Confederation of European Waste-to-Energy Plants

2006-2008 progress made in Waste-to-Energy in Europe

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President
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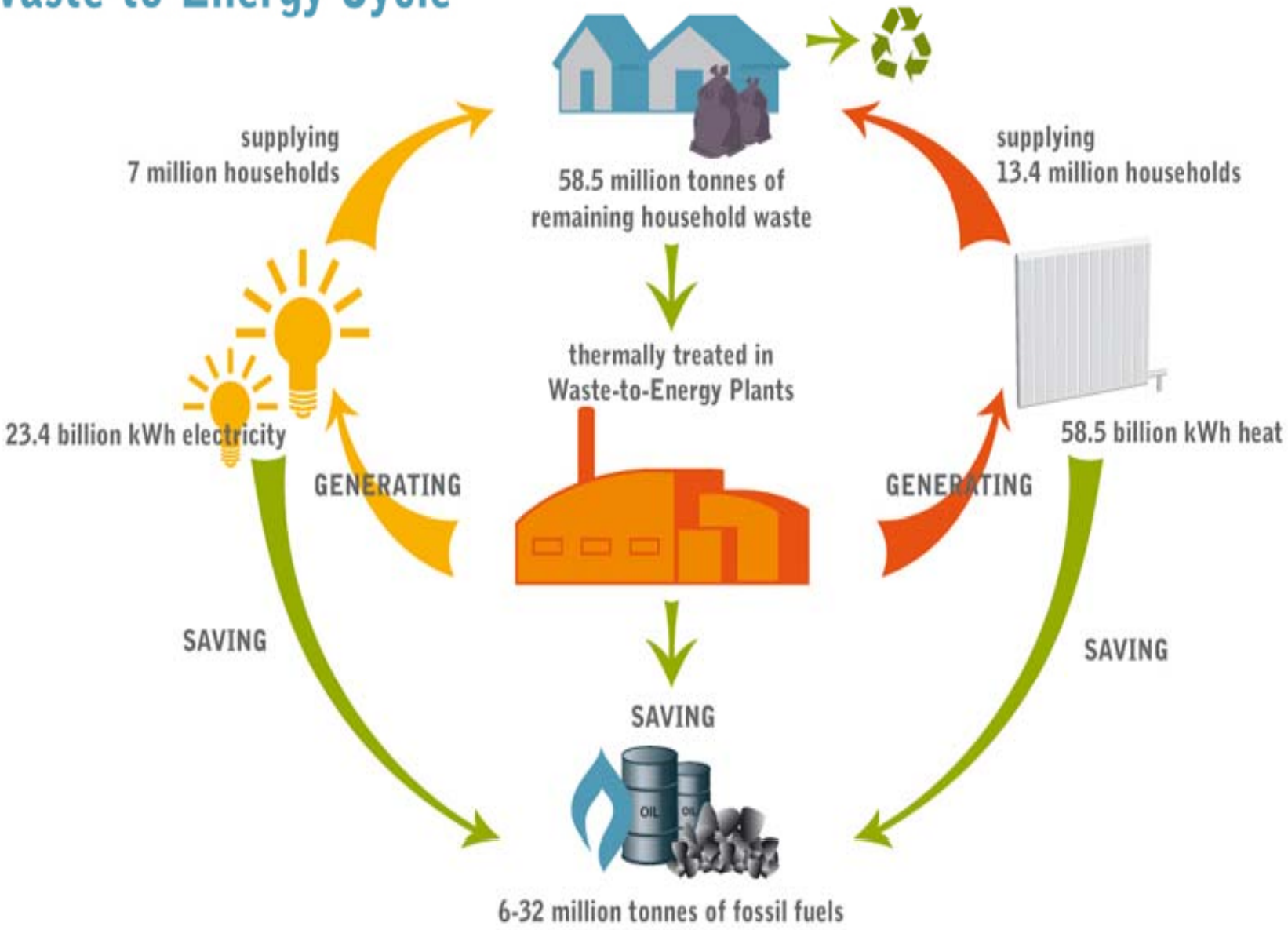
WTERT, 17th October 2008

CEWEP
Confederation of European Waste-to-Energy Plants

CEWEP represents about 340 Waste-to-Energy plants across Europe, 80% of the European market.

