eChemicles

Electrolysis for a Better Tomorrow!

We develop innovative sustainable electrolyser solutions to drive the transition of the chemical industry to reduce its environmental impact in a profitable way.

eChemicles – Industrya

Mission

We develop innovative sustainable electrolyser solutions to drive the transition of the chemical industry to reduce its environmental impact in a profitable way.

Vision

We want to become a leading electrolyser technology provider, transforming waste CO_2 to valuable chemicals using green energy sources.

Milestones

Immediate

Currently demonstrating our core technology of CO_2 electrolysis to CO with a fully operational containerised prototype. Key partnerships are in place, first commercial project undertaken.

Short-term

Industrialising and commercialising our small-scale units (up to 1kt CO /y) by 2027.

In parallel, further upscaling our technology with medium-scale pilots.

Mid-term

Commercialising medium-scale plants (50-100 kt CO /y) by 2030.

In parallel, further upscaling our technology to (up to 1000 kt CO /y).

The challenge: facilitate a *competitive* green transition

- Climate crisis
- Increasing costs
- Dependency on oil and gas
- Geopolitical megatrends

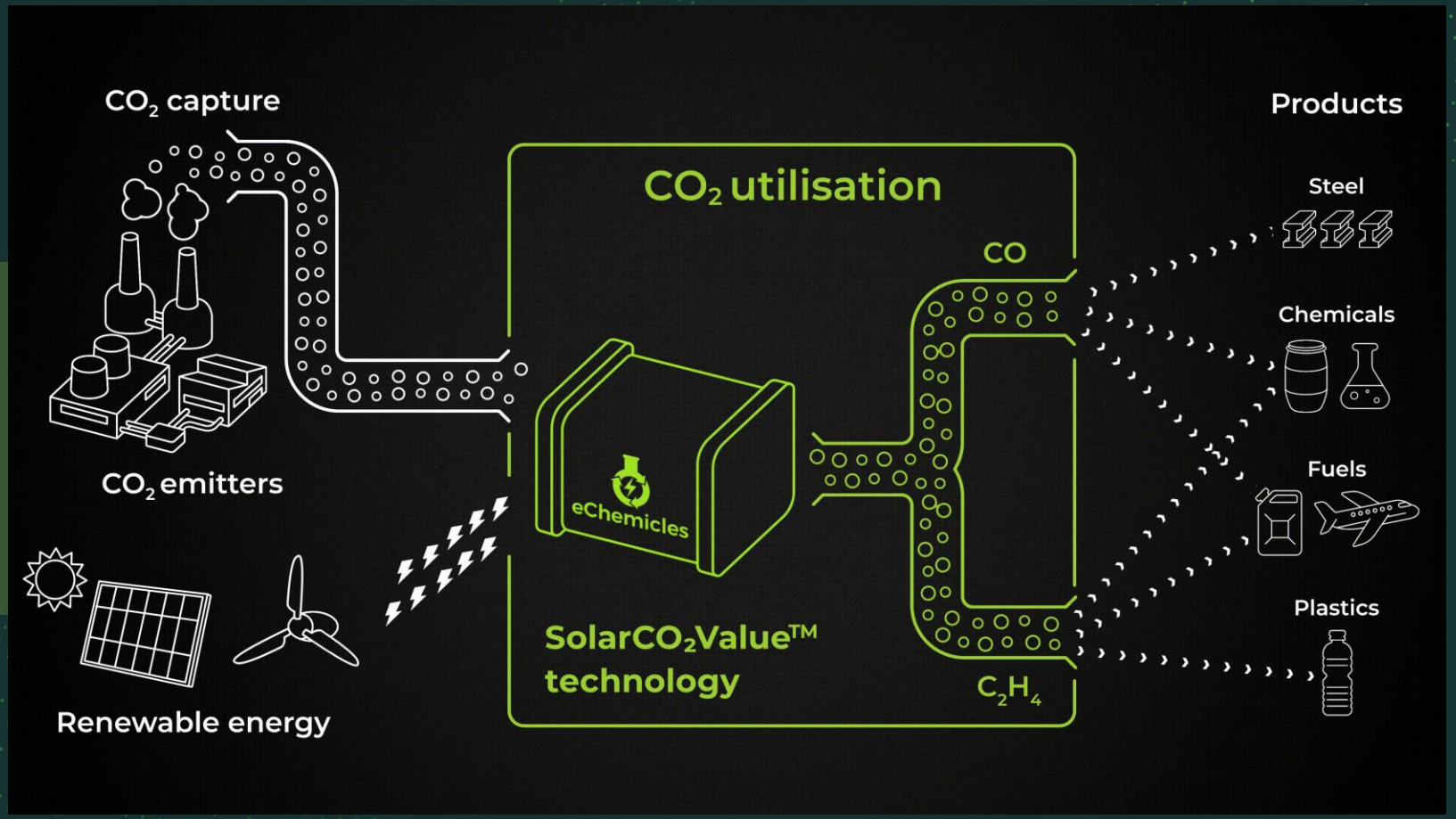
Decreasing competitiveness of the American and European Industry

