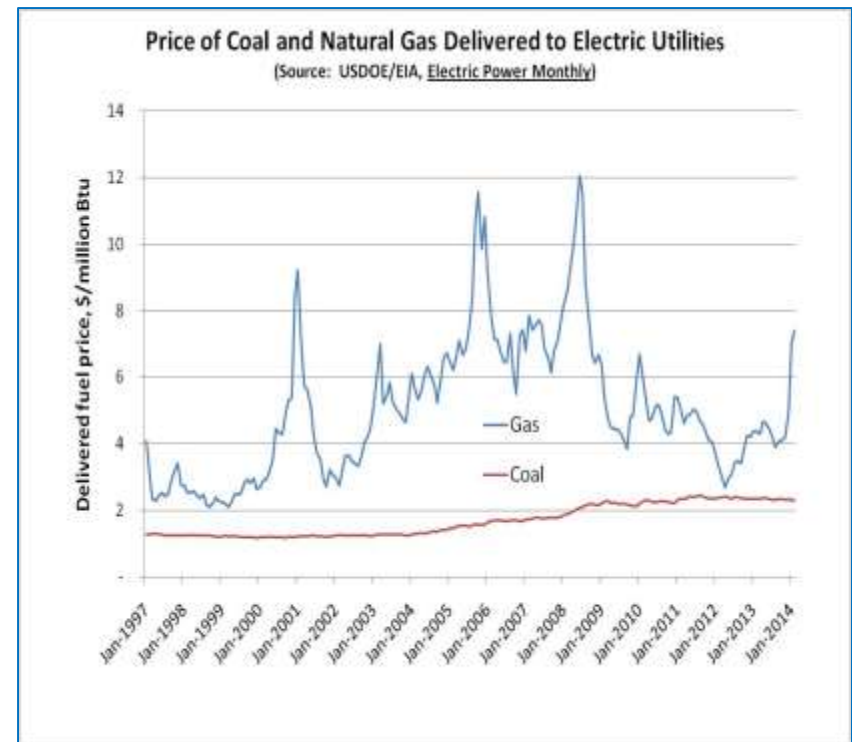
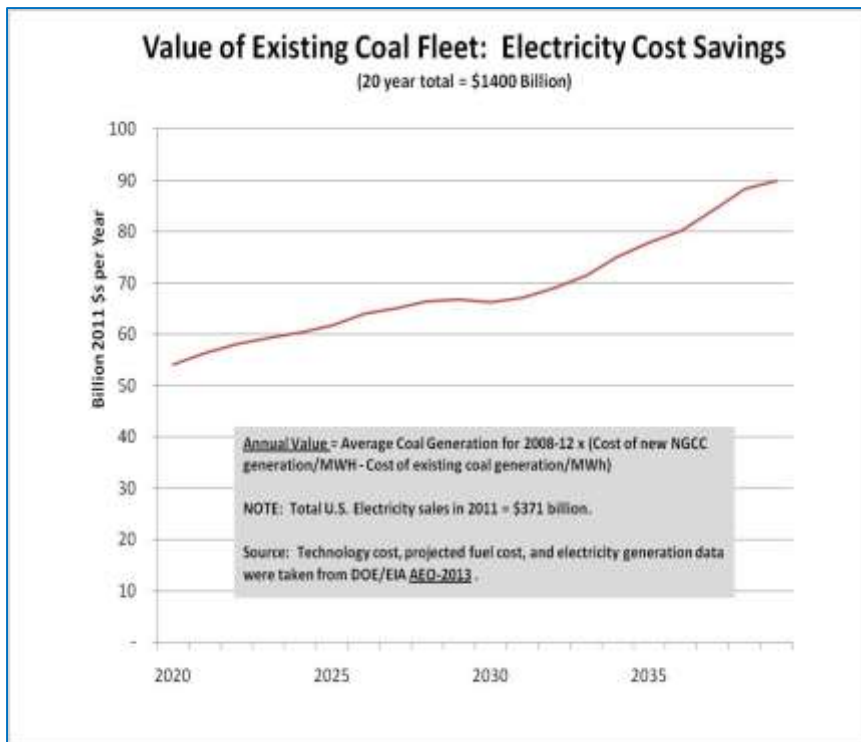


