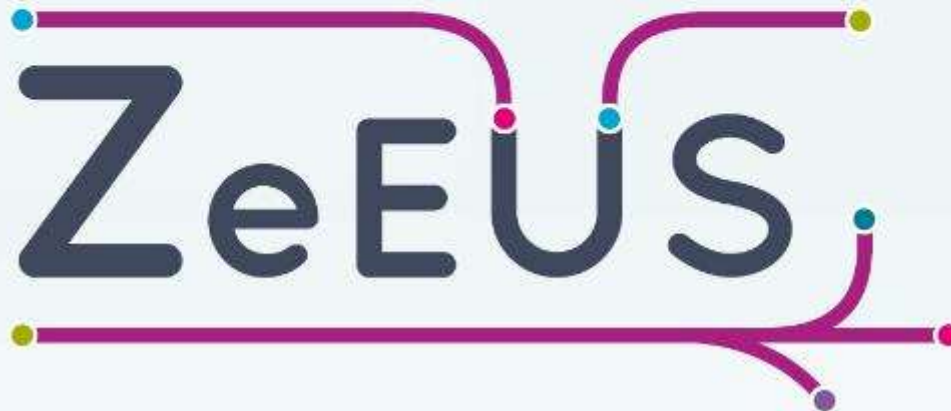




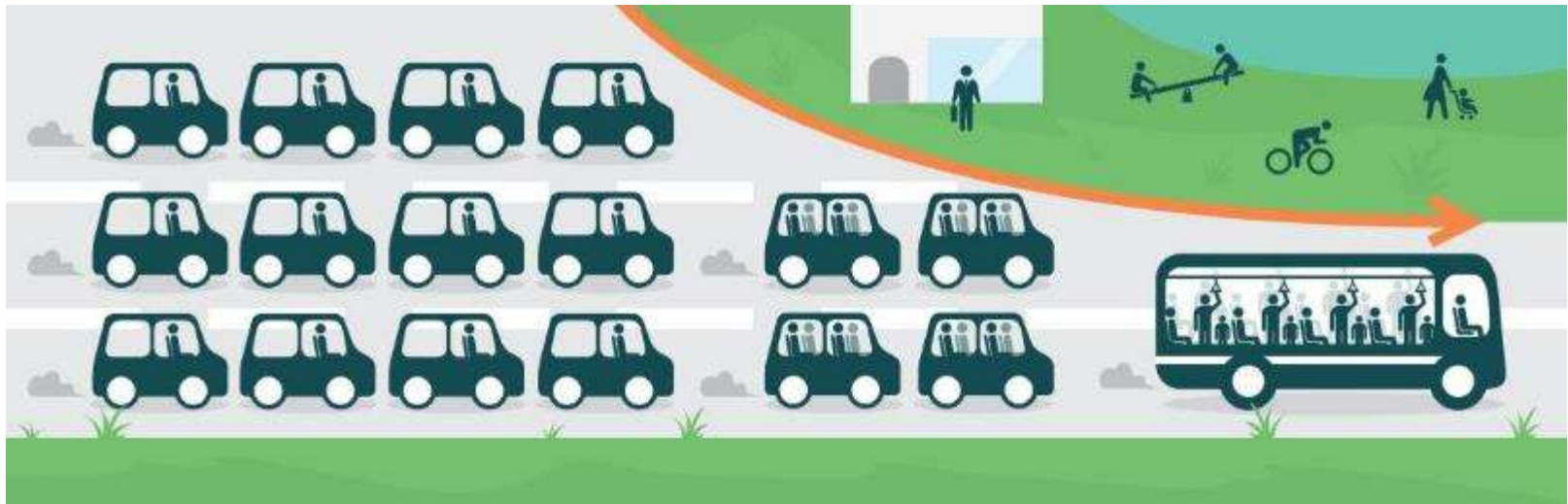
Trolley:motion Conference – Berlin – Tuesday 31st May

