HyLAW – Hydrogen technologies, new possibilities and current barriers

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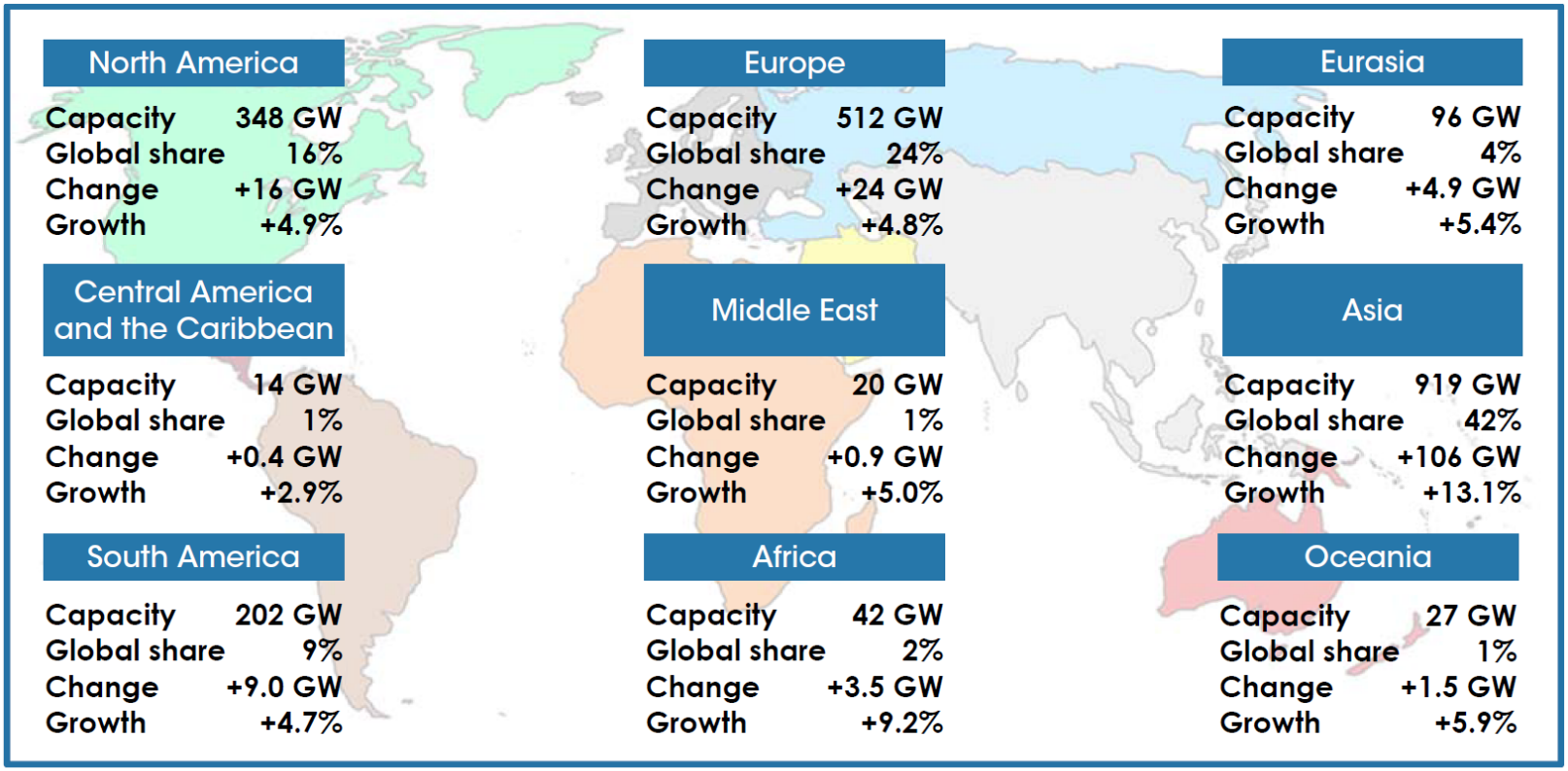
Outline of presentation

- Hydrogen economy – concept
- Hydrogen economy – current state
- Goals of project HyLAW
- Regulatory framework
- Conclusions

