www.biogas-weser-ems.de

Biogas, a cost effective waste treatment solution

Biomass, Biogas & Cogeneration 2015

-National Conference & Networking Forum-

biogas weser-ems GmbH & Co. KG

www.biogas-weser-ems.de

Agenda

- Company profile
- Biogas feasibility in Romania:
  - Technical indicators
  - Economical indicators
  - Enviromental indicators

www.biogas-weser-ems.de

Company profile

- Over 15 years of experience specialising in the design, planning and construction of biogas power plants.
- Input material of the first plants: organic waste, food processing waste and DAF.
- Weser-Ems region: intensive livestock farming.
- More than 370 installed biogas plants, 34 of them treating organic waste .
- Installed capacity: over 175 Mw_{el}.
- Bwe abroad: UK, Spain, Hungary, Czech Republic, Italy and Turkey.

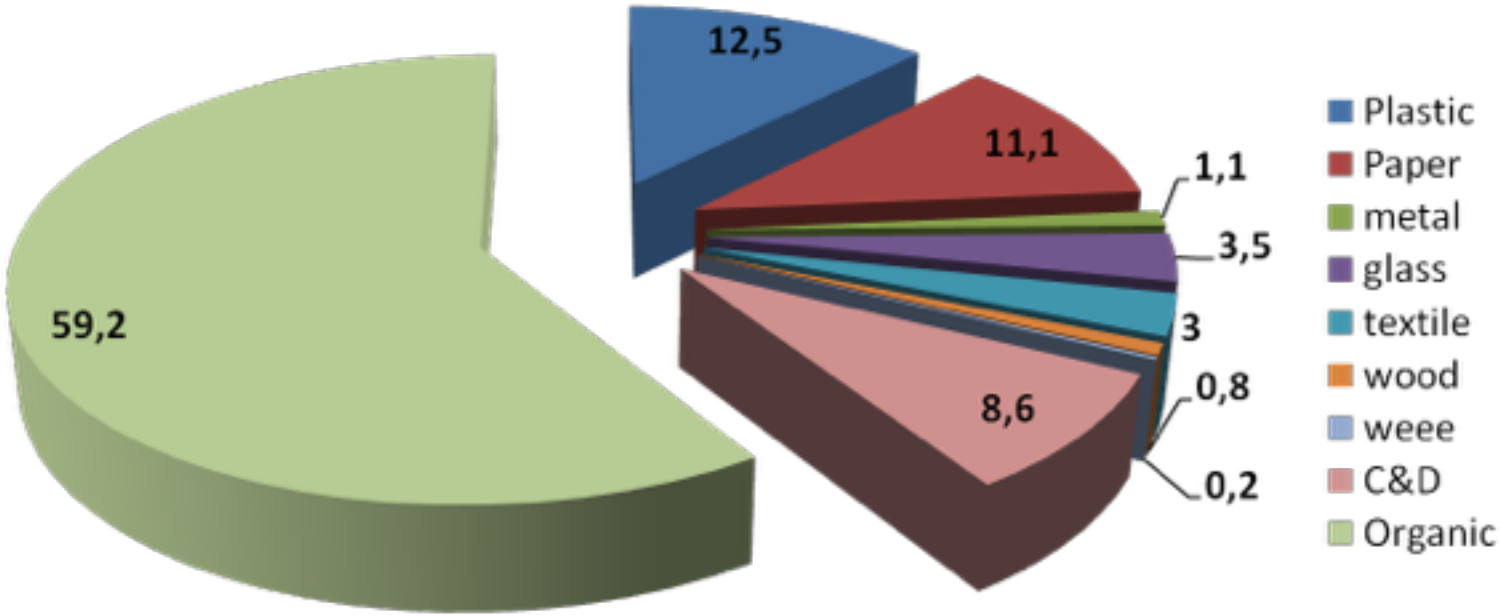
www.biogas-weser-ems.de

Agenda

- Company profile
- Biogas feasibility in Romania:
  - Technical indicators
  - Economical indicators
  - Enviromental indicators

www.biogas-weser-ems.de

Waste composition in Romania



Source: Balkwaste 2011
Life07/ro/686

2025 targets:

•50% recycling.

