QualyGridS

# Summary and Recommendations

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 735485. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and Hydrogen Europe and N.ERGHY

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

State Secretariat for Education, Research and Innovation SERI

This work is supported by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 17.00009.

# Objectives

- Recommendations for introduction and deployment of electrolysers providing grid services
- Based on QualyGridS results, information collection and analyses

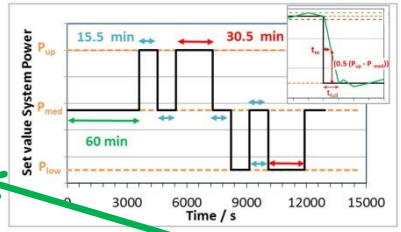
# Recommendation

## European uniformity needed

- Technical requirements, prequalification, market situation (bidding, …) needs to be harmonized
- More clear and harmonized definition of other, e.g. DSO grid services and market conditions

FCR

QualyGridS:

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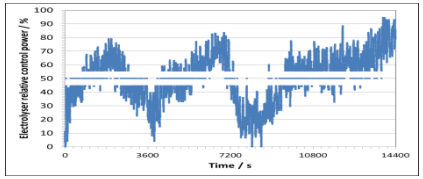



e.g. DE:

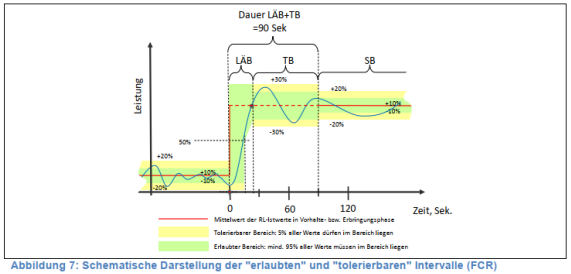



Abbildung 7: Schematische Darstellung der "erlaubten" und "tolerierbaren" Intervalle (FCR)

DK:

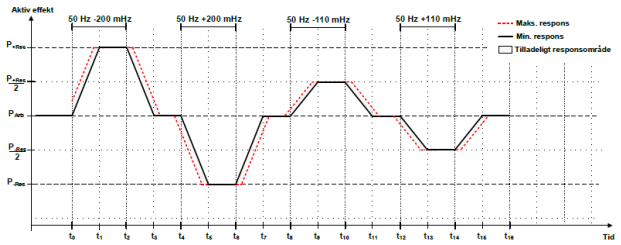
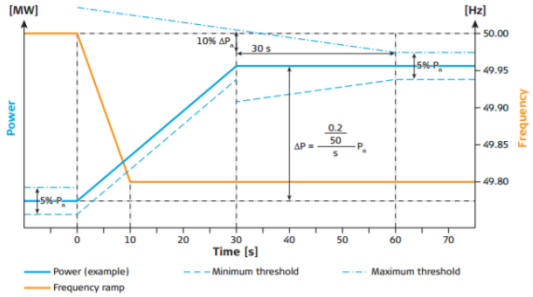



*Figure 4 - Tests of minimum requirements for FCR response.*

CH:

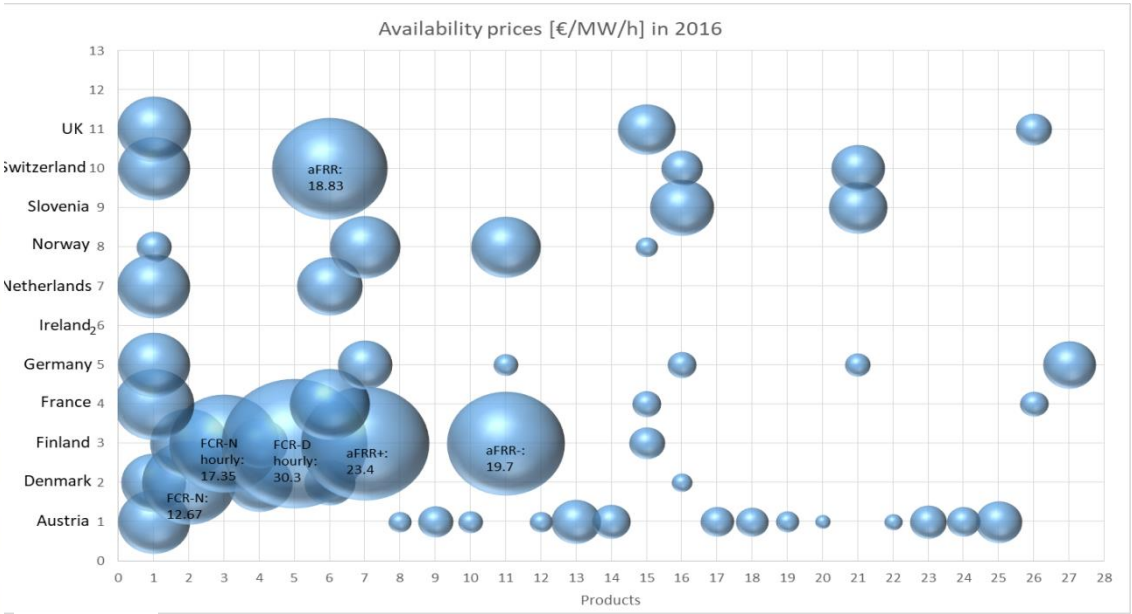


# Recommendation

## Database being permanently updated needed

- Technical requirements
- Prequalification
- Market situation (bidding, …)

| | |
|---|---|
| Country | Denmark |
| TSO | Energinet |
| Address | |
| Product | FCR |
| National / regional service name | FCR (DK1) |
| Non-rotating mass accepted for provision of the service (Y/N) | Y |
| Load accepted for provision of the service (Y/N) | Y |
| Geographically distributed loads or generators are aggregated and able to contribute to the service (Y/N) | Y |
| Service description (e.g. products with weekly, daily or hourly blocks) | hourly |
| Symmetrical / asymmetrical service provision | Symmetrical |
| Requested maximum output duration of one activation | |
| Requested minimum output duration of one activation | 15 min |
| Average availability price for the service in 2016 | €12 MW/h |
| Average utilization price in 2016 | NA |

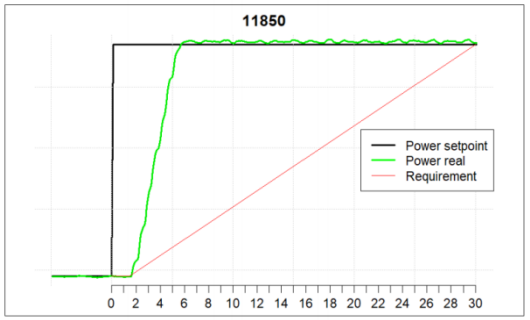


# Recommendation

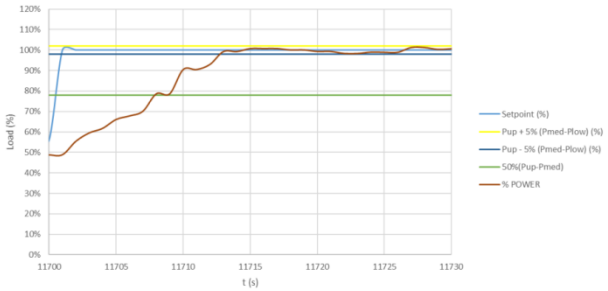
## Dissemination about electrolyser's abilities

- It is not true that alkaline electrolysers are not capable of doing fast services
- Some but not all PEM electrolysers can perform services starting from Standby with negligible power consumption

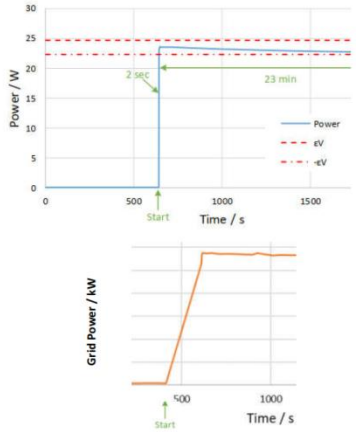
NEL AWE:




IHT AWE:



