

DLR PEM and Alkaline electrolysis – from Fundamentals to Megawatt Systems (Aldo Gago, Regine Reissner et al.)

System analysis
EL-underground-storage

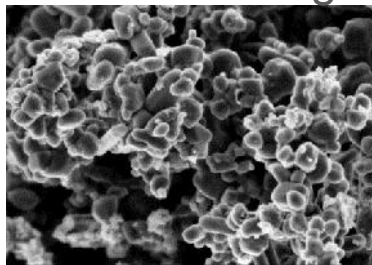
50 kW PEM Electrolyzer



Lab test stations



Catalysts
Low Ir-loading

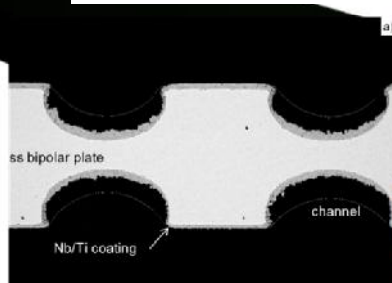


Coatings
Alkaline electrodes
PEM bipolar plates
PEM GDL

Stack components



Analytics



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Publications in the past 3 years:

<http://pubs.rsc.org/en/content/articlelanding/2017/ta/c7ta00679a#!divAbstract>

<http://doi.wiley.com/10.1002/ange.201507626>

<http://pubs.acs.org/doi/abs/10.1021/acs.jpcclett.6b01500>

<http://pubs.rsc.org/en/content/articlehtml/2016/cp/c5cp05296c>

<http://www.sciencedirect.com/science/article/pii/S0378775315306832>

<http://jes.ecsdl.org/lookup/doi/10.1149/2.0141611jes>

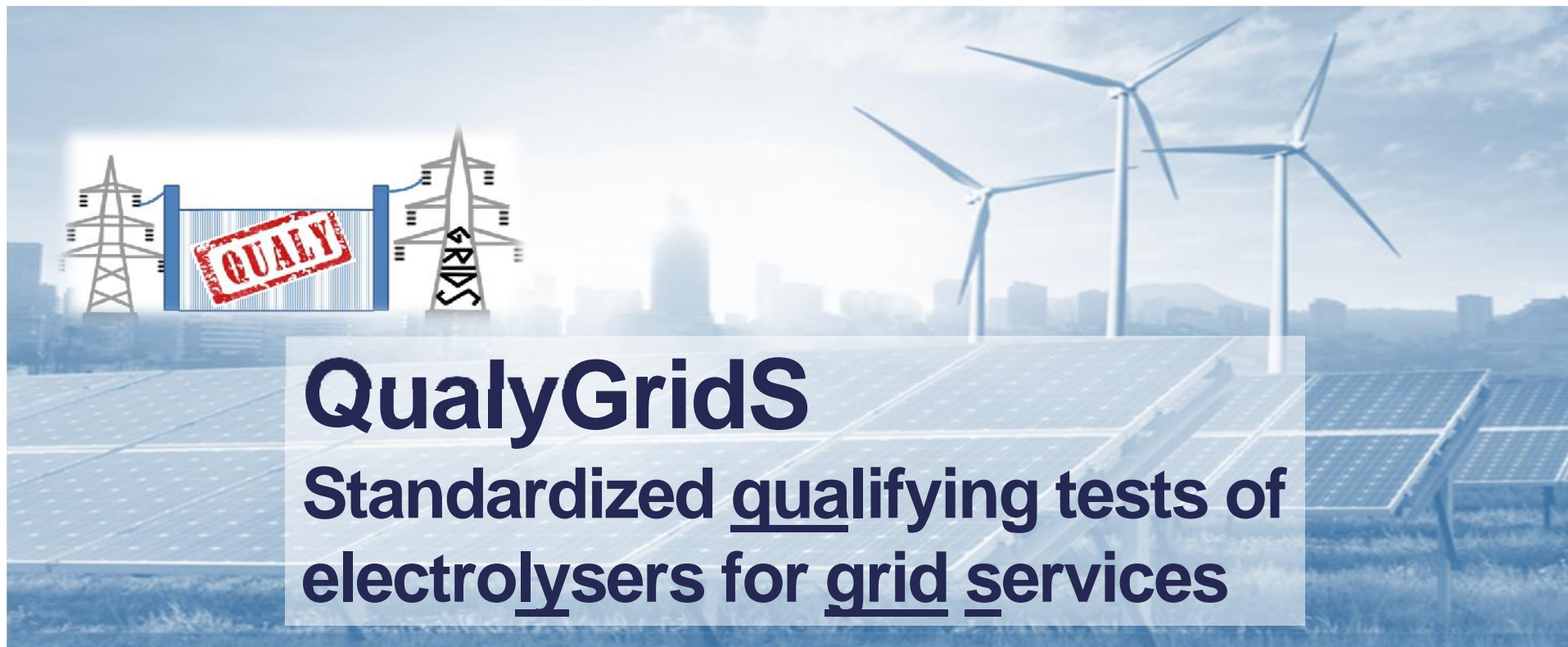
<http://linkinghub.elsevier.com/retrieve/pii/S0013468616310167>

