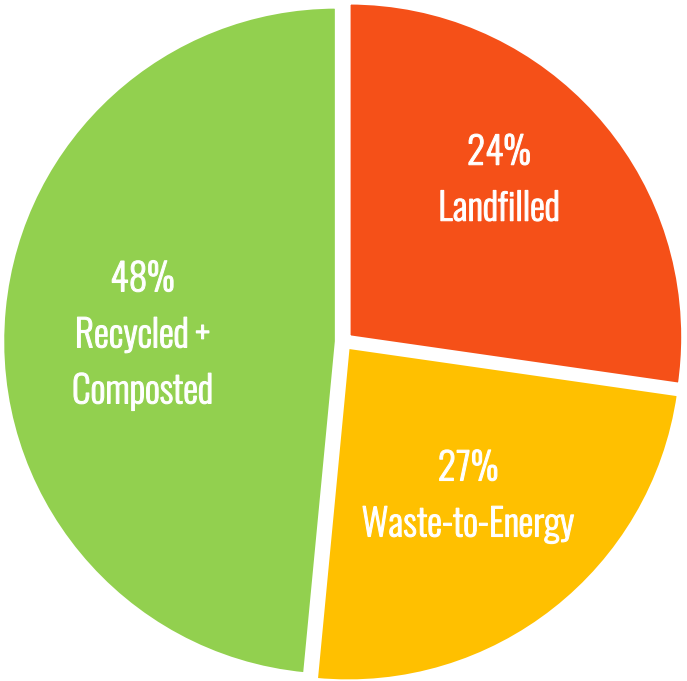
Waste-to-Energy: Energising your waste

CEWEP Confederation of European Waste-to-Energy Plants

Waste-to-Energy Plants (waste incineration with energy recovery) thermally treat household and similar waste that remains after waste prevention and recycling – generating energy from it.

Uddevalla WtE plant, Sweden

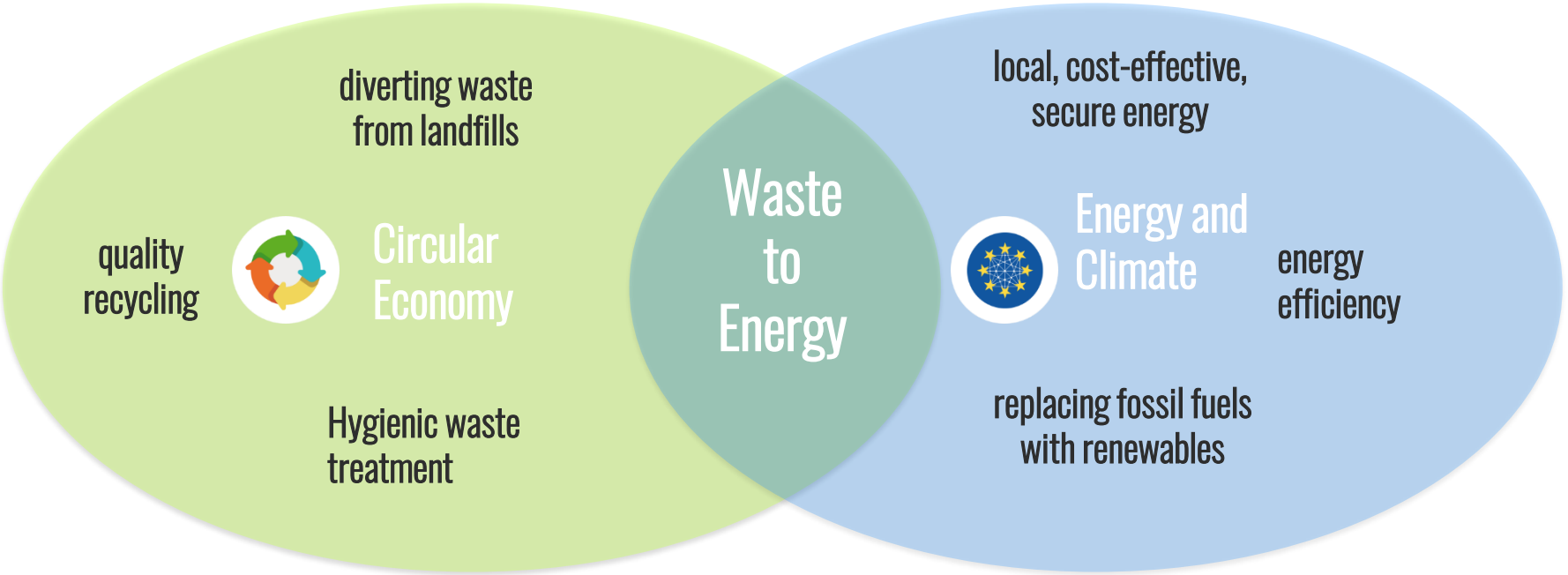
Municipal waste treatment in 2020 in EU27



Waste is a Resource.

