

Energising waste ▶ a win-win situation

CEWEP would like to highlight the role Waste-to-Energy (WtE) plays in producing

▶ Sustainable ▶ Low Carbon ▶ Cost-Effective ▶ Reliable ▶ Local Energy

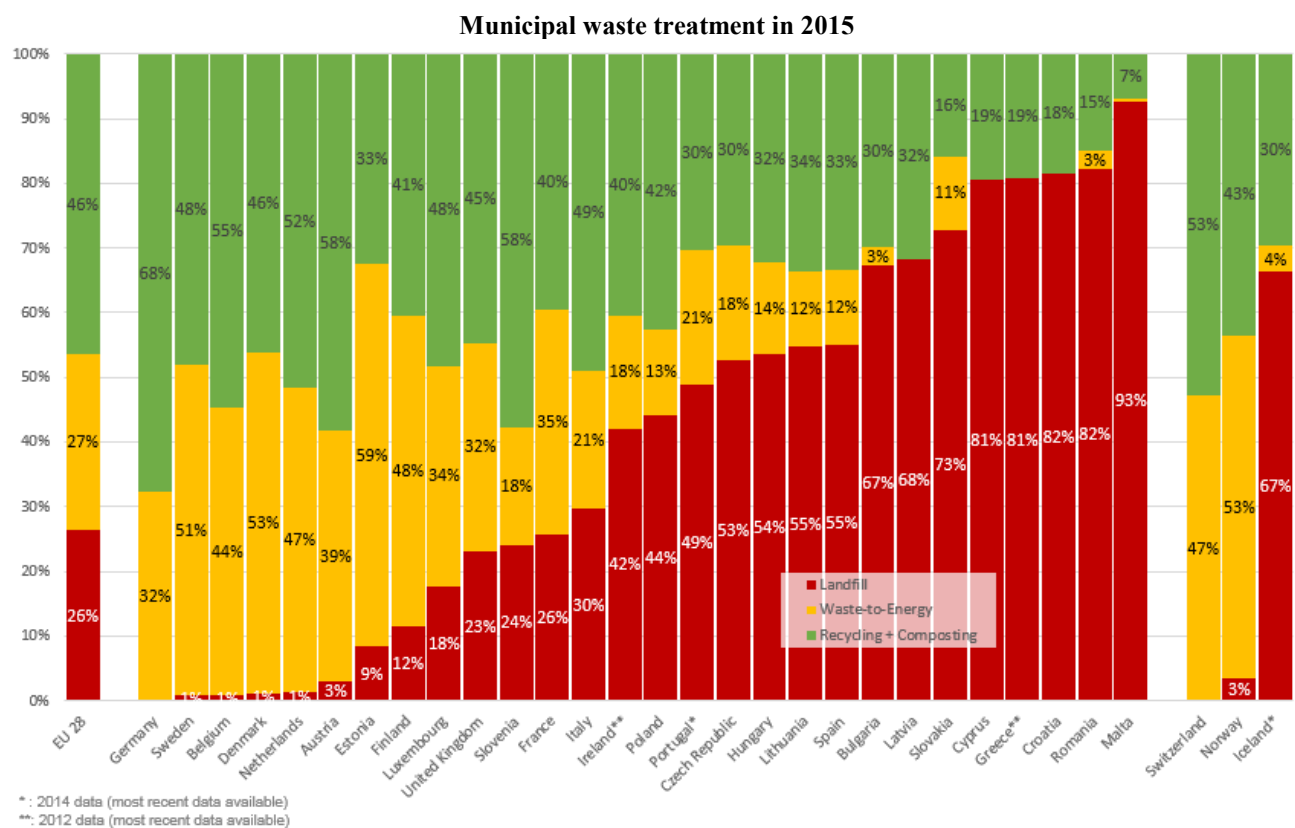
while replacing fossil fuels and helping to divert waste from landfills

Waste-to-Energy Plants (waste incineration with energy recovery) thermally treat waste, which is not suitable for recycling and which would otherwise be consigned to landfills, and transforms it into sustainable energy. CEWEP respects the priority given to recycling according to the waste hierarchy, and experience shows that Waste-to-Energy and recycling are complementary in order to divert waste from landfills and reduce Greenhouse gas emissions¹.

