FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

FCH-JU: role of hydrogen in circular energy waste; few examples

EUROPEAN ENERGY FORUM
FORUM EUROPÉEN DE L'ENERGIE

Bart Biebuyck

22 10 2019 Strasbourg Fr

Strong public-private partnership with a focused objective

A combined private-public of 1.85 billion Euro has been invested to bring products to market readiness by 2020

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

Hydrogen Europe

Industry grouping
>150 members
50% SME

European Commission

Hydrogen Europe Research

Research grouping
72 members

Energy

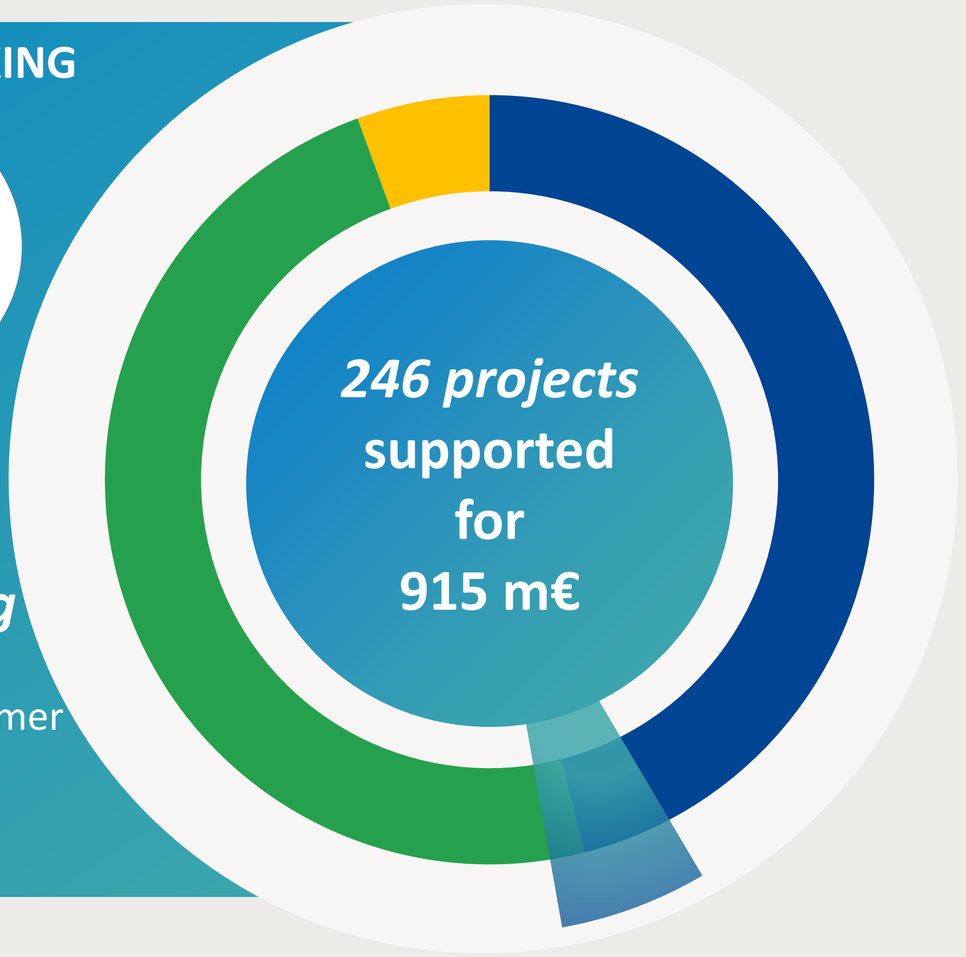
H_2 production and distribution
H_2 storage
F/C for CHP

Transport

Road vehicles
Non-road vehicles
Refueling infra
Maritime, rail and aviation applications

Cross-cutting

standards, safety, education, consumer awareness, …



47 %

428 million euros
136 projects

42 %

388 million euros
66 projects

6 %

53 million euros
40 projects

5 %

46 million euros
4 projects

Similar leverage of other sources of funding: 935 m€

Besides CO_2 abatement, deployment of the hydrogen roadmap also cuts local emissions, creates new markets and secures sustainable employment in EU

2050 hydrogen vision

~24%

of final energy demand[1]

~560 Mt

annual CO_2 abatement[2]

~EUR 820bn

annual revenue (hydrogen and equipment)

