

# Setting up a European Green Gas Market – Challenges and Opportunities

**Biomethane is a 100% renewable gas which can be used for the same purposes as natural gas in transport, electricity and heating. Thanks to its chemical composition and energy content similar to natural gas, biomethane can be injected into the natural gas grid and thus substitute part of the fossil gas. Its full deployment in Europe is hampered mainly by the lack of cross-border cooperation and the insufficient incentives within national borders. Recently, first progress in enabling international trading and harmonising technical standards has been made at the European level.**

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Biomethane is an upgraded form of biogas which can be sourced from organic waste, energy crops, sewage sludge and agricultural residues. Biomethane is thus a green gas, 100% renewable. Its chemical composition and energy content are comparable to natural gas allowing to use it in the same appliances as the fossil gas including vehicle fuel and injection into the gas grid. It can be blended with natural gas at any ratio. The green gas provides Europe with several advantages: it contributes to the European climate targets by reduced CO<sub>2</sub> emissions and improved air quality, and increases security of supply and makes Europe more energy independent from import of fossil fuels.

Currently biomethane is produced in 15 European countries<sup>1</sup> and injected into the natural gas grid in most of them<sup>2</sup>. Altogether there are over 200 plants in Europe which produce biomethane for three sectors: electricity, heat and transport. Particularly Sweden has tapped into the potential of biomethane as a renewable transport fuel: half of the produced biogas in Sweden is upgraded and used as a vehicle fuel.

Thanks to the mature technology and the existing natural gas infrastructure, biomethane is a commercially viable energy source in most parts of Europe but its full potential has not been exploited due to the lack of cross-border cooperation and the insufficient financial incentives within national borders which hamper the full deployment. The current support schemes that have been set up for renewable energies around Europe tend to be limited to green electricity while green gas is mostly left outside the schemes. The biomethane feed-in tariffs in the UK and France represent positive exceptions. In general, however, under the current market conditions, biomethane cannot compete against natural gas in sales price in most European countries as long as CO<sub>2</sub> certificates are traded at such low levels.

The biomethane market is promoted for example by the Intelligent Energy Europe (IEE) project GreenGasGrids<sup>3</sup> which brings together stakeholders from both national and international levels such as European Biogas Association. The three-year-project works on the

most pressing issues of the biomethane market development regarding sustainability, technical standards, trade, and policy targets.

## Trading biomethane over the country borders in Europe

The only cross border trading transactions of biomethane that so far were reported (from Germany to Switzerland, Sweden and the Netherlands) have been carried out under bilateral agreements between the participating companies without involving any government authorised certification organisations.

As in the case of renewable electricity, also renewable gas needs declaration, tracking, labelling and trading systems to increase the share of renewable energy source and to create market confidence. These instruments provide reliable information on the source of primary energy (declaration), on its flow (tracking), on other characteristics (labelling), and they allow it to be traded (trading). The next paragraphs will take a look at such systems established for the biomethane market.

In fact, only one biomethane labelling scheme exists so far, namely “naturemade star biomethane” in Switzerland. Additionally, in Sweden biomethane is sold at several filling stations under the Nordic Ecolabel (SWAN) which covers 63 different products and is thus not dedicated to the specific requirements of biomethane.

As regards declaration, tracking and trading, the project GreenGasGrids has studied the feasibility of introducing such systems at the EU level. The national biomethane registries that have been established in Austria (Biomethan Register), Denmark (Energinet), Germany (Biogasregister), the Netherlands (Vertogas), Switzerland (VSG) and the United Kingdom (Green Gas Certification Scheme) guarantee the origin of biomethane as for renewable origin, parameters of producing technology etc. Also basically all the



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<sup>1</sup>AT, CH, DE, DK, ES, FI, FR, HU, IS, IT, LU, NL, NO, SE, UK, <sup>2</sup>AT, CH, DE, ES, FI, FR, LU, NL, NO, UK  
<sup>3</sup>[www.greengasgrids.eu](http://www.greengasgrids.eu), <sup>4</sup><http://www.greengastrading.co.uk/>

registries have a tracking, data-bank character established. They provide an independent and objective system to register the volumes (and certain qualities) of biomethane fed into a natural gas grid and the full contractual chain until its final use. By means of these registries, the parties involved in the transactions do not need to be in direct contact with each other as the system grants the necessary confidence to the participants. However, the registries operate so far only within national borders. In order to facilitate cross border trade, the registries would need to start accepting each other's documents and issuing documents in the receiving country. The first attempt has been taken between the German and the Dutch registries.

As regards tradable certificates that have their inherent market value and which can be sold, purchased and traded independently from the product itself such as the EECs green electricity certificates, no such Europe-wide system has been established for biomethane trading as the national registries will always want to bind certificates to the physical transport of the gas. The Green Gas Trading Limited in the UK is the first attempt to establish a biomethane trading system on a national level. On its web-based, public trading platform<sup>4</sup>, biomethane producers and buyers are free to trade certificates at an open market determined price.

