The railways experience for Electric Road System

Patrick DUPRAT

Why the railways experience is interesting

- Thanks to the electrification, Railways is the transport mode having the lowest level of CO2 emissions

Source: EEA, 2017

- In Railways we have:
  - a long experience in Power Transfer Solutions
  - high power transfer solutions (more than the road need)
  - efficient solutions (performance, safety, reliability, availability, …)

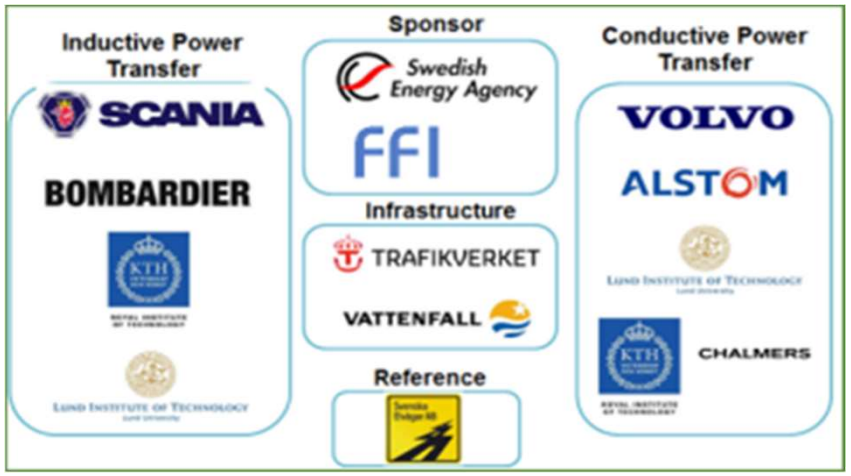
The APS solution is our ERS reference

- Segmented ground feeding system
- APS in operation since 2003 in Bordeaux and now in 6 others cities
  - 4 other cities under construction
  - More than 40 000 000km run in APS
  - Total: 334 tramways and 141km
- APS provides same performances than OCS
  - Same: acceleration, max. speed, slopes, no aux. limitation, availability
  - Complete intrinsic safety (Safety Case confirmed by 6 ISA)
  - Fully Compatible with mixed traffic (pedestrians or crossroads)

Solution to decarbonize the road freight transport

- Strategic Vehicle Research and Innovation program launched by the Swedish Energy Agency (SEA) in 2011
  - Comparison of 2 ground feeding solution for trucks:

- Criteria requested by the SEA:
  - Power loss data
  - Economical data
  - Maintenance related data
  - Vehicle power requirement data



