4-7 JUNE
UITP BARCELONA 2023
GLOBAL PUBLIC TRANSPORT SUMMIT

CBEP Bus Forum – The Final Event

6-7 June 2023, Barcelona

CLEAN BUS EUROPE PLATFORM

The Clean Bus Europe Platform is financed by the European Union.

4-7 JUNE
UITP BARCELONA 2023
GLOBAL PUBLIC TRANSPORT SUMMIT

Welcome!

CLEAN BUS EUROPE PLATFORM

The Clean Bus Europe Platform is financed by the European Union.

Welcome Words

Dario Dubolino, DG-MOVE, EC

Welcome Words

Umberto Guida, UITP

UITP ADVANCING PUBLIC TRANSPORT

The CBEP Journey

Aida Abdulah, UITP

UITP ADVANCING PUBLIC TRANSPORT

CLEAN BUS EUROPE PLATFORM

The Clean Bus Europe Platform is financed by the European Union.

The Platform

www.cleanbusplatform.eu

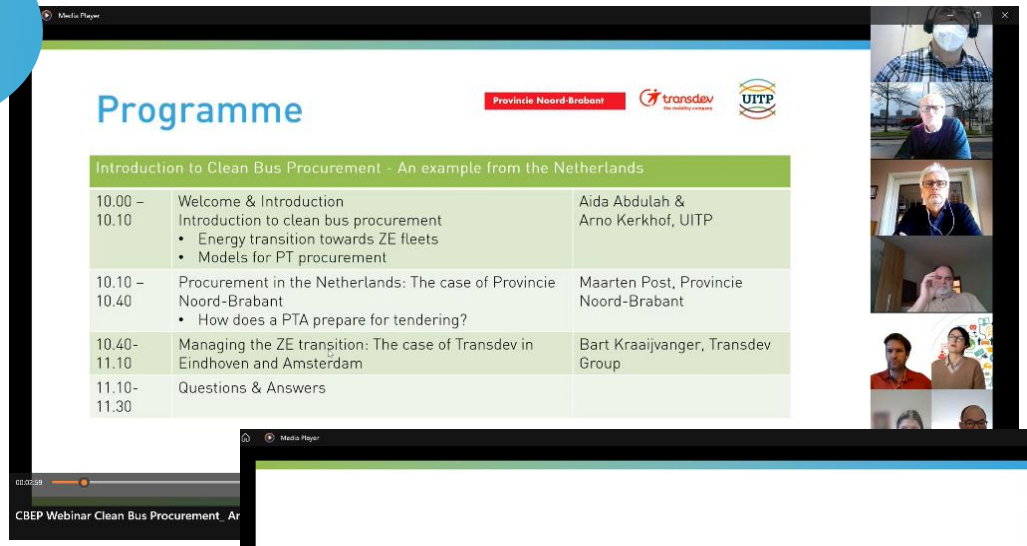
- Initiative of the EC, in the frame of the Clean Bus Deployment Initiative
- Strategic line of action to boost clean bus technologies across EU Member States
  - Running July 2019-June 2023
- Network of stakeholders related to CBD
  - PTOs, PTAs and city authorities
  - Industry: bus OEMs, charging/refuelling suppliers, energy grid operators...
  - Funding and financing institutions
  - Other associations
- Twinning approach: Host (experienced) & Target (learning) Cities
- Dedicated work plan to support cities and operators pursuing their plans
- Technologies
  - Battery electric, Plug-in hybrid, Fuel cells & hydrogen, Natural gas, In-motion-charging trolleybuses

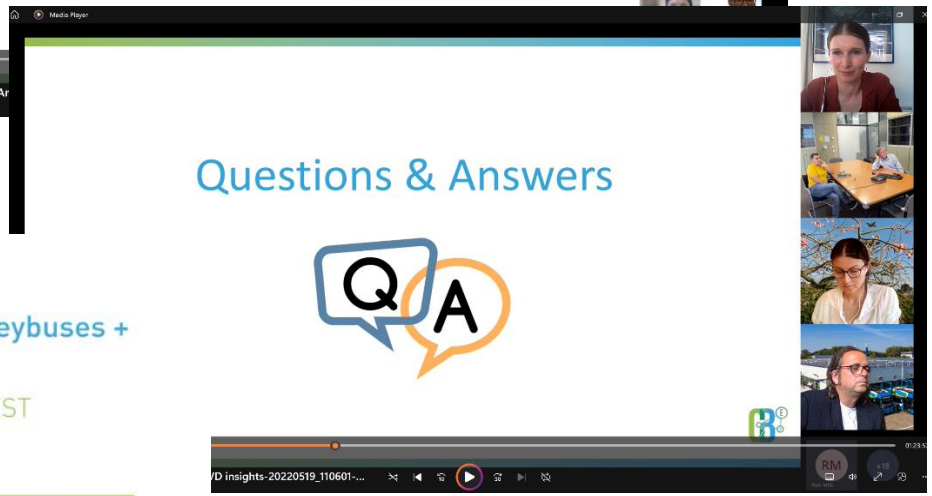
Our journey: a love story with clean buses

Activities, services, products

Webinars

19 webinars
+ 600
participants





Study Tour Amsterdam & Eindhoven

Vervoerregio Amsterdam

Provincie Noord-Brabant

transdev the mobility company

VDL BUS & COACH

Study Tour Madrid

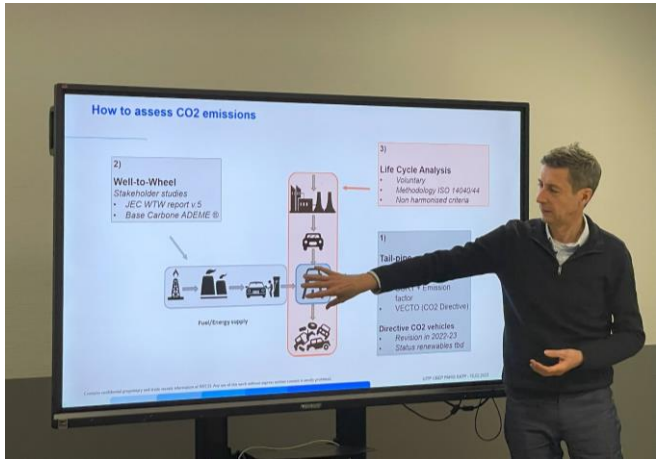
EMT MADRID



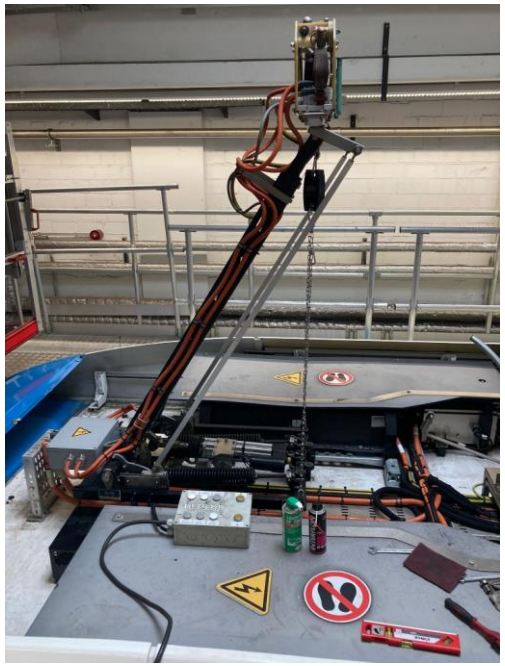




Study Tour Paris



Study Tour Münster-Solingen-Cologne



Stadtwerke Münster

KVB
Kölner Verkehrs-Betriebe AG


Linde


www.rvk.de

STADTWERKE SOLINGEN

Study Tour Copenhagen - Gothenburg


Anchersen
Vi kører

movia


umove
Movia UITP
April 13, 2023
Mikael Orasbek Kanstrup


Facts!
Anchersen

styrsöbolaget

västtrafik

Study Tour Birmingham - London

Transport for West Midlands


Coventry
VISITOR
national express


Coventry


J
K


Solar powered battery
Helping to charge our electric buses at night.
Recharged with the solar panels from our garage roof during the day.
ZENOBE
national express Bus


NO CHANGE, NO WORR
PAY BY CONTACTLESS
ZERO emissions
ABB furniture
Grand Opening SALE
OPENS GOOD FRIDAY
LG72 DVK

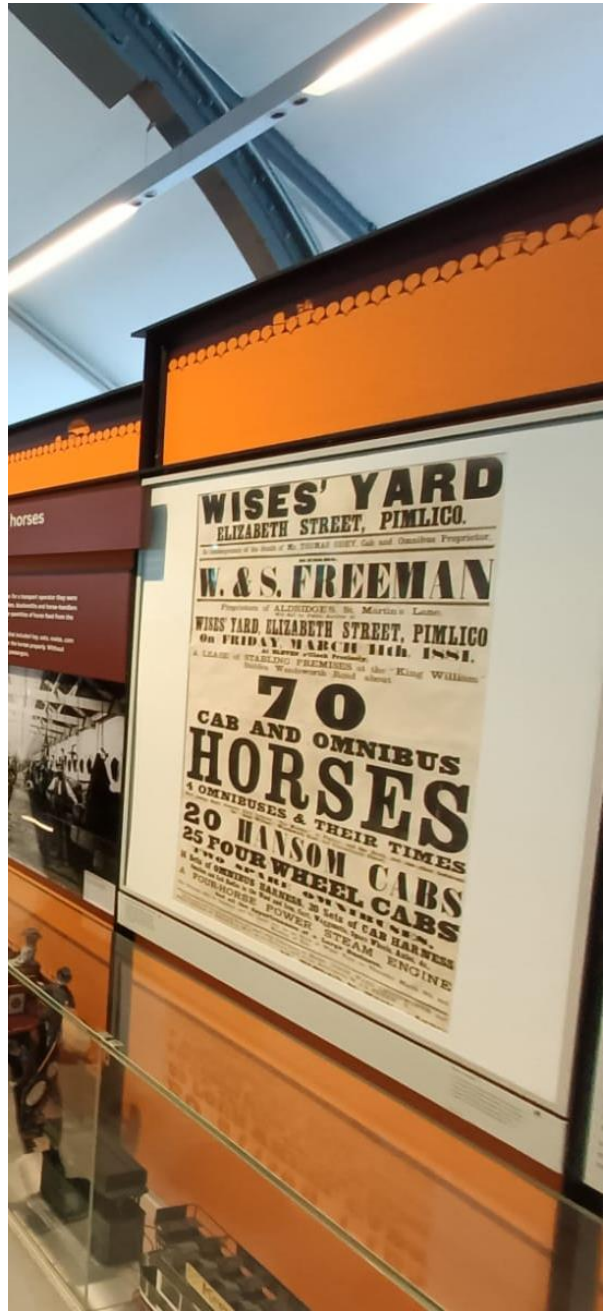
Stagecoach

Transport for London

Go-Ahead


Museum Depot


12
215


WISES' YARD
ELIZABETH STREET, PIMLICO.
W. & S. FREEMAN
WISES' YARD ELIZABETH STREET, PIMLICO
70
CAB AND OMNIBUS
HORSES
20 HANSOM CABS
25 FOUR WHEEL CABS


UNDERGROUND
BANK STATION


DRIVERS
62

CTM spa

Marketplaces Industry

- Industry
  - Supported by bus OEMs, charging and refuelling infra suppliers, energy operators, etc.

Marketplace Madrid, FIA2022

Marketplace Berlin, VDV ElekBu 2023


BVG
Willkommen in Berlin
Tickets
EBUSCO
1966
B V 1966E
BERLIN


NEW GEN CITEA
CITEA


ZF


ebusplan
Machbarkeitsstudien | Infrastruk-
kurplanung | Lastenhefterstellung
Fördermittelberatung | Techni-
sche und betriebliche Expertise
Studien & Konzepte


TWAICE
Predictive Battery Analytics
TWAICE
TWAICE


PSI
Software für die Mobilität von Morgen
Der easy Einstieg in Ihr
digitales Depot
Wir planen
die Zukunf


schunk
Up the Future
Schunk Smart Chargi

Marketplaces Financing

- Supported by financing and funding institutions
- Overview Recovery Plans, funding tools, mechanisms.

And much more!

Technical support

Social Dialogue

Data monitoring

This how we started…

Much more than clean buses…

Thank You
for believing with us!

aida.abdulah@uitp.org

Target Cities: True stars of clean bus deployment

Spotlight on the achievements,

lessons learned & next steps

City of Tyne & Wear

Rob Mills, Nexus

NEXUS

Introduction to Tyne & Wear/Nexus

- Metropolitan County in NE England (population 1.1m)
- Two Cities (Newcastle & Sunderland)
- Industrial heritage (ship building & mining)
- 4th highest bus use outside London (63.1 trips per head in 2022)
- Nexus 1 of 7 UK Passenger Transport Executives est. 1974
- Funded by contributions from 5 local authorities to plan and co-ordinate PT
- Own and operate Tyne & Wear Metro system / Shields Ferry
- Newcastle Clean Air Zone (CAZ) introduced January 2023





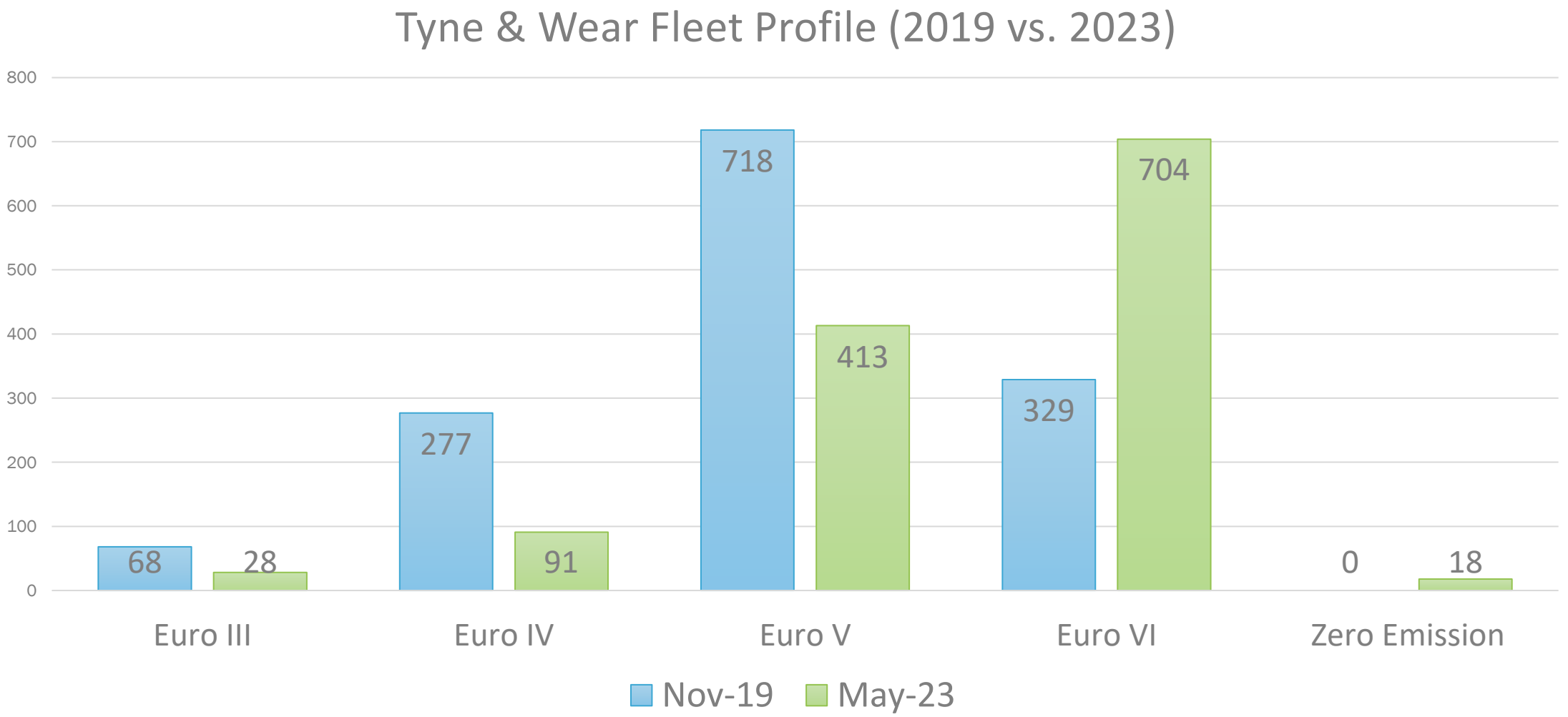
Tyne & Wear Network/Buses

- 200 bus lines / 1254 buses (PVR 1 – 23)
- 85% commercial / 15% contracted
- 93% of buses from 3 ops (Arriva 11% / GNE 48% / Stagecoach 34%)
- 7% buses from 6 small independent ops
- Mixture of high frequency urban and lower frequency inter-urban/rural routes
- Some buses travel up to 395 miles/636 KM per day
- Strong focus on customer on-board experience
- Complex ticketing

Our Clean Bus journey so far… (1)

- November 2020
  - 9 Yutong E10 buses launched by GNE on line 53/54
- September 2022
  - 9 Yutong E12 buses launched by GNE on line Q3
- 422kw battery / Range of 150miles (240km) per day
- Electricity from solar, wind & hydro
- Charging facilities (60KW DC) for up to 30 buses in depot
- High specification interior
- Buses extremely reliable and popular with drivers/customers
- ULEBS (DFT) funding secured by Nexus/GNE for buses & infrastructure
- No ability to hedge electricity exposes operator to financial risk

Our Zero Emission journey so far… (2)



Clean Bus Platform – Key learning (1)

- Amsterdam & Eindhoven
  - National policy/mandate
  - Phase introduction (trials then large-scale deployment)
  - Establish power grid capability early
  - Making progress vs. waiting for technology to evolve
  - Longer contracts better reflect asset life
  - Should national vehicle spec be developed to reduce cost?

- Madrid
  - Clear strategic plan
  - Zero emission delivered at scale/optimizing space
  - Different solutions/technology
  - Multiple power sources to mitigate risk
  - Range stated by suppliers not always true – test locally
  - Autonomous buses?
  - Battery farm to collect energy at night for use in day
  - Smart charging strategies
  - Need for battery warranty as technology/experience evolves?

Clean Bus Platform – Key learning (2)

- Germany
  - Vehicle technology evolving (carbon frames/under floor battery)
  - Benefits of Stadtwerke
  - Electrify easy routes first (but think about the hard routes)
  - Inter-operability between suppliers
  - Insurance: mitigating thermal incidents / flooding
- Copenhagen/Gothenburg
  - Understanding/reducing operator risk and TCO
  - Bespoke buses increase risk/cost
  - Market forces towards battery electric
  - Increased lead times between contract award/delivery
  - Capex 1/3 & Opex 2/3 vs. Capex 2/3 & Opex 1/3
  - Focus on highest polluters
  - Evolving tendering strategies
- London
  - Competition and access to power challenges
  - Role of private sector in supporting development
  - Importance of communication during transition








Next steps for Tyne & Wear

- Network stability
- Further develop delivery plan with regional stakeholders
- Secure more funding
  - £19.5m (22.4m euro) for 52 zero emission buses (spread over big 3 operators)
- Longer-term contracts / bus franchising?
- Build knowledge and network
- Autonomous zero-emission bus trial in Sunderland
- Share knowledge/learning
- Hydrogen bus trial?
- Electric ferry?

