

INTECUS GmbH

Waste Management and Environment-Integrating Management



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Waste Management in Germany and Vietnam

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1. General conditions

Germany (2008 / 09)

Population: 81.6 Mio.

Area: 357,112 sq km

Pop. dens.: 229 inh./sq km

Growth rate: -0.2 %

Share of urban Pop.: 73 %

Population < 15 ys.: 14 %

Population > 64 ys.: 20 %

GNI: 35,940 USD

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Vietnam (2008 / 09)

Population: 88.9 Mio.

Area: 331,690 sq km

Pop. dens.: 268 inh./sq km

Growth rate: 1.2 %

Share of urban Pop.: 33 %

Population < 15 ys.: 25 %

Population > 64 ys.: 8 %

GNI: 2,700 USD

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2. Waste figures

Germany (2008)

Amount of MSW:

41.7 Mio. tons

MSW per inhabitant:

511 kg / inh.

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Vietnam (2010)

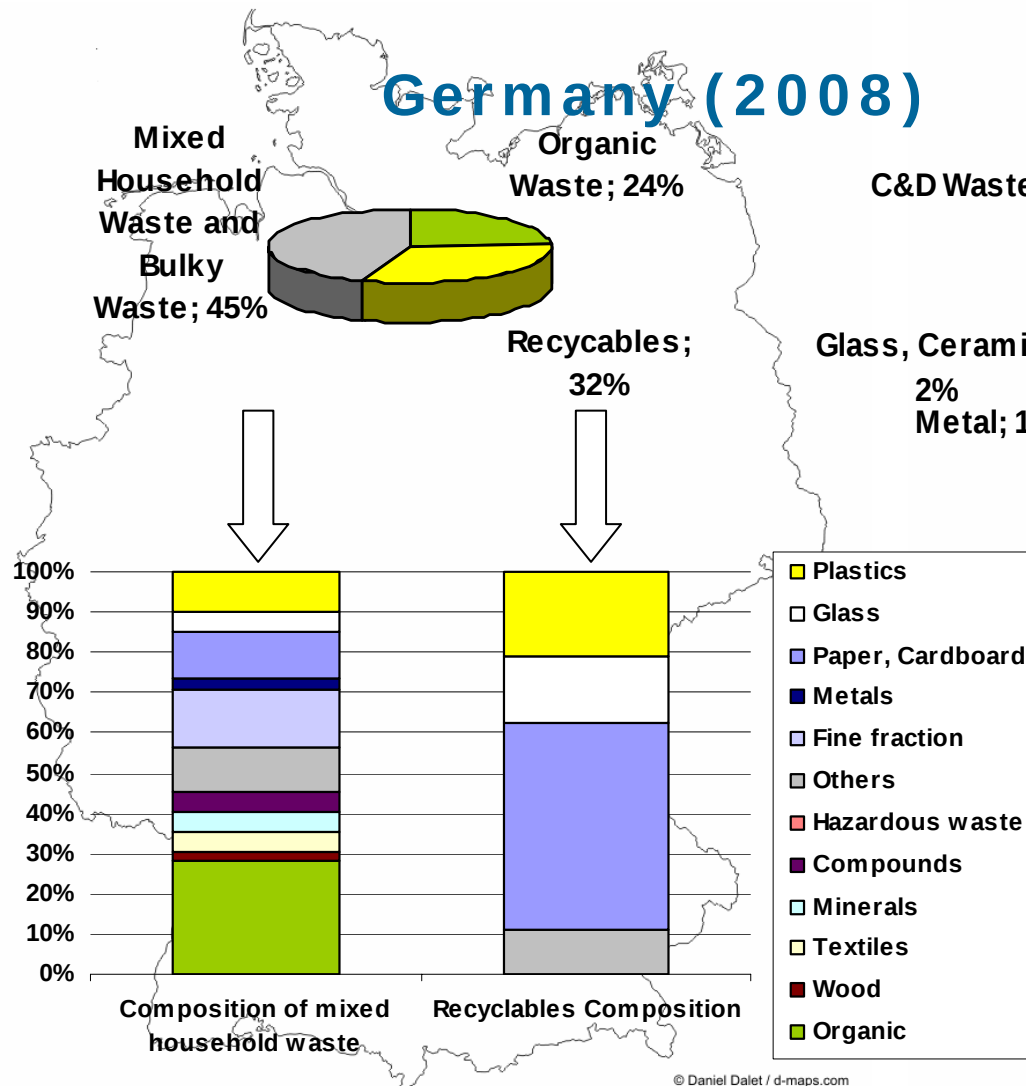
18.8 Mio. tons

211 kg / inh.