ZeEUS – Experiences and lessons learnt from European electric bus demonstrations

Marta Van den Bergh, UITP

Public transport strongly contributes to mobility solutions

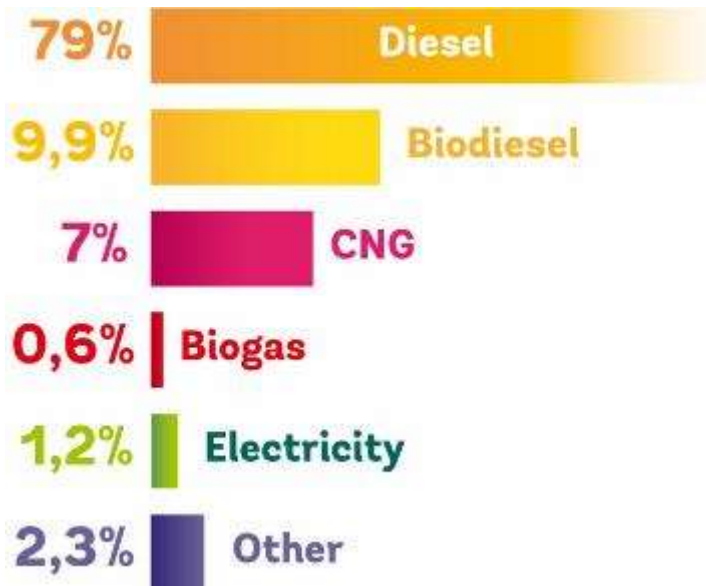
- **Energy consumption** of a diesel bus per passenger/km is **1/3 of that of a car**
- **Public space**: enabling a **minimum space** to move a **maximum of people**



Electric Buses?

Great Interest from Urban Mobility Actors

Current fleet



Bus fleet breakdown per fuel or energy used

Future fleet



Main challenges to introduce e-buses in cities

- Cost
- E-bus performance = conventional ICE bus performance?
- Contractual & organisational frameworks
- Interoperability & operational flexibility
- Energy provision



ZeEUS: a project to accompany the ebus transition

Zero Emission Urban Bus Systems

EU FP7
Demonstration
Project

€13.5m EU funding
(€22.5m total budget)

