

Waterstof Industrie Cluster: Minutes meeting 02/03/2023 @ Siemens/Siemens Energy Huizingen

Agenda:

- 10.00-10.05: Welcome Siemens/Siemens Energy
10.05-10.40: New WIC members presentation
10.40-11.00: Keynote 1: Developments on reducing the Ir content in electrolyzers,
Emilio Manrique Ambriz, TNO
11.00-11.15: News from WIC members, Besix, Ineos
11.15-11.40: WIC news, WIC-team, WaterstofNet
11.40-12.00: Keynote 2: Facilitating the Hydrogen Roll-out with Ammonia Cracking;
Zac Cesaro, Siemens
- 12.00-13.00: Siemens/Siemens Energy Activities & tour
13.00-14.00: Network Lunch

New members since last meeting

VTTI-APTC, Vandersanden, KBC, Kalmar, Somarine, TFC (Transfurans), Eneria, Helicus, Geldof-Engicon, Honeywell, CZAV and Intertec

Presentation new members:

- **Eiffage Energy Systèmes Belgium** : Bart Van Eyndt
 - Contractor for piping & electrical infrastructure, e.g. high pressure H₂ pipeline at Colruyt site in Halle between H₂ production and fuelling station
- **De Lijn** : Bert Van Hemelen=> presented by Samira
 - Flemish internal operator for public transport, with the target of being 100% zero emission in 2035. Current strategy is focus on BEB, but H₂ still in scope for some use cases.
- **Virya Energy**: Gautier Cogels
 - Energy holding of Colruyt Group and Korys, with Eoly Energy and Virya H₂ as subsidiaries. Several projects realised on H₂ production, mobility; currently involved in several projects such as 25MW Hyoffwind project, VoltH₂ projects in Vlissingen & Terneuzen etc..
- **Swagelok Belgium**: Piero Wattier
 - Offering Swagelok products & services, compatible with hydrogen, for electrolysis, fuel cells, refuelling stations & heavy duty vehicles (fittings, valves, measurement devices)
- **Emerson**: Kristof Heyndrickx
 - Engineering company mainly active in automation projects, working with products of different brands, with the ambition to be active in green hydrogen projects.
- **Luyckx**: Mathias Goris
 - Supplier of construction equipment (cranes, tractors, excavators). A first 35 ton dual fuel H₂/Diesel excavator has been developed with CMB-tech. Larger models will be developed.
- **C-Energy**: Niko Bonyns

- Part of Cordeel group. Provides energy solutions and is developing an integrated concept with hydrogen production from local PV & a refuelling station at their site in Temse.
- **Tialoc:** Hans Hooyberghs
 - Tialoc is active in waste treatment and waste-to-energy projects. As an engineering company they offer tailor made solutions including feasibility studies, EPC projects and service level agreements. Regarding hydrogen, they are interested in engineering of H2 and ammonia factories and storage facilities, and CFD modelling of H2 combustion.
- **KBC:** Geert Cleuren
 - As a financial organisation, they want to finance future hydrogen projects as they have done for offshore projects before. Via the WIC they want to gain expertise on hydrogen.
- **Eneria:** Curd Merlo
 - Part of the Monnoyeur Group, with solutions for different energy applications (emergency power, cogeneration, They offer a hydrogen fuel cell generator with instant electrical power of 100kVA-350 kVA, to be extended to 1MVA in the near future.

Keynote: Developments on reducing the Ir content in Electrolysers, Emilio Manrique, TNO

- The hydrogen activities of TNO are concentrated in two of the NL TNO locations: Holst Centre in Eindhoven (High TEC Campus) and the site in Petten.
- TNO has a technology available that can deposit very thin layers: 'spatial atomic layer deposition' (ALD). With this technique they are depositing very thin Iridium catalyst layers
- Iridium is used in PEM electrolysers, but if it is used in the typical current quantity the future demand – based on the targeted production capacity – will surpass the global availability of this scarce material. Reduction of the Iridium content in PEM electrolysers is one of the most effective ways to solve this issue.
- TNO has been able to reduce the Iridium content from a typical content of 0,67g/kW to below 0,01g/kW. This thin layer has shown to be robust up to 2000 cycles; at this stage the performance does not reach the performance of the reference product (current density only one third of the reference). However, these first results are promising and a large consortium of partners is involved to optimise this cell concept with the thin Ir layers.

News from cluster members:

Besix: Daniel Van De Gucht

Besix presents a project with a 12 ton tower crane working on a combination of a fuel cell and batteries. Such a system allows working without connection to the electrical network (which is not allowed on all places, e.g. in Brussels) or can replace a noisy diesel genset with lots of emissions.

The system is working well, the main challenge is the availability of affordable green H2.

