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CONGRESS
BRUSSELS, BELGIUM 6-9 OCT 2025
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 European Commission



EUROPEAN
ZERO EMISSION BUS
CONFERENCE 7th - 9th Oct 2025
@ **Busworld** Europe Brussels

Organised by



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SESSION #5

11:00 – 12:15

Optimising Zero Emission Bus Operations: Leveraging Data and AI

BREAKOUT SESSION



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Code: 7856 4997



Optimising Intelligent Charging for ZEB Fleets

Torbjørn Krøvel

CEO, TENIX



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Lessons in Reliability from 1000+ eBuses in the Nordics

Using AI and data to ensure Intelligent charging, battery health monitoring, and depot management in harsh Nordic conditions

Busworld / Zero Emission Bus Conference Oct 8th 2025

Torbjørn G. Krøvel, CEO

The **Charge Operations Platform** that Powers your entire fleet

1000+

eBuses handled
by Tenix Charge

8

Years of eBus
Experience

43

Depots in NO, SE, DK
9 operators

30+

Charger types
and all vehicle
brands

A red electric bus is shown driving through a snowy city street at night. The bus is moving towards the right, and its headlights are on. Snow is falling heavily, creating a blurred effect around the bus. The background shows city lights and buildings, also blurred due to the motion and weather.

A successful transition is dependent on reliable operations

ABOUT OSLO

- Early adopter of bus electrification (2019)
- 100% zero-emission public transport by 2028
- Operating in sub-zero winters
- A regional PTA-led franchising/route tender model similar to several other European countries

Oslo, Norway

Jan 17th 2024

Busskaoset fortsetter i Oslo: 190 innstilte avganger



Buss-kollaps i vinter: – En rekke forhold som bidro



VINTERKAOS: I vinter har det vært store mengder innstillinger og forsinkelser i Oslos kollektivbuss. Foto: Paul Kleiven (NTB)

Store mengder med snø skapte store trafikale utfordringer i hovedstaden. En rekke forhold bidro til forsinkelser og innstillinger.



-25°C

RUTER BYDEL NORDSTRAND BYDEL ØSTENØY BYDEL SØNDRE NORDSTRAND VINTER

Her sto bussen på tvers på Lambertseter – slik skal Ruter unngå samme kaos i vinter



Challenges presented by Norconsult

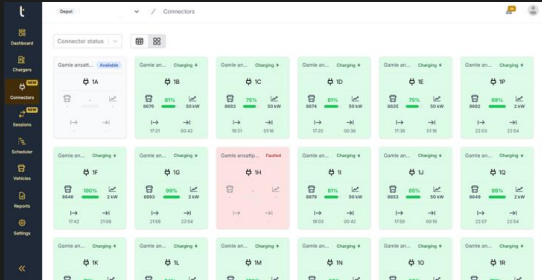
- ... **energy consumption** during winter for the new electric buses was **unexpectedly high**, and the buses had to **charge more frequently**.
- ... **problems with the charging infrastructure** for the new electric bus contracts, including **incorrect deliveries and chargers responding unexpectedly poorly** to cold, snow, and wind.



An aerial photograph of a winter scene. A snow-covered road with tire tracks runs diagonally from the top left towards the bottom right. A blue and white bus is driving on the road. To the right of the road, there is a small white shelter or bus stop. The surrounding area is covered in snow, with several evergreen trees heavily laden with snow. In the bottom left corner, there are some parked cars partially visible under the snow. A dark semi-transparent rectangle is overlaid on the bottom half of the image, containing white text.

How did we ensure that **eBuses** were ready even in the winter storms and what have we learned?

