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Determination of biodegradable/fossil part of the waste

Eddy Graauwmans

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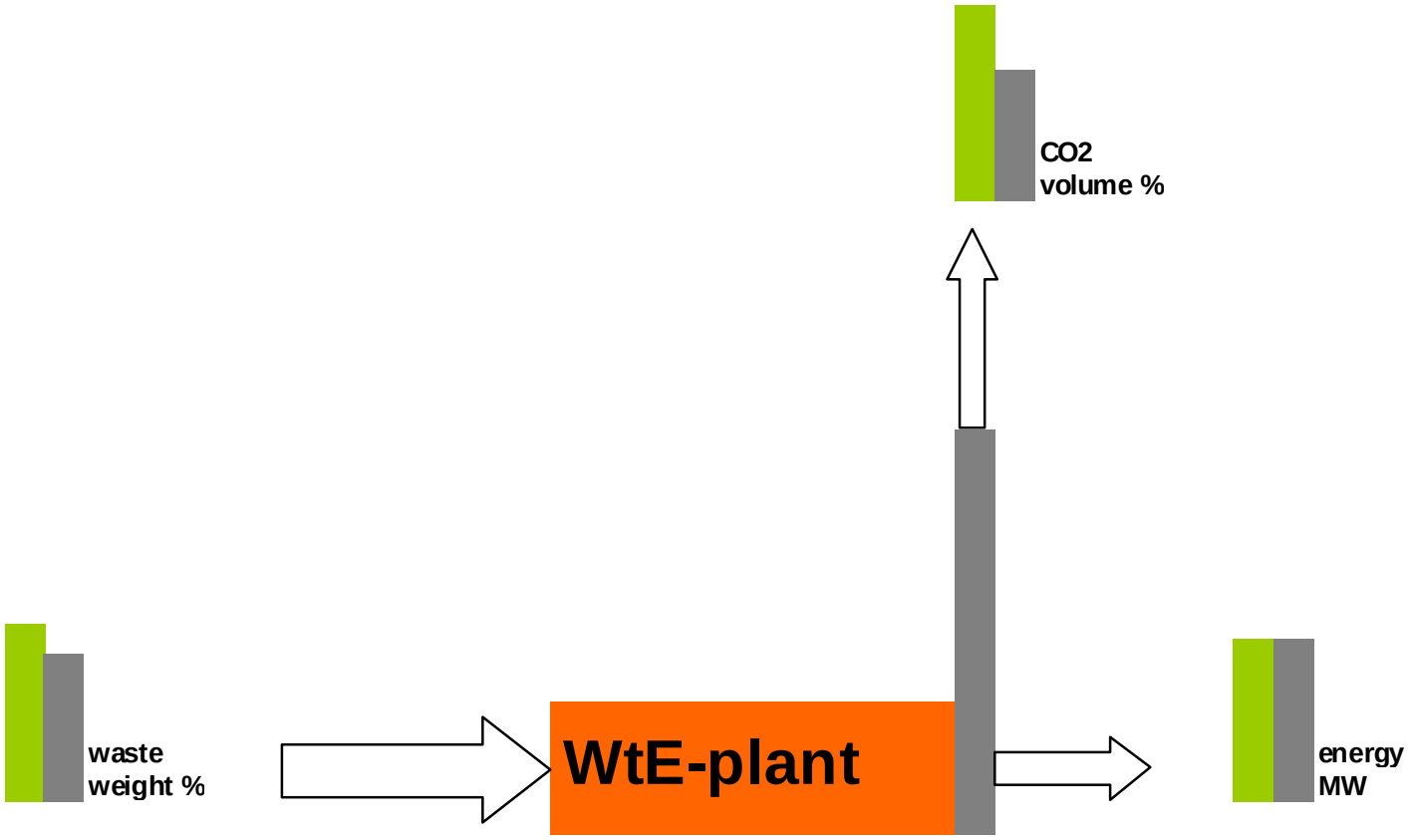
Overview

