



9-12 JUNE

STOCKHOLM 2019

GLOBAL PUBLIC  
TRANSPORT SUMMIT

# TECHNOLOGY FOR BETTER OPERATION OF ELECTRIC AND HYDROGEN BUS FLEETS

## INNOVATION GUIDED TOURS

Wednesday 12 June, 10:00 - 11:00

Vehicle manufacturers and technology providers will share their experiences and latest solutions to optimise electric and hydrogen bus operation. From energy consumption management and prediction, to thermal control tech-

nologies and charging and refuelling systems: the selected developments reveal a high potential to optimise energy efficiency and support the transition to cleaner public transport by bus.

heliox



## VDL

### Share Experience of Running Large Electric Bus Operations

Main 5 take aways when it comes to route calculations, definition of charge strategies, location and specification of charge infra, specification and performance of electric buses, preparation and running of an electric bus fleet. Interesting know how of operations throughout Europe with large fleets, city as well intercity buses.

As front runner in Europe on E-Mobility VDL Bus & Coach has over 25.000.000 kilometers of operational experience. Starting with pilot projects and changing to higher volumes quite fast have resulted in a steep learning curve when it comes to how to operate electric buses in the most efficient way. All the VDL electric buses are connected which means that of each bus data is available which can be analyzed with the aim to optimize the operations.

The 5 main take aways will be presented so that the audience does get a clear picture of the important topics to look at in case a fleet of 20-100 electric buses will be implemented. Experience from Cologne, Eindhoven, Amsterdam, Oslo, Osnabruck and many other cities across Europe will be used as examples.



BUS & COACH

**Menno Kleingeld**  
Managing Director VDL ETS  
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## Webasto

### High Voltage Heater

Webasto has developed a High-Voltage Heater (HVH 100) for electrically powered vehicles. The innovative water heating system uses a new patented heating layer technology.

Webasto uses innovative technologies to make substantive advances in resolving heating issues in electric vehicles. The very compact device heats the vehicle interior consistently and reliably. The electric heater operates at maximum efficiency, with an effectiveness level of up to 99%, allowing for flexible use in a power range up to 850 V DC.

The HVH promotes accelerated electrification of buses by providing them with greater driving range and improved comfort. It contributes to the sustainability of the bus & coach industry by providing an efficient working solution for electric heating. The benefits include:

- highest heat extraction rate compared to currently available solutions even at elevated temperatures (> 70°C) without decreasing performance
- heating modules are adapted to actual needs: reduce energy consumption, installation space, weight and costs.
- further potential for recuperation of braking energy and sophisticated heating systems for interior and battery systems.



**Robert Lang**  
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## ViriCiti

### Smart Charging and Electric bus Telematics

The increase of electric fleets comes with new challenges such as rising energy costs. Charging all vehicles in a fleet simultaneously often requires large, high-powered grid connections and an extensive charging infrastructure which is not feasible for many operators.

Smart charging by ViriCiti is a service where it's not just about energy management calculations but a combination of data insights derived from buses, charging stations and ITCS systems. We provide accurate energy consumption predictions based on energy requirements of separate buses including the amount of time they must charge before leaving the depot, the energy requirement of the routes to be driven, and the efficiency of the bus itself. With charging station data, we divide the available energy over the total amount of buses -divided over time. That way, charging can be done optimally and spread out over the period the buses are at the depot to lower peak loads.



**Alexander Schabert**

Co-founder & CCO

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## Heliox

### Battery Buffer smart charger

The "Battery Buffer Smart Charger" is an opportunity charger for electric buses with a battery included. It reduces your grid peak connection costs by storing energy at an average power and charging the buses with a peak of triple the power. Storing solar or wind energy behind the meter reduces distribution costs and improves efficiency. It is fully interoperable with existing electric bus fleets.



**Koen van Haperen**

Director Business Development

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## Linde

### Hydrogen Refuelling Station Technology

With technology from Linde, hydrogen infrastructure projects can be implemented in an efficient, sustainable and professional manner: we are the one-stop shop for hydrogen solutions – offering everything needed, from reliable H2 supply and cutting-edge fueling station systems to customized services, thus ensuring very low total cost of ownership per kilogram of hydrogen fuelled.

With more than 160 hydrogen refueling stations worldwide equipped with our technology, Linde is the world leader for hydrogen fueling solutions. Our products provide high performance and reliability with a very low spatial footprint. And naturally, our solutions meet highest safety standards



Making our world more productive

**Markus Bachmeier**

Head of Hydrogen Solutions

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# Schunk

## Schunk Smart Charging

Battery-driven vehicles are a key component of this new era of mobility and are increasingly expanding their role in private, industrial and public transportation. Alongside batteries and vehicles, charging systems and infrastructures must undergo continued advancements in order to realize the electrification of our mobility systems.

Schunk Carbon Technology supports you in taking the critical step toward e-mobility. With Schunk Smart Charging, we offer you a technologically-leading, mature and practice proven charging system for buses and cars that harnesses the advantages of hybrid and fully-electric vehicles: greater sustainability, lower environmental and noise impact and greater efficiency and economy.

In collaboration with our customers, we are advancing the development of e-mobility and opening up new, zero emission drive alternatives that can be flexibly adapted to the respective operating parameters. For instance, our charging system for electric buses and industrial electric vehicles enables automated and reliable charging of batteries in seconds via a fast charging pantograph or an inverted pantograph



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