Project feedback

- Co-ordination by Aida/Manel and UITP Team
- Learning what went wrong (as well as what worked) for host cities
- Right blend of classroom vs. depot vs. industry market
- Webinar learning during COVID
- Cross links with other projects (JIVE / UITP Bus Committee)
- Networking opportunities with other target cities
- But most of all the people with unrivalled access to leading experts/passionate believers who were happy to share their knowledge and expertise!!

Thank You!

Questions?

rob.mills@nexus.org.uk

City of Jönköping

David Lundberg, Jönköpings Länstrafik

City of Jönköping

-PTA Jönköpings Länstrafik (JLT)

Länstrafiken

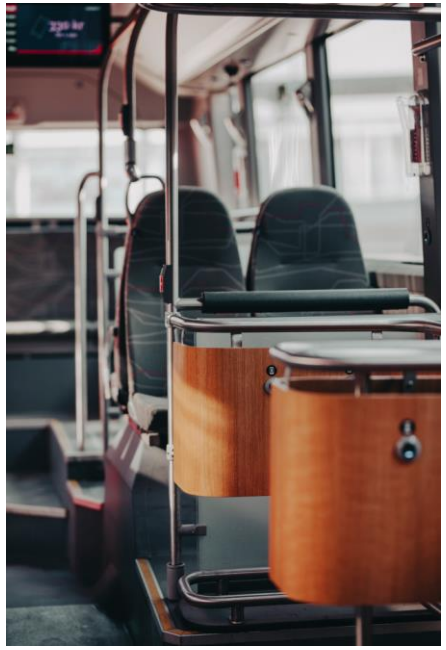
- Region of Jönköping 370 000, 6th, 13 municipalities
- Capital city - Jönköping
- 13 500 000 (city lines)

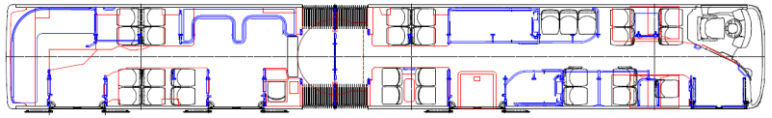
Jönköping

- Contract 2021
- 100% renewable (biogas/electricity)
- New bus lines
- Pantographs and terminals
- New depot

Vehicles

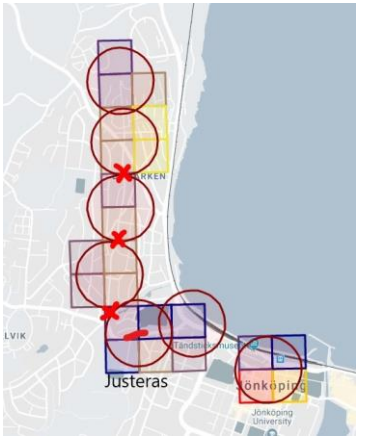
- Interior
- Collision protection
- Defibrilllator
- APC



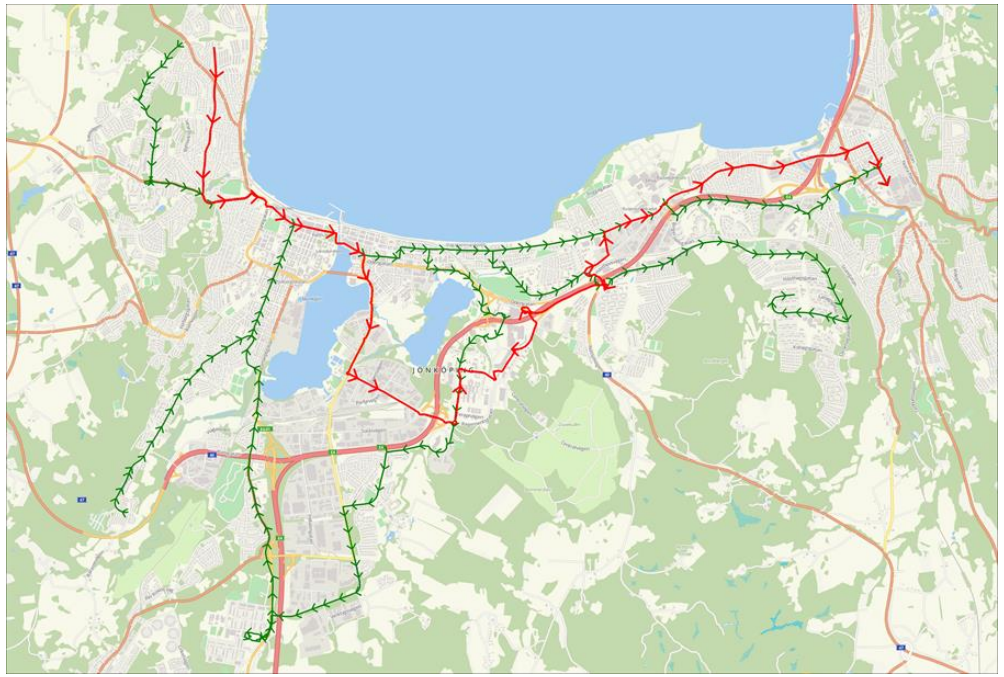


Line 4

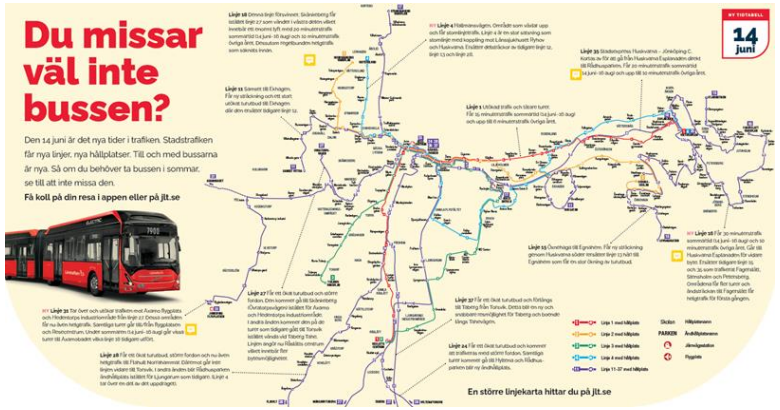

Här bygger vi om för
nya busslinje 4.
Vi gör trafik- och framkomlighetsåtgärder
och uppgraderar hållplatser.
Klart sommaren 2020


Jönköping
Jönköping
University


ELECTRIC
Länstrafiken
Länstrafiken
2435



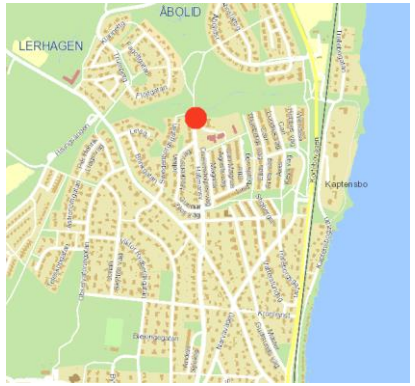
Line 4

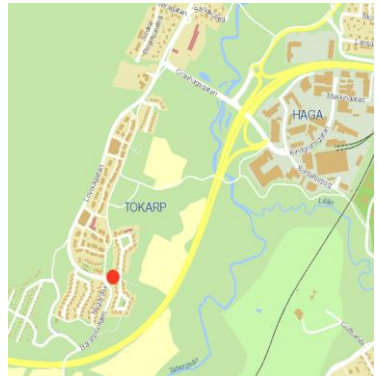

Du missar väl inte bussen?
Den 14 juni är det nya tider i trafiken. Stadstrafiken får nya linjer, nya hållplatser. Till och med bussarna är nya. Så om du behöver ta bussen i sommar, se till att inte missa den.
Få koll på din resa i appen eller på jit.se
14 juni
En större linjekarta hittar du på jit.se


4
HUSKVARNA
via Centrum-Ryhov
Länstrafiken
XYP 91L
2435

Pantograph

- 6 districts, 10 pantographs





Pantograph

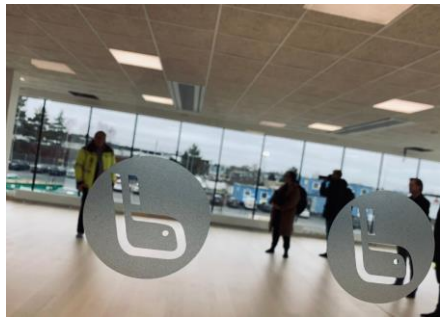
- Terminal Huskvarna

Pantograph

- Terminal Råslätt

Depot

- Biogas(local) and electricity
- Sun panels /Rain water
- 150 buses

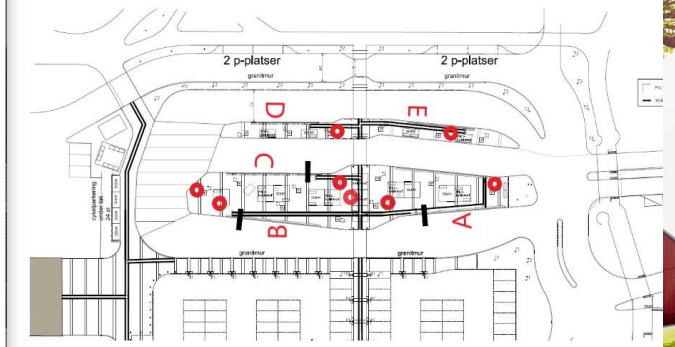


The CBEP and Jönköping

- Study tours
- Inspiration
  - Infrastructure
  - Technology
- Knowledge
- Lessons learned

Next step

- Technical solutions
- Dynamic charging positioning
- Interval control
- New bus lines/technology?
- New design bus stops/shelter



Thank You!

Questions?

Video tip:

Volvo Zero City Explorers-Jönköping

https://www.youtube.com/watch?v=6TMXF-BpAP4

David.Lundberg@jlt.se

City of Coimbra

Nuno Faria, SMTUC

City of Coimbra

Nuno FARIA, SMTUC

Introduction to Coimbra

- Coimbra is a city in center of Portugal with 134,156 inhabitants
- SMTUC is a public transport operator owned by the municipality
- Since 1911 tram lines. Transition to trolleybuses in 1947
- SMTUC operates 110 lines. 7 lines operated with battery electric buses

Coimbra and SMTUC strategy

- Energy transition is a goal of Coimbra's policy makers
- First tender for BEB launched in 2017 > first e-bus arrived in June 2019
- Coimbra joined CBEP in the end of 2018
  - During the project lifetime, SMTUC acquired 13 standard BEB and 11 BEB minibus. Similar amount of diesel vehicles were retired from the fleet
- Transition from diesel to electric supported with funding and municipality budget
- Currently in execution phase of contracts for additional e-buses:
  - 10 standard and 12 mini (7m) BEB
  - 3 MW new power substation

The CBEP and Coimbra - Outcomes

Knowledge exchange

- SMTUC participated in Study Tours and webinars
- Took part in Industry and Financing Marketplaces
  - Learn about manufacturers developments
  - Funding and financing solutions

Main learnings

- Depot adaptation to energy transition
  - SMTUC´s has an old depot with fuzzy planning over years and focused in diesel
- Charging and schedules from bigger operators
  - A growing e-fleet cannot rely solely on overnight depot charging
- Hydrogen technology and future
  - Depot refurbishment having hydrogen technology in sight
- And more to come!...

The CBEP and Coimbra – Experience

- Focus on energy transition
  - The project was an additional stamina to continue changing fleet source of energy
- Broad topics covered
  - Between study tours and webinars all subjects were addressed
- All approaches count
  - Different methods to achieve the same result: decarbonization of public transportation

The CBEP and Coimbra - Stimulus

- Continue fleet decarbonization strategy
- Financing opportunities
- Mature *In Motion Charging* (IMC) project
- Need of depot adaptation and charging methods for electric fleet growth
- Explore other forms of e-mobility (e-bikes, e-scooters…)

The CBEP and Coimbra - Expectations

- Battery end of life
- BEB end of life
- Reduce, Reuse, Recycle
- Target cities became host cities in a second CBEP
- Learn about similar initiatives from other continents

Thank You!

Questions?

nuno.faria@smtuc.pt

City of Donostia

Eduardo González, Dbus

City of Donostia – San Sebastián

Public Bus Company of San Sebastián - Dbus

d·bus

DONOSTIAKO TRANBIA KONPAINIA
COMPAÑÍA DEL TRANVÍA DE SAN SEBASTIÁN

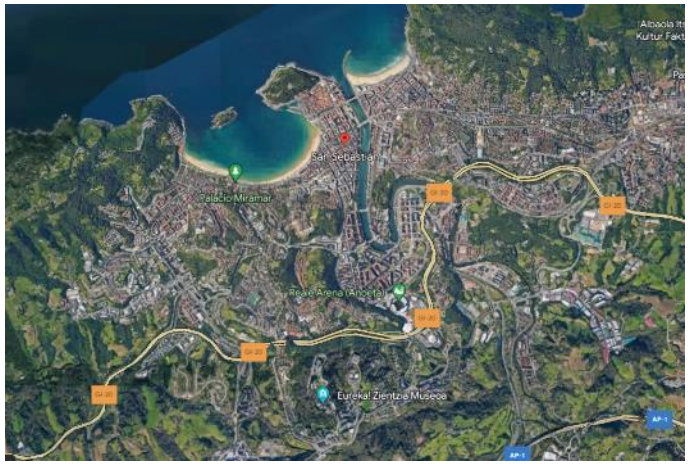
Eduardo González – Technical Manager

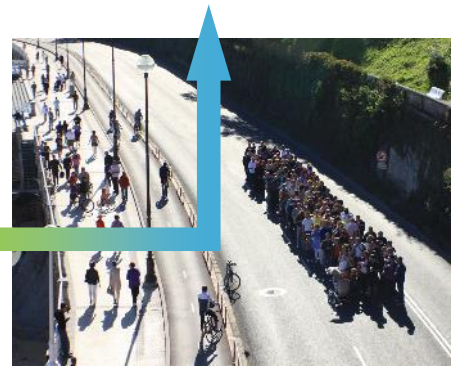
CLEAN BUS EUROPE PLATFORM

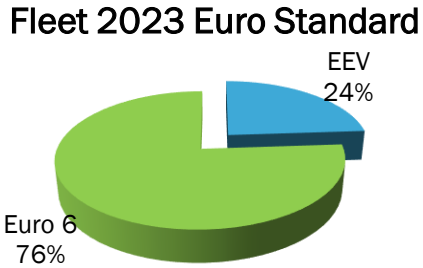
The Clean Bus Europe Platform is financed by the European Union.

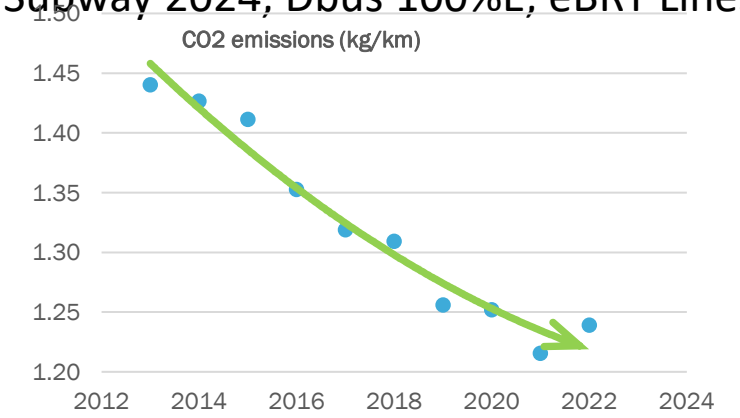
City of DONOSTIA – SAN SEBASTIÁN and Dbus: Key Figures

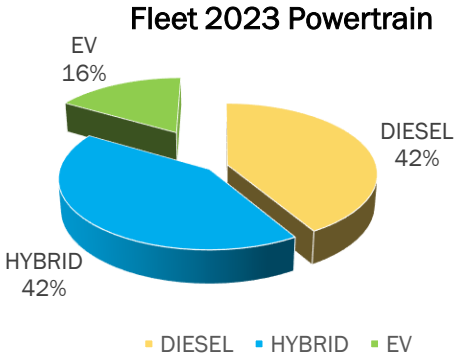
- Population: 188,000 inhabitants
- City shape, challenging orography
- High PT use: 29.5 million trips/year (pre COVID)
- 170 trips/inhab.-year (one of the highest of Europe)
- Average commercial speed >17km/h (Urban)
- 41 bus lines (9 night lines)
- Fleet: 140 buses
  - 92 buses 12m
  - 37 articulated buses 18m
  - 11 minibuses
- Diesel consumption (CO2) reduction
- Bus technology evolution, 100% EV 2030
- LEZ in 2023, Subway 2024, Dbus 100%E, eBRT Lines…

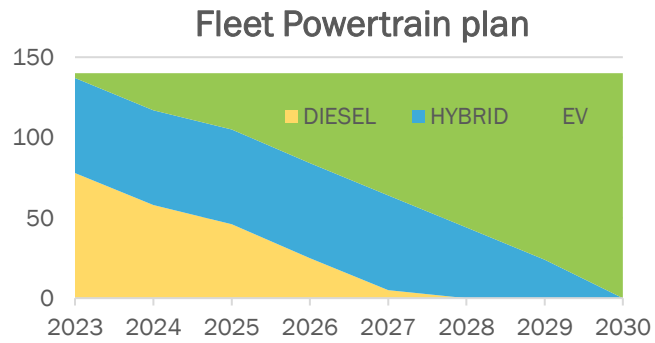












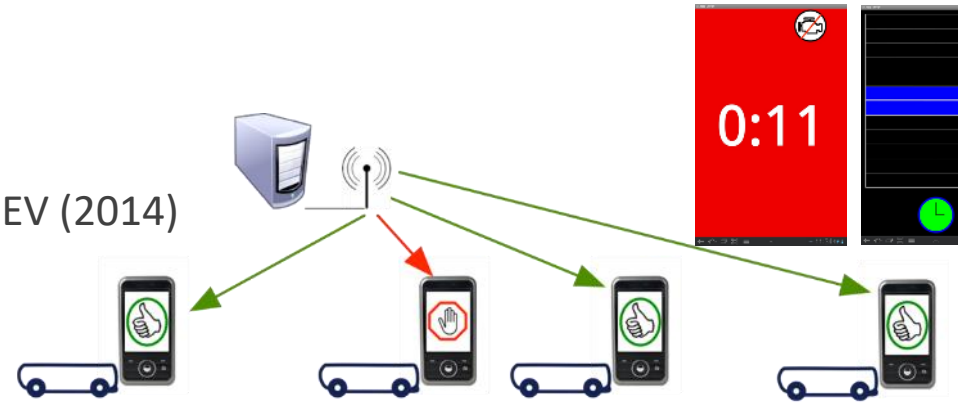
d·bus
DONOSTIAKO TRANBIA KONPAINIA
COMPAÑÍA DEL TRANVÍA DE SAN SEBASTIÁN

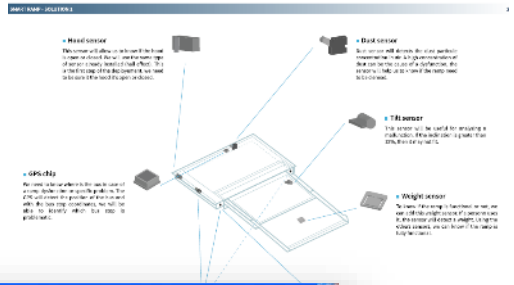
Why CBEP? Dbus & Clean Vehicles

- Continuous participation in several ”CLEAN” National, EU projects, Forums & workgroups such as:
  - CIVITAS Archymedes, HYBRID USERS FORUM, SITE-Interreg, smartCEM, EBSF2, REPLICATE, POCTEFA, E-MOBASK, ZeEUS, CBEP, …**eBRT2030**

Overall strategy for CLEAN service:

- 1. Fleet Decarbonization (97% energy consumption):
  - Highest Diesel Euro Std, Biofuels FAME (08-12), Hybrid (2011), EV (2014)
- 2. PT service efficiency:
  - Ekobus – Antiparing and Driving Assistance system
  - Driver training/evaluation
  - Bus priority system at crossroads, Reserved Platforms, Expert planning…
  - Predictive maintenance, smartRamp, smartClima…
- 3. PT promotion:
  - Marketing, Design…attractive Fleet & Company.
  - Passenger information system
  - Contactless payments (NFC, EMV, QR), intermodality…
  - ISO 50001 “energy management” standard from 2020.