UN SDGs

Conventional approaches of decarbonization are not enough, breakthrough innovations are needed to achieve a circular carbon economy.

Our low temperature CO_2 conversion technology can tackle the challenge

We convert captured CO_2 with renewable energy into a green CO for industrial usage.
In a next electrochemical step, we can convert CO to ethylene.



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Electrolysis for a Better Tomorrow!

Only proven and patented stack-based CO_2 electrolyser

Performance

- First team in breaking the 1 A/cm^2 limit for CO_2-to-CO` conversion.
- Lower OPEX and CAPEX costs.

Scalability

- Stacked design for easier transition to larger scales without redesign
- Current single cell area is 2500 cm^2 (assembled into stacks)

Dynamic operation

- First at demonstrating the intermittent operation of any CO_2 electrolyser.
- Our technology can be directly coupled with solar PV.

Durability

- A method, which restores the electrolyser performance, without needing to stop the operation.
- Developed, Patented and Published!

Public

Top Innovator according to the UpLink - World Economic Forum

eChemicles

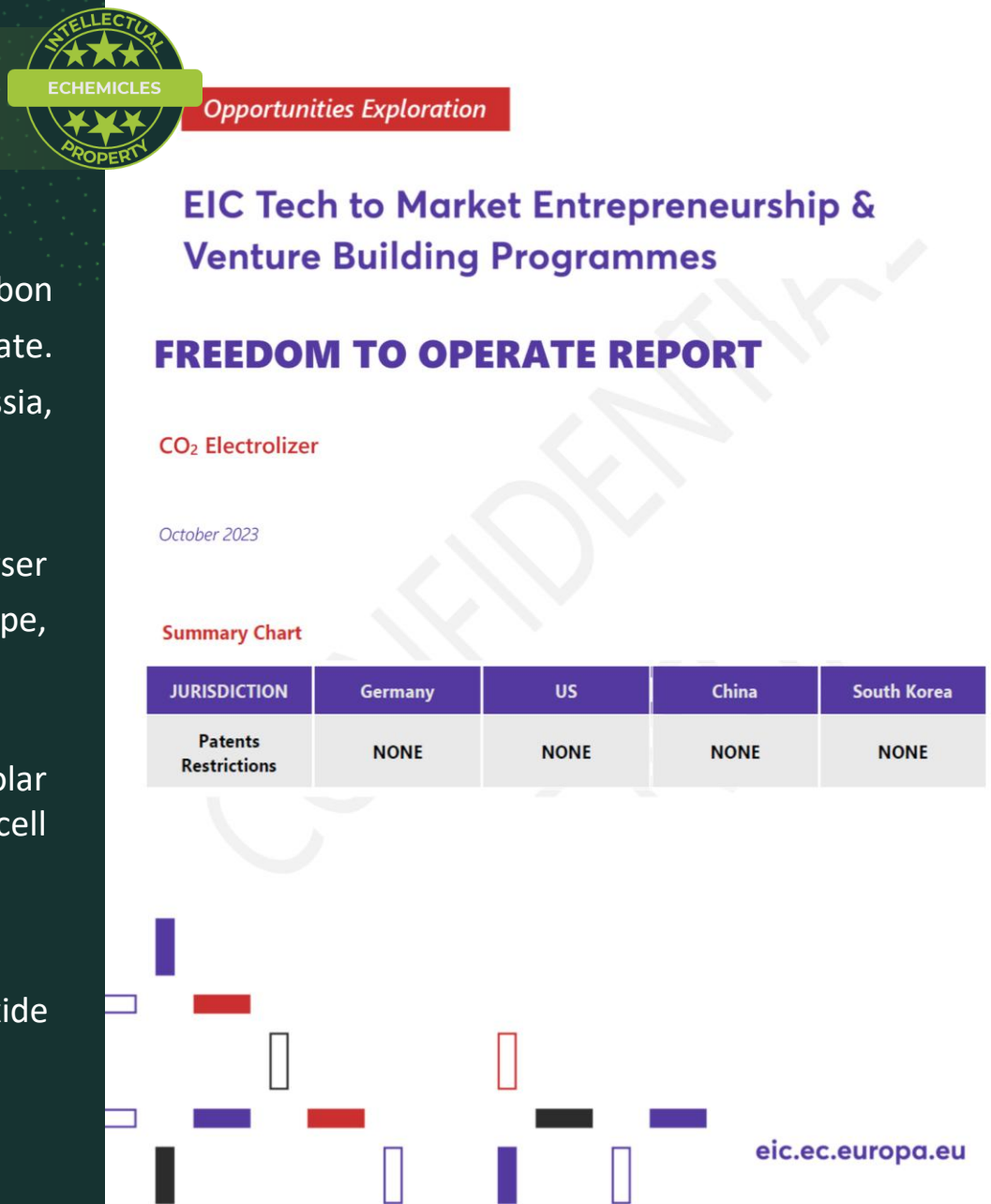
Based on cutting edge R&D

WO/2020/240218: Modular electrolyser cell and process to convert carbon dioxide to gaseous products at elevated pressure and with high conversion rate. (National phases in USA, Europe, China, Japan, Korea, India, Australia, Russia, Israel, Switzerland, Singapore) **IPRP: 24/24 claims are patentable**