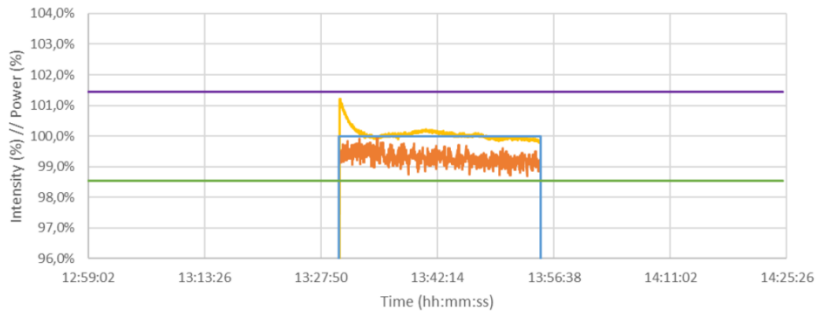

ITM/DTU PEMWE:



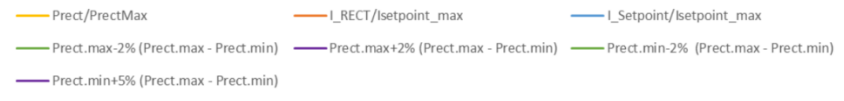
# Recommendation

## Electrolysers need power control

- Today most systems are current controlled, insufficient precision in following required power profile
- Control input port for setpoint needed
- Grid service performed only by rectifier input power should be permitted by TSO/DSO for most systems; if not, smoothing and minimizing BOP power consumption is needed
- Preferentially data acquisition/ control rate > 1 Hz




FHA test:

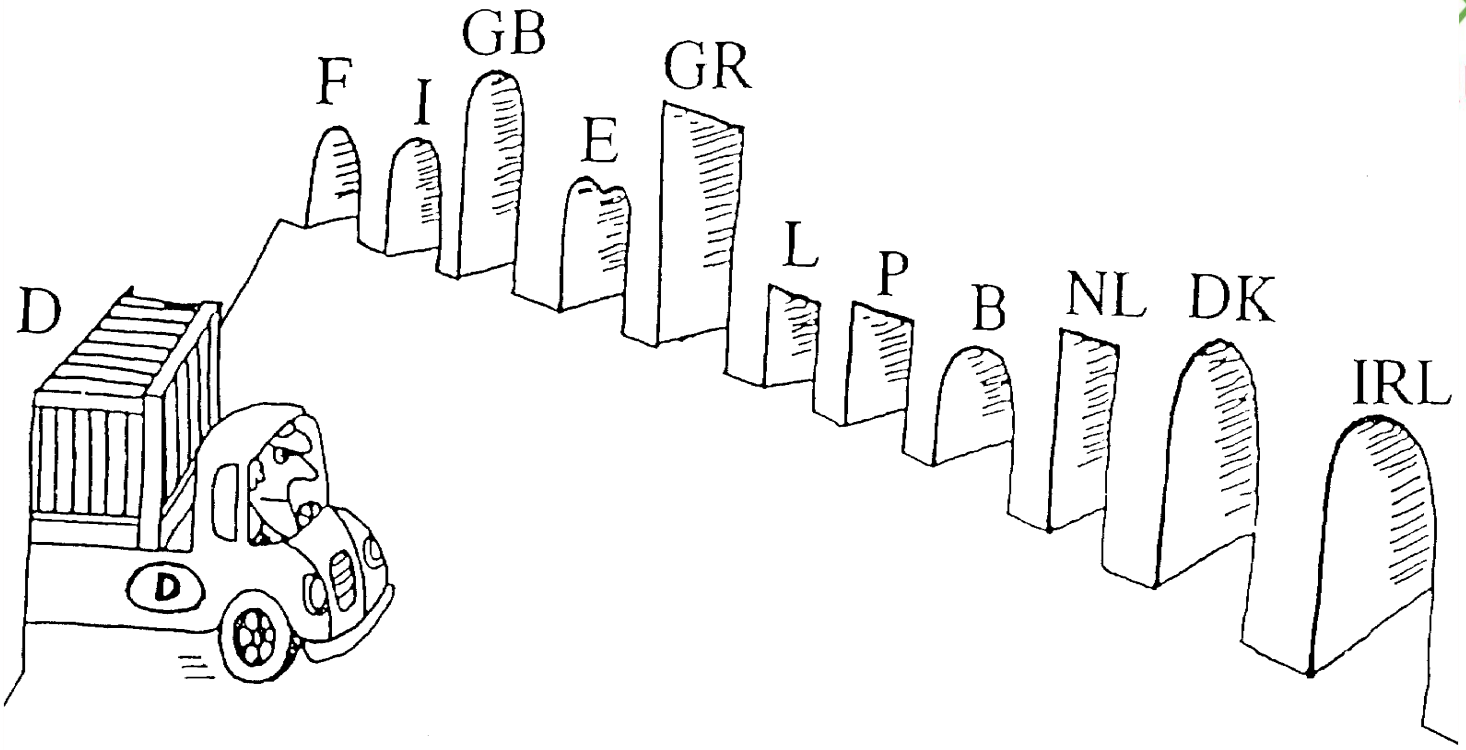


# Recommendation

## Standardized electrolysers properties

- Avoid individual design for every plant, get higher production volume
- All electrolysers should be capable of grid services
- 1st step: ISO NWIP for technical report

# Recommendation: standardization




- Overcoming trade barriers
- Economies of scale for manufactures
- (Cost) effiency
- Global acceptance

# Standardization

- Standardization initiative
  - Close contact with relevant TCs on global (ISO/IEC) and European (CEN/CLC) level to gather input and inform
  - December 2019:

    > TC197 welcomes the proposal of NEN of a NWIP on testing protocols for electrolysers performing grid services in collaboration with IEC TC105 and IEC TC 8. NEN is invited to submit the NWIP within 3 months. ISO TC197 will take the lead

  - Deliverable ISO Technical Report → CIB for project approval circulated among members ISO/TC 197 in the next week(s)
  - To be established joint working group with experts from IEC/TC 105, IEC/TC 8 and IEC/TC 120

  - Alignment with ISO 22734:2019 and uptake to full standard

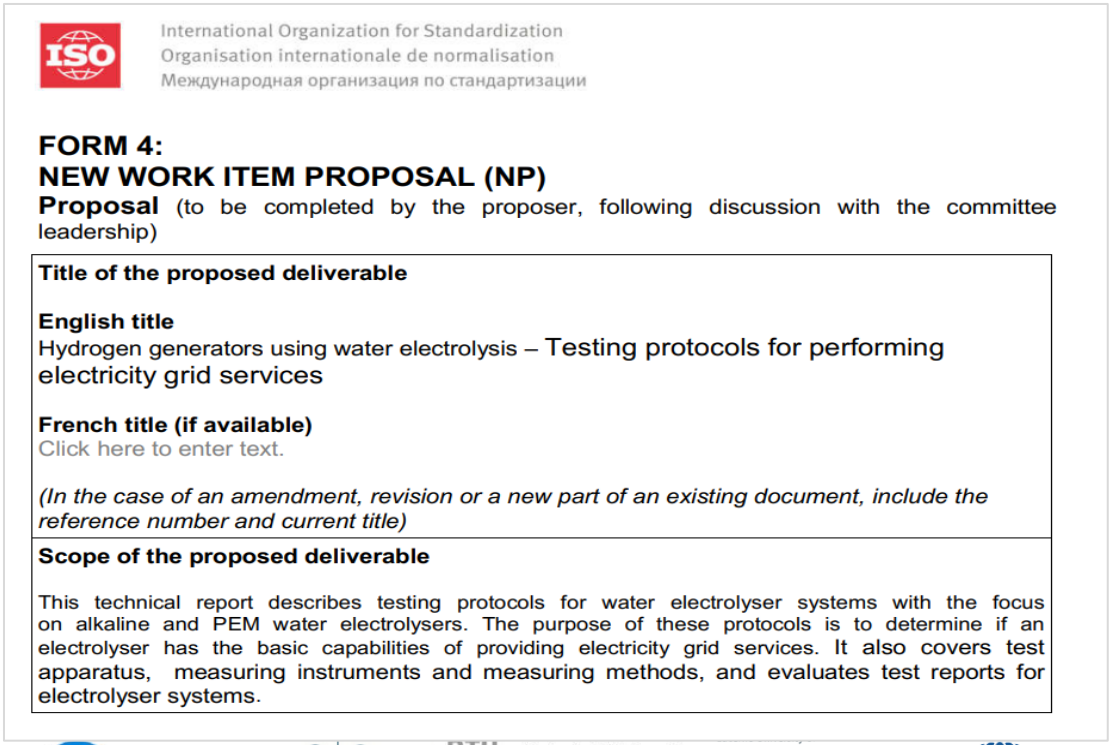
Highlight: project nominated for the CEN/CLC Innovation Award 2020

# Recommendation

## Standardized electrolyser tests and certificates

- Internationally agreed ISO Technical Report for grid service readiness

- DLR / CEA in the lead
- Join as technical expert!



