

# Composting and Compost use in Organic Farming

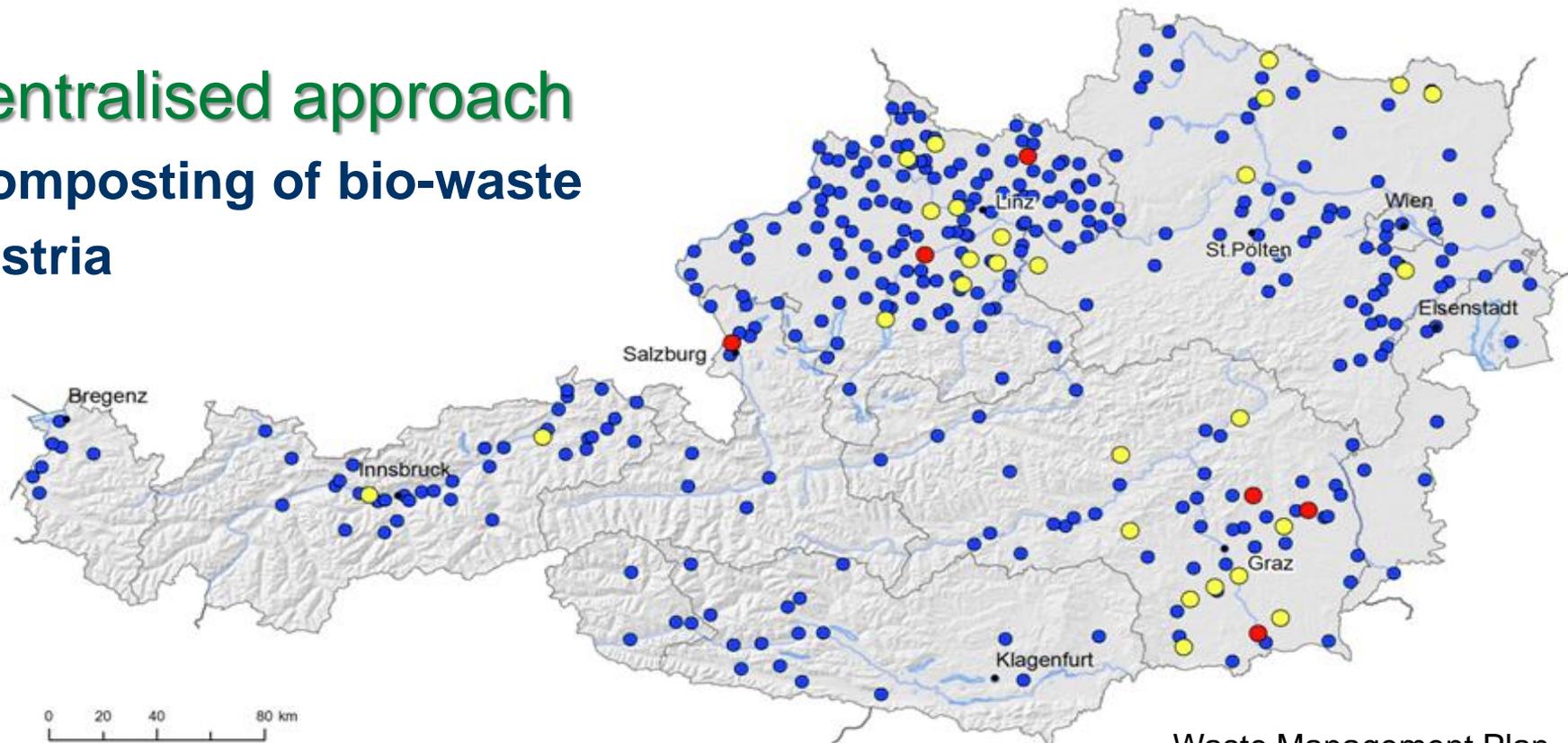
Tartu & Tallinn - 4 & 5 October 2017



How to do composting on farms? –  
The decentralised agricultural  
composting system in Austria

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Compost – Consulting & Development  
100NGO

