

Revival of Trolleybus systems and development of IMC networks

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Plzeň (Pilsen, CZ)
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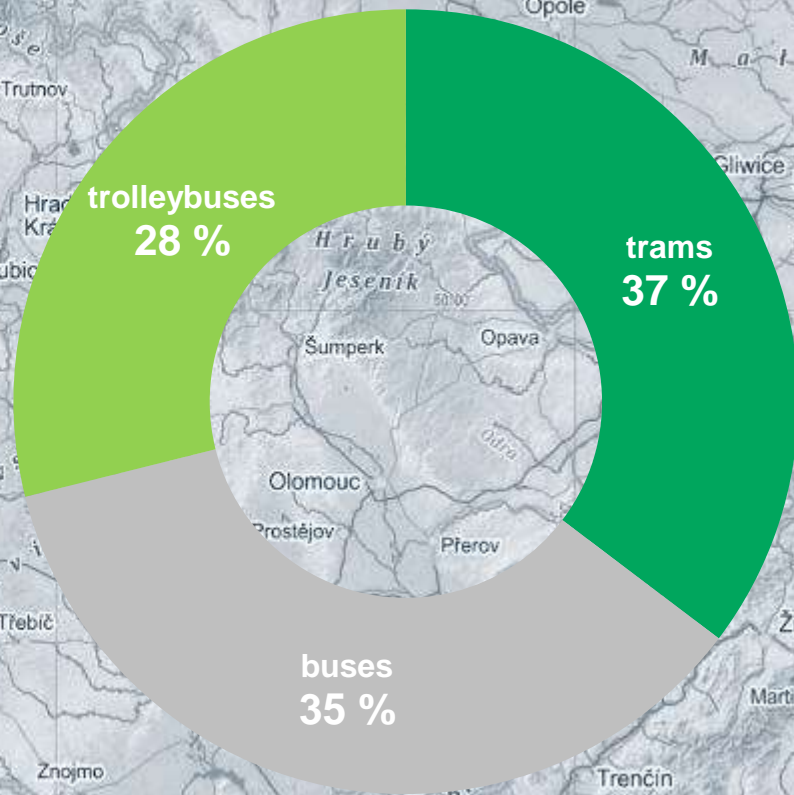
**65 % of Pilsner city public transport
is already electric!**

Město Plzeň

Plzeň

Annual performance (2019)

Trams	5,7 mil. km
Trolleybuses	4,4 mil. km
Buses	5,4 mil. km



CELEBRATIONS OF 80TH TROLLEYBUS ANNIVERSARY



4300 visitors
old-timer rides

PILSNER SMART CITY GOAL:

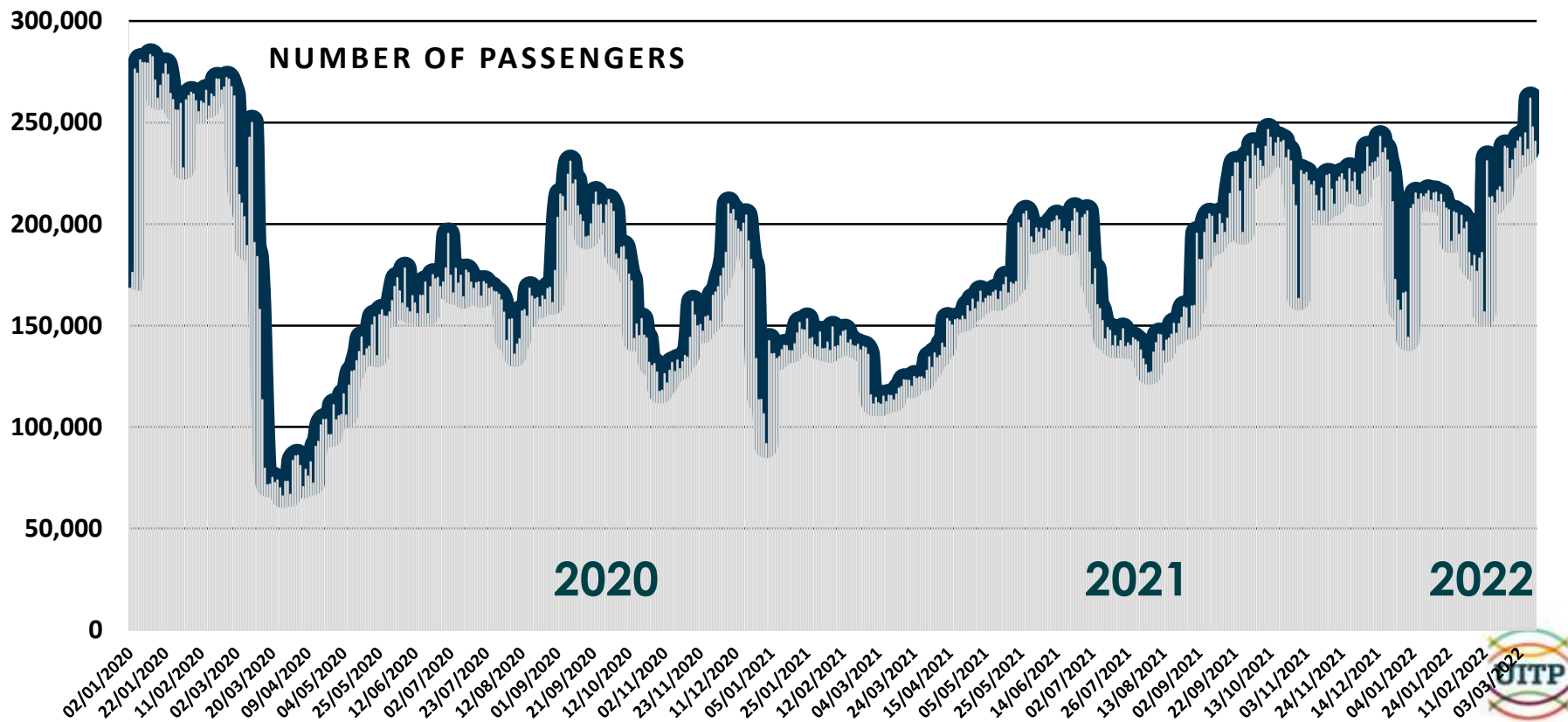
"To increase the share of electric traction in Pilsner PT to 85 % in 2030"



65 % of Pilsner city public transport is already zero-emission!



