



Solaris

Changing the image of public transport

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After Sales Coordinator

53. Autóbusz Szakértői Tanácskozás
2023 október 26.





Parts distributor



SOLARIS GROUP



FAD undercarriage parts representative in Hungary



DAFO – EXTINGUISHING SYSTEM OF VEH



Rába Chassis brand representation



Hübner bus joints



NRF REPRESENTATION OF HUNGARY



Federal Mogul (MOOG) representation



EKOENERGETYKA REPRESENTATION IN HUNGARY



Valeo representation



Vibracoustic exclusive representation in Hungary



AS-PL generators, starters



Contiental Contitech Hungarian representation



Who we are

Exclusive commercial
representative
of Solarisbus



Authorised
service workshop



Who we are

We manufacture modern and eco-friendly public transport vehicles – buses and trolleybuses



We are the leader on European electric bus market



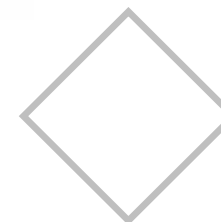
27 years of experience

We have been
operating since 1996

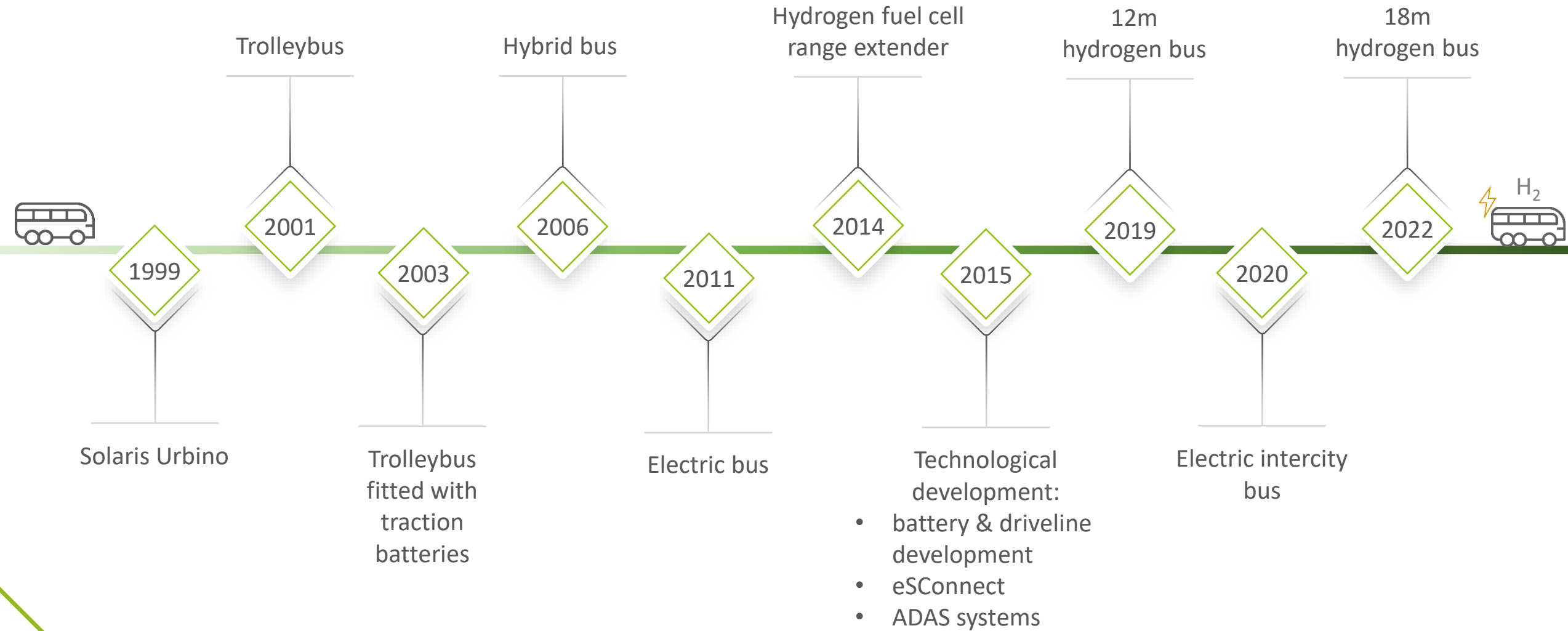


CAF

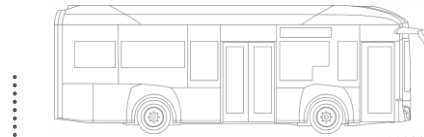
We are a part of
the CAF Group



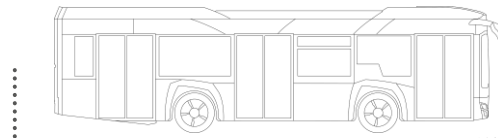
Development path towards e-mobility



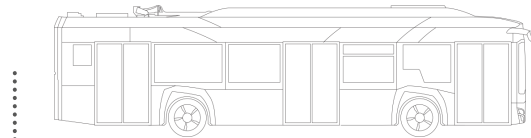
Broad vehicle portfolio



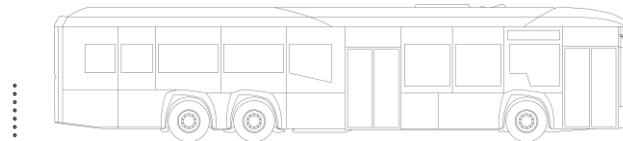
9 m



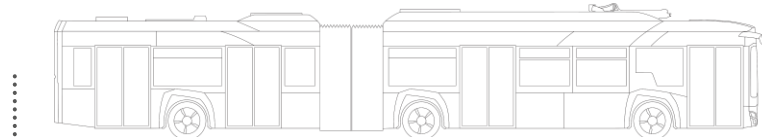
10.5 m



12 m



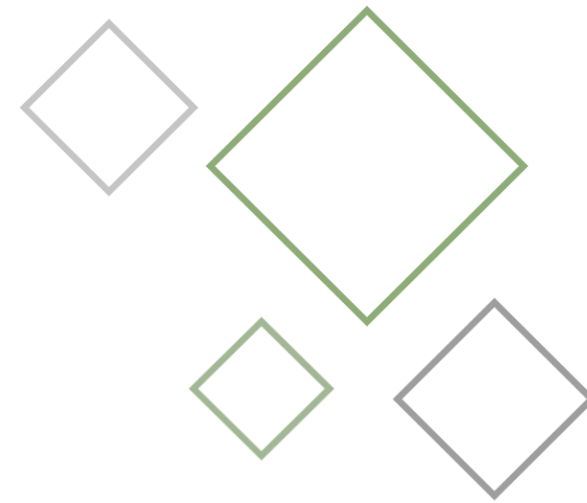
15 m



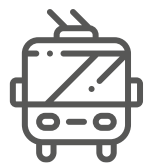
18 m



24 m



Extensive drive portfolio



TROLLEYBUS
Zero-emission



HYBRID
Low-emission



ELECTRIC
Zero-emission



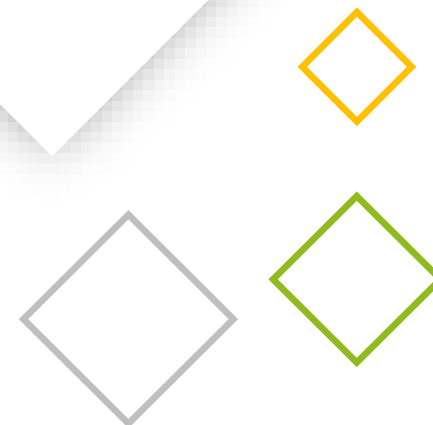
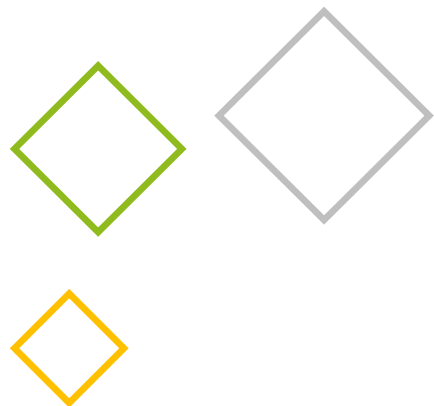
CNG



