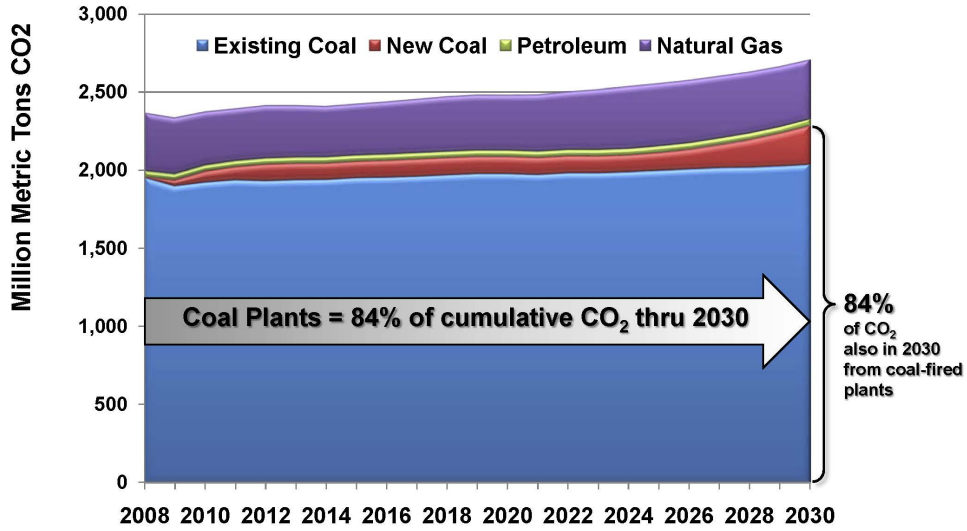


CARL O. BAUER
MARCH 10, 2009
APPENDIX

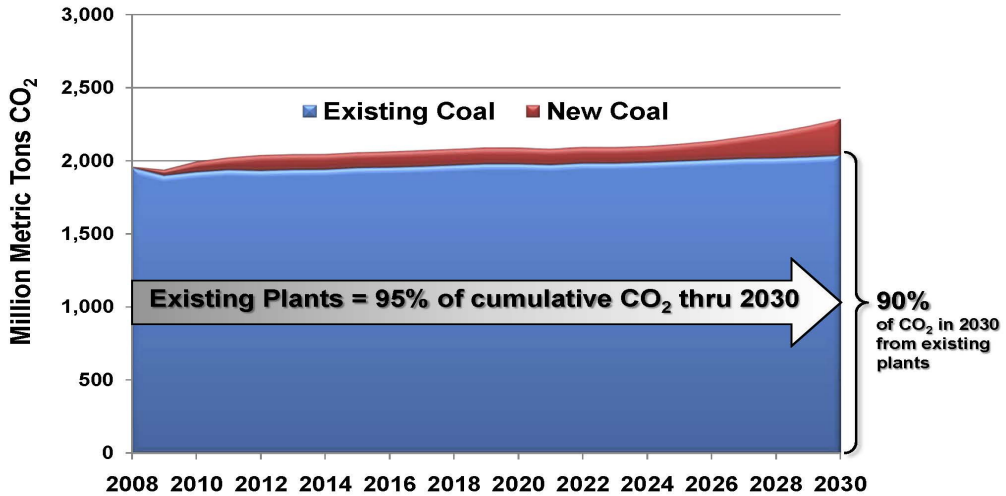
CO₂ Emissions Forecast for U.S. Electric Power Generation