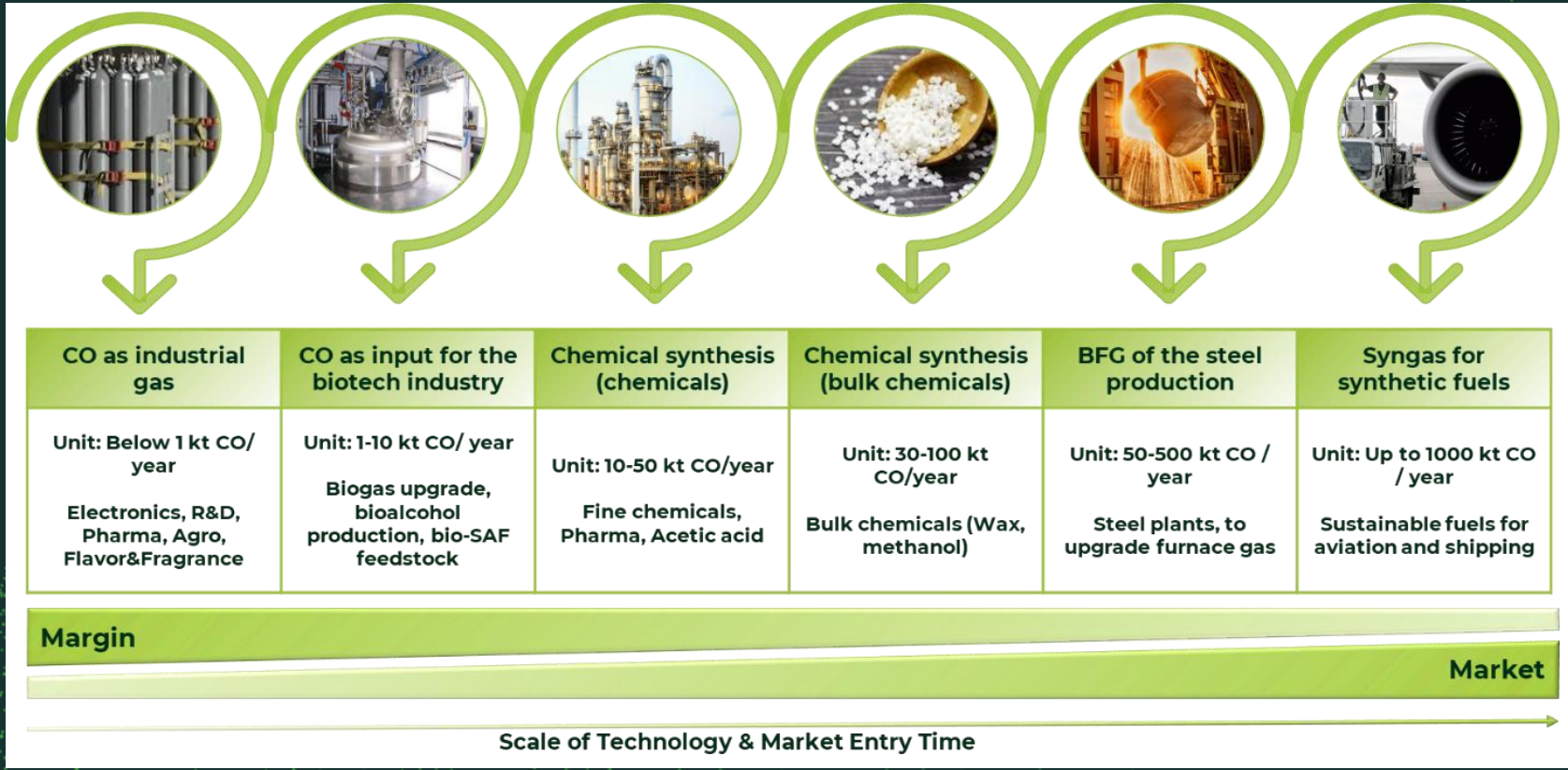
WO/2022/013583: Process and system to enhance and sustain electrolyser performance of carbon-dioxide electrolysers. (National phases in USA, Europe, China, Korea, India, Australia) **IPRP: 30/30 claims are patentable**

P2400372: This PCT application was filed in 2024, and relates to metal bipolar plates to be used, especially, in carbon dioxide conversion electrochemical cell stacks as one of the building blocks of the cells forming said stacks.

P2400373: This PCT application was filed in 2024, and relates to a carbon dioxide electrolyzing cell stack with novel flow design.



CO production – Our prospective market segments



- Different use cases are identified for a diverse set of non-exclusive markets.
- The technology can be tailored to different market needs, with opportunity for **quick entry to CO production** as an industrial gas.
- As the technology matures, market volumes that can be served will increase.
- TAM (pure CO demand, of small-mid markets):

  2030: $8 bn
  2040: $16 bn
  2050: $30 bn

Detailed analysis of the green CO market was carried out with Air Liquide:
https://pubs.acs.org/doi/full/10.1021/acsenergylett.3c02446

Competitive technologies and direct competition

	Temperature	Integrability	Efficiency	Adaptability	Maturity	Dynamic operability	CAPEX and OPEX
Our Low Temperature Electrolyser	⚡⚡⚡	⚡⚡⚡	⚡⚡	⚡⚡⚡	⚡	⚡⚡⚡	⚡⚡
Solid Oxide Electrolyser (SOEC)	⚡	⚡⚡	⚡⚡⚡	⚡⚡	⚡⚡	⚡⚡	⚡
Reverse WaterGas Shift (rWGS)	⚡	⚡⚡⚡	⚡⚡	⚡	⚡⚡	⚡	⚡