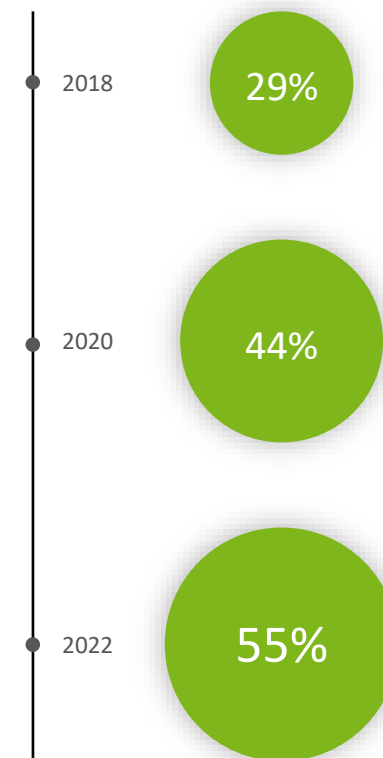
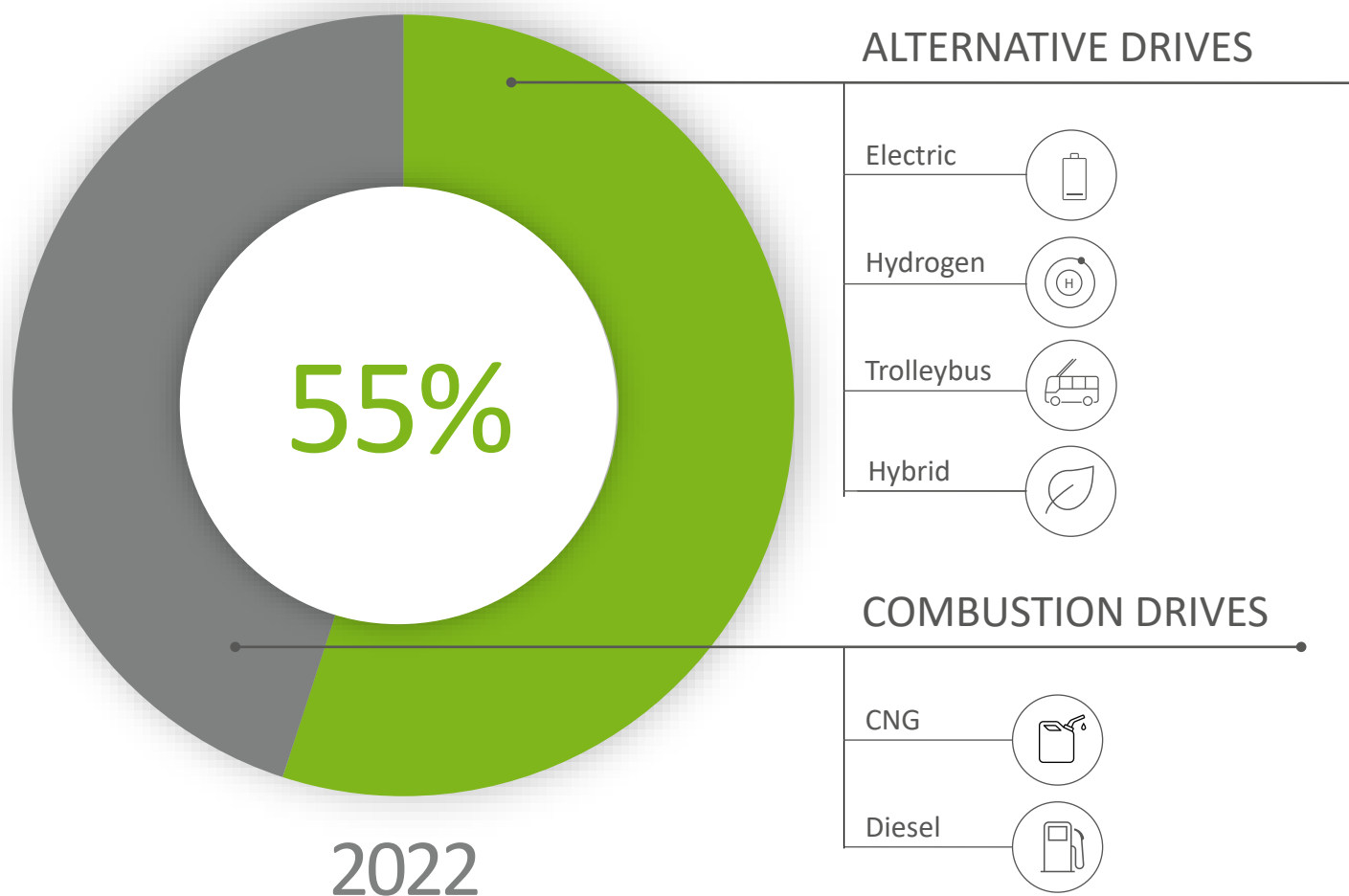
HYDROGEN
Zero-emission