1 NATIONAL ENERGY TECHNOLOGY LABORATORY
EIA Annual Energy Outlook 2009 Reference Case -- December 17, 2008

Figure 1

CO₂ Emissions Forecast for U.S. Coal-fired Power Generation



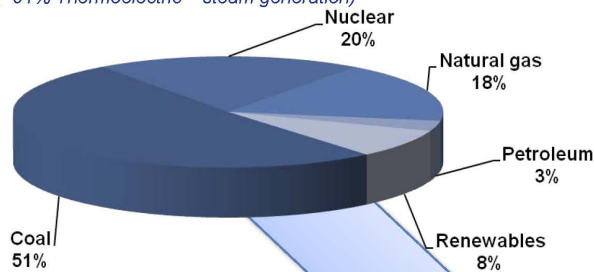
2 NATIONAL ENERGY TECHNOLOGY LABORATORY
EIA Annual Energy Outlook 2009 Reference Case -- December 17, 2008

Figure 2

U.S. Electricity Generation by Fuel Type

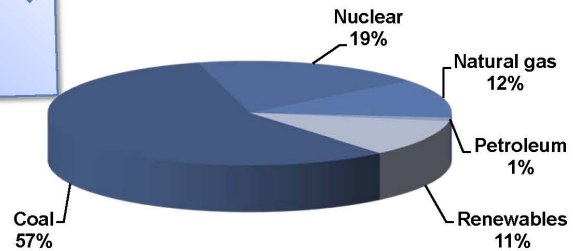
Base Case 2005

(~91% Thermoelectric – steam generation)



Reference Case 2030

(~86% Thermoelectric – steam generation)



5

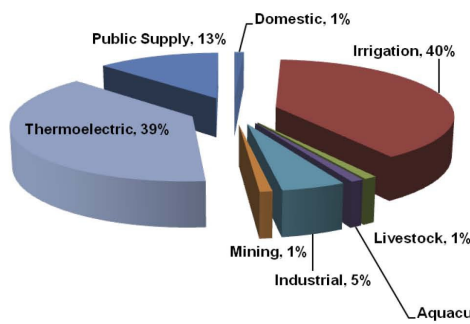
NATIONAL ENERGY TECHNOLOGY LABORATORY

Reference: Energy Information Administration / Annual Energy Outlook 2008

Figure 3

Competing Water Demands

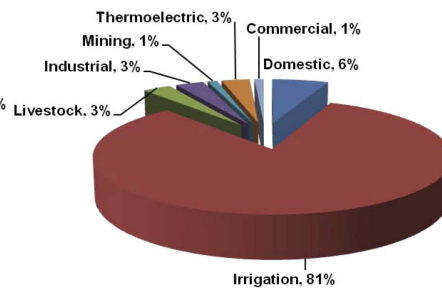
U.S. Freshwater Withdrawal¹



•2000 Thermoelectric water requirements:

- Withdrawal: ~ 136 BGD
- Consumption: ~ 4 BGD

U.S. Freshwater Consumption²



• Thermoelectric power plants compete with other use sectors.

