EUROPEAN
ZERO EMISSION BUS

European Commission

Why push for zero-emission buses?

- European Green Deal: Europe to become carbon neutral by 2050
- Climate Target Plan: 55% emission reductions by 2030
- This requires emission reductions in all sectors, including public transport
- Local benefits in terms of air quality, noise pollution
- Most major EU cities already committed to zero-emission mobility

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Legal requirements: the revised Clean Vehicles Directive

- **Scope:** all types of **public procurement** (including purchase, services, lease, hire-purchase, etc.) of **cars, vans, buses, trucks**
- Introduces a **definition** of clean vehicle
- Sets **minimum national targets** for their procurement as a share of total public procurement
- Specific **sub-targets for zero-emission buses**
- Leaves **flexibility** in how the targets are reached: Member States can decide how to share the effort between different public authorities and fleets
- Transposition **by 2 August 2021**
- Targets to be met over **two reference periods: 2021-2025 and 2026-2030**

https://eur-lex.europa.eu/eli/dir/2019/1161/oj

Uitp at a glance

- UITP is the only worldwide network to bring together all public transport stakeholders and all sustainable transport modes around the same table
  - Operators
  - Authorities
  - Policy decision-makers
  - Research institutes
  - The PT supply and service industry

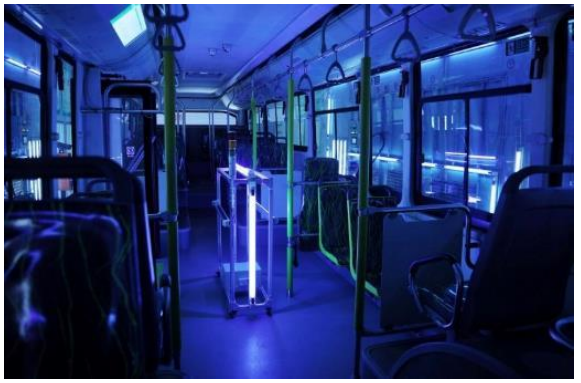
- The UITP Bus Committee is made of 55 worldwide bus operators bringing together expertise and knowledge on the operation of bus fleets around the world.

PT bus sector today (1)

- Operators focus on managing the pandemic and selected operators' challenges:
- Ensuring safety and security of staff
  - Equipping staff with protecting equipment, hand sanitizers and masks
  - Disinfection of all driver cab and driving consoles at the end of every round trip
  - No tickets on board, rear-door boarding, segregated driver's area, mandatory masks – enforcement by the driver, lower passenger occupancy and occupancy measurement technics, social distancing at bus stops and in bus, etc.
  - Data collection: correlation between specific measures and drivers' health?

PT bus sector today (2)

- To restore passenger's trust on a safe and reliable bus service
  - Vehicle disinfection e.g. ozone, Zoono, Eletrostatic sprayer, hydrogen peroxide robot, nanopolymers, photocatalyst, UV lighting…
  - Disinfection of all interior rods inside trains vehicles at the end of every round trip
  - Disinfection of door opening buttons several times a day
  - Control of ventilation system
    - HVAC systems: increase in filter cleaning or stopping ventilation in trams and buses.
  - Hand sanitising dispenser on board
- How to reduce overall cost of the new procedures?
- "Back to school" phase to ensure capacity:
  - E.g. Italy new law to increase bus occupancy/capacity to 80%;
  - Cooperation national-local government/PTA and PT operators



A SAFE and pleasant PT ride means…

- • Surfaces are kept clean
  - Often and throughoughly cleaning and desinfection of surfaces and vehicles
  - Contactless payment
  - Passengers clean hands before and after the ride
  - Passengers do not touch their face
- Avoid droplets projection
  - Proper mask use, covering mouth, nose and well fitted all the ride
  - Passengers avoid talk and eat while riding
- Avoid aerosols
  - Proper ventilation of vehicle
  - Vertical airflows
  - Air system with higher rates of air renovation - inlets of new, fresh air

Restoring passengers' trust

Why a transition to clean buses?