# The decentralised approach for composting of bio-waste in Austria



Waste Management Plan 2017; Data from 2015

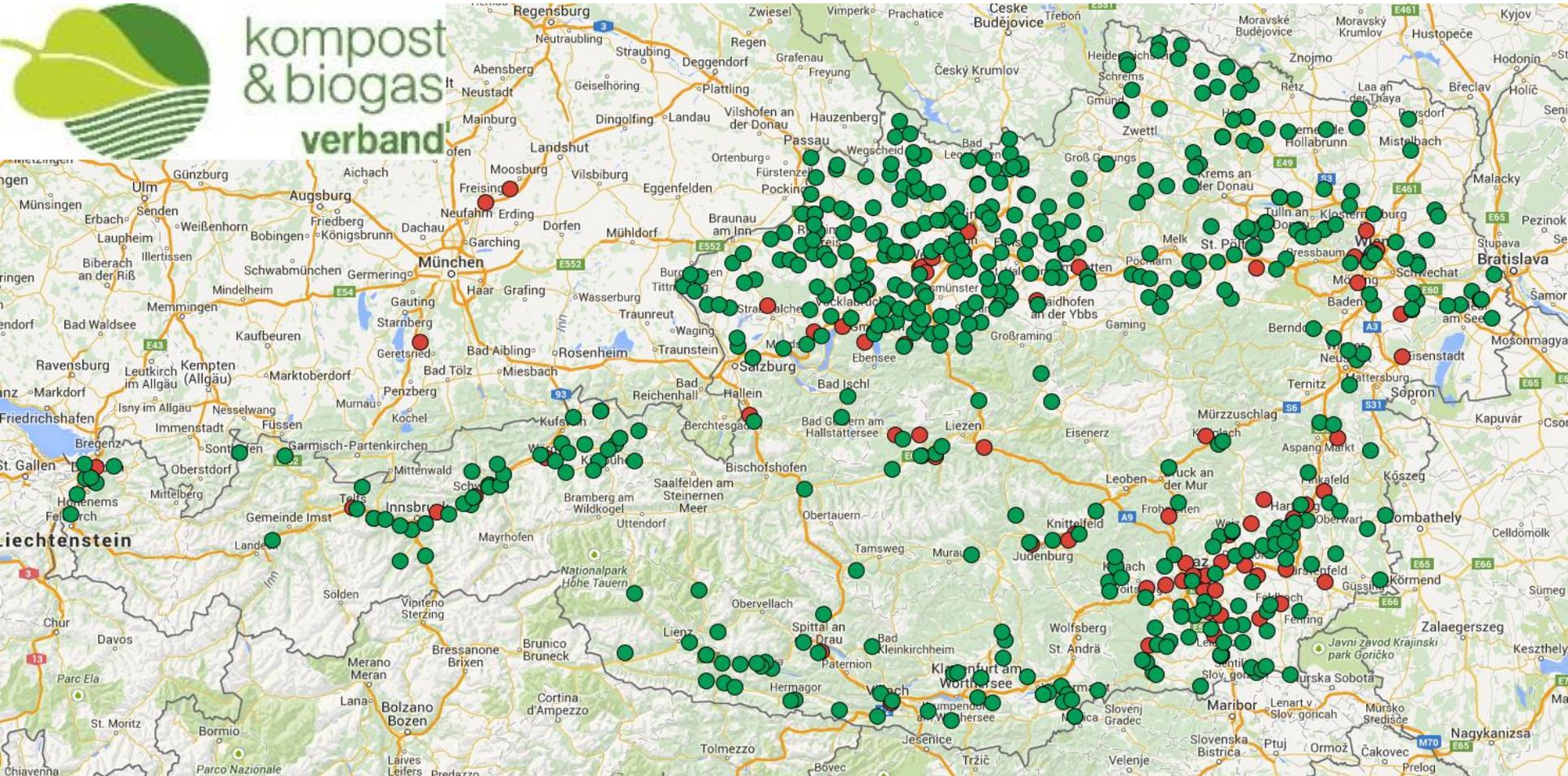
8.8 mio inhabitants

<b>Number of plants</b>	<b>404</b>
<b>Treated bio-waste &amp; sludge</b>	<b>1.14 Mt</b>
<b>Average treatment/plant</b>	<b>2 800 t</b>