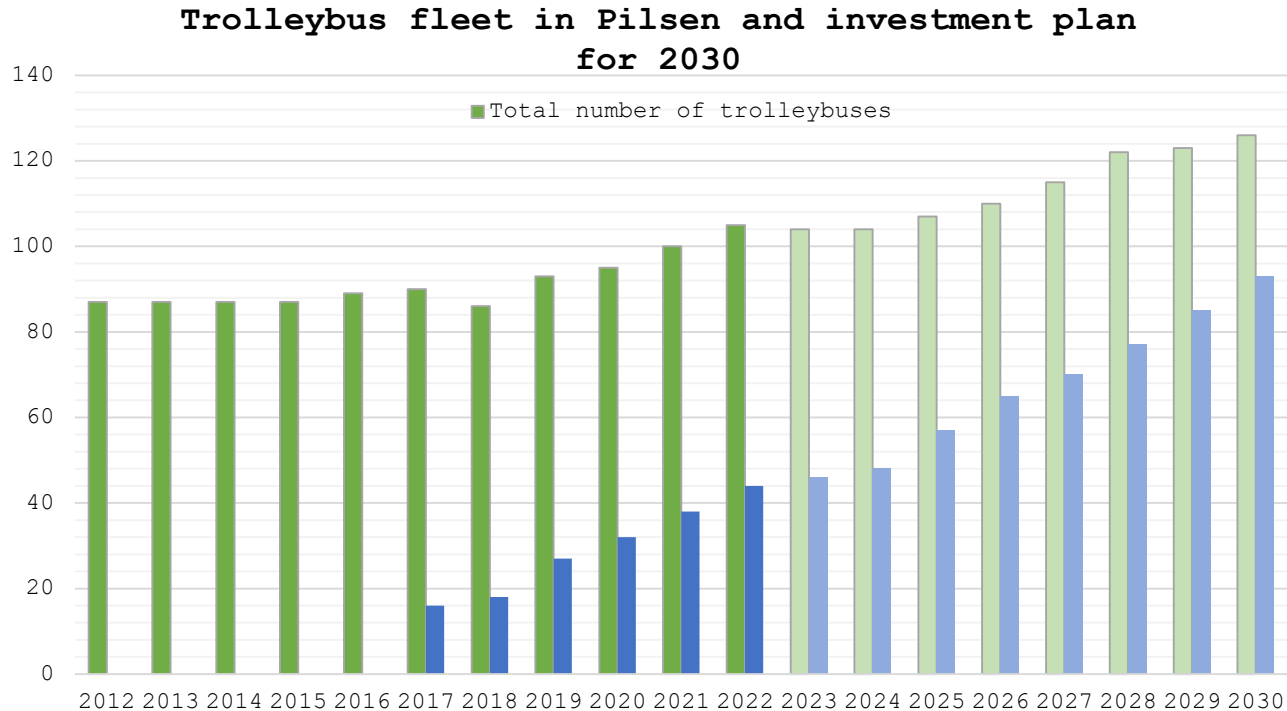
COVID-19 SITUATION IN PILSEN'S PUBLIC TRANSPORT





