

CLUSTER "PLATFORM POWER TO GAS"



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POWERTOGAS
Industry Cluster Flanders

Samen voor sterk innoveren

General
meeting

November 28,
2018
Lommel



AGENDA



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10.00	Cluster news and general info
10.30	Filip Van Den Abeele, Arcelor Mittal R&D/OCAS Hydrogen research, development and testing capabilities at OCAS
11.00	Andre Beukers, director of E-trucks-Europe: Activities and perspectives Hydrogen waste trucks
11.30	Tour in the factory
12.00	Lunch

- New cluster partner: **VANHOOL**
- Hydrogen Valley Flanders; FCH-JU Call 2019
 - Combine 3 ports into one “valley” proposal?:
 - Zeebrugge: offshore wind – injectie aardgasnet
 - Antwerpen: hydrogen to methanol
 - Gent : wind + solar to mobility (water/road)
 - Involvement of (local) authorities crucial
 - “only” 20% funding of EU
 - Practical support for development of HV from FCH-JU
 - Meeting with representatives of 3 projects on short term



GREENPORTS PROJECT



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- Study: Role of H₂ in storage of large scale offshore wind
- Officially started Nov 1, 2018 (after 10 months of solving administrative issues)
- Partners:

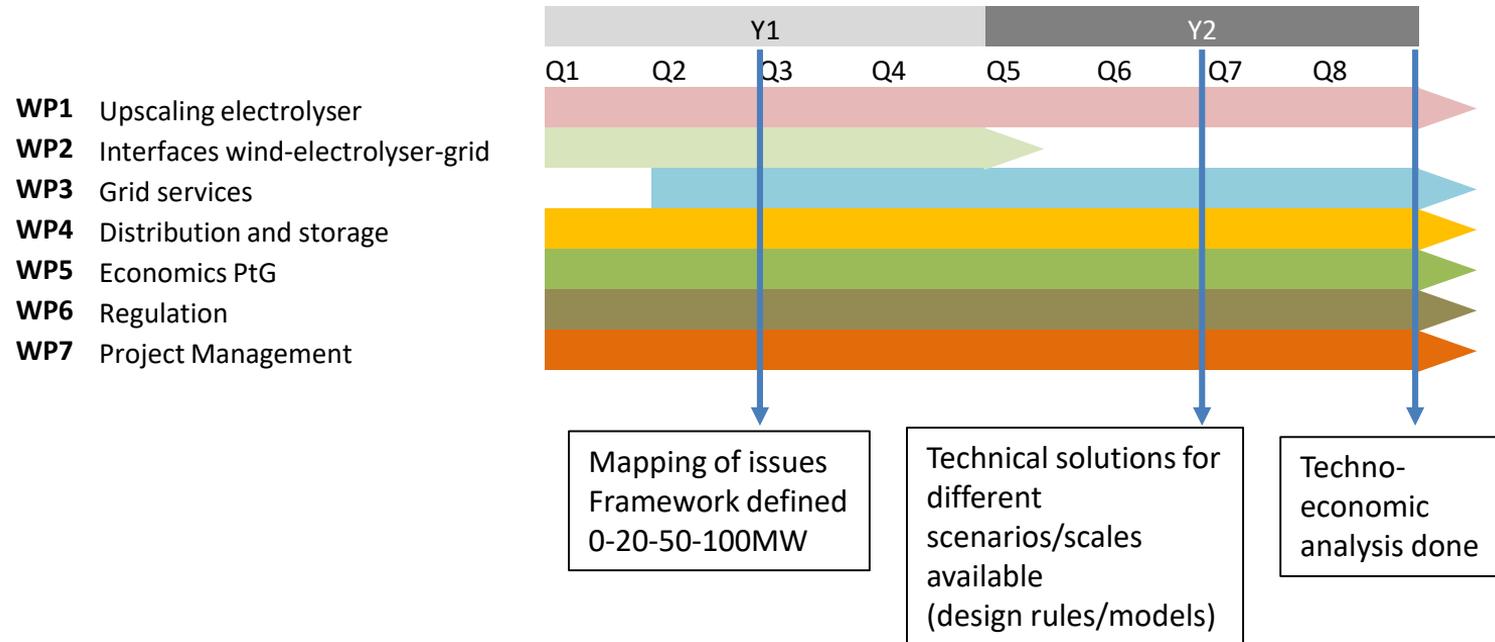


- Sponsored by:



Vlaanderen
is ondernemen





GOAL = align and improve the current state-of-the-art **energy models** serving the public debate for **Belgium's long-term planning towards 2030 and 2050**.