Smart operations start with **the right systems in place...**



Enable bus operators to plan ahead

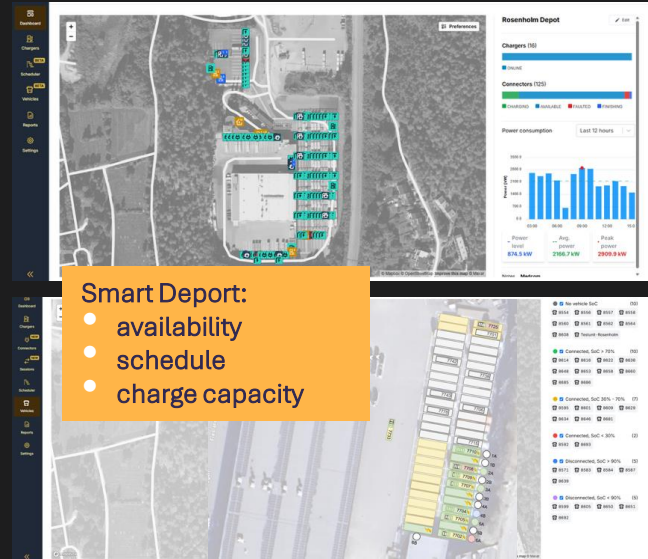
- Automatically **updated charging plans** – with preconditioning
- Automated **load balancing** and **peak shaving**
- Smart charging **flexibility**: Price, capacity, schedule and SoC targeting

Data from **route planning system** e.g. Hastus, IVU, Trapeze, Optibus etc via API or VDV 463

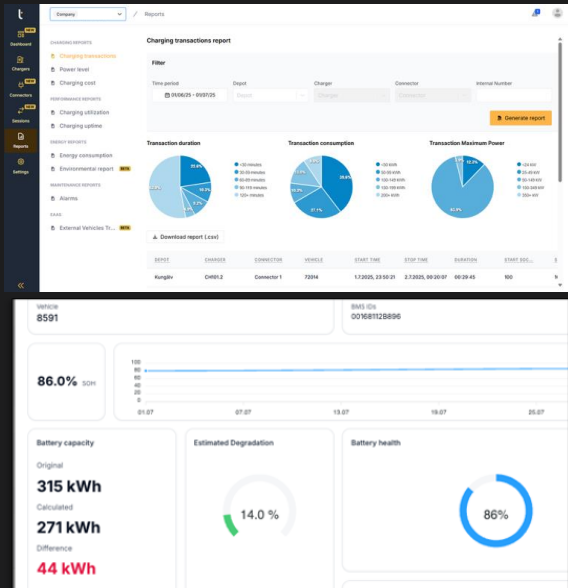
...alerting operators early on about low SoC levels...

Giving operators the complete visibility & control

- Know **Estimated Completion Time** for each bus and **get alerts** if the bus is not ready
- “**Air-traffic control**” **overview** of all depots, all chargers, all vehicles, regardless of brand
- **Know** when a vehicle is disconnected



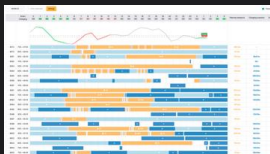
... and provide the ability to plan ahead



Full insights into Battery health, Charger Performance and Operations challenges

- Monitor the **battery health indication and degeneration** and know when to raise the flag
- Have insight into your **charger's performance** – and have data to show your infrastructure provider
- Spot **inefficiencies**, SLA discrepancies and **cost-reduction** opportunities

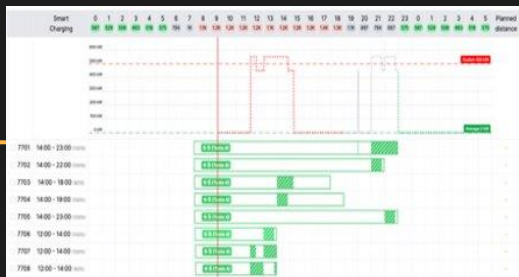
Intelligent Charging to ensure eFleet performance



Route & time
optimized charging



Cost & capacity
optimized charging



Machine Learning (MLP) to charge every bus
to optimal SOC% for a specific route

28 data parameters (speed, weight, weather,
tire pressure, battery capacity+++)



30+ charger brands



Battery Health

A fit-for-purpose CMS = higher ROI + reliable operations

Cut depot costs by 20-25% with SoC insights



Reduce energy bills by 25% + with peak saving and smart charging



Turn spare capacity into **new revenue** with Depot Sharing



Know true battery capacity to plan routes & fleet life



Invest Smarter

Spend Less

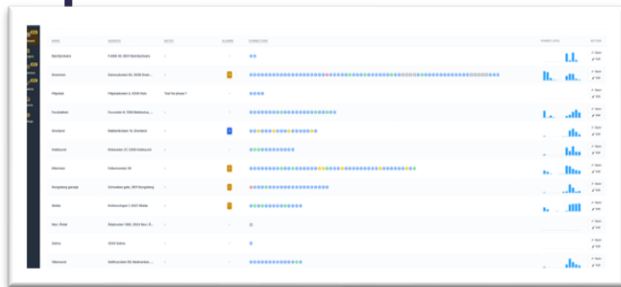
Earn More

Safer Operations

PROOF OF CONCEPT

Scaling a fleet of 500+ vehicles with limited grid capacity, 3 different charger brands in 12 depots

