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**THERMAL RECOVERY OF ENERGY AND MATERIALS IS AN
ESSENTIAL CONTRIBUTOR TO THE CIRCULAR ECONOMY -
FORTUM VIEW**

Thermal energy and material recovery from non-recyclable waste implies thermal incineration process, where energy as heat, steam and/or electricity, as well as materials like metals are recovered from ashes and slag.

Landfilled waste as well as waste incinerated without energy and material recovery represents an enormous loss of resources. The amount of waste disposed in such a way can be seen as an indicator of how efficient we are as a society, particularly in relation to our use of natural resources. This has been recognized by the European Commission and addressed in the development of the Circular Economy concept. Transforming waste into resources and boosting growth, employment and economy are important elements of the Circular Economy. Europe is struggling to reduce waste generation, recycle waste to the maximum extent and to recover energy from non-recyclable waste and gradually eliminate landfilling.

Over the last couple of years, the European Union has created and adopted environmental legislation on waste handling and treatment, with the specific purpose of protecting health and environment by promoting re-use, recovery and recycling of materials. In its 2015 Work Program the Commission announced its intention to table an ambitious and comprehensive Circular Economy approach that would cover the whole life-cycle of products and its impacts on resource efficiency.

Fortum wants to contribute to that work with this note that mainly focuses on the huge benefits of sustainable thermal energy and material recovery to be recognized and included in the Circular Economy concept i.e. by taking care of waste fractions that otherwise would be destined to landfills. Residual waste represents a local, resource and cost efficient, and secure source of heat to district heating networks and to industries, and electricity to the grid to replace fossil fuels in energy production.

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SUMMARY

- I** Sustainable thermal recovery of material and energy should be an integral part of the Circular Economy concept
- II** The ‘Waste Hierarchy’ principle is a relevant foundation for waste management, ensuring that combustible waste otherwise destined to landfills is used for thermal energy and material recovery
- III** Successful implementation of the waste hierarchy requires the participation of all actors involved
- IV** Reliable, comparable and unified definitions and statistics on recycled quantities are needed to achieve for target-setting and measuring the transition towards the Circular Economy.
- V** We support a tighter target for minimizing endorser to minimize the landfilling of recyclable and recoverable waste already since 2022 latest 2025 but would prefer even earlier implementation
- VI** The definition of quality criteria for recycling would be necessary to ensure that the circular economy focus and outcome would enhance the quality, not only the quantity of recycling
- VII** Waste destined for recovery purposes, shall be treated according to internal market principles meaning waste should be freely traded inside the EU
- VIII** Taxation of energy recovery from waste does not promote recycling nor prevention of waste production
- IX** A relevant legal and regulatory framework for waste management plans, permits, inspections and steering e.g. waste streams, waste-to-energy capacity and operations and access to energy markets should be enhanced at the EU level
- X** The biodegradable part of waste is to be regarded as a renewable energy source

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TOWARDS A CIRCULAR ECONOMY POLICY

I - Sustainable thermal recovery of material and energy should be an integral part of the Circular Economy CE concept

The fundamental objective of waste management, which has been established in the Waste Directive, is to reduce the overall environmental impacts of the generation and management of waste, thereby contributing to the sustainable use of natural resources. In this regard, waste management schemes are to be designed to prevent or reduce the generation of waste and its harmfulness, and to promote the recovery of waste by means of re-use, recycling and other recovery operations as well as ensuring safe disposal of waste that cannot be used otherwise.

The concept of the Circular Economy CE is an essential foundation for the future sustainable utilisation of resources. The concept should integrate also the energy perspective on waste management and thereby having a more holistic system view with the objective to find optimal efficient solutions for future sustainable cities and regions. Energy recovery, especially when electricity and heat are both recovered and used, would be economically as well as environmentally the best way to recover a certain fraction of the waste flow. This fraction varies depending on time and place, and policies and legislation should ensure that energy recovery can indeed take place in an environmentally and economically sound way.

