



## Sustainable Waste Policy

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# **Saving resources and protecting the climate – waste policy concept of Alliance 90 / The Greens in Germany**

**ESWET Workshop  
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### Alliance 90/The Greens -Who we are

- **Our Mission: party of peace, social fairness, protection of the environment and sustainable development.**
  - **In German Parliament for more than 25 years. National election results up to 10.7 %.**
  - **From 1998 – 2005 part of the government; Mr. Jürgen Trittin was the first “Green” Federal Minister for Environment.**
  - **Key Green successes: phasing out of nuclear power, passing the Renewable Energy Act and implementation of CO<sub>2</sub> emission trading.**
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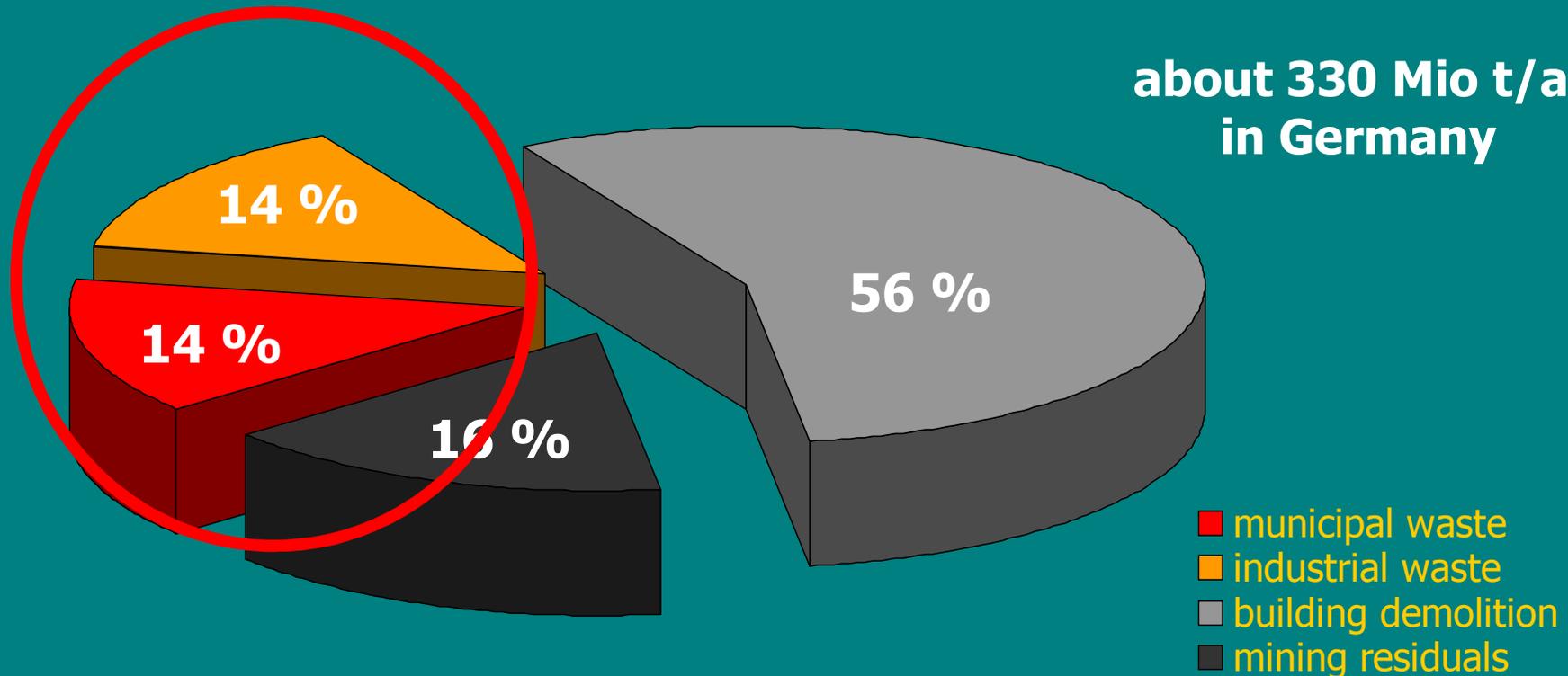
## Content

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- **What is waste?**
  - **Germanys waste policy**
    - investments, successes, benefits
  - **What needs to be done?**
  - **The Green 2020 Waste Concept**
    - Green measures for “closing the loop”
  - **How to deal with what is left?**
    - Landfilling, Pyrolysis ,MBT, Waste to Energy?
  - **Conclusions**
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## What is waste?

