

# Renewable Power Integration and Opportunities for Electrolyser

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Supported by:





# Hydrogen Mobility Europe

## Renewable power integration and opportunities for electrolyser

Hydrogen for clean transport conference

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**FUEL CELLS AND HYDROGEN**  
JOINT UNDERTAKING

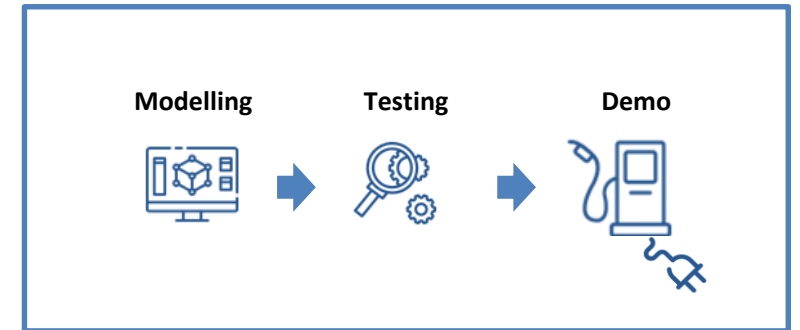


# Definition and objectives

## Our definition of flexibility

- Capability of electrolyser-HRS to operate in a flexible
  - Peak and off-peaks hours
  - Dispatch
  - Grid services
- EU Framework: DE; FR; UK

H2Me2 – WP4

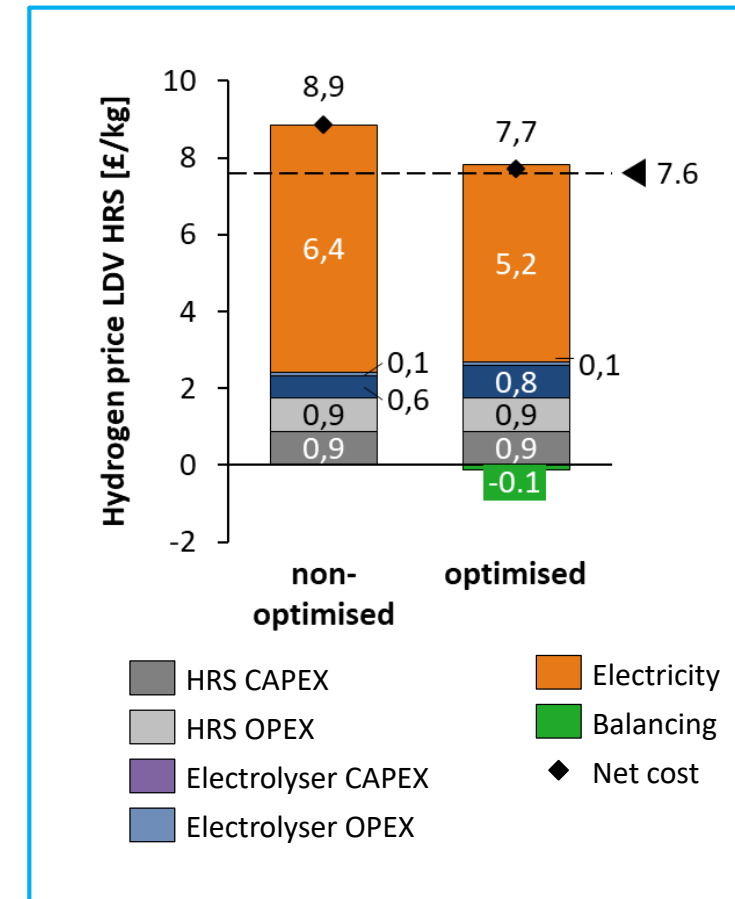
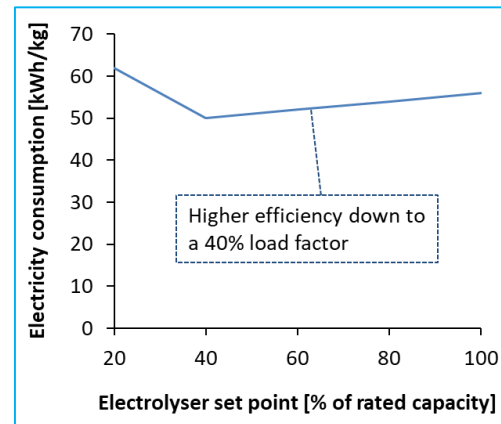


