STRATEGIC FRAMEWORK FOR DEPLOYMENT OF E-CHARGING STATIONS ON TEN-T NETWORK

20 December 2023, Vienna

Content of the presentation

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- ✓ The existing EVCS locations and their coverage
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- ✓ Key challenges
- ✓ Roadmap for deployment of EVCS

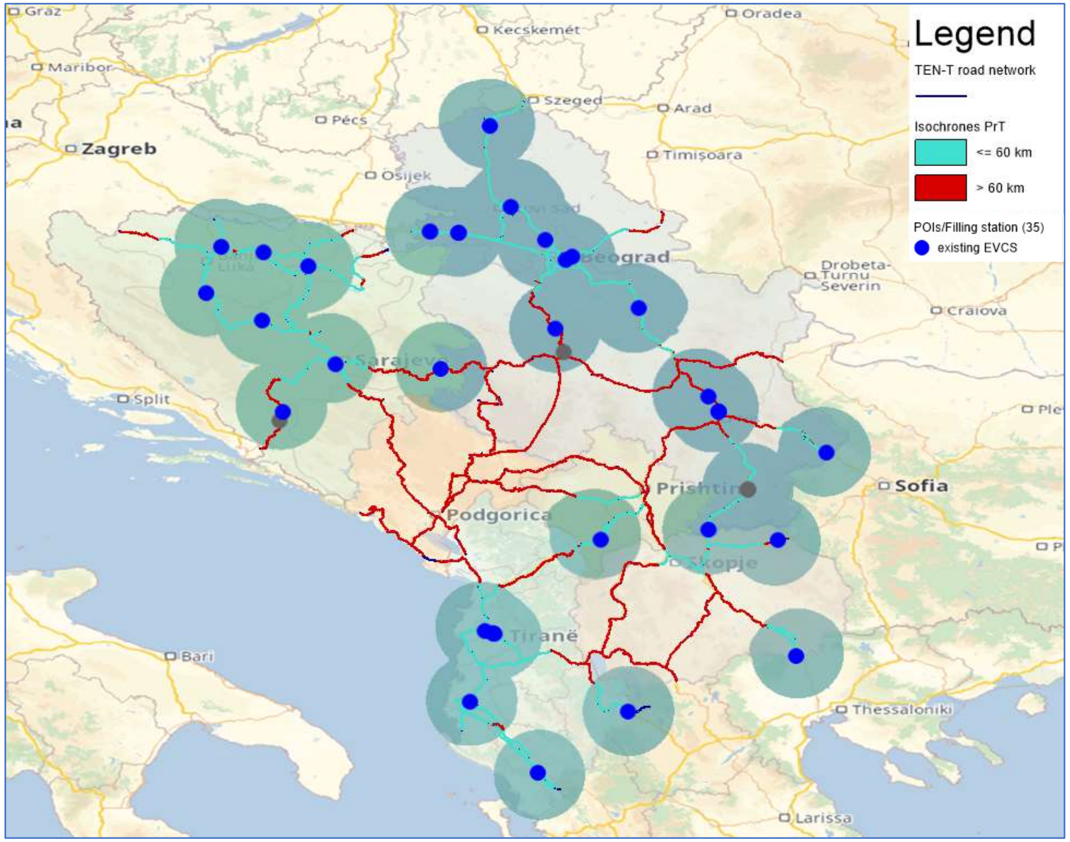
Legal basis

- Transport Community Treaty
- TEN-T Regulation (EU) 1315/2013 (art 29)
- EU Directive 2014/94/EU on alternative fuels infrastructure (art 3,4)
- Road Action Plan
- Strategy for Sustainable and Smart Mobility in Western Balkans

The existing EVCS locations

Regional Partner	Existing number of EVCS	TEN T
Albania	60	0
Bosnia & Herzegovina	93	5
Kosovo	13	1
Montenegro	49	0
North Macedonia	59	2
Serbia	85	19
Western Balkans	359	27

- Good coverage on corridors X and Vc
- Poor coverage in Montenegro, Western Serbia, Kosovo* and North Macedonia
- In Albania, partly good coverage on the north-south axis



*This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

The methodology for identifying potential sites for charging locations

- The existing charging station locations on the TEN-T network (as the most rational for upgrading)
- The existing fueling stations as they provide basic facilities required for drivers to stop (e.g. restaurant to wait 20-30 minutes)
- The distance between each of the proposed sites does not exceed 60 km
- At least one proposed location is among a pair of nodes on the TEN-T network
- On the motorways, the locations are proposed for each direction separately
- Proximity to 10 or 20 kV electric lines (required for 300 KW and 600 KW power output)

Scenarios - Description

- **Business as usual (BAU) scenario** - Consists of the changes in the transport systems as per "Five-year rolling work plan for the development of the indicative TEN-T extension of the Comprehensive and Core Network in Western Balkans", and the priorities of the Western Balkans Investment Framework (WBIF) under Sustainable Transport, grouped per time horizons 2025, 2030, 2040, and 2050.