• biodegradable solid waste going to landfills must be decreased by 50% [EU landfill directive 1999/31/EC].

www.biogas-weser-ems.de

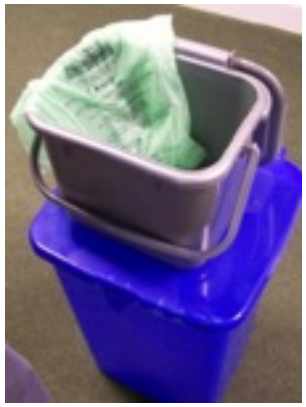
Technical Know how

2 MW waste biogas plant Oxford, UK

- Substrates: 150 t food waste
- Automatic separation of plastic materials
- Retention time: over 70 days
- Load factor > 95% average in 4 years
- Land footprint: approx 2 ha

www.biogas-weser-ems.de

Source separated food waste / kerbside



www.biogas-weser-ems.de

Waste feeding system

Capacity: 80 m^3

Waste delivered from Monday to Friday

www.biogas-weser-ems.de

Hammer mill – Waste shredding and separation

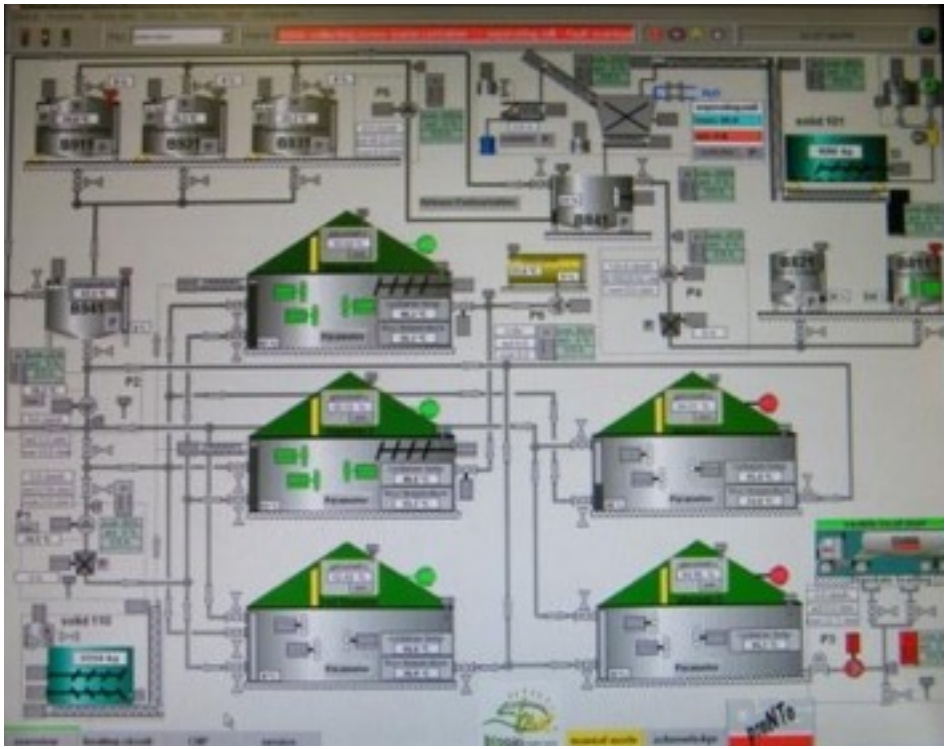
Product	Dry Matter (%)	Mass (%)
„Waste soup“	18%	85-90
Plastic contaminants	50%	15-10