- Climate change, pollution, congestion, and noise as biggest challenges for cities
- Urban transport represents 40% of CO_2 emissions
  - Bus sector can contribute to reducing emissions further
- The introduction of new technologies is an opportunity to rethink and redesign the urban bus system
- Policies on decarbonisation & clean technologies are driving both market and cities towards clean buses
  - Green Deal, CVD, DAFI
    - CVD ZEB quotas: **22.5%** 07/2021-12/2025; **32.5%** 01/2026-12/2030
- Cities have political will, but lack the capabilities and know-how
- Fleet renewal towards cleaner technologies is key for bus stakeholders
  - How to ensure the investment budget in these uncertain times?

CBEP: Supporting the transition

- In 2017, the EC launched the Clean Bus Deployment Initiative to speed up the introduction of clean buses across Europe
- Elements for the scale up:
  - Policy framework
  - Financial & funding framework
  - Exchange of **best practices and knowledge**

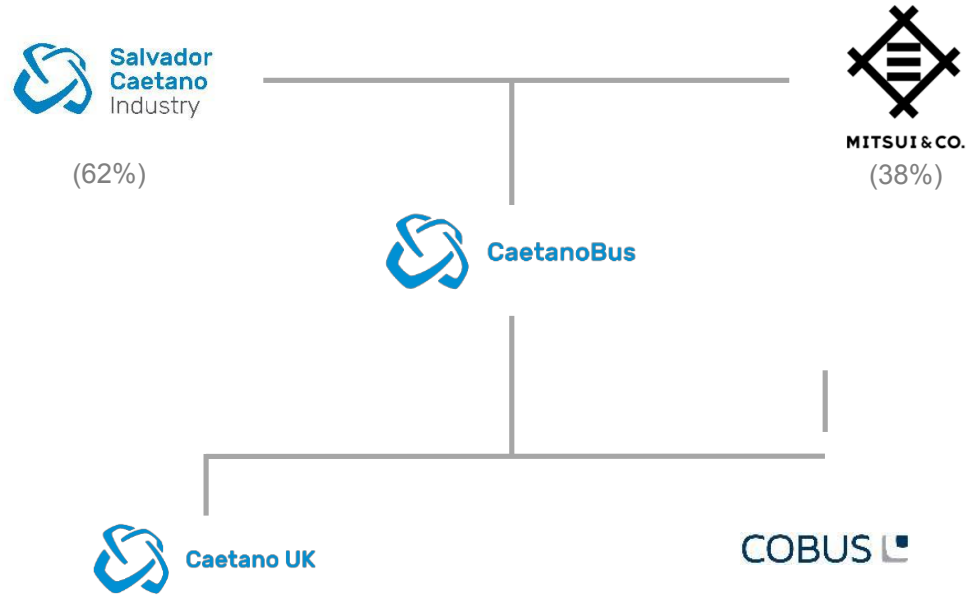
- The Clean Bus Europe Platform is the strategic line of action to develop, implement and support the transition towards clean bus fleets.
  - NOW: We need to understand how to better support cities and PTOs in face of uncertainty

CaetanoBus

CaetanoBus is **the most important manufacturer of buses and coaches in Portugal**.

We manufacture **chassis** and **buses** with different specifications for **urban**, **tourism** and **airport** service, as well as other products with unique solutions for niche markets.

Shareholders Structure



Covid-19 and The Transition to EV fleets
CaetanoBus Strategy

Now more than ever, our focus is:

- To create environmentally friendly solutions.
- To reduce cities' emissions and noise.
- To improve the quality of citizens' life.

Through:

- The use of advanced technology
- Development of clean vehicles.
- Of infrastructures development.

As hydrogen and cutting-edge battery technologies

Develop different classes of vehicles using this type of technologies.

Increase of our production and engineering capacity.