- **Do Something scenario** – Represents the impact of proposed actions on the targets of SSMS and the transport model.

- **Decarbonisation scenario** - Consists of the measures and targets defined in the SSMS. The impact of the targets on the transport model has been defined per each modelling horizon.

Scenarios - Assumptions

Scenarios	Time Period			
	2025	2030	2040	2050
Business as Usual	- EV Penetration: 0.5% - Charger Capacities as per current situation	- EV Penetration: 3% - Charger Capacities as per Type I (22KW) & II (50KW)	- EV Penetration: 20% - Charger Capacities as per Type I (22KW) & II (50KW)	- EV Penetration: 30% - Charger Capacities as per Type I (50KW) & II (100KW
Do Something	- EV Penetration: 3% - Charger Capacities as per current situation	- EV Penetration: 8% - Charger Capacities as per Type I (120KW) & II (150KW), when required by EV traffic.	- Penetration:25% - Charger Capacities as per Type I (210KW) & II (350KW), when required by EV traffic	- EV Penetration: 50% - Charger Capacities as per Type I (210KW) & II (350KW), when required by EV traffic
Decarbonisation	- EV Penetration: 8% - Charger Capacities as per current situation	- EV Penetration: 10% - Charger Capacities as per Type I (120KW) & II (150KW)	- EV Penetration: 60% - Charger Capacities as per Type I (210KW) & II (350KW)	- EV Penetration: 90% - Charger Capacities as per Type I (210KW) & II (350KW)

Annual Traffic Growth	2022-2030	2031-2050
Albania	3.16%	2.53%
Bosnia and Herzegovina	2.46%	1.97%
Kosovo	4.72%	3.78%
Montenegro	3.10%	2.48%
North Macedonia	3.34%	2.67%
Serbia	2.91%	2.33%

Level of Service
Waiting time (estimated)

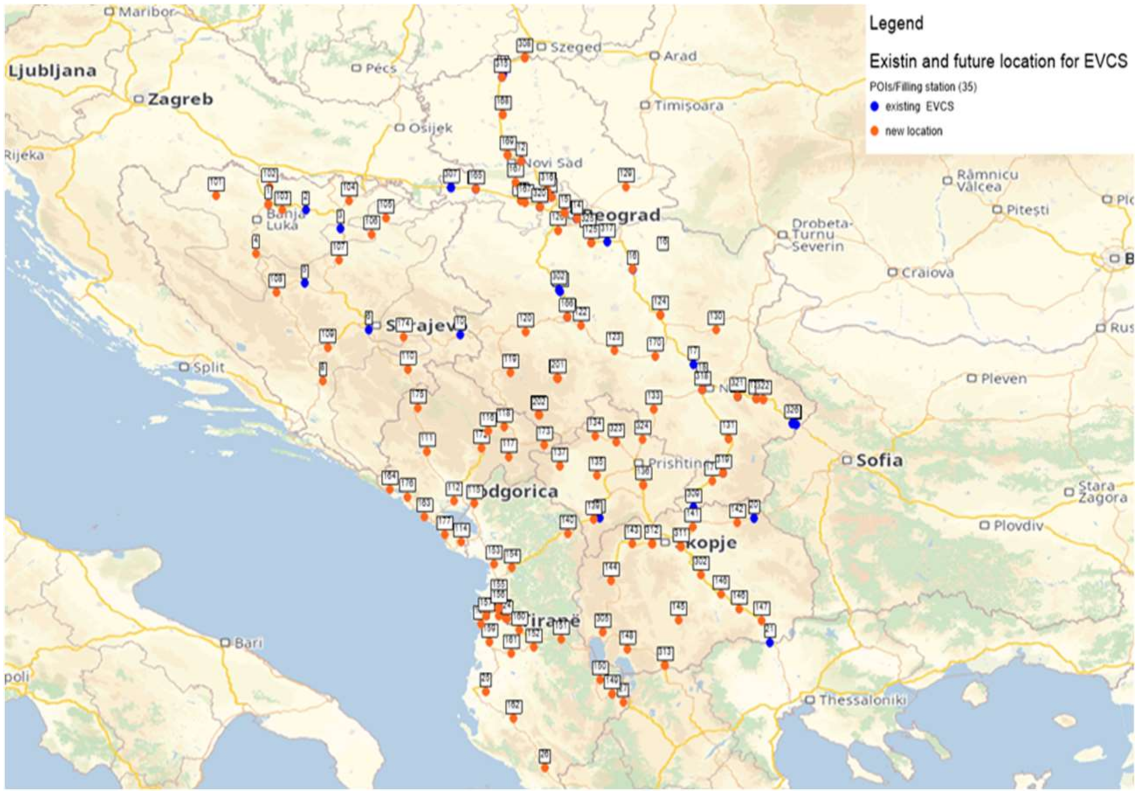
TYPE OF EV	CITY EV	LARGE EV	CARGO VAN	TRUCK AND BUSSES	
Average battery size	50 kWh	100 kWh	75 kWh	200 kWh	300 kWh
Power output per charging port	Average time to charge the battery from 20% to 80% SoC*				
50 kW	53 min	1 h 48 min	1 h 20 min	3 h 35 min	5 h 23 min
90 kW	30 min	1 h	45 min	2 h	3 h
120 kW	22 min	44 min	33 min	1 h 30 min	2 h 14 min
150 kW	18 min	36 min	27 min	1 h 12 min	1 h 48 min
180 kW	15 min	30 min	22 min	1 h	1 h 30 min
210 kW	12 min	24 min	19 min	51 min	1 h 16 min
240 kW	11 min	22 min	16 min	44 min	1 h 7 min
270 kW	9 min	19 min	14 min	39 min	59 min
300 kW	8 min	17 min	13 min	35 min	53 min
330 kW	8 min	16 min	12 min	32 min	48 min
350 kW	7 min	15 min	11 min	30 min	46 min

