ADVENT

Innovative Fuel Cells & Electrolyzers

Hydrogen and Green Gases Forum

Advent Technologies Holdings, Inc. - Overview

COMMERCIAL HT-PEM FUEL CELL TECHNOLOGY

- We manufacture innovative fuel cell components and systems.
- Key markets: Stationary (e.g., telecom towers, backup power), mobile (automotive, marine) and portable (e.g., critical infrastructure backup).
- Strategic partner of the US Department of Energy.

NOVEL ELECTROLYZERS

- AEM technology developed by Advent since 2018.
- Advent's electrolyzer tech reduces hydrogen costs without requiring iridium or titanium.

GLOBAL MANDATE TO DECARBONIZE

- US Inflation Reduction Act: $369 billion.
- REPowerEU: Up to €300 billion.
- EU Hydrogen Accelerator: Goal to produce 10 million tons and import 10 million tons of renewable hydrogen by 2030.

IPCEI FUNDING

- EU ratified Advent Green HiPo in July 2022.
- Total funding of €782.1m ratified for R&D and Production of fuel cells and electrolyzers.
- As part of Green HiPo, Advent has joined efforts with BASF to build a full loop component supply chain for fuel cells.
- More global partners with regards to Green HiPo will be announced shortly.

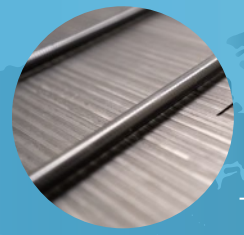
Organization

170+ Employees

38 Successful R&D Programs

700+ Combined Technical Years of Experience

150+ Patents Issued, Licensed, or Pending



Advent Technologies GmbH
Germany

- Development and assembly of Advent's 5kW-15kW stacks.

Advent Technologies A/S
Denmark

- Center of Excellence for fuel cells
- Development and assembly of Advent's 5kW-15kW Serene systems

Advent Technologies LLC
Silicon Valley, USA

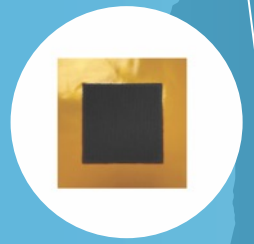
- Portable Fuel Cell Products R&D and Production
- DIGI-TRONIC fuel cell system R&D
- Development of advanced cooling technologies

Advent Technologies SA,
Greece

- Fuel Cells R&D and production
- Electrolyzers R&D and production
- MEA production
- Ion Pair™ MEA product development

Advent Green Energy Philippines Inc.
Philippines

- APAC service center for the telecom market
- Sales, service and site preparation



Advent Technologies Holdings Inc.
Boston, MA USA

- Corporate Headquarters
- Fuel Cell R&D and Manufacturing
- Ion Pair™ MEA production
- Electrolyzer test stations

Key Markets

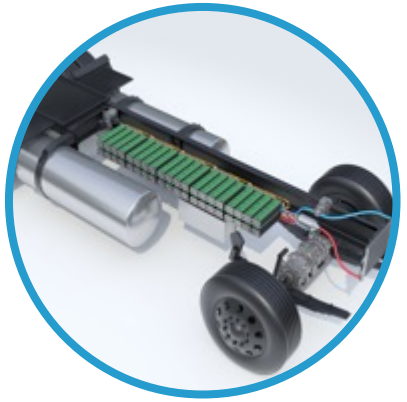
Stationary Power

- ✓ *Diesel Generator replacement*

Marine

- ✓ *Methanol Fuel Cells to decarbonize Shipping*

Automotive



- ✓ *Total Cost of Ownership reduction with Advent Fuel Cells*

Electrolyzers

- ✓ *Green Hydrogen Production*

Key customers

Stationary Power

Globe Telecom
Systems deployed as backup power for the telecoms industry in the Philippines.

German State of Brandenburg
Systems deployed as backup power for Brandenburg's BOS digital radio network.

Marine Power

Siemens Energy
Collaborating to develop a marine fuel cell solution using Advent's methanol-powered fuel cells.

