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NEWS THIS WEEK...

Blooming opportunities

Bloom Energy's technology allows a range of inputs to be used to generate power.

- **The company's solid oxide fuel cells tackle the historic challenges of such technology, providing efficiency at a competitive price.** *(Page 2)*

Green push

Japan is taking steps to increase its renewable energy output, coupling liberalisation of the market with feed-in tariffs.

- **Previous calculations have suggested replacing nuclear power with renewable energy would cost US$640 billion.** *(Page 3)*

Mandated supply

The US and Brazil are pushing towards greater biofuel consumption.

- **The US' EPA is putting pressure on refiners for more cellulosic biofuel to be used, but the struggle is likely to continue.** *(Page 8)*
- **Brazil has upped its biofuel blend requirements.** *(Page 8)*

For analysis, commentary on these and other stories, plus the latest alternative energy developments, see inside...

COMMENTARY

Putting the Bloom on fuel cells

New ways of storing energy provide opportunities for power supply

By Ashok Dutta

- **Bloom Energy's Red Lion Center is a world-leading fuel cell site**
- **Ample local supplies of shale gas can be used to power the Bloom Box**

In the past few years, the US government has not minced words about focusing on renewable energy and its environmental benefits, even as North America benefits from a major fossil fuel revolution.

Hydraulic fracturing and horizontal drilling have opened up new opportunities for the oil and gas industry, with production from the Bakken shale having passed the 600,000 barrel per day mark. Looking ahead, output could cross the 1 million bpd mark by 2015, a recent report from IHS CERA indicated.

While power generation, heavy industry and even LNG export plans have benefited from shale gas, the feedstock is also being put to use in the renewable energy sector.

A case in point is Red Lion Energy Centre, located 7 km south of New Castle, Delaware, which uses fuel cell technology – powered by natural gas – to generate electricity to be supplied to the state's grid.

Major equipment for the generating station will include 135 fuel cell units, or "Bloom Boxes," grouped in clusters, US-based Hill International's project executive, Mark Dickinson, told *REM*, in a phone interview.

The Red Lion plant will also include a natural gas regulating station, a control building and storm water management systems, he said.

Hill International is providing project management services during construction of the facility that will house the Bloom Boxes, produced by Bloom Energy, a California-based energy company.

"Our initial role began as a [project manager] for the Red Lion facility, which is being built in two phases. Subsequently, we were also entrusted with the responsibility of building a second facility, called Brookside," Dickinson said.

Phase 1 of the Red Lion Centre, which went operational on December 15, 2012, has a capacity of 5.8 MW. Work is under way for the second phase development, under which output will increase to 27 MW by early 2014.

"The Red Lion Center, as presently designed, is the most powerful fuel cell centre in the world," he said.

Technology

Bloom Energy's Bloom Box is powered by natural gas. The Bloom Energy server is a solid oxide fuel cell (SOFC) that can use a wide variety of inputs, including liquid or gaseous hydrocarbons produced from bio sources, to generate electricity on the site.

"It is highly efficient, low-cost and also has low polluting emissions. This type of fuel cell can withstand temperatures of up to 980 degrees Celsius, which would cause many other types of fuel cells to break down or need maintenance, and is highly advantageous for its smooth operation," Dickinson said.

> ***"The Red Lion Center, as presently designed, is the most powerful fuel cell centre in the world"***

According to Bloom Energy, a single cell can generate 25 W, with the server using thin white ceramic plates made from "beach sand."

For its part, the technology has proved to be successful with "servers," being currently deployed all across the US for a number of corporations like eBay, Google and Wal-Mart, to name a few.

"For the Red Lion and Brookside facilities, power is being uploaded to the grid to bolster its reliability," he said.

Commenting on other benefits that renewable energy power plants can provide, Dickinson pointed out the Brookside facility had continued to operate during the recent Hurricane Sandy, while major power generating centres in the US' east had shut down.

"We continued operations as supplies of natural gas and water that are required to generate power were not disrupted," he said.

Meanwhile, commenting on the future of renewable energy in North America, Dickinson said it was wide open.

"We have big gap between fossil fuels and renewable energy. But as fuel cells are being built to scale, benefits will accrue in terms of making the technology more price-competitive compared [to] conventional sources of power generation," he said.

As one of the world's largest energy consumers, few will deny fossil fuels will remain the bulwark of power generation in the US for the foreseeable future. No efforts are being spared, though, to ensure renewable energy has a place in the US' energy mix. ■