Coordinated by
UITP

40
consortium
partners

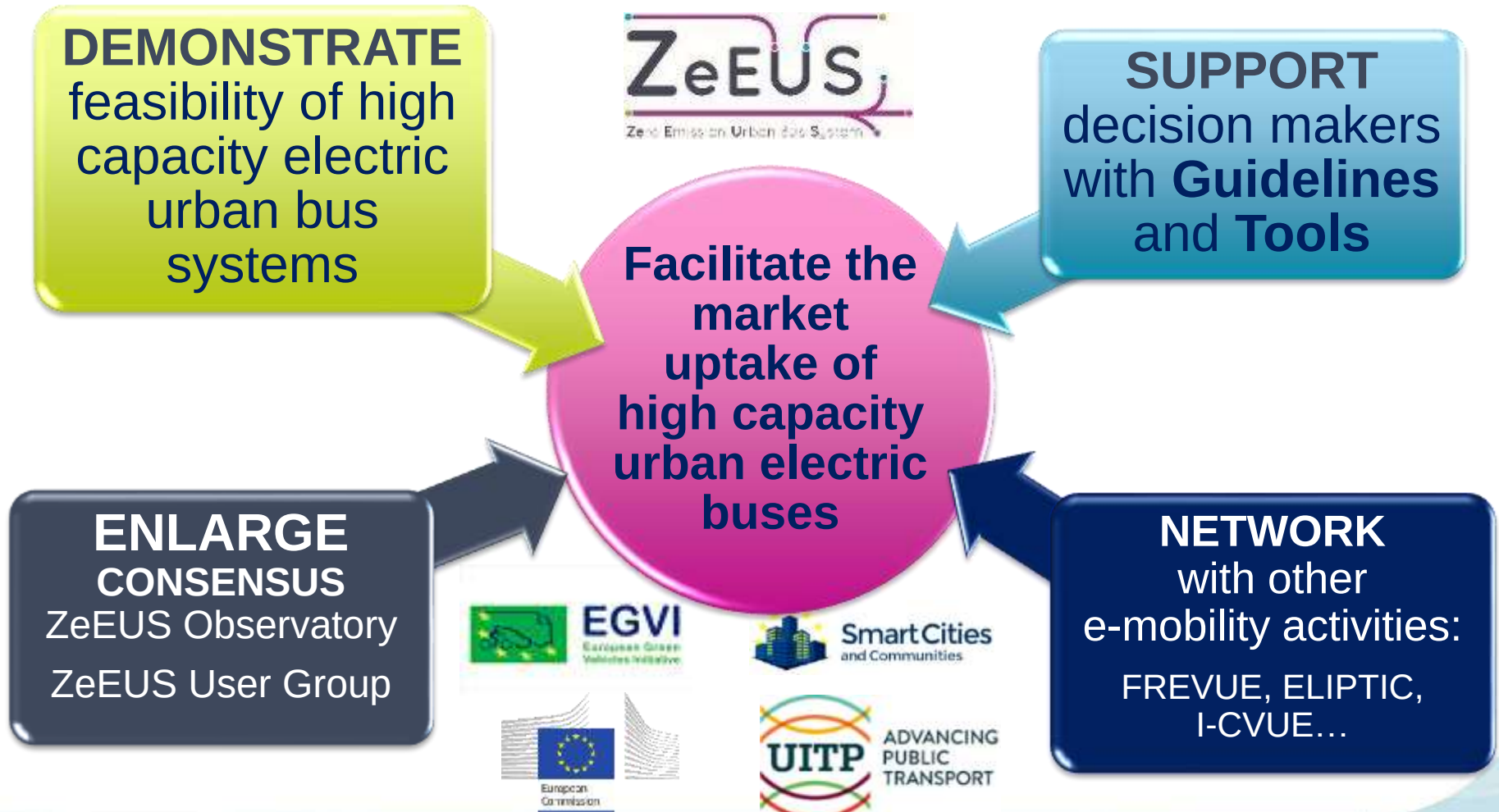
42 Months
November 2013
April 2017



DG Mobility
& Transport



ZeEUS Vision



ZeEUS

Core Demo Cities

LONDON
3 plug-in hybrid
Double deck
Alexander Dennis

RANDSTAD NL
Definition
on-going

PARIS
10+ full electric
BOLLORE 12m

BARCELONA
2 full electric
