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MINUTES

European Workshop on Biomethane

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Diamant Conference and Business Centre, Brussels

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MINUTES

1. Opening

Arthur Wellinger from the European Biogas Association, workshop moderator, welcomed the audience and introduced Silvia Vivarelli and Emilio Font de Monra to present the institutional framework under which the three workshop projects – Biomaster, GreenGasGrids and Urban Biogas – have been conducted.

1.1. Biogas and Biomethane in the Intelligent Energy Europe programme

Silvia Vivarelli started the presentation introducing the Executive Agency for Small and Medium-sized Enterprises (EASME), which replaced the Executive Agency for Competitiveness and Innovation (EACI) in January 2014 and has been responsible on behalf of the European Commission for the coordination of the three projects.

The Biomaster, GreenGasGrids and Urban Biogas projects have been developed under the Intelligent Energy Europe (IEE) Framework, whose main aim was to promote biomethane as vehicle fuel and for grid injection by creating favourable market conditions, shaping policy development and implementation, and to prepare the ground for investments, build capacity and skills, as well as to inform stakeholders and to foster commitment.

In total, 78 bioenergy projects have been conducted under the IE realm, out of which 22 projects have focused on biogas and biomethane.

Emilio Font de Monra briefly discussed the projects on biogas and biomethane. He mentioned that two of the projects - BIOGAS3 and BioEnergy Farm II – have just started and more information about the context and the development status of all projects can be accessed online under the [Intelligent Energy Europe homepage](#).

1.2. Latest EU policy developments in the field of bioenergy

At the beginning of his presentation, Andreas Pilzecker from DG Energy talked about the characteristics of biomethane and its advantages. Among the most important points, the broad use of feedstock for the production of biomethane, as well as the storage of biomethane were highlighted. Along with these advantages, other complementarities of economic, environmental and technological nature were presented. Due to its versatility, biomethane can be produced from many residues and co-products from bio-refineries, which is economically attractive. Furthermore, the co-product (digestate) is more environmentally friendly than artificial fertilizers, as it helps avoiding the release of methane emissions into the atmosphere. Thirdly, both feedstock and gas can be stored and used during energy peaks. Also excess electricity from solar or wind power can be used for the biomethane production in the “power2gas” process. Given these advantages, Andreas Pilzecker emphasized that biomethane is clearly underestimated as an energy source.

In the second part of the presentation, Andreas Pilzecker addressed the policy framework targeting bioenergy. Within this context, sustainability aroused as an important issue. In the EU there are 15 sustainability schemes for transport fuels and bioliquids, but none for biomass and biogas. Although it was considered to develop separated criteria for the latter categories, the Policy Officer stated that before 2030 there is most likely that there would be no initiatives of this type. One of the reasons underlining this position was that under the existing schemes there are some points, which address solid biomass and biogas.

The presentation continued with a discussion on the Update of Annex V from Renewable Energy Directive (RED). The co-digestion was identified as one of the first and most important issues when it comes to the update. The emphasis was put on the necessity to clarify this problematic. A more precise regulation

outside the master framework should exist so that the advantages of using biogas as an environmentally friendly energy source as well as its co-product digestate as a natural fertilizer, can be demonstrated. Also it was pointed at the difficulty to quantify nitrogen oxide emissions for biogas. A last point in the discussion on the Update of Annex V from RED referred to the fossil fuel comparator. Andreas Pilzecker showed openness and mentioned that the Commission is in favour of replacing diesel through biodiesel, natural gas through biogas. However, the switch for the engine is covered by another directive, namely the transport directive.

ILUC (indirect land use change) was the next topic of the presentation, followed by clean power for transport and further policy areas that target biomethane. At the end, the 2030 communication was analysed, with the remark that biomethane is fully included in the 40% GHG reduction target and that this target should be achieved through Emissions Trading Scheme (ETS) or the Effort Sharing Decision (ESD) for non-ETS sectors.

With regard to the 2030 GHG reduction “target”, Andreas Pilzecker explained that the reason behind the formulation of a non-binding policy on a national level was to empower Member States to commit to national-specific targets. Furthermore, it was explained that a 40% GHG reduction target would encourage by itself a greater share of renewables in Europe.

The Dos and Don'ts in the transport sector beyond 2020 pointed mainly to two aspects. Firstly, there should be no public support for food-based biofuels. Secondly, the focus of policy development should be on improving the efficiency of the transport system.