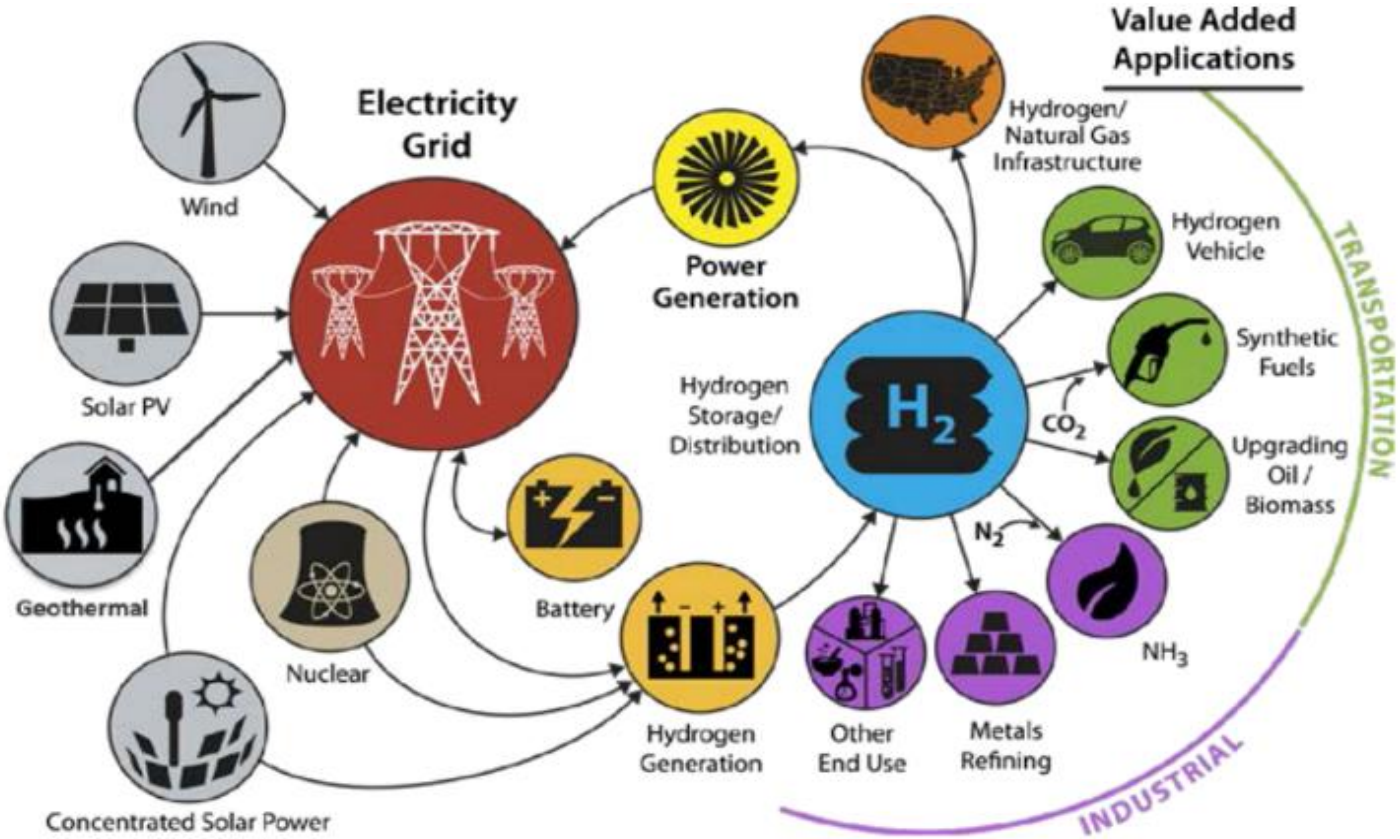
Hydrogen economy - concept

Renewables are undergoing substantial cost reductions, transforming electricity markets



For the complete dataset see: IRENA (2018), Renewable capacity statistics 2018, available at: www.irena.org/publications.