<http://www.sciencedirect.com/science/article/pii/S0378775316301008>

<http://ecst.ecsdl.org/cgi/doi/10.1149/07223.0001ecst>

...more in review process and in preparation





QualyGridS

Standardized qualifying tests of electrolyzers for grid services

Work programme topic: FCH-02-1-2016: Establishing testing protocols for electrolyzers performing grid services

Duration: 01/2017-12/2019



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 735485 it is supported by FCH JU





Consortium partners

- German Aerospace Center (DLR), Germany
- New NEL, Norway
- ITM Power, UK
- IHT, Switzerland
- EFCF, Switzerland
- Aragon Hydrogen Foundation FHA, Spain
- CEA, France
- DTU, Denmark
- Hochschule Luzern, Switzerland
- Royal Dutch NEN, Netherlands



Target

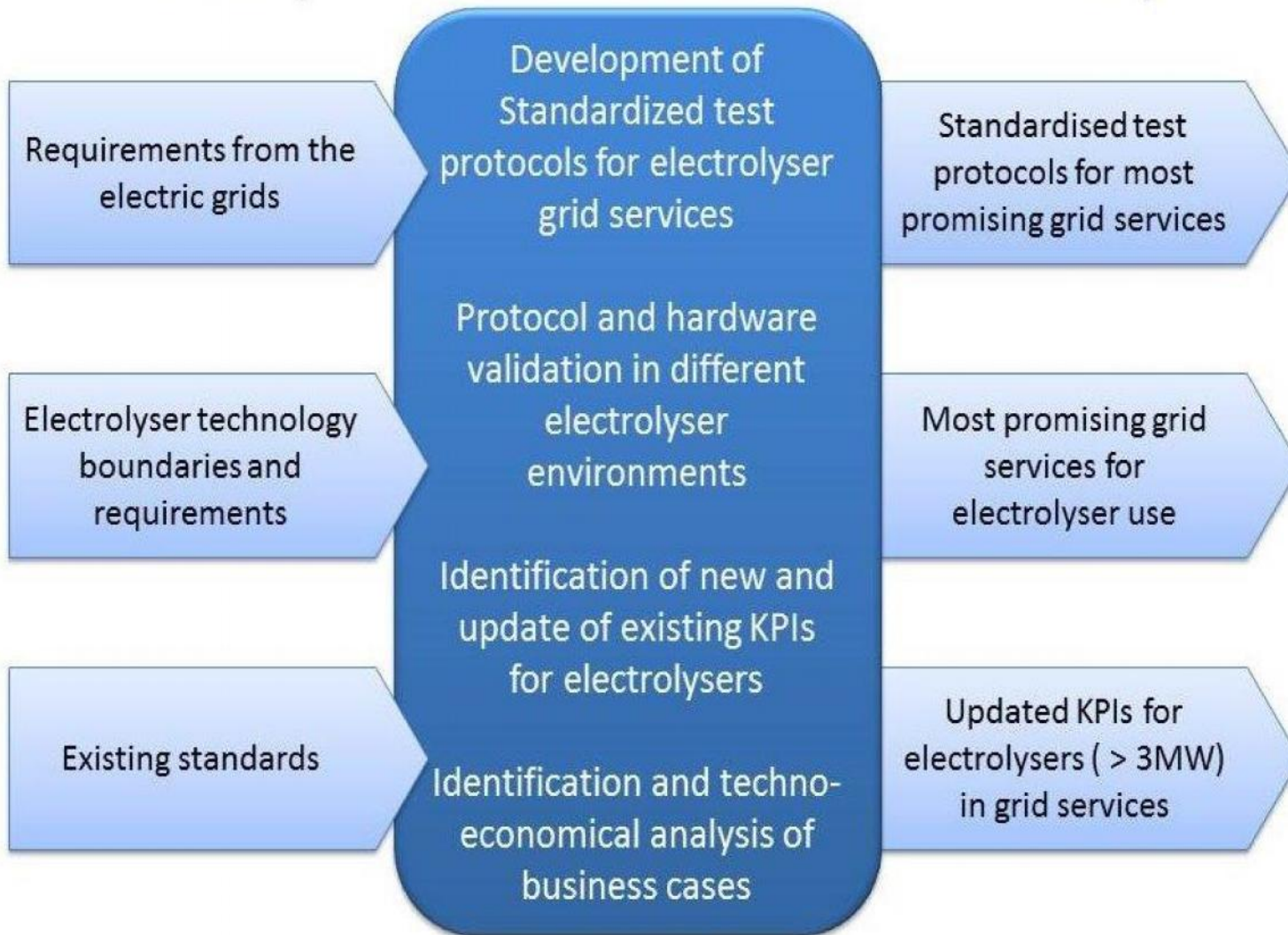
- Develop, apply and establish standardized testing protocols for electrolysers to perform electricity grid services
- Consider Alkaline electrolysers and PEM electrolysers , 50-300 kW for testing, MW extrapolation
- Consider a variety of different grid services
- Consider variety of hydrogen end user
- Techno-economic analysis of business cases
- Review and new KPI for electrolysers
- Testing protocols ready for standardisation process



