



TURKISH-GERMAN
BIOGAS PROJECT

Animal Waste based Biogas Potential in Turkey

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Bundesministerium
für Umwelt, Naturschutz
und Reaktorsicherheit

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

This project is part of the International Climate Initiative. The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety supports this initiative on the basis of a decision adopted by the German Bundestag.

Outline

- I. Turkish-German Biogas Project
- II. Biogas and agriculture
- III. Market opportunities in Turkey
- IV. Status quo of biogas plants

I. Turkish-German Biogas Project



a. Brief information

- International Climate Initiative (IKI) financed project
- 2010-2014
- Project partners:
 - TR Ministry of Environment and Urbanisation
 - Ministries of Agriculture, Energy, Industry



I. Turkish-German Biogas Project



b. Project goals

Overall goal: reduction of greenhouse gas emissions from agricultural residues (esp. Methane, Nitrous Oxides)

- Climate friendly production of renewable energies
- Supporting a modern and sustainable agriculture
 - Environmentally friendly storage and field application of manures and digestates
 - Improving the nutrient cycle through organic fertilizing
 - Improvement of soil quality
 - Supporting sustainable crop rotations
 - Strengthening biodiversity
 - Preventing erosion



I. Turkish-German Biogas Project



c. Project components

1) Pilot biogas plant: support of a biogas investment

- Substrates (manure) logistics and fertilizer application
- Technical assistance for biogas process optimization

2) Framework for biogas

- Focusing on animal waste and fertilizer legislation
- Supporting a national biogas strategy

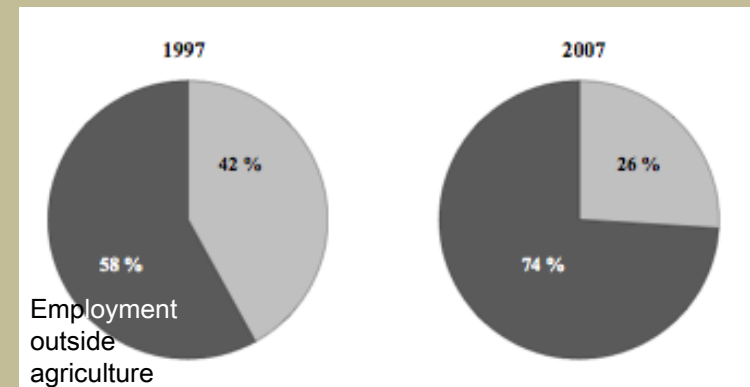
3) Capacity development

- National level: public administration, investors, finance
- Local level: practical trainings at the pilot site

II. Biogas and agriculture

a. Structural change in Turkish agriculture

- Micro and small enterprises still prevailing (average size: 6.1 ha), small parcels due to heritage customs
- Agriculture: 26,4% of total employment
- Around 3 million holdings (Germany: 370.500)
- Since 2010 government provides investment credits for farms of more than 50 cattle (zero interests rate, lent term 8 years) and opened many countries for livestock imports
 - Investments of large scale milk farms and feed lots
 - Enormous request of cattle from EU and overseas



II. Biogas and agriculture

b. Potential investors

- Trends to large scale milk farms and feed lots
 - Open to new manure management systems and potential biogas investors
- Modern and highly industrialized poultry sector sensitive to waste management obligations



→ Potential for biogas investments especially in modern and big scale farms in cooperation with food industry