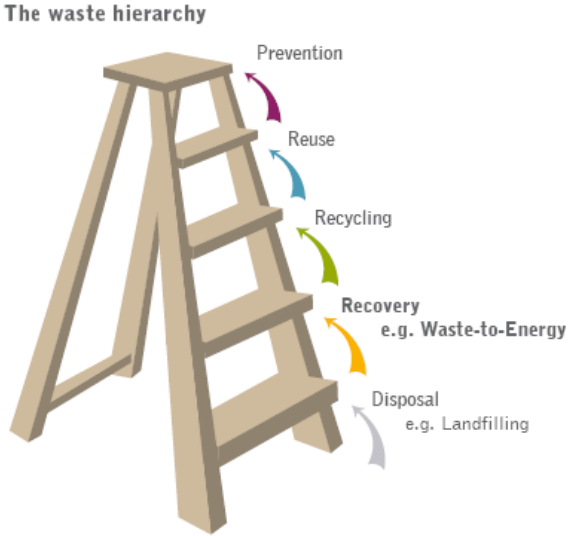
However 24% of municipal waste across the EU27 is still landfilled although landfill gases (methane) contribute significantly to global warming.

Where does Waste-to-Energy stand?



Circular Economy

"In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value." (European Commission, 2015)



Waste Hierarchy

Set in the EU Waste Framework Directive it helps to achieve sustainable waste management.

Circular Economy

There are many ways to keep the waste higher up the waste hierarchy:

And of course make things better in the first place...

But what do we do with residual waste?

While some things that there is no further use for can be at least recycled:

What about:

- Dirty, contaminated materials?
- Mixed materials?
- Degraded materials after multiple times of recycling?
- Materials containing substances of high concern?

The only options are...

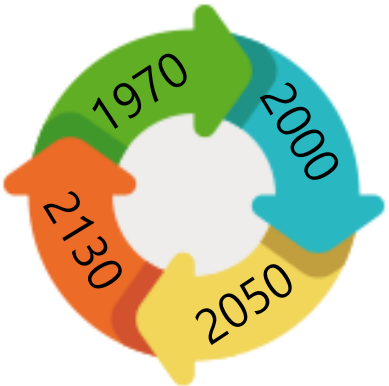
Recovery e.g. Waste-to-Energy

Disposal e.g. Landfilling

Not everything should be recycled…

*"In the recycling processes, articles (and the materials they consist of) that contain toxic substances contaminate the respective waste streams and are diluted in materials that do not contain toxic substances." **

*"According to modelling studies, it may take **centuries** to decontaminate a recycled waste stream, even if preventive measures are implemented"**



*Study for the strategy for a non-toxic environment of the 7th Environment Action Programme, European Commission 2017

But landfilling should be avoided

We need to divert waste from landfills in order to:

- protect soil and groundwater from contamination
- prevent microplastics from being blown into the seas and rivers
- avoid the creation of methane - a potent greenhouse gas (equal to 25 times CO_2 in mass)
- harness the material and energy content of residual waste

Waste-to-Energy provides local energy from our residual waste

While helping to divert waste from landfills

- Helps to reduce dependence on fossil fuels imports
- Saves millions of tonnes of CO_2
- Contributes to security of energy supply
- Provides sustainable, local, low carbon, cost-effective and reliable energy

*"Diversion from landfill is the main contributor to GHG mitigation in the waste management sector"**

*The Climate Change Mitigation Potential of the Waste Sector, Öko-Institut and IFEU on behalf of German Federal Environment Agency (UBA), 2015

