

Current biogas production and utilisation in the member countries of IEA Bioenergy Task 37

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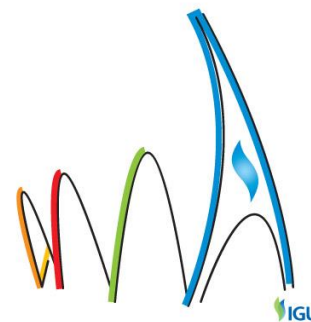


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Background

IEA Bioenergy Task 37 is a working group with 13 member countries that produce joint publications in the field of biological treatment of the organic fraction of municipal solid waste as well as the anaerobic treatment of energy crops, manure, sewage sludge and organic rich industrial waste water. The working group meets twice a year to discuss the progress of the work. At these meetings, the member countries also present the latest information from their country regarding production, utilization and financial support systems within the field of biogas. These presentations have been summarized in a joint publication from Task 37 that will be presented at the 26th World Gas Conference 2015 to give an overview of the current status of the biogas industry in the thirteen IEA Bioenergy Task 37 member countries; Austria, Brazil, Denmark, Finland, France, Germany, Ireland, Norway, South Korea, Sweden, Switzerland, The Netherland and UK. The country report can be downloaded here: <http://www.iea-biogas.net/country-reports.html>

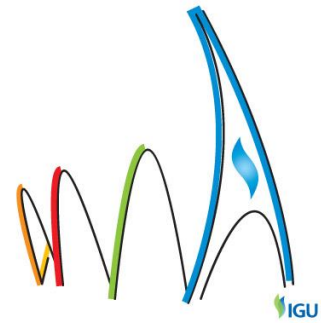
Aim

The aim of this report is to describe the development of the biogas sector that can be seen in the IEA Bioenergy Task 37 member countries and how the development is connected to the existing financial support systems.

Methods

The national representative from each of the member countries has collected and presented the latest information from their country according to a joint template so that the collected data can be compared.

The way information is gathered, recorded and reported varies from one member country to another and as a consequence direct comparison of country data is not always straight forward. Direct comparison is hampered by countries using different units to compile the



available biogas statistics. The largest difference is how the biogas production is expressed. The following three methods exist:

- the energy content in the produced biogas from different plant types independent of the utilisation;
- the energy content in the produced and utilised energy (such as electricity, heat and vehicle gas);
- installed capacity for energy production. While every attempt has been made to harmonise data in this publication, the different ways original data have been collected for national databases has made harmonisation and subsequent comparison difficult or even impossible in some cases.

Biogas production is presented for the following plant types:

- Waste water treatment plants
- Biowaste – co-digestion or monodigestion of food waste and other types of biowaste
- Agriculture – digestion at farms (mainly manure and energy crops)
- Industrial – digestion of waste stream from various industries (e.g. food industries).
- Landfill – landfills with collection of the landfill gas

Results

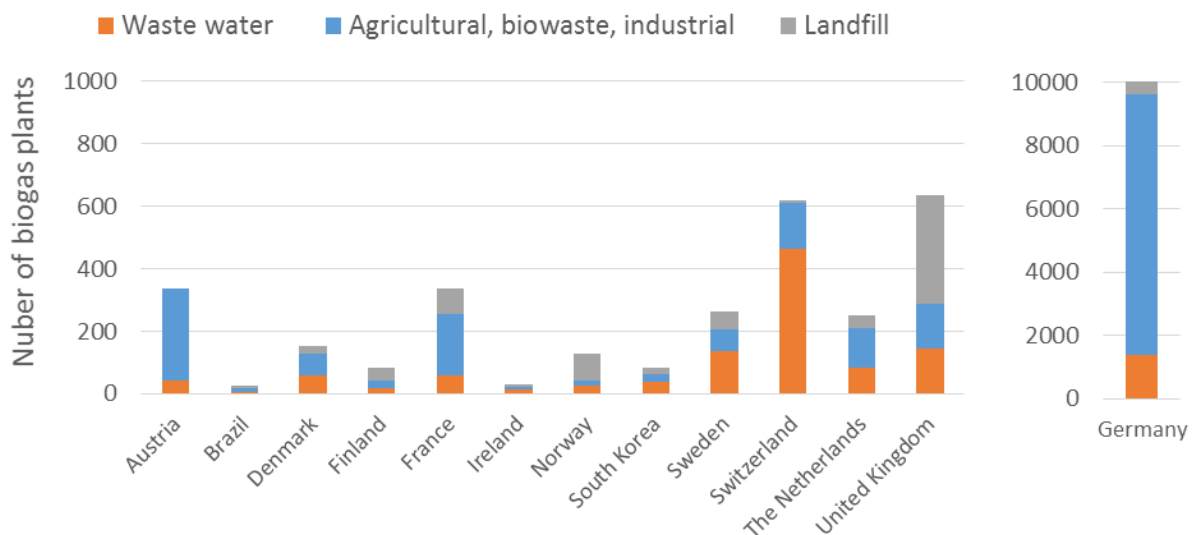
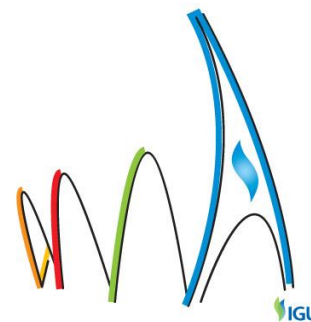


Figure 1: Biogas plants in the IEA Bioenergy Task 37 member countries.

