

2018 EUROPEAN
ZERO EMISSION BUS
CONFERENCE

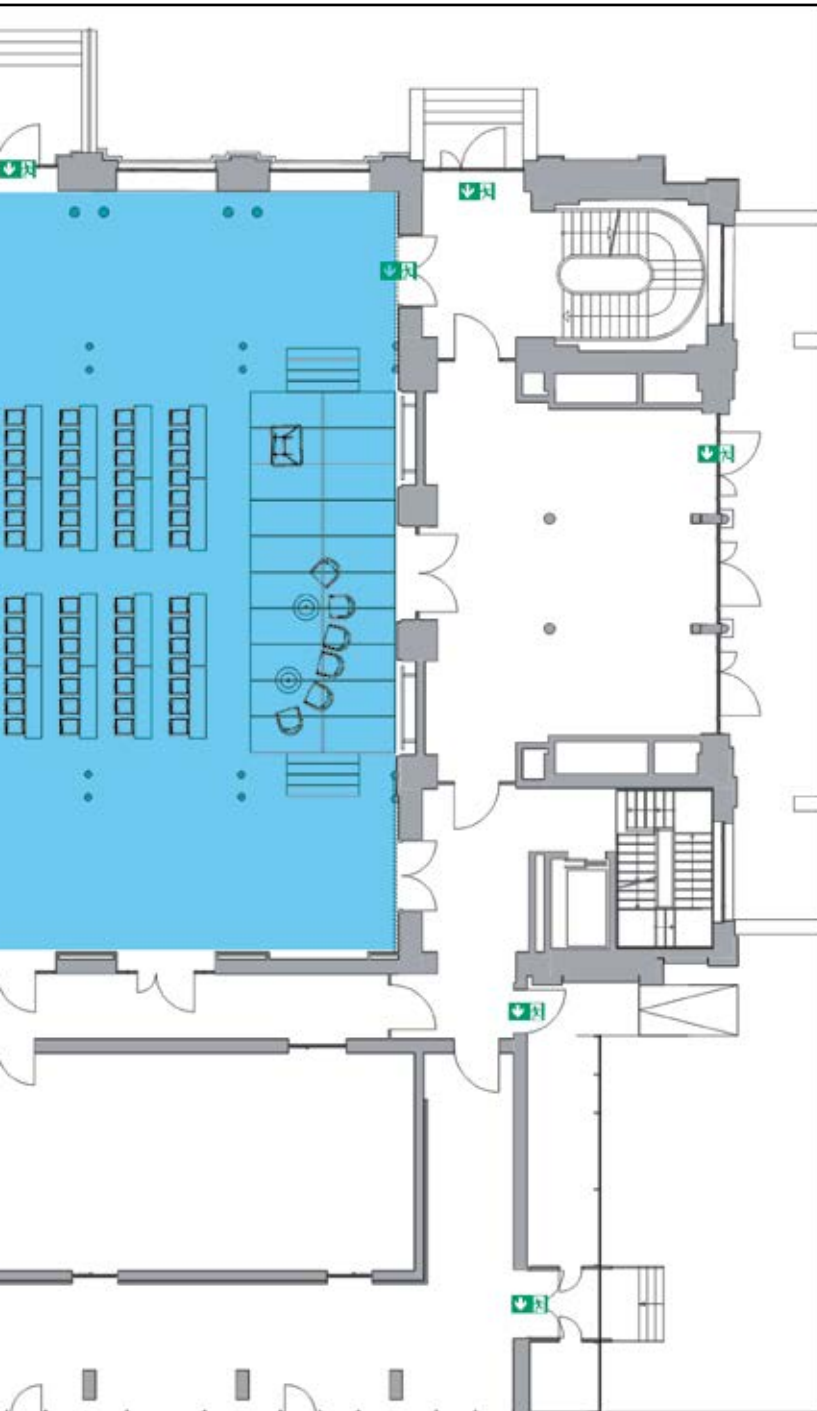
Cologne, Germany • November 27th & 28th



Floor plan



- ENTRANCE / REGISTRATION
- MAIN ROOM
- BISTRO ROOM
- SMOKING AREA



- 1** FCH JU
- 2** LINDE
- 3** MICHELIN
- 4** ELEMENT ENERGY & HYDROGEN EUROPE
- 5** ITM POWER
- 6** VAN HOOL
- 7** NEL HYDROGEN
- 8** BALLARD
- 9** UITP
- 10** BATTERY ELECTRIC BUS PROJECTS
- 11** FUEL CELL BUS PROJECTS
- 12** SHELL
- 13** SAFRA
- 14** NOW
- 15** AIR LIQUIDE
- 16** CITY OF COLOGNE, RVK, KVB
- 17** MCPHY
- 18** ENERGIE AGENTUR.NRW
- 19** EMCEL
- 20** NPROXX



TOILETS

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Welcome from the Mayor of Cologne

One of the greatest challenges to the growing city of Cologne is providing a fully functioning urban mobility infrastructure which is both environmentally friendly and accessible for all citizens. Public transport and the tightly-knit bus network in the urban area and the region of Cologne play a significant role in this context. I am therefore very pleased that the Zero Emission Bus Conference is taking place in our city this year and is bringing the vision of emission-free mobility to life.

The City of Cologne has been a member of the regional network for the promotion of hydrogen mobility for more than a decade and in its own operations and companies it is working towards the massive extension of e-mobility in public and private transport. Our regional bus operator Regionalverkehr Köln GmbH is replacing its complete bus fleet with hybrid fuel-cell buses and our local bus operator Kölner Verkehrs-Betriebe AG is driving forward the use of battery-electric buses in the city area. Our goal is to achieve emission-free bus operation in the Cologne public transport network by 2030.

In the light of this the City of Cologne will sign the Declaration of intent on promoting large-scale deployment of clean, alternatively fuelled buses in Europe with great determination.

I wish us all a successful conference, interesting debates and good discussions leading to results.



Henriette Reker
Mayor of the City of Cologne

Henriette Reker



01 Agenda

DAY 1 - TUESDAY 27TH NOVEMBER

Foyer, Flora Cologne

30' **COFFEE & REGISTRATION** 09:00 – 09:30

SESSION 1 WELCOME & INTRODUCTION 09:30 – 10:00

Ballroom, Flora Cologne, Cologne

09:30 - 09:40 10' **Welcome & Mayor's Address**

Henriette Reker, Mayor of Cologne

09:40 - 09:50 10' **Preparing for the Energy Transition: A Closer Look at North Rhine-Westphalia**

Christoph Dammermann, State Secretary of Economy, Innovation, Digitisation and Energy of North Rhine-Westphalia

09:50 - 10:00 10' **Germany's Transition to a Zero Emission Mobility System**

Birgit Breitfuß-Renner, Head of Directorate G2 (environment and noise protection), representing the Federal Ministry of Transport and Digital Infrastructure

10:00 - 10:30 30' **State of Play: Current Status and Prospects for Zero Emission Buses**

Nikolas Soulopoulos, Bloomberg New Energy Finance
Bart Biebuyck, Fuel Cells & Hydrogen Joint Undertaking

10:30 - 11:00 30' **Are Zero Emission Buses Ready For Mass Market Production**

A Technological Overview by Manufacturers

Hans Bekkers, VDL Bus & Coach bv
Geert Van Hecke, Van Hool

25' **COFFEE BREAK** 11:00 – 11:25

SESSION 2 OPERATION & MAINTENANCE 11:25 – 12:55

Ballroom, Flora Cologne, Cologne

11:25 – 11:35 10' **What Does the Data Tell Us About the Impact of Zero Emission Bus Deployment? A Summary**

Michael Faltenbacher, thinkstep

11:35 – 12:55 80' **Panel Session: The Impacts of Zero Emission Bus Deployment on Operation and Maintenance** What can we learn from operators' experiences with zero emission buses?