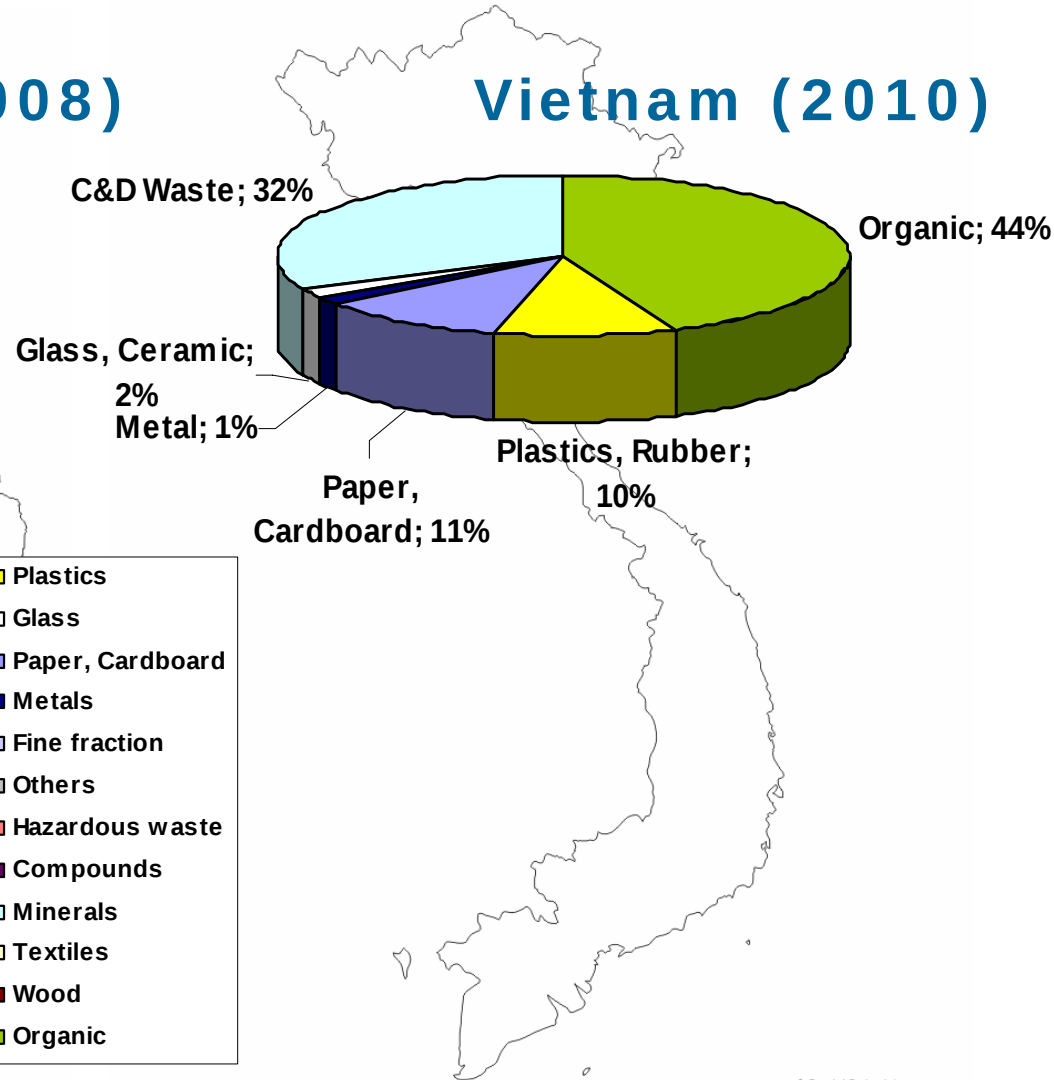
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3. Waste composition

Germany (2008)



Vietnam (2010)