They thermally treat 52 million tonnes of household and similar waste, that remains after waste prevention, reuse and recycling by generating energy from it.

Waste-to-Energy Cycle



Classifying efficient WtE Plants as “energy recovery”

- On 17th June 2008 the European Parliament (EP) voted on the Waste Framework Directive (WFD) in second reading, thus agreeing with a compromise dealt before with the Council.

- **The WFD accepts the energy recovery status for efficient WtE plants.**

- The classification consists of two parts: The recovery definition and the R1 formula stating energy efficiency criteria in Annex II of the WFD:

Energy recovery status

“Recovery" means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II sets out a non-exhaustive list of recovery operations;

- The wording “in the wider economy” ensures that WtE Plants are covered as they substitute other materials, i.e. fossil fuels used by power plants, not “in the plant”, but “in the wider economy”.

- The EP had deleted this wording in the first reading but adopted it in its second reading.

Energy Efficiency
R 1, Annex II of WFD

R1: “use principally as a fuel or other means to generate energy”
“This includes incineration facilities dedicated to the processing of MSW only where their energy efficiency is equal or above …

- 0.60 for existing plants (permitted before 1 January 2009) and
- 0.65 for plants permitted after 31st December 2008.

If necessary, the application of the formula shall be specified.
Local climatic conditions may be taken into account, such as the severity of the cold and the need for heating insofar as they influence the amounts of energy that can technically be used or produced in the form of electricity, heating, cooling or processing steam.

Energy efficiency formula:

$$\frac{\text{Energy produced} - (\text{Energy in added fuel} + \text{Energy import})}{0{,}97^{*} \times (\text{Energy in the waste} + \text{Energy in added fuel})}$$

Equivalency factor electricity production x 2,6
Equivalency factor heat production for commercial use x 1,1

* factor accounting for energy losses due to bottom ash and radiation

The elephant in the room

- It was a long journey in order to achieve this, and along the way many controversial debates took place on this issue, so much so it was called “the elephant in the room” by the European Parliament’s Conservative Rapporteur, Dr. Caroline Jackson, UK.

After having deleted the R1-formula in the Parliament’s plenary vote in the first reading
MEPs finally voted in second reading in favour of the formula, i.e. for the energy recovery status of efficient WtE Plants: **540 votes in favour, with only 128 votes against.**

The deal

- However, there was a deal in order to alleviate fears that energy recovery could hamper recycling efforts:

- The WFD sets ambitious recycling targets for household and similar waste of overall 50% by weight, for at least paper, glass, metal and plastic waste by 2020, as well as at least 70% recovery of non-hazardous construction and demolition waste.

The magic formula

WtE hand in hand with Recycling

The Member States who have most successfully reduced dependence on landfill have done this by combining:

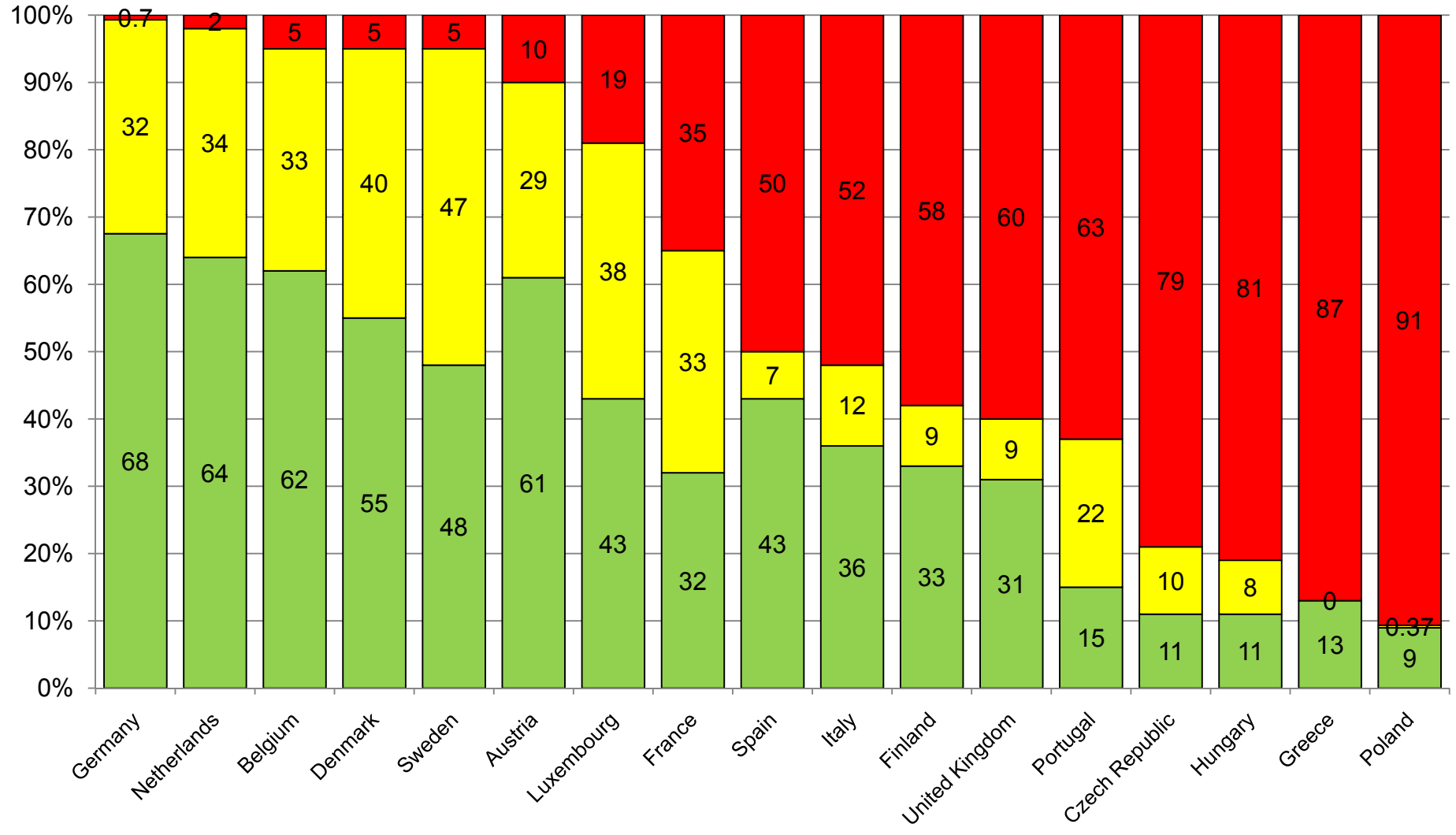
- **material recycling**
- **biological treatment** (composting and anaerobic digestion)
- and **Waste-to-Energy**

Proving that WtE goes hand in hand with Recycling.

Treatment of MSW in the EU 27 in 2006

Source: EUROSTAT

Recycling (Incl. Composting) | Waste-to-Energy | Landfilling



The European Environment Agency says:

"Recycling of municipal waste and incineration with energy recovery are used as complementary tools to divert waste away from landfills and to recover some economic value from waste."

