

EST 2021

WHAT ARE WE DOING?

H2Electro OÜ develops the next generation electrolyser to produce green hydrogen.

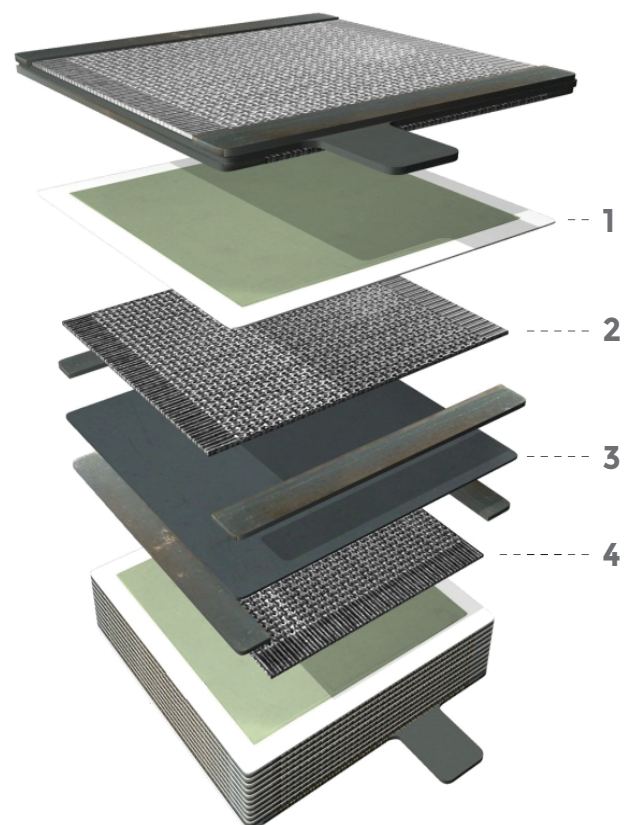
We are developing a durable electrolyzer single element with high efficiency.

The purpose of H2Electro is to provide an opportunity to enable widespread use of intermittent renewable energy sources (wind, solar), helping to reduce greenhouse gas emissions and air pollution.

The next generation electrolyser, what we are developing, works at high temperatures (650- 850°C) has the advantages of:

- 30% higher efficiency
- The product does not contain precious metals
- Allows the use of industrial waste heat to reduce electricity consumption
- The modular design helps to achieve different electrolysis capacities

Scheme of SOEC



- 1 - Electrolyte with electrodes
- 2- Oxygen flow field
- 3- Interconnect
- 4- Steam/hydrogen flow field

COMPARISON OF SOLID OXIDE ELECTROLYSER WITH OTHER TECHNOLOGIES.

Type of electrolyser	Alkaline	PEM	Solid oxide
Operating temperature	70-90°C	50-80°C	650-850°C
Efficiency	50-65%	60-75%	80-85%
Lifetime	10 years	6 years	5 years (goal is 10 years)
Electrolyte	KOH aqueous solution	PFSA membrane (Nafion)	Yttria-stabilized Zirconia (YSZ)
Electrode	Nickel, iridium	Platinum, iridium	Oxides of rare earth metals

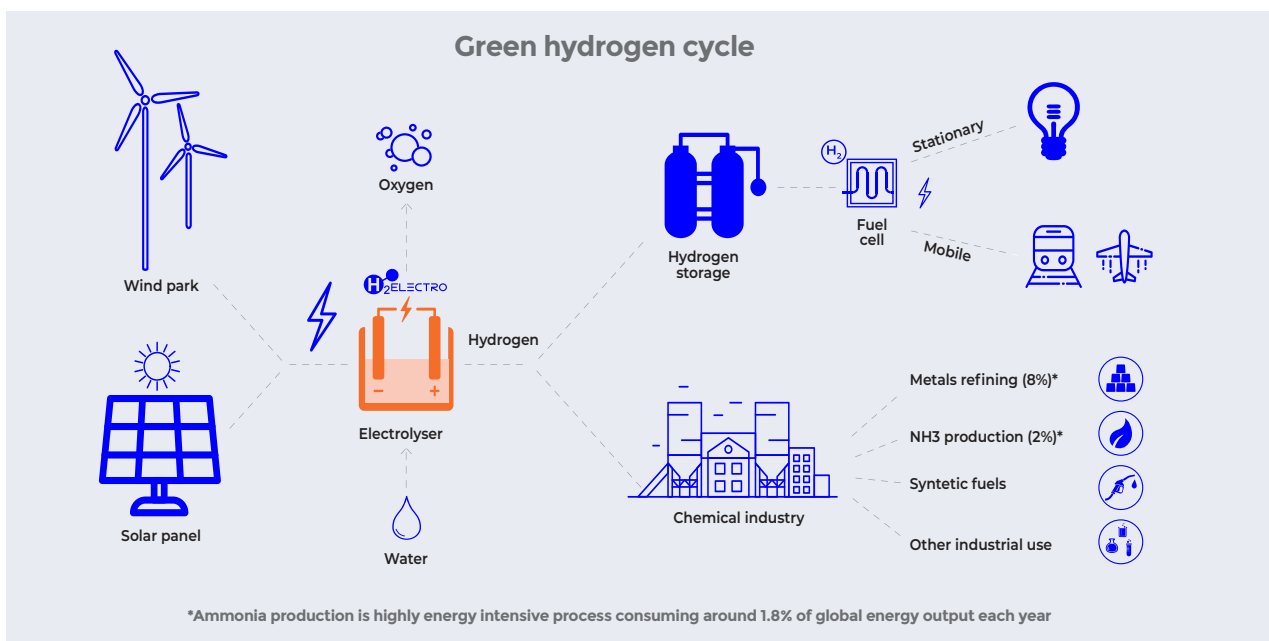
Due to high working temperature, it is possible to achieve higher efficiencies. Additionally, it is possible to use heat-off from industry to further increase the efficiency. No precious metals, such as iridium or platinum is used in the components of the device. Today, global iridium production allows to produce only up to 2 GW of electrolysers annually. This limitation is not the problem for solid oxide electrolysers. It means that using high temperature devices raw materials do not limit the production of electrolysers.