Waste-to-Energy has a role to play in both:

Sustainable Waste Management and Energy supply

Recycling and Waste-to-Energy in combination for sustainable waste management



Graph by CEWEP, Source: EUROSTAT

Eurostat figures show that Member States who have most successfully reduced landfilling, achieve good recycling rates which go hand-in-hand with Waste-to-Energy. They have worked towards a complementary waste management system where **both Recycling and Waste-to-Energy play a complementary role in diverting waste from landfills.**

¹ Recycling and Waste-to-Energy in combination for sustainable waste management, http://www.cewep.eu/information/policy/m_1038

Waste-to-Energy replaces fossil fuels and produces sustainable energy

Waste-to-Energy plants put the energy content of residual waste, not suitable for sustainable recycling, to good use: producing electricity and heat from a locally available energy source.

Waste-to-Energy technology is one of the most robust and effective alternative energy options to reduce CO₂ emissions and to save limited fossil fuel resources that would otherwise be used to produce the energy.

Waste-to-Energy Plants in Europe can supply 17 million inhabitants with electricity and 15 million inhabitants with heat. This is based on 88 million tonnes of residual household and similar waste that was treated in 2014 in Europe. Then between 9 and 48 million tonnes of fossil fuels (gas, oil, hard coal and lignite) can be substituted annually, which would emit 22 - 48 million tonnes of CO₂. Waste-to-Energy helps to achieve **low-carbon policy** objectives and to ensure **security of energy supply**.



Efficiently Transforming Waste into Energy

The 3rd edition of CEWEP's Energy Efficiency report² demonstrated that the energy efficiency criterion (R1 formula), which was introduced in the Waste Framework Directive (2008/98/ EC), has proved to be an incentive to increase the performance of Waste-to-Energy plants. Improvements in energy efficiency have been achieved due to optimization efforts carried out by the operators of Waste-to-Energy Plants.

The Waste-to-Energy sector is the first for which efficiency criteria have been introduced in the Waste Framework Directive, and it has proved to be an effective instrument for achieving quality (energy) recovery.

Waste-to-Energy generates reliable (base-load) Renewable Energy

² CEWEP Energy Efficiency Report (Status 2007-2010)

http://www.cewep.eu/information/energyclimate/cewepenergyefficiencyreports/976.CEWEP_Energy_Efficiency_Report_Status-.html

Waste-to-Energy also helps to achieve the EU's policy for **renewable energy sources** to cover 20% and 27% of the whole energy consumption by 2020 and 2030 respectively, due to the fact that about 50% of the energy produced by WtE plants comes from biodegradable biomass.

Waste-to-Energy provides base-load renewable energy supply, contributing to the stability of the grid and security of supply.