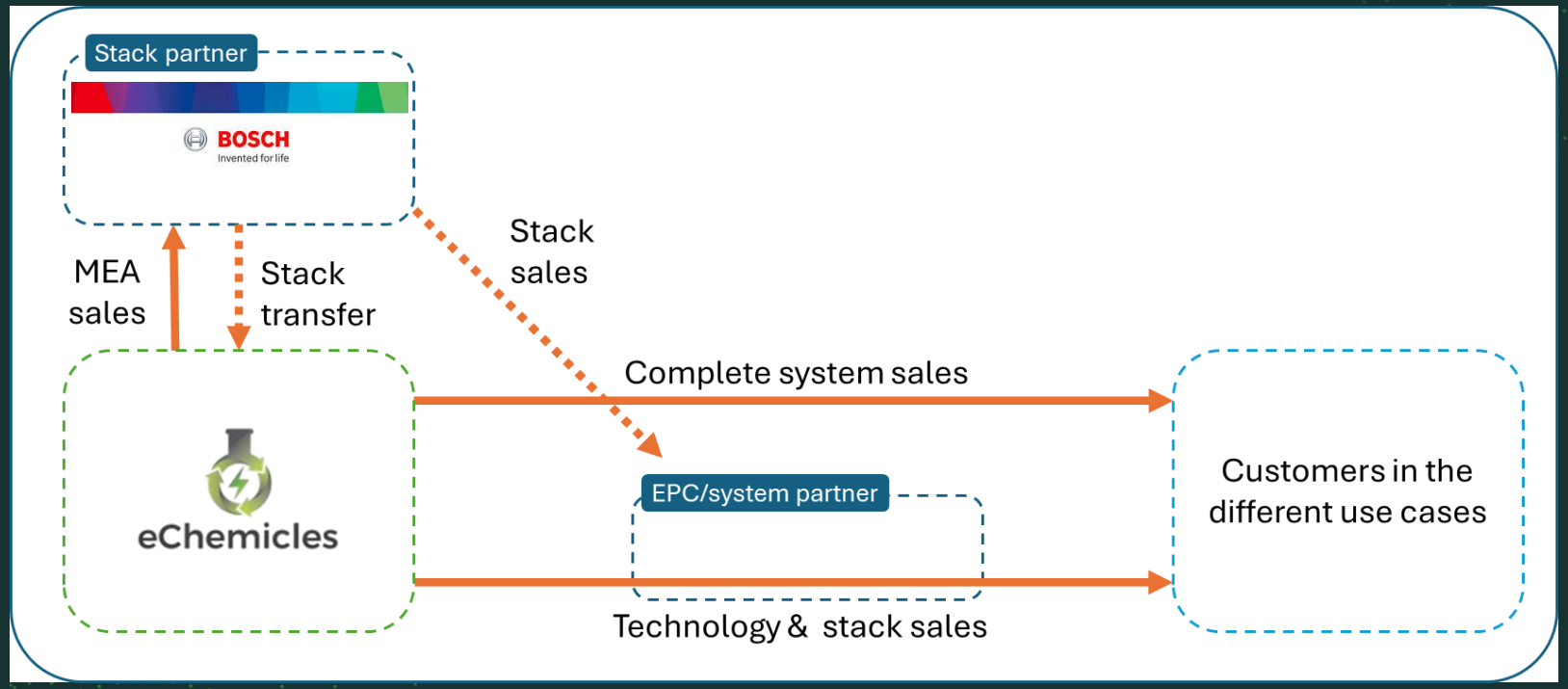
Attractiveness: ⚡ low ⚡⚡ medium ⚡⚡⚡ high