**about 330 Mio t/a  
in Germany**



- **Municipal waste is not the largest segment, but due to its inhomogeneous consistence it is responsible for the main part of the problem.**



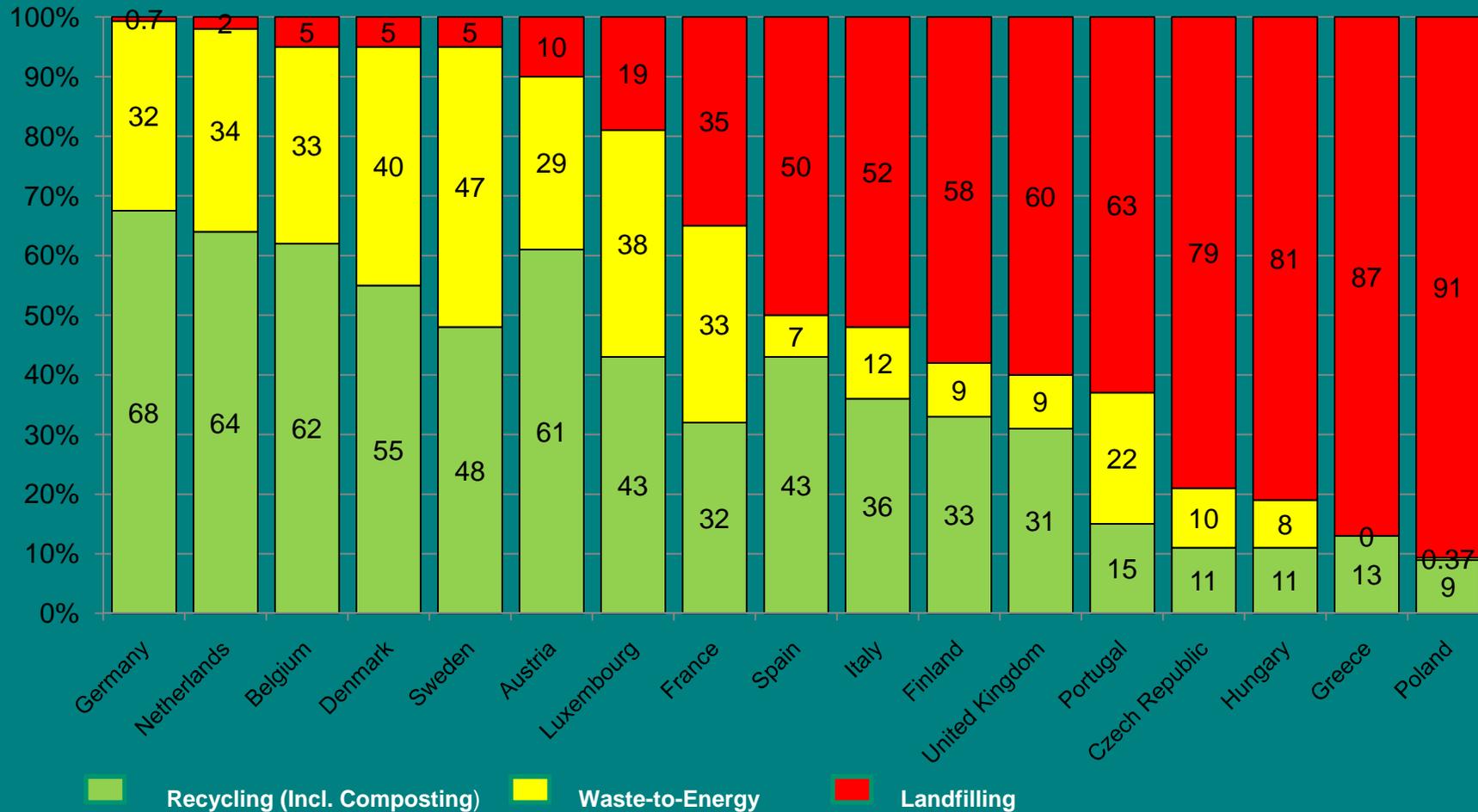
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### **“Milestones” in waste regulation since the 90’s**