~15%

reduction of local emissions (NO_x) relative to road transport

~5.4m

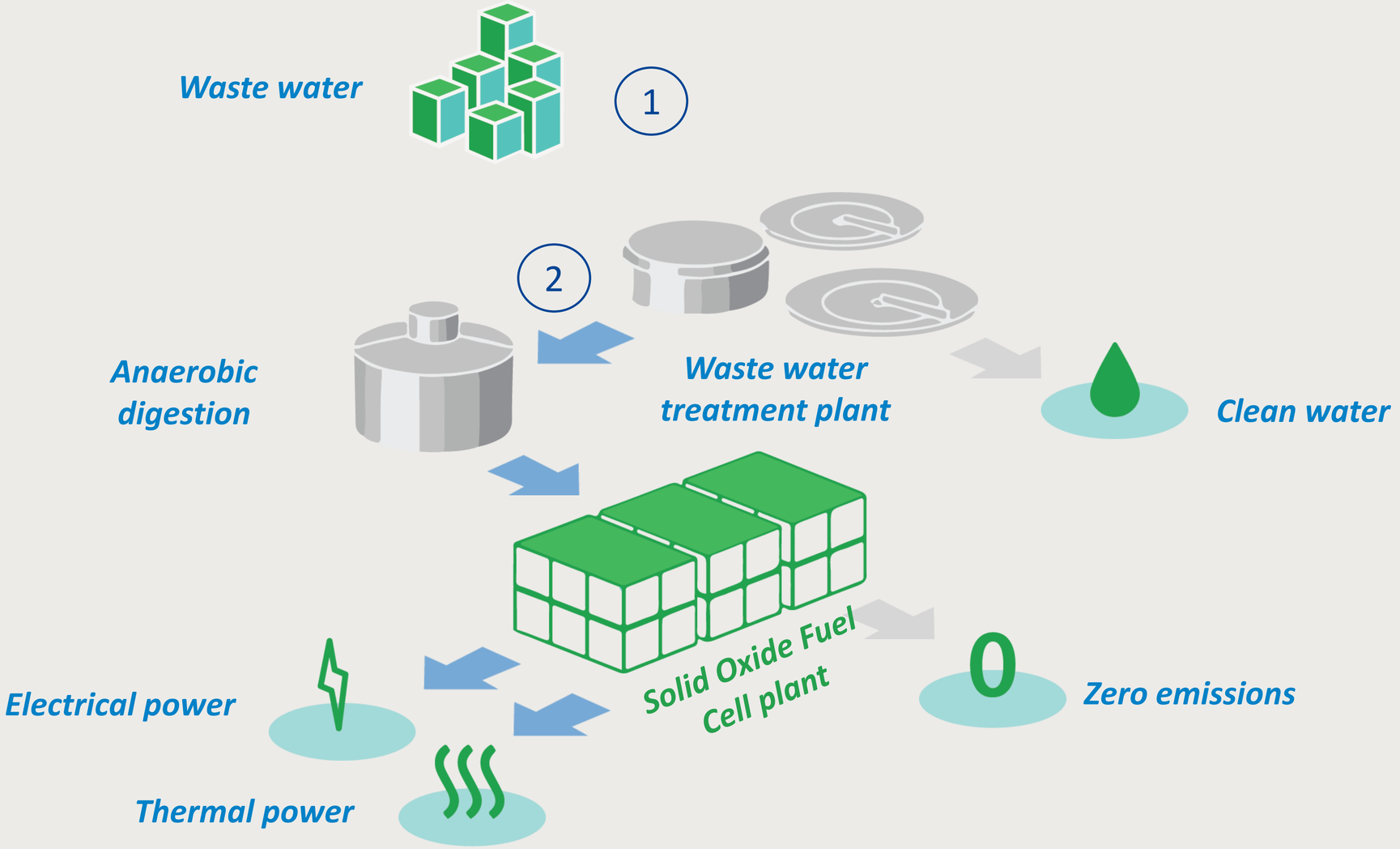
jobs (hydrogen, equipment, supplier industries)[3]

1 Including feedstock 2 Compared to the reference technology scenario 3 Excluding indirect effects

SOURCE: Hydrogen Roadmap Europe team

Fuel cells in the circular economy

Waste to energy: heat and power generation with zero local air emissions



Heat and power for waste water treatment plants

Fuel Cells contributing to the circular economy with zero impact on local air emissions

SOFC 174 kWe, 89 kW_{th}, Italy

- Fed by biogas from sewage sludge in a WWTP in Torino
- >55% electrical efficiencies achieved
- Zero local emissions
- EU market potential of 5,141 WWTPs in EU equivalent to 930 - 2550 MWel