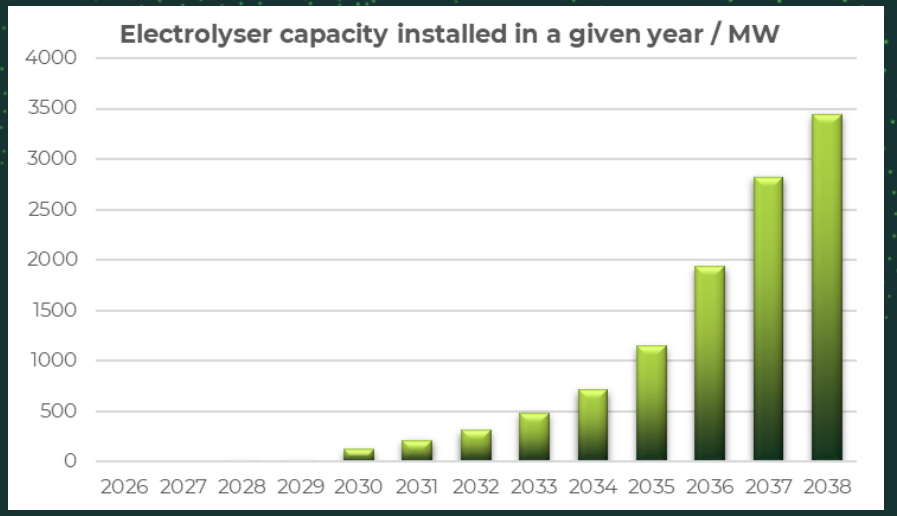
Compared to other low temperature electrolyser companies (such as Twelve and Dioxycle) we have:

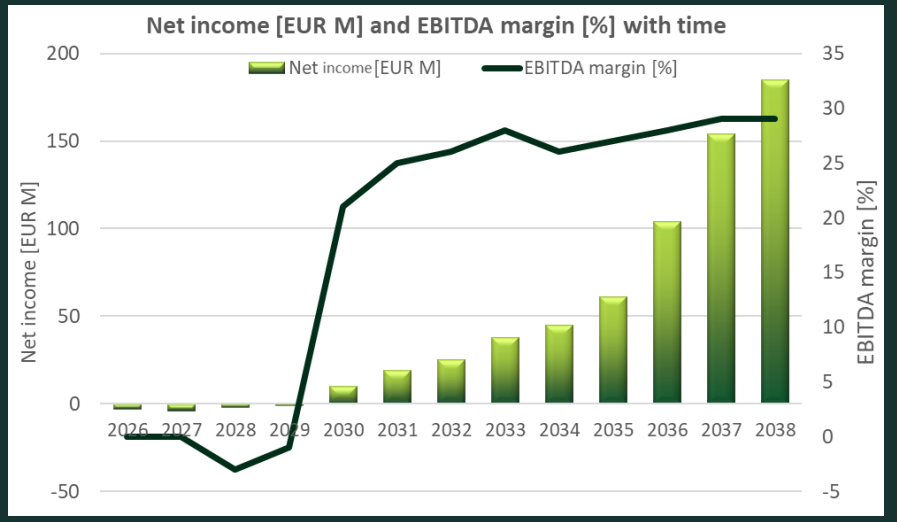
- An easily stackable design
- Engineering focused IP protection
- Class leading performance (TCO of CO)
- Emphasis on global partnerships for scale-up

We are open for customer visits, to show our technology in operation!

Business model + financials







- 3 different revenue streams
- Collaboration with industry giants allow rapid market entry
- Positive EBIT and EBITDA from 2030

Management with technology and business expertise

Founders

Dr Csaba Janáky
Co-founder and Chairman of the Board

- Pioneer researcher of electrochemical CO_2 and CO conversion technologies
- Published over 110 articles in peer-reviewed journals filed 20+ patents.

