

# Tracking New Coal-Fired Power Plants



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**June 30, 2008**



# Tracking New Coal-Fired Power Plants

This report is intended to provide an overview of proposed new coal-fired power plants that are under development. This report may not represent all possible plants under consideration but is intended to illustrate the potential that exists for installation of new coal-fired power plants.

Recent experience has shown that public announcements of new coal-fired power plant development do not provide an accurate representation of actual new operating power plants. Actual plant capacity commissioned has historically been significantly less than new capacity announced.

The report focuses on those power plant projects that have achieved significant progress toward completion, to provide a more accurate assessment of the ability of this segment of the power generation industry to support demand for new electricity capacity in various regions of the United States.

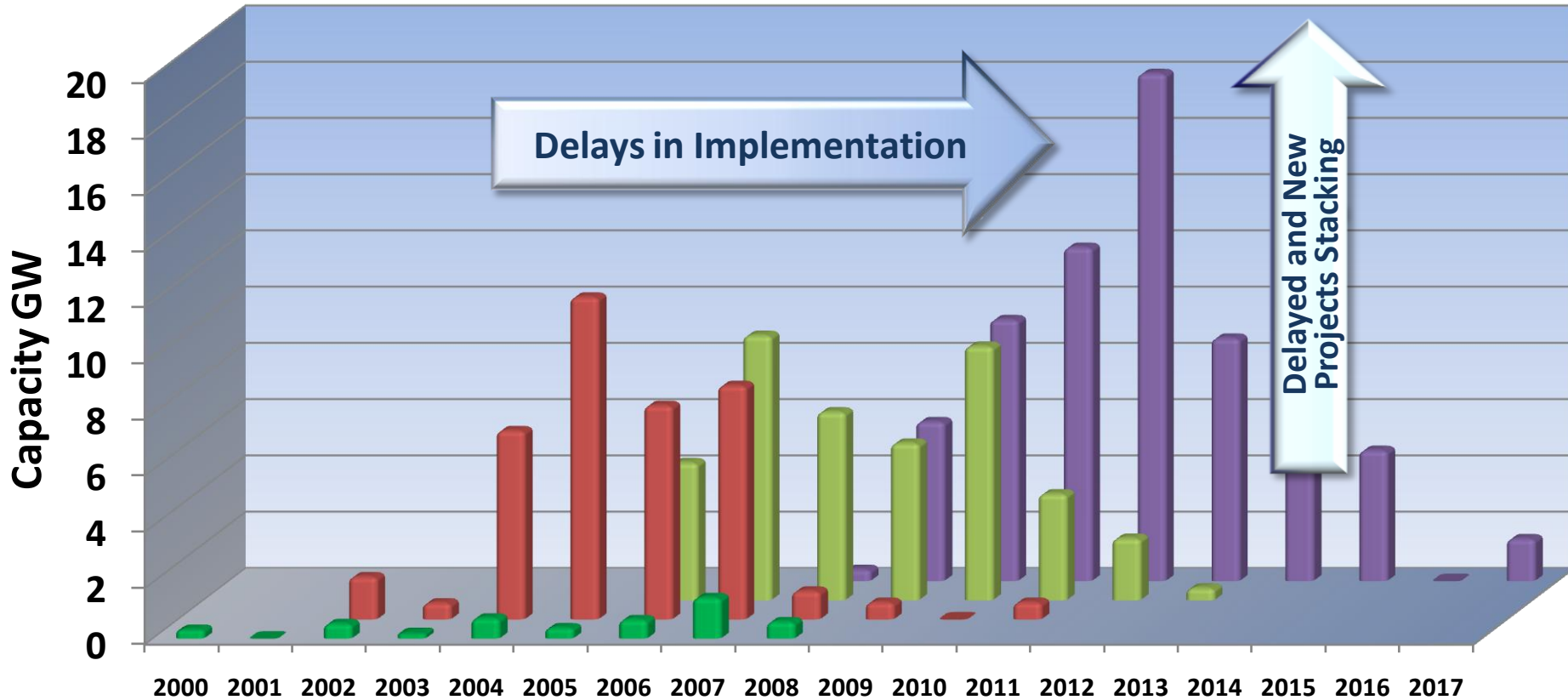
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# Tracking New Coal-Fired Power Plants

- **This report provides a perspective of coal-fired power plants that are currently under development, with a focus on those having made significant progress toward achieving commercial operation**
- **The status of projects in development varies from project announcements to those under construction**
- **Announced projects that are canceled before or during the permitting phase are not unusual; announced projects are not necessarily strong indicators of capacity additions**
- **Plants that are permitted or under construction reflect a developer's significant financial commitment to completion and offer a better perspective of the new generation capacity that may be forthcoming**
- **Long-term forecasts reflecting declining natural gas production for North America also highlight the importance of coal-fired power generation to the Nation's energy security and economy**

# Past Capacity Announcements vs. Actual

## Figure 1



Historically, actual capacity has been seen to be significantly less than proposed capacity. For example, the 2002 report listed 36,161 MW of proposed capacity by the year 2007 when actually only 4,478 MW (12%) were constructed.