~ 21 000 INH or 9 500 HH per plant



# ... Compost & Biogas Facilities = Members of Compost & Biogas Association Austria



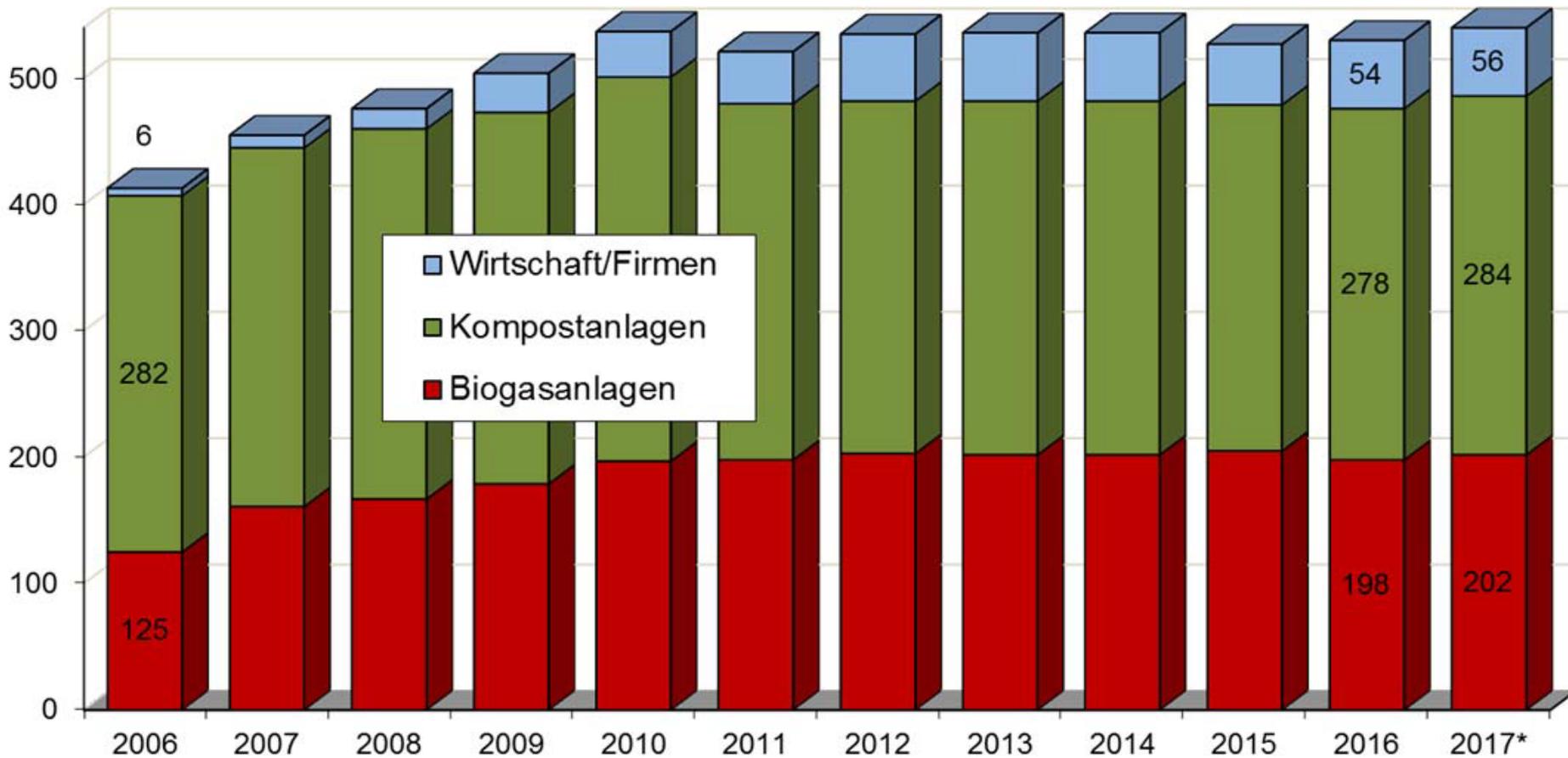
kompost  
& biogas  
verband

Number composting plants AT	404
Treated bio-waste & sludge AT	1.14 Mt
Average treatment/plant	2 800 t

➔ 284 / 70% with KBVOe-QAS  
➔ 132 kg/INH ... = 300 kg/HH



# Austrian Compost & Biogas Association ... Members



# The pillars of decentralised biowaste management



High quality home  
composting  
(= prevention)



Separate collection  
where home composting is not feasible



Favouring  
decentralised on-farm or  
municipal composting



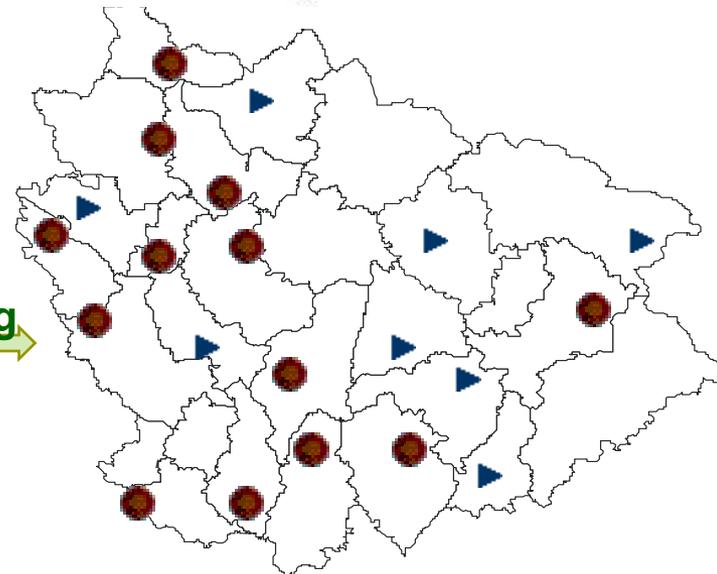
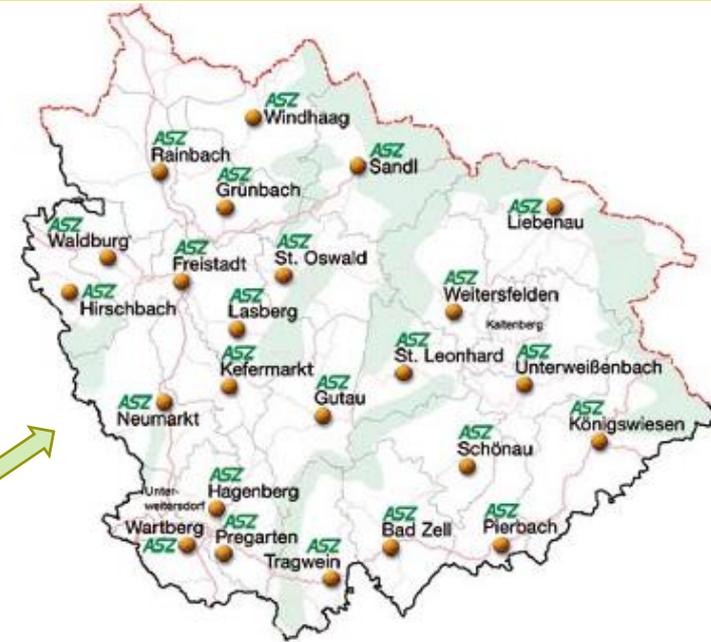


