



CERV 2018: Resonant Wireless Power – Standards and Interoperability

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The Future is Ubiquitous Wireless Charging

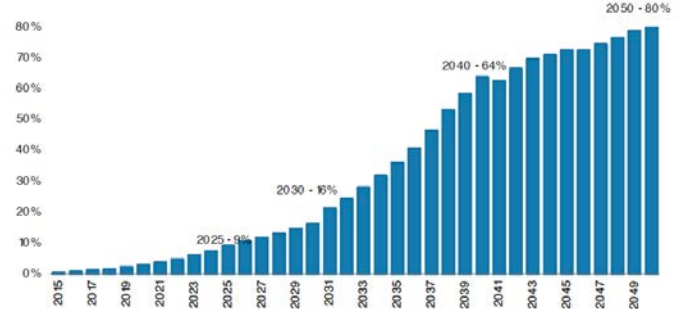
WIRELESS CHARGING FOR ELECTRIC VEHICLES

A better user experience through wireless charging is essential for consumer EV adoption.



Global BEV Sales Impact

BEVs reach 80% of global car sales by 2050



Morgan Stanley Research, On The Charge, August 2007



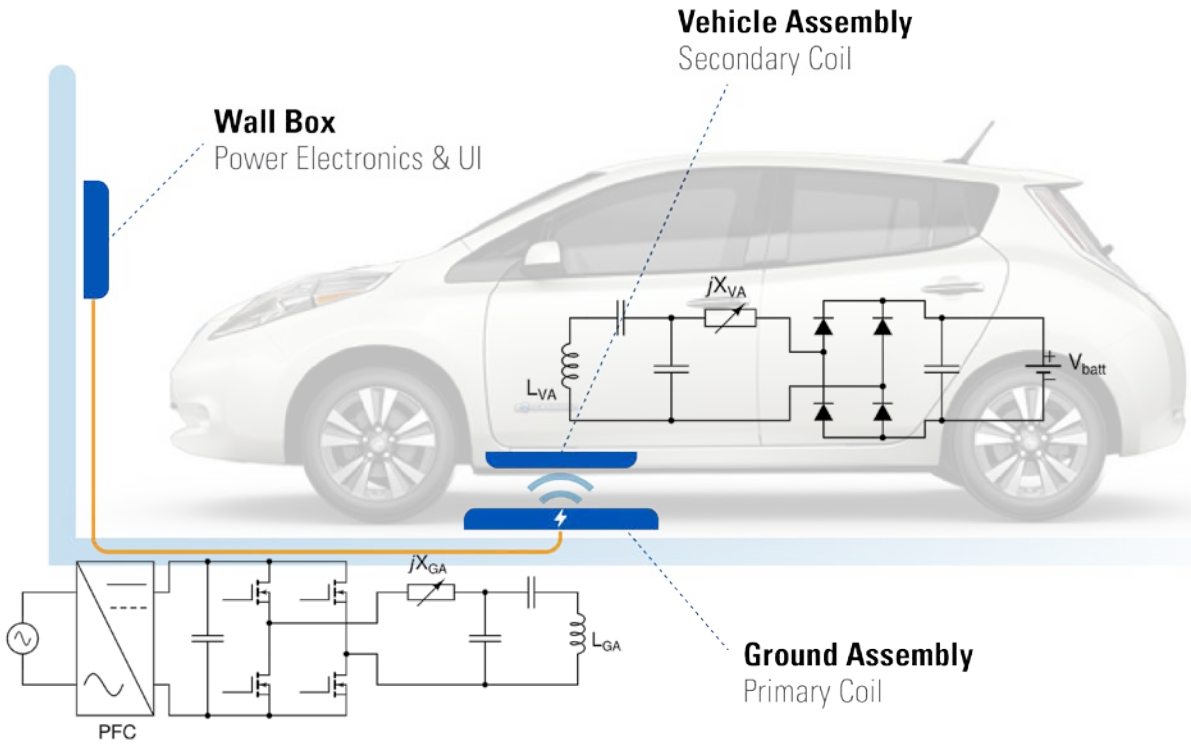
Adoption Through Standards and Interoperability

Need for Standards and Interoperability:

- Initial deployments most likely for at-home or at-work charging
- Public infrastructure deployments to follow
 - Shift in mentality to “charge anywhere” (power snacking)
- Establishes a platform for autonomous vehicles
- Wireless power “on-the-go” through in-motion charging infrastructure after years of experience with stationary infrastructure and interoperability

Global Standards Include: SAE J2954, IEC 61980, ISO 19363, etc.

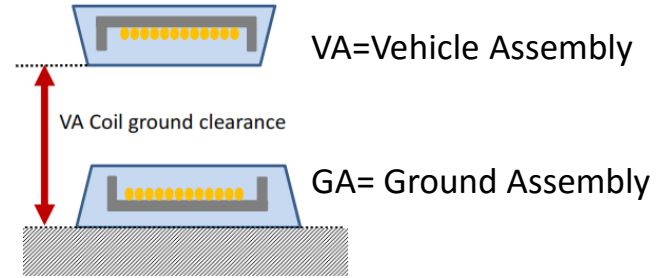
Light Duty WPT System





Light Duty Status of Standards

	L.D. WPT Power Classes*			
	WPT1	WPT2	WPT3	WPT4
Maximum Input Power	3.7 kW	7.7kW	11kW	22 kW ¹
Minimum target efficiency	>85% [In practice 90% + is typical]			



