



D.2.1 Compilation of reports and tools for regional biogas deployment

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1 Introduction

The report aggregates information on European projects concerning biogas industry, relevant tools developed at national level of the project partner countries, local preconditions in these countries and a list of interesting anaerobic digestion plants.

The report is divided into four main sections. Chapters 2 and 3 bring a highly comprehensive review of existing projects and tools concerning the biogas industry both on Pan-European and national levels. Each of the chapters starts with a comprehensive overview in form of a table and a concise assessment.

The European projects are listed in chronological order. The national tools are listed according to the country of origin. The overview of European projects is followed by a detailed description of each project listing the particular tools, proven results and outcomes, boundary conditions and limitations of the tool's applications, geographical scope and target audience as well as the list of the project partners. The report covers a wide range of projects on different topics such as biogas production and utilisation, economic and sustainability calculators, guidelines, documentation for banks and other financial institutions, information material for the near neighbourhood and the general public, evaluation of regional waste and feedstock potentials that were developed in the past. The national tools are also summarised in form of an overview table followed by detailed description of a particular tool, its proven results, boundary conditions, target audience and geographical scope.

Apart from the above mentioned projects and tools that were focusing on the development and support of the biogas industry Chapter 4 brings a description and assessment of local preconditions and successful and interesting biogas plants from participating countries based on data obtained during the survey that was spread within the project partners. The information on the local preconditions such as the public opinion on renewable sources of energy, the trust in the government, support schemes, their notification by the European Commission and the financing schemes are summarised in form of an overview table followed by a brief assessment of the results. Chapter 4.2 starts with an overview table and a brief assessment of the interesting anaerobic digestion (AD) installations, which is followed by detailed information for each particular AD plant providing information on investors, investment and operational support and conditions, substrates used and energy and digestate usage as well as the involvement of the region.

Conclusions bring the collation of results obtained from the assessment of the data collected, where the comparison between European and national tools are given as well as a summary of information on local preconditions and interesting AD plants.

2 European Projects

2.1 Overview of the projects developed at European level

An overview table (see Table 1) lists comprehensive information on biogas related projects developed at European level. The projects are listed in chronological order. The table shows the project topic, which types of tools were developed, who was the target audience and its geographical scope as well as the related chapter where detailed information on each project can be found.

There were 22 projects on biogas compiled covering a wide range of topics such as sustainable production of biogas, its usage in the form of combined heat and power production or biomethane, efficient heat use and biomethane use as a transportation fuel. Some projects focused on manure or urban and food and beverage wastes processing through anaerobic digestion technology. There were many tools developed since 2001 when the first project started.

2.1.1 Type of tools

Figure 1 shows number of projects providing certain types of tools

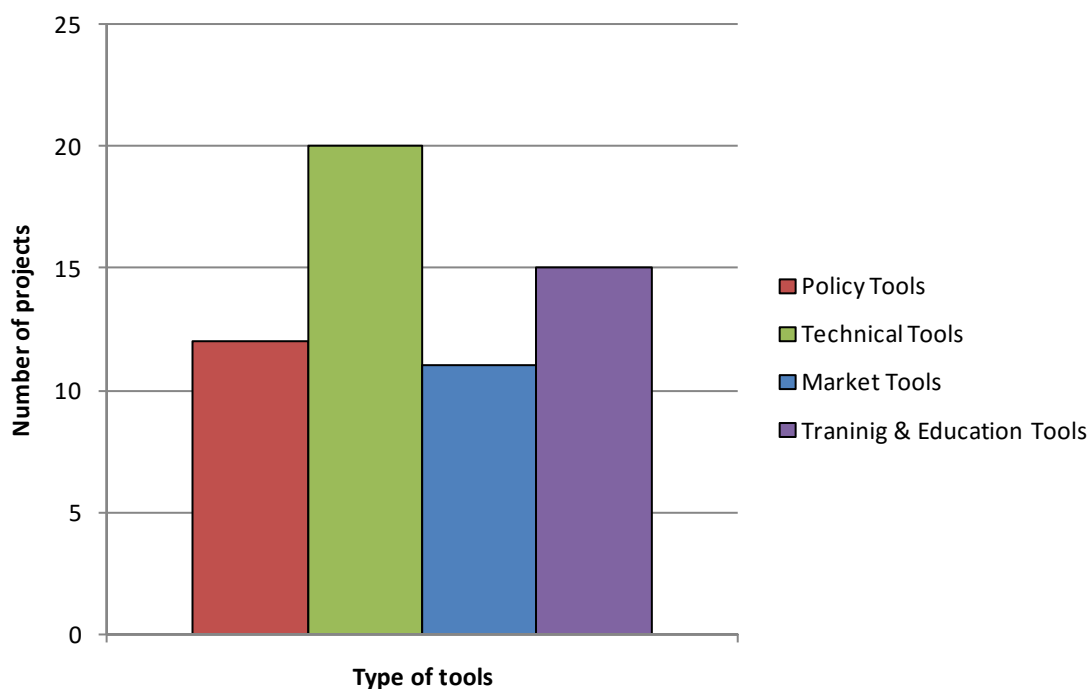


Figure 1: Number of projects providing certain type of tools

Out of the 22 projects 55% (12) of them brought policy tools such as recommendations, position and strategy papers, reports, face to face meetings with policy makers and many more. Most of the projects – 91% (20) of them – brought technical tools such as calculators, roadmaps, factsheets, handbooks, software tools, etc. Half of the projects brought market tools such as mobilisation campaigns, gatherings of stakeholders, promotion tools, guidelines for market actors, etc. More than two thirds of the projects – 68% (15) came up with training and educational tools such as workshops, trainings for farmers and other key players, work group meetings, study tours and much more. Most of the projects provided several tools of different types.

2.1.2 Target audience

When it comes to the target audience, the projects covered the whole chain of interested parties from policy makers through rural communities and regions, farmers, plant operators, investors and gas grid operators to consumers. Figure 2 shows the numbers of projects targeting certain types of audience.

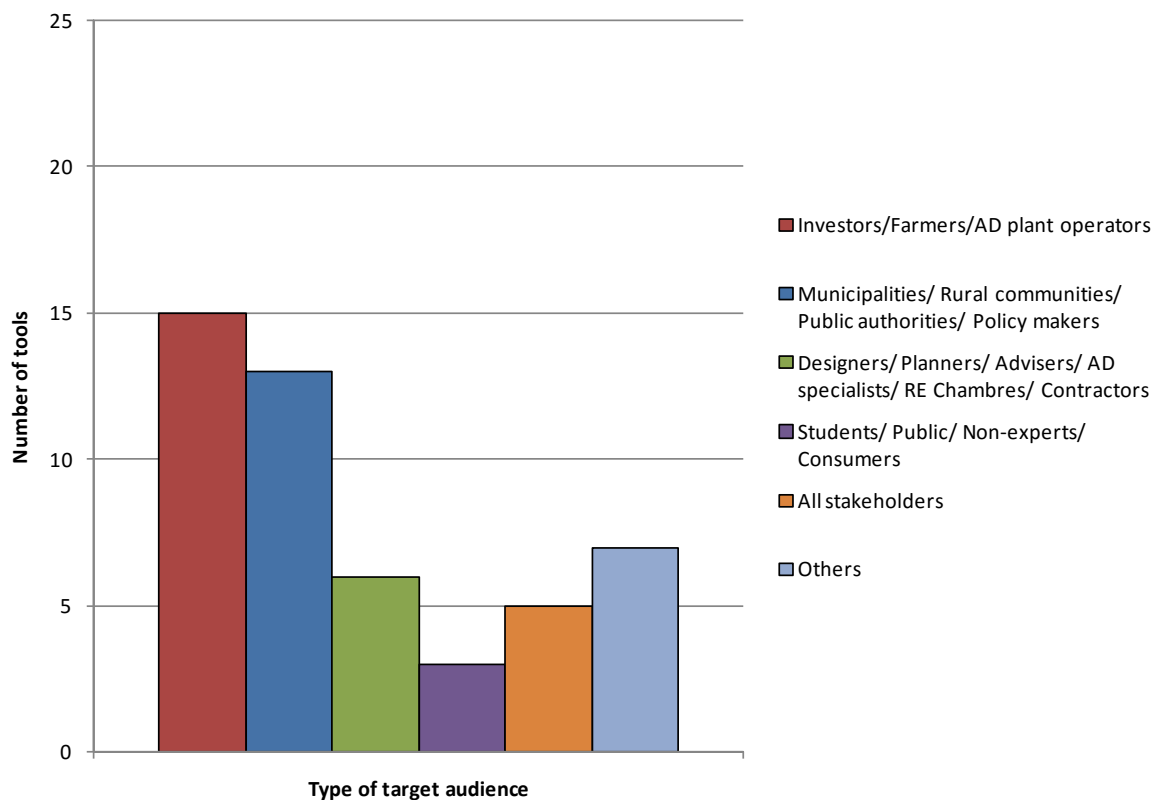


Figure 2: Number of projects targeting certain type of audience

As shown in Figure 2, most of the projects (68%) targeted the group of investors, farmers, AD plants operators, etc. Almost 60% of the projects aim the municipalities, rural communities, public authorities or policy makers. Designers, planners, adviser and other AD specialists are targeted by more than one fourth of the projects. Almost one fourth of the projects targeted the whole chain of stakeholders and key players. Other audience such as gas grid operators or terrain managers are targeted by 32% of the projects.

2.1.3 Geographical scope

Considering the geographical scope, some tools were developed at regional levels or their main target were individual cities. Some projects covered a bigger area such as Central and Eastern Europe. Three of the projects brought tools that were covering the whole Pan-European area.

More detailed information on each individual project, such as its description, list of particular tools, proven results and outcome, boundary conditions and project partners, can be found in the related chapter.

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Table 1: European projects related to the biogas industry

| Project | Chapter | Topic | Policy Tools | Technical Tools | Market Tools | Training & Education Tools | Target audience | Geographical scope |
|-----------------------|---------|---|--------------|-----------------|--------------|----------------------------|---|--|
| 100-res-communities | 2.2.1 | Joint SEAPs (sustainable energy action plans) | ✓ | ✓ | ✓ | ✓ | - Rural communities | AT, BE, CZ, FR, HU, IT, RO, UK |
| Biogasmax | 2.2.2 | Urban waste to biomethane for transport | ✓ | ✓ | ✓ | ✓ | - Municipalities and regions | Lille, (FR); Rome, (IT); Stockholm (SE); Goteborg (SE); Berne (CH); Torun and Zielona Gora (PL); Lombardy (IT) |
| Big East | 2.2.3 | Biogas use in Eastern and Southern Europe | ✗ | ✓ | ✓ | ✓ | - Farmers - Biogas plant operators - Decision makers | BG, EL, HR, LV, RO, SI |
| BiogasRegions | 2.2.4 | Biogas development in 7 regions | ✗ | ✓ | ✗ | ✓ | - Local authorities and elected people - Food processing industrials - Farmers and agricultural sector | Rhône-Alpes (FR); Castilla and León (ES); Malopolska (PL); Wallonia (BE); Abruzzi region (IT); SI; Gloucestershire, Wiltshire, South Gloucestershire, Monmouthshire and Powys (UK) |
| BiogasIN | 2.2.5 | Biogas market in CEE | ✓ | ✓ | ✗ | ✓ | - All biogas stakeholders | BG, HR, CZ, EL, LV, RO, SI |
| BioEnergyFarm | 2.2.6 | Manure codigestion | ✗ | ✓ | ✗ | ✗ | - Farmers. - Groups of farmers. - Project developers. | NL, DE, BE, PL, IT, EE |
| Crossborder Bioenergy | 2.2.7 | Crossborder investments and trade in the bioenergy sector | ✗ | ✓ | ✓ | ✗ | - Project partners: SME, investors. - B2B: suppliers, consumers. - workshops: policy makers from partner countries. | pan-Europe |
| Biocore | 2.2.8 | Biorefinery | ✓ | ✓ | ✓ | ✓ | - Stakeholders in India | FR, NL, EL, UK, BE, FI, LV, HU, CZ, DE, SE, LU, India |
| GERONIMO II-Biogas | 2.2.9 | Manure treatment | ✓ | ✗ | ✓ | ✓ | - Farmers | BE, HR, CY, HU, IE, MT, NL, ES, UK |
| Biomaster | 2.2.10 | Biomethane in transport | ✗ | ✓ | ✓ | ✗ | - Decision makers and politicians. - Local/regional stakeholders - Farmers associations, biogas associations, etc. For more information see chapter 2.1.14 | Trentino Province (IT); Skåne Region (SE); Norfolk County (UK); Małopolska Region (PL) |

D.2.1 Compilation of reports and tools for regional biogas deployment

| Project | Chapter | Topic | Policy Tools | Technical Tools | Market Tools | Training & Education Tools | Target audience | Geographical scope |
|--------------------------------|---------|---|--------------|-----------------|--------------|----------------------------|---|---|
| Biomethane Regions | 2.2.11 | Biomethane | ✓ | ✓ | ✗ | ✗ | - Local and regional policy makers - Potential developers | AT, BE, HR, DK, DE, HU, IT, SI, SE |
| GreenGasGrids | 2.2.12 | Biomethane | ✓ | ✓ | ✓ | ✓ | - Decision makers. - Gas grid operators - Biomethane producers | Pan-Europe |
| UrbanBiogas | 2.2.13 | Urban biowaste to biomethane | ✗ | ✗ | ✗ | ✓ | - Local stakeholders from the target cities - The city stakeholders | Zagreb (HR); Abrantes (PT); Graz (AT); Rzeszów (PL); North Vidzeme Region incl. Valmiera (LV) |
| BiogasHeat | 2.2.14 | Heat | ✓ | ✓ | ✗ | ✓ | - All stakeholders - biogas heat use | AT, HR, CZ, DK, DE, IT, LV, PL, RO |
| Sustaingas | 2.2.15 | Sustainable biogas | ✓ | ✓ | ✗ | ✓ | - Organic farmers - Green energy suppliers - Consumers | AT, BG, DE, DK, PL, ES |
| FAB Biogas | 2.2.16 | Waste to Energy Food and Beverage Industry | ✗ | ✓ | ✗ | ✓ | - Companies of the food and beverage industry. - Policy making institutions | AT, CZ, DE, FR, IT, PL |
| Bioteam | 2.2.17 | Bioenergy policy | ✓ | ✓ | ✓ | ✗ | - Investors - Particular stakeholders | NL, LT, DE, FI, IT |
| GR3: Grass to green gas | 2.2.18 | Grass and herbaceous residues as biogas feedstock | ✓ | ✓ | ✓ | ✓ | - Biogas plant owners - Authorities - Terrain managers | BE, DE, DK, IT, PT |
| Biogas3 | 2.2.19 | Biogas from agro-food waste in small scale | ✗ | ✓ | ✗ | ✗ | - Agro-food industry - Biogas sector associations - AD and waste management companies - Public authorities | DE, ES, FR, IE, IT, PL, SE |
| BioEnergyFarm II | 2.2.20 | Farm scale manure AD | ✗ | ✓ | ✗ | ✗ | - farmers - advisors | NL, BE, FR, DK, DE, PL, IT, other EU countries |
| Bin2Grid | 2.2.21 | Food waste to energy | ✗ | ✓ | ✗ | ✓ | - Zagreb, Skopje, Malaga, Paris | FR, HR, ES, MK |
| BIOSURF | 2.2.22 | Biomethane | ✓ | ✓ | ✓ | ✓ | - Decision makers. - Gas grid operators - Biomethane producers | Pan-Europe |

2.2 Detailed information on individual projects

2.2.1 100-res-communities

100-res-communities ran from 28/03/2001 to 27/09/2002 and it aimed at experimenting and spreading the model of joint SEAPs (Sustainable Energy Action Plan) development and implementation in rural territories and towns in 10 European countries. While evaluating their SEAPs and drawing lessons learnt, 5 experienced territories will support 5 learning territories to develop their joint SEAPs through a mentoring approach. The implementation of 2 actions in each territory will make the joint SEAP concrete. National clubs of RURENER networks will be created. While joining RURENER networks, rural communities commit to heading towards being "100% RES communities".

Tools

| | |
|-------------------------------|---|
| Policy tool: | Demonstrate the political commitment of rural towns and territories to go beyond EU sustainable energy objectives by signing the Covenant of Mayors and engaging in the 100% RES Communities dynamic, undertaking to put programmes, actions and investments in place to help achieve the overall objective of the project. |
| Technical tools: | Development of joint Sustainable Energy Action Plans (SEAPs), involving rural towns together with a territorial coordinator. |
| Market tools: | Allow monitoring the progress of the SEAPs implementation through an adaptation of the RES Champions League action and the introduction of "100% RES communities" criteria |
| Training and education tools: | Adapt and rationalise existing European campaigns and tools (RURENER, RES Champions League |

Proven results and outcome of the project

The discussions among the two-day Parliament hearing resulted in 10 policy recommendations. Establishment of a RES Champions League with 10 member states. Establishment of the RURENER Network. Publication of a leaflet on RES Champions Leagues 2012 and 2013 and 2014, publication of an advertising folder, publication of handbook on Definition of and Criteria for 100 % RES Communities, publication of a good practice brochure, publication of the ground investigation report, publication of the good practice brochure

Boundary conditions

The exchange of experiences and mutual support on joint SEAP development are valuable, but show some limits. The Covenant of Mayors procedures are not well adapted to the complex structuring introduced with the grouping of small communities willing to develop and implement a joint SEAP. The consortium will propose changes to this framework on joint SEAPs.

Geographical scope

- Austria
- Belgium
- Czech Republic
- France
- Hungary
- Italy
- Romania
- United Kingdom

Target audience

The target audience were the rural communities.

Project partners

- Liaison Committee for Renewable Energies (France),
- Association SOLAGRO (France),
- Climate Alliance / Klima-Bündnis / Alianza del Clima e.V. (Germany),
- LEGAMBIENTE Onlus (Italy), CITYPLAN spol. s r.o. (Czech Republic),
- Association pour la Promotion des Energies Renouvelables (Belgium),
- Community Energy Scotland (United Kingdom),
- deENet (Germany),
- ASSOCIATION FOR ENERGY ECONOMICS AND ECOLOGY, SLOVENIAN E-FORUM (Slovenia),
- University Vasile Alecsandri of Bacau (Romania),
- Climate Alliance Austria (Austria),
- Energiaklub Climate Policy Institute Applied Communications (Hungary)
- Network of Small rural communities for energy neutrality (France)

2.2.2 Biogasmax

Biogasmax ran from 01/01/2006 to 31/12/2009. The objective of the project is to address urban challenges related to air and water pollution, as well as waste management. The overall goal of the project is to reduce dependency on oil, reduce greenhouse gases and direct emissions through increased and more efficient production, distribution and use of biogas in the transport sector generated from a wide variety of feedstock available in urban areas and regions in Europe. The project adopts the well-to-wheel approach to identify the potential for efficiency gains and cost optimisation to ensure market expansion. BIOGASMAX anticipates making a strong response to the EC policy objective to replace 20% of petroleum-based fuels in the transport sector with 5 - 8% biofuels, 10% natural gas, and 2% hydrogen.

Tools

- Policy tool: List of recommendations for further policies.
- Technical tools:
- Technical document "Options for biogas plants".
 - Technical document "Biogas Checklist for Administrative Bodies.
 - Large-scale demonstration initiatives, working on both the supply and demand sides, designed by well-wheel approach (from feedstock and massive production to transport and distribution).
 - Use in captive fleets in cities.
- Market tools:
- Development of the production of biogas from the entire range of sources by cities.
 - Development of distribution pathways and infrastructure for biogas as fuel for vehicles.
- Training and education tools:
- Network of biogas-related demonstrations on the European territory with the aim of sharing experiences in terms of best practices in managing urban transportation.

Proven results and outcome of the project

The project delivered: Optimisation and increase of biomethane production; reduction of environmental impacts; increased number of NG/biomethane filling stations; injection of biomethane into the natural gas grid; more than 900 vehicles running on biomethane without problems in five European cities during the project, Biomethane Decision Guide.

Boundary conditions

The injection of biomethane into the natural gas grids brings along the problem of reaching the same quality of biomethane. In order to establish the biomethane implementation a fully-established network is necessary.

Geographical scope

- Lille (FR)
- Rome, (IT)
- Stockholm (SE)
- Goteborg (SE)
- Berne (CH)
- Torun and Zielona Gora (PL)
- Lombardy (IT)

Target audience

The target audience were municipalities and regions in determining whether or not they are candidates for biomethane implementation with the assistance of the Biomethane Decision Guide intends.

Project partners

- Urban Community of Lille (FR)
- Business Region Göteborg (SE)
- Göteborg Energi (SE)
- City of Stockholm (SE)
- University of Stuttgart, IKP (DE)
- City of Haarlem (NL)
- European Natural Gas Vehicle Association
- Institut für Solare Energieversorgungs-technik eV, ISET (DE)
- TNO (NL)
- Transport & Travel Research (UK)
- Gaz de France (FR)
- Nova Energie (CH)
- ADEME (FR)
- Esterra (FR)
- Cadet International (FR)
- City of Falköping (SE)
- Fordonsgas Sverige (SE)
- Stockholm Water Company (SE)
- AGA Gas AB (SE)
- Svensk Växkraft AB (SE)
- Svensk Biogas AB (SE)
- Van der Wiel BV (NL)
- DutCH4 (NL)
- Azienda Municipale Ambiente, AMA (IT)
- Institut di Studi per l'Integrazione dei Sistemi, ISIS (IT)
- University of Zielona Gora (PL)
- Biogaz Inwestor (PL)
- Con Voco (PL)
- EWB – Energie Wasser Bern (CH)
- Bernmobil (CH)
- Arabern (CH)
- Regione Lombardia (IT)

2.2.3 Big East

BiG>East ran from 01/09/2007 to 01/02/2010 and had for objectives to promote the production and use of biogas as a secure and sustainable energy source in six target countries of Eastern and Southern Europe: Bulgaria, Croatia, Latvia, Romania, Slovenia and Greece. This was achieved by knowledge transfer from project partners with extensive biogas expertise of Western Europe to farmers, biogas plant operators and decision makers in Southern and Eastern Europe. Furthermore, WIP-Renewable Energies 8 studies on national legislations, policies, barriers, biogas potential, agricultural structures, and utilisation opportunities of biogas in the BiG>East target countries were assessed.

Tools

| | |
|-------------------------------|--|
| Policy tool: | n.a |
| Technical tools: | Economic calculation tool. |
| Market tools: | Organisation of mobilisation campaigns for decision makers and funding bodies |
| Training and education tools: | <ul style="list-style-type: none">- Studies on the biogas potential and barriers in the target countries.- Development of training handbooks for farmers in English and national languages.- Implementation of pilot training courses for farmers.- Identification of promising sites for the set-up of new biogas plants.- Dissemination of project results via workshops, technical study tours and presentations. |

Proven results and outcome of the project

The proposed actions of BiG East will create various direct benefits for the target countries of Eastern Europe, as well as for the countries from Western Europe. Important direct benefits are described below. Generally, the BiG East project was a great success.

Thus, BiG East supported the efforts in the creation of these new markets. One of the outstanding and long lasting impacts of BiG East was the development of the biogas handbook in English and in national languages. In most of the target countries, the translated handbook represented the first biogas handbook in local language. Since the handbook is available for free also in electronic version on the website, it will even have a long-term impact beyond the project lifetime. Generally, large translation efforts were needed, not only for the handbooks, but also for the implementation of the other BiG East activities in the target countries. This included the development of national biogas terminologies, the translation of training material, and (simultaneous) translation during the presentations of foreign biogas experts for the training courses and mobilisation campaigns.

In the framework of the biogas training courses, farmers, but also other stakeholders, were trained. However, while implementing the BiG East project, also the project participants themselves were trained about biogas concepts, technologies, frameworks, and markets. This contributed to national capacity building on biogas production and utilisation in Eastern Europe. 18 training courses were successfully implemented in the target countries. In many cases, the duration of the training courses largely exceeded the schedules due to the high interest and motivation of the participants. In total, more than 340 participants attended the training courses. The BiG East Show Cases were elaborated in order to detect potentially suitable sites for biogas production, and to promote these examples among decision makers in so-called mobilisation campaigns. The Show Cases prepared the way for the implementation of several biogas plants. Especially in Greece Bulgaria, and Romania the Show Cases contributed to project realisations. 13 mobilisation campaigns were successfully implemented informing more than 560 decision makers about biogas. Local authorities, as well as potential plant operators and investors were the main groups of participants. At the Mobilisation Campaign in Bulgaria, the participants expressed the need to establish a Bulgarian Biogas Association and initiated first preparatory steps. At the 2nd mobilisation campaign in Croatia, the idea of establishing a biogas lobbying group have been introduced. Several months later, in November 2009, the Biogas Group at the Association of RES at the Croatian Chamber of Economy have been formally established. BiG East activities showed that there is very high general interest in biogas production in the target countries. Stakeholders made large efforts to gain information about biogas (some farmers travelled more than 1,200 km by car to attend the study tour). More than 1,000 WIP-Renewable Energies 64 stakeholders participated at various BiG East events and provided feedback on opportunities and barriers on biogas development in Eastern Europe. Since BiG East was one of the first projects in some of the target countries supported by public funds and since it initiated great interest among the involved partners and participants, there is urgent need to continue the biogas

activities in the target countries in order to positively improve the framework conditions for biogas development.

Boundary conditions

The limitations are that the handbook is now out of date.

Geographical scope

- Bulgaria
- Greece
- Croatia
- Latvia
- Romania
- Slovenia

Target audience

The target audience were the farmers, biogas plant operators and decision makers in Southern and Eastern Europe.

Project partners

- WIP Renewable Energies, Germany
- Slovenian Energy Restructuring Agency, Slovenia
- Ing. Gerhard Agrinz GmbH, Austria
- Centre for Renewable Energy Sources, Greece
- Ekodoma, Latvia
- Energoproekt jsc, Bulgaria
- Hrvoje Pozar Energy Institute, Croatia
- Finsterwalder Umwelttechnik GmbH & Co. KG, Germany
- German Biogas and Bioenergy Society, Germany
- N. Poushkarov Institute, Bulgaria
- SC Mangus Sol SRL, Romania
- University of Southern Denmark, Denmark

2.2.4 BiogasRegions

BiogasRegions ran from 01/11/2007 to 31/10/2010. This project focuses on fostering the biogas development in seven highly motivated European regions. Profiting from countries like Germany and Austria with a rapidly growing market of biogas plants the organised know-how transfer and sharing of experience will enable a rapid uptake in the less developed regions. The mobilisation of positive synergies between the different sectors (local authorities, farmers and food processing industries) and their concrete project implication will increase biogas plants realisation. The territorial approach facilitating partnerships between the different sectors and the elaboration of a strategic strategy and action plan in each region will overcome the obstacles and create a biogas friendly environment.

Tools

| | |
|-------------------------------|---|
| Policy tool: | n.a. |
| Technical tools: | Strategic outreach: Regional strategy and action plans for the development of biogas production giving medium and long term orientations |
| Market tools: | n.a. |
| Training and education tools: | - Information, awareness raising and training - Production of computerised opportunity study tool, realisation of 37 studies - Efficient technology transfer through matchmaking with experienced |

partners from Germany and Austria
- Identifying 14 sites and preparation of studies for investment triggering at least minimum 7 new biogas installations in the future

Proven results and outcome of the project

The project advanced beyond the performance indicators envisaged at the start of the project.