Waste-to-Energy is the link between resource and energy efficiency

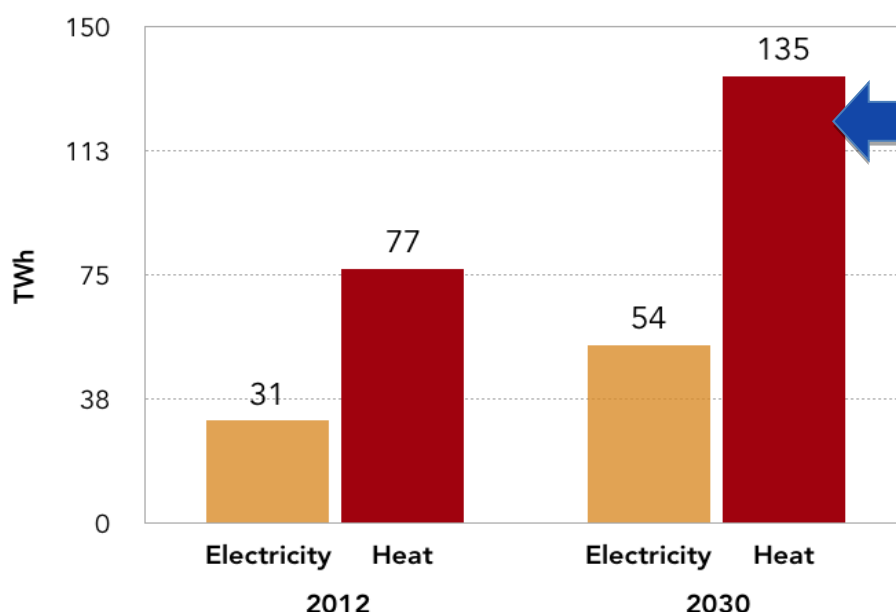
Waste-to-Energy also provides synergies between the Circular Economy and Energy Union goals helping to reduce dependence on landfills and its Greenhouse gas emissions and replacing fossil fuels used by conventional power plants.

Applying the Circular Economy targets as proposed by the European Commission on 2nd December 2015, the total amount of energy (renewable + carbon components) produced by Waste-to-Energy plants would potentially reach 189 TWh by 2030, enough to replace 10% of the energy supplied by the coal sector*.

Circular Economy targets (Dec 2015):

- ▶ Reuse + Recycling: **65%** of municipal waste by 2030
- ▶ Landfill: maximum **10%** of municipal waste by 2030

2030 Energy potential for WtE in EU28 based on Circular Economy targets



Potentially producing up to **189 TWh** of secure energy from MW and C&I waste

Which would replace 10% of the energy supplied by the coal sector*

*Heat Roadmap Europe 2050 (Second pre-study for the EU27), May 2013

- ▶ **This potential can only be realized if waste is diverted from landfilling and what is not suitable/feasible for recycling is processed by efficient Waste-to-Energy plants.**
- ▶ **For Waste-to-Energy plants energy efficiency, access to the grid and local infrastructure for heating and cooling is of tremendous importance.**

Waste-to-Energy is a cost-effective energy source

The [UNEP report "District Energy in Cities states: Unlocking the Potential of Energy Efficiency and Renewable Energy"](#)³ identifies modern district energy as the most effective approach for many cities in transition to sustainable heating and cooling, by improving energy efficiency and enabling higher shares of renewables. Energy from waste is presented as a way to produce low-cost heat and often initiate development of a city's district heating network, utilizing the energy content in non-recyclable, combustible waste.

► Policy recommendations

Waste-to-Energy can make a significant contribution to sustainable energy, reducing Europe's high dependency on fossil fuel imports as well as treating waste that is otherwise not recyclable in an environmentally sound way. In order to improve the contribution Waste-to-Energy can make towards climate protection, we recommend the following to decision makers:

► Diverting waste from landfills - *burying waste means wasting precious resources*

The EU Landfill Directive with its requirement to divert waste from landfills was an important first step to protect the climate, but it must be properly implemented. It is worth noting that some countries have gone further and reduced dependence on landfills dramatically (ca. 1%) using a combination of Recycling and Waste-to-Energy (Germany, the Netherlands, Belgium, Denmark and Sweden).

The Circular Economy package is an opportunity to further minimise landfilling and maximise the use of waste as a resource. It should take an ambitious approach and tackle also commercial and industrial waste, not only municipal waste.

The most effective way to unleash the full potential of waste as a resource would be to stop the landfilling of recyclable and combustible waste in order to produce secondary raw materials or energy.

