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Technologies & solutions
for a low-carbon
hydrogen future

Europe's dedicated exhibition and
conference showcasing the latest hydrogen
and fuel cell technologies, components,
raw materials, test and evaluation tools,
and engineering solutions.

PRELIMINARY CONFERENCE PROGRAMME



TRACK 01

Hydrogen
Production, Storage,
& Infrastructure
Development



TRACK 02

Fuel Cell Design,
Development,
& Manufacturing



TRACK 03

Carbon Capture,
Utilisation
& Storage



20-21 October 2021



Messe Bremen, Germany



hydrogen-worldexpo.com

TRACK 01

Hydrogen Production, Storage, & Infrastructure Development

DAY 1: OCTOBER 20, 2021

9:00 am - 12:30 pm
OPENING PLENARY &
KEYNOTE SESSIONS:



9:00 am
WELCOME ADDRESS

Kristina Vogt
Minister of Economic Affairs,
Labour and Europe, FREE
HANSEATIC CITY OF BREMEN



Welcome and opening of the conference.



9:05 am
**HYDROGEN - THE ENERGY
CARRIER OF THE FUTURE?**

Thorsten Herdan
Director General, FEDERAL
MINISTRY FOR ECONOMIC
AFFAIRS AND ENERGY, GERMANY



Germany's energy transition is not just about eliminating nuclear and coal-fired power plants, but a complete overhaul of the entire energy system. Germany's Climate Action Plan 2050 has declared greenhouse gas neutrality as the goal, so the country will construct a low-carbon society that relies mainly on sustainable energy sources including hydrogen technology.

TRACK 02

Fuel Cell Design, Development, & Manufacturing

DAY 1: OCTOBER 20, 2021

9:00 am - 12:00 pm
OPENING PLENARY &
KEYNOTE SESSIONS:



9:00 am
**FUEL CELL PROJECTS IN THE
FIELD OF MARKET ACTIVATION
AND R&D WITHIN THE NATIONAL
INNOVATION PROGRAMME
HYDROGEN AND FUEL CELL
TECHNOLOGY (NIP)**



Elena Hof

Programme and Team Leader, National
Innovation Programme Hydrogen and Fuel Cell
Technology (NIP), NOW GMBH

The presentation will provide updates on market
trends and the latest news from a range of fuel cell
projects across the EU observed by National Innovation
Programme Hydrogen and Fuel Cell Technology (NIP).



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TRACK 03

Carbon Capture, Utilisation & Storage

DAY 1: OCTOBER 20, 2021

9:00 am - 1:00 pm
OPENING PLENARY &
KEYNOTE SESSIONS:



9:00 am
**CARBON CAPTURE AND
UTILIZATION IN THE EUROPEAN
CONTEXT**



Secretary General
CCU Officer, CO2 VALUE EUROPE

Carbon capture and utilization (CCU) is gaining increasing attention as a solution to achieve the EU's ambitious climate goals for 2030 and 2050. Many pre-commercial projects are expected to come into operation in the next three to four years and many more are in the pipeline, supported by European and national schemes. Now is the time to invest in this scale-up to achieve net emissions reduction in various economic sectors, provide an alternative carbon feedstock for the production of everyday carbon-based products and increase circularity approaches within industrial processes. While support through schemes like the Innovation Fund, the IPCEIs, the CCUS SET-Plan and Horizon Europe is essential, equally important is the correct signal that policy should give to industrial actors who are ready and willing to upscale their processes. It is therefore essential that the complex climate policy framework is consistently supportive of the deployment of CCU technologies and the market uptake of CCU products.

TRACK 01



9:20 am
HYDROGEN VISION FOR 2025

Dr. Urban Keussen
CTO, EWE AG

EWE

Hydrogen in combination with renewable energy production will be an important pillar in the global portfolio.

The focus is on the industry sector and heavy-duty applications in the mobility sector along with integration of large-scale storage facilities and pipeline transport as an important aspect of cost reduction of hydrogen supply.



9:45 am
DECARBONIZATION, FLEXIBILIZATION AND HYDROGENATION – HOW TO INCORPORATE ELECTROLYZERS INTO ENERGY SYSTEMS

SIEMENS

Jörn Ernst
Project Developer, SIEMENS

This presentation will provide solutions for how electrolyzer technology could fit together into an energy ecosystem that serves as a backbone to create new business models.



10:05 am
THE IMPORTANCE OF COLLABORATIVE R&D IN THE HYDROGEN SECTOR

Marina Holgado
Technical Secretariat Coordinator
IEA HYDROGEN TCP



The Hydrogen TCP is an international collaborative R&D programme created under the auspices of the IEA in 1977. In this session, we will learn more about the current and planned activities of the Hydrogen TCP that will address challenges faced by hydrogen technologies in

TRACK 02



9:25 am
THE ROADMAP TO SUSTAINABLE MOBILITY

Prof. Dr. Christian Mohrdieck
Managing Director, CELLCENTRIC



The presentation will outline a roadmap toward series production of fuel cell systems and fuel cell trucks. This will include hydrogen fuel cell systems that can be used as a clean powertrain in trucks and other commercial vehicles, making long-range possible or as an emergency power supply for critical facilities in data centers.



9:50 am
FUEL CELL - A CRUCIAL PILLAR IN FUTURE AUTOMOTIVE POWERTRAINS



Achim Moritz
Vice President Product
Management Fuel Cell Mobility
Solutions and Innovations,
ROBERT BOSCH GMBH

Fuel cells can make an important contribution to reducing CO2 in the transport sector, which accounts for an enormous share of global CO2 emissions. By 2030, these emissions are set to be reduced by 30% in newly registered vehicles. Yet it is unlikely that these targets will be met by battery-electric drive systems alone. And that is where the strengths of the fuel cell come into play. The fuel cell can effect a lasting transformation in the transport sector and bring huge advantages to people and the environment. How do we bring the technology to scale?



9:20 am
THE ROLE OF EUROPEAN CO2 INFRASTRUCTURE IN THE RACE TOWARD NET ZERO



Per-Olof Granström
EU Director, CARBON CAPTURE
AND STORAGE ASSOCIATION

The future of CCS technology depends largely on successful CO2 transport and storage infrastructure. What is the latest in common access and tariff controls? Will they allow transport of CO2 that links emitters across Europe to storage sites?