Boundary conditions

The barriers for developing this technology are manifold.

Geographical scope

- France - Rhône-Alpes
- Spain - Castilla and León
- Poland - Malopolska
- Belgium - Wallonia
- Italy - Abruzzi region
- Slovenia
- United Kingdom - Gloucestershire, Wiltshire, South Gloucestershire, Monmouthshire and Powys

Target audience

The target audience were three main key players: the local authorities, the agricultural sector and the agro food industry.

Project partners

- Rhônalpénergie-Environnement
- WFG Schwäbisch Hall
- Landesenergieverein Steiermark or substitute
- Ente regional de la energia de Castilla y Leon
- Malopolska regional energy agency
- Centre Wallon de Recherches Agronomiques
- Regione Abruzzo
- Agricultural Institute of Slovenia
- Severn Wye Energy Agency Limited
- European Federation of Regional Energy and Environment Agencies

2.2.5 BiogasIN

Description

BiogasIN ran from 01/05/2010 to 31/12/2012 with the aims to create a sustainable biogas market in Central and Eastern Europe (CEE) by targeting the strongest framework barrier: high administrative barriers both in permitting and financing phases; this bottleneck was emphasised in many former European projects, and experiences. BiogasIN builds capacity among the public sector (national, regional and local governments and administrations responsible for permitting process of agricultural biogas plants). The objective is to create awareness, trust in the technology and the sensibility that biogas is a reliable energy, GHG and waste reduction technology for CEE. The credibility of biogas production technologies will increase the bankability of biogas projects and fasten the administrative permitting procedures. BiogasIN initiates close collaboration among all stakeholders and vertical and horizontal working groups or associations that will facilitate governments to tailor the biogas policy. Attitudes and drivers from different biogas stakeholders will be shaped via pan-European survey to facilitate development of biogas policy at EU and national level.

Tools

| | |
|-------------------------------|--|
| Policy tool: | Position paper declaring the promotion of biogas signed policy makers. |
| Technical tools: | - Technical document "Options for biogas plants". - Technical document "Biogas Checklist for Administrative Bodies. |
| Market tools: | n.a. |
| Training and education tools: | - Workshops - Conferences - Capacity building trainings |

Proven results and outcome of the project

The project was very successful and useful. The aim of the project was to support policy making and improve legislation, thorough consultative processes in which all relevant biogas stakeholders participated. In addition, raising awareness and education of biogas stakeholders (potential investors, civil servants involved in administrative procedures, bankers, farmers...), aiming to support biogas market development and increase investments in biogas.

Boundary conditions

The limitations were related to the BiogasIN activities: assessment of biogas potential, economic analysis of biogas investments.

Geographical scope

- Bulgaria
- Croatia
- Czech Republic
- Greece
- Latvia
- Romania
- Slovenia

Target audience

The target audience were the BiogasIN partners.

Project partners

- Energy Institute Hrvoje Pozar (EIHP), Croatia
- Wirtschaft und Infrastruktur GmbH & Co Planungs Kg (WIP), Germany
- European Biogas Association (EBA), Belgium
- Fraunhofer Institute for Wind Energy and Energy System Technology (IWES), Germany
- Centre for Renewable Energy Sources (CRES), Greece
- Czech Biogas Association (CzBA), Czech Republic
- Ekodoma, Latvia
- Energoprojekt JSC, Bulgaria
- Development Agency Sinergija Ltd (Sinergija), Slovenia
- Trinergi Grup Ltd (TG), Romania

2.2.6 BioEnergyFarm

BioEnergyFarm ran from 01/06/2010 to 01/04/2013. The aim of the BioEnergy Farm project was to stimulate the uptake of bioenergy production in an agricultural context. The project focussed on the wood production and combustion, and on manure co-digestion.

Tools

| | |
|-------------------------------|--|
| Policy tool: | n.a. |
| Technical tools: | ADPC (Anaerobic Digestion Profit Calculator). Available online and offline, the online version is a bit less elaborated than the offline expert version. |
| Market tools: | n.a. |
| Training and education tools: | n.a. |

Proven results and outcome of the project

With regards to the technical tool the ADPC led in the project period to 83 business plans of which 18 were realized in the project period. The online version of the tool is used a few thousand times. Overall the project was really successful. It succeeded in programming a feasibility calculator that worked quite well and was well spread and used around Europe. Even since the project was ended in 2013, the tools are still used and downloaded. Furthermore, the outputs of this project really helped farmers in the realisation of a biogas plant. Also all the other project targets were largely met.

Boundary conditions

The online version of the ADPC was a bit less elaborated than the offline expert version.

Geographical scope

- Netherlands
- Germany
- Belgium
- Poland
- Italy
- Estonia

Target audience

The target audience were farmers or groups of farmers or project developers, interested in the feasibility of a manure (co-) digester.

Project partners

- Cornelissen Consulting Services B.V., The Netherlands
- Department of Agricultural Forestry and Environmental Engineering - University of Turin, Italy
- National Energy Conservation Agency, Poland
- Institute for Energy Economics and the Rational Use of Energy - University of Stuttgart, Germany
- Institute of Agricultural and Environmental Sciences of Estonian University of Life Sciences, Estonia
- German Society for sustainable Biogas and Bioenergy Utilisation, Germany
- Italian Confederation of Farmers, Italy
- ZET Solutions, Netherlands
- Biogas-E, Belgium
- Stimuland, Netherlands
- Estonian Farmers' Federation, Estonia

2.2.7 Crossborder Bioenergy

Crossborder Bioenergy ran from 01/09/2010 to 31/05/2013. The purpose of this project was to analyse the attractiveness for investments, including crossborder investments and trade in the bioenergy sector. The project had a goal to help SMEs to evaluate markets in Europe and support their decision making process to invest in them.

Tools

Policy tool: n.a.

Technical tools:

- Sector handbook: 5 sectors explained in 5 separate handbooks; information based on official statistics, national action plans, support schemes and interviews of bioenergy experts from the single; the results offer a comprehensive picture of the bioenergy markets in Europe
- Market Handbook: shedding light on the biogas market structure, its mode of operation and the specific requirements for business operators to enter the market.

Market tools:

- B2B platform: provide interested stakeholders with information about the attractiveness of the different European bioenergy markets under the given market and framework conditions; comparison of the attractiveness of different factors influencing the bioenergy markets in different European countries and regions.
- B2B Database: the platform works as a European market guide facilitating sound matchmaking and assists companies in their marketing activities.

Training and education tools: n.a.

Proven results and outcome of the project

The project was successful and had a good follow up (BASIS project). The B2B platform is now open for entire world but only for wood chips.

Boundary conditions

With regards to the EU Navigator: Black box for users - the collected responses from countries don't appear, but only digested and final information. the data is not uploaded; the EU navigator covers NUTS-2 regions in partner countries, but not in other EU Member States. For the B2B market - it can't be controlled by the consortium (partnerships and other interaction). The project in general didn't explore advanced biotechnologies like 2nd generation biofuels, gasification, bio algae. The existing biofuels section doesn't break down to various fuels and feedstocks. In terms of data collection, the goal was too ambitious with 300 indicators (it took a lot of time to collect everything)

Geographical scope

Europe

Target audience

The target audience for the project were SME, investors; The target audience for B2B were suppliers, consumers; The target audience for the workshops were policy makers from the partner countries.

Project partners

- AEBIOM (BE)
- Austrian Biomass Association (AT)

- Danish Bioenergy Association (DK)
- The Bioenergy Association of Finland (FI)
- German Bioenergy Association (DE)
- Hungarian Biomass Competence Centre (HU)
- Italian Agroforestry Energy Association (IT). Latvian Bioenergy Association (LV)
- Slovak Bioenergy Association (SK)
- Swedish Bioenergy Association (SE)
- eclareon consultants (DE)
- Imperial College for Science, Medicine and Technology (UK)

2.2.8 Biocore

Biocore ran from 01/03/2010 to 01/02/2014 and focused on finding out how different types of biomass such as rice straw, birch wood and hardwood can be converted into the molecular building blocks that are required to make chemicals, fuels, polymers and other materials. was to conceive and analyse the industrial feasibility of a biorefinery concept that would allow the conversion of feedstock into a wide spectrum of products, including second generation biofuels, chemical intermediates, polymers and materials. By developing a range of polymer building blocks, BIOCORE aimed to show that 70% of polymers currently in use could be derived from biomass.

Tools

- Policy tool: n.a.
- Technical tools:
- The BIOCORE project intensively studied and optimised a pilot plant run which operates on organosolv technology, based on the use of a formic/ acetic acid solvent.
 - The organosolv process was tested for its capacity to use a feedstock mix comprising rice straw, hardwood and SRC wood. The studies revealed that, with some process modifications, the organosolv process can be adapted to use this feedstock mix, thereby meeting a key criterion of the BIOCORE concept.
- Market tools:
- Gathering of stakeholders of the partner countries opinion on the BIOCORE biorefinery concept.
 - Analyses of Supply chain logistics by the collection of a large amount of data describing current (2015) and future (2025) scenarios.
- Training and education tools:
- Newsletters
 - BIOCORE brochure
 - Technical note on lignins and pentose sugars.

Proven results and outcome of the project

Existing biorefinery plants are mainly focussed on fuel ethanol production and significant work is required to fully integrate the use of all biomass fractions in the manufacture of additional products. Consequently, there is clearly a need for industrial demonstration of new technologies that use lignocellulose as a raw material for the manufacture of both fuels and chemicals. By providing this, BIOCORE has made a significant contribution to the advancement of this technology and increased the potential for the use of bio-based products in the chemical industry in Europe.

Boundary conditions

The project's economic assessment of the bioerfinery concept was complicated by the current immaturity of the biorefinery sector, by market factors such as green premiums and by the fact that

BIOCORE biorefineries are expected to co-manufacture several products aimed at markets with very different volumes and revenue structures.

Geographical scope

- France
- The Netherlands
- Greece
- United Kingdom
- Belgium
- Finland
- India
- Latvia
- Hungary
- Czech Republic
- Germany
- Sweden
- Luxemburg

Target audience

The target audience were stakeholders in India including representatives of the paper pulp industry, dairy units for fodder, cattle owners, transporters, aggregators and farmers.

Project partners

BIOCORE is a large-scale European collaboration involving 24 partners. By uniting 8 companies, one NGO and 15 universities and R&D institutes, BIOCORE benefits from a wide panel of expertise and representatives from 13 countries, including a world-class Indian R&D institute, which supplies vital data that will help understand how bio-refining can be developed in India.

2.2.9 GERONIMO II-Biogas

GERONIMO II-BIOGAS ran from 05/01/2011 to 31/10/2013. It follows-on from GERONIMO (EIE/07/220), which developed the 1st interactive web portal for EU dairy farmers on the theme of on-farm energy efficiency and RES (www.dairyenergy.eu) and identified clear interest among farmers to uptake biogas technology as a manure management method. As the EU pig sector also faces challenges in terms of the management of large volumes of manure, the opportunity to work with both sectors in facilitating biogas technology uptake could enable huge amounts of unused biogas potential to be tapped into. To this end, GERONIMO II-BIOGAS will work closely with dairy and pig farmers at grassroots level to quantify the biogas potential on their farms and to capacitate them to draw up robust business plans and strategies for investment in biogas facilities. The most promising plans will be selected as pilot biogas investment projects, which will commence implementation during the action. In parallel, best practice in the area of pro-biogas policies, schemes and incentives from frontrunner regions such as Germany, Austria and Denmark, will be transferred to other EU regions in order to create pro-biogas regional frameworks that remove the barriers from the top that are preventing the uptake of biogas technology among farms.

Tools

Policy tool: 10 letters of intent have been signed by policy makers coming from the following countries: Belgium, Croatia, Cyprus, Hungary, Ireland, Malta, Netherlands, Spain, United Kingdom.

Technical tools: n.a.

- Market tools:
- Mobilisation of a bottom-up effort to assist dairy and pig farmers in quantifying the biogas potential on their farms and working closely with them to capacitate them to draw up robust business plans and strategies for investment in biogas facilities.
 - Top down effort is mobilised, whereby best practice in the area of pro-biogas governmental policies, legislation, schemes and incentives from frontrunner regions, such as Germany, Austria and Denmark, is identified and transferred to other EU regions in order to create pro-biogas regional frameworks that remove the barriers from top that are preventing the uptake of biogas technology among farms.
- Training and education tools: Perform training with farmers.

Proven results and outcome of the project

The project delivered leaflet for farmers, leaflet for policy makers, booklet on biogas business cases, roadmap mapping the way to pro/biogas policies for the benefit of farmer and the environment, book on profitable farms and biogas projects, guidebook for implementing a biogas project.

Boundary conditions

Farmers are difficult to reach via new communication channels like the project web platform. The trainings times have to be adjusted to farming activities schedules both in terms of year sessions and hours of the day.

Renewable policy frameworks are rapidly changing and thus constitute a main barrier for the uptake of biogas complicating the administrative procedures and reducing the trust among farmers. Along the project duration, major changes in policy have occurred in Spain, Germany, Denmark and Czech Republic.

The dimension of the biogas investments has to be adapted to country specific situations. One has to consider technical aspects, such as availability of gas grid, administrative constrains and the current economical situation with financial credit not easily available in many regions of the project. Depending on the country, Geronimo 2-biogas project partners are looking at small scale farm biogas projects or centralised plants where public administration acts as shareholder.

Geographical scope

- Belgium,
- Croatia
- Cyprus
- Hungary
- Ireland
- Malta
- Netherlands
- Spain
- United Kingdom

Target audience

The target audience were the farmers.

Project partners

- INNOVACIO I RECERCA INDUSTRIAL I SOSTENIBLE SL (Spain),
- European Biomass Industry association (Belgium),
- CZ Biom (Czech Republic),

- Institut für Energiedienstleistungen GmbH (Germany),
- Limerick Clare Energy Agency (Ireland),
- Lleters de Catalunya, Llet Nostra, SCCL (Spain),
- Royal Association of British Dairy Farmers (United Kingdom),
- Sveučiliste u Zagrebu, Fakultet strojarstva i brodogradnje (Croatia),
- ELECTRONIC SYSTEMS DESIGN LTD (Malta),
- MFKK FELTALALOI ES KUTATO KOZPONT SZOLGALTATO KFT (Hungary),
- KomTek Miljø, A/S (Denmark),
- A/FOI ANDREOU CHIROSTASIA LTD (Cyprus),
- Grup de Sanetjament Porci de Girona (Spain)

2.2.10 Biomaster

BIOMASTER ran from 01/05/2011 to 30/04/2014. It was a project with the ambition of exploiting the potential of biomethane production and use in transport, bringing the key actors of the biomethane chain into a joint initiative, stimulating investments and removing non-technological barriers.

The foremost qualifying character of the project laid in the commitment to a “waste-to-wheel” partnership in the sites along the biomethane chain, with project partners from the production, distribution and end user world in the 4 participating regions, Małopolska Region (Poland), Norfolk County (United Kingdom), Skåne Region (Sweden) and Trentino Province (Italy). This approach was reinforced with the set-up of regional networks by involving additional local and national stakeholders (beyond the official partners) to consolidate knowledge and to prepare concrete actions to boost the biomethane market.

In this sense BIOMASTER aimed to build, enlarge and strengthen the networks of actors (feedstock, production, distribution, use, policy, technology / research) that are essential for a long term collaborative market expansion both within each country and more broadly across the EU. A multiplier effect was triggered for the creation of similar networks in other areas of project regional countries, with transfer of information and organization of events. A replication effect was also promoted, with networks in countries others than the partners’ ones, through the organisation of workshops as kick-off step and visible milestone for their development.

Tools

| | |
|-------------------------------|--|
| Policy tool: | n.a. |
| Technical tools: | the Falköping Model: it is a calculation guide created during the BiogasMax project aiming to improve decision support for decision-makers considering investing in biogas production. |
| Market tools: | Promotion tools: newsletter, folder, postcards, website |
| Training and education tools: | n.a. |

Proven results and outcome of the project

The technical tool The Falköping Model was adopted to analyse the biogas potential in the 4 project sites (i.e., Trentino, Norfolk, Małopolska and Skane).

Overall the project rather successful, as witnessed by the results reached during its lifetime with 11 additional new biogas/biomethane production plants in the partner regions, in different stages of implementation. 5 Biomethane grid injection point. 54 New biomethane filling station. 3,284 Vehicles operating on biomethane. 4 regional networks established, one in each BIOMASTER site. 9 additional regional networks, 4 in each partners’ country. 5 additional networks in 5 countries other than the partners’ countries. Communication products: 6 newsletters, 6 factsheets, website with more than

60,000 page views, folder and postcard in 4 languages, outreach at more than 90 conferences reaching over 13,000 people).

Boundary conditions

In reference to the Falkoping model, it takes an overview of the process but doesn't look at the specific feedstock and biogas potential of that feedstock. This means that some of the detail is lost when using it in comparison to specific models developed by regions. In addition, the Falkoping Model uses a set number of feedstocks but can miss out on feedstock's, particular to a region, that results in a substantial reduction in the predicted biogas potential compared to the reality.

Geographical scope

- Trentino Province (IT)
- Skåne Region (SE)
- Norfolk County (UK)
- Małopolska Region (PL)

Target audience

The target audience were (1) Decision makers and politicians in municipalities, cities and regions deciding on the implementation of biomethane for transport. (2) Local/regional stakeholders in municipalities, cities, regions, whose cooperation and participation (in addition to the cooperation and participation of the decision makers and politicians) are essential for the success of the process. This group includes: organisations with an interest in establishing production plants, filling stations, gas grid connections, but also local/regional transport operators and suppliers of fuel. (3) Persons and organisations, who can act as external auditors and multipliers: city-consultants, transport consultants, city planners, and agencies/organisations which advice cities and regions on how to achieve energy efficient transport. (4) Persons and organisations, which are interested in increasing energy-efficiency of transport and therefore are (potentially) interested to support the dissemination of the knowledge of BIOMASTER: e.g. association-organisations (farmer's associations, biogas associations) and networks of municipalities, cities, and regions, public transport operators' associations, networks of energy-agencies, European Commission, European Parliament.

Project partners

- FGM-AMOR, Austrian Mobility Research
- ACSM S.p.a
- CRF, FIAT Research Centre
- CRPA, Research Centre on Animal Production
- Group Dolomiti Energia
- FEM, Edmund Mach Foundation
- ISIS, Institute of Studies for the Integration of Systems
- AGH, University of Science and Technology
- MSWM, Municipal Services and Waste Management
- PGNiG Energia S.A.
- Luenerg, Krafringen produktion AB
- Region of Skåne
- SEA-SE, Kommunförbundet Skåne
- NCC, Norfolk County Council
- NCS, Norse Commercial Services
- NGG, National Grid Gas plc
- TTR, Transport & Travel Research

2.2.11 Biomethane Regions

Biomethane Regions ran from 01/04/2011 to 30/04/2014 with the specific objectives of (1) Elaboration of a specific action plan and strategy for each country. (2) Facilitate new AD plants and bio-methane production through the provision of independent advice to potential developers, regulators, politicians and potentially affected persons. (3) Through an examination of case studies of existing plants, the visiting of existing high efficiency operations and the adoption of the most appropriate technology to

each circumstance, encourage best practice and solutions in new AD plants. (4) Through the above, address the objective of the 2010 call that seeks to bring un-tapped bio-resources onto the energy market by encouraging “biogas injection into gas grids or use as transport fuel”

Tools

| | |
|-------------------------------|---|
| Policy tool: | Provision of independent advice to potential developers, regulators, politicians and potentially affected persons |
| Technical tools: | The Biogas Calculator |
| Market tools: | n.a. |
| Training and education tools: | n.a. |

Proven results and outcome of the project

The tools were particularly successful with regard to the development of new AD/Biomethane plants.

Boundary conditions

The main problems were legislative and economic problems as well as the lack of knowledge in several countries. The development is very much depending on the political intent

Geographical scope

- Austria
- Belgium
- Croatia
- Denmark
- Germany
- Hungary
- Italy
- Slovenia
- Sweden

Target audience

The target audience were local and regional policy makers as well as potential developers.

Project partners

- Severn Wye Energy Agency - UK
- University of Glamorgan - UK
- Styrian Energy Agency -AT
- Technical University of Vienna - AT
- Rhonalpénergie-Environnement - FR
- Association of Local Initiatives in Energy and the
- Environment in Brittany and Pays de la Loire - F
- The Economic Development Corporation for
- Schwäbisch Hall district - DE
- Walloon Agricultural Research Centre -BE
- Knowledge Centre for Agriculture - DK
- Energy Agency for SE Sweden - SE
- Agricultural Institute - HU
- Agricultural Institute - SI
- Energy Institute - HR
- Abruzzo Regional Energy Agency - IT
- FEDARENE - European Federation of Agencies
- Regions for Energy and Environment – EU

2.2.12 GreenGasGrids

GreenGasGrids ran from 06/01/2011 to 31/05/2014. It aimed to substantially support increasing biomethane's contribution to the renewable energy targets of 20% and share in transportation up to 10% in 2020. The project's objective was to measurably increase the production and use of biomethane for transport, heat and electricity by addressing the most hindering barriers to biomethane deployment in the EU, both in forerunner and starter countries. The project aimed at establishing an exchange between the partner countries in order to boost the biomethane market development and enhance knowledge in a Pan-European perspective. The countries that took part were divided into two groups: starter countries and forerunner countries.

Tools

- Policy tool:
- The groups' work culminated in the writing of four discussion papers on the four themes.
 - Internet consultation and newsletters produced by the work groups were used to draw input from a broad support group, including people and organisations not involved in the project or biomethane activities before.
 - Start made to establishing an international standard for biomethane trading.
 - All issuing bodies signed a Letter of Intent to develop the framework conditions for an international standard for biomethane trading.
 - Assisted significantly to the development of this harmonised trading system.
- Technical tools:
- Extensive biomethane potentials were presented based on the available feedstock and most favourable policy environment.
 - National biomethane roadmaps were created
- Market tools:
- Guidelines for market actors has been developed, informing on how to successfully develop and implement biomethane projects.
- Training and education tools:
- Exchanging and generating knowledge - Know-how transfer from forerunner to starter countries with regard to biomethane market development.

Proven results and outcome of the project

Reports incorporate knowledge resources and provide an overview of incentive frameworks and gas quality demands, Brochures provide information to stakeholders to support the development of a biomethane market. Fifteen fact sheets were created, describing best practices – primarily pilot projects that incorporate lessons learned from the forerunner countries, two study tours were organized.

Boundary conditions

Political will is critical for biomethane markets to set off or flourish: The GreenGasGrids project has reviewed the present market status and has thoroughly looked at the obstacles hindering the broader production and application of biomethane. The Roadmap indicates, that - if the necessary actions will be taken - the level of biomethane production could reach 18-20 million m³, about 3% of the European natural gas consumption by 2030 and biomethane could provide min. 10% of total gaseous vehicle fuel consumption. Whether this role of biomethane would be reached is not a technical or raw material availability question – this is essentially the question of willingness, determination and consequent support by the political decision makers.

Geographical scope

Pan-Europe

Target audience

The target audience were decision makers, gas grid operators and biomethane producers.

Project partners

- German Energy Agency - dena (Germany)
- Fraunhofer UMSICHT (Germany)
- Austrian Energy Agency (Austria)
- Energetski Institut Hrvoje Požar -EIHP (Croatia)
- Agence de l'Environnement et de la Maîtrise de l'Energie - ADEME (France)
- Renewable Energy Agency - REA (UK)
- University of Szeged (Hungary)
- European Biogas Association Consorzio Italiano Biogas (Italy)
- Rijksdienst voor Ondernemend Nederland (The Netherlands)
- Krajowa Agencja Poszanowania Energii – KAPE (Poland)
- Slovenská Inovacná Eneregetická Agentúra - SIEA (Slovakia)
- Natural & bio Gas Vehicle Association – NGVA

2.2.13 UrbanBiogas

UrbanBiogas ran from 01/05/2011 to 01/05/2014. The objective was to prepare selected European target cities for the production of biomethane from urban bio-waste which will be fed into the natural gas grids or optionally used for transport: City of Zagreb (Croatia), Municipality of Abrantes (Portugal), City of Graz (Austria), City of Gdynia/ Rzeszów (Poland), and North Vidzeme Region including the City of Valmiera (Latvia). Core of the project was the implementation of more than 130 events, including workshops, working group meetings, study tours and city exchange visits in order to elaborate five WtB concepts for the target cities. These concepts describe measures how to implement WtB projects in the target cities.

Tools

Policy tool: n.a.

Technical tools: n.a.

Market tools: n.a.

Training and education tools: - Implementation of more than 130 events, including workshops, working group meetings, study tours and city exchange visits in order to elaborate five WtB concepts for the target cities.
- We collected best practice examples, wrote a guideline/ checklist and made a survey with a questionnaire.

Proven results and outcome of the project

The project successfully created: 1 tender (Valmiera) for a biogas plant that was published. 1 tender (Graz) is close to publication, the land for the installation is currently being purchased. 3 WtB plants are considered in the near future (Zagreb, Abrantes, Gdynia) UrbanBiogas Publishable Report June 2014 12 WIP. More than 770 participants attended the Task Force Meetings. 354 participants attended 13 training courses. 143 participants attended 4 promotional events for biogas companies to stimulate interest in the target cities. More than 170 people attended public events about waste collection. 21 signed partnership certificates were signed with other cities. 316 group members at Facebook are discussing about WtB issues.

Boundary conditions

All investigated cities, except Graz, do not yet have implemented separate waste collection systems for organic waste from households. In these cities, a major challenge was to convince local decision makers, that the set-up of a separate waste collection system with a biogas plant for bio-waste treatment is currently the most sustainable option from the environmental viewpoint. Furthermore, as the example of Rzeszow showed, it is very difficult to convince local decision makers about the benefits of AD. In that case, local authorities and politicians opted for an incineration plant and once the decision was made, it was not possible to reconsider other options.

A major challenge is to convince local decision makers about the economic and environmental feasibility of WtB concepts. The use of source separated biowaste has most environmental advantages, but directly competes with e.g. incineration plants, composting facilities, and mechanical biological treatment (MBT) of non-source separated waste.

There is an urgent need to inform decision makers about the benefits of anaerobic digestion for the organic fraction of municipal solid waste in comparison to other technologies. Therefore, their direct involvement in discussions (Task Force meetings), workshops and training courses are important. Furthermore, it is important to show decision makers good practice examples in order to show them the feasibility of the WtB concept. Many good examples are available especially in Sweden.

Geographical scope

- City of Zagreb (Croatia)
- Municipality of Abrantes (Portugal)
- City of Graz (Austria)
- City of Rzeszów (Poland)
- North Vidzeme Region including the City of Valmiera (Latvia)

Target audience

The target audience for the training activities were the local stakeholders from the target cities. Another target group were the city stakeholders.