# Benefits of Coal Fleet

## What is the value of the coal fleet?

### Supply & Price Stability

### Direct & Macro-economic

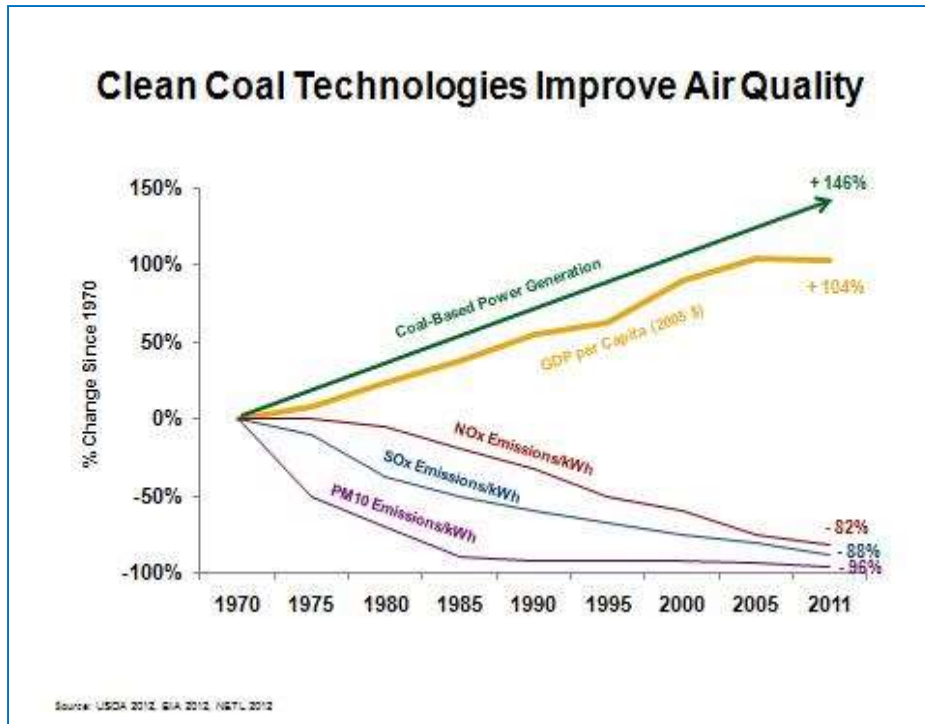


# Benefits of Coal Fleet

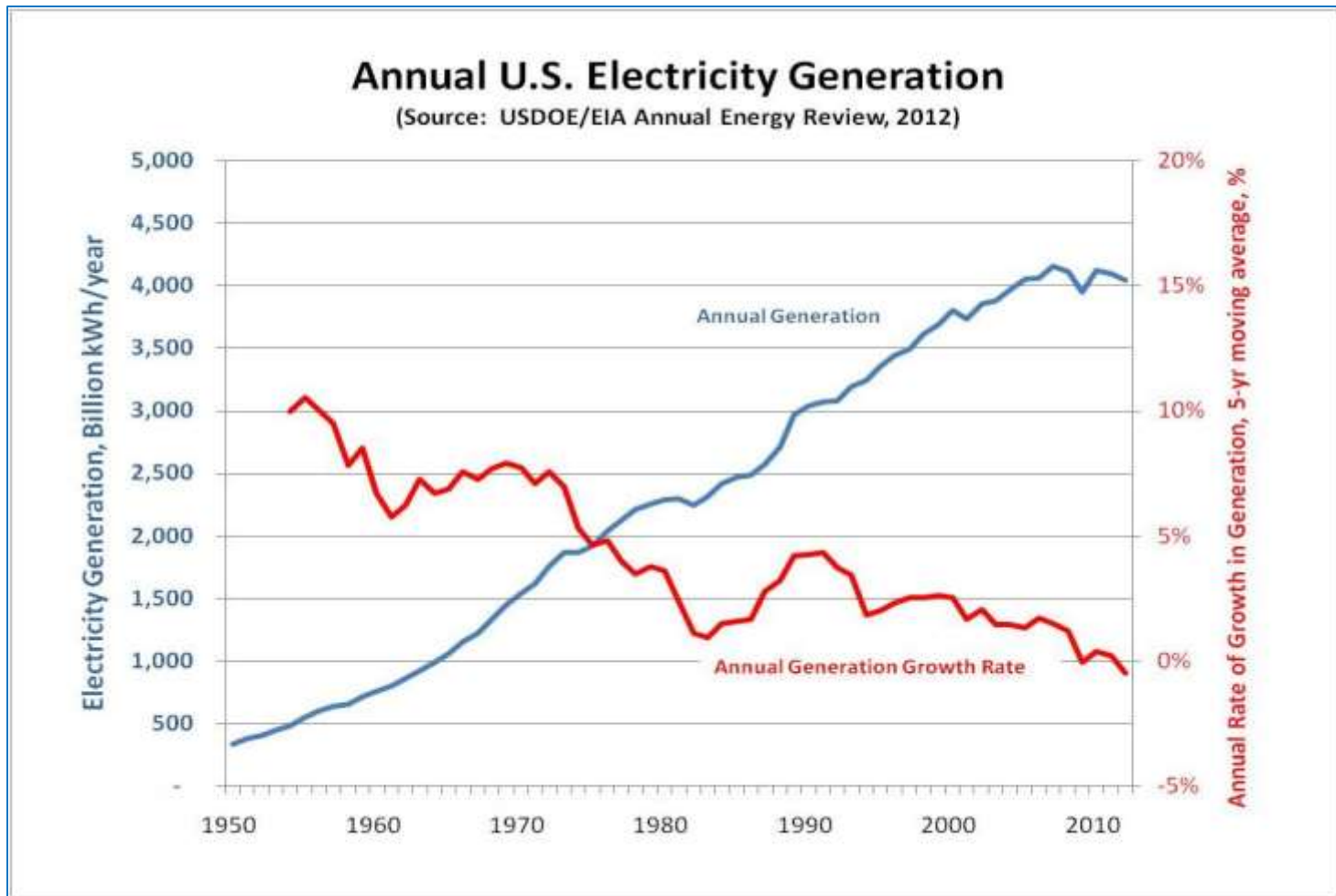
## What is the value of the coal fleet?