Alfa Laval
Exploring Advent's methanol-powered fuel cells as a source of marine auxiliary power.

Automotive Power

Hyundai
JDA after a positive tech assessment, aiming to advance HMC-Advent Ion Pair™ MEA.

Global Automotive Manufacturer
Advent's HT-PEM fuel cells and new MEA technology are being evaluated, with a JDA anticipated.

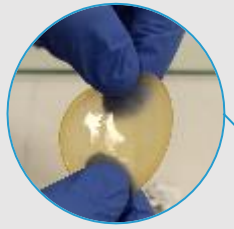
Aerospace Power

Safran
Collaborating to develop the next-generation of HT-PEM fuel cell technology by leveraging Advent's proprietary Ion Pair™ MEA technology.

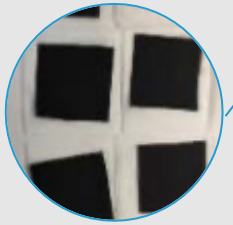
Advent Fuel Cells

We design and manufacture systems for different market needs

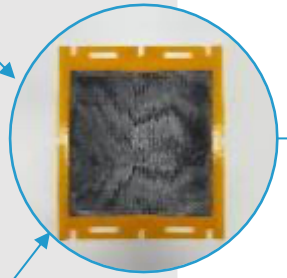
We make the MEAs The “heart” of the fuel cell



Membrane



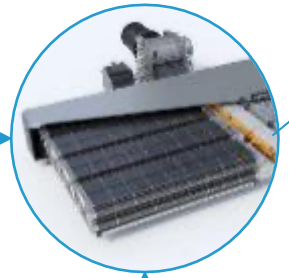
Electrode

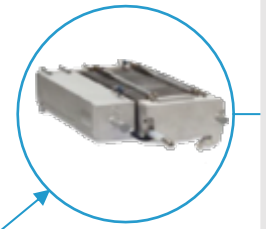


MEA

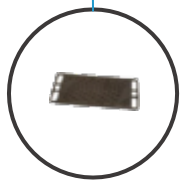
Design and manufacture the fuel cell stacks

