

# Optimising biowaste management in Germany through the use of biobags:

## from composting towards digestion



# Overview

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# C.A.R.M.E.N.



- **Bavarian Agency for Renewable Resources**

- founded in 1992 initiated by the Freestate of Bavaria

- since 2001 part of the Competence Centre for Renewable Resources, Straubing (Germany)

- NPO, 70 members (agriculture, science, economy etc.)

- ✓ *co-ordination, management and evaluation of projects*
- ✓ *support market introduction of technology and products*
- ✓ *provide expert advice and information to all interested parties*





## Biowaste management in GER: from the beginning til now



- **1982:** pilot project bio-bin
- **beginning of the 1990s:**  
*increasing amount of waste, running out of landfill space*  
⇒ separate collection of biowaste, glass, paper and metal is introduced
- **present situation:**  
⇒ around 72% of municipalities have introduced the bio-bin  
⇒ ~ 600 composting and digestions plants are processing kitchen and green waste






## Biowaste management in GER: data and facts

Type of waste	Total (2007)	Per capita (2007)
Residual waste	13,800 kt	168 kg
Biowaste	8,200 kt	100 kg

- share of impurities (e. g. plastic) in the biowaste (**~ 5%**)
- **high content of biowaste in the residual waste (33%, 4,600 kt)**
- **only 36 million German (44%) use the bio-bin (inhabitants are not obliged to use it if they do home composting)**

## Biowaste management in GER: optimisation possible?



**decrease (or stabilise)  
the share of impurities in  
the biowaste fraction**

**increase the amount of  
biowaste collected**

**reduce the content of  
biowaste in the residual  
waste down to 20%  
(2,600 kt)**

improve technical and  
economical feasibility

reduce the  
environmental impact  
of biowaste  
management (GHG)

intensify communication

make sure that  
composting/digestion is  
processed under  
optimal conditions

continue to introduce the  
bio-bin (especially in  
medium and more  
densely populated areas)

**turn from composting  
towards digestion**

**make the collecting of  
biowaste more convenient  
and hygienic for households  
(e. g. by biobags)**

# Case history Straubing: data and facts



## Data

**Bio-bin introduction:**  
1992

**organic waste:**  
35,000 tons (kitchen waste:13,000 t,  
green waste: 22,000 t)

**processing of biowaste:**  
til 2008 open windrow composting,  
since 2009 dry fermentation

**share of impurities:**  
2%



- 120 km north-east of Munich

- 142,000 inhabitants per 1,300 km<sup>2</sup>
- local waste association: ZAW Straubing Stadt und Land (ZAW-SR)



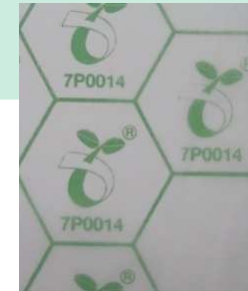
# Case history Straubing: goal



Situation	Goal and scope
+ Low share of impurities in the organic waste (2%)	Keep it steady
+ high amount of organic waste collected (~ 250 kg per capita)	keep it steady
– <b>numerous complaints and negative reporting in the media</b> ( <i>putrid smell, fast growth of moulds, insect eggs during summer, biowaste froze in bio-bins during winter</i> )	<b>render the collection of biowaste more convenient and hygienic for households</b>

⇒ **introduction of specially labelled, certified (EN 13432) 10-, 120- and 240-litre-biobags in 2004**