9:40 am
CARBON CAPTURE IN THE US & EUROPE: POLICY AND PROJECT TRENDS



Lee Beck
International Director, Carbon
Capture, CLEAN AIR TASK FORCE

Project development in the US and Europe is shaping up at unprecedented speed, with more than 40 carbon capture projects under way on either side of the Atlantic. At the same time, policymakers are drawing up new policies and innovative ways of support. What has happened over the past three years, where are we headed, and how does it align with achieving net-zero emissions? This presentation will review the latest trends carbon capture trends in policy and projects and discuss the technologies' role in achieving net-zero emissions.



10:00 am
PRESENTATION TITLE TO BE ANNOUNCED



Nick Flinn
EMEAR Technology Licensing and
Services Regional VP, SHELL

TRACK 01

the different steps of the value chain. What are the main challenges and drawbacks that limit the massive scale-up and deployment of hydrogen technologies? How are they being addressed? What is needed?

10:30 am - 11:00 am
BREAK



2:25 pm **GREEN HYDROGEN FOR ZERO-EMISSION AVIATION**

Guido Schwartz
Project Leader, AIRBUS



Airbus aims to lead the decarbonization of the aviation sector by building the world's first zero-emission airliner by 2035. Through the advancement of its new ZEROe aircraft concept designs, green hydrogen production will play a key role in the reduction of CO2 emissions.



11:25 am **QUO VADIS HYDROGEN?**

Dr. Peter Hoffmann
Associate Director Energy System Planning, TENNET



The presentation will first analyse the needs for Hydrogen and the renewable potential in Germany available for Hydrogen production. It will further work out, where the electrolyzers should be placed and how they need to be operated, to have maximum benefits for the society.

TRACK 02



10:45 pm **FUEL CELLS FOR REAL WORLD APPLICATIONS: WHAT DOES IT TAKE?**

George Rubin
CCO, LOOP ENERGY



Organizations that adopt hydrogen-electric solutions have two major benefits to gain: superior functionality and lower cost of ownership. Loop Energy has attracted customers and partners around the world to its hydrogen fuel cell products, and it has gained many market insights along the way. This presentation will outline critical factors that one must consider when designing a hydrogen fuel cell vehicle for mass market adoption.

10:15 am - 10:45 am
BREAK



11:30 am **PANEL DISCUSSION: ARE FUEL CELLS NOW A VIABLE CHALLENGER?**

Dr. David Hart
Director, E4TECH



Achim Moritz
Vice President Product Management Fuel Cell Mobility Solutions and Innovations
ROBERT BOSCH GMBH



Fuel cell technologies have experienced cycles of high expectations followed by periods of disillusionment. Recent evidence however suggests that these technologies form an attractive option for the decarbonisation of the global energy mix, and that recent improvements in their cost and performance point towards economic viability as well. Are we now at a time where we can see fuel cells competing against both fossil fuels and batteries?

TRACK 03



10:25 am **CCS+ INITIATIVE: UNLOCKING CARBON CREDIT POTENTIAL FOR EMISSION REDUCTIONS AND REMOVALS**

Matthias Krey
Managing Director, PERSPECTIVES CLIMATE GROUP



Introduction of the recently launched CCS+ Initiative, its objectives to scale up CCS+ activities through the carbon market and workplan for developing methodologies for carbon credit generation and associated compliance tools

10:50 am - 11:20 am
BREAK



11:20 am **DECARBONISING GAS TURBINES WITH CARBON CAPTURE WHILE PRESERVING THEIR VALUE TO THE ELECTRIC GRID**

Martin O'Neill
Vice President of Product Management, GE GAS POWER



In all scenarios envisioning the power grid in 2050, today's gas turbine fleet will still function to provide reliable, dispatchable, load-flexible power to a renewable grid. Few studies have approached decarbonizing gas turbines with the express goal of preserving the attributes of a natural gas combined-cycle plant, which are critical to enable a renewable energy-based future. GE has the expertise in NGCC design and operability to achieve this flexibility when integrated with post-combustion carbon capture without compromising the value GT's provide to the grid.

TRACK 01



11:50 am
PANEL DISCUSSION: WHAT'S HOLDING HYDROGEN BACK? INVESTMENT OR TECHNOLOGY?



Dr Carola Kantz
Deputy Managing Director, VDMA



Tore Sylvester Jeppesen
Senior Vice President, HALDOR TOPSOE



Victoria Judd
Counsel, PILLSBURY WINTHROP SHAW PITTMAN LLP



Salah Mahdy
Global Director for the Hydrogen Market, HOWDEN



Magnolia Tovar
Zero-Carbon Fuels Policy Director, Europe, CLEAN AIR TASK FORCE

Hydrogen can play a massive role in fighting both the climate crisis and decarbonising a variety of different sectors yet it still remains some way from realising its potential. Is this down to a lack of serious investment and infrastructure or is the technology and innovation standard still not up to speed?



12:30 pm - 2:00 pm
LUNCH

TRACK 02

12:00 pm - 1:30 pm
LUNCH

1:30 pm - 5:30 pm
DESIGN:



1:30 pm
UP AND AWAY: FUEL CELL POWERTRAIN DESIGN FOR AVIATION



Sergey Kiselev
Head of Europe, ZEROAVIA

The presentation will discuss a zero-emission powertrain that has 75% lower fuel and maintenance costs, resulting in up to 50% total trip cost reduction. It delivers 300-500 mile zero-emission missions in a 10-20-seat fixed-wing aircraft to utilize existing infrastructure and simplify regulatory issues.



1:55 pm
SCALING PRODUCTION TECHNOLOGIES FOR METALLIC BIPOLAR PLATES



Fabian Kapp
Managing Director, GRAEBENER BIPOLAR PLATE TECHNOLOGIES

The presentation will discuss specialized manufacturing technology for the production of metallic bipolar plates for fuel cells.