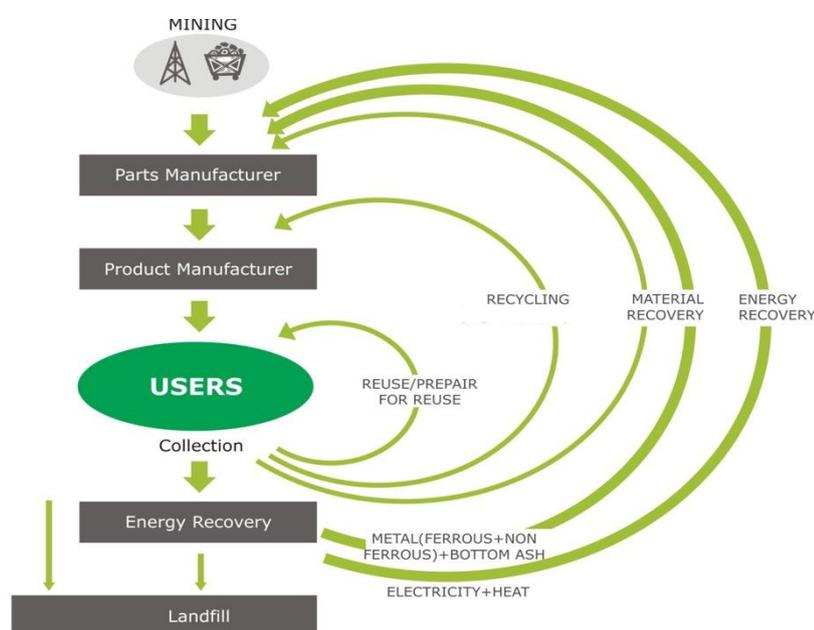


Figure 1. Part of the Circular Economy where thermal energy and material recovery is seen as vital contributors to the concept (source: Fortum)

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II - The ‘Waste Hierarchy’ principle is a relevant foundation for waste management, ensuring that combustible waste otherwise destined to landfills is used for thermal energy and material recovery

The waste hierarchy principle – prevention, re-use, recycling and other recovery operations, and safe disposal – when put into practice in an appropriate way, implies that only fractions that cannot be re-used or recycled for quality, environmental or economic reasons, and that are suitable for burning, will be used in energy production.

The use of landfills should be viewed only as a last option and gradually stopped. Implementation of the Directive on Landfills 99/31/EC will limit the use of landfills for biodegradable municipal waste drastically, which in turn means that other solutions must be available. In many countries, such as Sweden, the Landfill Directive has been implemented in such a manner that landfilling of biodegradable municipal waste is not allowed at all.

III - Successful implementation of the waste hierarchy requires the participation of all actors involved

Even though the waste management schemes vary between regions, they should always have separation/sorting at a source as a first step; producer of the waste, be it a household, a retail shop or industry, must separate the waste generated. Depending on the waste management scheme, this means that waste, such as paper, glass, and metals, is separated already at the source and sent for re-use or recycling. The remaining combustible waste that would otherwise be destined to landfills can then be used for energy recovery. This means that there is no conflict between recycling and energy recovery; in fact, countries using waste for thermal energy and material recovery usually achieve high recycling rates as well as the key to both are sound waste management practises.

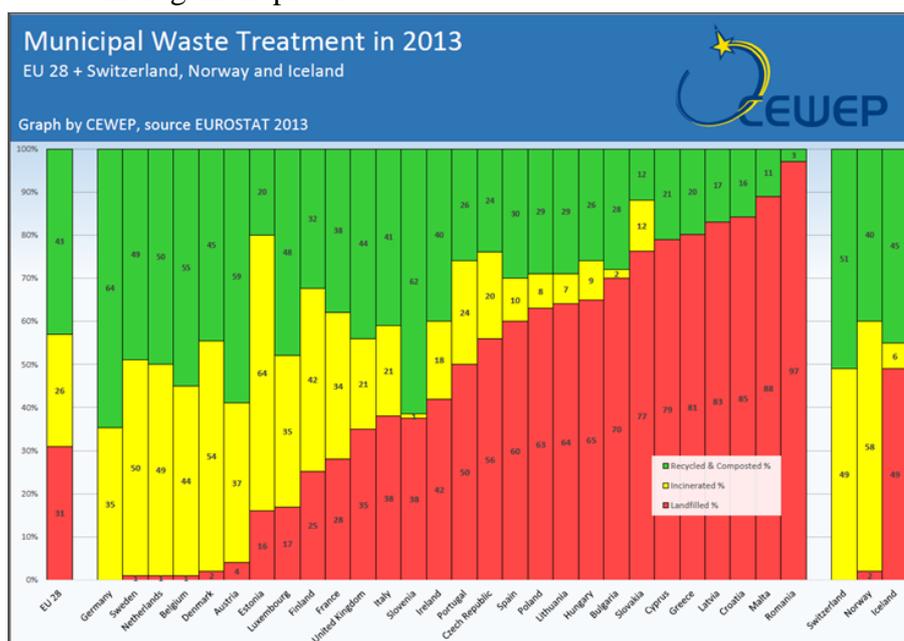


Figure 2. Municipal waste treatment (source: CEWEP, Eurostat 2013)

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Even though waste has been strictly regulated by the EU already for a long period of time, local characteristics dominate in waste management, and Member States have adopted approaches that vary considerably. As a result, the use of municipal waste in energy production varies a lot – from about 50% in Denmark and Sweden to about 35% in Finland, and there are some EU Member States that still landfill basically all municipal waste.

