
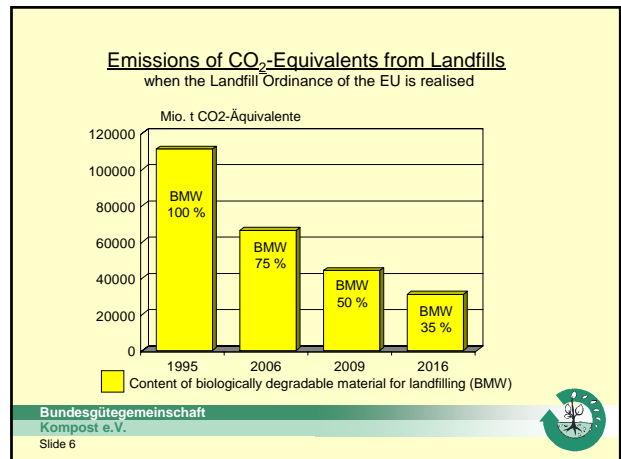
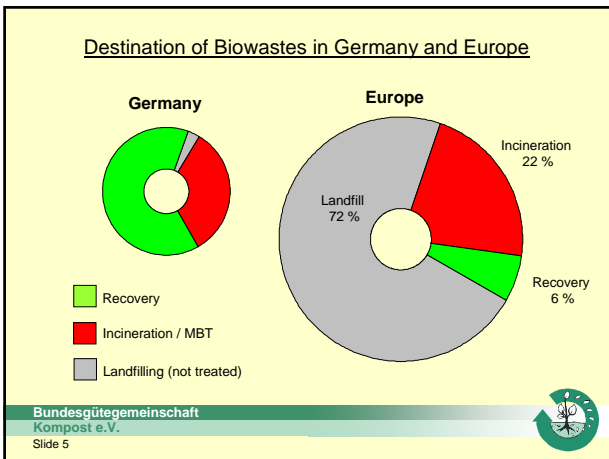
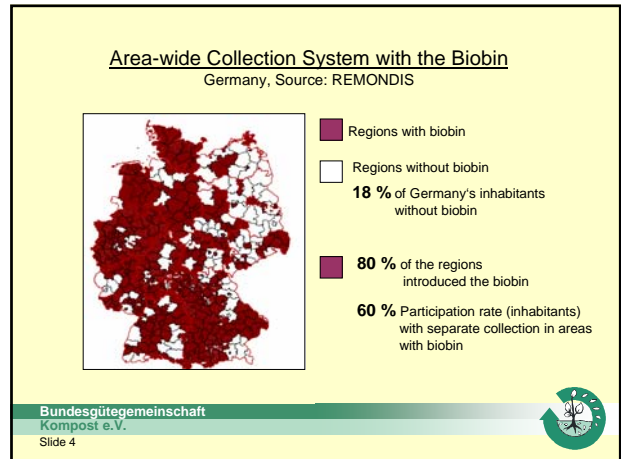
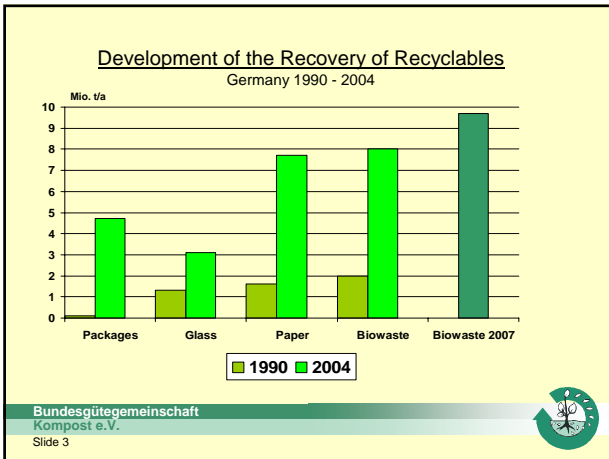
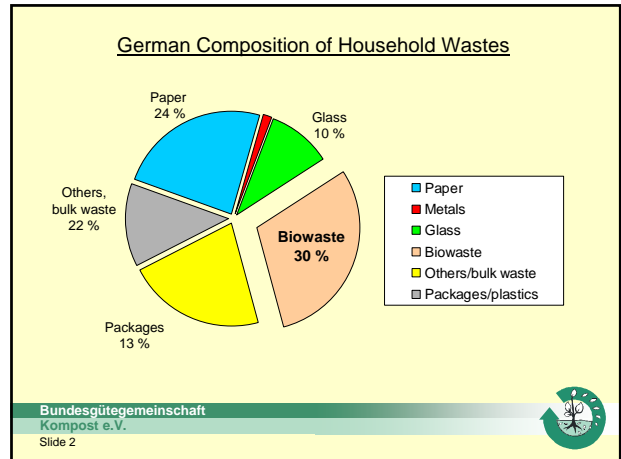


Long-term Outlook for Separate Collection and the Utilisation of Biowastes

„ECN-Workshop“
 The Future for Anaerobic Digestion of Organic Waste in Europe
 16 / 17 January 2008, Nuremberg/Nürnberg, Germany

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 Kompost e.V.