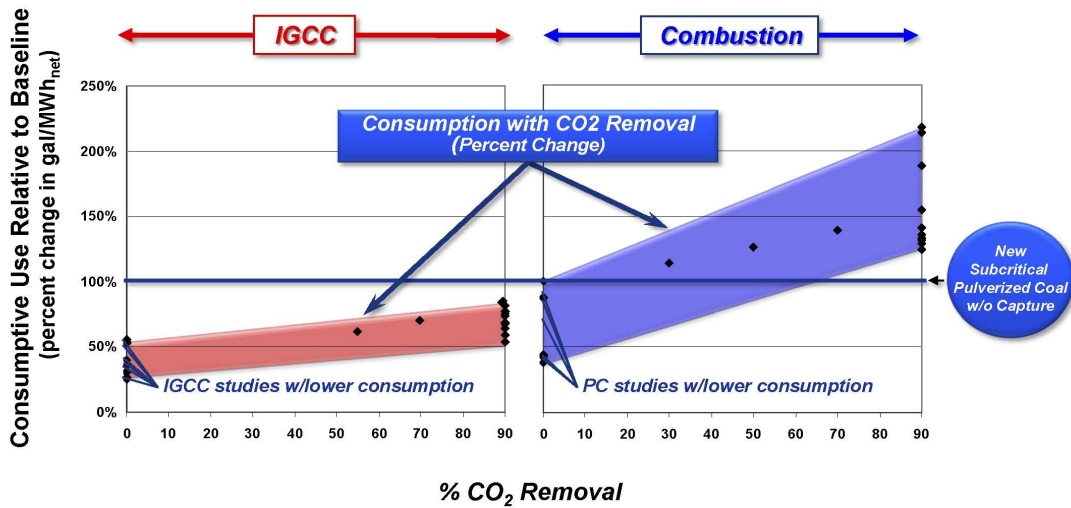
6

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Sources: 1USGS, Estimated Use of Water in the United States in 2000, USGS Circular 1268, March 2004
2USGS, Estimated Use of Water in the United States in 1995, USGS Circular 1200, 1998

Figure 4

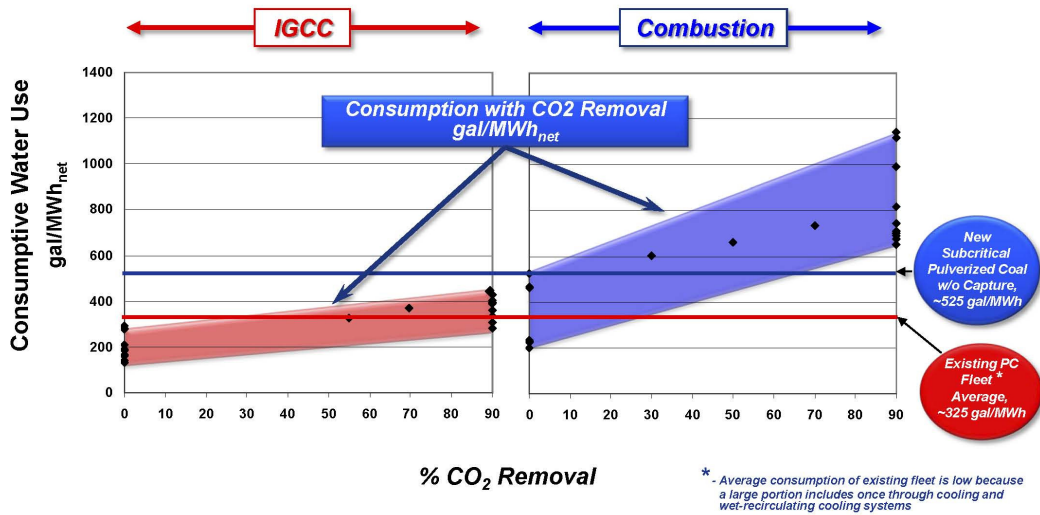
Comparative Impact of CO₂ Capture on Power Plant Water Usage



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Figure 5

Comparative Impact of CO₂ Capture on Power Plant Water Usage



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Figure 6

* - Average consumption of existing fleet is low because a large portion includes once through cooling and wet-recirculating cooling systems

DOE/NETL Innovations for Existing Plants (IEP) Program

Recognizing the current and future situation relative to water needs and carbon capture, the U.S. Department of Energy/National Energy Technology Laboratory (DOE/NETL) has initiated a comprehensive research, development, and demonstration program directed at reducing the dependence of the Nation's carbon capture activities on freshwater, addressing the implication of CO₂ capture and storage on water availability and quality.

DOE/NETL's Existing Plants, Emissions, and Capture Program is focused on research on optimizing power plant water use as it relates to carbon capture efficiency and optimization.

As part of DOE/NETL's Carbon Sequestration Regional Partnership Program, the impacts of geological CO₂ storage in oil and natural gas reservoirs, unmineable coal seams, and deep saline formations on groundwater quality is being studied.

As part of the Sequestration Program, DOE/NETL and the Environmental Protection Agency are supporting the development of the draft Underground Injection Control Program regulations for geologic sequestration of CO₂. These regulations will ensure that underground sources of drinking water are protected.