



Edison Electric Institute

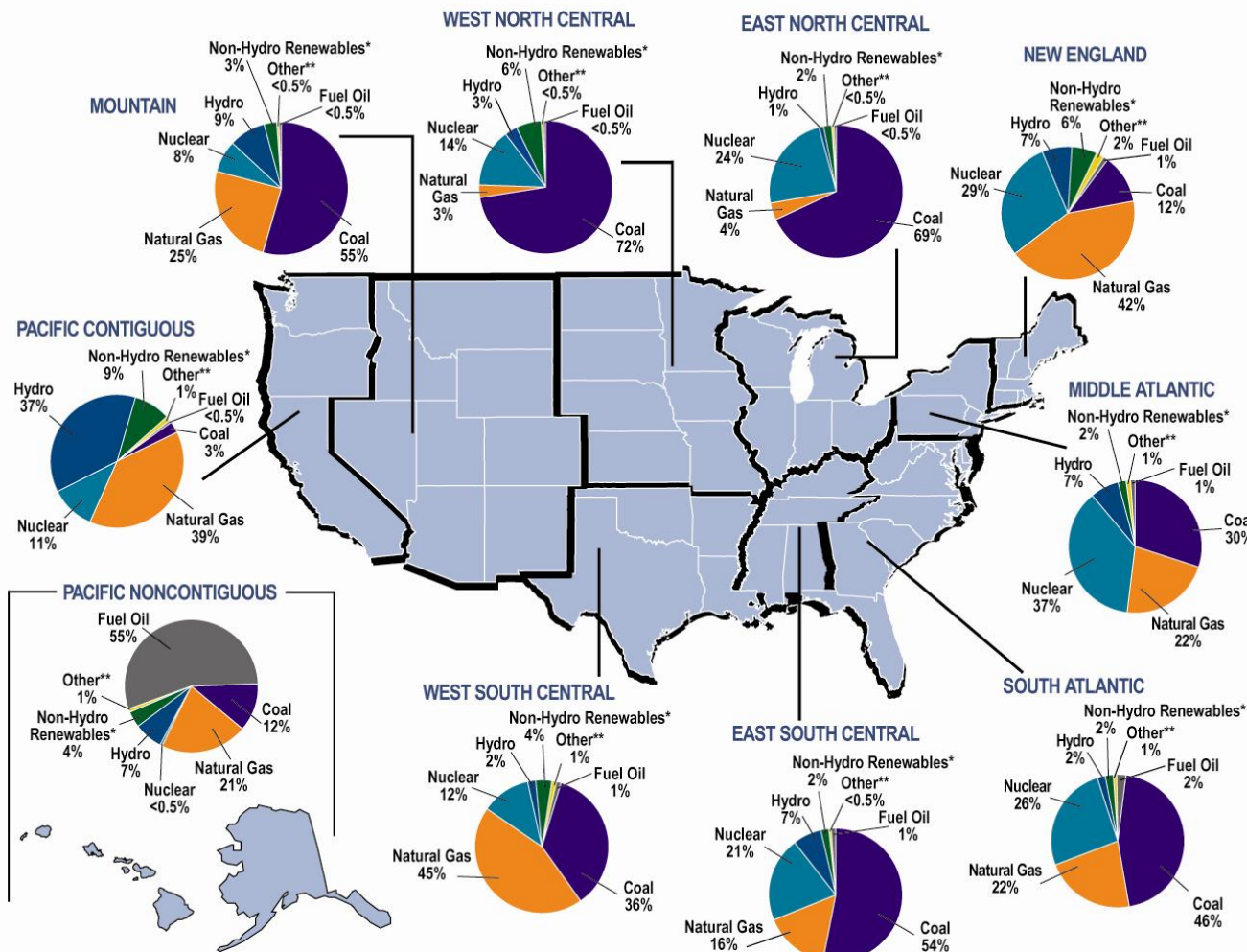
Power by AssociationSM

Natural Gas Trends & Technology

Lopa Parikh
Edison Electric Institute
May 7, 2012

Natural Gas Trends

Different Regions of the Country Use Different Fuel Mixes to Generate Electricity



*Includes generation by agricultural waste, landfill gas recovery, municipal solid waste, wood, geothermal, non-wood waste, wind, and solar.