www.biogas-weser-ems.de

Heating system: Pasteurisers and digesters

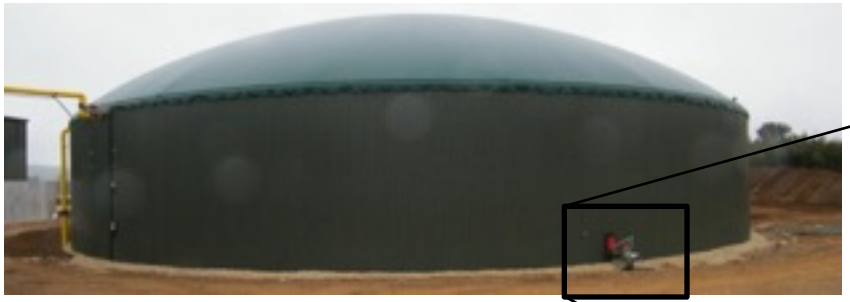
www.biogas-weser-ems.de

Monitoring and control



www.biogas-weser-ems.de

Digestates used as bio-fertiliser



Fuente: lohntec.de

www.biogas-weser-ems.de

Bio-fertiliser – following european regulations

PAS110 Approved Testing Laboratory

PAS110 Certificate of Analysis

Client: (M356) OXFORD RENEWABLE ENERGY LTD [DIGESTATE]
THE STABLES
RADFORD
CHIPPING NORTON
OXFORDSHIRE OX7 4EB

Originator: WALLINGFORD AD
WHOLE DIGESTATE

Lab ID: 86616 - 18571
Sample ID: WDS 18.03.13
Sample Type: Whole Digestate

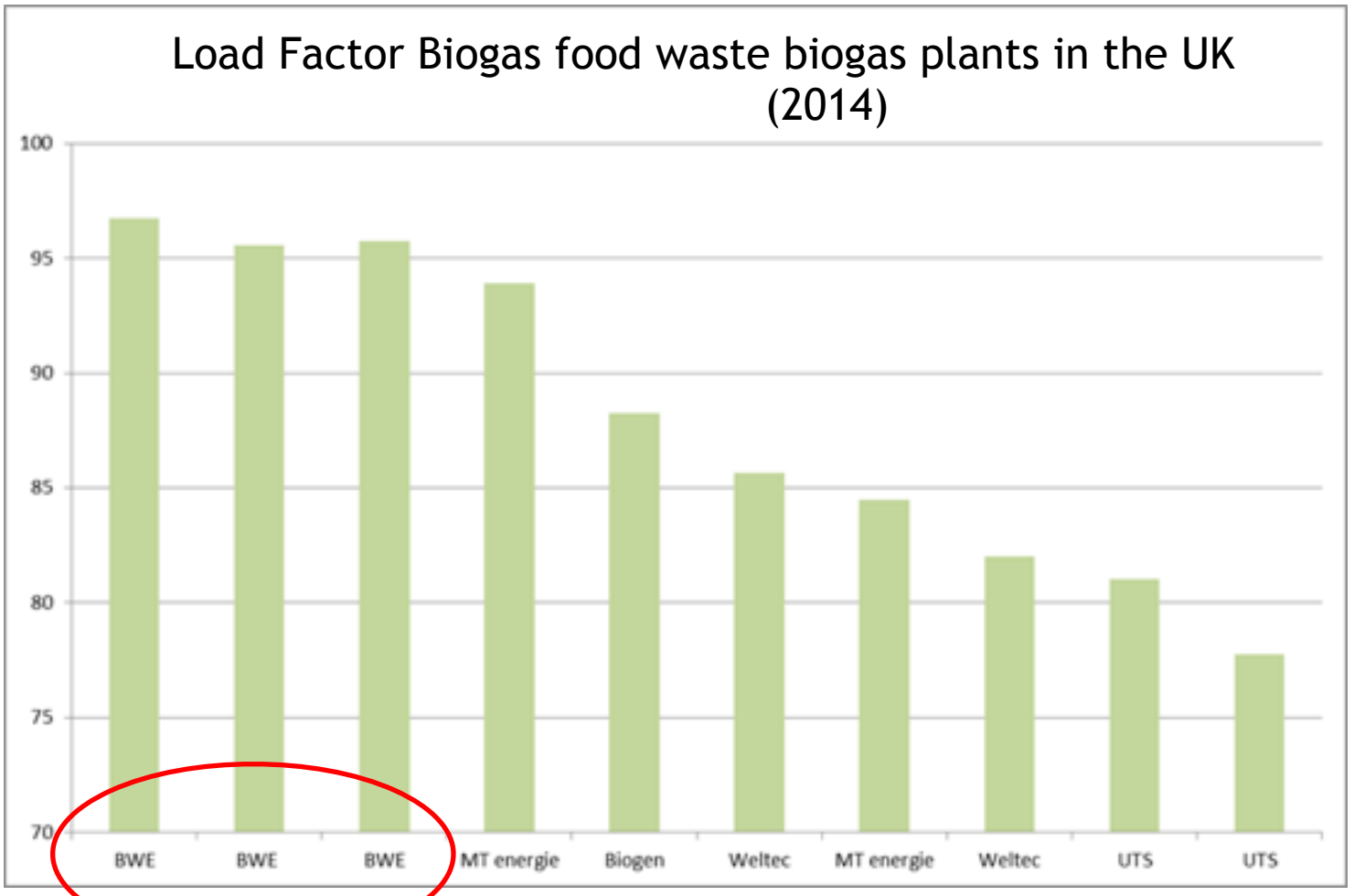
Date Received: 21/03/2013
Date Reported: 25/04/2013
Date Sampled: 18/03/2013