- **Technical Guidance for Municipal Solid Waste 1991**
  - **Packaging Regulation 1992 (light weight packaging)**
  - **17. Regulation to the Clean Air Act for waste incineration plants 1992**
  - **Law on Cycle-Waste-Management 1996**
  - **Regulation on Organic Waste 1998**
  - **Regulation on Disposal of Waste 2001 (obligation to treat before landfillig, directive under Green government)**
  - **Regulation on Waste Electrical and Electronic Equipment 2005**
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## Treatment of MSW in the EU 27 in 2006



### **Benefits for the environment and the economy**

#### **Waste treatment**

- **is climate protection:**
  - **collection und recycling is responsible for savings of 17,000 Mio. tons CO<sub>2</sub> eq.,**
  - **4.5 % reduction of greenhouse gas emissions since 1990 in Germany (56 Mio. tons CO<sub>2</sub> eq.)\*,**
- **is a job engine. 250.000 employees in waste economy in Germany in 2006,**
- **is a business with a turnover of 50 Bill. Euro per year in Germany,**
- **is a lead market for environmental technologies and technology transfer.**

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\* witch outphasing landfills + increased recycling and recovery activities



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**So is everything going fine?**

**Can we sit back and relax now?**

**No, there is still a lot of work do to!**

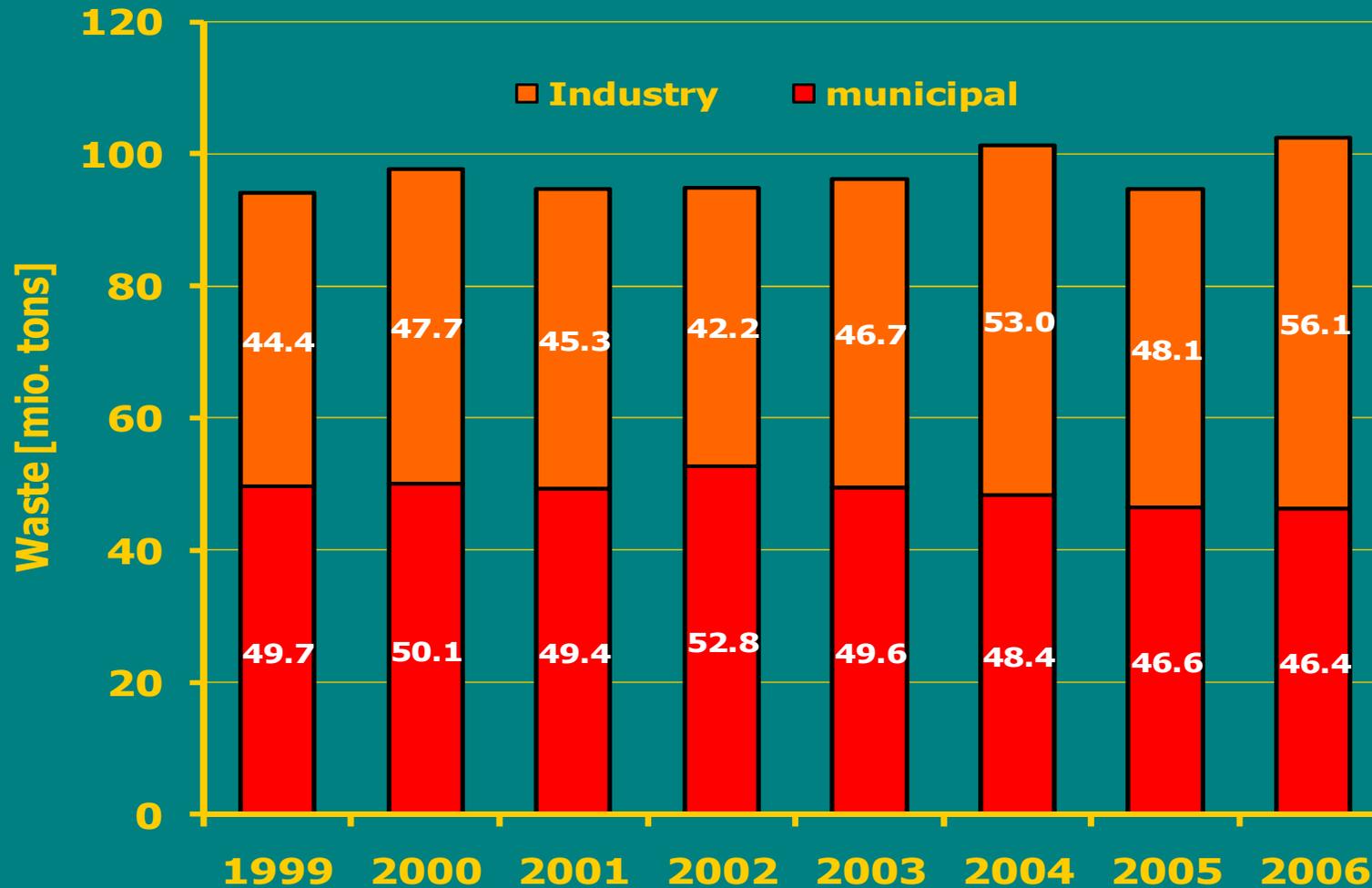
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## What needs to be done



