Confederation of European Waste-to-Energy Plants

Development and perspectives in Europe for energy recovery in integrated waste management

Dr. Ella Stengler
CEWEP - Managing Director

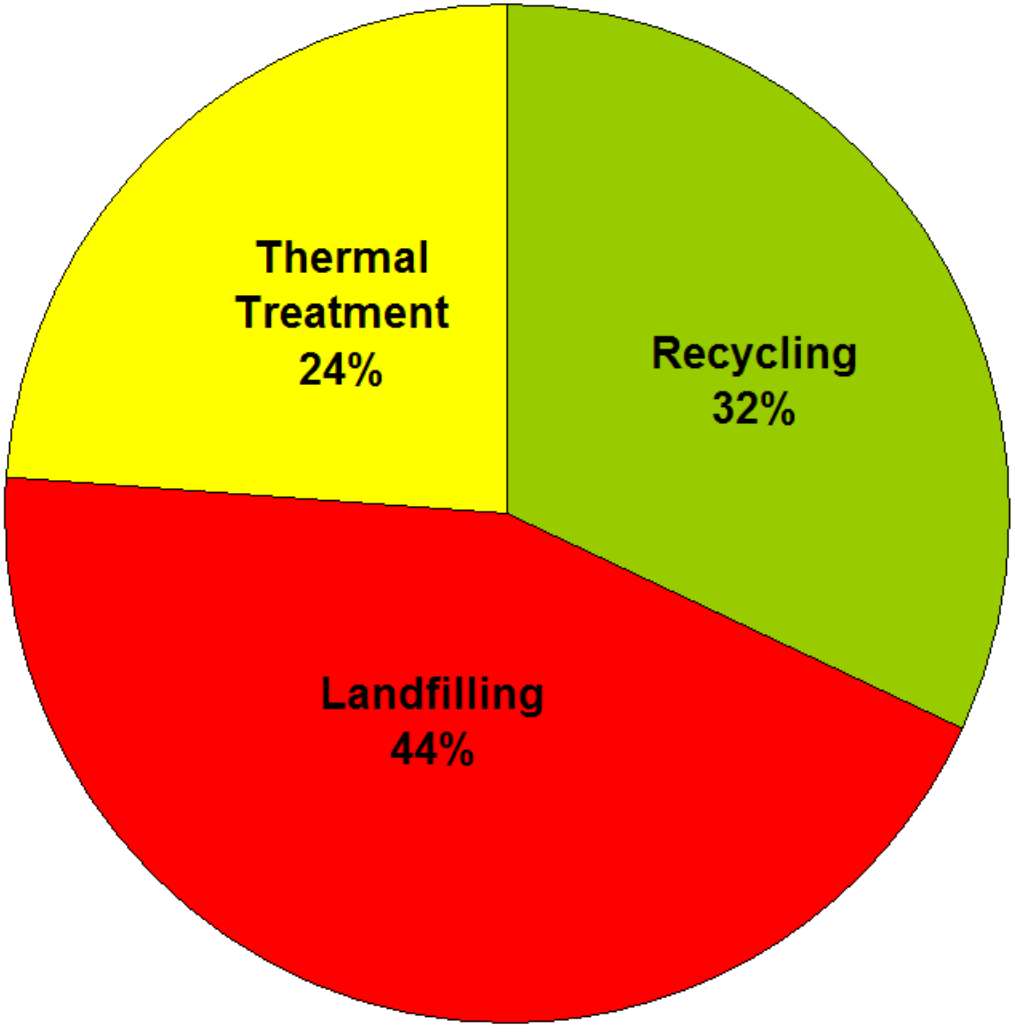
CEWEP
Confederation of European Waste-to-Energy Plants

CEWEP represents over 330 Waste-to-Energy Plants in 16 European countries (90% of the whole European WtE Market).

Member associations and plants provide necessary public infrastructure –

- Careful handling of waste
- Conserving natural resources
- Minimising possible emissions

Treatment of MSW in Europe



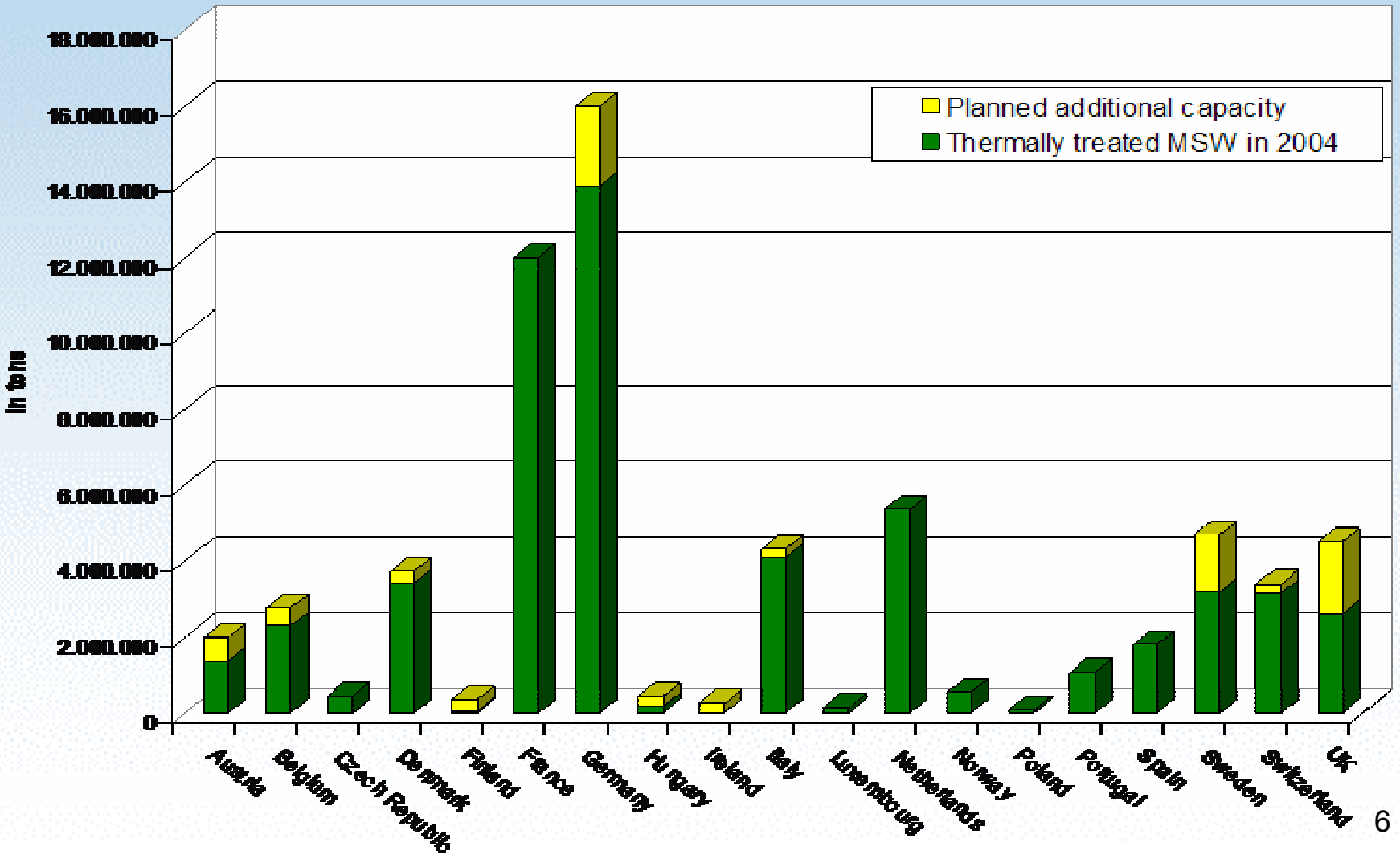
In the whole of Europe about 50 million tons of MSW is thermally treated in some 420 Waste-to-Energ plants