Ineos : Matthias Schnellman

INOVYN, the part of the business that included the hydrogen activities of hydrogen up to now, becomes INEOS Inovyn and its hydrogen business becomes INEOS Hydrogen.

WIC/WaterstofNet news & info

- The WIC member database is ready to roll out. The database will contain all members companies with email addresses from the staff and description of the activities. The

companies can be filtered following different categories. Also all WIC documents, such as meeting presentations/minutes, policy papers and working group description/participants will be published on this database. This is an internal platform, only accessible for WIC members. All individual members will receive a mail with instructions to register on the platform.

- At the EU level, different policy decisions/activities have been developed further during the past months: there was an update on the concept of the Hydrogen Bank, the adoption of the Delegated Act on Additionality and the announcement of the Green Industrial Plan.
- On the Belgian level, the Belgian Hydrogen Council has been constructed, with the election of the board and the first meetings of the five tasks to define the working program for 2023. The official launch of the BHC will be on March 17.
- In the Netherlands, the existing Hydrogen Platform will be replaced by a new industry association, i.e. 'NL Hydrogen'. At the government side, the 'Nationaal Waterstofprogramma' is coordinating several thematic groups and monitors the execution of the roadmap.
- Next to the 6 existing working groups, the working group permitting has been starting up with a number of actions to facilitate the permitting processes by initiating 'sectoral codes of good practice'.

WIC events in 2023

- **WIC meetings 2023**
 - WIC meeting 2: Thursday 8 juni @ Callens
 - WIC meeting 3: Thursday 21 sept @ Atlas Copco
 - WIC meeting 4: Thursday 7 dec @ Cummins
- **WIC/BHC conference** October 2023 (Week Oct 16, tbd) in Brussels
- **WIC visit NRW** (June 12-13, 2023, invitation will follow, draft program in the slides)
- **Meet & Greet:** to be planned in April
- **Webinars:** not planned yet, CALL for topics!
- **Thematic workshops** to be planned (input is welcome)
- **Event on German embassy** in Brussels, March 15, 12.00-15.30, (On German-Namibian-Belgian H2 development dimensions), cfr mailing 28/2

Keynote 2: Facilitating the Hydrogen Roll-out with Ammonia Cracking; Zac Cesaro, Siemens

- Ammonia is a very interesting carrier for green hydrogen; cracking ammonia to hydrogen is an essential step with costs a significant amount of energy.
- Siemens sees the application of ammonia cracking in two scenarios: the small scale crackers that are installed close to an application (e.g. HRS) and the large scale crackers that are in the ports next to the large scale ammonia storage and the large industrial H2 users.
- Siemens aims at an efficient integrated design of a cracker with a gas turbine operating on hydrogen, where the consumption of H2 is very high which justifies the storage in the form of ammonia.
- Regarding the technology, several concepts are possible, with the SMR/ATR type of reformer or a reversed Haber Bosch being the most relevant types for large scale cracking. Depending on the desired purity of the produced hydrogen, the cracking process and the used catalysts

can be optimised. There is still a lot of improvement possible regarding materials/energy consumption.

- Existing LNG import terminals can be reconverted to ammonia terminals (incl cracking) with a 'limited' retrofit cost. Integration with existing LNG terminals can create energy saving synergies.

Siemens/Siemens Energy Tour:

- **Virtual visit to the Haru Oni pilot project in Chile/Patagonia.** Production of e-fuel (methanol and e-gasoline) for Porsche cars, based on green hydrogen and CO₂ from Direct Air Capture.
- **Presentation of products & tools developed by Siemens/Siemens Energy** (Simcenter platform, building of digital twins of hydrogen projects, data management of complex systems e.g. network of refuelling stations etc...)

Present in the meeting
In person

Nick	Valckx	Agfa
Suzy	Valgaeren	Air Products
Wouter	Everaerts	APK
Philippe	Alboort	ArcelorMittal
Hans	Magits	Atlas Copco
Thom	Leeuwestein	Ballast Nedam
Chris	Dhulst	Bekaert
Daniel	Van De Gucht	Besix
Tony	Lippens	BIP Elneo
Ted	Straten	Bosal
Eddy	Pluymers	Bosal
Danny	Vancoppenolle	BUREAU VERITAS
Niko	Bonnyns	C-energy
Jan	Rongé	COKKAT / Solhyd
Patrick	Berre	Denys
Bart	Van Eyndt	Eiffage
Kristof	Heyndrickx	Emerson
Curd	Merlo	Eneria
Koen	Van Roy	Eneria
Erwin	Theys	Eneria
François	Boisseleau	Engie
Gautier	Cogels	Virya/ Eoly Energy
Anais	Blanc	Virya/ Eoly Energy
Dirk	Focroul	Fluxys
Riet	De Baets	Franki Construct
Peter	Verrept	Geldof
Jef	Dijckmans	Iemants (Smulders)
Matthias	Schnellmann	INEOS
Christian	Gateley	INEOS
Alain	Hanneuse	INEOS
Peter	Gysen	Intertek Belgium
Liviu	Rusu	Iulius
Olivier	Ulrici	John Cockerill
Bart	Van der Cruysse	Kalmar
Geert	Cleuren	KBC Bank
Frea	Van Steenweghen	KULeuven
Lander	Hollevoet	KULeuven
Pascal	Steiner	LRQA België
Pieter	De Vos	LRQA België
Mathias	Goris	Luyckx
Niels	Tobback	Messer Group
Dirk	De Keulenaer	Messer Group