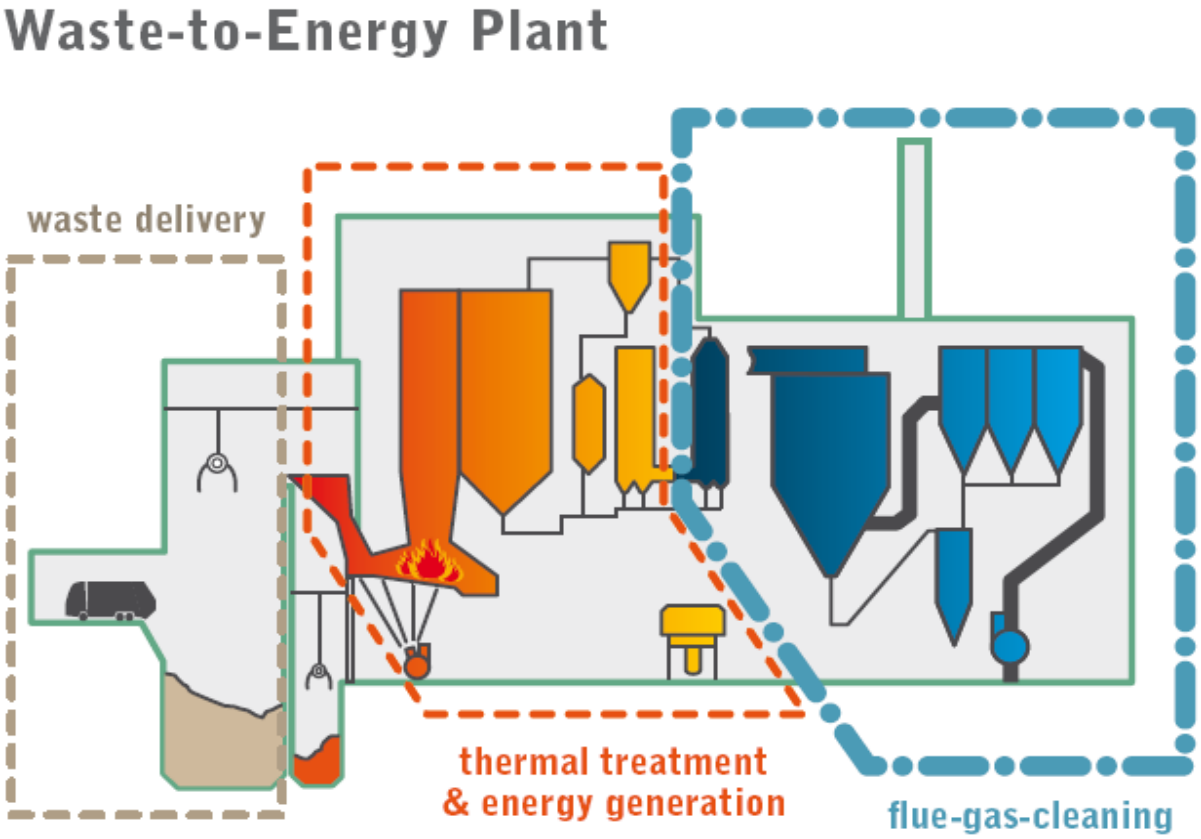
Health studies

Lisbon University's Institute of Preventive Medicine: waste incineration *"does not impact on dioxin blood levels of nearby residents"* of Waste-to-Energy plants http://www.sciencedirect.com/science/article/pii/S0045653506016158

UK Committee of Carcinogenity:
"any potential risk of cancer due to residency near to municipal solid waste incinerators was exceedingly low, and probably not measurable by the most modern epidemiological techniques"
http://www.advisorybodies.doh.gov.uk/Coc/munipwst.htm