Waste-to-Energy Plants in Europe operating in 2004
Thermally treated waste in million tons/year
Finland
1 0,05
Sweden
29 3,18
Norway
21 0,54*
Estonia
Latvia
Lithuania
Denmark
30
3,4
Ireland
United Kingdom
14 2,6
Netherlands
12 5,36
Germany
61 13,88
Poland
1 0,76*
Belgium
18 2,3
Luxembourg
1 0,13
Czech Republic
3 0,4
Slovakia
France
130 12
Switzerland
29 3,14
Austria
7 1,4
Hungary
1 0,16
Slovenia
Italy
52 4,22
Portugal
3 1,06
Spain
11 1,78
Greece

Plants Planned in 2004, in Europe

Country	Number of Planned Plants
Austria	3
Belgium	3
Finland	5
France	7
Germany	10
Hungary	2
Ireland	2
Italy	4
Spain	1
Sweden	10
Switzerland	1
UK	9
Total	**57**

Planned additional Waste-to-Energy Capacity in 2004



Example: Austria

2004 **Zwentendorf**
Electricity production: 120 MW,
Capacity approx. 300.000 tons/year

2004 **Kärnten**
Heat – 9 MWth/hour,
electricity 0,9 – 5 MW/hour,
capacity 80.000 tons/year

Example: Germany

www.itad.de

Start Year	Plant	Heat	Electricity	Capacity ton/year
2004	Thermische Abfallbehand-lung Lauta		120.000 MWh/year	225.000
2005	TREA Breisgau	20 MWh	15 MWh	150.000
2005	BKB Hannover	45.000 MWh/year	195.000 MWh/year	230.000
2005	Abfallverwer-tung Zorbau	3.100 MWh/year	160.000 MWh/year	300.000
2005 2007	MVV TREA Leuna I + Leuna II		18,5 MWh 18,5 MWh	195.000 195.000
End 2007	EVZA Staßfurt	360.000 MWh process steam to Sodawerk	75.000 MWh/year	300.000

Example: Spain

2005 **Zabalgarbi**

Capacity 30 tons/h

230.000 - 250.000 t/year

Number of inhabitants served: 670.000

Thermal capacity 70,8 MWh

Example: Sweden

Start year	Location	Capacity tons/year	Capacity tons/hour
2004	Borås	84.000	
2004	Finspång	28.650	
2004	Linköping		24
2005	Skövde	16.600	
2005	Stockholm		ca. 120
2005	Eksjö	16.600	
2005	Uppsala	150.000	
2006	Sundsvall	200.000	
2006	Jönköping	165.000	

Example: UK

Under Construction in 2004

Location	Capacity in tons/year
Chineham, Basingstoke	90.000
Havant, Portsmouth	165.000
Crymlyn Burrows, Neath	135.000

Planning Granted in 2004

Lakeside, Colnbrook, Slough	440.000
Marchwood, Southampton	165.000
Allington, Maidstone	500.000
Grimsby	55.000
Bernard Road, Sheffield	225.000
Carling How Farm, Teeside	125.000

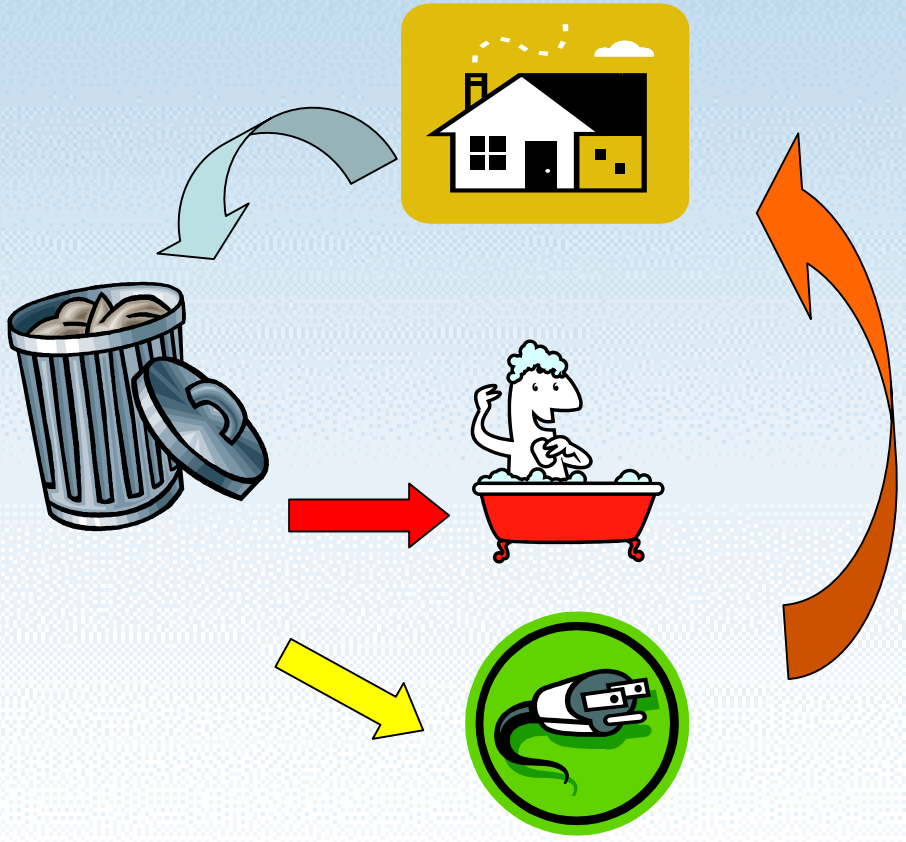
Example: France SVDU - www.incineration.org