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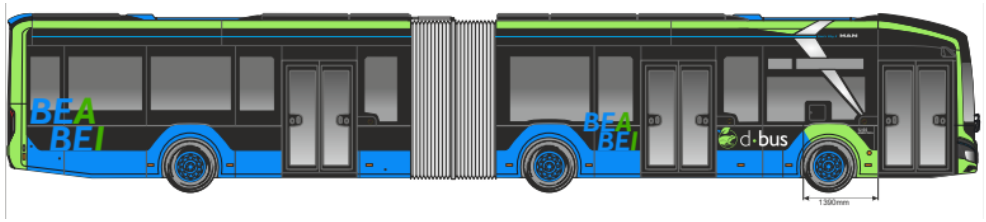
COMPAÑÍA DEL TRANVÍA DE SAN SEBASTIÁN

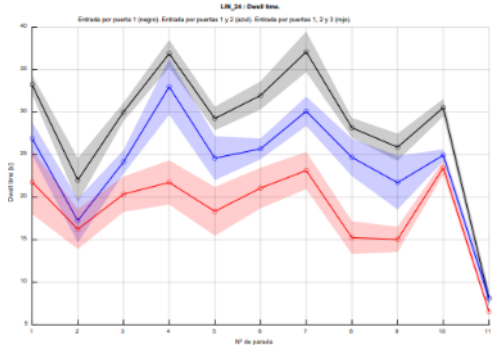


Dbus & CBEP: Perfect match!

CBEP aligned with Dbus electrification schedule:

Infrastructure and vehicles ready…then what?

Immediate next steps:



CBEP: Give and Receive Experience

Lessons Learned

- **All cases different**, same mandatory targets: 100% Decarbonized PT service.
- Study Tours: Eindhoven, Amsterdam, Madrid, Paris…**GOLD value for definition phase**.
- Webinars: Always something to get and apply in **tender requirements**.
- **No overall solution**, self base line-analysis and pre-decision process required.
- Multi-disciplinary technical issues in every phase of the project**, intense teamwork**.

Next Challenges for Dbus:

- Large EV Fleet **operation**.
- Fire prevention, early detection and **attenuation**.
- **Cybersecurity**! Full connected infrastructure-fleet-planning management, higher vulnerability.

MOST IMPORTANT: Unique group, team experience and professional network

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COMPAÑÍA DEL TRANVÍA DE SAN SEBASTIÁN

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DONOSTIAKO TRANBIA KONPAINIA
COMPAÑÍA DEL TRANVÍA DE SAN SEBASTIÁN

Eduardo González – Technical Manager

Barcelona 7th June 2023

The CBEP Roadmaps: supporting Cities along the journey

Fabio Cartolano, FIT

Róbert Lacko, DPMK (Košice, Slovakia)

The CBEP Roadmaps: supporting cities along the journey

Overview of technical support activities

CBEP Bus Forum – Final Event

7th June 2023 - Barcelona Global Public Transport Summit

Fabio Cartolano

FIT Consulting

The Clean Bus Europe Platform is financed by the European Union.

Technical Support to Target cities

CBEP Goal

To offer technical assistance necessary to establish robust strategies for clean buses deployment at target cities

Overview

Target cities already undertaken actions toward clean bus deployment and CBEP initiative aimed at support their path in order to **identify next steps**, **benefit from technical support in relevant areas** and **achieve more effective results**

Target Cities & Regions

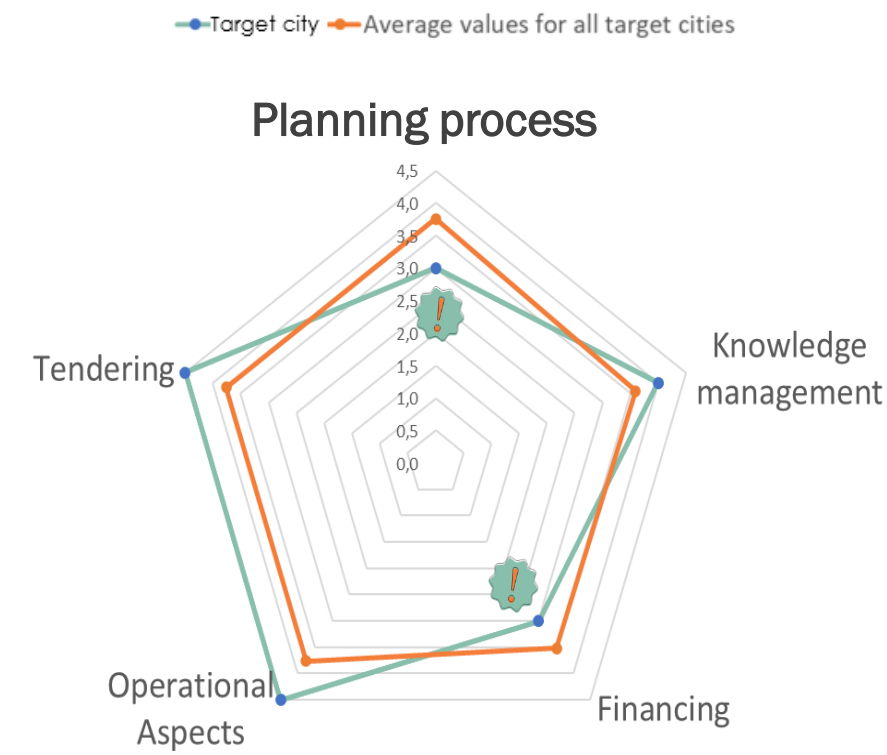
- Characterisation
  - 42 cities/regions from 23 EU countries (plus UK) addressed
  - Clean Bus deployment usually at strategic or piloting stage
- Overview of ongoing clean bus deployments
  - Some of them, spanning all Europe, showing excellent track record in sustainable transport
  - Usually needing to refocus internal activities when dealing with new bus technologies

Technical support path

- Meeting with Local Experts
  - Interview and support for preliminary analysis
- Questionnaires and Gap Analysis
  - Collection of a structured overview of the current status for the local ecosystem
  - Preparation of a Gap Analysis
- Roadmap preparation
  - Preparation of a Local Roadmap for clean bus deployment
  - Feedback from Target Cities/Regions and discussion

Gap Analysis

identifying *barriers* and *opportunities* that stand in the way of achieving the desired future state of having a cleaner, more sustainable public transport system



Planning process

maturity of the local ecosystem in defining and approving a medium-term strategy outlining the vision for the future of the public transport in the city, the goals, the relevant stakeholders to be involved, the economic sustainability

Gap Analysis

identifying *barriers* and *opportunities* that stand in the way of achieving the desired future state of having a cleaner, more sustainable public transport system

Knowledge management

readiness of the local ecosystem in defining knowledge building programs and assessing internal skills in order to deal with the clean bus deployment process

Gap Analysis

identifying *barriers* and *opportunities* that stand in the way of achieving the desired future state of having a cleaner, more sustainable public transport system

Financing

capacity of scouting, identifying, assessing and using funding and financial tools to sustain the deployment process

Gap Analysis

identifying *barriers* and *opportunities* that stand in the way of achieving the desired future state of having a cleaner, more sustainable public transport system

Operational aspects

status of deployment of clean buses (either piloted or operational) and the presence/identification of relevant infrastructures or ICT

Gap Analysis

identifying *barriers* and *opportunities* that stand in the way of achieving the desired future state of having a cleaner, more sustainable public transport system

Tendering

status of activities put in place for the tendering: preparation, requirement definition, joint procurement

Gap Analysis overview

- Improvement areas were found to be almost equally distributed, without prevalence of any area
- most of the cities started their clean bus deployment programs tackling appropriate actions in some areas and requiring to accelerate progresses in others
- some Target Cities/Regions, also because deployment programs have been accelerated after the end of pandemic exploiting dedicated EU or national funding, are quite in advanced stage, with several clean bus lines operational

Local Roadmaps

- According to the identified need, each Target City/Region was assisted with a dedicated support with strategies for clean buses deployment including:
  - Baseline institutional scenario and local public transport framework
  - Actions (regulatory, infrastructure, ICT, organisational) to be undertaken towards the deployment of clean buses
  - Stakeholders to be involved

Local Roadmaps - Planning process

- Vision and strategy. A strategic step-by-step approach for clean bus deployment
  - City commitment
  - Baseline assessment
  - Technology selection
  - Cost coverage
  - Deployment plan
  - Communication
- Focus about ESG practices to measure how the program integrates non-financial factors in the business model development

Local Roadmaps - Knowledge management

- Identifying and assessing competences
  - Per area of expertise (technical, procurement, operation, maintenance, monitoring, 2nd life)
  - Per specific requirements
- Allocating responsibilities in the local ecosystem
  - Ministry, Region, City, Authority, Operator(s), Research entities
  - Skill assessment methodologies
  - Input for training
    - Sources for clean bus competence building
    - Green Transport events of potential interest

Local Roadmaps - Financing

- Preliminary assessment
  - Eligibility criteria
  - Funding amount, period and conditions
  - Alignment with project goals
  - Competitive nature
  - Additional support
  - Level of bureaucracy
- Cost assessment per item and per funding concept
  - Pay upfront, capital/operational lease, battery supply…
- Possible Funding/Financing opportunities
  - Per program
  - Per technology

Local Roadmaps - Operational Aspects

- Technology review
  - Natural gas, Battery electric, Plug-in hybrid, Hydrogen
- Operationalise clean buses
  - Depot concept development (safety and regulations, locations, layout)
  - Refuelling/recharging (focus on smart charging, opportunity charging strategies)
  - Fleet management (charging infrastructure management, eco driving, remote monitoring)

Local Roadmaps - Tendering

- Main steps for a procurement procedure
  - From needs assessment to contract execution and maintenance
  - Tender template
- Models for the procurement of bus operation
  - Role of city/PTA/PTO
  - Focus on procurement Directives and Regulations
- Models for the procurement and contracting of clean bus systems
  - Outright purchase , Leasing, Performance-based contracting, Grant funding , PPP

Conclusions and next steps

CBEP path supported Target Cities/Regions in two core phases

The future of Public Transport needs to be planned with **long-term programs** and **structured investments**

Building **local ecosystems** and **sharing competences** at both local and EU level

PLANNING PROCESS

FINANCING

KNOWLEDGE MANAGEMENT

TENDERING

OPERATIONAL ASPECTS

Thank You!

Fabio Cartolano

cartolano@fitconsulting.it

www.cleanbusplatform.eu

Funding & financing clean buses

Caroline Lemoine, European Investment Bank

(Remote Speaker)

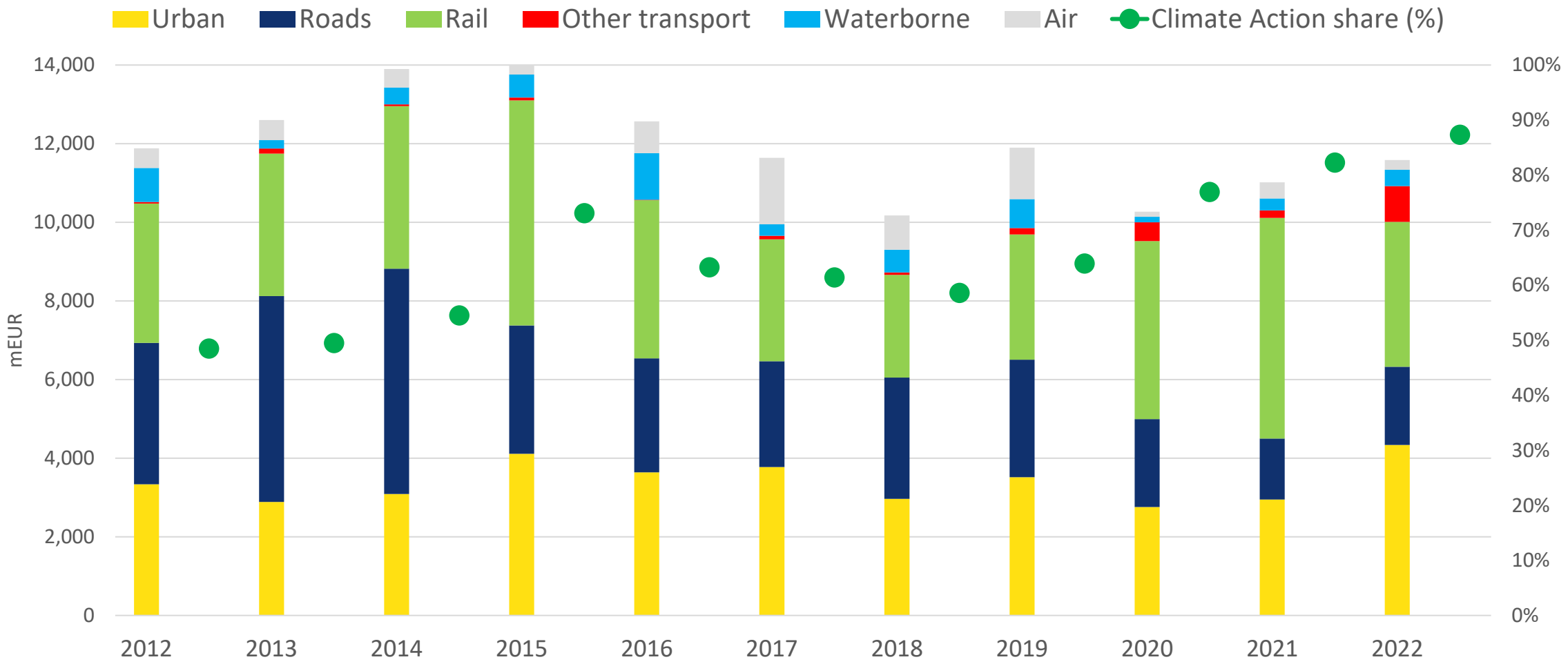
EIB’s contribution to clean bus deployment

European Investment Bank

Transport lending & climate action 2012-2022

+2 EURbn for RDI

+2 EURbn for MBILs



European Investment Bank

Cleaner Transport Facility (CTF)

- Launched by EIB/EC in December 2016
- Support the **accelerated deployment** of new cleaner transport technology
- Full range of **available tools (financial/advisory)** from EIB and EC

European Investment Bank The EU bank

Cleaner Transport Facility:
Supporting the deployment of cleaner transport

The alternative fuels and cleaner transport sector is gradually moving towards large-scale deployment across the EU. The European Investment Bank (EIB) is supporting this shift. The Cleaner Transport Facility (CTF) is a new initiative launched in December 2016 by the EIB and European Commission (EC) to assist investments, by both public and private entities, in cleaner transport projects through existing EIB products and new financial instruments.

The objective of the CTF is to support the accelerated deployment of cleaner transport vehicles and help meet their associated infrastructure needs. The CTF is an umbrella that deploys the EIB's technical and financial capacity to adapt to specific market needs in order to explore viable business models and boost opportunities to finance cleaner transport. The first projects were investments in cleaner public transport buses, and we are further exploring other markets.

We want to hear from stakeholders in the cleaner transport and alternative fuels sector to work together to develop financial products and structures tailored to the industry's profiles and investment needs. Please contact us to work together to develop financing solutions that meet your needs.

