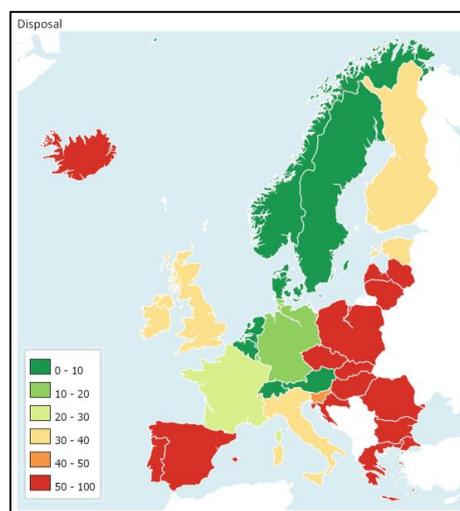


**Waste to Energy: empowering the
transition to a more circular economy**
Position paper on the circular economy in the European Union

Summary

The European Commission aims in its 2015 Circular Economy Package to reconcile environmental and economic priorities. AVR contributes to an EU Circular Economy by treatment of non-recyclable waste into valuable energy and raw materials.

To achieve a circular economy many EU Member States have to step up their efforts to capture the potential at hand. Statistics of the European Commission as provided in Eurostat¹ show around 2.5 billion² tonnes of waste were produced in 2012 and that 11 Member States send more than 50% of their waste (both household and commercial and industrial (C&I)) to landfill. Around 1 billion tonnes (which is almost 40% of the produced waste) were landfilled in the EU. As a first step up the waste hierarchy, there is ample room to improve on the waste hierarchy by diverting waste from landfill. In 2012 of the municipal waste (10% of total waste) a significant amount of more than **79 million tonnes** (33%) was landfilled.



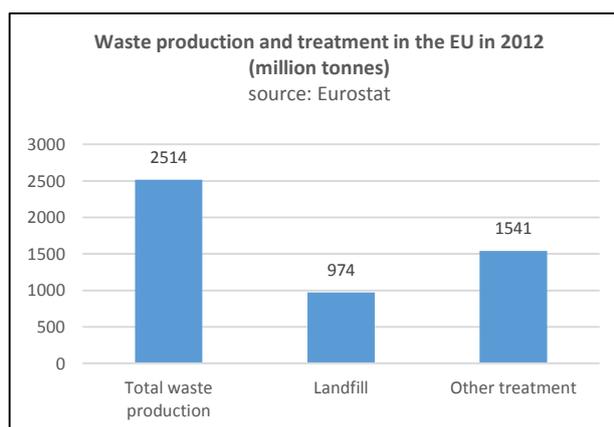
By treatment of current landfill waste that cannot be recycled, Energy-from-Waste (EfW) installations contribute to a circular economy by extracting pure raw materials, like metals and minerals, after the incineration process. EfW also contributes to the EU Energy Union goals by its energy generation from the non-recyclable waste. The EfW energy production advances a carbon free society and creates a lower EU dependency of non-EU energy sources.

For non-recyclable waste, incineration with energy recovery forms a mature alternative to landfilling. It helps recycling by having a solution for polluted waste flows, keeping them out of the recyclable waste, thereby enhancing high quality recycling.

Some member states have insufficient or no capacity to treat their combustible waste in a WtE plant. In other countries, there is a national overcapacity of WtE plants, leading to an unbalanced situation of combustible waste processing in the EU.

Therefore, AVR calls for the following:

1. EU and national policy in accordance with the waste hierarchy and therefore aims to divert from landfilling for all waste types.
2. Guarantee the free international movement of combustible waste in order to minimise national overcapacities of waste to energy plants in EU member states and fasten-up end to landfill all waste (recyclable & non-recyclable).
3. Transparency on impact for the environment to make a real circular economy happen, providing incentives for innovation to reduce the consumption of virgin materials fossil fuels. E.g. for innovations on non-recyclable waste: metal & mineral recycling from incineration and CO₂ as a product



Each of the above policy measures are explained shortly below.

¹ [Eurostat, 2015](#)

² Only a small part of the total waste of 2.5 billion tonnes, around 10% (or 246 million tonnes of waste) was produced by household and municipalities in 2012. Of this waste more than 100 million tonnes of waste were recycled (material recycling and composting/anaerobic digestion) in 2012, more than 71 million tonnes were incinerated, but still a significant amount of more than 79 million tonnes (33%) was landfilled.

EU and national policy in accordance with the waste hierarchy for all waste types

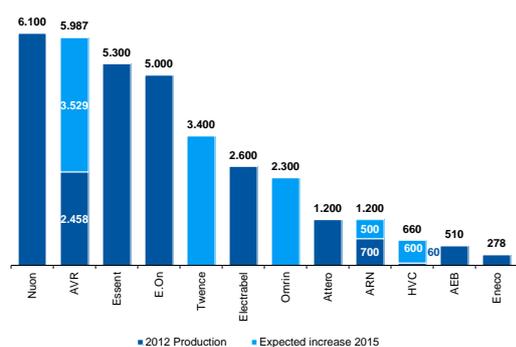
AVR fully supports the concept of circular economy and calls for legislative backing. In order to act according to article 4 of the waste framework directive, which concerns the waste hierarchy an absolute minimisation of landfilling is important. Once waste is landfilled, it is lost for quality recycling and becomes an environmental burden. Amongst others, CE Delft (2006) has calculated that the emission of CO₂ equivalent of landfilling is the highest of all waste treatment options, with **415 kg CO₂** emission per tonne of waste treated³. AVR calls for a gradual introduction of landfill diversion – on a country-by-country basis – to a ban on landfilling of recyclable, organic and mixed waste in the long term, e.g. 2025