Fuel Cell Stack



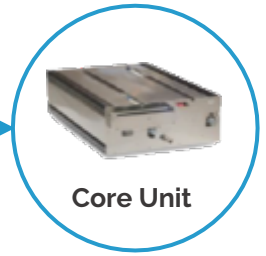


Reformer-HT-Stack

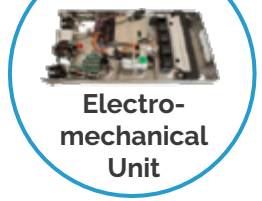


Bipolar Plate

The complete fuel cell system that is ready to ship



Core Unit



Electro-mechanical Unit

Power Electronics / Control Unit

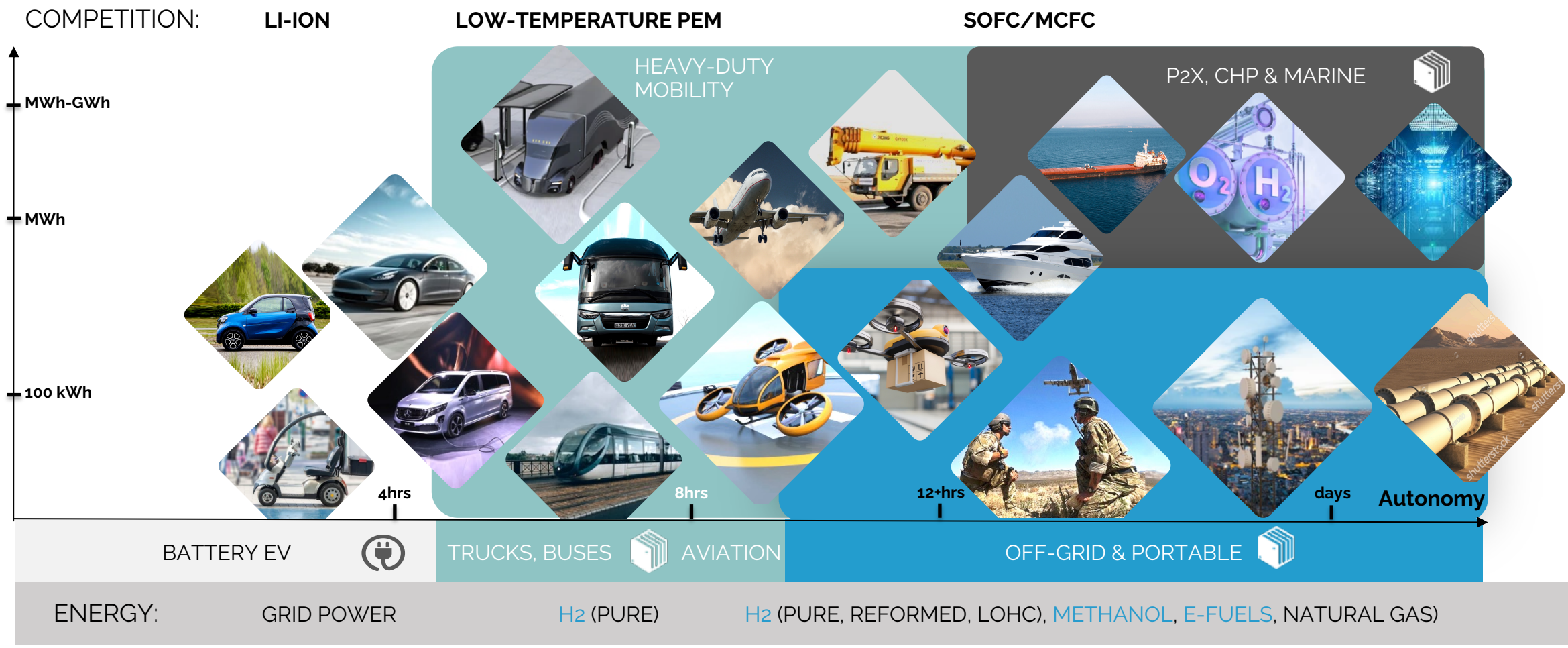
Stationary Power

Portable & Remote Power

Mobility

Fuel cells: Off-takers and applications

Fuel cells are targeting several sectors (heavy duty mobility, maritime and aviation, stationary and energy-to-hydrogen), having competitive advantages over other alternatives



Advent's AEM Electrolyzer Technology

SOLAR

WIND

H2

Hydrogen Pipelines

E-Methanol

eDiesel

eKerosene

Ammonia

Advantages

No Platinum
Unlike PEM electrolyzers, AEM does not require Pt that costs $100s per kW