EXAMPLES OF ADVISORY SUPPORT TO CLEAN BUSES

Warsaw

[JASPERS]

Greater Copenhagen

[ELENA – European Local ENergy Assistance]

Clermont-Ferrand

[Advisory Hub (eib.org)]

European Investment Bank

WARSAW BUS FLEET RENEWAL

- JASPERS support
- 130 battery electric articulated buses
- Bus depot with charging infrastructure
- ~ EUR 90m investment
- Co-founded EIB loan & EU funds

MZA Warszawa

European Investment Bank

PT FLEET ELECTRIFICATION COPENHAGEN

- Beneficiary: Movia, PTA of Greater Copenhagen
- Implement large scale electrification of public bus and harbor ferry service with the aim of securing one single charging solution in the street space to be used by all bus operators
- ELENA support: 1.3 MEUR
- Estimated investment programme cost: 68 MEUR

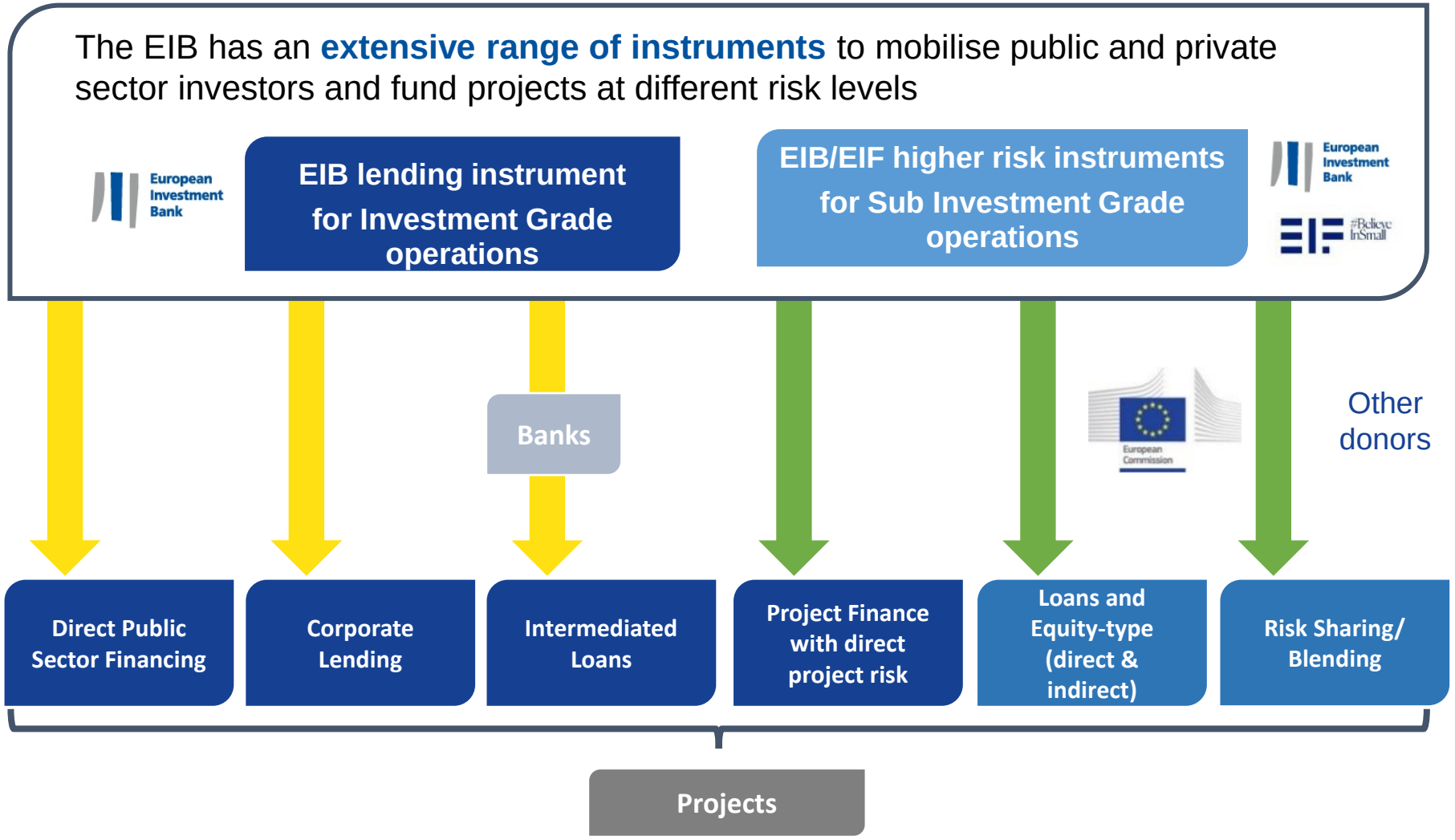
General rules for ELENA Projects

- Grant covers up to **90% of costs related to project development services**
- Application and budget allocation: rolling basis - first come, first served principle
- Required level of maturity: preparatory studies carried out and main decisions taken before ELENA support request (**ELENA proposal should demonstrate high probability that project will be implemented**)
- Market impact target: investment project/program **CAPEX min EUR 30m**
- Obligation of investment implementation - **leverage factor** required: typically **20** in energy-related projects and **10** in renovation of residential buildings and transport
- **Grants typically EUR 1-2.5m**
- In case the leverage not achieved: grant may be clawed back
- 3 or 4-year implementation period (investment realized or fully contracted)
- Investments can be implemented by the final beneficiary or by a third party

ADVISORY – EIAH & EIB LENDING EXAMPLE – CLERMONT FERRAND

- Technical, operational and financial option analysis for:
  - Bus fleet renewal strategy
  - the clean bus rapid transit (BRT) project (2 lines totaling 28 km)
  - Renewable energy production in the new depot
- Approved EIB loan end 2020: 90mEUR

In a nutshell - Overview of EIB Group products



EXAMPLES OF LENDING INTRUMENTS FOR CLEAN BUSES

- Framework loans
  - Direct public sector
  - Multi sector
  - Intermediated

    (Commercial Banks, National Promotional Banks)
- Programme Loans:
  - Netherlands, Spain, Italy and Germany
- Direct investment loans
  - Riga Transport company, Warzaw, …

E-BUS CDC INVESTMENT PLATFORM

- Intermediated framework loan through Caisse des dépôts et consignations (CDC)
- Small and average-sized local authorities targeted.
- Loans include a variable interest rate to mitigate uncertainties from an unexpected increase in electricity prices
- Each sub-project Investment programme will be limited to a maximum period of two (2) years.
- New projects eligible till Q4-2024
- Approved EIB loan end 2019: 100mEUR

European Investment Bank

CLEAN URBAN TRANSPORT PROGRAMME LOAN SPAIN

- Facilitate access to EIB financing
- Open for: public transport authorities, public and private operators, etc.
- Loan amount max 50% of project costs
- 200 mEUR approved in 2018 already disbursed
- 300mEUR approved in 2021
- EUR 25-100m per sub operation

European Investment Bank

Conclusion

- **Supporting investments in cutting-edge technologies**
- **Continue supporting and prioritizing zero emission mobile assets.**
- **Tackling investment barriers to accelerate the uptake of innovative solutions**

European Investment Bank


THANK YOU
C.LEMOINE@EIB.ORG
European
Investment Bank

EIB PROJECT CYCLE

Proposal

Appraisal

- Financial
- Economic
- Social
- Environmental
- Technical assessment

Approval

- EIB Management Committee
- Investment Committee (EFSI)
- EIB Board of Directors

Signature

Disbursement

Monitoring and reporting

Repayment

European Investment Bank

Coffee break!

Back at 11.00

Social Dialogue & the impacts of clean and zero-emission technologies on the workforce

Eckhard Voss, wmp consult

(Remote Speaker)

Facilitating Social Dialogue for the Deployment of Clean Buses – Preliminary Results

Eckhard Voss, wmp consult

CBEP Bus Forum – Final Event

UITP Global Public Transport Summit

Barcelona, 7 June 2023

The Clean Bus Europe Platform is financed by the European Union.

The Social Dialogue Project

- **The project:**
  - Initiated by UITP in the context of the Clean Bus Europe Platform
  - Implemented jointly with the European Transport Workers Federation, ETF between 2020 and 2023
- **Objectives and outcomes**
  - Analyse the deployment of clean buses as regards its impact on employment, working conditions and skills needs at the local level
  - Investigating the role of social dialogue – learning from good practices
  - Developing recommendations and orientation for local social partners in the transition process towards clean buses
  - Elaboration of training material on the issue of social dialogue on the deployment of clean buses
- **Activities:**
  - Desk research, stakeholder consultation, case studies and collaborative activities, final report

wmp consult

Advisory Board

UITP BUSINESS & HUMAN RESOURCES

ETF

TMB Transports Metropolitans de Barcelona

unite theUNION

RATP

Kommunal

GVB Door en door Amsterdam

СЪЮЗ НА ТРАНСПОРТНИТЕ СИНДИКАТИ В БЪЛГАРИЯ

HOCHBAHN

KEOLIS

ver.di

Final Report Structure

Preface UITP & ETF

1. **Introduction**
   - 1.1. Short introduction of the context, project and its main objectives
   - 1.2. Methodology and structure of contents

2. **Deployment of clean bus technology: Evolution and current state**
   - 2.1. Comparative overview of the transition and deployment in the European Union
   - 2.2. Clean bus technologies
   - 2.3. Growing diversity of manufacturers
   - 2.4. Demand side: Clean Vehicle Directive and national transition targets
     - 2.4.1. Clean Vehicle Directive and EU
     - 2.4.2. National targets for procuring clean buses
     - 2.4.3. Zero-emission bus targets in European Capital Cities
     - 2.4.4. Case studies: Amsterdam, Barcelona, Cagliari, Hamburg, Paris, Sofia and Stockholm
   - 2.5. Main challenges and experiences as regards technology and deployment as well as local/national framework conditions

3. **Impacts of clean bus deployment on different domains of urban public transport**
   - 3.1. Procurement and investments
   - 3.2. Operations
   - 3.3. Traffic management, disposition and planning
   - 3.4. Infrastructure and network management
   - 3.5. Charging, maintenance
   - 3.6. Other impacts

4. **Impact of clean buses on local economies – the perspective of clean bus suppliers**
   - 4.1. Urban infrastructure
   - 4.2. Clean buses in the context of green mobility solutions
   - 4.3. Employment impacts

5. **Impacts on employment, staff and skills needs**
   - 5.1. Current skills set and new (hard and soft) skills needs in major occupational profiles (driver, maintenance, traffic management, infrastructure engineering and planning, etc.)
   - 5.2. New emerging job/occupational profiles
   - 5.3. Additional tasks and multi-skilling requirements
   - 5.4. Training needs and practices – new emerging occupational profiles
   - 5.5. Practice examples from case studies

6. **Impact on working conditions and the role social dialogue**
   - 6.1. Work environment and work strains
   - 6.2. Work organisation and working time
   - 6.3. The driver perspective
   - 6.4. Health and safety
   - 6.5. Other impacts and challenges
   - 6.6. Workers' participation, information and consultation – diversity of framework conditions and common features

7. **Conclusions and recommendations**
   - 7.1. Conclusions from the research perspective
   - 7.2. Why social dialogue is important - Recommendations for European and national level social partners

Annex

- Training material
- Checklist of Do's and Don't for social dialogue on the transition

Deployment of clean buses: Variety of national targets

- All EU Member States have targets for the public procurement of alternatively fueled buses through the Clean Vehicles Directive, adopted in 2019
- For the first phase, from August 2021 to December 2025, the procurement targets for alternatively fueled buses range from 24% to 45% of new purchases. In the second phase, from January 2026 to December 2030, the targets range from 33% to 65%.
- The targets vary by Member State, with Eastern European countries generally subject to lower targets. Critically, at least half of the procurement target must be achieved through ZEBs.

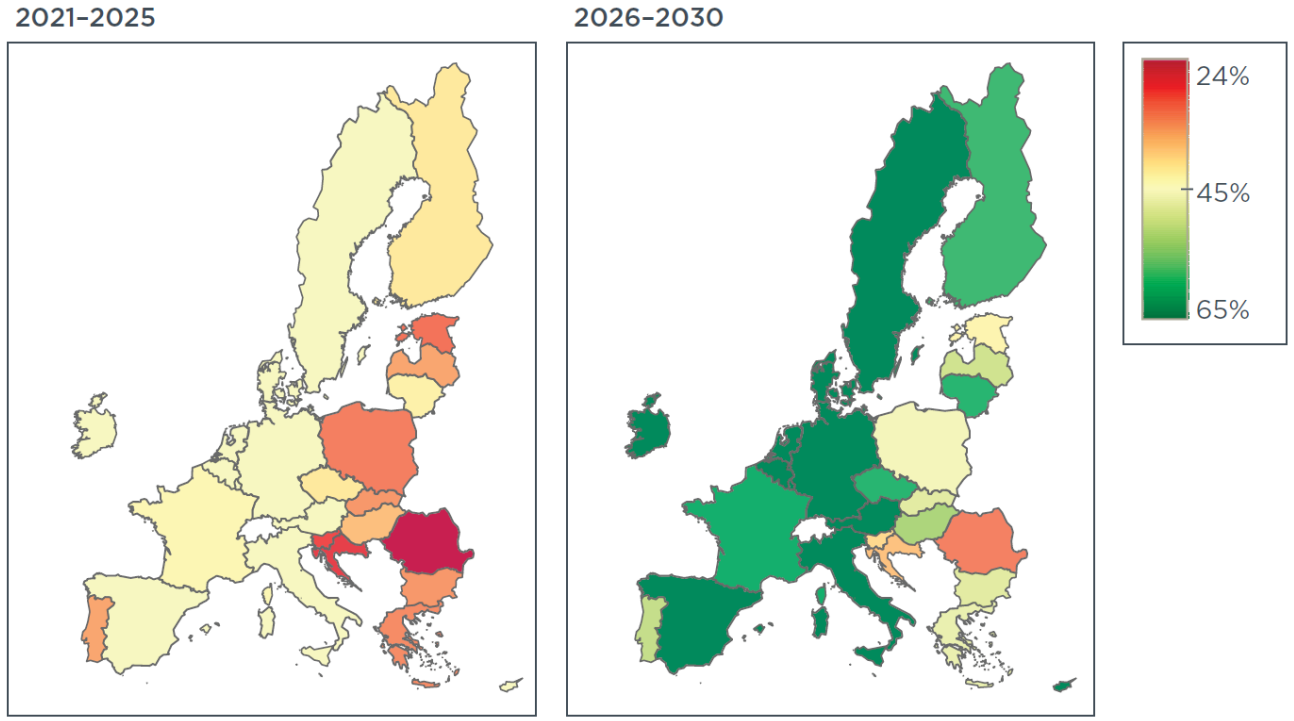


Figure 6. Targets for the public procurement of clean vehicles under the Clean Vehicles Directive by Member State

Deployment of clean buses:
Variety of national targets and deployment

- RATP in **Paris** committed in 2014 to a major technological and ecological transformation with the aim of converting most of its bus depots to electricity by 2025 (2025 Bus Plan). RATP aims at a 100% ecologically-friendly fleet by 2025 in the Paris region, featuring fully electrically-powered buses and buses powered by renewable gas and hybrid energy sources.
- GVB, the public transport provider in **Amsterdam,** GVB has one of the most ambitious targets for zero-emission buses in Europe with the plan to have a fully zero-emission bus fleet by 2025, most of them battery electric.
- Hochbahn in **Hamburg** plans to replace the approximately 1,100 diesel buses with zero-emission vehicles, namely battery buses and hydrogen buses. Hamburger Hochbahn has only been ordering electric buses since 2020. Roadmap for the future is that by the beginning of the 2030s, the entire fleet should be converted to zero-emission drives.
- In the city of **Sofia** with a fleet size of 720 (+ 120 trolley buses), the clean fleet in 2021 consisted of 45 e-buses and 334 natural gas engine buses. The city wants to halve legacy fossil fuel public transport buses by 2030 and be rid of them by 2050 as Bulgaria's Integrated Transport Strategy to 2030 entails CO2-free urban logistics by 2030
- A mass substitution of diesel vehicles by new CNG buses is ongoing in **Madrid**. EMT Madrid plans to phase out all diesel buses by December 2022. The EMT Madrid fleet composition in 2021 was 78% CNG, 15% diesel and 6% electric buses.
- In **Barcelona**, the electric fleet of TMB is planned to increase from 30 in 2021 to more than 200 in 2025, i.e. a share of around 20% of the total fleet. Also, the currently small hydrogen bus fleet is expected to grow up to about 40 in 2024.

Impacts of clean bus deployment on different domains of urban public

- Procurement and investments
- Operations
- Traffic management, disposition and planning
- Infrastructure and network development and management
- Charging, maintenance and depots
- Safety

Impacts on employment, skills needs and working conditions

- Employment impacts and job security
- Current and new emerging skills needs
- New emerging occupational and job profiles
- Training needs, further training and reskilling
- Work environment and working conditions
- Work organisation and working time
- Health and safety
- Other impacts: Linkage of green and digital transition in urban public transport

Social Dialogue: Key results

"Social dialogue can be defined as negotiations, consultations, joint actions, discussions and information-sharing involving employers and workers. Well-functioning social dialogue is a key tool in shaping working conditions involving a variety of actors at various levels. It balances the interests of workers and employers and contributes to both economic competitiveness and social cohesion."

- Clean bus deployment is not a dedicated topic of social dialogue …
- There are joint interests and issues of concern of employers and employees in clean bus deployment
- Social dialogue provides added-value at different level and in different phase of the deployment of clean buses
  - Transparency in information and consultation: Addressing concerns and insecurity in the workforce
  - Anticipation and building mutual trust, confidence and motivation
  - Involving workers in change processes
  - Developing concepts for the acquisition of new skills and training
  - Co-shaping of new emerging occupational profiles and functions
  - Identification and assessment of health and safety risks / joint development of tools and guidance
  - Tailoring solutions to company-specific, local and national framework conditions
  - Joint lobbying for sustainable and long-term public financing of the deployment of clean buses and related investments in infrastructure, depots and maintenance as well as in skills development and human resources

Recommendations from the research perspective

wmp consult

(1) Social dialogue should be regarded as an important tool for clean bus deployment and sustainable and smart mobility in urban public transport

(2) Fostering the anticipation of change and a joint understanding of needs and requirement at company and sector level

(3) Social partners' initiatives at local and national level to speed-up the process of clean bus deployment and guaranteeing sustainable financing

(4) Securing good working conditions and functioning of social dialogue at the workplace and at sector level

(5) Using the opportunity of linking the green and digital transition with making the UPT sector attractive for the younger generation and other groups

(6) Developing skills intelligence and prioritizing skills development and training in order to leave nobody behind

(7) Strengthening the role of European Social Dialogue on clean bus deployment and lobbying at EU level

Next steps and contacts

- Consolidation of research results and validation of report by advisory board members and interviewees
- Publication of the report and training material: Q3 2023

- Contacts:
  - Aida Abdulah, UITP (aida.abdulah@uitp.org)
  - Eckhard Voss, wmp consult (eckhard.voss@wilke-maack.de)

Networking & knowledge exchange

Pedro Gomes, POLIS

Keeping momentum for clean bus deployment

- Networking and knowledge exchange -

POLIS
CITIES AND REGIONS FOR TRANSPORT INNOVATION

CLEAN BUS EUROPE PLATFORM

The Clean Bus Europe Platform is financed by the European Union.

Knowledge exchange supported by POLIS

- Empowering cities and regions for the challenge of clean bus deployment
- During the project lifetime:
  - ➢ Preparatory ST surveys (expectations, technologies, funding, *“do’s and don’ts”…)*
  - ➢ Follow-up ST factsheets (local context, key findings, useful resources…)
  - ➢ Post-Marketplace surveys (funding opportunities, clean bus deployment status…)

Knowledge exchange supported by POLIS

MESTNA
OBČINA
MARIBOR

Feedback from participants:

"The City of Maribor is on the path to electrifying their PT services. in the past two years, we tested some new electrical solutions, installed charging pantographs, and bought 6 e-buses, with the goal of electrifying the whole city fleet by 2035. In attending this Marketplace and Study Tour, our expectations were to know more about new technologies, especially batteries, buses, and new materials. Maybe even to learn new information about the management of the system itself."