4. Waste policy goals

Germany

- prohibition of disposal of untreated MSW
- 5-step waste hierarchy:
avoidance → reuse → recycling
→ recovery (incl. WtE) → disposal
- utilization of MSW:
65 % by 2020
- utilization of C&D-waste:
80 % by 2020

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Vietnam

- sanitation of 100 % of the landfills by 2020
- collection of urban MSW / utilization of collected MSW:
 - 2015: 85 % / 60 %
 - 2020: 90 % / 85 %
 - 2025: 100 % / 90 %
- collection of C&D-waste / utilization of coll. C&D-waste
 - 2015: 50 % / 30 %
 - 2020: 80 % / 50 %
 - 2025: 90 % / 60 %

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4. Waste policy goals

Germany

- area-covering separate collection of bio-waste by 2015
- producer responsibility with recycling quotas for different materials, e.g. packaging material, waste of electric and electronic equipment (WEEE), end-of-life-vehicles (ELV), batteries, waste oil

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Vietnam

- segregation of waste at households:
 - 2015: 50 % of the cities
 - 2020: 85 % of the cities
 - 2025: 100 % of the cities
- collection rate in rural areas / craft villages
 - 2015: 40 % / 50 %
 - 2020: 70 % / 80 %
 - 2025: 90 % / 100 %

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4. Waste policy goals

Germany

- recycling quotas for packaging waste:
 - glass: 75 %
 - tinfoil: 70 %
 - aluminum: 60 %
 - paper & cardboard: 70 %
 - compounds: 60 %
- currently efforts to simplify the collection system for recyclables

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Vietnam

- reduction of the use of plastic bags (in comparison to 2010)
 - 2015: 40 %
 - 2020: 65 %
 - 2025: 85 %
- further goals for:
 - industrial waste
 - medical waste
 - sewage sludge

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5. Waste collection

Germany

▪ separate collection of:

- household waste
- packaging
- paper, cardboard
- glass
- bio-waste
- bulky waste
- WEEE
- ELV
- batteries
- waste oil
- hazardous waste



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Vietnam

- generally, collection of mixed MSW
- single initiatives for separate collection systems



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6. Waste treatment

Germany

- incineration of MSW with generation of electrical energy and heat recovery



- mechanical-biological treatment of MSW



Vietnam

- separation of recyclables on landfills by scavengers



- single solutions for utilization, e.g. production of fuels



6. Waste treatment

Germany

- sorting and utilization of recyclables (paper, cardboard, plastics, glass, metals)



- composting (90 %) and digestion (10 %) of bio-waste



Vietnam

- sorting of waste in sorting facilities is at the beginning



- composting of mixed household waste (9 % of total amount)



7. Waste utilization

Germany

- recycling of plastics, glass, paper/cardboard, metals recovered from packaging, WEEE, ELV, bulky waste a.o.



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Vietnam

- recycling of plastics, paper/cardboard, metals



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7. Waste utilization

Germany

- compost made of separate collected bio-waste
- dual use of separate collected bio-waste
 - biogas-generation
 - compost made of digested residues



Vietnam

- compost made of mixed household waste



7. Waste utilization

Germany

- waste-to-energy (made from e.g. wood, high calorific fraction of MSW, end-of-life tyres)



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Vietnam

- waste-to-energy (production of briquettes made of a mixture of waste and coal)



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8. Waste disposal

Germany

- disposal of pretreated waste on sanitary landfills with leachate collection and treatment as well as landfill gas capture



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Vietnam

- disposal of untreated waste, lack of leachate collection and treatment as well as landfill gas capture (sanitation planned until 2020)



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9. Financing

Germany

- MSW for disposal:
 - on hands of the municipality
 - 100 % fee-financed by the citizens
- MSW for utilization
 - on hands of the private sector
 - financed by producers (producers responsibility) and by fees paid by the citizens
- industrial and commercial waste
 - on hands of the private sector
 - financed by waste generators

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Vietnam

- environmental fee according to the size of dwelling (e.g. HCMC: 15,000-20,000 VND / month)
- co-financing by the municipality of 5-15 USD / ton
- 100 % fee-financing of waste collection and transport until 2020
- from 2020: co financing of utilization and disposal by fees



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10. History of Waste Management in Germany