Start Year	WtE plant	Capacity in tons/hour	Capacity in tons/year
2004	Nîmes	14	105.000
2004	Lasse	12,5	93.750
2004	St-Jean-de-Folleville (Le Havre)	24	180.000
2004	Villers-Saint-Paul	21	157.500
2006	La Veuve	12,5	93.750
2006	Valberg	0,5	3.750
2007	Issy-les-Moulineaux (Paris)		460.000

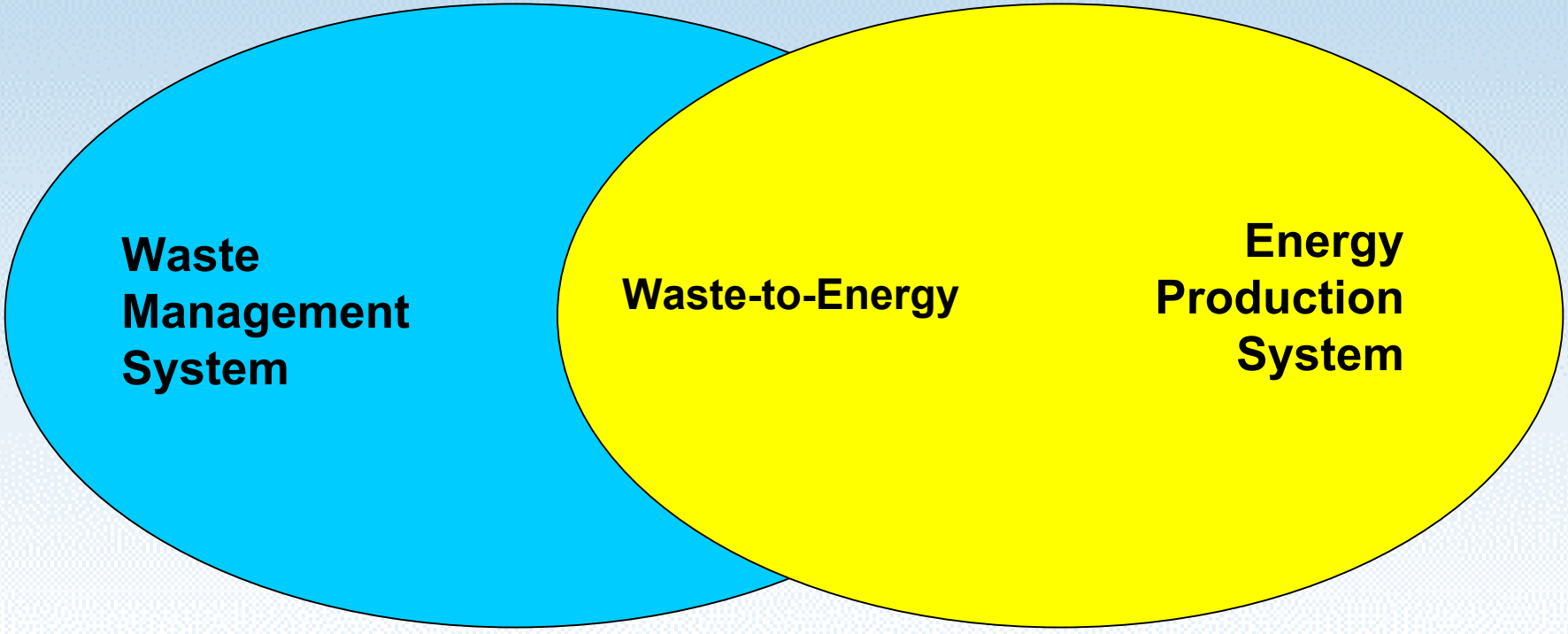
What is Waste-to-Energy?

'Waste-to-Energy' plants generate **electricity** and **heat** through the thermal treatment of **MSW**.

They supply this energy to **homes** and **industry**.



The role of Waste-to-Energy



WtE: Complementary in the waste management system

- **recovers energy from waste not recycled by other means**

Not all household waste can be adequately sorted and recycled.
Why not use this un-recyclable waste as a resource to produce energy?

Considering that more than half of MSW is biodegradable (62 %) this part is considered biomass and thus a renewable energy source (RES Electricity Directive 2001/77/EC).

- **hand-in-hand with recycling**

It is no coincidence that the EU Member States with the highest recycling rates, also have the highest levels of Waste-to-Energy Production.

WtE goes hand-in-hand with recycling

Country	Recycled/composted and other (per cent of total)	Landfill (per cent of total)	Incineration (per cent of total)	Waste per capita (kg)
Netherlands	65	3	32	624
Austria	59	31	10	627
Germany	58	20	22	600
Belgium	52	13	35	469
Sweden	41	14	45	464
Denmark	41	5	54	696
Luxembourg	36	23	41	668
Spain	35	59	6	662
Ireland	31	69	0	869
Italy	29	62	9	538
Finland	28	63	9	455
France	28	38	34	567
UK	18	74	8	600
Greece	8	92	0	433
Portugal	3	75	22	434

Source: Institute for Public Policy Research http://www.ippr.org.uk/pressreleases/?id=2283 base yr: 2003/4

WtE and MATERIAL RECYCLING
BRESCIA, ITALY

1991 Material recycling rate: 6,3 %

1992 Approval of WtE plant construction by Brescia City Council within an “Integrated Waste Management Project” with material recycling goal of 36%

