



# ROLE OF BIOGAS IN POLAND: Misconceptions and Opportunities

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## **REALITY Vs. EXPECTATION**

**The National Plan called for 2,500 biogas plants by 2020.**

**Poland currently has about 10 biogas plants, virtually all small and on farms. Another 30 projects under construction, again mostly small farm plants. About 300 projects are in the pipeline nationally. (IEO 2011).**

**Since only one third of announced biogas projects in the entire EU get actually built, Poland is on track to have 250-350 plants by 2020. Public objections to proposed projects in Poland have stopped most projects, based on fears of odor problems.**



## MISUNDERSTANDING THE PROBLEM

”Given the current level of knowledge with respect to agricultural biogas production in Poland, it should be noticed that we are facing the scarcity of the national technologies. The creation of satisfactory and effective conditions for the biogas plants development via tax and other financial incentives, which will influence the build up of the national market of services and biogas technologies remains a huge challenge. The lack of specialists in the field of operation and maintenance of biogas plants is another barrier for market development.”

Minister of Agriculture and Rural Development, November 19, 2010.

# THE BASIC ECONOMICS: Part 1

Investment costs including the increase index basis 2004

|                  | 100 kW    | 250 kW      | 500 kW      |
|------------------|-----------|-------------|-------------|
| Investment costs | € 800.000 | € 1.500.000 | € 2.500.000 |

Polish Govt estimate: € 2.5-3.7 MM/1 MW (Council of Ministers, July 2010).

Don't forget including costs for higher:  
Technique standards  
Safety techniques  
Environment protection  
Getting the permission



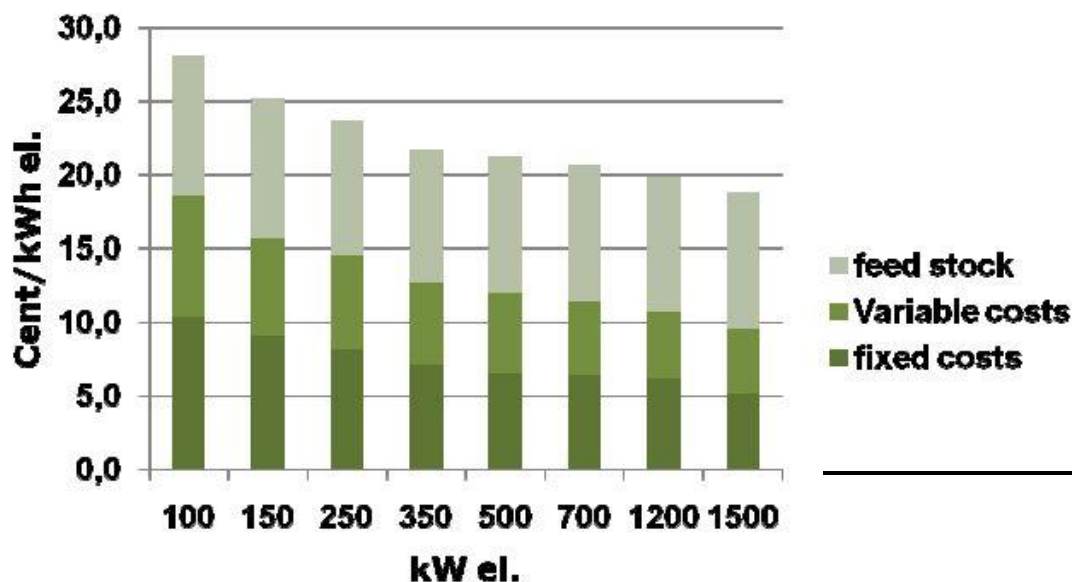
Full cost per 1 MW using German or Austrian suppliers: € 6,000,000. EBA

EBA, 10<sup>th</sup> International Biogas Forum, Warsaw March 2011.



# THE BASIC ECONOMICS: Part 2

Production costs for biogas  
Feedstock: agricultural crops [Cent/kWh el.]



Polish electricity price including subsidy

11.7 € cent/kWh

EBA, 10<sup>th</sup> International Biogas Forum, Warsaw March 2011.