TRACK 03



11:45 am
EFUELS – CONVERTING CARBON EMISSIONS INTO LIQUID, CARBON NEUTRAL FUEL



Asam Rafi
VP of Sales, vCARBON CLEAN



Claes Fredriksson
CEO & Founder, LIQUID WIND



The world needs large volumes of clean fuel, to reduce carbon emissions fast. Together Liquid Wind and Carbon Clean will efficiently capture biogenic CO2 and convert this into commercially-viable carbon neutral fuel. Join to find out how

Carbon Clean's innovative CCU technology combined with Liquid Wind's ambitious plans will reduce emissions by 1 billion tonnes by 2050.



12:10 pm
DIRECT AIR CAPTURE: A TECHNOLOGY SOLUTION TO GET TO NET-ZERO



Birk Teuchert
Head of Business Development, CLIMEWORKS

To get to net zero, significant carbon dioxide removal (CDR) capacities are required. Direct Air Capture (DAC) offers high potential in terms of scalability and permanence of the removals. Climeworks has set out to deploy DAC facilities in order to realize cost improvements as well as to get removal capacities to a climate-relevant scale in the near future.

TRACK 01

2:00 pm - 6:00 pm LOW-CARBON HYDROGEN PRODUCTION:



2:00 pm
**NANOMATERIALS-ENABLED
WATER ELECTROLYSIS – THE
PATH TOWARD ECONOMICALLY
COMPETITIVE GREEN HYDROGEN
PRODUCTION**



Dr Schwan Hosseiny

Co-founder and CEO, CUTTING-
EDGE NANOMATERIALS

The presentation will introduce novel nanomaterials and explain how their use in electrolyzer technologies will allow a drastic reduction of capex and opex and, by that, lower the levelized cost of green hydrogen (LCOH) to a level comparable with the gray hydrogen.



2:25 pm
**GREEN HYDROGEN FOR ZERO-
EMISSION AVIATION**

Dr. Tobias Reincke

Strategy & Innovation Lead,
AIRBUS



Airbus aims to lead the decarbonization of the aviation sector by building the world's first zero-emission airliner by 2035. Through the advancement of its new ZEROe aircraft concept designs, green hydrogen production will play a key role in the reduction of CO2 emissions.

TRACK 02



2:20 pm
**FUEL CELL STACKS AND SYSTEMS
FOR STATIONARY AND MOBILE
APPLICATIONS**



Andreas Bodén

Director Sales, POWERCELL
SWEDEN AB

Latest updates across a range of international projects and collaborations on fuel cell stacks and systems for stationary and mobile applications.

2:45 pm - 3:15 pm
BREAK



3:15 pm
**INNOVATIONS IN FUEL CELL
STACK DESIGN**



Mardit Matian

Founder & Director, EH GROUP

The presentation will introduce a uniquely redesigned fuel cell stack at the microstructure level, making it more compact, lightweight and efficient. FC technology operates with a simplified system architecture, leading to fewer parasitic loads, lower costs and higher efficiency. High micro precision eliminates conventional stack assembly methods, which drives down production costs significantly.

TRACK 03



12:35 pm
**WORLD-LEADING EXPERTISE IN
CARBON CAPTURE**



Arne Thorsen Kalle

Commercial Manager,
TECHNOLOGY CENTRE
MONGSTAD

Technology Centre Mongstad (TCM) offer world-class test facilities and competence to highly esteemed Technology Vendors in their pursuit of excellence. They provide Advisory Services – risk intelligence – to Project Owners through all project phases to mitigate technical, HSE and financial risk. Wide experience from proprietary and non-proprietary scientific campaigns, which has given valuable practical experience in emission measurements, operations and maintenance.

1:00 pm - 2:30 pm
LUNCH



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TRACK 01



2:50 pm ADVANCED ANION EXCHANGE MEMBRANE TECHNOLOGY FOR COST-COMPETITIVE GREEN HYDROGEN PRODUCTION



Dr Anna Pougin
Project Manager, EVONIK

Sustainable hydrogen is regarded as a key-component to a climate neutral society and industry. For sustainable hydrogen to make a difference and pose as an attractive alternative energy carrier or reactant it needs to be produced at costs competitive to conventional grey hydrogen. Today, the costs for hydrogen produced by water electrolysis with sustainable energy exceeds the costs of grey hydrogen by far. In order to reduce the costs of green hydrogen from electrolysis the investment costs into the electrolyzer have to be reduced, while operating at high energy efficiencies to keep operational costs at a minimum. Evonik's Alkaline Exchange Membrane (AEM) is the key component in alkaline membrane water electrolysis. It requires Evonik's competence in high-performance polymer design and electrolysis expertise, because it combines superior durability both mechanical and in alkaline medium while allowing for outstanding ion exchange rates. In this presentation we want to introduce you to our vision of how AEM can lower the costs of green hydrogen and why and how can become part of that vision.

3:15 pm - 3:45 pm
BREAK

TRACK 02



3:40 pm BIPOLAR PLATES FOR HT-/ LT-PEM FUEL CELLS AND ELECTROLYZERS



Thorsten Hickmann
CEO, EISENHUTH GMBH & CO. KG

The latest developments with porous and non porous composite bipolar plates for HT-/ LT-PEM fuel cells and electrolyzers.



4:05 pm ENERGY-EFFICIENT INTO THE FUTURE – THE STATIONARY FUEL CELL SYSTEM BY BOSCH



Marcus Spickermann
Senior Vice President - Head of
the stationary Solid Oxide Fuel
Cell (SOFC) program, ROBERT
BOSCH GMBH

The latest developments with porous and non porous composite bipolar plates for HT-/ LT-PEM fuel cells and electrolyzers.



4:30 pm COST EFFICIENT FUEL CELLS FOR MOBILE GENERATORS



Simon Pauli
Vice President, ASPENS

Generators using fossil fuel are state of the art for generating energy. What are the challenges for Fuel Cell Systems to become more competitive in the future? What is the impact of initial and operating cost on Fuel Cell System distribution?

