REVEAL

REVOLUTIONARY ENERGY STORAGE CYCLE WITH CARBON FREE ALUMINIUM

CONCEPT

Renewable electricity and heat can be produced cheaply today and short-term storage solutions for evening out mismatches between production and demand are available at low cost. However, technologies for **storing renewables for longer timespans of months or seasons are scarce and costly** and thus not widely used yet.

REVEAL project develops a **game-changing and unique solution** to this challenge, using the **conversion of aluminium oxide into aluminium metal (Power-to-Al)** in an environmentally friendly way to store renewable energy and produce a „renewable fuel" in the form of aluminium.

This ground-breaking technical solution will enable to store large amounts of energy with an unmatched density of over 15 MWh/m^3 at an attractively low cost, without losses and with lower environmental impact than today's solutions.

APPROACH

The advantages of this possibly disruptive Power-to-X technology compared to the standard technologies that are discussed and used today are:

Compared to **Power-to-H2**: a much higher volumetric energy density of 23.6 MWh/m^3 at maximum (block of Al), and > 15 MWh/m^3 in practice (Al grit used for the Al-to-Energy units), much safer handling, and much easier to store and transport, with corresponding cost savings and increase of acceptance.

Compared to **Power-to-CH4 and Power-to-methanol**: no carbon source is needed, a two times higher volumetric energy density, and safer handling, potentially reducing the cost of energy conversion and storage considerably.

Compared to **other technologies**: no combustion with air for energy conversion and therefore no NOx, VOC, CO and CO_2 emissions.

Goals:

Seasonal energy storage cycle
development of breakthrough components and solutions that are needed for an Al electrochemical energy storage cycle

Power-to-Al (Storage charging)
based on renewable electricity without emissions of greenhouse gases from the Al smelter (Power-to-Al) process

Al-to-Energy (Storage discharging)
emission free Al-to- Energy

Life cycle and economic analysis
for better economic and environmental performance

FUNDING

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CONTACT

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PARTNERS

Research consortium with nine partners from seven different European countries:

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