Potentially Toxic Elements in WD / SL / SF, subject to exemption provisions in clauses 13.2, 14.1.6 and 14.1.7 with the declarations required within PAS 110

Parameter	Units	Result	Upper Limit	Method of Test
Cadmium (Cd)	mg/kg	0.45	1.5 mg / kg dry matter	BS EN 13650 (soluble in aqua regia)
Chromium (Cr)	mg/kg	9.84	100 mg / kg dry matter	BS EN 13650 (soluble in aqua regia)
Copper (Cu)	mg/kg	50.9	200 mg / kg dry matter	BS EN 13650 (soluble in aqua regia)
Lead (Pb)	mg/kg	4.89	200 mg / kg dry matter	BS EN 13650 (soluble in aqua regia)
Mercury (Hg)	mg/kg	<0.05	1.0 mg / kg dry matter	BS ISO 16772

www.biogas-weser-ems.de

High Load Factor



www.biogas-weser-ems.de

Agenda

- Company profile
- Biogas feasibility in Romania:
  - Technical indicators
  - Economical indicators
  - Enviromental indicators

Economical aspect

Iasi: Population of 300.000

	Total waste (tonnes)	Plastic	Paper	Metal Glass Textile	Organic waste
Year	98550	16261	25820	3942	51344
Daily average	270	45	71	11	141

Source: Balkwaste 2011
Life07/ro/686

www.biogas-weser-ems.de

Economical Aspect

50.000 ton/year → 2MWel
→ 35.000 ton of digestates
→ 8000 ton of plastics and contaminants

Income.

Electricity
16000 MWh/y at 95€/MWh = 1,52 million €

Gate fee
50000 at 12€ =600.000€

Nitrogen in digestates
35.000 ton*4 kg/ton*€1 euro = 140.000€

Total approx 2.3 million €

Outcome.

