

## D2.2 | Interim Report on Networking & Cooperation



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| <b>Author(s):</b>          | <i>Stefano Proietti (ISINNOVA), Franz Kirchmeyr (AKB), Marie Verney (ATEE), Frank Hofmann (GBA), Kornel Kovacs (HBA), Carlo Pieroni (CIB), David Collins (REA)</i> |
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| <b>Coordinator:</b>        | Stefano Proietti, ISINNOVA   |
| <b>Tel:</b>                | 0039 063 212 655   |
| <b>Fax:</b>                | 0039 063 213 049   |
| <b>E-mail:</b>             | <a href="mailto:sproietti@isinnova.org">sproietti@isinnova.org</a>   |



**Table of Contents**

BIOSURF in a Nutshell ..... 3

1. Introduction and Structure..... 4

2. Activities of the Biogas/Biomethane Associations in the Project Countries..... 5

    2.1 Austria ..... 5

    2.2 France ..... 6

    2.3 Germany..... 7

    2.4 Hungary..... 8

    2.5 Italy..... 11

    2.6 United Kingdom ..... 13

3. Inter-Association Cooperation..... 16

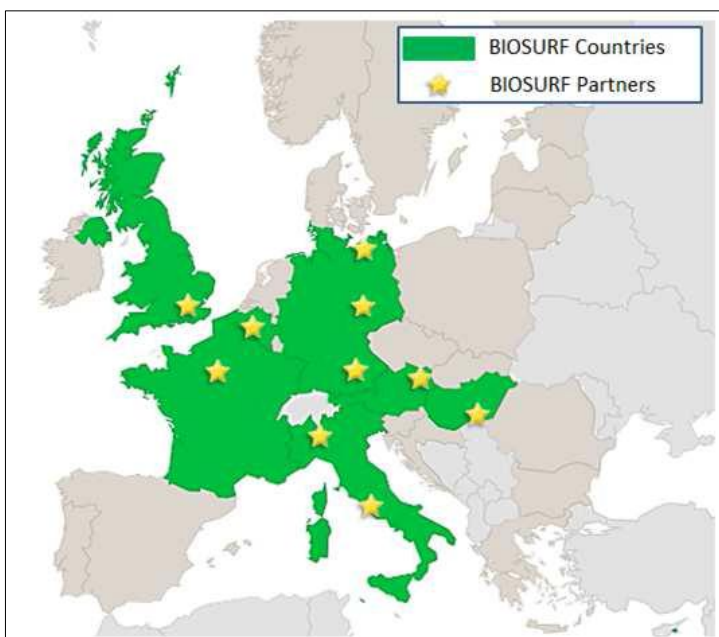
4. Intermediate Lessons and Conclusions..... 51



## BIOSURF in a Nutshell

BIOSURF is an EU-funded project under the Horizon 2020 programme for research, technological development and demonstration.

The objective of BIOSURF (BIOmethane as SUstainable and Renewable Fuel) is to increase the production and use of biomethane (from animal waste, other waste materials and sustainable biomass), for grid injection and as transport fuel, by removing non-technical barriers and by paving the way towards a European biomethane market.



The BIOSURF consortium consists of 11 partners from 7 countries (Austria, Belgium, France, Germany, Hungary, Italy and United Kingdom), covering a large geographical area, as indicated in the figure on the left.

The intention of the project is:

- To analyse the value chain from production to use, based on territorial, physical and economic features (specified for different areas, i.e., biofuel for transport, electricity generation, heating & cooling);
- To analyse, compare and promote biomethane registering, labelling, certification and trade practices in Europe, in order to favour cooperation among the different countries and cross border markets on the basis of the partner countries involved;
- To address traceability, environmental criteria and quality standards to reduce GHG emissions and indirect land-use change (ILUC), as well as to preserve biodiversity and to assess the energy and CO<sub>2</sub> balance;
- To identify the most prominent drivers for CO<sub>2</sub>-emissions along the value chain as an input for future optimization approaches and to exchange information and best practices all across Europe with regard to biomethane policy, regulations, support schemes and technical standards.

# 1. Introduction and Structure

**BIOSURF** consists, in WP2 (**Networking and Cooperation**), of a continuing stimulation, by the biogas/biomethane national associations and networks that partners of the project, of the full biomethane chain (decision makers, industry and the larger civil society) through a regular schedule of meetings, workshops, public conferences, awareness and technical events that are expected to inform on and boost the biomethane market.

Within WP2, BIOSURF will engage actors that are in the position to make a significant breakthrough in the development of biomethane. This involves creating the conditions and the specific opportunities for widespread networking, cooperation and participated debate, with the aim to consolidate the knowledge produced by the partners, by sharing it with the world of stakeholders and collecting from them inputs to be reflected within the project's products. This is done through the consolidation/enlargement of biogas national associations of stakeholders, with both national and inter-national tasks.

WP2 has a dual dimension, as it operates throughout the project's countries, and holds international sessions involving the whole group of networks on a rotating basis between the countries. Similarly, WP2 maintains an internal work plan and concurrently interrelates with the other project WPs, particularly WP8 for communication and dissemination activities and WP3, WP4, WP5 and WP6, whose knowledge improvements bear considerable weight on the success of the engagement effort of the networks.

D2.2 Intends to provide an intermediate update on networking and cooperation activities of the biogas/biomethane associations in the project countries.

**Section 2** defines the modalities and tools to operate the associations and networks in each of the project countries for the aims of the project. It also contains details on the meetings and the activities so far undertaken as well as on the stakeholders involved in such activities within the project and some intermediate lessons concerning each country.

**Section 3** provides details concerning the inter-associations cooperation, with particular focus on the inter-associations workshops.

**Section 4** contains some intermediate conclusions at project level, as a result of lessons coming from all activities related to the different associations of project countries.

## 2. Activities of the Biogas/Biomethane Associations in the Project Countries

### 2.1 Austria

#### 2.1.1 Approach and methodology

Austrian Compost & Biogas Association has a traditional partnership to natural gas industry in Austria due to its cooperation within the first biomethane upgrading installation in Upper Austria in 2005. Within BIOSURF, and already before, an ongoing process of cooperation started with nearly all needed stakeholders in the sector of biogas and energy:

- Federal ministry of commerce (BMWFW)
- Federal ministry of environment (BMLFUW)
- Natural gas industry (OMV, EVN, Salzburg AG, TIGAS, Energie AG, Energie Stmk)
- Österreichs Energie
- Scientific institutions (BOKU, TU Vienna, Energieinstitut Linz, Uni Innsbruck, TU Graz)
- E Control
- Chamber of gas and heat (FGW)
- Chamber of agriculture (LKO)
- Austrian gas clearing & settlement (AGCS)

The cooperation, information and exchange is done by different ways but mostly by direct contact within meetings, phone calls or at workshops/conferences.

#### 2.1.2 Activities within BIOSURF

##### **First BIOSURF workshop**

Within the first Austrian biomethane race our association organized the first workshop on 19th of June 2015 in Rechnitz. As this time plant operators using mainly organic waste streams were invited, the main topic was the potential of organic waste and possible markets for biomethane. 15 plant operators followed our invitation and discussed deeply how to proceed bringing biomethane to market. Rechnitz was chosen because it is a very good example for different developing steps within biowaste treatment and application. At first stage the plant operator started collecting biowaste, then installed the biogas plant with a CHP and selling the electricity under the Eco electricity act (Ökostromgesetz). The next step was then building the upgrading unit and buying new collecting lorries fueled with biomethane.

##### **Second BIOSURF workshop**

On 3rd of December 2015 we organized a Workshop on biomethane within our national conference held at federal chamber of Commerce in Vienna. The intention of this WS was to bring biomethane producer, natural gas industry and state experts together to discuss the future role of the natural gas grid within future energy supply and the importance of the shift to renewables in general and also for the natural gas grid. 80 persons, mainly coming from gas industry, experts within state authorities and plant operators, followed our invitation and discussed how to overcome the actual nearly stand

still in biomethane installations and how to bring more attention to the second important energy transport grid within the climate and renewable targets.

### Other activities

- During the “BIO Austria”, a state fair in Lower Austria held 15th to 16th of November 2015, we informed consumers how energy and organic fertiliser can be produced from source separated organic waste.
- In several bilateral meetings with FGW, BMLFUW, AGCS, UBA and natural gas industry (TIGAS, Salzburg AG, Energie AG, Österreichs Energie and OMV) we discussed the possibilities how to integrate biomethane into markets. As outcomes we expect a further development of the Austrian Biomethane registry and cooperation with UBA who is responsible for biofuel register. With the natural gas industry we discussed two specific projects in Salzburg and Tyrol which hopefully will be implemented. With Österreichs Energie, FGW, E Control, Energie AG and OMV we discussed in bilateral meetings the future role of the gas grid and possibilities of biomethane use in bigger GuD plants.

### 2.1.3 Intermediate lessons for Austria

Although there is a very good and positive cooperation between gas industry and the biogas sector, the gas grid with its opportunities for climate targets and shift to renewables is not seen by politicians and state experts. Therefore much effort is needed to convince that without the shift to renewables within the gas grid a major energy carrier will be lost in future. This will happen also in the highly populated urban areas where so far the shift to renewables nearly did not take place.

There was a big concern coming up against biogas from energy crops in Austria. Therefore plant operators, in cooperation with universities and companies, started to search for other substrates and started developing the use of catch crops and agricultural left overs as straw. This development is a positive process, but for sure it needs more time and effort.

## 2.2 France

### 2.2.1 Approach and methodology

ATEE Club Biogaz promotes biogas and biomethane development in France. ATEE Club Biogaz is part of the “Injection” working group steered by the French Ministry for the Environment and GRDF which meets every month to discuss biomethane news and issues. ATEE Club Biogaz made a presentation on BIOSURF during the last meeting. The members of the “Injection” working group are:

- The French Ministry for the Environment and Energy (MEEM – DGEC)
- The Energy Regulation Commission (CRE)
- ADEME
- Natural gas actors (GRDF, TIGF, GRTgaz, Engie, Réseau GDS)
- Civil society and industry representatives (Club Biogaz ATEE, RAEE, SER, FNADE)

### 2.2.2 Activities within BIOSURF

The official adhesion of ATEE to the BIOSURF project happened only in June 2016, so activities will be organised in the remaining period of the project.

### Other activities

Club Biogaz has recently signed a letter to the Ministry asking to change and upgrade the decreasing tariff applicable to biomethane when installations are already producing biogas and recovering it as electricity. Club Biogaz ATEE met with GRDF in July 2015 to discuss biofuels and taxation applicable to biofuels. Club Biogaz will also meet with national authorities to discuss these issues.

Club Biogaz informed the French Ministry for the Environment about the BIOSURF project. Club Biogaz will also meet with the Ministry to discuss the recognition of bioNGV as an advanced biofuel and its eligibility to reduced taxation.

Club Biogaz ATEE attended EBA's monthly phone calls on the legal and political framework of biogas production, as well as calls on more specific topics such as the fertilizer regulation. Club Biogaz ATEE wrote contributions for EBA's draft position on the fertilizer regulation.

### 2.2.3 Intermediate lessons for France

The national authorities are rather not in favour of the possibility to exchange biomethane with foreign countries, at least until the sector is structured and has reached a sufficient development. Moreover cross-border biomethane trade could be questioned in the view of the circular economy principles, where proximity of production and consumption should be prioritised.

## 2.3 Germany

### 2.3.1 Approach and methodology

The biogas and biomethane production is well established in Germany. End of 2015 almost 9,000 biogas plants thereof about 170 biomethane plants with an installed capacity of above 4 GWe<sub>el</sub> were in operation. This development was mainly triggered by attractive Fee-in Tariffs (FiT) for electricity generation. For several reasons the FiT was lowered for big installations using energy crops in 2012 and especially since the latest FiT from 2014 biomethane production for electricity usage is not attractive in Germany anymore. Biomethane for transport is also stagnating in Germany. Additional the discussion on limiting the use of energy crops made stakeholders hesitant to search for new big biomethane projects.

In essence the production of biomethane is focused on existing biogas plants but the interest in new installations is very limited. As a result it is not easy to keep stakeholders interested in that topic.

However, GBA tried the best to keep stakeholders interested in the theme biomethane production and trade with the following media:

- GBA companies newsletter
- Bioges/biomethane events, conferences and fairs
- BIOSURF workshops
- One to one discussions
- Workgroups



### 2.3.2 Activities within BIOSURF

#### First BIOSURF workshop

The first BIOSURF workshop was organized, in collaboration with the European Biogas Association, in February 15th 2016 in Nürnberg (with 24 participants), in conjunction with the Biogas Convention 2016 (which took place in Nuremberg on 16-17 February). The workshop was dedicated to Work Package 3 of the BIOSURF project, with focus on the administrative barriers hindering the cross-border trade with biomethane in Europe. Representatives of national biomethane registries, national biogas associations, companies involved in biomethane production, certification and trade, companies supplying anaerobic digestion and biogas upgrading technologies attended the meeting. The participants shared the view that there was an urgent need for enabling free movement of biomethane through the European natural gas network and supported the initiative formulated in Deliverable 3.2. of the BIOSURF project which included:

- approaching the European Commission with the request to recognise the European natural gas network as a single logistical facility with the regard to biomethane distributed over the system (blended with natural gas),
- organising a “non-typical” voluntary certification scheme under the provisional name: European Biomethane Certification Scheme (EBCS).

#### Other activities

- Company newsletter: in several issues of our newsletters (the company newsletter has about 25 issues per year and is sent to about 600 biogas companies and other stakeholders) we informed our members about actual market developments and activities within the BIOSURF project.
- GBA discussed about biomethane in several one to one and working groups events. Activities of Sandra Rosteck, Rene Walter, Stefan Rauh, Frank Hofmann. In sum about 30 meetings with Biogas or renewable energy Associations, stakeholders, political decision makers and manufacturers.

### 2.3.3 Intermediate lessons for Germany

Presently biomethane is not an actual topic on the agenda of the biogas scene in Germany. However we see a good potential to bring the topic back to the discussion if biomethane trade would be established in the EU and if biomethane is used as transportation fuel (in the past many biogas stakeholders focused on electricity production).