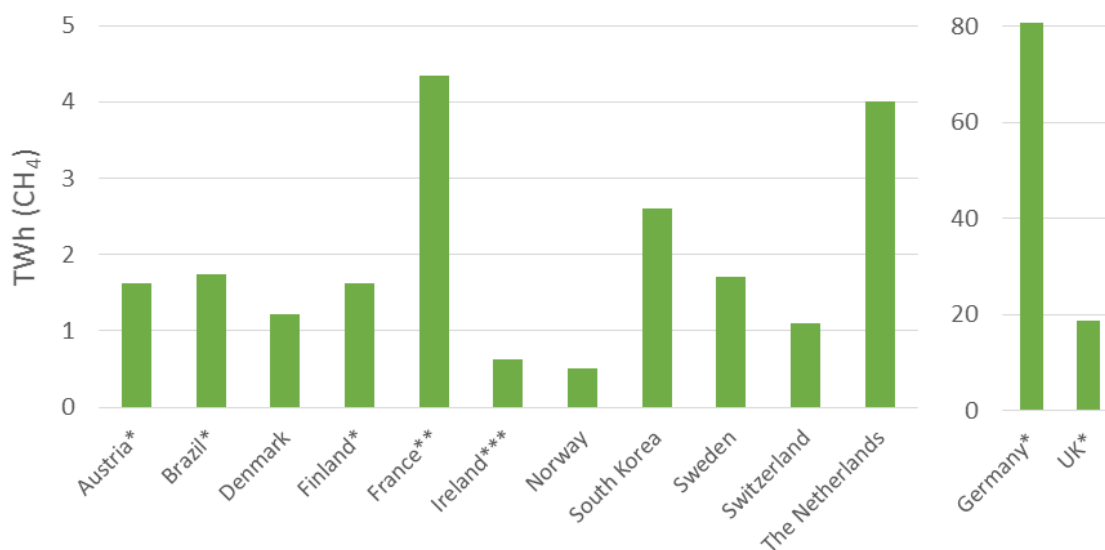
Biogas production in the IEA Bioenergy Task 37 member countries is clearly dominated by Germany with more than 10,000 biogas plants. No other member country today has more



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than 1,000 biogas plants and besides Germany only UK has more than 500 plants. For details, see Figure 1.

The annual biogas production is around 80 TWh in Germany, 20 TWh in UK, 4 TWh in both the Netherlands and France and between 0.5-2 TWh in the remaining countries (see Figure 2). The actual biogas production is not reported in all countries. In those countries where actual biogas production is not reported, in this report it has been calculated from the generated electricity by assuming a conversion efficiency of 35% and no additional losses. In countries like UK, Brazil and South Korea, the biogas produced in landfills is the largest source, while the landfill gas is only a minor contributor in countries like Germany, Switzerland and Denmark.



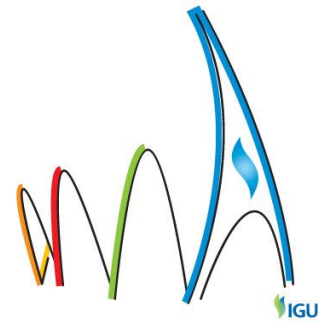
* = Calculated from the reported electricity production and an assumed efficiency of 35%.

** = Calculated from the reported electricity production an assumed efficiency of 35% for landfills, agricultural and biowaste based plants and from the sum of reported heat and electricity production for industrial and waste water plants.

*** = Calculated from 80% of the installed capacity for electricity production and an assumed efficiency of 35%

Figure 2: Annual biogas production in the IEA Bioenergy Task 37 member countries.

In most countries, the biogas produced is mainly used for generation of heat and electricity, with the exception of Sweden and Switzerland where approximately half of the produced biogas is used as vehicle fuel. Many countries, such as Denmark, Germany and South



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Korea, show initiatives and interest in increasing the share of the biogas to be used as a vehicle fuel in the near future.

The amount of biomethane produced and the number of biogas upgrading plants is increasing. In Figure 3 below the distribution of around 330 biogas upgrading plants in the IEA Bioenergy Task 37 member countries and the technologies in use are shown.