Steven	Keyzer	OCAS
Marc	Vanderschueren	OCAS
Koen	Van den Brande	Polders Investeringsfonds
Julian	Lai	SDISW (Siemens)
Pieter	Dejonghe	Siemens
Christophe	Van Doninck	Siemens
Johan	De Blicck	Siemens
Geert	De Coninck	Siemens
Christophe	Vandevelde	Siemens
Piet	Van der Biest	Siemens Energy
Dries	Goossens	Siemens Energy
Wim	Van Den Mosselaer	Siemens Energy
Laurence	Vereycken	Siemens Energy
Zac	Cesaro	Siemens Energy
David	Cay	Sirris
Pierre	Faché	Smart Hub - VL Brabant
Bram	Vermeulen	Sodeco
Caroline	Coorevits	Sodeco
Joris	Van Dyck	Solenco Power
Sven	Duchatelet	Solenco Power
Amedee	Somers	Somarine
Piero	Wattier	Swagelok Belgium
Olivier	Bravin	Swagelok Belgium
Hans	Hooyberghs	Tialoc
Emilio	Manrique Ambriz	TNO
Jonathan	van den Ham	TNO
Sven	Goethals	Tractebel
David	Bolsman	TÜV Austria
Rüdiger	Hoyer	Umicore
Nicole	Schichtel	Umicore
Ivan	Piette	Viessmann Belgium
Peter	Simkens	Von Karman Inst.
Tom	Verlinden	WaterstofNet
Stefan	Van Laer	WaterstofNet
Chris	Lefrère	WaterstofNet
Liesbet	Vanhoof	WaterstofNet
Isabel	François	WaterstofNet
Adwin	Martens	WaterstofNet
Davine	Janssen	WaterstofNet
Samira	Farahani	WaterstofNet
Franky	Van den Berghe	Willemen Groep
Hans	van Tigchelt	Ziero
Online		
Vince	White	Air Products
Siegbert	Verhulst	Air Products

Andrew	Shaw	Air Products
Eric	De Coninck	ArcelorMittal
Sandra	Wauters	BASF
Jasper	Smets	Chevron Phillips Chemical
Rene	Peperkamp	CroonWolter&Dros
Thomas	Cools	Eneco
Koen	Vlaeminck	Engie
Jeroen	Schmidt	Eriks
Lut	Bollen	EWI-Vlaanderen
Guy	Verkoeyen	Exion Hydrogen
Marleen	Dierickx	Farys
Leon	Cappaert	FPIM
Herman	Van Damme	G&V
Roy	Neha	Hyster-Yale
Pieter	Jacqmaer	Infrabel
Wim	Macleanen	Inland Navigation Luxemburg
Martin	Dorsman	Kelvion
Geert	Van Overloop	Naval
Arnaud	van de Bree	Nedstack
Steven	Perrault	P&V Panels
Didier	Van Osselaer	PoAB
Mark	Philips	SGS
Niels	Bellicourt	Swagelok Belgium
Philippe	Bellicourt	Swagelok Belgium
Luc	Boonen	Sweco Belgium
Fedrik	Vancraeynest	Sweco Belgium
Arjan	Missinne	Sweco Belgium
Yannick	Sijssens	Tessenderlo Group
Johan	Dekervel	Total Energies
Dimitri	Van Den Borre	Tractebel
Jens	Dedeyne	UGent
Lukas	Buelens	UGent
Marcel	Meeus	Umicore
Kurt	Vandeputte	Umicore
Julian	Hümmer	Uniper
Rein	Borgoo	VK Architects -Engineers
Joep	Fassaert	Vollenhoeven Olie
Ferenc	Petkovics	VoltH2
Stefan	Neis	WaterstofNet
Michel	Honselaar	WaterstofNet
Guy	Ruts	WaterstofNet
John	Van Leeuwen	Weidmüller

Isabel François
March 2, 2023