TRACK 03

2:30 pm - 6:00 pm CARBON CAPTURE & STORAGE:



2:30 pm DECARBONISATION AND IMPLEMENTATION ROADMAP OF HEIDELBERGCEMENT



Jan Theulen
Director Alternative Resources,
HEIDELBERGCEMENT

The presentation will discuss the 2030 and 2050 decarbonization targets for HeidelbergCement. This will include remaining competitive while complying with carbon pricing and climate change regulations; which technologies we are considering; our future fuel, energy and infrastructure requirements; support mechanisms needed to decarbonize the business; progress made toward our decarbonization targets.



2:55 pm METAL-ORGANIC FRAMEWORKS – ENABLING DEEPER DECARBONIZATION



Conor Hamill
COO, MOF TECHNOLOGIES

Metal-organic frameworks are a new class of advanced materials that are creating new possibilities for carbon capture. Their unique physicochemical properties and their engineerable structure offer opportunities for unmatched capacity and selectivity for CO₂ removal.

TRACK 01



3:45 pm
ACHIEVING THE END GOAL OF GREEN HYDROGEN: WHAT TECHNOLOGY DEVELOPMENTS ARE REQUIRED



Eugene McKenna

Managing Director Green Hydrogen, JOHNSON MATTHEY

There is an urgent need to limit the rise in global temperatures to avoid severe environmental and societal impact. This can be expressed as a target to achieve net zero carbon emissions by 2050. The provision of decarbonised hydrogen at scale is an essential step in helping to achieve net zero. Johnson Matthey's Low Carbon Hydrogen (LCH) technology permits the needs of scale and urgency to be met. Scale up of green hydrogen production will increase the role of electricity in hard to decarbonise areas, including transport, heating, and chemical industries, where it plays a small role today.



4:10 pm
RENEWABLE HYDROGEN ON THE WAY TO FOSSIL PARITY



Thorsten Herbert

Director for Market Development and Public Affairs, NEL ASA

Hydrogen produced from renewables, such as wind and solar, is a key enabler for the energy transition. With the current cost trend of renewables, green hydrogen is on a trajectory to start outcompeting fossil solutions by the middle of this decade.

TRACK 02



4:55 pm
PANEL DISCUSSION: EXPLORING RECENT BREAKTHROUGHS IN FUEL CELL DESIGN



Andreas Bodén

Director Sales, POWERCELL SWEDEN AB



Thorsten Hickmann
CEO, EISENHUTH GMBH & CO. KG



Mardit Matian

Founder & Director, EH GROUP



Marcus Spickermann

Senior Vice President - Head of the stationary Solid Oxide Fuel Cell (SOFC) program, ROBERT BOSCH GMBH



The global market for fuel cells is projected to reach almost US\$15 billion by 2027, driven by the technology's crucial role in building a clean and sustainable planet for future generations. Despite the research and improvements in fuel cell design and components made over the past several years, many issues still have to be addressed before they can finally become competitive enough. What are the latest developments in the market and what does the future of design look like for fuel cells across multiple industries?



END OF DAY 1

TRACK 03



3:20 pm
QUANTUM ALGORITHMS AND QUANTUM COMPUTING SOLUTIONS FOR ADVANCED CARBON CAPTURE, UTILIZATION AND STORAGE (CCUS) TECHNOLOGIES



Ilyas Khan

CEO, CAMBRIDGE QUANTUM COMPUTING

A collaboration with Total Energies will use CQC's expertise in quantum computing and quantum chemistry, including the utilization of CQC's industry-leading quantum chemistry platform EUMEN, to support and help develop Total Energies' CCUS R&D efforts.

3:45 pm - 4:15 pm
BREAK



4:15 pm
THE APPLICATION OF CRYOGENIC CARBON CAPTURE TO HYDROGEN PRODUCTION



Dr. Larry Baxter

Technical Director, SUSTAINABLE ENERGY SOLUTIONS

Cryogenic Carbon Capture (CCC) is a post-combustion technology that has the potential to reduce carbon emissions from fossil-fueled power plants by 95–99%, at half the cost and energy of current state-of-the-art carbon capture processes. In addition, CCC removes other pollutants, such as SOX, NOX and mercury.

TRACK 01



4:35 pm H2FUTURE – A EUROPEAN FLAGSHIP PROJECT FOR THE GENERATION AND USE OF GREEN HYDROGEN



Robert Paulnsteiner
Hydrogen Technologist, VERBUND

H2FUTURE is a European flagship project for the generation of green hydrogen from electricity from renewable energy sources. Coordinated by the utility VERBUND, the steel manufacturer Voestalpine and Siemens, a proton exchange membrane (PEM) electrolyzer manufacturer, a large-scale 6MW PEM electrolysis system will be installed and operated at the Voestalpine Linz steel plant in Austria. The Austrian transmission system operator (TSO) Austrian Power Grid (APG) will support the prequalification of the electrolyzer system for the provision of ancillary services. The Netherlands' research center TNO and K1-MET (Austria) will study the replicability of the experimental results on larger scales in EU28 for the steel industry.



5:00 pm SCALING EFUELS – PUSHING BEYOND GREEN HYDROGEN



Claes Fredriksson
CEO & Founder, LIQUID WIND



Engelbert Schrapp
Principle Corporate Account
Manager, SIEMENS ENERGY



The world needs large volumes of clean fuel, to reduce carbon emissions fast. Together Liquid Wind and Siemens Energy will utilise leading green hydrogen technology and digital expertise to produce commercially-viable carbon neutral fuel at scale. Join to find out how together they will establish 500 eFuel facilities and reduce carbon emissions by 1 billion tonnes by 2050.



TRACK 03



4:40 pm ENABLING CCUS WITH A BROAD AND DIVERSIFIED TECHNOLOGY PORTFOLIO



Gianluca Di Federico
Energy Transition and Carbon
Capture Strategist, BAKER
HUGHES

Deployment of CCUS at scale is essential to meet the growing demand for energy while also addressing climate change. Baker Hughes offers a full range of products and services to support the entire CCUS project value chain. For carbon capture in particular, Baker Hughes is focused on making sure the process itself is sustainable. It is using CAP (Chilled Ammonia Process) to remove carbon dioxide from the flue gas. CAP's solvent is stable, not susceptible to contaminants, widely available, easily procured and safe. Baker Hughes continues to innovate with technologies such as Compact Carbon Capture, a pioneering industrial scale solution, as well as to invest in bio-methanation technology company Electrochaea that provides a solution to recycle CO2 into grid-quality synthetic natural gas.