→

Supply chain empowerment

Deployment of clean buses

Visibility of market growth

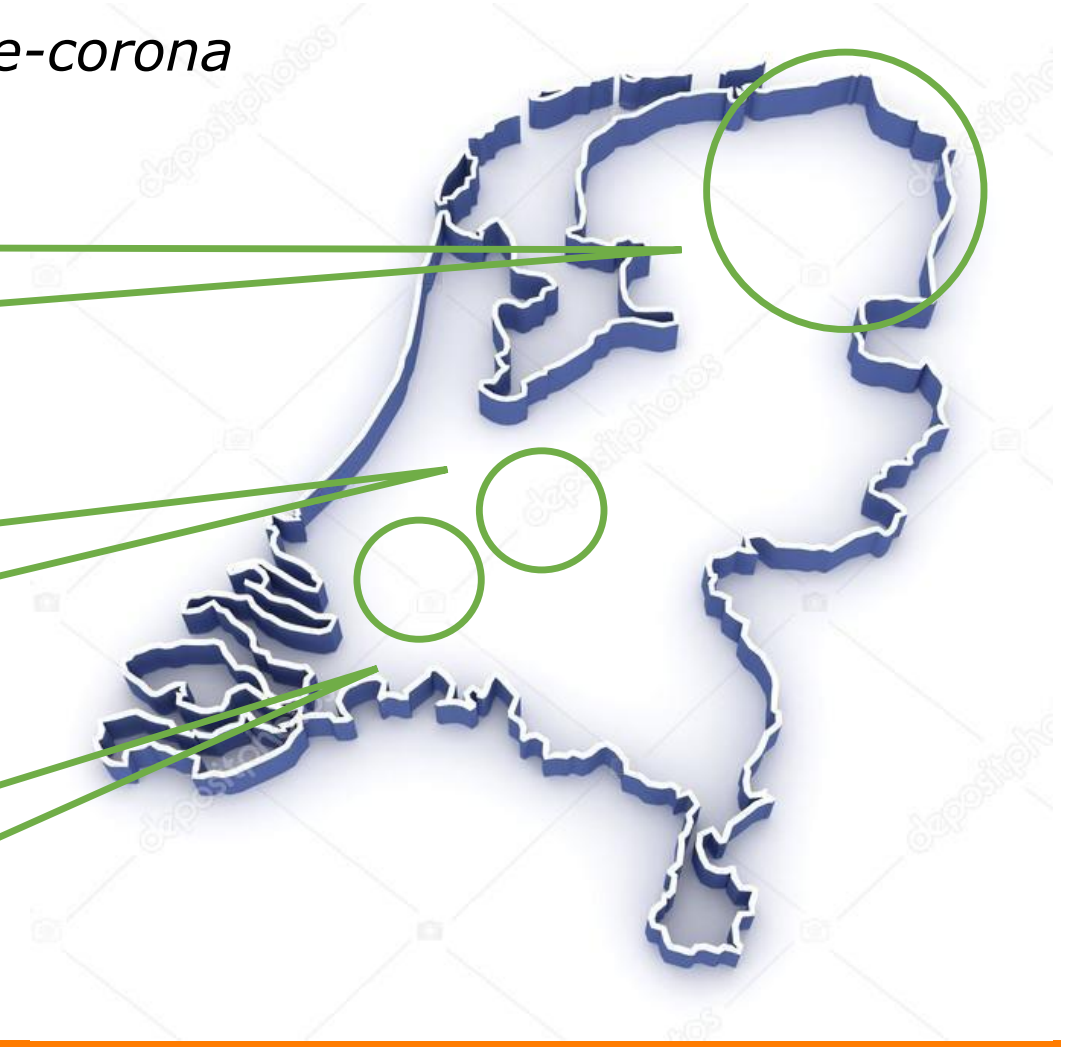
We are Qbuzz

pre-corona

Groningen Drenthe region:
- 100.000 commuters per day
- 3.700 rides per day
- 436 buses

Utrecht region:
- 200.000 commuters per day
- 5.000 rides per day
- 335 buses
- 49 trams

DMG region:
- 50.000 commuters per day
- 2.500 rides per day
- 166 buses
- 10 trains