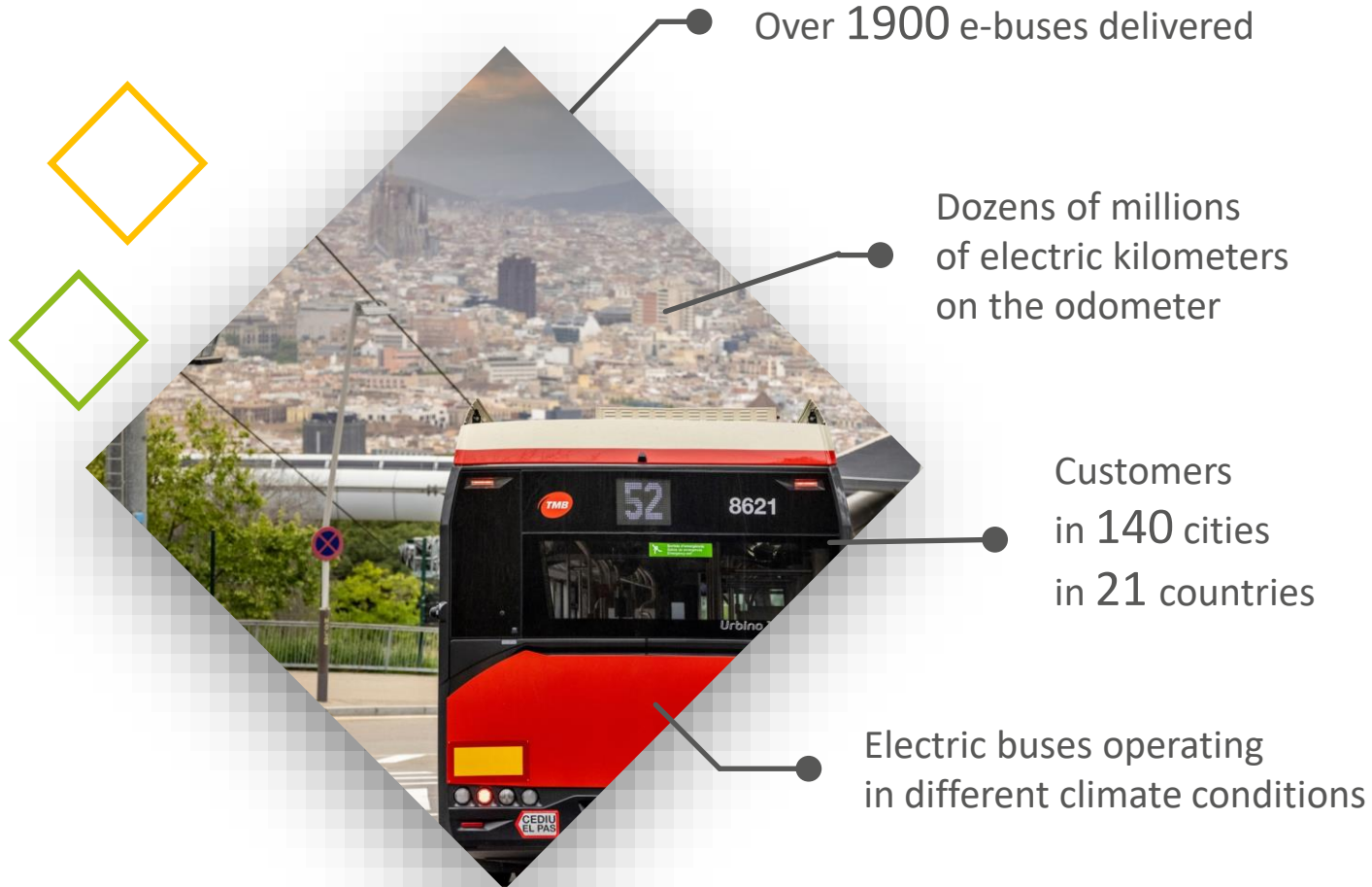
EURO 6



Share of alternative drives in Solaris buses in 2018-2022

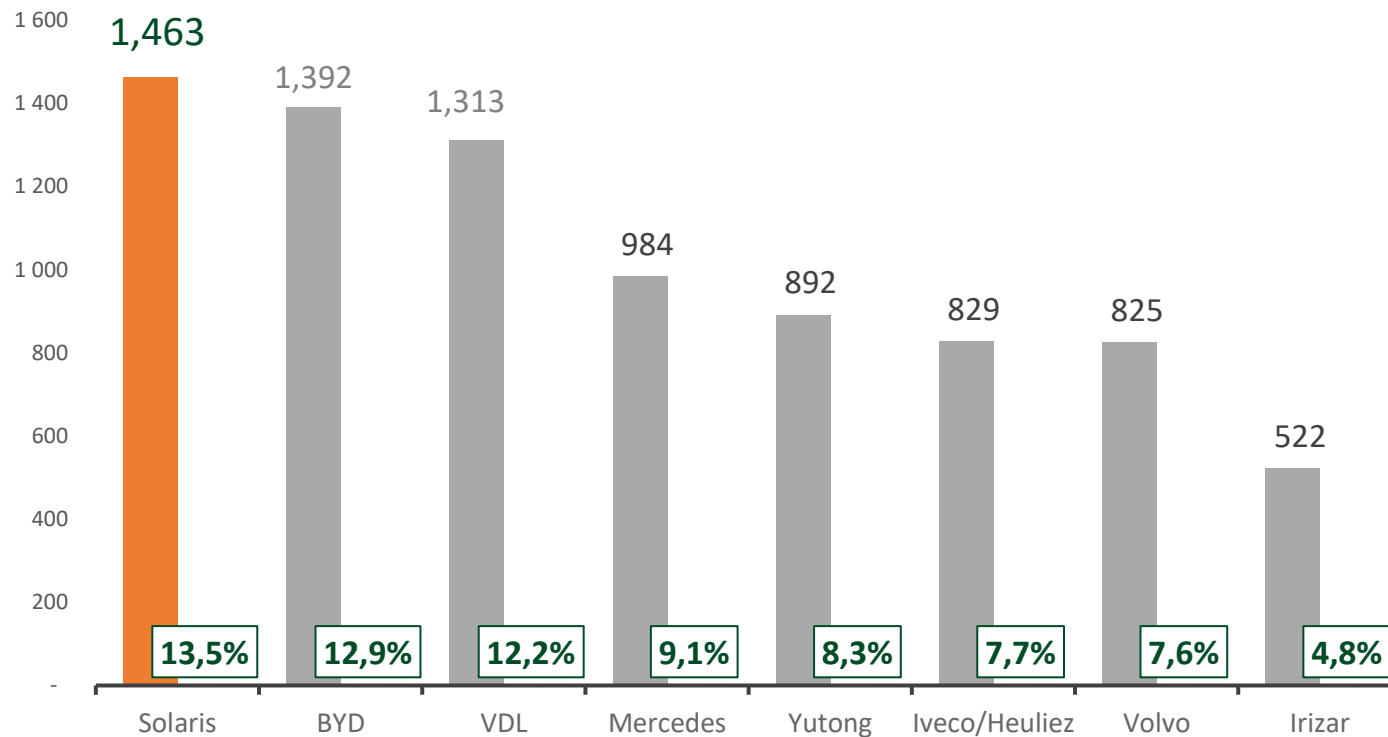


Solaris electric buses are conquering the roads of European cities



1st position in total number of e-buses delivered in Europe between 2012-2022

2012-2022 ELECTRIC BUS MARKET TOTAL SHARE SINCE 2012
EU27+NO+CH WITHOUT UK AND IRELAND
TOTAL MARKET SIZE: 10,798

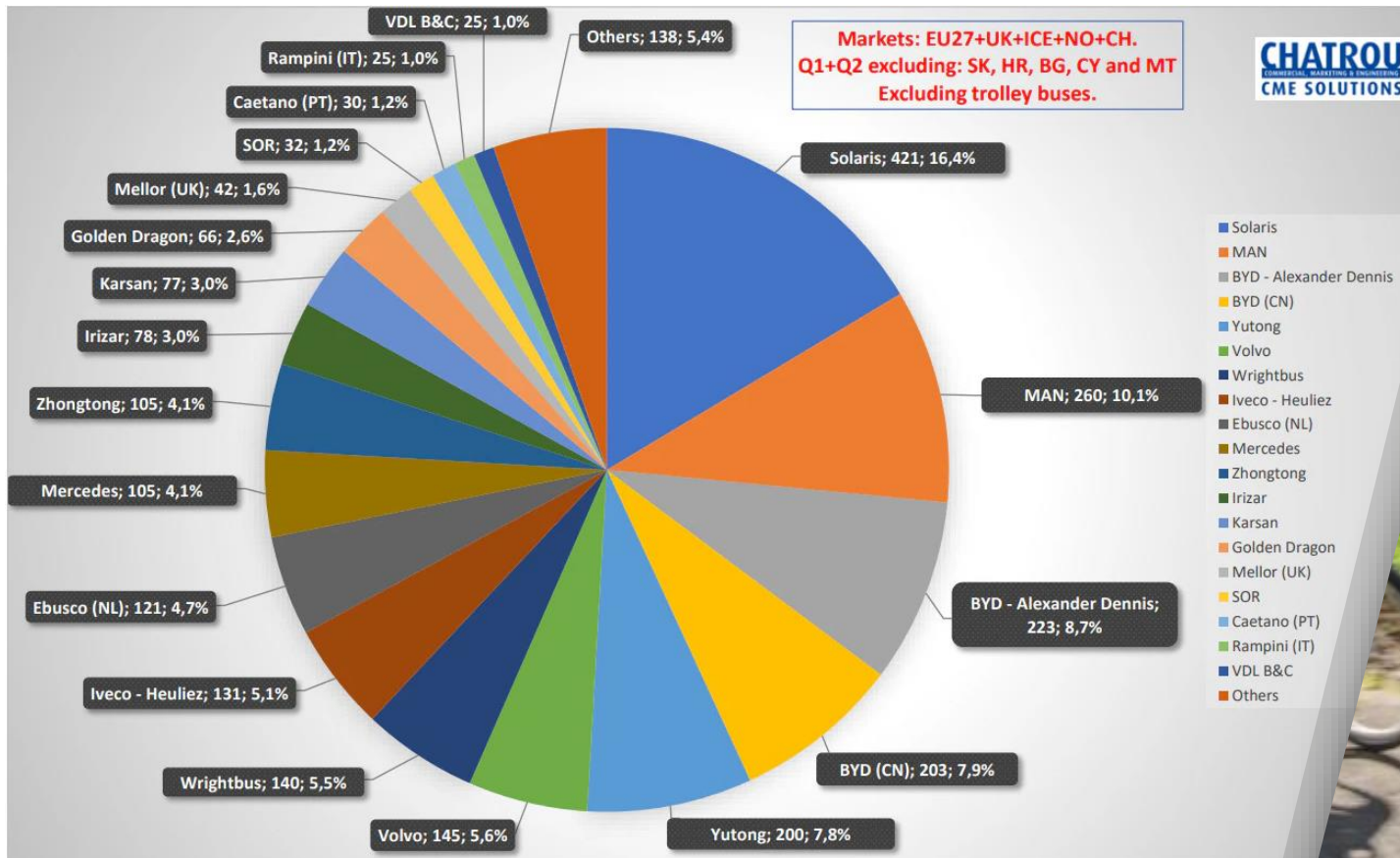


Source: CME Solutions, Chatrou



Registrations of electric city buses in Q1+Q2 2023, GVW > 8t

TOTAL MARKET SIZE: 2,567



Source: CME Solutions, Chatrou



The future is zero-emission





Urbino
electric LF

Urbino
electric LE

Trolleybus

BEV

FCEV

Trolleybuses

Fuel cell bus

Trolleybus 2.0

Electric bus – a tailor made product

5 BUS LENGTHS

- Urbino 9 LE electric
- Urbino 12 electric
- Urbino 15 LE electric
- Urbino 18 electric
- Urbino 24 electric

2 BATTERY TYPES

- Solaris High Power
- Solaris High Energy

3 CHARGING SOLUTIONS

- Plug-in – up to **260 kW**
- Pantograph – up to **450 kW**
- Inverted pantograph

2 TYPES OF DRIVE

- Central electric motor
- Electric drive axle with two integrated motors



Solaris Urbino 9 LE electric



Environmentally friendly

Designed solely for zero emission drivelines



Battery capacity: up to over 350 kWh

Operational range: 250 km *

1st + 2nd

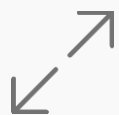
Meets the requirements for both M3/I and M3/II