Dr Richard Jones
Co-founder and Board Member

- Entrepreneur, co-founder of innovative start-ups for developing chemical technologies
- Product manager of the R&D 100 Award winning H-Cube®

Alex Drijver
Co-founder and Board Member

- A finance and life sciences professional, experienced CFO and CEO for start-up companies
- Led the successful exits (ComGenex, ChemAxon, ComInnex)

Advisors

Plamen Atanassov
Advisory Board Member

- Leading expert of Electrochemistry, Electrocatalysis, Fuel Cells
- Inventor of catalyst families used by top companies
- Chancellor of University of California- Irvine

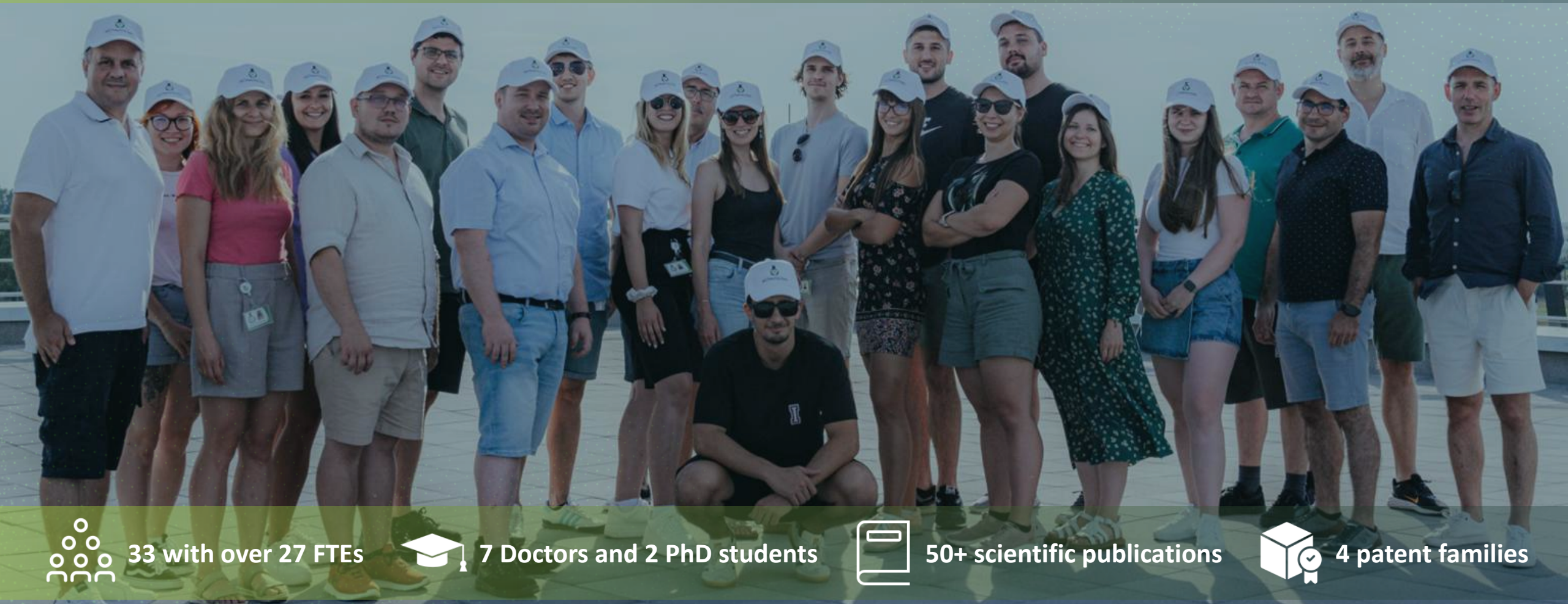
Helge Holm-Larsen
Advisory Board Member

- C-level executive in start-ups, primarily within clean tech, industrial automation and welfare tech.
- Experience includes small scale, mid-size as well as large industry.

Dominic Gallello
Advisory Board Member

- An established technology leader in vertical engineering software solutions.
- American top manager, with a track record in building products and global brands.

About us



33 with over 27 FTEs

7 Doctors and 2 PhD students

50+ scientific publications

4 patent families

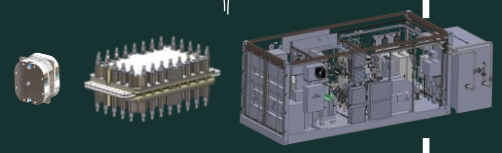
Partnership development II.

