

MetalCirc

From waste ash to value materials

2020



Company Summary

Company

MetalCirc is a Finnish company, which has solved the problem of treating hazardous waste combustion ash. Its new technology neutralizes waste ash and recovers valuable materials for reuse.

Achievements so far

Proof of concept on laboratory scale (TRL 4)

Proof of process demonstrated in relevant industrial environment (TRL 6)

Patented technology

Growth expectation

Global growth rate of treated waste to grow by 17 million tonnes per year.

High demand for end products

High global demand for catalysts, construction materials, and zinc nanomaterials.

Status

Founded in 2019

Based in Finland

At pre-revenue stage

Contact Info

Jorma Jokiniemi, Chairman of the Board (COB)

tel: +358 40 5050 668

email: jorma.jokiniemi@uef.fi

Team



Joonas Jokiniemi, CEO

M.Sc (Telecom Technology) Aalto University, expert in business consulting, marketing and sales.



Urho Ilmonen, IP Lawyer

Attorney at law at Helsinki University, expert in legal, IPR services and business development (Nokia).



Jorma Jokiniemi, COB

PhD (Physics) Helsinki University, expert in thermal and combustion methods, ash behavior in combustion processes.



Esko Kauppinen, Professor

PhD (Physics) Helsinki University, expert in R&D and business development.

Partners



1. The problem and need

1. Hazardous fly ash

- Currently 'stabilized' and dumped into landfills
- Globally 12.5 million tonnes of fly ash yearly



2. Wasting of value metals in waste combustion ash

- Difficulty and high cost of extracting valuable materials from the waste
- Many valuable materials are lost in the recycling process

3. Markets and costs for fly ash

- Cost: 200€/tonne
- Market: 2.5 billion euros yearly (12.5 million tonnes x 200€/tonne)



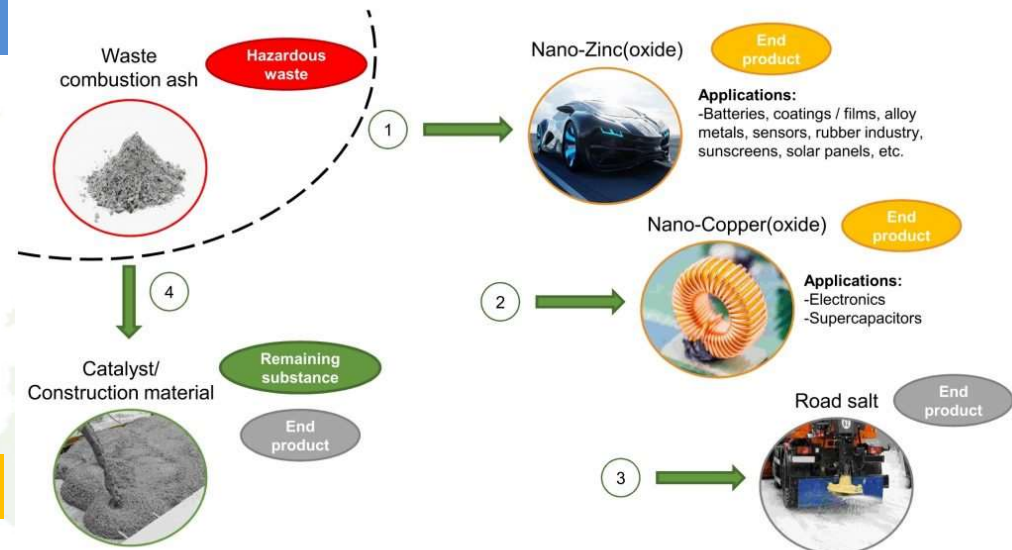
2. MetalCirc's solution

Technology

- a) Neutralization of hazardous fly ash
 - b) Recycling of all materials to produce valuable end products
- Reusable and valuable end products with no hazardous waste
 - Lower costs and new revenue streams from sales
 - Reduced need for mining: Significant environmental value

Status

- TRL 6 reached during 2019
- TRL 7 to be reached early 2021
- Time to market: 2-3 years
- Investment need: Between 1 to 5 million euros