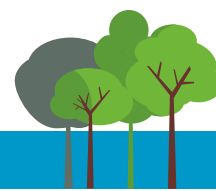
MODERATOR: Umberto Guida, UITP

- **Jörn Schwarze**, KVB
- **Marcin Seredynski**, Luxembourg E-Bus Competence Center
- **Gérard de Fleurieu**, Michelin
- **Aivars Starikovs**, Riga public transport operator, project H2Nodes
- **Jens Conrad**, RVK
- **Petra Piffer**, SASA
- **Josep Armengol Villa**, TMB

25'

LUNCH 12:55 - 14.00*Bistro & Orangery, Flora Cologne*

12:55 - 14:00 65'

Lunch Buffet & Exhibition*See first-hand the state-of-the-art battery and fuel cell electric buses from Van Hool and VDL Bus & Coach bv, courtesy of RVK and KVB***SESSION 3****POLICY & PRACTICALITIES** 14:00 - 15:45*Ballroom, Flora Cologne*

14:00 - 14:15 15'

How is the European Commission Supporting Zero Emission Technologies?**Maja Bakran Marcich**, Deputy Director General, Mobility & Transport, European Commission

14:15 - 14:30 15'

Practicalities of Procurement**Jos Sales**, IRU

14:30 - 15:45 75'

Panel Session: Creating Demand - Early Lessons from Implementing Zero Emission Policies and Procurement Guidelines in your City*Panellists will share their experiences of negotiating the policy and procurement issues surrounding deployment of zero emission buses.***MODERATOR:** Thorsten Herbert, NOW

- **Gerard Hellburg**, Vervoerregio Amsterdam, representing the region of Amsterdam
- **Mikkel Krogsgaard Niss**, City of Copenhagen
- **Heinrich Klingenberg**, hySOLUTIONS, representing the city of Hamburg
- **Nicolas Patriarche**, SMTU, representing the city of Pau
- **Andreas Meyer**, WSW, representing the city of Wuppertal

30'

COFFEE BREAK 15:45 - 16:15**SESSION 4****AFFORDABILITY** 16:15 - 18:00*Ballroom, Flora Cologne, Cologne*

16:15 - 16:30 15'

The Economics of Zero Emission Buses – Are They Affordable?**Celine Cluzel**, Element Energy

16:30 - 17:45 75'

Panel Session: Bringing the Cost Down - New Business and Financing Models*Expert panellists will discuss the support and mechanisms available to support affordable zero emission bus procurements in Europe.***MODERATOR:** Lionel Boillot, FCH JU

- **Nicolas Pocard**, Ballard
- **Frank Koch**, EnergieAgentur.NRW
- **Neil Valentine**, European Investment Bank
- **Richard Ferrer**, INEA, European Commission
- **Jacob Krogsgaard**, Nel Hydrogen
- **Matthew Lis**, Vantage Power
- **David Barnett**, Wrightbus

17:45-18.00 15'

Closing Remarks Day 1**Valerie Bouillon-Delporte**, Hydrogen Europe

120'

CONFERENCE DINNER 19:00 - 21.00*Sünner Brewery - Sponsored by Linde & Michelin*

19:00-21:00 120'

Networking & Dinner***A shuttle service will be arranged between the conference and dinner venues*

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DAY 2 - WEDNESDAY 28TH NOVEMBER

Foyer, Flora Cologne

30' **COFFEE & REGISTRATION** 09:00 – 09:30

SESSION 1 **GLOBAL PERSPECTIVES** 09:30 – 11:15

Ballroom, Flora Cologne, Cologne

09:30 - 09:45 15' **Welcome Address from Austria, Presidency of Council of the European Union**
Hans-Jürgen Salmhofer, Austrian Ministry for Transport, Innovation & Technology

09:45 - 10:00 15' **Zero Emission Bus Activity in the United States**
Dan Raudebaugh, Center for Transport & Environment

10:00 - 11:15 75' **Planning for large scale demand**
In this session major players will share details of current and planned large scale deployments and big projects including:

- Large scale deployment plans for the Greater Cologne Region – **Boris Jermer**, HyCologne
- REFHYNE: Hydrogen production at scale – **Oliver Bishop**, Shell
- Learnings from the launch of the biggest e-fleet in Europe – **Bart Kraayvanger**, Transdev & Gerard Hellburg, Vervoerregio Amsterdam (VRA)
- H2Bus Europe: implementing fuel cell buses at scale – **Jacob Krogsgaard**, Nel Hydrogen

25' **COFFEE BREAK** 11:15 - 11:40





SESSION 2 **FUTURE PLANS: SCALING UP** 11:40 – 13:30

Ballroom, Flora Cologne

11:40 – 12:20 40'

Bus Suppliers with big plans

Global bus manufacturers share details of the zero emission bus options available to cities today.

MODERATOR: Riccardo Schiavo, Sustainable Bus

- Daniel Vorgerd, Daimler EvoBus
- Dennis Herrmann, Irizar e-mobility
- Jean Christophe Hoguet, Safran
- Romuald Witkowski, Solaris
- Geert Van Hecke, Van Hool
- Hans Bekkers, VDL Bus & Coach bv
- Magnus Broback, Volvo
- David Barnett, Wrightbus

12:20 – 13:20 60'

Panel Session: Practicalities of Infrastructure at Scale

Can the infrastructure keep pace with the growing demand for zero emission buses?

MODERATOR: Ben Madden, Element Energy

- Manfred Frenger, EBG Compleo
- François Detroux, Engie
- Bob Bouhuijs, Heliox
- Charles Purkess, ITM Power
- Ibon Cerro, JEMA Energy
- Markus Bachmeier, Linde
- Bertrand Amelot, McPhy

13:20 – 13:30 10'

Closing Remarks

Jorgo Chatzimarkakis, Hydrogen Europe

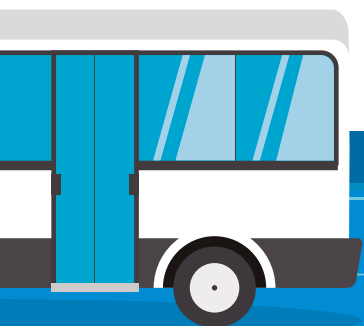
90'

LUNCH & CONFERENCE END 13:30 - 15:00

Bistro & Orangery, Flora Cologne

13:30 -15:00 90'

Lunch Buffet & Exhibition



Spotlight Interview Michelin

Why is Michelin committed to a zero emission future?

Michelin has set ambitious objectives with the aim of becoming a global leader in sustainable mobility and constantly innovates in its products and services to boost mobility today and invent the mobility of tomorrow. Already in 1992, Michelin invented the first green tire, improving at the same time energy efficiency, longevity and safety of the tire! Michelin also brings together each year the actors of the transport of tomorrow through Movin'On. Since 2015, Michelin is a leading partner of the "Paris Process on Mobility and Climate", a global platform aiming at representing the voice of the transport sector on the international scene (i.e. the COPs).

Tell me more about Michelin's role in hydrogen mobility

Hydrogen ticks all the boxes in terms of Michelin's vision of sustainable mobility: it eliminates emissions of CO₂, improves air quality and promotes energy transition, whilst adapting to every type of usage. It is because of these characteristics that we have been working on fuel cell technology source for 15 years, making Michelin a credible, legitimate partner in this field. Since 2014 Michelin is the first shareholder of Symbio, which has already equipped more than 300 Renault Kangoo ZE REH2 (the first hydrogen commercial vehicle in Europe). On the industrialization part, Michelin has a dedicated production unit, IMECA. Through this strategy, fuel cells systems have already been deployed for different types of applications: on light commercial vehicles (as a range extender on Renault Kangoo ZE models), on boats through the Yélo H2 project (La Rochelle), in aeronautics and more recently on buses! Recently Michelin signed a contract with the bus manufacturer Safran to integrate our fuel cell technology on Safran buses first for Artois-Gohelle (a city in the North of France, close to Lens).

Michelin is committed to demonstrate the validity of the cluster business model through the project Zero Emission Valley with Engie, Symbio and the Auvergne-Rhône-Alpes region. Through this project (20 stations and 1000 vehicles between by 2020) the region's ambition is to become the "spearhead" region in terms of hydrogen mobility at European level and to boost hydrogen mobility. With this project, the Auvergne-Rhône-Alpes region wants to deploy 20 hydrogen stations and a fleet of 1000 vehicles between now and 2020. This "cluster" strategy has also been recently adopted by the French government in the Hydrogen National Plan released in June 2018.

What is Michelin's offer in terms of hydrogen mobility, more specifically for buses?

Michelin offers a wide spectrum of products and services associated to hydrogen mobility, from the integration of the hydrogen "technological brick" in a vehicle to the maintenance and service support. First of all, Michelin offers fuel cell module solutions addressing all segments of the market, from passenger cars and light duty commercial vehicles, to heavy duty vehicles such as buses, trucks, trains or boats! Michelin also designs, prototypes and integrates H₂ modules systems for its customers.

