

Biogas - competition between different pathways

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BIOGAS PLANTS DEVELOPMENT PL

□ In 2009 according to URE (Energy Regulatory Office www.ure.gov.pl) **125** installations were producing electricity and heat (CHP) in that:

- ✓ 73 on landfill gas (39,99 MW)
- ✓ 46 on sewage treatment gas (23,60 MW)
- ✓ 6 agricultural biogas plant (7,25 MW)

□ In 2010 according to URE there were working **144** installations in that:

- ✓ 80 on landfill gas,
- ✓ 55 on sewage treatment gas and
- ✓ 8 agricultural biogas plant.

□ Ministry of Economy informed that in 2010 there were erected 10 new agricultural biogas plants with capacities from 0,2 to 2 MW.

□ The interest in agricultural biogas is still huge, there are dozens of projects under development.

Different ways of biogas / biomethane usage

- Production of electricity and / or heat
 - » This direction was implemented in Poland till now
- Injection to gas network
 - » Is possible after 2010 amendment to Energy Law
- Transport
 - » ???



Support measures for RES PL

Electricity :

- Quota obligation and green (and other colours) certificates - obligation imposed on energy companies selling electricity to final consumers
- Purchase obligation for electricity generated from RES

Heat:

- Purchase obligation for heat from RES

Transportation biofuels:

- National indicative targets - imposed on producers and importers of fuels
- Designated fleets
- Possibility of producing liquid biofuels by farmers for own use
- Excise tax relief for biofuels

Amendments to the *Energy Law*.

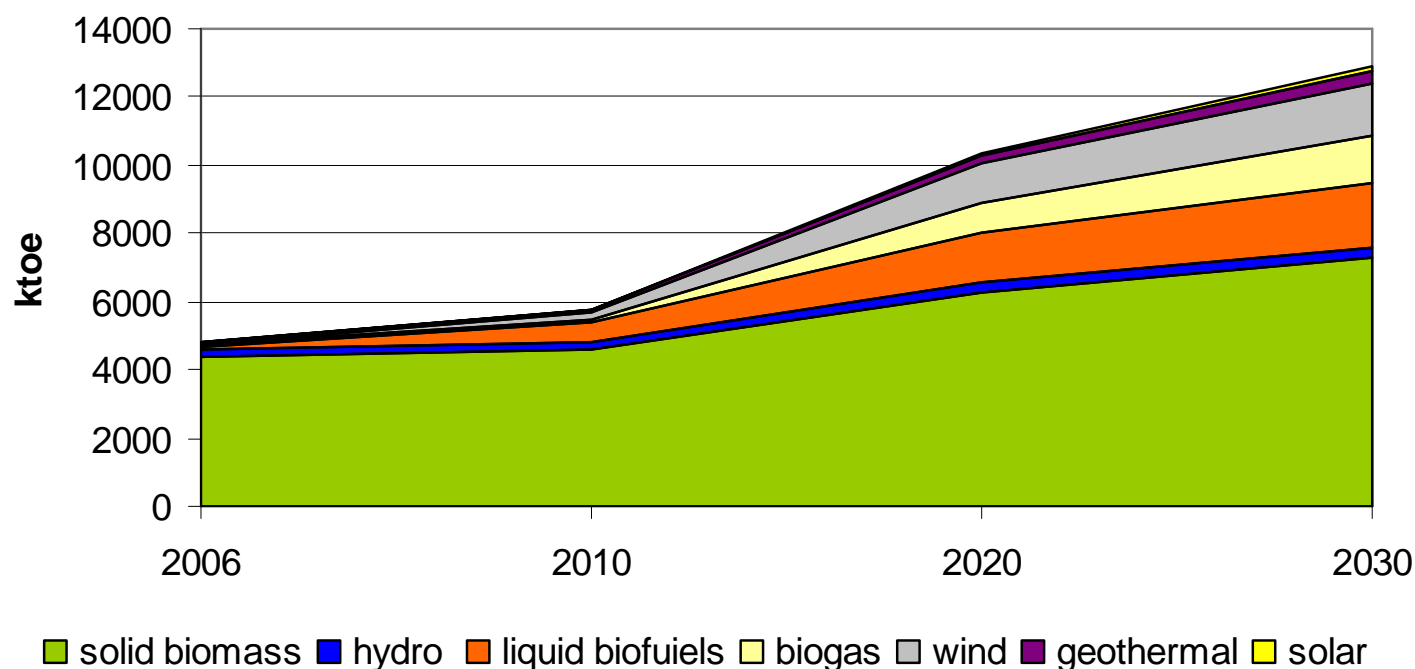
Adapted in December 2009:

- Definition of agricultural biogas - gaseous fuel obtained from agricultural feedstock, by-products from agriculture, fluid or solid animal excrements, by-products or wastes of food processing industry or forest biomass in the process of methane fermentation (Article 3, point 20a of the *Energy Law*);
- Change of definition of gaseous fuels - high methane or nitrated natural gas, including liquefied natural gas and propane-butane or other kinds of flammable gas, supplied by means of a gas grid, and also agricultural biogas, regardless of their use (Article 3, point 3a of the *Energy Law*);
- Introduction of certificate of origin for agricultural biogas (defining contents of the certificate, procedure for applying, issuing, redeeming, etc.) (Article 9o, section1); according to the Energy Regulatory Office (URE) the system of certificates of origin for biogas will be implemented on the market from the 1st June 2011.
- Definition of legal basis and quality requirements for injection of biogas to gas grid.

Demand for energy till 2030 PL

Demand for energy; structure of renewable energy sources

Source: Energy Policy for Poland till 2030

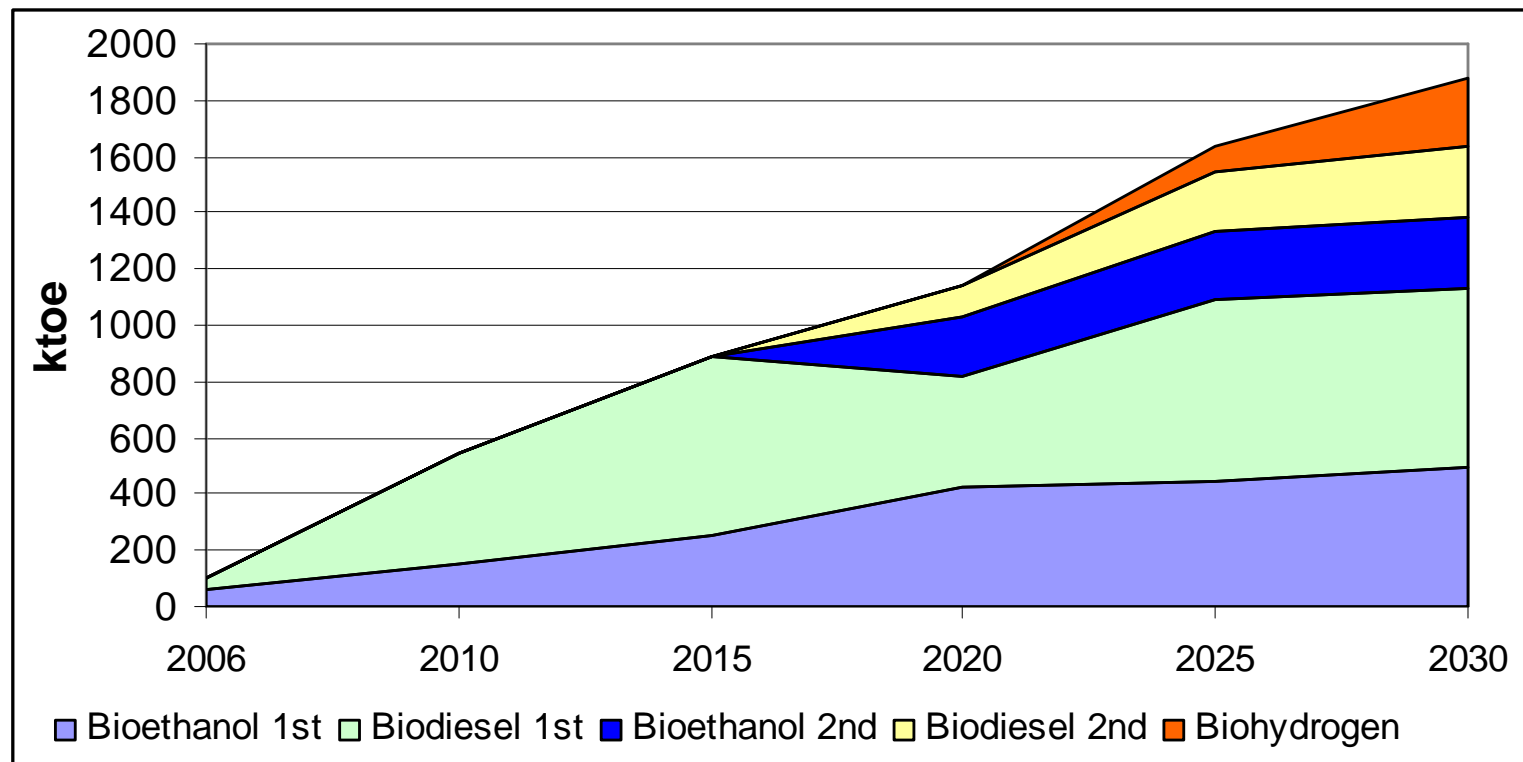


Demand increase from 4,8 Mtoe in 2006 up to 12,9 Mtoe in 2030

Biofuels in transport PL

Forecast of energy requirements - different types of biofuels

Source : Energy policy for Poland till 2030. Appendix II



Land availability for bioenergy

- ❑ Total agricultural area 16,2 million ha, of which 12,1 million ha arable land
- ❑ Agricultural land resources per capita 4,2 ha,
- ❑ High level of food-self sufficiency in Poland

- ❑ IUNG estimated the total land available for biomass production in PL 1,5 million ha
- ❑ The potential land could supply 12.8 million tons of biomass in dry matter (243 PJ per year)

- ❑ Future productivity increase in agriculture expected
→ some additional lands released

Competition within biomass resources

Supply side (eg. farmer):

- Food & feed production
- Production of biomass for industry
- Afforestation
- Nature protection (NATURA 2000)

Demand side:

- Energy sector
 - Heating & cooling sector
 - Production of transport fuels
 - Industry
- ⇒ Problem of limited resources was first time observed as a side effect of large scale co-firing of biomass development

Biomethane in Europe

- ❑ There are 28 European countries that produce biogas. Overview of production and use in EU - EurObserv'ER 2010 Biogas barometer
- ❑ Currently there are 8 European countries that are doing grid injection - Austria, France, Germany, the Netherlands, Norway, Sweden, Switzerland, UK - they have established their own national standards for biomethane. Luxembourg has plans for grid injection and other countries are in the process of creating the regulatory framework to do so.