1893

- First waste incineration plant in Hamburg

Beginning of the 20th century

- First waste sorting facilities in Berlin, Hamburg und Munich

1965

- starting of the modern waste management in Germany
- municipalities responsible for waste management

Beginning of the 70ties

- waste disposal problems due to the strong economic growth
- waste disposal on many uncontrolled dump sites
- only 37 % of the waste was disposed in a environmentally safe manner

1972

- Waste Disposal Act stipulates the environmentally safe waste management

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10. History of Waste Management in Germany

1986

- 4th amendment of the Waste Disposal Act: Waste avoidance as a goal

until 1993

- reduction of the waste dumping sites from 50,000 to 270 safe landfills
- enacting of different ordinances regarding producer responsibility, e.g. the packaging ordinance

1990-1993 in East Germany

- reduction of the waste dumping sites from 7,983 to 292 safe landfills

1996

- new Act for Promoting Closed Substance Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal

10. History of Waste Management in Germany

2000

- 358 landfill for MSW in operation

2005

- ban of untreated MSW from landfills
- implementation of the mechanical-biological treatment technology
- expansion of the incineration capacity

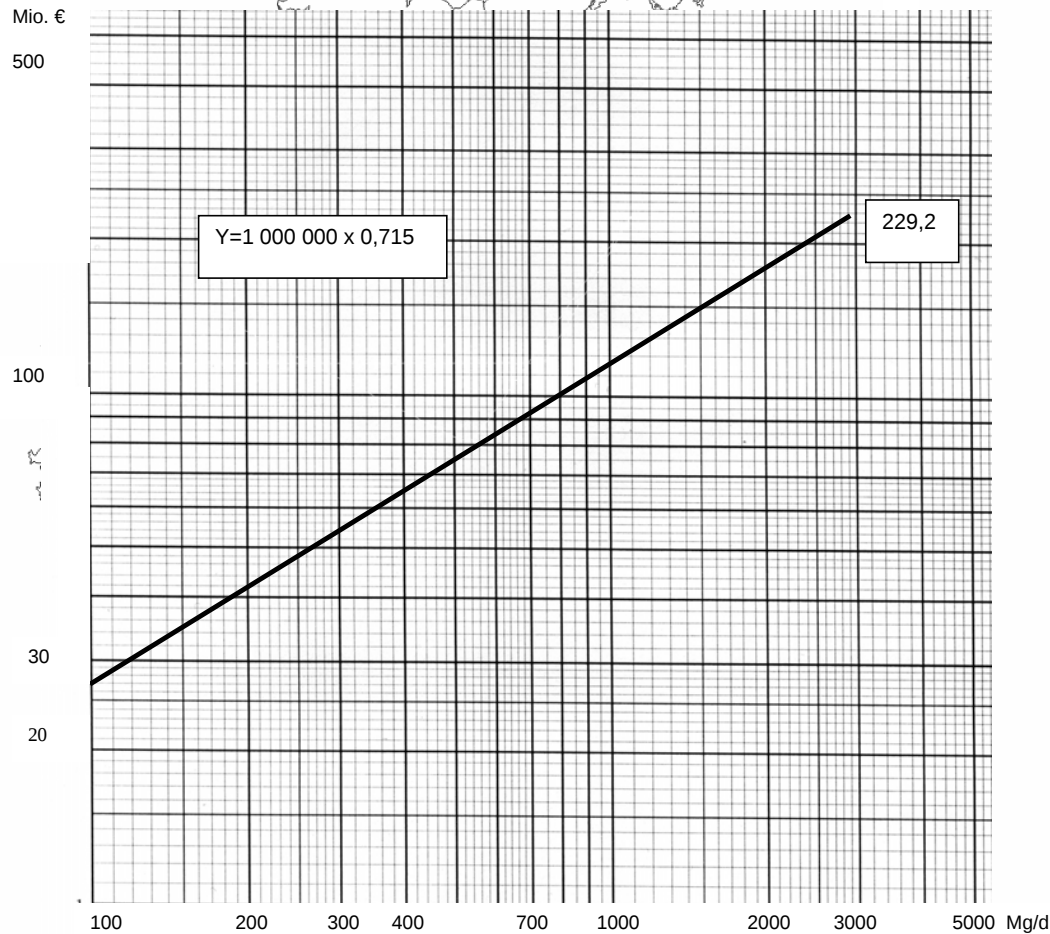
today (2008)