** Includes generation by tires, batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.

Sum of components may not add to 100% due to independent rounding.

Source: U.S. Department of Energy, Energy Information Administration, Power Plant Operations Report (EIA-923); 2009 preliminary generation data.

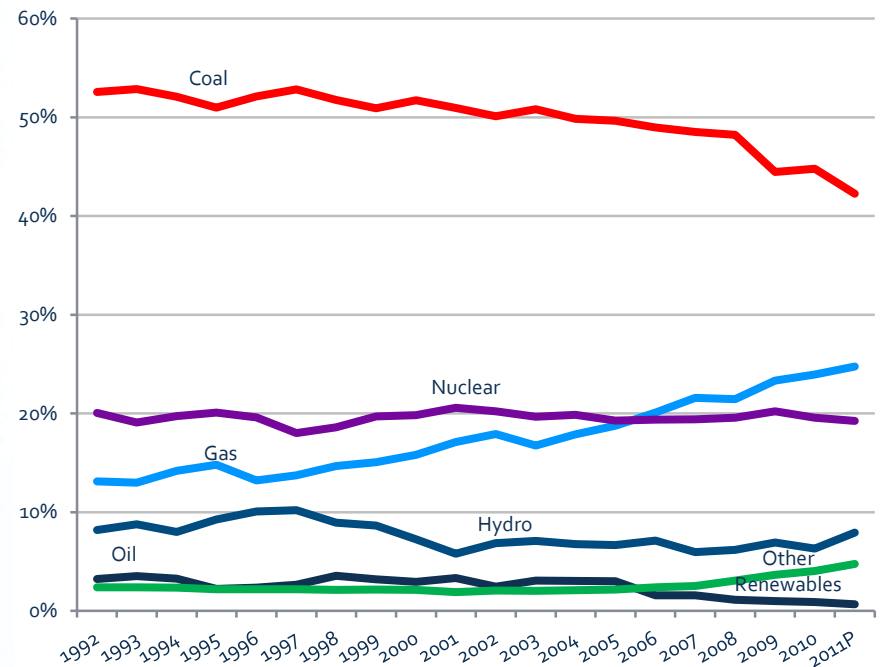
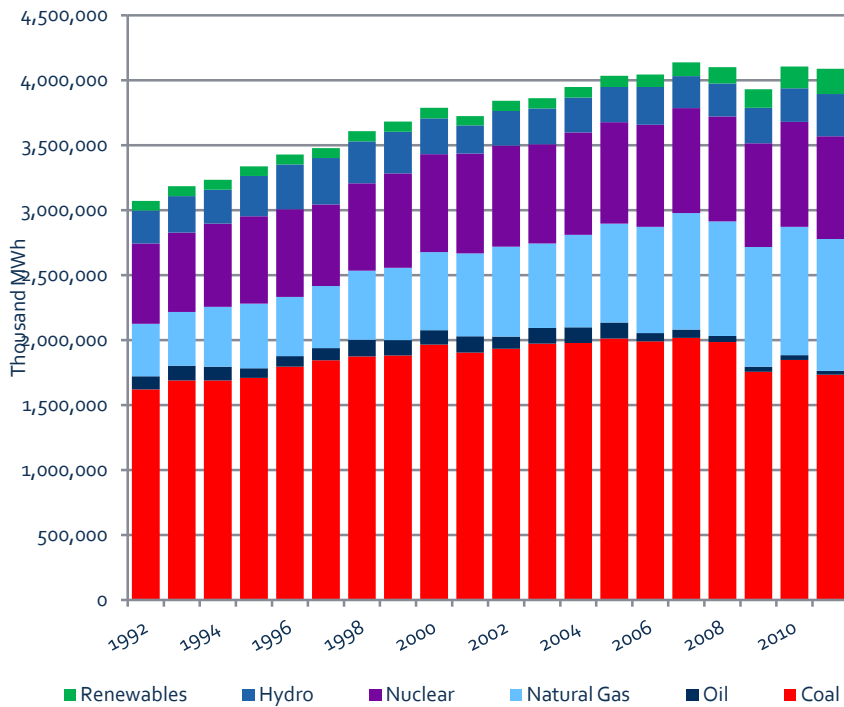
May 2010