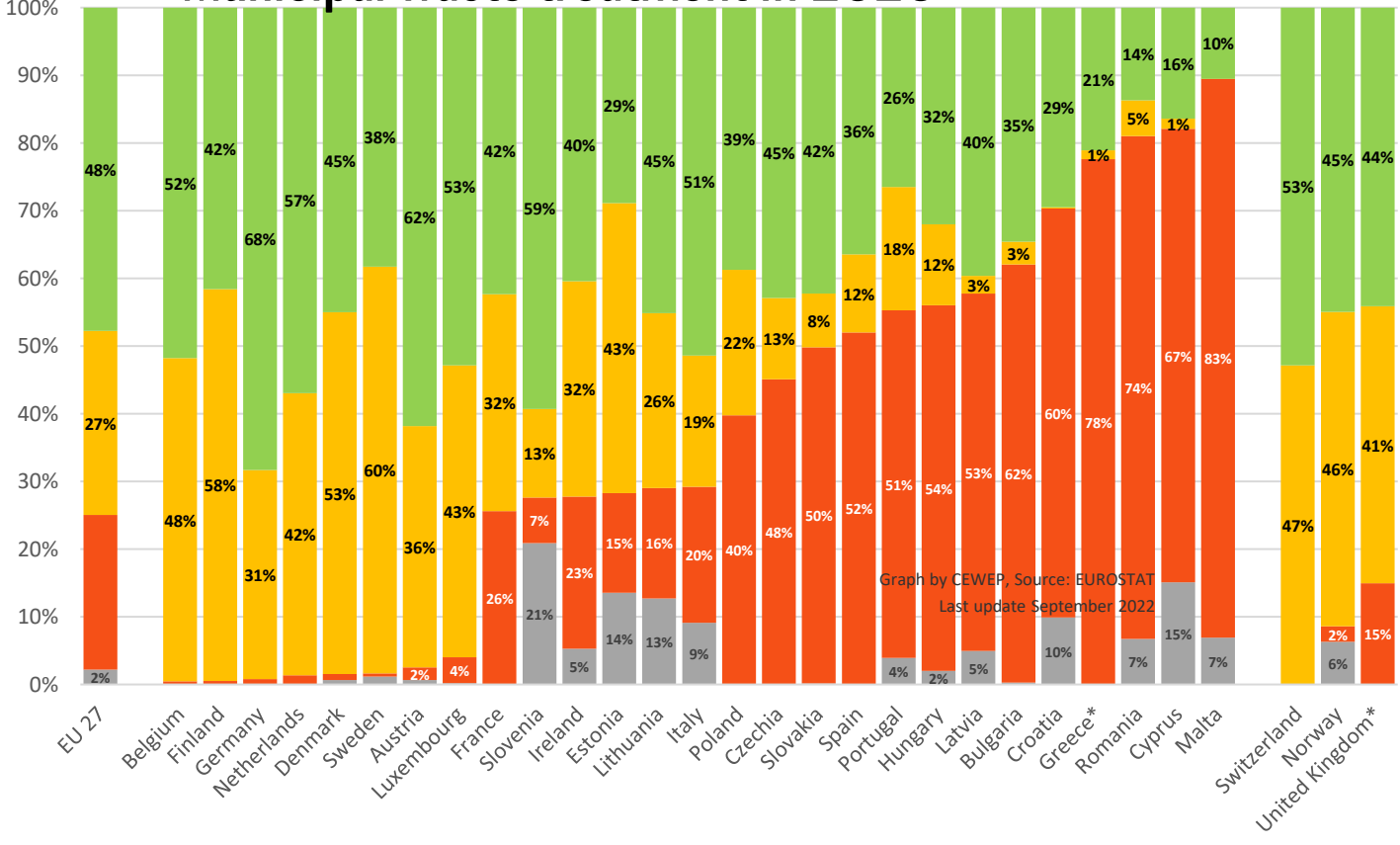
A Spanish study concluded that the Tarragona Waste-to-Energy plant *"does not produce additional health risks for the population living nearby."* It presents results from monitoring of the Tarragona (Catalonia, Spain) Waste-to-Energy plant regarding dioxins and furans (PCDD/Fs) levels in soil, vegetation, and air samples collected in the period 2009–2010. The concentrations of PCDD/Fs in the surroundings of the Tarragona plant were monitored over the last 15 years.
http://wmr.sagepub.com/content/30/9/908.full.pdf+html

Sophisticated flue-gas cleaning devices guarantee low emissions



Recycling and energy recovery complementary to avoid landfilling
Municipal waste treatment in 2020

EU 27 + Switzerland, Norway and the UK



Landfill
Waste-to-Energy
Recycling +Composting
Missing data

Percentages are calculated based on the municipal waste reported as generated in the country

