

CLUSTER "PLATFORM POWER TO GAS"



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POWERTOGAS
Industry Cluster Flanders

Samen voor sterk innoveren

General meeting

January 11, 2018
Brussel



PtG cluster meeting 10.00-11.00

- Introduction new cluster member: Q8 10'
- PtG cluster: Highlights 2017 - Agenda 2018 20'
- VEA study status 15'
- Discussion: suggestions for 2018? 15'

Workshop Offshore Hydrogen production 11.00-13.00

- Marcel Weeda: Offshore conversion of wind energy to hydrogen on Energy Islands in the North Sea
- Rene Peters: System Integration for offshore energy enabling energy balancing and storage from offshore wind.
- Gert van der Lee: Future Energy System, hydrogen the connecting element

Company name: Kuwait Petroleum (Belgium) N.V.

Main activities: Network of service stations in Benelux (see next slides)

Experiences with H2: Hydrogen Europe (workgroup advocacy) & Certifhy

Specific topics of interest within the cluster:

- Early business case hydrogen for mobility
- Early business cases hydrogen as feedstock for industry
- Networking/exploration in view of innovation project
- Partnership opportunities

KPC – A FULL STATE OWNED CONGLOMERATE



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Kuwait Petroleum Corporation is one of the world's largest integrated oil concerns and runs **8 subsidiaries in exploration & production, downstream and transport**

Kuwait boasts the world's **third largest** oil reserves



Kuwait Petroleum Corporation | مؤسسة البترول الكويتية
and subsidiaries | وشركاتها

Q8 BUSINESSES



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Q8Aviation

Q8Oils

Refinery
activities

Research &
Technology

International
Diesel Service

Retail

Supply
&
Logistics

Direct



Kuwait Petroleum Corporation | **مؤسسة البترول الكويتية**
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Q8 RETAIL BUSINESS IN BENELUX



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Q8 has close to 5000 service stations in Europe from which :
670* retail sites in the Benelux region



We aim to provide a **superior customer experience** by offering not only top **fuel quality but also innovative non-fuel concepts**. We have therefore concluded partnerships with Delhaize and Panos, amongst others. This has created a broad non-fuel offer of convenience stores and sandwich corners.



Q8 AUTOMAT STATIONS IN BELGIUM



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Belgium



+204* sites

Discounts & Clear
price sign

Neat & safe
impression

plus-card



Q8 AUTOMAT STATIONS IN THE NETHERLANDS



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Netherlands

+186* sites

High rebates and
clear pricing
communication

Local Marketing
instead of only
National Marketing

Tango eClub



Delhaize is one of the most important supermarket chains in Belgium. **Q8 and Delhaize** have a **partnership** with the Delhaize Shop & Go's

Around **120** Shop & Go's have been implemented in the Benelux. Our shops have a convenience offer with focus on fresh



THE Q8 LIBERTY CARD



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The **Q8 Liberty Card** is a top player in the **fleet** targeted Business to Business market by delivering a ‘state of the art’ fuel card for our existing clients and our prospects.

- With over 35,000 active customers it represents over 14% of our total retail volume
- Total card acceptance represents 22% of the total retail volume
- The aim is to increase the total card volume to 50%



We strive for continuous improvement in our environmental performance, by becoming more efficient in our business processes; reducing the resources we use to process and deliver our products to market.



Energy Efficient stations

- Solar panels
- Green roofs
- Led Lighting
- Closed fridges
- Double glass doors
- Green electricity
- Refrigerator covering heat systems



Environmental friendly products



Sensitization on Safe and Energy Efficient driving



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- ❑ 8 extra cluster members joined , 1 left (NPG)

- ❑ Projects started / approved with cluster members:
 - **Sunshine:** feasibility project Terranova Solar (VLAIO, Flux 50)
 - **Brightfields:** study project Terranova Solar (pilot in parallel in 2018?)
 - **Greenports:** study project Zeebrugge (VLAIO, Flux 50)
 - **ReVive:** pilot project waste collecting trucks (FCH-JU)
 - **H2-Benelux:** 8 HRS in the Benelux (TEN-T)
 - **H2share:** pilot project H2 truck (Interreg NWE)