"When comparing waste disposal options, it is sometimes argued that incineration of waste with energy recovery hinders the development of recycling. However, there is no evidence to support this. Figure 6.26 on municipal waste shows that those countries with the lowest level of landfilling of municipal waste (less than 25 %) also have the highest levels of both recycling and incineration with energy recovery. In contrast, countries with a medium level of landfill (25–50 %) have a medium rate of recycling and limited incineration with energy recovery. Lastly, countries with a high share of landfill (greater than 50 %) have neither much recycling nor incineration with energy recovery."

Report "Europe's Environment - The fourth assessment" October 2007, Chapter 6 page 288.
http://reports.eea.europa.eu/state_of_environment_report_2007_1/en

German Federal Environment Agency (UBA) background paper issued on 3rd July 2008:
"Waste incineration does not oppose waste prevention"

"As waste is indeed incurred in our consumer society, thermal valorisation of waste which is not otherwise redeemable will also continue to be necessary and useful. A comparison across Europe shows that countries with progressive waste management systems in place have both a high proportion of waste incineration as well as high rates of materials recycling, as for example in Denmark and the Netherlands, where waste incineration does not impede high rates of recycling".

"…the energy content of residual waste from human settlements is about 50 percent biogenic content, which can be classed as carbon dioxide-neutral".

See press release: http://www.umweltbundesamt.de/uba-info-presse-e/2008/pe08-052.htm

Recycling and WtE - the magic formula for sustainable waste management

More recycling and WtE reduces net Green House Gas emissions

This is the conclusion of some recently published studies, e.g. a new briefing released by the European Environment Agency stating:

> "Increased recovery of waste and diverting waste away from landfill play a key role in tackling the environmental impacts of increasing waste volumes. As recycling and incineration with energy recovery are increasingly used, net greenhouse gas emissions from municipal waste management are expected to drop considerably by 2020."

http://reports.eea.europa.eu/briefing_2008_1/en/EN_Briefing_01-2008.pdf

Study by Prognos et al.

"*Resource savings and CO_2 reduction potentials in waste management in Europe and the possible contribution to the CO_2 reduction target in 2020*"

on behalf of a coalition of waste recycling and other waste management companies.

Reduction potentials of 145 - 235 Mt CO_2 equivalents (depending on the scenario examined in the study) **by 2020**

in addition to the CO_2 emission reduction of ca. 206 Mt CO_2 equ the waste sector in Europe has already achieved in 2004

due to recycling and energy recovery from waste.