The policy around biomethane in particular should concentrate in developing standards for the use of fuel and for grid injection, as well as on building a better harmonization of support schemes among Member States.

With regard to the biomass policy, maximizing the efficiency of the resource use and improving the sustainability framework were pointed out as being key issues on the post-2020 policy agenda.

With this, the presentation of Andreas Pilzecker concluded and there were no questions raised by the audience.

1.3. Biogas from waste in five European cities: the UrbanBiogas project

In a first step, Dominik Rutz presented the context of the project: develop the waste to biomethane supply chain in five cities.

The first step was to bring together all stakeholders (Waste companies, Consumers, Municipalities, Biogas plant operator, Biogas plant operator, Gas utility, Technology supplier, Biogas plant operator, Gas utility, Public transport sector, and Filling stations) in order to move forward with the implementation. The efforts to bring on one table the stakeholders of the first two segments of the supply chain (Waste Management and Biogas Production) resulted to be the most difficult task in the project.

The idea to focus on the treatment of municipal waste sector emerged from the discrepancies between the EU countries. Given Austria as an example, Dominik Rutz explained the motivation to start the project. Back in 2010, Austria was very low developed in terms of municipal waste treatment, anaerobic digestion (AD) not even being conducted at that time. In 2012, however, the evolution was remarkable, Austria managing to secure a top position among other EU member states and to build a significant number of AD plants.

The next part of the presentation explained the benefits of AD. While landfill does not provide any benefits and should be banned in the view of Dominik Rutz, incineration is not efficient and household/industrial

composting do not use energy, AD provides a high energetic output and can also generate fuels for the transport sector.

Directing his attention towards the project itself, Domink Rutz reminded participants the objective of the project, presenting the involved stakeholder, the challenges faced and the results. The aim was to promote the use of organic urban waste for biogas production in five target cities in order to inject biomethane in the natural gas grid and to use it in transport. This initiative was pursued in Austria, Croatia, Portugal, Poland, and Latvia. Progress has been made on the implementation side and currently most of the cities prepare for the tender.

At the end of the presentation Dominik Rutz pointed at the projects' website, where more information, pictures and reports can be accessed and downloaded: [<http://www.urbanbiogas.eu/de>].

1.4. The GreenGasGrids Project: Boosting the European biomethane market

Sandra Rostek presented the GreenGasGrids project on behalf of Axel Blume, who could not attend the workshop. At the beginning of the presentation she expressed her excitement about the achievements of this project, which was initiated in 2008.

The advantages of biomethane and the challenges of the project were presented at first. The lack of knowledge about biomethane was identified as the first important challenge. Since 2008 this challenge has been strategically addressed and even though it has not been completely overcome, there are currently 250 upgrading plants in Europe, whereas 200 of them inject gas into the grid.

Sandra Rostek emphasized that there are many business models opportunities but many more challenges to face. Other obstacles on the national level address the long planning procedures, low demand, few natural gas vehicles, lack of technical specifications and high investment cost. On the EU level on the other hand the lack of EU-harmonization, the absence of technical standards and of cross border tracking and certification, as well as the low public acceptance for biomethane (food vs. fuel) were identified as the most important.

Within the GreenGasGrids project a Consortium formed of industry and national body has committed to improve the situation and has provided support in the areas of sustainability, with technical aspects, with trade and legislation. Only few details were presented on these points, given that these were to be presented later during the workshop.

1.5. The Biomaster Project: biomethane for transport

Stefano Proietti presented the advantages of biomethane and the scope of the Biomaster project, which he has been leading.

The aim of the project was the uptake of biomethane production, distribution and use in vehicles. To achieve this aim the project stakeholders have been working on different challenges both on the EU and national level, among others on biomethane standards, the injection of biomethane into the natural gas grid, simplified permissions for building biogas plants, economic incentives or the improvement of the energy efficiency of gas vehicles. These points have been addressed mostly through "wheel-to-wheel" partnerships and the set-up of networks.

The results so far range from the establishment of four regional networks and the development of four detailed feedstock assessments, over the release of communication products in the form of newsletters, publications and reports and up to the building of five new rural biogas plants, one new injection point, five new public filling stations, 65 filling points for CNG buses, 2768 new CNG personal vehicles and about 800 CNG buses.