120 kW_e or 2 modules, already in operation

- **2014-2018**
- **6M€/4.5M€**
- **Project CO: Politecnica de Torino, IT**

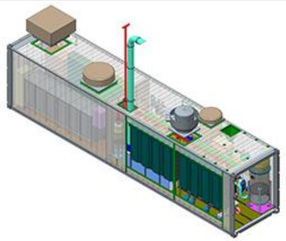
www.demosofc.eu

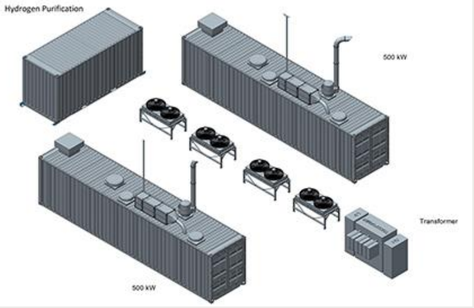
DEMOSOFC
FCH2-JU PROJECT

MW fuel cells greening big industry by using waste hydrogen

FCH-JU research projects shows Fuel Cells can help to decarbonise industry like the Chlor-Alkali industry

CG Démo





1MW plant at Martinique, oversea territory of France
Demonstrate the deployment of a 1MW PEM Fuel Cell, developed and purpose-built for the EU market, running on waste hydrogen from a refinery plant (246 t/year flared)
DURATION: 2012-2020 with FCH JU Funding: ~4.6M€

2MW plant at Ynnovate, Yingkou (province Liaoning), China
Design, build and operate a 2 MW power generator, with full integration of heat and power with an existing chlorine production plant. Fully automated way of operation and remote control
DURATION: 2015-2018 with FCH JU Funding: ~5.5M€

H_2 Valley Support for 20 Million Euro (Call Jan. 2019)

6 proposals received and 1 selected to start the grant preparation

HEAVENN KEY FACTS:

- North Netherlands (Groningen / Delfzijl / Emmen)
- Total project circa 90 million Euro
- 31 partners (public + private)
- Project supported by 65 parties (Nat. + Int.)
- 60MW Electrolysis for green H2 production,
- H2 Mobility: buses, passenger cars and trucks
- H2 Refueling stations
- E-Kerosene for aviation
- H2 for an inland water transport barge
- Domestic Heat applications
- Underground H2 storage (Hystock)

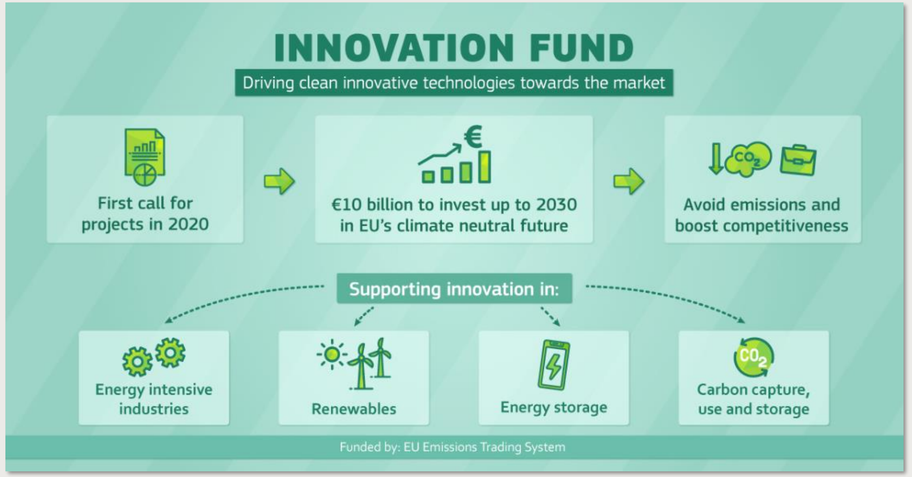
Future European Funding opportunities for hydrogen

Depending on the project seize and goal, the right funding instrument should be chosen, FCH can help you

New partnership: CLEAN HYDROGEN EUROPE

- **Channel cross-sectoral collaboration**
- **Involve more energy companies**
- **Include waterborne and rail transport industry**
- **The industrial sectors** (chemical, steel, refineries, etc.)
- **Include civil society and NGOs.**

Impact assessment (on-going) => Open public consultation for EU partnerships
https://ec.europa.eu/info/law/better-regulation/initiatives_en
Start in Jan 2021 with industry request a doubling of the budget



NEXT

Yearly program review days and stakeholder forum

Program Review days
19 & 20 Nov. 2019

Stakeholder Forum
21 Nov 2019

Charlemagne building Brussels, Belgium

Registrations just opened

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