Joint Development and Strategic Partnership with Bosch Thin Metal Technologies (Tilburg, NL) for establishing the mass production of our CO_2 electrolyzer stack.

Roadmap and Milestones

Current stage

Fundamental Research | Applied Research | Development | Industrialization | Scale-up



2014 | 2019 | 2022 | 2025 | 2028 | 2032

Proof of concept | PCT patents | Large lab scale | Prototypes | Small commercial units | Pilot plants | Medium Scale Plants

ERC grant € 1.5 M (finished)
Hungarian R&D grants € 2.75 M (finished)

EIC transition € 2.4M
Hungarian R&D € 0.8 M

EIC Accelerator
EU Innovation Fund

EU Innovation Fund

Seed
€ 1.25M

Series A
€ 15M

Series B / exit

eChemicles

Use Series A Total ~15M EUR

Technology scale-up

- Equipment needed for scale-up
- Pilot plant components
- 3 years development cost

Commercial scale-up

- Small scale commercial unit
- Pilot plant
- Building partnerships in the different market segments

Operation scale-up

- New location for scaled-up MEA manufacturing and container assembly
- New location(s) for BD

HR scale-up

- HR expansion (from ~30 to ~65 FTE)

Why eChemicles would fit to Industrya?

Technology and sector scope

- Directly related to the H_2 and eFuels industry
- Decarbonization focus
- Industry 4.0
- Leverage the industrial capabilities of the John Cockerill Group

High growth potential globally

- CCU/S is a must to achieve net zero
- CCU/S applications are on the rise globally

Thank you!

eChemicles

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Customer willingness to pay

Applications	CO as Industrial Gas	CO feedstock for Biotech	CO for Carbonylation	Syngas for e-chemicals	DRI / Other metallurgy	Synthetic Fuels
Incumbent tech	Steam Methane Reforming (SMR) and *delivery is needed*	*None*	SMR, Partial Oxidation of Methane (POM)	SMR, POM,	Coke gasification	*None*
Unit size (kt/y)	<1	<5	<50	<100	50-500	<1000
eChemicles' solution	Container unit 100 – 400 kW 2027	Several Containers 400 – 2000 kW 2027	Plant 5 - 40 MW Pilot 2027 FOAK 2030	Plant 10 – 100 MW Pilot 2027/28 FOAK 2031	Plant 40 – 200 MW Pilot 2028/29 FOAK 2032	Plant 100 – 500 MW Pilot 2029 FOAK 2033
Cost factors	**Incumbent:** ○ Large-scale and centralized facility ○ CO_2 Emission fee ○ Natural gas price volatility (+ pre-treatment) ○ Storage and Transportation of hazardous materials (for non on-site cases)					
	eChemicles: ○ Inlet gas pre-treatment ○ Electricity ○ CO_2 delivery* (*if no compatible source is available on site)					
Non-cost advantages	CO transportation cost avoidance. Dynamic operation, on demand production	Scale can be easily adjusted regarding specific use cases due to modularity			Direct integration into existing steel plants	Higher CO_2 emission savings competitors
Unit cost ($/tCO, <99% purity)	**Incumbent:** 4,000 -20,000 USD/t depending on scale (Linde, Messer, Air Liquide) **eChem:** 2500-6000 USD/t, depending on utilization rate	**Incumbent: 200 – 650 USD/t** depending on geographical location (e.g., in Finland 450 USD/t, while its over 600 USD/ Australia), correlating to Natural Gas prices **eChem: 300 - 800 USD/t** mostly depending on electricity price & available subsidies, and somewhat on the scale.				
Drivers for adoption	Net Zero Strategy ESG – Sustainability Safety Brand image, PR	Increase the production and efficiency of biotech methods Modularity Dynamic operation	Compatibility with existing infrastructure Increasing electrification Legislation (Mandates, Rising cost of emission, Subsidies) Net Zero Strategy ESG – Sustainability		Legislation (Mandates, Rising cost of emission, Subsidies) Electrification Net Zero Strategy Circular Carbon economy	