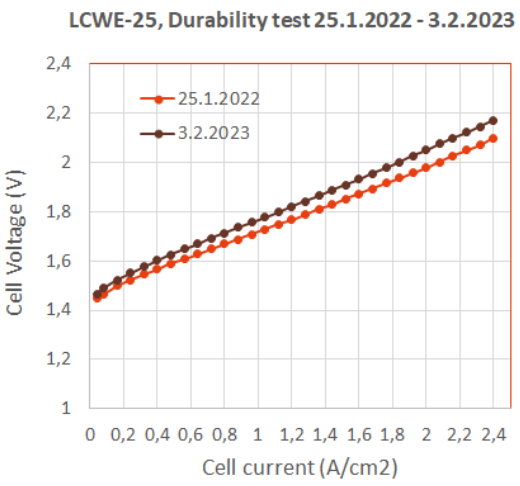
LEANCAT s.r.o. develops cost efficient advanced modular PEMWE systems

The global demand for hydrogen is rising, fuelled by efforts to reduce carbon footprint across energy sectors. Hydrogen consumption is expected to more than double in the coming years, to 180 Mt by 2030 (*IEA (2022), Hydrogen, IEA, Paris https://www.iea.org/reports/hydrogen*). However, certain requirements must be fulfilled to realise this growth in demand. In particular, a further reduction in carbon footprint and energy consumption of the hydrogen production chain must be achieved, as well as sustainable management of the rare resources needed per kg hydrogen produced.

In this respect, hydrogen production by water electrolysis offers the best results, compared to alternative routes, such as steam reforming of natural gas, since production from purely renewable energy sources is possible. However, state-of-the-art PEM water electrolysis technologies still suffer from several serious issues: among them high operational cost and too high capital cost, which is a serious drawback limiting availability of renewable energy. The main issue responsible for still high cost of hydrogen technology is very small repeatability of main component production, far from large scale production necessary for cheap manufacturing.

LEANCAT will address these issues by developing a modular PEM electrolyser concept bringing together everything needed for cheap, efficient and sustainable hydrogen production at large scale. Production and multiplication of high number of small identical modules is a path to efficient, repeatable, and inexpensive production enabling the future use of automated and robotic production tools.

LEANCAT effort is based on two pillars: (1) Development of own compact PEMWEs exhibiting high durability due to use of Ti as a structural material, additionally coated with anti-corrosion layers according to Leancat proprietary technology, and use of heat exchangers integrated directly in the stacks; (2) development of 5 kW electrolyser modules with a high level of autonomy (each module is controlled by own single chip computer), their assembly together forms a hydrogen generator easily customized to meet the customer's requirements.



LEANCAT intensively focuses on its own product development. R&D is the basis of the successful production of hydrogen generators, when we avoid hard-to-find third-party components and build a product that is as little dependent on external influences as possible. This includes an already completed development of the hydrogen absorption dryer and an ion trap exhibiting a small pressure drop and easy replacement of active material. We are also working on the development of PEMWE 50 kW and our own MEAs.

The expected main customer target group for generators is distributed hydrogen production,

the future development of which will be the path to important renewable hydrogen production.

Water Electrolysers

Green Hydrogen
On Demand

The beating heart of each water electrolysis unit is a stack. We offer stacks based on the established PEM technology with proven record of high flexibility and durability. Using 25 cm^2 cells, these stacks can be scaled up reaching maximum power of 5 kW.

PEM Water Electrolyser Stack LCWE-25

Key features

- Advanced PEM water electrolysis stack
- Produces hydrogen at high pressure up to 25 Bar
- Designed for integration in H_2 systems
- Power range up to 5 kW
- Optional integrated heat exchanger for the stack cooling