Operating cost including savings for a new engine = 800.000 €

Transport digestates
35000 +8000 at 3€ = 129.000 €

Disposal 8000 ton at 12€ = 96.000€

Total approx 1 million €

Plant investment 11 million €

Agenda

- Company profile
- Biogas feasibility in Romania:
  - Technical indicators
  - Economical indicators
  - Enviromental indicators

www.biogas-weser-ems.de

Enviromental aspect

Scenario 1: 100% landfill

1 ton MSW → Landfil l

0,9 tCO_2e

Scenario 2: Source separation

1 ton MSW → 40,8% Landfill

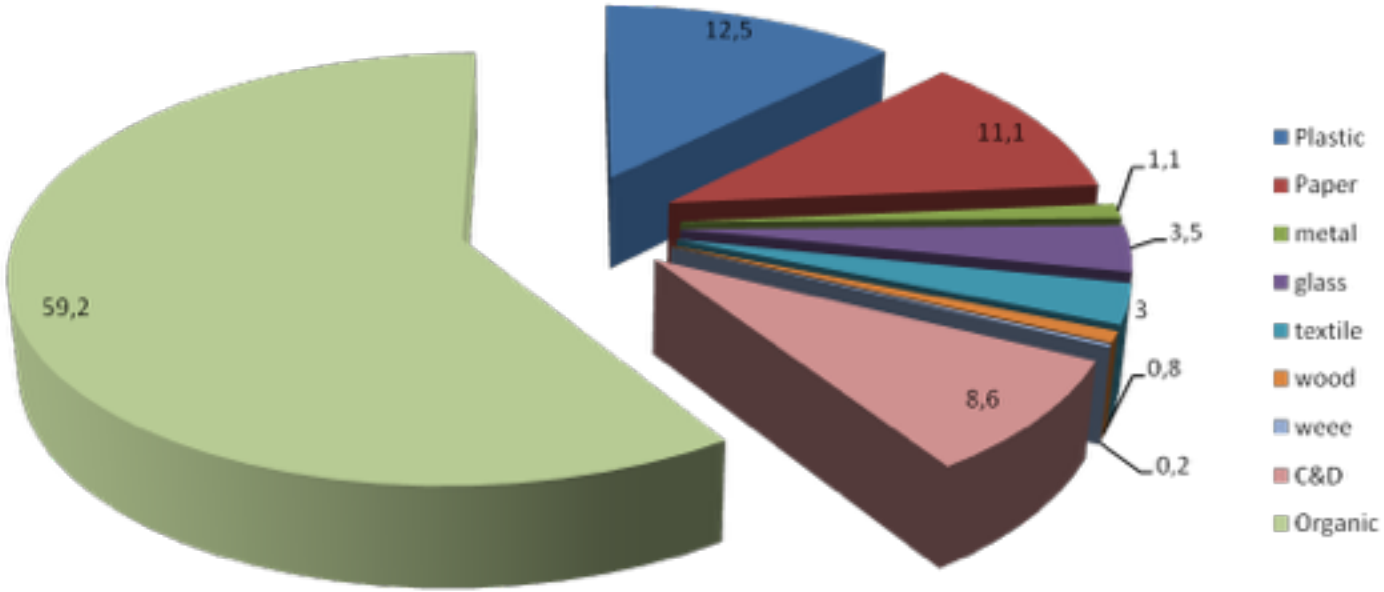
Organic = 59,2% by weight ➔ A.D

0,37 tCO_2e

Note:
- Emissions from digestate transportation are not considered.
- Savings from the use of organic fertilizer are not considered.
- Calculation based on IPCCC recommendations for degradable organic contents of waste.

www.biogas-weser-ems.de

Waste composition in Romania



2025 targets:

•50% recycling.

Bio recycling!!!

• biodegradable solid waste going to landfills must be decreased by 50% [EU landfill directive 1999/31/EC].

www.biogas-weser-ems.de

Thank you for your attention!