■ Actual     
 ■ 2002 Report     
 ■ 2005 Report     
 ■ June 2008

# Historic Capacity Additions by Years

*Refer to Figure 1*

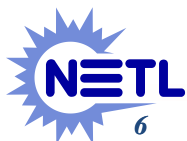
- **Actual plant capacity, commissioned since 2000, has been far less than new capacity announced; the year 2002 report of announcements reflected a schedule of over 36,000 MW to be installed by 2007, whereas  $\approx$  4,500 MW (12%) were achieved**
- **The trend over several years has reflected the bulk of power plant developments shifting out in time due to project delays**
- **Delays and cancelations have been attributed to regulatory uncertainty (regarding climate change) or strained project economics due to escalating costs in the industry**
- **New announcements combined with delayed projects have tended to increase the backlog of plants in the queue**
- **Cancellations become more prevalent as prospects of fulfilling all projects in the queue become impractical**

# Current Coal-Fired Capacity Projects *(1st half '08 change)*

**Table 1**

		<i>Number of Plants</i>			<i>Capacity (MW)</i>		
<i>General Status</i>		December 2007	Current Report	<i>Net Change</i>	December 2007	Current Report	<i>Net Change</i>
<b>Progressing Projects</b>	<i>Under Construction</i>	28	29	+1	14,885	16,534	+1,649
	<i>Near Construction</i>	6	5	-1	1,859	1,962	+103
	<i>Permitted</i>	13	18	+5	6,422	8,415	+1,993
	<b>SUB TOTAL</b>	47	52	+5	23,166	26,911	+3,745 (+16%)
<b>Uncertain Potential and Timing</b>	<i>Announced (early stages of development)</i>	67	58	-9	42,394	37,438	-4,956 (-12%)
	<b>TOTAL</b>	114	110	-4	65,560	64,349	-1,211 (-1.8%)
	<b>Operational this period (1st ½ '08)</b>	-	2	+2	-	590	+590
<b>TOTAL (with Operational)</b>				-2			-621 (-0.9%)

<i>Status Listing</i>	<i>Description</i>
<i>Under Construction</i>	Project is under construction.
<i>Near Construction</i>	Project has been approved; majority or all permits are obtained. Sponsor is contracting vendors and Engineering, Procurement and Construction (EPC) contractors. Site preparation has begun.
<i>Permitted</i>	In the permitting phase. Two or more permits approved or fuel or power contracts have been negotiated.
<i>Announced</i>	Early stages of development to filing for permits. May include a feasibility study.



