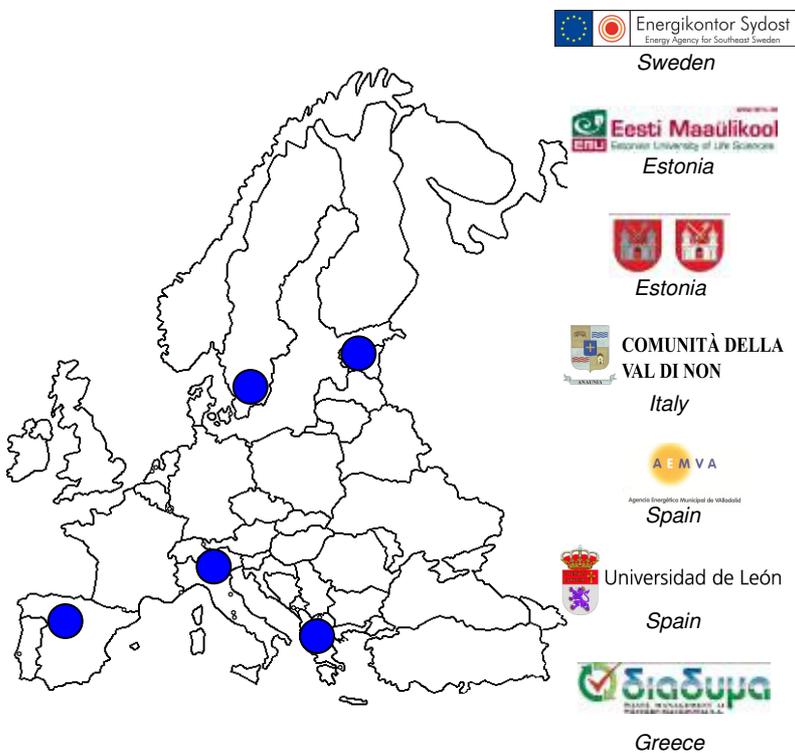


BaN – Biogas and Networks



Activity 2

Best-Practice BROCHURE



Activity 2



COMUNITÀ DELLA
VAL DI NON

Responsible:
Comunità della Val di Non

FONDAZIONE EDMUND MACH



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The brochure summarize the Activity 2 contents
of the *INTERREG IV C* sub-project *Ban (Biogas and network)*.
More information could be found in the Final Report of the Activity 2.

1) SOUTHEAST SWEDEN

The southeast of Sweden is a region consisting of three counties Kronoberg, Kalmar and Blekinge. The region is bordering with Scania in the south-west, Halland in the West and Jönköping and Östergötland in the north and north-west. The total population in the region is about 571 000, which is about 6,1 % of the total population in Sweden. (Kalmar is the most populated county in the region with 234 000 inhabitants followed by Kronoberg with 184 000 and Blekinge with 153 000. The total population in Sweden is about 9 415 000 and the total surface is about 449 964 km². The area of the region is 23 536 km² thus making the region accounting for 6,1% of the country's total

population and 5,2% of the country's total area. The region has a well-developed forestry and industry production. Pulp and paper and timber production is two of the main sources of income in the region. Other manufacturing industry and steel and aluminium production are also employing many people in the region. The east part of the region, consisting of the county of Kalmar, has a bigger part of agricultural industry due to the more fertile soil. It is also the region that has the highest potential for biogas production. In the region there is a long industrial tradition, new technology has made the industry grow and continuous investments have modernized the industry.

2) BIOGAS IN SOUTHEAST SWEDEN

In the southeast of Sweden there are a total of 19 Biogas plants with a total production of about 50GWh of Biogas. The most common plants are installed at sites for wastewater treatment. In the county of Kalmar there are:
9 AD plants. (1 landfill, 1 farm, 7 MSW total production about 33 GWh. 777 000 m³ of biomethane was sold in 2010)

In the county of Kronoberg there are:
6 AD plants (2 landfill + MSW and 2 only MSW)
The total production in 2010 was 13 GWh. 777 000 m³ biomethane was sold in 2010.
The county of Blekinge have 4 AD plants (2 landfill, and 2 MSW. The total production was about 4 GWh in 2009)

3) LOCAL ENERGY PLAN AND INCENTIVES

All three counties in the southeast of Sweden have regional energy plans. The objectives are to replace all fossil energy with renewables and to decrease the electricity use. The increase of biogas used both for transport and heat production are important to reach the goals set in the local energy plans.