## 2.4 Hungary

### 2.4.1 Approach and methodology

The Hungarian Biogas Association is a very diverse group of stakeholders comprising partners interested in the production and use of biogas and biomethane. Among them, there are technology providers, representatives of research institutes and educational centers, local governments as well as present or prospective investors and biogas facility operators, both in the form of companies and individuals.



Each members of HBA, who expressed interest to be involved, is kept informed about the progress of the project and subsequent meetings via HBA newsletters and materials posted on HBA homepage ([www.biogas.hu](http://www.biogas.hu)). The Presidium of HBA has regular meetings where relevant subjects are discussed and there are workshops and national biogas conferences to disseminate information. As part of these personal meetings, participants have the opportunity of open discussion with invited speakers and other guests as well as with other stakeholders.

### 2.4.2 Activities within BIOSURF

#### First BIOSURF workshop

A 2-day workshop on “Biogas in Hungary and in Europe” was organized in Kecskemét on April 23-24, 2015, with 82 participants. The meeting comprised Hungarian and European presentations (in English) with simultaneous interpretation. The workshop program included site visit at a biogas plant and the General Assembly meeting of HBA.

The topics covered:

- Renewable energy policy and support schemes in the 2015-2020 period in Hungary.
- Future directions and technical developments in the European biogas/biomethane industry.
- Experiences concerning the operations of the Hungarian biogas plants.
- Vision of the future of the Hungarian energy industry based on renewables.
- The status and future possibilities for gaseous fuel transportation in Hungary.
- The achievements and future development of the biogas and biomethane plant of Magyar Cukor refinery.
- The Biogáz Unió Corp. – biogas technology developed by a Hungarian company.
- Biogas production and utilization at waste water treatment plants.

The meeting was also attended by several companies displaying their products and/or technologies on posters. Stakeholders included decision and policy makers, industries, research institutions, representatives of other NGOs and biogas plant operators.

#### Second BIOSURF workshop

A workshop was organized under the umbrella of the National Agricultural Chamber (NAC) in Nyírbátor, on September 11, 2015, with 40 participants.

The central topic of the workshop was the formation and launching of the Renewable Energy Branch within NAC. Many of the 40 biogas plants, where biomass of agricultural origin is treated belong in the NAC, their plans, problems and suggestions were openly discussed during the meeting.

#### Third BIOSURF workshop

A third event was organized by HBA at the Hungarian Energy and Public Utility Regulatory Authority (HEPURA), a government agency supervising the energy and utility sectors at national level (with 25 participants). The meeting took place in the HEPURA headquarters in Budapest on December 3, 2015.

The aim of the workshop was to discuss regulatory issues related to biomethane use and implementation in Hungary and establishment of the Hungarian Biomethane Registry according to the BIOSURF recommendations.

The topics covered:

- Legal, technical and administrative tasks for the injection of biomethane into the natural gas grid.
- Production of “green electricity” from biogas in natural gas fuelled power stations.
- Biomethane for transportation fuel.
- Possibilities and benefits of the planned Hungarian biomethane register.

Following a constructive discussion with HEPURA experts, recommendations were formulated for further discussion on biomethane registry.

### Other activities

Co-operation within the HBA network was not only limited to the meetings and workshop events. During the implementation of the objectives and tasks of the BIOSURF project, special attention is paid to contacts with various renewable energy networking partners, seeking their advice and consultation related to biogas/biomethane production and utilization. HBA participated in numerous discussions and public consultations on regulations on digestate, disposal or organic waste, collections of source separated household waste, conceptual development of priority areas for green economy in Hungary.

### 2.4.3 Intermediate lessons for Hungary

The first lesson deals with the creation of a constructive discussion with a “mixed” group of stakeholders. The expertise and the professional aims of the different stakeholders vary widely. Representatives of public and planning authorities (mainly at energy, environmental and agricultural level), farmers, biogas companies and consultancies, research and training institutions, waste management companies and so on can make the difference in promoting the final aims of the project.

A second lesson is that in Hungary biogas/biomethane is far from being commonly known: in the last five years the attention towards this solution both from farmers and waste managers increased, but still remains difficult in realizing examples of facilities using this technique for the treatment of biomass. The primary technology for biomass waste disposal is still composting and/or incineration. Biomethane is seen as an interesting novelty but stakeholders are still waiting for national decisions, rules and incentives on it and these motivations are still missing. More thorough dissemination of the information is needed particularly among biogas operators and the general public.

Another lesson comes from the way of communication. This can be partly due to the farmers who are not very familiar with e-mail correspondence and information mining on the internet because they do not use it every day. This lesson will require much attention to be paid to live consultations at personal or group level.

It has been a positive experience that professional energy experts at HEPURA are very supportive in creating a Hungarian biomethane registry and promoting biomethane production and trade by administrative and regulatory measures.

### 2.5 Italy

#### 2.5.1 Approach and methodology

The biogas sector in Italy is well developed. Currently there are about 1,800 biogas plants representing the second biogas market in Europe. Italy is also the leader for what regards natural gas vehicles and has one of the most developed natural gas grid, but currently there are only 5 biomethane plants, with 3 of them being small pilot plants and none of them injecting biomethane in the natural gas grid. The main reason that explains such delay in the biomethane sector development is that the regulatory framework for biomethane in Italy is not completed yet.

As CIB we work regularly to develop the biomethane market in Italy contacting political authorities and stakeholders. We support and organize several meetings and events to support biomethane sector, some examples are:

- Newsletters to CIB members (about 600 members representing the 50% of biogas agricultural sector)
- BIOGAS INFORMA, a magazine written and managed by CIB on biogas and biomethane sector available for free on CIB's website and distributed in the most important events and fair in Europe and sent by emails to our members
- workshops on biomethane and BIOSURF project
- Organization of fairs and events on biogas and biomethane
- Private meetings with stakeholders

#### 2.5.2 Activities within BIOSURF

##### First BIOSURF workshop

The workshop takes place in Lodi on the 13/03/2015 and there were about 30 stakeholders. During the workshop with stakeholders (mainly agricultural biogas plants owners) was explained the normative framework for what regards biomethane in Italy and explained them the objectives of biosurf project. At the end of the workshop we asked them their point of view on the project's objectives.

##### Other Activities:

A first meeting with grid stakeholders was organised in Bologna on the 21/05/2015 and there were about 30 stakeholders.

The main themes discussed during the meeting are:

- **delibera 46/2015/R/gas**, "Guidelines for systems connections of biomethane to natural gas networks and provisions for determination of the amount of biomethane eligible for incentives", the Authority for Electricity, Gas and water System fixed the rules for the connection of plants producing biomethane to natural gas networks, to which network operators have to adapt their network codes, and regulations relating to determination of the amount of eligible biomethane incentives.
- Situation at European level for what regards the European standards for the injection biomethane in the natural gas grid (CEN TC 408). The CIG tried to solve this situation in Italy with the technical rule UNI TR 11537 (**rappporto tecnico UNI TR 11537**).

The aim of the meeting is to facilitate the encounter of all the stakeholders finding all the barriers/problems and trying to find a common solution.

A The meeting on biomethane as advanced biofuel was organised in Bruxelles on the 27/05/2015 and there were about 100 stakeholders.

The event was a great opportunity to revisit the virtuous circle of biomethane and its benefits, with reference to European policies for sustainable mobility. It also presented an important occasion for the principal representatives of European institutions and industry to come together.

A second meeting with grid stakeholders was organised in Bologna on the 10/09/2015 and there were about 350 stakeholders. The main topics were the available technologies on the market and Future actions for the Coordination of biomethane in Italy.

A biomethane event was organized on 04/11/2015 in Rimini by the Italian Biogas Consortium during Key energy fair for the industries to present the opportunities of the biomethane market: from incentives authorizations, through the technologies available on the market up to the opportunities of trade.

A biomethane workshop was organised in Verona on the 04/02/2016 and there were about 70 stakeholders. The topics addressed concerned the most important rules regulating the biomethane production in Italy, how works the support scheme and how to obtain the permission to construct the biomethane plants and how to obtain subsidies. There were also several speeches of biomethane suppliers that explained their technologies and showed several case studies underlining the business plan and the technical configurations of the plants.

A third meeting with stakeholders was organised in Rome on the 25-26/02/2016 and there were about 450 stakeholders in the first day and 70 stakeholders in the second day.

Biogas Italy, was an International event for manufacturers, researchers and institutions, sponsored by the CIB, Italian Biogas Consortium. The two-day, was opened by the “Stati generali del Biogas 2016”, which was attended by numerous representatives of the institutions, the world of national and international scientific research, environmentalism, industry. The CIB, Italian Biogas Consortium, Snam ( manager of the Italian natural gas grid) and Confagricoltura presented a manifesto of support to the chain of Italian biomethane. The document, addressed to the Government and the European Commission, highlights the strategic role of biomethane in the energy transition towards an economy based on sustainable use of resources and circularity. The poster highlights the need to draw up an agenda for biomethane in order to redefine the time interval for access to incentives; the provision of an annual target of biomethane to be fed in by 2030; the update of the national legislation in the field of advanced biofuels in line with the Directive ILUC and the provision of a system that enhances the role of the biomethane production chain in the CO2 reduction strategy.

### 2.5.3 Intermediate lessons for Italy

The first meeting with national authorities focused on the possibility to import or export biomethane in/from Italy was not encouraging. National authorities underlined that will not be possible to import biomethane from foreign countries until the Italian biomethane market will be not structured.

The only approach to favor the creation of an international biomethane market is to proceed in a way that ensures the possibility to develop the national biomethane sector. Based on the above described reasons:

- The Biomethane imported in Italy does not be supported by the Italian support scheme;
- The Biomethane imported in Italy will not interfere in any way with the fulfilment of the obligations under European and national legislation, for what regards the introduction of biofuels for producers of fossil fuels;

- To create a market of biomethane in Europe in which only countries that have already an important biomethane sector will enter immediately. Then there will be a period of 3-4 years for countries that do not have yet a solid biomethane industry to start the biomethane chain nationally, before entering into the European market of biomethane;
- An alternative solution proposed by several stakeholders, even if is not totally in conformity with the BIOSURF project, is the possibility to adopt the method of reciprocity for the cross-border biomethane trade: in this case Italy could import only the same quantity, measured for example in MWh, of biomethane that it exports towards foreign countries;

The current opposition of the Italian stakeholders is not the only problem that we have to solve in the next months. In Italy there isn't yet any biomethane register. Our role as CIB until the end of the BIOSURF project will be at first to create a biomethane register in Italy and then try to find a solution with Italian stakeholders that will match also BIOSURF objectives.

## 2.6 United Kingdom

### 2.6.1 Approach and methodology

Meetings with REA Biogas members every two months. The meetings are normally attended by between 30 and 50 members who represent many different types of company as well as individual members. These include:

- Plant operators
- Farmers
- Equipment suppliers
- Financial companies
- Lawyers
- Waste contractors
- Government officials
- Gas Network Operators
- Transport operators

### Regular members emails

Every two weeks a news e-mail is sent to members – the mailing list is about 350 addresses. This gives an update on BIOSURF from time to time when there are developments.

### Bi-monthly Biogas Report

Before every REA Biogas meeting a comprehensive report is written on all the current issues relating to biogas and biomethane. BIOSURF news is included in this. The report is discussed at the biogas meetings and circulated to all members.

### Specific Events

A one or two day biomethane conference is held every year in April or May attracting around 300 people. All the issues relating to BIOSURF are covered to provide an update on the UK biogas industry and the European context.

### 2.6.2 Activities within BIOSURF

A **first biomethane Conference** was held in Birmingham on 15<sup>th</sup> and 16<sup>th</sup> June 2015. During the two days the topics addressed concerned market update, transport, gas grid networks, food waste projects, BIOSURF and the wider European market, innovation, sustainability and green gas certification. 275 delegates attended. There was a BIOSURF stand with information and the conference was opened with an address by President of EBA, including the BIOSURF project.

A **second Biomethane Conference** was held in Birmingham on 20<sup>th</sup> April 2016. 310 delegates attended. There was an opening presentation from EBA which covered the BIOSURF project and the development of Biomethane in other countries in Europe. Other topics included changes to sustainability requirements, thermal production of biomethane, policy and incentives relating to injection and transport, green gas certificates, trading and details of newly constructed plants.

#### Other activities

Green Gas Certification Scheme Panel meets every 3 months to discuss the GGCS and gets an update on BIOSURF

Specific experts meetings for small numbers (3 to 8) on specific technical issues relating to biomethane injection are also organised. Subjects include CV of gas, grid entry agreements, entry to medium pressure systems etc.

### 2.6.3 Intermediate lessons for UK

Concerning communication with the biogas industry, it was found that using a mass email was not a very effective way of getting responses - it was far better to select a smaller number of stakeholders and contact them on a personal basis.

We have found that the most effective way of reaching the right people is to include BIOSURF presentations and information within an established format that is already attracting a good attendance from the industry. For instance the inclusion of BIOSURF updates within regular two monthly biogas meetings has been a success. Likewise, an established biomethane conference is a good vehicle for informing the industry and for presenting the findings of work packages for comments.

During periods of major political change, such as the UK has experienced over the past months, potential influence on government officials is reduced; this is because they are not permitted to engage in outside activities whilst political change is underway. The Department directly involved in renewable energy, DECC, has just been closed by the new government, and moved to a new department called Business, Energy and Industrial Strategy. This is seen as a downgrade for renewables. New contacts will have to be made.

In addition, the UK has experienced severe cuts in subsidies for renewable energy, and in this context care has to be taken to promote and explain those technologies which have a future in the

short term. Biomethane injection is still considered a success story in the UK, more so than electricity generation from CHP. BIOSURF has played a part in keeping biomethane injection within the government plans for the future.



### 3. Inter-Association Cooperation

The associations and networks in each of the project sites have been given the opportunity to regularly meet up in ad-hoc inter-association workshops to be held alternately in each BIOSURF country according to the consortium meeting rotation.