Project partners

- WIP-Renewable Energies
- Grazer Energieagentur Ges.m.b.H.
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.
- Ekodoma
- Podkarpacka Agencja Energetyczna Sp. z o.o.
- Polskie Towarzystwo Biomasy
- IrRADIARE, Investigação e Desenvolvimento em Engenharia e Ambiente, Lda
- ENERGY INSTITUTE "HRVOJE POZAR"
- Câmara Municipal de Abrantes
- Ziemeļvidzemes atkritumu apsaimniekošanas organizācija
- City of Zagreb Holding Ltd

2.2.14 BiogasHeat

BiogasHeat ran from 05/04/2012 to 04/04/2015. The purpose of the project is to support the economic and sustainable utilisation of heat from existing and future biogas plants, which currently is wasted and to increase the capability in several target countries (Austria, Croatia, Czech Republic, Denmark, Germany, Latvia and Romania) through specific measures, including analysis of technical options, feasibility studies, entrepreneurial strategy development of business cases and field testing to

address key barriers. As well to boost capacity through trainings, skills enhancement and knowledge transfer.

Tools

- Policy tool:
- European strategy paper on heat use from biogas plants presented to several relevant DGs of the European Commission.
 - National policy enforcement for heat use from biogas in Austria, Croatia, Czech Republic, Denmark, Germany, Italy, Latvia and Romania. With Feedback of these countries.
- Technical tools:
- Report on promising strategies for the utilisation of heat from biogas plants in several EU countries.
 - Report on help-desk activities, including FAQ list. The report has been developed at the end of the project and contains an overview about relevant questions and answers during BiogasHeat project implementation.
- Market tools:
- n.a.
- Training and education tools:
- Good practice examples for efficient use of heat from biogas plants. Presented during conferences, workshops, trainings and roundtable discussions of the BiogasHeat project.
 - Questions and answers brochure.
 - Report of overall conclusions, recommendations and good practices.
 - Handbook "Sustainable heat use of biogas plants". It is a good

Proven results and outcome of the project

The BiogasHeat project was successful and got a lot of positive feedback from project target groups as well from EASME. The BiogasHeat during its project time helped 11 biogas plant operators to realize the implementation of heat use of their plants (enabling 38 000 MWh/year of efficient use of heat). One of the most appreciated outcomes of the BiogasHeat project was the Handbook on sustainable heat use in biogas plant. During the project lifetime it has been downloaded from BiogasHeat web-site more than 14 000 times and more than 3 000 hard copies have been distributed.

BiogasHeat project supported 290 target group stakeholders in sustainable heat use planning from the biogas plants. 80 pre-feasibility studies have been carried out, 65 on-site visits and meetings organized, 12 business cases developed and 11 of them field tested. By the end of the project 4 of the field tests were actually implemented.

The project has been successful as well in terms of awareness raising and communication. During BiogasHeat events 124 policy makers were informed about sustainable heat use during national roundtable discussion events, 3 countries started introduction of heat use incentives in the national legislation. On the European level the policy strategy paper has been presented in 3 relevant DGs of the European Commission. 276 biogas plant operators have been trained regarding heat use solutions of the biogas plants during national training events. 786 stakeholders have been informed during the national workshops. 70 relevant stakeholders were directly addressed at the international coaching kick-off-transfer workshop. Coaching activities to 9 different European countries outside the project consortium have been implemented.

Boundary conditions

The strategy paper can be used for European policy design to favour the use of heat from biogas plants. Even though, the feedback from the members of the European commission DGs was that decisions regarding heat use of biogas plants are mostly made on national level and EC has not

much power in this decision making process. Furthermore, the included questions and answers are not country-specific, but only relate to the overall situation in Europe.

Geographical scope

- Austria
- Croatia
- Czech Republic
- Denmark
- Germany
- Italy
- Latvia
- Poland
- Romania

Target audience

- Biogas plant owners/ operators and policy makers on European level.
- Biogas plant operators, farmers, technology providers, policy makers, students, municipalities, consulting companies and other persons interested in the biogas heat use topic.
- Biogas plant owners and operators, actors of the heating sector, project developers and consultants.
- Biogas plant owners and operators, policy makers, actors of the heating sector, project developers and consultants.
- Biogas plant owners/ operators, policy makers and people generally interested in the topic.
- National policy makers and lobby groups in biogas and heating sector.
- European policy makers and lobby groups in biogas and heating sector.

Project partners

- Latvia (Ekodoma - consulting company, the coordinator of the project),
- Croatia (Energy Institute Hrvoje Požar),
- Germany (WIP Renewable Energies),
- Czech Republic (Energy Efficiency Center SEVEN),
- Italy (Sogesca srl - consultancy and engineering company),
- Austria (e7 Energie Markt Analyse GmbH – consulting company),
- Denmark (Danish Technological Institute),
- Romania (SC Mangus Sol Srl – consulting company),
- Belgium (Euroheat&Power - international association representing the District Heating and Cooling (DHC) and CHP sector in Europe and beyond).

2.2.15 Sustaingas

SUSTAINGAS ran from 01/04/2012 to 31/03/2015 and promoted sustainable organic biogas production by identifying and analysing the specific characteristics of organic biogas, its market and barriers, its economic viability (in relation to the crop yield) and its sustainability; and by promoting best practice examples and a handbook in workshops, online trainings and webinars.

Tools

- Policy tool:
- Consultations with political and commercial stakeholders.
 - Recommendations and strategies for stakeholders.
 - Organisation of round table for encounters with stakeholder groups on EU level.

| | |
|-------------------------------|--|
| Technical tools: | <ul style="list-style-type: none">- Economic tool and manual.- Evaluation scheme of the sustainability of organic biogas production.- Guidelines on standards for sustainable organic biogas production in Europe. |
| Market tools: | n.a. |
| Training and education tools: | <ul style="list-style-type: none">- Handbook- Training activities for the target group: workshops, online training and webinars |

Proven results and outcome of the project

The detailed definition tool generated a common understanding of sustainable organic biogas production in the project consortium. The detailed definition, which was published in form of a folder, proved successfully to be an important means of communication to transport the idea of SUSTAINGAS to the target groups.

As for the Market analysis tool for sustainable biogas production generated an important input for the Handbook and proved useful for contacts with political and commercial stakeholders.

Overall the tools assisted in demonstrating the positive effect of biogas production on GHG reduction.

Boundary conditions

The user interface of the economic tool might could have been more satisfying and user-friendly, if a partner from Information technology service area was joining the project.

With regard to the guidelines: farmers and associations appreciated the argumentation that organic biogas is good for the environment but they were sceptical about additional regulation barriers if these guidelines come into effect.

The time required to get the approval of publishing and copyrights were important factors. In the future tackling this way in advance would improve the smooth development of this task.

The translation of the handbook was a lot of work and was challenging to realise for the partners.

It was difficult to plan and organise events due to the farmer's schedule depending on the agricultural calendar. Weather conditions could change their schedule. Something to take into account for the next projects.

A lack of general interest on the topics was noticed. More relevant topics need to be put forward to ensure a collective interest.

Geographical scope

- Germany
- Austria
- Bulgaria
- Denmark
- Spain
- Poland

Target audience

The target audience were local and regional policy makers as well as potential developers.

Project partners

- STUDIA Schlierbach Studienzentrum für internationale Analysen
- Ecofys Germany GmbH
- International Federation of Organic Agriculture Movements European Union Regional Group (IFOAM EU Group)
- Økologisk Landsforening
- PROTECMA Energía y Medio Ambiente, SL
- Renewables Academy AG
- FiBL Projekte GmbH
- Foundation for Environment and Agriculture
- FUNDEKO Korbek, Krok-Baściuk Sp. J.

2.2.16 FAB Biogas

FAB Biogas ran from 01/04/2013 to 30/09/2015. The purpose of the FABbiogas project was to change the mindsets of all stakeholders along the waste-to-energy chain by promoting residues from Food and Beverage (FAB) industry as a new and renewable energy source for biogas production.

Tools

| | |
|-------------------------------|---|
| Policy tool: | n.a. |
| Technical tools: | <ul style="list-style-type: none">- Google maps showing existing waste biogas plants in partner countries.- Google maps showing organic waste streams of the FAB industry.- Biogas calculator for FAB industry. |
| Market tools: | n.a. |
| Training and education tools: | <ul style="list-style-type: none">- Fact sheets of best practice examples.- Advisory service/contact point in each partner country.- Handbook: Biogas production in the food and beverage industry.- Youtube clips on "best practice examples" of biogas plants in the FAB industry- Numerous national and international info days, study tours, etc. |

Proven results and outcome of the project

The tools provided the development of new biogas projects to be under construction/or being planned as a result of our "advisory services" and "feasibility studies".

Boundary conditions

The FABbiogas project ended before the full implementation and building of new biogas plant. Financial outcome of the project could therefore only be estimated. Contact points that were established during the project gave general knowledge to the customers, however for detail planning the customers had to contact directly the biogas plants constructors.

Geographical scope

- France
- Italy
- Germany
- Czech Republic
- Poland
- Austria

Target audience

The target audience were FAB companies and Policy making institutions.

Project partners

- University of Natural Resources and Life Sciences, Vienna
- European Biogas Association
- ATRES, Owner Gunther Pesta
- Association Nationale des Industries
- Kompetenzzentrum für Ernährung, Cluster Ernährung
- Federation Italiana dell Industria Alimentare
- Federation of the Food and Drink Industries of the Czech Republic
- Lebensmittelcluster Niederösterreich
- Technical University of Łódz

2.2.17 Bioteam

Bioteam ran from 01/04/2013 to 31/03/2016. The aim of BIOTEAM is to help public and private stakeholders gain better insights on how the bioenergy market works and how private business decisions and EU and national policy instruments (e.g., NREAPs, fiscal instruments, feed-in schemes, land-use/forest management policies, etc.) affect bioenergy pathway competitiveness and sustainability (i.e. environmental, economic and social).

Tools

| | |
|-------------------------------|--|
| Policy tool: | <ul style="list-style-type: none">- A comprehensive assessment of bio-energy policy interactions- Strategic policy recommendations on how to shape policy instrument packages at the EU and Member State levels in such a way that they allow for fair competition between bio-energy pathways within the common European market for bioenergy with optimised sustainability contributions in economic, social and environmental terms. |
| Technical tools: | A detailed sustainability impact assessment of a set of prioritised bio-energy pathways for each country involved (Finland, Germany, Italy, Lithuania, the Netherlands and Poland). The pathway assessments describe the lifecycle sustainability impact of a bio-energy product and will form the basis for further analysis within the project. It will also be assessed how the pathways fit into the countries' present energy systems and how they relate to alternative use modes of the biomass resources; |
| Market tools: | 6 national market system assessments (or 'market maps') for each of the combined set of bioenergy pathways that are part of the overall national bio-energy market. These market maps will allow bio-energy market stakeholders to take a snapshot of the overall market system for bio-energy and its associated governance structures. This market system assessment will show how market actors optimize their individual behaviour and how they interact, within the boundaries of given certain system barriers |
| Training and education tools: | n.a. |

Proven results and outcome of the project

It was found that LCA - as an analysis tool – is very useful, but that the tool and the associated results has some limitations. In general, LCA results are (or can) strongly depend on methodological choices / assumptions that are made. As a result, the main lesson learned is that pathway assessment results should be interpreted with care, and should never be presented by the BIOTEAM consortium as absolute or fixed values.

Boundary conditions

An important lesson learned relates to the early involvement of public stakeholders and trying to establish feedback loops with public stakeholders. Although the consortium has contacted and engaged several public stakeholders, in hindsight the BIOTEAM work planning - first focus on sustainability assessments and then on policies and markets – did not perfectly match with the needs of public stakeholders, who generally expressed more interest in the policy and the market system analysis.

Geographical scope

- The Netherlands,
- Lithuania,
- Germany,
- Finland,
- Italy

Target audience

Investors and particular stakeholders.

Project partners

- Stichting Joint Implementation Network (NL),
- Maa- ja elintarviketalouden tutkimuskeskus (FI),
- Baltycka Agencja Poszanowania Energii S.A. (PL),
- Ita-Suomen yliopisto (FI),
- GEORG-AUGUST-UNIVERSITAET GOETTINGEN STIFTUNG OEFFENTLICHEN RECHTS (DE),
- LIETUVOS AGRARINIŲ IR MIŠKŲ MOKSLŲ CENTRAS (LT),
- Fondazione per l'Ambiente Teobaldo Fenoglio (IT)

2.2.18 GR3: Grass to green gas

GR3: Grass to green gas and ran from 04/01/2013 to 31/03/2016. It aims at promoting the use of grass and other herbaceous residues from landscape management as a resource for biogas in Belgium, Italy, Germany, Denmark and Portugal. The energy potential of these residues remains underutilized across Europe. Boosted by know-how transfer between countries, the project will bring key market actors together and provide them as well as decision-makers with technical, investment and legislative advices. This will trigger investments in value chains for grass residues and increase their market uptake as biogas feedstock. As such, the project will increase renewable energy production without competing with food production, protect permanent grasslands from land use changes, and increase ecological landscape management.

Tools

Policy tool: Report for decision makers and the general public summarising the benefits of grass residue valorisation and recommendations for removing the non-technical barriers

- Technical tools:
- Manual on best practices, technologies and regulations for (amongst others) municipalities, and one for (amongst others) nature conservancies.
 - Manual on the digestion of grass residues for biogas plants.
 - Distribution during regional workshops.
- Market tools:
- Expected result: more widespread utilisation of grass residues as biogas feedstock throughout the partner regions.
 - Goal of 40% energetic utilisation of available and practically utilisable grass residues by 2020.
 - Improvement of the perception of biogas production amongst local stakeholders such as municipalities by communicating advantages of grass residue digestion (such as local job creation) will reduce NIMBY bottlenecks that hinder increased biogas production.
- Training and education tools:
- Webtool for prediction of biomass quality stating suitability for digestion of grass residues in function of their origin, manner of harvesting and digestion technology.
 - Development of profit calculation Webtool for evaluating the techno-economic feasibility and profitability of replacing conventional feedstock with grass residues.

Proven results and outcome of the project

The project overall delivered Several scientific articles, good practice guide as recommendation for local authorities, several reports, and a SWOT analysis.

Boundary conditions

The barriers identified are the insufficient awareness and acceptance of suitable technologies for the mowing, storage and anaerobic digestion of grass residues, absence or lack of cooperation between stakeholders along the value chain, as well as legal barriers. The legal framework can be a significantly restriction for the energetically use of grass (especially classification waste or product). Within every one of the participating regions the legal restrictions might be the major problem in order to have grass valorised in digesters.

Whether or not the valorisation of grass clippings is possible is highly dependent of case-by-case situations. There are a lot of factors that have influence on the actual feasibility of grass digestion, both economic (e.g. country-specific subsidy guidelines) and technical (level of contamination etc.)

Geographical scope

- Belgium
- Italy
- Germany
- Denmark
- Portugal

Target audience

The target audience were local authorities, biogas plant owners, authorities and terrain managers.

Project partners

- DLV BELGIUM CVBA (Belgium),
- Fördergesellschaft für nachhaltige Biogas- und Bioenergienutzung e.V. (Germany),
- Institute for Future Energy Systems gGmbH (Germany),
- Provinciale Hogeschool Limburg (Belgium),

- UNIVERSITA DEGLI STUDI DI VERONA (Italy),
- Veneto Agricoltura (Italy),
- Laboratório Nacional de Energia e Geologia I.P. (Portugal),
- INAGRO, PROVINCIAAL EXTERN VERZELFSTANDIGD AGENTSCHAP IN PRIVAATRECHTELIJKE (Belgium),
- SYDDANSK UNIVERSITET (Denmark),
- Pro Natura vzw (Belgium),
- Universiteit Gent/ Ghent University (Belgium)

2.2.19 Biogas3

Biogas3 ran from 01/03/2014 to 28/02/2014. The project was focused on promotion of sustainable production of renewable energy from the biogas obtained through agro-food waste in small-scale concepts for energy self-sufficiency in seven European countries (Spain, Italy, Poland, France, Germany, Sweden and Ireland). In particular, to report, train and help agricultural, farms and food and beverage processors to manage the waste through biogas technology small scale concepts for energy self-sufficiency.

Tools

| | |
|-------------------------------|--|
| Policy tool: | n.a. |
| Technical tools: | <ul style="list-style-type: none">- Software tool for evaluation of sustainability of small-scale anaerobic digesters.- Handbooks and information material for promotion.- Models for different target groups (policy makers, etc.). |
| Market tools: | n.a. |
| Training and education tools: | n.a. |

Proven results and outcome of the project

This project was very successful in terms of dissemination of small-scale anaerobic digestion models between involved countries. More than 300 EU agro-food companies had the opportunity to evaluate the feasibility of the installation of a small-scale anaerobic digester. In reference to the tools used these enabled that over 1500 interested stakeholders were trained through the capacity building activities of Biogas3. More than 300 European agro-food industries participated in the programme of one-to-one meetings of the Biogas3 project. And almost 150 sustainability analyses have been performed for small-scale anaerobic digesters by Biogas3 partners in the seven countries.

Boundary conditions

The tool's application was only from September 2014 until February 2016 and were only in involved countries.

Geographical scope

- Spain
- Italy
- Poland
- France
- Germany
- Sweden
- Ireland

Target audience

The target audience were the agro-food industry as the main target group – including farms and food and beverage processors. From which the key actors engaged with/via the project were: (1) Agro-food industry associations who represent the target group; (2) Associations representing the biogas sector; (3) Anaerobic digestion and waste management companies who are technology and service providers; and (3) Stakeholders in public authorities responsible for policy and administration.

Project partners

- TCA (Italy)
- DEIAFA (Italy)
- ACTIA (France)
- IFIP (France)
- JTI (Sweden)
- FUNDEKO (Poland)
- RENAC (Germany)
- FIAB (Spain)
- AINIA (Spain)
- IrBEA (Ireland)

2.2.20 BioEnergyFarm II

BioEnergyFarm II started in 01/03/2014 and is to finish at the end of this year 31/12/2016. The purpose of the BioEnergy Farm 2 project is the promotion of farm scale manure digestion. So mono-manure digestion, or manure with left-overs. So no dedicated maize or corn. For organic farmers the exception is dedicated clover-grass co-digestion to generate a nitrogen-rich fertiliser.

Tools

| | |
|-------------------------------|--|
| Policy tool: | n.a. |
| Technical tools: | - The online tool is a very rough estimation for if a biogas plant can be feasible based on one's feedstock. - The offline tool is a very elaborated expert calculator. It is preferred that only trained experts use this tool |
| Market tools: | n.a. |
| Training and education tools: | n.a. |

Proven results and outcome of the project

The tool is being used by the consortium partners and several external experts. Up to today about 150 business plans were generated with the offline tool. The online is filled in a 1200 times.

This project is so far successful. The project is addressing the needs for unbiased information on farm scale digestion. In almost all partner countries and in other EU countries the interest in farm scale biogas production is increasing. With this project we provide the information and the tools that are needed in this expanding market. The offline tool was classified as 'the best feasibility tool free available in Europe'.

Boundary conditions

The calculation tools are made for only small scale biogas plants. So generally from 10 kW up to 150 kW or 25.000 ton of biomass input.

The database contains data from the partner countries and some other countries. It is very easy to implement other country databases and/or translations.

Geographical scope

- Netherlands;
- Belgium;
- France;
- Denmark;
- Germany;
- Poland;
- Italy.
- Other- EU countries

Target audience

The target audience for the project are farmers and farmers advisors. The focus of the tool is only farm based digestion. So only farmers and other experts that advice the farmers are addressed by this tool.

Project partners

- Cornelissen Consulting Services (CCS) NL
- DCA Multimedia (NL)
- Innovatiesteunpunt (BE)
- TRAME (FR)
- CRAB (FR) chambers of commerce for farmers in France.
- Organic Denmark (DK)
- Agrotech (DK)
- IBBK (DE)
- KTBL (DE)
- NAPE (PL)
- FNEA (PL) agricultural faculty of university of Warsaw
- DISAFA (IT) University of Turin
- Coldiretti (IT) Farmers organisation in Italy

2.2.21 Bin2Grid

Bin2Grid started on 01/01/2015 and will end on 31/12/2017 and is currently ongoing. The overall objective of Bin2Grid concept is to promote segregated collection of food waste as energy source, conversion to biogas, and its upgrading to biomethane and utilisation in associated network of filling stations. Accent is given to defining strategies for establishing efficient network of food and beverage waste collection methods and practices.

Tools

| | |
|-------------------------------|--|
| Policy tool: | n.a. |
| Technical tools: | <ul style="list-style-type: none">- Factsheets on waste quantities and composition in cities for benchmarking and overview, including what trucks are used for collection, collection frequency, costs, incomes and expenses;- Factsheets on energy potential of different waste types as a starting point for future feasibility studies and assessing energy potential of other cities; |
| Market tools: | n.a. |
| Training and education tools: | Guidelines for AD of food waste and waste from food and beverage industries for various waste types giving potential treatment options |

and current waste management performances. It will also include a policy overview.

Proven results and outcome of the project

The project is running and its early to talk about effectiveness. However, one proven result is a planned biogas plant in Skopje, Macedonia

Boundary conditions

There is a low impact on national decision making, targeting national decision makers, as the tools are oriented towards local governments and investors. In terms of available feedstock for AD analysis, the project only looks at household biowaste and waste from food and beverages and doesn't take into account agricultural waste or sewage sludge.

Geographical scope

- France,
- Macedonia,
- Croatia,
- Spain

Target audience

4 Target cities (Zagreb, Skopje, Malaga, Paris)

Project partners

- Zagreb Holding (HR), Faculty of Mechanical Engineering and Naval Architecture (HR),
- WIP Renewable Energies (DE),
- Gussing Energy Technologies (AT),
- JSP Skopje (MK),
- City of Skopje (MK),
- Andalucian Institute of Technology (ES),
- ORDIF (FR)

2.2.22 BIOSURF

BIOSURF (BIOMethane as SUstainable and Renewable Fuel) started on 01/01/2015 and will end on 31/12/2017 and is currently ongoing. Its objective 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. Aims are the analysis of the value chain from production to use, based on territorial, physical and economic features and the identification of the most prominent drivers for CO₂-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.

Tools

- Policy tool:
- Proposal for the establishment of national and European biomethane certificate trading platforms.
 - Recommendations for the adaptation of the GHG calculation methodology for biomethane systems included in Annex V of the EU RED.
 - Recommendations for EU and national policy makers.

- Technical tools:
- Technical-economic analysis for determining the feasibility threshold for tradable biomethane certificates.
 - Assessment of GHG reduction potentials due to the use of animal excrements and organic waste streams as biogas substrates and the replacement of industrial chemical fertilisers by digestate.
- Market tools:
- 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.
 - Market survey on determining the market accepted threshold for the value of tradable biomethane certificates.
- Training and education tools: Workshops

Proven results and outcome of the project

The main outcome and a success of the project so far is an initiative to have a European Renewable Gas Association, that would gather all stakeholders along the biomethane value chain working together on the ultimate goal, also foreseen by the BIOSURF project itself.

Finalised deliverables so far: Comprehensive guidelines for establishing national biomethane registries, Technical-administrative proposal to EC for declaring natural gas network as a single, closed mass-balancing system with respect to biomethane cross-border transactions, Report on data availability of selected raw material categories, Report on current and future sustainable biomass supply for biomethane production.

Project is still ongoing thus further results will follow.

Boundary conditions

Since the project is currently ongoing the planned tools are not executed yet and so far no problems have been encountered.

Geographical scope

- Pan-Europe

Target audience

The target audience were decision makers, gas grid operators and biomethane producers.

Project partners

- Istituto di Studi per L'Integrazione dei Sistemi Scrl (ISIS)
- European Biogas Association (EBA)
- Arge Kompost Und Biogas Osterreich Verein (AKB)
- AGCS – Gas Clearing and Settlement Ag (AGCS)
- Cib-Consorzio Italiano Biogas E Gassificazione (CIB)
- Fachagentur Nachwachsende Rohstoffe E.V. (FNR)
- Magyar Biogaz Egyesulet (HBA)
- DBFZ Deutsches Biomasseforschungszentrum Gemeinnuetzige GmbH (DBFZ)
- Groupement Regional des Centres d'Études Techniques Agricoles de l'Île de France GRCETA (GRCETA)
- Renewable Energy Association Lbg (REA)
- Fachverband Biogas Ev (GBA)

3 National tools

This section of the report gives an overview of national projects and activities in the biogas sector. There is a detailed analysis of specific tools used in the countries of the project partners of Biogas Action. This information was gathered with the help of a questionnaire that was sent out to the respective project partners. This questionnaire focused on the different types of tools developed and/or used in a particular country.

3.1 Overview of tools developed in partner countries

Table 2 lists comprehensive information on 62 tools developed and/or used in project partner countries. The tools are listed according to the country of origin. The overview table shows the name of the tools, the types of the tool, the target audience and its geographical scope as well as the related chapter where detailed information on each tool can be found.

3.1.1 Types of tools

Figure 3 shows numbers of tools of certain types used in national projects.

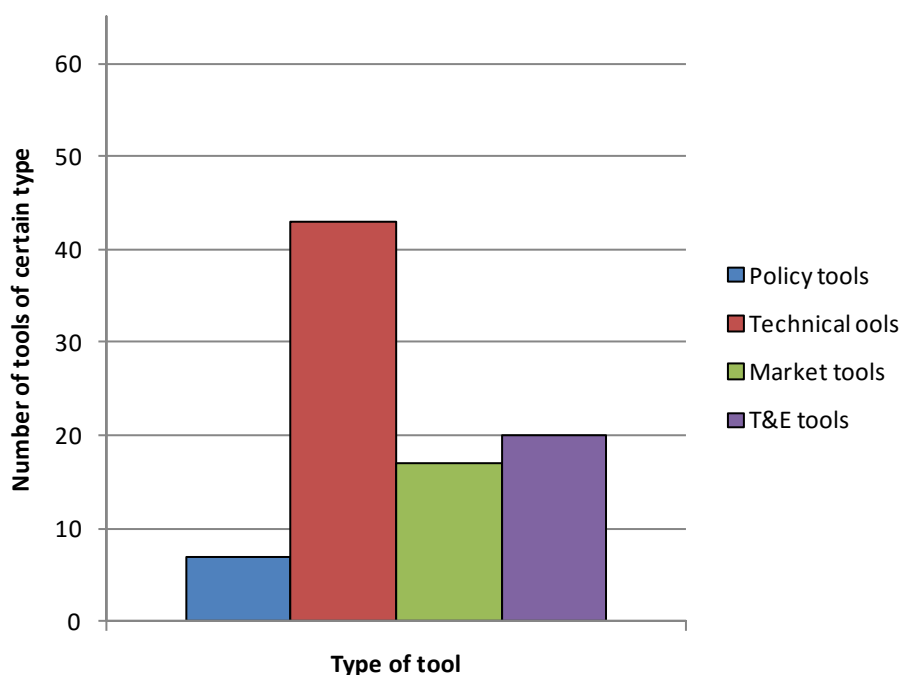


Figure 3: Number of tools of certain types

Out of the 62 tools used in national projects, only 11% (7) are policy tools. Most of the tools – 69% (43) of them – are technical tools such as methodologies, guidebooks, software, calculators, etc. More than one quarter of the tools used, namely 27% (17), are market tools such as different kinds of guidelines, promotion tools in form of Youtube videos, websites, etc. And 32% (20) are training and educational tools such as handbooks, guidelines, webpages, summer school, etc. More than half of the tools (53%) can be considered tools of multiple types.