*: last available data

Recycling & WtE complementary to divert waste from landfills

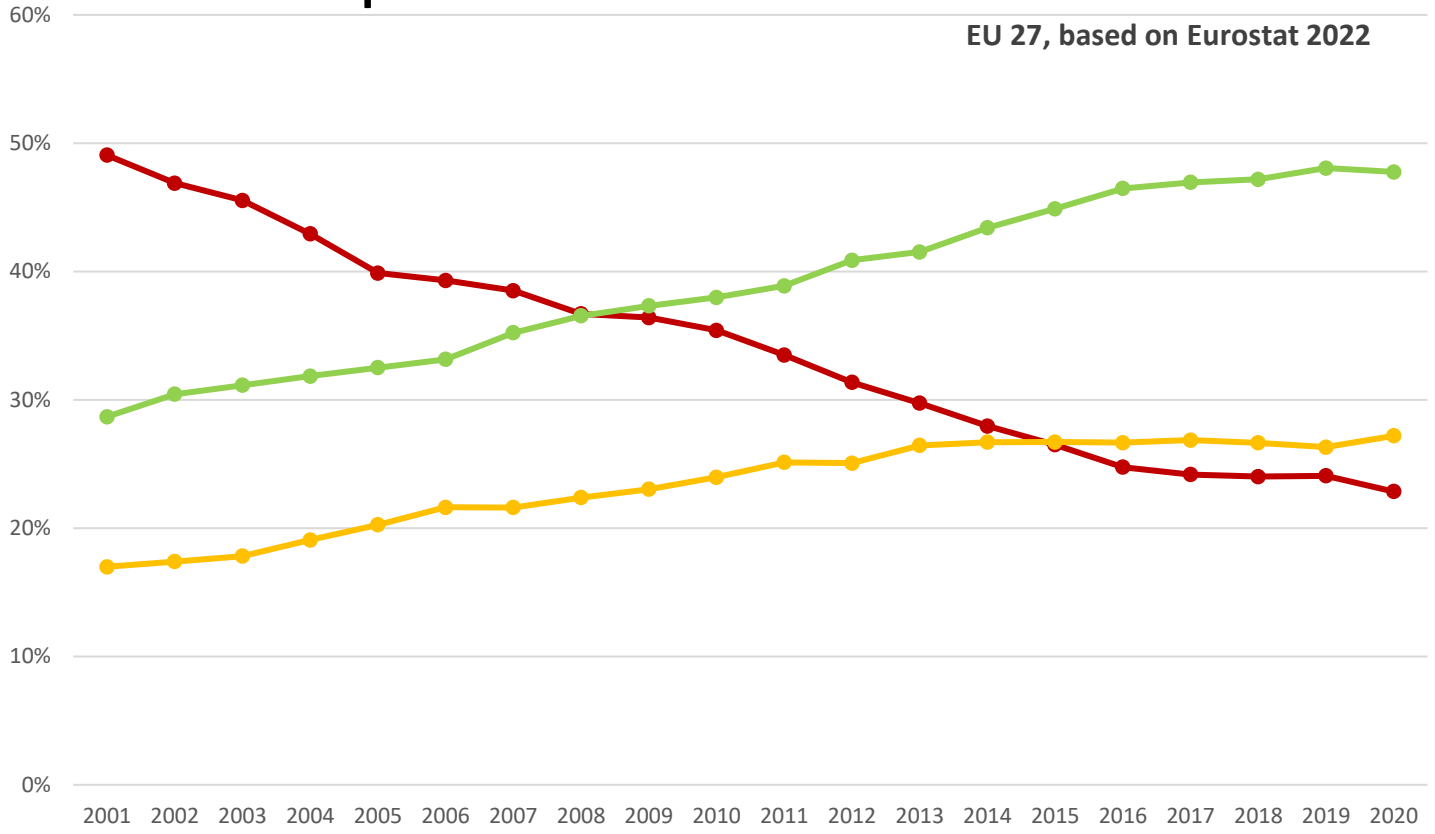
Lessons to be learnt from the countries in the EU28

Landfilling 4% of municipal waste or less:

Germany, the Netherlands, Austria,
Belgium, Denmark, Sweden & Finland

- Most of them have introduced landfill bans
- And have proven that Waste-to-Energy & Recycling are complementary to divert waste from landfills

Recycling and energy recovery complementary to avoid landfilling
Municipal waste treatment 2001 - 2020



