

IN DENIAL

“CCS IS GOING TO BE REQUIRED, WHETHER WE LIKE IT OR NOT!” —
HANS-JUERGEN KIESOW, SIEMENS ENERGY

I usually have to dig hard to find suitable topics for these columns, but the 2009 TurboExpo plenary session provided more than ample material.

John Elnitsky, Vice President of Nuclear Development for Progress Energy, declared “coal is a headache (for Progress Energy) now.” Progress Energy’s focus will be on Smart Grid and Demand Side Management initiatives, and generation choices would include renewables, nuclear and “state-of-the-art” gas. He also stated that as long as the current administration was in place, coal was not a logical choice. No further explanation was provided.

More specifically, Elnitsky indicated that, although there were concerns over fuel cost volatility, IGCC was competitive with new nuclear for base load. And Progress Energy favored the smaller 600 MW blocks as a better match to their load growth, and that they would be built on a standard architecture with rapid turn-down and ramp-up capabilities.

Sunao Aoki, Senior Executive Vice President at Mitsubishi Heavy Industries, offered that the product development cycle was very long in contrast to the market dynamics and that any decision had to respect the 3 Es, “Energy, the Environment and the Economy.” He said that the high cost of renewables and their inherent instability, the CO₂ associated with coal, and cost and permitting time for nuclear plants made Gas Turbine Combined Cycles the most promising choice for new generation. He added that new natural gas discoveries and advanced drilling technologies along with MHI’s 1,700°C, J-Class development at 62% - 65% LHV in support of that decision.

Lou Cerone, Senior General Manager of Advanced Technology Operation for GE Energy, offered a litany of so-called enabling component technologies that included migrating aero engine technologies into power generation platforms. These included high-pressure ratio and high stage-loadings, re-energizing diffuser boundary layers, the use of Ceramic Matrix Composite shrouds, and compact, high-intensity low NOx combustors. Cerone did not comment specifically on generation choices, but the focus of his comments certainly indicated a gas turbine preference.

All of these comments include an

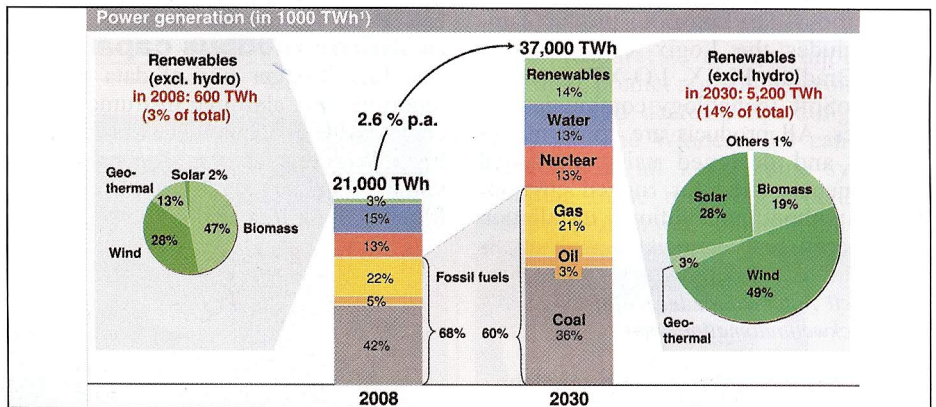


Figure: Siemens estimates of future power generation sources

underlying and unstated assumption that natural gas-fired turbines will continue to be permitted without Carbon Capture & Storage (CCS). I think that this is a flawed assumption, and reflects more wishful thinking or limited perspective, rather than sound strategy. I would call it “in denial!”

Hans-Juergen Kiesow, Director of Gas Turbine Engineering for Siemens, got it right. He observed that the business cycles are getting shorter, but more intense, necessitating better forecasting to mitigate the very inefficient boom-bust cycles of the past. He offered population growth, urbanization and increased life span as “megatrend” energy demand drivers. Kiesow also went on to echo others in stating that load following, turn-down, fuel flexibility, and cycle efficiency will be essential design attributes.

OK, so far so good! But then, and in stark contrast to those that preceded him, he offered that coal is a vastly available fuel and that it will be used.

Kiesow was the only plenary speaker to mention CCS, stating quite definitively that “CCS is going to be a requirement whether we like it or not.”

Uh-oh!

Getting it right

Phil Ratliff, Director of Siemens Energy Next Generation Gas Turbine, offered Siemens’ insights on the nature of the power generation market in years to come (Figure). As indicated, Siemens projects overall growth at 2.6% per year and consumption increasing from 21,000 to 37,000 TWh. It also projects that renewables will grow almost ten-fold to 14% of the total. It is clear that “mother

nature” will have dispatch authority over 77% of those, i.e., wind and solar. But Siemens reasons that political forces will require renewable energy be dispatched first as “must take” generation at \$0.42 per kilowatt-hour.

In this scenario, renewables and nuclear plants will run base load, and intermittent loads will fall to fossil-fuel units to provide. IGCC units, purchased previously for base load, will become intermediate duty units and operating flexibility will provide significant competitive advantage.

The ability to start rapidly and follow or take load quickly will be essential. Low start-up cost, good part-load efficiency and meeting part-load emissions will become important differentiators. The Siemens approach to meet these requirements is to offer an air-cooled configuration with 20 minute start time, followed by 10 minutes to synchronize to the grid, as an “H machine configuration” option.

I think Siemens has it right, maybe because of their European roots or bias, but their approach and conclusions seem to be more pragmatic than hopeful.

Who knows? I may be the one that’s in denial. We’ll see.

Author

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