AREAS OF USE

The electrolyser makes it possible to replace fossil fuels, **such as natural gas, with renewable energy.**

The main uses of hydrogen are:

- Steel industry
- Fuel refining and synthetic fuels
- Production of fertilisers
- Energy storage



OBJECTIVE OF TECHNOLOGY DEVELOPMENT

By 2030, the European Commission plans to deploy 40 + 40 GW of electrolyser facilities in the European Union and at nearby locations, producing up to 20 million tonnes of renewable hydrogen each year.

To achieve this goal, 24 to 42 billion euros need to be invested in the production and deployment of electrolysers. *

Our aim is to achieve at least 1% of the total European market by 2030.

TEAM

H2ELECTRO

UNIVERSITY OF TARTU



Henrik Hal
Co-Founder

Henrik is responsible for partnerships and opportunities for cooperation.



Asko Ant
Co-Founder

Asko is responsible for supporting the activities of the team as a whole and coordinating the implementation of these activities.



Silver Sepp
Deployment scientist

Silver is responsible to ensure smooth cooperation between the company and the university and to prepare and carry out scientific projects.



Laura Sipelgas
Project lead & back-office

Laura is responsible for project demonstration and the smooth running and productivity of the working environment.



Prof. Enn Lust

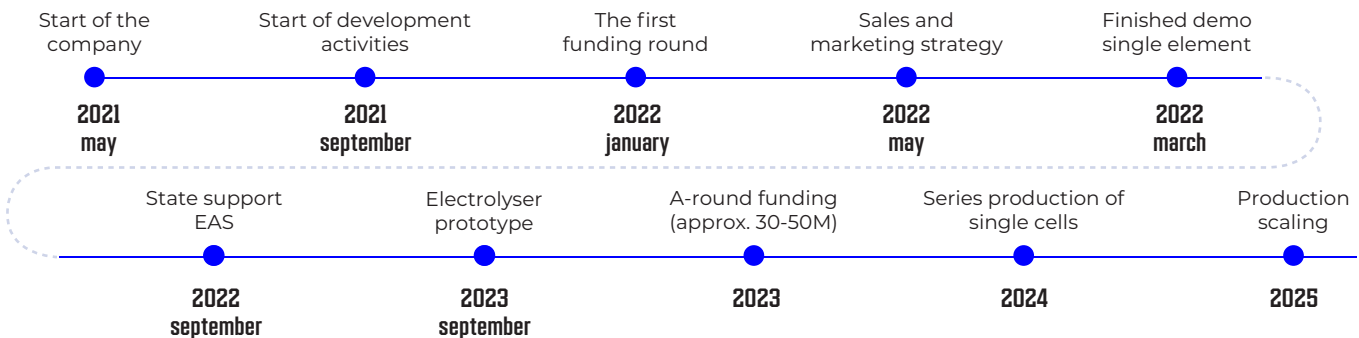
Professor of Physical Chemistry and Director of the Institute of Chemistry at Tartu University.



Co-prof. Gunnar Nurk

Associate Professor who leads the research group on solid oxide fuel cells and electrolysers in the Department of Physical Chemistry at Tartu University.

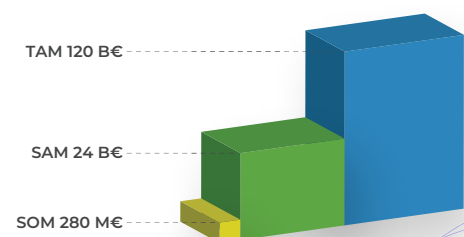
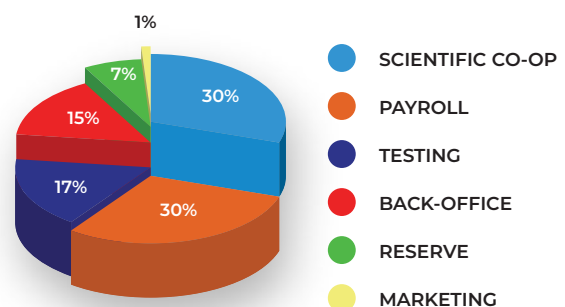
TIMELINE



FINANCING

Raising **2.25M €** in seed equity investment round:

- Raising money through the sale of a company's holdings
- Investor income is generated through the growth of the company's value
- The first round of funding up to 2.25 M € until the end of 2022
- Round A financing round will take place in 2023a in the amount of 30-50 M €
- We additionally plan to involve ongoing funding from state and public funds in Estonia (and also from foreign countries)





HYDROGEN IS THE FUTURE

Hydrogen is an energy carrier that can be used to store, transport/move and supply energy produced from renewable intermittent sources.

Hydrogen currently makes 3% of the EU's energy resources, but must reach at least 24% by 2050, according to European Commission resolutions.



COOPERATION PARTNERS



Hydrogen
Europe



TARTU ÜLIKOOL

CATALYZE
THE GLOBAL MOVEMENT CATALYST



Eesti Vesiniku-
tehnoloogiate Ühing



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