- ❑ Visit EnergiePark Mainz
- ❑ Team meetings / concept discussions shipping applications, offshore hydrogen, legislation
- ❑ Workshops in diff. provinces (WaterstofRegio project) with contributions of cluster partners
- ❑ VEA study for Flanders running

PROJECTS APPROVED 2017 (1)



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SUNSHINE feasibility study (VLAIO, Flux 50)

Partners: Terranova Solar, Lampiris (Total), UGent, Port of Gent, WaterstofNet

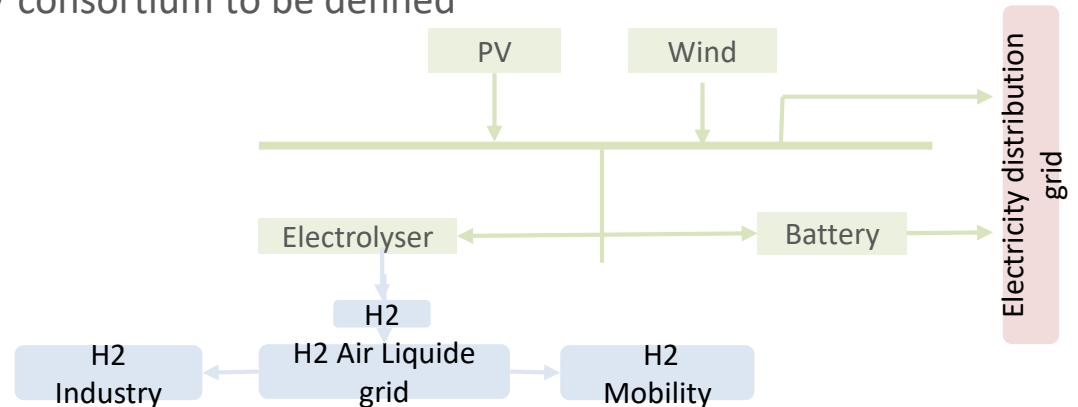
Concept: H2 production at TNS, # operation hrs maximised with PV+wind+ battery
H2 injection in Air Liquide H2 network

Study project **BRIGHTFIELDS** approved (Hydrogenics, Xant, Terranova Solar, Actility, U-Gent)

Timing: 2018-2021 (3 years)

Demonstration project to be discussed / consortium to be defined

Preferred location H2 production; Direct connection to A.L. pipeline



PROJECTS APPROVED 2017 (2)



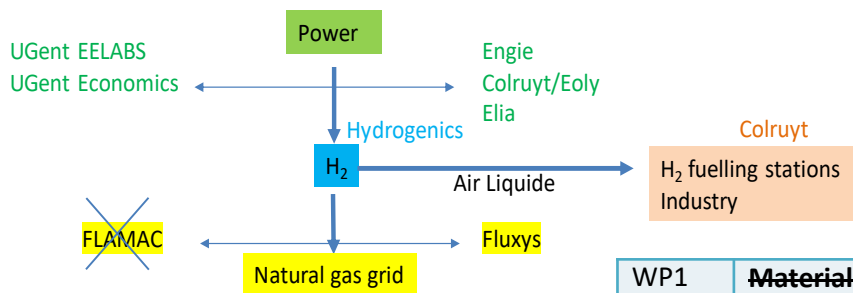
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GreenPorts study project (Zeebrugge): VLAIO transition priorities project, approved Dec 2017
Partners: Engie, Colruyt/Eoly, Hydrogenics, Fluxys, MBZ, ELIA, (Air Liquide), WaterstofNet, U-Gent

GREENPORTS (Gas from Renewable Energy in PORTS)



Timing: 2018-2020 (2 years)

WP1	Material aspects H2 in gas T&D lines (Not accepted for funding)
WP2	Strategies for upscaling of the electrolyser to 20-50-100MW
WP3	Technical solutions for the wind-electrolyser-interface for onshore/offshore wind parks
WP4	Technical and economic conditions for the use of the wind-electrolyser system for grid services
WP5	Distribution and storage of hydrogen from a central production site
WP6	Economic analysis of the power-to-gas case for Flanders
WP7	Regulatory aspects and relation to the business case

PROJECTS APPROVED 2017 (3)



ReVive (FCH-JU project)

Partners: [Tractebel](#), [E-trucks](#), Symbio Fuel cell, Suez, 8 cities in EU (a.o. Antwerp), [WaterstofNet](#)

Development and demonstration of 15 waste collecting trucks at 8 sites.