These sessions represent a crucial discussion venue where people from different backgrounds but with similar agendas will meet face to face. The cooperation concept animating this activity calls for inter-association meetings arranged as follows:

| Host  | Participants  | Concrete Activities   |
|---|---|---|
| Rotation involving: <ul style="list-style-type: none"> <li>▪ AKB</li> <li>▪ CIB</li> <li>▪ ATEE</li> <li>▪ HBA</li> <li>▪ REA</li> <li>▪ GBA</li> </ul> | <ul style="list-style-type: none"> <li>▪ Hosting association: all interested stakeholders</li> <li>▪ Visiting networks: the BIOSURF partners</li> </ul> | <ul style="list-style-type: none"> <li>▪ Open discussion of priority topics</li> <li>▪ Transfer of experiences</li> </ul> |

Each six-monthly consortium meeting are integrated with a half a day inter-association workshop with the aim to provide, mainly to stakeholders of the hosting country, updates on the entire project and on the activities of the other associations within the project.

#### **First Inter-Association Workshop (Wien, 27 February 2015)**

On the 27 February 2015, the first BIOSURF Inter-Association workshop was held in Wien, Austria, with 40 participants.

Welcome message from **Franz Kirchmeyr** (AKB) and introduction to the workshop by **Stefano Proietti** (ISINNOVA).

**Jan Stambasky** (EBA) presented the state of the art of biogas industry throughout Europe, in terms of production (m<sup>3</sup>), number of plants and installed capacity (MW).

Countless are the uses of biogas and this makes it an important sustainable resource on different aspects: it allows the decentralization of energy production, can be aimed at different uses (heat, electricity and fuel for transportation), allows a better waste management, contributes to GHG savings, etc.

Due to its multifaceted nature, there are many opportunities that biogas can offer, including the use of natural gas distribution and storage systems, a new geographical and commercial dimension made possible thanks to cross-border transactions and, last, the increase of its use in transport.

It is then highlighted the problem of energy dependence from Russia and Gulf countries. The development of biogas / biomethane can be a possible solution to the problem.



**Franz Kirchmeyr** (AKB) provided a short presentation on the state of the art of biogas and biomethane in Austria, focusing on the currently feedstock used, mainly coming from renewable resources from agricultural land.

The potential from bio waste, waste from farmland and farm fertilizer must not be neglected and biogas could be the key technology using the left over from previous production steps as food, feed or chemistry production and organic waste.

12 biogas upgrading plants with a capacity of 2400 Nm<sup>3</sup> biomethane are running at the moment. They mainly use bio-waste as feedstock. Additionally energy crops and gas from sewage sludge is used.

Actually, about 180 CNG public filling stations are existing.

- Thereof 3 are directly linked to a biogas plant and upgrading station.
- Thereof about 60 have a blend with biomethane.

Furthermore, in Austria the electricity and gas grids are well developed and they must be taken into account in order to reach the 2050 climate and energy targets. At the moment, we see only a focus on the electricity grid. The gas grid has to be involved into 2050 energy and climate targets otherwise this important energy grid would automatically lose amounts of transported energy and therefore the grid costs would have to be raised and so the gas grid will lose competitiveness. Support to transform the gas grid also becoming more and more renewable is of high importance for the competitiveness of the gas grid on the longer run.

Among the main challenge identified: the change in the used feedstock with a big potential from non-food/feed sources and the need for technology improvements. At the end we see the biogas technique as the end step of cascade use of food, feed bio refinery processes using all kinds of organic matter producing renewable energy and organic fertilizer from their left overs. However, it must take into account some obstacles to overcome: lack of political interest, lack of market demand: few cities with methane busses, few lorries, CHP after grid injection is at the beginning.

**Jean-François Delaitre** (GRCETA) showed the current legislative situation in France concerning biomethane production and National Biomethane Registries.

Overall, in France there are 6 existing upgrading plants injecting into the natural gas grid (4 on agricultural waste/ 2 Bio-waste) producing 70GWh/yr. There are 290 filling stations with 3 options CNG / EcoCBG / BioCBG.

The main barriers in the development of biomethane are identified in the lack of connection between farmers, the public, politicians, waste companies and gas grid operators (GrDF / GrT Gaz); furthermore, delays in terms of funding, production and marketing of the CNG / CBG cars do not help.

To overcome these obstacles, a will to make changes is necessary, the farmers are often conservative, hence a new generation with more enthusiasm is needed.

Cooperation between gas grid operators and taking inspiration from the German Model (maize silage / out Sustainability, growth rate) are important drivers as well as improvement of the coordination between administrations, review French fuel taxes, developing training program.

**Sandra Rostek** (GBA) provides a brief overview on biomethane in Germany.

After being Europe's most evolving market ever since 2007, the market for biomethane in Germany is now stagnating. In 2014, the feed-in tariffs for usage in CHP plants were abolished with the Renewable Energy Sources Act ("EEG 2014") and there is no longer a bonus for upgrade technology and no tariff for energy crops. So, the current biomethane production can continue for the duration of the feed-in tariff grant (20 years). All project planning is on hold because the other markets (heat sector and use as fuel) are growing very slowly and are risky. Currently in Germany, there are 151 feed-in plants in operation producing about 93,650 Nm<sup>3</sup>/h. 46 projects are in the planning phase or under construction (but many to be stopped).

The 90 % of gas is used in CHP plants.

There are about 1,000 methane filling stations in Germany.

- Thereof about 170 offering a blend of biomethane and natural gas
- Thereof 119 are pure biomethane filling stations

Barriers have been mostly identified in:

- The CHP sector: no sufficient compensation according to the Renewable Energy Sources Act;
- Heat market: sole heating applications are hardly subsidized (obligation to use in CHP due to higher CO<sub>2</sub>-reduction);
- Fuel sector: stagnating CNG vehicles sales, new regime CO<sub>2</sub>-Quota bear many risks and uncertainties, lack of transparency at fuelling station totems;
- International Trade: Prohibitive national legislations, lack of EU-wide mass balance system.

Due to the barriers mentioned above, national drivers are rather scarce at the moment, but interest in German biomethane upgrade technology and cross-border trade from abroad is growing.

Several perspectives for development are still valid.

- There is significant substrate potential also beyond energy crops (e.g. organic household waste, manure...);
- The future role of biomethane in the electricity sector will be to provide flexibility to the system (balance fluctuation from wind and solar energy); this role will become ever more important as the energy transition progresses;
- The fuel sector, if ever political attention were to be applied, holds immense potential;
- Independency of foreign gaseous sources might become a more important issue for the EU.

Moreover, the next reform of the Renewable Energy Sources Act is coming up in 2016, auctions are going to be introduced for all renewables by 2016. The government is currently revising the electricity market system as a whole and announced to make major changes to the current design. (Fossile) CHP-legislation is under revision, possibly with a new momentum regarding CO<sub>2</sub>-saving and chances for biomethane.

**Kornél L. Kovacs** (HBA) provided a brief overview on biomethane in Hungary.

In Hungary, biomethane is underdeveloped and political support is limited. This is because the domestic regulations are slow and very bureaucratic and nuclear is preferred at the expense of renewables that are not supported.

As for biogas, less than 5% of capacity is utilized. Several biogas plants from agricultural feedstock and waste water sludge are in operation but only one 1 site producing biomethane exists.

Therefore legal, technical and economic barriers need to be overcome but there are some perspectives of development:

- Studies and detailed analyses on the local benefits from biomethane production (public transportation and utility vehicles), purchase of such vehicles with EU support.
- Advocating social, political and economic benefits in workshops and public appearances.
- Training of experts and operators.
- In collaboration with the natural gas grid operators, the development of conditions to support biomethane based transport.
- Implementation of “best practices” (with the help of BIOSURF project).
- Introduction of research and development results.

**Lorenzo Maggioni** (CIB) provided a short presentation on the state of the art of biogas and biomethane in Italy, focusing principally on legislation, outlining the main barriers and showing the effective potential of investing in this area.

Actually, in Italy, there are 1,300 biogas plants. Only 2 biomethane plants are in operation without connection to the grid. As for transport, Italy holds the first place in the number of NG Vehicles (823,000) and NGV fuelling stations (1,022).

On December 2013, the biomethane decree, which introduces and regulates the incentive system, entered into force and the main technical barriers have been overcome.

The potential of biomethane is not to be overlooked, particularly from the economic point of view: 1 billion cubic meters of biomethane produced per year may involve investments of 4 billion euro.

A realistic development plan of methane/biomethane within 2020 is needed and it should include:

- doubling the fuelling station (from about 1,000 to 2,000);
- doubling current means of transport using CNG (preferably LNG) up to about 2 billion Nm<sup>3</sup> by 2020;
- Increasing biomethane consumption up to 35% of the total consumption, about 700,000,000 Nm<sup>3</sup>/year.

**David Collins** (REA) provided a short presentation on the state of the art of biogas and biomethane in UK.

The Renewable Energy Directive fixed targets for UK, for which, within 2020, the 15% of total energy produced must come from renewable energy sources.

In order to reach these objectives, incentives were made available, in particular the Renewable Heat Incentive (RHI), for supporting heat and biomethane injection (new Incentives are available from 9 February 2015).

Since 2010, the number of projects on biomethane increased exponentially from 1 in 2010 to more than 25 in 2014. According to data and forecasts there will be more than 50 projects before 2016 and over 60 before 2017.

As for transportation, Green Gas Certificates and Funding for NGV are available.

Among the barriers:

- budget restraints and future tariff regression
- availability of waste feedstocks
- the use of crops still under debate

- gas grid capacity
- cost of grid connections/delays
- energy content (CV) of biomethane v grid (propane)
- Sustainability Criteria- in force 5<sup>th</sup> October 2015
  - 60% GHG savings compared to GHG EU fossil heat average
  - Lifecycle emissions of < 125.28 kg CO<sub>2</sub> equivalent (34.8gCO<sub>2</sub>e/MJ) of biomass heat generated
  - Consignment basis – no averaging
  - Waste exempt – emissions up to the process of collection
  - Land criteria requirements to be introduced by April 2015
  - All existing plants will have to comply

UK total gas demand now is around 800 TWh/annum. Biomethane injected by the end of 2015 will be around 2.00 TWh. The maximum potential estimated for biomethane by 2030 is around 20TWh.

**Stefano Proietti** (ISINNOVA) introduced the aims and rules of the workshop, with three parallel sessions based on three groups, according to the following topics:

- What is needed for substantial cross-border biomethane trade in Europe?;
- Sustainable raw material supply for the production of biomethane;
- Assessment of environmental impacts from the production and use of biomethane

**Table 1- What is needed for substantial cross-border biomethane trade in Europe?**  
(moderated by Attila Kovacs, EBA)

The following questions were addressed to the participants and the main outcomes of discussion are reported below:

**1. Why cross-border biomethane trade needed?**

Biomethane can be blended with natural gas at any ratio and – as such – can be distributed all over Europe through the natural gas pipeline network. This enables production of biomethane in those regions of Europe where sustainable biomethane raw materials are available but there is no local market for the product (for any reason). The biomethane produced there should be transported to those parts of the continent where the demand exceeds the volumes which can be produced locally on feasible terms. Thus the cross-border trade is needed to establish and maintain the supply-demand balance on regional and European levels.

**2. Is cross-border biomethane trade needed for enabling 100% load of the existing biomethane producing capacities?**

The existing biomethane producing capacities are small in comparison with the size of the natural gas market and it must be possible to place the volumes within the national borders. Nevertheless, cross-border biomethane trade is absolutely needed to provide a bigger and more flexible market flexibility for future biomethane producing installations.

**3. What should be first: trade system or production?**

The cross-border biomethane trade system should be organised as soon as possible without waiting for substantial increase in biomethane output. The availability of the European biomethane trade system can be considered as a precondition for new, export-oriented investments.

#### **4. Which countries could be the main importers?**

European countries which

- have highly developed biogas industries,
  - are already processing most of the available organic waste materials,
  - have no substantial additional raw material sources for future projects,
  - have no major potential for increasing the output of the food processing industries,
- could be those ones where the demand for biomethane will – temporary or on longer term – exceed the domestic supply.

The development of national biomethane markets depends highly on national policies, which may change over time, the interest to import or export might also arise over time. National governments are not obliged to provide the same financial benefits to imported biomethane as offered for domestic production but may still elect supporting biomethane imports for the purpose of achieving renewable energy/biofuel targets.

#### **5. Which countries would be the main exporters?**

Countries with huge volumes of untreated organic waste with very weak local markets for renewable energy (like PL, RO) and with substantial potential in further development of agricultural production and food processing industry (like FR, IT, ES).

#### **6. Who is interested in developing the cross-border biomethane trade?**

- investors into new animal farms, food processing factories etc.,
- technology and equipment suppliers, including suppliers of biomass gasification technology,
- natural gas industry, natural gas vehicles industry (biomethane contributes to public acceptance and more speedy expansion of use of methane in transportation).

#### **7. Where is the volume potential for cross-border biomethane trade?**

The total biomethane production potential estimated for 2020 is in the range of 6,5 billion m<sup>3</sup>, and at 18 billion m<sup>3</sup> for 2030. Deducting the volumes used domestically and the volumes supplied to customers directly, and further assuming a 40% export share the following cross-border trade volumes can be expected: 2,5 – 3,0 billion m<sup>3</sup> in 2020; 6,0 – 8,0 billion m<sup>3</sup> in 2030. Nevertheless, these forecasts and estimates must be checked and verified in course of the BIOSURF project.

#### **8. What are the key regulatory/administrative preconditions for cross-border biomethane movements?**

- solving mass-balancing on European level;
- international cooperation among the national biomethane registries;
- equal access to support systems for domestic and imported biomethane;
- biomethane to be compared to the European mix of fuels for every application (instead of comparing to natural gas only).
- Involvement of natural gas industry companies and their customers.



**Table 2 - Sustainable raw material supply for the production of biomethane** (moderated by Christoph Neitzel, FNR)

The following key aspects were discussed in the workshop:

1. The main challenges for a sustainable raw material supply for biomethane production;
2. The advantages of producing biomethane from sustainable raw materials;
3. Needed actions to overcome barriers.