IV - Reliable, comparable and unified definitions and statistics on recycled quantities are needed to achieve Circular Economy CE

All definitions are correctly concentrated in the Waste Framework Directive (WFD). Therefore the definitions for recovery of materials, energy and nutrients (bio-waste) should also be included in the WFD. Definition of municipal waste (MW) should only list the type of waste included, not where it occurs or who collects it. Municipal solid waste (MSW) means household waste and all waste from commercial and industrial activities which is similar to household waste.

Adoption of one unified, output-based calculation method for recycling, where the point of measurement is after sorting, is strongly advisable and supported. This means that pre-treatment facilities shall not be accounted for recycling. Implementation of such calculation shall decrease the share of recycling in some countries where mainly collected quantities for sorting are measured.

A combination of establishing the measurement of recycled quantities after sorting together with common definition of municipal waste should lead to better and more comparable statistics on European level. Today, national definitions of MW vary across countries.

V - We support a tighter target for minimizing landfilling of recyclable and recoverable waste already since 2020

Stricter and accelerated targets for banning landfilling is one of the most critical drivers towards circular economy. We also suggest to establish a ban on landfilling for fractions which can be used for recovering energy, not only materials. This obviously requires prudent implementation in the European legislation.

Waste fractions that cannot be re-used, or recycled are a resource that should be utilized through thermal energy and material recovery instead of landfilling. Energy recovery includes always the efficient usage of heat and electricity with best-available technology (BAT). Waste based CHP solutions has a proven track record and high availability. CHP processes producing both electricity and heat make it possible to recover more than 85% of the energy embedded in waste. Today, only about 60 % of waste-to-energy plants across Europe are CHP plants.

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VI - The definition of quality criteria for recycling would be necessary to ensure that the circular economy focus and outcome would enhance the quality, not only quantity of recycling and that recycled materials do not pose environmental or health risks.

Quality recycling includes also the real value for money. The Commission could provide examples and recommendations for setting such quality criteria. National criteria for the end-of-waste (EoW) status for Solid Recovered Fuels (SRF) or Refuse Derived Fuels (RDF) should comply with the conditions set out in Waste Framework Directive (WFD), other regulations i.e. Industrial Emissions Directive related to waste incineration and Waste Shipment Regulations.

VII - Waste destined for recovery purposes, shall be treated according to internal market principles meaning waste should be freely traded inside the EU

Allowing free movements of waste for recovery purposes inside and between the Member States contributes to efficient use of capacities built for energy recovery and is a crucial part of environmentally and economically sound energy recovery of waste. Calculation shows that for every imported ton of waste to Sweden, designated for incineration in the WtE (CHP) plants, brings a considerable reduction of net emissions of CO₂ in all studied cases, if the alternative is disposing the waste in landfills .

VIII - Taxation of energy recovery from waste does not promote recycling nor prevention of waste production

Instead it just makes waste treatment more expensive for citizens and industries. Taxation would very likely create a barrier for new energy recovery investments in countries of high share of landfilling today. Taxation may lead to increase of non-quality recycling and have very little impact on consumers' behaviour on the prevention of waste, and shall likely steer to uneconomic transport of waste to such countries who have low or no such taxation. The waste incineration tax was terminated in Sweden in 2010 due to the above reasoning and Sweden is having one of highest recycling rates in Europe. If the amount of capacity for energy recovery of waste represents a concern, it should be addressed via permitting.

IX - A relevant legal and regulatory framework for waste management plans, permits, inspections and steering e.g. waste streams, waste-to-energy capacity and operations and access to energy markets should be enhanced at the EU level

Fortum supports the introduction of a relevant, harmonised and effective framework of laws and rules regarding waste management plans, permits, inspections, authorisations, registrations, monitoring, and the like, aiming at upholding the waste hierarchy principle. Efficient, transparent, relevant and predictable administrative processes in general and permitting processes in particular are of essence for both private and public investors as well as municipalities.

The steering of waste streams and the pricing of outputs (heat and electricity) should to the greatest possible extent be based on market mechanisms, not on command and

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control types of rigid regulations. They should be designed in such a manner that the waste hierarchy principle is respected. All prices in the waste management system, disposal fees, transport fees, re-use and recycling premiums etc. should be designed accordingly. This would also ensure the compliance with another important principle applicable for waste management, namely the 'polluter pays' principle.

Permitting procedures must also ensure that the overall capacity for waste-to-energy applications is kept at a level that supports the waste management hierarchy.

Maximising energy efficiency, taking into account waste transport, will generally imply plants nearby larger cities, with large volumes of municipal waste available and a significant demand for heat, thereby creating the necessary preconditions for CHP solutions. It will not, however, automatically rule out longer transports of waste, if it is justified in terms of overall energy efficiency. This might be the case if one chooses to fuel a more distant CHP plant instead of a more local HOB plant (Heat Only Boiler), incineration without energy recovery or landfilling.

X - The biodegradable part of waste is to be regarded as a renewable energy source

The renewable part of waste should be in every Member State regarded as a renewable energy source, thus eligible for relevant investments and operational support schemes if in place.

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