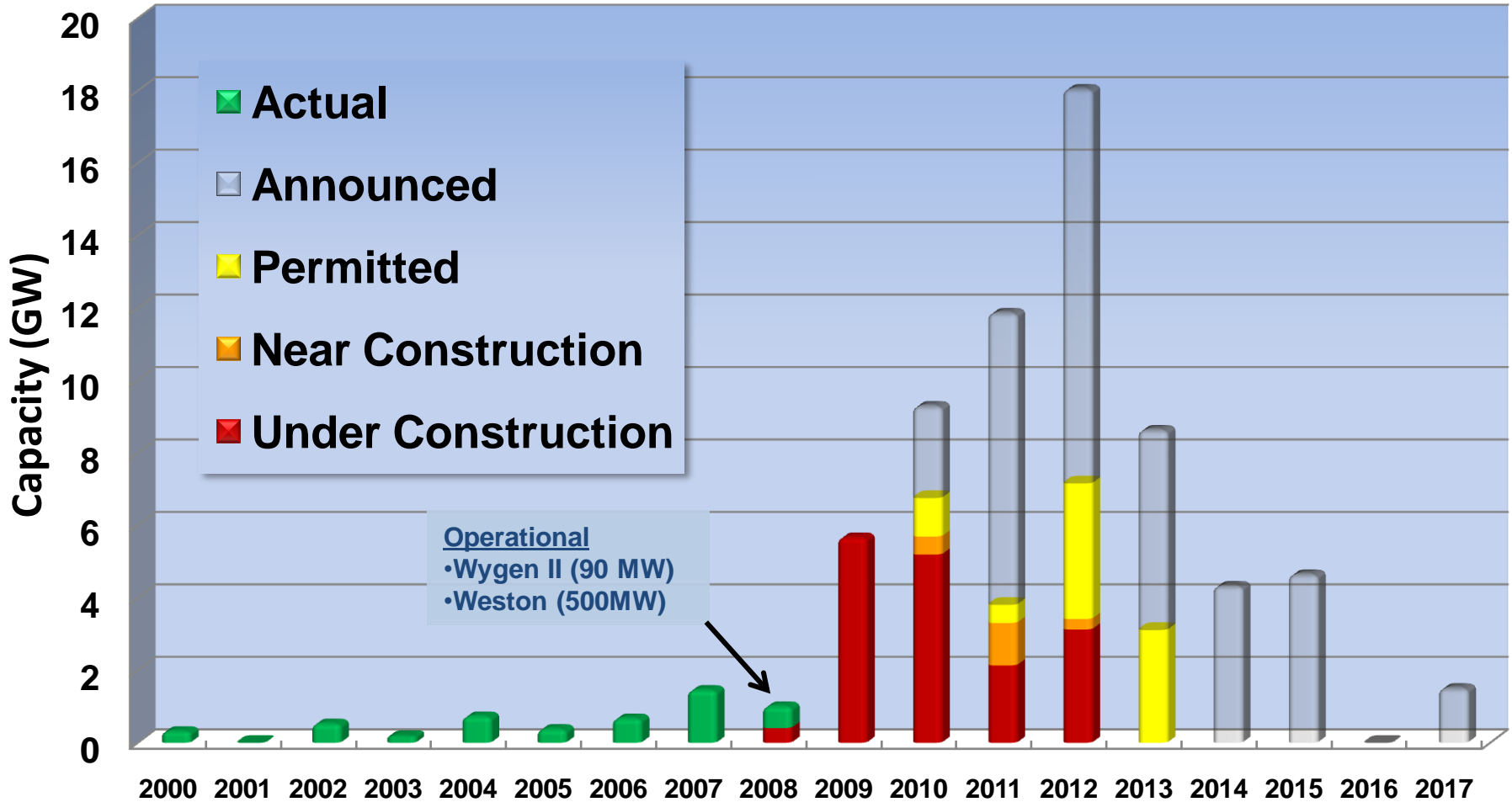
# Current Capacity Additions by Years

*Refer to Table 1*

- **Table 1 reflects the current status of coal-fired plant development activity compared with the past 6 months**
- **“Progressing” plants are projects with status indicating permitted, near construction, or under construction**
- **Progressing plants have attained a higher likelihood of advancing toward commercial operation; however, regulatory uncertainty and industry cost increases are impacting development decisions for all projects**
- **The 90 MW Wygen II (Wyoming) and 500 MW Weston (Wisconsin) plants have been removed from the tally and is now operational**
- **There has been a net increase of 3,745 MW (16%) of Progressing projects during the 1st half of 2008**