© 2010 by the Edison Electric Institute. All rights reserved.

U.S. Energy Production by Fuel Source

Fuel Source	2000	2010	2011
Coal	51.7%	44.8%	42.9%
Natural Gas	15.8%	23.8%	24.4%
Nuclear	19.8%	19.6%	19.1%
Hydro	7.2%	6.1%	7.8%
Non-Hydro Renewable	2.1%	4.1%	4.7%

Coal Use is Declining



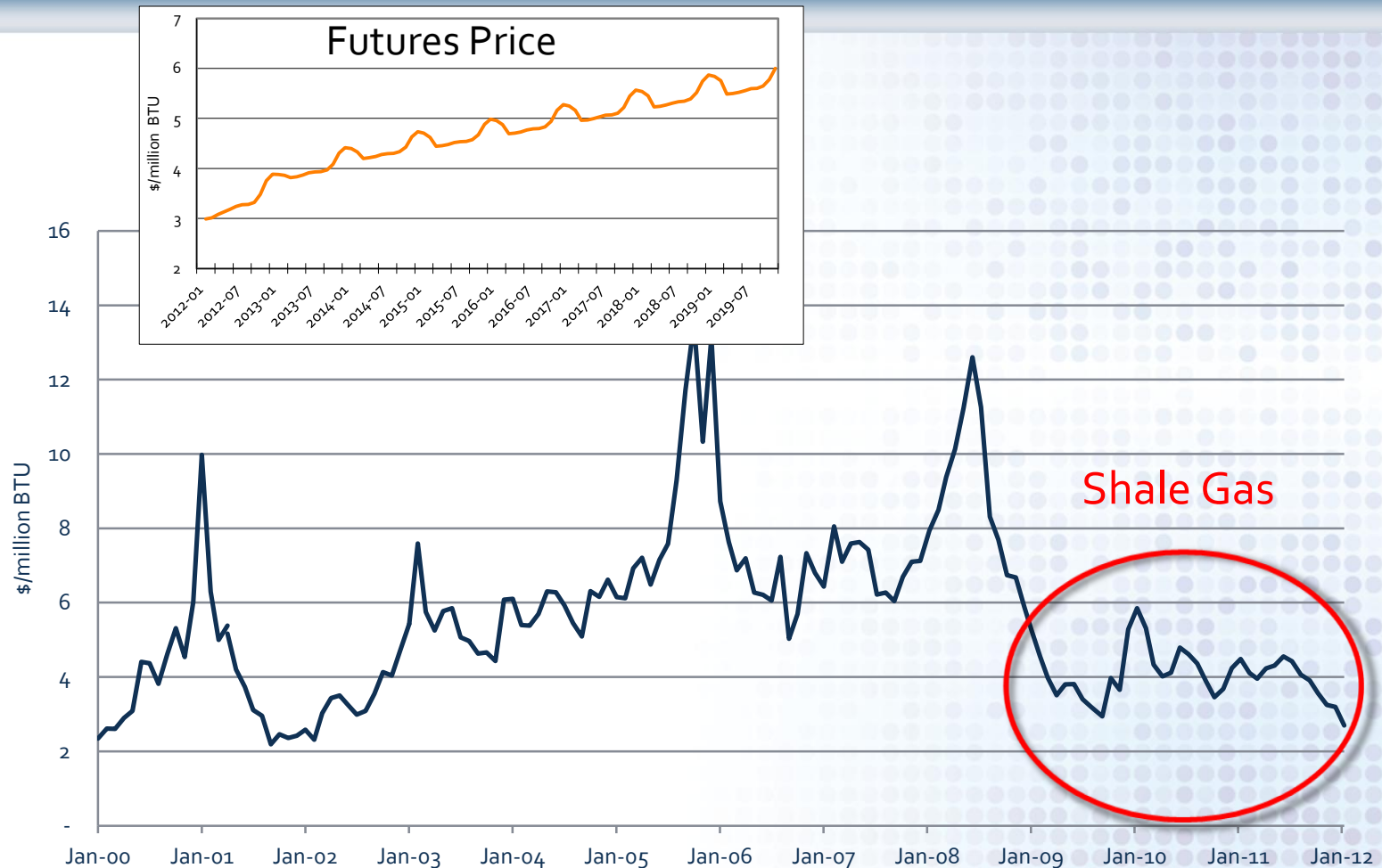
Coal Plant Retirements

Company	Total MW	State	Year(s) Built	Year(s) Will Retire	Units Retiring/Notes
AEP ³	5,848	Various	1944-1980	2012-2014	26 units in 6 states (OH, WV, VA, IN, KY, TX)
AES	188	NY	1951, 1953	2011	2 units
Alliant	522	IA	1921-1968	2010	15 units
Ameren ⁴	1,277	MO, IL	1953-1961	2011, 2022	7 units
APS	634	AZ	1963, '64	2015	3 units (Four Corners)
Black Hills	44	CO	1955, '59	2013	2 units
Consumers ⁵	971	MI	1952-1958	2015	7 units
Dominion ⁶	2,515	various	1952-1992	2013-2022	17 units in 3 states (MA, IN, VA)
DTE ⁷	169	MI, CA	1952, '87, '89	2010-2011	4 units
Duke ⁸	4,012	various	1940-1969	2011-2018	34 units in 4 states (NC, SC, IN, OH)
Dynegy	489	IL	1953-1959	2011-2013	4 units