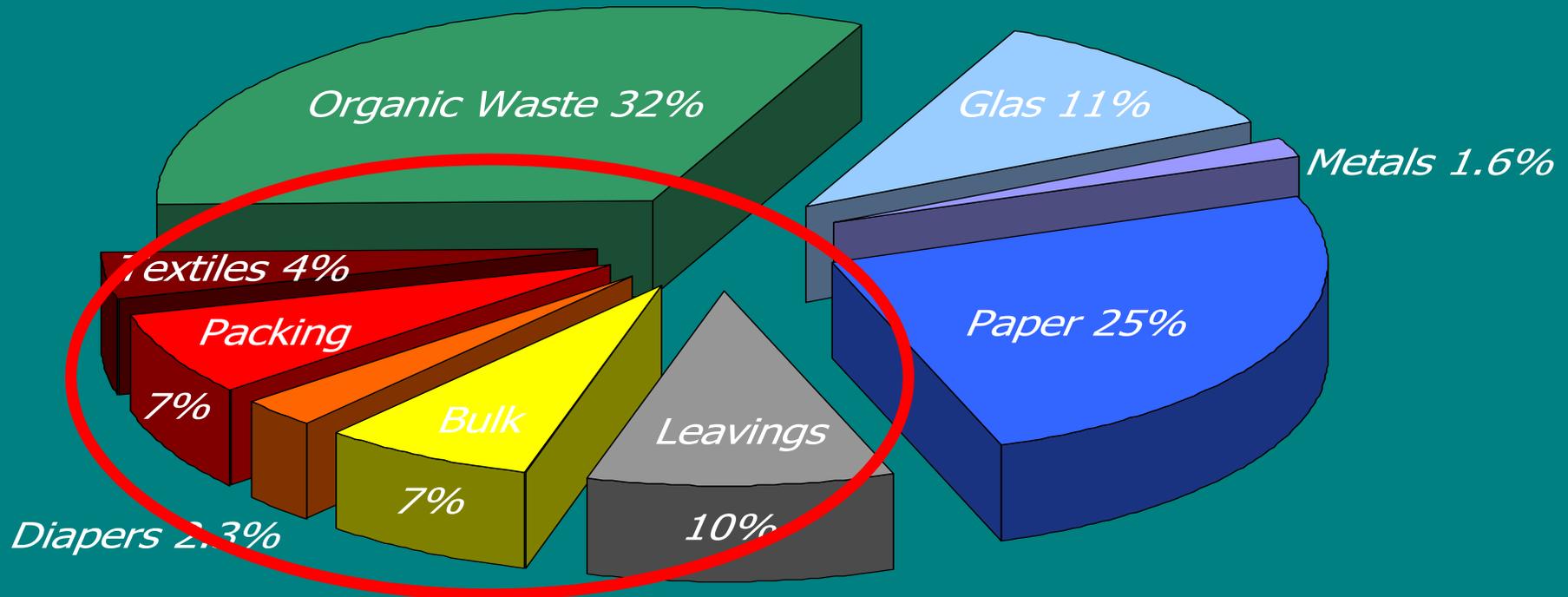
**No avoidance of waste (!)**

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## What needs to be done

### Challenges in the recycling process





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# Plastic as a source of concern

