Charging technologies for heavy-duty electric vehicles

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fast and smart charging solutions for full size urban heavy duty applications

- Develop **innovative** heavy-duty and medium-duty **vehicle solutions**
- **Interoperable charging infrastructure** concepts
- Enhancing performances, comfort and safety while reducing the TCO and contributing to a competitive and sustainable mobility

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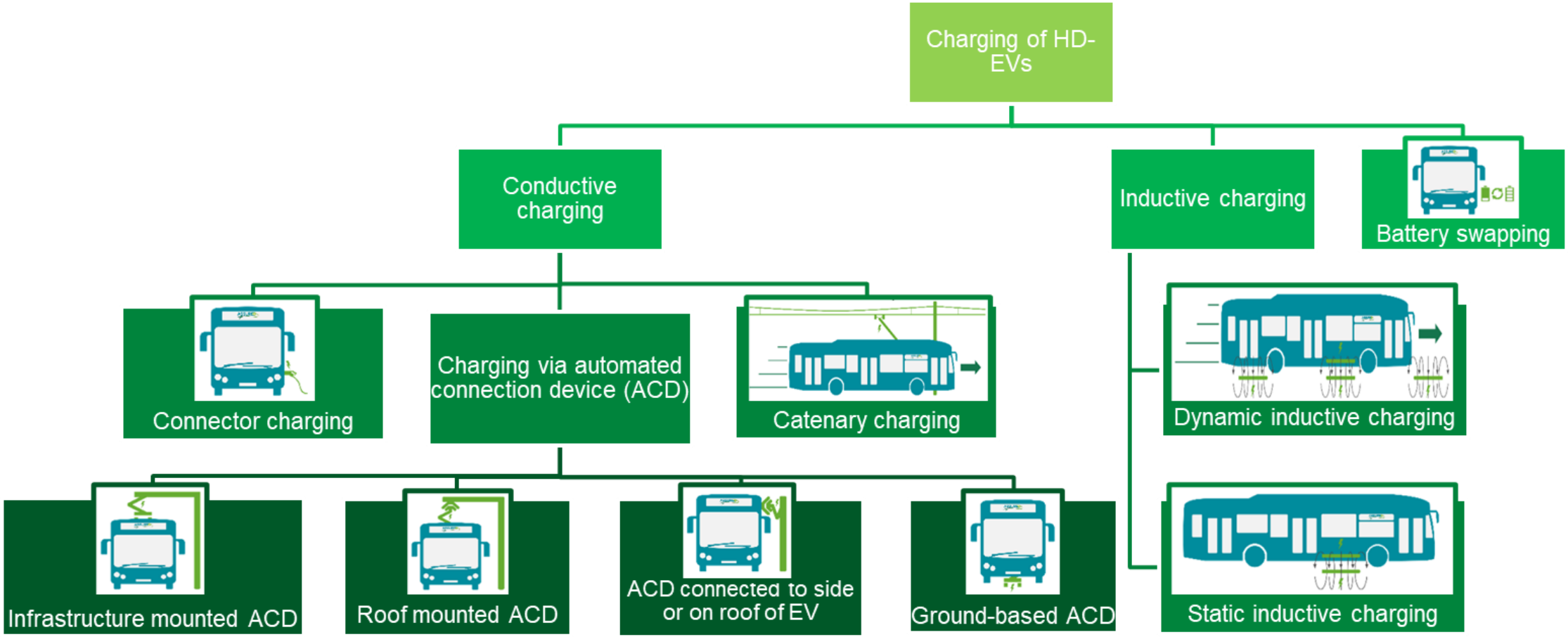
Period: October 2017 - March 2022 (4.5 years)

Project total cost: EUR 23,648,132.51/ **EU contribution:** EUR 18,657,433.06

Partners: 39 partners from 12 countries representing industry, research centres and local governments