IRIZAR 12 m
2 full electric
Solaris 18m

CAGLIARI
12 m Battery Trolleys
4 VOSSLOH /VAN HOOL
2 SOLARIS

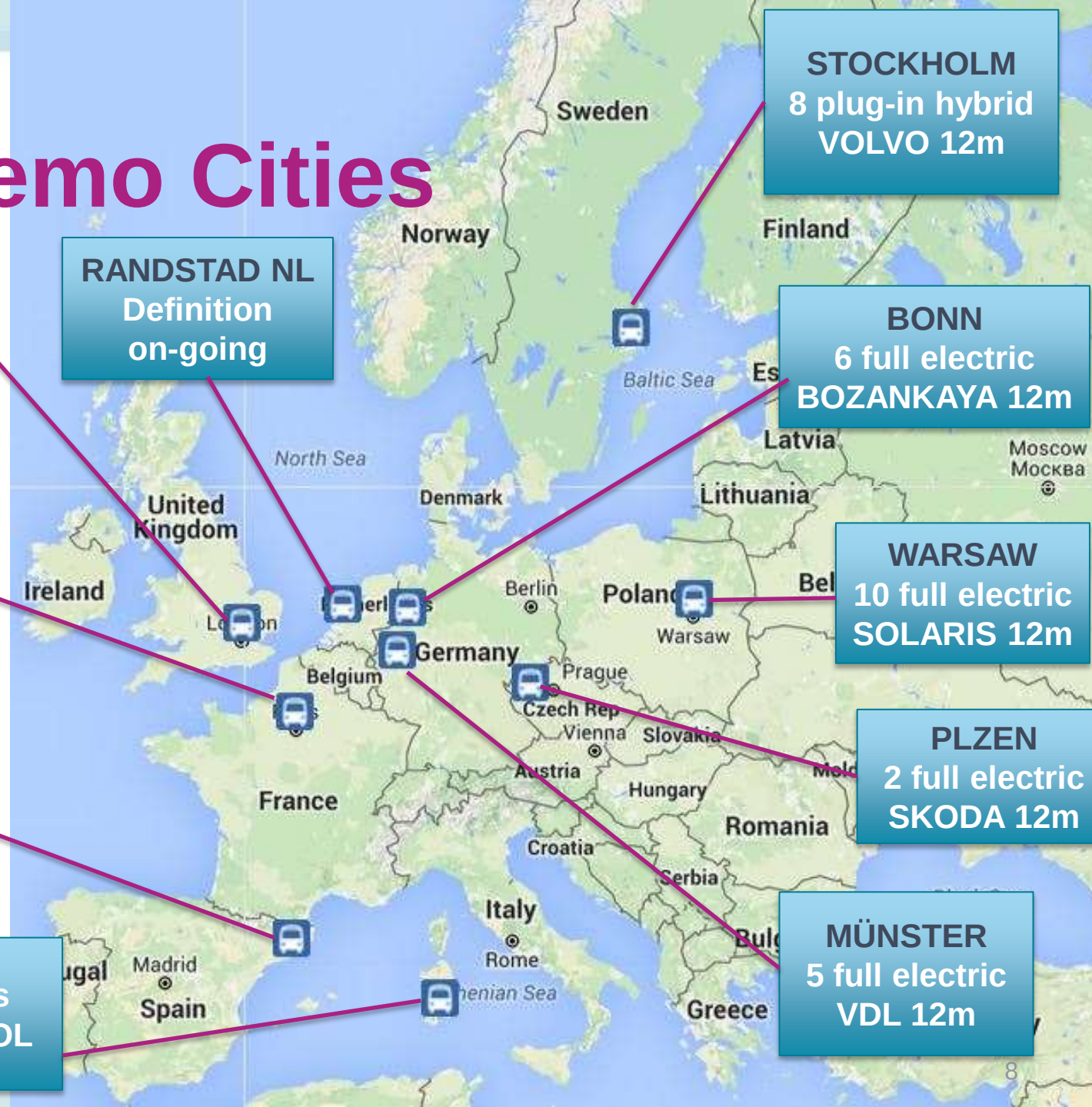
STOCKHOLM
8 plug-in hybrid
VOLVO 12m

BONN
6 full electric
BOZANKAYA 12m

WARSAW
10 full electric
SOLARIS 12m

PLZEN
2 full electric
SKODA 12m

MÜNSTER
5 full electric
VDL 12m



IN OPERATION