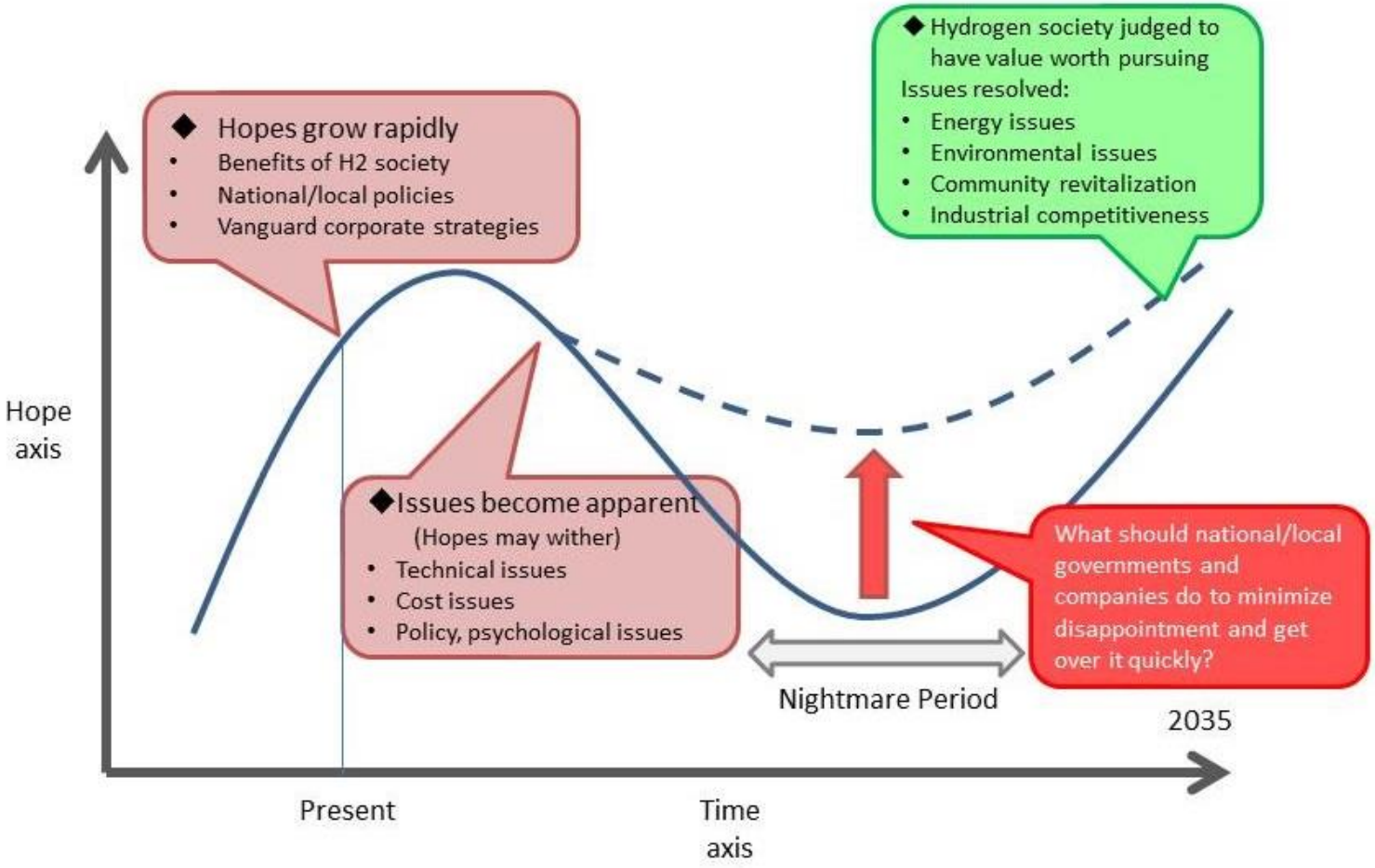
Hydrogen economy - concept



Miller E. L., Hydrogen Production & Delivery Program, Annual Merit Review and Peer Evaluation Meeting (2017)

Hydrogen economy - concept

Where are we?

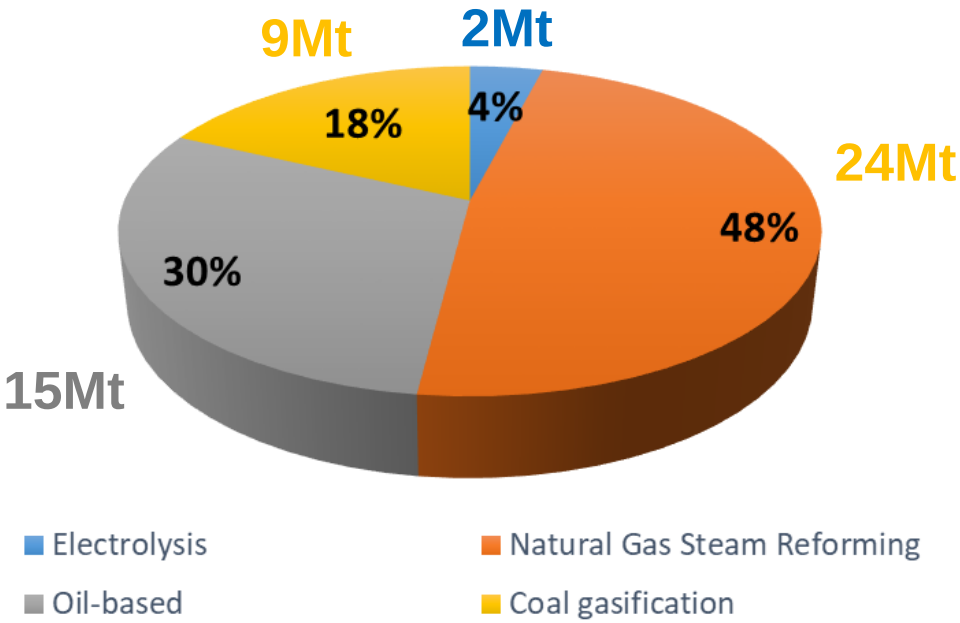


Fujitsu Research Institute (2016)