- What's the problem
- Situation on EU-level
- Methods for determination
  - Sorting analysis
  - Selective solution
  - C14-analysis
  - Balance method
- Conclusions

What's the problem



What's the problem

What's the problem

natural gas

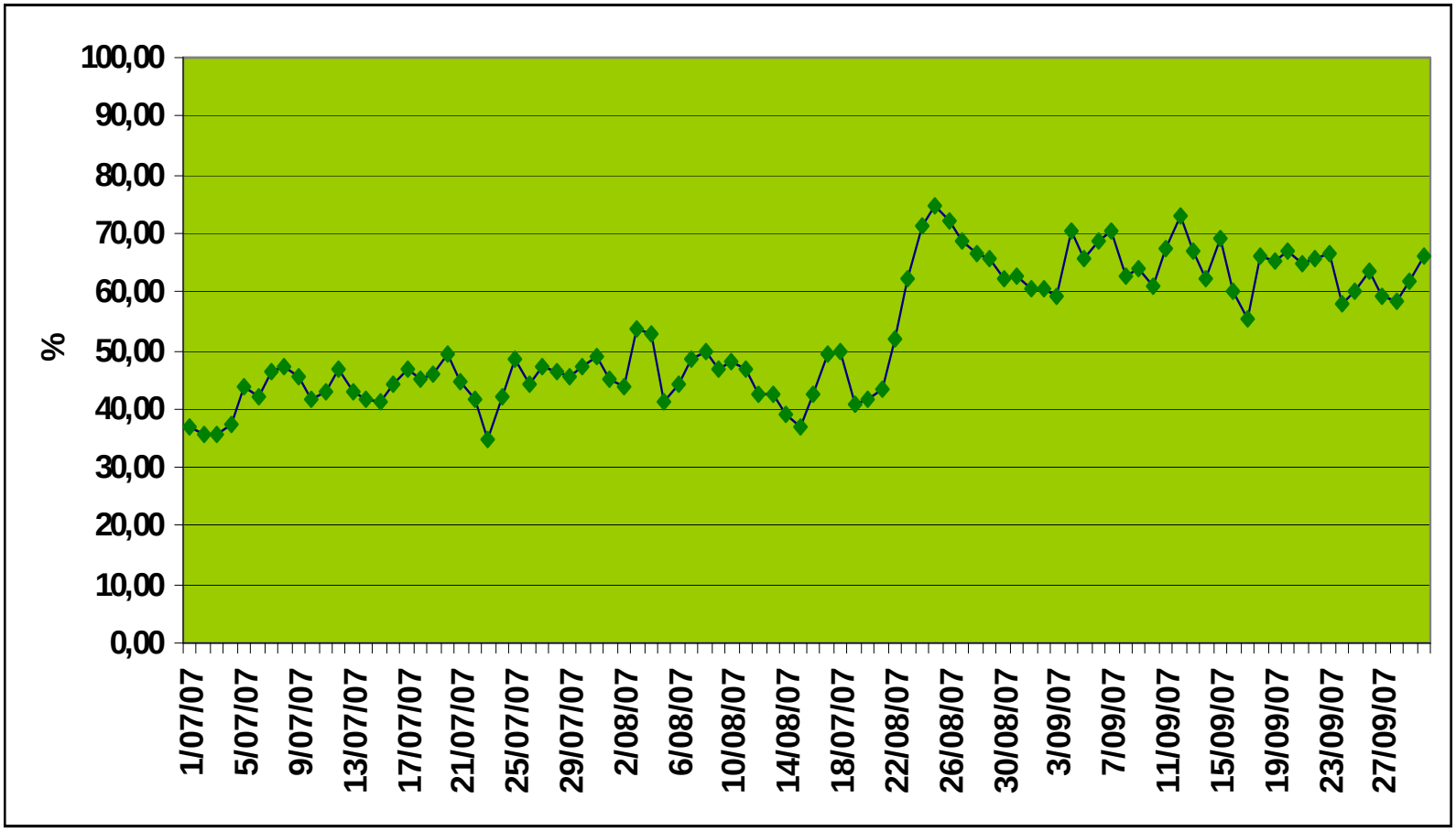
?

bio-oil

CO2

climate-neutral?

