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State of Development of Biogas Production in Europe

Michel Torrijos*

INRA, UR0050, Laboratoire de Biotechnologie de l'Environnement, Avenue des Etangs, Narbonne, France

Abstract

The share of renewable energies in electricity production is still low in Europe but there is a political will to increase it in the future by the development of solar and wind energies but also by the development of electricity production from biogas. Biogas production from solid waste is developing in Europe but with important differences between countries. Germany is from far the country where biogas industry is the most developed with 62 % of the European biogas plants. However, the latest support schemes implemented in Germany (2012 and 2014) have strongly slowed down the German biogas market. Italy is number two for the number of anaerobic plants. Biogas industry developed very rapidly till 2013 when Italy had the highest feed-in tariff in Europe. However Italy has revised its support scheme to redirect the biogas market towards small size plants based on animal and agricultural waste. The development of biogas in France started significantly at the end of the years 2000 with the implementation of the first support scheme. However, the biogas market is developing rather slowly due to the rather low feed-in tariffs implemented in France. The example of Germany shows clearly that biogas market dynamism is directly linked to the support schemes and the feed-in tariffs implemented. Indeed, biogas industry in Europe was performing rather well since recently, but negative changes or cuts in the support schemes in some countries during the last two years, particularly in Germany and Italy, have slowed down a lot the biogas market, phenomenon which should last in the coming years though some countries like UK or France are maintaining their policies in favor of biogas.However, several factors could favor the development of the biogas market: The acceptance of digestate as a fertilizer, the possible ban of land-filling and the limitation of incineration of organic waste.

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Keywords:Renewable energy, Electricity production, Anaerobic digestion, Biogas;

* Corresponding author.
E-mail address:michel.torrijos@supagro.inra.fr

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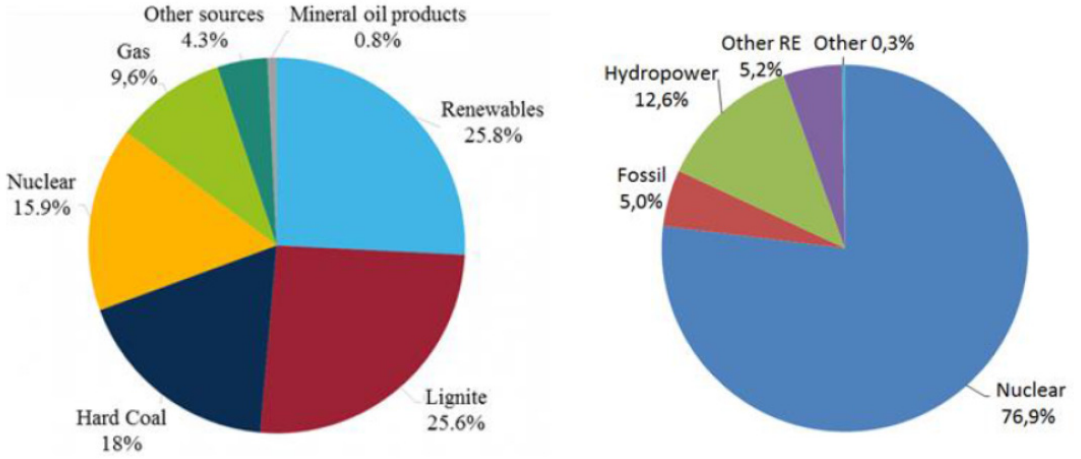
1.0 Introduction

In Europe, electricity production is mainly based on fossil sources or nuclear power and the production of electricity by renewable energy is still low. In Germany for example, in 2014more than 50 % of the electricity was produced from fossil sources, 15.9 % from nuclear power and 25.8% from renewable sources, mainly photovoltaic, wind and biomass(fig. 1a, Appunn 2015).The situation is very different in France where, in 2014, nuclear plants generated 77% of the electricity produced and renewable sources represented 17.8%, mostly from hydropower(fig. 1b, RTE 2015). However, the contribution of renewable energies in the electricity production will increase in the future, and France is planning to have 23% of the electricity produced from renewable energies in 2020 and Germany is targeting 35% in 2020 and up to 80% in 2050. When renewable electricity will be the dominant part in the total electricity generated, production will be mostly based on solar and wind energies. In this context, electricity by cogeneration from biogas produced by anaerobic digestion of solid substrates will play an important role taking into account its possible flexible production.

Anaerobic digestion of solid waste for renewable energy production is developing in Europe but, the situation is very different from one country to another. General data on biogas production in Europe will be presented in a first part of the paper and, in a second part; the current situation in three countries will be analyzed into details: Germany, Italy and France.



a- Germany (Appunn, 2015) b- France (RTE, 2015)

Fig. 1.Sources of electricity production in a- Germany and b- France

2.0 Biogaz Production in Europe

The data presented in this paper are based on the Biogas Report 2014 of the European Biogas Association (EBA 2014) published in December 2014. This report covers 27 EU countries (apart from Malta) and Switzerland. It contains compiled data on the number of biogas and biomethane plants, production, information on support schemes and predictions of the biogas market in the nearest future.

2.1 Number of plants:

In 2013, the total number of biogas plants in Europe was 14,572. Germany is from far the country where the biogas industry is the most developedwith 9,035 plants in operationthat is to say 62% of the total number of plants, followed by Italy (1,391 plants), Switzerland (620 plants) and France (610 plants), Fig. 2 (EBA 2014).The increase in the number of plants in 2013 compared to the number of plants in 2012 was rather low with 760 new plants which represent an increase of only 5.5%, which is much lower than the 12% increase of the previous year. This