Green energy certificates:

The electricity producers whose production meets the requirements in the Electricity Certificates Act receive one electricity certificate unit for each megawatt-hour of electricity that they produce. The demand for the certificates is created by the fact that all electricity suppliers, and also certain users, are required to purchase certificates corresponding to a certain proportion of their electricity sales or electricity use. The quantity to

be purchased is adjusted from year to year in progressive steps. By selling their certificates producers of electricity from renewable energy sources (including biogas) the producers receive additional income. In this way the system encourages the expansion of electricity production from renewable sources and new technologies. The average price for a certificate was 28 EURO/MWh over the last year. The CO₂-tax on biogas distributed together with natural gas was removed on the 1st of January 2011. There is a programme for rural development that runs until 2013 that can help with investments in the form of aids and grants for rural development. Companies/farmers in southeast Sweden can apply for support of up to 30% of the investment cost through this programme.

BEST BIOGAS PRACTICE



The biogas plant Sundet in Växjö represents a best practice for the production of biomethane from municipal waste with a good reduction of odour and good use of the waste treated.



Ayuntamiento de Valladolid



Agencia Energética Municipal de Valladolid



Universidad de León

Agencia Energética Municipal de Valladolid

Institute of Natural Resources - University of Leon

1) CASTILLA Y LEON

With a population of 2.559.515 inhabitants, Castilla y León is the largest region of Spain. This region is located over an elevated plain which is limited by the mountain ranges *Sistema Iberico* to the east, *Cordillera Central* to the south, *Cordillera Cantabrica* to the north and by *Duero* river towards Portugal. The region presents a population density of 26.8 inhabitants/km², with this value being far lower than that of the average Spanish density value (89.6 inh/km²). The productive sector in Castilla y León has suffered several changes in recent years. These changes are characterised by an important reduction in the primary sector (agriculture) following the same trend of the Spanish Nation. In this sense, the primary sector of Castilla y León represented

9.6% of the gross added value of the region in the year 2000 and reported a decrease to 7.4% in 2007. However this sector is of major relevance considering that this region is one of the most important agricultural areas of Spain. The main use of land is dedicated to herbaceous crops, in addition Castilla y León presents the highest mean of agricultural surface cultivated (54.3 ha). Spain is the second producer of swines. However, Castilla y León presents the highest volume of cattle and sheep farms. The service sector reported 60.8% to the regional gross added value. With regard to the industrial sector, the region has experienced a loss of 2.2 point resulting in a value of 15.7% in 2007.

2) BIOGAS IN CASTILLA Y LEON

In Castilla y León there are 23 biogas plants that are expected to produce an amount of biogas equivalent to 20 kTEP/year. 19 of these plants obtain biogas from anaerobic degradation and the other from gasification. These plants are mainly waste water treatment plants (WWTP) which have a line for sewage sludge digestion and digesters installed in solid waste treatment plants. These

digesters usually have in common mechanical separation of the organic fraction of municipal solid waste which may lead in some cases to a gas production lower than expected. However, major efforts are being performed to increase biogas potentials. Valorisation of biogas by production of electricity accounts for 10.2 MWe and heat production accounts for 2.9 MW.

3) LOCAL ENERGY PLAN AND INCENTIVES

Regarding to the regulations, the region of Castilla y León made a local plan, the "Plan regional del ambito sectorial del la bioenergía del Castilla y León". In Spain the electricity feed-in tariff is regulated by Royal Decree 661/2007, which lays down conditions for the production of electrical energy in special regime. This Royal Decree

establishes three different categories with their respective groups and subgroups. In particular, facilities belonging to "group b.7" use as primary fuel biomass from manure, bio-fuels or biogas from the anaerobic digestion of agricultural and livestock wastes, biodegradable industrial residues or wastewater purification sludge.

4) BEST BIOGAS PRACTICE



The Almazán (Soria) was the plant selected for fulfilling the special aim of the project related to the special focus the project highlights over small scale biogas projects in farm installations.