The conclusion drawn from the conducting of the Biomaster project was highlighted by Stefano Proietti at the end of his presentation. He pointed out that biomethane represents a viable solution for now and not only for the future, but this can be only pursued in the presence of a favourable and stable policy – which he pointed out to be a critical element of development, as well as of legal, economic and fiscal frameworks. Furthermore, technical developments to reduce costs and improve efficiency are needed.

1.6. Questions and Answers

A round of Q&A followed.

The first question addressed to Dominik Rutz covered the potential use of gases from landfill. Rutz explained that there have been discussions in this sense among the Consortium members and although theoretically the existing landfills should be covered and the released gases should be captured, there are more arguments in favour of waste separation. Firstly, the latter allows the recycle of materials in a more precise and efficient way. On the other hand, when it comes to the production of biogas, the substrate needs to be of high quality and it is not allowed to contain any impurities, such as gas or plastic. Therefore, the focus should be on separated waste collection for biogas plants. Depending on different national regulatory frameworks there were, however, different opinions on this issue in the Consortium.

The second question referred to the tracking systems for biogas and was addressed to Sandra Rostek. There was implied that biomethane could benefit from the same tracking systems as the ones for electricity generation. Sandra Rostek replied that there were analyses conducted on this subject and whether tracking systems for electricity might apply for biogas as well, but this is not the case. She further pointed out that one of the presentations that would follow would address this issue in a more detailed manner.

2. Markets and Policies

2.1 Biomethane Markets and Policies in Europe

The second part of the workshop was moderated by Sandra Rostek, who introduced as first speaker Sabine Strauch from Fraunhofer UMSICHT. In her presentation, Sabine Strauch talked about the context of biomethane markets and policies, focusing on the financial aspects.

At the beginning of the presentation, the characteristics of biomethane and the status quo of the deployment of biomethane plans in Europe was presented. Afterwards, the financial support schemes, both direct and indirect were introduced and discussed.

Sabine Strauch stated that the pioneer in the field of biomethane, Sweden succeeded to encourage biomethane production through tax exemptions. The latest developments in Germany are positive due to the same mechanism provided by FIT. Sabine Strauch also introduced the new comer countries and mentioned that a great development is expected in emerging markets such as France, Italy and UK.

In every country the FIT functions differently. Sabine Strauch presented the German model for the FIT and narrowly talked about the policy framework in the UK, in Italy and in France.

Germany is a special example as beside the main support system FIT for electricity, support is also provided for utilisation through the biofuel quota and tax reductions. Furthermore, Germany introduced measures for the grid injection to cover the cost for the grid injection itself and transport. Although the framework seems favourable for the development of the biomethane sector, Sabine Strauch expressed her concerns about the Renewable Energy Act (EGG) revision and pointed out that municipal waste should be encouraged, upgrade should be remunerated and landfill should be banned.

Referring to another support scheme, which is investment support, the Swedish model was presented. The advantage of this model is that specific target groups can be addressed, but no incentive is provided for operation. In Sweden this comes in the form of tax exemption or tax benefits for companies.

By the end of the presentation participants were encouraged to be aware of the special value, storability and flexibility of biomethane, but also of the importance to balance the support mechanisms between production and utilization. In this regard, it was further stated that the electricity quota is not successful, as the storability of biomethane is not addressed.

2.2 Biomethane Road Map and Certification

Attila Kovacs began his presentation with the remark that the benefits of biomethane will not be recapitulated. Instead, he stated that he will concentrate his presentation around the biomethane road map developed within the GreenGasGrids project.

The vision of this roadmap was the development of the biomethane industry until 2030 with the mission to achieve a target of 18-20 m³ of biomethane production in Europe. A supply potential matrix was shown to present this idea. The basis of this matrix was supported by technical elements, Attila Kovacs emphasizing that the biological methanisation on an industrial scale was taken into consideration.

The way forward to achieve this goal was presented through a list of suggested action plan items, which included among others the national biomethane registries, the coordination with major stakeholder, the development of the CNG/LNG infrastructure, the reduction of the GHG from the biomethane production, as well as the development of technical standards for biomethane and the public awareness. Out of these points the compatibility of registries for international trade and the development of local markets proved to be the most crucial one. Attila Kovacs emphasized that the sooner steps are done in that direction the better it is.