- 312 landfills for MSW are approved (335 Mio. m³ rest volume), but only approx. 100 of them are in operation, actually
- 89 incineration plants for MSW (18.5 Mio. tons per year)
- 51 mechanical-biological treatment plants (5.9 Mio. tons per year)

future

- new Act for Promoting Closed Substance Cycle Waste Management in 2011
- more waste avoidance, more recycling, less bureaucracy

11. Costs of Waste Management in Germany (Incineration)



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Chart of basic prices of
capital needs for
incineration plants with
cogeneration of heat
and power (price basis
2000)

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11. Costs of Waste Management in Germany (Incineration)

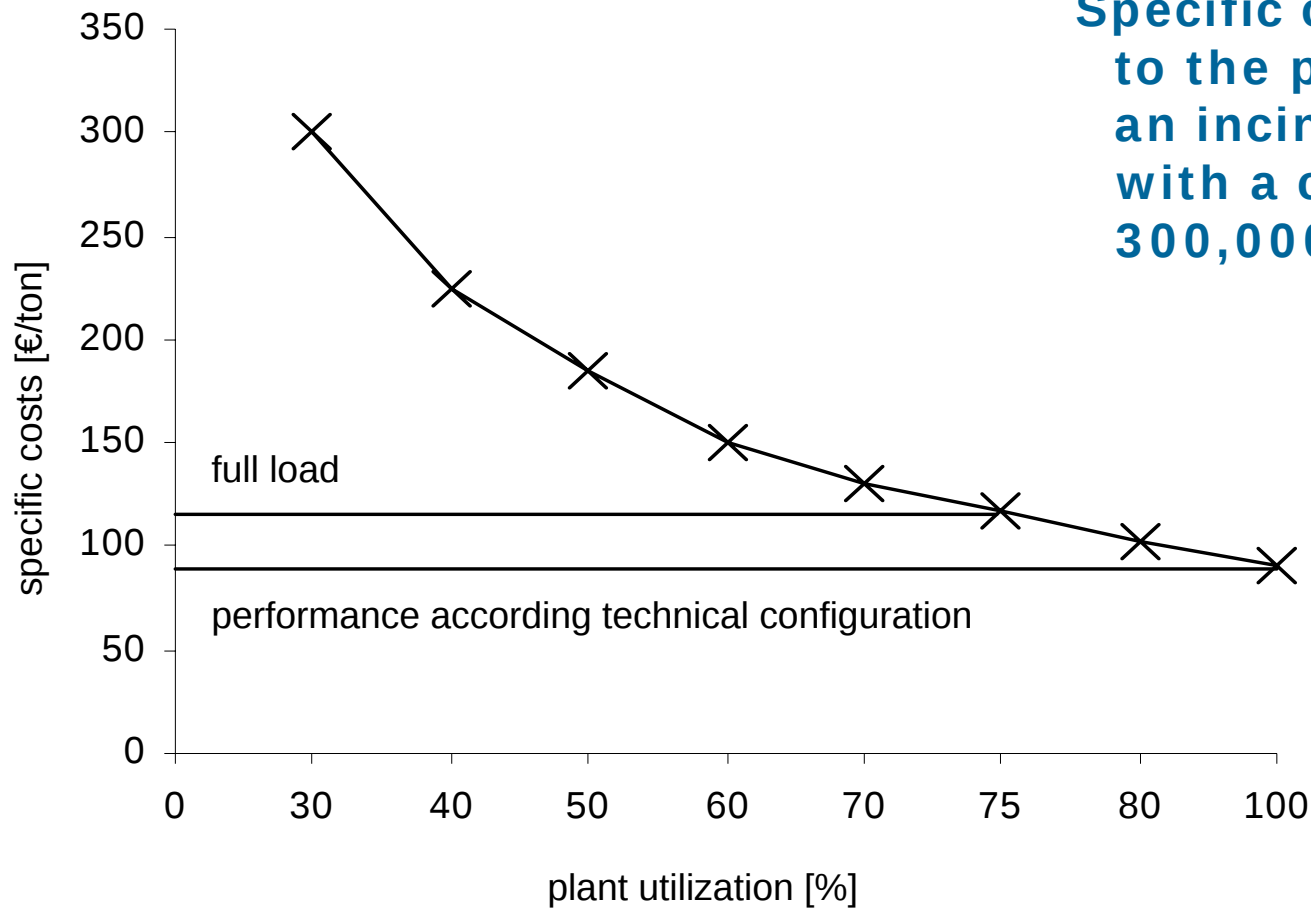
Capacity [tons/d]	50,000	100,000	200,000	300,000
Position [%]				
1. infrastructure provision	0.5	0.4	0.3	0.2
2. construction	13.6	15.7	16.2	16.4
3. machinery - electric	69.7	67.9	68.3	68.2
4. external works	2.5	2.5	1.6	1.5
5. additional costs, financing	13.7	13.5	13.6	13.7
6. capital needs	100.0	100.0	100.0	100.0