COMUNITÀ DELLA
VAL DI NON

Comunità della Val di Non

1) VAL DI NON

The Comunità borders coincide with the Val di Non territory (39.134 inhabitants), and they are composed by 38 municipalities. The Val di Non is located in the Northern of Trentino Region, in a geographical plateau, crossed by the Noce River, with a total surface of 596,76 km². In the centre of the Valley is located the artificial lake of Santa Giustina with a capacity of 182 mil m³ of water. The Valley is closed to the north border by the Maddalene mountains and to the south-west by the Dolomiti di Brenta mountains. The Val di Non is reached on rivers and lakes (e.g. alpine like of

Tovel). In the 1967 the Provincia Autonoma di Trento, created the Adamello Brenta Natural Park, the biggest protected area in Trentino.

The main economic activity is the apple cultivation: the valley is famous with the Melinda apple brand. Part of the territory is dedicated to livestock (dairy farms) concentrated in few farms with high number of animals. Also the tourism and the craft have some importance for the local economy; the industries are small and concentrated in the building sector.

2) BIOGAS IN VAL DI NON

In the Val di Non area, there aren't AD plants; the potential biogas is the following:

- animal manure (solid/liquid): ~4.600.000 m³/year of biogas from cattle manure
- agro-food industry: ~500.000 m³/year of biogas from apple pomace + ~90.000 m³/year of biogas from distillation process
- wastewater treatment plants: ~150.000 m³/year of biogas from dried sludge
- biowaste/kitchen waste: ~300.000 m³/year of biogas from kitchen waste
- other: ~150.000 m³/year of biogas from mowing waste + ~700.800 m³/year of biogas from landfill

Only 5 AD plants are working in Trento Province: 3 AD plants (Trento nord plant, Trento sud plant and Rovereto plant): they treat sludge (~70.000-100.000 t/year) from waste water plants, with wet technology using the biogas in CHP units/industrial boiler; 1 AD plant uses agro industry waste (~100.000 t/year), with wet technology using the biogas in CHP units (Menz & Gasser plant); 1 AD pilot plant installed at the E. Mach Foundation and used for tests. It reproduces a dry technology process, with 12-15 m³ of maximum biomass input (e.g. kitchen waste).

A new zootechnical AD plant is under construction (Fustini plant).

3) LOCAL ENERGY PLAN AND INCENTIVES

At the state of the art the Trentino region is working to produce a local energy plan.

The commercialization of the electricity generated using biogas is particularly profitable in Italy comparing to the other renewable energies. The electricity feed-in tariff (omni-comprehensive

incentive of electrical power production) regulated by the Law 244/2007, guarantees 0,28 €/kWh for maximum 15 years but is limited to plants with P<1MW. To benefit of the incentives, a limit of maximum of 40% of national and local incentives is fixed.

4) BEST BIOGAS PRACTICE



The AD plants located in Trento Province and chosen as BP are the following: Trento nord, Rovereto, Menz & Gasser (TN)

The Trento nord and Rovereto are waste water plants with sludge AD treatment. The advantages are essentially connected to the energy production and the reduction on odour impact.

The Menz & Gasser plant is an example of how an AD reactor can treat an agro-food industry waste producing heat power (used during the industrial process) and energy power (sold to the net).



**Institute of Technology, Estonian
University of Life Sciences**

Tartu City

1) ESTONIA

Estonia (Estonian: Eesti Vabariik), is a state in the Baltic region of Northern Europe. It is bordered to the north by the Gulf of Finland, to the west by the Baltic Sea, to the south by Latvia (343 km), and to the east by the Lake Peipsi and the Russian Federation (338.6 km). Across the Baltic Sea lies Sweden in the west and Finland in the north. The territory of Estonia covers 45,227 km² (17,462 sq mi) and is influenced by a temperate seasonal climate. With a population of 1.34 million, Estonia is one of the least-populous members of the European Union, Euro-zone and NATO. Food, construction, and electronic industries are currently among the most important branches of

Estonia's industry. Another important industrial sector is the machinery and chemical industry which is mainly located in Ida-Viru County and around Tallinn.