## Objectives of our work

- € Assess the opportunity of electrolyser-HRS to monetize grid services
- 🔧 Assess the capability of electrolyser-HRS to provide grid services

# Flexibility modelling in UK

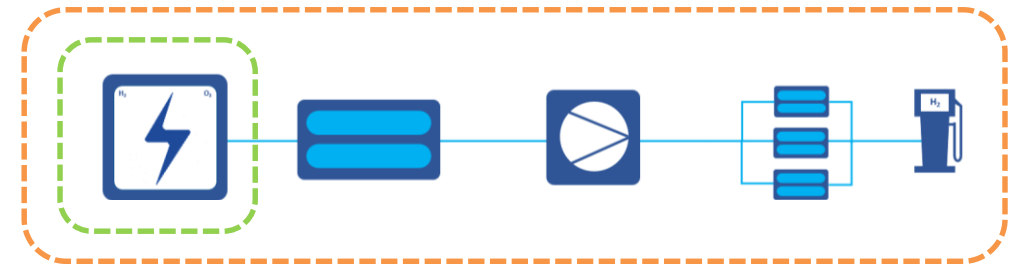
- ❑ Electricity costs represents > 70 % of overall H<sub>2</sub> production costs
- ❑ 60% of the electricity price is dynamic and can be optimized
- ❑ Minimising system infrastructure leads to inflexible operation, causing exposure to high energy costs
- ❑ By oversizing the electrolyser and H<sub>2</sub> storage capacity, the electrolyser can be operated in more flexible and dynamic manner.
- ❑ Electrolyser operational optimisation enables a **21% electricity cost reduction**
- ❑ Trade off between efficiency and flexibility results in cost optimal operational of electrolysers at **60% load factor**