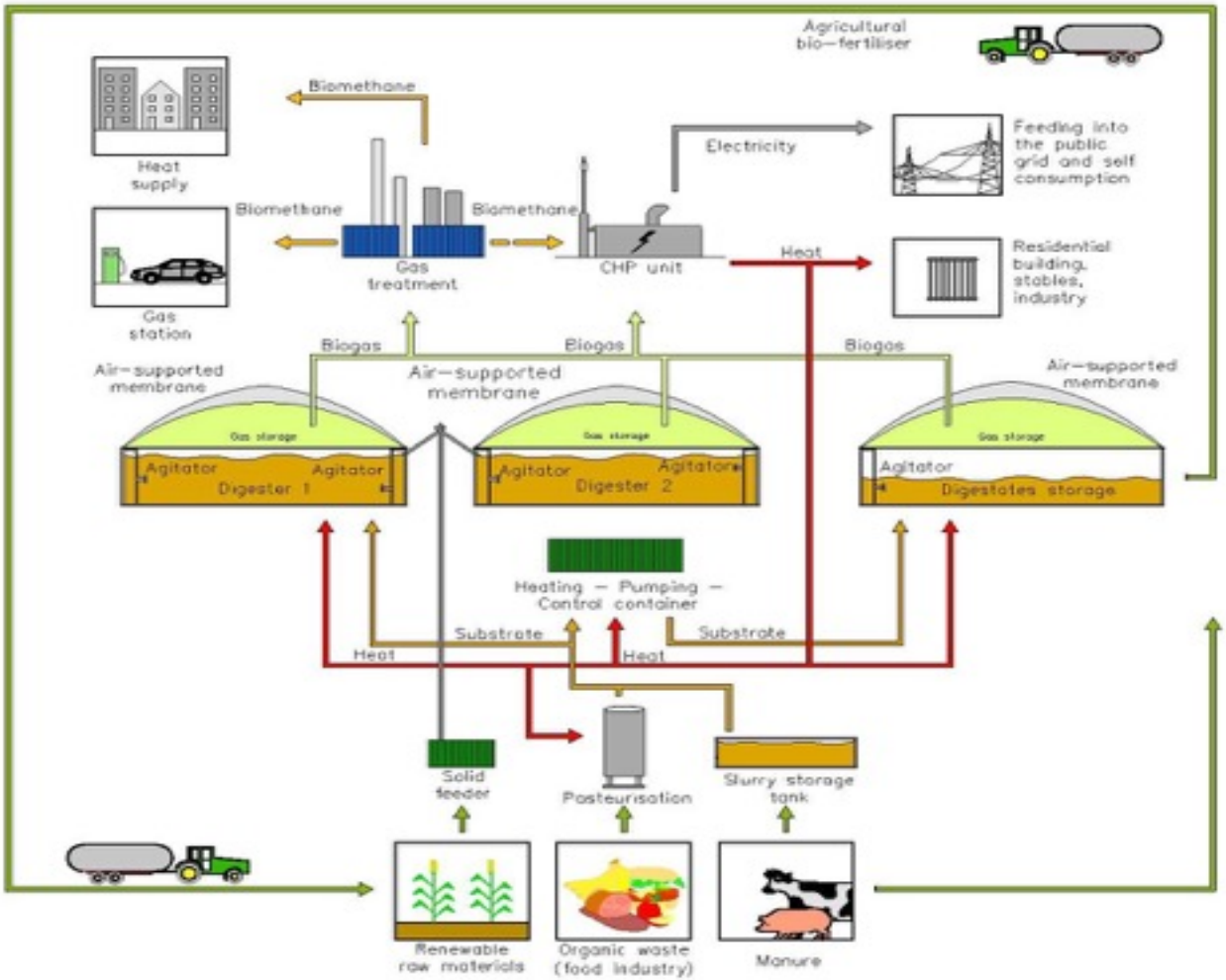
Camilo Wilches
- International Project Development -

Tel.: +49 449193 800-32
camilo.wilches@biogas-weser-ems.de

bwe biogas weser-ems GmbH & Co. KG
E-Mail: info@biogas-weser-ems.de
www.biogas-weser-ems.de

www.biogas-weser-ems.de

Biogas flow diagram



www.biogas-weser-ems.de

Why BWE?

- Remote supervision and biological support
- Maintenance contracts
- Preassembly containers: cost and construction time reduction
- Load factor > 95% (waste plants)
  - E.g. 1062 kW