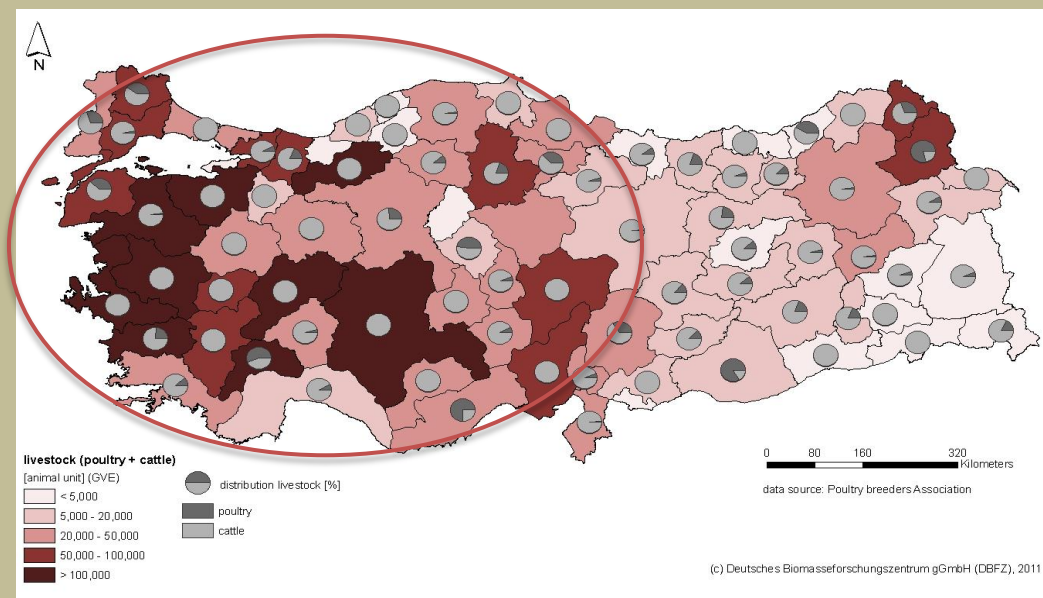
III. Biogas market opportunities

a. Technical biogas potential: summary of sectors

Sector	Substrate	Theoretical Biogas Potential [PJ/year]	Technical Biogas Potential [PJ/year]
Agriculture - livestock	Cattle Manure	107.8	42.1
	Poultry Manure	36.6	36.2
Agricultural Residues	Straw of Cereals	276.7	27.7
	Sugar beet leaf	17.5	4.4
	Tomato Waste	11.1	4.1
Energy crops	Energy Crops on fallow land	325.1	81.3
Agro-Industrial Residues	Meat production residues	0.5	0.2
	Cheese - waste water	2.7	2.4
	Sugar beet press cake	5.0	4.5
	Molasses (sugar production)	3.3	2.9
	Olive press cake	1.3	1.2
	Olive mill waste water	1.3	1.2
	Juice residues (Pomace)	1.8	1.6
	Draff (Bioethanol-production)	0.9	0.8
Municipal Waste	Municipal Waste	22.0	11.0
	Total (with energy crops)	813.4	221.5
	Total (without energy crops)	488.3	140.3
	Total (without energy crops and straw)	211.6	112.6

III. Biogas market opportunities

b. Cattle and poultry manure

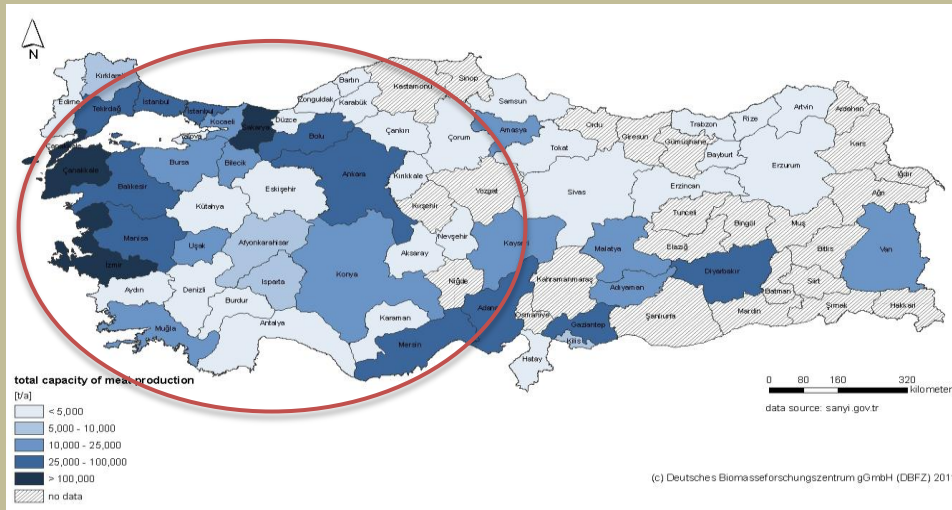


Almost every province with > 50.000 animals units is located in the western part of Turkey

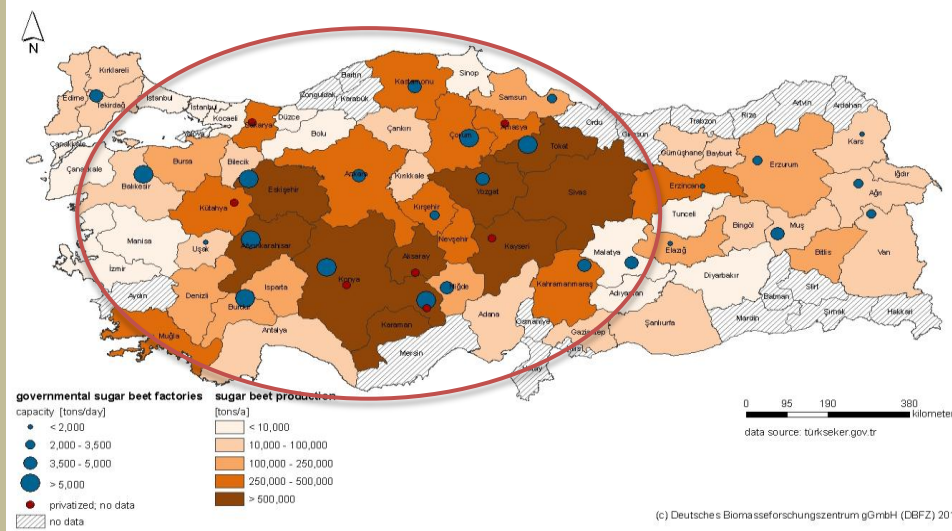
→ Huge energetic potential of animal residues currently unused

