Coal-Bed Methane Provides Less-Invasive Production Method

Elizabeth J. Rundgren

If the twenty-first century has done anything, it's allowed the extrapolation of "personalization" on a global scale. Once limited to purchasing items during set business hours from a local store's inventory, consumers now acquire everything from tailored clothing to kits of gourmet food every minute of the day—sometimes delivered to their doorsteps within hours. This revolution has redefined what it means to "provide" and "consume."

No longer are residential and commercial customers content with what's available—instead, consumers' priorities and choices have actually altered the face of commerce. Utilities are no different. Instead of making do with one or two power options, customers are actively seeking out ways to reduce costs while supporting cleaner energy sources and corporate responsibility initiatives.

Commitment to the environment, community involvement, and fair trade/living wages have become integral factors in doing business, and the natural gas industry is poised to leap ahead.

TIME OF TRANSFORMATION

During the deregulation of the energy industry leading up to the turn of the twenty-first century, more consumer choice among energy providers laid the groundwork for new opportunities with "greener" energy sources.

However, with the standard electrical grid collecting and apportioning power, there was little to no way to track the creation or usage of power created by cleaner or renewable fuel sources. To monitor the usage of these cleaner resources, Renewable Energy Credits or Renewable Energy Certificates (RECs) were created. According to the US Environmental Protection Agency (EPA), "RECs represent the technology and environmental attributes of electricity generated from renewable sources."[1]

Usually measured in 1-megawatt-hour units, RECs can actually be sold or traded independently of the underlying power they represent, making them a flexible means for end-users to offset a portion of their traditional electricity usage with that created from renewable resources. However, RECs merely represent the clean energy that has been created, while the actual power enters the standard electrical grid and becomes indistinguishable from traditionally created power. Thus, while the development of RECs provided a new way to "purchase" and incorporate cleaner energy into the landscape, it still remained more expensive than traditional power.[2]

As social demands and legislative support gathered steam, Renewable Portfolio Standards (RPSs) developed in many states and mandated the increased production of energy from cleaner resources. Coupled with federal tax credits, this cleaner energy suddenly looked like a win-win for all involved, and some utility providers began to market "green" power options.

In 2000, the voluntary use of cleaner energy took a leap forward when the EPA closed the first retail REC trade agreement with the Bonneville Environmental Foundation (BEF)[3] in Oregon for more than 2.5 million kilowatt-hours, which served as a precursor to the first carbon offset calculator launched by the BEF in 2001. Over the next few years, the EPA began a recognition

Elizabeth J. Rundgren is manager of T.D. Stranger, LLC.

  / DOI 10.1002/gas.21936

program for buyers of renewable energy, more states developed RPSs, and a groundswell began. To meet the statutory requirements of RECs and Power Purchase Agreements (PPAs), a new market began to emerge in the energy economy—those users seeking to meet compliance standards.

In 2006, the first solar PPA was established and served as a catalyst for significant industry growth. According to the Solar Energy Industries Association, a PPA basically provides a way for a developer to finance/build a solar energy system on an energy consumer's property. While the energy consumer has no capital outlay, the consumer receives a discounted price on the power generated by the system, and the developer receives the energy income as well as any tax credits/incentives.[4]

While RECs still served as the main avenue for energy end-users to support cleaner energy, no direct connection yet existed between commercial/industrial consumers and renewable/clean-energy generators. That demand for lower costs while still meeting sustainable energy goals opened a new growth area. In 2014, the World Resources Institute and the World Wildlife Fund published the Corporate Renewable Energy Buyers' Principles, defining criteria to help companies meet their goals of purchasing renewable/clean energy directly from providers, rather than utility companies.[5]

Now, with established track records, an increasing number of PPAs and new third-party financing arrangements are springing up—both onsite and offsite. At this rate of development, a new frontier has emerged for providing/purchasing greener energy on a massive scale—including companies dedicated to using nothing but clean power. This collective movement of influential commercial and industrial consumers has significant sway over the future path of energy. But that doesn't discount the importance of smaller organizations and individual consumers, who hold just as much power in their energy consumption decisions.

While the REC industry and PPAs have historically focused on the retail electrical market, the natural gas retail market has been later to differentiate itself with consumers. There are a number of sources for power generation, and as many (or more) choices for "greening" the power landscape, but what options exist for industrial, commercial, and individual consumers wanting to exercise their values and commitment via natural gas usage?