Benefits of Material Recovery of Biowastes

Soil nutrition

Humus supply
Humus effective for reproduction

Lime supply
Alkaline material as CaO

Plant nutrition

Basic fertilisation
P, K, Mg, S and trace nutrients

Nitrogen
Soluble contents, follow-up supply

Component in mixtures

Growing Media and Substrates
Top soils, Culture substrate

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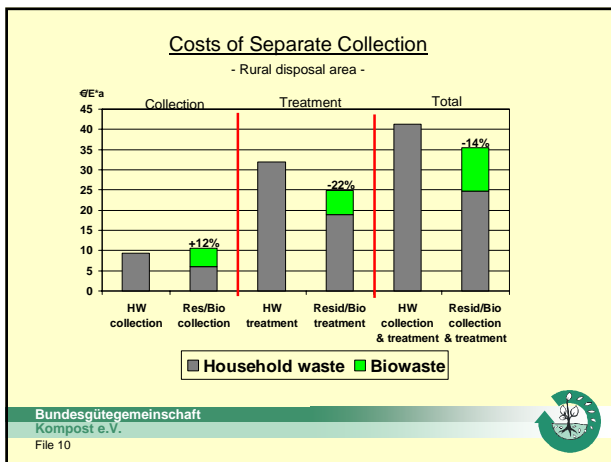
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Benefit Value of Biowastes: Treatment Options

Treatment Options	Compost		Digestion		Incineration
	material solid	energ./material solid	energ./material liquid	energ./thermal dry	energ./thermal dry
	Material recovery			Energy Recovery	
Humus reproduction	+++	++	+	-	-
Peat substitution	++	++	-	-	-
Nitrogen	+	+	+	-	-
Phosphorous	++	++	++	-	-
Other nutrients	++	++	++	-	-
Energy, heat	-	+	+	+(+)	++

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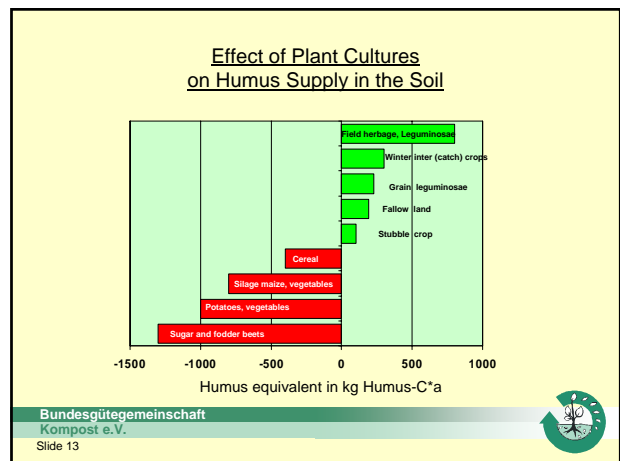
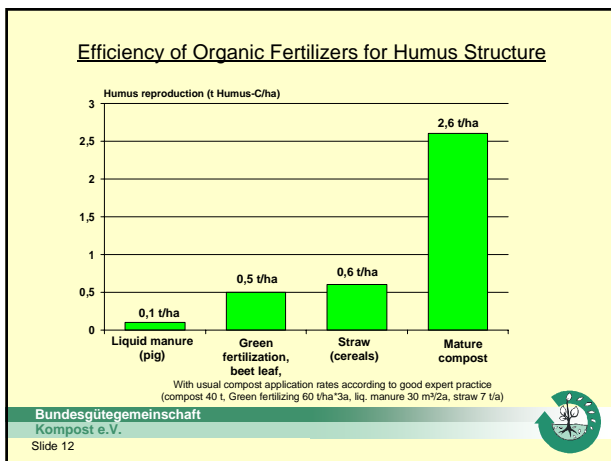
Value of Organic Matter

Biomass for humus reproduction	Humus-C ¹ rate Total carbon
Compost	51 %
Straw	21 %
Liquid manure	21 %
Green fertilisation	14 %

1) Humus-C is such carbon part that is stable against degradation, which can be used in the soil for humus reproduction.