*A more ambitious EU policy on diverting waste from landfills would potentially reduce 92 m t CO_{2equ} /year by 2030⁴
= 8 % of the amount to be reduced by 2030 (1137 m t CO_{2equ})⁵*

► Boost Quality Recycling

In a clean circular economy quality recycling (rather than just quantity) should play the fundamental role. Waste that is too polluted should not be returned to the resources cycle and from waste that is degraded after several times of recycling it is not possible to produce a quality product that will meet consumers' demand. Waste-to-Energy is the most sustainable way to treat this kind of waste. Producing energy from waste not suitable for recycling is part of a responsible circular economy.

► Policies to foster Energy Efficiency

Apart from generating renewable energy, distribution is a key element in order to improve energy efficiency, reduce CO₂ emissions and ensure security of energy supply. There is a major opportunity to use even more energy from waste in the form of heat, if the appropriate linking of heat (or

³ District Energy in cities: Unlocking the Potential of Energy Efficiency and Renewable Energy", a report by United Nations Environment Programme http://unep.org/energy/portals/50177/DES_District_Energy_Report_full_02_d.pdf

⁴ The Climate Change Mitigation Potential of the Waste Sector, Institute for Applied Ecology (Öko-Institut) and the Institute for Energy and Environmental Research (IFEU) on behalf of German Federal Environment Agency (UBA), <http://www.umweltbundesamt.de/publikationen/the-climate-change-mitigation-potential-of-the>

⁵ Calculation based on 2013 CO₂ emissions data provided by the [European Environment Agency](#)

process steam) customers to Waste-to-Energy plants would be encouraged. Therefore we need drivers for improving **infrastructure for district heating and cooling** in addition to **incentives to maximize electricity production from waste**.

Replacing individual boiler heating (fuelled by fossil fuels) with District Heating, supplied inter alia by energy from waste⁶, would also **improve air quality** and help cities to comply with clean air standards.

Regarding **access to the grid**, there should be an appropriate hierarchy for priority of dispatch. Waste-to-Energy plants should not be put at disadvantage in comparison to other renewable energy sources.

► Waste-to-Energy Success Stories

Dutch Waste-to-Energy Plant received the Global District Energy Climate Award 2013, for innovative heat and steam supply

Twence has been awarded this prestigious international prize for its supply of heat to a local district-heating network and its supply of steam to AkzoNobel's salt-production, both of which are produced in its Waste-to-Energy Plant. The International Energy Agency was part of the selection committee that evaluated the various entries from all over the world.



Since 2011, the Waste-to-Energy Plant at Twence has not only been producing electricity, but also supplying heat to Essent and steam to AkzoNobel. This was made possible by the construction of a pipeline of over 5 km for the supply of heat and a 1.5 km pipeline for the supply of steam. Thanks to these pipelines, Essent and AkzoNobel managed to reduce their consumption of natural gas by a total of 125 million cubic metres in 2011 and 2012.

The combined supply of both heat and steam makes this a unique initiative.

More than 40% of Paris' district heating network, including the famous Louvre museum, is supplied by 3 Waste-to-Energy Plants.

These Waste-to-Energy Plants are: St Ouen, Issy-les-Moulineaux and Ivry/Seine.

The Plants treat the household waste, which is not suitable for recycling, of the 6.5 million inhabitants of Paris and its inner ring area. By treating this waste they prevent the consumption of 220,000 tonnes of oil equivalents and the release of some 700,000 tonnes of CO₂ into the atmosphere each year.



The **Waste-to-Energy Plant in Malmö** (Sweden) supplies 60% of the heat demand of the city

and the **Brescia Waste-to-Energy Plant** (Italy) provides more than 50% of the city's heat demand.