- **The Austrian Biowaste Ordinance (1992)**
  - *Obligation for source separation* and biological treatment of organic waste
- **The Austrian Compost Ordinance**
  - End of Waste *Quality Standards* for compost including documentation
- **Guidelines for Best Available Techniques and good practice**
  - *Technical standards* for *design and operation* of composting and Biogas plants
- **Standards and guidelines for the use of compost & digestate**
  - *ÖNORM* - Austrian *Standards* and technical sheets for *Compost Substrates* and *application rules for digestate*
- **Implementation of the EU Animal By-Products Regulation**
  - *Hygienisation / Sanitisation rules* for catering waste and other animal by-products

# Concept I ... SEMI-RURAL-URBAN: Each Municipality → 1 Composting Plant



- Basic waste-economy-law since 1991
- Organisation and coordination of district wise waste management
- 180 recycling centres for 1,4 Mio Population
- 159 composting plants = *9000 INH/plant*
- LAVU: Provincial Recycling Company with central recycling centre & logistic centre



Recycling centres

Composting plants



Population	64.900
Inhabitants / km <sup>2</sup>	65
Nr. of municipalities	27
Municip. >5,000 - 10,000	1
Municip. > 2,000 - 5,000	13
Municip. 1,000 – 2,000	12
Municip. < 1000 Inh	1
Mean population per municipality	2.400

Waste treatment	MBT/INC
CA-Site: Waste collected in %	54% (!)
Residual waste - door to door	13 x [48 %]
Nr. Composting plants	10 food w. 8 green w.
Operator	Farmer
Av. quantity / plant	1.000 m <sup>3</sup>



# Dense net of recycling centres (RC)



# Green waste delivery at the **RECYCLING CENTRE**

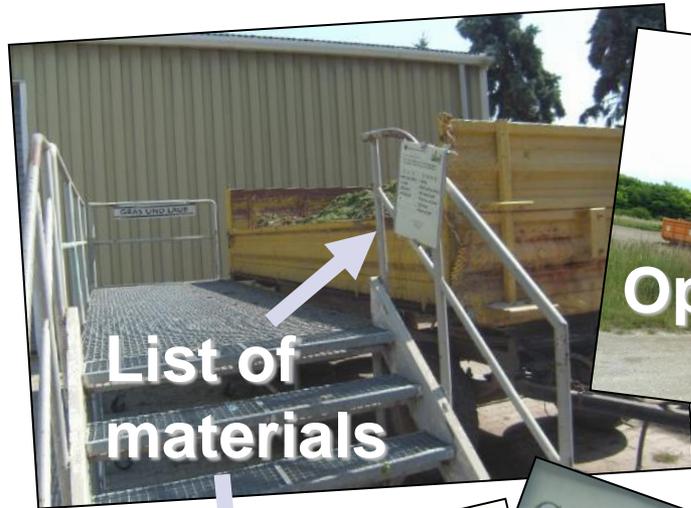


# ... or at specific **Garden Waste Collection Sites** – *Good Examples*



# Garden Waste Collection Sites

## Fencing – opening hours – what type of green waste



List of materials



Fence  
 Opening days  
 & hours



Sehr geehrte Mitbürgerinnen!

Wir bieten Ihnen weiterhin die kostenlose Entsorgung von Mähgut (Grasschnitt) an.

☺ JA ☺	☒ NEIN ☒
•Grasschnitt	•Äste
•Laub	•Strauchschnitt
•Blumen	•Baumschnitt
•Fallobst	•Küchenabfälle
•	•Steine
•	•Bauschutt

Mit freundlichen Grüßen  
 Der Bürgermeister  
 Tobias Müller

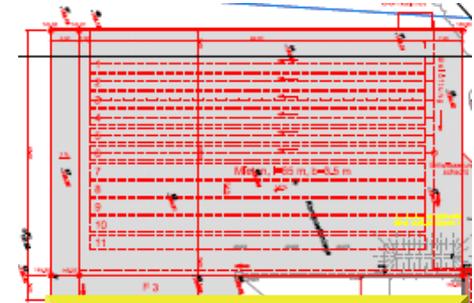
Grünschnittübernahme  
 Samstag 8 bis 11.30 Uhr  
 Dienstag 13 bis 16 Uhr



# Biowaste – composting decentralised plants



**Turner**



**Engineering**

## WMA

Coordination, consulting, plant planning  
 advertisements, **subsidies**

**Province Upper Austria**  
 Consulting, **subsidies**

**Municipalities**  
 Contracting party  
**subsidies**

## Farmers

**Finances 25 to 50% of CapEx for construction and machines**  
 collection + controlling  
 Compost production  
 Quality assurance – working group

contracts



**Collection truck**



**Shredder**



**Screen**

# The Farmers Contract

## The State of the Art of Composting

A guideline in good practice



Tender & Selection	<ul style="list-style-type: none"><li>➤ Proximity; <b>accessibility</b></li><li>➤ Approved <b>Compost Master</b></li><li>➤ Land and human <b>resources</b></li></ul>
Treatment	<ul style="list-style-type: none"><li>➤ Treatment of all materials received</li><li>➤ <b>Waste license</b></li><li>➤ Operation according to "State of the Art of Composting"</li><li>➤ Gate fee: <b>€ 45 to 65.-</b></li></ul>
Quality Management	<ul style="list-style-type: none"><li>➤ <b>Record keeping &amp; documentation</b></li><li>➤ Membership in an <b>Quality Assurance Organisation</b> with at least yearly external inspection</li></ul>
Compost Use	<ul style="list-style-type: none"><li>➤ On own agricultural land according to "<b>Good Agricultural Practice</b>"</li><li>➤ Delivery to the City Council for the use in <b>public park &amp; garden</b> maintenance as well as <b>citizens</b></li><li>➤ Marketing according to <b>Compost Ordinance</b></li></ul>

