A RENEWABLE FUTURE FOR NATURAL GAS

Promising technologies and new partnerships assure a sustainable role for North America’s cleanest fossil fuel

BY DAVID DODSON
Tt is perhaps tempting for some to depict natural gas as unavoidably in competition with other forms of energy, particularly renewables such as solar, wind and geothermal. But the reality is that natural gas utilities are embracing other energy sources—especially renewables—to ensure the industry’s business model remains viable over the very long term.

Today’s natural gas utilities are pursuing strategies that could prove to be important to customers and the environment in the years ahead. They are showing developers how to build efficient, environmentally friendly energy solutions into their projects from the ground up. Their assistance is helping builders decipher changing building codes and uncover opportunities for incorporating direct use of natural gas in ways that save money and reduce emissions.

And in some parts of the country, natural gas utilities are taking methane that would otherwise benefit no one and converting it into pipeline-quality gas that can be used to make electricity or, even better, used directly in heating, cooling and other applications.

Still others are taking the bold step of asking policymakers and regulators to view some forms of natural gas as renewable resources in themselves. As the benefits of carbon-neutral forms of natural gas such as biogas and landfill methane are demonstrated, the role of natural gas in reducing emissions will take on even greater dimensions.

Building It In

The cleanest, cheapest and most abundant energy is the energy that doesn’t get consumed. Laclede Gas Co. in St. Louis has been around a very long time (its stock first traded in 1889, making it the eighth-oldest listed stock on the New York Stock Exchange), and it has taken an early lead in what has become known as the “green building” movement.

“Green building” can mean many things. The International Code Council has its 2015 International Green Construction Code. The American National Standards Institute offers several certifications for construction that improve energy efficiency and reduce overall emissions. Then there is the U.S. Green Building Council’s Leadership in Energy and Environmental Design designation. And Home Innovation Research Labs (formerly The National Association of Home Builders Research Center) serves as the secretariat for the ICC-700 National Green Building Standard, a residential green building rating system that received ANSI approval.

The list goes on, but these standards all point in one direction: Conservation and energy efficiency are low-cost, high-impact contributors to overall reduction in emissions. And natural gas figures prominently.

Laclede was a catalyst for broad acceptance of the Green Building Standard in its service territory, advising its customers on how they could dramatically increase energy efficiency through building technology and incorporating better direct-use appliances, according to Jim Hearing, director of sales and customer accounts.

“A lot of builders didn’t really understand green building and sustainability. What they do understand very well is building codes,” Hearing said.

So Laclede reached out to builders and conducted an ongoing series of seminars and workshops to help builders and developers understand how the direct use of natural gas in homes and businesses is extremely efficient and will meet green building certification. Laclede also helped builders achieve NAHB’s Green Building Certification, important third-party validation that going green saves money and helps the environment, Hearing said. Certification is also a must-have for developments to qualify for certain federal funding programs.

Laclede Gas has also been a long-time advocate for the development and preservation of affordable and sustainable low-income housing; however, promoting natural gas in this market had been a challenge. But then state requirements were modified to mandate that low-income projects adhere to sustainable green building protocols.
This was the breakthrough that Laclede Gas needed. By investing in natural gas appliances on the front end, owners were able to offer tenants a home that was energy efficient while providing lower monthly utility costs compared to all-electric housing. “These lower monthly costs helped keep tenants in their homes longer and reduced rehab and re-inspection costs for vacancies,” said Hearing.

These programs have worked so well for Laclede and Missouri home builders that the NAHB named Laclede its Utility Partner of the Year in 2013. The company was also recognized as one of the 2013-14 Home Innovation NGBS Green Partners of Excellence for its dedication and success in advancing green home building and for providing leadership and commitment to high-performance homes.

“If I help the developer—and the local public agencies and municipal authorities—understand how everybody benefits from direct use, then we’re raising everybody’s comfort that from a cost perspective and from an environmental perspective, [green building techniques] work,” Hearing said. “We work closely with AGA’s Sustainable Growth Committee to work with that message, and it’s always good to have like-minded people work together to further this cause.”