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### Advantage:

- light and stable, more and more substitution of metals and glass, high potential to save energy during production and lifetime

**But: In Germany “only” 20 % of plastic waste goes into recycling, the greater part is still being converted to energy**

### Reasons:

- “the smell of waste lasts for ever”
- Plastics are a large variety of very specific and different products
- strong technical limits of using plastic as recycling material
- Recycling process could course more environmental impact than incineration or landfilling
- during capture and processing up to 50 % sorting rests!
- sooner or later even recycling materials become a not recyclable waste (Problem of downcycling)!



## Bioplastics as part of the solution

- **Biodegradable Bioplastics**



### Advantages:

- renewable raw material,
- ideal for packaging of food,
- can substitute mineral oil,
- compostable,
- waste avoidance in landscapes,
- waste to energy is more or less climate neutral!

## Bioplastics as part of the solution II

- non biodegradable bioplastics



### Advantages:

- renewable raw material,
- can substitute mineral oil in many products,
- if not recyclable, waste into energy is more or less climate neutral!



### **Obstacles for overcoming the challenges**

- **There is still no real incentive to save raw materials. Primary raw materials are often cheaper than secondary raw materials.**
- **Product design is focused on the period of use. The waste and opportunities for recycling of products are not taken into account.**
- **The producers are mostly not legally responsible for their products after the products have become waste.**
- **Recycling often leads to “downcycling” (a plastic package becomes not a package again but a lower quality product)**

**Green 2020 Concept tries to tackle these problems**

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## Closing the cycle in 2020

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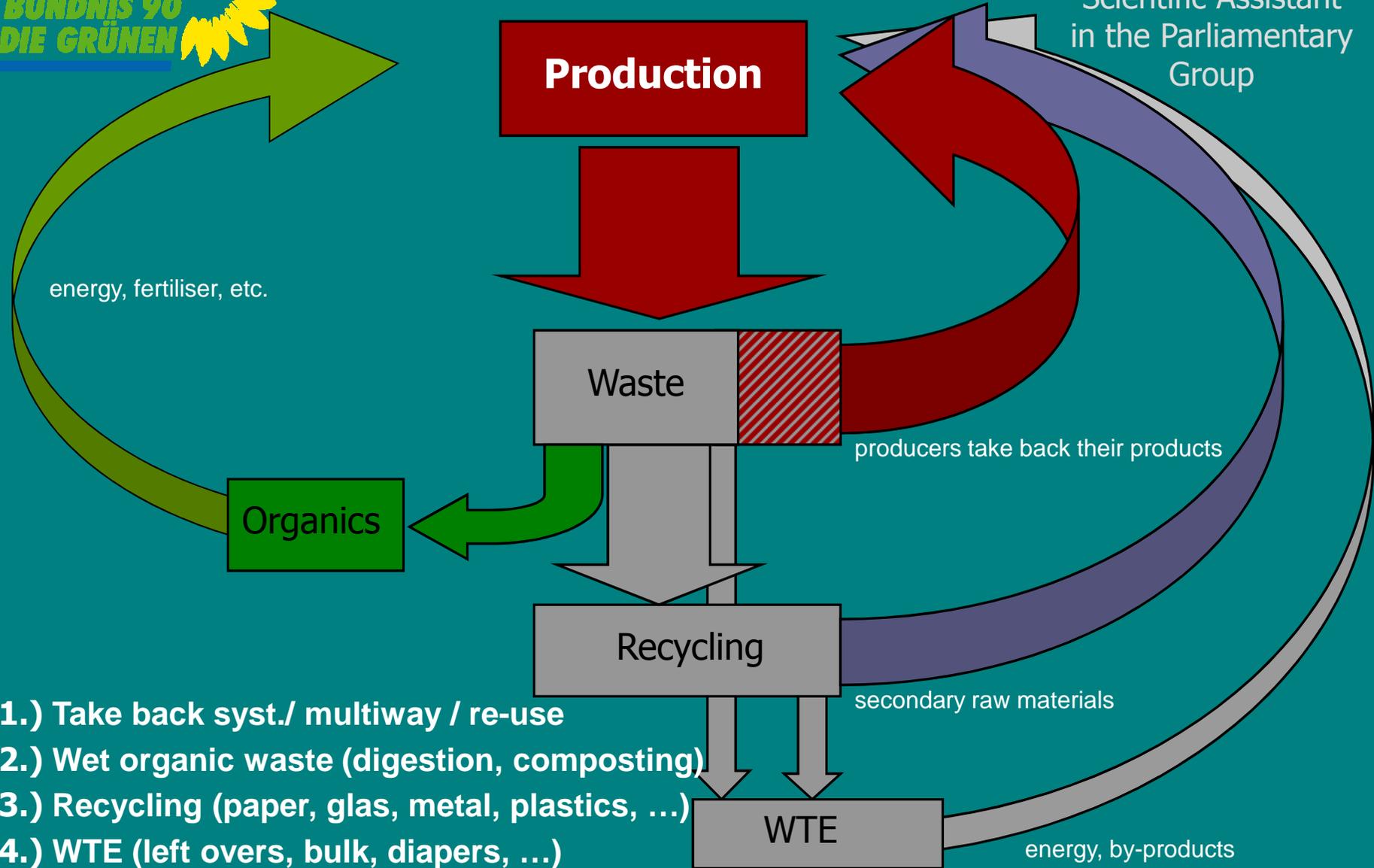
### Cornerstones of the Green 2020 Waste Concept

