

CLUSTER "PLATFORM POWER TO GAS"



AGENTSCHAP
INNOVEREN &
ONDERNEMEN



Samen voor sterk innoveren

General
meeting

September 19,
2018
Lillo



AGENDA



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POWERTO GAS
Industry Cluster Flanders

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10.00	Introduction new cluster members EDF, ABC, Oil tanking, Suez, Agfa	
10.30	Speaker 1: Nicola Zandona (Symbio/Michelin) “Symbio Fuel cell activities, zero emission valley project im Auvergne Rhone Alpes”	
11.00	Speaker 2: Wim Velghe (Air Liquide) “Air Liquide H2 mobility for 2020 for Benelux and Europe”	
11.30	Cluster news: <ul style="list-style-type: none">• Hydrogen Valley• Follow-up actions Strategic workshop• Coming events	
12.00	Presentation Van Wingen 10kW demo	
12.30	Lunch	

Main activities:

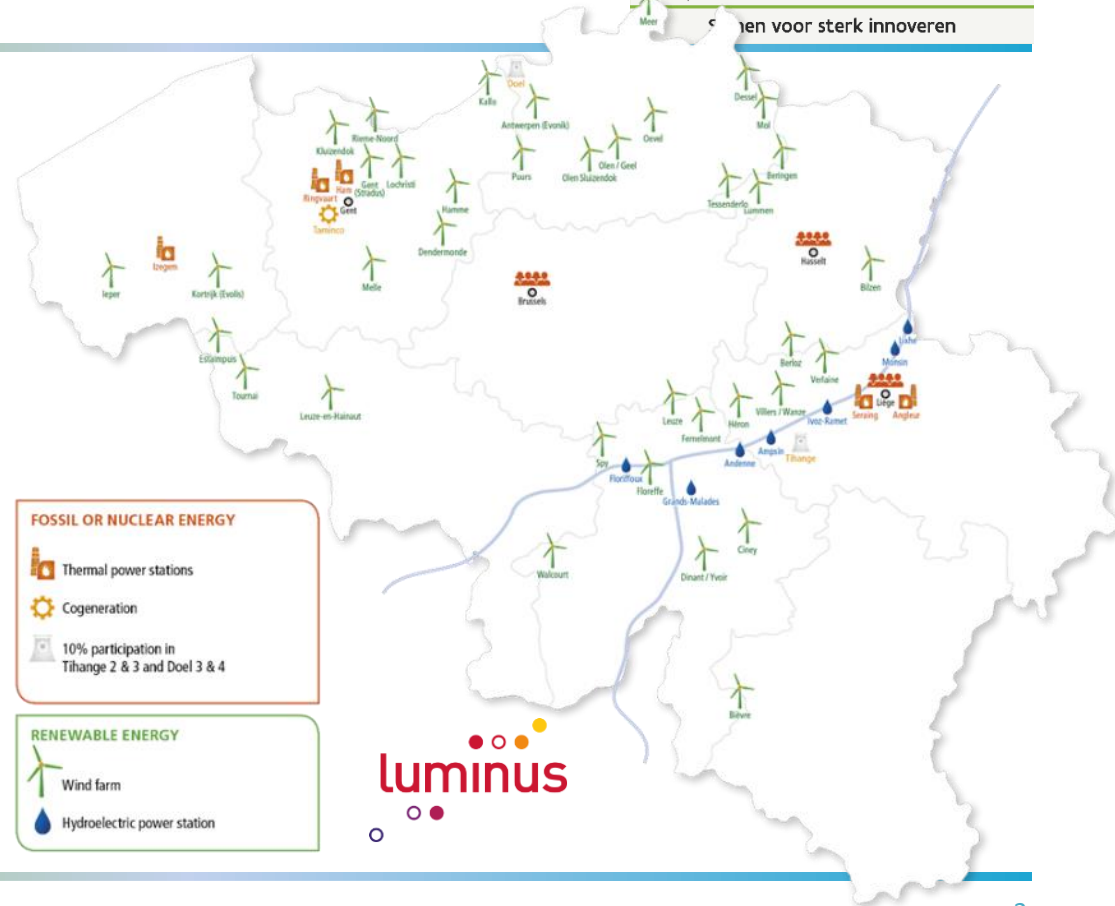
- Supplier of gas & electricity
- Producer of electricity and heat
- **Belgian Leader in On-shore Wind energy**
- Energy Services Supplier

Experiences with H2:

- At the heart of our innovation track
- Large experience through EDF Group
- EDF is now shareholder of McPhy

Specific topics of interest within the cluster:

- Sharing of experiences and good practices
- Regulatory leverage
- Main focus:
 - Heavy mobility
 - Light industry
 - Logistics



Main activities:

Medium Speed Engines from 1-10MW.