- Techno-economical investment models
- Energy-market models
- Electricity network models
- Models for buildings and transport

PARTNERS: Imec, KU Leuven, UHasselt, ICEDD, het Federaal Planbureau, **WaterstofNet**, Transport & Mobility Leuven, Ugent, UMons, KMI (Het Koninklijk Meteorologisch Instituut van België), UCL, ULiège en ULB.

Duration: 4 years

Sponsored by: Energy Transition Fund (federal)

Stakeholders: Industrial advisory board

EPOC 2030 - 2050

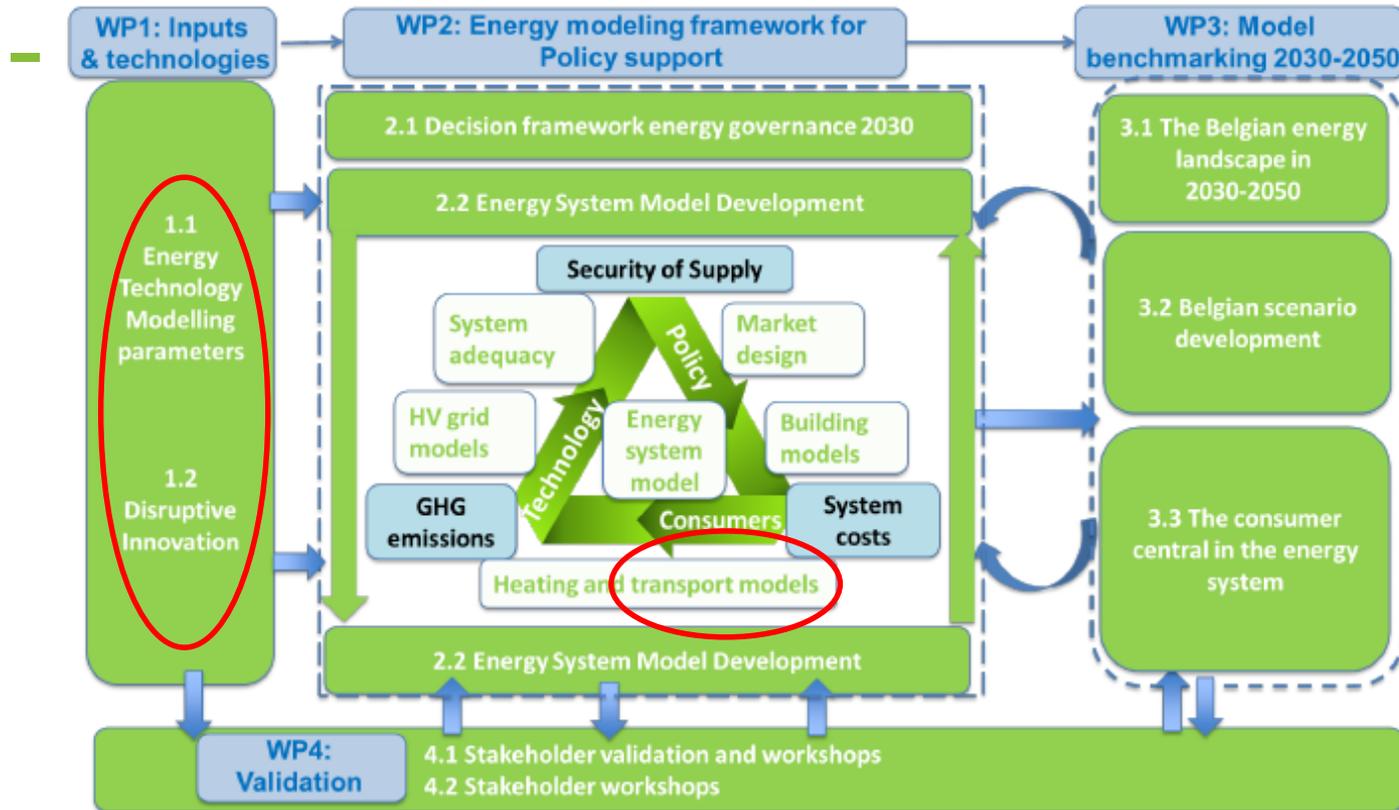


Figure 1: Overview of the EPOC 2030-2050 project



HyLAW Online Database

<https://www.hylaw.eu/database>

Production of hydrogen

Stationary Storage

Transport and distribution of hydrogen

Hydrogen as a fuel and refueling infrastructure for mobility purposes

Vehicles

Electricity grid issues for electrolyzers

Gas grid issues

Stationary power; fuel cells

Info Centre

The HyLaw consortium has analysed the applicable legal and administrative processes in all the regulatory barriers and the impact they have on the timely delivery of hydrogen technologies. V

National policy papers