- 1.) Focus on avoiding wastes by introducing a new compulsory public charge / tax on raw materials.
  - 2.) More production of reusable, renewable and recyclable products by implementing producer responsibility. This supports an integrated product design. Unsustainable products must be fined or made more expensive
  - 3.) Automatic sorting of the residual waste and recovery of all valuable substances by ambitious recycling quotas and complete ban on landfilling in 2020.
  - 4.) All unavoidable and unusable residues must be used to generate energy - duty to use the best available technology".
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# The Green 2020 Waste Concept

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- 1.) Take back syst./ multiway / re-use
- 2.) Wet organic waste (digestion, composting)
- 3.) Recycling (paper, glas, metal, plastics, ...)
- 4.) WTE (left overs, bulk, diapers, ...)

**no more landfilling**

### How to deal with residues today?

#### Alternatives:

- Landfilling / landfilling with methane recovery
- Pyrolysis, gasification and others
- Mechanical Biological Treatment
- Incineration

### Waste to energy versus landfilling?

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### Problems with landfill sites

- Landfill sites are black boxes, with uncontrolled biological and chemical processes.
- They need intensive care for generations, leaching water has to be treated for years.
- Permanent danger of leaks and rents, with major impacts for groundwater and soil. Such problems are usually not reparable.
- This is why the Greens are campaigning to entirely end the disposal of waste from human settlements on landfill sites by 2020.



### Landfilling with Methane recovery

- **Methane capture /recovery is a practical way of dealing with existing old landfills only.**
  - Only up to a maximum of 50 % of methane is being captured
  - high costs for landfill security
  - problem of leaches and danger of groundwater contamination is not solved
  - no sustainable solution black box
  - probably later need for remediation

**This technology is not for the future!**



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### Components of landfill gas

Methane	CH <sub>4</sub>	up to 65 Vol.%
Carbon Dioxide	CO <sub>2</sub>	up to 65 Vol.%
Carbon Monoxide	CO	up to 2,8 Vol.%
Ammonia	NH <sub>3</sub>	up to 0,35 ppm
Hydrogen Sulphide	H <sub>2</sub> S	up to 700 ppm
Acetaldehyde	CH <sub>3</sub> CHO	up to 150 ppm
Benzene	C <sub>6</sub> H <sub>6</sub>	up to 800 ppm
Vinyl Chloride (VC)	C <sub>2</sub> H <sub>3</sub> Cl	up to 72 mg/m <sup>3</sup>
Dichlormethane	CH <sub>2</sub> Cl <sub>2</sub>	up to 2400 mg/m <sup>3</sup>
Chloroforme	CHCl <sub>3</sub>	up to 11 mg/m <sup>3</sup>
Trichloroethylene	C <sub>2</sub> HCl <sub>3</sub>	up to 251 mg/m <sup>3</sup>
Tetrachloretylene	C <sub>2</sub> Cl <sub>4</sub>	up to 182 mg/m <sup>3</sup>
...		

