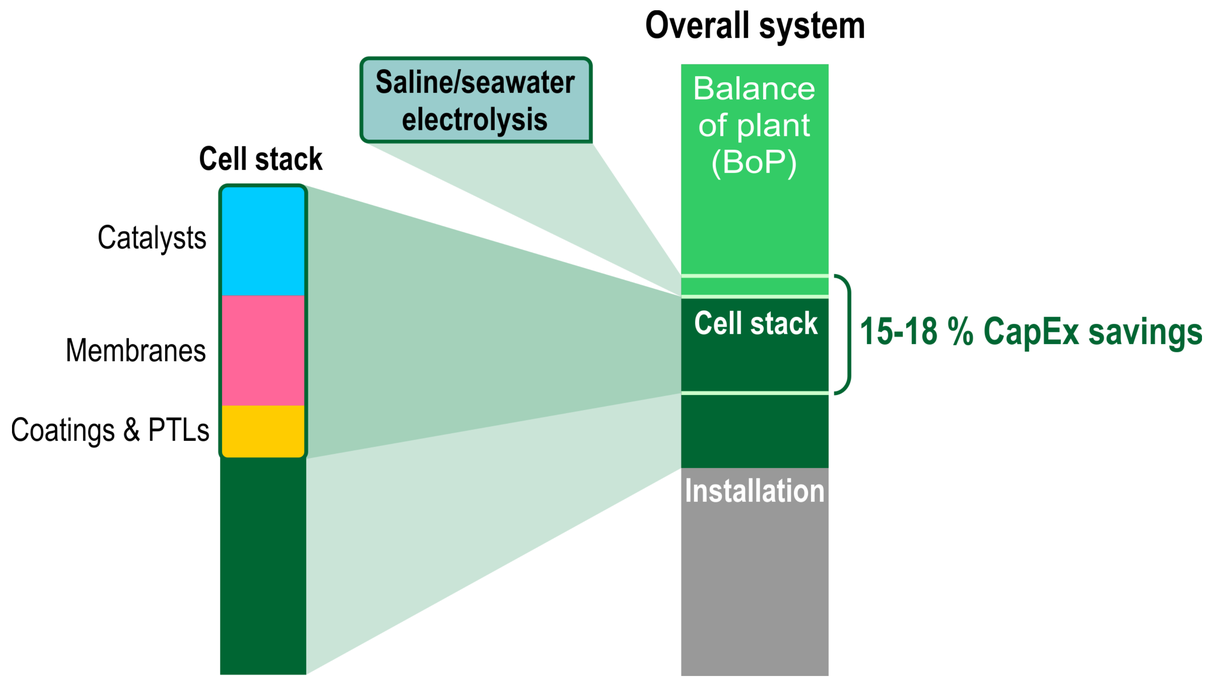
Lowering the cost of proton exchange water electrolysis systems

The project aims to accelerate commercialisation of renewable hydrogen production through cost-reductions in a high-efficiency water electrolysis technology that uses proton-exchange membranes

The specific objectives of the project are:

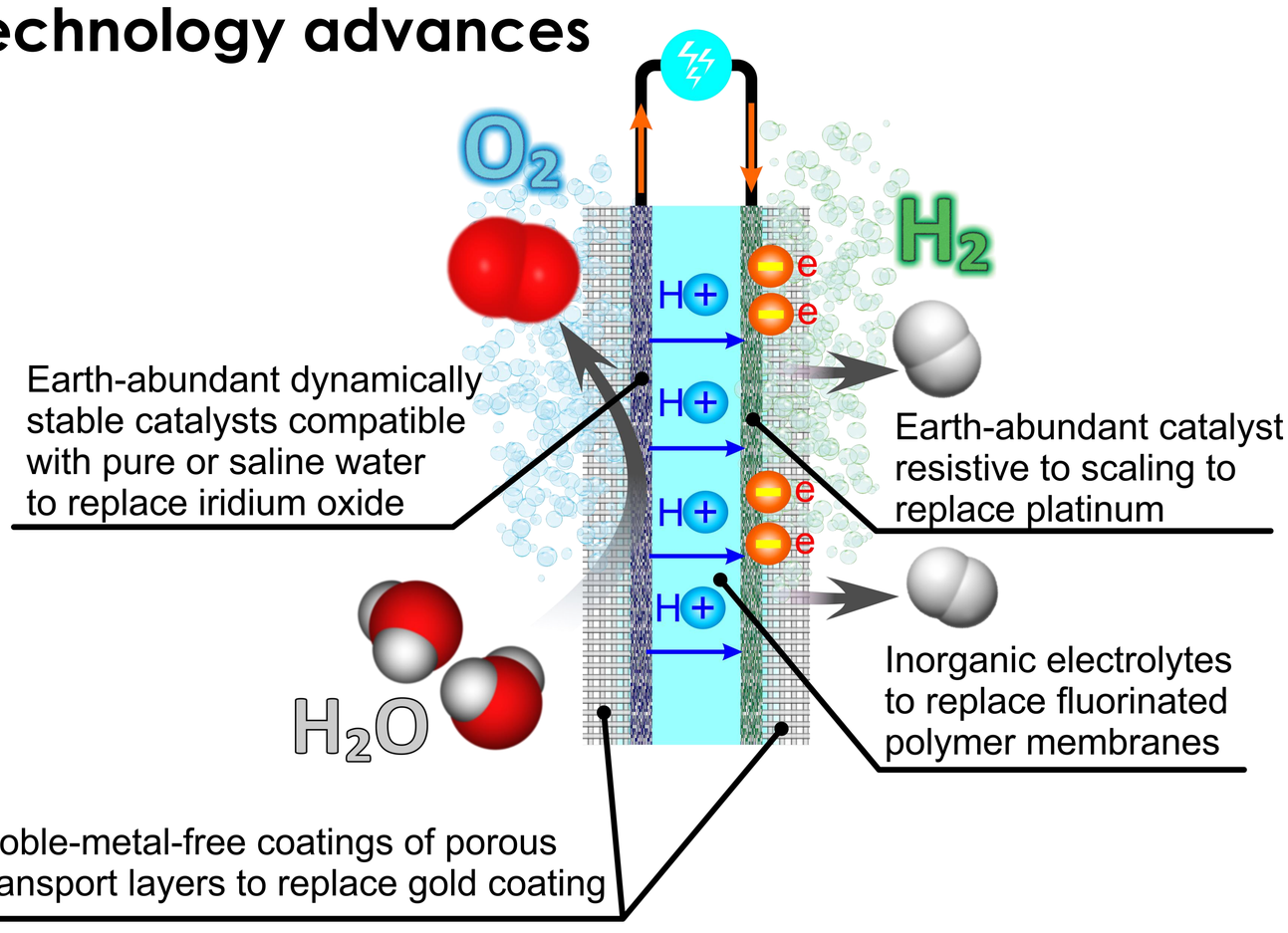
1. Refine, develop and optimise noble-metal-free catalysts, high-conductivity membranes and porous transport layers (PTLs) produced by scalable industry-ready methods.
2. Integrate the new materials into proton-exchange water electrolyser prototypes and optimise the operating conditions to maximise performance.
3. Demonstrate robust operation of the laboratory-scale devices under industrially relevant conditions on a practical timescale.
4. Translate the pure and saline/seawater proton-exchange electrolysis technology from the laboratory to demonstration scale, assess efficiency and demonstrate practical durability.