2.3 Standards of Biomethane

Mattias Svensson started his presentation about the standards of biomethane emphasizing the importance of their development at the national level. Currently these standards are still in revision. Figures from 2010 and 2011 were presented in this context, revealing some recent developments, i.e. in the Netherlands the level set for Siloxanes (mg/Nm³)= 0.08.

The most important and less important parameters for non-conventional source gases were discussed step by step afterwards, with some of the following observations: halocarbons, which raise corrosion and health concerns, have a low risk probability since levels are generally low; volatile metals have a low risk probability and are not present in biomethane. An American study on the health and corrosion risks associated with biomethane has been conducted but without any conclusive remarks and drying is very important as it reduces the risk of corrosion.

In the second part of the presentation, Mattias Svensson talked about CEN's formation and mandate. It was the lack of standards at the European level, which led to the creation of a committee (CEN) with the mandate to elaborate standards on CNG and biomethane (compatible fuels to be standardized at the same time). The committee mandate period began in 2011 and stretches until 2015. In parallel to the work of CEN a project committee CEN/TC408 is in charge of facilitating the joint work between the gas and automotive industry.

A picture showing the work of CEN was displayed, showing the structure of the standards related to biomethane – part 1: grid injection; part 2: automotive specification.

The different expert groups (EG) involved in the work of CEN were presented. EG 2, EG 3 and EG 4 were introduced as the most important groups as they are in charge of health criteria to determine on which

levels we are safe. Within this context, Mattias Svesson said that the most animated discussion was conducted on the sulphur levels. With regard to CO, the health criteria work come to the result of 3%, but for public acceptance a lower level of 0.1% was suggested. The level of siloxanes was another important issue on the list of health criteria, which led to disagreements between the automotive and grid businesses. While the automotive industry wanted 0.1 mg Si/Nm³, in Sweden 0.5 mg Si/Nm³ was reachable for vehicles, whereas in the grid up to 5 mg Si/Nm³.

The GreenGasGrids impact on the standardizations work made the last point of the presentation. In this regard, two points aroused:

1. EBA, NGVA Europe and NGVAE affiliate SGC jointly discussed the matter at hand, publishing discussion papers. A final report on the biomethane standardization is to be released soon.
2. The GreenGasGrids project members added national actors with quality gas information to the discussions.

2.4 Sustainability of Biomethane

William Mezzullo talked about the sustainability of biomethane.

Within the GreenGasGrids project the sustainability working group aimed to: understand how the latest sustainability criteria elaborated for biomass and biogas by the European Commission can apply to biomethane, analyse different national sustainability criteria, identify key issues and formulate recommendations on the sustainability criteria implementation for biomethane.

William Mezzullo gave the public an insight into the Renewable Energy Directive (RED) criteria and described on what the sustainability working group has worked. In a first stage the groups reviewed the national sustainability schemes and the impact of these criteria on the biomethane market. The key findings were presented in a discussion paper.

Secondly, the group assessed the lifecycle of the biomethane production chain, concentrating on areas of the production chain that are most responsible for GHG emissions. Accordingly, recommendations for reducing the GHG emissions were formulated. Among the key recommendations, a critical aspect regarded the nitrogen inhibitors: in the final paper it was recommended to reduce the process of nitrification. Increasing proportions of nitrogen were identified in the soil. Other recommendations included the minimising of the transportation distances for feedstock, the introduction of methane slip detection systems to avoid methane slip from biogas and biomethane upgrade or the coverage of liquid digestate storage to avoid the release of methane emissions.

A comparison between existing criteria and leaked directive followed. The leaked document, which was released in August 2013, proposed an immediate GHG reduction target of 60%. In comparison, RED proposed the same target to be implemented from 2018 only. The amounts of CO₂ per MJ differed in both documents, whereas the figures in the leaked directive were lower and more concrete – CO₂ level for grid gas injection was included: 69g CO₂ / MJ.

On a following slide William Mezzullo showed the GHG Comparators in detailed and explained that the aim of this kind of analysis, which includes GHG reduction against fossil comparators, should be the removal of coal and not of natural gas.

In order to respond to the question whether it is possible to meet the European Commission's sustainability requirements the working group analysed both industry and academia data, while construction worst and best case scenarios for the GHG reduction. An important observation of the literature review was that there are remarkable discrepancies between academic data and industrial data.