3.1.2 Target audience

When it comes to the target audience, the tools cover the whole chain of interested parties from policy makers through rural communities and regions, farmers, plant operators, investors to non/experts, students and consumers. Figure 4 shows the number of projects targeting certain groups of audience.

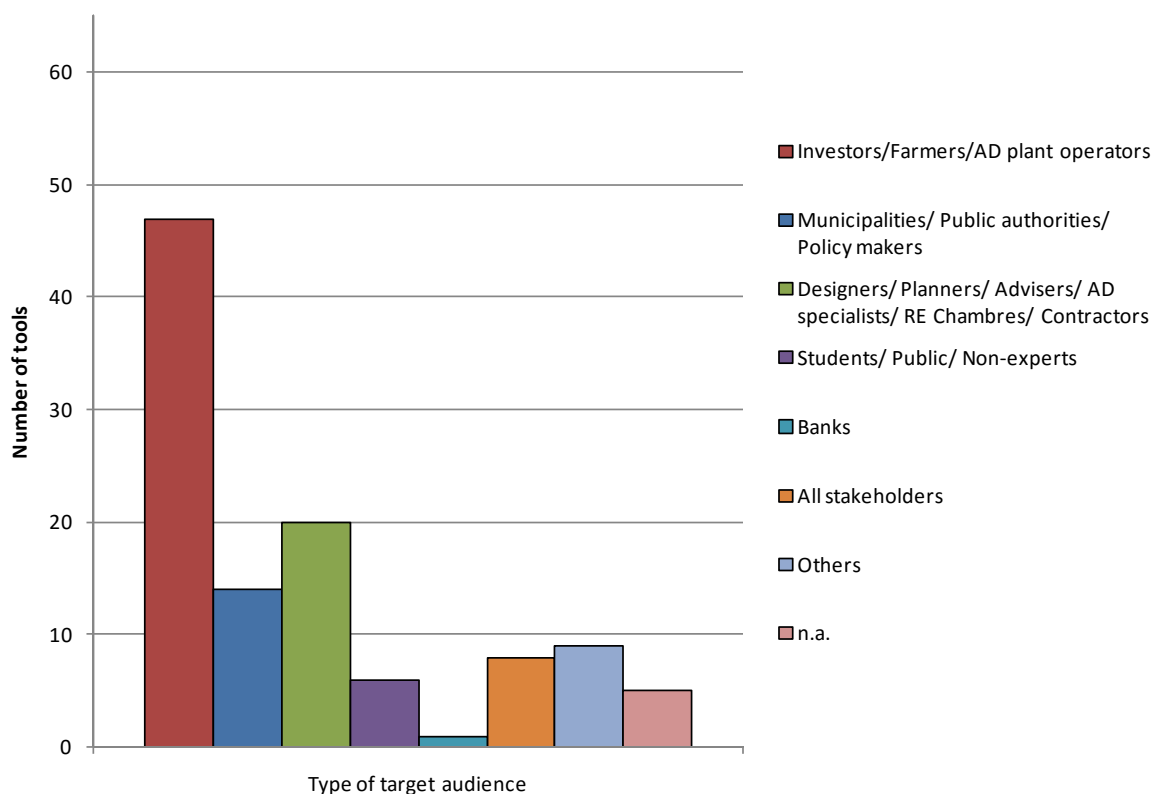


Figure 4: Number of tools targeting certain type of audience

Most of the tools (more than three quarters) target the group of investors, farmers, AD plants operators, etc. Nearly a third of the tools (32%) aim at the experts in AD such as technology providers, consultants, advisors, designers and planners, RE chambers and associations, etc. Almost one quarter of the projects (23%) target the public authorities, policy makers and municipalities. General public, students and non-experts are the target for 10% of the tools. Nearly 13% of the tools are targeting all stakeholders.

3.1.3 Geographical scope

Considering the geographical scope, most of the tools were developed at regional levels and they are also applicable at regional level. There are just a few tools that can be applied at European level. This is in many cases caused by the fact that most of the tools are available only in the national language.

More detailed information on each individual tool can be found in the related chapter (see also Table 2).

D.2.1 Compilation or reports and tools for regional biogas deployment

Table 2: Overview of existing tools developed at national level in partner countries.

| Country/ Project partner | Tool | Chapter | Policy tool | Technical tool | Market tool | Traning & education tool | Target audience | Geo. scope - developed at/applied for |
|-----------------------------|--|---------|-------------|----------------|-------------|--------------------------|---|---------------------------------------|
| CZ/ CzBA | RESTEP - interactive map and calculation tool | 3.2.1 | x | ✓ | x | x | - Investors - Municipalities | CZ |
| | Web database mojeoze.cz | 3.2.2 | x | ✓ | ✓ | x | - Owners and users of property - Producers and sellers of mini and micro RES technologies | CZ |
| | Bioreg - study and supporting SW | 3.2.3 | x | ✓ | x | ✓ | - Investors - Reviewers of AD projects | CZ |
| | Regional Innovative vouchers | 3.2.4 | ✓ | x | ✓ | x | - Regional companies that prosper from R&D services | CZ |
| | biogasIN - Final Report (Planning and implementation of biogas plants) | 3.2.5 | ✓ | ✓ | x | ✓ | - Investors - Reviewers of AD projects | CEE |
| | RSA methodology (Regional Source Assessment) | 3.2.6 | x | ✓ | ✓ | x | - Investors - Municipalities - Public administration in project assessment (EIA/ SEA, grants, etc.) | CZ/ EU |
| | Certified Methodology - Determination of physical and chemical properties of solid and liquid components of digestate from biogas stations | 3.2.7 | x | ✓ | x | x | - AD plants operators - Processors - Digestate users | n.a./ CZ |
| | Certified Methodology - Simlation and economic evaluation of investement project in power usage biomass | 3.2.8 | x | ✓ | x | x | - AD plants operators | CZ |
| | Certified Methodology - The use of the solid component of digestate to prepare growing media | 3.2.9 | x | ✓ | x | x | - AD plants operators - Processors - Digestate users | CZ/ EU |
| | Certified Methodology - The methodol. of costs and revenues calculation of stations on biogas production of agribusiness enterprises | 3.2.10 | x | ✓ | x | x | - AD plants operators | CZ |

D.2.1 Compilation or reports and tools for regional biogas deployment

| Country/ Project partner | Tool | Chapter | Policy tool | Technical tool | Market tool | Traning & education tool | Target audience | Geo. scope - developed at/applied for |
|-----------------------------|--|---------|-------------|----------------|-------------|--------------------------|---|---------------------------------------|
| CZ/ CzBA | Certified Methodology - Possibilities of cultivation of cup-plant <i>Silphium perfoliatum</i> | 3.2.11 | x | ✓ | x | x | - AD plants operators - Agriculturalists | CZ |
| | Certified Methodology - Utilization of organic waste form agricultural production and rural settlements. Etc. | 3.2.12 | x | ✓ | x | x | - Designers/ Planners - Investors | CZ |
| | Software for Biogas station designing | 3.2.13 | x | ✓ | x | x | - Designers/ Planners - Investors | CZ/ EU |
| | Software Economy of biogas plant | 3.2.14 | x | ✓ | x | x | - Investors | CZ/ EU |
| DK/ DFFB | Guideline Planning process for biogas plants | 3.3.1 | ✓ | ✓ | x | x | - Public authorities | DK |
| | "Cookbook" for biogas plants | 3.3.2 | x | ✓ | x | ✓ | - AD plant operators | DK and EU |
| | Scandinavian handbook for Biogas | 3.3.3 | x | ✓ | x | ✓ | - Policy makers | Scandinavia and EU |
| | More biogas for the same money - Calculation tool | 3.3.4 | x | ✓ | x | x | n.a. | DK |
| | Guide - Briquetted straw more than doubles biogas production | 3.3.5 | x | ✓ | x | x | n.a. | DK |
| | Business model for biogas planning in Denmark - Calculation tool | 3.3.6 | x | ✓ | ✓ | x | n.a. | DK |
| | RecOil - Guide on Optimization of a biomass collection systems | 3.3.7 | x | ✓ | ✓ | x | n.a. | DK |
| FR/ AILE | Compilation of 6 product sheets (Digestate) | 3.4.1 | x | ✓ | x | ✓ | - Digestate producers and users - Consultants and advisors | FR |
| | Excel document: Annexe financière (Financial annexe) | 3.4.2 | x | ✓ | x | x | - anyone who applies for an aid in Brittany | Brittany/ FR |
| | Guide Book: Suivi biologique d'une unité de méthanisation agricole (Biological follow-up of a farm plant of methanisation) | 3.4.3 | x | ✓ | x | ✓ | - Farmers - Non-experts | Western France/ FR |

D.2.1 Compilation of reports and tools for regional biogas deployment

| Country/ Project partner | Tool | Chapter | Policy tool | Technical tool | Market tool | Training & education tool | Target audience | Geo. scope - developed at/applied for |
|-----------------------------|--|---------|-------------|----------------|-------------|---------------------------|---|---------------------------------------|
| FR/ AILE | Guide Book: Démarches de raccordement (Process of connection) | 3.4.4 | x | ✓ | x | ✓ | - All investors of biogas plants for electricity production | Pays de la Loire and Brittany/ FR |
| | Guide Book (Mise en marché des digestats - Digestate marketing) | 3.4.5 | x | x | ✓ | x | - Farmers - Advisors | Brittany/ FR |
| | Cahiers des charges pour une demande d'aide (Requirements specifications for an aid application) | 3.4.6 | x | ✓ | x | x | - anyone who applies for an aid for a biogas plant | Western France/ FR |
| | Calculation Tool: Simulateur Methasim (Simulator Methasim) | 3.4.7 | x | ✓ | x | x | - Farmers - Technicians | FR |
| | Technical Guide Book: La méthanisation à la ferme (Farm scale AD) | 3.4.8 | x | ✓ | x | ✓ | - Farmers - Other direct investors | FR |
| | Guideline Book: Conseils et exemples de rédaction pour un dossier technique d'homologation des digestats issus de codigestion (Writing tips and examples of technical approval file for marketing digestate and derivatives) | 3.4.9 | x | ✓ | ✓ | x | - Engineering consultants - Advisors | FR |
| FR/ RAEE | Website for gas grid injection | 3.5.1 | x | ✓ | x | ✓ | - Investors - Consultants/ advisors - Public, Administration, Banks, etc. | FR |
| | Website with resource centre | 3.5.2 | x | x | ✓ | x | - Investors - Consultants/ advisors - Public, Administration, Banks, etc. | Rhône-Alpes region |
| | Guideline: Guide de recommandations: montage de projet méthanisation | 3.5.3 | x | ✓ | x | ✓ | - Investors - Consultants/ advisors - RE associations/ chambres | Rhône-Alpes region |
| | Youtube videos for CHP and biogas plant operation | 3.5.4 | x | ✓ | ✓ | ✓ | - RE associations/ chambres - Public, Schools - Local authorities | Rhône-Alpes region/ FR |

D.2.1 Compilation or reports and tools for regional biogas deployment

| Country/ Project partner | Tool | Chapter | Policy tool | Technical tool | Market tool | Traning & education tool | Target audience | Geo. scope - developed at/applied for |
|-----------------------------|--|---------|-------------|----------------|-------------|--------------------------|--|---------------------------------------|
| FR/ RAEE | Guideline: Règles de sécurité dans une unité de méthanisation | 3.5.5 | x | ✓ | x | ✓ | - RE associations/ chambres - Consultants/ advisors - Local authorities | FR |
| | Brochure le biomethane de nos territoires bien plus qu'une énergie d'avenir | 3.5.6 | x | x | ✓ | x | - RE associations/ chambres - Consultants/ advisors - Local authorities, etc. | FR |
| | Excel file "Outils d'autoévaluation d'un projet de méthanisation territorial ou à la ferme " | 3.5.7 | x | ✓ | x | x | - RE associations/ chambres | EU/ n.a. |
| | Tool guide for administrative steps | 3.5.8 | x | ✓ | x | x | - Investors - Consultants/ advisors - RE associations/ chambres, etc. | Rhône-Alpes region |
| | Guideline for PR for project owners | 3.5.9 | x | x | ✓ | x | - Investors - RE associations/ chambres - Constructors | AT/ FR |
| | Feasibility study Small scale biomethane plant in France | 3.5.10 | x | ✓ | x | x | - Investors - Consultants/ advisors - RE associations/ chambres - Local authorities | FR/ FR |
| | Excel file - Requirements from decrees on AD in France | 3.5.11 | x | ✓ | x | x | - Investors - Consultants/ advisors - RE associations/ chambres, etc. | Rhône-Alpes region/ FR |
| DE/IBBK | Calculation tool I - Economics (KTBL) | 3.6.1 | x | ✓ | x | x | - Farmers | DE |
| | Calculation tool II – Economics (DBFZ) | 3.6.2 | x | ✓ | x | x | - AD plants operators | DE |
| | Calculation tool III: Digestate | 3.6.3 | x | ✓ | x | x | - AD plants operators | DE/EU |
| | Calculation tool IV: Contribution margins | 3.6.4 | x | ✓ | x | x | - Farmers | DE/EU |
| | Calculation tool V: Biogas and methane yields | 3.6.5 | x | ✓ | x | x | - AD plants operators | DE/EU |
| | Education package in combination with promotion pool and media center | 3.6.6 | x | x | x | ✓ | - All stakeholders | DE/EU |
| | Education package I: Guide for operators | 3.6.7 | x | x | x | ✓ | - AD plants operators | DE/EU |

D.2.1 Compilation or reports and tools for regional biogas deployment

| Country/ Project partner | Tool | Chapter | Policy tool | Technical tool | Market tool | Traning & education tool | Target audience | Geo. scope - developed at/applied for |
|-----------------------------|---|---------|-------------|----------------|-------------|--------------------------|--|---------------------------------------|
| DE/IBBK | Education package II: Publications | 3.6.8 | x | x | x | ✓ | - AD plants operators - Stakeholders in biogas technology | DE/EU |
| | Education package III: Online-book store | 3.6.9 | x | x | x | ✓ | - Farmers - Stakeholders in biogas technology | DE/EU |
| LV/ Ekodoma | Handbook - Sustainable Heat use of Biogas Plants (BiogasHeat) - EDUC TOOL | 3.7.1 | x | x | x | ✓ | - AD plants operators/ Farmers - Technology providers - Students, municipalities, consultants | DK, DE, HR, CZ, IT, LV, RO |
| | Summer School - Energy Aspects on Biogas (BiogasIN) - EDUC TOOL | 3.7.2 | x | x | x | ✓ | - AD plants operators/ Farmers - Energy enterprises - Students | LV |
| | Calculation Tool Biogas Potential in excel (BiogasIN) | 3.7.3 | x | ✓ | x | x | - AD plants operators/ Farmers - Energy enterprises - Policy makers, municipalities, etc. | BG, HR, CZ, EL, IT, LV, RO |
| | Brochure - Did you know that biogas...? (BiogasIN) - PROMOTION TOOL | 3.7.4 | x | x | ✓ | x | - AD plants operators/ Farmers - Energy enterprises - Policy makers, municipalities, etc. | BG, HR, CZ, EL, IT, LV, RO |
| | Short film Waste to Biomethane (UrbanBiogas) PROMOTION TOOL | 3.7.5 | x | x | ✓ | x | - AD plants operators/ Waste management - Municipalities - Students | AT/ LV, HR, PT, AT, PL |
| | Handbook - Biogas (Big>East) | 3.7.6 | x | x | x | ✓ | - AD plants operators/ Farmers - Energy enterprises, technology providers, - Policy makers, municipalities, etc. | DE, SI, AT, EL, LV, HR, BG, RO, DK |

D.2.1 Compilation or reports and tools for regional biogas deployment

| Country/ Project partner | Tool | Chapter | Policy tool | Technical tool | Market tool | Traning & education tool | Target audience | Geo. scope - developed at/applied for |
|-----------------------------|---|---------|-------------|----------------|-------------|--------------------------|---|---------------------------------------|
| SE/ ESS | Investment and operational support | 3.8.1 | ✓ | ✗ | ✗ | ✓ | - Investors - All key actors - Stakeholders | SE/ regional and local level |
| | Tax exemptions | 3.8.2 | ✓ | ✗ | ✓ | ✗ | - Investors - All key actors - Stakeholders | SE/ regional and local level |
| | Political will | 3.8.3 | ✓ | ✗ | ✓ | ✗ | - Investors - All key actors - Stakeholders | SE/ regional and local level |
| | Regional startegy based on regional and local goals | 3.8.4 | ✓ | ✗ | ✓ | ✗ | - Investors - All key actors - Stakeholders | SE/ regional and local level |
| | Biogas Sydost (Biogas Southeast) - regional network | 3.8.5 | ✗ | ✗ | ✓ | ✗ | - Investors - All key actors - Stakeholders | SE/ regional and local level |
| UK/ SWEA | ADAT - AD assessment tool SW | 3.9.1 | ✗ | ✓ | ✗ | ✗ | n.a. | n.a. |

3.2 Czech Republic (Data delivered by the Czech Biogas Association)

3.2.1 RESTEP - Regional Sustainable Energy Policy: Map and calculation tool

| | |
|----------------------|---|
| Description: | The new comprehensive method for urban management and regional planning in the field of proposing and assessing energy projects. The method uses an innovative software tool – the interactive map of conditions for renewable and alternative energy sources including biofuels. |
| Proven results: | The tool is being used for partial analysis of the chosen area, as the background of investment or land-use planning projects. |
| Boundary conditions: | The border of Czech Republic. The exactness of assessment results depends on background data exactness. |
| Target audience: | Investors (in energy / agriculture) sectors Municipalities in investment and land-use planning |
| Geographical scope: | Developed in and applied for the Czech Republic. |

3.2.2 Web Database www.mojeoze.cz

| | |
|----------------------|---|
| Description: | Database of micro and mini technologies for renewable energy sources (RES) technologies. |
| Proven results: | The tool is being used for assessment and economical calculation of RES technologies, with respect to users potential (building or piece of land characteristics etc.). |
| Boundary conditions: | Micro and mini technologies only. Czech version only. |
| Target audience: | Owners and users of buildings and pieces of land Producers and sellers of mini and micro RES technologies |
| Geographical scope: | Developed in and applied for the Czech Republic. |

3.2.3 Bioreg

| | |
|----------------------|---|
| Description: | Study and supporting system |
| Proven results: | The tool is used for the assessment of land potential for some type of biogas station localization and operation. |
| Boundary conditions: | Not for industry biogas station. Czech version only. |
| Target audience: | Investors – agriculturists, municipalities, waste management companies Reviewers of biogas station projects |
| Geographical scope: | Developed in and applied for the Czech Republic. |

3.2.4 Regional Innovative Vouchers

| | |
|----------------------|--|
| Description: | Innovative vouchers help to connect commercial sector with R&D, through the small grants on R&D services for regional companies. |
| Proven results: | The innovative vouchers scheme was implemented in most of regions of Czech Republic and calls for proposals are repeatedly. |
| Boundary conditions: | Regional scope – for regional companies only. Limited amount of grant. |

Target audience: Regional companies that prosper from R&D services.
Geographical scope: Developed in and applied for individual regions of the Czech Republic.

3.2.5 BiogasIN

Description: BiogasIN aims to create a sustainable biogas market in Central and Eastern Europe (CEE) by targeting the strongest framework barrier: high administrative barriers both in permitting and financing phases; this bottleneck was emphasised in many former European projects, and experiences.

Proven results: The final report of project is used for planning and process of implementation of biogas stations in Czech Republic (it contains the list of permitting procedures, financing options etc.).

Boundary conditions: The risk of become out of date.

Target audience: Investors – agriculturists, municipalities, waste management companies
Reviewers of biogas station projects

Geographical scope: Developed in Central and Eastern Europe and applied for individual regions of the Czech Republic.

3.2.6 Regional Source Assessment (RSA) methodology

Description: The tool for regional material and energy sources and local conditions assessment, including practice for citizens, corporates, municipalities and public administration.

Proven results: The tool is used for partial analysis of the chosen area, as the background of investment or land-use planning projects.

Boundary conditions: The exactness of assessment results depends on background data exactness.

Target audience: Investors (in energy / agriculture) sectors
Municipalities in investment and land-use planning
Public administration in projects assessment (EIA/SEA, grants etc.)

Geographical scope: Developed in the Czech Republic. No limits for its application.

3.2.7 Determination of physical and chemical properties of solid and liquid components of digestate from biogas stations

Description: Realized certified methodology

Proven results: The methodology provides instructions and gives the summary of physical and chemical properties determination and the way of these detections to operators of biogas, processor and users of digestate, solid phase of digestate and liquid phase of digestate.

Boundary conditions: Czech version only.

Target audience: Operators of biogas plants
Processors
Users of digestate

Geographical scope: Czech version only.

3.2.8 Simulation and economic evaluation of investment project in power usage biomass

| | |
|----------------------|--|
| Description: | Realized certified methodology |
| Proven results: | The Expert system for modelling of bio-fuels production economy allows energy phytomass producers to comprehensively assess the economy of energy crop growing, solid bio-fuel production and biogas production. |
| Boundary conditions: | Czech version only. |
| Target audience: | Operators of Biogas plants. |
| Geographical scope: | Developed in and applied for the Czech Republic. |

3.2.9 The use of the solid component of digestate to prepare growing media

| | |
|----------------------|--|
| Description: | Realized certified methodology |
| Proven results: | The presented methodology provides complete instructions for evaluating the chemical and physical properties of different types of separates for their possible utilisation in the preparation of growing media. |
| Boundary conditions: | Czech version only. |
| Target audience: | Operators of biogas plants. Processors and users of digestate |
| Geographical scope: | Developed in the Czech Republic. No limits for its application. |

3.2.10 The methodology of costs and revenues calculation of stations on biogas production of agri-business enterprises

| | |
|----------------------|---|
| Description: | Realized certified methodology |
| Proven results: | The methodology should be understood as recommended to agribusiness entities with accounting. |
| Boundary conditions: | Czech version only. |
| Target audience: | Business enterprises Biogas station operators |
| Geographical scope: | Developed in and applied for the Czech Republic. |

3.2.11 Possibilities of cultivation of cup-plant *Silphium perfoliatum L./ Galega orientalis Lamb. / Phalaris arundinacea L./ Cannabis sativa L.* for biogas production

| | |
|----------------------|---|
| Description: | Realized certified methodologies |
| Proven results: | Methodology for practices provides basic agro botanical characteristics and information on growing and using innovative multifunctional fodder and energy crop cup-plant <i>Silphium perfoliatum L./ Galega orientalis Lamb. / Phalaris arundinacea L./ Cannabis sativa L.</i> , especially as a raw material for the production of biogas. |
| Boundary conditions: | Czech version only. |

Target audience: Biogas station operators
agriculturalists

Geographical scope: Developed in and applied for the Czech Republic.

3.2.12 Utilisation of organic waste from agricultural production and rural settlements. Collection, classification and utilisation of organic waste. Equipment for thermal processing of organic waste

Description: Realized certified methodologies

Proven results: The results of research work from projects regarding energy and biogas renewable resources are used in the publication.

Boundary conditions: Czech version only.

Target audience: Designers
Planners
Investors

Geographical scope: Developed in and applied for the Czech Republic.

3.2.13 Software for biogas station designing

Description: Software

Proven results: Software is based on model, that works with real data of particular biogas station especially with sort and volume of substrate and another input conditions.

Boundary conditions: Czech version only. Licence is required in some cases.

Target audience: Designers
Planners
Investors

Geographical scope: Developed in the Czech Republic. No limits for its application.

3.2.14 Economy of biogas plant

Description: Software

Proven results: Internet expert system – serves to the modelling and simulation of agricultural biogas plants economy and to the support of decision-making about the future investments.

Boundary conditions: Czech version only. Licence is required in some cases.

Target audience: Investors (in energy/ agriculture) sectors

Geographical scope: Developed in the Czech Republic. No limits for its application.

3.3 Denmark (Data delivered by the Danish Technology Centre for Biogas)

3.3.1 Planning process for biogas plants – a guideline for public authorities

Description: The Danish government established back in 2012 (1) a national “Mobile Team for Biogas” to support municipalities in the planning process for biogas plants (2) a detailed time table for the whole planning phase (3) an Inspiration catalogue for the VVM (Environmental Impact Assessment, EIA).

Besides the national description for a planning process made by the “Mobile Team for Biogas”, Region Zealand have made their own planning process targeting the municipalities through the project Bioenergy Zealand. The project was focusing on how to use biomass for the further energy supply in the region.

Proven results: The tools and guidelines were used in each municipality in connection with the overall municipal planning that takes places every 4 years.

Boundary conditions: n.a.

Target audience: Each municipality with rural areas had to identify areas for biogas production.

Geographical scope: Developed in and applied for Denmark.

3.3.2 “Cookbook” for Biogas Plants.

Description: The Danish cookbook lists biogas knowledge, tools for citizen involvement, the latest case law of the approval of biogas plants etc. The Cookbook is developed by INBIOM (Innovation Network for Biomass).

Proven results: n.a.

Boundary conditions: n.a.

Target audience: n.a.

Geographical scope: It is mainly connected to the Danish geography but some of the tools are general.

3.3.3 Scandinavian Handbook for Biogas

Description: The Scandinavian Handbook describes the key elements in the planning of biogas plants in Norway, Sweden and Denmark and compares strategies, status and legislation in the three countries.

Proven results: n.a.

Boundary conditions: n.a.

Target audience: Policy makers were the main target.

Geographical scope: Scandinavia and EU.

3.3.4 “More biogas for the same money”

Description: When choosing which type of biomass, we have to feed a biogas or bioethanol plant with, one of the big questions is: What are most profitable?

A calculation tool can give a hint regarding the economy when using new biomasses. You must enter specific figures for the installation and thus the tool can analyze different specific scenarios before investing or adaptations in existing value chains. Can it for example pay to briquetting straw before it is transported to the biogas or bioethanol plant? Provides straw briquettes enough extra gas output to make it worthwhile for the pre-treatment? Model tool is described and illustrated with some specific examples for the costs of a report published by DCA - Danish Centre for Food and Agriculture at the University of Aarhus. The tool is not online but can be requested.

Proven results: n.a.
Boundary conditions: It is supposed to be a general tool, but it will need some adjustments.
Target audience: n.a.
Geographical scope: n.a.

3.3.5 Briquetted straw more than doubles biogas production.

Description: Practical guide on how to double the biogas production by using briquetted straw in the biogas production.
Proven results: n.a.
Boundary conditions: n.a.
Target audience: n.a.
Geographical scope: n.a.