5:05 pm SAFE AND COST-EFFICIENT CO2 STORAGE: EMERGING MONITORING TECHNOLOGIES



Cathrine Ringstad
Senior Adviser, SINTEF

A reliable monitoring system is essential for safe and cost-efficient CO2 storage. This presentation will look at emerging technologies for the acquisition and interpretation of geophysical data for efficient and accurate CO2 monitoring. It will include topics such as fiber-optic sensing, noise-based monitoring, integration of complementary data types and the use of machine learning.

TRACK 01



5:25 pm
PANEL DISCUSSION: CAN HYDROGEN MEET ENERGY DEMANDS? CLEAN HYDROGEN FOR A GREEN RECOVERY



Dr Carola Kantz
Deputy Managing Director, VDMA



Jens Bischoff
Business Development, ENAPTER



Jörg Balster
Business Manager, EVONIK



Bart de Vries
Business Development & Sales Manager, VONK



Jean Louis Kindler
Co-Founder, and CEO, WAYS2H



Clean hydrogen is a major piece of the climate puzzle and a prominent feature of the European Green Deal, a strategy the EU has adopted to reduce the dependence on dirty, imported fossil fuels. In recent years green hydrogen has been hailed as the magic bullet but is it the answer and can it meet increasing energy demands as we get back to a new normal post-pandemic?



END OF DAY 1



TRACK 03



5:30 pm
PANEL DISCUSSION: ENABLING LARGE-SCALE CCS: KEY ACTIONS AND INVESTMENT OPPORTUNITIES



Birk Teuchert
Head of Business Development, CLIMEWORKS



Massimo Pardocchi
Global Development Director Projects & Key Account Management, BILFINGER



Cathrine Ringstad
Senior Adviser, SINTEF



Carbon capture and storage technology is vital for the decarbonisation of energy-intensive industries, which are responsible for about a fifth of all greenhouse gas emissions in the EU. At the same time, carbon capture technologies have only been tested on a smaller scale and are still not yet available for multiple energy-intensive industries that need them. What steps should be taken to address economic and political barriers and what support is needed to develop key infrastructure and technology?

END OF DAY 1

TRACK 01

DAY 2: OCTOBER 21, 2021

9:00 am - 12:30 pm INFRASTRUCTURE AND TRANSPORTATION NETWORK:



9:00 am
**THE ROLE OF SUPPLY CHAIN
DEVELOPMENTS IN HYDROGEN
INFRASTRUCTURE**



Dr. David Hart
Director, E4TECH

For low-carbon fuel such as hydrogen to work, improvements and changes to infrastructure and the transportation network are necessary. How will a fledgling supply chain encourage more widespread adoption of hydrogen?



9:25 am
**EXPANDING THE NORTHERN
NETHERLANDS HYDROGEN VALLEY**



Nienke Homan
Regional Minister, PROVINCIE
GRONINGEN

Over the past several years, the Northern Netherlands has accelerated its hydrogen project pipeline together with its ambitions of becoming the leading European hydrogen ecosystem. By 2040 it aims to connect all of western Europe through its unique hydrogen valley.

TRACK 02

DAY 2: OCTOBER 21, 2021

9:00 am - 12:30 pm DEVELOPMENT, TESTING & SAFETY:



9:00 am
**HYDROGEN AND FUEL CELLS:
OPPORTUNITIES FOR GROWTH
IN EUROPE**



Bart Biebuyck
Executive Director, FUEL CELLS
AND HYDROGEN JOINT
UNDERTAKING (FCH JU)

A public-private partnership supporting research, technological development and demonstration of activities in fuel cell and hydrogen energy technologies in Europe is required to accelerate the market introduction of such innovations, realizing their potential as an instrument in achieving a carbon-clean energy system.



9:25 am
**MODEL BASED DEFINITION OF
REQUIREMENTS FOR FUEL CELLS**



Ralf Wascheck
Head of Fuel Cell & Hydrogen
Mobility, IAV

Fuel cells are used for a variety of different applications in the mobility sector, which will increase in the near future. To reduce the costs of fuel cell systems and powertrains by exploiting scale of economy effects one strategy is to use the same components, stacks and systems for various applications. But this is not feasible for all use cases and also depends on the powertrain layout and hybrid control calibration. In addition the right V&V program is needed for each specific component, component group and (sub) system. So Tier2s, Tier1s and OEMs have to use an effective requirements engineering process to address the different parameters previously mentioned and fulfill the market requests. This speech shows a holistic model based approach applying state of the art systems engineering methods for such a process.

TRACK 03

DAY 2: OCTOBER 21, 2021

9:00 am - 1:00 pm CCUS:



9:00 am
**CAPTURING CARBON. CREATING
VALUE**



Babette Pettersen
VP of Europe, LANZATECH

LanzaTech recycles carbon from industrial off-gases and syngas generated from solid waste streams, turning the global carbon crisis into a feedstock opportunity with the potential to displace 30% of crude oil use today and reduce global CO2 emissions by 10%. The LanzaTech process converts carbon-rich gas streams to valuable products via gas fermentation, to reduce emissions and make new products for a circular carbon economy.



9:25 am
BUILDINGS AS CARBON SINKS



Petri Laakso
CEO, SOLETAIR POWER

Petri Laakso will introduce and explain Soletair Power products and how they can make buildings as carbon sinks. CO2 capturing in building ventilation will make people perform better and be more wellbeing. Captured CO2 can be turned into different valuable products and it also makes negative emissions to reduce buildings emissions.

TRACK 01



9:50 am THE KEY ROLE OF COMPOSITE STORAGE SYSTEMS IN HYDROGEN DISTRIBUTION

Hartmut Fehrenbach

Vice President Hydrogen Distribution,
HEXAGON PURUS



The latest updates on high-pressure full composite cylinders and systems for compressed gases and their impact on the hydrogen economy.

