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Political drivers of the European biomethane market

The growth of renewable biogas and biomethane (biogas upgraded to pipeline quality standard) presents a new potential for the natural gas industry, demonstrating that natural gas is a diverse, renewable resource and not only a traditional fossil fuel with a limited long term supply potential.

Biogas is taking its place as part of a larger renewable energy strategy that also includes solar (thermal and photovoltaic) and wind energy. Much of the attention to renewable energy has been, however, focused on replacing oil or coal-fired electric generation capacity and, for the transportation sector, liquid biofuels (ethanol and biodiesel). Nevertheless, biomethane has the potential to replace at least 20% of the overall energy consumed in the European transportation sector.

Blended into the existing pipeline network, biomethane is an environmental 'green gas' can supplement existing gas supplies to all types of customers, including residential, commercial, industrial and transportation markets.

The European Union institutions – the Commission, Parliament and Council – have made it clear through legislative mandates and related opinions and communications that biogas and biomethane can and should be used for a variety of purposes, including electric generation, directly as a vehicle fuel, and to be 'mainstreamed' into the existing natural gas grid.

Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas is clear in the obligations of member states to allow access to the natural gas grid and, importantly, specifies that biogas should be given non-discriminatory access to the natural gas system so long as it is brought up to pipeline quality (which still is under national authority until the Committee of European Normalization finalizes a biogas quality standard). European regulatory authorities that do not allow 'grid-injection' of biogas are not in compliance with European law.

A bus depot in Lille, France. The buses are powered by biomethane

Biogas supply status in Europe

According to Eurostat, the European Union's statistics watchdog, there are at least 28 countries within the Euro region producing biogas. Biogas production has grown 411% since 1997, from 1,483 thousand tons of oil equivalent (t-toe) to 7,585 t-toe in 2008 (1 toe = 1,125 m3 natural gas). From 2006 to 2008 biogas production in these 28 European countries increased 56%, reflecting new political initiatives focused on renewable energy development. Because of the new focus on renewable energy, biogas represents a new dimension for the natural gas industry. It also represents a 'new industry' that results in new jobs and advanced technology development.

The Netherlands, Sweden and Switzerland have the longest experience upgrading and feeding biogas into the natural gas grid. Although Sweden has the largest number of plants upgrading biogas to biomethane, Germany is leading in feed-in capacity in comparison to all other European countries.

This is partly related to the size of the natural gas infrastructure – the German network covers a majority of the country and Sweden's network is limited to the Western region — but also to the transparency of political policies supporting the introduction of biogas into the pipeline network.
Before European renewable energy policies gained momentum, biogas was a low priority for the German (and other countries) natural gas industry. But the German market has seen significant growth since they started biogas operations in 2006. As of April 2010 fifty three of the more than 80 biogas plants feed upgraded biogas into the public natural gas grid.

Of 28 countries within the Euro region producing biogas, eight currently operate biogas 'networks' including: Austria, France, Germany, Luxembourg, Netherlands, Norway, Sweden, Switzerland. At this writing (August 2010) there are 67 feed-in facilities; 33 more under construction, and the UK is planning to build 5 facilities where biogas will be produced and injected into the grid (making it a 9th country).

In some cases, such as in Sweden biomethane is delivered to compressed natural gas (CNG) fuelling stations directly through small, local pipe networks or via truck. Still, Sweden has 8 locations where biomethane is fed into their grid.

From a *production* standpoint, the leading biogas countries are, according to Eurostat (2008): Germany (3695 t-toe); United Kingdom (1637 t-toe); France (452 t-toe); Italy (410 t-toe); Austria (248 t-toe); Netherlands (226 t-toe); Spain (203 t-toe); Poland (132 t-toe); and Sweden (102 t-toe). Most of these same countries also have strong or developing NGV programs. Thus it is time to link political mandates for biofuels with NGV market potential.

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Legal and regulatory status of biogas in Europe

One of the key requirements to build the biogas market is the ability to inject the gas into the normal natural gas pipeline grid. The gas producer must bring the product to pipeline quality and sellers/buyers must agree upon a price as well as accept quantities of gas that is available throughout the year when seasonal demand fluctuates.

There are a range of contractual and regulatory possibilities related to injection of biogas into the natural gas grid, from simple to complex.
The 'simple' approach involves less or no prescriptive regulations where market forces are left to determine the price and conditions of biogas grid injection. Other structures are more complex and prescriptive as the biogas sector is treated more like the traditional, regulated gas industry. Regardless of the regulatory approach, the critical aspect is that grid operators must provide non-discriminatory access. Still, this is not yet *completely* the case in all countries. Some countries are 'learning as they go' and some countries and grid operators are more resistant to change. Nevertheless, there are enough different legislative and regulatory 'models' emerging to satisfy a wide range of national approaches for countries just beginning to use renewable biogas as part of their normal energy mix.

► **Gas quality.** Most existing regulations, including those at the EU-level, recommend or allow grid injection so long as the gas quality/composition is within 'pipeline quality' standards and does not include materials or components that would be harmful to the natural gas pipeline network. France prohibited grid injection of biogas from landfills until research was done to ensure that it was safe for pipeline access. Austria at this time prohibits biogas injection from landfill and sewage. Other countries rely on regulations specifying biogas composition and as long as the gas operators satisfy those conditions, grid injection is allowed.

► **Mandatory grid injection.** Germany and Switzerland do not allow pipeline operators to refuse grid injection. The Netherlands, Sweden and the UK, on the other hand, do not mandate biogas grid injection but it is being promoted as national policy, in accordance with EU directives. France, which is now finalizing its regulatory policies will require mandatory acceptance of grid injection.

►**Prescriptive vs. Non-prescriptive regulatory style.** Germany is highly prescriptive in a well-specified legislative and regulatory framework about grid injection of biogas. Sweden is on the other end of the spectrum, with no specific regulations other than gas quality requirements, but the national policy strongly encourages the use of biogas for all possible sectors. The Netherlands and the UK are just beginning to deal with biogas grid injection and are encouraging the practice but are studying options and learning as their experience becomes more mature.

A variety of national incentives, sometimes supported by additional provincial government subsidies are becoming more popular, including:

- Green gas certificates to be bought and sold by biogas consumers;

- Pricing incentives for complying with injection requirements;

-A variety of economic initiatives depending upon the different types of feedstock used for biogas production;

- Incentives for returning the biogas 'waste-byproduct' as agricultural fertilizer;

- Research and development;
Direct subsidies (on a shared basis with private sector stakeholders) for biogas production.

Some large and small European natural gas companies have been reluctant to support biogas due to its small supply potential compared to pipeline gas and due to cost and economy of scale factors.

But It is increasingly clear that 'politics' is driving renewable biogas and biomethane to become a permanent part of the clean, green gas potential for the European natural gas industry.

This pattern is likely to translate to other parts of the world in the not-too-distant future as the natural gas industry, governments and their regulatory authorities learn more about the virtues and potential of biogas and biomethane.

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