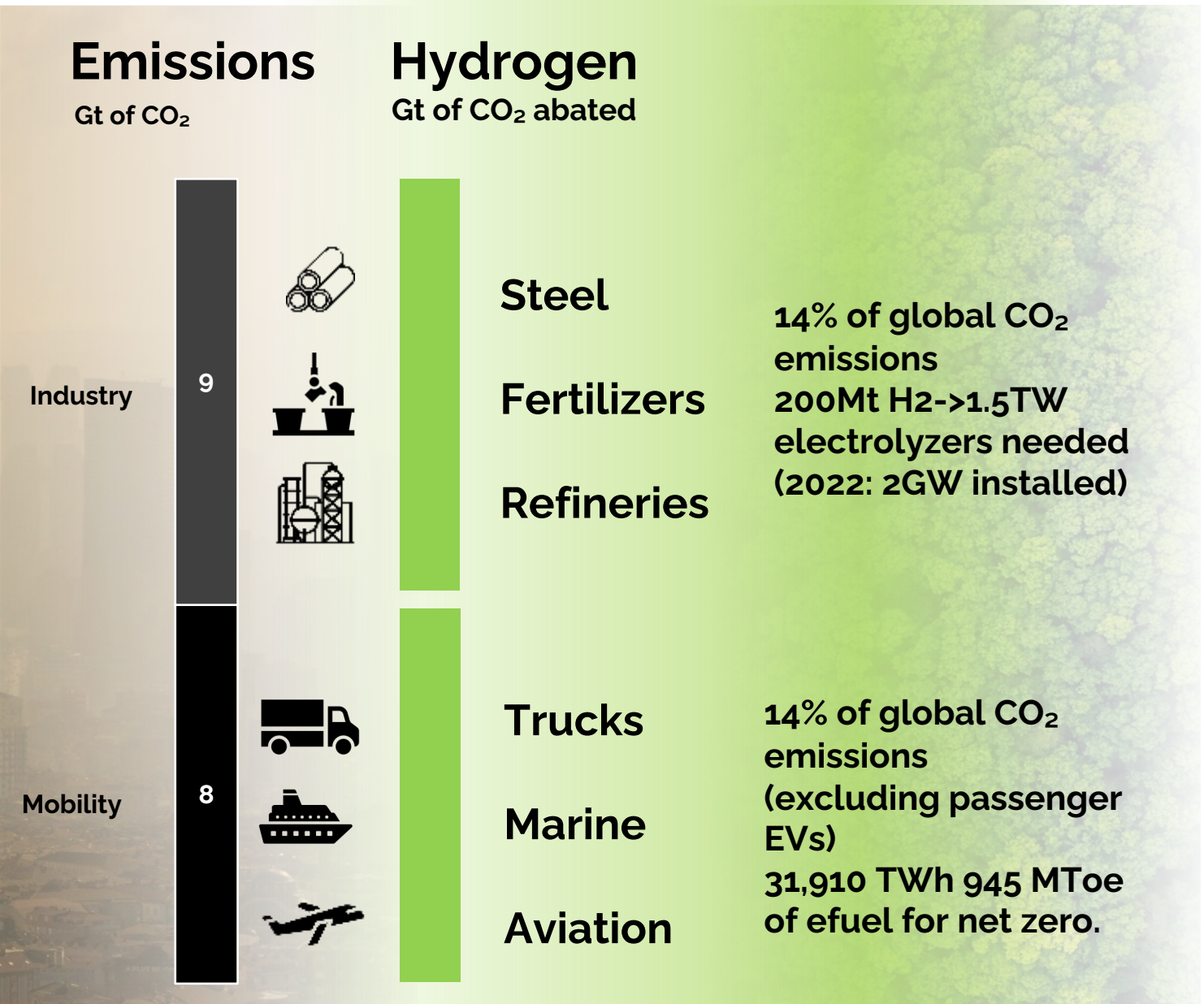
No Iridium
Unlike PEM electrolyzers, AEM does not require Ir that costs $100s per kW