Edison Int'l ⁹	1,239	IL	1955-1968	2010-2014	5 units
Empire District	88		1950, 1954	2018	2 units
EFH ¹⁰	1,187	TX	1974-1975	2012	2 units (Luminant)
Exelon	895	PA	1954, 1960	2011-2012	3 units
First Energy ¹¹	3,797	various	1944-1972	2010-2012	24 units (MD, OH, PA, WV)
GenOn ¹²	3,493	various	1949-1970	2012-2015	25 units (OH, PA, VA)
Madison G&E	178	WI	1938-1961	2010-2012	5 units
NiSource ¹³	629	IN	1950-1970	2010-2012	6 units
NRG ¹⁴	440	DE	1951-1970	2010-2013	4 units
NV Energy	342	NV	1965, '68, '76	2016	3 units
OGE	171	OK	1956	2010	1 unit
PGE	601	OR	1980	2020	Will retire Boardman plant 20 years early
PPL	908	KY	1953-1969	2015	6 units (LG&E and KU)
Progress ¹⁵	2,532	NC, FL	1951-1972	2011-2020	13 units
Southern ¹⁶	10,379	GA	1963-1967	2011-2013	5 units
TransAlta ¹⁷	1,460	WA	1971	2019-2024	2 units (Centralia)
TVA ¹⁸	4,775	various	1952-1965	2012-2117	25 units in 3 states (TN, AL, KY)
WE Energies	112	MI	1964, 1966	2010	2 units
Xcel Energy ¹⁹	1,430	CO, MN	1951-1968	2010-2022	12 units
Others	2,031	various	1943-2004	2010-2022	
	53,353				