What's the problem



What's the problem

		emission factor kg CO2/t waste	waste type
balance method	plant 1	508+/-17	>90% HHW
	plant 2	316+/-21	60% HHW
	plant 3	511+/-22	60% HHW
EpE (2008)		293	HHW and non-haz. IW
Johnke (2003)		473	MSW
IPCC (2000)		557	MSW

Recognised biogenic (energy-) fractions in waste

Situation on EU-level

	% of energy
Austria	50
Belgium (Flanders)	47,78
Denmark	80
France	50
Germany	50
Italy	51
The Netherlands	48

Situation on EU-level

- Directive 2009/28/EC of 23 April 2009 on the promotion of the use of energy from renewable sources
- Article 22: “Each Member State shall submit a report to the Commission on progress in the promotion and use of energy from renewable sources by 31 December 2011, and every two years thereafter.”
- “The report shall detail, in particular: (n) information on how the share of biodegradable waste in waste used for producing energy has been estimated, and what steps have been taken to improve and verify such estimates.”

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Methods for determination

method	in/out	sample	determination	direct result for	
				energy	emission
selective solution	in	waste mix	%bio (weight), cv		
sorting analysis	in	sorted fractions	%bio (sel.sol./abitr.), cv		
C14 analysis	out	flue gases	C14		
balance method	in and out	energy + material	plant measurements		

Selective solution

Methods for determination

1. SAMPLING OF WASTE MIX	2. PREPARATION OF SAMPLE	3. ANALYSIS
representative	homogenisation 5 gram	selective sol. analysis =>bio analysis of cv calculation: cv x bio%

Selective solution: weakness

Methods for determination

- Representative sampling
- Sufficient homogenisation
- Accuracy of selective solution analysis (lignin…)
- No determination of biogenic CO2-emission
- Calculation of biogenic energy: calorific value is different for biodegradable and fossil fraction

Methods for determination

1. SAMPLING AND SORTING	2. ANALYSIS: CV AND BIO%	3. CALCULATIONS
representative manually	cv analysis of each fraction determination bio% - arbitrarily - selective solution	calculat. bio-energy of each fr. calculation of bio%

Methods for determination

- Representative sampling
- Arbitrary determination of biogenic energy in the fractions
- Historical value
- Accuracy

C14-analysis

Methods for determination

1. SAMPLING OF FLUE GAS	2. C14 ANALYSIS	3. CALCULATION
one-shot test lt sample, flow dependant	analysis C14 isotope specialised laboratory	calculation of bio%-emission calculation of bio%-eneregy

C14 analysis: weakness

Methods for determination

- Ratio of C_{biogen}/C_{fossil} in the atmosphere
- Limited number of laboratories
- Flow dependant sampling

Balance method

Methods for determination

1. REGISTRATION PARAM.	2.	3. MATHEMATICAL MODEL
existing instrumentation calibration CO2/O2-analysers		calculation of: - bio%-emission - bio%-energy

Methods for determination

- Complex mathematical model
- Influence on accuracy of some ‘special’ materials in the waste: bio-plastics, bio-oils, used-tyres…

Conclusions

- Determination of two relevant figures:
  - CO2-emission of biological-organic compounds
  - Energy contribution of biological-organic compounds
- Variations are important:
  - In one plant
  - Between different plants
- Four methods/analysis are under discussion
- Critical aspects: representative and accuracy
- EU-member states have to report the energy-contribution of biodegradable waste from December 31, 2011, onwards

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