Building on the content of the database, National policy present the state of play of the Hydro

[Austria](#)

[Germany](#)

[Poland](#)

[Belgium](#)

[Hungary \(EN\)](#) [HU](#)

[Portugal](#)

[Bulgaria](#)

[Italy](#)

[Romania](#)

[Denmark \(EN\)](#) [DK](#)

[Latvia](#)

[Spain \(EN\)](#) [ES](#)

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[United Kingdom](#)

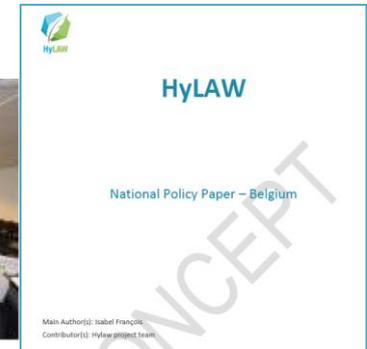
EU policy paper

Analytical reports and other deliverables

National workshop Belgium, October 23

National policy paper Belgium: recommendations for regional & federal authorities

1. Hydrogen refueling infrastructure permitting procedure
2. Hydrogen quality requirements- and monitoring in HRS
3. H₂ for shipping
4. Incentives for hydrogen vehicles: cars, buses, trucks
5. Injection of hydrogen in the gas grid



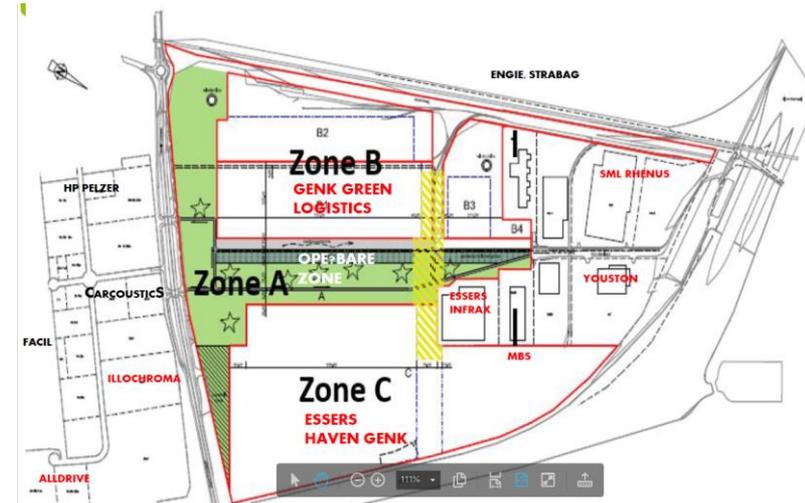
Follow-up:

- Include recommendations in Benelux and interfederal (Enover) working group on H2
- Include H2 in a coherent way in Regional Energy & Climate plans
- Check the role of BIN (Belgian Institute for Normalisation) in the different standardization work forces related to hydrogen.