Hydrogen economy – current state

Production methods and global production

- Methane steam reforming
- Partial oxidation
- Authotermal process
- Electrolysis
- Thermochemical reaction
- Microbial conversion
- Photosynthesis process

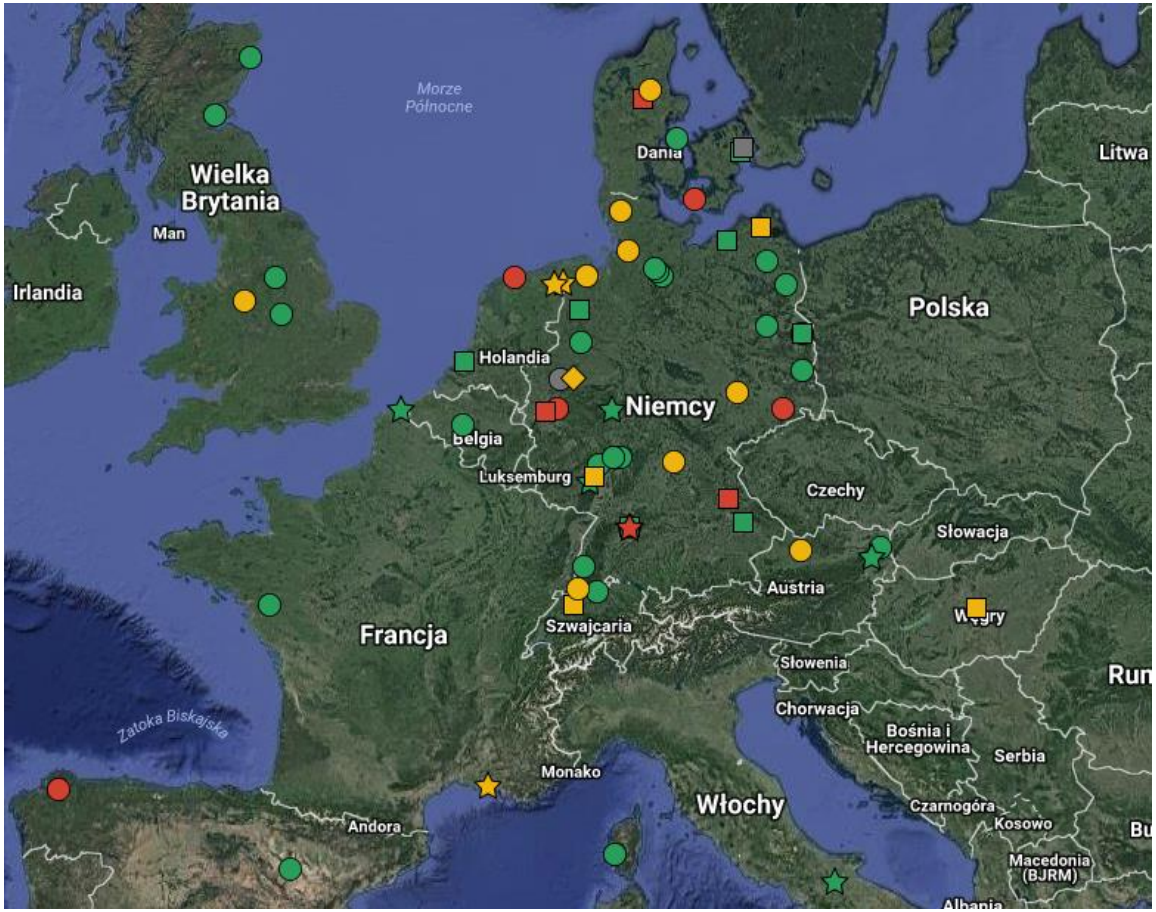


International Energy Agency (IEA) Technology roadmap: hydrogen and fuel cells, (2015) Paris