10:15 am - 10:45 am
BREAK



10:45 am INTEGRATED HUB FOR THE OPTIMIZATION OF RENEWABLE HYDROGEN COSTS IN INDUSTRIAL AND MOBILITY APPLICATIONS

Christoph Erdmann

Vice President On-site, MESSER GROUP



The presentation will introduce an integrated hub concept for the optimization of renewable hydrogen costs in industrial and mobility applications, drawing on practical examples from European countries.

TRACK 02



9:50 am PROCESSES OF MECHANICAL PEM MEMBRANE DEGRADATION AND ITS IMPACT ON PROGNOSTIC HEALTH MANAGEMENT

Marius Zübel

Technical Specialist Fuel Cell, FEV



Understanding the underlying physical processes of degradation and its impact on prognostic health management.

10:15 am - 10:45 am
BREAK



10:45 am HYDROGEN FUEL CELL SOLUTIONS FOR POWER AT BERTH (COLD IRONING)

Renaud Cornu

Senior Sales Passenger Vessels, GE
ENERGY CONNECTIONS



10:40 am CCO, NEDSTACK

The use of a fuel cell to produce electrical power required on a ship while in port represents a potentially viable alternative to cold ironing.



TRACK 03



9:50 am FULL-SCALE CCS ON WASTE-TO- ENERGY – NEGATIVE EMISSIONS FROM SUSTAINABLE TREATMENT OF RESIDUAL WASTE

Jannicke Gerner Bjerkås

Director CCS, FORTUM OSLO
VARME



The presentation will outline Oslo's plans for a full-scale CCS plant on WtE. From landfills to BECCS and CDR, contributing to Europe's net-zero goal – a blueprint for cities to produce negative emissions while dealing with non-recyclable waste.



10:15 am INFRASTRUCTURE DEVELOPMENT FOR CCUS VALUE CHAINS

Leila Faramarzi

CCUS Director, VALLOUREC



The presentation will take a look at the supply chain and capabilities enabling deployment to be ramped up.



10:40 am CARBON2CHEM

Dr. Markus Oles

Head of Carbon2Chem
Sustainable Production,
THYSSENKRUPP



To reduce the CO2 emissions generated in steel production, ThyssenKrupp is working alongside partners from the worlds of science and industry in the Carbon2Chem research project to recover materials from steel-mill gases. As a raw material for the chemical industry, the process gases from blast furnaces can be used to produce fuels, plastics and fertilizers.

TRACK 01



11:05 am
WASTE-TO-HYDROGEN: USING BIOMETHANE TO PRODUCE RENEWABLE HYDROGEN FOR HEAVY-DUTY TRANSPORT



Steve Jones
VP Europe, BAYOTECH

Exploring the use of renewable biomethane as a pathway to low-cost, low/no-carbon hydrogen to fuel captured fleet buses and trucks.



11:25 am
ACCELERATING HYDROGEN DEPLOYMENT TO REACH NET ZERO



Corin Taylor
Principal Consultant, DNV GL

The presentation will offer DNV's energy transition view of how energy demand and supply will change over the coming years, and how more will be needed to get to net zero, including work DNV has done for Eurogas on hydrogen deployment.



11:45 am
H2 HIGH PRESSURE PROCESS BALL VALVES



Eduard Ametller
Managing Director, Europe, HABONIM

Storage, transportation and fuelling of hydrogen is pushing process valves to new limits in terms of pressure, fugitive emissions control, highest cyclability, weight optimisation and certification. Get an overview of cost-effective solutions for high pressure compressed and liquified H2. Presentation will cover the offering and the technology of Habonim's high pressure H2 process valves.

TRACK 02



11:10 am
RAPID PEM FUEL CELL PRODUCT DEVELOPMENT FOR COMMERCIAL VEHICLES



Amy Nelson
Manager, Stack Architect, AVL FUEL CELL CANADA INC

This talk will highlight gaps and opportunities for achieving emerging technical and commercial targets. The focus is on rapid product development with emphasis on systems engineering processes, integration of expert capabilities from subscale material evaluation up to powertrain engineering, smart controls and operating strategies, accelerated test methodology and validation strategy.



11:30 am
PANEL DISCUSSION: UP TO THE TEST? DEVELOPING AND TESTING FUEL CELLS



Ralf Wascheck
Head of Fuel Cell & Hydrogen Mobility, IAV



Marius Zubel
Technical Specialist Fuel Cell, FEV



Amy Nelson
Manager, Stack Architect, AVL FUEL CELL CANADA INC



An enhanced focus on the rapid development of standards and regulations is required in order to ensure wherever possible that fuel cell development is not further held up and that standards across different sectors do not conflict. Testing and evaluation equipment is essential to the continued successful development of the supply chain, to validate and improve components and systems, and also to certify them. Europe is currently reasonably well placed, but how does it capitalise on this position of strength?

TRACK 03

11:00 am - 11:30 am
BREAK



11:30 am
MEETING TIGHTER EMISSIONS GOALS WITH LOW COST CO2 CAPTURE USING HONEYWELL H2 SOLUTIONS TECHNOLOGIES



William J. Blasko
Senior Offering Manager, Hydrogen, HONEYWELL UOP

Demand for hydrogen is expected to increase up to ten-fold by 2050, with industry reports predicting 8% to 24% of the world's final energy demand will be supplied by hydrogen. Hydrogen has a unique ability to address 'hard-to-decarbonize' sectors, including refining, chemicals, steel, heating, long-haul transport, and long-term power storage – all of which currently produce significant CO2 emissions. For hydrogen to enable decarbonization of these sectors, it must be produced with significantly lower carbon intensity than is practiced today. Further, each of these sectors will require the supplied hydrogen to meet purity and pressure specifications tailored to the end use. To meet the demand of all these burgeoning markets, both hydrogen production from hydrocarbons with carbon capture, utilization and storage and production from renewable energy via electrolysis will be required. Today, customized and integrated carbon capture and hydrogen purification technology deliver the most cost-effective and proven routes to low carbon intensity hydrogen. This presentation will share the latest examples of hydrogen production and CO2 capture systems optimized to serve various end-use applications for hydrogen and CO2, including both existing and new assets.