Retirements

- 53,000 MW of retirements or conversions of coal plants have been announced with retirement dates between 2010-2022
- Factors include:
 - Aging of the coal fleet
 - Demand – Economy/Weather
 - EPA regulations
 - Fuel prices

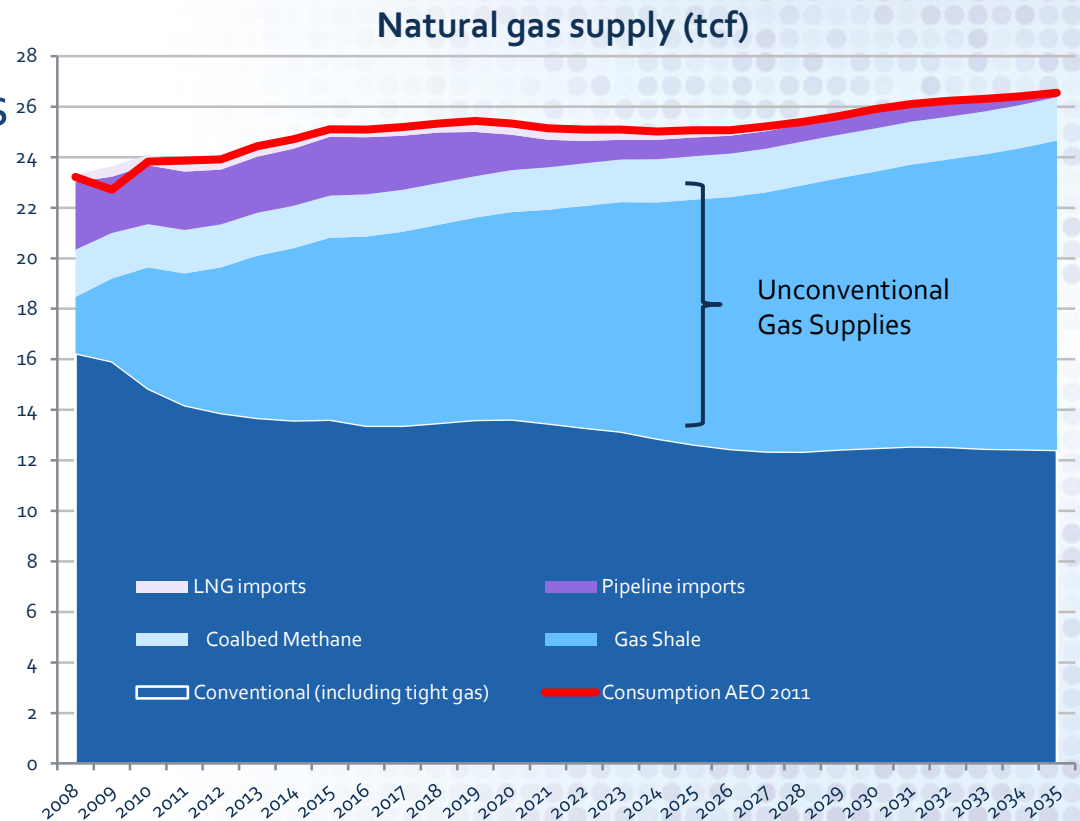
Natural Gas Prices



Source: NYMEX

Natural Gas Trends

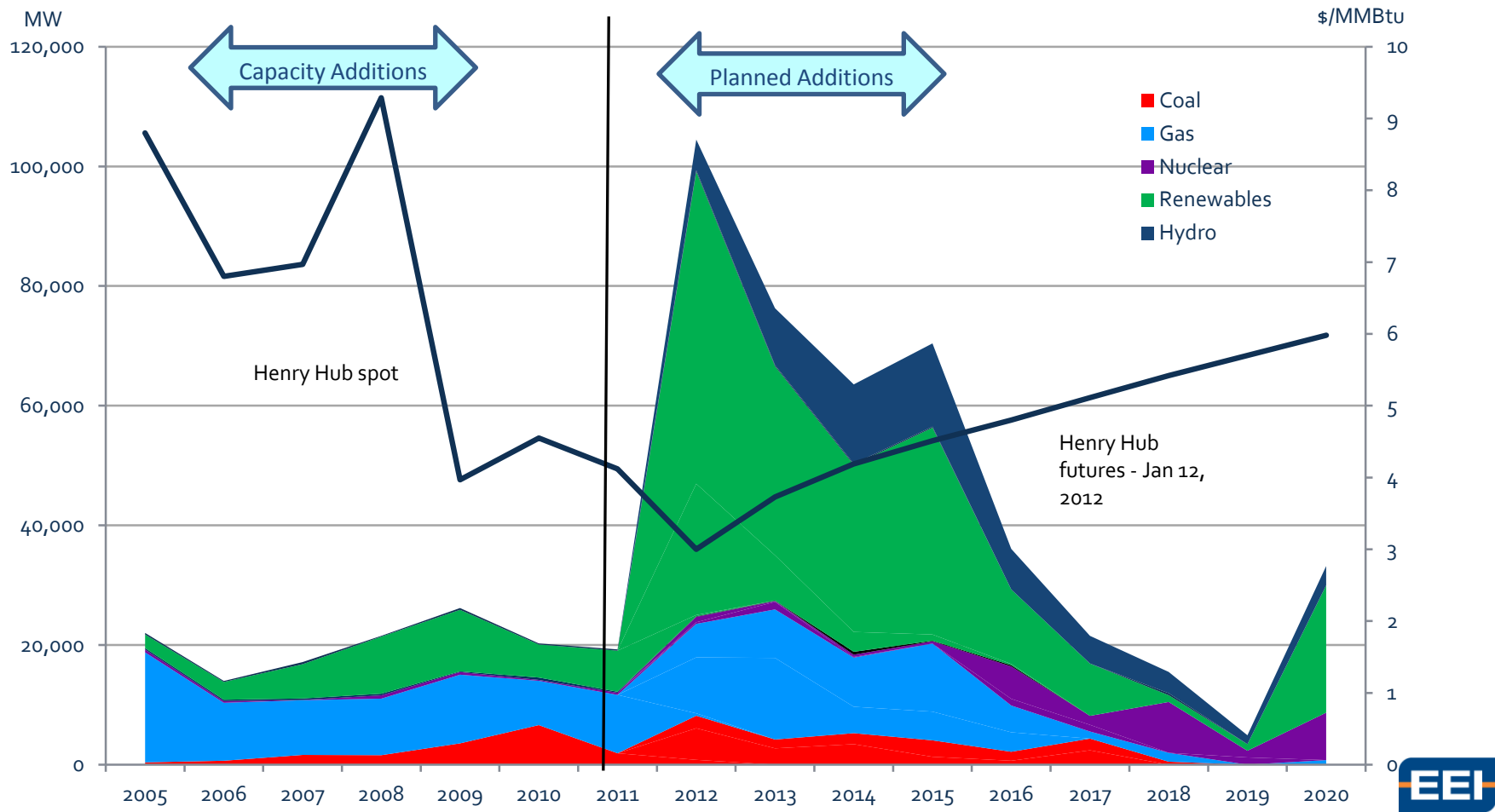
- Abundant shale resources
- Shale formations now account for more than 70% of total new production



Rapid Growth of Shale Gas

- Shale gas as a percentage of US natural gas supply
 - 2000 -- 1%
 - 2010 -- 23%
 - 2035 -- 34%
- 650 trillion cubic feet - DOE estimate of total shale gas in US (energy equivalent = 118 billion barrels of oil)
- Shale rigs account for over 43% of total gas rigs
- Power industry is largest potential growth sector

Natural Gas Prices and Generation Investment





Natural Gas Technology

Types of Technology

- Combustion Turbine
- Steam Turbine
- Combined Cycle
- Liquefied Natural Gas
- Fuel Cells