- Smart Charging** IVU + Tenix integration for schedule-based charging
- Load management** 120+ buses need 8 – 15MW; depot runs on ~4MW on largest depot
- Additional revenue** Infrastructure shared with B2B clients on selected depots
- Readiness in cold** Preconditioning enabled



12
Depots

500+
Fleet

3
Charger
brands

5
Bus OEM



*Tenix Charge strongly contributed to our ability to deliver **95% accuracy** at our bus routes during the **snow blizzards in Oslo in 23/24***

Bent Kjersem-Dragset, CEO Connect Bus Norway





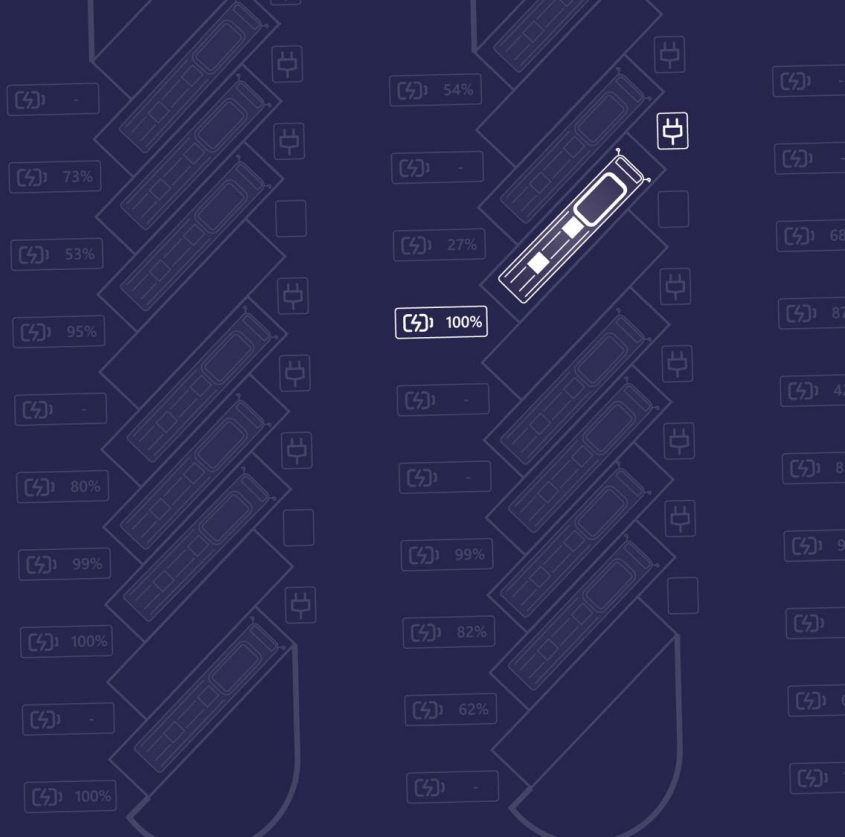
Thank you

Torbjørn G. Krøvel

CEO

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Smart Operational Management Software for Large BEB Fleets

Michel van der Mark

Program Director Innovation, Qbuzz



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Driving the Future: Qbuzz's journey into smart electric mobility

Michel van der Mark
Program director Innovation



Moving forward together

Qbuzz

Qbuzz operates public transport concessions in the Netherlands, transporting 112 million passengers with ~1,400 vehicles

- Qbuzz footprint and concessions



Highlights

112 million
passengers transported

885 million
passenger km driven

4,724
employees

Main assets

1,363 buses
(of which 681
zero-emission)