NATURAL GAS STRAIGHT FROM THE SOURCE

While the REC industry and PPAs have historically focused on the retail electrical market, the natural gas retail market has been later to differentiate itself with consumers. There are a number of sources for power generation, and as many (or more) choices for "greening" the power landscape, but what options exist for industrial, commercial, and individual consumers wanting to exercise their values and commitment via natural gas usage?

The conventional thought has been "Gas is gas is gas—no matter the source." However, when deposit location allows for specific extraction methods, the resulting natural gas presents new opportunities for the creation of "REC-like" offsets or certificates that could enable gas utilities to offer a new choice for their customers. Taken to the logical conclusion, what if the end-user could purchase responsibly sourced natural gas directly from the producer, skipping a "middle man" altogether? The "what-ifs" are getting closer to realization every day.

In 2001, a revolution in the fossil fuel industry was taking off in the United States, with increased oil production and a new wave of natural gas production from shale deposits in much of Texas, and later Pennsylvania and other locations. Once considered unrecoverable and/or too expensive to extract, these gas deposits were made accessible by newly developed, unconventional recovery technologies, including horizontal drilling and hydraulic fracturing, or "fracking." Long-standing tax credits for unconventional natural gas served to up the ante in the energy game.

This "shale gale," as it was dubbed by Daniel Yergin and Robert Ineson in their November 2, 2009, *Wall Street Journal* article,[6] started slowly and quietly. However, over roughly 20 years, it became well-established that natural gas would be a cornerstone in the foundation of twenty-first-century energy. Less expensive to build than coal-based power plants, new natural gas plants boasted higher efficiency and lower carbon dioxide emissions.

More efficient, lower-cost, and cleaner burning than other fossil fuels, there didn't seem to be

DOI 10.1002/gas

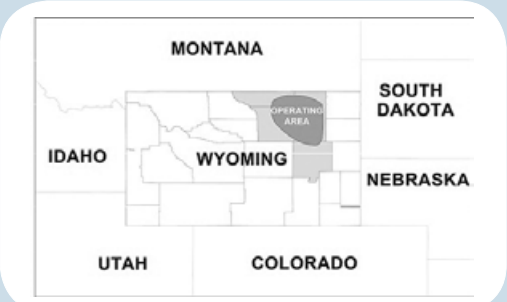
much downside to unconventional natural gas. Nevertheless, concerns over hydraulic fracturing techniques, chemicals, and water usage stirred local and nationwide debate. While a 2015 EPA study assessed that "fracturing activities have not led to widespread, systemic impacts to drinking water resources,"[7] in the same year, New York enacted a statewide ban on the process. Currently, in the United States, more than 500 resolutions against fracking have been passed at the state and local levels.[8] While the debate rages on, it seems the widespread perception is one that continues to question the effects of hydraulic fracturing. However, it's far from the *only* process.

A re-examination of conventional extraction techniques and specific sourcing has provided another option for producing natural gas in a less invasive manner. For Carbon Creek Energy, it's marketed as "FracFree" gas for utilities and end-users looking to satisfy their own concerns regarding hydraulic fracturing.

CARBON CREEK ENERGY AND *FRACFREE GAS*

Headquartered in Midland, Texas, Carbon Creek Energy produces approximately 320 million cubic feet of natural gas per day—all from naturally fractured coal seams in Wyoming's Powder River Basin. (See **Exhibit 1**.) This means that wells do not require hydraulic fracturing stimulation. While concern continues about contamination of groundwater, consumption of fresh water, and ecological disruption from fracking, Carbon Creek Energy uses a conventional extraction technique and simply drills very shallow wells into coal seams and lowers the well's pressure, allowing natural gas to desorb from the coal.

Exhibit 1. Operating Area



Carbon Creek Energy focuses on natural gas trapped in a coal-bed formation approximately 1,500 feet below the surface. Because of the relatively shallow depth and natural fractures already in the coal bed, no hydraulic fracking is required,[9] resulting in a far less intensive effort than those required for shale formations elsewhere in the United States.

Natural gas from coal beds is created through a biogenic process of micro-organisms digesting organic matter in an anaerobic environment. Because of its biogenic nature,[10] the only hydrocarbon in coal-bed natural gas is methane. Likewise, the chemical structure of coal and its naturally occurring cleat system (small open cracks) allow for a more readily available methane than found in an equal volume of conventional reservoir rock. (See **Exhibit 2**.)