These advances are expected to eliminate the reliance of the technology on highly expensive components (iridium, other noble metals, fluorinated membranes) to enable multi-gigawatt installations, and provide CapEx savings of up to 18% corresponding to immediate cost-reductions of renewably generated hydrogen (H_2) by up to 16%.



Summary of the CapEx reductions in the proton-exchange water electrolyser plant targeted by the research and commercialisation activities of the project

Technology advances



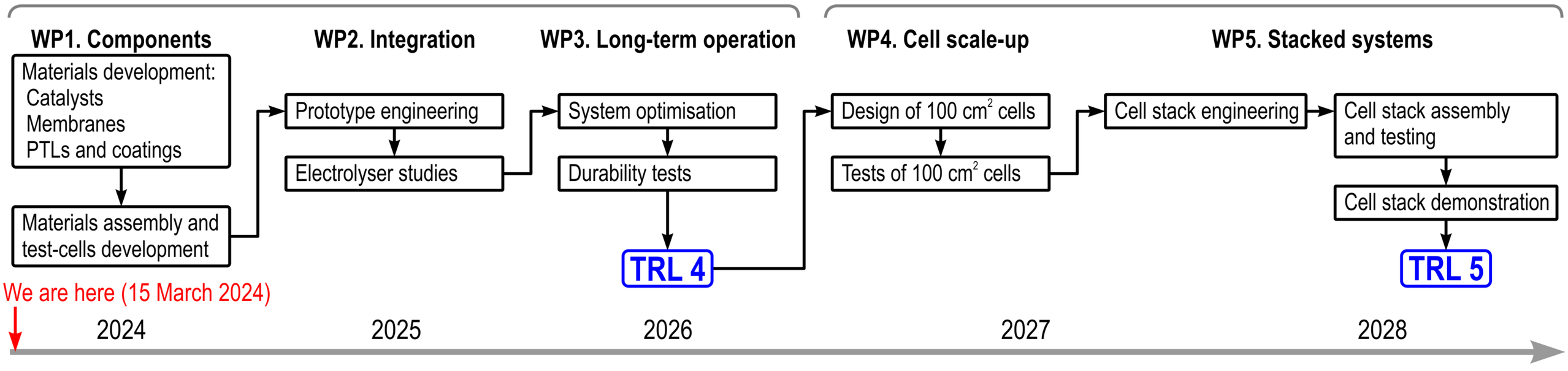
Schematic presentation of a proton-exchange water electrolyser and specific improvements targeted by the present project

Demonstration

Demonstration of the robust operation of a best-performing stacked electrolyser system developed in the project is planned at the IXOM Laverton site, which has ample space for the technology demonstration purposes

IXOM Laverton site
(satellite image from Google Maps; Map data ©2024 Google)

Research plan and timeline



Leadership team: Assoc Prof A. N. Simonov, Prof D. R. MacFarlane, Prof H. Wang, Prof A. Tricoli, Dr S. Giddey, Dr P. Sernia, Dr K. Kaka, B. Hart, Dr J. Joshi

Key contact: Assoc Prof Alexandr N. Simonov, alexandr.simonov@monash.edu, +61 3 99 056 962

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