The results of the discussions are shortly summarised below:

### 1. Challenges:

*Why is sustainable raw material supply for biomethane production a problem?*

- *Policy*
  - Creation of a reliable climate and energy framework that acknowledges the role of biomethane in the energy mix.
- *Economy*
  - Higher costs of electricity production from bioenergy compared to other renewables (and fossil resources), due to continuous costs for input (substrates);
  - Prices for energy crops, such as maize, increase so it becomes more unprofitable to use them for biogas plants. Hence, other substrates, like bio-waste, animal waste and second/intercrops become more interesting.
- *Environment*
  - Get to know what the available feedstock potentials are and provide information about their sustainability;
  - Elaborate on and identify the impact on food security;
  - Increased competition for land and biogenic raw material by the four F's (Food, Feed, Fibre and Fuel) of a bioeconomy;
  - LUC / ILUC / Water / Soil quality / Biodiversity.
- *Society*
  - Decreasing public acceptance of using energy crops for energy;
  - General vague knowledge about the possibilities to integrate into a farming system the production of substrates for bioenergy production. The production of substrates for bioenergy production into a farming system as using manure, catch crops, straw and other left over from agricultural production. The additional use of organic waste brings besides energy the advantage of a nutrient cycle through digestate.
- *Technology*
  - Further development for efficient pretreatment of alternative feedstock (i.e. other than maize) still needed.

### 2. Advocacy:

*What are arguments in favor of using biomass for biomethane production?*

- Biomethane is a strong support of rural development and emphasizes the value of local production.
- Biomethane fosters decentralized energy production.
- The possibility exists to integrate it into a power-to-gas concept.
- Biomethane is multifunctional (heat, electricity, fuel) and is storable, in comparison to other renewable energy sources.



- Biomethane reduces the dependency from fossil and nuclear energy; and in particular third countries like Russia and Gulf countries so that money is also kept within EU.
- As compared to fossil fuels (Natural Gas versus Biomethane), the GHG reduction potential, and thus the climate benefits, are evident.
- Alternatives for energy crops do exist, such as bio-waste and intercrops, without neglecting/reducing the food production.
- Biomethane offers an additional market branch for farmers besides covering the demand from food and feed industry.

### 3. Need for action:

*What is needed to overcome the challenges and unfold the full potential of biomethane produced from sustainable raw materials?*

- *Policy*
  - Implementation of favorable/reliable political and legal frameworks.
  - Raising prices for conventional energy carriers that reflect externalities.
  - No subsidies if sustainability of the biomethane production is not proven. That said, the respective assessment must become easier for the stakeholders.
- *Socio-ecological*
  - Consideration of sustainability aspects, e.g. via certification, guidelines, and develop a common sense on sustainability.
  - Improvement of PR activities for more acceptance.
  - Being transparent in the whole process of developing biomethane value chains and involving the relevant stakeholders so that a consent on using bioenergy exists at a local/regional level.
  - Avoiding discussions about food security by using smart cropping systems (that includes for instance, inter-cropping and an efficient transportation system/ decentralized approaches)
- *Technology*
  - Quantify raw material potentials.
  - Development of alternative substrates (e.g. algae) and second (energy) crops in an intercropping farming system.
  - Increasing use of residual matter and waste materials in the production.
  - Research on and demonstration of process optimization (e.g. process control, substrate pre-treatment, microbial processes).
  - Raising efficiency in production and use of bioenergy.
  - Flexible and demand driven bioenergy production
  - Combination of bioenergy with fluctuating renewables.
  - Securing a constant and diversified production of biomass and other feedstock that can be used for biomethane production is more important on the long term than trying to constantly maximize the production and mostly facing high production variations in this process. A mix of substrates will be optimal in regard to sustainability of the feedstock. Biomethane plants could be considered as bond between farmers and waste companies.
- *Economy*
  - New business models, such as bioenergy villages/regions, renewable energy villages/regions, where the sector demonstrates the important role of biomethane in the energy mix.
  - Develop partnerships with a variety of stakeholders on the supply side and agree on long-term (e.g. 5 yrs) contracts for substrate provision; for instance with the municipalities about and their waste materials.

**Table 3 - Assessment of environmental impacts from the production and use of biomethane**  
(moderated by Stefan Majer, DBFZ)

After a short introduction about Greenhouse gas emission reduction (&) certification, the following questions have been discussed with the workshop participants:

- What are the main challenges with regards to the calculation of GHG emissions from biomethane production and use (data and methodology)
- What are the most interesting scoping questions from the perspective of the participants (e.g. to calculate the GHG mitigation potential, to discuss optimization approaches, etc.).

During this discussion, three main topics to be addressed were identified.

The topics can be summarized as follows:

During the workshop, the importance of a profound scientific base for data and assumptions regarding the emissions and potential emission savings during the production and use of biomethane has been discussed. Especially, the following topics are of high importance:

- manure,
- catch crops,
- organic waste,
- straw and
- synthetic fertilizer (as comparator calculating GHG savings through the use of digestate).

These aspects will be addressed particularly within future work in the project to review the existing database and to identify potential gaps.

### 1. Methodology

It was agreed that the basis for the GHG calculation approaches within WP5 will be the methodology of the EU RED. This methodology has slightly adopted for biomethane given that the focus of this methodology is yet on liquid biofuel products.

### 2. Presentation of the results

The results of GHG calculation shall be understandable, robust and have to consider the specific claims of various stakeholders along the biomethane value chain:

- farmers;
- traders;
- plant owners;
- politicians;
- clients.

At the end of the workshop, the three moderators reported to the entire audience the main issues addressed and discussed during the three tables.

During the final discussion, **Stefano Proietti** (ISINNOVA) asked how to deal with the fear of countries less advanced in the biomethane domain towards the threat of been “invaded” by biomethane coming from countries more advanced.

**Attila Kovacs** (EBA) answered stressing the need for clear and transparent rules regulating the European market, while keeping flexibility and the possibility to adopt some safeguard and limitation options.

**Kornel Kovacs** (HBA) considered important to shift threat and fear in an opportunity, as driver to push and contribute to develop biomethane markets yet at their initial steps and to overcome existing barriers.

### Second Inter-Association Workshop (Lodi 19 June 2015)

On the **19 June 2015**, the second BIOSURF Inter-Association workshop was held in **Lodi, Italy**, with 45 participants.

Welcome message from **Piero Gattoni** (CIB) and introduction to the workshop by **Stefano Proietti** (ISINNOVA).

**Jan Stambasky** (EBA) introduced the European Biogas Association and members who are part of it.

Then it was presented the state of the art of biogas industry throughout Europe, in terms of number of plants, installed capacity (MW) and share feedstock used.

Countless are the uses of biogas and this makes it an important sustainable resource on different aspects: it allows the decentralization of energy production, can be aimed at different uses (heat, electricity and fuel for transportation), allows a better waste management, contributes to GHG savings, etc.

According to the forecasts and following the NREAPs pathways, the future of biomethane will see great developments, reaching 30% of technical potential by 2030.

Then, the main objectives of BIOSURF project were presented, which are:

- To develop a **value chain analysis** from production to use depending on the territorial, physical and economic features
- To analyse, compare and **promote biomethane registering, labelling, certification and trade practices in Europe**
- To address **environmental criteria and quality standards**
- To address **GHG emission reduction** and certification

Finally, JS concluded saying that it is necessary a strong push on biomethane right now and the biomethane industries can be a pillar of EU energy because of its huge technical potential.

**Franz Kirchmeyr** (AKB) provided a short presentation on the state of the art of biogas and biomethane in Austria, focusing on the currently feedstock used, mainly coming from renewable resources from agricultural land.

The potential from bio waste, waste from farmland and farm fertilizer must not be neglected and biogas could be the key technology using the left over from previous production steps as food, feed or chemistry production and organic waste.

12 biogas upgrading plants with a capacity of about 2,500 Nm<sup>3</sup> biomethane are running at the moment. They mainly use bio-waste as feedstock.

Actually, about 180 CNG public filling stations are existing.

Thereof 3 are directly linked to a biogas plant and upgrading station.

Thereof about 60 have a blend with biomethane.

Furthermore, in Austria the electricity and gas grids are well developed and they must be taken into account in order to reach the 2050 climate and energy targets.

Among the main challenge identified, FK highlighted: the change in the used feedstock with a big potential from non-food/feed sources and the need for technology improvements. At the end we see the biogas technique as the end step of cascade use of food, feed bio refinery processes using all kinds of organic matter producing renewable energy and organic fertilizer from their left overs. However, it must take into account some obstacles to overcome: lack of political interest, lack of market demand, few cities with methane busses, few lorries, CHP after grid injection is at the beginning.

A more favourable political framework is necessary.

The main points on the landfill and waste framework directive have been outlined concluding stressing the importance of circular economy which will be introduced and become a big driver for biogas/biomethane. A more favourable political framework is necessary.

**Christan Couturies** (Club biogas) was invited to present via video conference a brief state of the art of the biomethane development in France.

He reported the history of the first biomethane sites in the country. Then he explained about the possibility to inject biomethane into the natural gas grids and showed the past, present and future projects for that, with a particular focus on agricultural sites. He ended with showing some figures about perspectives of jobs creation in the sector of bioemthane.

**Manuel Maciejczyk** (GBA) provided a brief overview on biomethane in Germany.

After being Europe's most evolving market ever since 2007, the market for biomethane in Germany is now stagnating. Last year, the feed-in tariffs for usage in CHP plants were abolished with the Renewable Energy Sources Act ("EEG 2014") and there is no longer a bonus for upgrade technology and no tariff for energy crops. So, the current biomethane production can continue for the duration of the feed-in tariff grant (20 years). All project planning is on hold because the other markets (heat sector and use as fuel) are growing very slowly and are risky.

Currently in Germany, there are 8.100 biogas plants in operation with an installed capacity of 4,000 MWel.

Estimations foresee about 150-200 new biogas plants in 2015 (mainly manure based plants with max. 75 kWel. and more than 80% manure in the input). Internationalization of the German Biogas/Biomethane industry is becoming more and more important.

For what concerns biomethane, nowadays 164 feed-in plants are in operation producing about 171,215 Nm<sup>3</sup>/h, the 80% of biomethane is produced from energy crops. About 15 projects are in the planning phase or already under construction.

80% of the total production of biomethane is used for electricity production, 10% for heating and 10% for fuel.

There are about 1000 methane filling stations in Germany:

- Thereof about 170 offering a blend of biomethane and natural gas

- Thereof 119 are pure biomethane filling stations

Barriers have been mostly identified in:

- The CHP sector: no sufficient compensation according to the Renewable Energy Sources Act;
- Heat market: sole heating applications are hardly subsidized (obligation to use in CHP due to higher CO<sub>2</sub>-reduction);
- Fuel sector: stagnating CNG vehicles sales, new regime CO<sub>2</sub>-Quota bear many risks and uncertainties, lack of transparency at fuelling station totems;
- International Trade: Prohibitive national legislations, lack of EU-wide mass balance system.

Due to the barriers mentioned above, national drivers are rather scarce at the moment, but interest in German biomethane upgrade technology and cross-border trade from abroad is growing.

Several perspectives for development are still valid.

- There is significant substrate potential also beyond energy crops (e.g. organic household waste, manure...);
- The future role of biomethane in the electricity sector will be to provide flexibility to the system (balance fluctuation from wind and solar energy); this role will become ever more important as the energy transition progresses;
- The fuel sector, if ever political attention were to be applied, holds immense potential;
- Independency of foreign gaseous sources might become a more important issue for the EU.

Moreover, the next reform of the Renewable Energy Sources Act is coming up in 2016, auctions are going to be introduced for all renewables by 2016. The government is currently revising the electricity market system as a whole and announced to make major changes to the current design. (Fossile) CHP-legislation is under revision, possibly with a new momentum regarding CO<sub>2</sub>-saving and chances for biomethane.

International barriers need to be addressed in order to provide market uptake.

**Kornél L. Kovacs** (HBA) provided a brief overview on biomethane in Hungary.

The total energy demand in Hungary is around 1,000-1,100 PJ and more than 60% is fulfilled by imported energy. The main energy carrier is natural gas (more than 80% imported). The total production from renewable energy sources ranges from 800 to 1,300 PJ, mainly from biomass (250-300 PJ)

As for biogas, about 1% of potential is exploited. 40 agricultural biogas plants and 24 waste water digester are in operation

In Hungary, biomethane is underdeveloped and political support is limited. This is because the domestic regulations are slow and very bureaucratic and nuclear is preferred at the expense of renewables that are not supported.

Among the main legal, technical and economic barriers there are:

- Complex permit system: 24 permits from various agencies before starting.
- Additional legal regulations during operation
- Too many supervising bodies – contradictory regulations
- Regional variations
- No regulation or standards for biomethane feed-in
- EU Directives are adopted but only compulsory ones are followed
- Low subsidy, only for green electricity
- No support for biomethane
- Green electricity support has been „suspended” for 5 years
- High investment is risky in unbalanced environment

- Nuclear energy is heavily promoted
- Indifferent general attitude

**Lorenzo Maggioni** (CIB) introduced the state of the art of biogas and biomethane in Italy, focusing principally on legislation, outlining the main barriers and showing the effective potential of investing in this area.

As for biogas production, Italy holds the third position in the world after China and Germany. About 4 Billion € have been invested in the last 5 years in this sector. Actually, there are more than 1,300 biogas plants for a total installed capacity of more than 1,000 MW<sub>el</sub>; more than 8 GWh<sub>el</sub> are produced every year and about 2 billion of biomethane equivalent Nm<sub>3</sub>/yr are used.

For what concerns biomethane, only 5 biomethane plants are in operation without connection to the grid.

On December 2013, the biomethane decree, which introduces and regulates the incentive system, entered into force and the main technical barriers have been overcome. The new rules will apply to different kinds of plant and incentives will cover both new plants and the construction of upgrading units in existing biogas plants (for which incentives will be lower). The incentives scheme will last 20 years. The amount of incentives will depend on:

- Final use of biomethane: injected into natural gas grid, used in transport (highest incentives), used in high efficiency cogeneration plants
- New upgrading plant (> €) or existing biogas plant (< €)
- Size of the upgrading plant (> € if < 500 m<sup>3</sup> CH<sub>4</sub>/h)
- Use of by-products (> €)
- Only for biomethane for transport, the producer is also involved in the distribution of biomethane, e.g., gas station, (> €) or not (< €).