Input

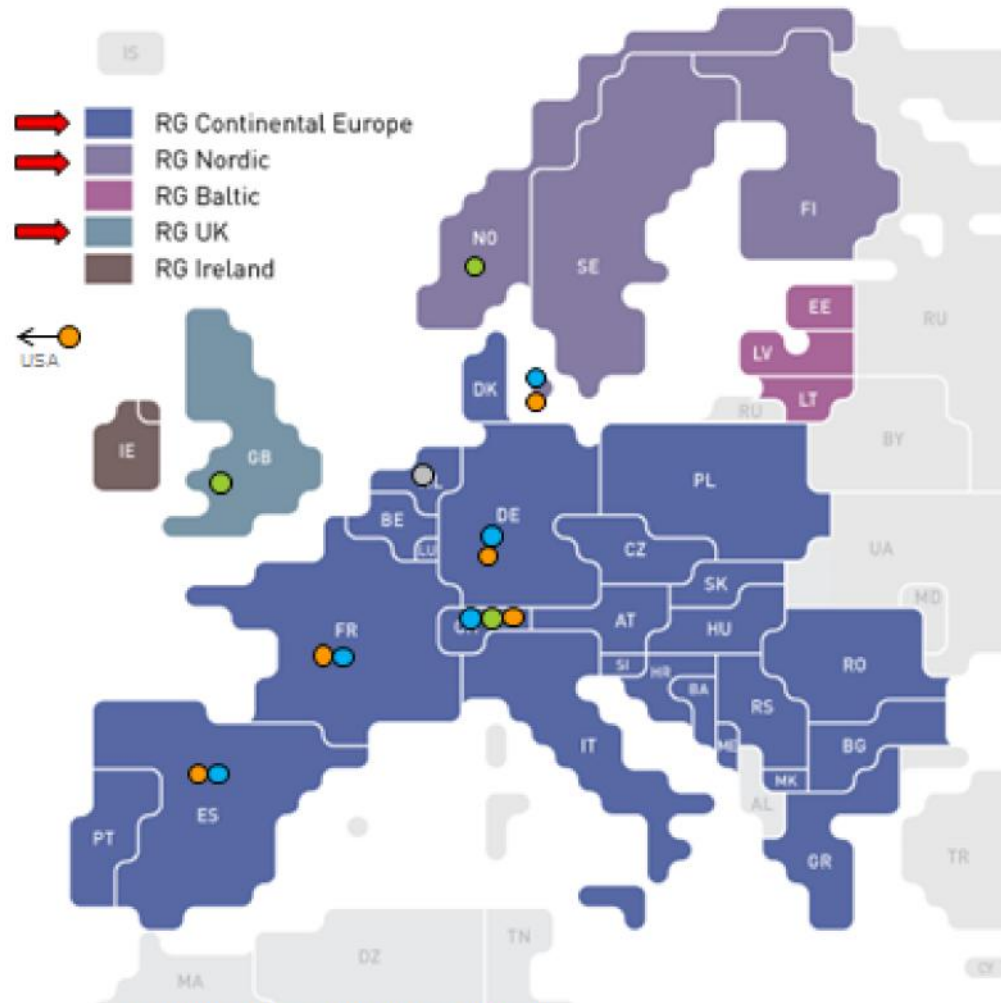
QualyGrids

Output





Mapping QualyGrids to European Synchronous Areas



- IS
- RG Continental Europe
- RG Nordic
- RG Baltic
- RG UK
- RG Ireland

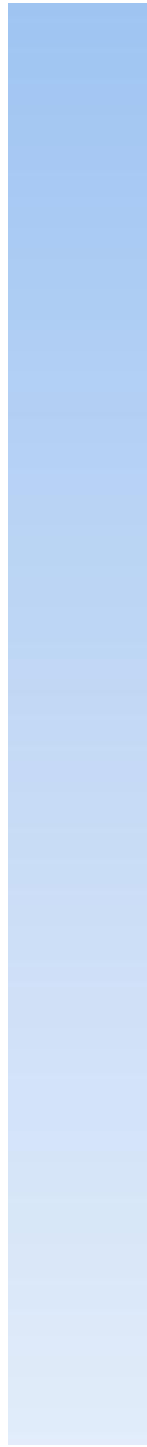
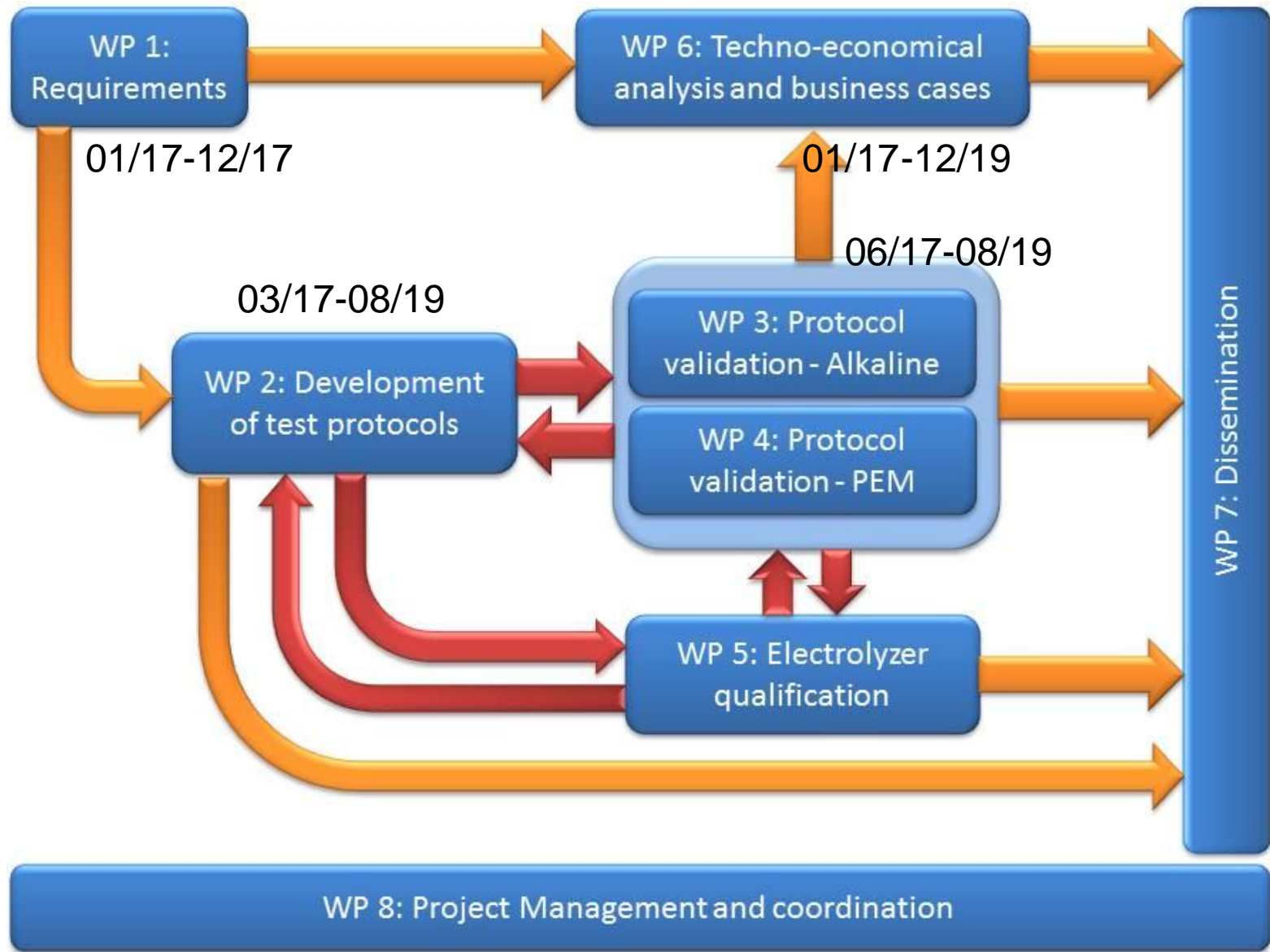
← USA

Partners

- Industrial partners
NEL(NO), ITM (UK), IHT (CH), EFCF(CH)
- Research institutes
DLR (DE), FHA (ES), CEA (FR), DTU(DK), HSLU (CH)
- Standardization institutes
NEN (NL)

Advisory Committee

- SwissGrid, RTE, ENDESA, Energinet.dk, ZEAG, NREL, Sunfire, BKW





Collaborations

- Any external information input to the project (existing protocols, information about grid services present and future) is highly appreciated

Workshop planned in July

- If consortium agrees parts of first drafts of testing procedures can be shared with this harmonisation activity
- If consortium agrees testing procedures from this harmonisation activity can later be tested and verified experimentally

Thank you

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