But Michelin is also a European leader on heavy duty services and maintenance, through the networks of Euromaster and Michelin services & solutions. Our trained staff can perform the global maintenance of the vehicle, including usual spare parts, and the H₂ module. Moreover, we offer through Michelin Services & Solutions a range of services for fleet managers from monitoring and optimization of tyre wear (effityre®) to prevention and reduction of breakdown and real-time monitoring of vehicles (effitrailer®).

HYDROGEN: TAKING ACTION NOW FOR BETTER MOBILITY TOMORROW.



Hydrogen electric vehicles run on fuel cells, which give drivers safety, comfort and more autonomy, while preserving the environment.

For over 15 years, we've been researching fuel cells for electric vehicles. We're convinced that hydrogen will make a key, sustainable contribution to better mobility. We've already developed our own unique, innovative fuel cell. And in 2018, we will launch our first fuel cell production unit!

#MichelinTakesAction

[Twitter.com/michelin](https://twitter.com/michelin)



[Facebook.com/MichelinSustainableMobility](https://facebook.com/MichelinSustainableMobility)



Why is hydrogen technology so useful for bus applications?

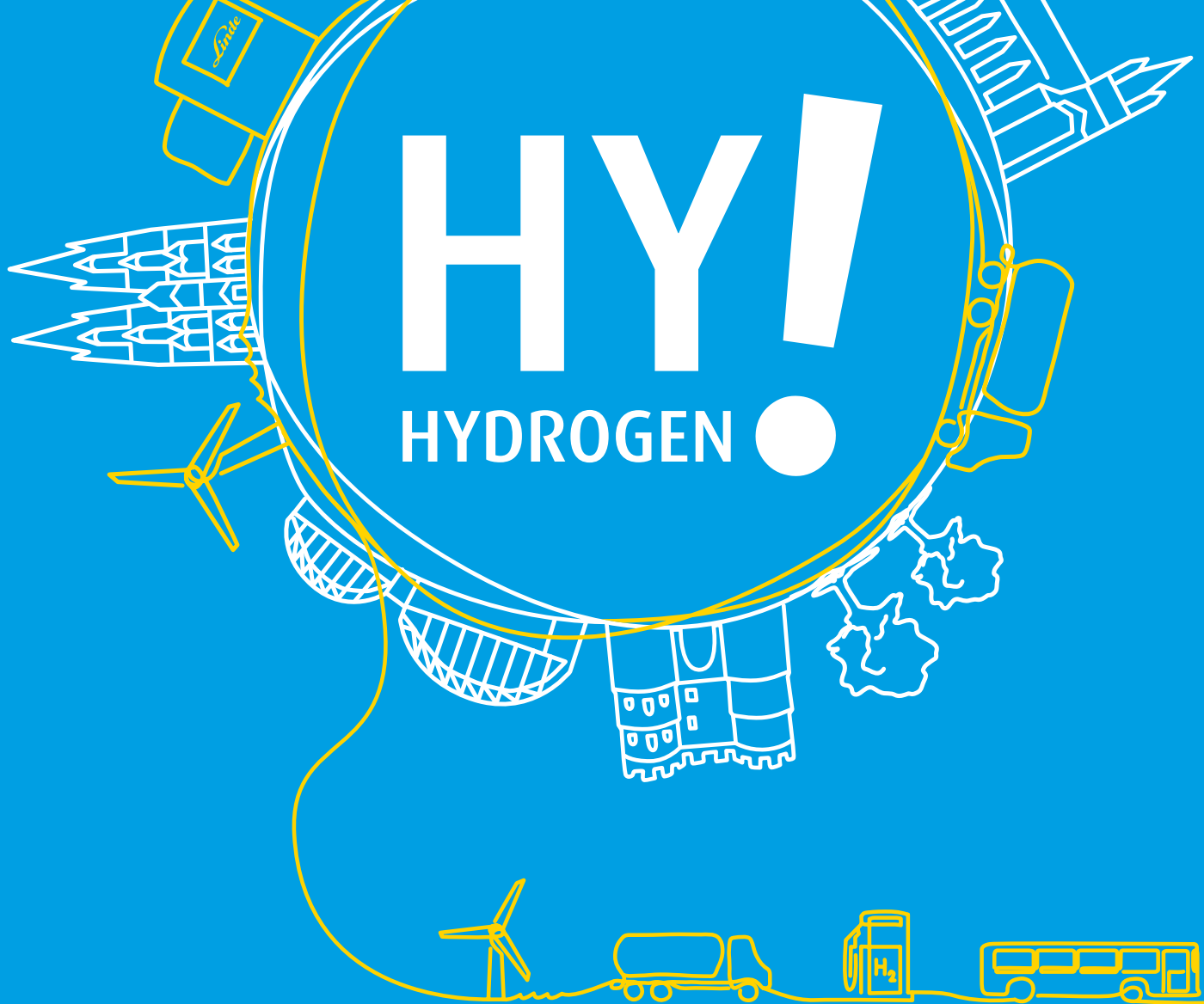
Hydrogen fuel cell technology means zero emissions with high ranges and quick refueling times. It enables reliable operations for longer and uninterrupted rides, also during cold conditions. Combined with public funding, we are getting closer and closer to economically viable business cases for bus operators, in part because of the ability to operate from one central depot. Linde is the most experienced infrastructure supplier with more than 150 hydrogen refueling stations equipped worldwide. From this experience, we know that hydrogen mobility is an absolutely safe, efficient and state-of-the-art technology.

What are the most crucial challenges for HRS in bus applications?

Like in all other applications, you need the fuel cell electric vehicles. It's good to see that first tier OEMs are about to launch hydrogen buses. In this early market stage, it is crucial that bus operators, bus manufacturers and infrastructure providers closely cooperate. Especially in public transport applications, you need highly reliable and efficient refueling stations in general and compressor technology specifically. Since installing our first public HRS in 2002, we have gained a wealth of experience, constantly optimizing our technology. Thanks to innovations by Linde, like our ionic compressor or cryo pump, we have further reduced refueling times and enabled greater volumes of hydrogen, taking up less space, to be stored at the depot. This is particularly important for large vehicles like buses that require more hydrogen.

What is Linde's engagement in bus applications?

Linde has successfully realized several bus HRS already in all major markets around the globe: In Germany, Japan, Korea, California, UK and Italy. We currently have a project running with Regional Verkehr Köln GmbH in Cologne, Germany, and we will supply the HRS for the Rhein-Main area, where the cities of Mainz, Wiesbaden and Frankfurt will operate 11 buses next year. A remarkable turn-key project was realized by Linde in Aberdeen, Scotland, in 2015. Here, Linde delivered a bus refueling depot, from which 20 buses can be fueled per day. This is Europe's largest operating bus project as of today. The H₂ is being produced on-site by electrolysis powered by renewable energy. It is a great blueprint for absolute zero emission public transport – well to wheel.



production

distribution

fuelling

zero emissions

Powering the future of mobility.

Hydrogen technology and energy supplier.

Here at Linde, our technology know-how covers the entire hydrogen value chain. With many years of experience and expertise, we plan, realize and manage hydrogen projects so you can get moving with zero emissions. Our innovative offer starts with renewable hydrogen production, storage and distribution extending to fuelling station and dispenser manufacturing – ensuring highly efficient operation of your bus fleets.

Complemented by our wide range of services we are your partner of choice from A to Zero.

Zero emissions mobility powered by Linde. Because the future starts now.

hydrogenmobility@linde.com, www.linde-gas.com/hydrogen

THE LINDE GROUP

Linde

04

Meet the Organisers

JIVE 2



The JIVE 2 (Joint Initiative for hydrogen Vehicles across Europe) project seeks to deploy 152 new zero emission fuel cell buses and associated refuelling infrastructure across 14 European cities throughout France, Germany, Iceland, Norway, Sweden, the Netherlands and the UK. JIVE 2 will run for six years from January 2018 and is co-funded by a 25 million euro grant from the FCH JU (Fuel Cells and Hydrogen Joint Undertaking) under grant agreement number 779563 of the European Union Horizon 2020 framework programme for research and innovation. The project consortium comprises 23 partners from nine countries.

The JIVE 2 project is an expansion of the JIVE project which is now entering its second year of activity. Combined, the JIVE projects will deploy nearly 300 fuel cell buses in 22 cities across Europe by the early 2020s – the largest deployment in Europe to date.