- Meeting October 2:
Discussion of strategy at BE level on how to influence implementation of RED II in Belgium
 - ❑ Dec 2018: Final text REDII published
 - ❑ Mid 2020 (18 months): **Transposition of the EU RED II directive in EU member state** legislation ready
- Our Goal: maximize adoption of H2 and derived E-fuels in the transport sector
⇒ Define strategy and write this down in policy paper
- Pillars:
 - ❑ Create a **level playing field between the different options** to reach the 14% BE target including hydrogen, E-fuels and Power-to-refinery
 - ❑ **Tax/grid fee reduction** for installations that help to integrate renewable energy in the total energy system
 - ❑ A **certification scheme for e-fuels** in Belgium based a guarantee of origin scheme for hydrogen
 - ❑ Local **pilot projects**
- Next meeting December 3

- GENK Ford site (Tractebel / Engie)
 - 43 wind turbines planned
 - Possible H2 use for industry and transport
 - Inventory of possible users running
 - Draft feasibility/business case early 2019
- Izegem / Roeselare (POM West-Vlaanderen)
 - Inventory of possible users for HRS made
 - Further developments to be determined

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- Study WaterstofNet/Hinicio for Vlaams Energie Agentschap
- Inventarisation potential green H2 in transport, industry, heat in 2030-2050
- Calculation of required renewable energy in GWh

<https://www.energiesparen.be/sites/default/files/atoms/files/Rapport-Vlaams-potentieel-groene-waterstof.pdf>



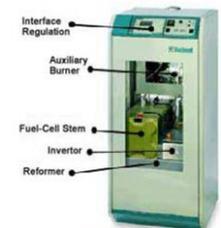
Het potentieel voor groene
waterstof in Vlaanderen
Een routekaart

In opdracht van: Vlaams Energie Agentschap (VEA)

- Roadmap for Flanders in volumes of H2 applications

- Strategic workshop June 2018
- Six challenges defined for 2030 in Flanders:
(follow-up of H2 Flanders study:

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



FOLLOW-UP STRATEGIC WORKSHOP



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Category	Actions defined	Next step
City transport	“H2-mobility” platforms in Flemish cities	Info-sessions on H2 mobility – per city- at existing HRS <ul style="list-style-type: none">• Workshop Leuven (@ Air Liquide station in Zaventem): Feb 18• Workshop Antwerpen (@ station DATS24 in Halle): Feb 20• Workshop Gent-Brussels to be planned
Bus	Define location for pilot project with 20 buses at one depot.	Discussion with De Lijn => options in new depots Rumst/Deurne Follow-up discussion with “director strategic projects” of De Lijn
	Set up Flemish plan for implementation of buses on H2 for 2020-2030, in collaboration with the cabinet.	Join existing ZEB platform , commissioned by Dept. Environment? Meeting with Jochen De Smet (The New Drive) Future of ZEB platform not clear yet. New application for follow-up phase 1 to be written.
Waste trucks	Set up Flemish plan for implementation of H2 waste trucks on H2 for 2020-2030.	<ul style="list-style-type: none">• H₂ case presented @ VVSG (Nov.) : unites FL “intercommunales”• Interest in H2 solutions, but financial support needed• Suggestion of VVSG: join forces with VIL for larger logistic project• Meeting with VIL planned on Dec 4

CLUSTER NEWS: FOLLOW-UP STRAT. WORKSHOP



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Category	Actions defined	Next step
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 truck prototypes when available: - 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"> - Discussions with ALD automotive /RENTA - Interest in working out “H2-lease test” on short term
Ships	Pilot projects needed. Focus on applications with public interest : Ferry-waterbus- tug boats.	<ul style="list-style-type: none"> - 2 Project initiatives submitted, Interreg <ul style="list-style-type: none"> ➤ ISHY: lead by Port of Ostend (Crew Transport Vessel GEOxyz; fuelling infra Ostend) ➤ H2SHIPS: lead by EDF
	Demo Ferry H2	- Integration in Terranova Solar project; discussions with VLOOT
	Demo Tug boat on methanol	- To be determined