Demo Sites

Breda
Helmond
Groningen
Amsterdam
Antwerp
Fribourg
South Tyrol
Roosendaal

REVIVE across Europe



Core objectives

- Develop a high performance fuel cell refuse truck that can provide the flexibility of incumbent solutions
- Trial the trucks in their operating environment
- Compile the evidence base for continued rollout of the technology
- Raise the profile of the technology as a viable option for waste collection
- Demonstrate that hydrogen fuelled refuse vehicles can have a significant impact on the utilisation of urban refuelling stations

Timing: 2018-2022

PROJECTS APPROVED 2017 (4)



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H2Share (Interreg NWE)

Partners: [VDL](#), Wystrach (D), different regions in D-NL-VL, Hydrogen Europe, [WaterstofNet](#);
Associated partners : a.o. [Colruyt](#)

27 TON heavy duty truck (VDL) + Mobile refueller (Wystrach)

To be demonstrated by:



in 4 countries/6 cities:



Timing: 2017 –2020

PROJECTS APPROVED 2017 (5)



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H2Benelux (TEN-T project)

Partners: Colruyt, Pitpoint, Shell, WaterstofNet, ...

8 HRS and 80 FCEV



Locations:

Luxemburg	1 (Shell)
Wallonia	1 (Colruyt)
Flanders	2 (Colruyt)
Netherlands	4 (Shell/PitPoint)

Timing: 2017- 2020



- ❑ **Workshop off-shore H2 production:** today
- ❑ **Hannover Messe April 23-27:**
participate in Hydrogen Europe initiative
(no separate booth for cluster – no interest)
- ❑ **Power-to-Gas conference** on May, 7 in Antwerp (date to be confirmed)
- ❑ **H2 –Flanders study** for VEA to be finished in March 2018
 - End result = proposal for next steps
- ❑ **Strategic exercise** with cluster members as follow-up of VEA-study
 - Workshop to be planned in April 2018



- ❑ International guest speakers / minister Muyters

- ❑ Possible subjects
 - Hydrogen vision North of NL (A. Van Wijck?)
 - Hydrogen in gas grid (City of Leeds?)
 - Storage and transport of H₂ (LH₂, LOHC,.. Who?)
 - Low carbon chemistry based on renewable H₂ (IEA?)
 - Grid balancing and storage (EASE?)
 - Overview PtG projects in EU and results (IEA task 38?)
 - Developments electrolyzers
 - Plans and results from running Flemish initiatives (PoA, TNS..?)

- ❑ Opportunities for cluster members to present the company with poster



VEA STUDY STATUS AND NEXT STEPS (1)



- ❑ Potential of Green hydrogen for Flanders and plan for implementation
- ❑ Assignment from VEA, in preparation of VL Energy and climate plan 2030-2050
- ❑ In collaboration with HINICIO

❑ Timeline:

Studies other countries – technical potential H2 in Flanders

Stakeholder meeting Nov 27, 2017

Scenarios for different applications

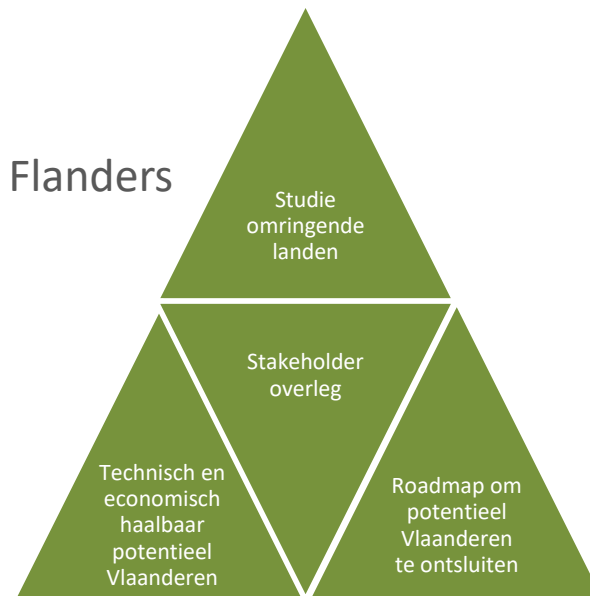
Economic boundary conditions

Proposal for next steps –

Advise for policy measures

Stakeholder meeting Jan 26, 2018

End-report Feb/March 2018



- All members Power-to-Gas cluster
- Different sector organisations: ODE, Febiac, Febetra, Agoria, Essenscia, Traxio, VIL, Flux50
- Flemish Government: VEA, VREG, VLAIO, Dpt of Energy
- Utilities companies, TSO, DSO, ELIA
- Knowledge institutes: UGent-KUL-Thomas Moore
- Other: De LIJN, BBL