The oil shale based mining industry, which is also concentrated in East-Estonia, produces around 90% of the entire country's electricity. Like the rest of the economy, agriculture in Estonia has been in great flux since the degeneration of the collective and state farm systems. Estonia has some 1.3 million hectares of agricultural land, nearly 1 million hectares of which are arable. (source: <http://en.wikipedia.org/wiki/Estonia>)

2) BIOGAS IN ESTONIA

There are approximately 200.000 ha permanent grasslands (grassland occupation over 5 years) in agricultural production. The production of green fodder in tons was from 1.5 to 1.9 Mt per year (Agriculture in figures, 2009). About 283.000 ha of agricultural land have been abandoned and 123.000 ha have been excluded from agricultural registers. Compared to the activities of animal husbandry in regions we may assume that 40-50% of grasslands are not used for fodder production, but have been cut for land maintenance once a year (Roostalu et al., 2008-1). Biomass production from meadows ranges

from 1.7 to 5.7 t ha⁻¹ yr⁻¹. Total production from semi-natural meadows is approximately 182.000 t yr⁻¹ of dry matter (Melts et al., 2008). By rough estimation, the potential for bioenergy from natural grasslands, unused fodder from grasslands and abandoned agricultural land is 6.66, 2.3, and 6.93 PJ, respectively, resulting in a total potential of about 16 PJ annually (Roostalu et al., 2008-2). It is estimated that renewable energy potential of biogas production based on biomass from abandoned agricultural land is 5 PJ a year (Kask, 2008).

3) LOCAL ENERGY PLAN AND INCENTIVES

Estonia adopted a local energy plan. In Estonia the support for renewable electricity price (0.84 EEK/kWh) is one of the lowest in

Europe, approximately 3 times smaller than in Germany and also Latvia.

4) BEST BIOGAS PRACTICE



1. Paljassaare waste water treatment plant is only waste water treatment plant in Estonia where

anaerobic digestion and biogas collection is applied.

2. Saare Economics biogas plant in Jööri is the only operational biogas plant in Estonia operating on animal waste.

3. Pääsküla landfill – one of two landfills in Estonia where biogas collecting is applied. Being already closed and covered the only operation is biogas collecting.



Waste Management of Western Macedonia SA

1) WESTERN MACEDONIA

The region of Western Macedonia is situated in north-western Greece, bordering with the peripheries of Central Macedonia (east), Thessaly (south), Epirus (west), and bounded to the north at the international borders of Greece with the Republic of Macedonia (Bitola region) and Albania (Korçë region). Although it covers a total surface of 9,451 km² (7,2% of country's total), it has a total population of 302,892 inhabitants (2.9% of the country's total), thus it is a low-density populated region (32 per km², as compared to the country's 79.7 relevant figure). The Region has one operational Industrial Area in Florina and

another one under construction in Kozani. The secondary sector is very important for the Regional economy, mainly due to the mining activities, the production of electric power (60% of country's total power is produced in the Region) and the fur-leather sector. The last years the region is being developed in tourism mainly on winter. It is the only Greek region without sea coast, but on the other side there are a lot of lakes, mountains, graphic villages and two big ski centers in Florina (Vigla) and Grevena (Vasilitsa).

2) BIOGAS IN WESTERN MACEDONIA

The biogas in anaerobic digestion plants can be produced from any organic waste (livestock waste, agricultural waste, urban organic wastes, organic fraction of mixed municipal solid waste). Up to now no source separation of urban organic waste is applied in Greek cities and therefore the particular fraction is landfilled together with MSW. The installation of biogas collecting piping systems in the landfills currently in operation and the utilisation of the land fill gas in Internal Combustion Engines (ICEs) could provide. The main potential source for biogas plants in the region of W. Macedonia are agricultural residues

and farming residues. Regarding agricultural residues considerable variations of the quantities and types of residues are present over the time, due the annual changes of the cultivations. Furthermore in the specific region about 82% of the territory is covered by mountains, which makes transportation and logistics more difficult. Ideal solution for this area is the utilization of livestock waste. Livestock production in the region and especially in Kozani may well be supplying a biogas plant with the necessary quantities.

3) LOCAL ENERGY PLAN AND INCENTIVES

At the state of the art Western Macedonia doesn't have a energy plan. The new law for RES (3851/2010) dedicated to the overall promotion of RES, set a new environment in the electricity

generation and among others, simplified the licensing procedures, the guaranteed market price increased while the licensing deadlines were reduced.

4) BEST BIOGAS PRACTICE

DIADYMA will focus on the development of its installation for the production of biomass examining different options and comparing with

other partner's practices and similar cases across the EU.