# Current Capacity Additions by Years

Figure 2





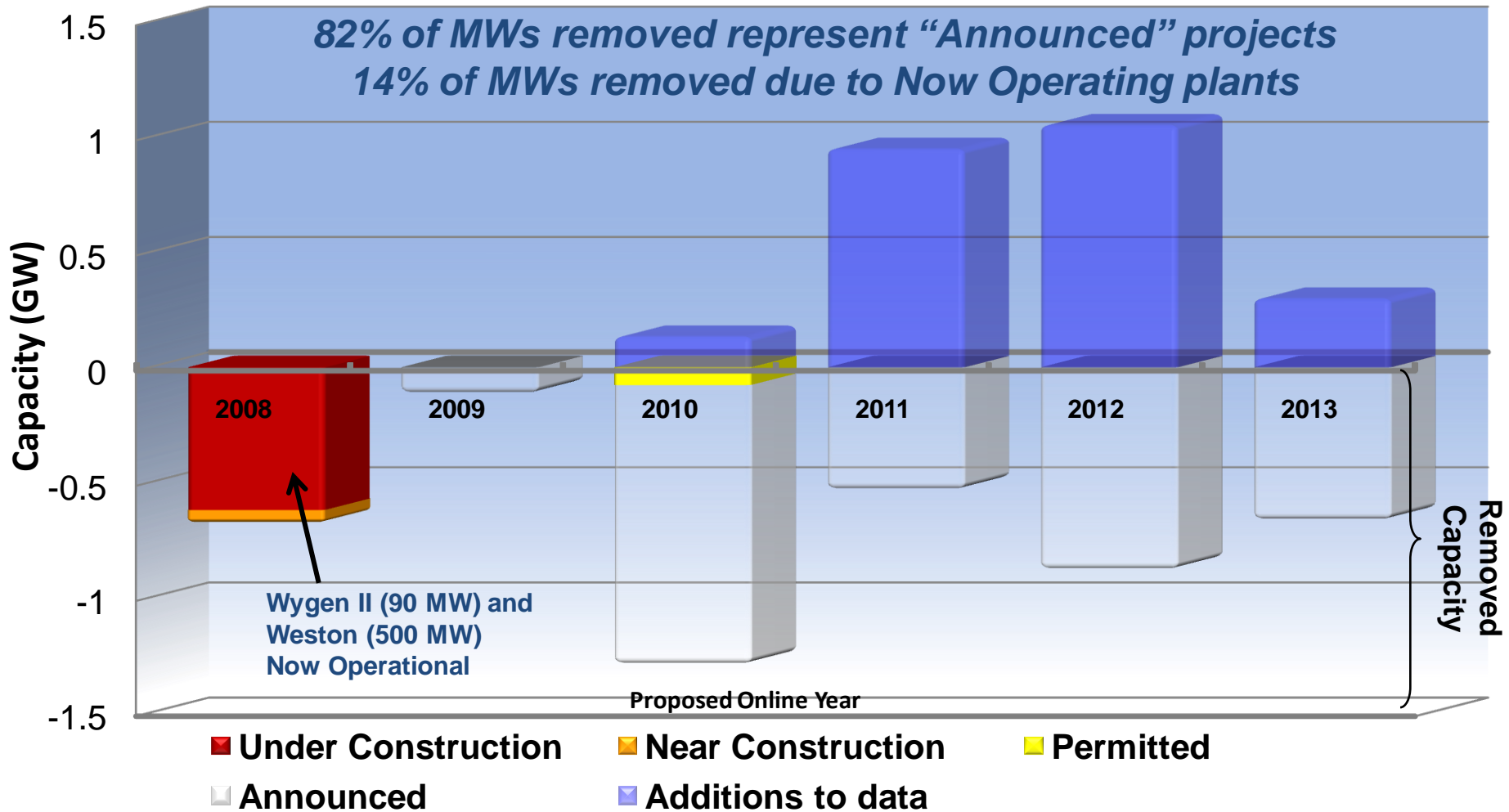
# Current Capacity Additions by Years

*Refer to Figure 2*

- **Current coal-fired projects in development reflect the potential for a surge in growth but questions exist as to whether this is achievable**
- **The 3,079 MW of new added capacity installed in the last three and a half years (800 MW per year) is only 11% of the 27,218 MW of progressing plants that are proposed to be operational in the next three and a half years**
- **Coal-fired plants commissioned, from 1990 through 2007, have averaged 976 MW per year in the U.S.; this lack of domestic project implementation has significantly reduced the level of skilled human resources available to perform current projects**
- **Scarcity of skilled labor for power plant engineering, procurement, project management and construction activities, increases major equipment and EPC (engineering, procurement, construction) costs and calls into question the viability of the annual commissioning levels reflected in current forecast**

# Net Capacity Changes (Removed or Added Opportunities)

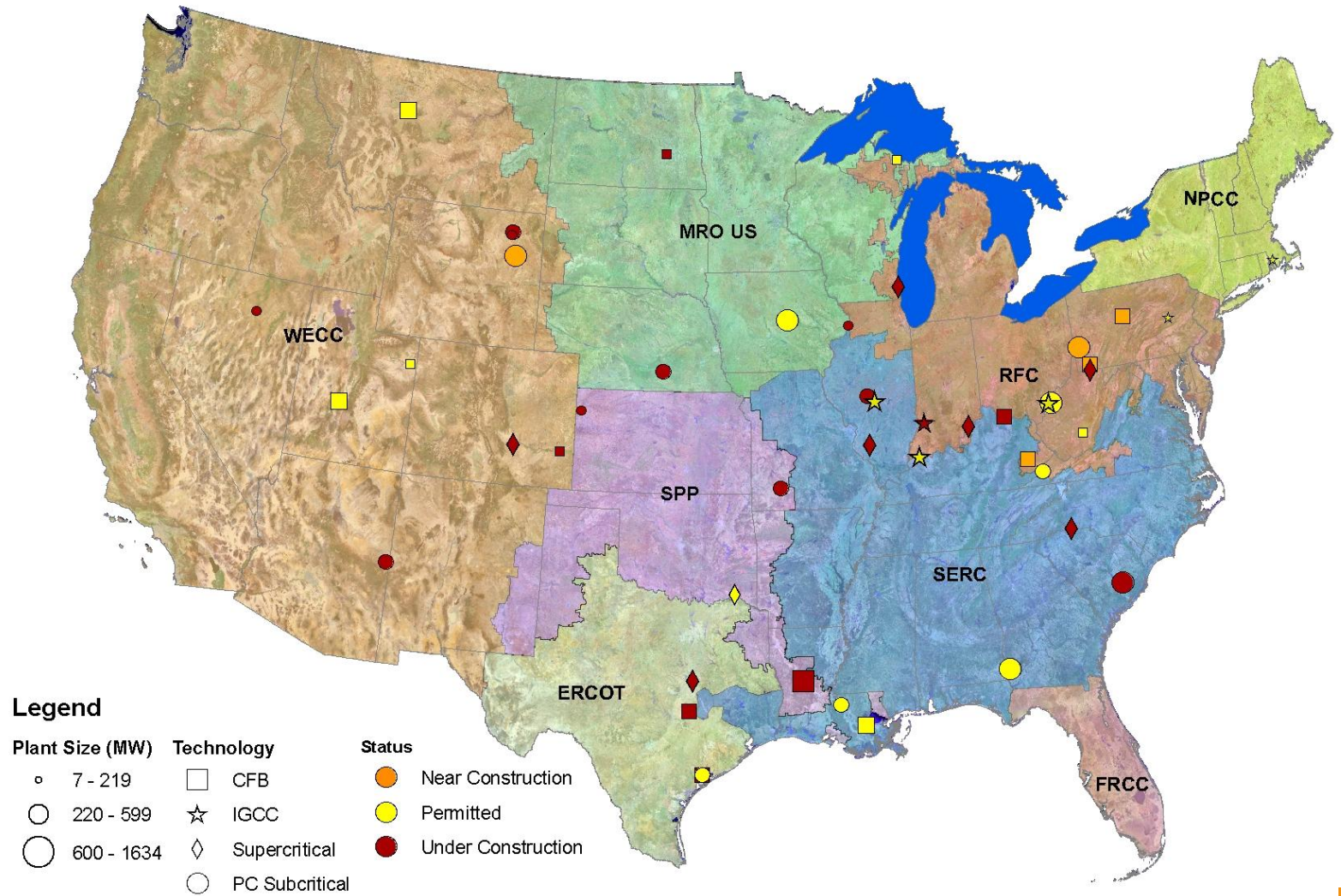
## Figure 3 During the 1<sup>st</sup> Half of 2008