Specification of the Z-classes for Above Ground Mounting

Z-Class	Vehicle Assembly (VA) Coil ground clearance range (mm)
Z1	100 – 150
Z2	140 – 210
Z3	170– 250

Light Duty Vehicles

Start of Band (kHz) End of Band (kHz)



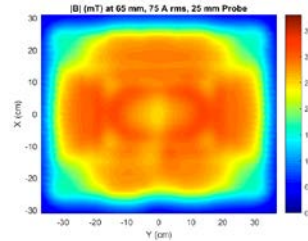


Adoption Through Standards and Interoperability

System Aspects to Consider for Interoperability and Safety:

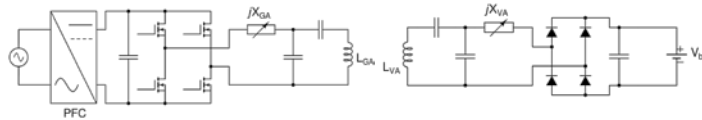
- **Magnetic Interoperability**

- Distance
- Power Level
- Coupling / Field Shape



- **Power Electronic Interoperability**

- Impedance Range



- **Magnetic Alignment and Pairing**

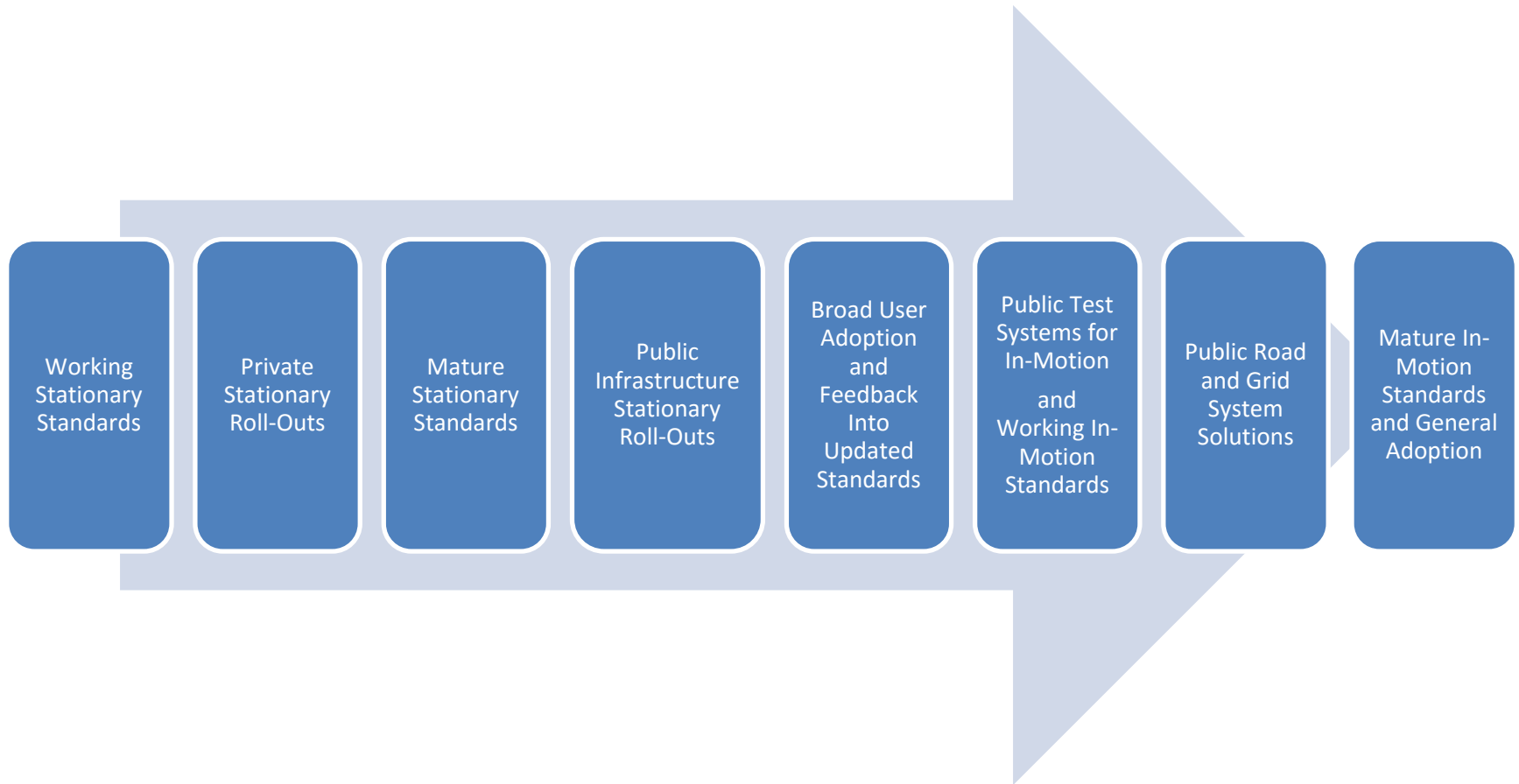
- **Foreign Object Detection (to prevent over-heating)**

- **Living Object Detection (to prevent human exposure)**

Additional complexities when considering in-motion...



Summary of Milestones for WPT Ubiquitous Adoption





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