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; for H2 combustion applications (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	- Meeting Fluvius (Eandis) – Fluxys planned - Possible feasibility study / development explored for small scale H2 storage in residential area (with Cogen VL, Flux 50, Univ Gent...)
	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

- Gasunie/Tennet announce 100 MW H2 production in Germany (ThyssenKrup)
- Engie announces 100 MW H2 production in Eemshaven
- Tata Steel announces 100 MW 100 MW H2 production in Amsterdam
- Hyundai announces supply of 1000 trucks on H2 to Switzerland
- NEL announces the building of a large network of heavy duty stations in USA (for Nikola trucks)
- Nikola trucks announces the future supply of H2 trucks to the Norwegian market, as the first market in Europe.
- Toyota sells fuel cells to European heavy duty applications (e.g. Caetanobus in Portugal).
- First Mercedes GLC on H2 - hydrogen-PHEV hybrid - drives in Germany.
- H2 buses with cost price of 380kEuro have been mentioned in the framework of the EU project H2bus (CEF project).
- Germany has now 50 H2 stations, up to 100 stations are planned by the end of 2019, long term goal of 400 stations (J.V. H2MobilityDeutschland)

1.000 FC HEAVY DUTY TRUCKS IN SWITZERLAND

- MOU between Hyundai & H2Energy Zurich
- 18 ton truck (34 ton combined with trailer)
- Range 400 km/ 250 miles (7 minutes refueling)
- Delivery expected between 2019-2023



Sources:

<https://www.telegraph.co.uk/cars/news/hyundai-supply-1000-hydrogen-fuel-cell-lorries-switzerland/>

NIKOLA TRE FOR EUROPEAN MARKET (NOV. 2018)

- Nikola truck
- 500-1200 km range
- Refill time 20 minutes @ 700 bar
- 500-1.000 HP
- 6x4 or 6x2 configurations
- Fit within current size and length restrictions
- Redundant braking, steering, 800 Vdc batteries and fuel cell for true level 5 autonomy.
- Expected production 2022-2023



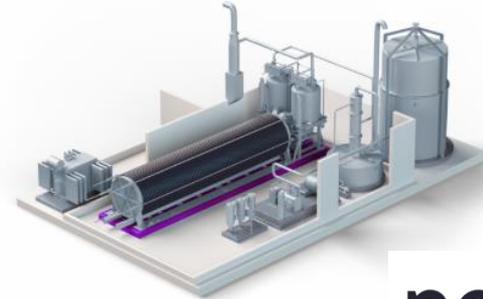
Sources:

<https://nikolamotor.com/tre>

<https://www.prnewswire.com/news-releases/nikola-launches-stunning-truck-for-european-market-300743835.html>

HEAVY DUTY REFUELING STATIONS DELIVERED BY NEL ASA

- 448 electrolyzers (1GW total) + refueling equipment (700 bar)
- Refueling for trucks & passenger vehicles
- Deployment/roll-out as of 2020
- Low cost (due to scale) and renewable
- Initial order of USD 9 for 2 demostations delivery end 2018
- Fleet testing in 2019, first stations in Arizona and California
- Next 28 stations along route Anheuser Busch (USA)



nel



Sources:

<https://nelhydrogen.com/press-release/awarded-multi-billion-electrolyzer-and-fueling-station-contract-by-nikola/>

INTERESTING NEWS & PUBLICATIONS



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Topic	Subject	Reference- Link
Bus	<p><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.</p>	<p>A study for the Fuel Cells and Hydrogen Joint Undertaking. https://www.fch.europa.eu/sites/default/files/Strategiess_%20for_joint_procurement_of_FCbuses_final_report.pdf</p>
H2 in gas grid	<p><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.</p>	<p>https://www.netbeheernederland.nl/_upload/RadFiles/New/Documents/Kiwa%20-Toekomstbestendige%20gasdistributienetten%20-%20GT170272%20-%202018-07-05%20-D...pdf (in Dutch)</p>