The Path to the Green Deal for EU Waste Management
The Integrated Resource-Recovery Facility

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About ESWET

- **ESWET** is the association representing the **European Suppliers of Waste-to-Energy Technology**.
- Our main task is to **foster the development** and **information sharing** about Waste-to-Energy Technologies.
- We seek to support a **positive Market Design** to maximise the recovery of non-recyclable material.
- Helping to **increase R&I funding** for the fast evolution towards even more resource and energy efficient plants

ESWET members

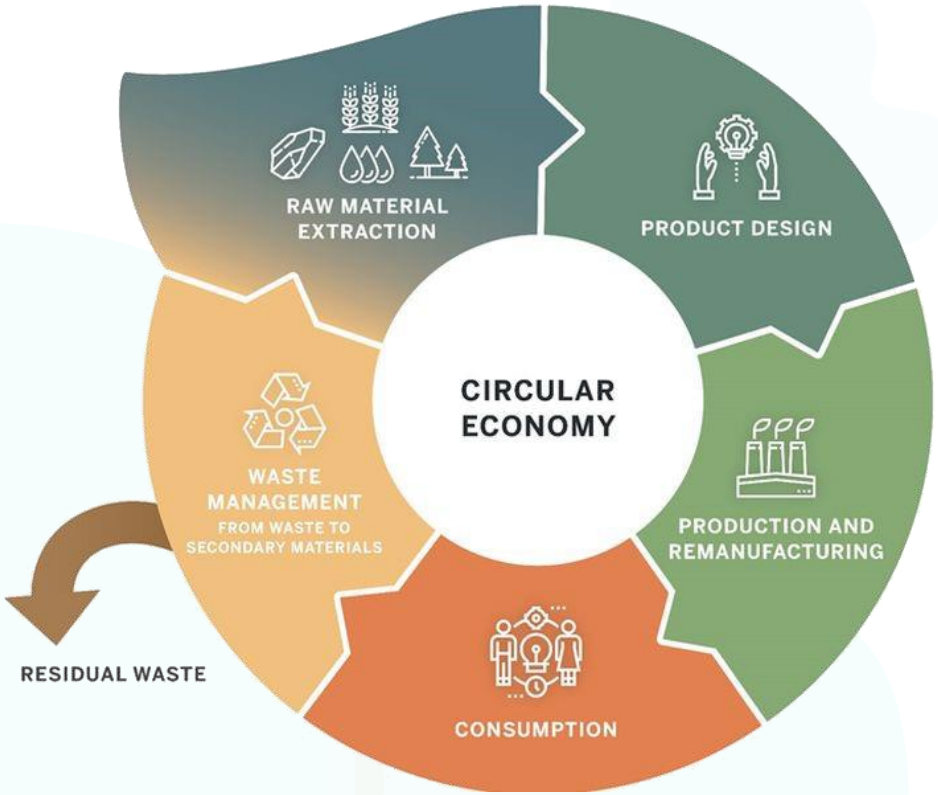