Environmental

Jobs



# Changes Impacting the Fleet

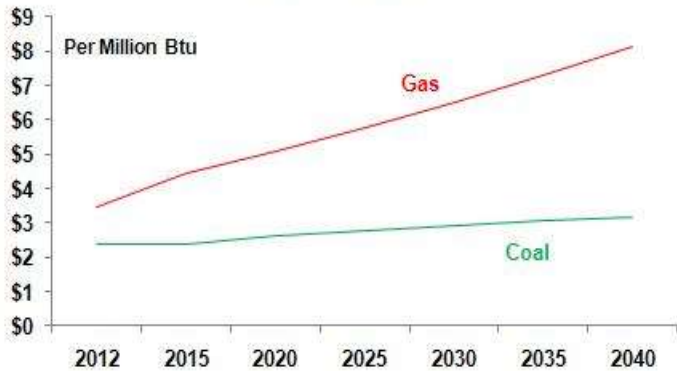


**Reduced Rate of Demand for Electricity**

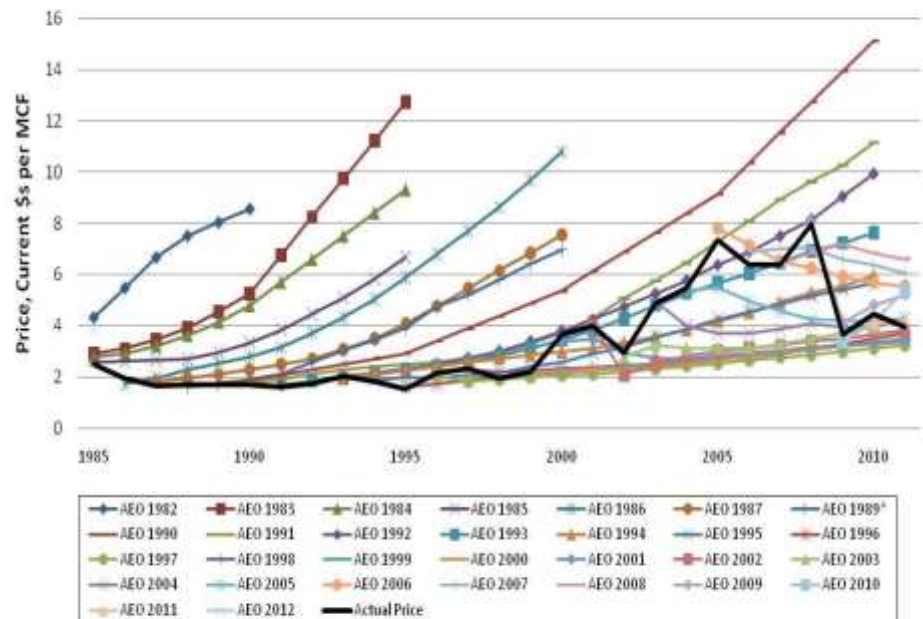


# Changes Impacting the Fleet

Forecast Natural Gas and Coal Prices for Electric Power Producers



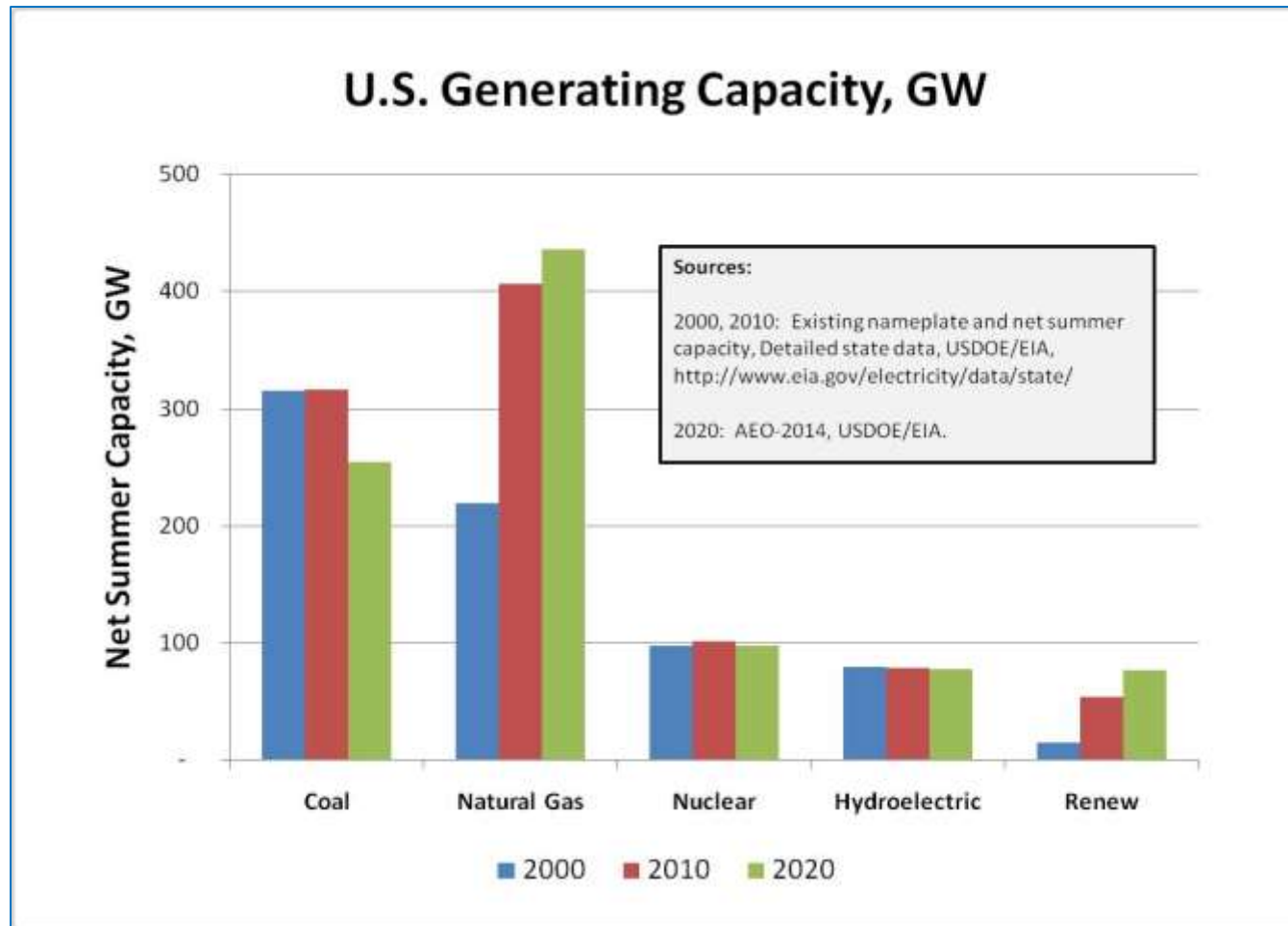
EIA Wellhead Price Forecasts from 1982 to 2012



More Advantageous Natural Gas Prices



# Changes Impacting the Fleet



Environmental Regulation





# Changes Impacting the Fleet



United States Environmental Protection Agency

**“As applied to existing power plants and refineries, EPA concludes that the NSR program has impeded or resulted in the cancellation of projects which would maintain and improve reliability, efficiency and safety of existing energy capacity. Such discouragement results in lost capacity, as well as lost opportunities to improve energy efficiency and reduce air pollution.” ~ EPA**