Passenger capacity up to 73 (Class I) and 60 (Class II) *



CO2 air-conditioning with heat pump

40% savings on energy used for heating



Enhanced travel comfort

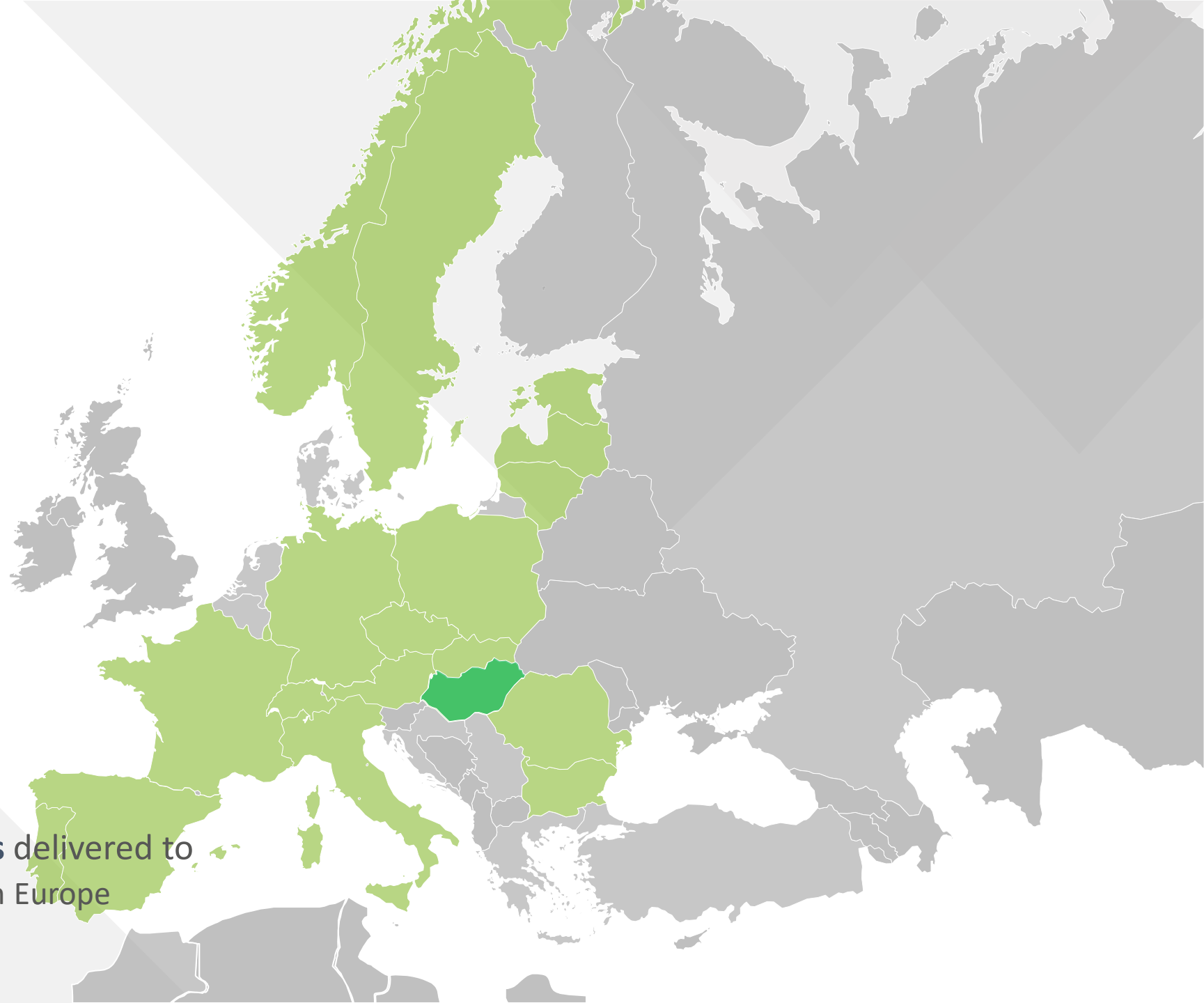
Increased distance between the seats

* individual calculations are prepared for each case



Trolleybus

- Experience in the assembly of trolleybuses since 2001
- 3 vehicle lengths (12, 18 and 24 m)
- 3 partners for electric fittings (Škoda Electric, Medcom, Kiepe Electric)
- 18 markets
- 62 cities
- 145 new trolleybuses for Hungary



1896

**trolleybuses delivered to
18 states*** in Europe

* as of 13.03.2023

Solaris Trollino



Electric motor
quiet, emission-free



Traction batteries
in-Motion-Charging and the ability
to ride apart from overhead wires