For more information, please visit www.fuelcellbuses.eu/projects/jive-2 and follow us on Twitter [@Fuelcellbus](https://twitter.com/Fuelcellbus)

Element Energy



Element Energy is a specialist energy consultancy dedicated to understanding and helping to solve the challenge of climate change. We have an excellent reputation for rigorous and insightful analysis in the area of low carbon energy. We consult on both technical and strategic issues - our technical and engineering understanding of the real-world challenges support our strategic work and vice versa. We apply best-in-class financial, analytical and technical analysis to help our clients intelligently invest and create successful policies, strategies and products. Element Energy work across all major low carbon energy sectors, including: Built Environment, CCUS and Industrial Carbonisation, Energy Networks, Hydrogen and Fuel Cells, Low Carbon Transport and Smart Energy Systems. Our clients include government departments, local government, public transport authorities, NGOs, FTSE100 companies, technology startups and cleantech SMEs.

For more information, please visit www.element-energy.co.uk

Hydrogen Europe



Hydrogen Europe is the European association representing the interest of the hydrogen and fuel cell industry and its stakeholders. We promote Hydrogen as the enabler of a zero-emission society. With more than 100 companies, 70 research organisations and 12 national associations as members, our association encompasses the entire value chain of the European Hydrogen and fuel cell ecosystem collaborating in the Fuel Cell Hydrogen Joint Undertaking. We are a Brussels-based association fostering knowledge and pushing for fact-based policy making ensuring that the European regulatory framework enables the role of Hydrogen in our society.

For more information, please visit www.hydrogeneurope.eu and follow us on Twitter [@H2Europe](https://twitter.com/H2Europe)

05

Meet the Partners

ANAV



More than 70 years have passed since a group of Italian bus transport companies decided to set up their own association capable of representing and protecting the interests of the category, relaunching a sector that played a key role in the rebirth of the country in the second half of the 20th century. ANAV, Associazione Nazionale Autotrasporto Viaggiatori (the Italian national association of passengers transport) has been the home of companies, mainly with private capital, who have adhered to a “vision” of the collective mobility of people on buses as a mission of economic development and social inclusion. There are more than 550 member companies in ANAV, active in the three segments of local public transport, bus rental with driver and national and international long distance buses.

For more information, please visit www.anav.it

Elektro Mobilität



ElektroMobilität NRW is an umbrella brand of the NRW ministry of economics, where all activities of the federal state North Rhine-Westphalia around the topic electric mobility are bundled. Under this umbrella structure, the competence centre ElektroMobilität NRW and the EnergyAgency.NRW combine their expertise and capacities on behalf of the NRW ministry of economics to support new advancements in electro mobility – sponsored by the “European fund for regional development (EFRE)”. The goal of ElektroMobilität NRW concentrates on the diffusion of electric mobility within the on-road transport of people and goods. To provide relevant information to the citizens is one of the tasks just like the support of companies, municipalities and players from R&D in NRW. The organisation of specialized information events, workshops as wells civic days, exhibition appearance, lectures or publication of relevant brochures are the major tools to reach the goal. A further important task is to give advice concerning national funding programs. Furthermore, ElektroMobilität NRW supports municipalities and companies with concrete assistance around the topic electric mobility, e.g. in the electrification of their corresponding vehicle fleets.

For more information, please visit www.elektromobilitaet.nrw.de

EnergieAgentur.NRW



The EnergyAgency.NRW works on behalf of the state government of North Rhine-Westphalia as an operative platform with broad expertise in the field of energy: from energy research, technical development, demonstration to market launch and energy consultancy. All hydrogen and fuel cell and battery-electric activities are coordinated by the Fuel Cell and Hydrogen, Electric Mobility Network NRW (FCHEN) founded in 2000. This non-profit organization financed by the State's government has got more than 450 members from all over the world. NRW pursues a comprehensive hydrogen and fuel cell strategy covering production and usage of H₂. We also work on battery electric mobility activities in NRW, under the umbrella of Elektromobilität.NRW.

With regard to zero emission buses the FCHEN coordinates the German Fuel Cell Bus Cluster which was originally initiated by FCH JU and actually brings together 18 public transport operators which plan to integrate FC buses into their fleets. Interested operators are welcome to join this group.

For more information, please visit www.energieagentur.nrw

FCH JU



The Fuel Cells and Hydrogen Joint Undertaking (FCH JU) is a unique public private partnership supporting research, technological development and demonstration (RTD) activities in fuel cell and hydrogen energy technologies in Europe. Its aim is to accelerate the market introduction of these technologies, realising their potential as an instrument in achieving a carbon-clean energy system. Fuel cells, as an efficient conversion technology, and hydrogen, as a clean energy carrier, have a great potential to help fight carbon dioxide emissions, to reduce dependence on hydrocarbons and to contribute to economic growth. The objective of the FCH JU is to bring these benefits to Europeans through a concentrated effort from all sectors. The three members of the FCH JU are the European Commission, fuel cell and hydrogen industries represented by Hydrogen Europe and the research community represented by Hydrogen Europe Research.

For more information, please visit www.fch.europa.eu

HyCologne



In the Cologne / Rhineland region, large quantities of hydrogen have been produced in the local chemical industry for decades. The initiative HyCologne together with their members has realized to make this hydrogen available for future-oriented projects at attractive conditions. In combination with highly efficient fuel cell applications, hydrogen offers excellent opportunities to achieve global climate goals and decouple energy supply from fossil energy sources in the transport sector and other climate relevant sectors to reduce climate influencing emissions. HyCologne e.V - strong in the Cologne region and at request in other regions: We advise and support our partners and members in the development and realization of projects in the field of hydrogen, fuel cells and electromobility such as: hydrogen infrastructure and logistics, refuelling and supply interfaces (filling stations), operation of Fleet Vehicles with Fuel Cell Drive (project: Chemergy), power to X technology and development of concepts for electromobility.

For more information, please visit www.hycologne.de

IRU



IRU is the world's road transport organisation, promoting economic growth, prosperity and safety through the sustainable mobility of people and goods. Founded in 1948, IRU has members and activities in more than 100 countries.

For more information, please visit www.iru.org



Stadt Köln



Cologne – a metropolis on a growth course. The 2000-year-old metropolis of Cologne is young, colourful, open-minded and multicultural. More than 100,000 students study here at over fifteen universities. Cologne Cathedral, a UNESCO world heritage site, outstanding museums, galleries, theatres and concert halls as well as the independent scene, club culture and traditional carnival attract millions of guests every year. Most businesses located in Cologne are in the automotive and chemical industries, in the fields of mechanical engineering, trade, media, ICT, insurance, life sciences and healthcare. Along with international manufacturers of hydrogen cars, chemical companies in which hydrogen is generated or is available as a by-product are located here. Together with RheinEnergie AG, the City of Cologne has initiated the platform SmartCity Cologne for the promotion and networking of diverse climate protection projects. Cologne is a climate partner of Rio de Janeiro and supports the expert network HyCologne. With the transition of the bus fleets at Regionalverkehr Köln GmbH and Kölner Verkehrs-Betriebe AG to emission-free drive systems, the business region Cologne is becoming a hot spot of emission-free public transport. Today Cologne has 1,084,795 inhabitants, with up to 200,000 more expected by 2040. So it is important that Cologne grows – but in a climate-friendly way.

For more information, please visit www.stadt-koeln.de

UITP



UITP (International Association of Public Transport) is a passionate champion of sustainable urban mobility and is the only worldwide network to bring together all public transport stakeholders and all sustainable transport modes. We have 1,500 member companies giving access to over 18,000 contacts from 96 countries. Our members are public transport authorities and operators, policy decision-makers, research institutes and the public transport supply and service industry.

For more information, please visit www.uitp.org



Linde



Linde is the most experienced provider of hydrogen refueling stations worldwide providing fueling technology at lowest total costs of ownership per kg and highest safety standards. Linde is the one-stop shop for hydrogen solutions – offering everything needed, from reliable H₂ supply (compressed gaseous or liquid) and cutting-edge fueling station systems to customized services. In the 2017 financial year, The Linde Group generated revenue of EUR 17.113 bn, making it one of the leading gases and engineering companies in the world, with approximately 58,000 employees working in more than 100 countries worldwide. Linde acts responsibly towards its shareholders, business partners, employees, society and the environment in every one of its business areas, regions and locations across the globe. The company is committed to technologies and products that unite the goals of customer value and sustainable development.