3.3.6 Business model for biogas planning in Denmark

Description: This calculation tool has been developed as part of a project in Randers in Denmark in connection with Agro Business Park. Right now it is a local business model but can be developed into a more general model for biogas planning. The tool led to a business plan for a biogas plant in Randers in Jutland. The status of the business plan is not known.
Proven results: n.a.
Boundary conditions: It is relevant to mention, that within the last year or two, there was a switch from plant based on guaranties from municipalities to plants based on private funding. Due to the private funding it is more difficult to analyze the business models because it is commercial secrets.
Target audience: n.a.
Geographical scope: n.a.

3.3.7 RecOil

Description: Recoil project is supported from the European Commission through the Intelligent Energy Europe (IEE) program. As part of the project there has been carried out pilot projects with the collection of used cooking oil - and fat from private households in all participating countries. From 1 February 2014 to 15 January 2015 there was a pilot in Viborg Municipality, which was a partnership between Agro Business Park, Revas - Viborg Municipality's waste

management company and Daka, which produces biodiesel. In addition, the project developed teaching material to schools about the great energy potential, as fat from cooking contains. The guide presents good practices and provides guidelines for how to implement value chain used cooking oil / grease into biodiesel. It provides an overview of the critical aspects and necessary basic step in the optimization of a collection system, as well as examples of best practice from Recoil countries and the EU. The guide can be used as a tool for stakeholders in the development of a more efficient used cooking oil / fat-to-biodiesel supply chain.

Proven results:

Boundary conditions: n.a.

Target audience: n.a.

Geographical scope: n.a.

3.4 France (Data delivered by AILE Association)

3.4.1 Compilation of 6 Product Sheets

Description: 6 product sheets (Raw digestate, Liquid fraction of digestate, Solid fraction of digestate, Dried digestate, Compost from solid fraction of digestate, Ammonia Sulfate)

Each leaflet describes: the statue, how it is obtained, an account, features and agronomical efficacy, the safety, recommendation of use

Proven results: The leaflets have been released in June 2015 and 500 copies have been distributed since June 2015.

Boundary conditions: The guide book is based on a small collection of data (depending on the type of digestate). There are other kind of derivatives not described here (Ex : Mineral concentrate.)

Target audience: Digestate producers, digestate users, consultants and advisers.

Geographical scope: Developed in France by 3 partners: Agricultural Chambers of Brittany, AILE and TRAME; application for the French context (statue, legal framework...)

3.4.2 Excel Document “Annexe financière” (financial annexe)

Description: This document helps the person who does an aid application. It is necessary to describe the investment in order to separate what is available or not for the aid. In this document there are two other parts in order to describe the charges and the outputs.

The table for the investments has 7 parts:

- Investment for the site
- Investment for the substrates
- Investment for the digestion
- Investment for the digestate but not the storage
- Investment for the biogas
- Investment for the development
- Investment for the engineering

The tables for the charges and the outputs have also different parts which correspond with the different parties of charges and outputs.

| | |
|----------------------|---|
| Proven results: | The economic data could be compared to references, in order to identify either excessive amount or underestimate amount. Almost 200 projects have been register following this framework. There are now comparisons available between projected and final budget. |
| Boundary conditions: | It is a document for the aid application in Brittany. The parts for the charges and the outputs are not. |
| Target audience: | This document is for the person who does an aid application in Brittany. The same exists for Pays de la Loire. |
| Geographical scope: | Developed in Brittany. Applied for France. |

3.4.3 Guide Book “suivi biologique d’une unité de méthanisation agricole” (biological follow-up of a farm plant of methanisation)

| | |
|----------------------|--|
| Description: | <p>It is an informative guide book with five parts.</p> <ul style="list-style-type: none">• The biology of the methanisation.• The period of the start of a digester. What substrates incorporate? The increase of the temperature. The retention time. The follow-up of the biology.• The follow-up of the biology during the rated speed. What parameters follow? The method of follow-up. The main biological problems.• The equipment of measures• A list of suppliers |
| Proven results: | It has been published in 2011 in our website. Some farmers register the main parameters in order to prevent biological problems. |
| Boundary conditions: | This guide book is in order to inform before build a digester. It can be used like reminder but it is not exhaustive. It is informative and gives not full information about biological processes in biogas production. It can be completed by training. |
| Target audience: | The main target of this guide book is the farmers or non-experts to have a first approach of biological rules. |
| Geographical scope: | Developed in Western France. National wide application. |

3.4.4 Guide Book: “Démarches de raccordement” (Process of connection)

| | |
|--------------|--|
| Description: | <p>This guide book was created in order to help for the process of connection for the biogas plant and the sale of electricity. It is an informative guide book. There are 6 sections:</p> <p>“quiquoi” (whowhat): describes who publishes what document. The roles of the different representatives in the process. This part gives the period of the answer and the duration of validity of the documents. Composed by 2 part:</p> <p>One part for DREAL, ADEME, EDF OA, DGEC...</p> <p>Another for ERDF</p> |
|--------------|--|

“contenu dossier” (contents of the dossier): this part gives the documents which are necessary for the dossier and the links of the website.

“Infos” (information): all information which are useful

“résumés” (summaries): exposes the steps of the dossier and the links between them. For two subjects: high voltage and low voltage.

“Contacts EDF AOA” and “Contacts ERDF”

- Proven results: At least 3 farmers who ask us for the guide (Beatrice Dechamps, GAEC de Bienvenue, GAEC Limovents). It has also been referenced by Club Biogaz and the Ministry of Environment to help projects under development.
- Boundary conditions: It is an informative guide book. It gives the essential elements which are necessary to do a dossier for the connection to the electric grid. It can be used by any investor, constructor or developer.
- Target audience: The target audience is all investors of a biogas plant for electricity production and commercialisation. Until now it is the same proceeding with no importance to plant size.
- Geographical scope: Developed in Pays de la Loire and Brittany. National wide use, because grid connection proceeding is the same anywhere in France.

3.4.5 Guide Book “mise en marché des digestats” (digestate marketing)

- Description: The guide book was writing within the framework of the programme VALDIPRO in 2012. This tools describes the legal framework for marketing digestate and specially the two possibilities “the process of probate” and “the standardisation” and identifies the possibilities for 4 types of digestate to be put on the market with requirements (sanitation, stability and homogeneity). This guide book was writing from a survey of 6 biogas plants.
- Proven results: AILE received 45 demands concerning this guide book.
- Boundary conditions: The tool is based only on six plants. It gives broadly the process and the legal framework of the marketing proceeding. It is not sufficient in order to put his digestate on the market. It is informative.
- Target audience: The target audience is both the advisers and the farmers.
- Geographical scope: Developed in Brittany (France), applied by ADEME and French energy associations

3.4.6 Cahier des charges pour une demande d’aide” (Requirements specifications for an aid application)

- Description: The tool is divided into three requirements specifications for three different types of project of methanisation (at farm scale, for a group of farmers and a multi-partner project). These requirements specifications are for an aid application. With these, the applications have the same structure and all information useful for the aid application are given.
- Proven results: With this tool the aid application are more complete and better. For the person who studies this application it is easier and needs less time. For the person who does this application it is easier to know what information to give.

- Boundary conditions:** The good practical application depends on the person who fills in. Sometimes the dossier is not well filled in. This requirements specification is only to answer to the needs of the person who expertises the aid application.
- Target audience:** It is for all people or group who want to do an aid application for a biogas project.
- Geographical scope:** This tool has been developed in Western France and is now used in all regions. The template is used by ADEME, Regional councils.

3.4.7 Calculation tool “simulateur Methasim” (simulator Methasim)

Description: This tool enables to simulate a project and calculate all the parameters of the project and verify if the project is coherent. There are several parts so that the data capture is led.

- A part for the inputs
- A part for the process
- A part for the heat valorisations
- A part for the economy
- A part which builds an overview

Different simulations for the same project could be compared.

Proven results: AILE have used this tool to expertise more than 100 projects since 2012. The calculator is used by numerous technicians. A new version will be available at the end of 2016.

Boundary conditions: It can be used for projects at farm scale and with CHP plant. The economic data will be updated with the new version.

Target audience: The target audience is both farmers who can simulate the first approach of his project and technicians who help farmers to develop their project. Training sessions exist to understand how to use the tool.

Geographical scope: This tool has been developed by French partners (including AILE). It can be used in France.

3.4.8 Technical Guide Book “La méthanisation à la ferme” (« Farm-scale AD »)

Description: The guide is built with different parts:

- The biological process of the anaerobic digestion. This part explains the steps of the AD and the necessity of the biological monitoring.
- The methanisation sector at beginning of his development. Description of the features of the French farm plant in 2011, the policy support and the national aim.
- The interests of the methanisation on the farm.
- Which stuff use? Description of methanogen potential, the ration, qualities/confines of some stuff and the interdictions.
- The process “mesophilic totally mixed”, the advice and feedbacks.
- The alternative process (dry-process)
- The features of the digestate
- Biogas and heat development.
- Perspectives of the biogas development.
- Regulatory aspects.

- The economy of a project: description of the investment (expenses and incomes).
- The main steps of a project of methanisation on the farm.

In the guide book there are also some sources to find more information.

The guide book is formed by 20 pages. A synthetic brochure was created. This brochure is more easily accessible for a first approach.

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| Proven results: | Printed in 2011 in 1000 copies, all distributed during fairs. Still downloadable on partner's websites. ADEME is interesting by an updated version. |
| Boundary conditions: | The guide book is usable for a farmer who wants to have the first information concerning methanisation. The guide book can help to identify the appropriate contact. A second use is to inform more widely all interested persons in schools, municipalities or neighbours of biogas plants, because of its pedagogical approach. |
| Target audience: | The main target of this guide book is the farmers or other direct investors. |
| Geographical scope: | Developed by French energy associations, applied by ADEME, national wide use. |

3.4.9 Guideline Book “Conseils et exemples de rédaction pour un dossier technique d’homologation des digestats issus de codigestion” (Writing tips and examples of technical approval file for marketing digestate and derivatives)

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|----------------------|---|
| Description: | This is a guideline book to help digestate producers to market their digestate. The guideline gives examples and advices to write the technical file for marketing authorization. |
| Proven results: | This guideline book can be obtained by asking AILE through its webpage. It has allowed GEOTEXIA to market 3 derivatives from digestate from the 5 products containing digestate currently authorized in France. |
| Boundary conditions: | This tool is intended to consultants with knowledge about: AD and marketing proceeding. |
| Target audience: | It is intended to engineering consultants and advisers. |
| Geographical scope: | Developed in France by 3 partners: Agricultural Chambers of Brittany, AILE and TRAME, application only for the French Market. But it has already been downloaded by Flemish organization which intends to sell Flemish digestate in France. |

3.5 France (Data delivered by RhôneIénergie Environnement)

3.5.1 Website for gas grid injection

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|----------------------|---|
| Description: | Website for gas grid injection in France: steps for building a project, regulation, administration, list of actors, know-how, observatory ... actuality ... Can be accessed at http://www.injectionbiomethane.fr/ |
| Proven results: | The website comprises information for all necessary elements for gas grid injection. |
| Boundary conditions: | Only for gas grid injection projects, few economical data, in French. |

Target audience: Project owners, RE association/ agriculture chambers, Consultants/ advisers, Constructors, Administration, Public, Schools, Local authorities, Banks

Geographical scope: Developed by ADEME and GRDF and other partners in France. Application for French projects and in French.

3.5.2 Website with resource centre

Description: Website with resource centre (tools...) with 2 interesting things:

The list of professionals: planners, constructors, equipment's manufacturers, banks, economical players for plant development, others

The map of biogas projects: the web map for projects from the step of feasibility study to operation by type of project and energy production

Can be accessed at <http://www.cogenerationbiomasserhonealpes.org/>

Proven results: 1000 is the average number of times people log

Boundary conditions: Resource centre for French territory. Map only for rhône-alpes region.

Target audience: Research, Project owners, RE association/ agriculture chambers, Consultants/ advisers, Constructors, Administration, Public, Schools, Local authorities, banks

Geographical scope: Developed by RAEE, application: Rhône-Alpes region.

3.5.3 Guideline: guide de recommandations: montage de projet méthanisation

Description: Brochure for setting up biogas plants comprising 12 pages to be downloaded here: <http://www.cogenerationbiomasserhonealpes.org/node/705>

Proven results: Widely distributed in France

Boundary conditions: Methodological guideline with specific recommendations in a French context.

Target audience: Project owner, RE association/ agriculture chambers, Consultants/ advisers

Geographical scope: Developed by RAEE and financed by ADEME and Rhône-Alpes region. Application for project owners

3.5.4 You tube videos for chp and biogas plant operation

Description: Biogas production from substrates to electricity and heat valorisation: <https://www.youtube.com/watch?v=2hW46hx0gBM>

Biogas plant operation: <https://www.youtube.com/watch?v=rOZnE9QsUvg>

How to operate a CHP plant: <https://www.youtube.com/watch?v=7K55XM6Tr5I>

Proven results: 2000 views in average

Boundary conditions: Only for biogas plant with a CHP plant, in French but easy to translate.

Target audience: RE association/ agriculture chambers, Public, Schools, Local authorities

Geographical scope: Developed RAEE within the Cogen Goes Green EU project. Application in France.

3.5.5 Guideline: Règles de sécurité dans une unité de méthanisation

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|----------------------|--|
| Description: | 28 pages' guideline to identify all the risks and security aspects in a biogas plant in 2009 Pedagogical explanations To be found: http://www.ineris.fr/centredoc/guide-methanisation-def-1.pdf |
| Proven results: | Can be found online: http://www.ineris.fr/centredoc/guide-methanisation-def-1.pdf |
| Boundary conditions: | For France, in French, for biogas plant with CHP plant too. Not for gas grid injection. |
| Target audience: | RE association/ agriculture chambers, Consultants/ advisers, Local authorities |
| Geographical scope: | Developed by ineris. Application in France |

3.5.6 Brochure le biomethane de nos territoires bien plus qu'une énergie d'avenir

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|----------------------|--|
| Description: | 4-page brochure as a promotion tool for biomethane at a political level in 2012 Download: http://www.aile.asso.fr/wp-content/uploads/2012/06/le-biomethane-de-nos-territoires.pdf |
| Proven results: | Widely used in France, Brittany and Pays de la Loire and Rhône-Alpes |
| Boundary conditions: | In French, for local authorities. |
| Target audience: | RE association/ agriculture chambers, Consultants/ advisers, Constructors, Administration, Public, Local authorities |
| Geographical scope: | Developed by AILE and RAEE within biomethane regions project. Application for local authorities. |

3.5.7 Tool « Outils d'autoévaluation d'un projet de méthanisation territorial ou à la ferme »

| | |
|----------------------|--|
| Description: | In 2009 has been created to "train" project owner and to allow a self "evaluation" of his project. Excel file that give a score and give a good evaluation of the maturity of a project strait to a feasibility study. You can distinguish: "non go" items and evaluation of points like substrats, landscape planning, digestats, gas valorisation (chp only), project owner, investment capacity, local actors, neighbourhood. The result illustrates the weakness and strength of the project: http://www.biogazrhonealpes.org/le_montage_doperations.php |
| Proven results: | This questionnaire could be the first step when you meet a project owner to check all the points of vigilance for a project. It is quite good. |
| Boundary conditions: | Built in 2009, only for CHP plant but in 10 languages, within biogas regions project. It could be interesting to update it add biomethane production. |
| Target audience: | RE association/agriculture chambers |

Geographical scope: Developed by biogas regions EU project partners. Application at the feasibility study step

3.5.8 Tool guideline for administrative steps

Description: There are 20 models of letters, document to succeed on administration steps to build a project

<http://www.cogenerationbiomasserhonealpes.org/documents-administratifs-demarches>

Proven results: Very used in France and adapted in other regions.

Boundary conditions: Build in 2010, necessity to update the document and could be done within the biogas action project.

Target audience: Project owner, RE association/ agriculture chambers, Consultant/ advisers, Constructors, Administration

Geographical scope: Developed by RAEE. Application in Rhône-Alpes for administrative framework

3.5.9 Guideline: savoir communiquer sur son projet de méthanisation

Description: 14-pages guideline to explain to project owner some key for public acceptance

12 steps from the idea to the operation step to communicate and give advertising to do it.

Download:

http://www.biogazrhonealpes.org/doc/outils_de_communication/guide_communication_site_final_16fev2010.pdf

Proven results: Used in France.

Boundary conditions: Quite old built in 2009.

Target audience: Project owners, RE association/ agriculture chambers, Constructors

Geographical scope: Developed by LEV (in English) adapted by RAEE within biogas regions project. Application in France.

3.5.10 Feasibility study: to develop small scale biomethane plant in France

Description: Made in 2014 feasibility study: to develop small scale biomethane plant in France. French Technical review for upgrading systems, gas grid injection and refuelling stations. Economical boundary, Methodology to define a project

Proven results: 2 presentations in biogas Europe and within a national training.

Boundary conditions: Wrote in 2014, the technical review is now quite old.

Target audience: Project owners, RE association/ agriculture chambers, Consultants/ advisers, Local authorities

Geographical scope: Developed by astrade financed by AILE and RAEE within the biomethane regions project. Application in France

3.5.11 Excel file: to give all the requirement from decrees for a biogas plant

| | |
|----------------------|---|
| Description: | Tool to describe all the requirement from decrees on AD in France Possible to check it by categories: technical, administrative, communication, equipment, organization.... Download: http://www.biogazrhonealpes.org/le_montage_doperations.php |
| Proven results: | Technical approach. |
| Boundary conditions: | For French context. |
| Target audience: | Project owners, RE associations/ agriculture chambers, Consultants/ advisers, Constructors, Administration, Local authorities |
| Geographical scope: | Developed by RAEE. Application in France. |

3.6 Germany (Data delivered by IBBK)

3.6.1 Calculation tool I - Economics (KTBL)

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|----------------------|--|
| Description: | Calculator for economics of biogas such as remunerations for electricity from biogas, and for performance and costs of energy crops provided by KTBL Association for Technology and Structures in Agriculture (Kuratorium für Technik und Bauwesen in der Landwirtschaft). Website: www.daten.ktbl.de/biogas/startseite.do |
| Proven results: | Instrument for preliminary planning of performance figures of a biogas plant, the possible gas utilisation on the basis of used substrates, key figures for the process and economic figures for the usage of heat excess. |
| Boundary conditions: | Available in German language only |
| Target audience: | Developed for German farmers who think about installation of a biogas plant. |
| Geographical scope: | Developed for farmers in Germany who are thinking about installing a biogas plant. |

3.6.2 Calculation tool II – Economics (DBFZ)

| | |
|----------------------|--|
| Description: | Calculator for economics according to Renewable Energy Act (EEG 2012) provided by DBFZ German Biomass Research Centre (Deutsches Biomasseforschungszentrum) to calculate individual remunerations. Website: www.dbfz.de/EEG-Monitoring |
| Proven results: | Calculator for remunerations by using deposited numbers for substrates according to the biomass directive which calculates the individual remunerations of the Renewable Energy Act (EEG 2012). |
| Boundary conditions: | Available in German language only |
| Target audience: | Developed for biogas plant operators in Germany who feed in electricity and are paid according to the Renewable Energy Act (EEG 2012) |
| Geographical scope: | Calculator for economics to calculate individual remunerations which is calculated according to the Renewable Energy Act (EEG 2012) |

3.6.3 Calculation tool III: Digestate

| | |
|----------------------|---|
| Description: | Calculation of digestate provided by Biogas Forum Bavaria at LfL. Website: www.biogas-forum-bayern/online-anwendungen/gaerrestrechner |
| Proven results: | By giving amounts and types of substrates the tool calculates the digestate arising per year and the respective nutrient contents and estimates the storage room with regard to solid/liquid separation. |
| Boundary conditions: | Available in German language only |
| Target audience: | All biogas plant operators |
| Geographical scope: | For individual calculation of digestate arising with or without solid/liquid separation and the respective average nutrient contents for agricultural, commercial and industrial biogas plants. |

3.6.4 Calculation tool IV: Contribution margins

| | |
|----------------------|---|
| Description: | Calculation of digestate provided by Biogas Forum Bavaria at LfL. Website: www.biogas-forum-bayern/online-anwendungen/gaerrestrechner |
| Proven results: | Calculation of economics of agricultural processes in conventional and ecological production. |
| Boundary conditions: | Available in German language only |
| Target audience: | Farmers who grow biomass and sell it to biogas plant operators |
| Geographical scope: | Individual calculation of full costs of different substrates and biomass in Europe. |

3.6.5 Calculation tool V: Biogas and methane yields

| | |
|----------------------|--|
| Description: | Calculation of digestate provided by Biogas Forum Bavaria at LfL. Website: www.biogas-forum-bayern/online-anwendungen/gaerrestrechner |
| Proven results: | This tool will calculate the digestion ratios, maximum gas and methane yields under optimal digestion conditions on basis of average nutrient contents such as fat, protein and carbohydrates if there are no good data on substrates available. |
| Boundary conditions: | Available in German language only |
| Target audience: | Biogas plant operators |
| Geographical scope: | Calculation of maximum possible gas and methane yields of plant-based and animal substrates and agricultural residues in Europe under optimal digestion conditions. |

3.6.6 Education package in combination with promotion pool and media centre

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|-----------------|---|
| Description: | Education package in combination with promotion pool and: media centre provided by Agency of Renewable Resources (FNR). Website: www.mediathek.fnr.de/broschueren/bioenergie/biogas.html |
| Proven results: | Grand selection of information brochures for download and also printed versions for purchase on general topics of bioenergy and specific topics on biogas for a broad audience. Many brochures are translated in different |

languages such as English, Russian, Ukrainian, Turkish, French, Spanish, Portuguese and Chinese.

Boundary conditions: Some publications are translated but only in English language.

Target audience: All stakeholders of and interested persons in biogas technology.

Geographical scope: Grand selection of information brochures for a broad audience. Some publications were translated to English language because of high international interest.

3.6.7 Education package I: Guide for operators

Description: Education package in combination with promotion pool and: media centre provided by Agency of Renewable Resources (FNR). Website: www.mediathek.fnr.de/broschueren/bioenergie/biogas.html

Proven results: This guide for operators should help operators to answer their question on biogas production, especially for troubles during ongoing operation. It gives answers to frequently asked questions, it helps finding causes for problems and gives hints for possible solutions.

Boundary conditions: Available in German language only

Target audience: Biogas plant operators

Geographical scope: This guide for operators should help them to answer their question on biogas production, especially for troubles during ongoing operation.

3.6.8 Education package II: Publications

Description: Publications provided by Biogas Forum Bavaria at LfL. Website: www.biogas-forum-bayern.de

Proven results: Grand selection on information brochures for download for a broad audience provided by Biogas Forum Bavaria at LfL.

Boundary conditions: Available in German language only

Target audience: Focus on biogas plant operators, stakeholders of and interested persons in biogas technology

Geographical scope: Grand selection on information brochures for download for a broad audience provided by Biogas Forum Bavaria at LfL.

3.6.9 Education package III: Online-book store

Description: Online-book store provided by KTBL Association for Technology and Structures in Agriculture (Kuratorium für Technik und Bauwesen in der Landwirtschaft). Website: www.ktbl.de/shop

Proven results: Online-book store provided by KTBL Association for Technology and Structures in Agriculture with a grand selection of published specialist books and conference proceedings for plant operators and substrate providers.

Boundary conditions: Available in German language only

Target audience: People coming from the field of agriculture and dealing with or are interested in biogas technology

Geographical scope: Online book store with publications for purchase focusing on agriculture but also target local representatives, regulatory authorities and political decision-makers.

3.7 Latvia (Data delivered by Ekodoma)

3.7.1 Handbook – “Sustainable Heat use of Biogas plants” (project BiogasHeat)

Description: Educational tool. Handbook includes additional information and experiences from implementation of prefeasibility studies and field tests of heat use solutions for biogas plants in project target countries.

Proven results: Handbook available in libraries (e.g. Riga Technical university). During the project lifetime 3,100 printed handbooks have been distributed and more than 14,500 times downloaded from the project web-site.

Boundary conditions: Useful for biogas plant owners, operators, energy companies and students. Information might get useful if biogas plant has excess heat or in planning phase of new biogas plants (overview of heat use for heating, drying, cooling and additional electricity production). Also information about innovative concepts for efficient biogas conversion can be found: biogas upgrading and grid injection of biomethane, biomethane use in transports, biomethane transport in containers, biomethane and power-to-gas.

Target audience: Biogas plant operators, Farmers, Technology providers, Students, Municipalities, Consulting companies

Geographical scope: Handbook was developed in corporation between project partners and translated in English and in 7 other languages (Danish, German, Croatian, Czech, Italian, Latvian, Romanian). Applied in Latvia and other partner countries

3.7.2 Summer School - Energy Aspects of Biogas (project BiogasIN)

Description: Educational tool. Summer school can be organised in 3 days. The first two days are dedicated to biogas production planning and financial aspects, but the third day is about cogeneration processes.

Proven results: After the summer school this course has been officially registered in the registry of study courses of Riga Technical University. Course has been registered with identification number EAS755 and is amount of 3 ECTS.

Boundary conditions: Most useful for bachelor students. Course content can be taught also in seminars and other specific courses for biogas plant operators, farmers etc. This training is intended more for people without previous knowledge on biogas.

Target audience: Students, biogas plant operators, farmers, energy enterprises

Geographical scope: Summer school was developed in Latvia cooperating with Riga Technical university. Applied – in Latvia for students, farmers, biogas plant operators etc.

