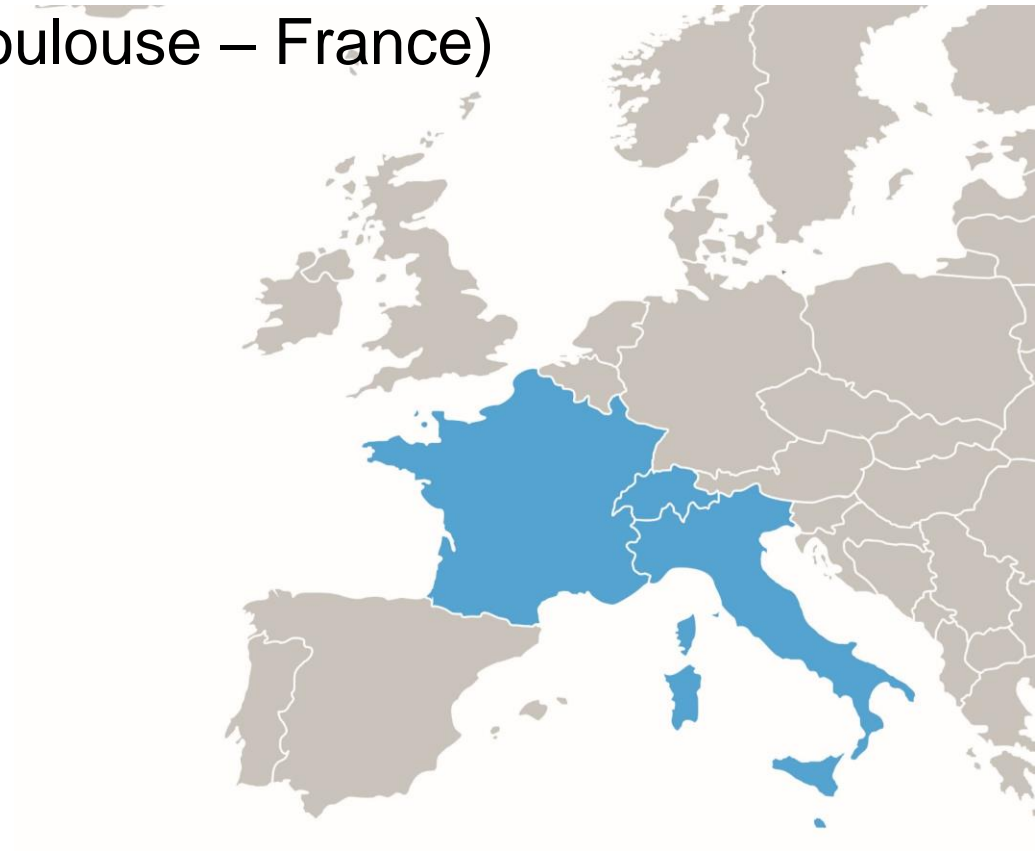


Project coordinator: LAPLACE (Univ. Toulouse – France)