For more information, please visit www.linde.com

Michelin



Michelin, the leading tire company, is dedicated to enhancing its clients' mobility, sustainably; designing and distributing the most suitable tires, services and solutions for its clients' needs; providing digital services, maps and guides to help enrich trips and travels and make them unique experiences; and developing high-technology materials that serve the mobility industry. Michelin is continuously innovating to promote the transport of today and to invent the transport of tomorrow. For Michelin, hydrogen ticks all of the boxes with regards to sustainable transport (impact on CO₂ emissions, air quality, energy transition), while tackling all of these uses. The Group has been working in this field for many years, becoming a shareholder in Symbio in 2014. Michelin strongly supports the "Zero Emission Valley" project in the Auvergne Rhône-Alpes region (20 hydrogen stations and 1,000 vehicles by 2020). Headquartered in Clermont-Ferrand, France, Michelin is present in 170 countries, has 111,700 employees and operates 68 production facilities in 17 countries in 2016.

For more information, please visit www.michelin.com/eng

Ballard



Ballard Power Systems is a world leader in the development, manufacture, sale and servicing of PEM hydrogen fuel cell modules. Ballard represent decades of innovation and engineering leadership in clean energy for vehicles especially transit buses. We work with leading European bus OEMs to bring zero-emission fuel cell powertrain on the road. FCveloCity® heavy duty power modules lead the industry in performance, durability, cost, and overall road experience with more than 80 buses currently in service and 12M km of commercial operation. Fuel cell electric buses powered by Ballard offer zero emission with no compromise in operational capabilities. Collaborating with our partners, we continue to improve our solutions to deliver affordable fuel cell electric buses with engineering excellence. Ballard is present in Europe with dedicated application engineers and service team to support commercial deployment of fuel cell electric buses.

For more information, please visit www.ballard.com and zeroemissionbus.org

ITM Power



ITM Power manufactures integrated hydrogen energy solutions for grid balancing, energy storage and the production of green hydrogen for transport, renewable heat and chemicals. ITM Power will be building a hydrogen bus refuelling station in Birmingham, UK to supply hydrogen to a fleet of 20 fuel cell electric buses. By the end of the year, ITM Power will have 10 hydrogen refuelling stations in the UK for private and commercial use. The Company signed a forecourt siting agreement with Shell for hydrogen refuelling stations in September 2015 and subsequently a deal to deploy a 10MW electrolyser at Shell's Rhineland refinery.

For more information on ITM Power, please visit our website www.itm-power.com

Gold

Nel



Nel is a global, dedicated hydrogen company, delivering optimal solutions to produce, store and distribute hydrogen from renewable energy. We serve industries, energy and gas companies with leading hydrogen technology. Since its foundation in 1927, Nel has a proud history of development and continual improvement of hydrogen plants. Our hydrogen solutions cover the entire value chain from hydrogen production technologies to manufacturing of hydrogen fueling stations, providing all fuel cell electric vehicles with the same fast fueling and long range as conventional vehicles today.

For more information, please visit www.nelhydrogen.com

Van Hool



Whoever thinks of public transport thinks of Van Hool. The wide range of buses in Van Hool's product portfolio offers each public transport company exactly that type of vehicle it is looking for: midi to double articulated, alternative drive and fuel systems. Van Hool offers a cost-efficient and environment-friendly range of buses, to enhance the operator to face the future challenges of public transport. For 70 years, Van Hool is recognized for top product-quality, detailed engineering and industrial flexibility to respond to the ever increasing demands: bus concepts are time-tested and built with pride. What these buses all have in common is their high quality, reliability and user-friendliness. Van Hool provides its customers with direct access in the manufacturing plant for aftersales service and spare parts distribution. Van Hool currently, has over 50 FC buses in operation both in North-America and in Europe and has over 40 FC buses in production for cities in Germany and France.

For more information, please visit www.vanhool.be

Silver

Air Liquide



The world leader in gases, technologies and services for Industry and Health, Air Liquide is present in 80 countries with approximately 65,000 employees and serves more than 3.5 million customers and patients. Air Liquide is a pioneer in the hydrogen sector. With over 40 years of technical and industrial experience in hydrogen, and more than 15 years specifically on H2 refuelling stations, we propose modular, "all inclusive" hydrogen solutions to meet your specific needs. Air Liquide is actively involved in setting up a hydrogen industry and allowing the widespread use of H2 as a clean energy. The related activities cover the entire hydrogen energy chain - from production, storage and distribution to a wide variety of applications. Air Liquide is contributing to the growing use of hydrogen in the transportation sector by supporting the creation of the necessary network of hydrogen stations at the global level. At this point, more than 100 hydrogen stations have been designed and built by the Group.

For more information, please visit energies.airliquide.com

Silver

McPhy



In the framework of the energy transition, and as a leading supplier of hydrogen production, storage and distribution equipment, McPhy contributes to the deployment of clean hydrogen throughout the world. Thanks to its wide range of products and services dedicated to the hydrogen energy, zero emission mobility and industrial hydrogen markets, McPhy provides turnkey solutions to its clients. These solutions are tailored to our client applications: renewable energy surplus storage and valorization, fuel cell car refueling, raw material for industrial sites. Last April, McPhy launched its “Augmented” electrolyzer and hydrogen station ranges, specifically designed to decarbonize “heavy transport”. Backed by state-of-the-art research & innovation, and a top-tier industrial infrastructure, McPhy takes a strong position in the rapidly growing market of large-capacity stations for buses, trains or boats, for example. McPhy proposes #CleanEnergy systems by interfacing its stations to new generation electrolyzers that produce clean hydrogen from renewable sources.

For more information, please visit www.mcphy.com

NOW



NOW GmbH was founded in 2008 by the Federal Government, represented by the Federal Ministry of Transport and Digital Infrastructure (BMVI). The task of NOW GmbH involves the implementation of federal development programmes which besides the previous subjects of the National Innovation Programme Hydrogen and Fuel Cell Technology (NIP) and battery-electric mobility from 2017 also include the programme implementation of recharging infrastructure for electric mobility and the continued development of the Mobility and Fuel Strategy. These are programmes to support the market preparation and launch of the corresponding technologies. Besides research and development activities, a main focus of support is on demonstration projects and market activation. On behalf of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, NOW GmbH supports the climate protection technologies export initiative in the area of hydrogen and fuel cell technologies as well as the German-Japanese cooperation in the power-to-gas area.

For more information, please visit www.now-gmbh.de

Shell



Shell is a global group of energy and petrochemical companies with an average of 86,000 employees in more than 70 countries. We use advanced technologies and take an innovative approach to help build a sustainable energy future. We believe customers have a right to decide which source of energy they need to power their lives. Therefore, it is important that we offer a mosaic of fuels – from battery electric and hydrogen to LNG and biofuels. Hydrogen has the potential to be an important low carbon transport fuel in the future. Shell is taking part in several initiatives to encourage the adoption of hydrogen as a transport fuel by adding it to our portfolio of fuels and growing our business in this area.

For more information, please visit www.shell.com/hydrogen

Bronze

EMCEL



EMCEL is an engineering company. Our field of expertise lies in consulting, engineering and bus service, particularly in the field of fuel cells, hydrogen technology and electric mobility. EMCEL is a specialized and reliable partner for public and private bus operators when it comes to the conversion of diesel bus fleets to the appropriate electric bus technology. We offer customized, technology-open and independent consulting services on battery, trolley and fuel cell buses. EMCEL is also supporting bus manufacturers in engineering electric buses in terms of regulations, codes and standards as well as documentation. For a smooth operation of your bus fleet, EMCEL is servicing your battery and fuel cell buses. We offer the full range of bus service and maintenance in a modular system, which allows a configuration according to the individual needs of any customer.

For more information, please visit www.emcel.com

KVB



The Kölner Verkehrs-Betriebe AG (KVB) operates Cologne's urban light railway system and buses and is responsible for the maintenance of vehicles and infrastructure work related to the mass transit system. The KVB operates over 350 trains and approximately 300 buses, with more than 800,000 people transported each day. Environmental protection and sustainability are the foundations of the KVB's corporate policy. To underline this, the KVB operates bus line 133 entirely with e-buses since December 3rd, 2016. On the approximately seven-kilometer-long line, connecting Breslauer Platz at the main station with the South Cemetery in Zollstock, eight battery electric buses are operating in the KVB's daily scheduled services.

By converting this line to e-mobility, the KVB is taking the next step in climate protection. The use of e-buses prevents the emission of around 520 tonnes of carbon dioxide (CO₂) per year.

