

Hydrox, is a South African company specialising in unlocking the green future of energy by being the first company in the world to build a membraneless prototype 5Kg/day electrolyser through patented technology. Hydrox is in the field of research and development of clean energy solutions and is searching for Finnish partners to expand new opportunities and to develop a one-hundred-kilogram unit with a view to commercialisation. This partner should preferably be capable of providing access to systems/facilities to improve the electrodes through catalytic deposition of non- noble metals. Future development will entail a technology capable of replacing the anodes by a material that can function around 2000 C and also to develop a new polymer that can handle the high temperatures.

During the past eight years, Hydrox Holdings Ltd. has successfully developed an innovative new method of alkaline water electrolysis technology which operates on a principle termed Divergent Electrode Flow-Through (DEFTTM). This unique, internationally patented, process does not use a conventional diaphragm or membrane as gas separation is obtained by the manipulation of electrolytic flow through porous electrodes. This process provides excellent separation and enhanced operational flexibility compared to conventional electrolysers, which employ membranes/diaphragms as these create certain operational limitations. The key aim of this new method is to enable competitive, robust and reliable hydrogen production through simplicity in design and operation.

DEFTTM achieves gas separation by employing a pressure differential created through flow. This allows for a broad turndown ratio, which many conventional systems cannot achieve as cross-gas contamination, when dropping to lower current densities, remains a huge problem. DEFTTM is also ideally suited to handle fluctuating current loads, especially from renewable energy sources; through this, affordable green hydrogen is now achievable.

The developmental timeline for DEFTTM is as follows:

1. 2013 – 2014: Proof of concept development of a single test rig;
2. 2015 – 2017: Proof of concept optimisation and scale-up trials of three test rigs;
3. 2018 – 2020: Completion of a 5 kg per day plant conforming to the stringent safety criteria as prescribed by Shell Energy through their GameChanger Programme.

In 2017, Hydrox Holdings Ltd. presented its groundbreaking technology at the International Conference on Electrolysis (ICE2017, Copenhagen, Denmark). During this event, Hydrox were approached by members of the Shell GameChanger team (Innovation Hub, Amsterdam, Netherlands) and they subsequently submitted a proposal to them. After a stringent due diligence and screening process, Hydrox's proposal was selected by Shell and funding was approved with the project commencing in 2018.