In fact there are still several constraints that hamper the cross border trade of biomethane in Europe. The first such constraint relates to the mass-balancing requirement introduced by the European biofuels legislation covering also biomethane when used as a transport fuel. The national registries look after the energy balancing of the custody chain but they consider only the grid that is laid within national borders as one balance group. The volumes that are just transported through balance groups and being transferred to a third country could not qualify for a national support scheme. Another serious obstacle for international biomethane trading is the national character of support schemes in general: in many countries only biomethane that is produced within the national borders can qualify for support schemes such as feed-in-tariffs or can get tax reliefs. Other constraints relate to the different national quality requirements, difficulties in registering cross border physical flow in the pipelines and to the small market size: only a limited amount of companies are interested in international biomethane trade which is not enough to finance the establishment of an electronic trading system.

The GGG project tries to bring the existing registries together and makes propositions on how a cross border trade could look like. However, the final model including contracts has to be developed by the registries themselves.

The project evaluated two policies: either a system of bilateral

<sup>5</sup>Biogas Journal 3\_2013, p. 39

<sup>6</sup>Dena: <http://www.erdgasmobilitaet.info/service-und-aktuelles/aktuelles-und-presse/meldung/datum/2013/03/27/biomethan-auf-der-ueberholspur.html>

and multilateral agreements between the registries with data banks that are compatible or a creation of a single European registry. After receiving feedback from the registries involved, it was concluded that at this point it would be best to establish a national system in each country and strongly encourage cooperation and harmonisation among the registries. This cooperation will be determined and put down in a Letter of Intent which is to be signed by all established registries in summer 2013.

In order to eliminate other hurdles, the European natural gas network in its entirety should be considered as one single balancing unit in the mass-balance systems and imported biomethane should be treated under the support schemes equally to the domestically produced green gas. Also a common, transparent, electronic platform for registering and transferring the relevant information between registries should be developed.

### Importance of common standards for the European biomethane market

In all those countries where biogas is upgraded to biomethane, standards for gas grid injection have been developed. Such standards are usually defined for all unconventional gases, thus including also biomethane from gasification and from anaerobic digestion. However, also in this case national differences prevail regarding even some very fundamental aspects of the standards such as parameters and/or compounds of concentrations other than methane.

In order to facilitate the production and use of biomethane, the European Commission mandated CEN in 2010 to develop common European standards for both, biomethane that is used as a vehicle fuel and biomethane that is injected into a natural gas grid. The CEN working group (TC408) is composed of national gas standard organisations and supported by dedicated associations such as European Biogas Association in the role of advisors. The working group scheduled 10 meetings to take place until autumn 2013 by when the draft proposal should be released. In spring 2013, a number of issues are still open for discussion including for example sulphur limits, siloxanes which mainly occur in biogas produced from landfill and sewage sludge and which can cause risks in engines, and trace components that may have an effect on health. In case no scientifically based values can be assigned by autumn, preliminary figures will be used which can subsequently be adapted. The UK has recently made an important step towards the other European countries by issuing a class exemption to GS(M)R to allow network conveyance of gas with an oxygen content of less than 1%.



### Concluding remarks

If these barriers hampering the development of the European biomethane market could be eliminated, the upgraded form of biogas could effectively contribute to the European targets on decarbonising the energy sector. Biogas has a large untapped potential due to its high substrate flexibility, it can be blended with natural gas at any proportion (or used in its pure form), and it can significantly reduce CO<sub>2</sub> emissions: when a vehicle is fuelled with waste-based biomethane, it reduces greenhouse gas emissions even by 97% compared to diesel or petrol powered vehicles<sup>5</sup>.

To exploit the full potential, the production and use of biomethane would also require strengthened support at both national and European levels. Encompassing support schemes with feed-in-tariffs and tax reliefs increase the profitability of biomethane and flatten the cost differences between natural gas and biomethane while well-developed waste management systems facilitate the production. Long term-targets (2030-2050) aiming at fossil free societies, provide investors with the necessary security. The European Commission on the other hand should start recognising the potential of biomethane and actively contribute to the development of the European market. Biomethane is usually not explicitly mentioned in the Commission's policy and legislation papers. Alluding to the insignificance of the market does not seem valid anymore since the green gas is increasingly capturing more market share from CNG: in Sweden biomethane has already overtaken CNG with the share of 57% and in Germany the share more than doubled only within one year (2012) from 6 to more than 15%<sup>6</sup>.

All in all, there is still a lot of important work left to be done regarding the elimination of market barriers and convergence of national policies and procedures. Support and legal contribution from the EU institutions could give a positive push to the future development of green gas.