For more information, please visit www.kvb.koeln

Bronze

RVK



Regionalverkehr Köln GmbH (RVK) is a regional public transport provider. It organizes and maintains public transport for the Cologne region. The core traffic area includes Kreis Euskirchen, Rheinisch- Bergischer Kreis, Rhine-Sieg Kreis on the left bank of the Rhine, as well as Rhein-Erft Kreis. In addition, RVK also provides its services in the independent cities of Cologne, Bonn and Leverkusen. RVK thus connects urban agglomerations with sparsely populated, rather rural areas. RVK is aware of its social and environmental responsibility as a strongly anchored and committed company in the region. Especially in times of scarce resources and climate change that can no longer be ignored, environmental awareness is a key factor to the company. Thus, RVK launched the project “Null Emission” (Zero Emission) which aims to substitute all conventional diesel buses with zero emission vehicles. In consequence, RVK deploys two fuel cell buses since 2011. This year RVK ordered 30 additional fuel cell buses to take a major step towards a sustainable, emission free public transport.

For more information, please visit www.rvk.de

Safra



SAFRA manufactures and sells the Businova, an urban bus, available in different version: electric hybrid plug-in, full electric with slow or fast charging system, and hydrogen.

For more information, please visit www.safra.fr

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Bloomberg NEF (BNEF), Bloomberg's primary research service, covers clean energy, advanced transport, digital industry, innovative materials and commodities. We help corporate strategy, finance and policy professionals navigate change and generate opportunities.

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Bus und Bahn



DW Media Group publishes the leading German-language trade media for public transport: the monthly magazine "DER NAHVERKEHR" with in-depth technical articles, the weekly "NaNa Nahverkehrs-Nachrichten" for an weekly overview, and the expert medium "NaNa-Brief" for background information, analyses and comments. These media are supplemented by digital services such as websites and e-mail newsletters, an extensive digital archive as well as conferences. DW Media Group thus offers a comprehensive range of information for all areas of public transport. The latest developments in electric buses and alternative drives are also constantly reported in the public transport media. Once a year, DER NAHVERKEHR publishes a special issue exclusively on the subject of electric buses.

For more information, please visit www.busundbahn.de

H2 International



H2-international is an e-journal, a blog, and a newsletter. The blog (www.h2-international.com) offers news and detailed information on the latest research results and other developments in hydrogen and FC technology. The newsletter appears monthly and is published cost-free via the internet. It contains headlines and teasers.

The e-journal on hydrogen and fuel cells: is a quarterly publication with detailed articles, news, events, companies, specials; contains 60 pages full of information – per issue (PDF-file); provides full access to all articles & special offers (free tickets & congress discounts); is available for only USD 40 per year (35 Euro, excl. VAT); is available at a 50 % discount to students and retirees.

For further information please go to www.h2-international.com

REVOLVE



REVOLVE

Based in Brussels and Barcelona, REVOLVE is a communication group fostering cultures of sustainability. REVOLVE publishes a quarterly international magazine focusing on the themes of water (winter), nature (spring), energy (summer) and mobility (fall). REVOLVE coordinates publications, curates photo exhibitions and organizes forums. REVOLVE also offers graphic design, data visualization, content development, branding and marketing, social media engagement and media relations to maximize outreach and impact reporting for EU projects and other partner campaigns. REVOLVE works with partners to accelerate the energy transformation and the possibility of a cleaner world.

For more information, please visit www.revolve.media

Sustainable Bus



Sustainable BUS

Sustainable Bus is the only global media fully focused on clean buses and sustainability in the field of public transportation. A headlight on future mobility. Why? Because urbanization and climate change are global challenges that ask public transportation to change attitude. Public transportation is heading toward a transition that implicates a new paradigm. Future society will be sustainable only if it will be able to grant both the right to an efficient mobility and to a cleaner air. Alternative drives, not only battery electric but also hybrid, cng, lng, biogas and fuel cell, will allow a drop of emissions from the vehicles. The success, though, will be accomplished only if the whole chain will be sustainable, from the manufacturing to the energy supply. Sustainable Bus devotes attention to product news, tenders, experiences, case studies, market trends, international exhibitions and congresses, and aims to play a role in the building of a new mobility culture based on the value of sustainability.

For more information, please visit www.sustainablebus.com



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The European Zero Emission Bus Conference builds upon a 15-year tradition of international zero-emission bus collaboration. With roots in working groups established in 2003 led by the US Department of Transportation, US Department of Energy, and the European CUTE/HyFLEET: CUTE programs, the current ZEB Conferences bring a deep perspective to the ZEB adoption challenges at hand.

In 2016, CTE and Element Energy teamed up to host the inaugural International Zero Emission Bus Conference at London City Hall with the Mayor of London. Over 250 high level stakeholders from 22 countries attended the event, and it was agreed unanimously that ZEB technologies are commercially ready.

The 2018 American Zero Emission Bus Conference was held in September in Los Angeles at LA Metro's Headquarters. LA Metro is the second largest bus operator in the US and has committed to a 100% zero-emission fleet by 2030. The American Conference was the largest assemblage of transit agencies in the US looking to electrify their fleets. More than 60 unique transit agencies from across the country attended alongside the leading ZEB

manufacturers: Proterra, New Flyer, Gillig, BYD, Alexander Dennis, ENC, and GreenPower Bus. The event theme was strategies for ZEB scale-up with discussion centering on large infrastructure requirements, engaging utility providers, managing assets during transition, incorporating renewables, and achieving resiliency. This event sold out with more than 300 participants in attendance.

We now turn our sights to 2019 where the combined European and US dialogue will reconvene in San Francisco. This international forum will be our largest gathering yet and will make a global statement on the role clean transit will play in addressing climate change and the health of our communities. As cities initiate their plans to become completely emission-free, it will be forums such as this with leaders like you that find and illustrate the operational best practices and technological solutions needed. **See you there.**



**2019 INTERNATIONAL
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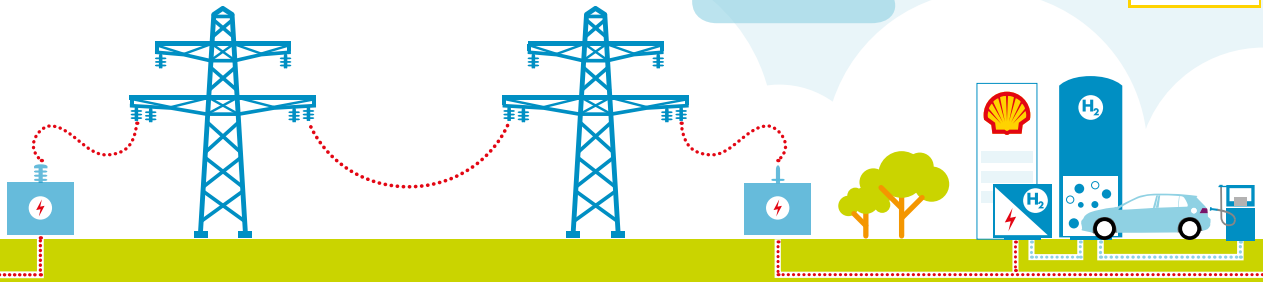


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By end of 2018, Shell will have close to 40 hydrogen stations operating under its brand, with presence in the UK (three stations in the Greater London area), California (up to nine) and the remainder in Germany as part of our JV with H2Mobility.

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Industry, science and politics have recognised this and are working in strategic alliances to prepare the market for these technologies.



08

Battery Electric Buses: An Introduction

Cities around the world are shifting towards zero emission vehicles to help overcome climate change and air quality issues. Fleets such as buses, with direct policy control, are expected to be early adopters in this transition to zero-emission vehicles (e.g. C40 Cities Fossil Fuel Free Streets Declaration). An electric powertrain is the most technologically advanced zero emission bus option available today with ~1,000 vehicles already deployed in Europe. Leveraging the battery learning achieved across the developing electric vehicle market in cars, buses and trucks, will quickly deliver an ever improving electric bus offering (increasing range at reduced cost).



SounderBruce. Proterra electric bus at Eastgate P&R.