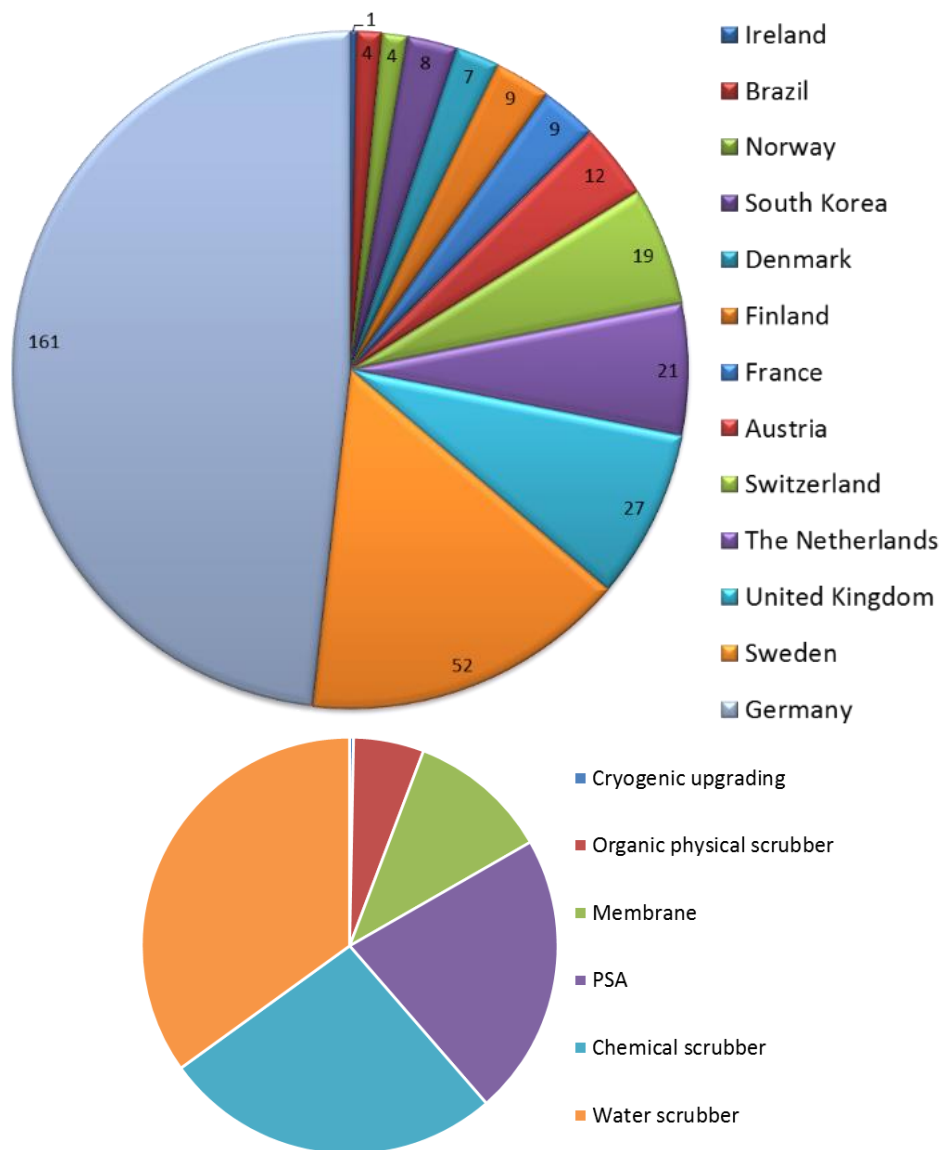
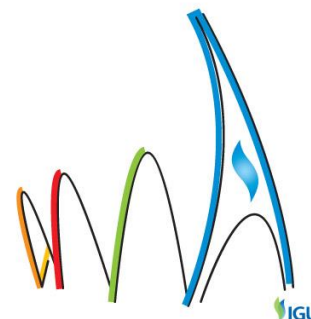


Figure 3: The location of the existing biogas upgrading units in the IEA Bioenergy Task 37 member countries. The labels are in the order from the smallest to the largest.

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Financial support systems are very different from country to country. Various systems with feed-in tariffs, investment grants and tax exemptions exist. A clear correlation between the financial support system and the way biogas is utilised can be seen in the Task 37 member countries. In UK and Germany the system of feed-in tariffs for electricity have led to that most of the biogas is used to produce electricity, while the system with tax exemption in Sweden favours the utilisation of the biogas as a vehicle fuel. Lately new financial support has been developed in countries such as Denmark and UK and we do now see a lot of new plants with biogas upgrading and grid injection in these countries.

Conclusions

The produced biogases today is mainly used for electricity production, but the interest in upgrading the biogas to biomethane and inject it into the natural gas grid and use it as a vehicle fuel is increasing in several countries. Germany is dominating the biogas market today, but the development in Germany has been possible due to a very generous financial support system, that now is being decommissioned. The development in Germany is therefore expected to slow down at the same time as the market is growing rapidly in other countries such as the UK, Denmark, France, the Netherlands, South Korea and Brazil