

Steady Transformation Ahead In Power Generation Market

Demand for electrical power will slowly and steadily grow over the next 20 years, increasing by just less than 1 percent annually through 2040.

Coal has long dominated power generation. It currently accounts for 37 percent of supply, followed by natural gas (31 percent), nuclear (16 percent), renewables (12 percent) and hydropower (7 percent).

But coal's supremacy in the power generation market is about to wane. The combination of cheap and plentiful natural gas, programs encouraging renewable fuel use and tighter emissions control regu-

lations is steadily transforming the industry. That's not an easy thing to do.

"Power is really hard to change," says Jack Hand, president and CEO of POWER Engineers, Inc. It takes hefty investments and long lead times to build new power facilities. That's why change will happen slowly. The United States Energy Information Administration (USEIA) projects that natural gas won't surpass coal as the nation's primary power generating source until 2035. By 2040, natural gas will account for 35 percent of power generation, followed by coal (32 percent), nuclear

(16 percent) and renewables (16 percent).

Natural Gas Rising

The development of hydraulic fracturing and horizontal drilling techniques has opened a pipeline to the nation's shale gas reserves. And that work will only increase. USEIA projects shale gas production will more than double by 2040, from 7.8 trillion cubic feet/year to 16.7 trillion cubic feet/year.

Such dramatic supply expansion has many immediate impacts—natural gas prices have plummeted and chemical companies and other manufacturers have repatriated factories. But its full force is only now being felt across the industry.

"Up until fracking, natural gas plants were running at about 35 percent capacity," says Hand. "Today we're over 50 percent. The word on the street is we won't start building new plants until when we get to 60 percent of capacity."

But give it a few years. Work on several new natural gas plants should kick into high gear in 2016, says Hand, who adds, "Once it gets going, I really don't think it's going to slow down."

According to the American Public Power Association's (APPA) latest *Report on New Generating Capacity*, power plants totaling 47,525 megawatts (MWs) are currently in permitting. Of those, 48 percent are natural gas plants. Coal plants, which accounted for 40 percent of plants in permitting in 2009, make up less than 6 percent.

Two key regulations further



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Electricity Generation by Fuel (Percentage of market)

	2012	2040
Coal	37%	32%
Natural Gas	30%	35%
Nuclear	19%	16%
Renewables	12%	16%
Oil and Other Liquids	1%	1%

Source: USEIA

Permitted Plants by Primary Fuel Type

Primary Fuel Type	Capacity (MW)	% of Total
Natural Gas	20,961	48.2
Wind	12,716	29.2
Solar	5,132	11.8
Coal	2,560	5.9
Geothermal	671	1.5
Hydro	494	1.1
Other	317	0.7
Waste	169	0.4
Biomass Gas	50	0.1
Agricultural Byproduct	49.9	0.1
Biomass Solid	28	0.1

Source: APPA

threaten coal's future. The Mercury and Air Toxics Standard, which takes effect in 2016, and the Obama administration's recent decision to cut carbon emissions from power plants by 30 percent by 2030 will significantly increase operating costs for many coal plants. Utilities must weigh whether to retool those facilities or shutter them.

Dean Oskvig, president and CEO of Black & Veatch's energy business, anticipates a surge in requests to retrofit coal plants, even if on a limited-time basis. "Each plant is its own story and will have to be addressed on a case-by-case basis," he says. "That work won't continue forever, though, and before too long all the big plants will be done."

Even with those upgrades, USEIA estimates that 50,000 MWs of coal-fired capacity will be retired by 2021.

Rather than retiring or retooling a plant, Hand says



some utilities are changing tack completely. “They can turn an existing facility into a natural gas plant. They don’t have to pay for the infrastructure, other than adding the gas line,” he says.

Renewables Percolating

Wind and solar power are projected to grow significantly in the coming years, filling some of the void left by coal, but “they will never be base load,” Hands says.

Hand expects more utilities to combine solar and natural gas in single facilities, a move that would reduce a firm’s carbon footprint.

Meanwhile, the future of nuclear power is in flux. Near-term retirements of plants will cut the generating capacity from 102,000 to 98,000 MWs by 2020.

“The industry is watching how the five reactors under construction go, in terms of cost and schedule,” says Oskvig. “After that, they’ll decide on whether to make some moves.”

Hand says he is bullish on the long-term potential of nuclear power generation. “It makes too much sense,” he says.

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