**Barcelona
(IRIZAR)**



**Stockholm
(VOLVO)**



**Münster
(VDL)**



**Pilsen
(SKODA)**



**Warsaw
(SOLARIS)**



**London
(ADL)**



2014



2015



2016

Randstad



**Cagliari
(VAN HOOL / SOLARIS)**



INITIAL⁹ OPERATION



**Bonn
(SILEO)**



**Barcelona
(SOLARIS)**

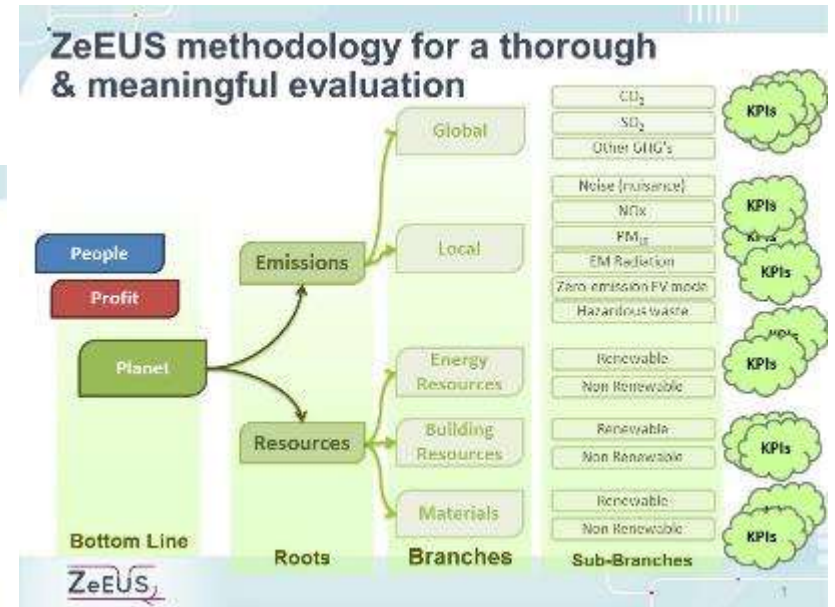
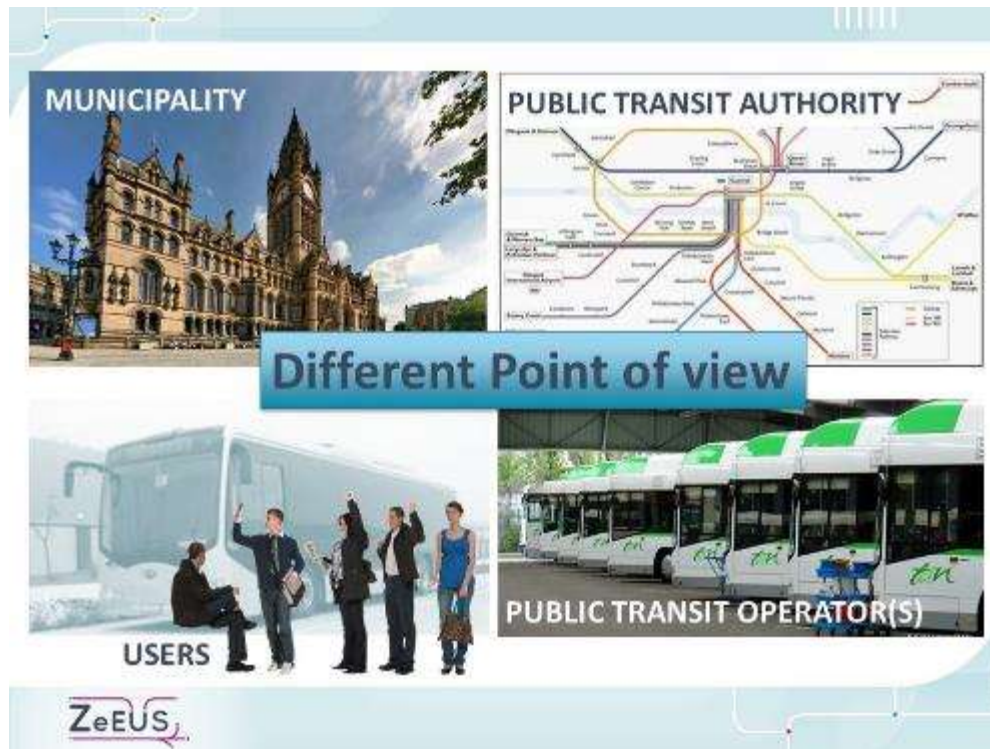