# Implementing the collection scheme



- 15 information evenings for individual quarters; „Waste counselors“ visit the households who couldn't attend these events
- After this the region was included in the collection scheme
- Distribution of 15 to 35 Litre buckets to each household
- Every bucket with name and address
- Weekly emptying
- Collection is done by farmers





# Simple collection trucks also for bio-bins



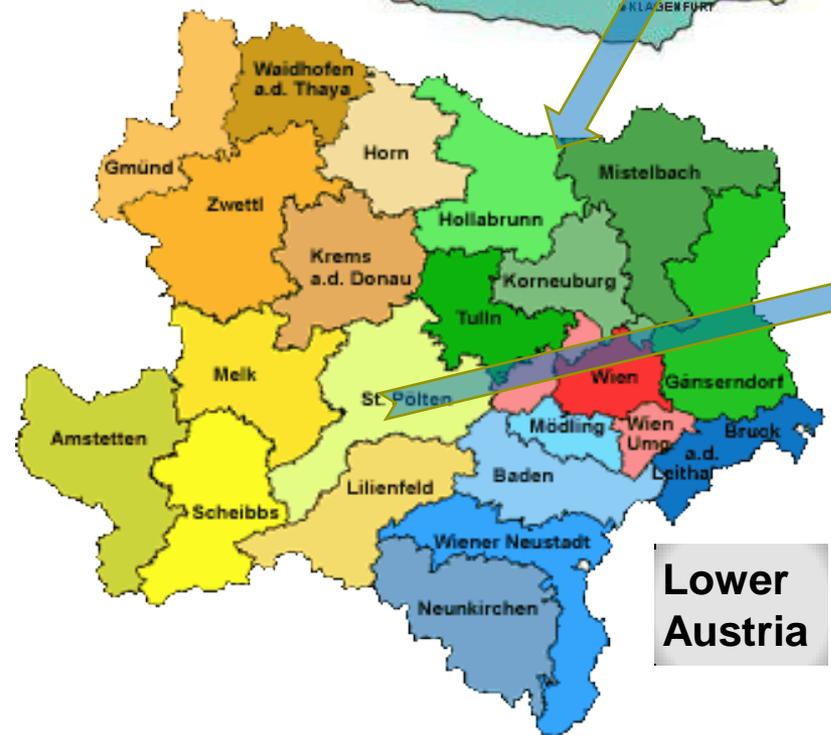
# Concept II: SEMI-RURAL-URBAN

## St. Pölten District (Lower Austria)

### ONE District → several Composting Plants



Austria



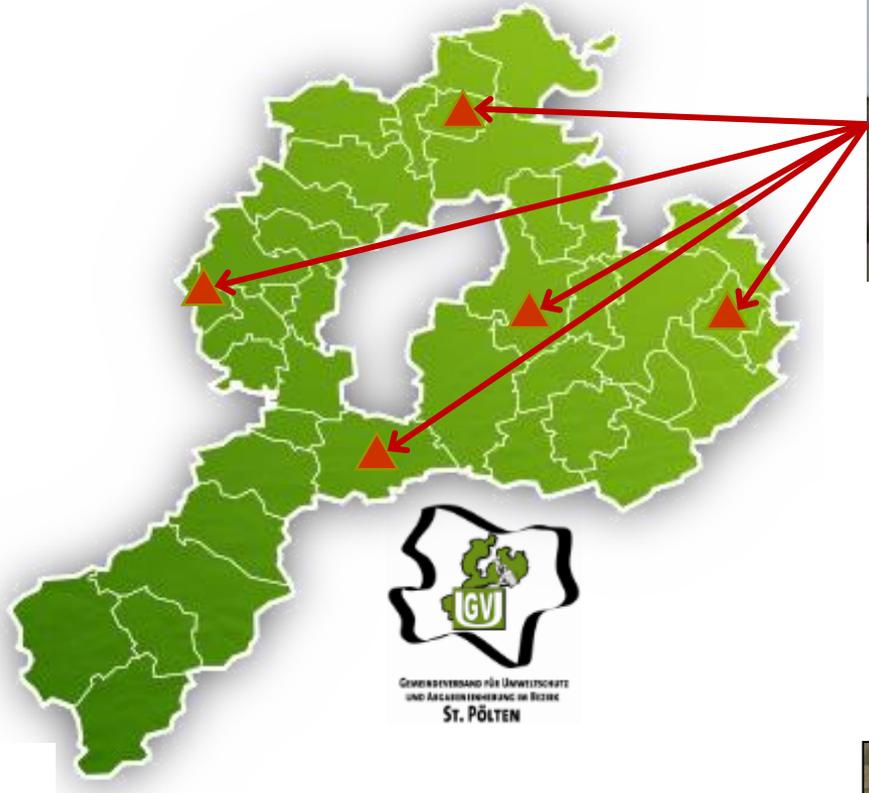
Lower Austria



St. Pölten City

- Inhabitants: ~ 98.000
- Area: ~ 1.043 km<sup>2</sup> , rural structure
- Municipalities: 37
- Households: ~ 37.700