Several are the strengths linked to biomethane use in transport, one of the main is the quantitative of GHG emissions produced which are very low with respect to other transport fuels (considering the overall Well to Wheel process).

Beyond the very low emissions, it must be considered that car engines using biomethane are less noisy and a distribution infrastructure is not needed because already existing (about 34, 000 and 250,000 km of primary and distribution network respectively). Moreover, biomethane can be blended at any ratio with natural gas.

Among the weaknesses there are many uncertainties for what concerns the quality parameters, measurement and the value of certificates.

Nevertheless, it must be said that Italy is in the top ten NGV countries in the world (holding the first place in Europe).

The potential of biomethane is not to be overlooked, particularly from the economic point of view: 1 billion cubic meters of biomethane produced per year may involve investments of 4 billion euro. The new rules will apply to different kinds of plant.

A realistic development plan of methane/biomethane within 2020 is needed and it should include:

- doubling the fuelling stations to 2,000;
- doubling current means of transport using CNG (preferably LNG) up to about 2 billion Nm<sup>3</sup> by 2020;
- Increasing biomethane consumption up to 30% of the total consumption, about 500,000,000 Nm<sup>3</sup>/year.

In the next future, interest could be directed to new options for biomethane production: not only from AD but also from gasification and power to gas technologies.



Then LM introduced the BIOGASDONERIGHT model which is a technological platform that combines Anaerobic Digestion (AD) technologies and other Industrial and Agricultural practices, that when applied synergistically are able to:

- produce additional carbon both in already farmed land and in land that suffer desertification or lowered productivity, especially in dry lands;
- simultaneously increase the World Net Primary Production (NPP) of farmland and lower the negative externalities associated with modern conventional agricultural practices;
- continuous increase (until an equilibrium is reached) of the organic content of soils sequestering carbon at the required scale (> 1 Gton C per year);
- realize this at very low cost;
- contribute at the same time to an ecological agricultural intensification.

Finally it was concluded that biomethane is a very important advanced bio-fuel. It could contribute to the European climate targets thanks to the reduction of CO<sub>2</sub>eq emissions, it advances security of supply and European energy independency from third countries and also generates green jobs.

In Italy biomethane has enormous potential. It is important to remove, as soon as possible, some of the major barriers for his development.

**David Collins** (REA) provided a short presentation on the state of the art of biogas and biomethane in UK.

The Renewable Energy Directive fixed targets for UK, for which, within 2020, the 15% of total energy produced must come from renewable energy sources.

In order to reach these objectives, incentives were made available, in particular the Renewable Heat Incentive (RHI), for supporting heat and biomethane injection (new Incentives are available from 9 February 2015).

Since 2010, the number of projects on biomethane increased exponentially from 1 in 2010 to more than 25 in 2014. According to data and forecasts there will be more than 50 projects before 2016 and over 60 before 2017.

As for transportation, Green Gas Certificates and Funding for NGV are available.

Among the barriers:

- budget restraints and future tariff regression
- availability of waste feedstocks
- the use of crops still under debate
- gas grid capacity
- cost of grid connections/delays
- energy content (CV) of biomethane v grid (propane)
- Sustainability Criteria- in force 5<sup>th</sup> October 2015
  - 60% GHG savings compared to GHG EU fossil heat average
  - Lifecycle emissions of < 125.28kg CO<sub>2</sub> equivalent (34.8g CO<sub>2</sub>e/MJ) of biomass heat generated
  - Consignment basis – no averaging
  - Waste exempt – emissions up to the process of collection
  - Land criteria requirements to be introduced by April 2015
  - All existing plants will have to comply



UK total gas demand now is around 800 TWh/annum. Biomethane injected by the end of 2015 will be around 2.00 TWh. The maximum potential estimated for biomethane by 2030 is around 20TWh.

**Stefano Proietti** (ISINNOVA) introduced the aims and rules of the workshop, with three parallel sessions based on three groups, according to the following topics:

- Cross-border biomethane trade for supporting the expanded use of methane as transportation fuel in Europe
- Sustainable feedstock for Biogas/ Biomethane production
- Assessment of environmental impacts of biomethane deployment

The topic „**Cross-border biomethane trade for supporting the expanded use of methane as transportation fuel in Europe**” was introduced through a presentation by **Attila Kovacs** from EBA. The presentation addressed the benefits of biomethane among the biofuels for transportation (especially with regard to the reduction of GHG emissions compared with the fossil fuels (including natural gas). The review of the resource potential for biomethane indicated that the biomethane industry will be able to keep pace with the expansion of use of CNG and LNG as vehicle fuel. Much attention was given to the prevailing obstacles for cross-border biomethane trade, while limiting the production and application to the territories within the national borders would hinder the full utilisation of resources and would also deprive the industry from a tool balancing supply and demand on the European level.

The following exchange of views concluded that:

- Italy has the best potential in Europe to realize the application of biomethane as vehicle fuel (due to the high number of natural gas driven vehicles and CNG refuelling stations and to the developed natural gas pipeline network);
- it is important to enable the supplies of biomethane to vehicles (including ships) in different ways:
  - compressed or liquefied,
  - pure biomethane (without blending with natural gas),
  - bio-CNG and bio-LNG (blends of biomethane with natural gas).

The participants agreed that a strong cooperation among the natural gas and biogas industries is necessary for a quick development; the two fuels (natural gas and biomethane) should be seen as complementary and should not compete with each other.

The discussion paid much attention to the sustainable raw material supplies for biomethane production. The participants supported the “Biogasdoneright” approach elaborated by the Italian Biogas Association (CIB) which enables producing biogas/biomethane without any negative effect of food/feed production and also important carbon sequestration/soil improvement. The benefits of integrating the anaerobic digestion technology into up-to-date agricultural practice must be made well known to politicians, farmers and all other stakeholders in agriculture. Special attention is to be given to the possibility of using compressed biomethane as fuel for agricultural vehicles.

There were mixed views regarding the support systems. Most of the participants would favour providing financial support to biomethane producers (rather than to the biomethane consumers); the general belief is that the incentives directed to production have a stronger effect for financing the investments.

The following key factors were identified for the development of production and use of biomethane as transportation fuel:

- a) Overall development of the natural gas vehicles market;
- b) Right political priorities, political support for biomethane (as advanced biofuel);

- c) Broad marketing cooperation between the natural gas and biogas industries;
- d) Monetizing the intrinsic („green”) value of biomethane on the market together with monetizing the fertiliser value of digestate;
- e) Reduction of biogas/biomethane production costs (through technological improvements and expansion of the raw material base);
- f) Feasible possibilities for cross-border trade.

The session on “**Sustainable Raw Material Supply**”, moderated by **Kristin Sternberg** (FNR).

Two interlinked topics were chosen to be presented to the audience aiming to raise subsequent discussions. The national availability of sustainable feedstocks for biogas production and their potential for additional use was one of these aspects. A graph showing the average use of biogas substrates and their potentials in Germany was used to highlight the importance of assessing the current availability of different feedstocks as well as to discover and unlock still unused sustainable feedstock sources.

Additionally the country specific differences in the use of feedstocks in biogas-plants were picked out as a central theme. A graph visualised the different average substrate mix in Germany and France. Different drivers (i.e. local availability and political framework/ incentives) for these situations were mentioned and described by the moderator aiming to get some feedback on the conditions in Italy (e.g. in form of field reports). It was further shown that there is notifiable slow but gradual change in the use of substrates. This statement was also used to raise potential discussion or reports on own experiences.

Particular focus in these sustainable feedstock discussions is on the use of waste and residue materials, without completely excluding energy crops from the substrate mix.

Unfortunately the audience was not very active after the short presentations and even several enquiries from the moderator’s side and the display of guiding questions could not succeed in actively involving the stakeholders in a constructive/ informative dialogue with the BIOSURF project team.

Only two questions were raised from the audience:

- 1) How does the shift of used substrates into the direction of an increased share of waste and residue materials effect the construction of the plants? Can changes of existing plants be easily done?
- 2) Is the use of enzymes in the digestion process, particularly of waste and residue materials, beneficial or even crucial to get good gas exploitations? Currently these enzymes are still very expensive is it economically viable to use them and are price reductions or further developments expected?

The first question was mainly answered by the BIOSURF project partners Franz Kirchmeyr and Manuel Maciejczyk, who pointed, among others, to the regulations and descriptions of the national and European waste framework directive. Prof. Kornel Kovacs elaborated on the second question, revealing the unsatisfactory results of different research efforts on the use of enzymes in the digestion process in biogas plants.

During the session on the “**Assessment of environmental impacts of biomethane deployment**”, **Stefan Majer** from the DBFZ presented the different objectives of the BIOSURF project with regards to this topic. Amongst others he highlighted the specific challenges for the GHG emission

calculations for Biomethane in the context of the EU RED sustainability certification. These main challenges are:

- The allocation of by-products: According to the RED methodology by-products can only be allocated according to their lower heating value. However, digestate as the main by-product of the biogas process usually has a high water content and can therefore often not be considered adequately.
- GHG mitigation effects from the use of agricultural wastes and manure: The use of agricultural waste materials for biogas production can help to avoid emissions associated with the conventional storage and handling of these materials. However, accounting for this benefit within the GHG calculation for biomethane production is not clearly defined within the RED methodology.
- Data insecurity: The sustainability certification process for transportation fuels is designed as a standardized and transparent process. However, a number of emissions which are relevant for the GHG assessment are associated with high data uncertainties.

During the presentation Stefan explained the BIOSURF approach of dealing with the identified challenges to support the various stakeholders.

### Third Inter-Association Workshop (London, 16 December 2015)

On the **16 December 2015**, the third BIOSURF Inter-Association workshop was held in **London (UK)**, with 29 participants.

Welcome message from **David Collins (REA)** and introduction to the workshop by **Stefano Proietti (ISINNOVA)**.

**Jan Stambasky (EBA)** introduced the European Biogas Association and members who are part of it.

Then he presented the state of the art of biogas industry throughout Europe, in terms of number of plants, installed capacity (MW) and share feedstock used.

Countless are the uses of biogas and this makes it an important sustainable resource on different aspects: it allows the decentralization of energy production, can be aimed at different uses (heat, electricity and fuel for transportation), allows a better waste management, contributes to GHG savings, etc.

According to the forecasts and following the NREAPs pathways, the future of biomethane will see great developments, reaching 30% of technical potential by 2030.

Then, the main objectives of BIOSURF project were presented, which are:

- To develop a **value chain analysis** from production to use depending on the territorial, physical and economic features
- To analyse, compare and **promote biomethane registering, labelling, certification and trade practices in Europe**
- To address **environmental criteria and quality standards**
- To address **GHG emission reduction** and certification.

Finally, Jan Stambasky concluded stressing the necessity for a strong push on biomethane right now and highlighting that the biomethane industries can be a pillar of EU energy because of its huge technical potential.

**Kiara Zennaro (REA)** provided a short presentation on the state of the art of biogas and biomethane in UK.

UK has great gas grid:

- 85% of domestic market connected to grid
- 95% of industry
- Power generation back up to wind

To build gas grid and central heating etc. would cost around £100 billion.

All UK Grid Owners are very supportive and have created an attractive regime to allow projects to go ahead at lower cost/quicker.

Some figures and information about the current situation were then provided and can be briefly summarized as follows:

- 45% of all UK energy is used for heating, responsible for about one third of the UK's carbon emissions
- Over 70% of the UK's heating demand is met by gas
- Renewable energy targets: 15% of energy from renewables by 2020 and UK sub-target to meet 12% heat from renewable sources by 2020
- Climate Change Act 2008: 50% GHG emission reduction on 1990 levels by 2025 and 80% by 2050
- UK continental resources are running out.

Renewable Heat Incentive, introduced in 2011, is the primary policy which supports biomethane in the UK and is the world-first financial incentive to promote the generation of renewable heat and biomethane. This scheme is funded through general taxation. Payments are made quarterly over 20 year period on basis on metered biomethane injected (p/kWh)

Initially funded until March 2016, on 25th November Government announced that RHI will be continued to 2020/21 (£700 million less than originally planned).

Since 2010, the number of projects on biomethane increased exponentially from 1 in 2010 to more than 25 in 2014. According to data and forecasts there will be more than 50 projects before 2016 and over 60 before 2017.

Currently the UK total gas demand is around 700 TWh/annum, of which around 50% for domestic heating, 25% for power gen and 25% for industry.

The biomethane injected by end 2015 into the grid is around 2 – 2.5 TWh. The maximum potential estimated for biomethane by 2030 is around 20TWh.

Among the barriers:

- budget restraints and future tariff regression
- availability of waste feedstocks
- the use of crops still under debate
- gas grid capacity
- cost of grid connections/delays
- energy content (CV) of biomethane v grid (propane)
- Sustainability Criteria- in force 5<sup>th</sup> October 2015:
  - 60% GHG savings compared to GHG EU fossil heat average
  - Consignment basis – no averaging

- GHG criteria may be tightened up in the future.

UK total gas demand now is around 800 TWh/year. Biomethane injected by the end of 2015 will be around 2.00 TWh. The maximum potential estimated for biomethane by 2030 is around 20TWh.

For what concerns transport, biomethane has a considerable potential, particularly in HGVs and buses. A study carried out by Ricardo-AEA for DfT (2014) showed that use of biomethane in vehicles could deliver substantial GHG savings, compared to use of petrol, diesel or natural gas. Currently, only very limited amount of biomethane (0.1 Peta Joules) is produced for supply to the transport sector, as the available biogas/biomethane goes into heat and/or power sector as current incentives provide better returns.

To overcome these barriers, the Transport Energy Task Force has been set up by the DfT with the aim to provide recommendations to increase the support for biomethane for transport and to remove barriers to deployment of HGVs and buses.