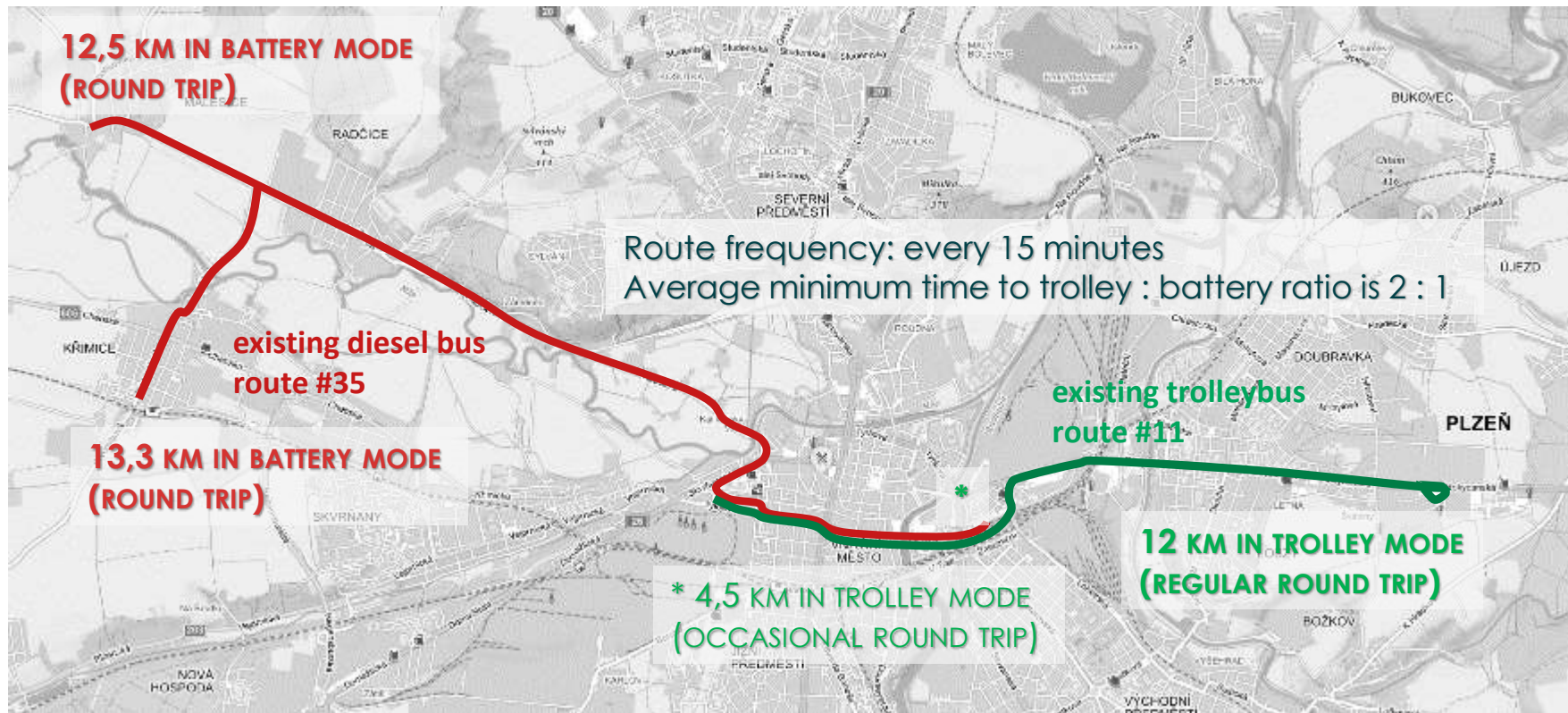
CURRENT FLEET

- ✓ ongoing investment in rolling stock according to Clean Vehicle Directive



➤ CONVERTED DIESEL BUS ROUTE INTO IMC

Since 1st September 2021



➤ CONVERTED DIESEL BUS ROUTE INTO IMC



Regular operation since 1st September 2021

- interval 15 (30) minutes
- 7 battery trolleybuses

Positive effects reached:

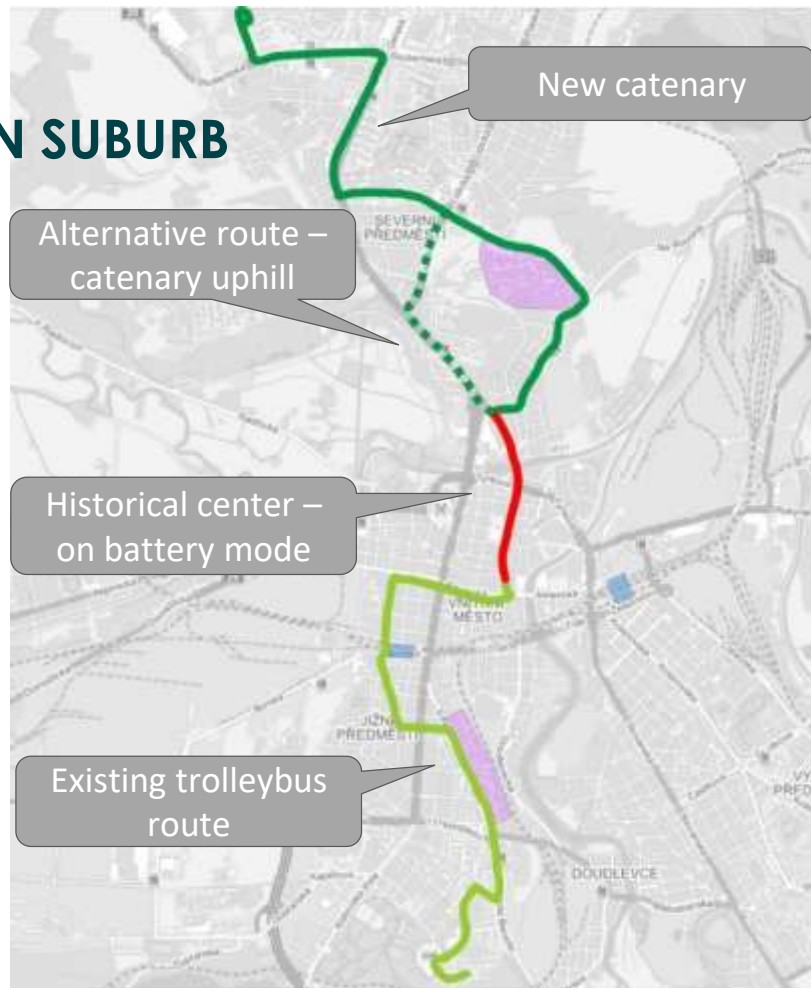
- saving 2 vehicles & 2 drivers on weekdays
- more trip connections for citizens
- saving > 112,000 liters of diesel annually
- less noise and less air pollution in the city center and suburbs



