

# Summary of the present situation on Supply and utilisation of biogas and natural gas in the MADEGASCAR regions - based on D2.2, fact sheets

D2.3

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## Summary

This common document shows the result of national fact sheets (D2.2.1-12) made during the first period of the MADEGASCAR project.

Within the MADEGASCAR partner regions, the partners have made a vast inventory of the present situation of the gas market in every region. The data gathered have been presented as country specific fact where data, such as the areas mentioned below, have been compiled for the different countries:

- Gas filling stations
- Biogas plants
- Biogas treatment plants (upgrading)
- Available models of personal cars
- Available models of light duty transport vehicles
- Data about gas grids
- etc.

There is a big difference between the present situation on the gas markets in the different countries and regions. Some regions has a large use of Natural gas for example industry and heating in houses, a well built out gas grid, but so far no use of NGV's. Other regions have no gas grid, but already a use of NGV's filled up by locally produced biogas.

This document compares the most important aspects on the gas market between the MADEGASCAR regions and countries, based on the fact sheets D2.2.1-12. The table below shows the main figures for the regions. The numbers have been presented separated for the regions in Sweden and Poland, therefore these numbers are kept apart also in this report.

Where data is not available it has been replaced with “-“ in the table.

	Mälardalen	South Sweden	Austria	Great Britain	Slovenia	Lithuania	Poland, PAE	Poland, IEO	Bulgaria	Spain	Germany	Czech rep.
Biogas plants	17	44	440	1	14	4	1	1	0	-	3700	150
Biogas production	48	270	1240	-	-	39,3	-	-	0	571	6288	-
Filling station	5	28	26	0	0	2	9	2	12	2	56	20
Personal cars	336	1725	235	4	0	1	-	220	40000	0	3000	1000
Buses	-	400	70	0	0	5	40	26	200	762	-	-
Filling stations	-	150	1	0	0	-	-	10	20	545	-	-

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## Supply

The number of biogas production plants differs between the different partner countries. So does also the use of the produced biogas. It has not been possible to find the exact number of production plants in every region while the delivered amount of gas is missing for other regions. When it comes to biogas production plants, it has not always been possible to divide the biogas plants into the sub categories. For the Austrian, German and Czech partners statistics on national basis are presented as no regional numbers were available.

## Biogas plants

Comparing the regions where statistics is available, the Swedish regions had the largest total number of biogas production plants, followed by Slovenia. The two Swedish regions have a total of 61 biogas plants. In Germany, Austria and Czech rep. the number of biogas plants for the separate regions are unknown, but it should be a rather large number for each one of the MADEGASCAR regions. In the whole Germany the number of biogas plants is 3700 and in Austria and Czech rep. the number is 440 and 150 respectively. The partner from Bulgaria have reported that there are no biogas plants within their region.

Where data is not available it has been replaced with “-“ in the table.

	Mälardalen	South Sweden	Austria	Great Britain	Slovenia	Lithuania	Poland, PAE	Poland, IEO	Bulgaria	Spain	Germany	Czech rep.
Biogas Plants	17	44	440	1	14	4	1	3	0	-	3700	150
Produced Biogas (GWh)	48	270	1240	-	-	39,3	-	82,1	0	571	6288	-

## Bio methane (gasification)

Gasification of biomasses to methane has a great potential, but is so far not made commercially in the MADEGASCAR regions. There are only 2 existing pilot plants in the entire area.

## Natural gas

In most of the MADEGASCAR countries and regions natural gas is a fairly large source of energy. It is basically only one region, Mälardalen in Sweden that does not have any infrastructure (gas grid) for natural gas so far. In this region LNG is imported as a backup when the biogas production plants and upgrading plants cannot supply the NGV's with CNG. There is a large number of natural gas suppliers present in the MADEGASCAR regions, a total of 112 major gas distributors is acting within the regions, serving more than 10 million end costumers with natural gas.

## Treatment of biogas (upgrading)

Treatment facilities for upgrading biogas for use in NGV's or insertion to the gas grid exist in 3 out of the 10 MADEGASCAR countries. In the German region, a total of 10 plants are in operation and about another 10-15 are planned to be build. In Austria there are 6 plants so far, and in the Swedish regions 14 upgrading plants are producing about 160 GWh of bio methane for use in vehicles.