Danish success factors

- Extensive Landfill ban
- Waste-to-Energy = Combined heat and power plants
- Wide spread district heating systems - Tradition of creating collective heating systems

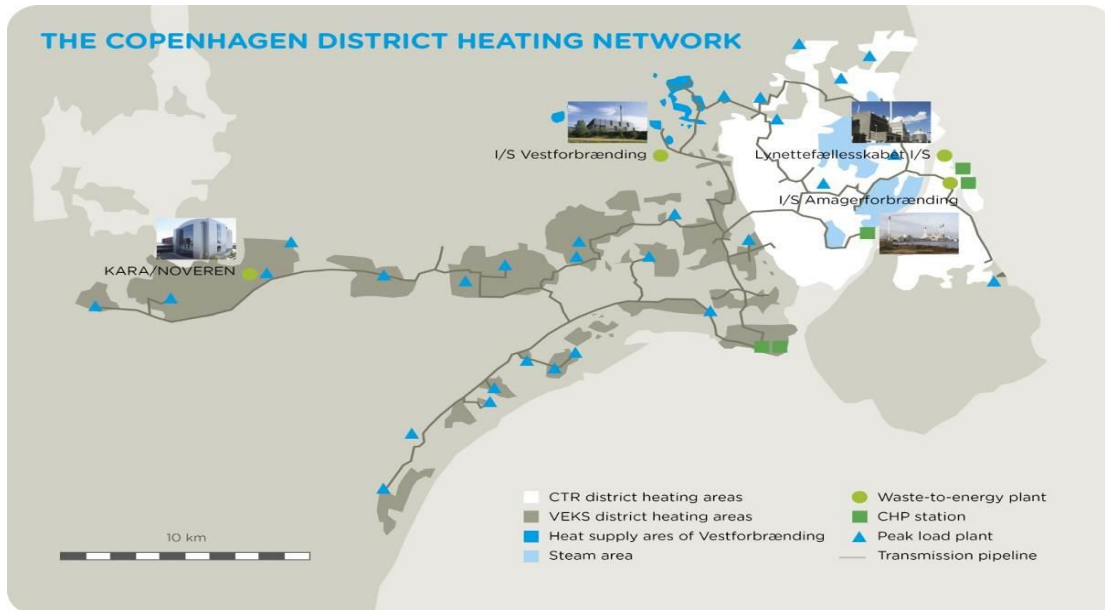
⁶ See also „Warmth from Waste”

[http://www.cewep.eu/information/energyclimate/warmthfromwaste/1115.Warmth from Waste A Win-Win Synergy.html](http://www.cewep.eu/information/energyclimate/warmthfromwaste/1115.Warmth%20from%20Waste%20A%20Win-Win%20Synergy.html)

High utilization of energy
High energy efficiency
High public acceptance

Since the oil crisis in the 1970's great efforts have been made in Denmark to establish large district heating transmission networks in order to reduce dependence on oil. WtE is a part of this policy as waste is a locally sourced fuel that in addition to reducing the use of fossil fuels, contributes to increasing fuel independence.

One of the world's largest district heating networks is the Copenhagen network, stretching more than 50km from east to west. Three WtE Plants supply heat to the same network and **more than 30% of the total district heating in the Greater Copenhagen area is generated by waste.**



► **And Waste-to-Energy is COOL...**

A district **cooling** system has been set up in the centre of Copenhagen, as well as at other WtE Plants in Denmark, to supply cooling to nearby shopping centres, hospitals or other buildings with a high cooling demand.



Also the **Spittelau WtE Plant in Vienna** provides cooling and heating to the Vienna General hospital.

This is in addition to providing heating for over 60,000 households in the city each year.

The plant processes around 200,000 t/year of household waste from Vienna.

Some other cities are harnessing waste for cooling
 ... coming to a city near you?

Brussels, June 2017

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CEWEP is the umbrella association of the operators of Waste-to-Energy plants across Europe. They thermally treat household and similar waste that remains after waste prevention, reuse and recycling by generating energy from it. This is how they replace fossil fuels, such as coal, gas and oil, used by conventional power plants. At the same time Waste-to-Energy plants help to reduce Greenhouse gas emissions by diverting waste from landfills.