Knowledge exchange supported by POLIS

- After the project lifetime:
  - ➢ Engagement and discussion among POLIS Members at CV&AQ WG meetings:

Session: *Capacity for regions to structure and manage budgets/funding of Clean Buses and charging infrastructure* with **Ile-de-France** and **Transdev**

Cooperation with other EU initiatives

- SOLUTIONSplus project
  - ➢ Joint initiatives/Study Tours
  - ➢ Further outreach outside EU: LATAM, Africa and Asian cities
- European Alternative Fuels Observatory (EAFO)
  - ➢ Communication and cross-dissemination

4-7 JUNE
BARCELONA 2023
GLOBAL PUBLIC TRANSPORT SUMMIT

CLEAN BUS EUROPE PLATFORM

Thank you!

pgomes@polisnetwork.eu

Networking & knowledge exchange

Wolfgang Backhaus, Rupprecht Consult

RUPPRECHT CONSULT
Forschung & Beratung GmbH

CLEAN BUS EUROPE PLATFORM

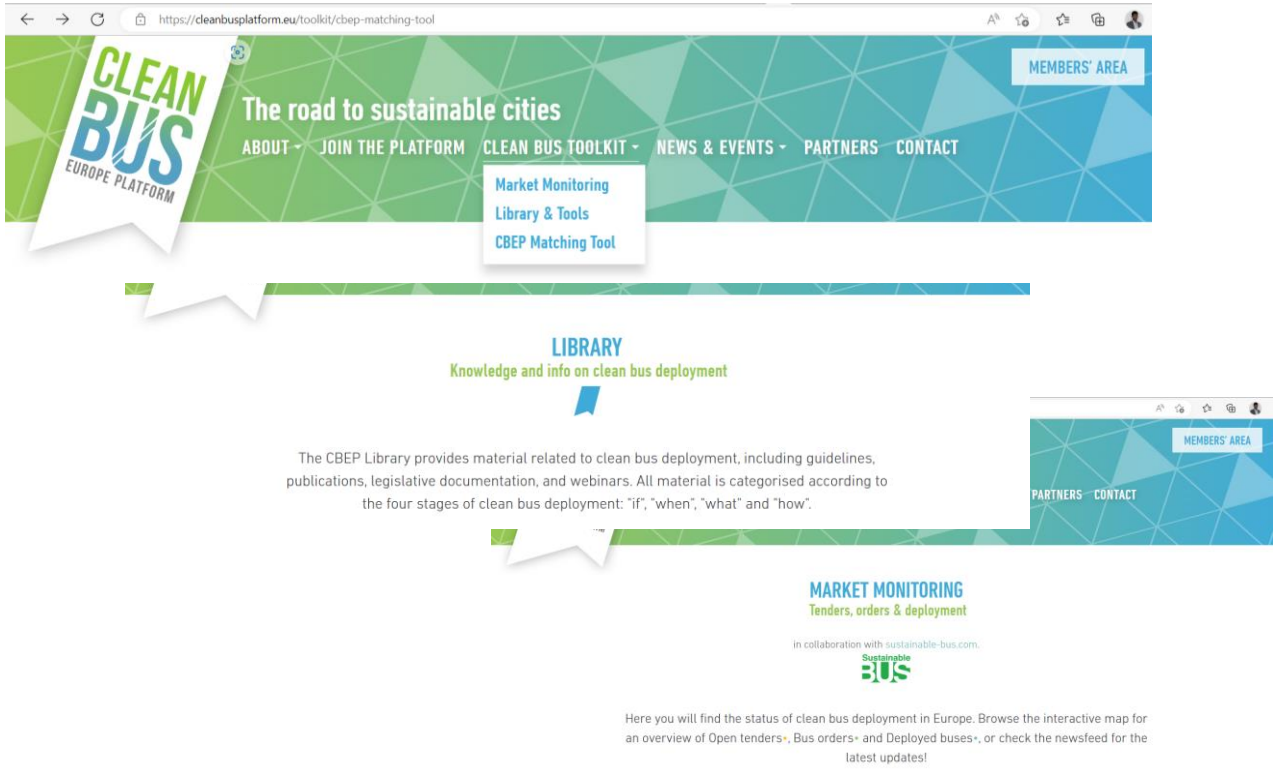
Capacity building and knowledge transfer

CBEP Toolkit

The Clean Bus Europe Platform is financed by the European Union.

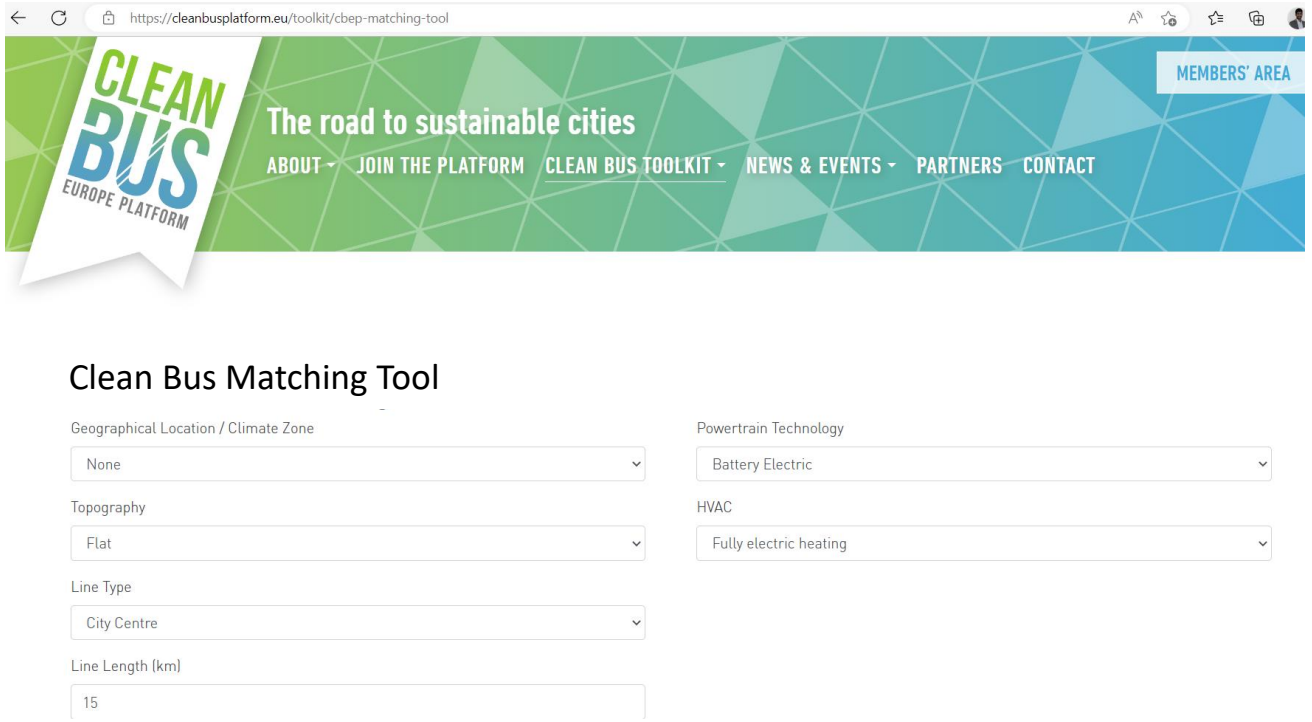
CBEP Toolkit

- Clean Bus Toolkit intends to serve as a single source of knowledge for
  - Market monitoring
  - Library section which is an extremely intuitive resource designed based on the phases of deployment
  - CBEP matching tool



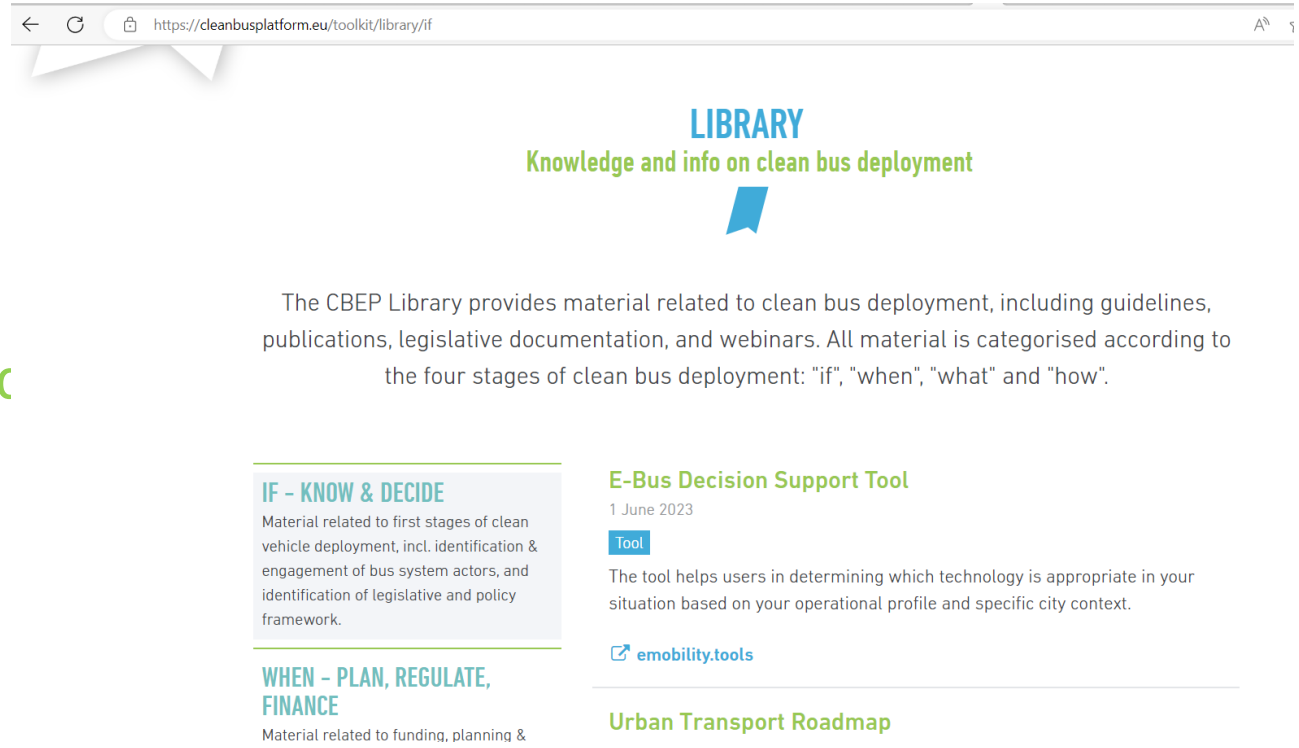
CBEP Matching Tool

- Matchmaking tool as the title describes is intended for PTOs and PTAs who would like to get some knowledge based on operational similarity of their local conditions
- The development of the tool is ongoing, and the database of the tool is currently and in future being updated from ASSURED Clean Bus Report and targeted data collection
- The tool includes a provision to foster networking opportunity to develop networks and clean bus interest groups based on similarity of deployment conditions
- Detailed user guide for the tool will be made available on the website shortly



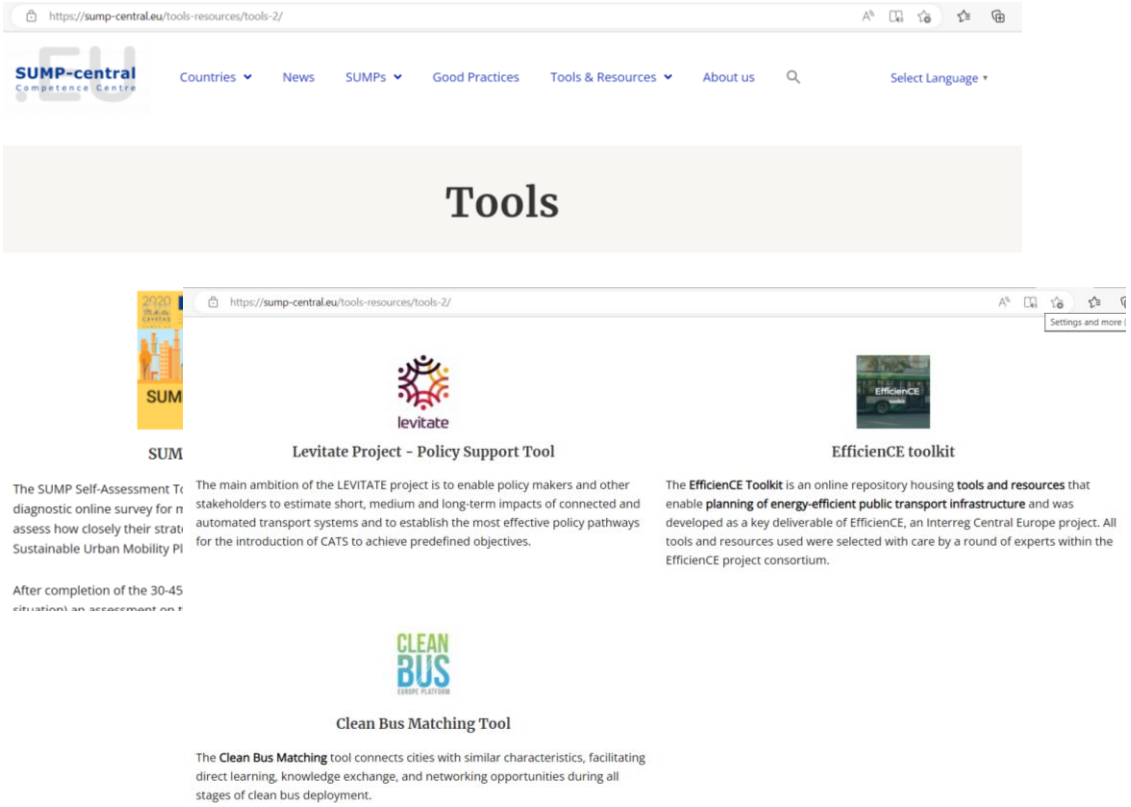
CBEP Library Section

- The intent for this section is to make the platform the go-to one for knowledge exchange
- It is updated with further tools available for clean bus deployment The tools are mapped according to the categorization of If, When, What and How
- Future outlook:
  - Enhancing with knowledge materials from languages across EU



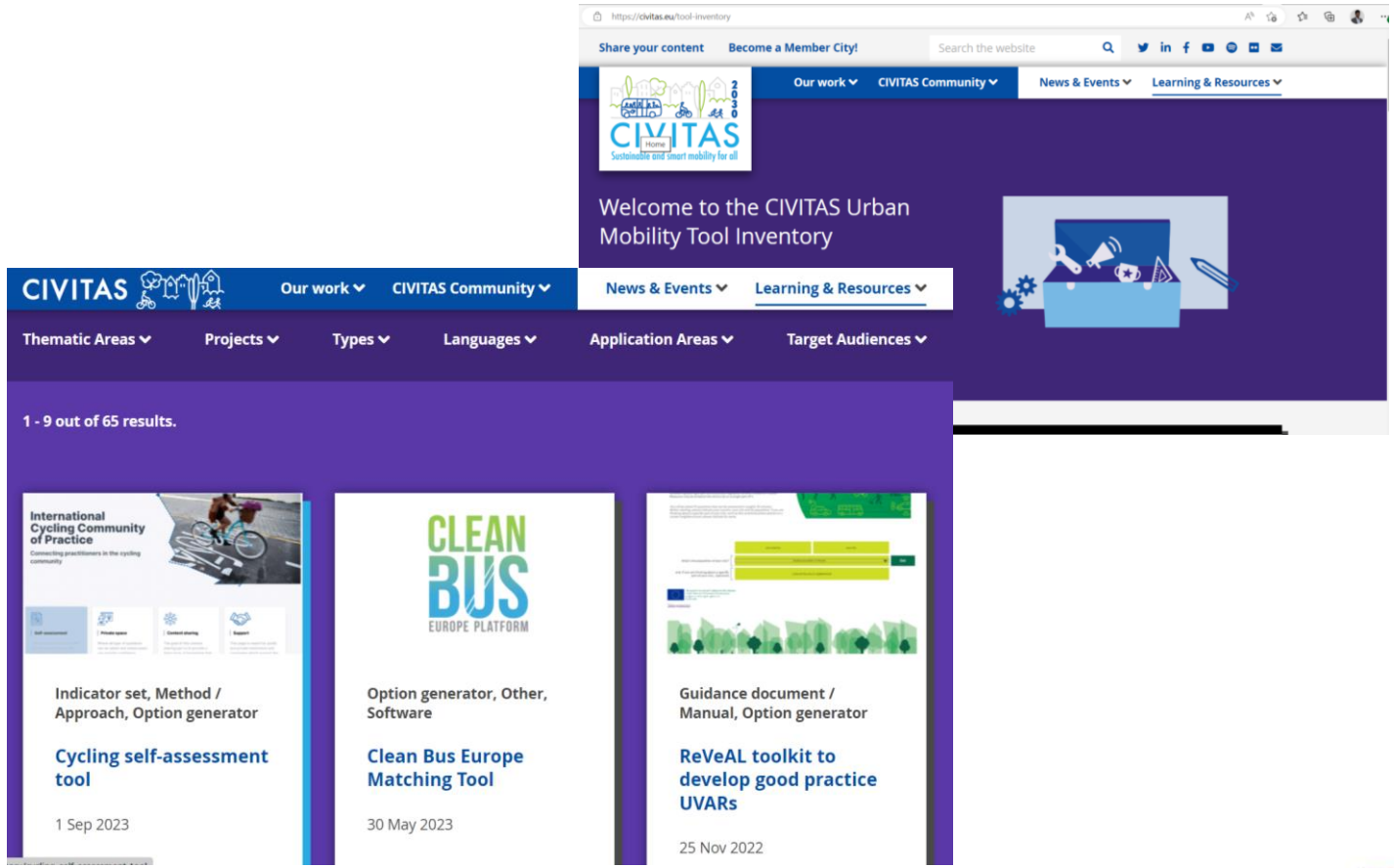
Cooperation with cross-cutting initiatives

- SUMP-Central
  - CBEP Platform and the Matching tool is integrated in SUMP Central's Tools section which is the collation of several CIVINETS including Romania and Poland who uses SUMP Central as their only platform in CIVITAS initiative



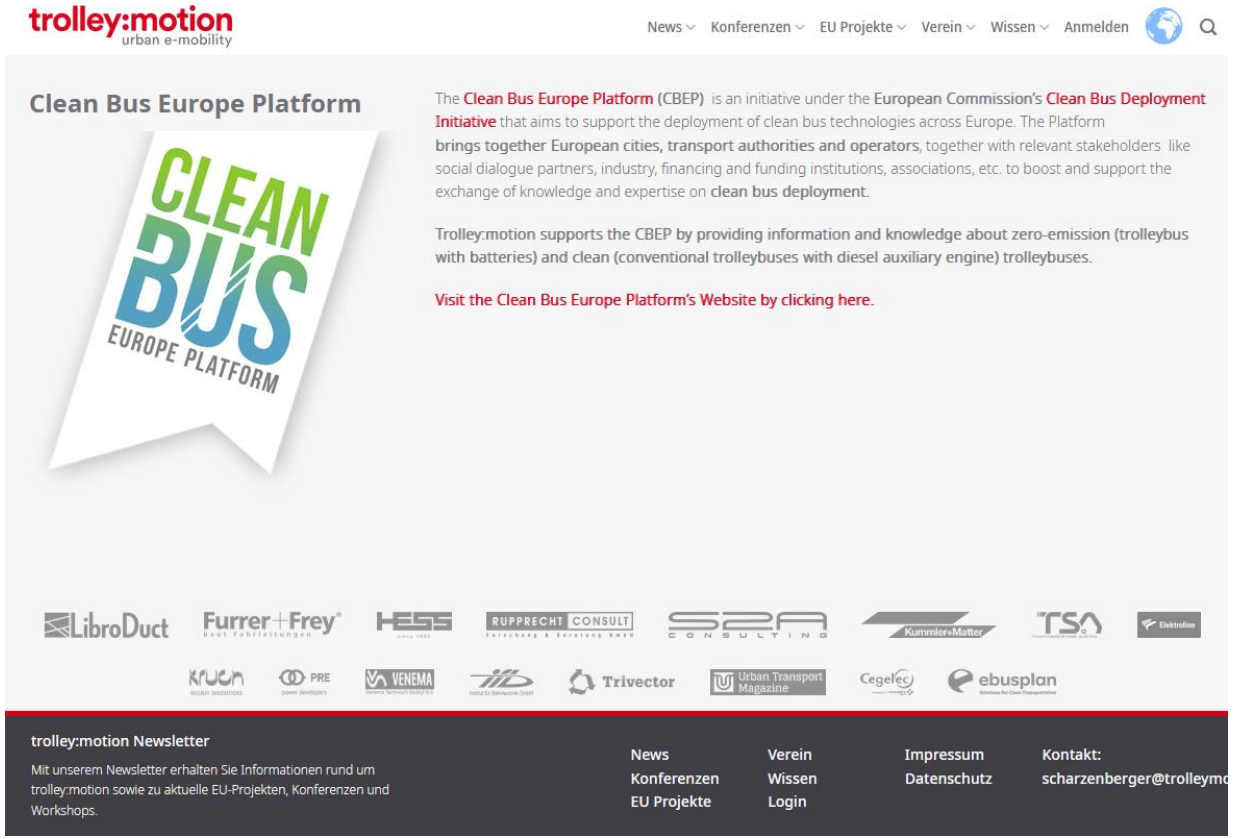
Cooperation with cross-cutting initiatives

- The Matching Tool is also now part of the CIVITAS Tool inventory which is an exhaustive and widely used platform among the CIVINETS across EU



Cooperation with cross-cutting initiatives

- Platform and tool is also integrated in the Trolley:Motion, ASSTRA and VDV networks which should be further exploited



4-7 JUNE
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CLEAN BUS EUROPE PLATFORM

Thank you!