Hydrogen economy – current state

Energy storage & conversion

Map of P2G (demonstration) projects in Europe



Operational

- Hydrogen
- Methane
- Hydrogen/Methane

Planned

- Hydrogen
- Hydrogen/Methane
- Methane

Project finished

- Methane
- Hydrogen

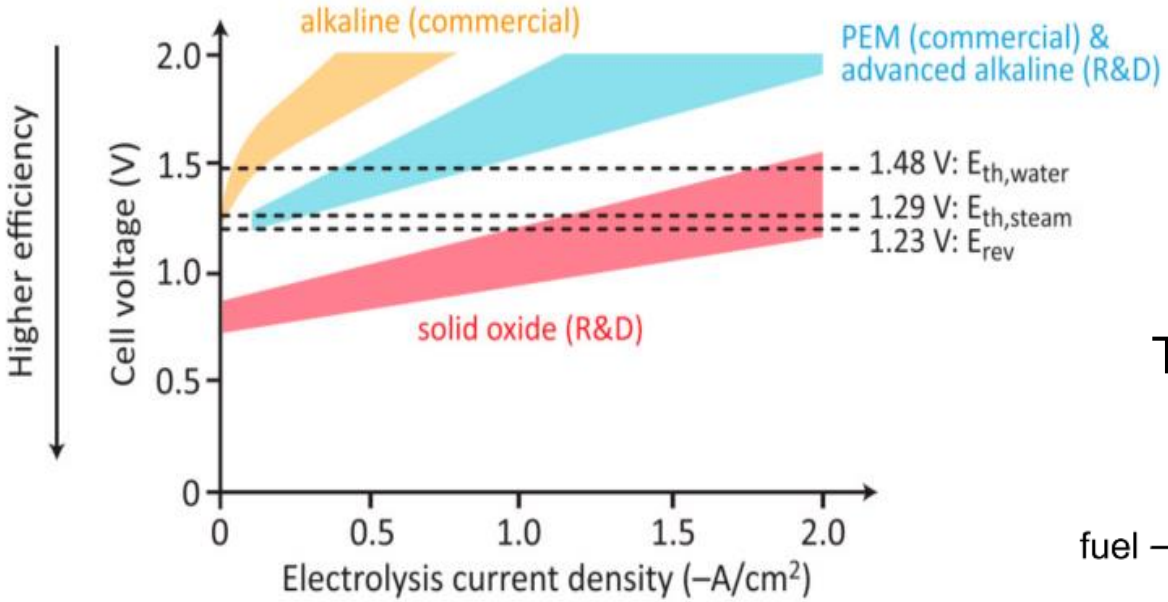
Unknown

- Hydrogen
- Methane

European Powertogas

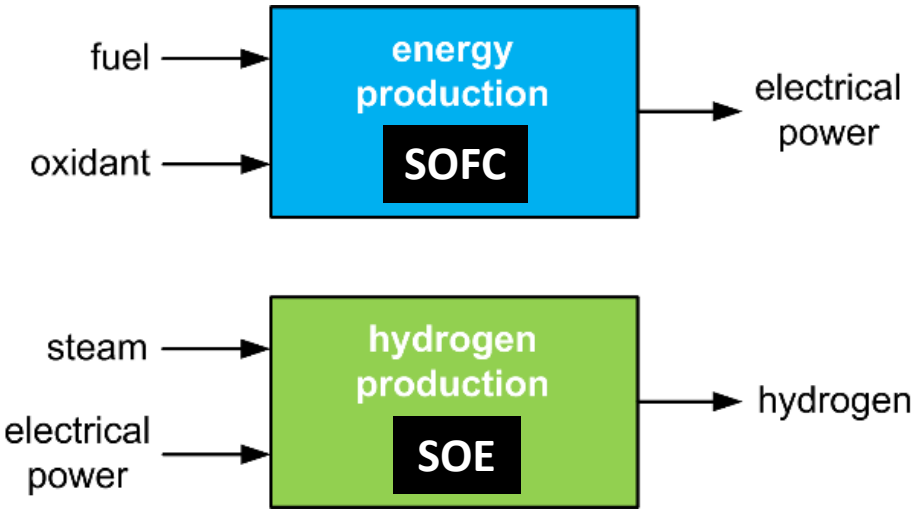
Hydrogen economy – current state

Energy storage & conversion



Graves C., Ebbesen S.D., Mogensen M., Lackner K.S., Sustainable hydrocarbon fuels by recycling CO2 and H2O with renewable or nuclear energy, Renewable and Sustainable Energy Reviews, 15, 1-23 (2011).