TRACK 01



12:00 pm
PANEL DISCUSSION: FUELLING AND SUPPLYING HEAVY-DUTY TRANSPORT



Dr. David Hart
Director, E4TECH



Bill Ireland
CEO, LOGAN ENERGY



Thorsten Harder
Product Manager, BURCKHARDT COMPRESSION



Richard Kennett
Managing Director, PDC MACHINES



Hydrogen fuel may still only be making minor waves in the automotive sector, but in the future of the wider heavy-duty transport industry, it is touted as the fuel of the future. According to the Energy Transition Outlook Report it is anticipated that up to 13% of heavy good vehicles will be powered by hydrogen by 2050. What infrastructure and bespoke technology and equipment is required to meet these targets and how do we ensure that supply is kept with demand?



TRACK 02

12:00 pm - 1:30 pm
LUNCH

1:30 pm - 4:30 pm
MANUFACTURING AND AUTOMATION:



1:30 pm
ACCELERATING FUEL CELL TECHNOLOGY ADOPTION FOR HEAVY-DUTY MOBILITY



Mark Kammerer
Sales and Business Development Director, BALLARD POWER SYSTEMS

The presentation will outline the latest technology innovations, cost-reduction efforts and system integration partnerships to reduce technology adoption friction points and increase the deployment of fuel cell buses, trucks, trains and marine vessels.



1:55 pm
H2 STARVATION EVENTS IN PEM FUEL CELLS – MATERIAL MITIGATION STRATEGIES



Christian Gebauer
Head of Hydrogen Systems, HERAEUS PRECIOUS METAL

The presentation will focus on fuel cell anode catalyst materials and the latest developments in manufacturing.

TRACK 03



11:55 am
CAPTURE COALITION: AN ANCIENT MICROORGANISM HELPS TO UTILIZE CAPTURED CO2 TO PRODUCE RENEWABLE METHANE



Doris Hafenbradl
CTO/Managing Director, ELECTROCHAEA

The conversion of carbon dioxide to valuable chemicals such as methane has drawn great attention for use in supporting carbon capture and utilization, especially as methane can be used not only as fuel but also as a hydrogen carrier, transporting town gas to existing infrastructure.



12:20 pm
PANEL DISCUSSION: THE NORTHERN LIGHTS PROJECT AND ITS ROLE IN THE CCS VALUE CHAIN



Jorunn Brigtsen
CCUS Development Manager, TOTALENERGIES



Kim Bye Bruun
Communications & Government Relations Director, NORTHERN LIGHTS



Nina Scholz
Country Manager Germany, EQUINOR



The Northern Lights project will be the first cross-border, open-source CO2 transport and storage infrastructure network and offers European industrial emitters the opportunity to store their CO2 safely and permanently underground. Phase one of the project will be completed in 2024 with a capacity of up to 1.5 million tonnes of CO2 per year.



TRACK 01

12:30 pm - 2:00 pm
LUNCH

2:00 pm - 5:00 pm
STORAGE SOLUTIONS:



2:00 pm
**THE ROLE OF HYDROGEN
REFUELING STATIONS IN
REALIZING THE HYDROGEN
ECONOMY**



Hendrik Sijtsma
Area Sales Manager Hydrogen,
RESATO INTERNATIONAL BV

The construction of public and private hydrogen fueling stations is rapidly advancing across Europe and beyond. How do we ensure that the complex supply chain for the components and the amount of testing that is required to ensure their safe operation remains in line with demand?



2:25 pm
**HIGH-PRESSURE CYLINDERS FOR
HYDROGEN TRANSPORTATION
AND STORAGE**



Frank Ashton
Head of Strategy and Commercial
Development, PRESSURE
TECHNOLOGIES

TRACK 02



2:20 pm
**FUEL CELL SYSTEMS AND THEIR
ROLE IN THE STATIONARY AND
AUTOMOTIVE SECTOR**



Matteo Schmid
Sales Manager Commercial
Vehicles, PROTON MOTOR FUEL
CELL

The presentation will discuss the integration of fuel cell systems in commercial vehicles, the challenges of system engineering, current Proton Motor projects (stationary and automotive) and a market forecast with the status of the industry for future development of different segments.

2:45 pm - 3:15 pm
BREAK



3:15 pm
**INVESTMENT IN GIGAFACTORY
MANUFACTURING PLANT FOR
FUTURE FC PRODUCT GROWTH
REQUIREMENTS**



Dennis Hayter
Head, External Affairs,
INTELLIGENT ENERGY

This presentation will look at the latest developments reflecting Intelligent Energy's plans to increase manufacturing capability with a new state-of-the-art gigafactory facility in the East Midlands, positioning the region as a centre of hydrogen fuel cell manufacturing in the UK.

TRACK 03

1:00 pm - 2:30 pm
LUNCH

2:30 pm - 5:00 pm
CCU & SUSTAINABILITY:



2:30 pm
**CCU AS A STEP TOWARDS A
CIRCULAR ECONOMY**



Dr Gorge Deerberg
Deputy Director, Division Director
Processes, FRAUNHOFER
UMSICHT

Carbon is a central building block for the manufacture of chemical products and is currently provided predominantly from fossil raw materials. A circular economy is therefore needed that enables production to be defossilized. CCU solutions are an essential part of the solution. The example of the Carbon2Chem® project can be used to show how implementation can take place and what challenges still need to be solved.



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TRACK 01



2:50 pm
**LARGE-SCALE ELECTROLYSIS:
INCORPORATING CLEAN
HYDROGEN INTO THE
RENEWABLE ENERGY MIX**



Denis Thomas

Global Business Development
Leader - Water electrolysis,
CUMMINGS INC

The presentation will cover the basics of electrolysis; incorporating clean hydrogen into the renewable energy mix; hydrogen storage – liquefaction, compression, material-based, hydride storage, sorbents; driving down the cost of hydrogen; regulation and investment requirements to enable rapid scale-up and adoption.

3:15 pm - 3:45 pm
BREAK



3:45 pm
**BREMERHAVEN PORT AS A
MARITIME TEST FIELD FOR
HYDROGEN TECHNOLOGIES**



Robert Howe

Managing Director
BREMERHAFENPORTS GMBH & CO. KG

The presentation will explain how to meet the growing demand for hydrogen and how the port can facilitate improved transportation, including transshipment facilities and related safety measures.