4 partners from 3 countries:
Switzerland, Italy, France



POLITECNICO
MILANO 1863

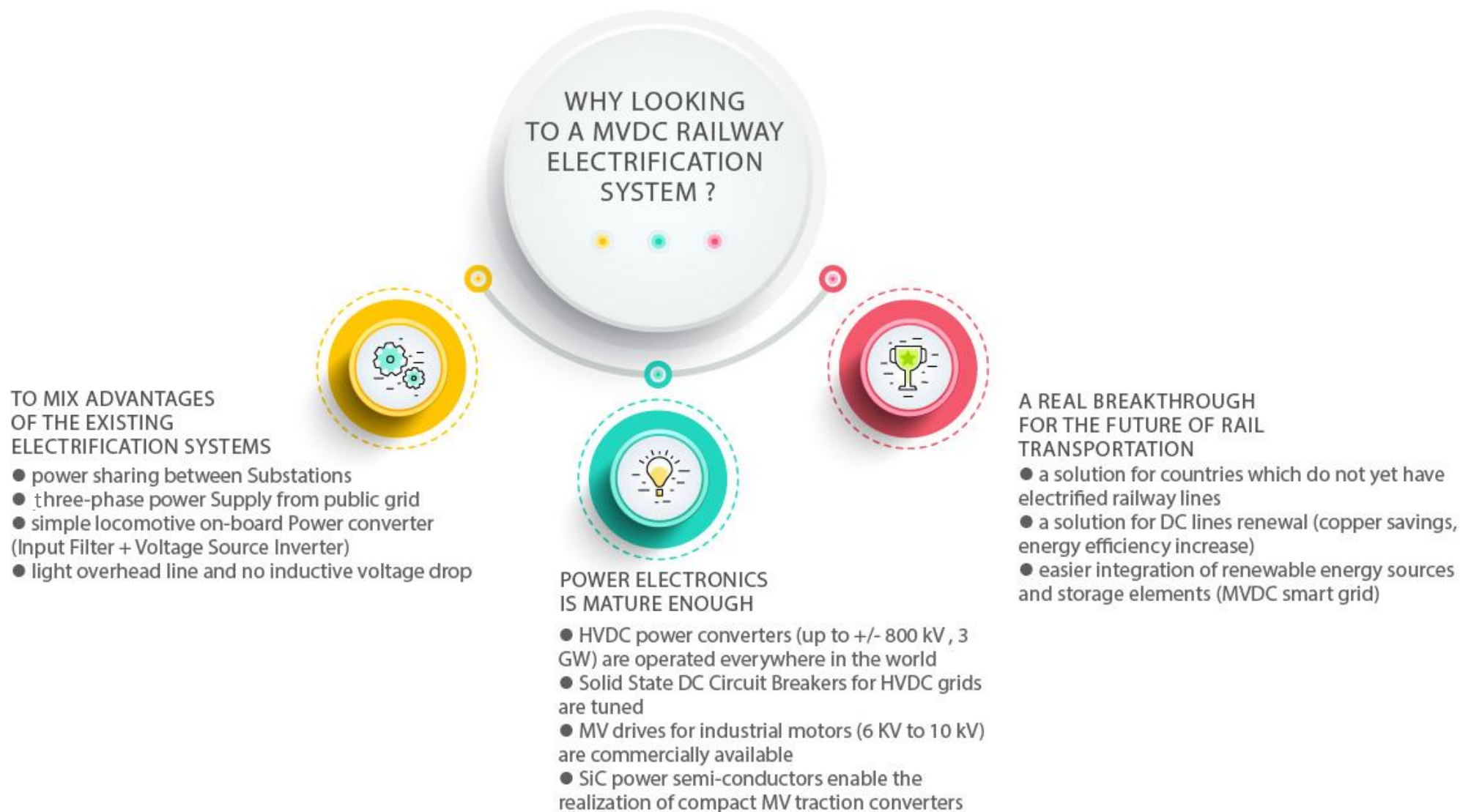


MVAC electrification systems:

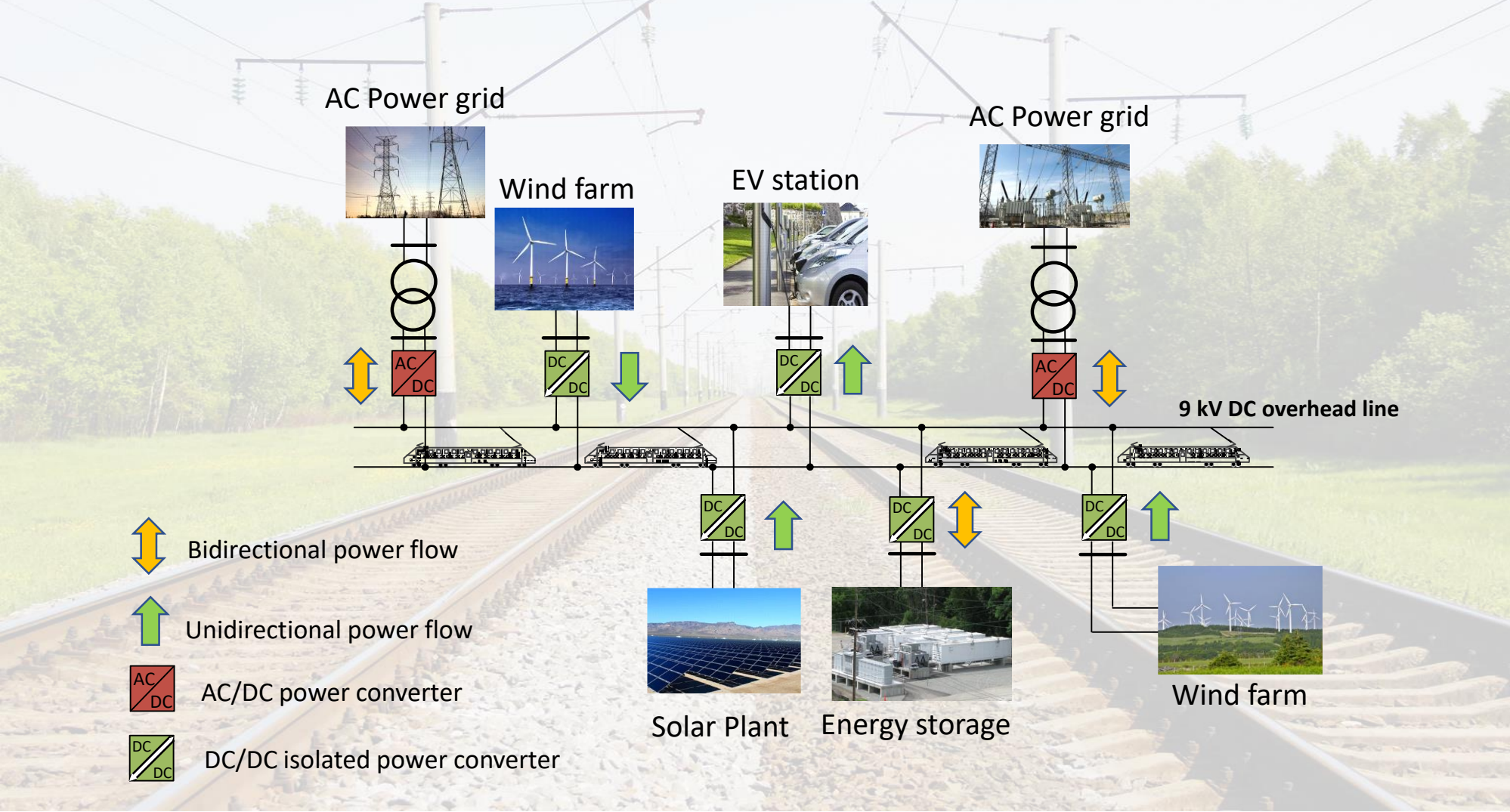
	☹	☺	Lines in EU
15 kV 16,7 Hz <i>(1905 ->)</i>	<ul style="list-style-type: none"> - Specific generation and distribution grid - Bulky substation transformers - Locomotive on-board AC/DC conversion and 2.f filters 	<ul style="list-style-type: none"> - No phase break - AC circuit breakers 	33 000 km
25 kV 50 Hz <i>(1950 ->)</i>	<ul style="list-style-type: none"> - Single Phase Substations - Neutral Sections - Locomotive on-board AC/DC conversion and 2.f filters 	<ul style="list-style-type: none"> - Supply from public grid - Overhead line cross-section - AC circuit breakers 	28 000 km

DC electrification systems

	☹	☺	Lines in EU
1.5 kV or 3 kV <i>(1915 ->)</i>	<ul style="list-style-type: none"> - AC/DC conversion in substation - Overhead line cross-section - DC circuit breakers 	<ul style="list-style-type: none"> - Substations in parallel - Three-phase power Supply from public grid - Simple locomotive on-board Power converter (<i>Input Filter + Voltage Source Inverter</i>). 	1.5 kV : 9200 km 3 kV : 38 000 km



A new power supply scenario including renewable energy sources



Regarding the energy challenge for the railway sector, the project FUNDRES presents a deep forward thinking scenario and proposes related work to define the future of railway.

FUNDRES focuses on a Medium Voltage DC electrification system that can serve as energy hub for renewable sources in order to:

Significant cost savings for contact-line renewal (several millions euros per 100 km)



increase the capacity while improving the energy consumption and limiting the environmental impacts

Energy Efficiency increase from 90% to 95%



decrease the investment and exploitation costs, while maintaining safety and service quality