Nevertheless, based on academic sources and information from the industry, the GHG lifecycle assessment was accomplished and the aims of the project, which were highlighted at the beginning of the presentation, were reached.

2.5 Questions and Answers

The second round of Q&A started with a question on the sustainability criteria for solid biofuels and biomass. It was asked how the lack of sustainability criteria affects the practical work in the field of biomethane. It was replied that there are countries, such as the UK, which develop their own sustainability criteria and made them mandatory. In that case, these criteria must be respected.

How could the biomethane sector function without subsidies was the next question addressed to the speakers. Attila Kovacs provided the answer. He stated that if all benefits of the production of biogas and biomethane, including among other the GHG reduction and the replacement of artificial fertilizers through digestate, were to be considered and utilised in a market oriented manner, the biomethane sector would not need any additional support of financial nature. Nevertheless, this is a future scenario and implies the development of several fractions of the market and above all the crucial support from politicians.

III. Value Chains and Case Studies

3.1 Securing feedstock for biomethane production in Norfolk

After the break Stefano Proietti moderated the third section of the workshop – Value Chains and Case Studies.

James Thorpe started with an introduction about Norfolk, which is a county in Eastern England with a large energy industry. He continued with a presentation about the Norfolk County Council, which is the local authority that has been in charge of developing a regional network and also co-ordinating work concerning the biogas production and upgrading addressing all stages at the top of the biomethane chain from feedstock, through production to upgrading to the appropriate quality for distribution. The work also considers the use of by-products and residuals that result from the production process.

James Thorpe highlighted that the Biomaster project in Norfolk started with a sustainable feedstock analysis, which took into account domestic and commercial waste, as well as sewage. It was pointed out that in Norfolk there is a total potential of 119.000 tonnes, which is mostly collected. The highest potential comes, however, from agriculture; there is a high amount of agricultural waste that should be managed better.

Within this context, the barriers for the conducting of the Biomaster project in Norfolk were presented:

- Norfolk County Council does not collect the waste and therefore it does not have a control to secure feedstock
- Norfolk County Council is a local authority with elected members, and there is the risk that when new people are elected, the support for the project diminishes
- In Norfolk there is no main source of waste, which makes collection difficult
- The competition is high, as there are already composting facilities

However, James Thorpe said that local politicians were excited about AD. Therefore the Norfolk County Council set up a company, Norfolk Energy Futures, which has planning authority and uses the expertise to bring benefits to the project.

The feedstock in Norfolk is much diversified and currently the project members analyse the best options to be used for AD, while working on creating a successful network which would insure political support.

On the other hand, the learning from other regions, which have been confronted with similar problems, represents an important of the project setting.

James Thorpe pointed out that potential for this kind of project was great in the region, as it has a large coastline, which might even allow algae as a potential feedstock.

3.2 Plans for a Biomethane Plant in Graz

Ernst Meißner delivered a presentation about the Biomaster project in Graz, Austria.

Ernst Meißner started with an introduction about Graz. He mentioned that the waste collection in Graz started in the 1980s, when residual waste and bulky waste were separated. In the 1990s started the separated biowaste collection and in 2012 there were 34,000 sites with separated biowaste collection. The problem about biowaste in Graz is that it is composted and not used to produce energy. In average there are 45 kg of organic waste collected per inhabitant – about 8% of the population in Graz is composting their biowaste in their gardens.

This statistic led to estimate the potential of organic waste at 47,500 tonnes/year for Graz and 22,000 tonnes/year for the surroundings of Graz. In total, this amount would be the equivalent of 5.3 m³/year of biogas and accordingly 3.2 m³/year of biomethane.

The stakeholders involved in the development and implementation of the Biomaster project in Graz and also the fields of utilisation of the produced biomethane were presented in a further step. With regard to the latter, the public transport sector, but also the fleet of the waste collecting trucks were mentioned as potential customers.

However, Ernst Meißner pointed out that there are still obstacles to be overcome in order to successfully complete this project. Among the main hurdles, the public acceptance, the high investment costs and finding a good location for the construction of the plant were mentioned.

So far, the tender for the planning works was realised and locations were evaluated. With regard to the latter, positive signals were received by the end of last year and works are on the way to schedule the start for the detailed planning.