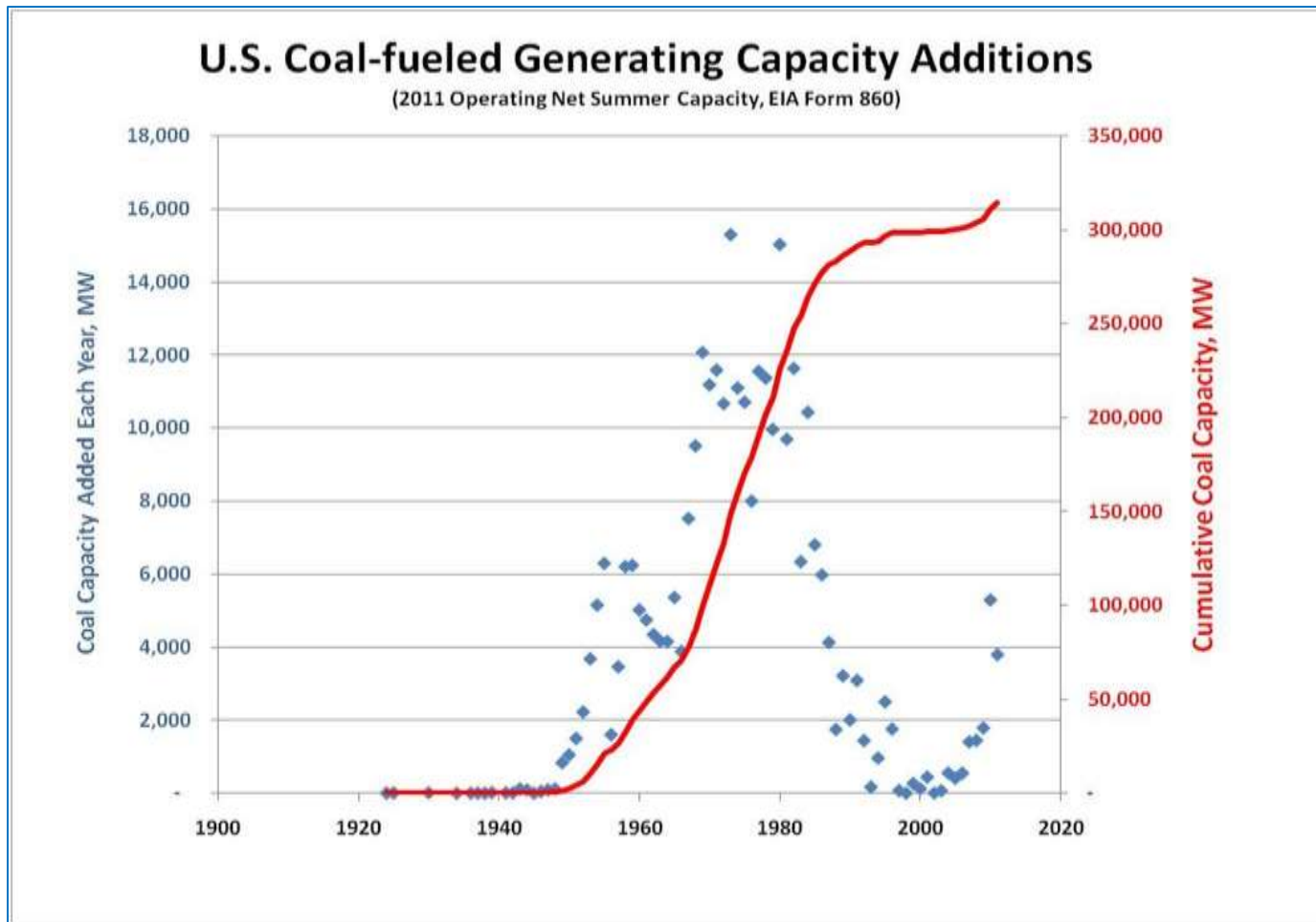


**“NSR’s treatment of modifications has been particularly controversial.” National Research Council**

**New Source Review**



# Changes Impacting the Fleet

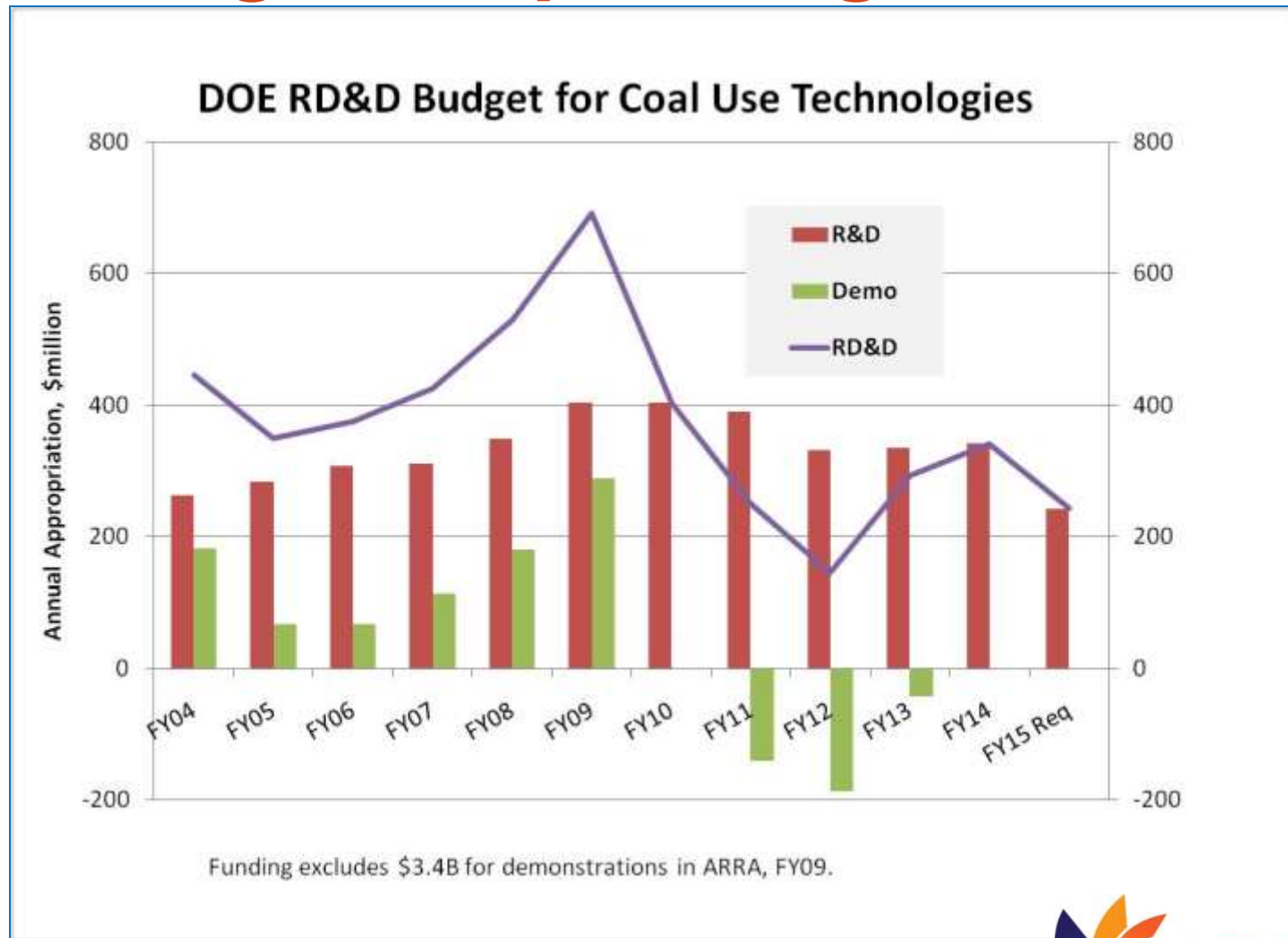