Percentage distribution
of the main positions of
capital needs for an
incineration plant
according to the
capacity

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11. Costs of Waste Management in Germany (Incineration)



Specific costs according
to the performance of
an incineration plant
with a capacity of
300,000 tons per year

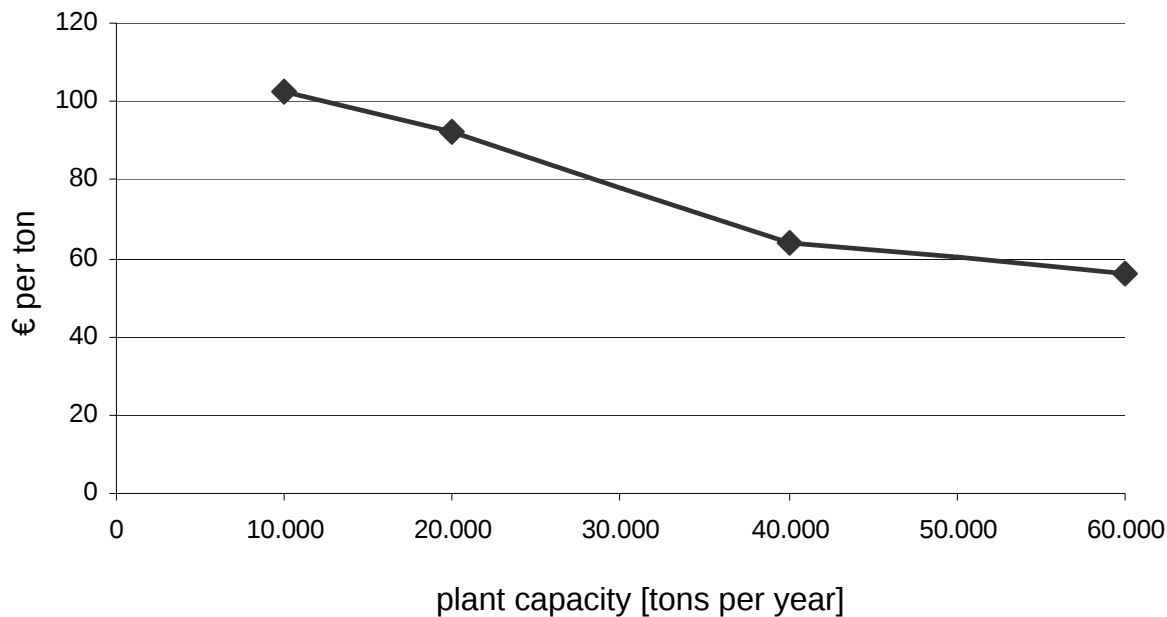
11. Costs of Waste Management in Germany (Mechanical-Biological Treatment)

Investment	Mechanical stage	Biological stage	
		Composting	Digestion
Construction	40 €/ton*year	70-90 €/ton*year	50-60 €/ton*year
Stationary machinery	20-80 €/ton*year	110-140 €/ton*year	130-180 €/ton*year
Mobile machinery	5-10 €/ton*year		