Short term goal

Long term goal

Propose EVCS locations

Regional Partner	Proposed EVCS
Albania	23
Bosnia & Herzegovina	22
Kosovo	9
Montenegro	14
North Macedonia	19
Serbia	71
Western Balkans	**158**



133 new EVCS proposed in existing fuel stations, rest areas and parking places.

Only 5 of the proposed EVCS locations are green-field areas.

Average purchase and installation cost

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	Type of charger	Purchase cost (EUR/charger)	Installation cost (EUR/charger)
2025-2039	120 kW (2xCCS)	32,000	7,000
	150 kW (2xCCS)	45,000	9,000
2039-2050+	210 kW (2xCCS)	55,000	12,000
	350 kW (2xCCS)	125,000	15,000

OPEX costs

OPEX Cost element	Cost
Electricity cost (for vehicles charging)	Depends on the price of electricity per RP and is calculated as: $\text{daily electricity demand} * \text{price of electricity}$
Routine maintenance cost	400 EUR/year/charger
Unexpected cost	7% on routine maintenance costs (EUR/year/charger)
Insurance costs	2% of total CAPEX cost (EUR/year)
Advertising cost (at the location of EVCS)	400 (EUR/EVCS/year)
Electricity consumption for the operation of the EVCS	
Electricity consumption 2030 (billboards, standby chargers, etc.)	Consumption: 28 kWh/day/EVCS Cost: Depends on the price of electricity per RP and is calculated as follows:$\text{daily electricity consumption} * \text{price of electricity}$
Electricity consumption 2040 (billboards, standby chargers, etc.)	Consumption: 33 kWh/day/site Cost: Depends on the price of electricity per RP and is calculated as follows:$\text{daily electricity consumption} * \text{price of electricity}$
Electricity consumption 2050 (billboards, standby chargers, etc.)	Consumption: 38 kWh/day/site Cost: Depends on the price of electricity per RP and is calculated as follows:$\text{daily electricity consumption} * \text{price of electricity}$

CAPEX costs

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Regional Partners	Scenario		
	BaU	Do Something	Decarbonisation
	TOTAL CAPEX (2030 + 2040 + 2050)		
Albania	2.472.000	22.439.000	26.140.000
Bosnia and Herzegovina	2.422.000	18.681.000	22.196.000
Kosovo	1.861.000	9.059.000	12.168.000
Montenegro	1.928.000	12.492.000	13.346.000
North Macedonia	2.297.000	17.242.000	20.342.000
Serbia	4.479.000	62.176.000	66.403.000
Western Balkans	15,459,000	142,089,000	160,595,000

Results of calculation of GHG emissions avoided from introduced EVCS

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Saved GHG emissions (in tCO^2e)

Regional Partners	2030		2040		2050	
	Do smth	Decarb	Do smth	Decarb	Do smth	Decarb
Albania	777	972	3,119	7,486	8,010	14,418
Bosnia & Herzegovina	120	150	481	1,154	1,233	2,220
Kosovo	31	39	141	338	408	734
Montenegro	136	170	552	1,324	1,439	2,590
North Macedonia	124	155	518	1,244	1,387	2,497
Serbia	501	627	1,976	4,742	4,983	8,970
Western Balkans	**1,690**	**2,112**	**6,786**	**16,287**	**17,460**	**31,428**