1998 Start up of WtE plant

1999 Material recycling 36,4%

2004 New goal 50% decided for material recycling

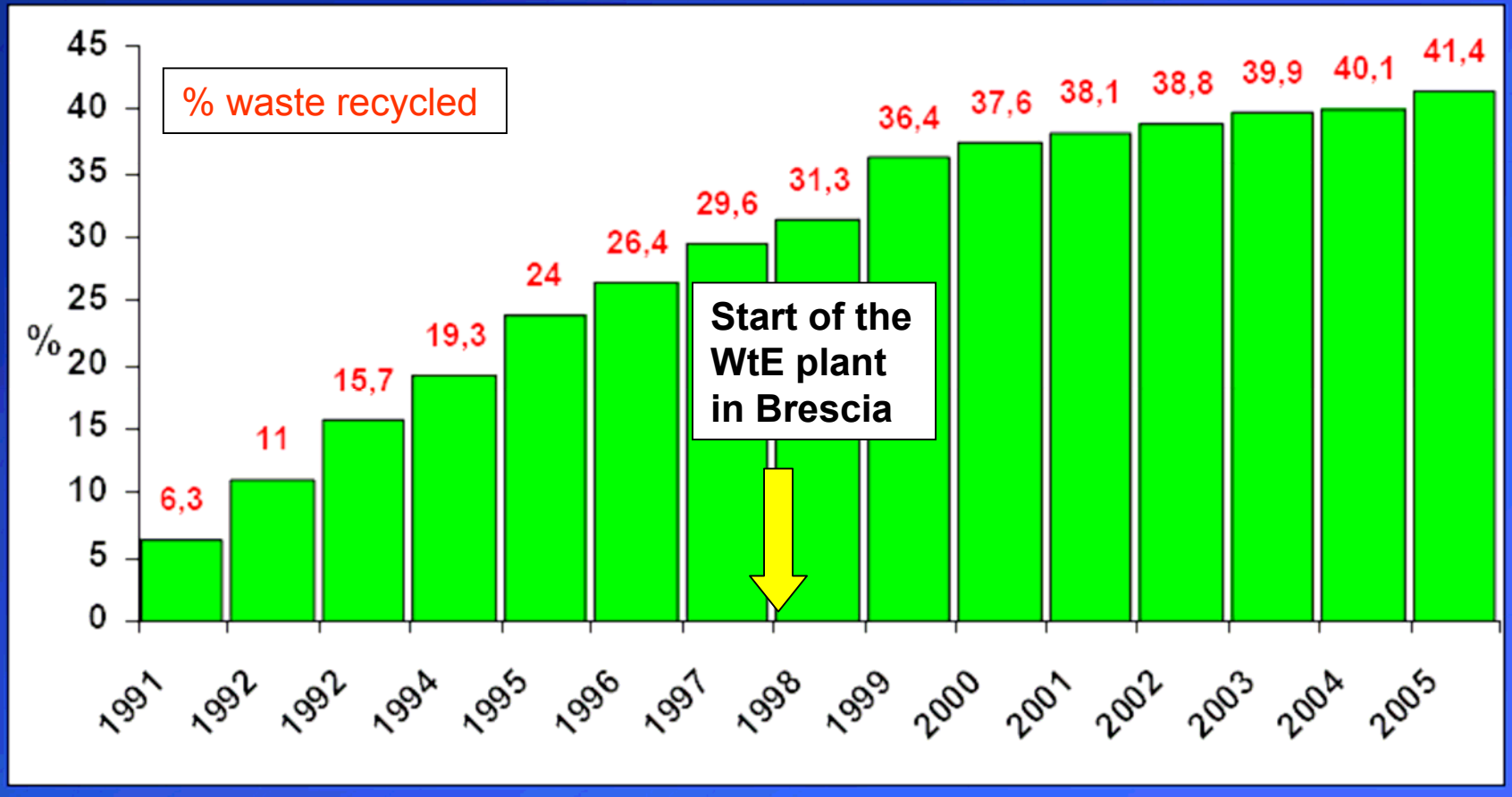
2005 41% has already been achieved

This clearly demonstrates that recycling and WtE goes hand in hand and that WtE does not hamper recycling

ASM Spa

MATERIAL RECYCLING

Through seperate waste collection* in Brescia



* Paper, glass, metals, organic waste.

WtE: Instrumental in EU Waste Policy

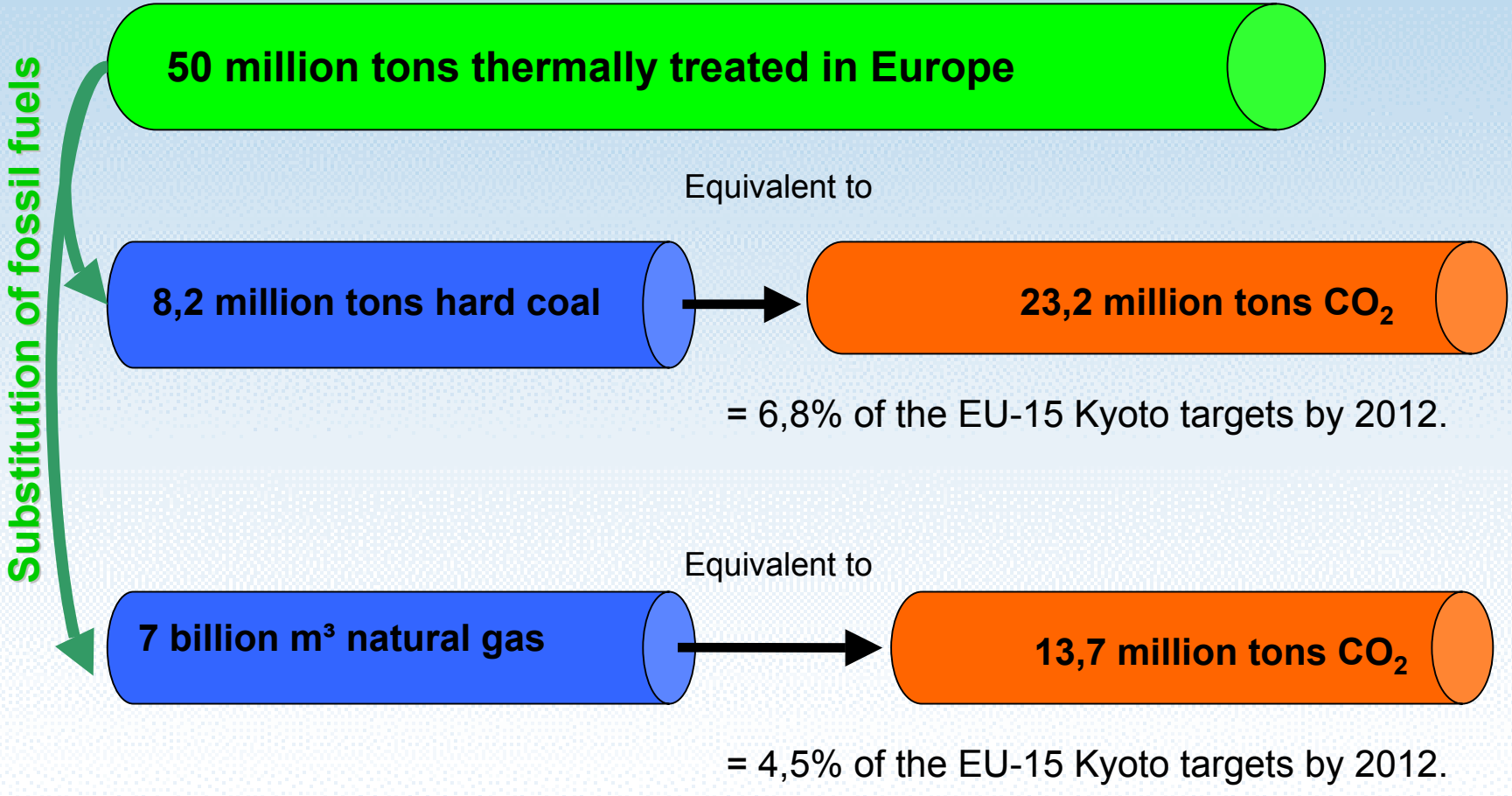
According to the Landfill Directive (1999/31/EC) biodegradable municipal waste going to landfills must be reduced:
to 35 % of the total amount (base year 1995)
by 2016.