Range extender
in-Motion-Charging by fuel cell gives autonomy
up to 100 km



Safety
double insulation of the construction



Differences

compared to an electric bus

Connected to an Overhead Contact Line

- variable voltage ($0,67 U_n$ to $1,2 U_n$)
- voltage interruptions

Double insulation of the HV components

Additional (3rd) insulation for the entrances, doors and handrails

Safety, Regulations

R107, R100, EN 50502:2015



New product: Trolleybus 2.0

Przedsiębiorstwo Komunikacji Trolejbusowej, Gdynia

6 x Trollino 12 electric
synergy of trolley and e-bus



Gdynia, Poland

E-bus equipment

Trolley equipment

• TECHNICAL DATA



IMC charger:
150kW double insulated



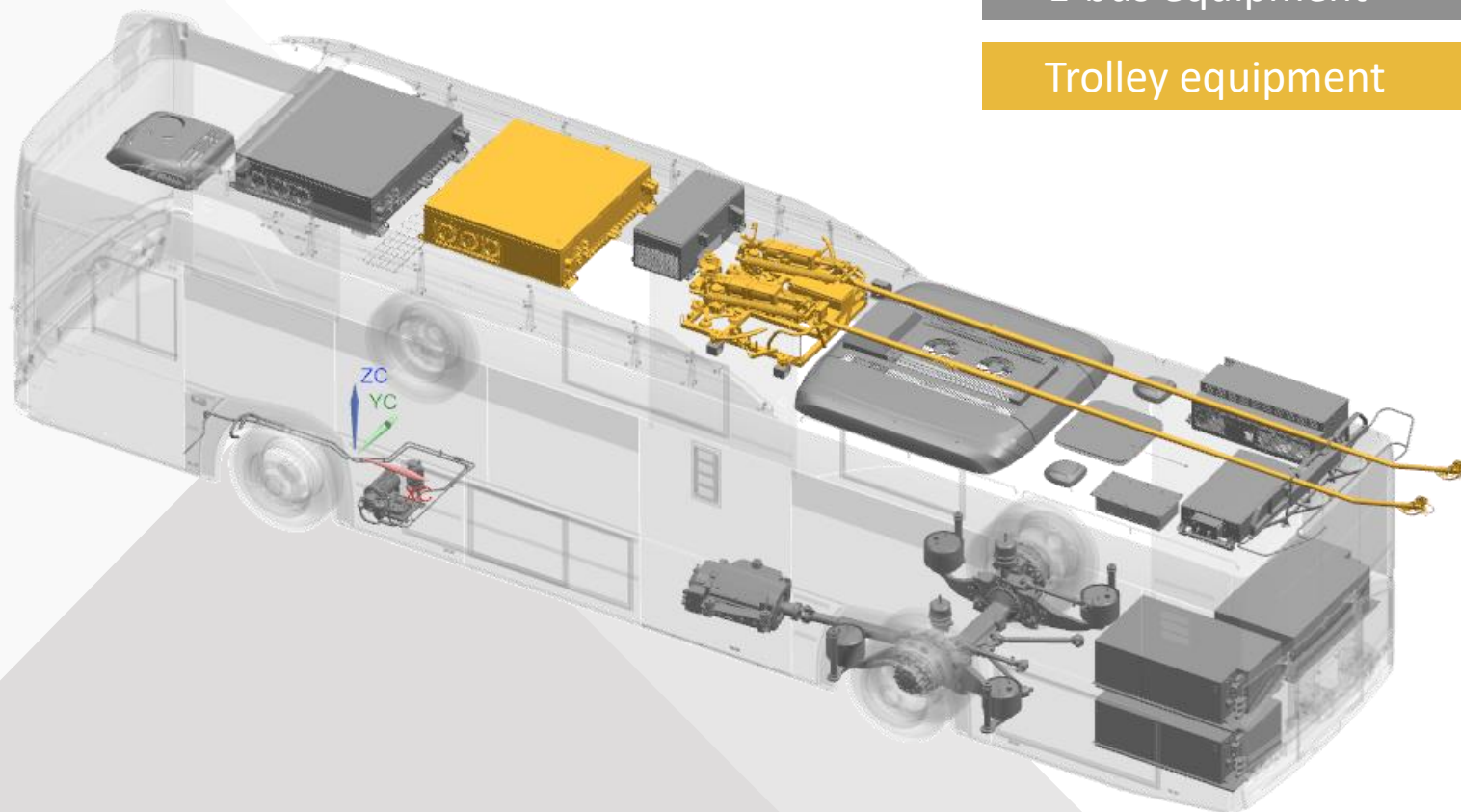
Solaris High Power
batteries with
capacity of 87 kWh



Electric motor
central motor
160 kW



E-bus
driveline



Hydrogen buses in Solaris' offer



Solaris Urbino
12 hydrogen



Solaris Urbino
18 hydrogen





Solaris Urbino
12 hydrogen

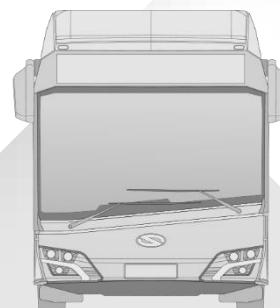
length
12 m

19,2 t



28 t, 29 t, 30 t*

*depends on local regulations



width
2,550 mm

height
3,300 mm



Solaris Urbino
18 hydrogen

length
18 m

FCmove 70 kW	Hydrogen fuel cell (Ballard)	FCmove 100 kW
1560 l / 37,5 kg	Hydrogen tanks (Type 4, 350 bar)	2141 l / 51,2 kg
ZF AxTrax (2x 125 kW)	Drive	TSA central motor (240 kW)
CO ₂ heat pump 30 kWh	Air conditioning	CO ₂ heat pump 60 kWh
min. 350 km	Battery	
	Range	min. 350 km