INITIAL OPERATION

**Paris
(BLUEBUS)**



A transferable evaluation methodology





IF – Know & Decide

- Define a **Global Vision** and a **Roadmap**
- **Study cases** and **share of experiences**

ZeEUS
Guidelines
and **Tools** to
support PT
stakeholders

The Bonn vision to 2030: the complete conversion from diesel to e-buses

One year for:

- Market exploration
- Feasibility study
- Fields tests
- Technical specifications
- Charging concept
- Operational concept



→ Complete Conversion of all conventional diesel buses to full electric propulsion by 2030 by decision of the EB



IF – Know & Decide

- Define a **Global Vision** and a **Roadmap**
- **Study cases** and **share of experiences**

WHEN – Plan & Regulate

- **Assess** possible technical solutions in own scenario
- **Standard** for eBus charging
- Most suitable **Funding & Financing** tools
- Optimal **Regulatory** frame & **Urban policies**

ZeEUS
Guidelines
and **Tools** to
support PT
stakeholders

Preparation phase

- Successful preparation of the vehicles
- Overcoming administrative challenges
 - Approvals and building permits
 - Energy regulators & providers
- Existing regulations
- Funding and risk sharing



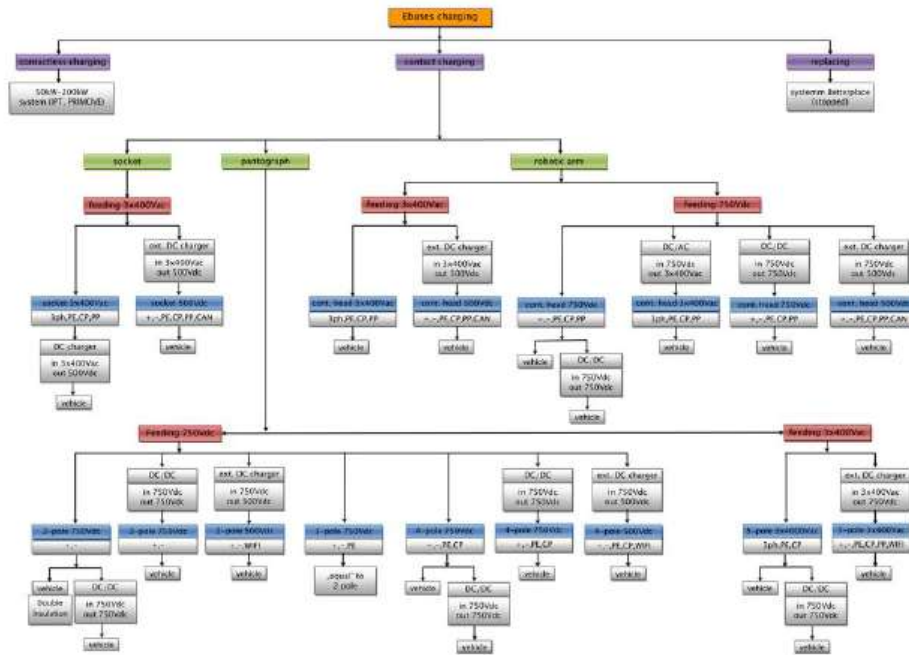
Stockholm – charging pole issue



Stockholm – charging pole issue



Standardisation of charging infrastructure is on-going

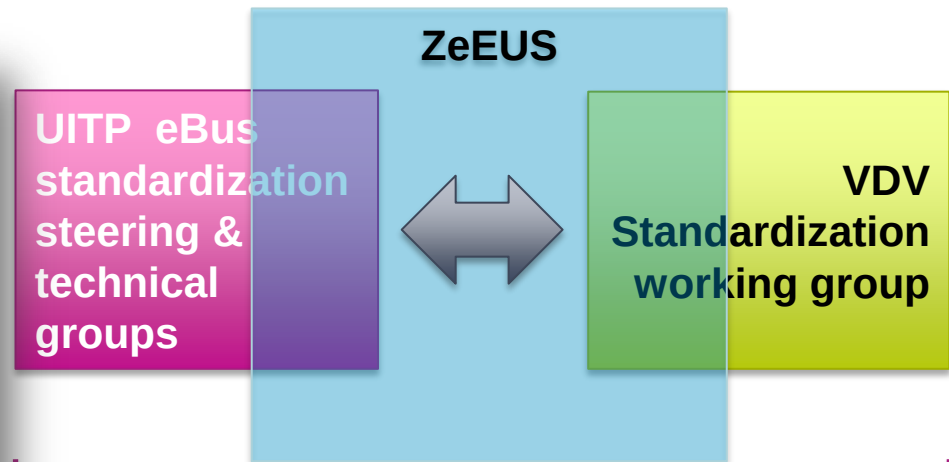
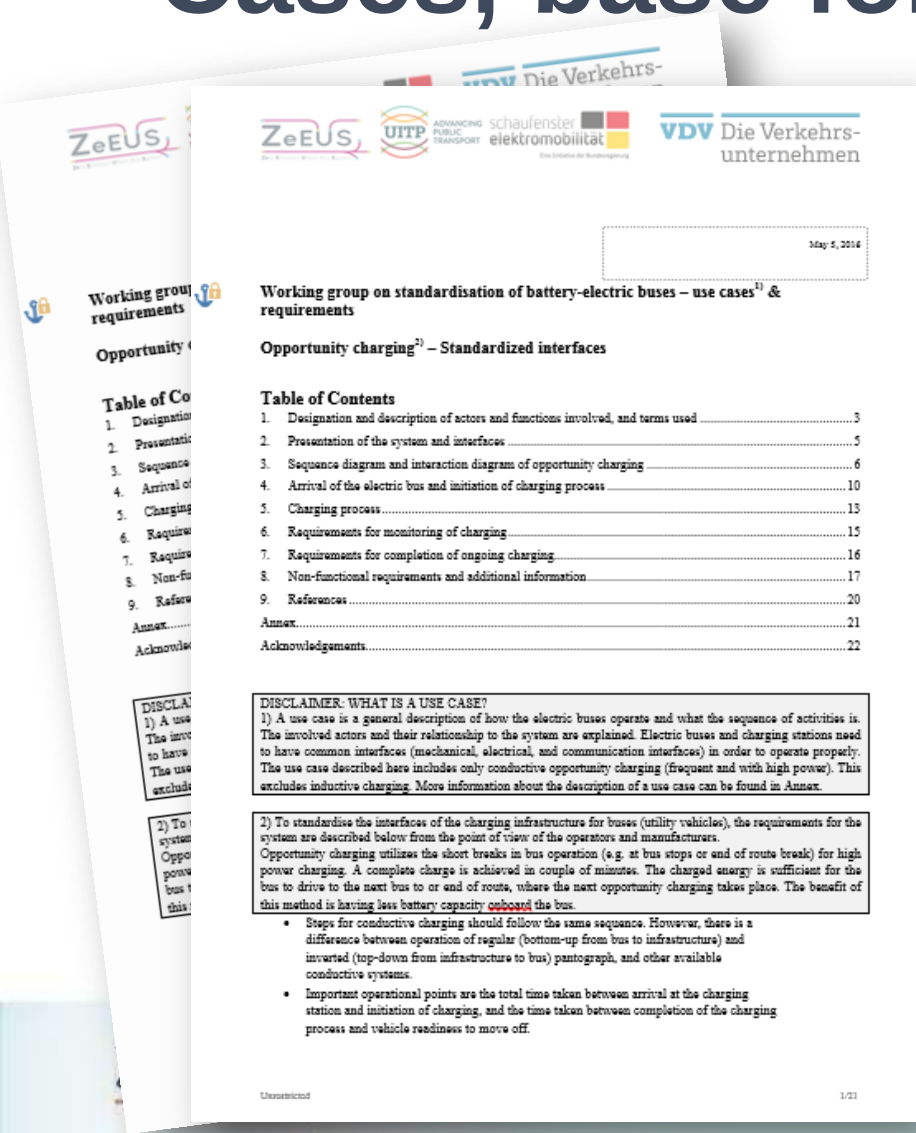


Cegelec

ZeEUS

UITP
RESEARCHING
Public
Transport

Electric Bus charging Use Cases, base for standardization



CEN-CENELEC
(EC Mandate M/533 about eBus standards for 2019)