→ reducing greenhouse gas emissions by around 74 million tons CO_2-equivalents

Methane emissions from landfills are much more significant to global warming than CO_2.

WtE helps to fulfill the Landfill Directive while also contributing to climate protection through the substitution of fossil fuels.

WtE: Contribution to Climate Protection

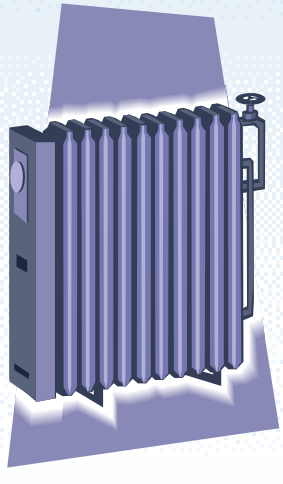


WtE: Complementary in the Energy Production System

50 million tons of MSW annually treated
can generate

→ **20 million MWh of electricity**

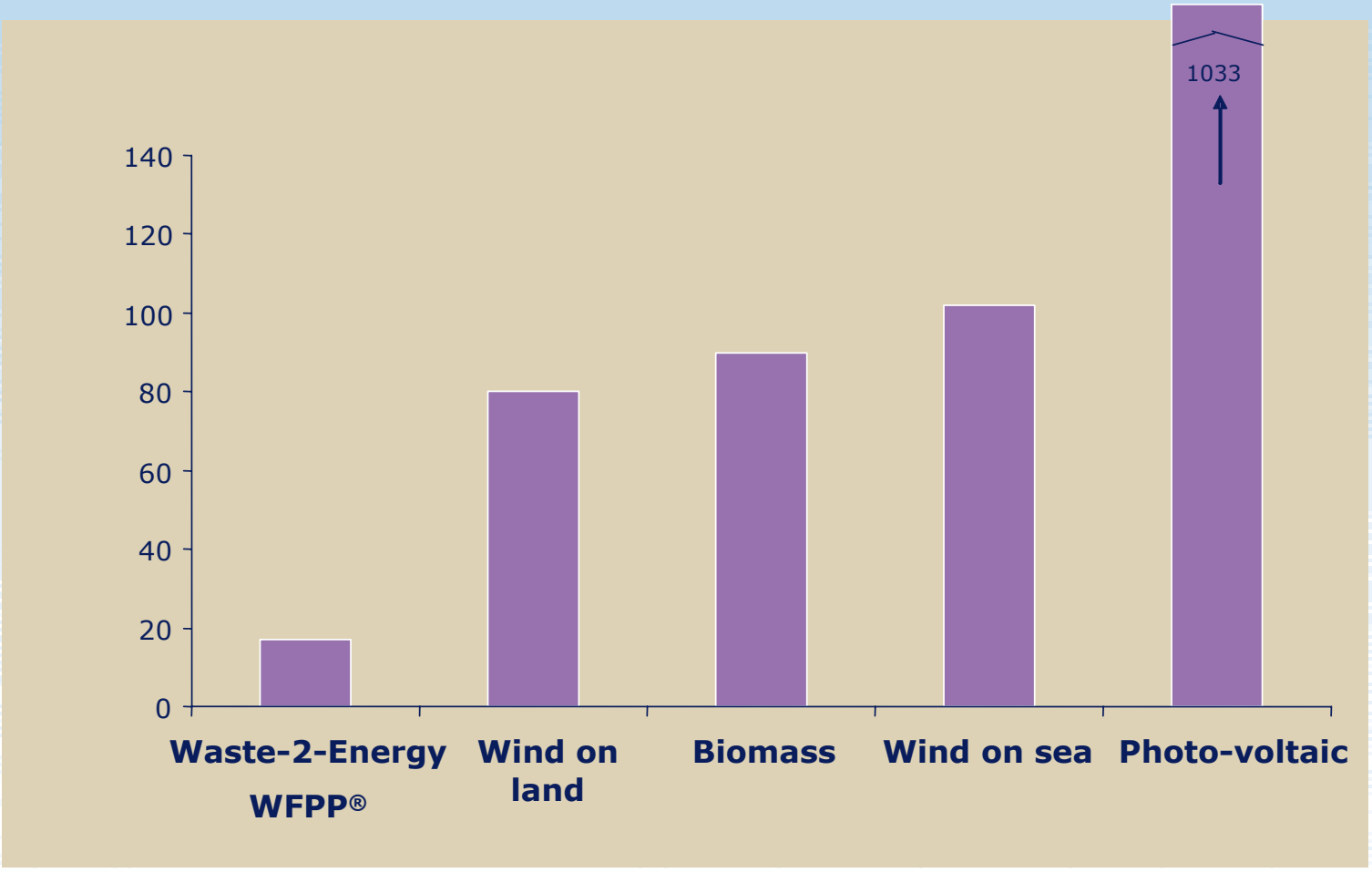
(can supply 20 million inhabitants
= population of Belgium, Denmark and Lithuania)



→ **50 million MWh of heat**

(can supply 32 million inhabitants
= population of the Netherlands, Hungary, Finland and Malta)