### **Pyrolysis, gasification and others**

**Experiences made in Germany in the past were not successful - High costs with poor results**

- “Babcock- pyrolysis” capacity only 26.000 t/a in the 80’s
- “Schwel-Brenn-Verfahren” pilot plant never worked regular
- “Thermoselect” only one facility end in 2004, loss of 400 Mill. €
- “PKA –process” since 2007 off duty
- “black pump” 2004 sold for one Euro, since 2007 using coal
- ...

**These technologies have not shown reliability so far!**

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## Mechanical Biological Treatment

### Mechanical Biological Treatment:

- separation of waste stream in a recycling chain (metal, wood), a solid fuel strain (paper, plastics) and the biological treatment of the almost organic rest with a following landfilling.
  - Supported by the Greens in the early days
  - But there are still major technical problems, no market for solid fuel, landfilling is still necessary

**This technology is to be seen as an intermediate solution!**



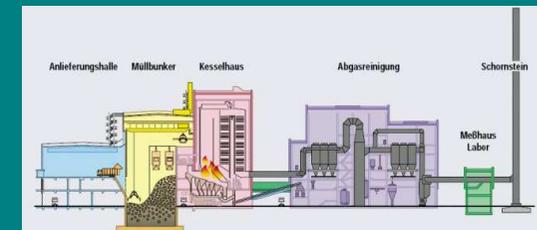
Explosion in MBA in Göttingen 2006

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## Incineration

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- **Advantage: proven technology for many years**
- **When using a facility with the best available technology - very low environmental impact:**
  - **high efficiency in recovering of heat and electricity**
  - **low emissions**
  - **use of different by-products by producing acid and gypsum**
  - **use of ashes e.g. in the construction industry**
  - **no landfilling, only small amount of the input has to be left over to be deposited in the subsoil**
  - **potential to be developed into more decentral, flexible structures**
  - **producer responsibility leads to products free of harmful substances, like heavy metals, means future potential for much lower emissions**



## Reliability is of high importance

**Missing it is definitely the worst case for our environment!**

- examples: Napoli, Italy and not working MBT Technology





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## Conclusions

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### Lessons learned in Germany

- **Avoiding waste and recycling quotas cannot be sufficient to solve all problems related to municipal waste – they are an integral part of the solution.**
  - **Recycling has limits, e.g. plastic, hygienic products like diapers, and others...!**
  - **Even recycling products become waste after use, problem of “downcycling”.**
  - **Using the best available technology for the incineration of residual waste leads to less impact on the environment and on the climate than landfilling.**
  - **Environmental commitment is an important requirement for developing cleaner incineration technologies.**
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### Conclusions cont.

**There are still challenges to face**

**A sustainable waste management is a central element of environmental and climate protection. This includes**

- 1. establishing re-use and take back systems;**
  - 2. closing the cycle for raw materials, including integrated product-design and increased recycling;**
  - 3. no more landfilling at the earliest possible point;**
  - 4. residues should generate heat and electricity – using the best available and reliable technology.**
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## **Sustainable Waste Policy**

### **The Role of the Greens**

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- **In the 80's strictly against Incineration because of low emission standards (in particular Dioxin).**
  - **During the 90's Greens environmental commitment became successful: cleaner incineration technologies became available.**
  - **The awareness about global warming as a major problem grew in the 90's. Methane emissions from landfill sites were recognized as a serious problem in this respect.**
  - **Today: Incineration with low emissions is accepted to play a secondary part in a waste concept. Requirements:**
    - **no shift of problems from landfill to air**
    - **use of byproducts such as heat and electricity**
    - **capacities of incineration must be matched with regional demand.**
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**Thank you for your  
attention**

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