Waste-to-Energy in Europe

WTERT Annual General Meeting 2006

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CEWEP
Confederation of European Waste-to-Energy Plants

CEWEP represents over 330 Waste-to-Energy Plants in 15 European countries. 45 Mio. t capacity/y = 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
Waste-to-Energy Plants in Europe operating in 2004
Thermally treated waste in million tons/year
In the whole of Europe about 50 million tons of MSW is thermally treated in some 420 Waste-to-Energy plants.
Planned additional Waste-to-Energy Capacity (base year 2004)
The role of Waste-to-Energy

- Waste Management System
- Waste-to-Energy
- Energy Production System
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?

• 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

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

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
Start of the WtE plant in Brescia

Through separate waste collection* in Brescia

% waste recycled

* 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

- 50 million tons thermally treated in Europe

Equivalent to

- 8.2 million tons hard coal
  - Equivalent to 23.2 million tons CO₂
  - = 6.8% of the EU-15 Kyoto targets by 2012.

- 7 billion m³ natural gas
  - Equivalent to 13.7 million tons CO₂
  - = 4.5% of the EU-15 Kyoto targets by 2012.
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)
Renewable energy from waste

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).

<table>
<thead>
<tr>
<th>Country</th>
<th>Recognition as renewable energy</th>
<th>Price in € cents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium (Flanders)</td>
<td>+ (40%)</td>
<td>1 cent market price + 10 cents/kWh Green certificates</td>
</tr>
<tr>
<td>Denmark</td>
<td>+ (80%)</td>
<td>0.19926 market price + 3.598 cents</td>
</tr>
<tr>
<td>Germany</td>
<td>+</td>
<td>3.5 cent market price (no subsidy)</td>
</tr>
<tr>
<td>Italy</td>
<td>+</td>
<td>9.6 cents/kWh Green Certificates</td>
</tr>
<tr>
<td>Netherlands</td>
<td>+ 47%</td>
<td>1.45 cents/kWh (minimum 26 % net efficiency required) subsidy</td>
</tr>
<tr>
<td>Portugal</td>
<td>+</td>
<td>7.5 cents/kWh (renewables tariff)</td>
</tr>
</tbody>
</table>
The European Commission has recently held a public consultation on Heating and Cooling from renewable energy.

CEWEP aims to get support for heat generation: A RES Heat Directive?
WtE is the most cost effective option to reduce CO₂
Sophisticated filtering devices minimise the emissions into the atmosphere by blocking the pollutants, originating from the waste, such as heavy metals.
Waste-to-Energy Plant (Würzburg)

Waste delivery

Incineration/ Energy recovery

Flue-gas cleaning

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 extraction
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
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.
Waste-to-Energy serves the public

- Waste-to-Energy plants are an essential part of both the waste management and the energy supply network

- Provides solutions for EU and Member States Waste Management policy and climate protection goals (incl. security of energy supply)

- 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

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.
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 account

• 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

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