The European Green Deal

The EU context

Transition to a circular economy

Decarbonisation of industries

Ensuring resource security

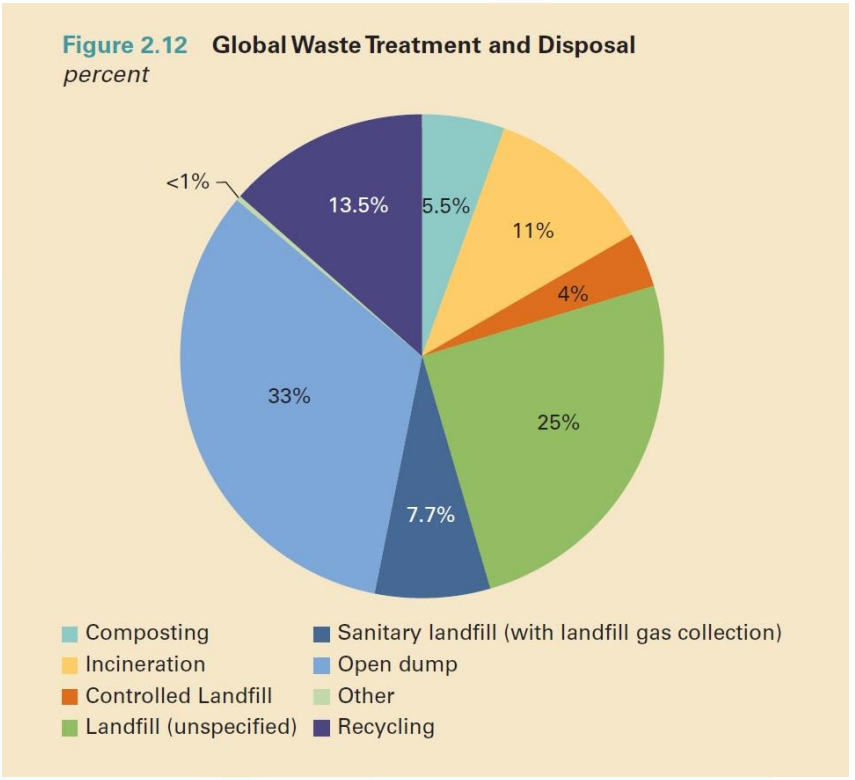


The global context

Waste generation is expected to reach **3.40 billion tons by 2050** generating up to 7% of global CO_{2eq} emissions

Landfills and open dumps are still the main treatment options for non-recyclable waste

Waste-to-Energy is recognised globally as a **sustainable solution and investment** to treat non-recyclable waste



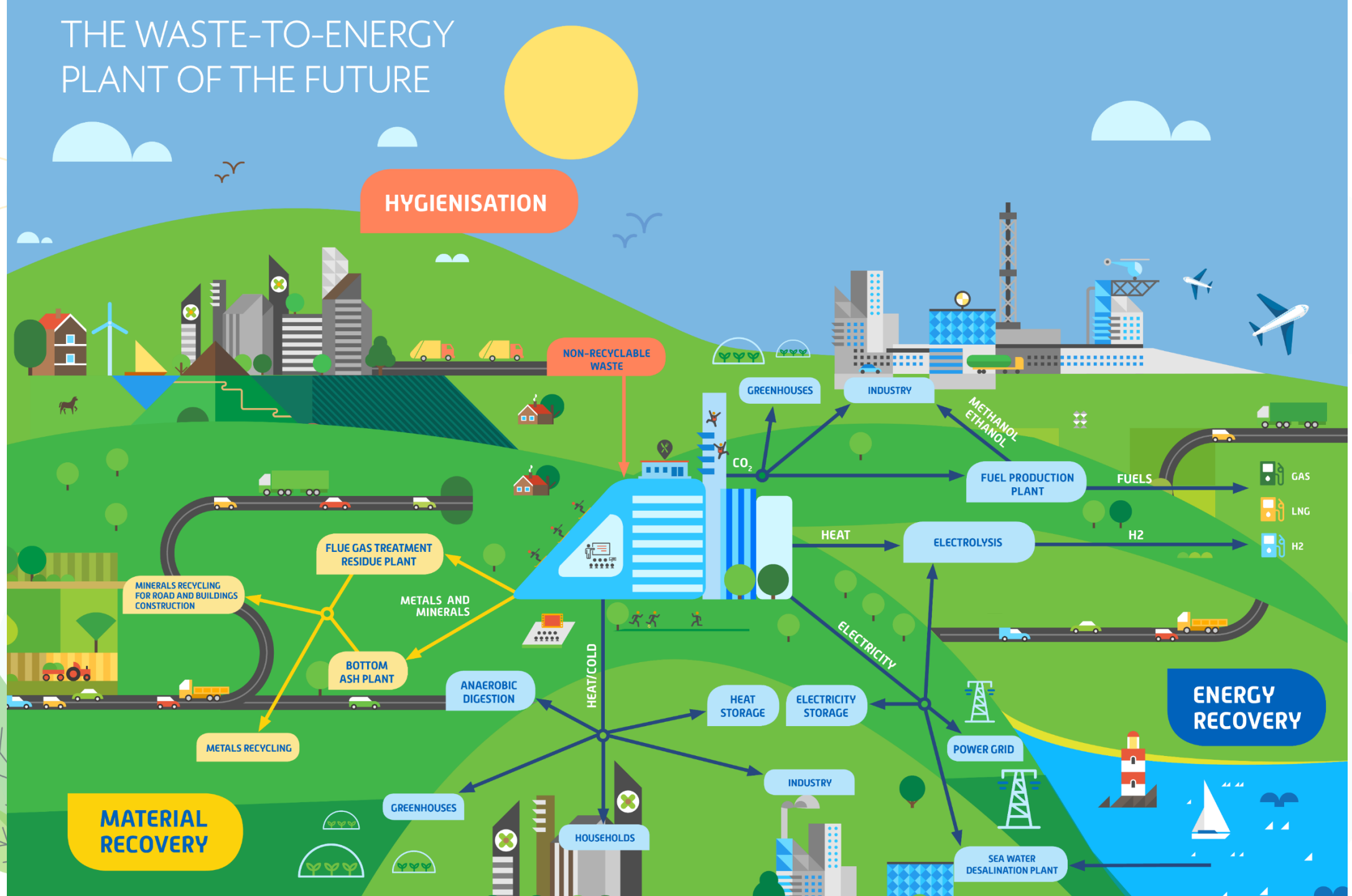
EU decisions have an overall influence on the global scale