Fuelled with **various fuels**: Diesel, HFO, Bio Fuels, Dual Fuel LNG, Dual Fuel CNG, HVO, GTL, BTL, ...

Future fuelled with MeOH, Hydrogen, ...

Much appreciated in Marine, Traction, Power Generation and Nuclear applications

Experiences with H₂:

MeOH and H₂ combustion under investigation at **single cylinder** research engine

Specific topics of interest within the cluster:

Exploring market for early adopters of renewable fuelled medium speed engines

Understanding the **complete cycle** of renewable fuels, from well to propeller



Amsterdam (NL):
1,698,373 cbm



Antwerp (B):
1,330,950 cbm



Ghent (B):
1,006,729 cbm



Antwerp (Gas)(B):
138,400 cbm



Terneuzen (NL):
511,187 cbm

At Oiltanking we believe that our company's strengths of today will also be of value to develop the concepts of tomorrow:

- *Experience in engineering, construction & operation of (storage) infrastructure*
- *Asset & HR footprint at major energy hubs across the globe*
- *A healthy appetite to invest equity with a long term view, prevails over short term results*
- *Momentum to increase renewable footprint within M&B*
- *Within ARA, OT Europe is involved in various energy transition initiatives*

Oiltanking

Main activities:

Waste to Energy installation Roosendaal, NL

- 2 lines with dry Flue Gas Treatment (FGT)
- Throughput 336.000 ton waste per annum (C&I and HH waste)
- Heating value as designed 11,7 MJ/kg, actual 10,65 MJ/kg
- Steam conditions: 422°C at 62 bar.
- Combined water steam cycle with turbine from GE
- Electricity production 33 MWe,
total 240.000 MWh netto (enough to provide 70.000 households or 170.000 persons).
- 54% of which is marked as 'Green' or 'Sustainable' Energy
- Heat delivery to nearby greenhouses and district heating
- 50 FTEs, 24/7 operation, 5 shifts