For more information: baerbel.birnstengel@prognos.com
www.prognos.com

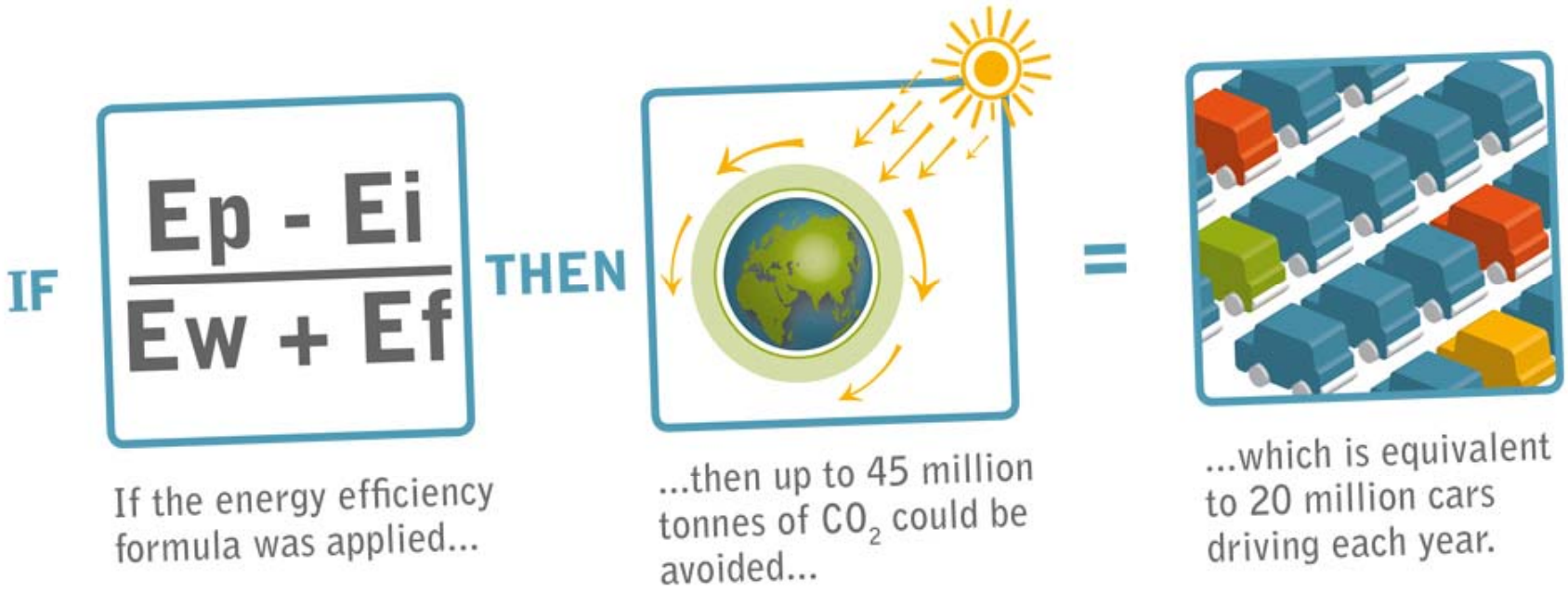
FFact Study on WtE contribution to climate protection

This study shows the positive effect the energy efficiency formula of the WFD (Annex II, R1) could have on CO_2 emissions.

WtE's contribution to climate change is calculated according to International Panel on Climate Change (IPCC) in the framework of the UN convention of Climate change.