⇒ first 10 bags for free then sold at local retailers

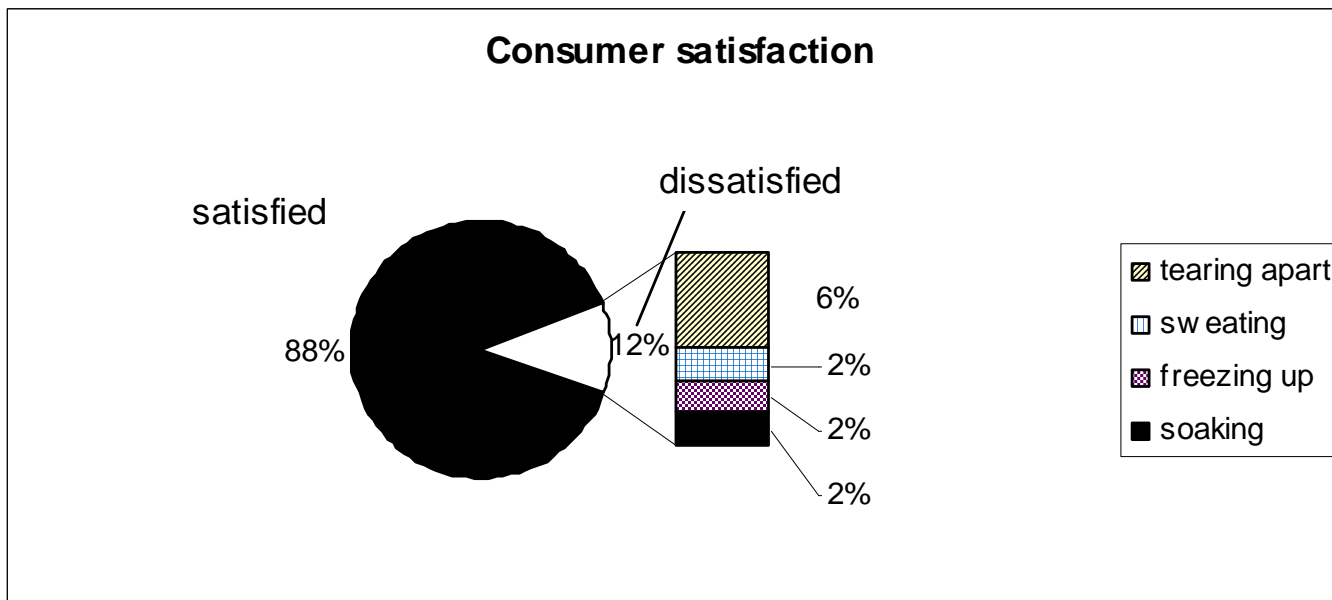




# Case history Straubing: project results



- No technical problems during the composting process
- consistent high quality of the compost
- no increase in impurities (*but no decrease, too*)
- **high rate of consumer satisfaction (88%)**



## Case history Straubing: from composting towards digestion



- **2008:** the local waste association (ZAW-SR) decides to build a dry fermentation plant for biowaste

⇒ **improve the technical and economical feasibility**

*“Renewable Energy Sources Act” (EEG) fixes a basic feed-in tariff for electricity production from biomass at 7.71-11.55 €ct per kWh (2010)*