3.7.3 Biogas potential calculations for different regions in excel. (project BiogasIN)

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|----------------------|---|
| Description: | Calculation tool. Excel includes calculations about possible production of renewable energy (electricity, heat and biofuels) if all livestock manure available in the region is used as biogas feedstock. |
| Proven results: | Biogas theoretical potential using different feedstock, electricity and heat production potential, CHP and biofuels production potential calculations have been made in Latvia for 5 regions: Madona, Alūksne, Gulbene, Valka, Cēsis. |
| Boundary conditions: | Most useful it is for farmers, biogas plant operators, municipalities. Calculation tool might get useful if farmers are planning to build a new biogas plant. Tool offers an overview of biogas theoretical potential, electricity production potential, heat production potential, CHP potential, biofuels production potential. |
| Target audience: | Municipalities, farmers, biogas plant operators, policy makers, energy enterprises, technology providers |
| Geographical scope: | Calculation was developed by European Biogas Association and project partners (Bulgaria, Croatia, Czech Republic, Greece, Latvia, Rumania). Tool was applied for 5 regions in Latvia: Madona, Valka, Cēsis, Gulbene, Alūksne and in other partner regions. |

3.7.4 Brochure – “Did you know that biogas...?” (project BiogasIN)

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|----------------------|---|
| Description: | Promotion tool. Brochure contains information on biogas and advantages what biogas provides. Also brochure includes additional information about situation of 7 project countries regions and their benefits from biogas. |
| Proven results: | Brochure available in libraries (Riga Technical university). |
| Boundary conditions: | Brochure useful for students, farmers, biogas plant operators and municipalities. Provides information about biogas situation and benefits what it provides in other partner countries. |
| Target audience: | Students, farmers, biogas plant operators, policy makers, energy enterprises, municipalities |
| Geographical scope: | Brochure was developed in cooperation between project partners (Bulgaria, Croatia, Czech Republic, Greece, Latvia, Rumania) and translated in project partner languages. It was applied in Latvia and other partner countries |

3.7.5 Short film – Waste to Biomethane (project UrbanBiogas)

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|----------------------|--|
| Description: | Promotion tool. Short film provides targeted information about advantages and technologies of waste-to-biomethane in order to overcome barriers related to public acceptance. |
| Proven results: | Short film can be found on YouTube and on the webpage: www.urbanbiogas.eu Video was used as training material for municipalities. |
| Boundary conditions: | Short film is a visual material which is useful more for students, municipalities, cities, farmers, waste management sector. The short film provides information not only about the objectives of project, but also the process how to obtain biomethane from organic waste. |

- Target audience: Students, municipalities, biogas plant operators, waste management
- Geographical scope: The short film was developed by GEA (Graz Energy Agency - Austria) of a best practice WtB example. Applied in Latvia (with subtitles in Latvian and Russian) and other project countries

3.7.6 Handbook – Biogas (project Big>East)

- Description: Educational tool. Handbook is intended as a “how to approach”-guide, giving basic information about biogas from anaerobic digestion, with the main focus on agricultural biogas plants.
- Proven results: In addition to the electronic version of the handbook, 2,300 hardcopies were printed. The handbooks were used in the BiG>East training courses and in some mobilisation campaigns.
- Boundary conditions: The handbook is primarily addressed to farmers and to future agricultural biogas plant operators, but also to the overall biogas stakeholders. The handbook consists of three main parts. The first part, “What is biogas and why do we need it”, provides basic information about biogas technologies. The second part - shows how to approach the planning and building of a biogas plant and the third part includes explanation of terms, conversion units, abbreviations.
- Target audience: Farmers, biogas plant operators, students, municipalities, energy enterprises, technology providers
- Geographical scope: Handbook was developed by the project consortium. Expert group elaborated an English biogas handbook which was translated into the languages of the target countries (Germany, Slovenia, Austria, Greece, Latvia, Croatia, Bulgaria, Romania, Denmark). Applied in Latvia and other project countries

3.8 Sweden (Data delivered by Energy Agency for Southeast Sweden)

3.8.1 Investment and operational support

- Description: Investment and operational support
- Investment support for biogas/biomethane production or treatment of digestate. (2) Operational support for biogas/biomethane production based on manure. (3) Climate stride (4) The Swedish Energy Agency. (5) Lowered taxable benefit for electric, hybrid and Bio-CNG vehicles.
- Proven results: Operational support for biogas/biomethane production based on manure
- The support is based on the quantity of manure delivered to the plant and how much biogas based on manure is produced. In case of co-digestion, the support is only based on the production from manure. The support was introduced in 2015 and was initially 2,2 cents/kWh. From 2016 the maximum amount granted is 4,4 cents/kWh. The support is paid as long as there is money left. There is a budget for each year that must not be exceeded. This means that the support received depends on both the number of producers applying for support and the amount of biogas produced from manure. The maximum amount granted is twice as high for biogas that is upgraded and produced for the use as vehicle fuel.
- Climate stride

The support called Climate stride is part of the national budget approved by the Swedish Parliament for 2016. The Swedish Environmental Protection Agency, together with national authorities and the county administrative boards are in charge of the support to local climate investments. The investment can be made by a city, a municipality or a company. They should give the highest possible climate benefit, the main target being to reduce the greenhouse gas emissions. Examples of initiatives that have received support are biogas plants and filling stations for electric and gas vehicles. In 2015 the support was 125 million SEK. There will be additional 600 million SEK per year granted to climate investments from 2016 to 2018. The support scheme is based on the climate and energy strategies prepared on local and regional level.

Boundary conditions: Investment support for biogas/biomethane production or treatment of digestate

To be entitled for the support the company has to be located in the countryside. The turnover must be less than 10 million € and the number of employees less than 50. The substrate must not consist of energy crops or plants based on oil. If the expenditures exceed 100 000 SEK, approx. 10 000€, the support can be at the most 40 % of the investment.

Operational support for biogas/biomethane production based on manure

The support is based on the quantity of manure delivered to the plant and how much biogas based on manure is produced. In case of co-digestion, the support is only based on the production from manure. The support was introduced in 2015 and was initially 2,2 cents/kWh. From 2016 the maximum amount granted is 4,4 cents/kWh. The support is paid as long as there is money left. There is a budget for each year that must not be exceeded. This means that the support received depends on both the number of producers applying for support and the amount of biogas produced from manure. The maximum amount granted is twice as high for biogas that is upgraded and produced for the use as vehicle fuel.

Climate stride

The support called Climate stride is part of the national budget approved by the Swedish Parliament for 2016. The Swedish Environmental Protection Agency, together with national authorities and the county administrative boards are in charge of the support to local climate investments. The investment can be made by a city, a municipality or a company. They should give the highest possible climate benefit, the main target being to reduce the greenhouse gas emissions. Examples of initiatives that have received support are biogas plants and filling stations for electric and gas vehicles. In 2015 the support was 125 million SEK. There will be additional 600 million SEK per year granted to climate investments from 2016 to 2018. The support scheme is based on the climate and energy strategies prepared on local and regional level.

The Swedish Energy Agency

The Swedish Energy Agency supports research and development connected to supply, conversion, distribution and use of energy. The current program called Energy & Environment supports development activities in the fields of research, innovation and development related to vehicles in the fields of energy efficiency, transition to renewable fuels, reduced climate impact and

the possibility to strengthen the competitiveness of Sweden and the Swedish automobile industry in a global perspective.

Lowered taxable benefit for electric, hybrid and Bio-CNG vehicles

The Swedish Government has proposed that the period for lower taxable benefit for electric, hybrid and Bio-CNG vehicles will be extended from 2017 until the end of 2019.

Target audience: The target audience are investors in biomethane plants and all key actors and stakeholders.

Geographical scope: The support systems have been developed on national level. All of them are applied on regional & local level.

3.8.2 Tax exemptions

Description: A very important incentive is the exemption from energy and CO₂ tax approved by the European Commission for biomethane used as vehicle fuel valid until the end of 2020.

Proven results: n.a.

Boundary conditions: n.a.

Target audience: The target audience are investors in biomethane plants and all key actors and stakeholders.

Geographical scope: The support systems have been developed on national level. All of them are applied on regional & local level.

3.8.3 Political will

Description: Political will is crucial since it affects everything: national support schemes, regional and local goals, public procurement etc.

Proven results: n.a.

Boundary conditions: n.a.

Target audience: The target audience are investors in biomethane plants and all key actors and stakeholders.

Geographical scope: The support systems have been developed on national level. All of them are applied on regional & local level.

3.8.4 Regional strategy based on regional and local goals

Description: The Regional Strategy and Action Plan for Biomethane prepared by the regional network in the IEE Biomethane Regions project has been adapted by the County Administrative Boards in our region. It is now one of the tools that is used in the transition from fossil fuels to renewables.

Proven results: n.a.

Boundary conditions: n.a.

Target audience: The target audience are investors in biomethane plants and all key actors and stakeholders.

Geographical scope: The support systems have been developed on national level. All of them are applied on regional & local level.

3.8.5 Biogas Sydost (Biogas Southeast) - regional network

Description: The regional network Biogas Sydost (Biogas Southeast) is another important tool since it offers a platform for both private and public biogas/bio-methane key actors and stakeholders where they can exchange experiences, learn from each other and help one and other. They can also put pressure on politicians on both regional and local level and, together with other similar networks in the country, they can affect politicians on national level too.

Proven results: n.a.

Boundary conditions: n.a.

Target audience: The target audience are investors in biomethane plants and all key actors and stakeholders.

Geographical scope: The support systems have been developed on national level. All of them are applied on regional & local level.

3.9 United Kingdom (Data delivered by Severn Wye Energy Agency)

3.9.1 ADAT - Anaerobic digestion assessment tool

Description: ADAT - Anaerobic digestion assessment tool

This software tool is an updated version of the spreadsheet AD modelling tool developed for the FP6 CROGEN, RCUK AD4RD and FP7 VALORGAs projects. It has now been consolidated into a compiled programme with an improved user interface to allow modelling of the energy balance for AD of both crops and wastes.

Proven results: n.a.

Boundary conditions: n.a.

Target audience: n.a.

Geographical scope: n.a.

4 Interesting AD installations and local preconditions in partner countries

A survey was spread within the project partners with the aim of finding interesting AD installations and evaluating local conditions. The results are assessed in the following chapter.

4.1 Overview of local preconditions

The local conditions are summarised in an overview table (see Table 3).

Table 3: Overview of local preconditions in partner countries

| Country | Public support towards RES | Trust in the government | National support schemes | EU Commission Notification of the support scheme | National/ regional scheme financing |
|---------|----------------------------|-------------------------|---|--|--|
| HR | n.a. | 50.3% | FIT till 31/12/2015 Market premium from 1/1/2016 | Yes | Fees for all electricity consumers |
| CZ | No | 40% | a. Investment support - innovation funds b. No operational support since 31.12.2012 (until then FIT and Green bonus) | No | a. Consumers b. National budget |
| DK | Yes | n.a. (high) | a. Investment support - municipality guaranty for a loan b. FIT | Yes | Tax on energy consumption - end users |
| FR | Yes | 45-80 % | a. Regional rules on investment support b. FIT electricity and biomethane c. Subsidies from the national energy agency d. Local taxes exemption for building | a. The feed in tariffs are notified by the commission this year but only for electricity b. No notification for feed in tariffs for gas grid injection c. Subsidies are notified | a. EU funds b. Tax on energy consumption - end users |
| DE | Yes | n.a. (high) | FiT for electricity | Yes | Consumers |
| LV | No | 18-20% | a. FiT or b. Payments for the installed capacity | No | Tax on energy consumption - end users |
| NL | No | 55-65% | a. SDE+ b. Investment support for innovation projects up to 50% | Yes | a. Tax on energy consumption - end users b. Dedicated energy tax on RES |
| SE | Yes | 39.5 % | a. Investment support b. FiT - manure c. Climate Stride d. Lower taxable benefit for vehicles (CNG, electro, hybrid) | Yes | National budget |
| UK | Yes | 37% | a. FiT b. RHI (heat) | Yes | a. FiT - surcharge on energy bills, b. RHI - National budget |

4.1.1 Public support towards renewable sources of energy

(Question 1: Is there a general public support towards renewables and EU targets?)

The public supports renewable sources in Denmark, France, Germany, Sweden and United Kingdom while in the Czech Republic, Latvia and the Netherlands the public opinion on RES renewable energy sources is rather negative. The Croatian partner did not really provide an unambiguous answer, saying the public supports the environmental protection but the support for RES would depend on the project itself. The percentage ratio is graphically demonstrated in Figure 5.

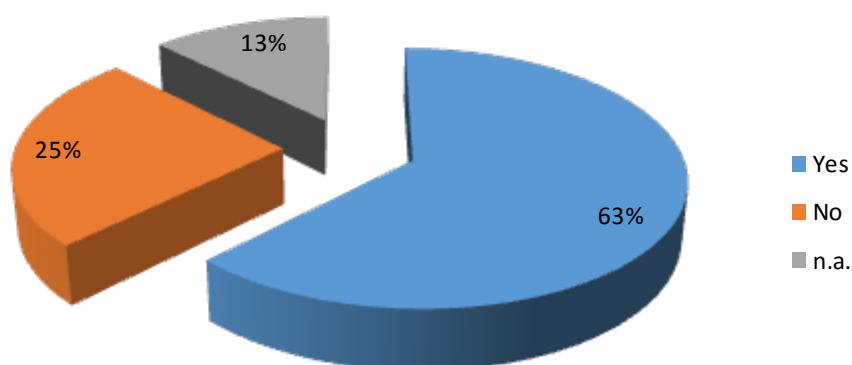


Figure 5: Public support towards renewable sources of energy in partner countries.

As shown in the Figure 1, renewable sources are mainly supported in the partner countries. The RES are mainly supported in economically higher developed countries. The only exception is Netherlands which provided an answer on the public support of biogas and not all the RES.

4.1.2 Trust in the government

(Question 2: What is the trust to your government in %?)

As the trust in the government is a highly unstable indicator and the data were not consistent (e.g. French partners provided two different numbers, Denmark did not provide a number) it would be highly questionable to draw any conclusions. The answers are therefore shown in the Table 4.

Table 4: The trust in government in partner countries

| Country | Trust in the government |
|----------------|-------------------------|
| Croatia | 50.3% |
| Czech Republic | 40% |
| Denmark | n.a. (high) |
| France | 45 - 80 % |
| Germany | n.a. (high) |
| Latvia | 18-20% |
| Netherlands | 55-65% |
| Sweden | 39.5 % |
| UK | 37% |

4.1.3 Support schemes

(Question 3: List your national support schemes with a short description)

An overview of the support schemes is shown in Table 5.

Table 5: Support schemes in partner countries

| Country | Investment support | Operational support |
|----------------|---|--|
| Croatia | No | FiT till 31/12/2015 Market premium from 1/1/2016 |
| Czech Republic | Innovation funds | No |
| Denmark | Municipality guaranty for a loan | FiT |
| France | Regional rules Local taxes exemptions on building | FiT Subsidies from the national energy agency |
| Germany | No | FiT for electricity |
| Latvia | No | FiT or Payments per installed capacity |
| Netherlands | For innovation projects up to 50% | SDE+ |
| Sweden | For biogas/biomethane production or treatment of digestate | a. FiT b. Climate stride b. Lower taxable benefit for vehicles (CNG, electro, hybrid) |
| UK | No | a. FiT b. RHI (heat) |

a) Investment support

New innovative projects are being supported in the **Czech Republic** and the **Netherlands** with financial support up to 50% of the investment.

In **Denmark** there are no support schemes for biogas plans unless a new plant is built having a municipal guaranty. This is only possible if the plant is going to produce biogas for CHP. The municipality can offer a guaranty for a loan to build a plant.

In **France** public support for biogas projects is provided by the National Waste and Energy Agency (ADEME). Subsidies are attributed by national or regional officers according to the project's energy efficiency, the use of energy crops. Substrate security wherewithal is mobilised from the waste fund which is financed by taxes payed by industrial waste producers. In the Pays de la Loire region and in Brittany the ADEME publishes a call for projects every year destined to projects with approved and experienced technology. On national basis there are special calls for projects with innovative technologies. On regional level every regional council is free to set the focus on fund attribution. In Pays de la Loire region there is a call for projects at that time. The administrative district council has FEDER funds for projects financing and local investment funds for renewable energy. Depending on the natural preconditions, projects can be related to water quality protection when there is a surplus of fertilising elements in the digestate. Subsidies are attributed to the mean of export of screw press, centrifuge, stripping or other digestate treatments and to the need for nutrient export. In Brittany, there is a common committee for the attribution of public subsidies. The members of this committee are the regional council of Brittany, the administrative district council, the National Waste and Energy Agency

and AILE as a technical advisor for biogas projects. Each member has its own directives for financing a biogas plant.

There is no investment support scheme in **Germany**.

In **Sweden** there is an investment support for biogas or biomethane production or treatment of the digestate. To be entitled for the support, the company has to be located in the countryside. The turnover must be less than 10 million € and the number of employees less than 50. The substrate must not consist of energy crops or plants based on oil. If the expenditures exceed 100 000 SEK, approx. 10 000 €, the support can be at the most 40 % of the investment. Sweden also has a support called Climate stride which is part of the national budget approved by the Swedish Parliament for 2016. The Swedish Environmental Protection Agency, together with national authorities and the county administrative boards are in charge of the support to local climate investments. The investment can be made by a city, a municipality or a company. They should give the highest possible climate benefit, the main target being to reduce the greenhouse gas emissions. Examples of initiatives that have received support are biogas plants and filling stations for electric and gas vehicles. In 2015, the support was 125 million SEK. Additional 600 million SEK per year will be granted to climate investments from 2016 to 2018. The support scheme is based on the climate and energy strategies prepared on local and regional level. The Swedish Energy Agency supports research and development connected to supply, conversion, distribution and use of energy. The current programme called Energy & Environment supports development activities in the fields of research, innovation and development related to vehicles in the fields of energy efficiency, transition to renewable fuels, reduced climate impact and the possibility to strengthen the competitiveness of Sweden and the Swedish automobile industry in a global perspective.

No investment support schemes were mentioned by **Croatian, Latvian** and **British partners**.

b) Operational support

Most of the countries provide operational support for biogas plants in form of Feed in Tariffs (Croatia until the 31st of Dec 2015, Czech Republic until the 31st of Dec 2012, Denmark, France, Latvia, Sweden and United Kingdom).

In **Croatia** the support is provided in form of Market premium.

There is no support in the **Czech Republic** since the 1st of Jan 2013.

In **Germany** the electricity fed into the is supported in form of a fixed feed in tariff which is based on the Renewable Energy Directive EEG. This directive was implemented in 2000 and since then was revised every three to five years according to gained experiences.

Latvia offers either Feed in Tariff or payments per installed capacity.

The Netherlands has a SDE+ scheme which compensates the difference between cost price and market price for renewable energy. The cost price is defined at the start of the project. The market price is corrected every year.

In **Sweden** the support is based on the quantity of manure delivered to the plant and how much biogas is produced from this manure. In case of co-digestion, the support is only based on the production from manure. The support was introduced in 2015 and was initially 2.2 cent/kWh. From 2016 on, the maximum amount granted is 4.4 cent/kWh. The support is paid as long as there is money left. There is a budget for each year that must not be exceeded. This means that the support received depends on both the number of producers applying for support and the amount of biogas produced from manure. The maximum amount granted is twice as high for biogas that is upgraded and produced for the use as vehicle fuel. Sweden also offers lowered taxable benefit for electric, hybrid and Bio-CNG vehicles. The Swedish Government has proposed that the period for lower taxable benefit for electric, hybrid and Bio-CNG vehicles will be extended from 2017 until the end of 2019.

In the United Kingdom, the main support for smaller-scale renewable energy is the Feed in Tariff for electricity and the Renewable Heat Incentive (RHI) for heat. The FiT was introduced in March 2010. Prior to that, it was signalled that some recently built installations will become eligible for payments at the start date.

4.1.4 EU Commission Notification of the support scheme

(Question 4: Is the national or regional scheme notified by the Commission?)

The percentage ratio of notified support schemes is graphically demonstrated in Figure 6.

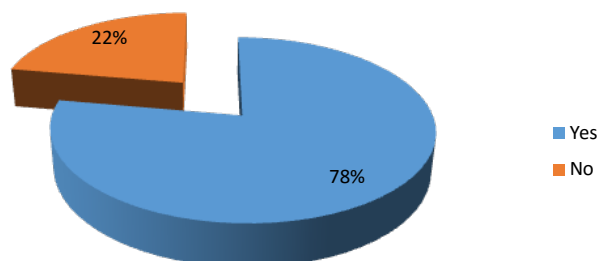


Figure 6: Percentage ratio of notification of the support schemes in partner countries

The support schemes in Croatia, Denmark, France, Germany, the Netherlands, Sweden and the United Kingdom are notified by European Commission. In the case of France, Feed in Tariffs and subsidies are notified by the commission this year but only for electricity, there is no notification for feed in tariffs for gas grid injection. The notification is missing in the Czech Republic and Latvia.

4.1.5 National/ regional scheme financing

(Question 5: How is the national or regional support scheme financed (levy on energy consumption, general tax money, tax relieve, etc.?)

The overview of financing schemes is shown in Table 6.

Table 6: National/ Regional financing of the support schemes in partner countries

| Country | Financing schemes |
|----------------|--|
| Croatia | Fees for all electricity consumers |
| Czech Republic | a. Consumers b. National budget |
| Denmark | Tax on energy consumption - end users |
| France | a. EU funds b. Tax on energy consumption - end users |
| Germany | Customers |
| Latvia | Tax on energy consumption - end users |
| Netherlands | a. Tax on energy consumption - end users b. Dedicated energy tax on RES |
| Sweden | National budget |
| UK | a. FiT - surcharge on energy bills, b. RHI - National budget |

In most of the participating countries the support schemes are financed by the costumers either in the form of surcharge fees or through a tax on energy consumption. Some countries combine these payments with the money from the national budget (Czech Republic, United Kingdom) or in case of France with money from EU funds. Only in Sweden the support schemes are financed solely from national budget.

4.2 Interesting AD installations in partner countries.

The descriptions of interested AD installations are provided below based on the answers from the survey that was spread within the project partners. Data were collected on 24 biogas plants form eight countries.

4.2.1 Overview of interesting AD installations in partner countries

Data on interesting AD plants collected from the survey that was spread within the project partners are summarised in Table 7. For more detailed information, such as comprehensive description of investors, investment and operation support, substrates used, energy and digestate utilisation and the cooperation between municipality or region see the related chapter.

Investors

Figure 7 shows the distribution of types of investors of the interesting AD plants.

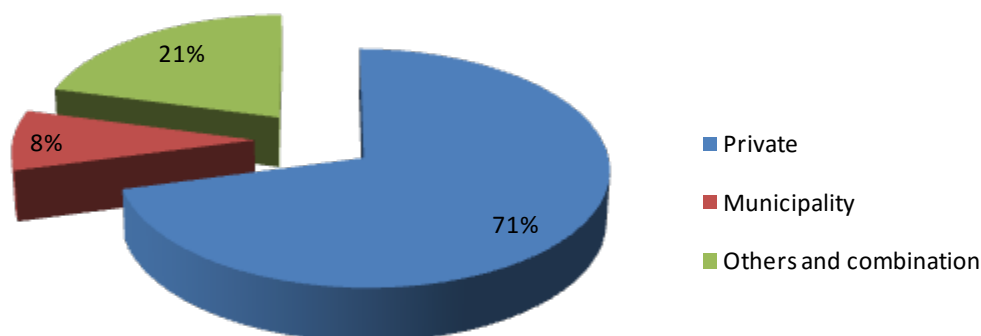


Figure 7: Types of investors

As shown in the Figure 7, more than 70% of the projects were realised by private investors, whereas it can be said that the 21% of others and combinations of private and municipal, there definitely was an involvement of private investors as well. Only 8% of the projects have municipality as sole investor.

Investment support

Figure 8 shows the ratio of interesting AD plants that obtained an investment support. Some project partners did not provide information on the investment support therefore it is not possible to claim the other plant did get no investment support. Thus 16% of the answers were not described and addressed with “n.a.” in the graph.

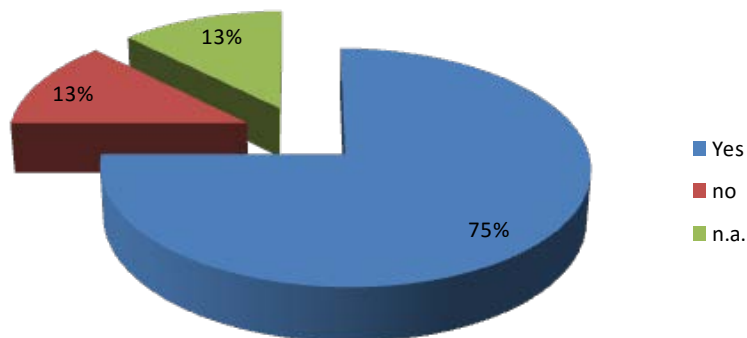


Figure 8: Investment support

As shown in Figure 8, most of the projects (75%) could be realised because of investment support.

Operation support

The ratio of interesting AD plants that are getting operation support is shown in Figure 9.

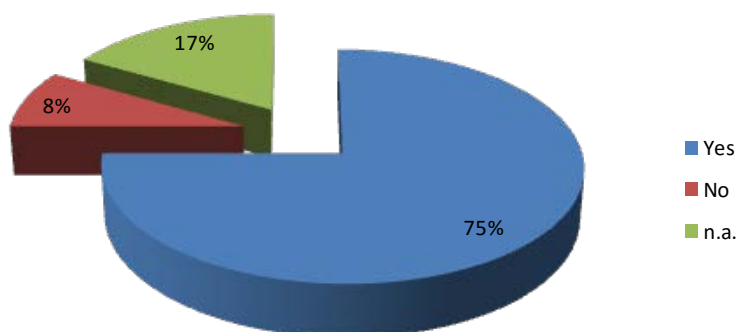


Figure 9: Operation support

Three quarters of the plants are receiving operation support. Only 8% of them operate with no operation support. There are no relevant data on 17% of the plants.

Substrates

Types of substrates used at the biogas plants are shown in Figure 10.

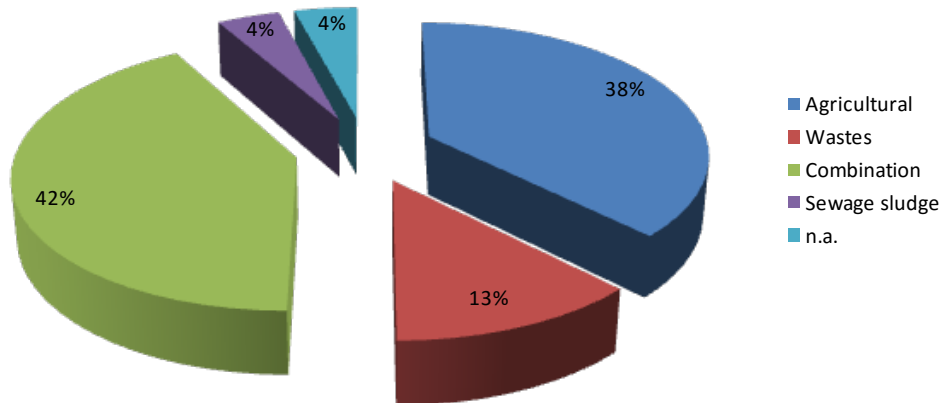


Figure 10: Types of substrates

As shown in the Figure 10, 42% of the plants are combining agricultural substrates such as manure, energy crops, biowaste etc. 38% of AD plants are processing just agricultural substrates such as manure, slurries and energy crops. One plant processes sewage sludge and three plants process solely wastes. One of the plants is in the planning stage, thus there is no substrate processed there at the time.

Energy utilisation

Energy utilisation of biogas at the AD plants is shown in Figure 11.

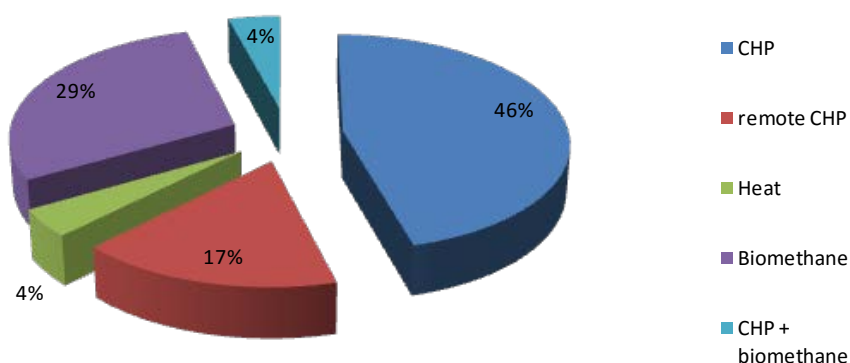


Figure 11: Energy utilisation

More than half of the plants are using biogas in the combined heat and power production process (CHP) either at the plant location or after transporting the biogas to the place of consumption (remote CHP) which allows in many cases the efficient use of heat. Nearly 30% of the plants upgrade the biogas to natural gas quality. One AD plant uses the biogas to produce heat only. One AD plant uses CHP and provides biomethane by upgrading technology.