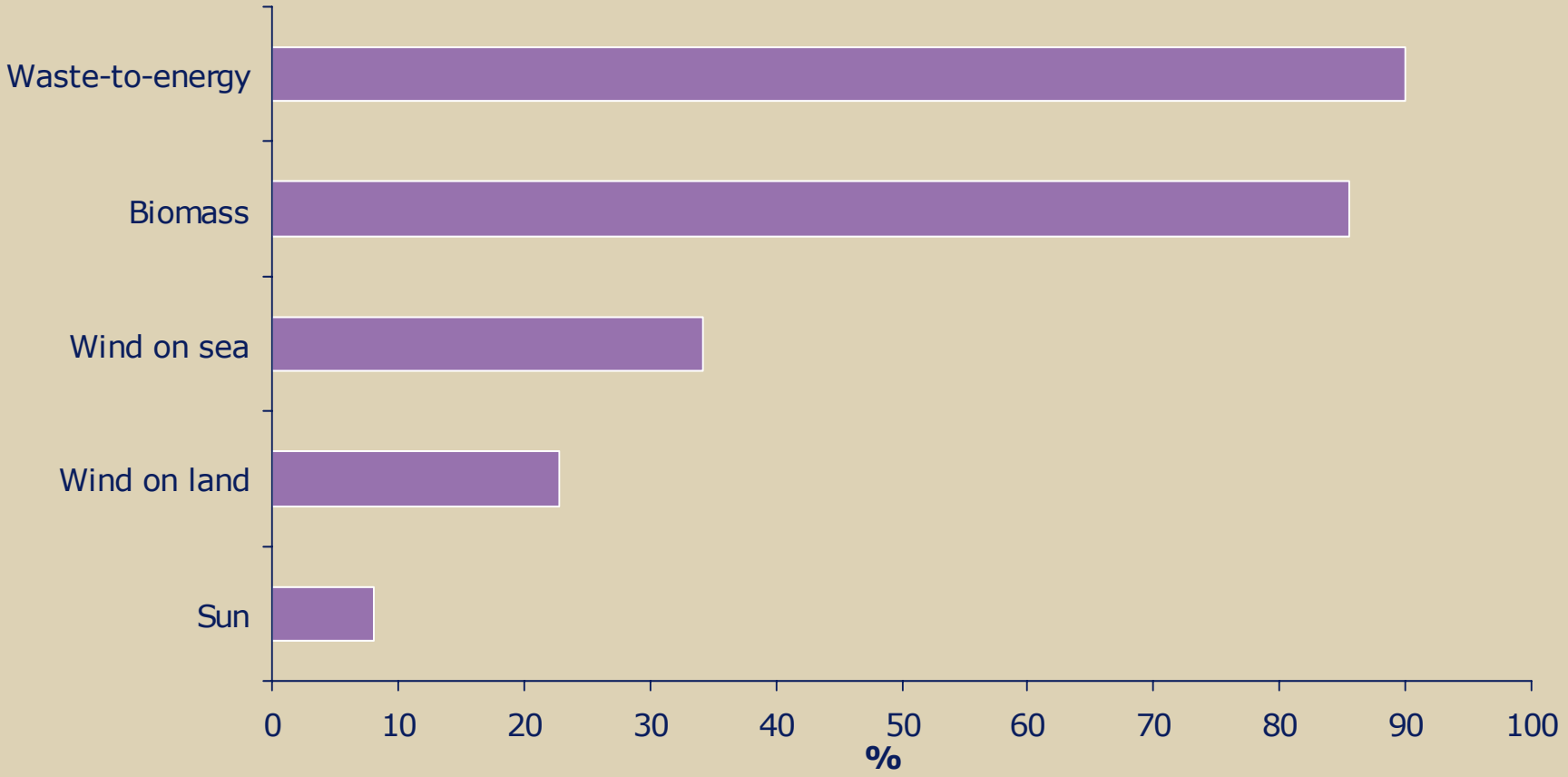
WtE is the most cost effective option to reduce CO_2



Sources: EZ, Regeling subsidiebedragen milieukwaliteit elektriciteitsproductie; VROM, personal communication; ECN, 2002, Duurzame Energie en Ruimte, M. Menkveld; analysis Deloitte

… and reliable

Availability (% of time per year)



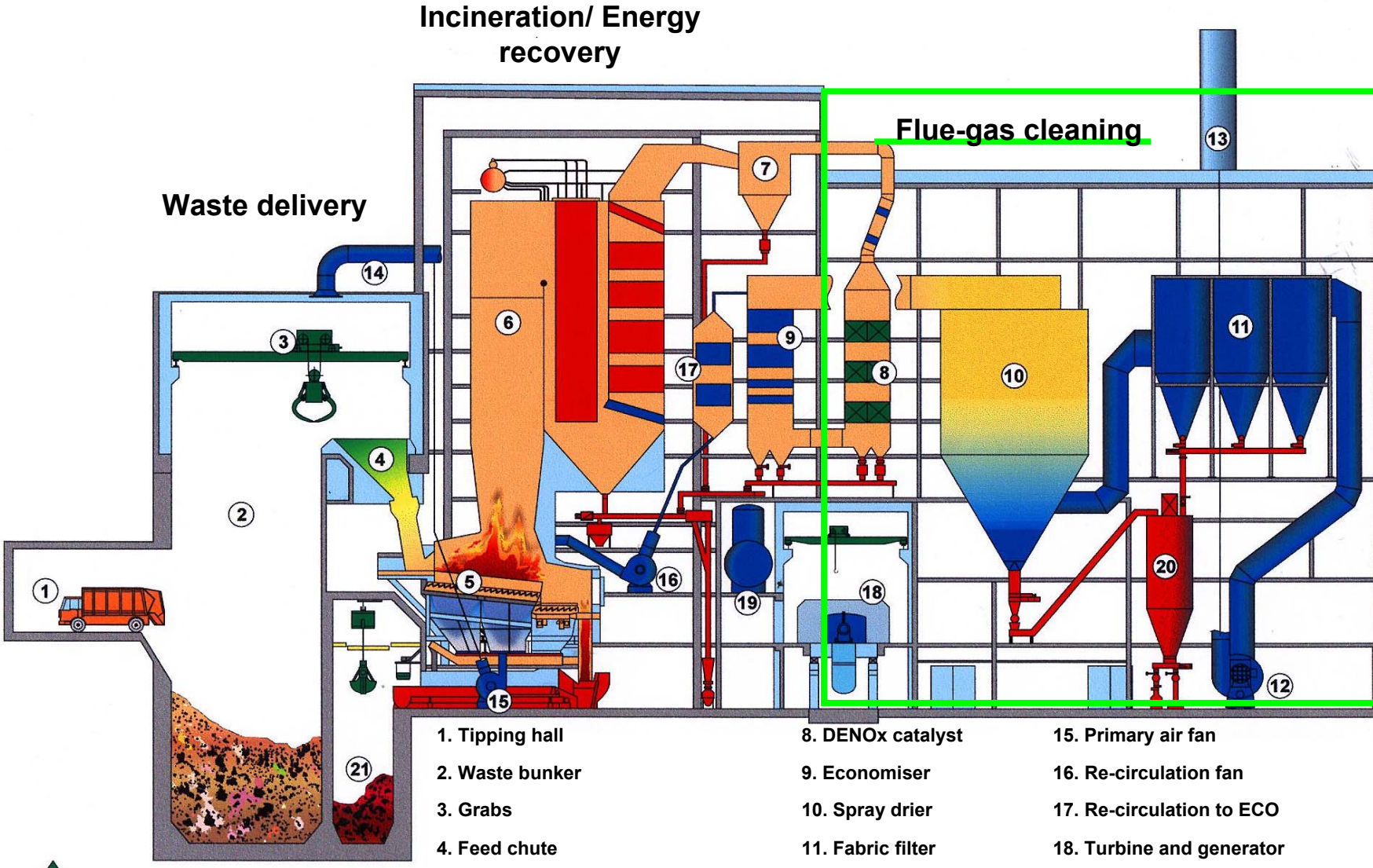
Sources: EZ, Regeling subsidiebedragen milieukwaliteit elektriciteitsproductie; VROM, personal communication;

Deloitte.

