

# **TECHNOLOGY INFRASTRUCTURES ON HYDROGEN AT TNO**

› **M. WEEDA (TNO), 23 JUNE 2022**

**EUROPE'S GREEN AND DIGITAL TRANSITION:**

**THE ROLE OF TECHNOLOGY INFRASTRUCTURES IN THE NEW PACT FOR RESEARCH AND INNOVATION**



# TECHNOLOGY INFRASTRUCTURE FOR SCALING UP ELECTROLYSIS

## R&D ON VARIOUS TRL, OVER ENTIRE VALUE CHAIN, ACROSS SECTORS



- Research on PEM, SOE, Alkaline
- Material and cell research: screening, testing and characterization
- Focus: new low-cost materials, performance, degradation



- Research on PEM, Alkaline
- R&D stack 250 KW: verification performance, operating strategies
- Focus: durability, scale-up potential, novel stack design, optimize BoP



- R&D on thin-film manufacturing techn.
- ALD-based CCM manufacturing line (Part of Open Innovation Test Bed)
- Focus: industrialization and efficient scale-up CCM manufacturing



- Demo-site at semi-industrial scale
- Open innovation lab facility for industrial electrification technologies
- Focus: process integration, Power2X electrochemical conversion



Press release strategic partnership (26/4/2022): [TNO and partners to work together to boost the efficiency of renewable hydrogen production](#)



### With and for our Partners



# TECHNOLOGY INFRASTRUCTURE SUSTAINABLE GEO ENERGY

## R&D FOR SUBSURFACE/UNDERGROUND HYDROGEN STORAGE

Facilities are part of the TNO Energy Storage Development Platform together with other TNO facilities focusing on energy storage technologies (Energy Storage lab)



- Material Solutions Lab, Eindhoven
- effects of hydrogen reactions with rocks and fluids, and effects of hydrogen exposure on cement and well materials
- HyUSPre: Establishing the technical feasibility and techno-economic potential for H<sub>2</sub> storage in reservoirs



- Geomechanics & well integrity lab, Utrecht
- Geomechanics, measurement of strength and leak-tightness of rocks, cement and wells on a reduced scale



- Centre for Sustainable Geo Energy, Rijswijk
- open innovation lab for improving geo-energy technologies to accelerate the energy transition ([www.rcsg.nl](http://www.rcsg.nl))
- Facilities for full-scale testing and validation new well designs and sensor technology as well as drilling techniques and materials under high pressure and temperature

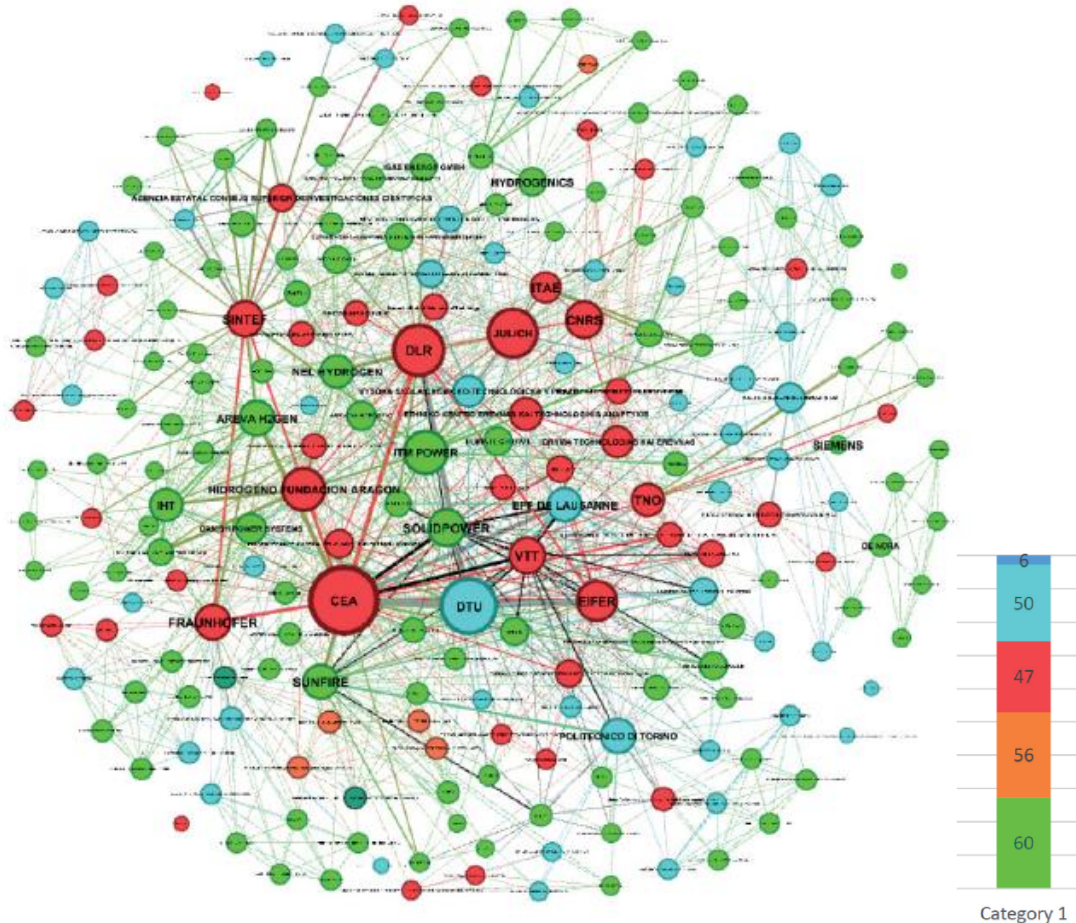


Addressing the economic challenge of energy storage, bringing together the technology infrastructure of a consortium of RTOs, universities and industries to jointly improve performance of storage technologies to supply needed flexibility in the future energy system.



# › RTOs ARE SPIDER IN THE WEB OF TECHNOLOGY DEVELOPMENT

## PIVOTAL ROLE REQUIRES STRONG TECHNOLOGY INFRASTRUCTURE



RTOs position in FP6, FP7 and H2020 electrolysis related R&I,  
source: S. Shurieh, 2020 (TNO/TU Delft)

- › (Hydrogen) Technology Infrastructure:
  - › Applied: bridge gap between academia and industry
  - › Diverse and flexible: support, complement and supplement R&D capacity industry and SME's
  - › Focus: testing, benchmarking, demonstration and upscaling
- › Technology infrastructures are vital to the twin transition and strategic autonomy of the EU
  - › Knowledge accumulation through own research, contract research and shared research programs
  - › Ecosystems foster orchestrated development across the entire value chain and across sectors
  - › Accelerates knowledge sharing and development and deployment of new (hydrogen) technologies





› **THANK YOU**  
FOR YOUR ATTENTION