# Concept II ... SEMI-RURAL-URBAN: ONE District → several Composting Plants



Delivery of the bio-waste in an alternating rotation to 5 different agricultural on-farm composting plants



Kerbside collection at every house



**Biomüll**

Gemeindeverband für  
Umweltschutz St. Pölten-Land

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# The collected biowaste



- MSW from HH: 38.000 tons = ~1.008 kg/HH = 403 kg/Inh
- Biowaste (DtD): 5.800 tons = 154 kg/HH = 62 kg/Inh

*[for HH / INH WITH a bio-bin = 406 kg/HH = 162 kg/INH]*

- Bulky green waste: 4.900 tons = 130 kg/HH = 52 kg/Inh
- Fine green waste: 3.000 tons = 80 kg/HH = 32 kg/Inh

- 
- Total Organics 13.700 tons = 364 kg/HH = 146 kg/Inh

= 36% of total household waste

- Households with Bio-bin: ~ 38%

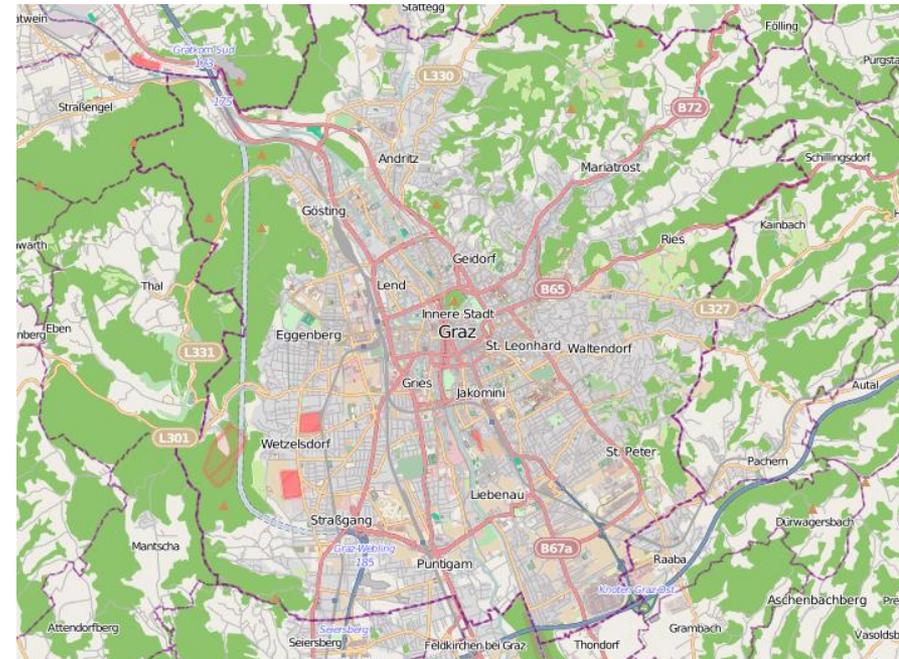
# St. Pölten: 5 composting plants within the district



# Concept III: **Agro-Urban Cooperation**

## The City of **Graz**

the capital of the  
province of Styria



**Inhabitants (Inh)**

**Graz: 287.000**  
**Suburbs: 35.000**

**Population density**

**Graz: 2.250/km<sup>2</sup>**  
**Suburbs: 100/km<sup>2</sup>**

## The Graz Compost Cycle – from WASTE to PRODUCT



### Collection of bio-waste

- Organisation & control by Holding Graz - Waste Management
- Collection by SERVUS ABFALL

### Pre-treatment of bio-waste

- Pre-treatment facility of the der Holding Waste Management

### Composting

- 18 agricultural and commercial composting plants in the province of Styria
- A.D. BioErde und Kompost GmbH

### Marketing of products

- At the Recycling Centre of Holding Graz Waste Management



# Graz – Door to Door collection:



- **Paper and cardboard** → currently ca. 75% ... 240 litre **red lid** → included in residual waste charge
- **Plastic packing material**
  - 110 litres **Yellow bags** // 1.100
  - litres container → multi-storey building
  - → collection is covered by packaging license fee under the *Packaging Ordinance (Producer Responsibility Scheme)*

- **Obligatory Residual Waste bin** (120 / 240 /1100 liter)
- **Collection:** 5 x /week to 1x /month

Bin	Waste fee / year			
	Collection:	weekly	1x/2 weeks	1x/month
120 litre		435,-	218,-	<b>110,-</b>
<b>Home compost bonus</b>		<b>- 61,-</b>	<b>- 31,-</b>	<b>- 18,-</b>
240 litre		719,-	360,-	<b>180,-</b>
<b>Home compost bonus</b>		<b>- 123,-</b>	<b>- 61,-</b>	<b>- 31,-</b>
1100 litre		3.049,-	1.527,-	---
<b>Home compost bonus</b>		<b>- 553,-</b>	<b>- 277,-</b>	---

- **Obligatory Bio-Bin:** 50 % of Residual Waste volume
  - 17.400 \* 120l / 11.550 \* 240 l / 250 \* 1.100 l  
= **29.200 bins** = 15l / EW
  - 5 trucks, 2 with cleaning device, 15 drivers/loaders
  - **BUT:** Possibility to opt out  
→ **Home compost bonus !**
- **Collection frequency:**
  - April – October** = 1 x/week
  - November – March** = 1 x/2 weeks
  - = 38x /yr**