Digestate utilisation

All the digestate is used as a fertiliser either untreated or after liquid/solid separation. Some plants treat the digestate by composting or pasteurisation.

Municipality or region involved

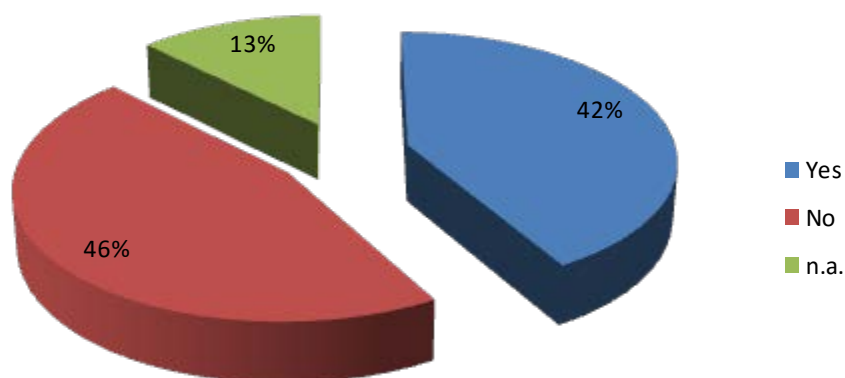


Figure 12: Municipality or region involvement

As shown in Figure 12 Municipalities or regions were involved in 42% of the projects of interesting AD installations. Almost 46% of the projects were developed without the municipality or region involvement.

D.2.1 Compilation of reports and tools for regional biogas deployment

Table 7: Overview of interesting AD installations in participating countries

| Country | Project name | Chapter | Investors | Investment support | Operation support | Substrates | Energy utilization | Digestate utilization | Municipality/ region involved |
|---------|--|---------|--------------------------|--------------------|---------------------------|---|--------------------|------------------------------------|-------------------------------|
| HR | EIHP | 4.2.2 | to be found | n.a. | FiT | n.a. | CHP | problem | n.a. |
| CZ | Biogas plant Trebon | 4.2.3 | private | Yes | FiT | MS, GS, WPS | remote CHP | arable land | Yes |
| | Biogas plant Vetrny Jenikov | 4.2.4 | private | Yes | FiT, Green Bonus for heat | Distillery residues, potato roughage, cereal groats | CHP | arable land | No |
| | Plant Zdar Nad Sazavou | 4.2.5 | private | Yes | FiT, Green Bonus for heat | Biowaste | remote CHP | arable land | No |
| DK | Plant LINKO Gas | 4.2.6 | cooperative company | n.a. | n.a. | manure and slurries, biowaste | remote CHP | arable land | n.a. |
| | NFG Nature Energy - Holsted Biogas Plant | 4.2.7 | private | n.a. | n.a. | manure and slurries, biowaste, energy crops | biomethane | n.a. | n.a. |
| | Solrød BiogaS | 4.2.8 | municipality and private | Yes | n.a. | Seaweed, manure, pectin, etc. | CHP | arable land | Yes |
| FR | EC Network & Aile | 4.2.9 | private | Yes | Yes | manure and slurries, food waste | biomethane | LP - arable land SP - composted | Yes |
| | Methanea | 4.2.10 | private | Yes | FiT and subsidies | manure, plant matter, floating sludge | CHP | arable land | Yes |
| | Terrageau | 4.2.11 | private | Yes | n.a. | manure, agricultural/food | biomethane | composted and then arable land | Yes |

D.2.1 Compilation of reports and tools for regional biogas deployment

| Country | Project name | Chapter | Investors | Investment support | Operation support | Substrates | Energy utilization | Digestate utilization | Municipality/ region involved |
|---------|---|---------|---|--------------------|--|--|--|--|---|
| DE | Agrogas & Wärme GmbH & Co KG | 4.2.12 | private | No | Renewable Energy Directive EEG 2009 | Pig manure, cattle manure, solid cattle dung, maize silage, grass silage, raven silage | five CHP (two on-site and three remotes) | arable land | No financial support, joint discussions |
| | Bio Energie Hofgut Räder GmbH & Co. KG, Agrogas & Wärme GmbH & Co. KG | 4.2.13 | private | No | Renewable Energy Directive EEG 2009 | Solid pig dung, solid cattle dung, pig manure, clover grass silage, rapeseed-WPS, grains | CHP | arable land | No |
| | Agrokraft Streutal GmbH & Co. KG | 4.2.14 | private | No | Renewable Energy Directive EEG 2004; remunerated by local gas provider | Cattle manure, maize silage, corn-WPS | CHP + biomethane | arable land | No financial support, joint discussions |
| LV | Plant Agro Iecava | 4.2.15 | private | Yes | FIT | MS, GS, CS, Slurry, Manure, dairy by-product | CHP | arable land | No |
| | Plant Bio Ziedi Ltd. | 4.2.16 | private | Yes | FIT | MS, GS, CS, Slurry, Manure | CHP | arable land | No |
| | Plant "Mc Bio" Ltd. | 4.2.17 | private | Yes | FIT | MS, Slurry, Manure | CHP | arable land | No |
| NL | Grendal verigsting | 4.2.18 | farmer, regional investment fund, banks | Yes | SDE+ | Manure, whey, food waste, glycerine | CHP | partly spread, partly pasteurized and exported | No |
| | Biogashub Noord Deurningen | 4.2.19 | farmers and local grid operator | Yes | SDE+ | Manure | heat | arable land | Yes |

D.2.1 Compilation of reports and tools for regional biogas deployment

| Country | Project name | Chapter | Investors | Investment support | Operation support | Substrates | Energy utilization | Digestate utilization | Municipality/ region involved |
|---------|------------------------------------|---------|----------------|--------------------|-------------------|---|--------------------|-----------------------|-------------------------------|
| SE | Alvesta Biogas AB | 4.2.20 | private | Yes | Yes | Manure, slaughterhouse waste, cereal starch | biomethane | arable land | Yes |
| | Biogas in Småland AB | 4.2.21 | private | Yes | Yes | Manure, household waste | biomethane | arable land | Yes |
| | VMAB biomethane plant | 4.2.22 | municipalities | Yes | No | Biowaste | biomethane | arable land | Yes |
| | Växjö Municipality | 4.2.23 | municipality | Yes | No | Sewage sludge, biowaste | biomethane | arable land | Yes |
| UK | Lodge Farm, Holt, Wrexham | 4.2.24 | private | Yes | FiT, RHI | Slurry, manure, biowaste | CHP | arable land | No |
| | Bore Hill Farm Digester, Wiltshire | 4.2.25 | private | Yes | FiT, RHI | Food waste | CHP | arable land | No |

4.2.2 Croatia, Energy Institute Hrvoje Pozar

| | |
|-----------------------------------|---|
| Investors: | <p>At this point, Croatia is still trying to identify the investors due to the change in subsidizing systems and investors entering/obtaining the quota, losing it for idling.</p> <p>Until now, they have set their eyes on two types of investors:</p> <ul style="list-style-type: none">- Pig/cattle farmer with <300 kW plant that is eligible for FiT (gained quota rights before 2016). Unfortunately, all those plants are based on manure and maize silage as feedstock. They will try to find other substrates.- Small biogas plants 30 kW suitable for local communities (that will comply with market premium system but still gain FiT due to its size), electricity to the grid and heating the school. Many schools were built on a bad loan so those municipalities are looking for free heating source, in exchange for location availability and soft support. Biogas plant could be a centralized manure management centre for the municipality – main feedstock: manure plus organic left-overs... |
| Investment support: | n.a. |
| Operation support: | FiT |
| Substrates: | n.a. |
| Energy utilisation: | <ol style="list-style-type: none">1. Only RES-E is purchased at special (FiT) price. Heat use is mandated. Croatian energy regulator agency (ex HROTE now HEA) is providing the subsidy, HEP ODS is taking the electricity to the grid.2. Biomethane or gas sales are not considered so far as an option. Croatia has the cheapest gas prices in the EU: 0.048 and 0.040 €/ kWh VAT excl. in 2014. |
| Digestate utilisation: | <p>Digestate utilisation is a problem due to the high cost of application and lack of knowledge in regards of its features.</p> <p>Professional crop growers are inclined towards precision agriculture which excludes digestate.</p> <p>At most of the time, digestate is a cost statement and not income.</p> |
| Municipality/ region involved: | n.a. |

4.2.3 Biogas Plant Trebon (Czech Republic, CzBA)

| | |
|---------------------|--|
| Investors: | <p>The investor of this project is a private company BIOPLYN Trebon, Ltd. formed by natural persons and E.ON Energie, a.s. Ceske Budejovice. Through the investors there are several companies cooperating such as R. A. B., Ltd., as the owner of the areal and operator of a wastewatertreatment plant (that also produces biogas by AD of wastewater sludges), provides the grounds for the biogas plant. Company K+K Bridlice supplies maize, grass silage and the whole plant silage. The municipality of Trebon as the only owner of the town spa complex is the heat consumer. E.ON Energie, a.s. Ceske Budejovice is providing supply and purchase of the electricity and supply of the natural gas.</p> |
| Investment support: | <p>The project costs were 125 million CZK (ca. € 4.6 mil.) and the investors obtained an investment support of approximately 25 % from the European</p> |

regional development fund, Operational Programme Enterprise and Innovation, EKO-ENERGIE.

- Operation support: The operational support in the form of Feed-in-Tariff for the electricity as there was no operational support for heat use at the time.
- Substrates: The biogas plant is fed by maize and grass silage and whole plant silage which are supplied by K+K Bridlice, one of the interested parties, and the cost of the substrates is approximately 750 CZK per tonne (ca. € 27,55 per tonne).
- Energy utilisation: The biogas is transported from the biogas plant to a CHP unit that is located by the town spa complex which is the main consumer of the heat. The heat is therefore purchased by the municipality of Trebon (the owner of the spa complex) for 285 CZK/ GJ (€ 10.53 per GJ). The electricity is sold to E.ON Energie, a.s. Ceske Budejovice that use it for 790 CZK/ kWh (€ 29.18 per kWh).
- Digestate utilisation: The digestate is being spread on the arable land and it is a cost of 85 CZK/ m³ (€ 3.14 per m³).
- Municipality/
region involved: The municipality is a consumer of the heat.

4.2.4 Plant Vetrny Jenikov (Czech Republic, CzBA)

- Investors: The investor of this project is an agricultural and ethanol producing company ZEVAR, Ltd, that was searching for solutions to enhance both material and energy balance of the overall process of ethanol production.
- Investment support: The project cost 70 million CZK (ca €2.6 mil.) has also been cofinanced from the European regional development fund, Operational Programme Enterprise and Innovation, EKO-ENERGIE.
- Operation support: The operational support in the form of Feed-in-Tariff for the electricity and green bonus for the heat use.
- Substrates: The biogas plant processes 40,200 tonnes per year of distillery residues and 3,700 tonnes per year of potato roughage from a starch production and 1,000 tonnes per year of cereal groats.
- Energy utilisation: The heat is fully used in the distillery in the hot water circuit and a steam collector that are integrated in the ethanol production process. The electricity is partially used at the installation and the surplus is sold into national grid.
- Digestate utilisation: The digestate is being spread on the arable land.
- Municipality/
region involved: The municipality nor the region was involved in the project.

4.2.5 Plant Zdar nad Sazavou (Czech Republic, CzBA)

- Investors: The biogas plant treats biowaste from households, businesses and restaurants. Biowaste is collected from the town Zdar and Sazavou and smaller municipalities in the 50 km range by the company ODAS ODPADY, Ltd. that is also an investor of the project.

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| Investment support: | The overall cost of the project of was approximately 103 million CZK (€3.8 million). The investor obtained 42.5 million (ca. €1.6 mil.) CZK from European Structural and Investment Fund - Cohesion Fund (35%) and The State Environmental Fund of the Czech Republic (6%) and a loan for 30 million CZK (ca. €1.1 mil.) from a bank. |
| Operation support: | The operational support in the form of Feed-in-Tariff for the electricity and green bonus for the heat use. |
| Substrates: | The plant processes up to 15,500 tonnes of biowaste per year. |
| Energy utilisation: | Biogas is transported by a 1.5 km long pipeline to an industrial enterprise ZDAS, a.s, where the CHP unit is located. All the heat and electricity is used at the place, which is very unique in Czech conditions. |
| Digestate utilisation: | The digestate is being regularly analysed and spread on the arable land. |
| Municipality/ region involved: | The municipality nor the region was involved in the project. |

4.2.6 Plant LINKO Gas (Denmark, DFFB)

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|------------------------|---|
| Investors: | The biogas plant is operated as a cooperative company, owned by 50 local farmers who are members of Linko Gas A.m.b.A. |
| Investment support: | n.a. |
| Operation support: | n.a. |
| Substrates: | Animal manure and slurries from 50 livestock farms (cattle and pig) mixed with digestible wastes (such as from fish and food processing industries, pharmaceutical industry, abattoir intestinal contents and sewage sludge from a waste water treatment plant) provided by the 50 local farmers who own the plant together. |
| Energy utilisation: | The biogas produced is piped via a 7 km low pressure gas transmission system from the central plant to Rødding combined heat and power (CHP) plant, where it is used in two biogas engines to produce electricity (max. 2080 kW output) and district heating (max. 2600 kW output). At the biogas plant, the biogas is used in a 1121 kW engine for process heating, and in a 900 kW back-up gas boiler. |
| Digestate utilisation: | The farmers supplying slurry to the biogas plant receive back digestate, with the amount of nutrients calculated not to exceed the allowed limits for their crops according to Danish harmony rules for nutrient management. The surplus, which is about 30% of the digestate produced by the biogas plant, is sold to about 50 crop farms in the nearby area. The pH and the dry matter of raw slurry and of digestate are determined in the mini laboratory at the biogas plant following periodic sampling. Along with these measurements, a declaration of the content of macro-nutrients added when digestate is transported to the farmers. The digestate must be stored in one of the 78 specially built concrete storage tanks located close to the fields where digestate will be applied as fertiliser. |

Municipality/
region involved: n.a.

4.2.7 NGF Nature Energy - Holsted Biogas Plant (Denmark, DFFB)

Investors: NGF NE owns at least 51 % (Prerequisite for financing) – Biomass supplier own up to 49 %. But: constructor owns app. 10 % for at least 5 years. The cooperation is secured for a long time through identical interests in the running of the plant. All contracts are market based and at arms' length. Ownership agreement secures minority interests, options etc.

Owners: NGF: 62 %
Suppliers: 29%
Constructor: 9%

Investment support: Danish government aims at fossil free society by 2050. The gas grid will be used for distribution of sustainable energy.

Operation support: n.a.

Substrates: The plant co-digests annually 400,000 tons of biomass, of which about 70 % is represented by manure and slurries from cattle, pigs and mink farms. In order to boost the methane yield, the animal manure is co-digested with deep litter, organic waste from food and agro-industries and some energy crops. The biogas plant is connected through a piping system with a neighbouring waste separation and treatment plant, which supplies separated food waste and other organic waste from supermarkets.

Energy utilisation: NGF Nature Energy Holsted was taken into operation in 2015 as the largest biogas plant in Denmark that feeds the produced biogas in the natural gas grid. The energy produced will be 11-13 million m³ of biomethane per year.

Digestate utilisation: n.a.

Municipality/
region involved: n.a.

4.2.8 Solrød BiogaS (Denmark, DFFB)

Investors: The plant was established and is operated by Solrød Biogas A/S, founded May 28, 2014 with Solrød municipality as shareholder.

Investment support: Investment, DKK 85 million (ex. CHP unit); EU grant 0.5 million EUR; Annual revenues DKK 30 million

Operation support: n.a.

Substrates: The biogas plant has a treatment capacity of 200,000 tons feedstock/year, such as 7,400 t Seaweed (*Zostera maritima*, *Pilayella littoralis* and *Ectocarpus* sp.), 53,200 t Manure, 79,400 CP Kelco (pectin) and 60,000 t Chr. Hansen.

- Energy utilisation:** There is a methane production of 6 million m³/year which results in supply of 60 GWh/year renewable energy, comprising 23 GWh/year of electricity and 28 GWh/year of heat production (District Heating). The biogas produced is used for CHP generation in a large gas engine. The power is sold to the grid and the heat is supplied to the local district heating system which is operated by Vestegnens Kraftvarmeselskab I/S and owned by 12 municipalities as stakeholders.
- Digestate utilisation:** The produced digestate is used as biofertiliser for farmers.
- Municipality/region involved:** The idea to build a biogas plant in Solrød emerged from the need to find a sustainable solution to the community's odour problem, caused by seaweed fouling the beach. Simultaneously, the Solrød Municipality also wished to take concrete action concerning climate change challenges by producing green energy. The project benefited from the synergic involvement of several actors and interests, as local industries also had challenges finding beneficial outlets for their wastes and by-products, and they became involved as they found great interest in the project plans. The energy production of the biogas plant and the anticipated savings of CO₂ (equivalent) became part of the Solrød Municipality's Sustainable Energy Action Plan (SEAP), under the Covenant of Mayors.

4.2.9 EC Network & AILE (France, AILE)

- Investors:** The investors are 10 farmers on four farms, Terrena and Lyonnaise des eaux. The French investment fund for green energy is part of the consortium.
- Investment support:** They had a support from National Waste and Energy Agency (ADEME) 760,000€, 60,000€ from the district council, and 195,000€ FEDER attributed by the district council, 70,000€ subsidies by water supply agency Loire Bretagne
- Operation support:** ADEME, regional council and district council: Investors have to present their project in a 30 to 35 pages grand request. Within this request their have to present the project (<http://www.aile.asso.fr/index.php/biogaz/plan-biogaz/les-aides-a-linvestissement/?lang=fr>). Project costs have to be detailed in a financial annexe. Subsidies from the district council where attributed in spring 2011 for the continuing of an innovative investment project. For the ADEME, subsidies where demanded in the beginning of 2012 and accorded September 2012. FEADER subsidies where demanded in 2012 and accorded spring 2014. Water supply agency: Investors have to present their project and the need of treatment of digestat. The presented project was helped for the screw press and the storage capacity for the liquid phase. The need of export of phosphor is more important to the agency than the export of nitrogen in this particular area.
- Substrates:** Dairy cow and pig slurry, dairy cow manure, waste from grease of decantation (slaughterhouse, precooked meals, pork butchery or the grease and oil from restaurants) delivered by Terralis, Onova and Brengéon. Food waste represents 1/3 of all substrates and produces 60% of the biogas. All the manure and slurry is delivered by the investors. Dairy cow slurry is from an investor 500m beside the plant by a pipe transport. Pig slurry is transported by manure barrel and solid manure by tractor. The overall

treatment charge is 34,000 €/ year for the benefit of the biogas plant and 25,000 €/year to buy substrates from waste producers.

- Energy utilisation:** The energy is sold by the mean of biométhane to ENGI (ex GDF). Without the price for the certificate of origin in the beginning of the project in 2014 the production volume was 65 Nm³/h for 0.126€/ kWhPCI. This price is related to the production volume and with the recent rise of production volume to 80 Nm³/h price sinks to 0.12343€/ kWhPCI. Another augmentation of the production volume is decided by the plant investors to 85Nm³/ h. Additionally the foreseen of the project is à GNV station for busses and lorries. Of course the bio-methane is consumed locally by a big bakery but the certificates of origin are sold to local authorities.
- Digestate utilisation:** The digestat is separated by a screw press and within a few months by a centrifuge. The liquid phase is spread by an external company and the solid phase is composted by FertiEveil (cost 10€/tonne solid phase for the transport).
- Municipality/
region involved:** The plant is close to a district border and so the district council supported the project by public subsidies under the condition of building the plant in their district.

4.2.10 Methanea (France, RAEE)

- Investors:** The EARL du Grand Veyriat (limited liability farming partnership) is a pig farm managed by Thierry Thenoz. It is located at Lescheroux in the Ain district of France. Mr Thenoz created the Methanea limited liability company to set up the anaerobic digestion unit. This company is an association of two corporate bodies, the EARL les Terres de Bresse (which manages the plant production workshop on 230 hectares) and the EARL du Grand Veyriat.
- Investment support:** 1. Yes, by the regional council and the ADEME, the 40% own funds, contract for substrates
Investment: €1,514 million
Public aid: - ADEME: €261,425, State / EPP: €200,000, regional council 150,000 €
- Operation support:** The farmers have hired a design office to assess the technical and economic feasibility of an anaerobic digestion project. This study, conducted in 2007, defined the project outline (power capacity to be installed, energy to be used, land aspects, etc.) and led to the considered provision of external substrates to improve profitability. It is in operation from 2008.
Feed in tariffs (depending heat used) and subsidies
- Substrates:** The METHANEA anaerobic digestion unit is located at Lescheroux, near to Thierry Thenoz's pig farm on agricultural land managed by the project owner. The unit is fed with solid and liquid manure, plant matter and flotation sludge generated by the agri-food industries.
- Energy utilisation:** The plant has a CHP; the electricity is sold. The heat produced by anaerobic digestion is used on-site to hygienise flotation sludge, heat livestock buildings, heat a home and a workshop and pre-heat building and equipment cleaning water. A heat grid is installed for drying fodder in a grange for a goat farmer and for drying alfalfa for a group of cow farmers.

Digestate utilisation: The digestat is being spread. The digestate is spreaded on the land owned by the EARL Les Terres de Bresse and that of the land lender. No price.

Municipality/region involved: The regional council and the department council are involved financially providing subsidies.

4.2.11 Terragreau (France, RAEE)

Investors: In Evian, the local authority opened a call to private structure to finance, build and operate the plant as a public service delegation: SAS TERRAGR'EAU has been created by private company that in charge of building and operating the plant
Other partner is DANONE

Investment support: Communauté de Communes du pays d'Evian (the local authority) .73 million €, Danone 3.73 million €, SAS Terragr'eau 1.3 million €, EU, subsidies from Régional council, Département, ADEME 2.5 million €
Total cost: 9,300,000 €

Operation support: The project is a gas grid injection plant under construction. The most interest thing is the origin of the project: to collect all organic matters (especially manure) to protect the evian waters impluvium in order to "save" the quality of Evian water sells by Danone.
Feasibility study done in 2006, the plant will be in operation in 2017.

Substrates: Solide and liquid manure from 20-30 farmers, 90% of substrates
Local Agrofood industries 10 %
33,000t of substrates
Free for manure, a small price for agrofood industries

Energy utilisation: The gas will be injected into the grid and sold to an energy supplier, the price will depend on size and % of manure, around 90 €/MWh injected, 100 Nm³/hour

Digestate utilisation: The digestate will be composted and will return to the field.

Municipality/region involved: Subsidies from EU, Régional council, Département, ADEME = 2.5 million €

4.2.12 Agrogas & Wärme GmbH & Co KG (Germany, IBBK)

Investors: This is a joint biogas plant with 18 farmers involved. The produced biogas is used to provide electricity but part of it is also upgraded to biomethane.

Investment support: No

Operation support: The electricity provided by this plant is injected into the gas grid and is remunerated according to Renewable Energy Directive EEG 2009. The produced biomethane is marketed by municipal utilities.

Substrates: Pig manure: 10,000 t FM/a (share in substrate mix 16%); cattle manure: 7,000 t FM/a (share in substrate mix 11%); solid cattle dung: 360 t FM/a (share in substrate mix 1%); maize silage: 40.000 t FM/a (share in substrate mix 63%); grass silage 4,000 t FM/a (share in substrate mix 6%); raven silage

(share in substrate mix 3%). All substrates are delivered by the 18 involved farmers.

- Energy utilisation:** The biogas is used in five CHP units to provide energy and heat. Two CHP units are located on-site but three CHP units are so-called satellite- or remote-CHP units located a few kilometres far away from the biogas plant. The installed electrical power is 1.3 MW_{el}. The local heating grid provides 57 costumers. The heat supply is ensured with a peak load boiler. The price of the sold heat is around 70% of the price of heating oil, in between 2.5 to 6.0 €cent/kWh_{th}. During summer, the produced biogas is mainly upgraded to biomethane and sold to municipalities.
- Digestate utilisation:** There are around 50,000 t of digestate per year which is divided between the participating farmers in the same share as they provide substrates.
- Municipality/
region involved:** The site of the biogas plant was a joint decision of residents, representatives of the municipalities and authorities but there was no financial support provided by those stakeholders.

4.2.13 Bio Energie Hofgut Räder GmbH & Co. KG, Agrogas & Wärme GmbH & Co. KG (Germany, IBBK)

- Investors:** This biogas plant is an individual small-scale plant on an agricultural farm which is specialised on ecological cultivation. In April 2009, the plant was commissioned with electrical power of 190 kW_{el}. In March 2011, the CHP plant was exchanged which led to an increase of electrical power to 250 kW_{el}.
- Investment support:** No
- Operation support:** The electricity provided by this plant is injected into the gas grid and is remunerated according to Renewable Energy Directive EEG 2009. One fourth of the provided surplus heat is injected into a local heating grid which brings additional revenues.
- Substrates:** Solid pig dung: 1,480 t FM/a (share in substrate mix 27%); solid cattle dung: 224 t FM/a (share in substrate mix 4%); pig manure: 120 t FM/a (share in substrate mix 2%); clover grass silage: 2.587 t FM/a (share in substrate mix 48%); rapeseed-WPS whole plant silage: 330 t FM/a (share in substrate mix 6%); grains: 20 t FM/a (share in substrate mix 0.4%). Animal excrements are only used from the farmer's own animals. Around 50% of clover grass are from own production, the other 50% are delivered by neighbouring farms which are also producing ecological.
- Energy utilisation:** The produced biogas is burned in a CHP plant with the electrical power of 250 kW_{el} to provide heat and energy. The biogas plant has its own heat use concept. Heat is used in the own farm but also provided to public buildings and commercial enterprises in the village. The surplus heat is used to heat the town hall, a school, a butcher, a bakery, the rectory and four apartment buildings. 506,500 kWh_{th} are provided to the local heating grid every year. The biogas plant also provides the service of drying wood, grain and wood chips which uses a heat amount of 1,428,00 kWh_{th}.
- Digestate utilisation:** Half of the yearly digestate amount of 5,300 t is used as organic fertiliser for the farmer's own agricultural land. The rest is used by other farmers. The digestate spreading is done in a very innovative technique (using gliding skids technology) which provides plants with nutrients in a way very gentle to soil.

The biogas technology contributes to a circular economy for its agricultural surroundings. Farmers providing clover grass receive digestate as fertilisers. Consequently, their soil is provided with high-quality nutrients at the required time.

Municipality/
region involved: No. The local heating grid was planned, constructed and financed by the biogas plant owner.

4.2.14 Agrokraft Streutal GmbH & Co. KG (Germany, IBK)

Investors: Two independent biogas plants are operated by Agrokraft which is supported by 46 different farmers.

Investment support: No

Operation support: Biogas plant number 1 was commissioned in 2007, this is why the injected electricity from this plant is remunerated according to the Renewable Energy Directive EEG 2004.

