Biomethane development
and the decarbonisation strategy in Italy

Position Paper of Consorzio Italiano Biogas - Snam - Confagricoltura for COP 21 - Paris

The fundamental role of biomethane in the Italian energy transition

The Consorzio Italiano Biogas, Snam S.p.A. and Confagricultura share the vision of a fundamental role for biomethane in the Italian strategy for fighting climate change and for an energy transition towards a low-carbon economy based on sustainability and circularity in the use of scarce resources.
This vision is based on specific elements that characterize the biomethane production and utilization value chain.

Biomethane is an energy source that is:

• ***renewable***, because it is produced from biomass of agricultural origin that are renewed over time and can be virtually inexhaustible;

• ***sustainable***, because biomasses in their lifetime have incorporated carbon that is contained in the atmosphere: its consumption does not release the carbon sequestered in fossil sources fields, with almost no additional greenhouse gas emissions; and, if produced according to the principles of "biogas done right"[1], it helps to significantly reduce emissions in the agricultural sector, where they account for over 14% of total emissions[2] (in Italy 7%); because its production can take place while preserving biodiversity and the carbon storage function performed by forests and farmlands.

Its use can take place in a way that is:

• ***flexible***, because it can be used in every energy uses, from the production of heat and cold to the generation of electricity, and as a fuel in the transport sector; it can even become a raw material for the production of biomaterials and biochemicals ;

[1] See for instance "*Biogasdoneright and soil carbon sequestration*" www.consorziobiogas.it

[2] IPCC Mitigation Report , April 2014

• ***programmable***, being similar to natural gas it can fully utilize the gas infrastructures (transport and storage), allowing its supply to being available to different and changing territorial and temporal demand conditions in all consumption sectors;

• ***efficient*** in terms of energy conversion into electricity thanks to a CCGT fleet among the most modern in the world, as well as being available for a safely and efficient use in the distributed generation.

Its production can take place in a way that is:

• ***compatible*** with the food supply chain thanks to technical and farming practices that do not negatively impact on food availability as they are based on by-products, on manure crops from marginal lands not suitable for food production or based on crops integrated into food crop rotations that can also bring additional environmental benefits;

• ***useful*** to the development of a competitive and environmentally friendly agricultural sector by enhancing significantly soil fertility, increasing soil utilization, reducing the cost of treatment of livestock manure and by-products of primary processing of agricultural products, diversifying farmers' end markets thus improving their creditworthiness;

• ***multifaceted***, being based on a multiplicity of substrates originated in the agricultural, agro-industrial, urban and industrial waste sectors. Technological progress in thermochemical gasification of forest biomasses can in the medium term further expand the range of organic materials that can be exploited, also using the converted carbon fraction of CO_2 contained in biogas in the production of non-biological bio-syngas[3], almost doubling the production of methane product per unit of biomass used;

• ***efficient*** in land utilization given the maximization of land energy yield so limiting the recourse to monocultures for the production of energy crops.

A natural gas transport, storage and distribution system among the most developed and interconnected in the world can guarantee its delivery to consumers and sustain in the future an active cross-border trade.

[3] See further "Power-To-Gas"

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Biomethane and the power sector

Biomethane, as a primary energy source for power generation, can potentially enable a decarbonisation path of the electricity sector at an overall lower cost than with the sole further penetration of mostly intermittent renewable sources such as wind and solar.
This is because such a path:

- can be pursued by using already available infrastructures (power plants combined cycle; transport networks, storage systems and distribution networks of gas transmission and distribution of electricity);

- allows the achievement of significant economies of integration between gas and electricity systems at the planning stage, minimizing the need for additional costs for the transmission and storage of electricity that the prevalence of non-programmable renewables would otherwise require;

- enables a further optimization of the electrical system by virtue of a distributed generation systems that could be integrated within the dispatching system (as biogas plants can allocate the biogas both to electricity and to biomethane production, they can constitute a programmable asset).

Biomethane and the transport sector

Biomethane can contribute to the decarbonisation of the transport sector as it is a biofuel based on advanced technologies and domestic biomasses.
Furthermore, as it is produced almost exclusively within the borders of the European Union, it allows a much easier and reliable verification of its effective and overall sustainability thanks to rigorous and independent auditing schemes approved and monitored by the European Commission, so reducing dependence on biofuels produced in areas of the world where biomass production shows critical aspects regarding both the preservation of biodiversity (and natural carbon sink) and the impacts on the food supply.

Biomethane and the carbon value

As to the relationship between decarbonisation and use of biomethane, the European directives that establish and regulates the Emission Trading System (ETS) and the related implementing regulations clearly state that biomethane is a renewable source with zero emissions and that its consumption, even in co-combustion with fossil gas, relieves the relevant subject from the obligation of submitting of Emission Unit Allowances (EUAs) equivalent in terms of avoided emissions.