International Organization for Standardization
Organisation internationale de normalisation
Международная организация по стандартизации

**FORM 4:**
**NEW WORK ITEM PROPOSAL (NP)**
**Proposal** (to be completed by the proposer, following discussion with the committee leadership)

**Title of the proposed deliverable**

**English title**
Hydrogen generators using water electrolysis – Testing protocols for performing electricity grid services

**French title (if available)**
Click here to enter text.

*(In the case of an amendment, revision or a new part of an existing document, include the reference number and current title)*

**Scope of the proposed deliverable**

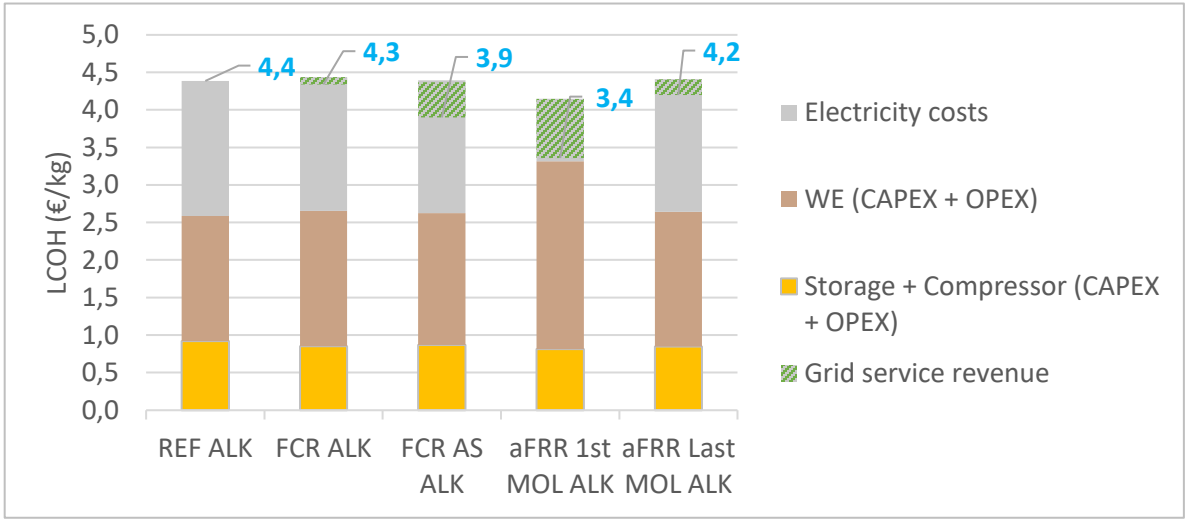
This technical report describes testing protocols for water electrolyser systems with the focus on alkaline and PEM water electrolysers. The purpose of these protocols is to determine if an electrolyser has the basic capabilities of providing electricity grid services. It also covers test apparatus, measuring instruments and measuring methods, and evaluates test reports for electrolyser systems.

Official form NWIP for ISO tech. report submitted by NEN

# Recommendation

## Dissemination about economic impact

- Primary business case is hydrogen production, secondary adding some additional revenues is grid service
- Positive economic impact, the potential interest has been described in more details



# Recommendation

## Need for strong CAPEX reduction & market incentives

- Important work needed on WE CAPEX to reduce hydrogen production cost
- Market incentives :
  - No EEG surcharge or other fees on electricity price
  - More “flexible” grid products : shorter commitment period…
  - Certificates and advantages for green hydrogen / $CO_2$ cost charge

***More communication on electrolyser’s and hydrogen’s advantages to politics and electricity grid responsibles***

# Recommendations – what is your opinion?

- Our report “Summary, recommendations and roadmap at the European level” wants your input!

# Thank you

## Contact details

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QualyGridS

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