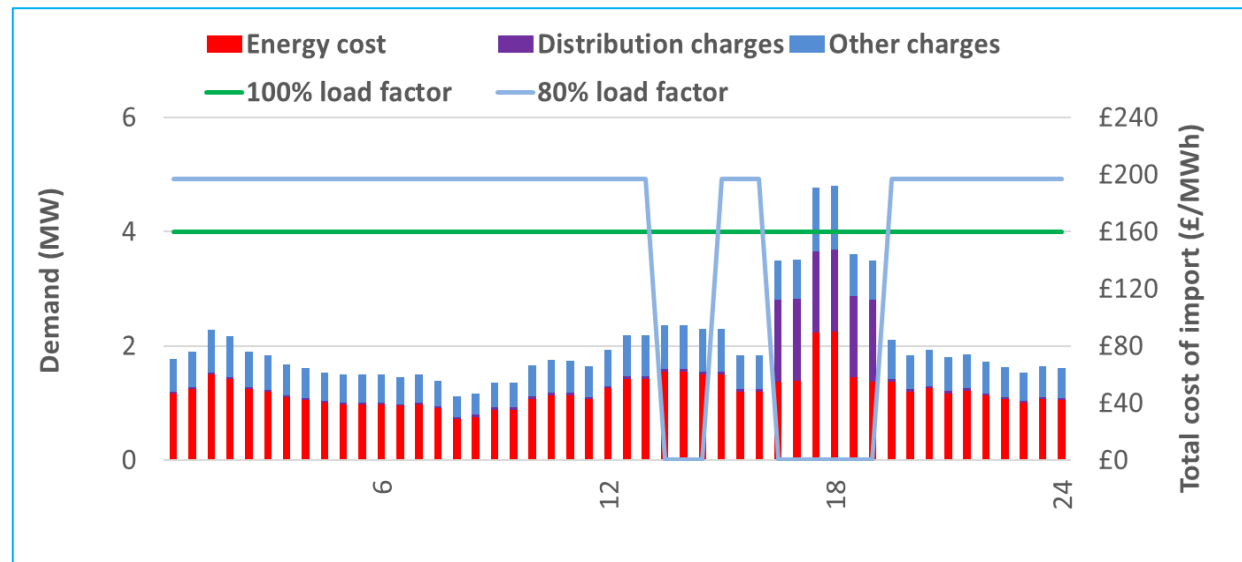
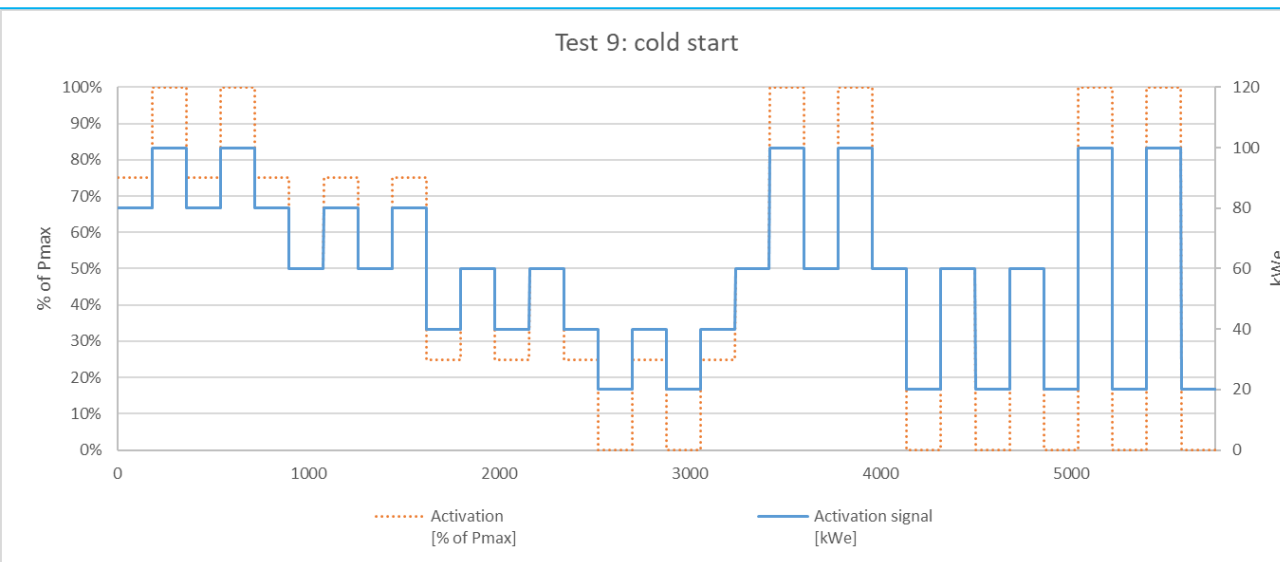
# Flexibility testing

- ❑ TSO prequalification tests in France and UK
- ❑ Flexibility HRS  $\ll$  Flexibility electrolyser
- ❑ Level of flexibility perimeter
- ❑ Remote control system  $\sim$  10 k€ + HR
- ❑ Measurement of reaction time, signal quality, etc.
- ❑ Impact on stack degradation

## Flexibility of electrolyser



## Flexibility of Hydrogen Refueling Station (HRS)



# Aggregation

- Open Energi is in engagement with ITM Power on establishing the optimum control strategy
- Electricity markets: **FFR + peak price avoidance**
- Control has been established and electrolyser responds well to dispatches.**
- Constraints need to be overcome before economic optimisation or balancing services testing can be completed
  - better understanding of underlying demand from car users
- Current availability: 4/5 hours a day** when the electrolyser is operational and within control set points