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While there is significant investment required to build charging infrastructure for electric bus fleets, this market is developing quickly with major charge point suppliers such as ABB, Siemens and Heliox offering well developed solutions. Electric bus charging demand is predominantly during the night allowing bus operators to make use of reduced price electricity tariffs further improving the operating costs and therefore the total cost of ownership of electric buses. Many electric bus operators in Europe are making use of opportunity charging (charging at bus stops along/at the end of routes). This approach helps to increase the range of electric buses, reduce the battery size, and therefore the cost, and spread the charging load both temporally and spatially helping to reduce the effects

on the electricity grid. Further integration of electric buses into the wider energy system is expected with advances in smart charging management.

Electric buses are currently offered by ~30 bus manufacturers on the European market. This market offering includes close to 100 models with buses of all sizes offered, from small minibuses up to large double-decker buses and articulated buses. BYD is by far the largest electric bus provider on the European market with over 200 vehicles sold. This is followed by Solaris and Optare both with over 100 vehicles sold. Other players such as Van Hool, VDL and Volvo are a small part of the market but are growing quickly. Although electric buses of all sizes are available, by far the most successful uptake has been in the 12 meter single decker class which accounts for ~70% of electric buses on the market in Europe today. Depending on the charging strategy (large battery and irregular charging or small battery with charging at bus stops) 12m buses are available with everything from ~350kWh batteries and over 250km of range to ~75kWh batteries and only 65km of range. This demonstrates how the electric bus market is quickly maturing to offer a diverse range of products that can meet the varying needs of cities.

Fuel Cell Buses: An Introduction

A hydrogen fuel cell bus is a type of electric bus in that propulsion is provided by an electrified powertrain, but unlike battery electric buses (which require recharging from the electricity grid), fuel cell buses derive their energy from hydrogen stored as compressed gas on board. The fuel cell system generates electricity by combining hydrogen and oxygen, leaving only water and heat as by-products, thus there are no harmful local emissions. Fuel cell buses are essentially hybrid buses as they combine a hydrogen fuel cell system for base power output and batteries/capacitors to provide peak power to the motors and to capture energy through regenerative braking. The relative sizes of the fuel cell and batteries is a design decision affected by factors such as duty cycle (e.g. average power requirements, peak power demand), weight, costs, etc. All fuel cell buses currently on the market in Europe rely on hydrogen as the only source of fuel, however some manufacturers are developing fuel cell range extender buses that can be refuelled with hydrogen and that have batteries capable of being recharged from the grid.

Offering high ranges (600km+) and short refuelling times (~7 minutes), fuel cell buses can replace conventional diesel buses on a one-for-one basis without operational compromises. Most fuel cell bus fleets use depot-based refuelling and these vehicles do not require any additional on-street infrastructure or permits.

Hydrogen is a flexible energy vector that can be produced from a wide range of energy sources and is a by-product of various industrial processes. When the primary energy used to make hydrogen is from renewable sources (such as renewable electricity, biomass, or biogas) the fuel has a low / zero carbon footprint, thus allowing fuel cell buses to offer a completely zero carbon public transport solution.

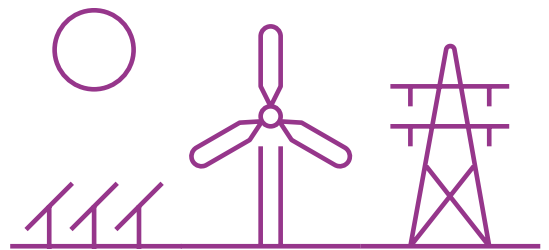
While fuel cell buses have been demonstrated over many years in a range of environments, the technology is not yet fully commercialised. There are around 60 fuel cell buses in day-to-day operation in Europe today, and plans are in place to introduce hundreds more into regular service by the early 2020s. With an increasing number of European cities adopting policies promoting zero emission buses, the demand for fuel cell buses is anticipated to continue to grow and thousands of units are expected to be deployed by the mid-2020s. European bus manufacturers / suppliers offering or developing fuel cell buses include Alexander Dennis, CaetanoBus, ebe Europa, EvoBus, Safran, Solaris, Van Hool, VDL, and Wrightbus.



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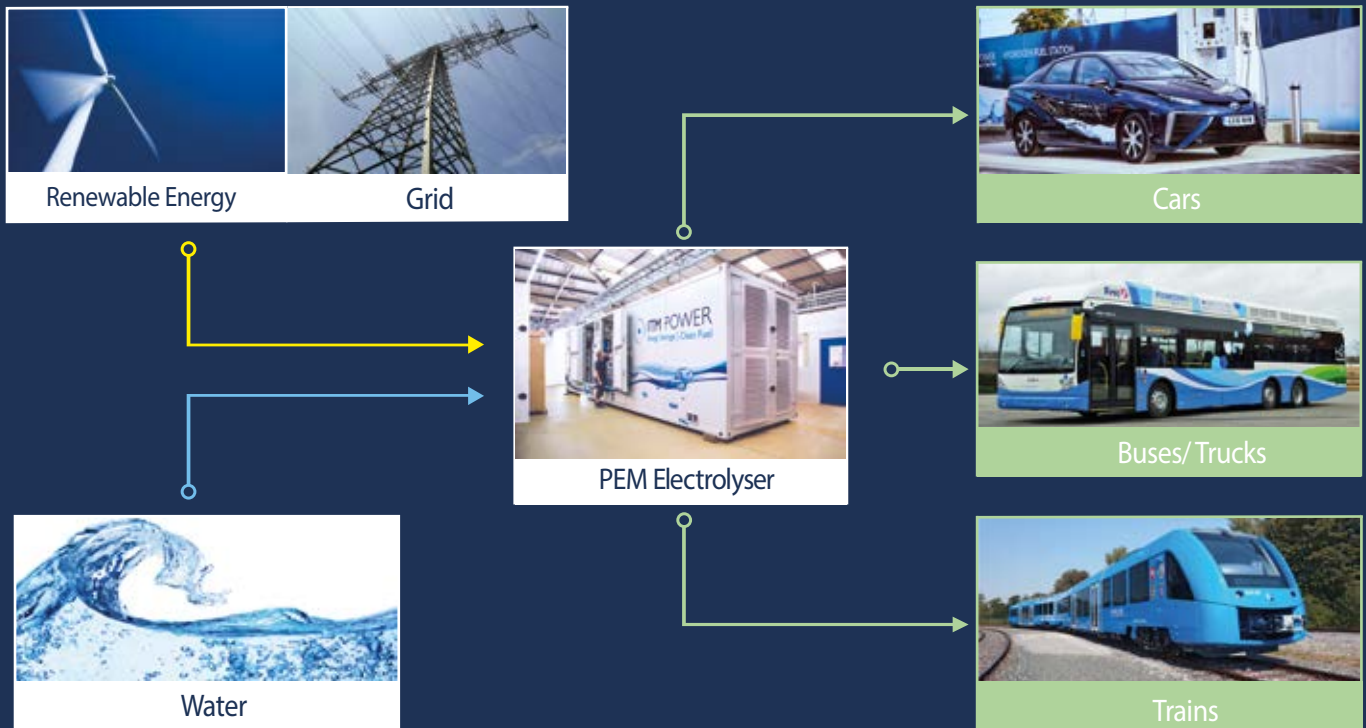
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10

Zero Emission Buses: Goals for Cologne

The discussion on climate change and air quality has raised awareness of the importance of alternative propulsion systems, especially in highly polluted cities. Public transport has an exemplary function here. For this reason, bus fleets must be changed as soon as possible. In Cologne, the two main bus operators chose two different ways of getting Zero Emission Buses on the road: the local operator Kölner Verkehrs-Betriebe (KVB) is transitioning to battery-electric vehicles, while the regional operator Regionalverkehr Köln (RVK) will shift to fuel cell buses.

On the one hand, individual technical components are developed for battery-operated buses, which receive their energy at decentralized power charging stations. They have not been finally proved in their systemic composition. On the other hand, without recharging, their range does not correspond to that of diesel buses in the medium term. This needs to be compensated for with new logistics concepts with adapted depots and a network of charging stations corresponding to the bus network. As a result, a significantly higher investment in vehicles, infrastructure and workshop equipment is required. This leads to great challenges for the transport companies.

The main goal was to first convert the lines that run in the two areas with the highest air pollution levels in Cologne. These areas are located near the air monitoring stations on Clevischer Ring in Mülheim and at Weiden Zentrum. The conversion is to be carried out route by route. As ranges increase, fewer charging stations may be needed in future.