- **2009:** starting of the new digestion plant





# Dry fermentation plant, Straubing: plant design and technical data



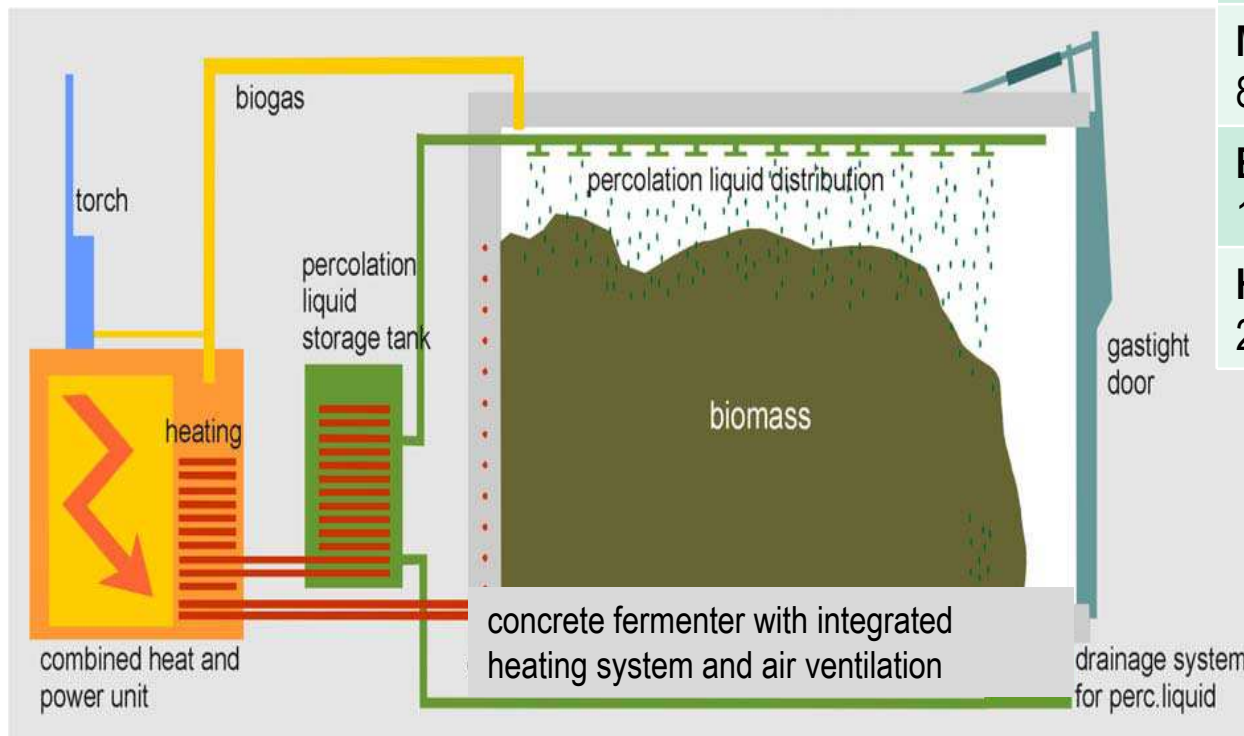
## Technical data Straubing

**Methane content:**  
50-60%

**Methane yield:**  
80-90 m<sup>3</sup> per ton biowaste

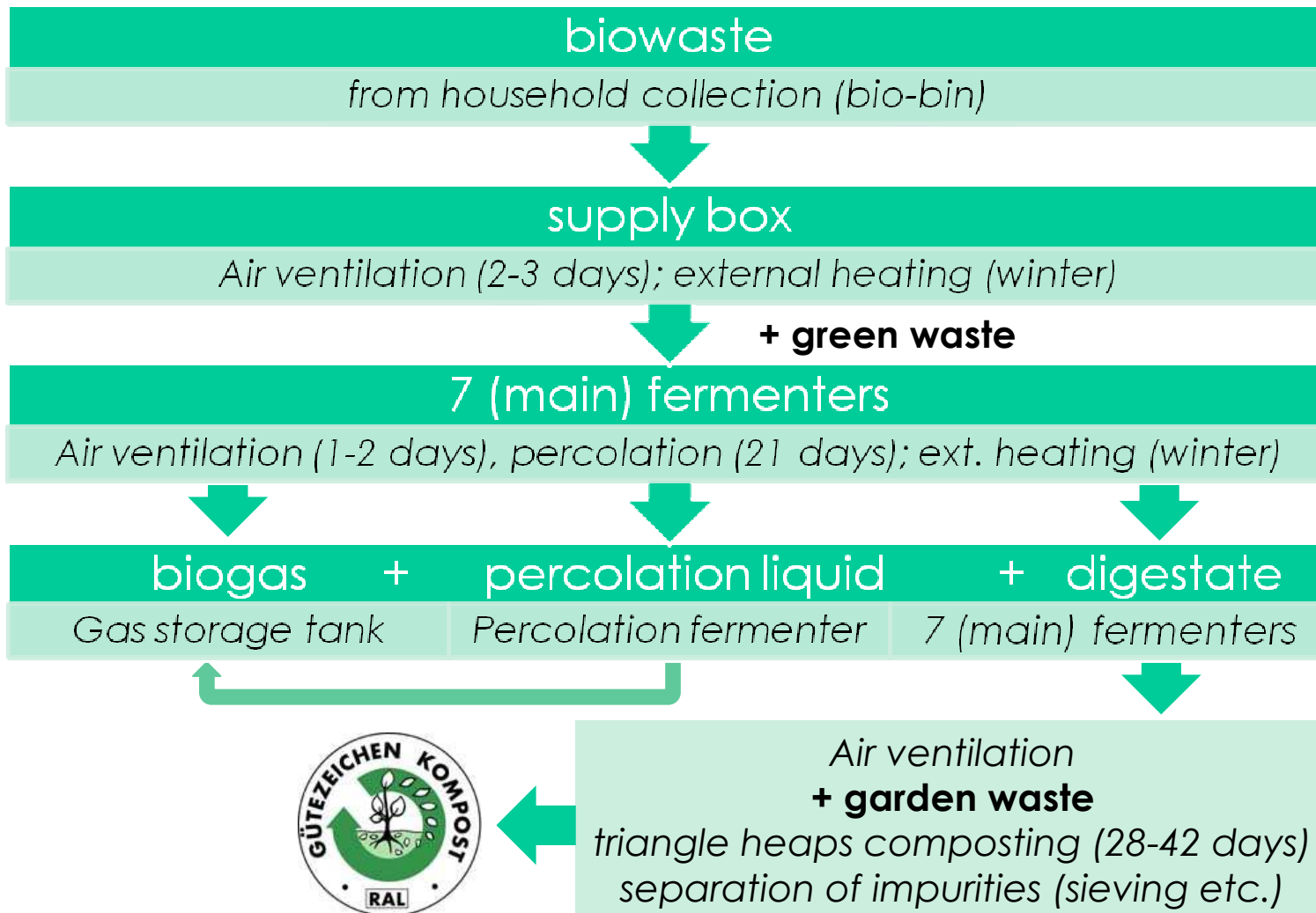
**Electricity production:**  
170 kWh per ton biowaste

**Heat production:**  
200 kWh per ton biowaste





# Dry fermentation plant, Straubing: process scheme





# Dry fermentation plant, Straubing: supply box and fermenters





# Dry fermentation plant, Straubing: gas storage tank, heat and power plant





## Case history Straubing: results



- biobags are gone after 3 weeks of digestion
- consistent high quality of compost can be produced
- **biobags are compatible with the existing dry fermentation technology (*fermentation boxes*)**



## Conclusions

- **Biobags facilitate biowaste management to households**
  - ⇒ consumer satisfaction can be improved
  - ⇒ good results (*amount and quality of biowaste*) can be kept steady
  - ⇒ moderate or bad results (*amount and quality of biowaste*) can be improved
- **biobags are compatible with different composting and digestion systems**
  - ⇒ *but*: each system must be checked in detail
- **high quality compost can be produced**



# Thank you

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... for your attention!

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