WtE: minimising emissions

The Waste Incineration Directive 2000/76/EC introduced the most stringent emission limit values applied to any single industry.

Waste-to-Energy Plant (Würzburg)

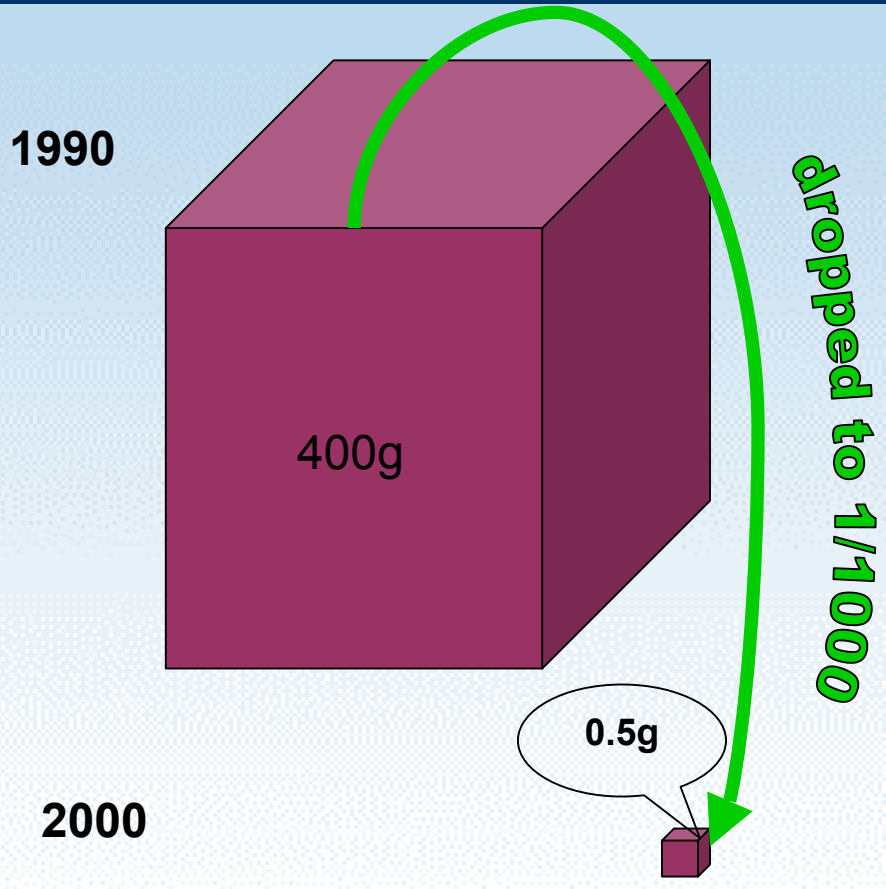


1. Tipping hall
2. Waste bunker
3. Grabs
4. Feed chute
5. Moving grate
6. Boiler
7. Electrostatic precipitator
8. DENOx catalyst
9. Economiser
10. Spray drier
11. Fabric filter
12. Fan
13. Stack
14. Bunker air
15. Primary air fan
16. Re-circulation fan
17. Re-circulation to ECO
18. Turbine and generator
19. Boiler water tank
20. Residue silo
21. Bottom ash bunker

ZWECKVERBAND ABFALLWIRTSCHAFT RAUM WÜRZBURG

Vermeiden Verwerten Behandeln

WtE: reduces emissions



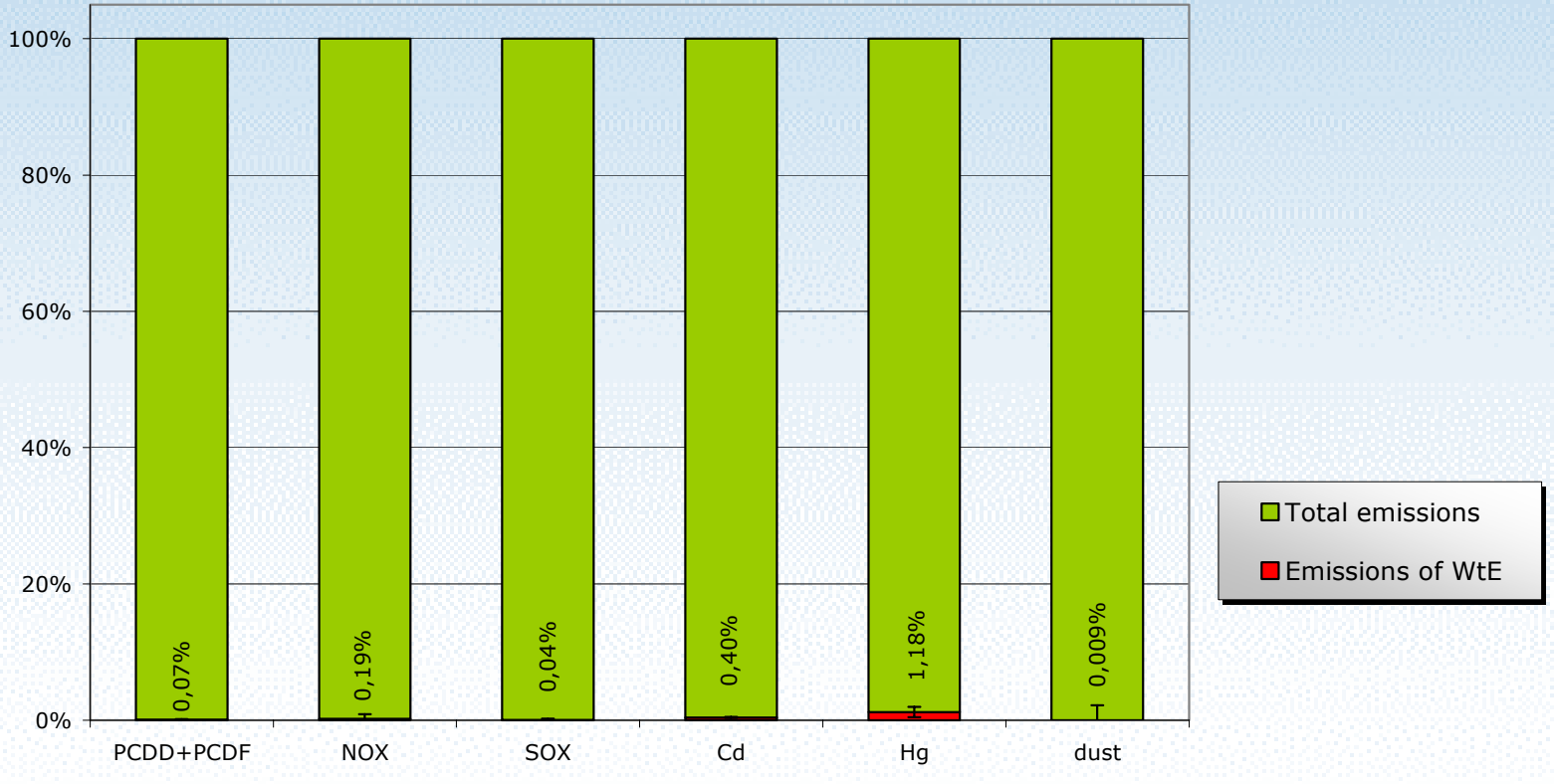
"in 1990 one third of all dioxin emissions in Germany came from waste incineration plants, for the year 2000 the figure was less than 1% " (BMU July 2005).