Biogas plant number 2 was commissioned in 2010. Its produced biogas is upgraded to biomethane and injected into the local gas grid which is run by Bayerische Rhöngas GmbH and remunerates the operators for the provided biomethane.

Substrates: Cattle manure: 406 t FM/a (share in substrate mix 1%); maize silage: 27.229 t FM/a (share in substrate mix 70%); corn-WPS whole plant silage: 9.729 t FM/a (share in substrate mix 25%); potatoes, onions, etc.: 769 t FM/a (share in substrate mix 2%), grass silage: 390 t FM/a (share in substrate mix 1%); corn: 380 t FM/a (share in substrate mix 1%). 80% of the substrates of both biogas plants are provided by the 47 involved farmers. 20% of the substrates are bought on the open market.

Energy utilisation: The produced biogas from plant 1 is used in a CHP unit with an electrical power of 889 kWh_{el} to provide heat and energy. Downstream to the CHP there is a post-combustion installed. The total heating output is 1,000 kW_{th}. 400 kW_{th} are used to run the biogas upgrading system which uses an amine washing system. The residual 600 kW_{th} are injected into the district heating system which is also owned by Agrokraft. It delivers heat to several residential homes, a butcher and also to a greenhouse of a gardener in the neighbourhood. The heat is sold for approximately 3 €cent/kWh_{th}. Yearly, around 3,000,000 kWh_{th} are sold. Biogas plant 1 sells around 3,420,000 kWh_{th} of heat per year to biogas plant 2 which uses this heat for the upgrading of the produced biogas from plant 2.

Digestate utilisation: Both biogas plants produce a total amount of 28,750 m³ digestate. The digestate is provided to the involved farmers in the same share as they deliver substrates. 0.75 m³ digestate per ton of delivered substrate fresh matter are delivered to the farmers for free. They are responsible for the transportation and spreading costs. Every farmer has his own electronical chip to register for digestate withdrawal. This allows every party to have a good overview of the system.

Municipality/
region involved: No. The site of the biogas plant was a joint decision of operators together with the municipality and under consideration of customers of the heat. The mayor is also participant in this joint project.

4.2.15 Plant Agro Iecava (Latvia, EKODOMA)

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| Investors: | Private investors from Latvia. |
| Investment support: | Yes, Rural Support Service provided 40% of the total eligible costs for the establishment of biogas plant. |
| Operation support: | Mandatory purchase of electricity generated from renewable energy sources (feed-in tariff), according to Cabinet Regulation No.262: Regulations Regarding the Production of Electricity Using Renewable Energy Sources and the Procedures for the Determination of the Price). Since year 2014 incomes from the sold electricity are liable to subsidized electricity tax – 5%. |
| Substrates: | Maize silage 27,608 tonnes/year (provided by sister company); Grass silage 6,675 tonnes/year (provided by sister company); Cereals silage 250 tonnes/year (provided by sister company); Cattle slurry 4,392 tonnes/year (bought from nearby cattle farm); Poultry manure 7,919 tonnes/year (bought from nearby chicken egg farming); Solid manure (sheep) 100 tonnes/year (provided by sister company); Dairy by-product 2,767 tonnes/year (bought from a milk processing company) |
| Energy utilisation: | Ltd “Agro Iecava” sells electricity for JSC “Latvenergo”, which is the main energy service provider in Latvia. Price for electricity is 0.1895 EUR/kWh + VAT before subsidized electricity tax and 0.180052 EUR/kWh + VAT after the subsidized electricity tax. Biogas plant sells not only electricity, but also heat energy. Heat is transferred to Ltd. “Iecavas Siltums”, which provides district heating to nearby city. For instance, 8,242.98 MWh of heat was sold in year 2015. According to reciprocal contract, price for heat energy is 25.61 EUR/MWh + VAT. Sold heat is accounted in Ltd. “Iecavas Siltums” boiler house. |
| Digestate utilisation: | All digestate is dispersed on sister’s company agricultural land. Cost of digestate utilisation for biogas plant is between 4 – 7 EUR/tonne. |
| Municipality/ region involved: | The municipality or region was not involved in development of biogas plant (no specific support for the construction of biogas plant), but importantly, there weren’t any considerable barriers. |

4.2.16 Plant Bio Ziedi Ltd. (Dobele) (Latvia, EKODOMA)

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| Investors: | Existing dairy farm owners invested their own funds and received a loan from a bank. |
| Investment support: | Yes, Rural Support Service provided 40% of the total eligible costs for the establishment of biogas plant. |
| Operation support: | Mandatory purchase of electricity generated from renewable energy sources (feed-in tariff), according to Cabinet Regulation No.262: Regulations Regarding the Production of Electricity Using Renewable Energy Sources and the Procedures for the Determination of the Price). Since year 2014 incomes from the sold electricity are liable to subsidized electricity tax – 5%. |
| Substrates: | Maize silage 14,429 tonnes/year (produced by parent company); Grass silage 9,070 tonnes/year (produced by parent company); Cereal silage 6,949 tonnes/year (produced by parent company); Cereal flour |

3,177 tonnes/year (bought from nearby grain processing companies); Cattle slurry 58,666 tonnes/year (produced by their own farm); Solid manure (cattle) 1,393 tonnes/year (produced by their own farm). The price depends from actual cost of raw material. Grain flour is purchased through procurement. In year 2015 total cost for raw materials were 1,668,367, EUR.

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| Energy utilisation: | "Bio Ziedi" Ltd sells electricity for JSC "Latvenergo", which is the main energy service provider in Latvia. Price for electricity is 0.1895 EUR/ kWh + VAT before subsidized electricity tax. In year 2015 amount of produced electricity was 15,821.85 MWh. Heat energy is transferred to parent company without cost. The parent company uses heat energy to heat dairy farm and recently has started fish (sturgeon) and shrimp production. Balance for produced heat energy is: 30% for fermentation tanks; 45% for cow farm complex and 25% for fish and shrimp production and processing plant. In year 2015 heat energy of 4,786MWhth was transferred to parent company. Transferred heat energy is accounted in "Bio Ziedi" Ltd. CHP. |
| Digestate utilisation: | All digestate is dispersed on "Bio Ziedi" Ltd. agricultural land. Cost of digestate utilisation for biogas plant is between 3 – 6 EUR/tonne. |
| Municipality/ region involved: | The municipality or region was not involved in development of biogas plant (no specific support for the construction of biogas plant), but importantly, there weren't any considerable barriers. |

4.2.17 Plant "Mc Bio" Ltd. (Mežacīruļi near Zaļenieki, Latvia, EKODOMA)

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|---------------------|---|
| Investors: | Existing dairy farm owners invested their own funds and received a loan from a bank. |
| Investment support: | Yes, Rural Support Service provided 38% of the total eligible costs for the establishment of biogas plant. |
| Operation support: | Mandatory purchase of electricity generated from renewable energy sources (feed-in tariff), according to Cabinet Regulation No.262: Regulations Regarding the Production of Electricity Using Renewable Energy Sources and the Procedures for the Determination of the Price). Since year 2014 incomes from the sold electricity are liable to subsidized electricity tax – 5%. |
| Substrates: | Maize silage 9,976.65 tonnes/year (provided by associated company); Cattle slurry 11,885 tonnes/year (is pumped from the cattle farm located next to biogas plant); Poultry manure 886 tonnes/year (bought from nearby poultry farm); Solid manure (cattle) 4,283.335 tonnes/year (provided by sister company). |
| Energy utilisation: | "Mc Bio" Ltd sells electricity for JSC "Latvenergo", which is the main energy service provider in Latvia. Price for electricity is 0.20154 EUR/kWh + VAT before subsidized electricity tax. In year 2015 amount of produced electricity was 6,119.65 MWh. Biogas plant sells not only electricity, but also heat energy. Heat is transferred to "Mežacīruļi" Ltd., which is used for greenhouse heating (the area of greenhouse: 5,117 m ²) and for cattle farm heating (hot water, heating for technical rooms, office rooms). In year 2015 heat energy of 5,235.68MWhth was transferred to "Mežacīruļi" Ltd. without additional cost. |

Digestate utilisation: All digestate is dispersed on “Mc Bio” Ltd. agricultural land and they are registered as users of digestate in Food Veterinary Service. Cost of digestate utilisation for biogas plant is between 2.5 – 3 EUR/ tonne.

Municipality/
region involved? The municipality or region was not involved in development of biogas plant (no specific support for the construction of biogas plant), but importantly, there weren't any considerable barriers.

4.2.18 Greendal vergisting (Netherlands, CCS)

Investors: The farmer, regional investment fund for renewable energy, banks

Investment support: Yes, an innovation subsidy for innovative, nitrogen rich, fermentation

Operation support: SDE+ subsidy, so per kWh produced a compensation for the difference between cost price and market price

Substrates: Mainly manure: poultry, pig, cattle manure. And whey, supermarket residues, other products like glycerine

Energy utilisation: Electricity and heat. Electricity is sold to the grid, for market prices. The heat is used for digestate pasteurisation and for growing of algae and duckweed.

Digestate utilisation: Digestate is partly spread over the fields (cost) or pasteurized and exported, what is been seen as manure treatment under the Nitrogen directive. Pasteurisation is a cost, but the certificates for the exported phosphate can be sold, so there is a nett income.

Municipality/
region involved: No.

4.2.19 Biogashub Noord Deurningen (Netherlands, CCS)

Investors: Farmers and local grid operator

Investment support: Yes, a national investment subsidy for the demonstration of this innovative concept. And a local support for capacity building.

Operation support: Yes, SDE+ subsidy

Substrates: Manure, from the own farm. So no costs related to biomass

Energy utilisation: Heat. The biogas is sold to industry and used for heat production (steam). Price is set at gross market price for natural gas equivalents

Digestate utilisation: Spread over the own fields

Municipality/
region involved: Yes, involved as spokes partner and stimulating project development. Not financial involved, but very cooperative in the bureaucratic issues.

4.2.20 Alvesta Biogas AB (Sweden, ISS)

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| Investors: | 89 % of the shares are owned by farmers and Växjö diocese together. 11 % is owned by Entreprenörsinvest (an investment company) that also takes care of the administration which is their expertise. The plant has been operational since 2015. The production is delivered to the local refuelling station as well as to refuelling stations in neighbouring municipalities. |
| Investment support: | Alvesta Biogas received investment support from the County Administrative Board in Kronoberg County. The support is aimed at micro companies with a maximum of 10 employees, which excluded municipalities. The cost of the plant was 60 million SEK and the investment support 11 million SEK. |
| Operation support: | The plant receives support for biomethane production from manure since 2015 and it is supposed to continue ten years forward. The support was approx. 1.1 cent/kWh for the ten first months and from 1 st November 2015 until 31 st October 2016 it will be 2.2/kWh. |
| Substrates: | The potential is in total approx. 65,000 tons/yr. It corresponds to a production of 1.8 to 1.9 MNm ³ biomethane. The major part of the substrate consists of manure that is provided by the co-owners, the rest consists of slaughterhouse waste and cereal starch that otherwise should be thrown away. |
| Energy utilisation: | The energy comes from wood chips and the upgrading is made with a water scrubber that, according to the operations manager, gives rather low monthly heating cost of 46,000 SEK/month. |
| Digestate utilisation: | The digestate is used as fertiliser and delivered to the co-owners. They receive the same amount that they deliver to the plant. The rest is sold to other farmers for 15 SEK (1.5 €) /m ³ + transport. |
| Municipality/ region involved: | There was no infrastructure to start with so the municipality of Alvesta bought the land initially and sold it to Alvesta Biogas for 3.5 million SEK. |

4.2.21 More Biogas in Småland AB (Sweden, ESS)

| | |
|---------------------|--|
| Investors: | The company has 23 owners/investors of which 17 are local farmers. The other owners are: a producer of bio-methane (Famax AB), ALMI Invest AB (an investment company), a globally operating supplier of turnkey plants for biogas and bio-methane (Läckeby Water), CA Fastigheter (a real estate company), Hund Holding and the municipal company Kalmar Energy. The share of the farmers is approx. 35 %. The company was established in 2011 and the production of biomethane for the use as vehicle fuel started in 2014. |
| Investment support: | Yes approx. 10.5 million SEK. |
| Operation support: | The company receives operational support i.e. support for the production of biomethane from manure. |
| Substrates: | The substrate used consists of manure (approx. 75,000 tons) from the farms that are co-owners of the plant and of household waste (approx. 15,000 tons) from five neighbouring municipalities. The price for the substrate is low simply because there is not much money left to pay for the substrate. |

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|-----------------------------------|--|
| Energy utilisation: | The production is approx. 20 GWh/yr biomethane or about 500 Nm ³ /h that is fed in the grid. The plant is heated with wood chips delivered by the co-owners. For this the company pays a market price. |
| Digestate utilisation: | The digestate consist of 90,000-ton bio-fertiliser. It is returned to the farms and used as bio-fertiliser. |
| Municipality/ region involved: | The municipal energy company is one of the co-owners. |

4.2.22 VMAB (Västblekinge Miljö AB) biomethane plant (Sweden, ISS)

| | |
|-----------------------------------|---|
| Investors: | The regional waste treatment company, VMAB, owned by three municipalities Karlshamn, Olofström and Sölvesborg in Blekinge County. VMAB is responsible for the municipal waste treatment and sets also the tariffs. The plant is the first dry digestion plant in Scandinavia. It has been operational since 2013. |
| Investment support: | Yes, 19 million SEK from the Swedish Energy Agency for a total investment of 54 million SEK. |
| Operation support: | There is no operational support. |
| Substrates: | 15,000-ton source separated household waste and 5,000 ton gardening waste provided by the municipalities. The price for the substrate is 400-500 SEK/ton. |
| Energy utilisation: | The production consists of 2.4 million m ³ biomethane used as vehicle fuel. Raw gas is used for heating. E.ON buys the Bio-CNG for approx. 6 SEK/m ³ . |
| Digestate utilisation: | The digestate consist of 8,000-ton bio-fertiliser. It is spread on the farm land and transported 9 km at the most. |
| Municipality/ region involved: | The plant owner is a regional company. |

4.2.23 Växjö Municipality – Sundet waste water treatment plant (Sweden, ISS)

| | |
|---------------------|--|
| Investors: | The plant owner and investor is the Municipality of Växjö. The plant has been operational since 2012. |
| Investment support: | The Municipality of Växjö received support from the Swedish Energy Agency with 9.5 MSEK for increased biogas production using thermal hydrolyses. |
| Operation support: | There is no operational support. |
| Substrates: | The substrates used consist of the municipality's own sewage sludge and household waste with rather low DS-content (TS). Approx. 25 % of the dry substrate inserted in the digester consists of organic waste i.e. household waste and fat. See table below. Little less than 40 % of the biogas production comes from other waste than sewage sludge. Approx. 75 % or 11 GWh of the biogas produced during 2015 was used by the city buses. When the plant runs on its full technical capacity the production will be 20 GWh/yr, which will |

reduce the greenhouse gas emissions from the city transports with approx. 2.5 %.

The Municipality of Växjö does not pay for the substrate. External suppliers pay for the treatment of the waste they deliver. The fee depends on what it is.

Energy utilisation: The biomethane that is produced on the plant is mainly used as Bio-CNG. The biomethane is bought by bus companies or distributors of gas. The price is confidential.

Digestate utilisation: The digestate is sent to Scandria (south of Sweden) and spread on the farm land. For this the municipality pays 35 €/ton.

Municipality/
region involved: Owner

4.2.24 Lodge Farm, Holt, Wrexham (United Kingdom, SWEA)

Investors: The business was set up by the three directors: Chris Morris, who had the time and experience to deal with the business set-up process; Jonathon Tomlinson, who had the engineering capability to build a digester; Richard Tomlinson having a dairy herd and land in order to feed the digester and utilise the by-product (digestate). The project was directly funded by the three Directors plus a £45,000 innovation grant from the Welsh Government. The grant did not directly support the construction of the plant and, thus, did not impact upon the ability to claim FiT.

Investment support: £45,000 innovation grant from the Welsh Government. The grant did not directly support the construction of the plant.

Operation support: FiT
All of the electricity production (including the sacrificial load on the plant) is subject to FiT payments that would be likely to have started at 12.7p per kWh. This payment is index-linked and for a period of 20 years. The electricity used on-site displaces imported power and thus valued mostly at a business tariff. That which is exported to the grid is subject to around 3p per kWh (also index-linked).
RHI – heat

Substrates: The digester is fed with slurry from the dairy herd owned by Richard Tomlinson and chicken litter from a local broiler unit. The chicken litter is purchased but the price paid is unavailable. Over recent years the plant has been modified and authorised to take in food waste and this now contributes significantly to the feedstock supply. A small gate fee is received from the suppliers of the waste – which was previously going to landfill.

Energy utilisation: The outputs are 160kW of electricity and 200kW heat.
- Approximately 30kW electricity is used on site to power the engineering business, the Fre-energy office, and a large 7-bedroom farmhouse.
- Approximately 60kW of heat is used to heat the cow slurry and chicken litter in the digester up to 40°C and the rest is used to heat the house and office (when needed).
- The remainder of the electricity is exported to the national grid.

A small district heating system was constructed to make use of the available heat at the farm house, office and the engineering business. This does not use all of the available heat but does displace other fuel costs and results in some income from the RHI. The utilised heat has to be metered and only that which is productively utilised receives RHI subsidy. The payments had to be negotiated with OFGEM and this proved to be long, complicated but ultimately successful.

Digestate utilisation: All the digestate goes through a separator. The liquid is stored in a lagoon that has 6-month storage capacity and from there it is spread onto the grassland using either umbilical cord through a spike aerator followed by a low level trailing shoe or by a 3000-gallon low ground pressure Vacky tank with the same system attached. The solid digestate, which contains a higher proportion of the phosphate and potash, is transported by road to land used for growing winter crops to feed the dairy herd. The digestate makes significant contribution to the business case by displacing alternative fertilisers and increasing yields.

**Municipality/
region involved:** The local authority was not involved (other than as land-use planning authority) but the Welsh Government provided a grant

4.2.25 Bore Hill Farm Digester, Wiltshire (United Kingdom, SWEA)

Investors: The plant was built by an independent company known as Malaby Biogas. Whilst there is a related company, Malaby Martin, Malaby Biogas only owns the Bore Hill digester and is relatively small and local.

Investment support: Malaby Biogas was the first recipient of a loan from a £10m anaerobic digestion fund launched in July 2011 by the Department of the Environment, Food and Rural Affairs (UK Government) and administered by WRAP. The one-off £800,000 loan was added to other funding secured by Malaby Biogas, including support from Clydesdale Bank, to construct and commission a new anaerobic digestion plant on the site of a redundant 12-acre smallholding. The total cost of the initial plant was around £5m and it was commissioned in May 2012.

Operation support: The electricity generated at the plant is eligible for the FiT. The FiT rate for plants of the size concerned was 13.6 per kWh (index-linked for 20 years). A second engine was added with a FiT of 9.9* kWh (index linked for 20 years) (*2012 rate)
Heat use is and will be eligible for RHI payments.

Substrates: Feedstock for the plant will be non-packaged food waste supplied by a new commercial collection operator with additional material potentially coming from other commercial and industrial food waste providers within the local area. The linked "Direct-to-AD" collection service was trialled that picked up waste food from a number of local outlets, including restaurants and schools – but this service ceased after the trial proved to be ineffective. The plant was designed to initially process around 17,000 tonnes of waste a year with the ability to be able to handle up to 20,000 tonnes at full capacity. Some of the feedstock attracts a gate fee but some of it does not.

Energy utilisation: The plant was initially expected to generate 4.3 million kilowatt hours of electricity a year. Around seven per cent of this is likely to be used to power

the AD plant itself, and any excess that is generated will be sold on to national grid. The FiT rate for plants of the size concerned was 13.6 per kWh (index-linked for 20 years). The exported power is sold to a specialist electricity supplier under a power purchase agreement. This provides a little income over the minimum payments required by the regulations. A second engine was added with a FiT of 9.9* kWh (index linked for 20 years) (*2012 rate)

A short heat main has been added in recent years to make use of some of the available heat energy and an extension to serve external consumers is planned for the near future. This metered heat use is and will be eligible for RHI payments. The heat used for pasteurisation of the digestate is eligible for RHI payments but the energy used to keep the digester warm is ineligible.

Digestate utilisation: Digestate is distributed to local agricultural land but the company has to pay the farmers to take it.

Municipality/
region involved: The local authority was not involved other than as the land-use planning authority.

5 Conclusions

There were 24 projects on biogas compiled at the level of European Union and 62 tools developed at national level. European projects as well as the national tools are covering a wide range of topics such as sustainable production of biogas, its usage in the form of combined heat and power production or biomethane, digestate utilisation, efficient heat use and biomethane use as a transportation fuel. Some projects focused on manure or urban and food and beverage wastes processing through anaerobic digestion technology. Within the tools interactive maps, software, financial analyses, guidelines and handbooks, methodologies, resource websites, etc. can be found.

There were many tools developed since 2001 when the first European project started. Policy tools were brought by more than half of the European projects while those were only 11% of the tools developed at national level. Almost all the European projects (91%) brought technical tools which were more than two thirds of the national tools. Half of the European projects also provided market tools, 27% of the national tools were market tools. More than two thirds of the European projects used training and educational tools. While almost a third of the national tools were of this type. Most of the European projects provided several tools of different types, as well as a lot of tools developed at national level could be considered multifunctional.

When it comes to the target audience, both the projects developed at European level and the tools developed at national level covered the whole chain of interested parties from policy makers through rural communities and regions, farmers, plant operators, investors and gas grid operators to consumers. More than two thirds of the European projects targeted the group of investors, farmers, AD plant operators, etc. While the same audience was targeted by more than three quarters of the tools that were developed at the national level. More than half of the European projects and on the other hand only 23% of the national tools aimed at municipalities, rural communities, public authorities or policy makers. Designers, planners, advisers and other AD specialists are targeted by more than one fourth of the European projects and 32% of the national tools. Almost fourth of the European projects targeted the whole chain of stakeholders and key players, while it was only 13% of national tools.

Considering the geographical scope, some tools were developed at regional levels or their main target were individual cities, some projects covered a bigger area such as Central and Eastern Europe. Three of the projects brought tools that are covering the whole Pan-European area. When it comes to the national tools most of them were developed at regional levels and they are also

applicable at the regional level. There are just a few tools that can be applied at Pan-European level. This is in many cases caused by the fact that most of the tools are available only in the local language.

Concerning the local preconditions renewable sources are mainly supported in the partner countries. The RES are mainly supported in the economically higher developed countries. The only exception is the Netherlands which provided an answer on the public support of biogas and not all the renewable sources. Investment support is being provided under certain conditions in the Czech Republic, Denmark, France, Netherlands and Sweden. Operation support can be obtained in Croatia, Denmark, France, Germany, Latvia, Netherlands, Sweden and United Kingdom. The support schemes are notified in most of the countries except of the Czech Republic and Latvia. In most of the participating countries the support schemes are financed by the costumers either in the form of surcharge fees or a tax on energy consumption. Some countries combine these payments with the money from the national budget (Czech Republic, United Kingdom) or in case of France with money from EU funds. Only in Sweden the support schemes are financed solely from national budget.

The report also brings information on 24 interesting AD projects. Most of them were realised by the private investors. An investment support was received by 75% of them, the same ratio receives operation support. Only 8% of them does not get any operation support. 42% of the plants process biowaste combined with agricultural substrates. Those are processed solely by also 38% of the plants. One plant treats sewage sludge and three of them use solely wastes as an input material. More than 60% of the plants are using the biogas in the combined heat and power production process (CHP) either at the plant location or after transporting the biogas to the place of consumption (remote CHP) which allows in many cases the efficient use of heat. Almost 30% of the plants upgrade the biogas to natural gas quality (solely or with the combination with CHP). One AD plant uses the biogas to produce heat. When it comes to digestate utilisation all the digestate is used as a fertiliser either untreated or after the separation of liquid and solid phase. Some plants treat the digestate by composting or pasteurisation. Municipality or region was involved in 42% of the projects of interesting AD installations. Almost 46% of the projects were developed without the municipality or region involving.

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6.3 Annex 3: List of Abbreviations

| | |
|-----------------|---|
| AD | Anaerobic digestion |
| ADPC | Anaerobic Digestion Profit Calculator |
| AT | Austria |
| B2B | Business to business |
| BE | Belgium |
| BG | Bulgaria |
| Bio-CNG | Compressed biomethane or compressed natural gas blended with biomethane |
| CCS | Cornelissen Consulting Services, Netherlands |
| CEE | Central and Eastern Europe |
| CNG | Compressed natural gas |
| CO ₂ | Carbon dioxide |
| CS | Cereals silage |
| CY | Cyprus |
| CZ | Czech Republic |
| CzBA | Czech Biogas Association |
| CZK | Czech Crown |
| DCA | Danish Centre for Food and Agriculture at the University of Aarhus |
| DE | Germany |
| DFFB | Danish Technology Centre for Biogas |
| DGs | Directorate-Generals |
| DHC | District Heating and Cooling |
| DK | Denmark |
| EASME | The Executive Agency for Small and Medium-sized Enterprises |
| EBA | European Biogas Association |
| EC | European Commission |
| ECTS | European Credit Transfer and Accumulation System |
| EE | Estonia |
| EIA | Environmental Impact Assessment |
| EL | Greece |
| ES | Spain |
| ESS | Energy Agency for Southeast Sweden |
| EU | European Union |
| FAB | Food and Beverage |
| FAQ | Frequently asked questions |
| FI | Finland |
| FIT | Feed in Tariff |
| FR | France |
| GHG | Greenhouse gases |
| GS | Grass silage |
| HR | Croatia |
| HU | Hungary |
| CH | Switzerland |
| CHP | Combined Heat and Power |

| | |
|-------|--|
| IE | Ireland |
| IT | Italy |
| LCA | Life cycle assessment |
| LP | Liquid phase |
| LT | Lithuania |
| LV | Latvia |
| MBT | Mechanical biological treatment |
| MK | Macedonia |
| MS | Maize silage |
| MT | Malta |
| n.a. | not applicable/ not available |
| NG | Natural gas |
| NGO | Non-governmental organization |
| NREAP | National Renewable Energy Plan |
| PL | Poland |
| PT | Portugal |
| R&D | Research and development |
| RAEE | Rhône-Alpénergie Environnement |
| RE | Renewable energy |
| RED | Renewable Energy Directive |
| RES | Renewable energy sources |
| RHI | Renewable heat incentive |
| RO | Romania |
| RSA | Regional Source Assessment |
| SDE+ | Stimulation of Sustainable Energy Production |
| SE | Sweden |
| SEA | Strategic environmental assessment |
| SEAP | Sustainable Energy Action Plan |
| SEK | Swedish Krona |
| SI | Slovenia |
| SME | Small and medium enterprises |
| SP | Solid phase |
| SWEA | Severn Wye Energy Agency |
| SWOT | strengths, weaknesses, opportunities, and threats analyses |
| T&E | Training and education |
| UK | United Kingdom |
| VVM | Environmental Impact Assessment, Denmark |
| WPS | Whole plant silage |
| WtB | Waste to biogas |
| yr | year |