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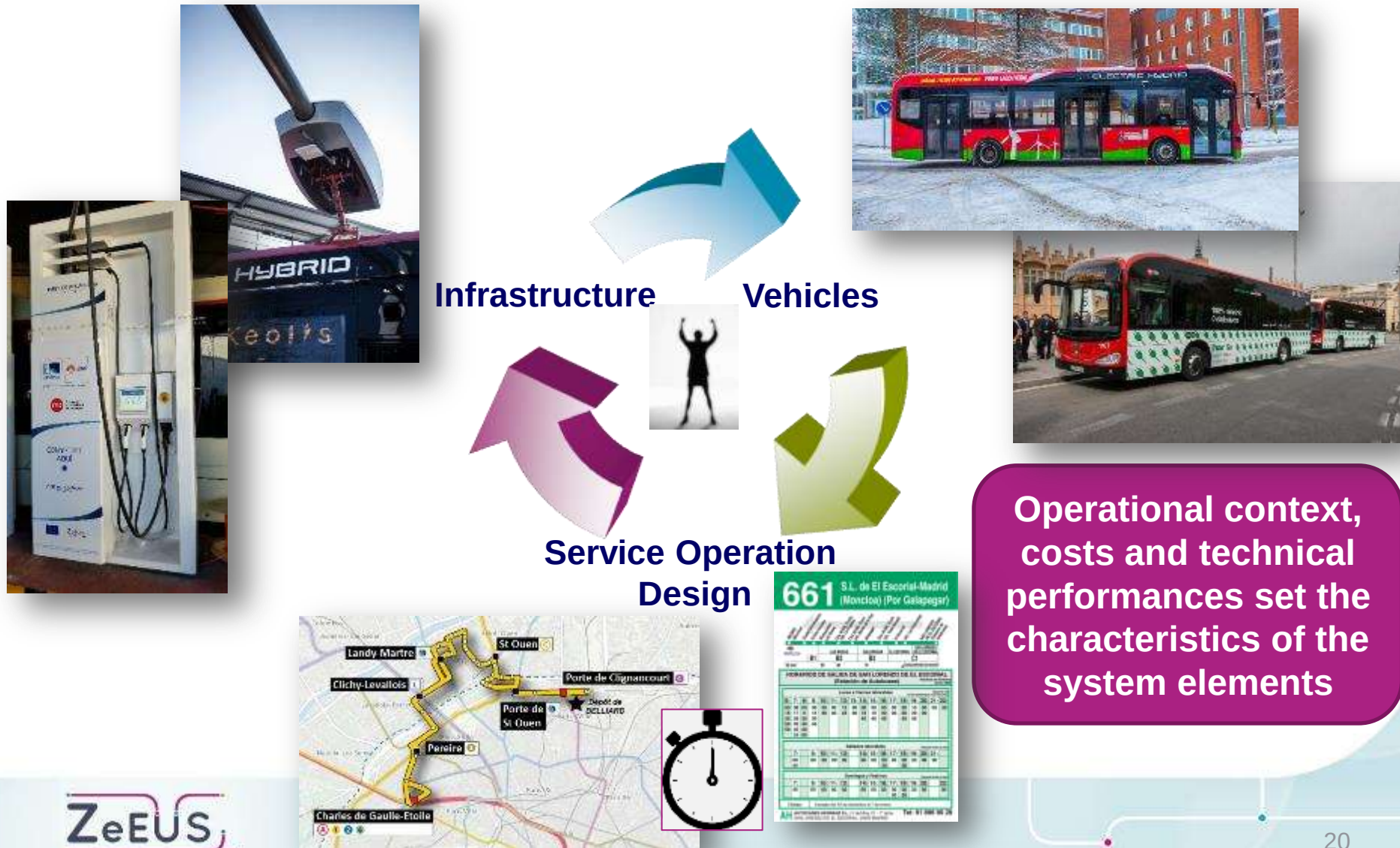
WHAT – Select & Procure

- **KPI** and Methodology for procurement-oriented **evaluation**
- **SORT-E** Developed and validated
- **Tender** structure for eBus procurement
- **Platform for eBuses “easy” procurement**

ZeEUS
Guidelines
and **Tools** to
support PT
stakeholders



System Approach is necessary





IF – Know & Decide

- Define a **Global Vision** and a **Roadmap**
- **Study cases** and **share of experiences**



WHEN – Plan & Regulate

- **Assess** possible technical solutions in own scenario
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WHAT – Select & Procure