REA RTFG Renewable Gases Working group, working closely with DfT is working to identify the role that biomethane and other renewable gases could play in transport to 2020 and beyond 2030: potentially biomethane from AD and gasification could be around 300 PJ/yr (E4Tech)

To unlock this sector is needed:

- An adequate level of support for producers of renewable gases for transport
- Support for refuelling infrastructure
- Support to gas vehicles R&D and development of a mass market for gas vehicles.

**Franz Kyrchmeyr (AKB)** provided a short presentation on the state of the art of biogas and biomethane in Austria, focusing on the currently feedstock used, mainly coming from renewable resources from agricultural land.

The potential from bio waste, waste from farmland and farm fertilizer must not be neglected and biogas could be the key technology using the left over from previous production steps as food, feed or chemistry production and organic waste.

12 biogas upgrading plants with a capacity of about 2,500 Nm<sup>3</sup> biomethane are running at the moment. They mainly use bio-waste as feedstock.

Actually, about 180 CNG public filling stations are existing. Thereof 3 are directly linked to a biogas plant and upgrading station. Thereof about 60 have a blend with biomethane.

Furthermore, in Austria the electricity and gas grids are well developed and they must be taken into account in order to reach the 2050 climate and energy targets.

Among the main challenge identified, FK highlighted: the change in the used feedstock with a big potential from non-food/feed sources and the need for technology improvements. At the end we see the biogas technique as the end step of cascade use of food, feed bio refinery processes using all kinds of organic matter producing renewable energy and organic fertilizer from their left overs. However, it must take into account some obstacles to overcome: lack of political interest, lack of market demand, few cities with methane busses, few lorries, CHP after grid injection is at the beginning.

A more favourable political framework is necessary.

**Marie Verney (ATEE)** presented a brief state of the art of the biomethane development in France.



A national call for tenders « 1500 AD plants in 3 years » was launched in France in 2014 and also a national plan « EMAA » aiming at 1000 on-farm AD plants was issued.

Moreover, the National Law on Energy Transition for Green Growth (LTECV) set several objective in the field of energy:

- Renewable energy : 23% of the energy mix by 2020
- Renewable energy : 32% of the energy mix by 2030
- **Green gas : 10% of the total gas consumption by 2030**
- Green fuel: 15 % of the total fuel consumption by 2030.

In this framework, ADEME carried out prospective scenario for biogas development, estimating, in the best case, an increase of 80 unit/year (MW) in the period 2015-2020.

In February 2015, 6 biomethane units were operating in France and the annual injection volume in 2015 has been around 70 GWh, enough to cover the annual gas consumption of about 6000 households.

Feed-in tariffs are adopted as the main support mechanism for biomethane injection, varying from 6.5 to 12,5 cent/kWh depending on the type of feedstock used (agricultural input and agro-food waste, household waste, catering waste and public waste, etc.). The feed-in tariff mechanism is also applicable to biomethane as a fuel and upcoming evolutions are foreseen for electricity.

There are also other support schemes adopted for injected biomethane used:

- in households:
  - Subsidies
  - Domestic consumption tax on natural gas
  - Guarantee of origin (GoO) sold by the supplier to the costumer (25% of the price goes to the supplier).
- As a fuel in transport:
  - Subsidies
  - Domestic consumption tax on natural gas
  - Guarantee of origin (GoO) sold by the supplier to the costumer (100 % of the price goes to the supplier)
  - Tax incentives : exoneration on the cost of registration certificates for vehicles
  - Amortization of the purchase of a bioNGV vehicle (up to 18 300€ / year).

**Frank Hofmann (GBA)** provided a brief overview on biomethane in Germany.

After being Europe's most evolving market ever since 2007, the market for biomethane in Germany is now stagnating. Last year, the feed-in tariffs for electricity production from biogasplants were reduced with the Renewable Energy Sources Act ("EEG 2014"). There is no longer a bonus for upgrade technology and no bonus for biogas from energy crops.

So, the current biomethane production can continue for the duration of the feed-in tariff grant (20 years). All project planning is on hold because the other markets (heat sector and use as fuel) are growing very slowly and are risky.

Currently about 9,000 biogas plants in operation with an installed capacity of 4.177 GWel. Estimations foresee about 200 new biogas plants in 2015 (mainly manure based plants with max. 75 kWel. and more than 80% manure in the input).

Internationalization of the German Biogas/Biomethane industry is becoming more and more important.

For what concerns biomethane, nowadays 190 feed-in plants are in operation producing about 180,000 Nm<sup>3</sup>/h, the 80% of biomethane is produced from energy crops. About 15 projects are in the planning phase or already under construction (many to be stopped).

80% of the total production of biomethane is used in CHP plants, 10% for heating and 10% for fuel. There are about 1000 methane filling stations in Germany:

- Thereof about 170 offering a blend of biomethane and natural gas
- Thereof 119 are pure biomethane filling stations

Barriers have been mostly identified in:

- The CHP sector: no sufficient compensation according to the Renewable Energy Sources Act;
- Heat market: sole heating applications are hardly subsidized (priority to use biomethane in CHP due to higher CO<sub>2</sub>-reduction);
- Fuel sector: stagnating CNG vehicles sales, new regime CO<sub>2</sub>-Quota bear many risks and uncertainties, lack of transparency at fuelling station totems;
- International Trade: Prohibitive national legislations, lack of EU-wide mass balance system.

Due to the barriers mentioned above, national drivers are rather scarce at the moment, but interest in German biomethane upgrade technology and cross-border trade from abroad is growing.

Several perspectives for development are still valid.

- There is still a significant potential for development (e.g. organic household waste, manure...)
- The future role of biomethane in the electricity sector will be to provide flexibility to the system (balance fluctuation from wind and solar energy); this role will become ever more important as the energy transition progresses;
- The transportation sector has an immense potential but needs political support
- Independency of foreign gaseous sources might become a more important issue for the EU.
- Interest selling CO<sub>2</sub> as a product beneath methane is growing.

Moreover, the next reform of the Renewable Energy Sources Act is coming up in 2016. Auctions are going to be introduced for all renewables by 2016. The government is currently revising the electricity market system as a whole and announced to make major changes to the current design by 2016. (Fossil) CHP-legislation is under revision, possibly with a new momentum regarding CO<sub>2</sub>-saving and chances for biomethane. The THG-Quota in the fuel sector is to be implemented and proven in practice.

Finally, international barriers need to be addressed in order to provide market uptake.

**Kornel Kovacs (HBA)** provided a brief overview on biomethane in Hungary.

He mentioned a new contract between EC and the Hungarian government concerning LNG and biomethane. Then he showed activities on networking (WP2) and dissemination (WP8), with production of articles and the organisation of events, including “Biogas Science 2016” in August 2016.

He ended by showing the sugar refinery of Kaposvár, with biogas upgrading and injection.

**Lorenzo Maggioni (CIB)** introduced the state of the art of biogas and biomethane in Italy, focusing principally on legislation, outlining the main barriers and showing the effective potential of investing in this area.



Firstly, the BIOGASDONERIGHT model was introduced, which consists is a technological platform that combines Anaerobic Digestion (AD) technologies and other Industrial and Agricultural practices, that when applied synergistically are able to:

- produce additional carbon both in already farmed land and in land that suffer desertification or lowered productivity, especially in dry lands;
- simultaneously increase the World Net Primary Production (NPP) of farmland and lower the negative externalities associated with modern conventional agricultural practices;
- continuous increase (until an equilibrium is reached) of the organic content of soils sequestering carbon at the required scale (> 1 Gton C per year);
- realize this at very low cost;
- contribute at the same time to an ecological agricultural intensification.

As for biogas production, Italy holds the third position in the world after China and Germany. About 4 Billion € have been invested in the last 5 years in this sector. Actually, there are more than 1,300 biogas plants for a total installed capacity of more than 1,000 MW<sub>el</sub>; more than 8 GWh<sub>el</sub> are produced every year and about 2 billion of biomethane equivalent Nm<sup>3</sup>/yr are used.

For what concerns biomethane, only 5 biomethane plants are in operation without connection to the grid.

On December 2013, the biomethane decree, which introduces and regulates the incentive system, entered into force and the main technical barriers have been overcome. The new rules will apply to different kinds of plant and incentives will cover both new plants and the construction of upgrading units in existing biogas plants (for which incentives will be lower).

The decrees foresees different scenarios depending on the final use of biomethane:

**Case A:** Biomethane injected in the natural gas grid:

- PREMIUM TARIFF linked to the market price of natural gas
- Duration of the incentive: 20 years
- Supplementary incentives for use of by-products and if < 500 m<sup>3</sup> CH<sub>4</sub>/h

**Case B:** Biomethane used in transport:

- Issue of "CIC" (*Certificati di Immissione in Consumo di biocarburanti*- certificates of release for consumption of biofuels)
- 1 CIC corresponds to 10 Gcal
- A double counting is foreseen for use of by-products and waste
- Duration of the incentive: 20 years

**Case C:** Biomethane used in high efficiency cogeneration plants:

- there are different incentives according to the feedstock used, the installed capacity of the plants and their working life. This scheme of incentives is under review but will not be very different to the one proposed in the Decree.

The potential of biomethane is not to be overlooked, indeed, according to Italian Biogas Consortium a realistic development plan of methane/biomethane within 2020 should include:

- doubling service stations to 2000;
- Doubling current means of transport consumption of CNG methane (preferably LNG) up to about 2 billion Nm<sup>3</sup> by 2020;
- Increasing biomethane consumption up to 25% of the total consumption, about 500.000.000 Nm<sup>3</sup>/year (bio-CNG or bio-LNG)

Several are the strengths linked to biomethane use in transport, one of the main is the quantitative of GHG emissions produced which are very low with respect to other transport fuels (considering the overall Well to Wheel process).

Beyond the very low emissions, it must be considered that car engines using biomethane are less noisy and a distribution infrastructure is not needed because already existing (about 34, 000 and 250,000 km of primary and distribution network respectively). Moreover, biomethane can be blended at any ratio with natural gas.

Among the weaknesses there are many uncertainties for what concerns the quality parameters, measurement and the value of certificates.

Nevertheless, it must be said that Italy is in the top ten NGV countries in the world (holding the first place in Europe).

Moreover, among the several uses that biomethane can have transport, the use of this in dual-fuel engines (diesel + biomethane) can be a good opportunity to be exploited

The main threat to the development of biomethane is the presence of powerful lobbies which are fighting against biomethane and the political uncertainty is another challenge to be overcome.

In the next future, interest could be directed to new options for biomethane production: not only from AD but also from gasification and power to gas technologies.

Finally it was concluded that, as the chemical composition and energy content of biomethane are close to natural gas, it can likewise be used in the same way:

- Gas grid injection and used as a natural gas substitute in any blend proportion
- Vehicle fuel

Biomethane is a very important advanced bio-fuel. It could contribute to the European climate targets thanks to the reduction of CO<sub>2</sub>eq emissions, it advances security of supply and European energy independency from third countries and also generates green jobs.

In Italy biomethane has enormous potential. It is important to remove, as soon as possible, some of the major barriers for his development.

### **Workshop – Setting the scene and introduction**

**Stefano Proietti (ISINNOVA)** introduced the aims and rules of the workshop, with three sessions based on three topics:

- The present status and future prospects for biomethane as transportation fuel
- Sustainable feedstocks for the biomethane production – approaches in different countries
- Environmental impacts from biomethane production and utilization

Different aspects connected with these topics were presented to the audience followed by long and lively discussions of the whole group (invited stakeholders as well as present BIOSURF partners). The workshop has been attended by external stakeholders, members of the Renewable Energy Association (REA). The audience was very interested and eager to give feedback and their opinion on the topics.

### **The present status and future prospects for biomethane as transportation fuel**

The topic “The present status and future prospects for biomethane as transportation fuel” was moderated by **Attila Kovacs (EBA)**.

In view of the fact that, in the UK grid injected biomethane receives attractive financial support from the Renewable Heat Incentive (RHI), the presentation and discussion were focused on using biomethane as biofuel in transportation.

In the UK presently only a very limited amount of biomethane (0.1 PJ) is produced for supply to the transport sector. This biomethane is 0.2% of total biofuels supplied to road transport, and 0.1% of the 85 PJ of biogas produced from landfill sites and the anaerobic digestion of wastes in 2013.

The discussion highlighted several key factors hindering the use of biomethane as transportation fuel in the UK:

- a) At present, for the purpose of the Renewable Transport Fuels Obligation (RTFO), biomethane can only be regarded as a transport fuel (and receive renewable transport certificates) if it is directly, physically supplied to the vehicle. Such regulation is implemented to enable tracking the sustainability claims along the full chain of custody (from producer to the vehicle).  
Injection of biomethane in to the gas grid, to allow the use of the gas grid to transport the biomethane to the filling system, using a tracking system such as 'Green Gas Certificates' to provide a link between supply and dispensing mechanism, does not at present qualify. The use of biomethane in the transport sector could develop better if policy and legislation were changed, so that biomethane destined for transport use, which is injected into gas grid, and uses the gas grid to transport the biomethane to the point where it is dispensed to vehicles, could also qualify for RTFCs.
- b) It was also noted that for production of transport fuels to be attractive to developers and operators of biogas plants, it is not enough that the production of the fuel is profitable – it will need to be more commercially attractive to them than using the biogas in other ways, such as electricity generation, use in a combined heat and power (CHP) plant or upgrading and injecting to the grid and receiving payments under the RHI. Presently the financial support provided under the RHI provides much better returns than the sales of biomethane as vehicle fuel.
- c) The main potential barrier identified by stakeholders to the production of biomethane for use in transport is the nature of RTFCs. RTFCs can be traded bilaterally between producers and obligated suppliers, or sold via brokers or traders. While information on the price of RTFCs traded bilaterally is not available, data on certificates traded via NFPAs shows that certificates have traded over a wide price range and that pricing is very volatile. This means that when making investment decisions, and when seeking finance for investments, the income from RTFCs is not considered very 'bankable'. In addition, at present, there is no guaranteed period over which RTFCs will be made available.
- d) According to the present rules the GHG characteristics of different biogas substrates (raw materials) cannot be averaged. This causes serious difficulties for operators:
  - high administrative burden due to handling big number of biomethane consignments,
  - no possibility to offset the less attractive GHG numbers of energy crops with the more attractive GHG numbers of manure/slurry/organic wastes, which are co-digested in the biogas plants.