In a static state, the natural gas exists within the molecular fabric of the coal. Then, as water is removed from the coal seam, the methane desorbs from the coal and coalesces into vapor. With lower pressure in the wellbore, the natural gas migrates to the wellbore and is produced to surface gathering facilities. Thus, rather than using chemicals and fracturing associated with other types of natural gas extraction, Carbon Creek Energy simply drills a water well and reduces pressure on the coal.

No chemicals, no creation of fractures, and no massive consumption of potable water—just natural gas produced in a less-invasive manner. It's gathered at compressor stations and sent down pipelines to produce cleaner electricity, fuel natural gas vehicles, and heat homes. According to Carbon Creek Energy President Tom Fitzsimmons, ecological responsibility and corporate citizenship are paramount to the company's mission. "We are committed to being a good neighbor and steward of the natural resource under our control. In Wyoming's Powder River Basin, the water produced from coal seams is potable, in an area where wildlife and agriculture are prevalent," Fitzsimmons said.

He added that—as a dedicated corporate citizen—Carbon Creek Energy works to responsibly manage the precious water produced when extracting gas by working with the Wyoming Department of Environmental Quality to meet set water quality standards and maintain permits to release water via numerous outfalls. The water released is suitable for livestock and wildlife watering; thus, the company has situated the

  / DOI 10.1002/gas

outfalls to supply local wildlife, enrich wetland habitat, water local livestock, help irrigate crops, and replenish underground reservoirs.

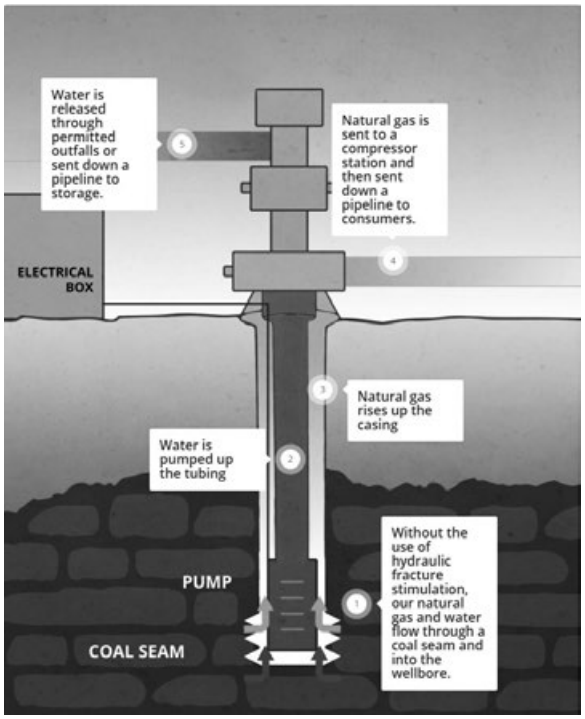
Within the Powder River Basin area, Carbon Creek Energy also supports the Council of Community Services in Gillette, Wyoming,[11] to help provide food, shelter, and emergency loans for local citizens facing economic difficulty and/or homelessness. The company has also partnered with the Thunder Basin Grasslands Prairie Ecosystem Association[12] to support local wildlife conservation, leadership development, and land management efforts.

CHOICE AT HAND

In the last three decades, the landscape of energy production, consumption, and regulation has undergone a massive shift. The concerns of producers, utility providers, commercial/industrial consumers, and individual retail customers have become more aligned toward common goals of producing lower-cost, cleaner-burning, and more efficient fuel sources. "Carbon Creek is on the forefront, leading a shift in the oil and gas industry where we, as the producers, are in direct communication with the consumers," Fitzsimmons said. "We want to work directly with them to help provide a solution that meets their values, while simultaneously educating the consumers on the importance of environmental and economic sustainability."

The "bottom line" no longer seems the sole factor in determining methods of natural gas extraction/production. There exists a segment of the population that demands more responsible sourcing, social consciousness, and higher quality in nearly every area of their lives. In response, Fitzsimmons said, "Carbon Creek Energy is forging a cutting-edge partnership between environmentally conscious consumers and energy producers through our FracFree Gas."

Exhibit 2. Extraction Process



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