Main feedback of first stakeholder consultation:

- Strong resistance from chemical sector against any quantitative targets on use of green H₂, but interest in innovative pilot projects
- More attention for hydrogen as storage medium for R.E.

EXAMPLE RESULT: TECHNICAL POTENTIAL TRANSPORT

	# VL In 2015	# H2 2030	kton H2 in 2030	MW wind in 2030	# H2 2050	kton H2 2050	MW wind 2050
Cars	3.300.000	30.000	9,0	245	1.000.000	240,0	6545
Buses	3.000	300	2,4	65	1500	9,6	262
Smaller Trucks	60.000	1500	6,0	164	15.000	48,0	1309
Larger trucks/trailers	30.000	1500	18,0	491	15.000	150,0	4091
Trains			0,33	9		1,65	45
Ships			2	40		18	480

Inspired by e.g. scaling up scenarios Hydrogen Council...

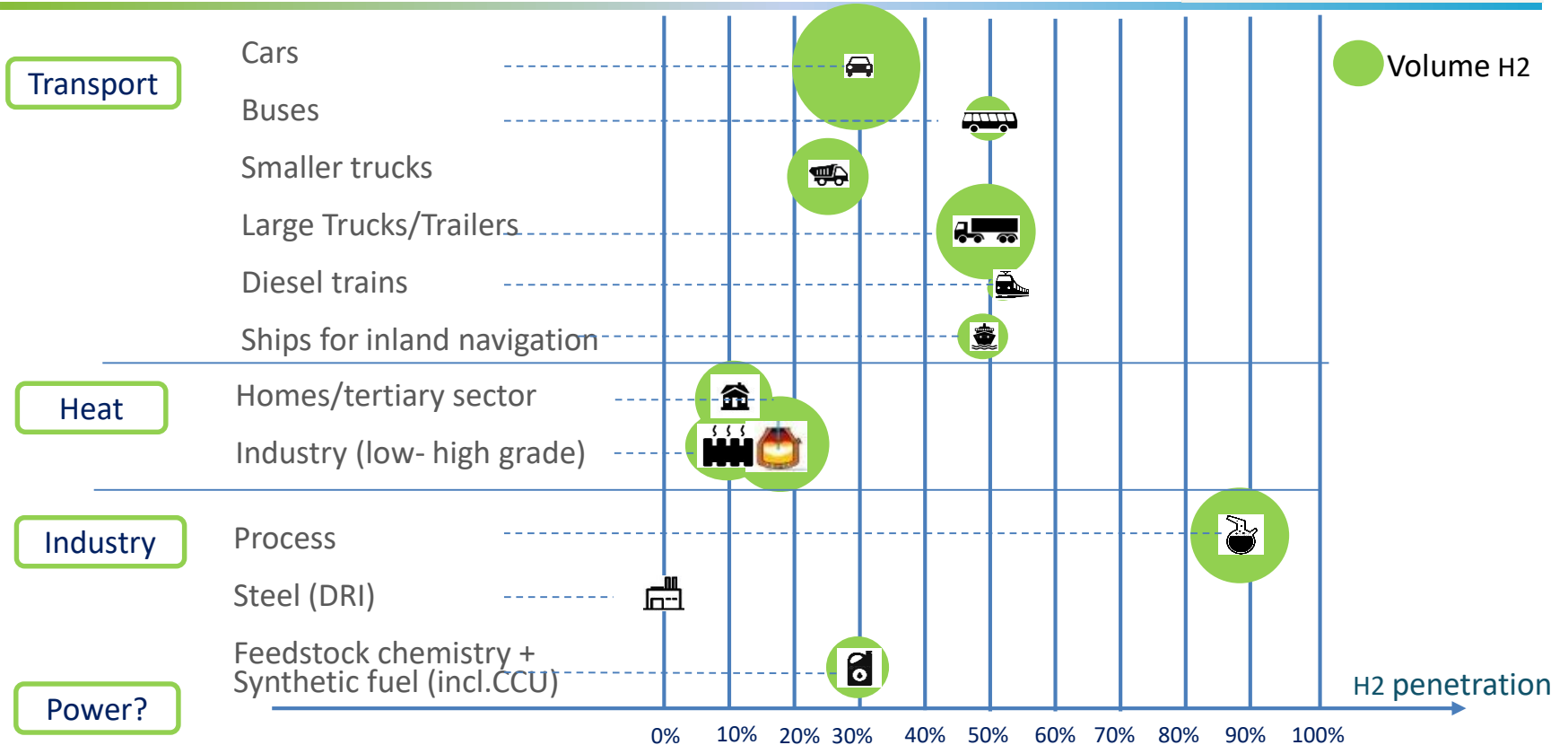
RESULT: ROLE OF H2 IN FLANDERS (2050)