3.3 Biomethane developments in Tretino, Italy

Silvia Silvestri was introduced to present the status of the Biomaster project in Tretino, Italy. The presentation started with a short analysis of the national framework, which firstly showed the fact that Italy is the third country in Europe for biogas production. Secondly, the national presentation revealed the legislative framework. By the end of 2013, a new law, which defines incentives for the production of biomethane plants, was approved. These incentives apply for new plants and there is double counting for some sorts of waste. To finalise the discussion on regulations, Silvia Silvestri pointed out that there are some technical annexes that are still awaited for the concrete boosting of the market.

Coming back to the project, Silvia Silvestri presented the Tretino region, which has 2 farm AD plants in operation, 1 AD and composting plant from food waste, 5 CNG filling stations, 34 CNG busses and 3,000 CNG private vehicles.

The Biomaster project in Tretino runs in two sites, Primiero and Cardino and includes the development of a strategy for 100 biomethane vehicles. The plans for the first site were to organize the feasibility studies, the planning, the construction and operation works for one centralized biogas and upgrading plant. However, due to some difficulties in finding a suitable location for the plant and the very low acceptance of the people living at the proposed site, the works at this site are now in standby.

At the other location the first AD plant was constructed in 2012 and currently feasibility studies for upgrading are conducted. The aim of the Cardino project is to collect 50% of the food waste and separated waste produced in the region. The methane production of this plant is by 60% and there are plans that 35% of the biogas produced to be upgraded to biomethane.

In this context, Silvia Silvestri showed the area of the AD plant that is to be dedicated to the production of biomethane and the figures showing the planned biogas input and biomethane output. Silvestri further mentioned that the direct use of biomethane in FS is much more convenient; the connection to the grid is associated with very high costs.

The technical partner for the project was identified, whereas the upgrading technology, related costs and business plan need to be still defined, along with the final uses for the produced biomethane.

The last part of the presentation focused on conclusions. Silvia Silvestri confirmed the potential of biomethane in Italy and said that the aim is to improve the production chain. She further emphasized that the Biomaster project in Tretino was effective in promoting biomethane, so that the new planning tools adopted in Tretino (Energy Plan, Biomass Action Plan) include biomethane and biofuels.

3.4 Waste collection challenges for biogas production in Zagreb, Croatia

The presentations round continued with an example from Zagreb. The speaker, Bojan Ribic He started his presentation describing the waste composition of the city of Zagreb, as well as other characteristics of the city – Zagreb City Holding, Waste Management Division.

The Waste Management Division is in charge of maintaining the cleanliness of public areas and waste management. The landfill in Zagreb is about 300,000 tonnes / year. The recycling in the city includes 6000 containers and bins for paper, glass, plastic, biowaste and metal on public places, as well as 9 recycling yards for 20 types of waste.

Bojan Ribic presented a graph of the waste composition, which highlights that 26.5% of the waste is kitchen waste and around 4% is garden waste. In total, the amount of organic waste reaches 600,000 tonnes / year.

The City of Zagreb started to collect biowaste from household and it realized that more than 50% of the collected separated waste is biowaste. Following this acknowledgement, the collection of waste from malls and cafeteria also started. The challenge for this is, however, that the plants cannot use the waste that the project partners would like to collect, as the restaurants have also animal rest and salt and these impurities cannot be removed. Nevertheless the planned plant capacity would be by 20,000 tonnes / year.

3.5 Strategies for biomethane production in Skåne

Carina Sühnel presented the case of Skåne. The Biomaster project in Skåne is a regional collaborative project led for and by stakeholders within the biogas field in Southern Sweden. Under the name of Syn Biogas this network aims to increase the production and consumption of biogas in the region.

The biogas production and upgrading in Skåne is of 300 GWh. Carina Sühnel said that in Sweden there is no extended gas grid, the gas grid is just on the West coast. She further stated that the politicians are to solve this issue – who would pay, which part would be extended. Syn Biogas has been developing a strategy for the extension of grids, which is according to Sühnel very concrete and up to date. From last year on five new public stations have been build, but in the view of Syn Biogas this is not enough, as there is also the need for more cars running on biomethane in order to make the production profitable.

The map of a functioning market developed by Syn Biogas was presented afterwards. Carina Sühnel re-emphasized in this context that more filling stations need to be built in good locations as to make them profitable.