44
trams

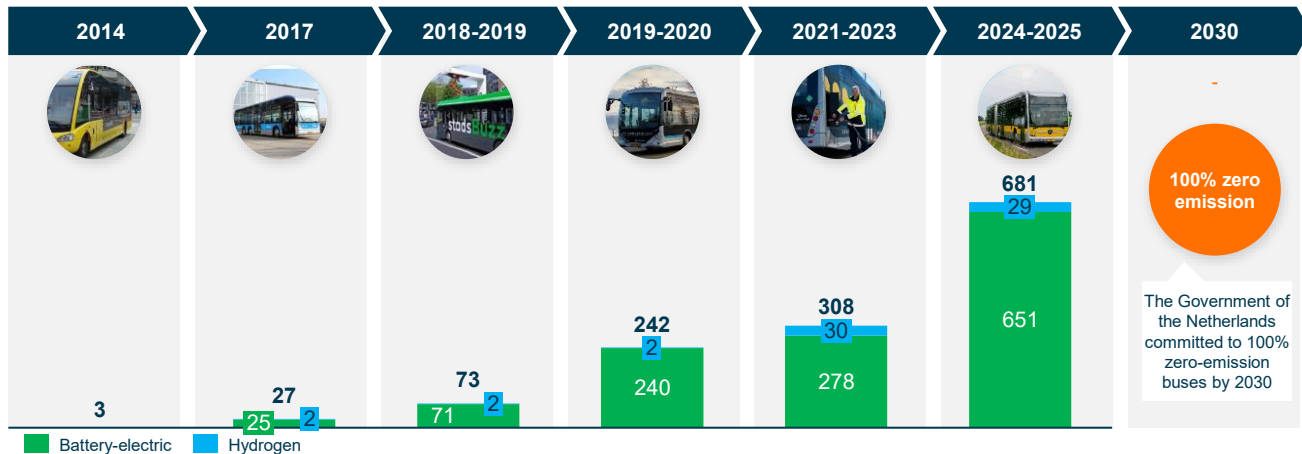
10
trains

**Zero-emission
ecosystem**
own tech platform for
zero emission fleets



Qbuzz Zero Emission Roadmap

Cumulative # of zero-emission buses, up to 2025



Methods of Charging

Overnight chargers



Opportunity chargers



Moving forward together

Hydrogen refueling



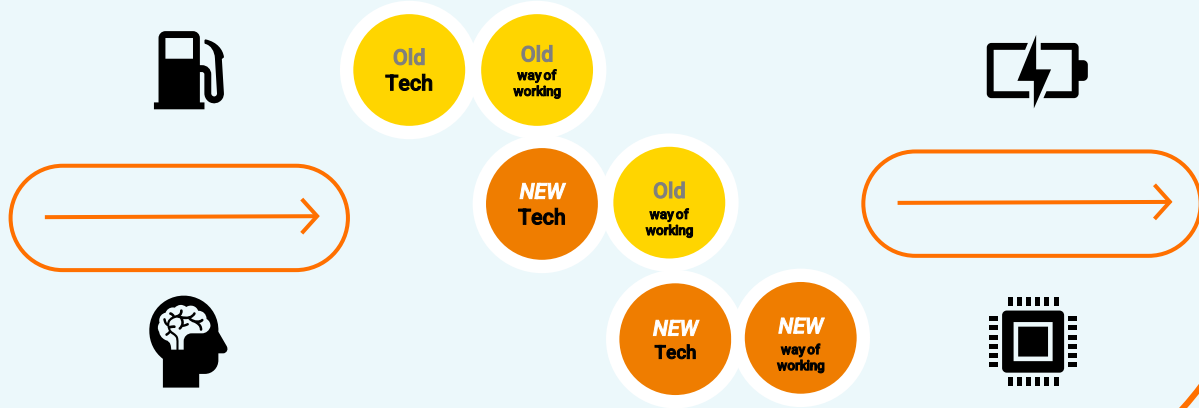
Qbuzz

The Game-Changing Impact of New Variables

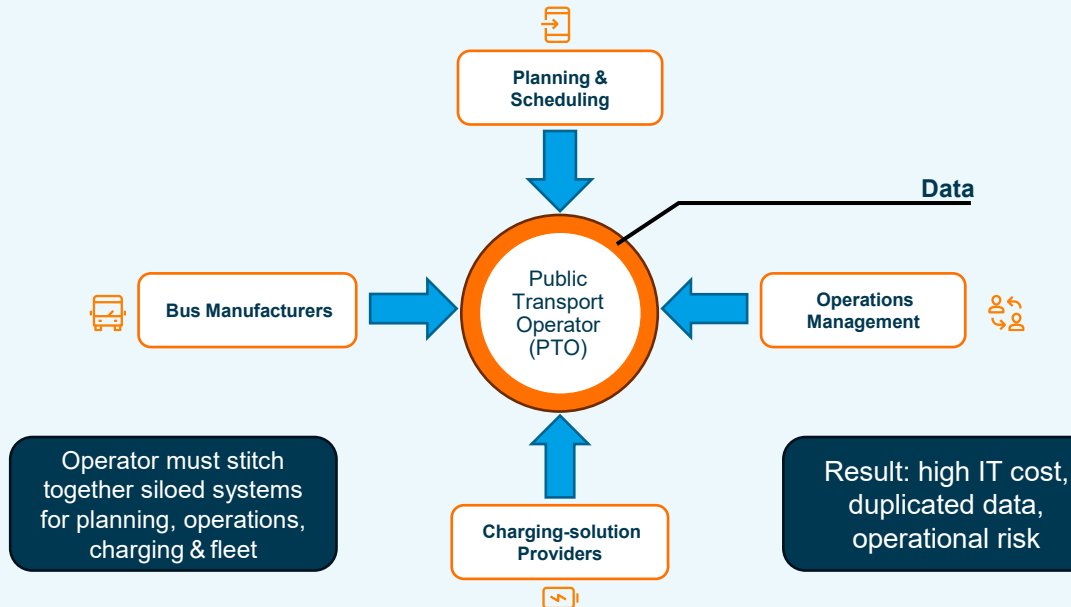


Range at start of operation	Range 5 years later	Fuelling / charging time	Acquisition costs
1.000 km	1.000 km	5 to 10 minutes	Euro 250.000
Depends	Depends	Depends	Euro 500.000 (thereof 30-40% = battery)

Transition to Zero Emission: Embracing innovation and overcoming challenges



Solutions are emerging from various perspectives...



... while Public Transport Operators like Qbuzz are building their own integrated solutions

Qbuzz ZE ecosystem



- Zero-Emission (ZE) ecosystem: **own designed and built tech platform** to manage zero-emission fleets
- Integrates **battery, energy, depot and logistics mgmt.** and provides real time data to drivers and control centers
- Predicts and acts with **AI**
- Ensures **operational excellence**



Battery management



- Maintains **batteries' warranty**
- Allows for **extended lifetime**
- Monitors battery and vehicles' **safety**



Strategic Energy mgmt.



- **Charges** when prices are low
- **Delivers** to the grid when prices are high
- **Shifts charging** when availability is low
- **Reuses bus batteries** for energy storage
- **Shares energy** with stakeholders who lack access to the grid due to congestion