Unlocking Landfill Methane
The Environmental Protection Agency estimates that municipal solid waste facilities—landfills—contribute 18.2 percent of human-related natural gas emissions in the United States each year. As a result, the EPA is encouraging entrepreneurs and natural gas utilities to capture that methane before it reaches the atmosphere.

Renewco, a landfill methane project developer and operator and a subsidiary of AGL Resources in Atlanta, needs little encouragement in that regard. “Like most utilities, AGL places emphasis on sustainability,” said Michael Ellis, Renewco vice president and director of AGL Energy Services. Renewco has operated one landfill methane installation in Athens, Tennessee, since 2011 and is in negotiations to develop a second site. These facilities extract methane from landfill gas, and through controlled processes, refine the methane to the point that it meets established industry standards for pipeline-quality gas. Once that is achieved, it can be injected into the pipeline system and used like any other natural gas.

“It’s a very niche market,” Ellis said, and for a variety of reasons. “The energy content of the landfill gas has to be high enough to justify your development costs. In addition, there can’t be too much atmospheric intrusion into the landfill gas or the nitrogen and oxygen levels will get...
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too high and the processing equipment can’t achieve the gas quality spec.” Also, a viable site must be physically close to a pipeline that provides an injection point to transport the gas to the end user.

Then there are other difficulties.

“Landfills are dynamic. The quality of the landfill gas changes depending on what’s placed in the landfill. Landfill operators are constantly putting a changing variety and quantity of materials into the landfill, and the resulting constituents in the landfill gas change. What’s in the landfill really matters. One such example is gypsum board. Too much of it results in higher levels of sulfur compounds that may require an investment in additional equipment to meet natural gas pipeline specs,” Ellis said. “A lot of times, you don’t know exactly what you have as to quantity and quality of the gas until the plant is actually operational. There’s a lot of engineering involved both prior to and after the commissioning of a landfill gas facility...[But] the goal is to achieve pipeline-quality gas with a heat value of 1,000 to 1,050 Btus per cubic foot and, of course, to be cost-effective while meeting our sustainability goals.”

Renewco is focused on demonstrating that landfills are a viable source of pipeline-quality methane and that they provide a carbon-neutral source of renewable natural gas. “With limited landfills meeting the criteria for a cost-effective site, landfill gas is not going to substantially move the needle in the near future,” Ellis said. “But there’s no doubt it works, and I feel it is our moral obligation to capture this often wasted resource.”

“Farming” Natural Gas

As is often the case, California is a leader in renewable technologies. Part of that comes naturally in the Golden State, some is driven by customer expectations and a good portion is required by Assembly Bill 32, the California Global Warming Solutions Act of 2006. That legislation commits the state to reducing its greenhouse gas emissions to 1990 levels by the year 2050.

“I think the challenge of natural gas in California is quite different than the rest of the country,” said Patrick Lee, senior vice president for customer service, innovation and business strategy at Southern California Gas Co. While Lee believes California’s aggressive greenhouse gas reduction targets “put a shadow over natural gas as the cleanest fossil fuel,” SoCal Gas is confident there is a path to meet the act’s requirements.

SoCal Gas has invested broadly in strategies to meet emission reduction standards, Lee said, and that includes “both investments in energy efficiency and technology development, including new combustion technologies, low-emission vehicles, fuel cells—a number of things that are either derived from or complementary with natural gas.”

One big step SoCal Gas is taking is in the direction of biogas, or biomethane—the production of renewable natural gas from existing sources such as dairies, food processing plants, wastewater treatment facilities and biomass. That effort has been facilitated by SoCal Gas’ success at getting a Biogas Conditioning and Upgrading Services Tariff approved by the California Public Utilities Commission.

SoCal Gas sees the tariff as vital in encouraging potential customers “to actually get into the biogas market and take the steps to enable getting this gas injected into the pipeline,” Lee said. SoCalGas would build, own and operate the biogas filtering system, and the customer would own the biogas. “If there is a need to extend the pipeline, we will make the necessary investment in our infrastructure.”

The technology is there now, Lee said, but there are still many considerations for anyone thinking about getting into the biogas business.