An example of the success of the Biomaster project in Skåne was then presented. Almost all of the busses owned by the public transport company in Skåne run on gas and the goal is that in 2020 all of them will run on gas and hopefully on biogas / biomethane.

The positive news that came along with this last point was that last year the Ministry of Rural Affairs in Sweden announced that there would be a special incentive for biogas, which would favour the upgrading to biomethane.

3.6 Plans for a dry fermentation plant in Valmiera, Latvia

Mārtiņš Niklass from ZAAO presented the Biomaster project in Valmiera Latvia. He started by presenting the company in charge of the project, ZAAO. The company was founded by North Vidzeme regional governments in 1998 and provides services in the field of waste collection and depositing.

Martins Niklass talked about the difficulty to introduce separated waste collection in Latvia. He further mentioned the regional MSW facility – landfill Daibe, which was built with co-financing from the European Union and has a total waste disposal of 12 ha.

The MSW facility in Valmiera is in accordance with the EU law, a new Directive from July 2013 requires all MSW landfills in Latvia to reduce landfilling of organic waste by 50%. Currently the organic fraction of MSW is composted. In March, however, there will be a public tender, for the dry fermentation AD plant construction.

At the end of his presentation Martins Nikklas pointed out at the capacity of the plant – 9,000 to 10,000 tonnes / year and said that the planned total investment is EUR 2,043,443. Although the design of the plant has already been planned, the public is not ready yet to pay the price. For this reason, Martins Nikklas stated with concern that in case the public tender is not successful, the funds received from the European Commission to undergo the Biomaster project in Latvia would need to be returned.

3.7 Questions and Answers

The first question was addressed to Martin Nikklas and focused on the level of implementation of the AD plant in Valmiera. Nikklas said that for the public tender all building permissions exist and also the size of the plant is set. However, the treatment volume and the technology must be decided by the future supplier. Regarding the investment costs, he said that these are based on market research and estimated at around EUR 2 Mio.

The second question was directed to Carina Sühnel and referred to the factors that could be accounted for the success of Skåne. Sühnel said that the political support was the most important. The regional organisation in charge of the project organised the roadmap to secure the success of the project. A follow up question addressed the role of the industry. Sühnel pointed at Fredrik Luthman from Kraftringen Energi AB, which was present at the workshop from the Swedish side. He highlighted the good cooperation that has existed between business and policy. He also said that the energy companies are distributing 50-50% bio-natural gas due to a supportive legislation, which promotes tax exemption. Carina Sühnel completed the answer and said that strategies prepared by Syn Biogas for the filling stations are elaborated in tight cooperation with the industry.

The third question targeted the public acceptance of biomethane. The answer came from two project partners. It was said that transport companies play an important role to shape social acceptance for biomethane. People hardly see the merits and biomethane is not broadly known. The public is also

concerned about the smell. Nevertheless, when it comes to biomethane to be used as a transport fuel, the acceptance is higher. In this context Carina Sühnel said that the aim of Syn Biogas is to make the transport company in Skåne run only on gas.

IV. Conversion Technologies and Utilisation of Biomethane

4.1 Injection of Biomethane in the Natural Gas Grid

John Baldwin reviewed the UK project on biomethane to grid. He started with a short introduction about the Renewable Energy Association and then referred to the UK Gas Transmission Network. The UK Gas pipeline network is very established for gas and shale gas, serving 20Mio customers.

The reasons why biomethane is a particular fit for the UK represented the next section of the presentation. In this context, the barriers that were overcome 2007 and 2013 were pointed out. Through the feed in tariffs a favourable environment for the introduction of biomethane was created (attractive rate of 9 cents / kWh). Also the population became aware of the importance of biomethane and an effective biomethane supply chain was created.

In a next step, John Baldwin provided a summary on the ownership model that was agreed on. The biomethane producer funds, owns and operates the Grid Entry Unit and the Gas Distribution Network provides capacity in the gas grid without owning any physical assets on site. Through the removal of monopoly and the support of competition it is possible to cut the costs from EUR 1Mio (1st unit) to EUR 400,000 (the current price of one unit).

A description of project itself followed. UK's first commercial project was at Poundbury. The next was constructed in Vale Green and used vegetable waste, managing to also achieve CO₂ efficiency through the separation of CO₂. 75% of the gas produced at Vale Green went to grid.