The KVB will operate its e-bus fleet with certified electricity from renewable sources ("green electricity"), like they already do with their light rail system. From 2020, the KVB plans to procure only emission-free buses. The aim is to convert the entire KVB bus route network to e-buses by 2030. For the calculated number of vehicles, a gradual extension of the range is assumed due to innovations in battery technology.

Since 2011 the RVK has used fuel-cell hybrid buses on their routes. The company started with two prototype Phileas models manufactured by the Dutch firm APTS. In 2014 the zero-emissions fleet was expanded by two Van Hool fuel-cell hybrid buses. In February 2018 the RVK placed the largest order yet with Van Hool for fuel-cell hybrid buses. In 2019, 30 fuel-cell hybrid buses will gradually be delivered to the RVK. To run the 30 new buses the RVK will build two hydrogen refuelling stations, one in the Rhein-Sieg district (Meckenheim) and one in the Rhein-Berg district (Wermelskirchen). The implementation of this innovative technology is financed by the European Regional Development Fund, the Federal State of North Rhine-Westphalia, the Federal Ministry of Transport (NIP 2) as well as the FCH JU.

By participating in the Europe-wide programmes to promote e-mobility powered by hydrogen, the RVK contributes to developing the market for fuel cell hybrid buses. Additionally, the RVK is pushing the construction of a network of appropriate refuelling / charging stations. From 2030 onwards, it is the RVK's intention to procure only zero emissions vehicles. The city council of Cologne supports this project with its resolution of 06/05/2018.

This ambitious migration towards Zero Emission Buses in Cologne will certainly support the goal of cleaner air in the city. The need for reliable vehicles is essential and committed operators are required. The international exchange of experiences is therefore very important in this process.

Authors: **Diplom-Volkswirt Karl Schroeteler**

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Diplom-Geograph Jens Conrad

Regionalverkehr Köln GmbH | Division Manager Alternative Propulsion Systems

Dr.-Ing. Gregor Waluga

City of Cologne | Department of Mobility and Transport Infrastructure, Advisor to the Head of the Department





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FUEL CELL BUS KEY FIGURES

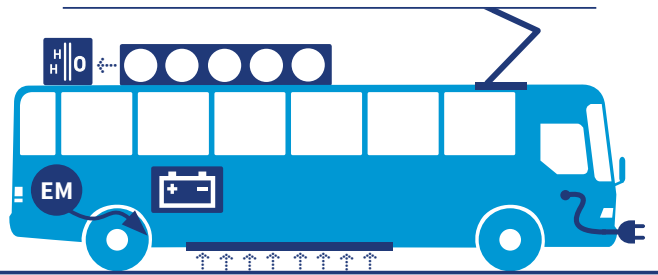
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10 History of the Flora



The story of the Flora Köln mirrors the eventful history of the last 150 years. The original building was officially opened on 14th August 1864, with a grand ball, concert and firework display: a palatial conservatory made of cast iron and glass, designed by the Cologne architects Max Nohl and Joseph Felten. The architectural design was inspired by the Crystal Palace in London and by the Jardin d'Hiver in Paris, with Arabian and Moorish style elements as well as Romanesque round arches and hints of the renaissance.

The building is located in the heart of the actual Flora, an extensive, symmetrically-arranged garden, laid out by Peter Joseph Lenné in the so-called "mixed German garden style", and includes elements of the French and the Dutch baroque, the Italian renaissance and the English landscape style. In the 19th century, the park and building were frequently used as exhibition grounds. The park was enlarged between 1912 and 1914 to become the Botanical Gardens, with greenhouses for tropical and subtropical plants and orchids. Both sections were combined in 1920 to form a park covering 28 acres.

The entire gardens – and also the Flora – suffered extensive damage during the Second World War. The financial resources required for reconstruction in the former style were lacking and, therefore, a decision was made in favour of a more pragmatic solution: a tiled hip roof replaced the former barrel roof made of glass and the outer towers were provided with small spires. The façade remained largely unchanged.

In 1978-79, the building was completely restored for use as a banqueting house. Parts of the old constructions were revealed once again – for example, the cast-iron columns in the historic large hall. In July 1980, the entire Flora was added to the city's list of protected monuments as it represents an important legacy of the social and horticultural history of Cologne.

At the beginning of 1988, a start was made on the restoration of the gardens which were reopened to the public with a grand festive event in March 1988 - their 125th anniversary – in the new "old" style. In 1995 the ancillary rooms of the Flora were renovated and the catering areas extended to include the Park Salon as well as the Bistro.

In June 2006 the Council of the City of Cologne decided to transfer the operation of the Flora to the municipal subsidiary company KölnKongress. As a result of considerable structural defects in the historic building, the Council of the City of Cologne decided on the temporary closure of the Flora and in June 2011 on the general renovation of the Grade II listed building based on the historical plans. In June 2014, the Flora Cologne was officially re-opened in the 150th anniversary year of its opening and the 100th anniversary year of the opening of the Botanical Gardens.

11 Getting Around

Organisers:

Madeline Ojakovoh - madeline.ojakovoh@element-energy.co.uk

Sophie Derksen - s.derksen@hydrogeneurope.eu

To get to: The Flora

Address:

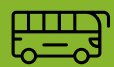
Am Botanischen Garten 1a, D – 50735 Köln

Tel: +49 221 821 31 83



By rail / tram

On arrival at Cologne Central, take the no. 18 tram to the stop “Zoo/Flora”



By bus

Take the no. 140 bus to stop “Zoo/Flora”



By taxi

Taxi Ruf - <https://www.taxiruf.de> - Tel: +49 221 2882

To get to: The Sünner Brewery

The Conference Dinner on the evening of the 27th will take place at the Sünner Brewery.

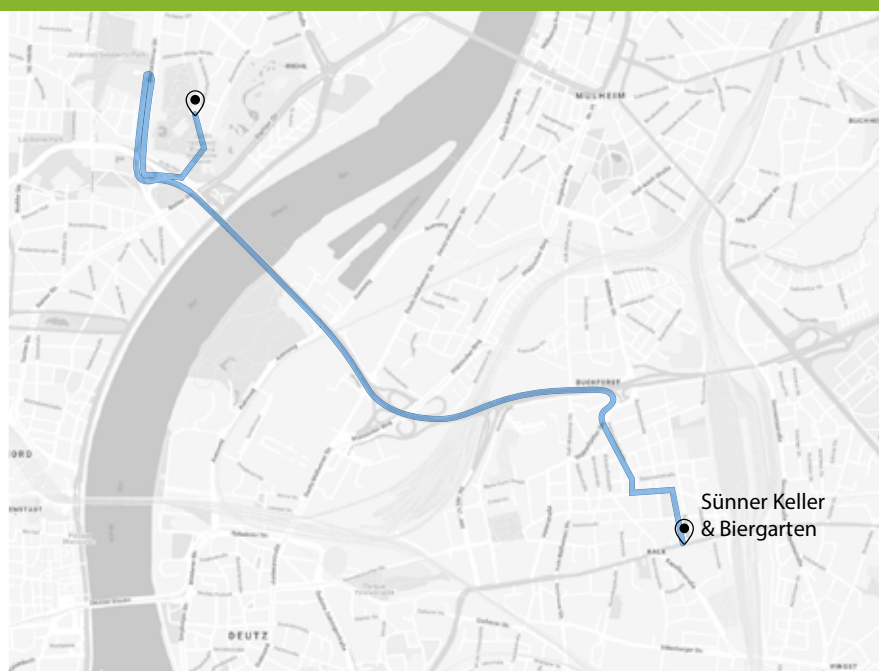
RVK and KVB buses will be operating a shuttle service that will take attendees to the Sünner Brewery from the Flora. The conference will end at 18:00 to allow time to get everyone to the venue by 19:00.

Address:

Sünner Keller, Kalker Hauptstr.

260-262, 51103, Köln-Kalk

Tel: +49 221 9855 7400



If you would like to arrange your own travel to the Sünner:



By taxi

Taxi Ruf
<https://www.taxiruf.de>
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By tram

18 from Riehl Zoo/Flora
to Neumarkt, then 1 from
Neumarkt to Kalk Kapelle.



About the Sünner Brewery

The Sünner Brewery is the oldest Kölsch brewery in the world and has been owned by the Sünner family since 1830. It is also the oldest industrial building in Cologne preserved in its original function. The unique vaulted cellars under the Sünner brewery in Cologne-Kalk have been in operation since 2009. Formerly used as an ice cellar for the freshly brewed Sünner Kölsch, it has been lovingly and authentically converted into a brewing and dining experience.



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