TRACK 02



3:40 pm
**FUEL CELL PROTOTYPE
DIGITISATION: FROM
COMPONENT DESIGN TO
SYSTEM ANALYSIS**



Christian Altenhofen

European Application Lead for Fuel Cell
Applications, GAMMA TECHNOLOGIES



Akrem Mouffouk

Scandinavia Regional Manager, GAMMA
TECHNOLOGIES



The presentation will describe how virtual development and state-of-the-art simulation methods support the development of fuel cells, from initial component design to system controls development. A focus will be put on the efficiency gains from virtual product development with respect to time and cost. Different stages of the development process and their specific requirements will be discussed. Real world use cases will be presented along the way.

TRACK 03



2:50 pm
**MORE THAN OFFSETTING -
ACTIVELY REDUCE EMISSIONS BY
CARBONIZATION**



Marcel Rensmann

Head of Sales, PYREG



Caspar Ziegner

CEO, CARBOCONTROL



As a plant manufacturer and CCS solution provider, Pyreg and CarboControl enable industries to convert biogenic residues into the valuable, carbon negative resource - biochar. The technical expertise, as well as advanced consulting and operation management services help businesses adapt to a new low carbon future. Quick transition positions them for success, as the markets and conditions are rapidly changing. During the pyrolysis process, most of the carbon in the resulting biochar is sequestered, preventing the release of CO₂ into the atmosphere, for centuries. Biochar production is a negative emission technology (NET) with a wide range of durable applications that create a carbon sink. This not only unlocks new opportunities, but it will allow companies to seamlessly transition to circular business models. The sequestered CO₂ can be certified and used either to meet own sustainable corporate goals or to trade them as certificates on the open market. With over 35 systems in operation, they represent one of the first commercialized CCS solution available on the European market. The sister companies, are the market leaders and specialists in this field, helping customers worldwide to close the loop while improving their carbon footprint and using the renewable energy generated.

TRACK 01



4:10 pm HYDROGEN STORAGE AND DISTRIBUTION VIA LIQUID ORGANIC CARRIERS

Daniel Teichmann

Founder and CEO,
HYDROGENIOUS LOHC
TECHNOLOGIES



The presentation will discuss patented technology enabling safe and efficient storage of hydrogen in an easily transportable oil, thus eliminating the need for pressurized hydrogen tanks.



4:30 pm PANEL DISCUSSION: CLEAN HYDROGEN COASTLINE

Dr Geert Tjarks

Stakeholder Management, EWE AG



With the Clean Hydrogen Coastline project, partners intend to integrate up to 400 megawatts of electrolysis capacity with corresponding storage of hydrogen into the energy system by 2026 with a corresponding funding framework. The hydrogen generated by offshore electricity will be used, among other things, for climate-neutral steel production. In addition, the Clean Hydrogen Coastline can create the basis for bringing up to 12,000 hydrogen-powered commercial vehicles into operation by 2026.

END OF DAY 2

TRACK 02



4:00 pm PANEL DISCUSSION: UNLOCKING THE POTENTIAL FOR FUEL CELL DIGITISATION AUTOMATION

Christian Gebauer

Head of Hydrogen Systems,
HERAEUS PRECIOUS METAL



Akrem Mouffouk

Scandinavia Regional Manager, GAMMA
TECHNOLOGIES



Matteo Schmid

Sales Manager Commercial
Vehicles, PROTON MOTOR FUEL
CELL



The fuel cell stack and its components are being manufactured using mostly laboratory fabrication methods that have been scaled up in size, but do not tend to incorporate high-volume manufacturing methods. More manufacturing research is needed to prepare advanced manufacturing and assembly technologies that are necessary for low-cost, high volume fuel cell powerplant production. There have been recent successful demonstrations of automated lines but what is required to then bring automation to scale?

END OF DAY 2

TRACK 03



3:10 pm CHEMICAL LOOPING FOR STEAM, HYDROGEN OR SYNGAS PRODUCTION WITH CO2 CAPTURE FOR CARBON FOOTPRINT REDUCTION

Brian Higgins

Director of Advanced Technologies,
BABCOCK & WILCOX



BrightLoop is the next generation of chemical looping. Babcock & Wilcox has partnered with some of the brightest minds in academia to demonstrate that Chemical Looping is ready for commercial scale-up. Their collaboration has shown that Chemical Looping can effectively separate CO2 while producing hydrogen, steam and/or syngas. Our Chemical Looping system is a game-changing evolution capable of ushering in a new era of decarbonization.

3:30 pm - 4:00 pm
BREAK



4:00 pm PROCESS SIMPLIFICATION WITH PHASE-CHANGE CO2-REMOVAL

Lukas Krischak

Sales & Project Engineer, KELVION



Capturing CO2 in processes followed by storage or reuse in other applications is one of the greatest challenges when moving towards a carbon neutral future. Conventional approaches like amine systems are widely used yet connected to cost intensive post processing including compression, drying and cooling. Kelvion follows another path. With almost 70 years of experience in desublimation technology, Kelvion is able to offer an energy efficient capturing method, that results in a liquid, medium pressure stream of very pure CO2. Follow our presentation to learn about this game-changing approach for applications in Blue Hydrogen and LNG.



TRACK 03



4:20 pm
**INDUSTRIAL CARBON FLOWS
– STATUS, OUTLOOK AND THE
ROLE OF CCU**



Michael Carus
Managing Director, NOVA-INSTITUTE

This presentation will look at the latest research around carbon flows for chemicals and derived materials with regards carbon management and utilisation.



4:25 pm
**PANEL DISCUSSION:
CO2 UTILISATION AND
SUSTAINABILITY**



Jarno Dakhorst
Consultant, NEN



Dr Francisco Vidal Vázquez
Project Manager, KIT –
KARLSRUHE INSTITUTE OF
TECHNOLOGY



Michael Carus
Managing Director, NOVA-
INSTITUTE



Following on from Michael's presentation, panellists will take a deep dive into the role of CCU in supplying the Chemical Industry with carbon.



END OF DAY 2

For further information and general enquiries
please contact us via email or phone:



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20-21 October 2021



Messe Bremen, Germany