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HOW – Operate & Maintain

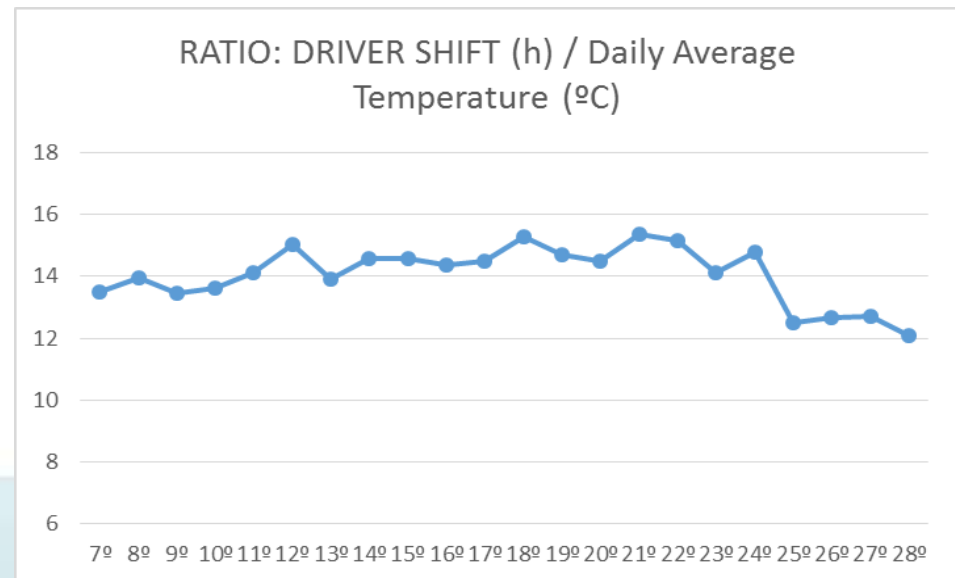
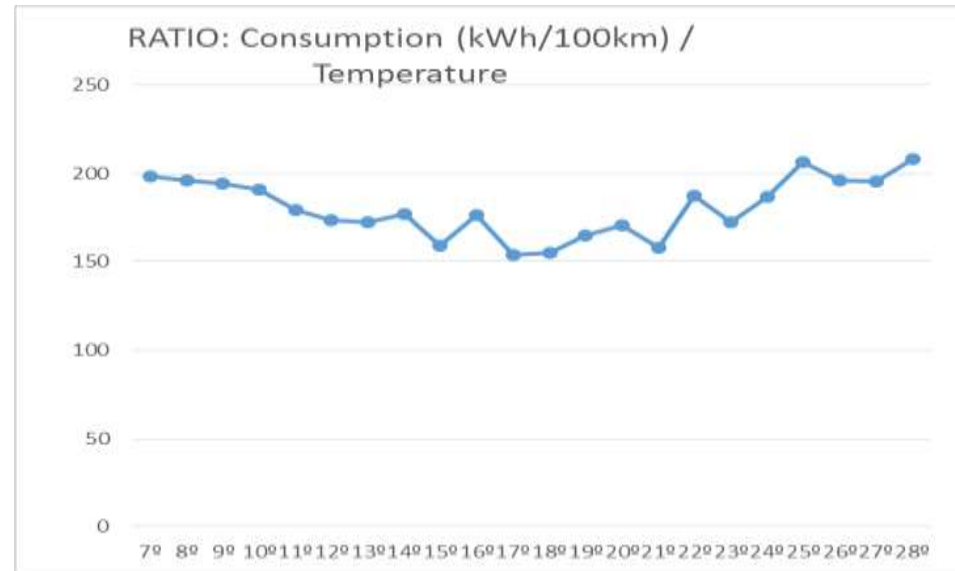
- Staff **training** guidelines (for optimal operations)
- Optimised **operations** of electric buses on the Bus Network operations
- Optimization of **charging operation in bus depot & opportunity stations**

ZeEUS
Guidelines
and Tools
to support PT
stakeholders

Optimisation of operations



Example: The impact of temperature as an external factor on operational performance



An extended network of local experiences

Core Demonstrations
Observed Demonstrations
User Group



More than 40 cities in Europe
and beyond have joined the
ZeEUS Observatory
It is still possible to join us!



Contact to join:
pauline.brugue@uitp.org

Upcoming events: join us!

Event	Date	Place
Transports Publics 2016	14th – 16th June	Paris
European Bus Forum	23rd June	Manchester
Annual POLIS Conference	1st – 2 nd December	Rotterdam



ZeEUS – Want to know more?

www.zeeus.eu



[@zeeusproject](https://twitter.com/zeeusproject)



pauline.bruge@uitp.org