*Total Net Reductions (less operating) 590 MW (-0.9%) for 1<sup>st</sup> Half 2008*

# Geographical Map by NERC Regions: Coal-Fired Plants (Permitted, Near Construction, and Under Construction)

Figure 4



# Proposed Capacity by NERC Regions

## Table 2

NERC Region		Progressing Projects				Announced	Grand Total (less Operational)	1st half '08
		Under Construction	Near Construction	Permitted	Sub Total			Operational
ASCC	Capacity (MW)	0	0	0	0	300	300	
	Plants	0	0	0	0	2	2	
ERCOT	Capacity (MW)	4,165	0	303	4,468	6,745	11,213	
	Plants	5	0	1	6	7	13	
FRCC	Capacity (MW)	0	0	0	0	750	750	
	Plants	0	0	0	0	1	1	
MRO US	Capacity (MW)	1,149	0	640	1,789	3,500	5,289	500
	Plants	4	0	2	6	7	13	1
NPCC	Capacity (MW)	0	0	125	125	1,420	1,545	
	Plants	0	0	1	1	3	4	
RFC	Capacity (MW)	2,555	1,142	3,278	6,975	5,857	12,832	
	Plants	3	3	6	12	10	22	
SERC	Capacity (MW)	4,943	500	2,689	8,132	4,751	12,883	
	Plants	7	1	4	12	9	21	
SPP	Capacity (MW)	1,832	0	750	2,582	1,400	3,982	
	Plants	4	0	1	5	2	7	
WECC	Capacity (MW)	1,890	320	630	2,840	12,115	14,955	90
	Plants	6	1	3	10	16	26	1
N/A	Capacity (MW)	0	0	0	0	600	600	
	Plants	0	0	0	0	1	1	
Total Sum Capacity (MW)		16,534	1,962	8,415	26,912	37,438	64,349	590
Total Count of Plants		29	5	18	52	58	110	2

# Proposed Technologies of New Plants (1st half '08 change)

Figure 5

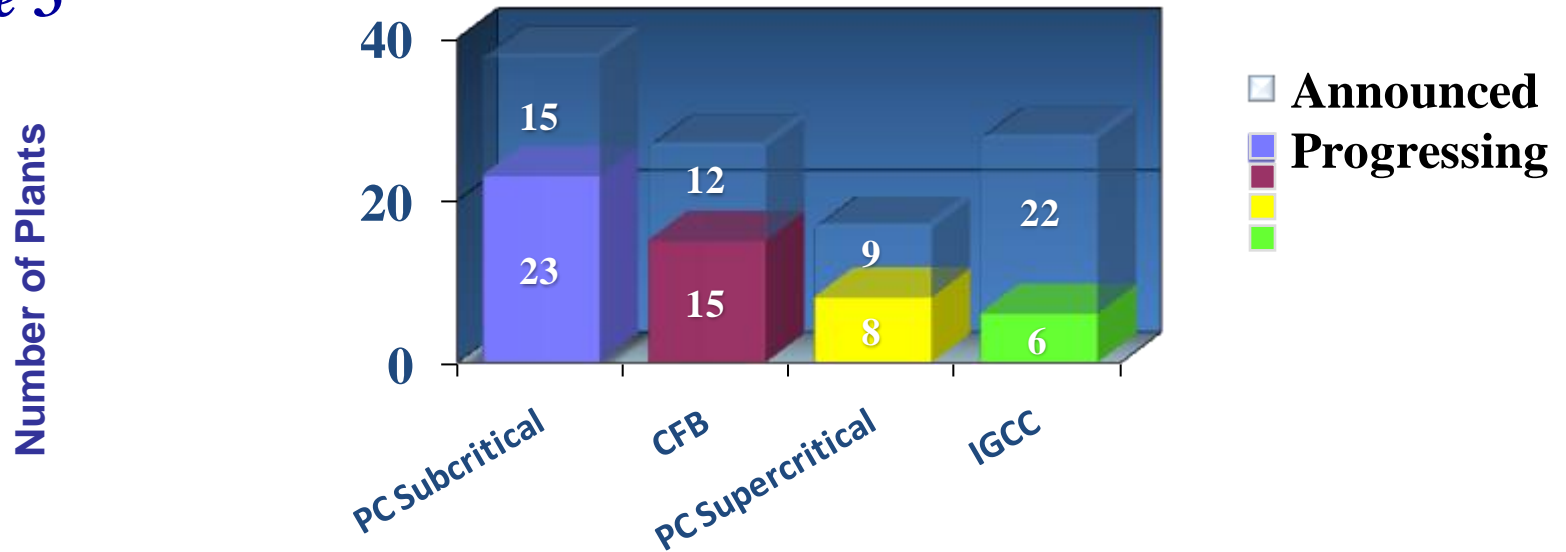


Table 3

\*Wygen II and Weston moved from Under construction to Operational

Technology Listings	Operational (Since 2000)	Progressing (Permitted, Near-, and Under Construction)		Announced		Total Proposed	
		December 2007	Current (Change)	December 2007	Current (Change)	December 2007	Current (Change)
PC Subcritical	12*	22	23 (+1)*	18	15 (-3)	40	38 (-2)*
CFB	8	14	15 (+1)	11	12 (+1)	25	27 (+2)
PC Supercritical	1	8	8 (0)	9	9 (0)	17	17 (0)
IGCC	1	3	6 (+3)	29	22 (-7)	32	28 (-4)