In addition, the same legislative package clearly state that the **Guarantee of Origin** of biomethane is a sufficient evidence to prove the renewable origin of the gas withdrawn from the gas network: in this regard the establishment of a Register of Guarantees of Origin would create a link between biomethane and the ETS.
The above should in any case be accompanied by the implementation of a complementary mechanism to the ETS that should generate a floor price for carbon: in fact, the Emission Trading System established by the European Directive 2003/87/EC over the last years has been characterized by a huge oversupply of EUAs caused by the fall in energy demand following the economic crisis which started in 2008.
There is convergence of operators' expectations that the ETS reforms will not deliver a significant rise in the price of emission allowances until after 2020.
The national energy policy, following the example of the British and French governments, should therefore consider the possibility of establishing a complementary mechanism to the ETS in order to set a carbon floor price (if this cannot be rapidly achieved at a EU level).

Biomethane in a Life-Cycle Assessment approach

The contribution of biomethane to decarbonisation is not limited to the phase of energy consumption. Its production process makes available a number of other products, by-products and services that can lead to a reduction of greenhouse gas emissions. In particular:

• digestate is used as organic fertilizer and soil improver, enhancing productivity of agricultural land and its ability to retain emissions by acting as carbon sinks. To this end it must be recalled that biogas implemented according to the principles of "biogas done right" not only allows the production of additional carbon without reducing the production of carbon markets for Feed and Food, but allows, through increased amounts of organic matter to land, a substantial effect of storage as recently brought to the attention of the COP21 by the French Government. This form of biogenic CO_2 storage, which applies well-known sequestration technologies (agronomic practices related to the increase of organic fertility of the land), can immediately help removing carbon from the atmosphere and, in the future, be complemented with geological sequestration technologies not economically viable today;

• the use of products and waste originated in the agribusiness and forestry as a starting substrate for the production of biomethane avoids the emission of greenhouse gases that otherwise would be produced and emitted by the natural fermentation of organic matter; the same applies to urban organic waste;

• as biogas technology is efficient even on a small scale, it can be essential (for single farms or consortia) to reduce the impacts of agriculture in terms of both greenhouse gas emissions and other types of emissions (leaching of nutrients to water bodies, manure, etc.) and simultaneously increase the competitiveness of farms in their traditional activities aimed at the reduction in

production costs (reducing the use of chemical fertilizers, increased use of land) and in operating costs of manure, etc..

Biomethane and the integration with other technologies

The biomethane chain shows considerable potential for integration with other technologies that will – once developed in terms of economic efficiency - further contribute to the decarbonisation of the country:

- ***Power-to-Gas***: electricity production surpluses from intermittent renewable sources such as wind and solar can be converted into a bio-syngas thanks to the CO_2 naturally available in biogas;
- ***Carbon Capture and Storage***: the Carbon Capture and Storage technology applied to the consumption of biomethane can remove carbon from the atmosphere. The V UNFCCC Report on Climate Change has emphasized the potential role that the capture of biogenic CO_2 could have in the long run as a *carbon negative* measure (BECCS - Bioenergy with carbon capture and storage).

An agenda for biomethane

Of particular importance will therefore be the set-up of policy measures aimed at creating a stable regulatory framework to promote the sound development of the industry. In particular it's important to:

- redefine the timing for accessing the support scheme for biomethane projects, considering the delays registered in the definition of technical regulation necessary to inject it into the gas network;

- establish, for the year 2030, a target for biomethane of at least 10% of total grid injection, given that Italy can produce in a sustainable way about 8 billion cubic meters of biomethane, only considering the technology of anaerobic digestion of agricultural and waste matrices;

- update the existing national legislation on advanced biofuels (MD 10 October 2014) in line with the provisions introduced by the Directive (EU) 2015/1513 in force from October 2015;

- establish a carbon accounting system to quantify the role played by agricultural enterprises in the absorption of CO_2 at different stages of the production of biomethane; that would also be useful for a re-definition of the support scheme according to a Life-Cycle-Assessment approach;

- establish a Register of Guarantees of Origin of biomethane, allowing the development of an active market trading that could reveal the economic link between biomethane and avoided carbon emissions;

- reform the market for biofuel consumption certificates in the transport sector (CIC - *Certificati di Immissione a Consumo*) aimed at enhancing transparency in the transactions and therefore in price formation;

- establish a mechanism to set a minimum price for carbon (Carbon Price Floor) that complements the Emission Allowance Unit price that forms on Emission Trading System.

The impact of biomethane on the Italian economy

Finally, the potential contribution of biomethane to the economic growth of the country should be duly considered. Biomethane is a resource obtained from a plurality of production processes and from different sectors and makes it possible to develop a production process characterized by economies of scale, variety and integration with positive effects on the economy in terms of technological innovation in the manufacturing, agricultural and urban public services sectors.
The development of the biogas–biomethane value chain can bring many positive spill-overs in several industrial branches in which Italy already express a strong presence in international markets.

The experience gained so far clearly demonstrates that the development of bio-energies has outperformed any other renewable sources in terms of financial and employment benefits.