Two mode operation with Solid Oxide Cells



Hydrogen economy – current state

Energy storage & conversion

Single cell

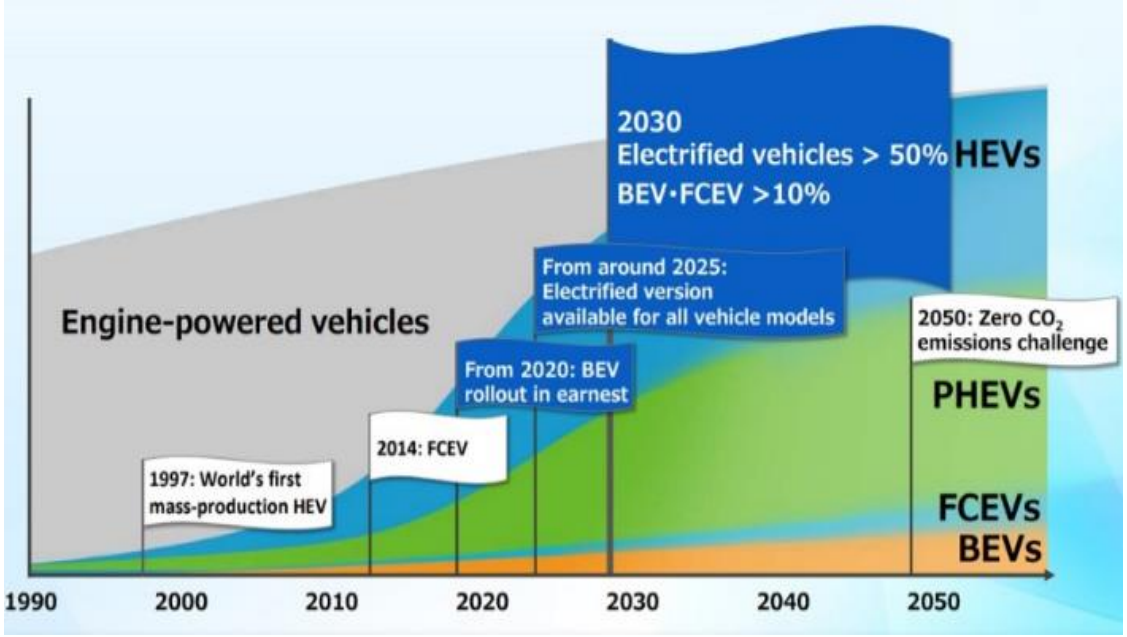
Solid Oxide Cell stack

First polish micro-CHP unit
(2 kWe) based on SOC cells

Hydrogen economy – current state

Transport

Toyota's vehicle electrification milestones



IEA, 2017)