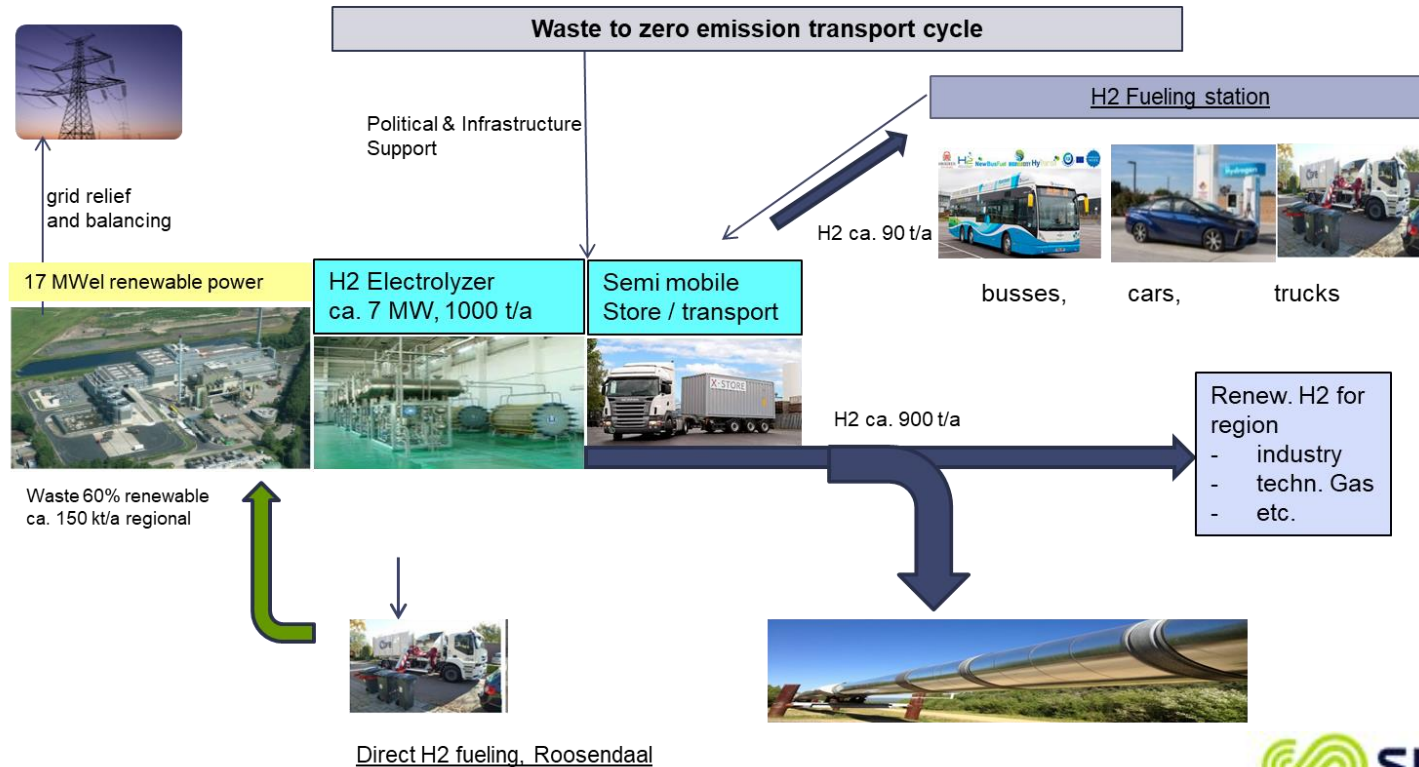


Experiences with H2:

Try to develop a Waste to fuel concept.

“Regional waste valorization for regional zero emission transport”

- Transition of renewable WtE power to low carbon H2 as transport fuel and chemical feed stock
- Flexible, long term, industrial size demonstration (8.000 h/a)
- Including different customers and stakeholders (waste valorization, power (grid) supply, gas supply, zero emission transport, renewable chemical production)



- Specific topics of interest within the cluster:
- H2 for fueling
- H2 for gas grid
- H2 as feedstock for industry

Main activities:

The Agfa-Gevaert Group develops, produces and distributes an extensive range of analog and digital imaging systems and IT solutions, mainly for the printing industry and the healthcare sector, as well as for specific industrial applications.

Agfa's headquarters and parent company are located in Mortsel, Belgium. Building on 150+ years of technology expertise, Agfa Specialty Products offers a diversified portfolio of polyester-based films enriched with coatings for specific applications as well as advanced chemicals for hi-tech industries.

Experiences with H2:

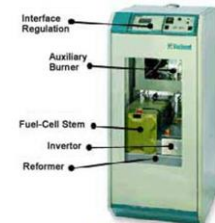
Agfa is active >10years as a membrane supplier for alkaline water electrolysis: ZIRFON PERL. It provides efficient electrolysis cell operation and it is very durable, allowing for years of operation.

Specific topics of interest within the cluster:

connect with H2 system developers to keep our membrane optimally synergistic with latest technologies and insights; develop collaborations

- **Hydrogen Valley**
- **Approved projects with cluster partners:**
 - ❑ **HyOFF**: PtG Fluxys/EOLY/PARKWIND (Energy Transition Fund)
 - H2 in gas transport network
 - ❑ **EPOC 2030-2050 project** (Energy Transition Fund) : with Belgian academic partners /WaterstofNet
 - Energy transition models for 2030-2050
 - ❑ **FCH-JU call 2018** evaluation done, project negotiations running
- **Continuation of cluster after 3-years period (Sept 2019)**
- **Other interested partners**
 - Farys – Gent (Water company Gent, infra-structural works)
 - CMI – Seraing (Infrastructural works; new BU focused on H2)
 - OCAS/ Arcelor Mittal (Research institute; H2-steel interaction)
 - Technogas (Measurement/monitoring systems for natural gas, CNG, H2...)
 - Van Hool (Buses on H2)
 - eBo services (offshore networking and services)

- Strategic workshop June 2018
- Six challenges defined for 2030 in Flanders:
 1. Heavy-duty: 3000 trucks, 300 buses and 100 waste trucks
 2. Cars: 30000 cars on H2 and 100 HRS in Flanders
 3. Shipping: 50 ships (inland shipping) on H2/derivatives
 4. Industry: Green H2 (or derivatives) in industry on a relevant scale
 5. Heating: Green H2 for industrial or residential heating a relevant scale
 6. Offshore energy: H2 for storage and transport of offshore energy on relevant scale