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Example transport: proposal for roll-out/pilot projects incl. cost calculation

•Cars






- Network of 20 stations for minimal coverage Flanders / operational in 2019-2020
- Subsidies for 15 stations to be built @ 1,5 M€/station (50% subsidie = 7,5M€ in total)
- Subsidies for first 1000 vehicles (50 cars per station)

•Buses:



- Demonstration project 20 buses on one depot
- Subsidies for 20 buses: $20 * 200 \text{ k€} = 4 \text{ M€}$
- Subsidies for extra cost fuel 0,5 M€/year
- Refuelling station does not need to be subsidised due to full utilisation.

Example transport: roll-out/pilot projects are proposed incl. cost calculation

- Trucks  
 - Test projects individual trucks (development projects)
 - Demonstration at a number of transport companies
 - 10 trucks per demonstration (50% subsidy)
 - Fuelling station does not need subsidy (full utilisation)
- Inland shipping (ferries or utility vessels?): 
 - Test projects individual ships (development projects)
 - Demonstration with one refuelling point
 - 3 – 5 vessels per demonstration (50% subsidy)
 - Fuelling station does not need subsidy (full utilisation)

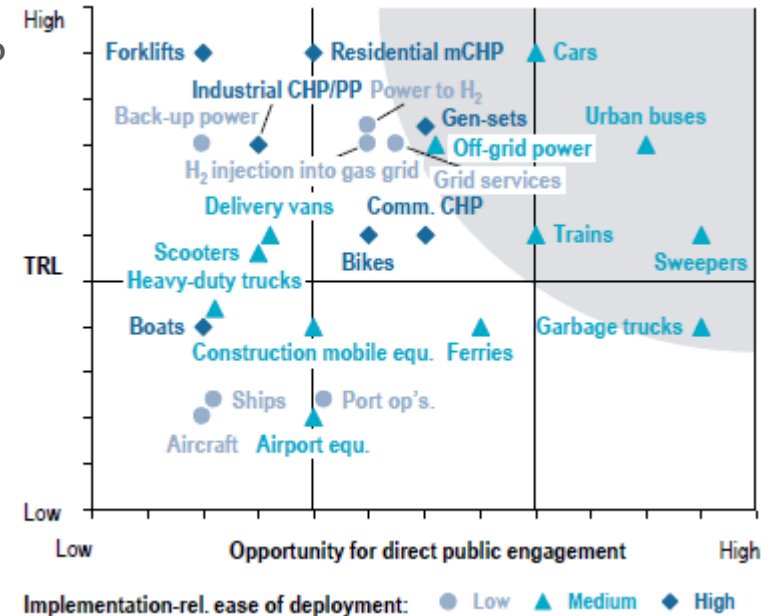
H2 for heating:

- demonstration injection in gas grid
- local gas grid with 100% H2 in test district?

H2 for industry/chemistry:

- Methanol demonstration plant to fuel a few ships in/a?

Questions / suggestions ??



Ref. FCH-JU regions and cities project

Suggestions for activities, themes, way of working....

????

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“Offshore conversion of wind energy to hydrogen on Energy Islands in the North Sea”

Rene Peters (TNO):

“System Integration for offshore energy enabling energy balancing and storage from offshore wind”

Gert van der Lee (Tennet):

“Future Energy System, hydrogen the connecting element”