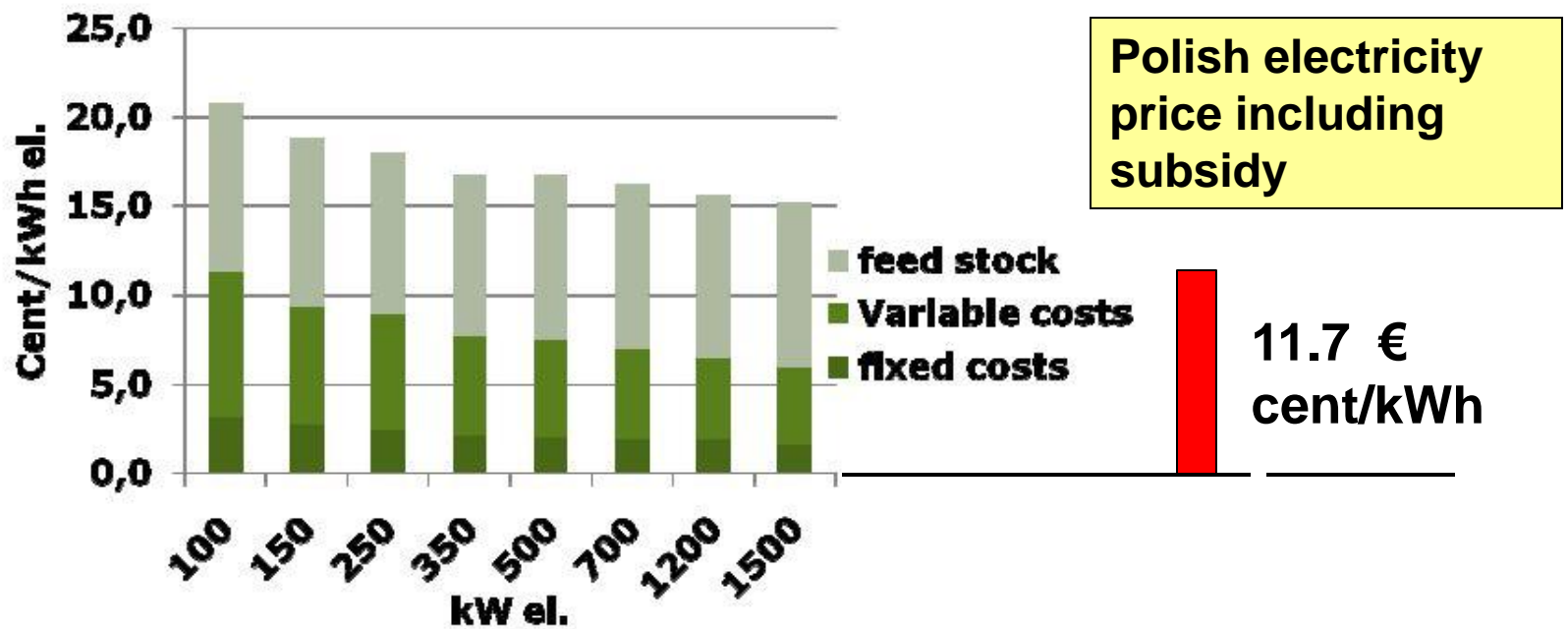
Veranstaltung



# THE BASIC ECONOMICS: Part 3

Production costs for biogas  
including 70 % subsidies

Feedstock: agricultural crops [Cent/kWh el.]



Veranstaltung



## THE BASIC ECONOMICS: Part 4

Where does international investment go?