Access and standardizing the e-mobility ecosystem is essential for universal access to critical data.

Data Act (EU) 2023/2854

5 key benefits the EU Data Act brings you as a bus buyer:

- **You gain the right to access operational data from your buses** (e.g., battery status, mileage, maintenance events) directly from the manufacturer.
- **You can instruct the manufacturer to share your bus data with third parties** (such as independent maintenance providers or fleet management platforms).
- **You receive clear information about what data is collected, how it's stored, and how you can access it**—ensuring transparency and control.
- **You benefit from increased competition and innovation**, as data access enables you to choose better services and optimize fleet operations.
- **Sensitive data (trade secrets, security-critical, personal data) remains protected**, so you can use and share bus data safely and legally

Standardizing



Qbuzz

Questions for the panel?
Ask them on [mentimeter.com](https://www.mentimeter.com):



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PANEL DISCUSSION



**Sanne van
Breukelen**

Moderator

Cenex Nederland



**Michel van
der Mark**

Panellist

Qbuzz



**Santosh
Alexander**

Panellist

fleetcast



**Claudius
Jehle**

Panellist

Volytica Diagnostics

Qbuzz

fleetcast

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Learn more



fleetcast.io

Lunch Break



Learn more at our sponsors' booths:
BetterFleet – Hall 7, Booth 770A
UNVI – Hall 3, Booth 301
Siemens – Hall 8, Booth 801C

Next plenary session starts at 13:30 in Room 1123:

“Organisational Change and Real-World Performance of Zero Emission Buses”



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