TROLLEYBUS PROJECT TO THE HOSPITAL AND NORTHERN SUBURB

- Extension length 6,7 km
- Height difference 108 m
- Peak/off-peak frequency 15/10 min
- Synergy with other new tram project – new substations for both modes

**Realization:
ca 2025-26**





Trolleybus as a E-Bus

with the longest operational experience



GLOBAL OVERVIEW

USA+CA:
6 systems, 56 lines,
886 vehicles

EUROPE: 90 systems,
523 lines, 5.174 buses

Russia: 83 systems, another
8 systems in Central Asia

Ukraine: 43
systems

East Asia: 34
systems
(PRC: 13, PRK: 19,
JP: 2)

**277 trolley systems
worldwide**

(incl. approx. **50 systems** with new
trolley-battery **IMC concepts**)
(www.trolleymotion.eu)

2 systems, 20 lines,
+ 400 buses

7 systems, 15
lines, 251 buses

Africa:
1 system

Middle East:
3 systems



ALL CLIMATE CONDITIONS

Vancouver, CA >



Photo Arndt Bätzner

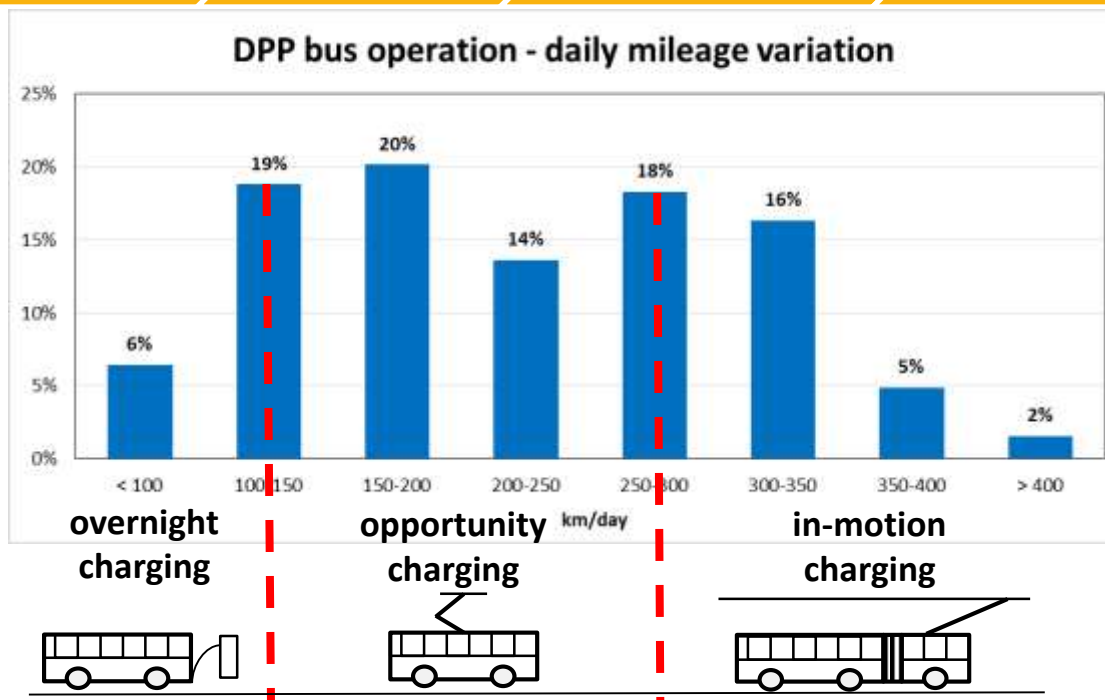


From trolleybus to IMC E-Bus

High-capacity E-Bus with unlimited range



➤ INNOVATION PATH OF TROLLEYBUS SYSTEMS



Prague, CZ >

➤ AUTOMATIC TECHNOLOGY

Beijing, CHINA ➤



Photo Arndt Bätzner

➤ AUTOMATIC TECHNOLOGY



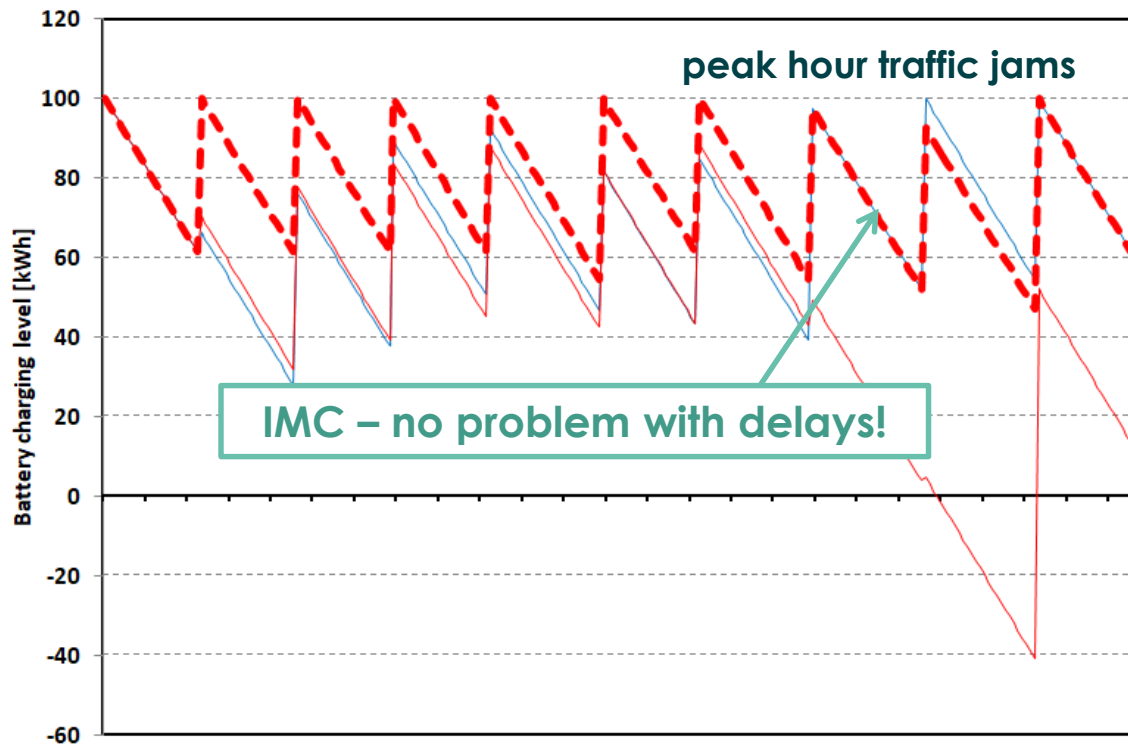
Beijing, CHINA ➤

➤ CHARGE WHERE YOU REALLY NEED IT

Traffic jams: problem for opportunity charging, **opportunity** for IMC!