Role of Waste-to-Energy

- ✓ Supplying **local, partly renewable, base load energy**
- ✓ Providing **metals and minerals** from incineration bottom and fly ashes
- ✓ Diverting non-recyclable waste from landfills
- ✓ Providing a **hygienisation service** to the community freeing land for life

While being **low carbon**

Still, more can be done to support the climate objectives exploiting a **valuable resource**

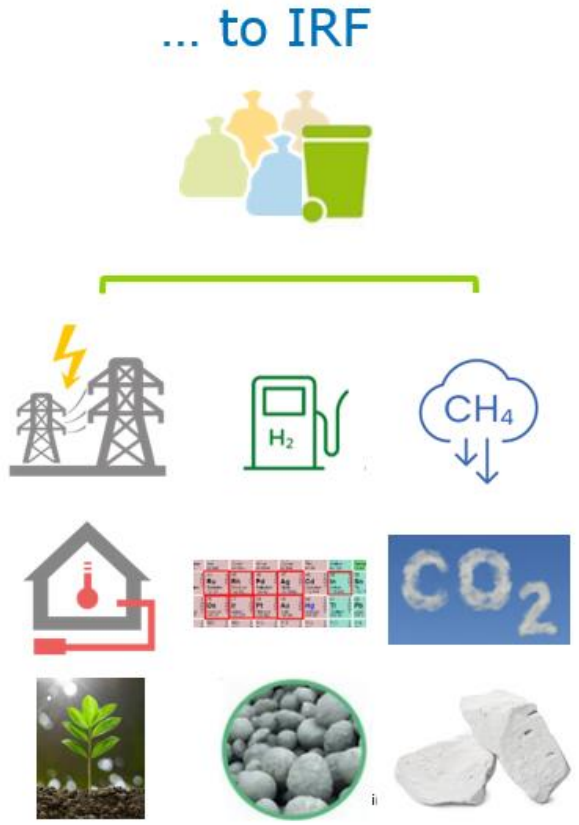

THE WASTE-TO-ENERGY PLANT OF THE FUTURE
HYGIENISATION
NON-RECYCLABLE WASTE
GREENHOUSES
INDUSTRY
METHANOL ETHANOL
CO_2
FUEL PRODUCTION PLANT
FUELS
GAS
LNG
H2
HEAT
ELECTROLYSIS
H2
FLUE GAS TREATMENT RESIDUE PLANT
MINERALS RECYCLING FOR ROAD AND BUILDINGS CONSTRUCTION
METALS AND MINERALS
BOTTOM ASH PLANT
ANAEROBIC DIGESTION
METALS RECYCLING
HEAT/COLD
ELECTRICITY
HEAT STORAGE
ELECTRICITY STORAGE
POWER GRID
ENERGY RECOVERY
INDUSTRY
GREENHOUSES
HOUSEHOLDS
SEA WATER DESALINATION PLANT
MATERIAL RECOVERY

IRF – A new approach

Adopting a **holistic** approach to go from **carbon neutral** to **carbon negative**

The **Integrated Resource-Recovery Facility (IRF)** is a step-change evolution