Building and operating a biogas facility requires a major investment and expertise. “In most cases, the dairy owner or farmer doesn’t really have the capital or the know-how,” Lee said, because that’s not their primary business. But with the tariff in place and with support and guidance from SoCal Gas, potential operators can connect the dots between the methane their operations produce but don’t monetize and its conversion to a useful fuel that can be injected into the grid and sold downstream, he said.

“It is important for them to have that comfort that they will be able to market this biogas. We are now making it possible for them to inject it, contract with someone downstream and create situations in which that fuel qualifies as a renewable resource,” Lee said, all for the purpose of meeting emission reduction targets.

The potential is huge. SoCal Gas estimates that 16 percent of current natural gas supply in California could be replaced with renewable biogas. But maybe that’s conservative, Lee said. There’s huge...
potential to maximize production: For example, perhaps farmers could plan for purpose-grown biomass crops to increase the amount of biogas going to market.

SoCal Gas acknowledges that biogas is three to four times more expensive than indexed natural gas.

“If people remember, when the renewable portfolio standards first came out, solar and wind were six to eight times the cost [of electricity produced by combined-cycle natural gas-fired generation],” Lee said. “Now, with more applications and with mass production, the price has come down to probably no more than one to two times. We expect that as we move into mass production and we see continued technological improvements, [biogas] prices will come down to very competitive levels.”

SoCal Gas is looking for supportive policies at the state level. “Given our state’s aggressive goals, we will be getting a lot of support for our gas renewables program,” Lee predicted. And that could mean, for one example, requiring that a certain percentage of the state’s renewable portfolio be supplied by gas renewables.

“California needs to give notice to the market that there is a priority here, and it needs to recognize that there is market support [for gas renewables],” Lee said. For its part, SoCal Gas needs to continue to demonstrate “that we are continuing to evolve new technologies and we are focused on how natural gas can complement other technologies.”

There are sound environmental reasons to pursue technologies such as biogas. “Take internal combustion engines, for
example,” Lee said. “Previously, if we looked at burning natural gas in an engine, we achieved a 15 percent to 18 percent reduction in carbon dioxide. But if you use renewable natural gas in that application, you are achieving a 70 percent greenhouse gas reduction.”

And, of course, gas renewables support direct use of a clean fuel. “If you look at the long term for California, renewable natural gas will play a major role in direct-use applications that will help us attain the greenhouse gas [reduction targets],” Lee said.

**Renewables: A Growing Future**

These efforts by natural gas utilities demonstrate a commitment to the environment and sustainability that doesn’t impose negative impacts on ratepayers or shareholders.

Across the United States, utilities are also working day-by-day in small but impactful ways to benefit the environment. For example, most utilities long ago accepted the notion that conservation of natural gas at the burner tip in direct-use applications is good for customers, commercial interests and utilities, not to mention the environment. Virtually all natural gas utilities offer programs to builders and homeowners to help reduce energy consumption with better, more efficient appliances and wiser construction methods and materials.

And natural gas has amply demonstrated its value in applications where heat generated by its combustion can create electricity and serve other thermal purposes at the same time. Arguably the greatest synergies among natural gas and renewable technologies are at the bulk energy level, where natural gas serves as a backup fuel to solve the intermittency issue inherent in making electricity from the sun and wind.

While teaming natural gas with renewable technologies to make electricity seems an obvious choice, it doesn’t tell the whole story.

SoCal’s Lee cautioned that generation of electricity—by natural gas, renewables or any combination of energy portfolios—is not the answer to every energy question.

“We don’t have to generate electricity first and electrify everything,” he said. “What other alternatives are out there? What are the mixed alternatives that call for us to continue to use natural gas and renewables? What are the opportunities with synthetic natural gas?”

Lee suggested that what is needed is appropriate signals from policymakers, regulators, end users and natural gas utilities that investment in new approaches and new technologies will pay off in overall conservation, environmental protection and meeting demand. “We need to really focus on what makes sense for the customer,” Lee said. “In the end, that is what’s going to help us sustain our business and venture into new markets.”

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