EIA Regulatory Framework
Introduction of EVCS projects

- All the Western Balkan have largely harmonised their EIA legislative framework with EU EIA Directives, including Directives 2011/92/EU and 2014/52/EU.
- EVCs projects (as such) are not listed either in Annex I or Annex II of the national EIA regulations, meaning that those projects are not a subject of an EIA procedure;
- However, the EIA regulations leave the space that any of the infrastructure projects may requires an EIA Screening procedure if planned in environmental sensitive areas (nature-protected areas, vicinity of the cultural heritage, water protection zones, fire risks, flood risk, etc.);
- In case that the installation of a large number of EVCS is planned within the National Plan or Program (e.g. of E-mobility), such a document (Plan/Program) may be subject to a Strategic Environmental Impact Assessment (SEIA), as required by the SEIA Regulations;
- In case that the installation of a large number of EVCS is financed with the support of International Financial Institutions (EU, EBRD, EIB, WB, etc.), it is to be expected that such project could be subject to Environmental Due Diligence (ESDD) according to respective IFIs standards.

Business models

Public contract	The **public authority controls the specification, installation, operation and use of the infrastructure**. It retains most of the project risks from installation through to exploitation (including user-demand risk). The **public authority finances** the capital, operation and maintenance expenditure, and collects and retains revenues from users.
Joint venture	The **public authority and private partner share control of the infrastructure** through a joint venture company they create. The **risks are shared** by the parties according to their stakes in the joint venture. The model is flexible on arrangements for **financing, which might come from one or both parties or from a separate third party**. User revenues are also collected and shared by the parties according to their stakes.
Concession	The **public authority retains some control over the specification, installation, operation and use of the infrastructure**. The **risks associated with installation through to exploitation** (including user-demand risk) are typically transferred to the **private partner**, although risk allocation in the concession contract can be tailored to the specific circumstances. The private partner finances the capital and maintenance expenditure, with or without subsidies, guarantees or other financial support from the public authority. It also collects and retains user revenues, with or without sharing with the public authority.
Availability-based contract	The **public authority retains some control over the infrastructure**, as in the concession model. **Risks associated with installation through to exploitation** are mainly transferred to the **private partner**, with the notable **exception of user-demand risk**. The **private partner finances the expenditure**, with or without financial support from the public authority, and **is paid by the public authority over the duration of the contract only if the infrastructure is continually available for its intended use**.
Licence	The **private partner controls the infrastructure and retains most of the project risks from installation through to exploitation**. It **finances the capital and maintenance expenditure, and collects and retains user revenues**. A licence might include conditions and limitations regarding the private partner's actions, but typically **allows more freedom than other partnering models** (stating what the private partner may, rather than must, do).

Regional Participants – state of play

- **Albania**

There is no specific contractual model that is being used for the deployment of EVCSs, since there is no explicit legislation dealing with EC charging infrastructure.

- **Bosnia and Herzegovina**

There is no specific contractual model that is being used for the deployment of EVCSs, since there is no explicit legislation dealing with EC charging infrastructure.

- **Kosovo**

There is no primary or secondary national legislation that deals specifically with building publicly accessible recharging infrastructure for EV in Kosovo.

- **Montenegro**

No specific model is used for the public EVCSs

- **North Macedonia**

No specific model is used for the public EVCSs

- **Serbia**

Traditional Public Procurement is used as a contractual model for the deployment of EVCS

Proposed business models for EVCS

Regional Partner	Public contract	Joint venture	Concession	Availability-based contract	Licence
Albania			**√√**	√	√
Bosnia & Herzegovina	**√√**		√		√
Kosovo			**√√**	√	√
Montenegro	**√√**				√
North Macedonia			**√√**	√	√
Serbia	**√√**		√	√	√

Key challenges

- The coordinated development of the EVCS network in all RPs
- Transposition of Directive 2014/94/EU (now AFIR)
- The funding of the EVCS development
- The selection of the most appropriate business model
- The improvement of the electricity grid and the transposition of the Directive 2019/944/EU common rules for the internal market for electricity

Roadmap to deploy EVCS network

Proposed actions	2023	2024	2025	2026
Establishment of a “Coordination Committee for the EVCS development in WB6”				
The coordinated transposition of the EU Directive 2014/94/EU on the deployment of alternative fuels infrastructure in the legal systems of the RPs				
Setting of common approach to the selection of e-charging technology (specifications, other)				
Identification of “horizontal” (for all RPs) external funding possibilities				
Coordination of the implementation by all RPs of Phase 1 (of EVCS development)				
Coordination of the preparation of the RPs for the implementation of Phase 2 (of EVCS development)				
The selection of e-charging technology (i.e., the minimum common specifications for the EVCS to be developed in all RPs);				

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