Source: German Federal Environment Ministry (BMU), July 2005.

Contribution of WtE to national emissions

Emissions related to total national emissions

actual state of waste incineration



Dioxins

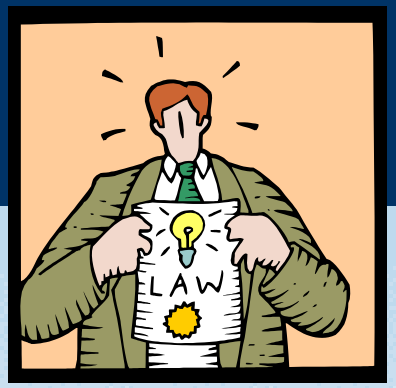
"Environment Agency estimates that during the Millennial celebrations in London the emissions from one 15 minute, 35 ton firework display equalled 120 years of dioxin emissions from the SELCHP waste incinerator."

Source: APSWG briefing on Energy from Waste; UK Environment Agency 2000

Waste-to-Energy serves the public

- Waste-to-Energy plants are an essential part of both the waste management and the energy supply network
- Contributes to security of energy supply
- Provides solutions for EU and Member States Waste Management policy and climate protection goals
- Creates jobs and know-how in a world leading technology

So what?



What needs to be done?

With regard to the review of the Waste Framework Directive (WFD) ...

Efficient WtE plants must be classified as an Energy Recovery option

... and should not be regarded as a waste disposal operation only

Why should efficient WtE plants get the recovery status?

- Giving incentives to further invest in energy efficiency

- Helping to fulfill the Landfill Directive (= diverting biodegradable waste from landfills).
  It would be counterproductive for European Environment policy if WtE plants are classified on the same level as landfills, i.e. disposal

- Many countries still rely heavily on landfilling. Investment in WtE plants would be easier if WtE‘s status is recovery rather than disposal

Why should efficient WtE plants get the recovery status?

- To get the balance right: Currently, we have a curious situation: WtE plants, which operate with the lowest emissions are discriminated against, while any industrial plant taking waste for co-incineration is qualified as energy recovery

- In terms of long-term security WtE can guarantee to treat MSW permanently in an environmentally sound way - Whereas industrial plants depend on the market ...

The Commission‘s proposal on the WFD

$$\frac{Ep - Eimp}{Ew - Ef}$$

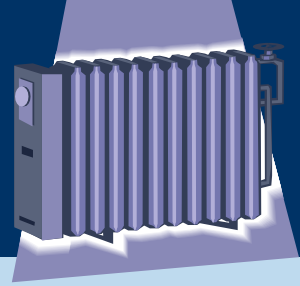
- The COM‘s proposal demands high energy efficiency values for WtE plants to get the energy recovery status, using a formula (Annex II, R1)

- Chosen process: co-decision
  for all other recovery operations: comitology

- CEWEP welcomes the COM‘s energy efficiency approach, however, the proposed factor of 0.6 is too high for existing WtE plants, even for those operating BAT.

  For future plants, requirements can be more demanding

Heat



- For heat, the formula takes into account both the efficiency of the plant to recover heat from waste and also the 'efficiency' of supplying consumers with the recovered heat.
- High energy efficiency can only be realized where there is a demand for the heat produced, because it cannot be transported long distances.
- Consumers for the heat need to be located near the plant. However, due to public reluctance WtE plants are often forced to be constructed far away from potential consumers.
- CEWEP hopes that this attitude will change in the future, considering WtE plants now operate with minimal emissions.

CEWEP Energy Efficiency report

- CEWEP carried out a report on energy efficiency, based on the R1 formula proposed by COM.
- 97 WtE plants assessed with a capacity of 24 million tons of MSW, representing 27% of the total amount of the plants in the EU and 49% of total EU capacity.
- Although most efficient WtE plants in Europe took part, only 67 WtE plants achieve the energy efficiency threshold of 0.6 proposed by COM.
- An energy efficiency threshold of 0.5 instead of 0.6, could be achieved by 85 WtE plants from the 97 plants studied by CEWEP.

What does it cost to improve energy efficiency?

- In the majority of cases an increase in energy efficiency rates in WtE plants will be combined with medium or high levels of investment.
- Although generalization is difficult due to the different situations and locations of WtE plants, it can be estimated that ca. 10 - 20 Mio. € investment is necessary to improve energy efficiency by 0.1 point.
- Naturally, this is providing that the plant has already invested in the basics in order to recover energy through the combustion of waste.

High energy efficiency as far as reasonably achievable

- The WtE sector is used to playing a driving role in environmental legislation (strict emission limit values)
- In further developing energy efficiency CEWEP members are willing to play an innovative role in waste management, once again
- The energy efficiency is a good criterion, taking climate protection into acount
- However, the efficiency threshold must be reasonable

Thank you for your attention

Please contact us if you would like some further information about Waste-to-Energy

CEWEP
Confederation of European Waste-to-Energy Plants
Office in Brussels:
Boulevard Clovis 12A
B-1000 Brussels
BELGIUM

Tel.: +32 (0)2 770 63 11
Fax: +32 (0)2 770 68 14
e-mail: info@cewep.eu

www.cewep.eu