For questions:

Wolfgang Backhaus (w.backhaus@rupprecht-consult.eu)

Shreesha Vaidhya (s.Vaidhya@rupprecht-consult.eu)

A look to the CBEP and market evolution: Where did we start and where are we now?

Julian Bopp, Sphera

(Remote Speaker)

A look to the CBEP Data Monitoring

Julian Bopp, Sphera

The Clean Bus Europe Platform is financed by the European Union.

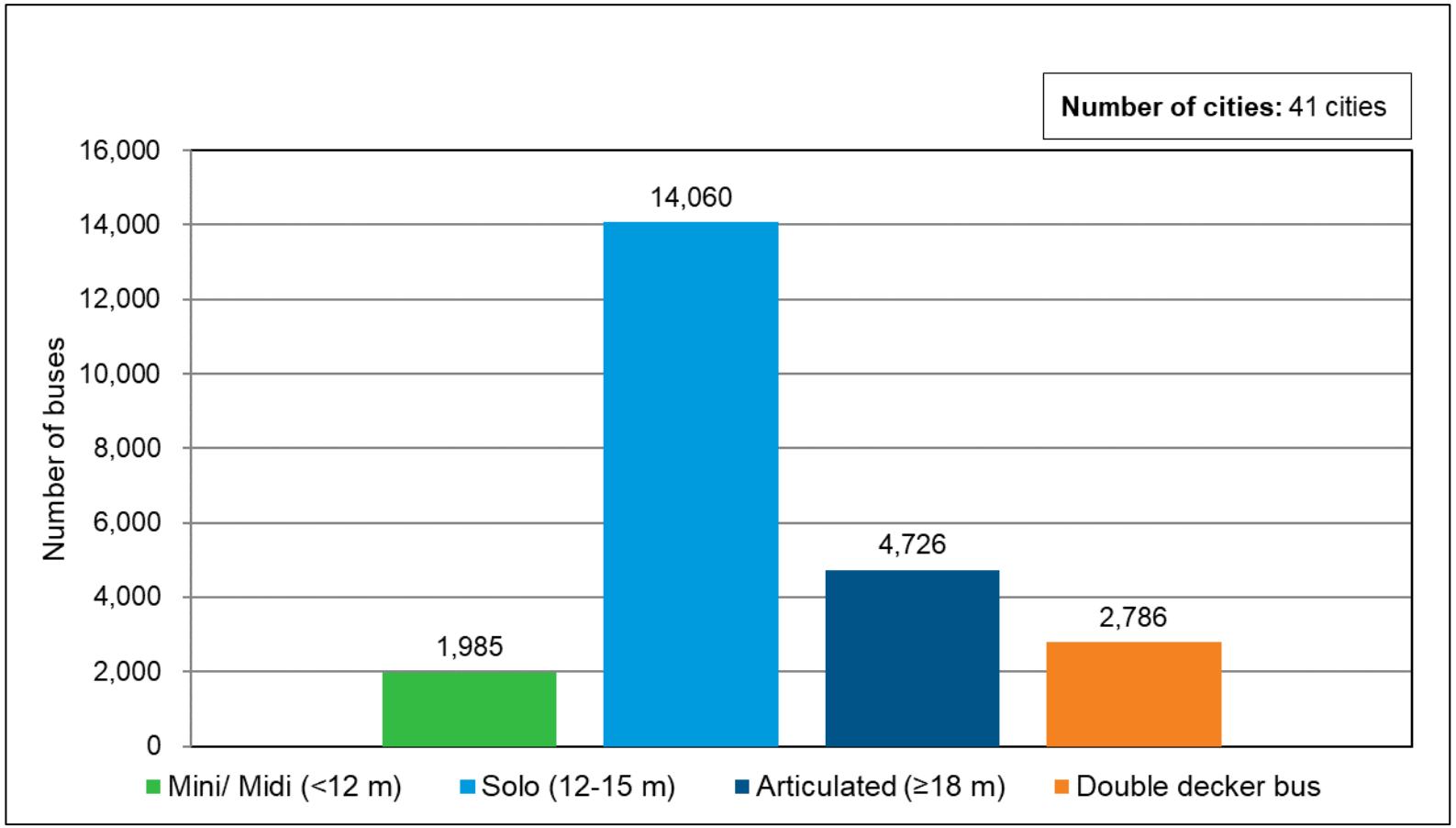
Agenda

- Baseline Questionnaire
- Performance of FCHEV
- Outlook

Baseline Questionnaire

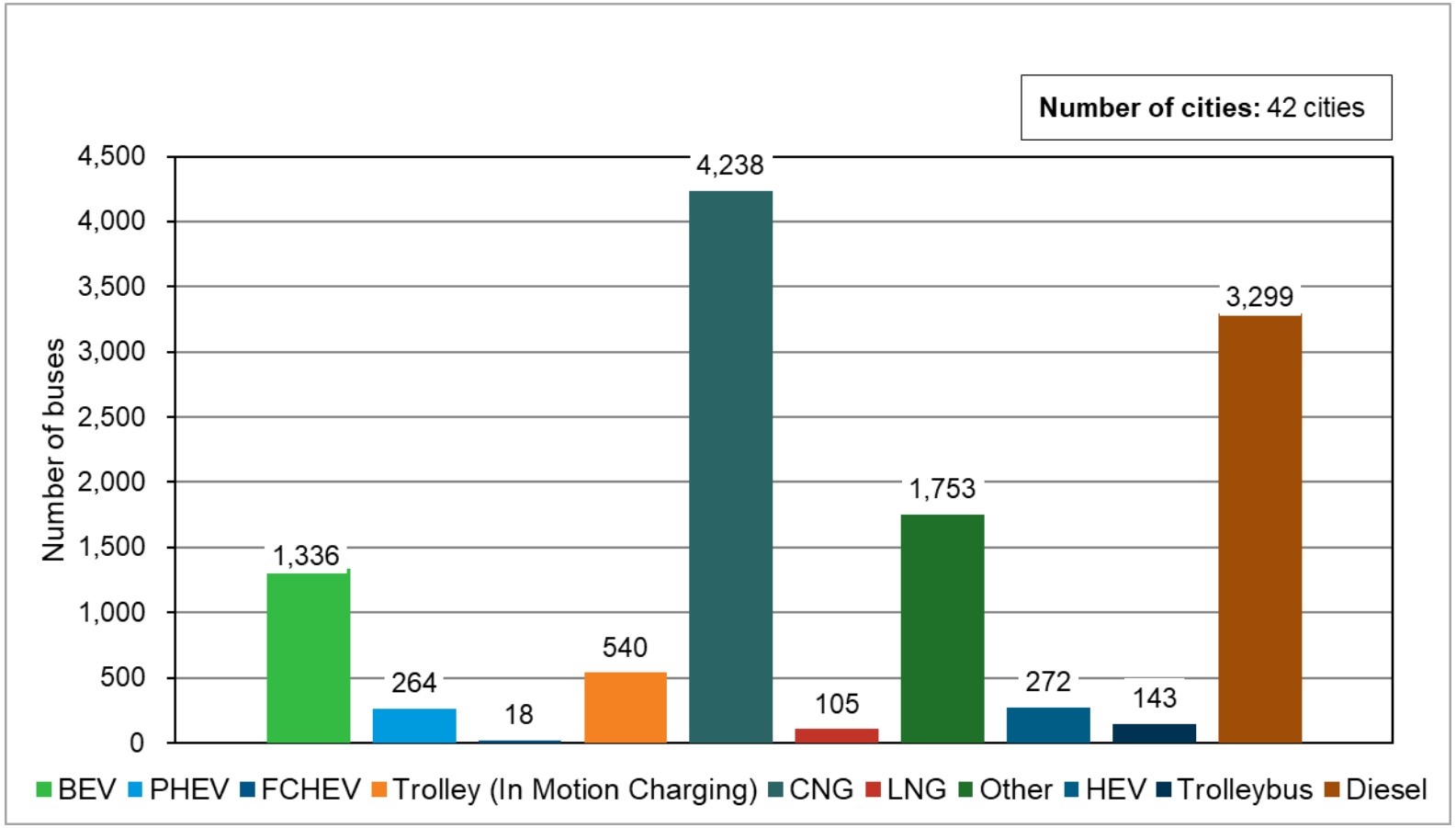
Current and Future Fleet Data

Current Fleet: Total Number of Buses



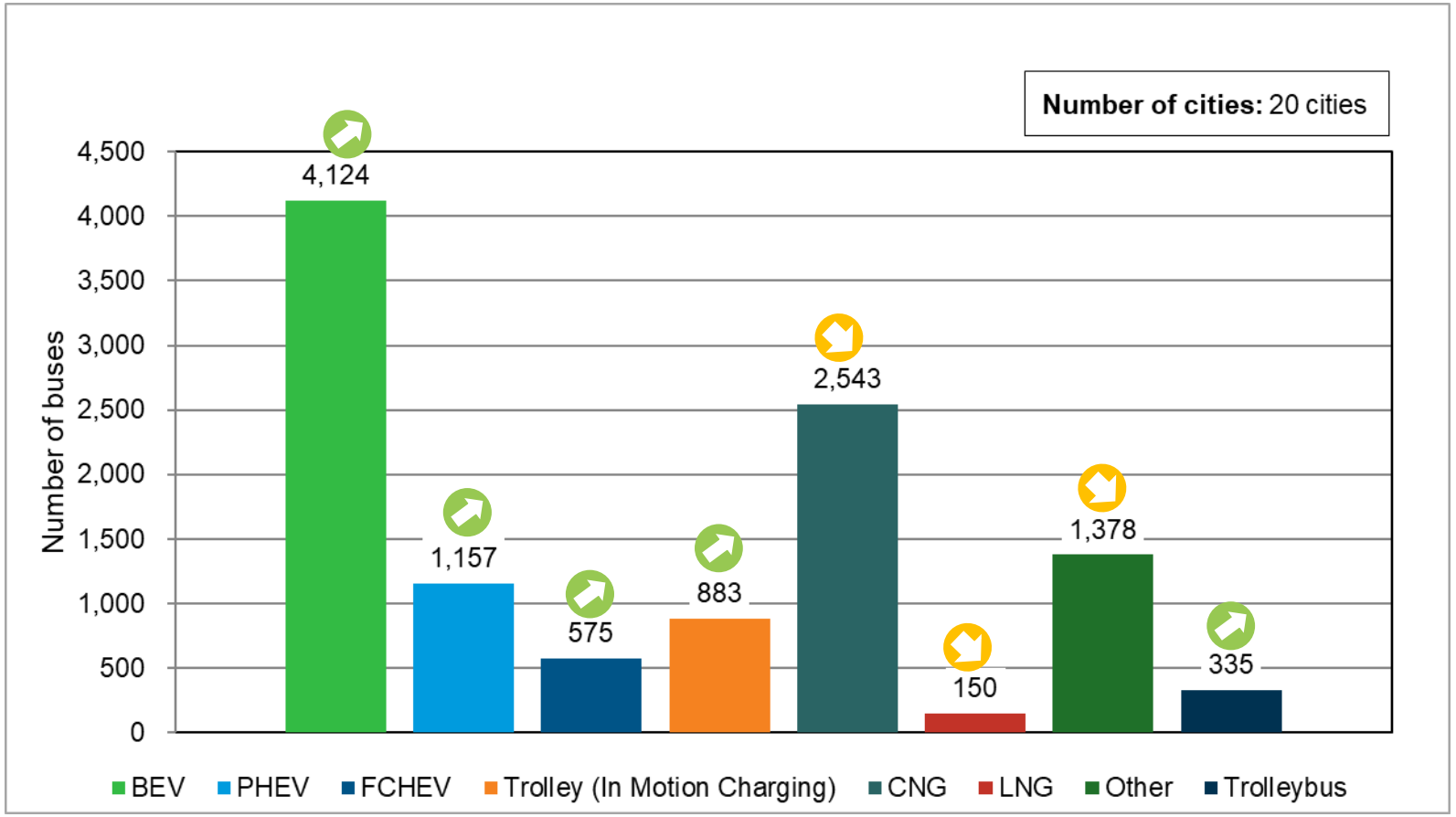
- Baseline Survey regarding current (2021) and future fleet
- Questionnaires sent to 67 cities from 22 countries
- Total number of buses evaluated: 23,557

Current Fleet: Number of buses per propulsion type



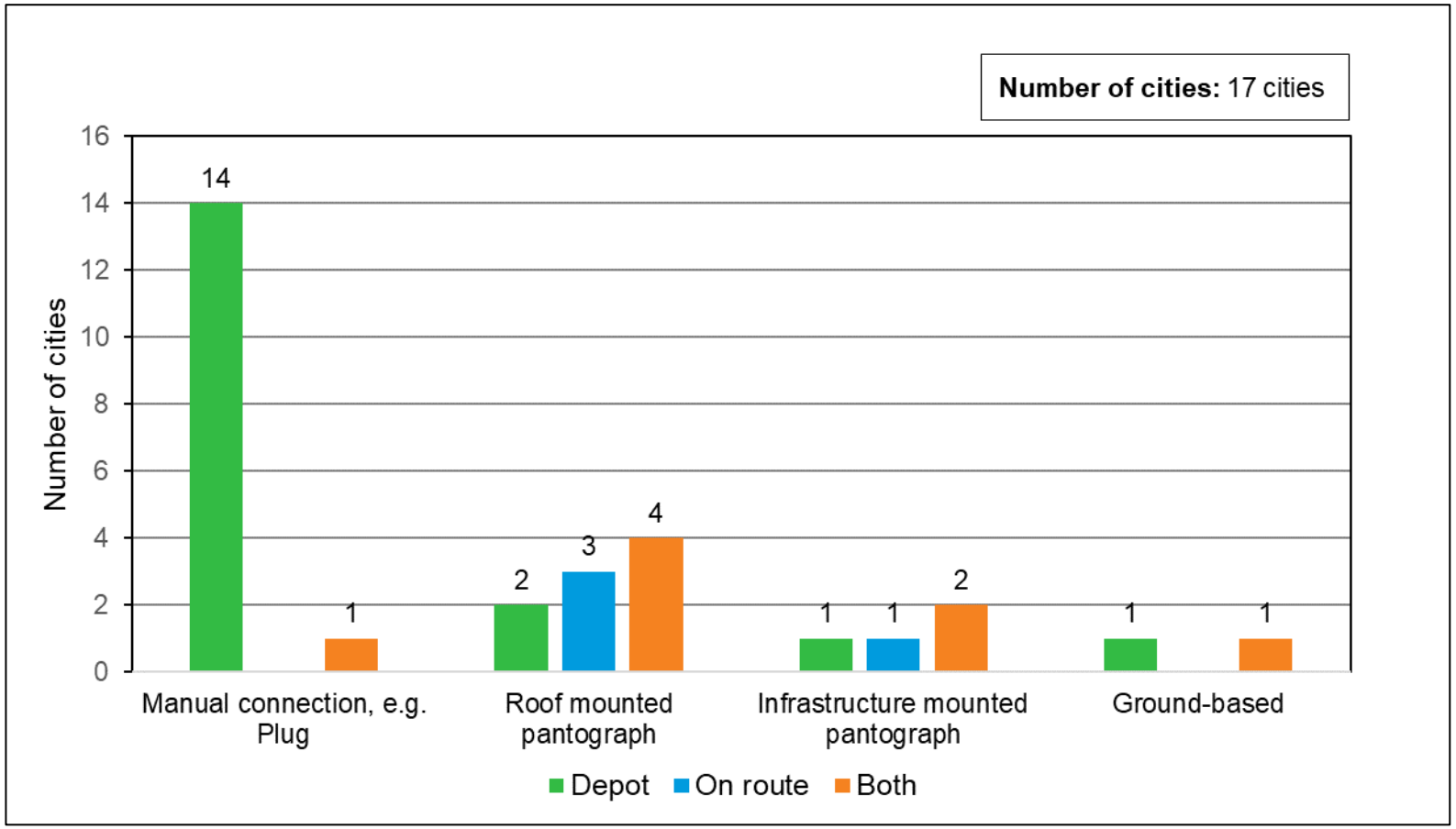
- Data for 11,978 buses
- Majority of buses: CNG buses (35%), followed by Diesel (28%)
- BEVs are the most used ZEVs
- "Other" buses are mainly not further specified or use bio-diesel

Future Fleet: Number of buses per propulsion type



- Data for 11,145 buses
- Majority of buses: BEV buses (37%), followed by CNG (23%)
- No Diesel and HEV buses anymore
- "Other" buses are mainly not further specified or plan to use bio-diesel