Age of Fleet





# Changes Impacting the Fleet



Reduced RD&D Funding— Industry & Government



# Technology Responses

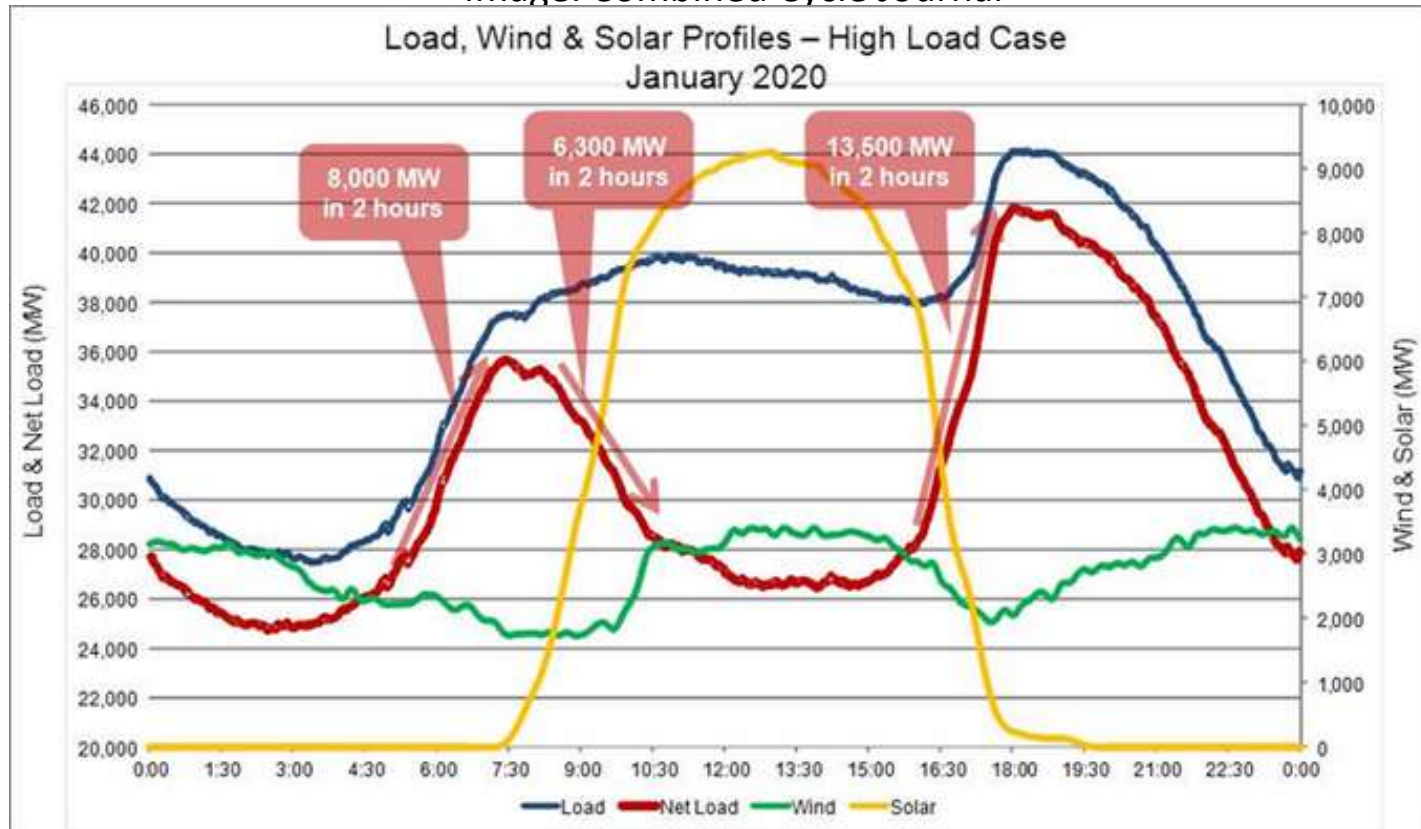
## Technology options to:

- Enhance Reliability & Flexibility
- Improve Efficiency
- Reduce Emissions



# Technology Responses

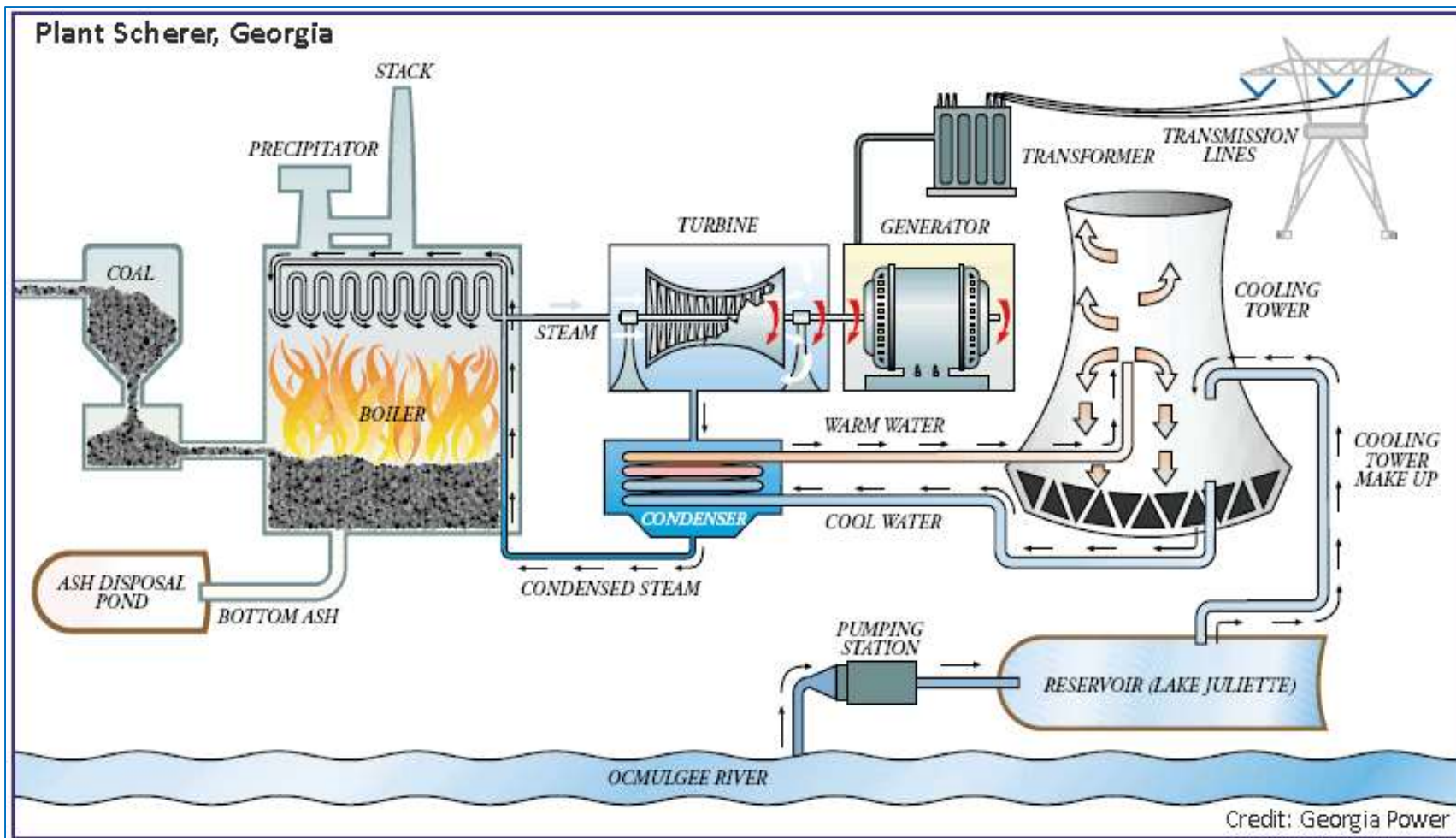
CAISO Load Profile Demonstrates Need for Pulsed Loads  
Image: Combined Cycle Journal