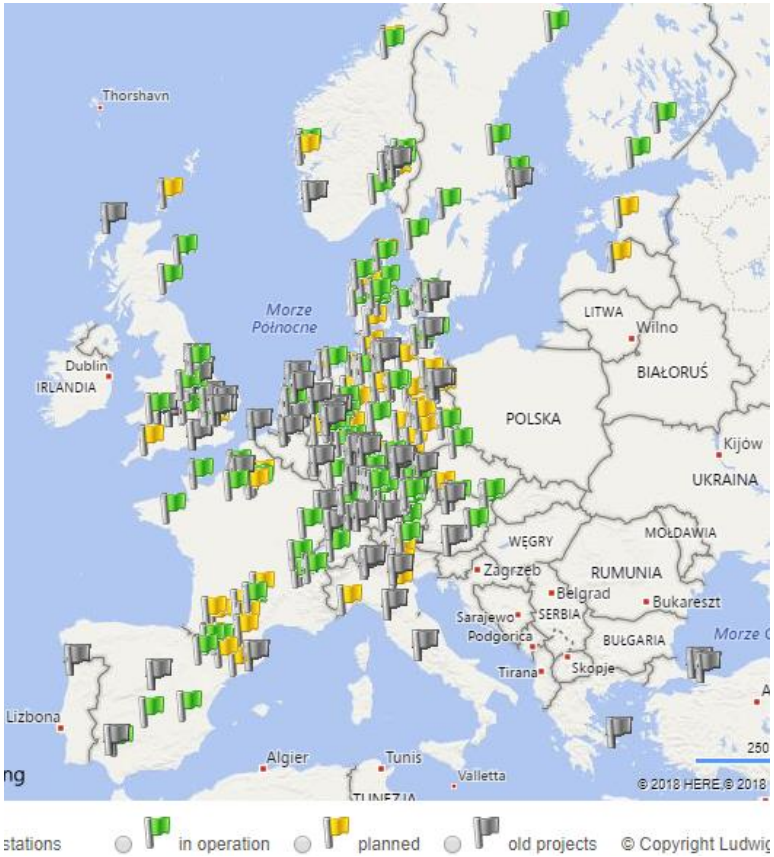
TOYOTA

HONDA

HYUNDAI

Hydrogen economy – current state

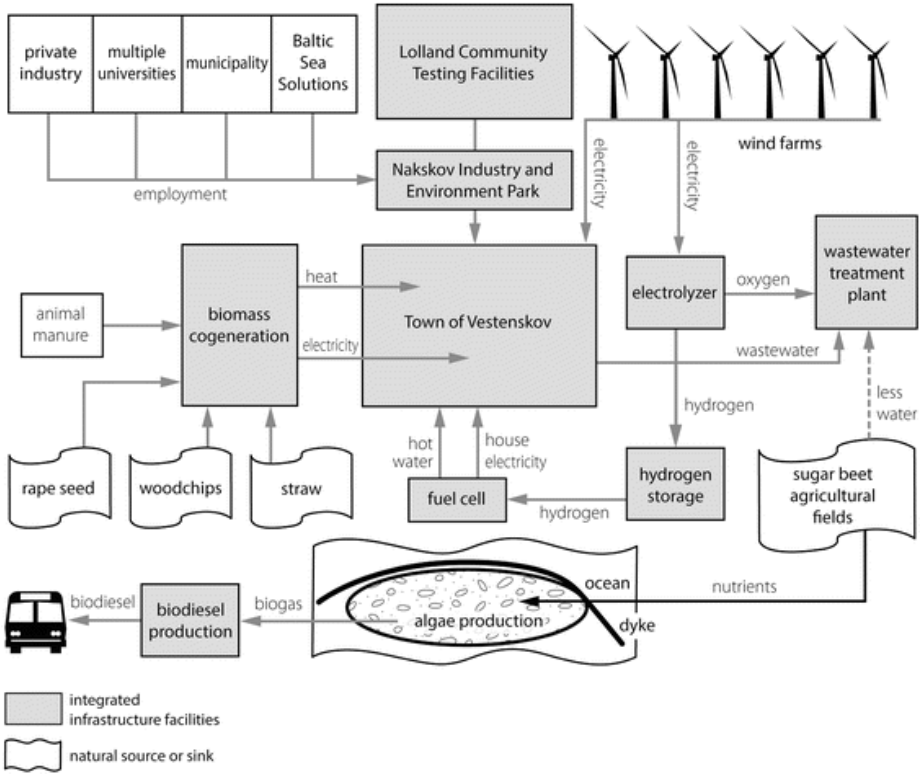
Transport



Orlen 1st hydrogen refuelling station in Germany

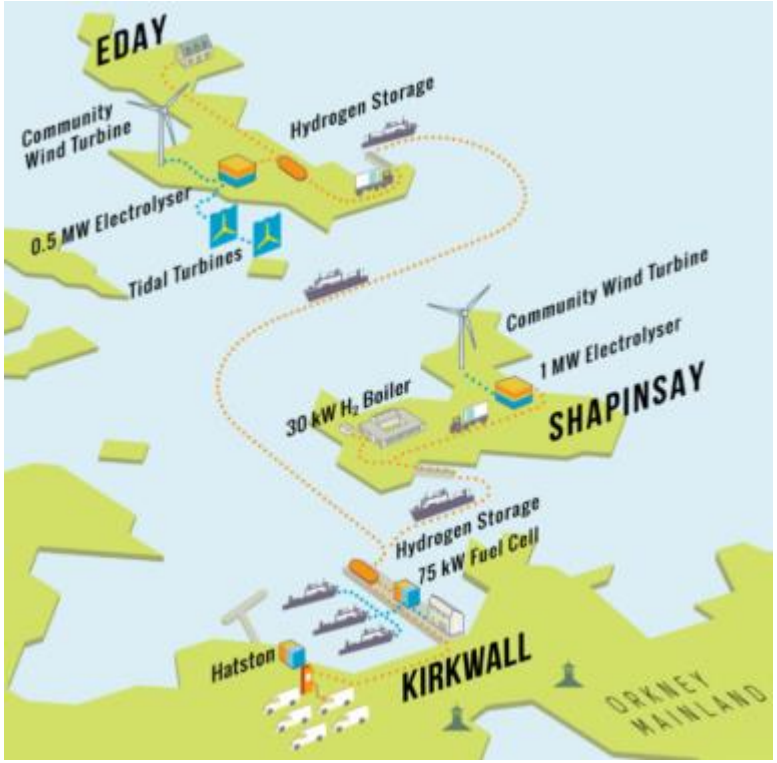
Hydrogen economy – current state

Vestenskov – 1st hydorgen village



Green Hydrogen' in Orkney islands

(BIG HIT) project



Hydrogen economy – current state

Tokyo

Olympic Village after the Tokyo 2020 Games (image)