Future Fleet: Charging Strategies for BEV

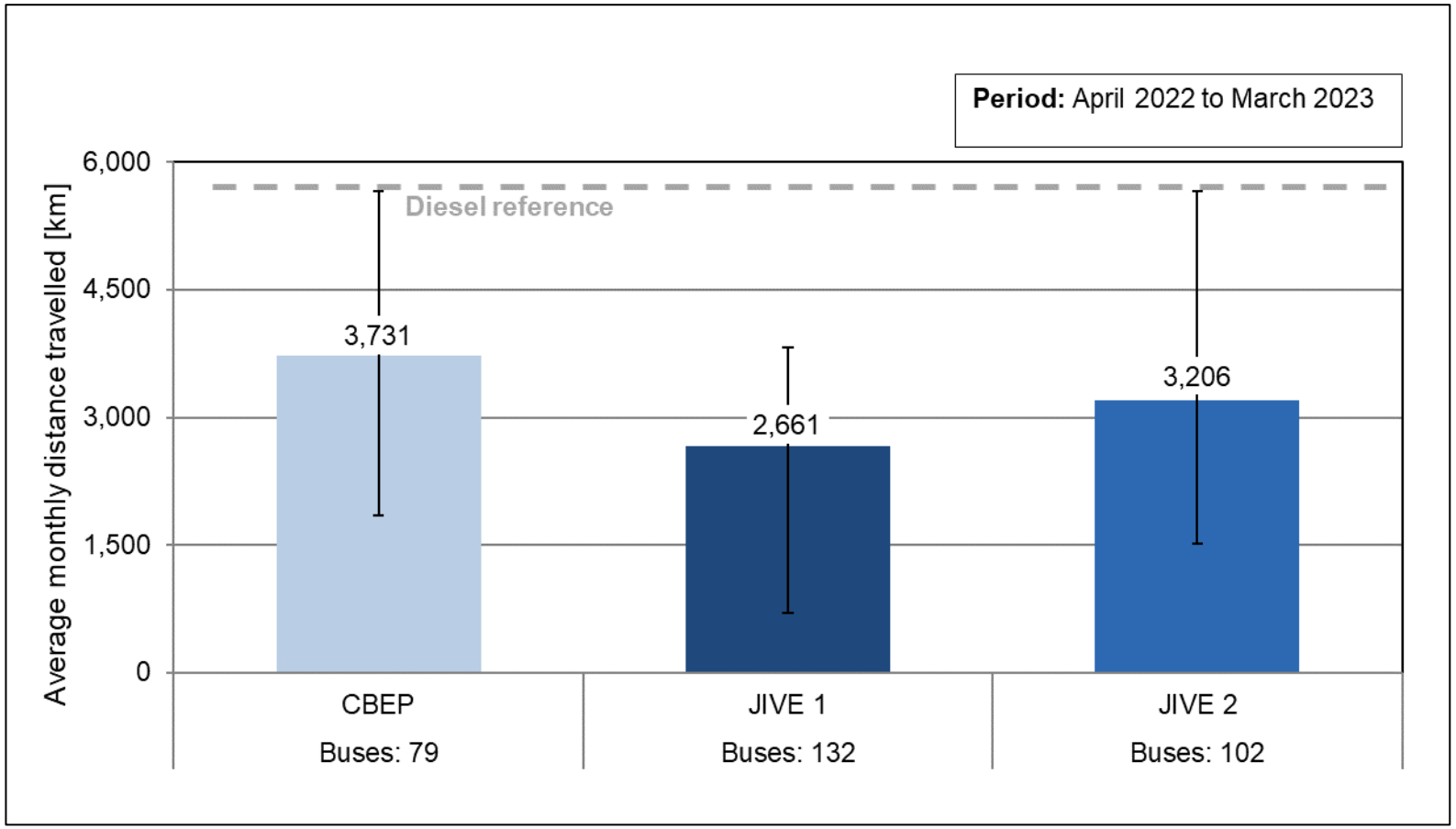


- Manual connection mainly planned technology

Data Monitoring

Performance of Fuel Cell Hydrogen Electric Vehicles (FCHEV)

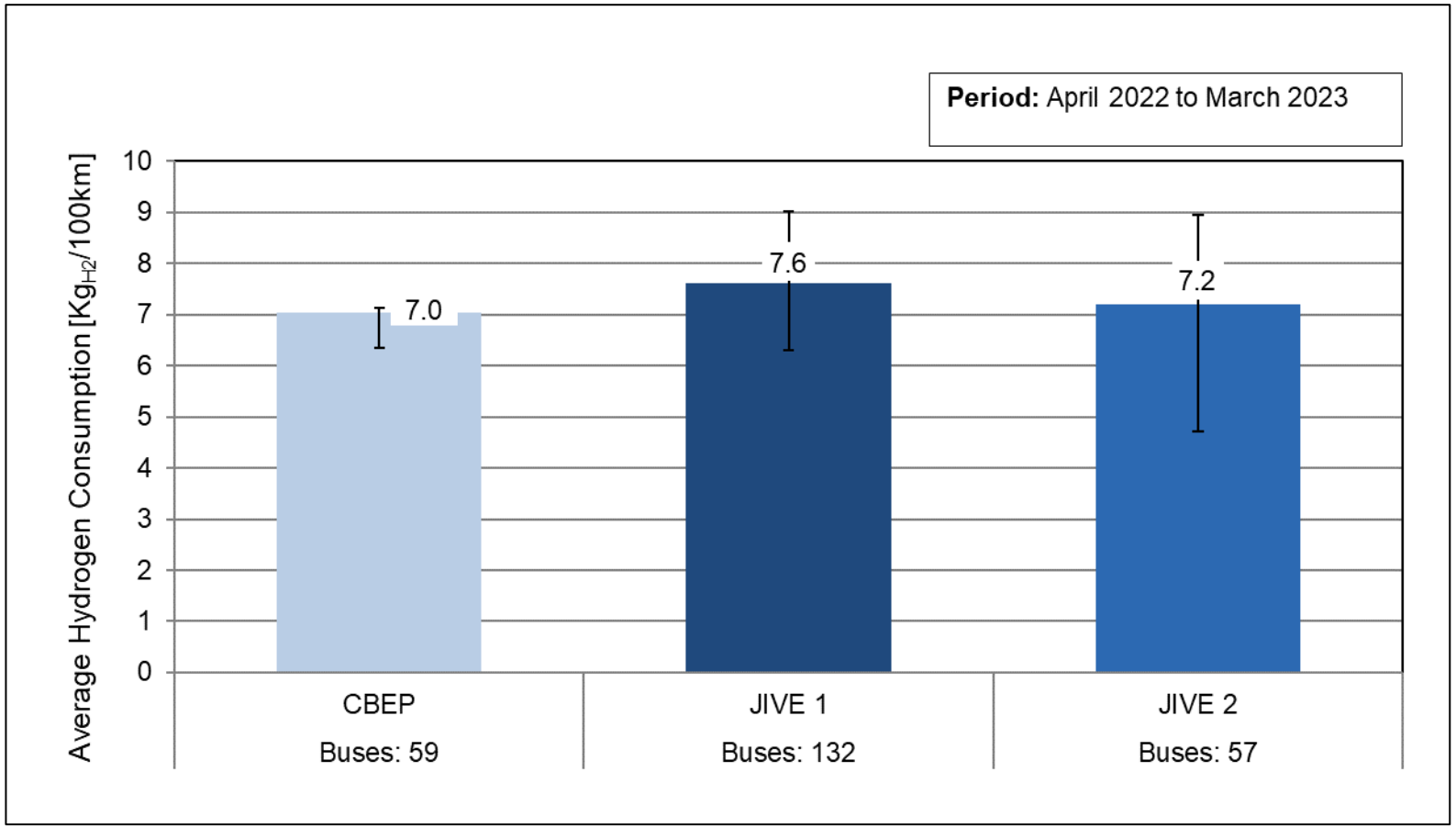
FCHEV: Distances Travelled



- CBEP buses outreach JIVE and JIVE 2 average: many intercity buses

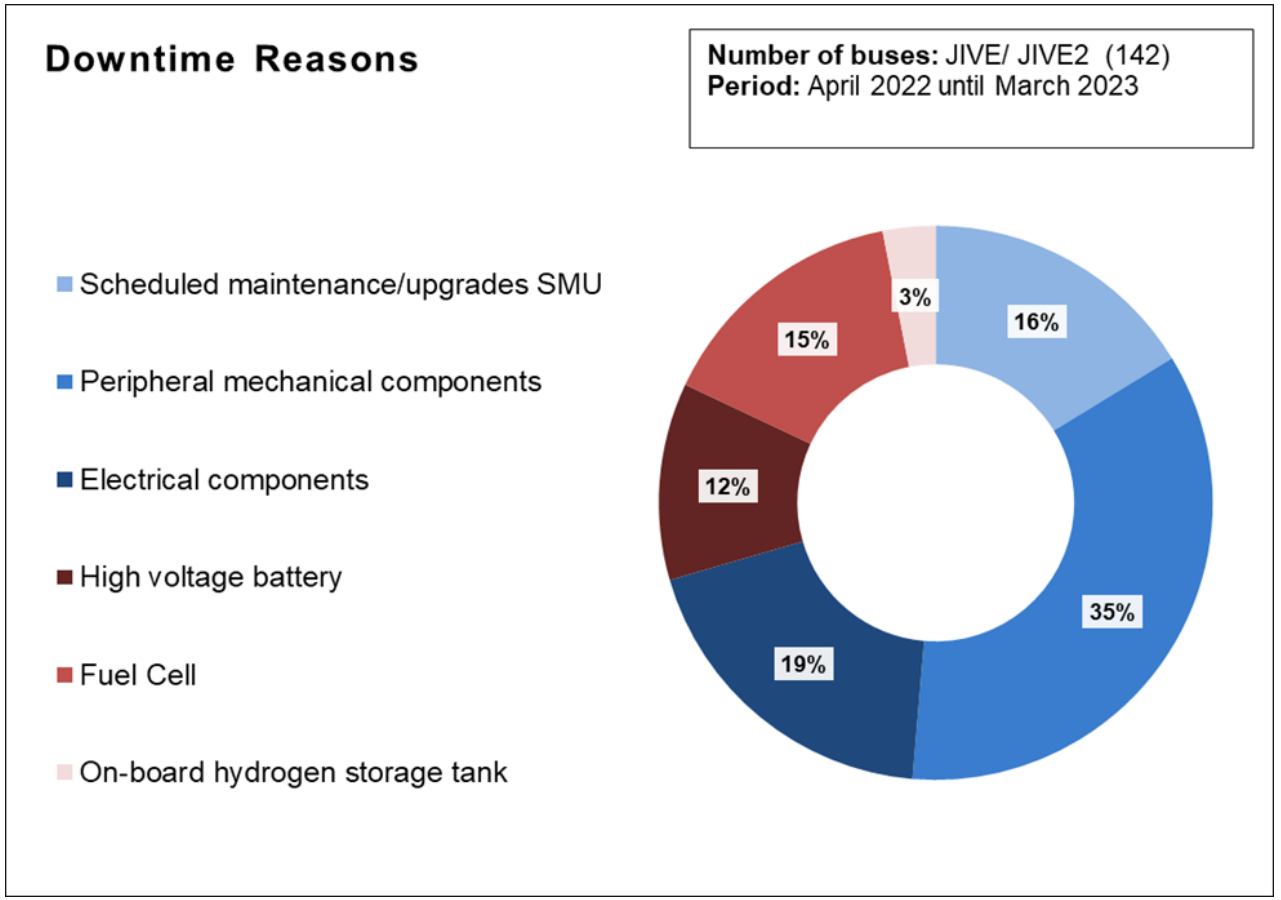
  → Technical readiness to replace Diesel buses

FCHEV: Hydrogen Consumption



- Across all projects average below 8 kg_{H2}/100 km
- Maximum in hilly area

FCHEV: Availability

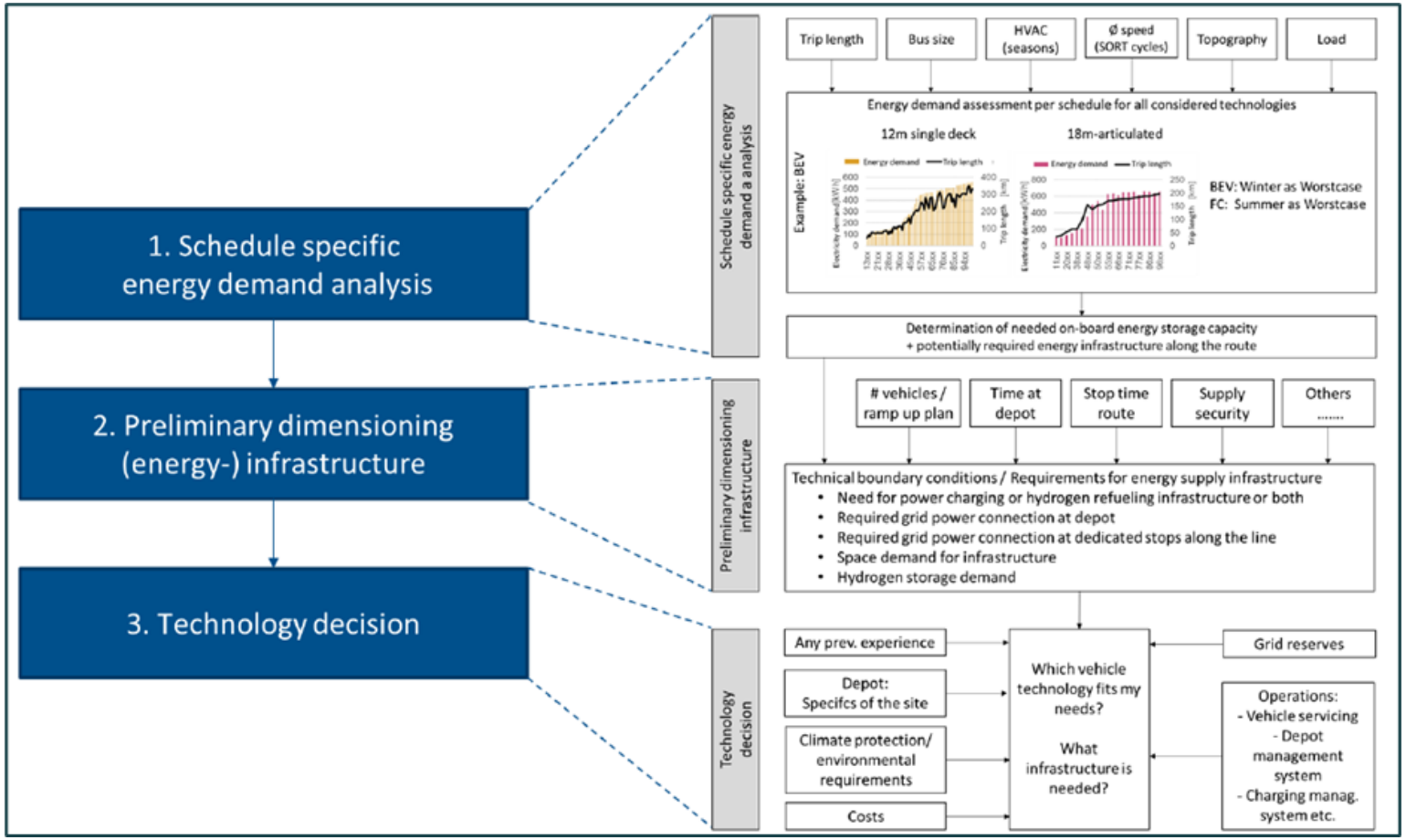


- Average availability of 85% across the JIVE/ JIVE 2 projects
- Hydrogen related components of the new drive train cause 18% of the downtime

Outlook

Factsheet for Decision Support

Factsheet for Decision Support



Thank You!

jbopp@sphera.com

A look to the CBEP and market evolution: Where did we start and where are we now?

Riccardo Schiavo, Sustainable Bus

Zero-emission bus market in Europe

Riccardo Schiavo

Managing Editor, Sustainable Bus

CLEAN BUS EUROPE PLATFORM

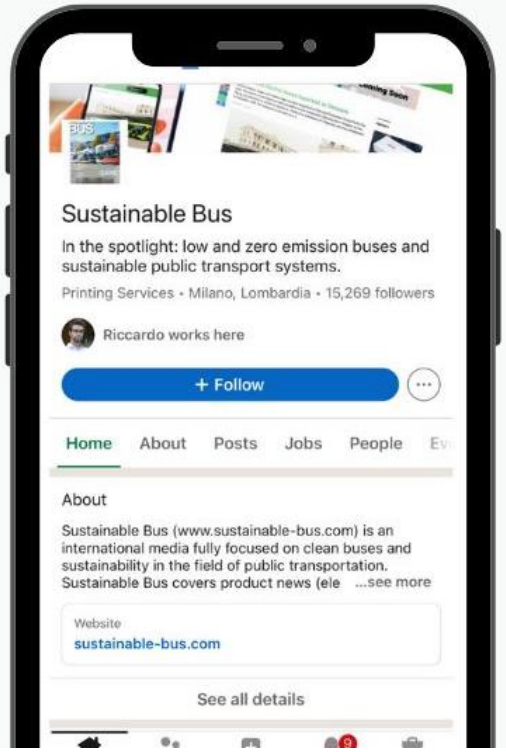
The Clean Bus Europe Platform is financed by the European Union.