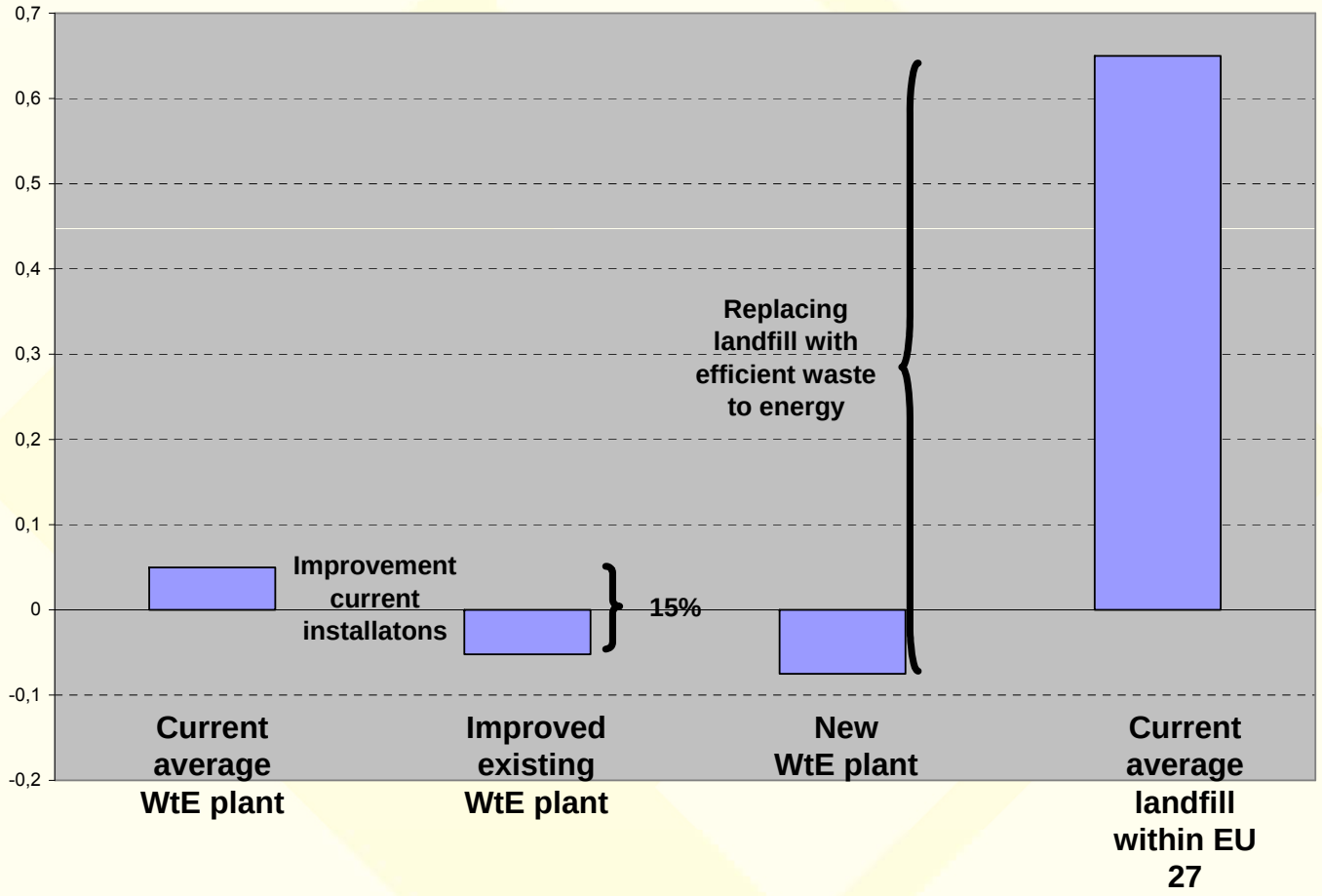
The study is based on the assumption that an ambitious policy in the EU aiming at **60% recycling** and efficient waste prevention measures are implemented.
The remaining 40% to be used to generate energy.

WtE: Contributing to climate protection



FFact study: Based on the methodological agreements made by the International Panel on Climate Change in the framework of the UN Convention on Climate Change

Reduction potential of emission of GHG in tonnes of CO_2 eq per tonne of waste managed



FFact
MANAGEMENT CONSULTANTS

Potential CO_2 reduction from WtE for EU 27

Installation	Million tonnes $CO_{2\ eq}$ avoided (both scenario's)	Equivalent annual emissions from cars
Improving of existing WtE plants (treating 56,7 million tonnes	5,8 million tonnes	3 million cars
New WtE plants (treating 54,8 million tonnes MSW additionally)	39,4 million tonnes	19 million cars
Total	45 million tonnes	22 million cars

45 million tonnes of CO_2 represents **6 %** of EU reduction target !

Implication of Energy Recovery status in WFD

The energy recovery status of WtE Plants gives incentives

to divert waste from landfills and

to invest in high energy efficiency

Good infrastructure and access to the grid necessary (Scandinavian countries show the way forward)

Location of WtE Plants close to customer for district heating (or cooling) is important for optimisation of energy efficiency

Public acceptance important!

Implementation

- The Waste Framework Directive will probably be adopted as an “A-item” (i.e. without further discussion) in the Council (on 20th October 2008) and then published in the EU Official Journal, entering into force on the 20th day following that of its publication.

- Then Member States have 24 months to implement the directive into national law.

The COM Energy and Climate Package

The Commissoin's "Energy Package" for Europe calling for the following by 2020:

- 20% increase in energy efficiency
- 20% reduction in greenhouse gas (GHG) emissions
- 20% share of renewables in overall EU energy consumption
- 10% biofuel component in vehicle fuel

These are ambitious targets: today 8.5% of energy is renewable. To achieve a 20% share by 2020 will require major efforts across all sectors of the economy and by all Member States.