III. Biogas market opportunities

c. Residues from agro-industries: 2 examples



- Meat production concentrated in the western part
→ Residues from slaughterhouses

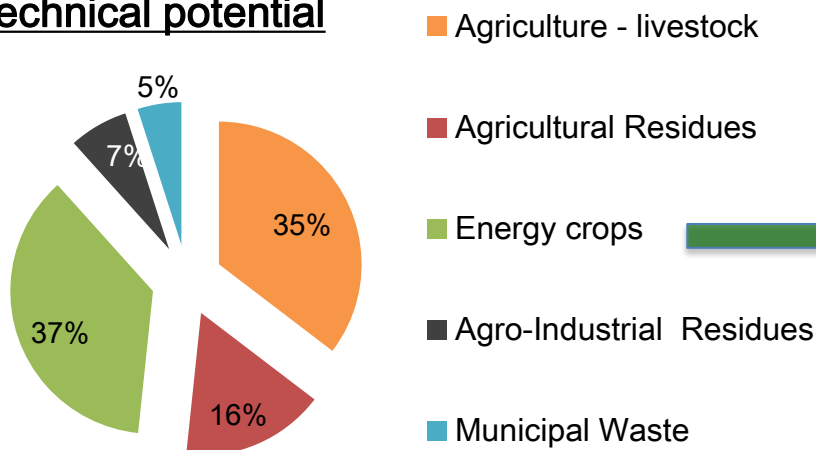


- Sugar beet production and sugar factories in the central part
→ Sugar beet presscake, molasse

III. Biogas market opportunities

d. Possible share of biogas in Turkey's energy production

Technical potential



BUT:
Straw and energy crops are not in the focus due to high commodity prices

Technical biogas potential based von animal and bio waste:

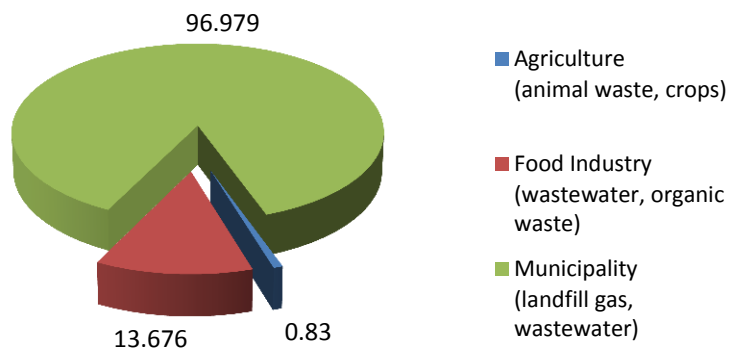
- 112.6 PJ/year = 31.3 TWh/year
- Technical potential can cover 6% of current electricity production

→ 4.800 biogas plants (installed capacity per plant ~ 350 kW_{el})

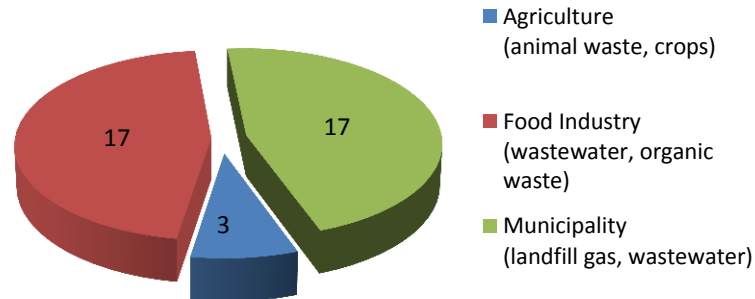
IV. Status quo of biogas plants

Biogas facilities in figures

Capacity in operation [MW]



Plants in operation



Data base 12/2011

■ Biogas from agriculture at its start...

3 plants installed; many more in planning stage

Thank you for your attention!



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