Media platform

- Launched in **2018**
- A headlight on sustainability and **innovation** in public transport
- Website / magazine / web events / social media / newsletters

EVERY WEEK WE REACH BEYOND 80,000 PROFILED USERS

LinkedIn Instagram Newsletter Weekly Newsletter Next Stop



Sustainable Bus CBEP

- Happy partner of the CBEP
- Providing contents on e-bus deployments /tenders / market analysis for the Market Monitoring section
- CBEP featuring webinars of the Sustainable Bus Tour

Already in 2018…

E-Buses to Surge Even Faster Than EVs as Conventional Vehicles Fade

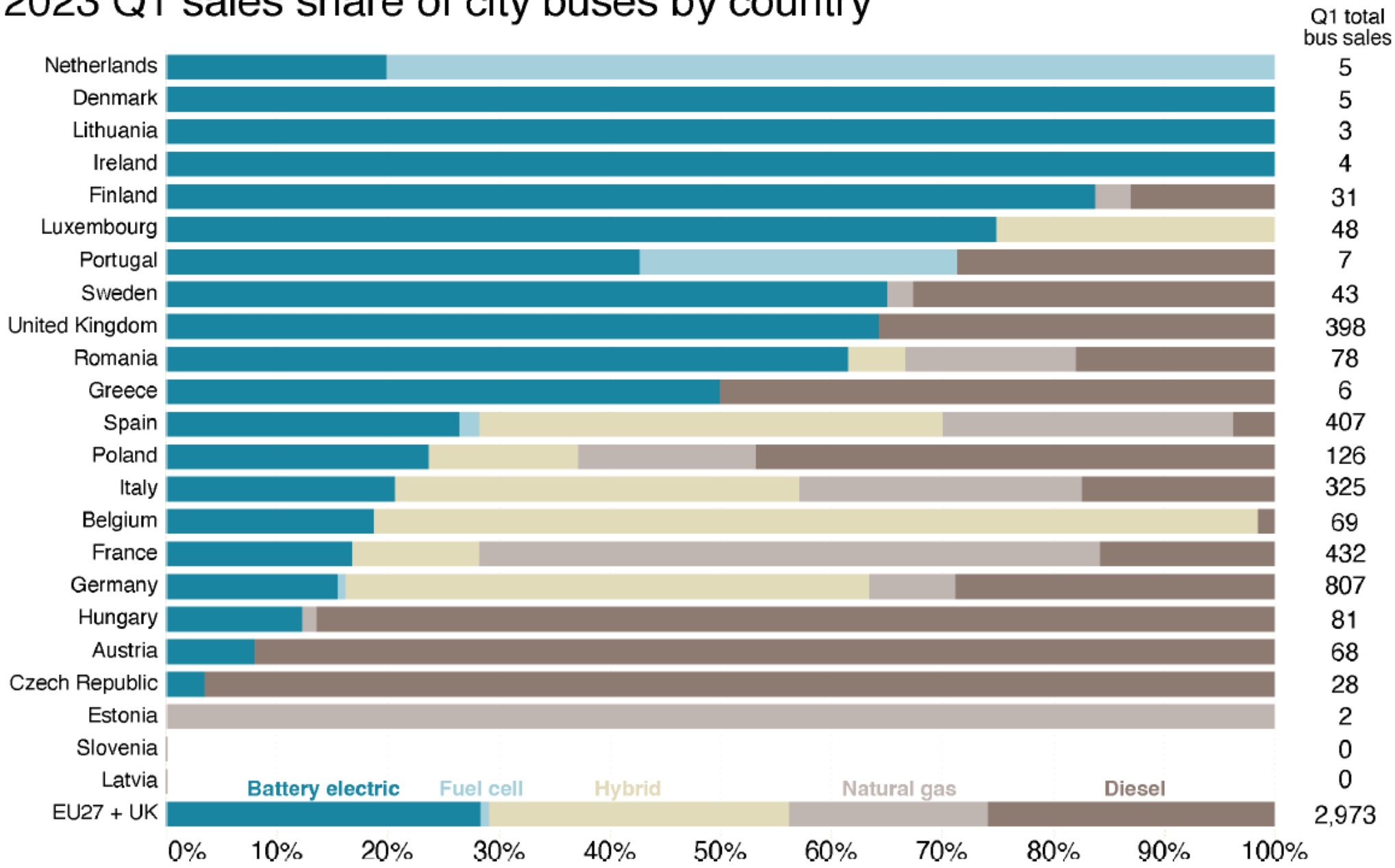
May 21, 2018

The supply of cobalt has emerged as a potential risk to the pace

Buses represent 55.7% of public transport journeys in Europe (32.1 billion passenger journeys per year)

Source: ACEA

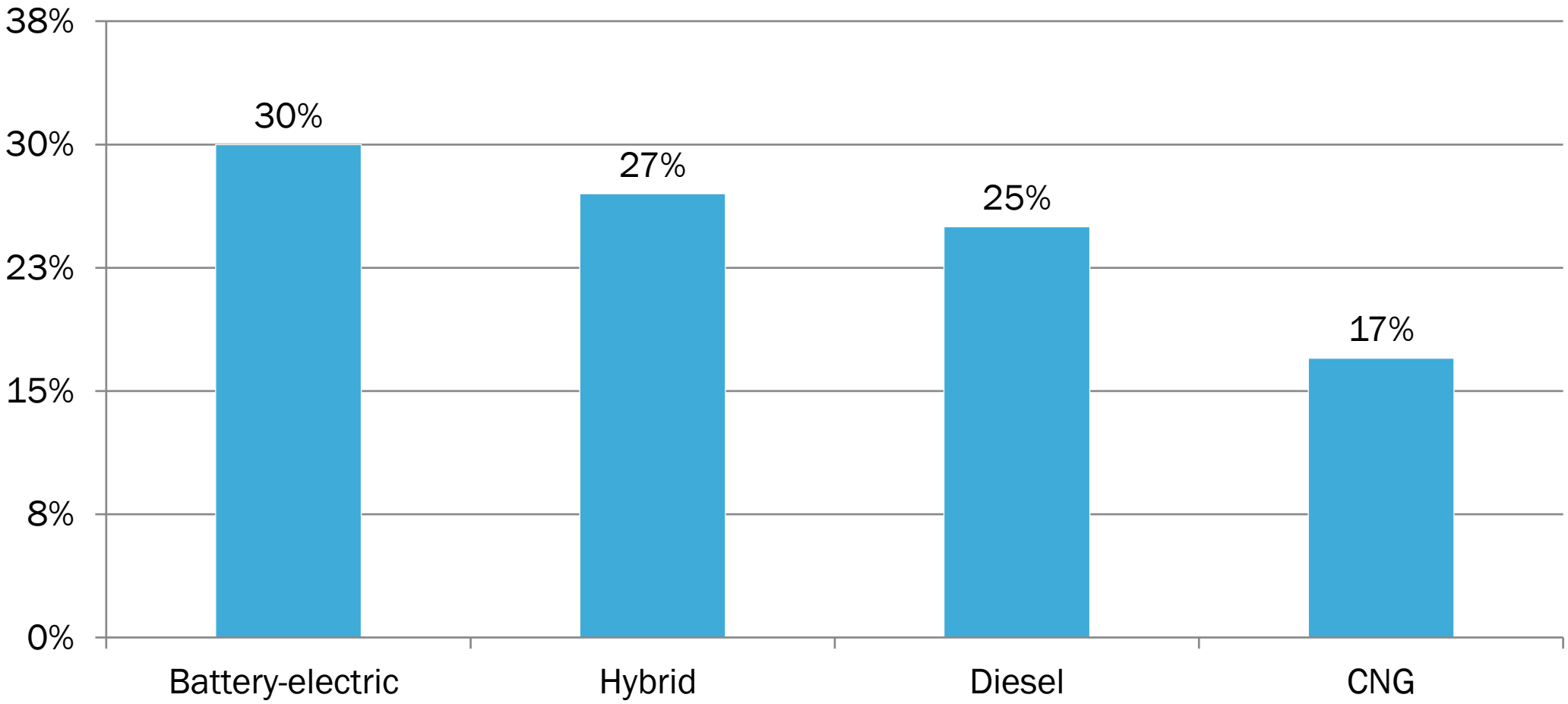
Source: ICCT - Chatrou CME Solutions



Elaboration on Chatrou CME Solutions' figures

City bus market EU Q1- 2023

Share % in city bus market



Electric city b uses outpaced diesel bus sales in Europe. YES, but…

- 30% share in the city bus market = as in 2022 (ACEA: **12.7% of the EU bus&coach market** in 2022)
- Worth mentioning: **hybrid buses outpaced CNG** buses (creditable to growth of **mild** hybrid powertrains)
- Fuel cell buses still **marginal** market

Random forecasts & drivers

- ResearchAndMarkets: the European electric bus market is expected to grow at a **CAGR of 28.8% from 2019 to 2025**.

- Rabobank: From 2020 to 2022 the market averaged 34% annual growth. A 100% net-zero city bus fleet by 2030 may seem very ambitious, but it turns out that **just sustaining 18% annual market growth** for electric city buses in the next seven years could get us there.

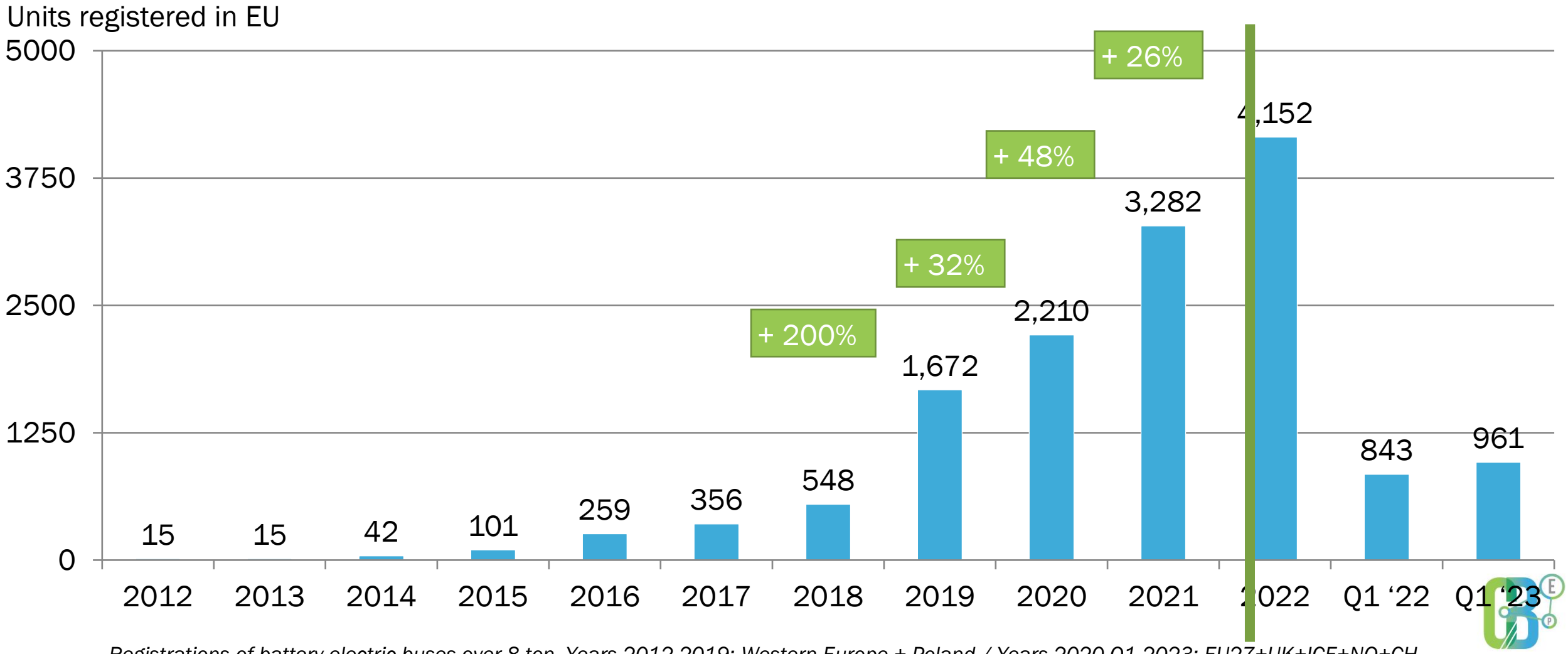
- ING: A third of the 200,000 buses in European public transport will be zero-emission by 2030. At that year, zero emission buses will cover **two thirds** of the new city bus registrations.

- Germany, PwC E-Bus Radar: “By 2030, plans are already known for 6,600 more e-buses”

- **Clean Vehicles Directive:** mandatory quota of 45% clean buses (and 22.5%) ZE buses in public tenders. Set to become 65% / 32.5% from 2026 to 2030.

Source: Chatrou CME Solutions' figures

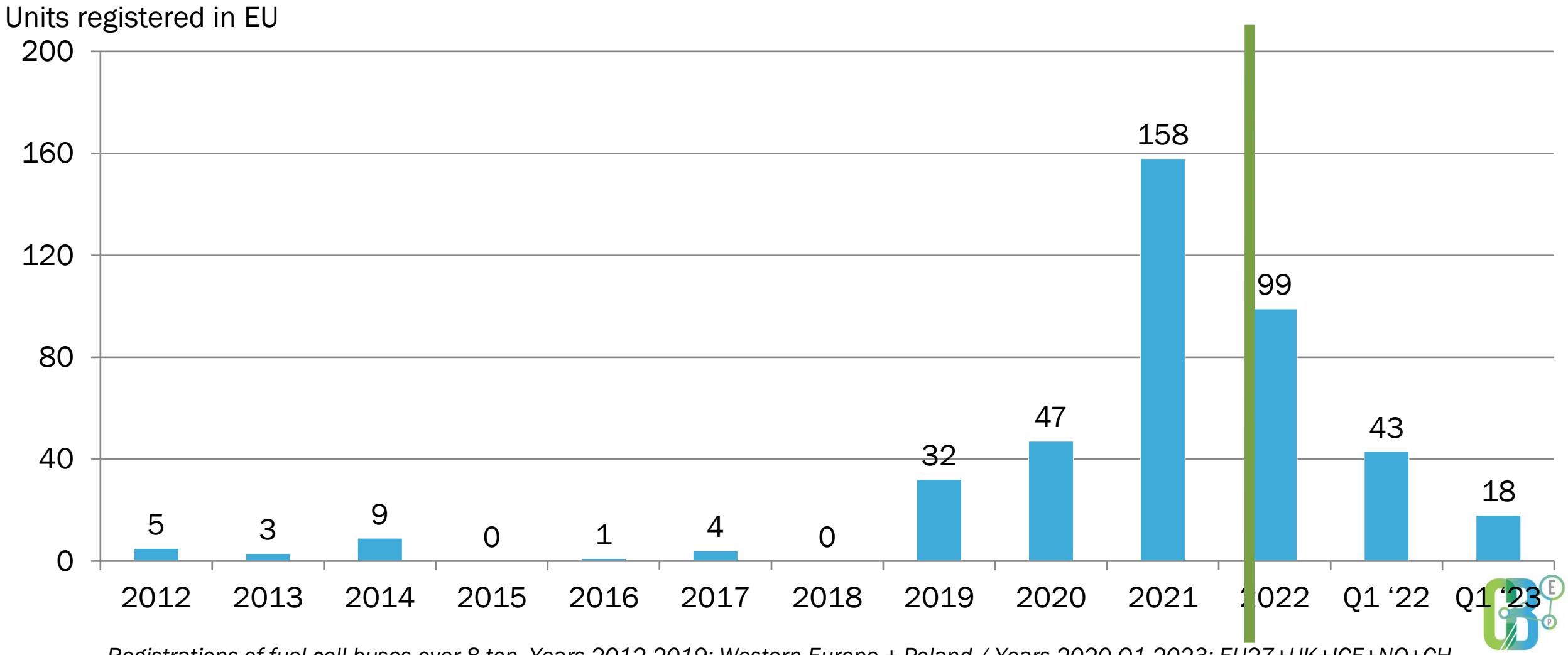
A decade of battery-electric bus market



Registrations of battery-electric buses over 8 ton. Years 2012-2019: Western-Europe + Poland / Years 2020-Q1 2023: EU27+UK+ICE+NO+CH

Source: Chatrou CME Solutions' figures

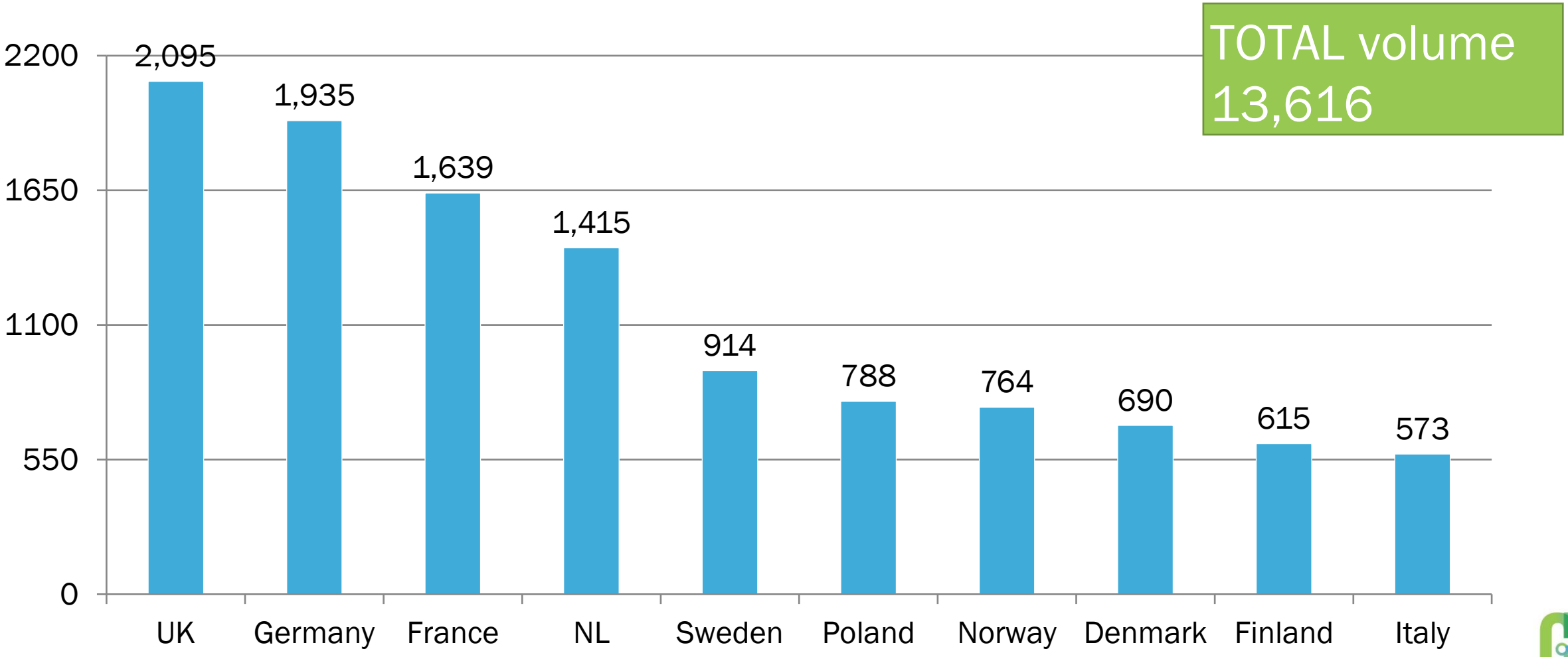
Fuel cell buses in Europe



Registrations of fuel cell buses over 8 ton. Years 2012-2019: Western-Europe + Poland / Years 2020-Q1 2023: EU27+UK+ICE+NO+CH

Source: Chatrou CME Solutions' figures

Where are the most e-buses running?



TOTAL volume 13,616

Registrations of battery-electric buses over 8 ton. Years 2012-2019: Western-Europe + Poland / Years 2020-Q1 2023: EU27+UK+ICE+NO+CH

Some trends

- **Concentration** in big brands (typically 4-5 brands make 70% of EU bus&coach market. With e-buses in 2022 we needed 8 brands)
- Changes in **industrial strategies** and relocations (alliances, spinoffs, change in business models, **search for profitability**…)
- Efforts in scale-up of zero-emission bus fleets challenged by **inflation** and long delivery time
- 2024-2025 first generation fleets of e-buses may reach **end of 1st battery life** - 2nd life battery market still to be created
- 2026: end of Next Generation EU **fundings**. Other funding streams? Question of sustainability of **business model**?

Many thanks!

Riccardo Schiavo

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CLEAN BUS EUROPE PLATFORM

The Clean Bus Europe Platform is financed by the European Union.

Panel Discussion

Moderation: Umberto Guida, UITP

Our panellists

Lucie Petersen

Senior Policy Expert

UITP

Gerard Hellburg

Program Manager Clean & Sustainable

Vervoerregio Amsterdam

Bart Kraaijvanger

Manager Zero Emission Program

Connexxion / Transdev

Francesco Caredda

U.O. Engineer Technique & Programming

CTM SpA

Mateusz Figaszewski

E-mobility Development & Market Intelligence Director

Solaris B&C

Thierry Lassus

SVP Transport Energy Network Leader

Hitachi Energy

Closing Words

Dario Dubolino, DG-MOVE

Closing Words

Umberto Guida, UITP

UITP ADVANCING PUBLIC TRANSPORT

Thank You
for being with us today!

Stay tuned at

www.cleanbusplatform.eu