Overview of charging technologies for HD-EVs



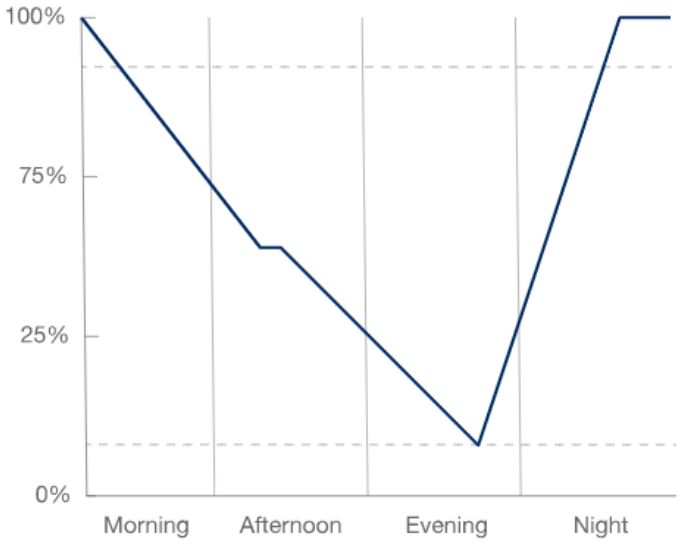
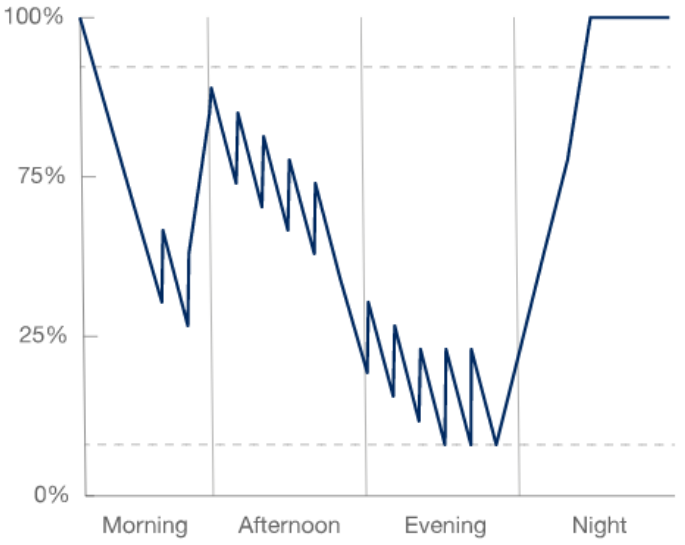
Charging technologies (real examples)

Next-gen of (very) high power charging

- Fixed catenary - flash charging
- Static or dynamic inductive & conductive power transfer
- High power cable: GB/T and HPCVC

Near-future standards	
DC fast charge	
ChaoJi	HPCVC
	
1500V x 600A 900 kW China, Japan	1500V x 2000A 3.000 kW N-America, Europe
Will replace CHAdeMO & GB/T Available 2020/2021 Higher power very important for Trucks/Buses	Proposal **Charin**, supported by many OEM's. Higher power very important for Trucks/Buses

Charging strategies

Strategy	Depot Overnight only	Opportunity Overnight and mid-day recharging
Charger type	Depot: 30 up to 150 kW (for buses with high range)	Depot: 30-50 kW
		Opportunity: 150/300/450/600 kW (e.g. at end-stop or terminal)
Charging technology	Mostly plug-in	Mostly pantograph
		Plug-in (less common)
		Induction (less common)
Load profile (illustrative)		
Typical range	100-250 km/day	200-500 km/day
Cost drivers	1 Higher battery cost 2 Lower charging infrastructure cost, unless an expensive depot charger of 100+ kW is required to fully recharge during night (instead of cheaper 30-50 kW)	1 Lower battery cost 2 Higher charging infrastructure cost 3 Slightly higher maintenance cost

McKinsey&Company | **Source:** Energy Insights

Thank you!

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