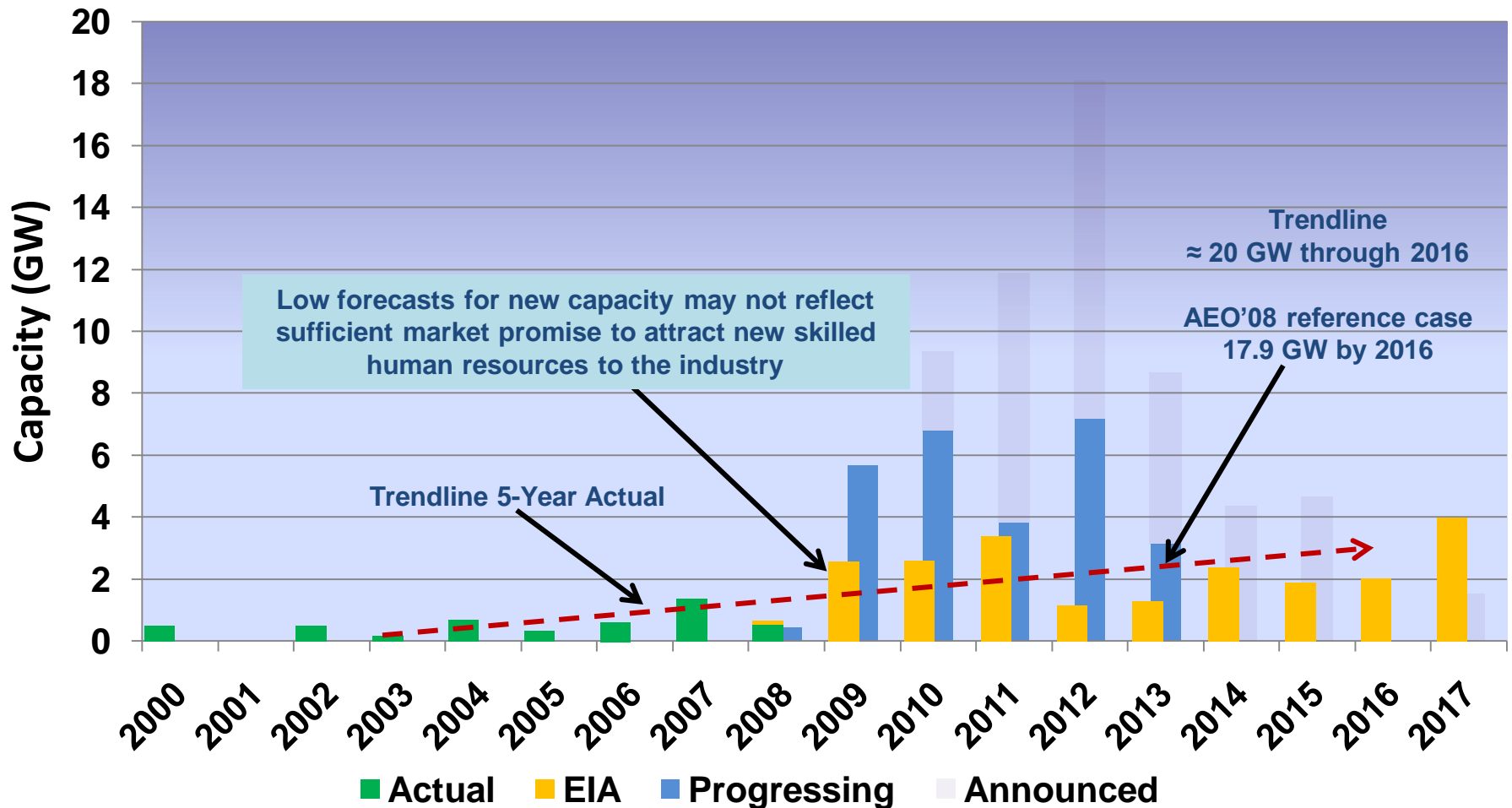
# Proposed Technologies of New Plants

*Refer to Figure 5 and Table 3*

- **Opportunities involving conventional technologies, such as subcritical PC and CFB, are more plentiful and tend to be more advanced due to earlier start in development (*Figure 7 & Table 3*)**
- **Advanced technologies proposed, such as supercritical PC and IGCC, reflect more recent trends in development activity, thus fewer have achieved permitted status**
- **Regulatory uncertainty for GHG legislation is a key issue impacting technology selection and reliability of economic forecasts**
- **Returns on investment for conventional plants, including supercritical, can be severely compromised by the need to subsequently address CO<sub>2</sub> mitigation**
- **Higher capital costs incurred for IGCC may make such new plants less competitive unless their advantage in CO<sub>2</sub> mitigation is assured**

# Development Activity vs. EIA AEO'08

Figure 6



*Actual Installation Trend close to EIA AEO'08 Reference Forecast;  
A Significant Surplus of Developments Exists Above EIA's Forecast Demand*