A conscious citizen can never be in favour of waste, however it's a given that 100% prevention or re-use is still in the making. A diversion from landfill to recycling is very hard to achieve from the one day to the other. Member States and EPR schemes have experience that setting up separate collection systems is very difficult. In order to treat the waste that cannot be recycled, incineration with energy recovery forms a mature alternative to landfilling. It has a number of strong features to be appreciated from EfW:

1. Waste is prevented from emitting methane and having impact on ground water and soil or causing litter
2. Waste can be sorted before or after incineration, in order to retrieve recyclable materials such as metals and minerals. These materials are sent to recycling facilities.
3. From the incineration of waste, a significant amount of energy can be produced.
4. This energy is offered in the energy network, giving power to multiple industrial companies and/or thousands of households. It leads to lower dependence on other resources to produce energy, such as oil, gas, coal or nuclear sources.
5. Because of the production of energy, incineration with energy recovery has a lower social cost than landfilling.
6. Residual elements from incineration such as bottom ash and fly ash are treated in the most environmentally friendly way and even be used for recycling or recovery. As an example, in the Netherlands, a green deal on treatment of bottom ash was signed between the government and industry. According to this, the goal is to make 75% of the bottom ash a secondary resource by 2017.

In 2006, the environmental performance of waste to energy in the Netherlands was estimated at **41 kg CO₂** per tonne treated². This means an advantage of **374 kg CO₂** per tonne MSW and similar waste treated other than being landfilled. The advantage has probably increased since then, owing to technology improvements in waste to energy plants and the increase of energy production. For a comparison with municipal waste, the value of 2006 is used.

Netherlands heating producers and expected increase (TJ p.a.)



Based on research of the weight of waste types that were produced in the EU in 2012, around **240 million tonnes** of waste are suited for incineration with energy recovery. With an **installed European energy from waste capacity of around 76 million tonnes**, assuming that the difference, 165 million tons, can be diverted from landfill, around 62 million tonnes of CO₂ equivalents could be saved annually. Furthermore, with the average technique of waste to energy plants installed in the Netherlands, more than 53 million MWh of electricity and 656 million GJ of heat with the help of steam could be produced. To put this into an EU-perspective, CEWEP (2014)⁴ states that the energy content of the waste treated by Waste-to-Energy plants in the EU can substitute

19% of Russian gas imports (2012).

Overall, incineration with energy recovery is a safe and cost efficient method to produce a high amount of energy to supply both industry and households with heat and electricity without having to extract additional fossil fuels and delivering post incineration secondary raw materials like precious metals and construction minerals and potentially CO₂ as product, instead of CO₂ capture and storage solutions.

³ CE Delft, 2006. Afvalverwerking en CO₂ : Quicksan van de broeikasgasemissies van de afvalverwerkingssector in Nederland 1990 - 2004

⁴ [CEWEP, 2014](#)

Guarantee the free international movement of combustible waste in order to minimise overcapacities of waste to energy plants in EU member states

In some Member States in Central and Northern Europe, there is sufficient capacity or even an overcapacity of waste to energy plants, whereas in Member States in mainly the South and East of the EU, there is not sufficient capacity. Therefore, the existing plants in countries with an overcapacity bring a benefit to the environment by accepting combustible waste from other Member States in order to treat it in their facility instead of having it landfilled. This situation is backed by article 16 of the Waste Framework Directive, in which it is stated that the principles of proximity and self-sufficiency shall not mean that each Member State has to possess the full range of final recovery facilities within that Member State.

In this light it is important to look carefully at how the current capacity of waste incineration plants in the EU is used. Currently, the capacity is around 76 million tonnes. More than 71 million tonnes of this capacity are used to incinerate municipal waste.

While well maintained waste to energy plants with heat and steam production will serve an indefinite lifetime to fulfil their important function in cities and to make the circular economy work, they should remain able to accept input from other Member States. Especially in a situation where waste volumes are decreasing (which is already taking place and can be expected from the future waste policy, which is a positive trend). Parallel to this, the national capacities of waste to energy plants should be closely monitored and converged on an EU level.

In order to enable proper market functioning, the transport of combustible waste in the way that it is currently done between EU countries should remain possible. By this, as much as possible waste can be incinerated with energy recovery, and landfilling can be minimised. Accordingly, member states with an overcapacity of waste to energy plants should not be allowed to force the market to reduce capacity.

Transparency on true impact for the environment to make a real circular economy happen to safe virgin materials and fossil fuel consumption

All stakeholders should cooperate to make the circular economy possible. An important factor of this is informing the society why policy measures are taken, to what benefits they lead and that it is good if they help to make the circular economy happen. Important elements in this communication is to mention the following:

- The environmental effects: by how much the environment profits from policy measures
- The social effects: how many new jobs are created and how much people make use of sustainable energy
- The economic effects: how much the efforts that people take to save the environment, save or cost them

Dependent on the choice of the policy maker, waste holder or process owner, a relevant key performance indicator has to be calculated and boundaries should be defined. Possible boundaries are:

- Environmental performance: tonne of avoided CO₂ equivalent per tonne of treated waste
- Economic performance: avoided cost per tonne of treated waste

To have the best of both worlds another indicator can be derived to make a clear trade-off:

- Additional cost per avoided environmental unit, e.g. € per avoided CO₂.

As an example if applied to landfill diversion into incineration with energy recovery per tonne 374 kg CO₂ is saved, at competitive prices to landfill costs. If this example would be assumed to be representative for the EU with a current landfill weight of 79 million tonnes, not only 29.5 million tonnes CO₂ would be saved. On top of that a significant amount of energy is generated and raw materials are extracted by post-incineration recycling. And all this from non-recyclable waste.

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