The participants expressed support to the proposal elaborated by the BIOSURF project, with regard to the administration of cross-border biomethane trade through mass-balancing in the European natural gas network.

### **Sustainable feedstocks for the biomethane production – approaches in different countries**

The session on “**Sustainable Raw Material Supply**” was moderated by **Kristin Sternberg (FNR)**.

She presented the country specific differences in the use of feedstocks in biogas-plants by comparing the situations in Germany, France and the UK. Different drivers, particularly local availability and political framework/ incentives, responsible for these conditions were mentioned and described by the moderator aiming to get some feedback and opinions from the British stakeholders. Furthermore sustainability criteria for raw materials for biogas production were shortly presented. In this context the controversial topic of the use of dedicated energy crops was used as starting point for further discussions.

During discussions within this workshop session, one aspect turned out to be of particular importance with regard to an increased use of waste materials for biogas plants: the reliability of feedstock supply and composition and, eventually, the gas quality. According to the Biosurf consortium the proportional use of energy crops can considerably help to reach more consistency in that regard. Further, the group agreed that it is easier to make a business case when using energy crops as (part of the) feedstock, which is particularly important for investors (which were present in the audience). It was also recognised by the stakeholders that energy crops are needed for an efficient biogas conversion process when using a high share of slurry.

According to the stakeholders, a popular model in the UK is to build biogas plants right next to food and feed production plants. Consequently the supply is better ensured, however the challenge of inconsistencies in the feedstock’s composition remains.

Another opinion addressed when discussing sustainability criteria for the biomethane production process was that a respective evaluation should actually always take into account the true costs the corresponding fossil based energy carrier.

### **Environmental impacts from biomethane production and utilization**

The session on the “Assessment of environmental impacts of biomethane deployment” was moderated by **Stefan Majer (DBFZ)**.

He presented the different objectives of the BIOSURF project with regards to this topic. Amongst others, the specific challenges for the GHG emission calculations for Biomethane in the context of the EU RED sustainability certification have been highlighted . These main challenges are:

- The allocation of by-products: according to the RED methodology, by-products can only be allocated following their lower heating value. However, digestate as the main by-product of the biogas process usually has a high water content and can therefore often not be considered in adequately.
- GHG mitigation effects from the use of agricultural wastes and manure: The use of agricultural waste materials for biogas production can help to avoid emissions associated with the conventional storage and handling of these materials. However, accounting for this benefit within the GHG calculation for biomethane production is not clearly defined within the RED methodology.
- Data insecurity: The sustainability certification process for transportation fuels is designed as a standardized and transparent process. However, a number of emissions which are relevant for the GHG assessment are associated with high data uncertainties.

Stefan Majer explained the BIOSURF approach of dealing with the identified challenges to support the various stakeholders.

In the following discussion a number of specific points regarding this topic have been mentioned:

- The European commission is going to publish new guidelines for the calculation of greenhouse gas-emissions which will be published in summer 2016. These guidelines should be considered in the respective work package of the BIOSURF-Project
- Averaging of credits in calculation of greenhouse gas-emissions is not allowed and not possible, which makes the calculations difficult and extensive, especially for small plants.
- Calculations on energy efficiency of anaerobic digestion- and biomethane-technologies would be of interest. How much external energy is needed as input and how much energy will be produced?
- "Black box approach" - methane leakage is set to 50 %. Default values for biogas are given in the JRC-report
- Emission factors for natural gas are very rough estimations compared to biogas and biomethane, e.g. no differentiation of feedstock sources and transport routes

The governmental greenhouse gas-emissions-calculator for the UK is not very convenient to use.

### Fourth Inter-Association Workshop (Berlin, 17 June 2016)

On the **17 June 2016**, the fourth BIOSURF Inter-Association workshop was held in **Berlin (GE)**, with 39 participants.

Welcome message from **Frank Hoffman (GBA)** and introduction to the workshop by **Stefano Proietti (ISINNOVA)**.

**Jan Stambasky (EBA)** introduced the European Biogas Association and members who are part of it.

Then he presented the state of the art of biogas industry throughout Europe, in terms of:

- number of plants: 17,240 in operation in Europe;
- Installed capacity : 8,293 MW<sub>el</sub>
- Generated electricity: 63.6 TWh
- Generated Heat: 32.2 TWh

In Europe, the number of new **biomethane** plants commissioned per year is growing more and more, reaching +30% in 2014 with respect to the year before. Most of them are in Germany, Sweden, UK and the Netherlands.

Some figures on biomethane production in 2014 (only from anaerobic digestion) are summed up as follows:

- 200,000 Nm<sup>3</sup>/h: Biomethane upgrading capacity;
- ~1.4 Bn m<sup>3</sup>: Approx. biomethane production;
- 367: Number of biomethane plants in Europe; 70% of them inject gas into grid;
- 10%: Approx. use of biomethane in transport

According with the forecasts, the future of biogas and biomethane will see great developments, reaching almost 50 billion Nm<sup>3</sup>/year of biogas/biomethane produced (biogas 30 and biomethane 18 billion Nm<sup>3</sup> respectively) and used in several applications: Electricity, heating & cooling (biogas) and Fuel and Grid (biomethane).

At the same time, forecasts shows the beginning of a sharp decrease in the use of natural gas since 2014 (Current average annual decrease: 22 bcm) in favour of renewables.

For what concerns transport, the use of biomethane shows a high saving potential in terms of CO<sub>2</sub> emissions (ranging from 40-97% less CO<sub>2</sub> emissions for BIO CNG vehicles with respect to LPG vehicles). It is worth also mentioning the wide potential of Liquid Biomethane which can be suitable with a larger number of applications.

For what concerns **biomethane trade**, currently, the cross-border trade is limited to bilateral agreements (CH-DE, DK-DE) and international trade is mainly done through road transport. This lack of biomethane trade prevents further biomethane developments and it comes as an obstacle to the elimination of the discrepancy between national demand and biomethane production that otherwise would be close to be met.

Green Gas Grids project have identified the biomethane potentials, while BIOSURF currently has the objective to develop national biomethane registries.

Finally, Jan Stambasky concluded stressing the necessity for a strong push on biomethane right now and highlighting that the biomethane industries can be a pillar of EU energy because of its huge technical potential.

On 27-29 September in Ghent (BE) the European Biogas Association conference will be held.

**Frank Hoffman (GBA)** provided a brief overview on biomethane in Germany.

After being Europe's most evolving market ever since 2007, the market for biomethane in Germany is now stagnating. In 2014, the Renewable Energy Sources Act („EEG”) was amended with the result of lower feed-in tariffs. At present, no bonus for upgrading technology is foreseen as well as no special tariff for energy crops anymore. So, the current biomethane production can continue for the duration of the feed-in tariff grant (20 years), moreover, some projects stopped because other markets (heat sector and use as fuel) are growing very slowly and are risky.

Currently about 9,000 biogas plants are in operation with an installed capacity of 4.177 GWel.

About 200 new biogas plants were built in 2015: mainly small manure based plants (max. 75 kWel and more than 80% manure input). Internationalization of the German Biogas/Biomethane industry is becoming more and more important

For what concerns biomethane, nowadays 190 feed-in plants are in operation producing about 180,000 Nm<sup>3</sup>/h, the 80% of biomethane is produced from energy crops. About 15 new projects are in operation since 2015.

80% of the total production of biomethane is used in CHP plants, 10% for heating and 10% for fuel.



There are about 120 biogas filling stations in operation; additional 170 filling stations offer a blend of biomethane and natural gas. The political goals of producing 6 billion Nm<sup>3</sup>/y in 2020 and 10 billion by 2030 are not yet relevant.

Barriers have been mostly identified in:

- The CHP sector: no sufficient compensation according to the Renewable Energy Sources Act;
- Heat market: sole heating applications are hardly supported (obligation to use in CHP due to higher CO<sub>2</sub>-reduction);
- Fuel sector: stagnating CNG vehicles sales, new regime CO<sub>2</sub>-Quota bear many risks and uncertainties, lack of transparency at fuelling station totems (price signs at fuelling station);
- International Trade: Prohibitive national legislations, lack of EU-wide mass balance system.

Due to the barriers mentioned above, national drivers are rather scarce at the moment, but interest in German biomethane upgrade technology and cross-border trade from abroad is growing.

Several perspectives for development are still valid.

- There is still a significant potential for development (e.g. organic household waste, manure...)
- The future role of biomethane in the electricity sector will be to provide flexibility to the system (balance fluctuation from wind and solar energy); this role will become ever more important as the energy transition progresses;
- The transportation sector is a huge potential for biomethane. More Renewables in transport sector are needed but electrification is limited. Political support needed
- Independency of foreign gaseous sources might become a more important issue for the EU.
- Interest in Liquefaction of methane (and separation of pure CO<sub>2</sub>) is growing.

Concerning the next future, the next reform of the Renewable Energy Sources Act is coming up in 2016. A tender system is going to be introduced for all renewables with 2016 reform. The government is currently revising the electricity market system as a whole and has announced to make major changes to the current design by 2016. (Fossil) CHP-legislation is under revision, possibly with a new momentum regarding CO<sub>2</sub>-saving and chances for biomethane, also regarding future revision in 2018. THG-Quota in the fuel sector is to be implemented and proven in practice.

Finally, International barriers need to be addressed in order to provide market uptake

**Franz Kyrchmeyr (AKB)** provided a short presentation on the state of the art of biogas and biomethane in Austria, focusing on the currently feedstock used, mainly coming from renewable resources from agricultural land.

An overview on the biogas and biomethane developments in Austria in recent years was provided. The main figures are summed up as follows:

- CHP
  - ~ 290 plants producing electricity and heat
  - ~ 550 GWh<sub>el.</sub> + 300 GWh<sub>th.</sub>
- Biomethane production
  - 12 plants have installed an upgrading system and connection to the gas grid
  - ~ 2,500 m<sup>3</sup> installed capacity
  - ~ 15 Mio Nm<sup>3</sup> biomethane production capacity but not reached yet
- One new plant is running to treat spent grain and produce steam and heat

Concerning feedstock, the potential from bio waste, waste from farmland and farm fertilizer must not be neglected and biogas could be the key technology using the left over from previous production steps as food, feed or chemistry production and organic waste. Data shows the total potential of biomethane is around 535 Million Nm<sup>3</sup>, of which 70 are from bio-waste.

In Austria energy grids (power and gas) are well developed and fixing 2050 climate and energy targets without involving the gas grid is a great mistake.

What must be done to create a win win situation? FK answered to this question highlighting that, according to the expected forecasts, there would be a reduction of 2% per year in the energy demand and this would lead to higher grid costs and chain reactions. To contrast this, a possible shift to renewables is important to favour stable costs, renewable electricity on demand (2500 GWh<sub>th</sub> biomethane for power), renewable transport (1600 GWh biomethane) and, of course, mitigation of GHG.

Finally, among the main challenge identified, FK highlighted: the change in the used feedstock with a big potential from non-food/feed sources and the need for technology improvements. The current energy situation is not a driver for further development and, since 2050 climate targets are not taking into account developments in the energy grids, good cooperation between biogas/biomethane and natural gas stakeholders is necessary.

A big lack can be found in the missing political interest in biomethane and in the market demand. To conclude, a more favourable political framework is necessary and an agreement on political level about the future part of the gas grid and biomethane in a 2050 target is needed.

**Marie Verney (ATEE)** presented a brief state of the art of the biomethane development in France. Concerning political targets in France, a national call for tenders « 1,500 AD plants in 3 years » was launched in France in 2014 and also a national plan « EMEA » aiming at 1,000 on-farm AD plants was issued.

Moreover, the National Law on Energy Transition for Green Growth (LTECV) set several objective in the field of energy:

- Renewable energy : 23% of the energy mix by 2020
- Renewable energy : 32% of the energy mix by 2030
- **Green gas : 10% of the total gas consumption by 2030**
- Green fuel: 15% of the total fuel consumption by 2030.

In this framework, ADEME carried out prospective scenario for biogas development, estimating, in the best case, an increase of 80 unit/year (MW) in the period 2015-2020.

Concerning biomethane, targets were fixed for the injection of 1.7 TWh by 2018 and 8 TWh by the end of 2023.

Currently, 20 biomethane units are operating in France, mainly producing biogas/biomethane from agricultural feedstocks and in small part from agro-industrial waste and household waste. The annual injection volume in 2015 has been around 70 GWh, enough to cover the annual gas consumption of about 6,000 households, while in 2016 it reached 82 GWh/year.

In June 2014: 400 projects for the distribution grid and 70 projects for the transmission grid were developed and in February 2015 about 600 biomethane projects were started, 400 for the distribution grid, 200 for the transmission grid.

Feed-in tariffs are adopted as the main support mechanism for biomethane injection, varying from 6.5 to 12.5 cent/kWh depending on the type of feedstock used (agricultural input and agro-food waste, household waste, catering waste and public waste, etc.). The feed-in tariff mechanism is also applicable to biomethane as a fuel and upcoming evolutions are foreseen for electricity.

There are also other support schemes adopted for injected biomethane used:

- in households:
  - Subsidies
  - Domestic consumption tax on natural gas
  - Guarantee of origin (GoO) sold by the supplier to the customer (25% of the price goes to the supplier).
- As a fuel in transport:
  - Subsidies
  - Domestic consumption tax on natural gas
  - Guarantee of origin (GoO) sold by the supplier to the customer (100 % of the price goes to the supplier)
  - Tax incentives : exoneration on the cost of registration certificates for vehicles
  - Amortization of the purchase of a bioNGV vehicle (up to 18,300 € / year).

For non-injected biomethane, used as a fuel, no feed in tariff are foreseen as well as no guarantees of origin.

As for the mechanism of certification:

- The French guarantee of origin (GoO) system has been created in 2011
- The gas suppliers buy green energy to the producers and then ask the register manager to certify the production. The GOs are then sold to the customers as part of “green” offers. All the GoO operations (creation, transfer, use towards end customer, deletion of GoOs by GoO manager) are marked in the register.
- GRDF is the register manager for biomethane production (appointed for five years).