## Gas grid

Gas grids for transport of natural gas or biogas are covering most of the regions participating in the MADEGASCAR project. One of the Swedish partners lacks a gas grid and the other Swedish partner has a gas grid that only covers a small part of the region. The Bulgarian region has a gas grid degree of covering with about 15 %. The rest of the regions have a higher degree of covering.

## Non grid transportation

Non grid transportation is a method for transporting gas that is not widely used in most of the region as there is close access to the grid.

## Gas filling stations

There are two regions where there were no existing gas filling stations when the MADEGASCAR project started, the region in Great Britain and the one in Slovenia. Since that the British partner has built a filling station in their region. The number of filling stations in the regions is found in the table below. Where data is not available it has been replaced with “-“.

	Mälardalen	South Sweden	Austria	Great Britain	Slovenia	Lithuania	Poland, PAE	Poland, IEO	Bulgaria	Spain	Germany	Czech rep.
Number of gas filling stations	5	28	26	0	0	2	9	2	12	2	56	20

## Utilisation of biogas and natural gas

Natural gas is, as previously mentioned a large source of energy in more or less all the regions of the participating partners. Natural gas has a wide range of uses.

### Utilisation of upgraded biogas and natural gas in vehicles

The number of NGV's in use in the MADEGASCAR regions is shown in the table below. It is showed here that the largest number of passenger cars running on gas is running in Bulgaria with about 40 000 cars. In the Spanish regions there are no passenger cars running on gas while there are gas driven buses and heavy duty trucks. In Slovenian partner region there are no vehicles running on CNG and the partner from Great Britain is by themselves running the only four NGV's in the region. For the Lithuanian region no numbers are available.

Where data is not available it has been replaced with “-“ in the table.

	Mälardalen	South Sweden	Austria	Great Britain	Slovenia	Lithuania	Poland, PAE	Poland, IEO	Bulgaria	Spain	Germany	Czech rep.
Personal cars	336	1725	235	4	0	-	-	220	40000	0	3000	1000
Buses	-	400	70	0	0	5	40	26	200	762	-	-
Heavy duty trucks	-	150	1	0	0	-	-	10	20	545	-	-

### Biogas for non transport applications

The largest quantities of the produced biogas in the different regions are used for heat or CHP (combined heat and power) production. There are some production plants that deliver the produced gas (after treatment) to local vehicle fleets or the natural gas grid as mentioned in the chapter on treatment and distribution.

### Natural gas for non transport applications

Natural gas is being used for a wide range of purposes in most of the European countries. The use of natural gas is mostly energy related, but it is also a raw material in some process industries. So far, the use of natural gas in the transport sector is only a small part of the total use of natural gas.

## LPG

LPG is used, or has been used as a vehicle fuel in many of the regions. In Poland and Bulgaria for example, about 25-30 % of the used petrol cars will be converted to LPG. See the number of filling stations and LPG cars running in the different regions in the table below. For some regions it has not been possible to find data about the use of LPG as a fuel for vehicles. Missing data have been replaced with a “-“ in the table below.

	Mälardalen	South Sweden	Austria	Great Britain	Slovenia	Lithuania	Poland, PAE	Poland, IEO	Bulgaria	Spain	Germany	Czech rep.
Personal cars	-	0	50	lots	-	lots	lots	449726	lots	-	-	250000
Buses	-	0	500	-	-	lots	lots	-	-	-	-	-
Filling stations	1	0	10	lots	-	658	lots	1050	-	-	152	700

## Available vehicles

The number of available vehicle models on the market, originally constructed to run on CNG, differs between the partner countries. The largest number of CNG models can be found in Germany where it is possible to choose between 17 passenger car models, and 8 light transport vehicles. See attached tables for available car models in the partner countries.

	Sweden	Austria	Great Britain	Slovenia	Lithuania	Poland	Bulgaria	Spain	Germany	Czech rep.
Personal cars	11	16	0	0	1	9	5	3	17	11
Light transport vehicles	7	8	0	0	0	1	0	1	8	5