Landfilling -25% points

Waste-to-Energy +9% points

Recycling +19% points

Landfill

Waste-to-Energy

Recycling +Composting

Graph by CEWEP,
Source: EUROSTAT 2021

Waste to Products:
Bottom Ash recycling

1 tonne of bottom ash contains between
10-12% metals

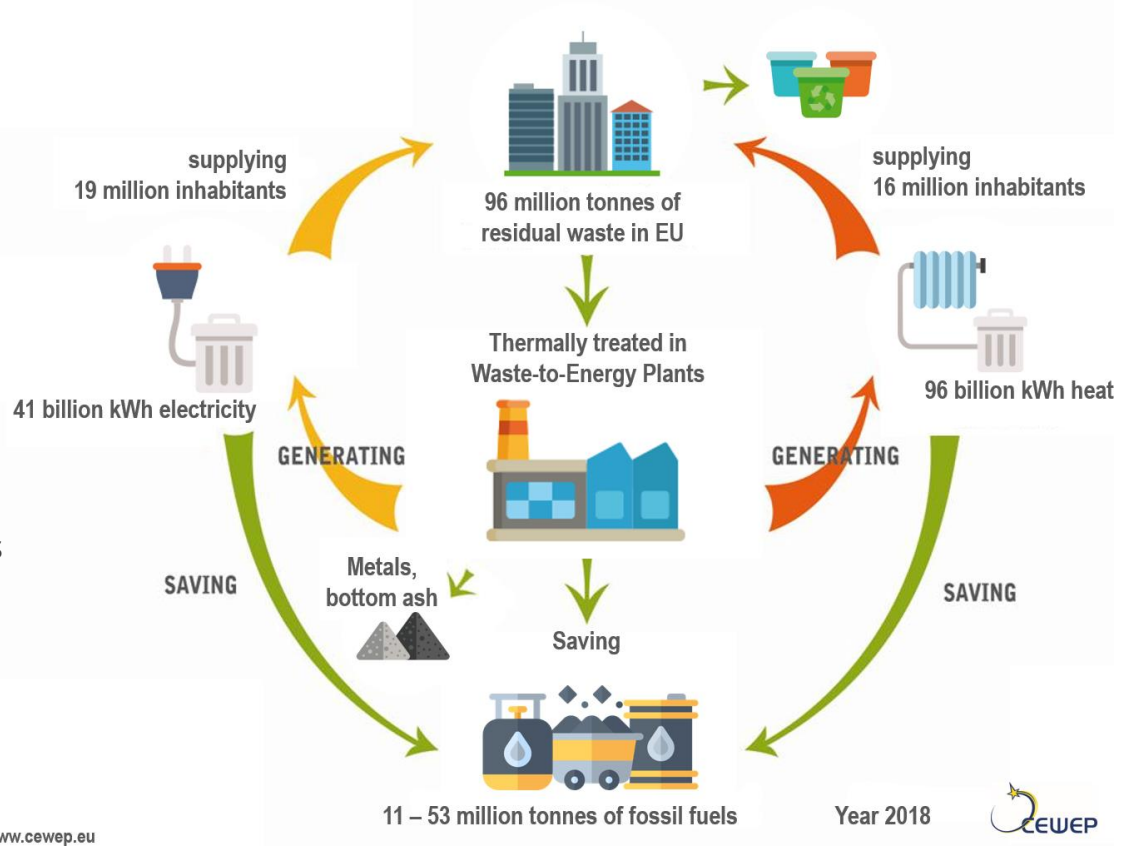
1 tonne of recycled metals from bottom ash saves **2 tonnes** of CO_{2equ} **emissions**

Minerals can be used as secondary aggregates (**road construction** or in **building products**)

Waste-to-Energy Cycle

This energy can be in the form of **steam, electricity or hot water**:

- **Electricity** is fed into the grid and distributed to the end-users,
- **Hot water** can be sent to a nearby district heating (or cooling) network to heat (or cool) homes, hospitals, offices etc.
- And **steam** can be used by nearby industry in production processes.