From the standard WtE plant



To a **stronger generation of sustainable infrastructure** incorporating innovative technologies

Integrated Resource-Recovery Facilities

A key enhancing infrastructure to support

EU energy & raw material security, decarbonisation and circular economy

European Energy security

From 142 TWh of electricity and heat produced in 2020

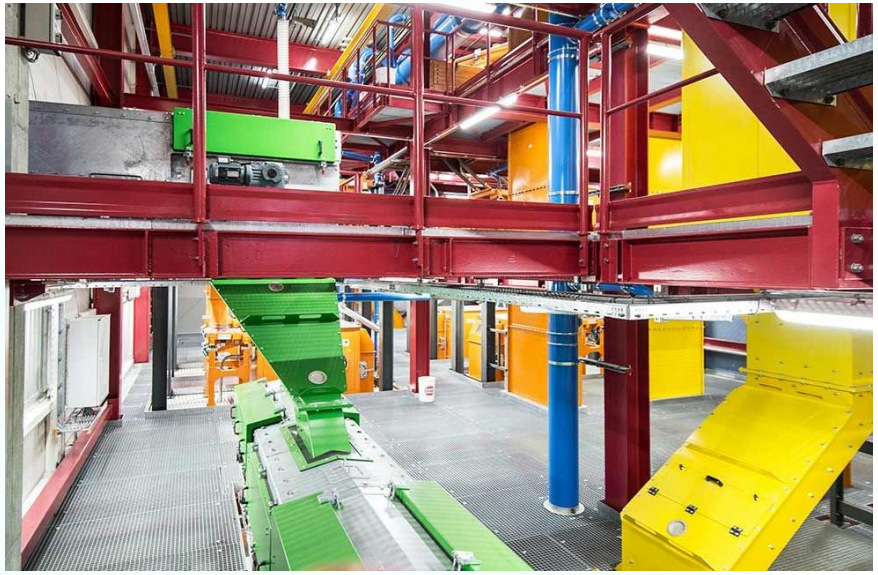
To enhanced energy efficiency technologies to **significantly increase the energy generation.**

Source: Copenhill, B&W Volund

EU raw material supply security

Both metals and minerals are valuable resources

Addition of new technologies such as **dry processing of dry-discharged bottom ash**



Source: ZAV Recycling plant

Enhanced recovery of metals and minerals **further contribute to the circular economy and decarbonisation, as up to 60kg of CO_2 can be saved by tonne of treated waste!**

EU raw material supply security

From bottom ash

Recovering of metals represents a potential market of over 2 billion € annually, and a potential of reduction of CO_{2eq} emissions of 14.5 million tonnes!