Finally, other incentives are set in support of biomethane:

- Priority to injection in the new governmental decrees on feed-in tariffs for electricity production for units over 300 kW (upcoming)

The legislation on large-scale producers of biowaste sets an obligation for these producers to recover their biowaste, with an increasing scope (see presentation for details).

**Kornel Kovacs (HBA)** provided a brief overview on biomethane in Hungary.

In Hungary the biomethane market is not yet developed (there are only 2 biomethane plants). Within the BIOSURF project the exchange of experiences is a big opportunity for learning and starting up the market.

Nevertheless, several activities have been undertaken to promote the theme of biomethane trade and registries. In particular there were and will be held events to discuss about this hot topic.

Then he focussed on the process behind the Power to Gas technology highlighting the sustainability criteria and giving a short explanation on the hydrogenotrophic methanogens process.

In August 2016, the conference “Biogas Science 2016” will be held in Szeged (HU).

**Lorenzo Maggioni (CIB)** introduced the state of the art of biogas and biomethane in Italy, focusing principally on legislation, outlining the main barriers and showing the effective potential of investing in this area.

Firstly, the BIOGASDONERIGHT model was introduced, which consists is a technological platform that combines Anaerobic Digestion (AD) technologies and other Industrial and Agricultural practices, that when applied synergistically are able to:

- produce additional carbon both in already farmed land and in land that suffer desertification or lowered productivity, especially in dry lands;
- simultaneously increase the World Net Primary Production (NPP) of farmland and lower the negative externalities associated with modern conventional agricultural practices;
- continuous increase (until an equilibrium is reached) of the organic content of soils sequestering carbon at the required scale (> 1 Gton C per year);
- realize this at very low cost;
- contribute at the same time to an ecological agricultural intensification.

As for biogas production, Italy holds the third position in the world after China and Germany. About 4 Billion € have been invested in the last 5 years in this sector. Actually, there are more than 1,800 biogas plants for a total installed capacity of more than 1,300 MW<sub>el</sub> and about 3 billion of biomethane equivalent Nm<sup>3</sup>/yr are used, for the moment, only for electricity production.

For what concerns biomethane, only 6 biomethane plants are in operation without connection to the grid.

On December 2013, the biomethane decree, which introduces and regulates the incentive system, entered into force and the main technical barriers have been overcome. Now in Italy it is possible to produce biomethane from agriculture and kitchen waste.

The new rules introduced with the Decree will apply to different kinds of plant and incentives will cover both new plants and the construction of upgrading units in existing biogas plants (for which incentives will be lower).

According with the Decree, *“The “natural gas grid” includes not only the transport and distribution grids of natural gas, but also other useful systems for the transport of biomethane as dedicated grids, the CNG trailers and distributors (gas station), including the agriculture, also not connected to the networks of transport and distribution of natural gas”*

Moreover the decree foresees different scenarios depending on the final use of biomethane:

**Case 1:** Biomethane injected in the natural gas grid:

- PREMIUM TARIFF linked to the market price of natural gas
- Duration of the incentive: 20 years
- Supplementary incentives for use of by-products and if < 500 m<sup>3</sup> CH<sub>4</sub>/h

**Case 2:** Biomethane used in transport:

- Issue of “CIC” (*Certificati di Immissione in Consumo di biocarburanti*- certificates of release for consumption of biofuels)

- 1 CIC corresponds to 10 Gcal
- A double counting is foreseen for use of by-products and waste (1 CIC - 5Gcal)
- Duration of the incentive: 20 years

**Case 3:** Biomethane used in high efficiency cogeneration plants:

- there are different incentives according to the feedstock used, the installed capacity of the plants and their working life. This scheme of incentives is under review but will not be very different to the one proposed in the Decree.

Beyond this strong recent development, several weakness can be identified in many uncertainties concerning the quality parameters and quality measurement, the value of certificates and the specification on the injection into the grid. During the next Summer a new Decree for biomethane subsidies will be published and, hopefully, many of these issues will be clarified.

The potential of biomethane is not to be overlooked, indeed, according to Italian Biogas Consortium a realistic development plan of methane/biomethane within 2020 should include:

- doubling service stations to 2,000;
- Doubling current means of transport consumption of CNG methane (preferably LNG) up to about 2 billion Nm<sup>3</sup> by 2020;
- Increasing biomethane consumption up to 25% of the total consumption, about 500,000,000 Nm<sup>3</sup>/year (bio-CNG or bio-LNG)

Currently, around 30 companies have obtained the permission to build new biomethane plants with sizes from 250 to 1,000 m<sup>3</sup>/h biomethane, using kitchen waste and agricultural feedstock.

Finally, LM concluded introducing a particular case study under development in Italy: Arborea project.

*Arborea* is a cooperative founded in 1956, with 248 shareholders owning farms with milk production. The goal of the project is to start producing LBM from manure by the end of 2017.

The main milestones and steps to reach the above mentioned objective are:

- March 31, 2016: closing terms for the tender's presentation.
- End of May 2016: contract signature and start authorization process.
- End 2016: start of construction of the plant.
- End 2017: completion of work and first LBM production.

**David Collins (REA)** provided a short presentation on the state of the art of biogas and biomethane in UK.

According to the RED targets, 15% of total energy in the UK must be from renewable (heat, electricity, transport)

The Renewable Heat Incentive, introduced in 2011, is the primary policy which supports biomethane in the UK and is the world-first financial incentive to promote the generation of renewable heat and biomethane injection.

Since 2010, the number of projects on biomethane increased exponentially from 1 in 2010 to more than 50 in 2015. According to data and forecasts there will be more than 60 projects in 2016 and an increase of about 20 projects per year is expected until 2021.

An overview of biogas projects by flow rate (m<sup>3</sup>/hour), CO<sub>2</sub> removal technology and feedstock can be found in the presentation followed by an overview of the total production, which reached 3.01 TWh in 2016, and RHI costs for the period 2012-2016.

Currently the UK total gas demand is around 800 TWh/annum, of which around 50% for domestic heating, 25% for power gen and 25% for industry.

The biomethane injected by end 2015 into the grid is around 2 TWh. The maximum potential estimated for biomethane by 2030 is around 20TWh.

For heat in cities there are few practical/economic alternatives: Biomass (air quality), heat pumps (do not work in very cold weather), district heating (too late to dig up cities).

Among the barriers to the development of biomethane, there are:

- budget restraints and future tariff decreasing
- availability of waste feedstocks
- the use of crops still under debate
- gas grid capacity
- cost of grid connections/delays
- energy content (CV) of biomethane v grid (propane)
- Sustainability Criteria- in force 5<sup>th</sup> October 2015
  - 60% GHG savings compared to GHG EU fossil heat average
  - Lifecycle emissions of < 125.28kg CO<sub>2</sub> equivalent (34.8 g CO<sub>2</sub>e/MJ) of biomass heat generated
  - Consignment basis – no averaging
  - Waste exempt – emissions up to the process of collection
  - Land criteria requirements to be introduced by April 2015
  - All existing plants will have to comply

### **Workshop – Setting the scene and introduction**

**Stefano Proietti (ISIS)** introduced the aims and rules of the workshop, with three sessions based on three topics:

- Sustainable biomethane production - Relevant Sustainability Criteria and Management practices in different countries
- Carbon foot printing within the context of the BIOSURF project
- Concept for biomethane cross-border trade administration and biomethane mass balancing case before the European Court of Justice

Different aspects connected with these topics were presented to the audience followed by short discussions of the whole group predominantly carried out by the present BIOSURF partners and some of the invited stakeholders.

The audience was very interested in the presented topics and there were many lively discussions during the get-together afterwards.

### **Sustainable biomethane production – Relevant Sustainability Criteria and Management practices in different countries**



The moderator **Kristin Sternberg (FNR)** introduced the fundamental EU regulations on sustainability in the area of renewable energies, which set the basic requirements and standards that needed to be transposed into national law. This was followed by a comparative analysis of the corresponding national regulations in the six BIOSURF countries (GER, UK, AU, HU, IT, FR) with a special focus on specific additional sustainability requirements or respective gaps in those countries. Furthermore, international and national management practices and sustainability verification/certification schemes were shortly addressed. In this context, one of the mentioned national voluntary sustainability certification schemes was presented: **Antje Fehr**, a representative of the organisation that issues the German label “Grünes Gas-Label –Label for Sustainable biomethane products” gave a more detailed overview of the involved measures and criteria for this specific voluntary scheme.

The last short presentation was used as starting point for further discussion. The moderator tried to encourage the audience to provide feedback on the presented topic and to share some own experiences with sustainability requirements and the connected verification procedures.

The most of attention was raised by the presentation on the Grünes Gas-Label. The stakeholders wanted to get more clarification regarding the trade of the certificate. Antje Fehr explained that the consumer takes the purchased volumes of gas from the natural gas grid and will receive the certificate for a corresponding amount of previously certified biomethane for an additional (premium) prize. Prerequisite for the trade and the transfer of certificates is the mass balancing of injected and withdrawn biomethane. Mrs Fehr further mentioned that the label is used in the free gas market and not in the supported one. The additional requirements of the label are mainly used for marketing reasons by the respective biomethane customers.

### **Carbon footprinting for biomethane in BIOSURF**

During the session “Carbon footprinting for biomethane in BIOSURF”, **Stefan Majer (DBFZ)** presented the topics related the GHG-assessment included in BIOSURF WP5 and first results of the WP. Amongst others, the specific challenges for the GHG emission calculations for Biomethane in the context of the EU RED sustainability certification have been highlighted. These main challenges are:

- The allocation of by-products: according to the RED methodology, by-products can only be allocated following their lower heating value. However, digestate as the main by-product of the biogas process usually has a high water content and can therefore often not be considered in adequately.
  - first results from D5.1 have been presented which include options to deal with this issue.
- GHG mitigation effects from the use of agricultural wastes and manure: The use of agricultural waste materials for biogas production can help to avoid emissions associated with the conventional storage and handling of these materials. However, accounting for this benefit within the GHG calculation for biomethane production is not clearly defined within the RED methodology.
  - the approach for D5.2 has been introduced. This Task will provide a database for future calculations

Stefan Majer explained the BIOSURF approach of dealing with the identified challenges to support the various stakeholders.

In the following discussion a number of specific points regarding this topic have been mentioned:

- One of the main challenges regarding this topic are the insufficient and incomplete default values for biomethane. We should discuss to which extent BIOSURF results could help to establish respective values for biomethane.
- Averaging of credits in calculation of greenhouse gas-emissions is not allowed and not possible, which makes the calculations difficult and extensive, especially for small plants.

BIOSURF WP5 should give some advice on the GHG calculators available.

### **Concept for biomethane cross-border trade administration and biomethane mass balancing case before the European Court of Justice**

The moderator **Attila Kovacs (EBA)** informed the participants about the work carried out within BIOSURF in relation to the establishment of the European market for biomethane. In the course of the project a concept for administering the cross border biomethane movements within the European natural gas network was elaborated.

A special purpose voluntary scheme is proposed under the name ERGaR (European Renewable Gas Registry) with the function of mass balancing of biomethane distributed along the European natural gas network. The core documents for the administration will be the European Biomethane Guarantees of Origin issued by the national biomethane registries.

ERGaR is intended to be the Europe-wide recognised organisation for administering and mass balancing volumes of biomethane virtually distributed along the European natural gas network. ERGaR will rely on the national biomethane registries as primary source of documentation and will follow jointly agreed procedures for issuing and cancelling Guarantees of Origin for consignments with export destinations.

The participants considered the initiative very important and timely and expressed support to the concept. A detailed discussion evolved about the interpretation of the terms „mixture” and „mass-balancing” (used in the RED and FQD) in relation to biomethane injected into the natural gas pipeline. The participants agreed the term „mixture” can be logically applied to the blend of fossil natural gas with renewable biomethane and – correspondingly the application of the „mass-balancing methodology” to this situation is appropriate.

A presentation by an invited speaker (**Dr. Max Peiffer**, energy lawyer) informed the participants about the running case before the European Court of Justice (E.ON Sweden vs. Swedish Energy Agency) which is directly related to mass balancing biomethane within natural gas systems.

The issue of sustainability verification was another topic of great interest. According to the RED and FQD such verification is mandatory for biomethane if used as transportation fuel. For other applications (electricity generation, heating) there is no Europe-wide commitment in place, but there are national regulations.

There was a consensus among the participants of the workshop that the cross-border biomethane administration scheme (ERGaR) should transfer the sustainability claims attached to the biomethane consignments.

### 4. Intermediate Lessons and Conclusions

The role of the biogas/biomethane associations in the countries of the project is being important in order to allow bringing together as much as possible stakeholders supporting the promotion of the biomethane economy and the possibility to favour its initial growth phase.

No matters the level of development of biomethane market in the project countries, all of them have to face and experience some obstacles, difficulties and uncertainties from the side of decision makers and/or business sectors.

In this sense, establishing and maintaining mutual trust and enabling a constructive dialogue between stakeholders can help authorities and business to solve or anticipate a number of issues that, if not removed, could obstruct further market development.

For example one problem raised by different groups of stakeholders is that often data are expressed on different reference basis like  $\text{m}^3$  biomethane compared to natural gas consumption,  $\text{CO}_2$ equi. kWh-1,  $\text{CO}_2$ equi. Head-1,  $\text{CO}_2$ equi tFM, etc, In this sense, more work is needed to harmonise and simplify such aspects

As for the inter-association cooperation, despite some barriers (first of all the language one), the dedicated workshops organised during the six-months consortium meetings provided an important opportunity to the stakeholders of the associations to open a window on the European dimension, thanks to the mutual dissemination and learning from different experiences: in this sense, they are an excellent opportunity to share what achieved in each country, also working as potential source of inspiration.

Moreover, for the consortium partners, we increased the added value of such workshops by combining them with technical visits as opportunity to “see with own eyes” some case study demonstration or other positive examples presented during the meetings. Technical visits are important steps to increase the discussion among the stakeholders, to improve the level of contacts, to facilitate the collection of data and the exchange of opinions and approaches adopted in solving the problems and facing difficulties.