**Specific investment costs
for mechanical-
biological treatment
plants**

**total treatment costs:
40-120 €/ton**

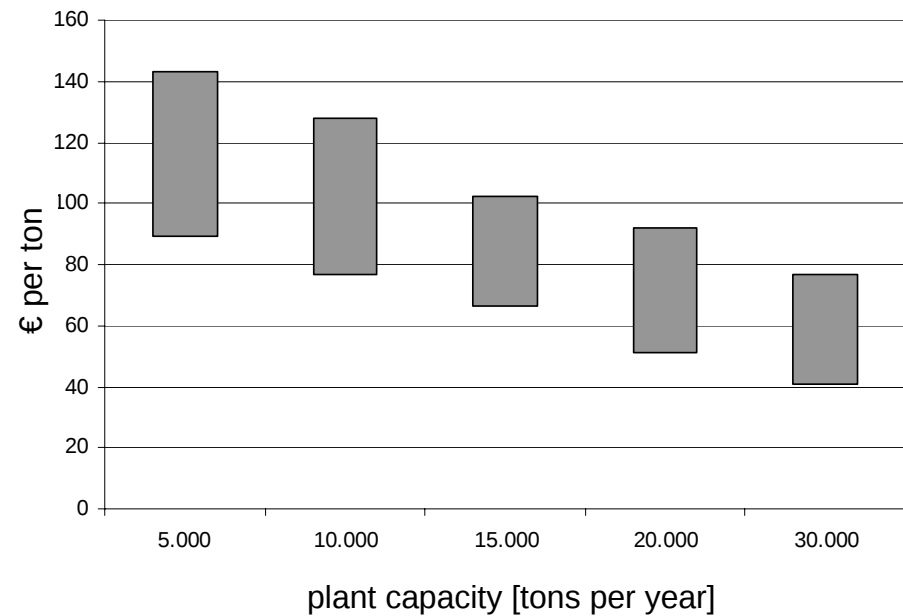
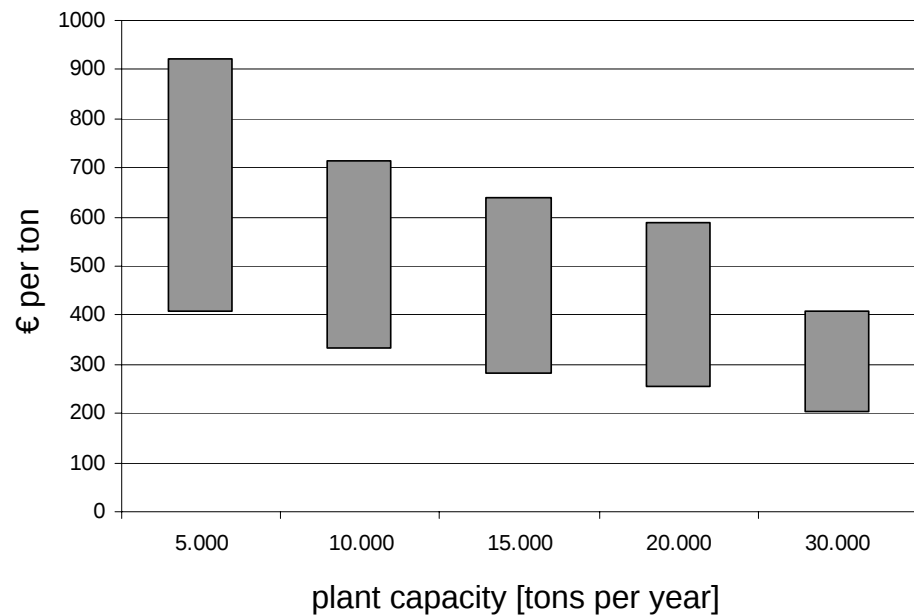
11. Costs of Waste Management in Germany (Biological Treatment - Composting)



Specific treatment costs for bio-waste composting according to the plant capacity

total treatment costs: 30-110 €/ton

11. Costs of Waste Management in Germany (Biological Treatment - Digestion)



Specific investment and specific treatment costs for bio-waste digestion according to the plant capacity

total treatment costs: 40-140 €/ton

11. Costs of Waste Management in Germany (Waste Collection Fee)

Saxony:

- Citizen with separate collection of bio-waste: 40-90 €/year
- Citizen without separate collection of bio-waste: 27-62 €/year

Germany:

25-150 €/year

Thank you for your attention!



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