# Coal and Natural Gas-fired Development Issues

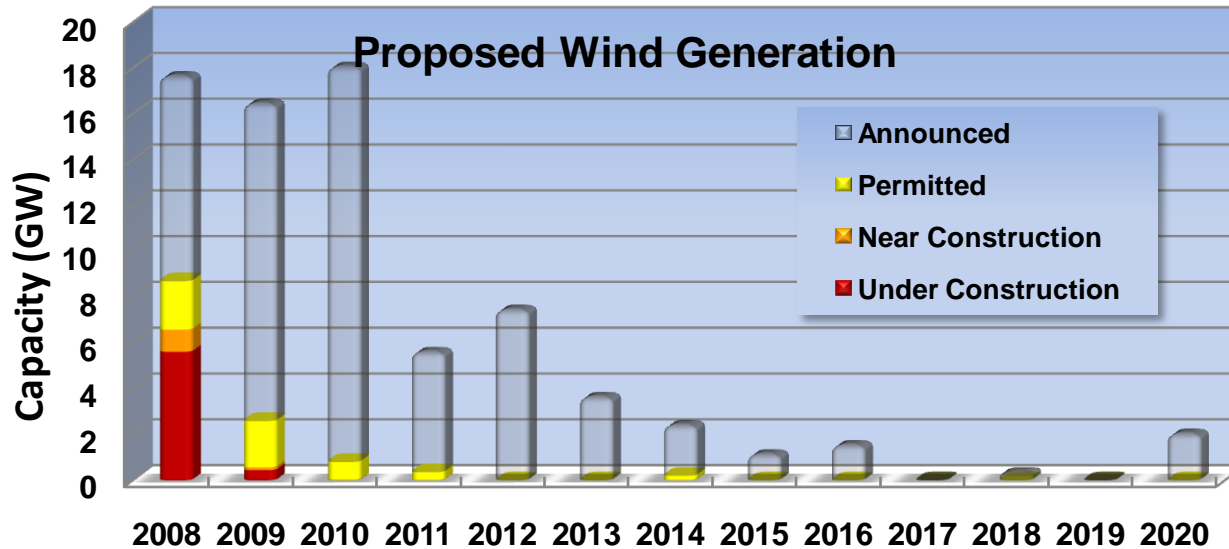
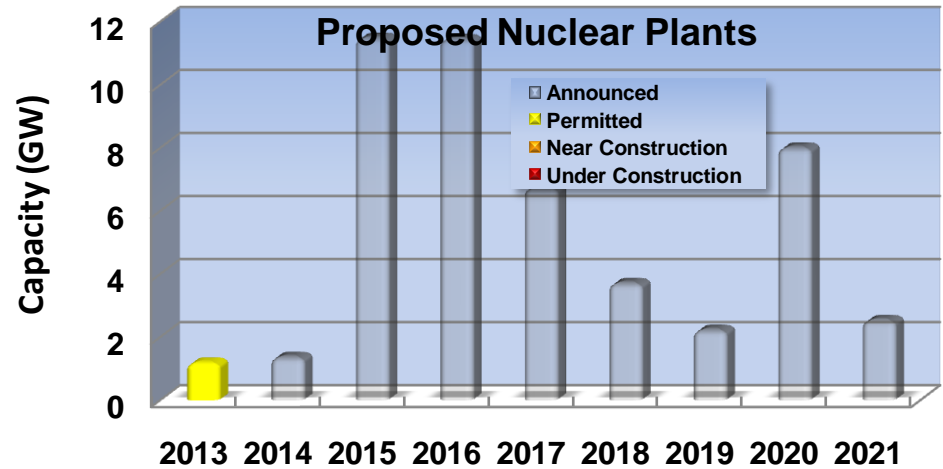
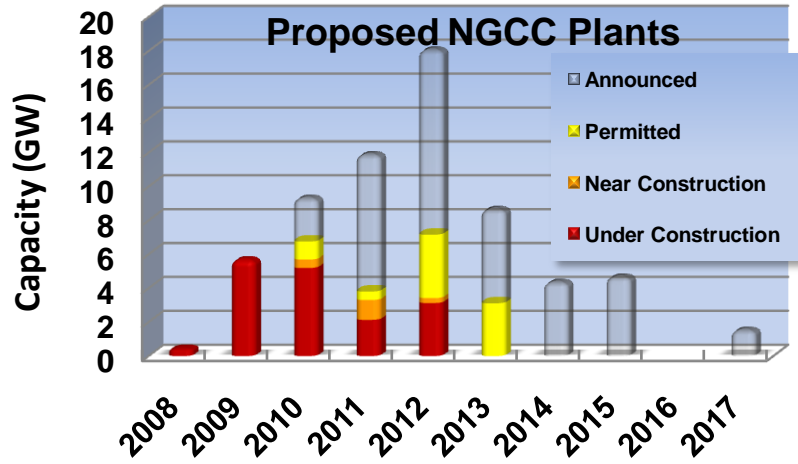
*Refer to Figure 6*

- **Coal-fired power plant development activity significantly exceeds the current estimate of need by EIA (*Figure 6*)**
- **Low forecasts of demand growth add an element of “*demand uncertainty*” to the problems of regulatory uncertainty and rapidly escalating costs for coal-fired power plant development**
- **Should electricity demand growth prove higher than anticipated, the alternative of increasing natural-gas fired generation will create fuel resource adequacy issues, due to diminished natural gas supply expectations**
- **Virtually all incremental demand for consumption of natural gas can be seen to require increases in imports of LNG according to AEO 2008**



