

# EXTENSION OF TEMPEST MODELLING DATASET AND TEST PROTOCOLS FOR DYNAMIC ALKALINE ELECTROLYSIS OPERATION



**Enhanced modelling and testing framework for dynamic pressurised alkaline electrolysis, enabling more accurate simulation and optimisation of flexible electrolyser operation.**

## Description

- Extended TEMPEST modelling framework with an expanded pressurised electrolysis data set
- New test protocols for dynamic electrolyser operation
- Accurate transient simulations under variable operating conditions
- Optimisation of operating strategies while maintaining performance, gas purity and temperature control
- Validated modelling and testing methodology supporting safe operation, further R&D and industrial collaboration

## Maturity of the Result

- Dynamic modelling framework extended and validated for high-pressure alkaline electrolysis.
- Test protocols developed and established for evaluating dynamic operation of alkaline electrolyser stacks.

## Result Availability

Available from November 2026

## Owner

**German Aerospace Center (DLR)**

## Impact

- 01 Optimised dynamic electrolyser operation under variable conditions
- 02 Improved prediction and control of gas purity and temperature
- 03 Enhanced safety and reliability of high-pressure alkaline electrolyzers
- 04 More efficient integration of renewable electricity into hydrogen production
- 05 Stronger basis for future research and industrial collaboration

## Target Users

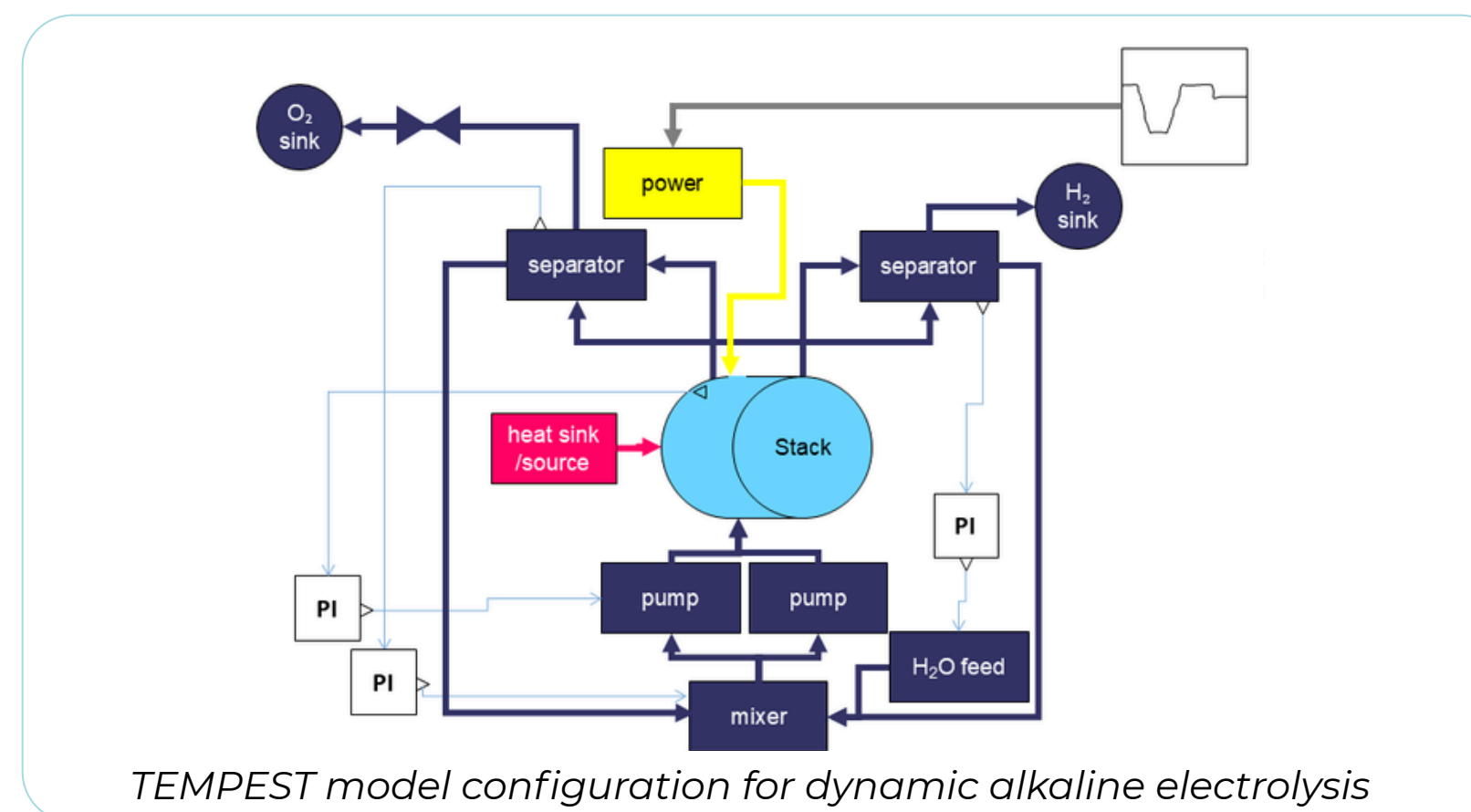
- Research organisations: Access enhanced modelling and testing tools for investigating dynamic high-pressure alkaline electrolysis.
- Universities and R&D centres: Support research, experimental validation and development of advanced operating strategies for flexible electrolysis.
- Electrolyser manufacturers (OEMs): Improve understanding and prediction of stack behaviour under dynamic operating conditions, supporting technology development and optimisation.
- Hydrogen system developers and integrators: Assess dynamic system performance and optimise the integration of electrolyzers with variable renewable electricity and industrial processes.

## Collaboration opportunities

- Research collaboration on dynamic high-pressure alkaline electrolysis
- Scientific dissemination through publications, conferences and technical workshops
- Potential licensing of the modelling framework to interested users
- Technology transfer through collaborative research and industrial projects

## More information

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- PEACE PROJECT: <https://www.h2peace.eu/>



TEMPEST model configuration for dynamic alkaline electrolysis



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