Category	Actions defined	Next step
City transport	"H2-mobility" platforms in Flemish cities	<p>Info-sessions on H2 mobility – per city- at existing HRS (Zaventem-Halle) for taxi & car-sharing companies, city services, selected transport companies...</p> <ul style="list-style-type: none"> • Antwerpen/Gent/Leuven are contacted: waiting for invitation • Genk is organising workshop on 26/9 • Brussels: discussion planned at October 4.
Bus	Define location for pilot project with 20 buses at one depot.	<p>Discussion with De Lijn planned 26/9</p> <p>Bus HRS in Port of Antwerp will be moved to bus depot in Q4, 2018.</p>
	Set up Flemish plan for implementation of buses on H2 for 2020-2030, in collaboration with the cabinet.	<p>Join existing ZEB platform, commissioned by Dept. Environment.</p> <ul style="list-style-type: none"> • ZEB is finishing first project phase – focus on BEV • Meeting beginning of October
Waste trucks	Set up Flemish plan for implementation of H2 waste trucks on H2 for 2020-2030.	<p>Contact VVSG : unites all "intercommunales" in Flanders => understand structure and select most interesting locations</p>

CLUSTER NEWS: FOLLOW-UP STRAT. WORKSHOP



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Trucks	Regular (1-2x per year) meeting with Flemish administration - transport federations – truck suppliers and HRS operators.	<ul style="list-style-type: none"> - Organise event around truc prototypes when available: 27 ton truck H2share and 40 ton truck WaterstofRegio 2.0; Colruyt will test WR truck. - Involve VIL (Flemish logistics cluster).
Cars	Discuss hydrogen car options with lease companies , what is their calculation model and how could we make them interested in H2?	<ul style="list-style-type: none"> - First discussions with lease companies <ul style="list-style-type: none"> - Meeting Oct 3, with ALD automotive /RENTA
Ships	Gather all interested parties (Antwerp-Gent-Zeebrugge - Oostende). Focus on applications with public interest: Ferry-waterbus- tug boats.	<ul style="list-style-type: none"> - Project initiatives running @ port of Ostend and CMB (to be submitted, Interreg)
	Start first demo project Ferry (Gent?) on H2	
	Start first demo project Tug boat on methanol	

CLUSTER NEWS: FOLLOW-UP STRAT. WORKSHOP



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Category	Actions defined	Next step
Industry	Living lab CCU	- Project via Port of Antwerp? EFRO?
	Use of (cheap) by-product hydrogen; synergies between local production/consumption; combustion technology (WKK, ship engines..)	- Exploratory contacts running
Heating	Study of specific situation in Flanders with respect to injection of H2 or pure H2 in distribution grid	- KIWA report for NL - Input Fluvius (Eandis) <= contact with TU Delft
	Make plan for possible tests/pilots for local H2 network	
Offshore	Define possible scenarios for future PtG from offshore energy in Belgium; define gaps and useful pilot project.	- Elia contacted for open discussion with interested partners

INTERESTING NEWS & PUBLICATIONS



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Topic	Subject	Reference- Link
Bus	<u>Strategies for joint procurement of fuel cell buses</u> Outlook on future scaling up of buses in an unsubsidised, commercial phase beyond 2020. Continuity and scale of demand will lead to significant price reductions, in the range of €330k–€450k for 12m single deck fuel cell buses.	A study for the Fuel Cells and Hydrogen Joint Undertaking. https://www.fch.europa.eu/sites/default/files/Strategies_%20for_joint_procurement_of_FCbuses_final_report.pdf
H2 in gas grid	<u>Toekomstbestendige gasdistributienetten</u> Study of readiness of existing distribution grid for injection of H2 and biomethane, executed by Kiwa Technology commissioned by “Netbeheer Nederland”. The main required modifications are listed; total costs are estimated to be max. 700 Meuro.	https://www.netbeheernederland.nl/_upload/RadFiles/New/Documents/Kiwa%20-Toekomstbestendige%20gasdistributienetten%20-%20GT170272%20-%202018-07-05%20-D..pdf (in Dutch)