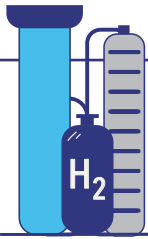


# HYDROGEN

Bringing nuclear quality and standards to system simulation.



# FLOWNEX<sup>®</sup>

SIMULATION ENVIRONMENT

*Flownex<sup>®</sup> SE determines pressure drop and heat transfer of interconnected components of an integrated system in steady state and transient.*

## TYPICAL USES

### DESIGN

- Component sizing
- Determine operating ranges

### ANALYSIS

- Performance assessment
- Transient behaviour
- Hydrogen production
- Filling
- Transport
- Storage

### OPTIMISATION

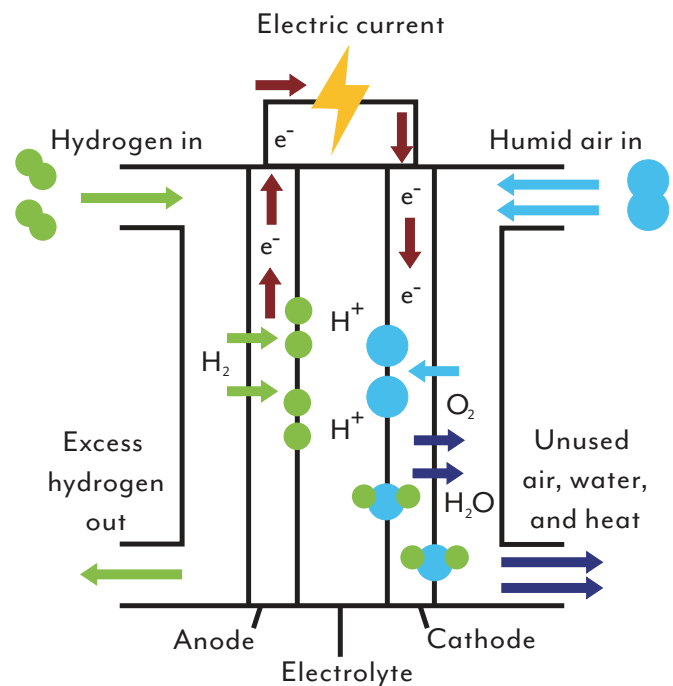
- System component optimisation
- Integrated system behaviour

*Flownex<sup>®</sup> is developed within an ISO 9001:2015 quality management system and is ASME NQA-1 compliant.*

WATCH HERE

### WEBINAR

Transient Analysis of a PEM Fuel Cell



TESTIMONIAL

MCPHY ENERGY  
GERMANY

M. Neben  
R&D Manager



*Using the Flownex scripting in conjunction with its thermo-fluid modelling capabilities made it a very valuable application for the problem at hand. In addition, Flownex has an intuitive design facilitating the modelling of large, complex systems.*

website



www.flownex.com  
enquire@flownex.com

Find us on:



## HYDROGEN FUEL CELLS

- Chemical reaction models for the stack
- Fluid capabilities: gas mixtures, humid air
- Pumps and compressor models
- Discretised heat exchange models
- Pressure drop models: piping, valves
- Control models for transient simulations

## FUEL CELL SYSTEM COMPONENTS

- System component design
- Humidifier implementation and design
- De-humidifier design
- Transient behaviour with load changes
- Transient control for required air and hydrogen ratio required

## PROTON-EXCHANGE MEMBRANE FUEL CELL AIR SIDE

- Required compressor power
- Cooling requirements to maintain appropriate temperature
- Humidifier modelling

## ELECTROLYSIS OF WATER

- Water electrolysis plant optimization
- Analysis of system behaviour at critical modes
- Sensor failure simulation
- Cooling loops
- Product design as per customer requirements

## ALKALINE WATER ELECTROLYSIS

McPhy Energy Germany GmbH utilized Flownex® SE as their tool of choice to optimise an alkaline water electrolysis plant. Optimisation of the plant that supports the chemical reaction of the water electrolysis, boosts efficiency and ultimately creates a viable business model for product commercialisation. Analyses of the system behavior at critical modes, for example a sensor failure, could be done.

DOWNLOAD HERE

### CASE STUDY

Alkaline Water Electrolysis  
(McPhy Energy Germany)