WASTE-TO-ENERGY IN DAILY LIFE

With 10 kg of residual waste

you can shower
7 times
5 minutes each

With 10 kg of residual waste

you can power your laptop
for 3 hours per day
for 2 months

With 10 kg of residual waste

enough heat can be
produced to warm your
home for at least 8 hours

Waste-to-Energy: examples of innovative sustainable energy use

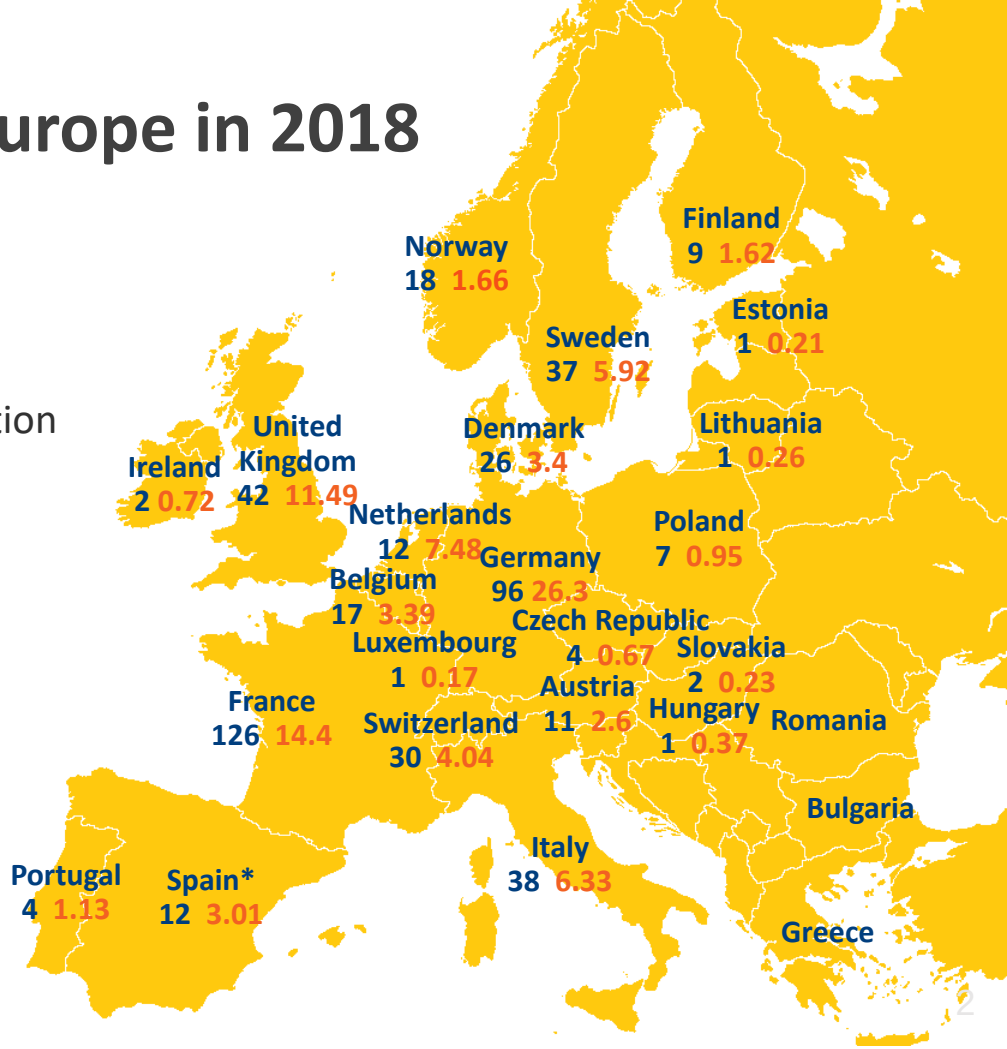
Twence Waste-to-Energy plant in the Netherlands captures CO_2 and transforms it into sodium bicarbonate. It is used in the plant's flue gas cleaning system thereby saving precious raw materials while reducing its carbon emissions

SUEZ Waste-to-Energy plant in Toulouse, France, provides heating for nearby greenhouses growing 6,000 tonnes of tomatoes each year

In Linköping, Sweden, Waste-to-Energy produces cooling for the district cooling network in a process that avoids the use of hydrofluorocarbons gases, that are thousands of times more destructive to the climate than CO_2

Waste-to-Energy in Europe in 2018

- WtE Plants operating in Europe (not including hazardous waste incineration plants) : **497**
- Waste thermally treated in WtE plants (in million tonnes): **96**



Data supplied by CEWEP members and national sources

*** Includes plant in Andorra and SAICA plant**

CEWEP Confederation of European Waste-to-Energy Plants

CEWEP - Confederation of European Waste-to-Energy Plants

CEWEP is the umbrella association of the operators of Waste-to-Energy Plants across Europe.

They thermally treat **household and similar commercial & industrial waste** that remains after waste prevention, reuse and recycling by generating energy from it.

Thank you for your attention

Confederation of
European Waste-to-Energy Plants

info@cewep.eu
Tel. +32 2 770 63 11
www.cewep.eu