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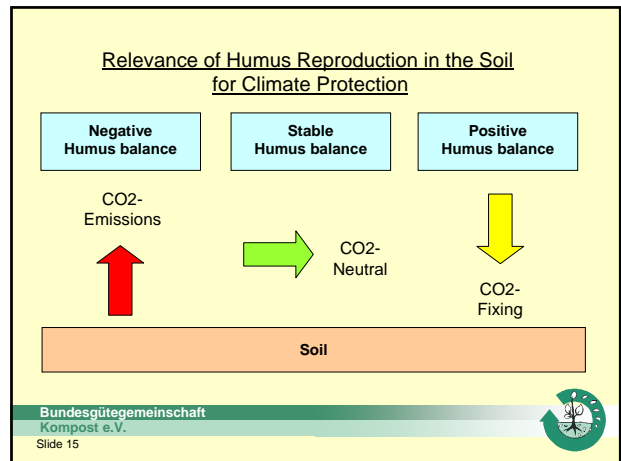
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Where Biomass is needed

Food stuff	Biomass for nutrition of humans and animals
Biomass	Biomasse for energetic utilisation
Humus supply	Biomass for the humus reproduction in the soil

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Suitability of Biowaste and Straw for Energetic or Material Recovery

	Biowaste	Straw
Humus-C rate in C-org. (compost / straw)	51 %	21 %
Calorific value (H _v)	4 MJ/kg	14 MJ/kg
Water content	60 % FM	13 % FM
Ash content (compost / straw)	45 % DM	15 % DM

Conclusion: Compost is the better humus fertiliser, Straw the better energy carrier
DM dry matter - FM fresh matter

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Potential of the Substitution of Straw for Humus Reproduction by Compost and Solid Digestion Residues

	Humus-C Mio. t/a	Humus-C %
Straw (remains on the field)	2.17	100 %
Biowaste compost	0.34	15.4 %
Solid digestates	0.13	6.0 %
Substitution potential	0.47	21.4 %

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Energy Potential at the Release of Straw at Alternative Humus Reproduction with Biowastes

Energy content of the used Biowastes/Digestion Residues	48 PJ/a
Energy content of the substituted straw	82 PJ/a

68,6 Petajoule = 68.600 Terajoule = 68.600.000 Gigajoule = 68.600.000.000 Megajoule
 Calorific values: straw 14 GJ/t, biowaste 4 GJ/t, 6 Mio. t straw, 4,8 Mio. t compost, 2,6 Mio. t solid digestion residues are based on ca. 12 Mio. t biowaste and digestion substrates.

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Potential of Fertiliser Substitution

	Nutrients ¹⁾ Mineral fertilizer	Nutrients ²⁾ Compost	Substitution Potential
Phosphate fertilizer	280.000 t	28.000 t	10 %
Potassium fertilizer	490.000 t	43.000 t	9 %
Lime fertilizer	2.100.000 t	175.000 t	8 %

1) Plant nutrients of amounts of mineral fertilisers sold in Germany
 2) Plant nutrients per annum in composts from separate collection of biowastes

Nitrogen	13.500 t	540 TJ
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Potential of Peat Substitution

Peat consumption	ca. 10 Mio. t
Substitution potential by compost and solid digestion residues	ca. 20 - 30 %
	2 Mio. t

Advantages of peat substitution:

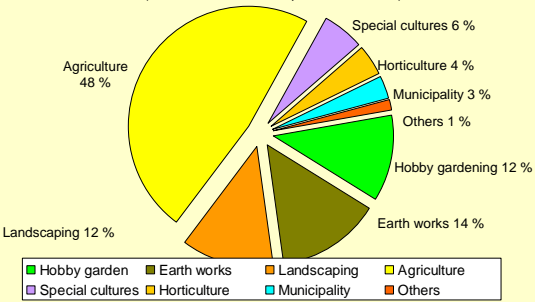
- Saving of the fossile raw material peat available in limited quantities
- Lowering of dependency on imports
- Lowering of CO2-Emissions

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Market Sectors for Compost

(total amount from BGK-plants ca. 3 Mio. t)



Agriculture	48 %
Landscaping	12 %
Earth works	14 %
Hobby gardening	12 %
Special cultures	6 %
Horticulture	4 %
Municipality	3 %
Others	1 %

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Development of Nutrient Value

2005 to 2007, Value in € per t FM and ha

Fertiliser	2005	2007	Increase
Compost	5,30 €/t FM	8,10 €/t FM	+ 52 %
	212 €/ha	320 €/ha	
Digestates solid	7,80 €/t FM	11,70 €/t FM	+ 51 %
	156 €/ha	235 €/ha	
Digestates liquid	4,45 €/t FM	6,72 €/t FM	+ 48 %
	123 €/ha	181 €/ha	

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Summary: Long Term Perspectives

- Recovery of biowastes by separate collection
- Costs of separate collection and treatment in comparison
- Protection of climate and resources belong together
- Importance of material recovery of biowastes increases
- Climate relevance of material recovery is not yet considered
- Surplus in supply is replaced now by surplus in demand

Separate collection and utilisation of biowaste is „best option“

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Thank you very much
For listening



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