Hydrogen refueling station

Targets for hydrogen stations		
2020	2025	2030
35	80	100

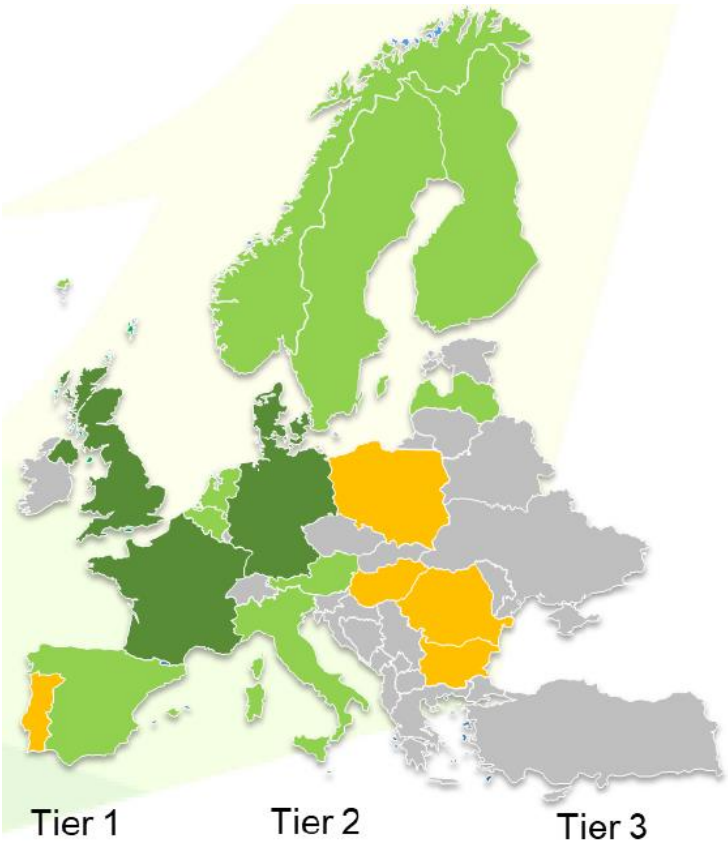
Fuel-cell vehicle

Tokyo's Environmental Policy

Targets for FCVs		
2020	2025	2030
6 000 vehicles and least 100 buses	100 000 vehicles	200 000 vehicles

Fuel-cell bus

Goals of project HyLAW



Identification of legal rules and administrative processes applicable to Fuel Cell and Hydrogen technologies' deployment, identification of legal barriers and advocacy towards their removal

Coordinator: Hydrogen Europe

Duration: 01.2017 – 12.2018

Web site: hylaw.eu

Goals of project HyLAW

Project's main outputs

- An online and publicly available database compiling legal and administrative processes applicable to hydrogen and fuel cell technologies in 18 countries across Europe.
- National policy papers describing each legal and administrative process, highlighting best practices, legal barriers and providing policy recommendations.
- A pan-European policy paper targeted towards European decision makers.
- National and European workshops for dissemination of the findings and convincing public authorities to remove barriers.

Regulatory framework

Lack of harmonization within EU countries:

- Lack of specific requirements or zone prohibitions for hydrogen storages, hydrogen production facility in the land use plans.
- Different steps and duration of permitting proces.
- Not unified situation in case of parking and travelling via bridges with FCEVs.
- No standards for maximum limit of quantity and pressure for H_2.
- Fuel origin - no binding or uniform guarantee certification system for H_2.
- No standards for measuring the quality of H_2.

Regulatory framework

Lack of harmonization within EU countries:

- Not unified type approval, maintenance and inspections rules for vehicles.
- There are no legal requirements in place for technical inspections of motorcycles, bikes and quadricycles at EU level.
- Blending and injection of H_2 to the gas grid.
- Inconsistency of legal definition for P2G or P2P facilities.
- No regulation concerning safety distances.

Conclusions

- Sustainable development is the best answer to undesirable impacts which origin from the place where we rest and work.
- This issue needs complex solution and involvement into transformation proces all stakeholders (EU level, national level, city authorities, standarization authorities, industry and business…).
- Power-to-gas technologies and gas can play a major role in coupling different sectors and networks.
- Hydrogen as the future energy vector enables effective usage of it with minimal negative impact on environment.
- Lack of consistent EU legislation dedicated to H_2.
- Project HyLAW as w tool towards the removal of barriers for hydrogen technologies development.

Upcoming workshops

HyLaw EU Workshop
Place: Brussels
Date: 6th of December 2018
Contact: Alexandru Floristean, a.floristean@hydrogeneurope.eu

HyLaw National, Polish Worskhop
Place: Warsaw
Date: 21st of Nevember 2018
Contact: Marcin Błesznowski, marcin.blesznowski@ien.com.pl

Acknowledgement

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Thank you for your attention!