Need for Waste-to-Energy plants

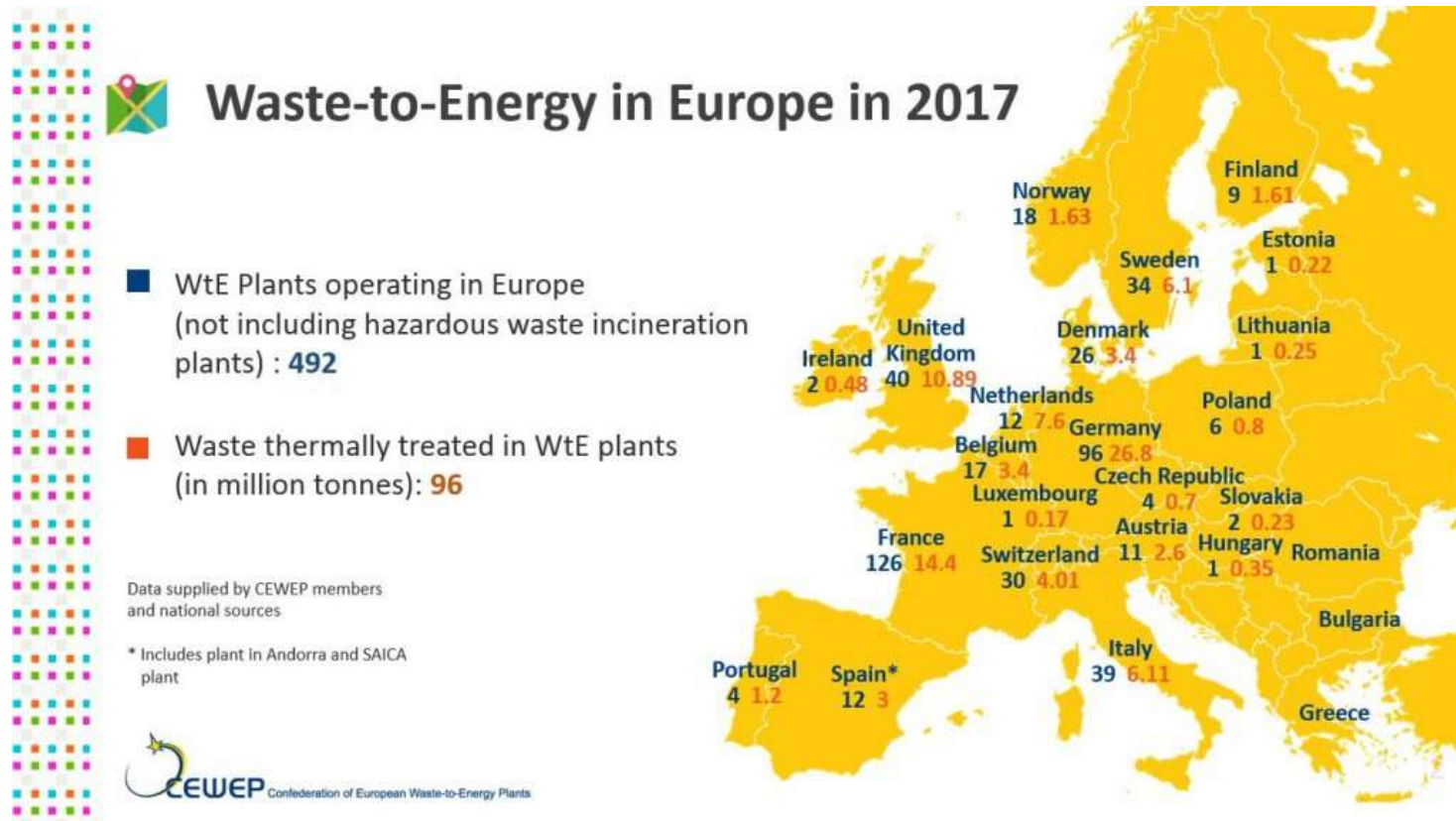
- Waste-to-Energy (WtE) is a modern-day solution for energy production needs as well as for reuse of waste when not recyclable.
- WtE and incineration of waste returns a large portion of the energy contained in the waste back into the energy system.
- It helps with reducing dependence on both landfill and limited fossil fuel resources.
- The residual waste treated in Waste-to-Energy plants is burnt under controlled conditions, reducing the volume of waste by about 90%*.



* www.cewep.eu/what-is-waste-to-energy/

** www.drenl.co.uk2

Waste-to-Energy (WtE) plants in Europe



Problems related to WtE

- The most significant problems in waste incineration are related to the remaining 10% of waste, which is mainly in the form of ash and slag. This is a huge amount: 9.6 million tonnes of ash and slag produced yearly.
- At the moment the problems related to the reuse of ash and slag include:
 - Difficulty and high cost of extracting valuable materials from the waste
 - Many valuable materials are lost in the recycling process
 - Additional chemicals are needed, thereby increasing the cost
 - Complicated processes related to reuse of materials
 - Lack of trust on the market for the recycled materials/end products
 - Lack of capability to produce final end products from ash



Hazardous fly ash

- The most problematic ash left from the incineration process is fly ash which is defined as hazardous waste due to its high content of heavy metals, chlorides, dioxins, and PAH.
- Fly ash is currently stabilized, sealed into containers, and dumped into hazardous landfill sites or salt mines. This means that valuable metals (e.g. zinc and copper) contained in the ash are also dumped in these sites.
- The valuable metal content in the ash can be surprisingly high e.g. 0.5-5 % for zinc.
- Managing fly ash is expensive as it requires a whole operation cycle of logistics, landfill sites, and stabilization plants.

**Hazardous
waste**





MetalCirc

MetalCirc's solution

- MetalCirc Oy has developed a new technology that is able to
 - a) Neutralize hazardous fly ash
 - b) Recycle valuable metals obtained from waste
 - c) Produce catalyst/construction materials from the remaining material
- The result is valuable and reusable materials and no more hazardous waste. Our specialty is creating nanomaterials out of the valuable metals contained in the ash.
- MetalCirc's process has also tremendous environmental value because the valuable metals contained in the ashes reduce the need to mine from ore.





Public perception

- Waste incineration is always under intense public scrutiny.
- Neutralizing fly ash with MetalCirc's technology can significantly improve the reputation of Waste-to-Energy plants, because the ash is no longer hazardous and valuable components are reused.
- Recycling materials from waste is environmentally positive as it decreases the need to mine virgin raw materials from ore and thus saves natural resources.



Profitable process

- Even a very conservative estimate suggests that the process is very profitable: repayment of a 3-5 million euro investment within 5 years.
- This is based on a waste incineration ash treatment plant with the capacity of 7 000 tonnes/year that neutralizes and utilizes valuable metals from ash.





Thank you!