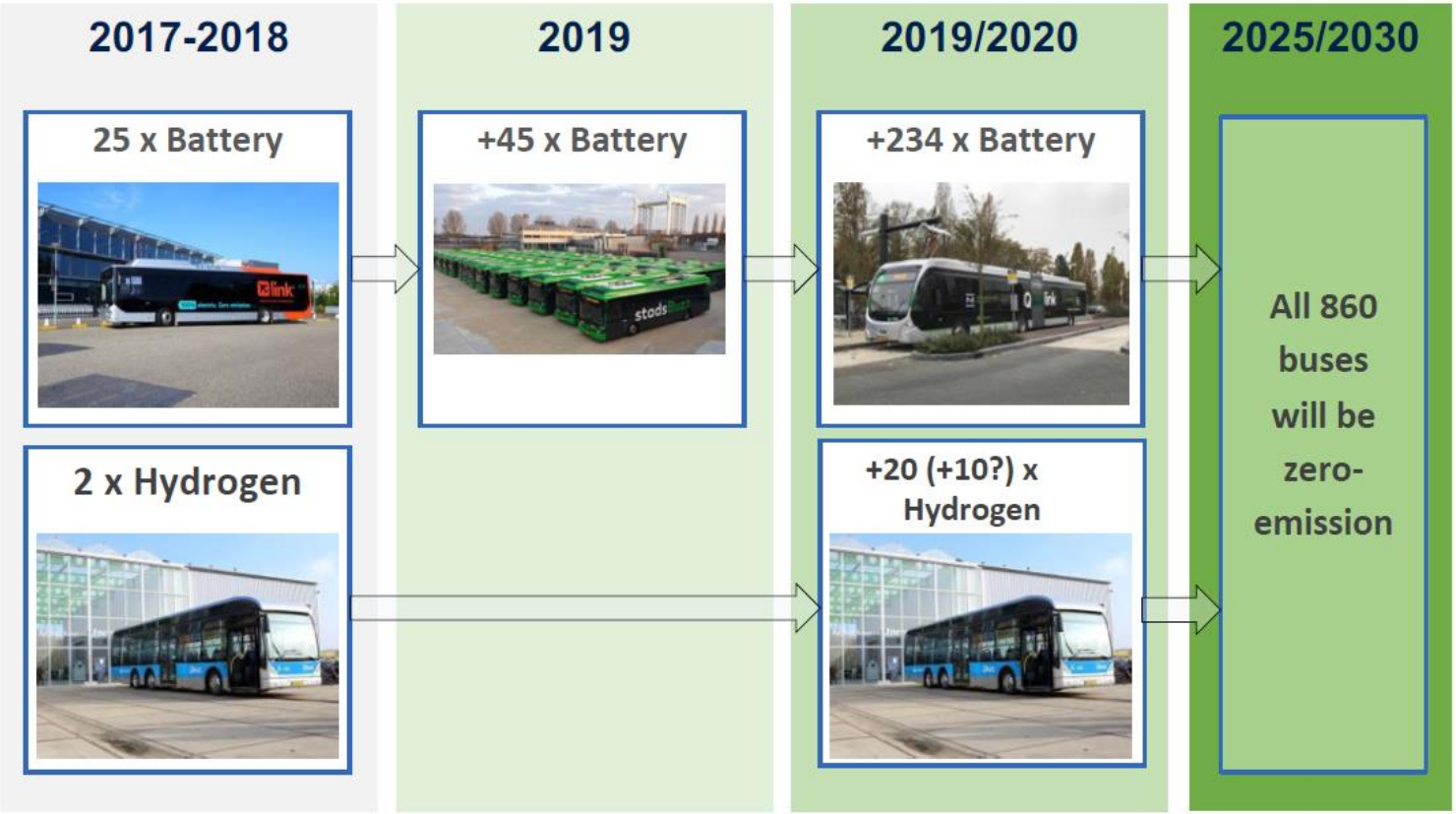
The Netherlands

- From 2025, all new public transport buses will be zero-emission vehicles
- By 2030, the entire Dutch bus fleet of approximately 5,300 buses has to be turned into a zero-emission bus fleet.