| country                        | time <sup>1</sup> of authorisation<br>[months] |                            | remuneration for electricity [€ct/kWh]<br>excl. VAT |                      |                                |                      |
|--------------------------------|--|----------------------------|---|----------------------|--------------------------------|----------------------|
|                                | permission of<br>construction                  | permission<br>of operation | agricultural<br>substrates                          |                      | non-agricultural<br>substrates |                      |
|                                |  |                            | 100 kW <sub>el</sub>                                | 500 kW <sub>el</sub> | 100 kW <sub>el</sub>           | 500 kW <sub>el</sub> |
| Austria                        | 6 – 18   | 3 – 12                     | 20.94 <sup>3</sup>                                  | 17.99 <sup>3</sup>   | 11.86                          | 9.79                 |
| Belgium                        | 4.5 – 8  | 4.5 – 8                    | 21.78   | 21.78                | 22.20                          | 22.20                |
| England and Wales <sup>4</sup> | 2 – 18   | 3 – 12                     | 14.8  | 14.8                 | 14.8                           | 14.8                 |
| France <sup>5</sup>            | 18   | 10                         | 14.0  | 13.7                 | 14.0                           | 13.7                 |
| Germany <sup>6</sup>           | 6 – 12   | 3 – 9                      | 21.83   | 15.77                | 10.83                          | 9.77                 |
| Italy                          | 1 <sup>7</sup>                                 | 6 <sup>7</sup>             | 30 <sup>8</sup>                                     | 30 <sup>8</sup>      | 18 <sup>8</sup>                | 18 <sup>8</sup>      |
|                                |  |                            | 28 <sup>9</sup>                                     | 29 <sup>9</sup>      | 17 <sup>9</sup>                | 17 <sup>9</sup>      |
| Poland                         | 6 – 18   | 6 – 12                     | 12  | 12                   | 12                             | 12                   |
| Slovenia                       | 6 – 24   | 6 – 12                     | 18.94   | 18.94                | 6.116                          | 6.116                |
| Spain                          | 12 – 18  | 3 – 9                      | 13.7945   | 10.2935              | 13.7945                        | 10.2935              |

"Country specific conditions for the implementation of biogas technology: Comparison of Remuneration," Biogas Regions Project, European Commission, January 2009.

## GOVERNMENT SUGGESTED SOLUTIONS

**National technologies: Invent a more cost-effective biogas plant? Look to more cost-effective technology for transfer.**

**Financial incentives: Lowest in the EU. Plants still possible with lower capex (€4MM/1 MW) and wider revenue model.**

**Scarcity of Personnel: Hardly unique and easily cured.**



Blabjerg biogas plant, Denmark



Therso biogas plant, Denmark



Studsgaard biogas plant, Denmark



## **MISSING ANSWER: WRONG MODEL**

### **Economic realities:**

**“Crop prices too high for energy production,” Michael Kottner, IBBK (German biogas institute 2008).**

**“More than half of existing plants in financial Difficulties.” Kottner, supra (when subsidies were 21 € cents).**

**Waste-derived biogas is more economical, although more difficult with fewer technology suppliers and operators.**

# MISSING ANSWER: HIGHER STANDARDS NEEDED FOR PUBLIC ACCEPTANCE

Danish biogas plants meet strict odor control standards and have proven that the worst organic waste can be handled without serious odor problems. See Danish Environmental Protection Agency Study (2007). Polish public does not realize what is technically feasible.



**Blabjerg biogas plant, Denmark**



*Large scale Danish biogas plant at Lemvig, noted as successful case study in IEA BioEnergy Report (2005)*



**Ribe biogas plant, Denmark**



**Thorso biogas plant, Denmark**

# HOW TO STOP ODOR PROBLEMS: Part 1

The Danish EPA 2007 study noted that: “**Odor may permeate through a plastic membrane which is considered gas tight.**” Accordingly, airtight and odor tight covers are required on digesters in Denmark. CEERES uses welded metal tops (left), not the membrane type top like farm plants(right) that have had problems.



# HOW TO STOP ODOR PROBLEMS: Part 2

**Danish standard: Waste transferred in closed building with negative air pressure vented to odor filter. No open air exposures (left). Farm plant procedure (right).**



Direct feeding of solid biomass



Michael Kottner, Agricultura AD in Germany, November 2006.

**Methane to Markets**

**defra**  
Department for Environment  
Food and Rural Affairs



## **CONCLUSIONS**

- 1. Farm plants are possible where large facility has established credit and needs manure management system. But not third-party investment grade project.**
- 2. Polish subsidies are probably too low to attract anything like the investment necessary to meet the government's expectations.**
- 3. Waste-based biogas is still practical if it is done by experts and experienced team. Eliminating cost of buying substrates is essential for a profitable project.**
- 4. Higher environmental standards are necessary for public acceptance of biogas in Poland.**



**THANK YOU FOR YOUR ATTENTION!**



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