Traffic congestion:

- arrival delay
- not enough time to charge at the terminus
- a lot of time to charge on a busy road for IMC

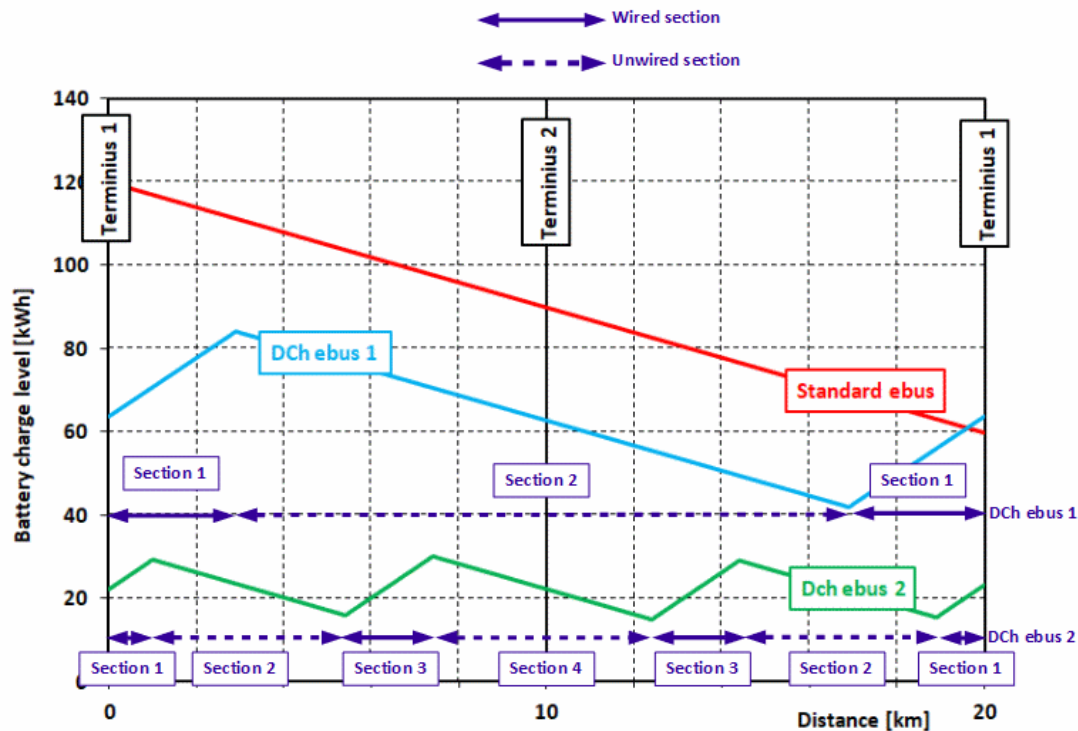


➤ CARRY PEOPLE, NOT BATTERIES

In-motion charging: way to reduce battery capacity and weight

- battery weight reduction up to 20 %*
- unlimited operational range
- large capacity vehicles

* in compare with opportunity fast charging e-buses and even more for overnight buses





Best practices

IMC as a backbone for heavy-duty
zero-emission city mobility

> XXXL IMC-BUS

Switzerland, Austria, Turkey

...and Prague (CZ)
or Bratislava (SK) **coming soon!**

Linz example >



➤ CLIMBING HILLS

Czech republic, Switzerland,
France ...