Solaris Urbino 12 hydrogen



33 seats
for the 3-door version

37 seats
for the 2-door version



89 passengers



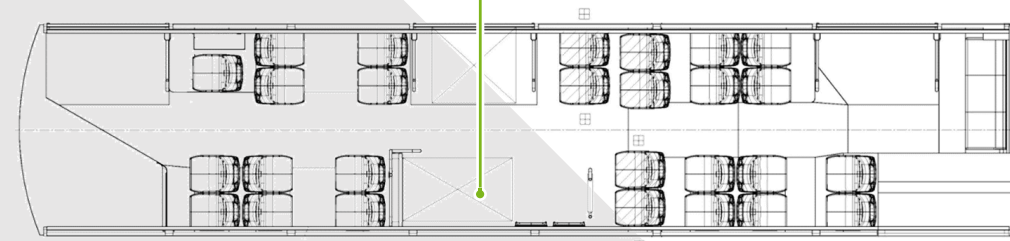
~10 passengers more
+10-15%

electric buses with a range of ~200
km available on the market

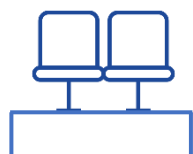
Solaris Urbino 12 hydrogen
with 19,2 t VGW



2,000 mm space
for a wheelchair



Solaris Urbino 18 hydrogen



up to 52 seats
in 3-door version



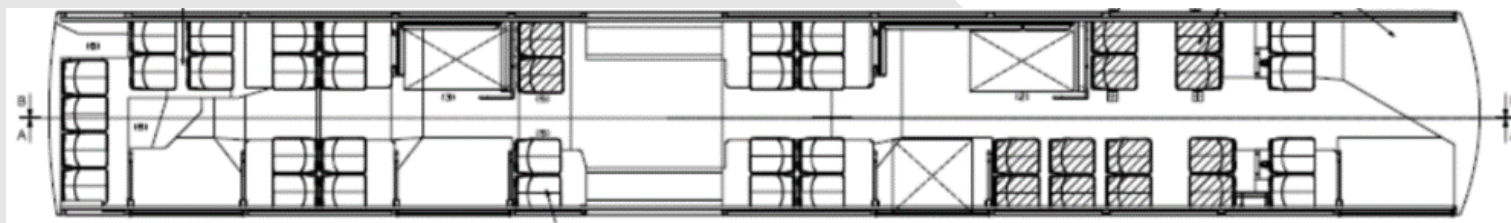
up to 18 seats
accessible from low floor



140 passengers

New seats layout
in the rear
compartment

Increased
passenger
capacity



Solaris Charging Park

Response to the growing demand for electric buses

Built and opened for use at the premises of Solaris Bus & Coach in Bolechowo, Poland, in the first half of 2022.



The entire Charging Park covers an area of 5000 m²



In the roofed part are 4 stands for vehicles, the main charger and a technical room



Photovoltaic panels installed on the roof of the structure to enable energy to be generated locally from renewable sources



Different charging systems with V2G (vehicle to grid) functions



A place for charging and uncharging processes as well as tests of new technologies and functionalities



Serves clients by showcasing innovative solutions for them to see



Full e-mobility package

SUPPORT IN TRANSITION
towards zero-emission
public transportation



CHARGING
INFRASTRUCTURE
consulting,
project implementation

ELECTRIC BUS
fully adapted to the
customer's needs



ESCONNECT
modern mobile application
for
FLEET MANAGEMENT



AFTERSALES SUPPORT
Dedicated structure
for alternative
drives

Online 24/7



MAGBUS

Platform with complete documentation, instructions, and access to the current range of spare parts



eSNOTE

Platform for reporting failures and monitoring repairs for customers



eSCONNECT

Online platform for fleet management and remote diagnostics



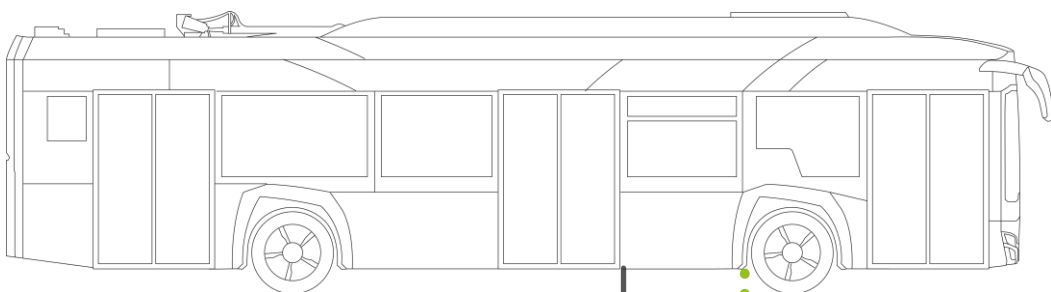
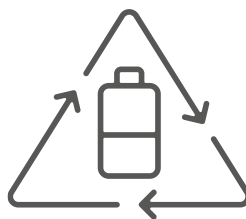
eSCLAIM

Platform for calculation and recording of warranty costs

24/7



Second life of a battery – future concept



1. RECYCLING

The battery still can be used even after being not longer suitable for vehicle application, e.g. in stationary energy storage

2. RE-USE

Used battery packs are analysed and prepared for second life applications



3. PROFIT

Stationary energy storage units support electric grid



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Any
questions?

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