FERROVIE DELLO STATO ITALIANE

Qbuzz

Development strategy ZE buses



Groningen - Drenthe

» 62 buses plug-in, 102 buses pantograph upwards

» 27 opportunity chargers, 176 depot chargers

FERROVIE DELLO STATO ITALIANE

Qbuzz

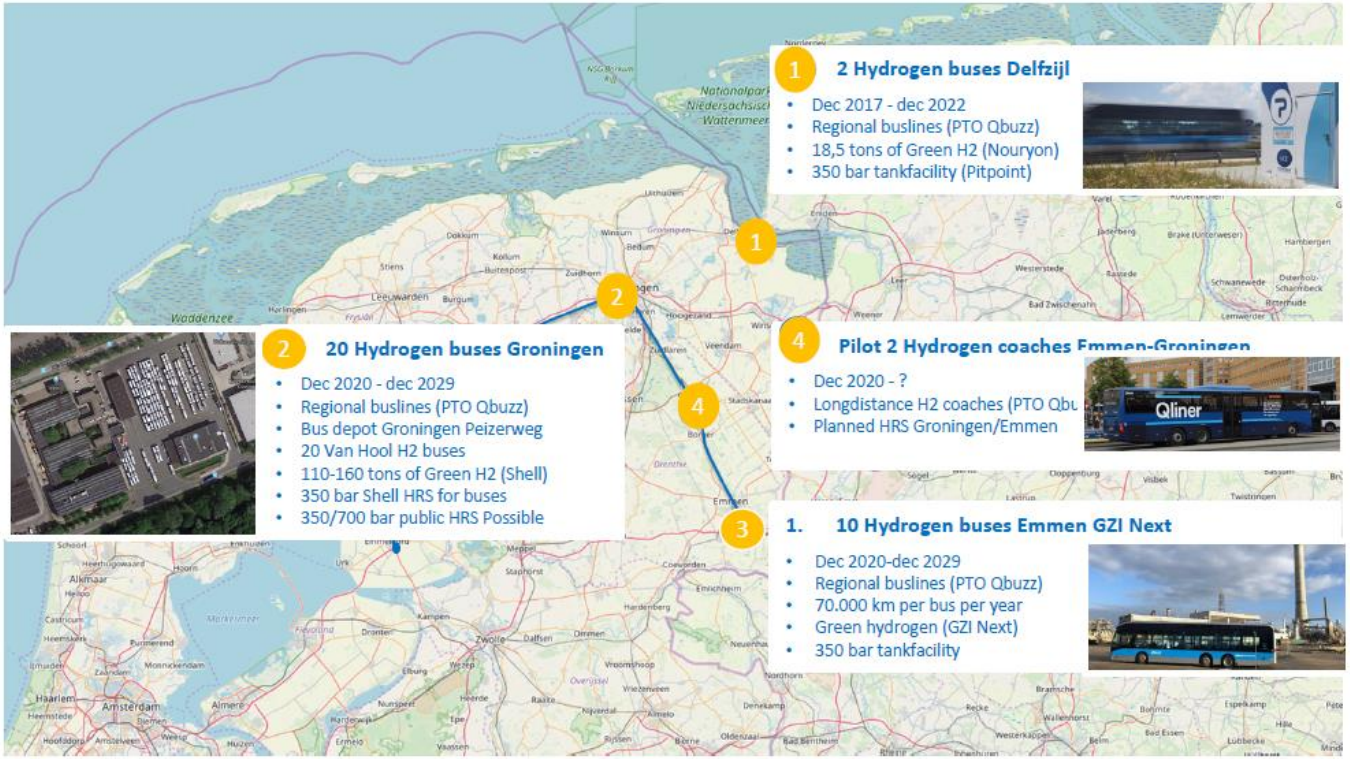
Groningen - Drenthe

» 32 hydrogen buses, 2 hydrogen stations

FERROVIE DELLO STATO ITALIANE

Qbuzz

Hydrogen projects



NORTHERN NETHERLANDS HYDROGEN VALLEY

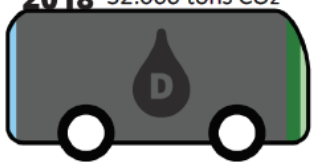
FERROVIE DELLO STATO ITALIANE

Qbuzz

Results in Groningen - Drenthe

GD concession dec 2009-dec 2019
Qbuzz

2018 32.000 tons CO_2



14 Zero emission buses (of 360)

- 10 Q-link (e)
- 2 citybuses (e)
- 2 regional buses (H2)

GD concession dec 2019-dec 2029
Qbuzz

- 90% CO_2
in 2020

2020 3.200 tons CO_2

186 Zero emission buses (of 360)

- 59 Q-link (e)
- 45 (all) citybus (e)
- 60 regional buses (e)
- 22 regional buses (H2)
- HVO in the rest of the buses

In planning:

- 10 regional buses (H2) Emmen

From 2020 to 2030
Transition to
all ZEB

0 % CO_2
in 2030

2030

Next steps 26 buses (already contracted)

- **Dec 2022** 4 Q-link 12 (Emmen) (e)
- **Dec 2023** 13 Q-link 6 (Delfzijl-Gn) (e)
- **Dec 2027** 9 Q-link 15 (Zernike) (e)