Example from San Francisco, USA ➤



Photo Gunter Mackinger

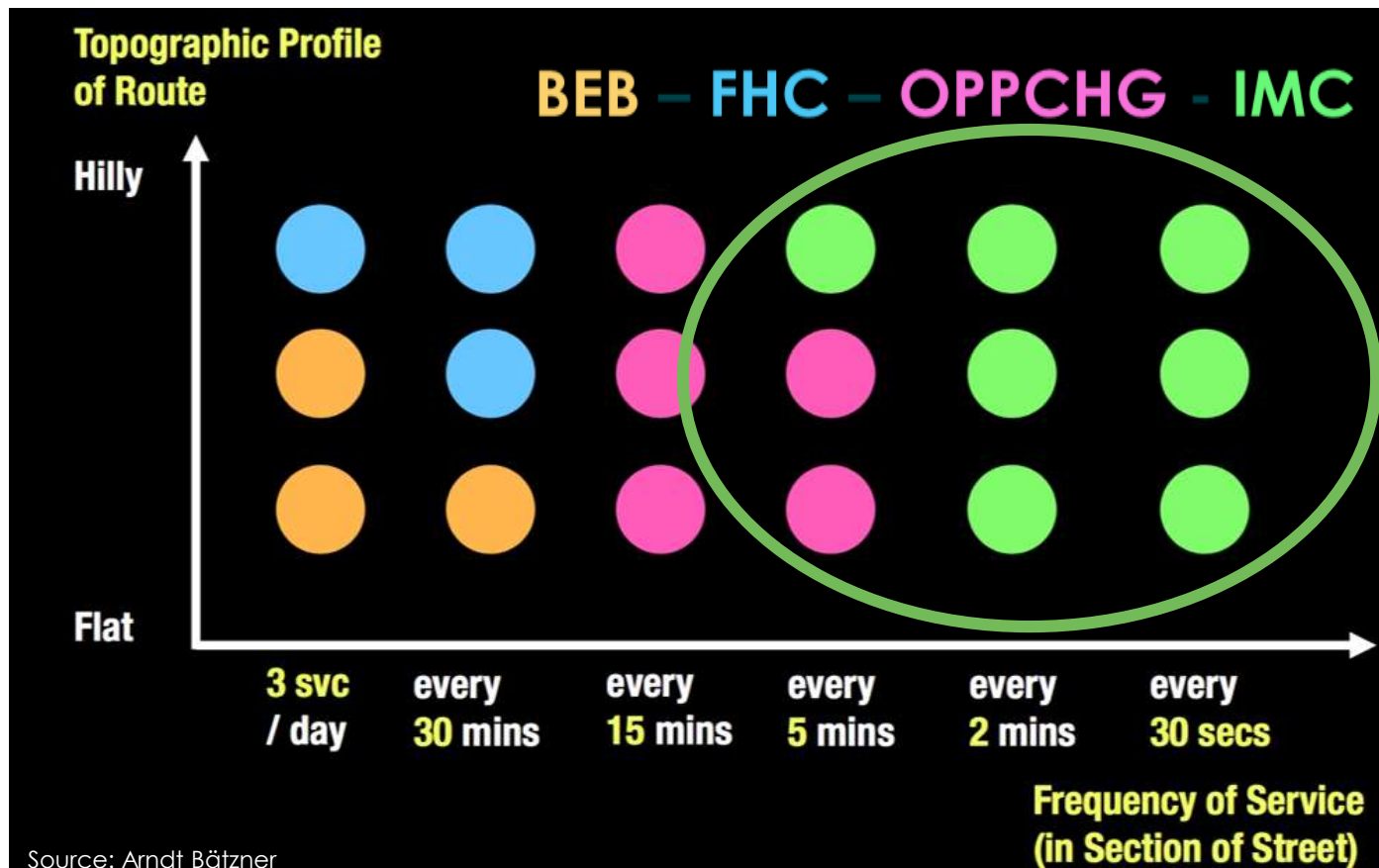
> INTERVAL & BUS ROUTE TOPOGRAPHY

IMC trolleybuses
suits to

all terrain,

climate

and mostly
high frequency
public transport



E-BRT CONCEPT



e-BRT project Rimini, Italy

Photo ©KiepeElectric



IMC challenges

Not every solution fits into every city





NECESSARY CONDITIONS FOR SUCCESSFUL IMPLEMENTATION

- **Good cooperation between PTA and PTO** (investment and ownership of infrastructure, correctly set contracts)
 - ideal for city companies or long-term contracts
- **Qualified staff** (design, maintenance)
 - ideal where a light rail or metro is in operation
- Cities with good **long-term sustainable mobility planning**
 - **should have any city that wants PT emission-free!**



QUESTIONS?

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Association of Public Transport



More Information

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