E-mobility I – Clean Public Transport
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Good Practice: Upgrading the trolleybus system and procuring new e-busses for the City of Brasov, Romania

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Priority 4 ROP 2021-2027
PO2, So 4.b (viii) Promoting sustainable multimodal urban mobility

- ***Development of clean urban infrastructure: development of sustainable urban mobility paths, cycling infrastructure, pedestrian planning, the introduction of bike-sharing systems, monitoring systems, etc., including existing publicly owned utility infrastructure.***

- *Developing and optimising public transport through **investments in rolling stock and related transport infrastructure**;*

- *Development of **alternative fuel infrastructures;***

- *Development of **urban mobility management systems** such as traffic management systems, mobility applications, park & ride systems, etc.*

Targets - 2029

Capacity of environmentally friendly rolling stock for collective public transport – 15.000 (RCO 57)

150 electric buses

*Km bicycle lanes – **160 km** (RCO58)*

***20 charging stations** (RCO59)*

***5 digitalised mobility systems** (RCO 60*

Good Practice: City of Brasov, Romania

At the level of the Center Region, within the E-MOB project:

There is a working group consisting of county seat town halls, town halls funded on ROP axes for mobility, public transport companies, development associations;Target policy instrument: Regional Operational Program 2014-2020, Priority Axis 4 - Supporting sustainable urban development – the Brasov future developments in the field of electrification were debated also here, in this group.

City of Brasov's objectives: to have full ecological transport in Brasov city (inside city limits) by 2027-2028 (trolleybuses, E-buses, Hybrid buses)

Also, all the metropolitan train lines will be operated by electric trains (and where the line is not electrified, battery operated engines are taken into consideration) – by 2030

An ambitious idea is also to reinstall the tram lines inside the city, but this is probably a long time design and preparation.

Good Practice: City of Brasov, Romania

Two major lines of action – renew the fleet of trolleybuses

and replacing the diesel buses with E-buses and some Hybrids

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Good Practice: City of Brasov, Romania

Upgrading the trolleybus system in Brașov, Romania

1. **The decline * of trolleybus system in Brasov – from 30 operational in 2014 to 19 in 2019**
2. **Starting the renewal of the fleet : 26 articulated trolleybuses operational in April 2021, 51 in December 2021 (all 18 m trolleybuses has been delivered, the last 25 are in test procedures)**
3. **Trolleybuses procurement - 2 procurement procedures awarded to Solaris Bus&Coach, Poland, with electric traction system by Skoda Electric, Czech Republic**

**** Brasov had in 1987 one of the most electrified urban transport in Romania, with 209 trolleybuses and 20 trams, out of a total of 465 vehicles***

Good Practice: City of Brasov, Romania

Technical data –trolleybuses

- Electric traction system by Skoda Electric
- Range without catenary: min. 5 km
- nano Lithium Titanate (nLTO) Batteries, 28 kWh
- Engine: central, 250 kW, 6 pole
- Batteries charging from catenary (600 VDC)
- Passengers capacity: 137 (42 seats) – *in the old photo you can see a 1987 double articulated trolleybus with almost 175 passenger capacity, one of the largest model ever (now they have in Geneva)*
- ITS: fleet management computer, 4 EMV validators, 9 video cameras, Passen info display, WIFI
- 5 years warranty
- Consumption: 1,6 – 1,8 kW/km

Good Practice: City of Brasov, Romania

Operational info–trolleybuses

- ❑ 4 urban routes which connects 4 city residential areas with the city center
- ❑1 Garage
- ❑Reintroducing trolleybuses toward city center area without investing in infrastructure
- ❑Transforming 4 bus routes on 4 trolleybus routes
- ❑New trolleybuses are operating on routes that have 65% catenary and 35% without catenary

Good Practice: City of Brasov, Romania

The e-buses projects of Brasov Municipality

Procurement of 72 e-buses (12 of 18m, 50 of 12m and 10 of 8m), 17 fast charging stations

Value: 45 mil. Euro

Starting in October 2018 – last delivery: 2022

- Technical data – E-buses : fully low floor, centrally located electric traction motor (rated power: 160 kW, with braking energy recovery), traction batteries (capacity 263 kWh, minimum autonomy 200 km), minimum service life: 5 years (cell batteries, already changed some cells during the warranty period)
- Estimated use : 15 years, with 2 changes of bateries

Good Practice: City of Brasov, Romania

Development projects of electric public transport in the area of Brașov municipality :

- purchase of another 30 buses* (also for metropolitan routes)
- introduction of a metropolitan train system**.
- Analyzing the tram system rebuild

* There is a target to have full ecologic transport in Brasov (city area) in 2027-2028 (trolleybuses, E-buses, Hybrid buses)

** where the line is not electrified, battery operated engines are taken into consideration

Good Practice: City of Brasov, Romania

Lessons learned during the implementation:

- Have in mind the power transformer issues* (also for cities with large power grid)
- Have in mind the use of fast charging station in an sustainable way, for batteries**.
- Training the staff, from bus drivers to tech support teams, and IT specialists is a key issue.

* There is 400kVmajor electric line near Brasov, and a network of 110 kV over the whole city, including transformers 110/MT that provide 6kV and 20kV for public distribution line. Still the transport company and municipality have to pay serious money for new transformers and connections for the old/new depot.

** use the fast CS with low power, otherwise the re-equilibration for the cells during the slow-night recharge could be extended with 50% time (from 6 to 9 hours) – check with the supplier if the fast charging is not decrease the life cycle of batteries.

Good Practice: City of Brasov, Romania

Final ideas, learned during the process :

- Have in mind the capacity of IT equipment to process the data you will receive from the equipment*
- Look forward to get as much technical support (for designing the whole project, and also for the Terms of reference for purchasing equipment and vehicles) as you can, before you start – fixing the problems on the spot , during the process , is quite challenging. ☺
- Start in small, develop later major projects. First hand experience is quite good as gold ☺

* Systems for Management of the traffic and the fleet, including IA, for large data (or even Biga Data) processing are very important

Thank you!

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