# URBAN central pre-treatment of source separated bio-waste



Delivery of pre-mixed bio-waste for composting to several farms

Inhabitants (Inh)	Graz: 287.000 Suburbs: 35.000	
Population density	Graz: 2.250/km <sup>2</sup> Suburbs: 100/km <sup>2</sup>	
HH with Bio-bin	Graz: 77% (95%) Suburbs: 41%	
HH with Home composting	Graz: 15% Suburbs: 85%	
<b>Collected and treated organic waste</b>		
BIOWASTE	Graz: 22.000 t Suburbs: 3.000 t	76 kg/INH 85 kg/INH
GREEN WASTE	7.000 t	94 kg/INH
TOTAL	32.000 t	100 kg/INH



# Pre-Treatment and Mixing Bio-Waste & Green Waste at Central Recycling Centre



Bio-waste after unloading



Mixing

- Shredding of woody garden waste
- Separation of bulky impurities
- Mixing of bio-waste from the bio-bin with garden and park waste
- Separation of ferrous metals with magnetic separator
- Automatic loading of transport containers (ca. 9 t / container)
- Collection of leachate / press water from collection trucks



Shredding of bulky green waste

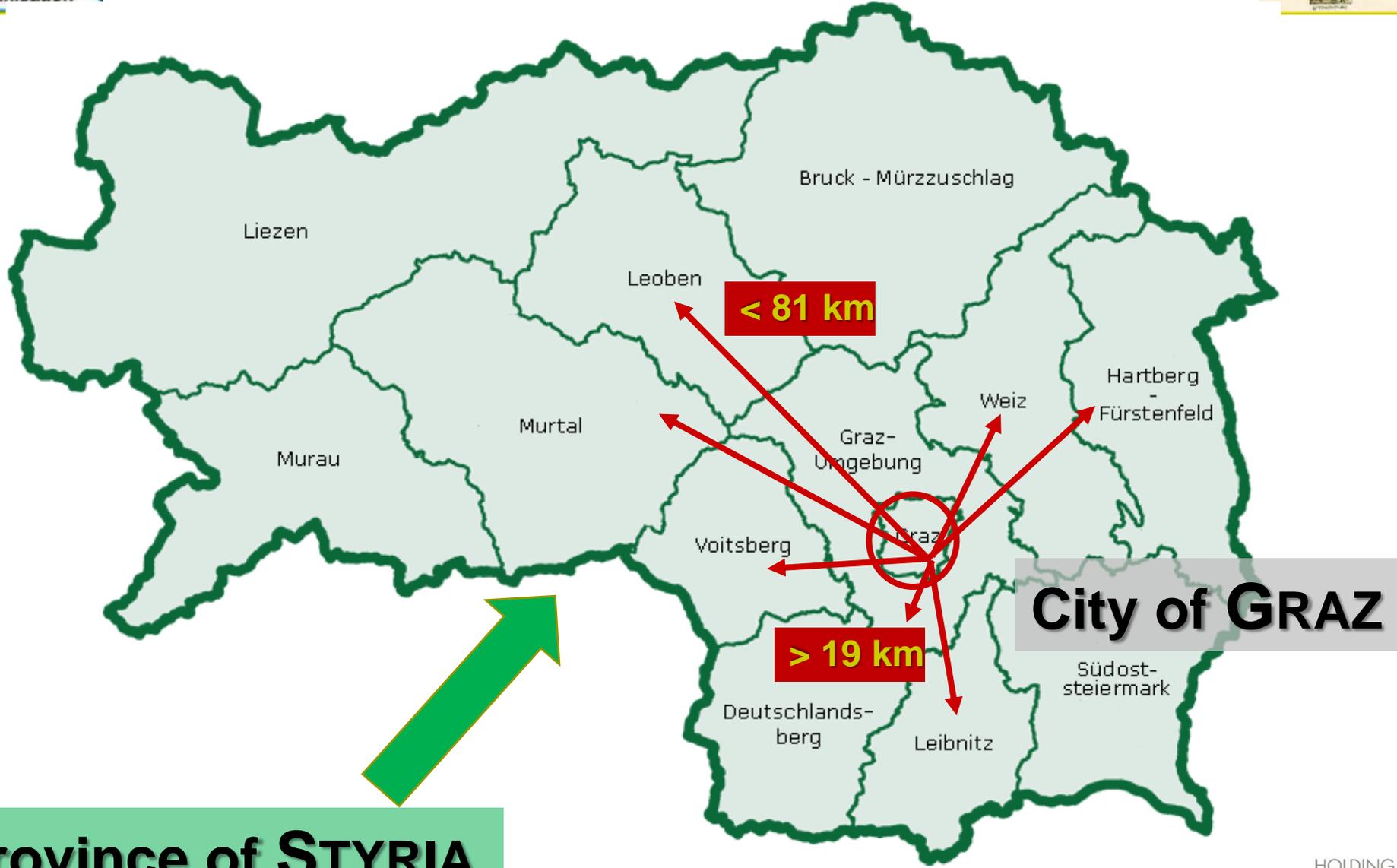


Ready for Transport

**Transport:** < 50 t/d (January to February) up to >200 t/d are delivered to 18 composting plants (maximum 75t/d per plant because of the rules of the **INDUSTRIAL EMISSION DIRECTIVE - IED**)