- ❑ Within CEN (The European Committee for Standardization), in TC234/WG9, work is on going to establish a unified European standard for grid injection.
- ❑ The upgraded biomethane in some countries is used directly as a vehicle fuel delivered either through its own dedicated pipeline or transported by truck as CNG (the best example is Sweden).

Biofuels

- ❑ Biofuels are expected to provide the main contribution for achieving the targets of 10% renewable energy use and 6% greenhouse gas reductions in transport sector by 2020, as mandated by the Renewable Energy and Fuel Quality Directives.
- ❑ The potential of biofuel production from both traditional crops and energy crops is determined by the area of land, which can be made available, the yield of that land, and the use of **biomass and co-products in other sectors**.
- ❑ The availability of biomass from crops for conversion to transport fuels is limited by sustainability criteria. The availability of biomass from ligno-cellulosic crops for all biofuels (including bioethanol, BTL, biomethane and hydrogen) is limited by **competition between biofuels and the use of biomass for other sectors**.

Sustainability issues

- ❑ When biogas is produced from residues and waste streams sustainability issues are fulfilled. In the case of energy crops, sustainability issues are as important for biogas / biomethane as they are for other biofuels
- ❑ Some countries are dubious about the environmental soundness of using energy crops such as maize for methanisation, preferring to convert already existing waste feedstock.
- ❑ The use of maize as a biogas feedstock is particularly controversial because of the crop's high water footprint and demand for inputs, and the same argument applies to its use as a biofuel feedstock.

Swedish LCA study on first generation biofuels (*Börjesson et al. 2009*).

- Biogas from manure 148%
- Biogas from food waste 119%
- Biogas from the organic fraction of household waste 103%
- Biogas from ley crops 86%
- Biogas from sugar beets including tops 85%
- Ethanol from sugar beets 80%
- Biogas from maize 75%
- Wheat based ethanol 71%
- RME (Rapeseed Methyl Ester) 68%
- Wheat based ethanol combined with biogas production 67%

Climate mitigating effect of biofuels under Swedish conditions. As reference petrol and diesel are used, having the same greenhouse gas emissions of 83.8 g CO₂ per MJ. The best performance of biogas from manure is explained by the avoidance of methane emissions occurring during conventional handling of manure

**THANK YOU FOR YOUR
ATTENTION!**

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