Reliability & Flexibility



# Technology Responses



Improving Efficiency



# Important Efficiency Caveats

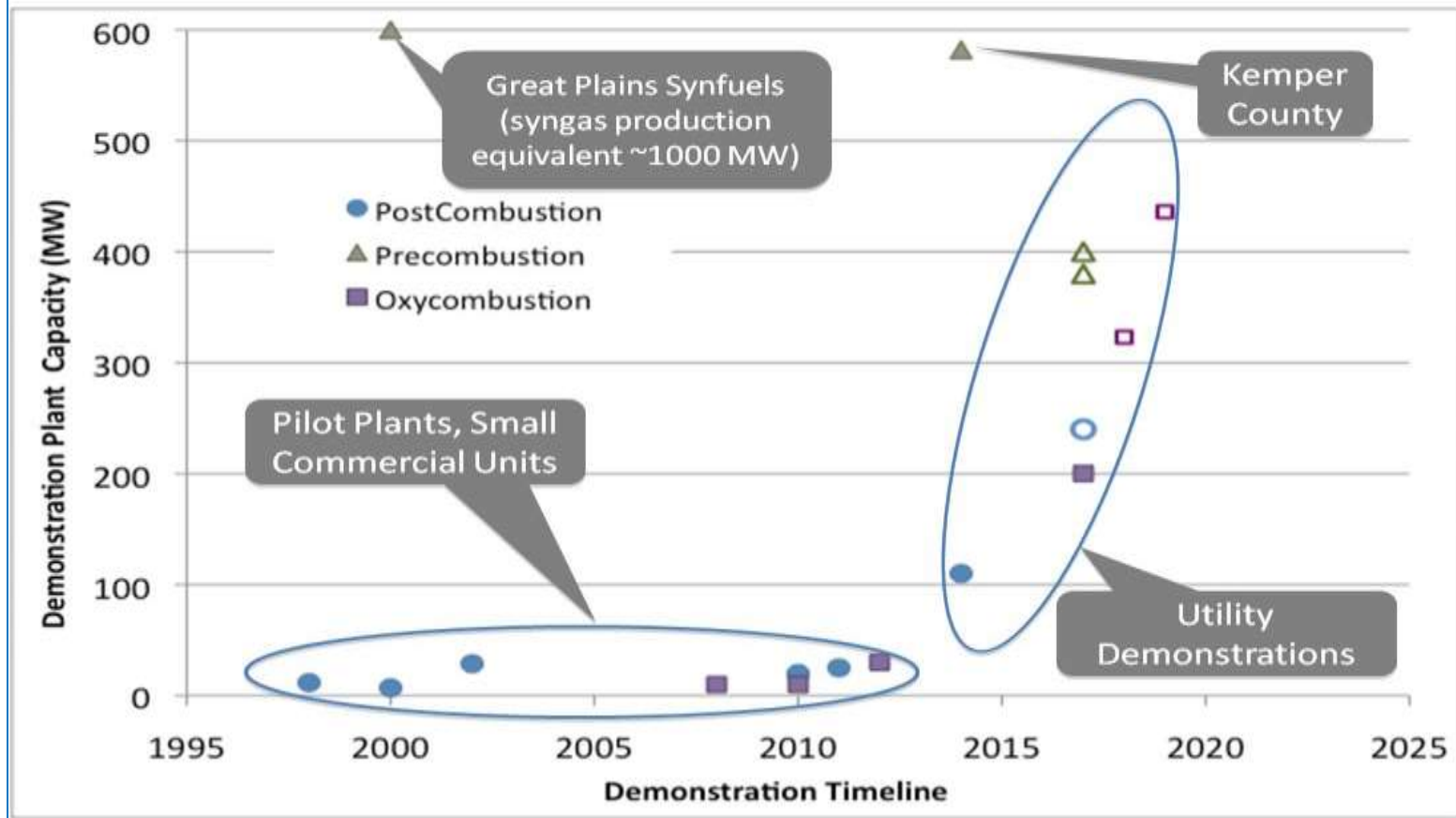
- Projects to improve the efficiency of existing coal plants need to be considered in the context of site-specific technical & economic considerations. The degree of efficiency technology deployment in the coal fleet cannot be described in general terms.
- There are also numerous factors at play which could lead to decreased efficiency at existing coal plants



# Technology Responses

## CCS Pilot and Demonstration Plant Timeline

Operating/Construction: Solid Symbols    Planned: Open Symbols



Emissions Reductions





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## RECOMMENDATIONS





# RECOMMENDATIONS FOR DOE

- Lead efforts to maintain coal's cornerstone role in a diverse portfolio, ensuring reliable, affordable power for families, businesses and institutions.
- Ensure that basic federal energy policy assessments consider the impact of lower priced electricity facilitated by coal power plants. Assessments should consider the value of diversity of generation sources and the impact of coal plant retirements.
- Lead collaborative efforts with industry to assess the impacts of the 2014 polar vortex experience on prices, availability, reliability and potential consequences of similar future events.
- Work with EPA to eliminate New Source Review (NSR) barriers that disincentivize efficiency improvements that reduce emissions, increase capacity and enhance plant operations.





# RECOMMENDATIONS FOR DOE

- Lead collaborative RD&D efforts with industry to develop advanced materials, assessment tools, improved sensors and controls, non-destructive evaluation, remaining life evaluation and an understanding of damage mechanisms.
- Lead collaborative RD&D efforts with industry to enhance practical knowledge of emissions control systems in a cycling environment.
- Lead collaborative RD&D efforts to develop topping and bottoming cycles that can be retrofit to existing power plants to enhance efficiency.
- Place significantly more emphasis on commercial scale demonstration of CCS.
- Recognize that the need for accelerated solutions points to greater emphasis on hands-on test facilities that emulate the National Carbon Capture Center design concept.





**[www.NationalCoalCouncil.org](http://www.NationalCoalCouncil.org)**

**[www.nationalcoalcouncil.org/NEWS/NCCValueExistingCoalFleet.pdf](http://www.nationalcoalcouncil.org/NEWS/NCCValueExistingCoalFleet.pdf)**

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