Supply Chain
Established: Rely on abundant non-precious materials

IP
Advent's strong IP in electrodes & membranes & scale-up readiness

Manufacturing
Designed for low cost of manufacturing, long lifetime

Electrolyzers: Off-takers and applications



Massive Opportunity for Electrolyzers

2030:
100s of GWs of Electrolyzers

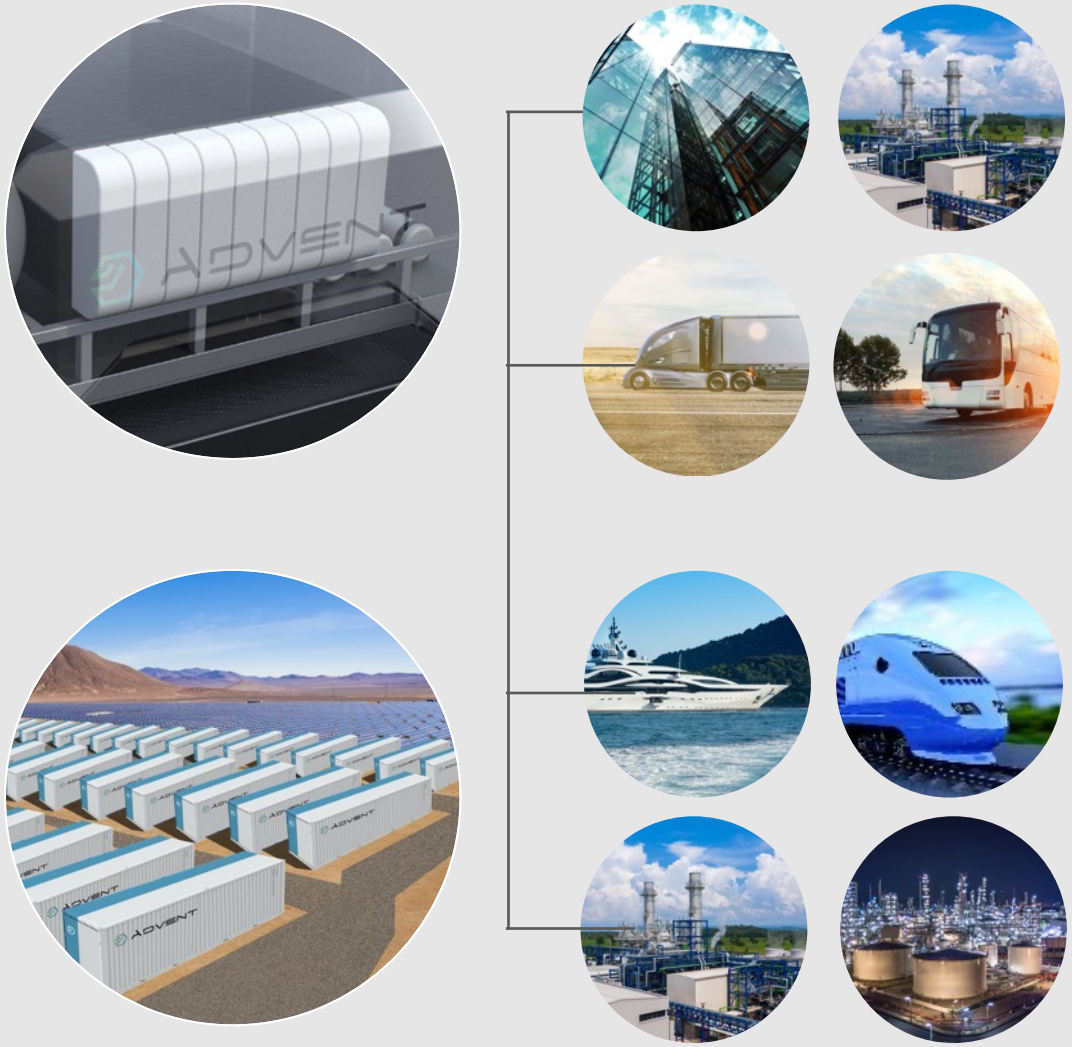
2050:
TWs of Electrolyzers

Green HiPo

Innovative Production of HT-PEM Fuel Cells and Electrolyzers in Western Macedonia, Greece

- **Total funding of 782.1m €**
- **Duration 2022-2027**
- **Under IPCEI Hy2Tech, Advent was one of only eight SMEs to have received ratification**
- **R&D and Production Facilities**
- **Direct and indirect cooperation with approximately 20 European entities**
- **Fuel Cells: 120MW over 6 years**
- **Electrolyzers: 1.5 GW over 6 years**

Green HiPo Off-Takers



Western Macedonia State-of-the-Art Advent Facility

- Approximately 650 new jobs over the next 6 years.
- Attraction for scientists and specialized professionals from local universities.
- Through Green HiPo, Advent aims to establish Western Macedonia as a key hub for the hydrogen and fuel cell industry in Europe.
- Green HiPo is a significant European initiative that will contribute to the EU's goal of achieving an electrolyzer capacity of up to 400GW by 2030.


ADVENT
Thank you.