<b>Specific costs:</b>	Pre-treatment:	€ 19,67/t		€ 480.000,-/a
	Transport:	€ 11,78/t		€ 380.000,-/a

# Graz – Step 2: Transport to 18 Agricultural On-Farm Composting Plants

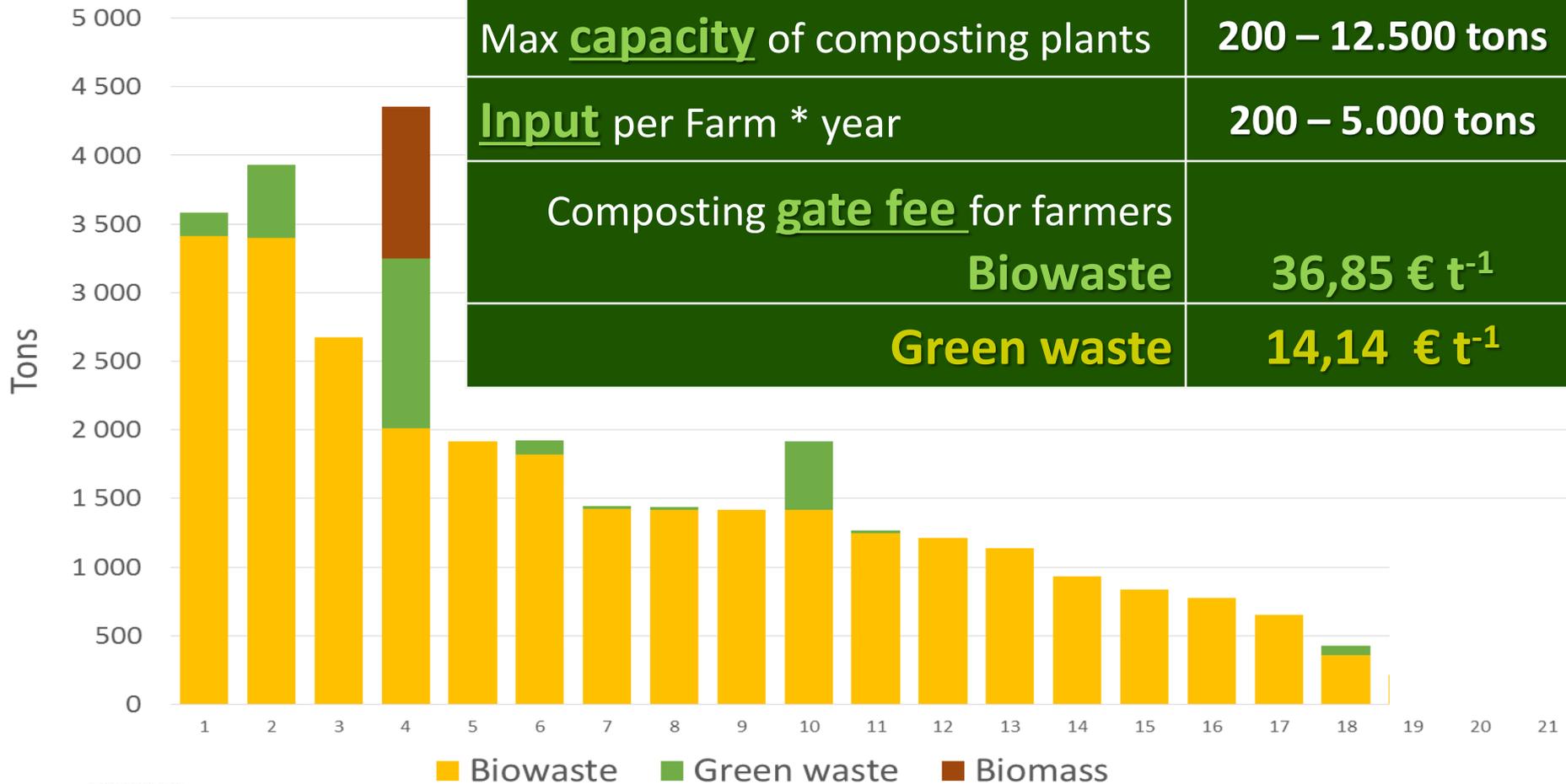


Province of **STYRIA**

# Graz – Quantity of Biowaste delivered to the On-Farm Composting Plants



Quantity of Bio and Green Waste distributed to 18 On-Farm Composting Plants



Max **capacity** of composting plants

200 – 12.500 tons

**Input** per Farm \* year

200 – 5.000 tons

Composting **gate fee** for farmers

**Biowaste**

36,85 € t<sup>-1</sup>

**Green waste**

14,14 € t<sup>-1</sup>

■ Biowaste ■ Green waste ■ Biomass





Bioabfall

Apfelbutzn rein,  
Plastik nein



Eine Aktion der arge kompost & biogas, [www.kompost-biogas.info](http://www.kompost-biogas.info)



Danke

WAS IST BIOABFALL?

Alle Abfälle biogener Herkunft aus Haushalt und Garten

Bioabfall  
Apfelbutzn rein,  
Plastik nein

Erklärung „Der wertvolle Bioabfall“  
Eine Aktion der arge kompost & biogas, www.kompost-biogas.info

## WAS IST BIOABFALL?

Alle Abfälle biogener Herkunft aus Haushalt und Garten





# Biannual International Practitioner Day ... since 2009





**Many Thanks!**



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