The full potential with enhanced recovery is of:

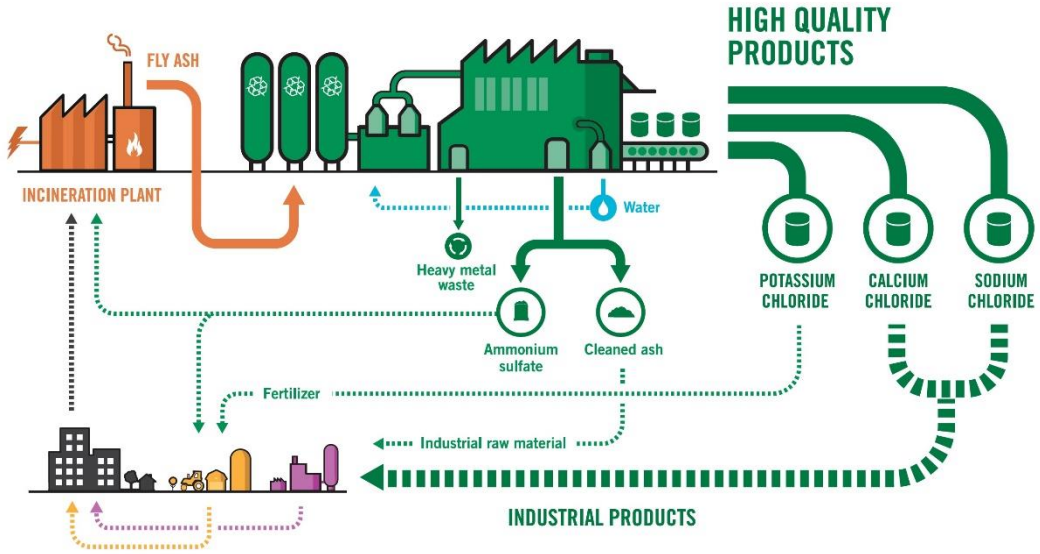
- ✓ **0.7 million tons of Aluminium**
  11% of European imports
- ✓ **2.4 million tons of ferrous metals**
  27% of European imports from Russia

Source: Meldgaard

EU raw material supply security

From fly ash

- ✓ Recovering silicates, potassium chlorides, sodium chloride or other components
- ✓ Recovering zinc and heavy metals
- ✓ Using the ash as a base for aggregates



Source: Ash2Salt, EasyMining

Increase the **security of raw material supply**, boost the European **circular economy** while reducing offshore European **carbon footprint**

Decarbonisation

Integrating carbon capture, storage and utilisation technologies to waste thermal treatment

- ✓ **Fully decarbonised plants**
- ✓ **Contribute to the circular economy** by capturing and using recycled CO_2

Amine or enzyme-based capture processes

CO_2 utilisation is developing

For chemicals and minerals
Supplying greenhouses
Producing synthetic fuels

Source: Copenhill, B&W Volund

IRF – A new Paradigm

Traditionally base load energy output, can be re-purposed to serve new urban needs

- ✓ **Hydrogen production** for mobility or gas grid injection leveraging urban localisation
- ✓ **CO_2 capture** with production of synthetic gaseous & liquid hydrocarbons or carbonate minerals

First biological methanation plant in Europe, Source: HZI

Key contributor to the **decarbonisation of hard-to-abate sectors while balancing the electrical grid**

Policy framework needed

- ✓ Preserve the **waste management hierarchy**
- ✓ Define the full sector's sustainability criteria under the EU Taxonomy
- ✓ **Consider the IRF's CO_2 offsets** via a Life Cycle Analysis
- ✓ Maintain the current definition of "biomass" in the Renewable Energy Directive
- ✓ Classify hydrogen produced from IRF as **partly renewable** and **partly low carbon hydrogen**
- ✓ Support **CCUS implementation** for IRF to become carbon-negative through both regulation and funding

IRF in the EU Green Deal

Enhanced benefits of IRF

Decarbonisation:

IRF can be carbon negative

Partly renewable hydrogen

Capture & storage of CO_2

Circular economy:

Enhanced metal recovery

Recovery of salts & metals

Recycled CO_2

Supply security:

Raw material & energy

Stability of the grid

Synthetic fuels

European Suppliers of Waste-to-Energy Technology

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