Energy Package

The package includes, inter alia, proposals on:

- a **directive on the promotion of the use of energy from renewable sources** (RES Directive)
- a **directive to improve and extend the greenhouse gas emission allowance trading system running from 2013 to 2020 (ETS)**
- a **decision on the effort of Member States to reduce their greenhouse gas emissions** to meet the Community's greenhouse gas emission reduction commitments up to 2020

This decision covers emissions from sectors not included in the ETS such as transport, buildings, services, agriculture and *waste*.

However, there are some MEPs suggesting that waste facilities should be included within the ETS.

Directive on Energy from Renewable Sources (RES Directive)

Annex I sets ambitious national targets for the share of energy from RES by 2020.

Definition of biomass (Art. 2) comprises the biodegradable fraction of industrial and municipal waste

➔ renewable energy source

as already in the RES Electricity Directive 2001/77/EC

Rapporteur in EP: Claude Turmes, Greens, Luxembourg

EP's Industry+Energy Committee, vote 11/9/2008

"biomass" means the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), ***aquaculture,*** forestry and related industries, the ***separated collected*** biodegradable fraction of industrial and municipal waste ***as well as wastewater sludge***;

The wording "separated collected" would disregard the significant proportion (ca. 50%) in residual waste
-> This has to be avoided!

Energy Resources & Climate protection

- **WtE** helps to reduce both, dependence on landfill and limited fossil fuel resources
- is a cost-effective and reliable renewable energy source
- is an effective option to reduce GHG emissions
- the technology (grate furnace) is robust and proven for decades of experience

Apropos robust and proven ….

What about the “innovative” alternatives to WtE, such as gasification, pyrolisis, mechanical biological treatment (MBT) etc?

Are they proven?
Are they robust enough to take the residual heterogenous waste?

Can MBT avoid the non beloved “incineration”?
Can MBT avoid landfilling?

MBT

One has to bear in mind that MBT is a pretreatment only.
It does not work without landfilling or thermal treatment.

Does this pretreatment have advantages

- From an environmental point of view?
- From a hygiene point of view? working conditions for employees?
- From an economic point of view?

As CEWEP might be criticised for not being objective on this,
let's have a look what the experts say, …
from a country which gathered some appropriate experience

10 Business RW No. 4 21 February 2007

"Mechanical-biological treatment is largely a failure", expert says

Europe's thermal treatment capacity to reach 84.4m tonnes by 2015

(D) – Germany's Advisory Council on the | the benefit of mechanical-biological waste

fluctuate dramatically from year to year.

In Eurcpe, Mr Vaccani expects the installed thermal treatment capacity to climb from 53.4m tonnes in 2005 to 84.4m tonnes in 2015. The highest concentration of waste incineration plants is found in Japan and Switzerland, where 75 to 80 per cent of all

German advisory council on the environment (SRU):

2008 environment policy report

10.2.4 Conclusions and Suggestions:

> *"The mechanical-biological treatment of waste (MBT) has been established as complementary to incineration, but it is still fighting with the fulfillment of the edge conditions like security of disposal, conformity with current legislation and economics. Due to these open questions, further constructions of MBT plants are currently* ***not advised****. There are chances of this treatment when being enhanced to a material flow method before incineration or as an* ***export*** *technology".*

The SRU is a scientific advisory board of the German Government to which it delivers every 4 years an environment report.

http://www.umweltrat.de/02gutach/downlo02/umweltg/UG_2008.pdf.

How MBT is viewed by the consultants

MBT is not a magic bullet:

Used inappropriately it can be *costly, have poor operational reliability, result in significant environmental impacts* and contribute little towards recycling and climate mitigation.

Used well, it can provide tangible benefits and *ease political and public acceptance* of new waste processing infrastructure, but it rarely provides overwhelming environmental gains relative to its cost.

Quote from a report by Juniper Consultancy

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