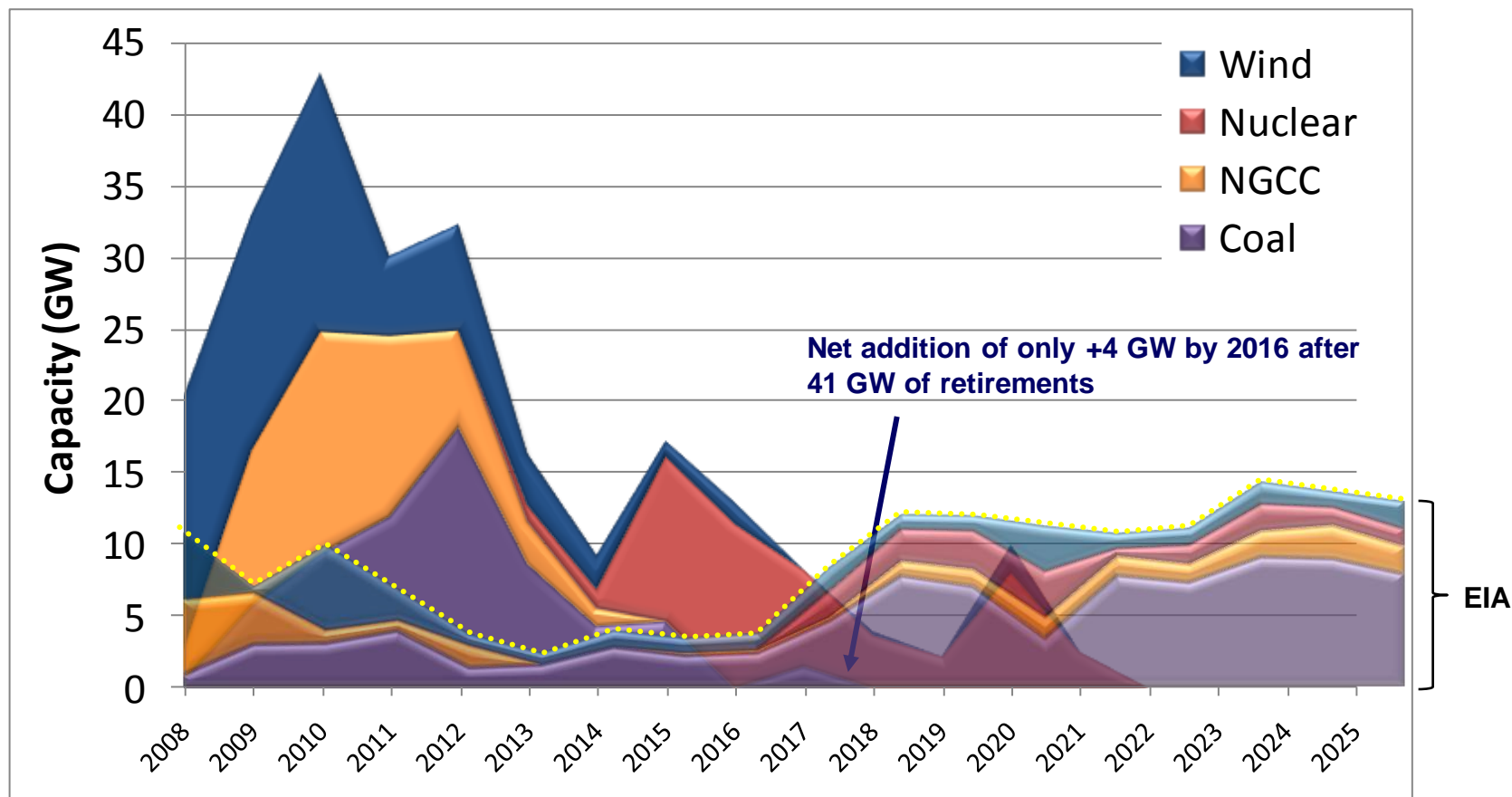
# Other Proposed Capacity Additions by Years

## Figure 7



# Other Proposed Generation - Compared with EIA AEO'08

## Figure 8



## Summary – 1<sup>st</sup> Half 2008

- Two plants totaling 590 MW have become operational during the 1<sup>st</sup> half of 2008 and therefore will not be tracked in future reports
- “Progressing” projects have increased by two plants with little change in the total MW involved, during the 1<sup>st</sup> half of 2008
- Since the end of 2007, 3,853 MW of new capacity have been proposed, 4,133 have been removed. Of the 4,133 MW removed, 590 MW have become operational and 3,543 MW have been canceled
- The net decrease of the proposed capacity, if the 2 operational plants are not removed from the tally, is 0.9%
- Project “Announcements” make up 58% of all currently proposed MWs of capacity additions
- Cancellations (5% of MW) during the 1st half '08 are mostly “Announced” projects (95%)
- Forecasts for natural gas supply to the U.S. indicate that turning to additional natural gas-fired generation will create the need for increased foreign LNG imports