The next presented project – Biogas Doncaster uses agricultural feedstock and injects 80% of the produced gas to the grid with 499 kWh CHP. In this regard, John Baldwin emphasized that every project should have CHP.

On the next presented project – ReFood Widnes, it was stated that work is done to facilitate the injection to grid for the second quarter of 2014. The plant would use food waste feedstock and inject 100% of the gas to grid.

John Baldwin continued with the presentation of other projects, among others one in Scotland that would be commissioned in late 2014 and would be the biggest of any biogas-to-grid facilities constructed so far. He further gave the news that the one of the projects – in Fraddon, received the approval on the day of the workshop.

What REA does within the Green Gas Grids project is to categorise projects according to the sectors defined by the Green Gas Grids project. In UK the 2015 subsidy forecast is EUR 200 Mio, which would cover 0.7 % of domestic customer gas demand. According to John Baldwin this represents an important reason for the need of shale gas in UK.

The conclusions of the presentation were summarized at the end with the remark that there should be a focus on reducing the capital costs for grid entry unit. In the UK a 50% reduction was achieved within the last five years and according to John Baldwin there should be ways to reduce the costs for biomethane equipment in order to boost the biomethane market.

4.2 Overview on Biogas Upgrading Technologies

Michael Beil, gave an overview on biogas upgrading technologies. He firstly presented the status of biogas upgrading in Europe, giving recommendations for technology selection afterwards.

Stating that there is no best upgrading technology, Michael Beil, said that it is important to first define the evaluation criteria before starting to plan a project and call for tenders.

The existing biogas upgrading technologies were presented and explained next.

4.3 Biomethane in Transport

The last speaker, Marco Tassan, presented important aspects of the biomethane use in the transport sector. In the first part of the presentation he showed the EU transport picture and the associated CO₂ emissions. A graph on the developments of the last years confirmed that the CO₂ emissions of the transport sector grew, whereas the emissions from other fields, such as agriculture or energy, decreased.

Within this context, but also because the price of excess emissions will grow from the present value of EUR 5 for the first g/km above the set limit to EUR 95 g/km in 2019, a range of actions are undertaken towards the CO₂ reduction in the transport sector.

Marco Tassan presented these actions and referred to the Fiat Group, which managed to achieve the lowest average CO₂ emissions among the large manufacturers. Downsizing – shift to smaller and lighter vehicles and the increasing share of alternative fuel vehicles were two of the actions presented.

How alternative fuels, i.e. methane, might contribute to the CO₂ reduction was shown in the next step. Ecological, economic and safety advantages were highlighted, with the remark that biomethane presents the same ecological advantages as methane.

Another alternative presented, next to biomethane was hydro-methane, which is made of organic waste and uses the properties of hydrogen.

The use of gas for vehicles has made the topic of a survey within the Biomaster project, with the aim to evaluate the degree of acceptance and awareness towards gas and biomethane. The results of the survey were that the perception of NGVs is good in general and customers are satisfied, primarily because NG/Biomethane vehicles saves them fuel. Also the environmental aspect represents a decisive factor for choosing a NGV.

The conclusions drawn by Marco Tassan at the end of his presentations highlighted the fact that fuels from renewable energy sources, such as biomethane have great opportunities for development and will play an important role in the near future, as the target is to reach 10% by 2020. For this to happen, Tassan emphasized the importance of taking a system approach towards the development of the biomethane supply chains and involve all stakeholders.

4.4 Questions and answers

The last round of Q&A started with a question addressed to Michael Beil. Referring to the statement made by John Baldwin that that the cost reduction for upgrading and injection technologies should be possible in the near future, it was asked whether he shares this view. Michael Beil firmly stated that does not think this is possible. In Germany the potential for cost reduction is limited. He estimated a cost reduction of 10-15% but not higher.

The last question directed to Michael Beil was how to improve the efficiency of biogas production. Michael Beil responded that the current legislations in Germany are not favourable on this aspect (the highest FiT apply for plants up to 75 kW). He was, however, positive about Europe and the regulatory development on the European level.

V. Closing of the Workshop

Following the last questions round, Arthur Wellinger thanked participants, organisers and project partners for their presence, summarized the day and drew some conclusions of the workshop. He said that very important steps have been done to develop the biomethane market, but the status quo does not represent the end of the story. He further emphasized the need of more projects, a more market oriented approach and the need to attribute sustainability a bigger importance.