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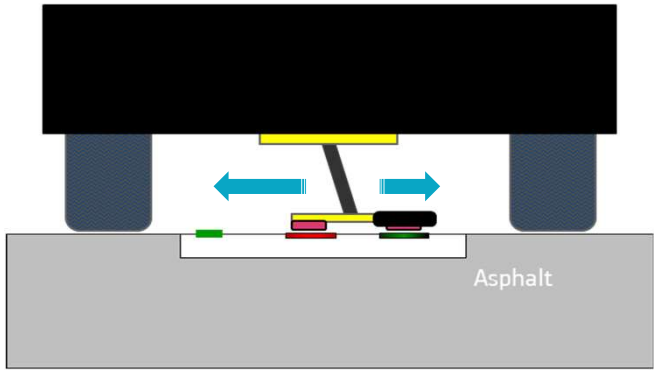
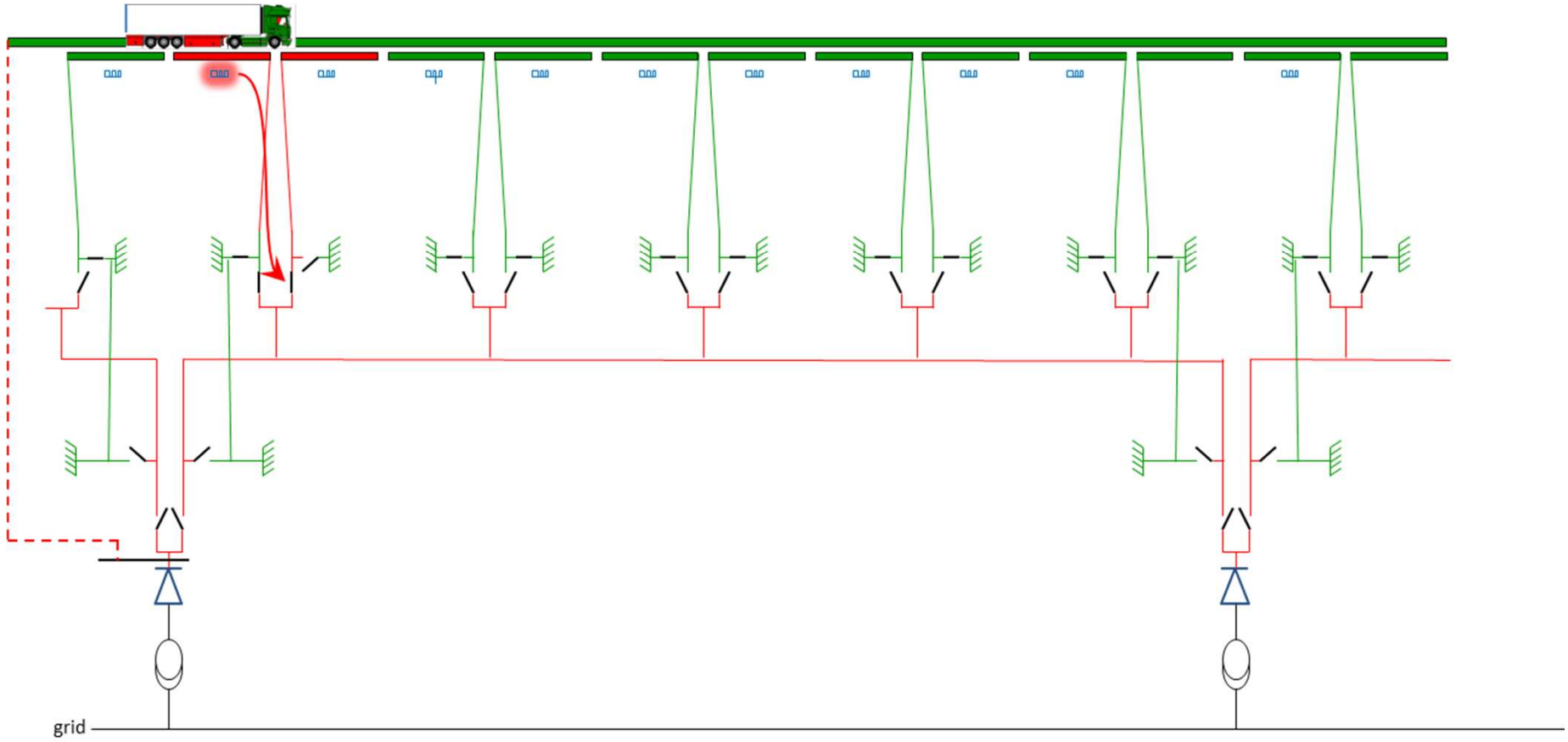
Solution to decarbonize the road freight transport

Adaptation for road application



Solution to decarbonize the road freight transport

First demonstrator in Swdeden



Solution to decarbonize the road freight transport

First ERS demonstrator in Swdeden

Solution to decarbonize the road freight transport

First tests done in 2012/ 2013

- Test results => concept validated

Current collection test	Result
126kWatts 180Amps 690VDC transfer	✓
Truck speed more than 80km/h	✓
20km of continuous power transfer	✓
Rainy conditions	✓
Short circuits tests	✓
Track adherence tests	✓

- Intermediate Reports
  - Slide In ERS Conductive Report (Volvo + Alstom):
    https://www.viktoria.se/publications/Slide-in-ERS-Conductive-project-report
  - Slide In ERS Inductive Report (Scania + Bombardier):
    https://www.viktoria.se/publications/Slide-in-ERS-Inductive-project-report

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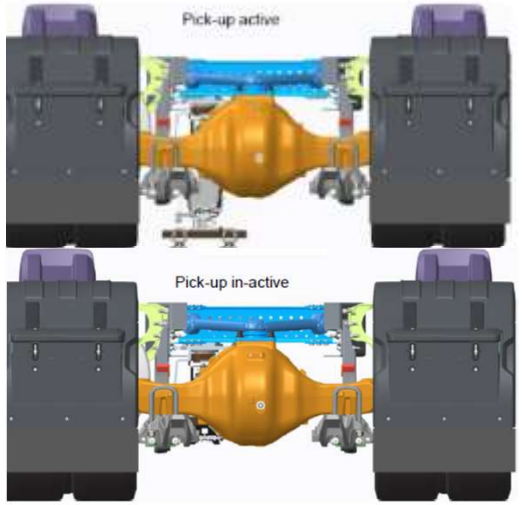
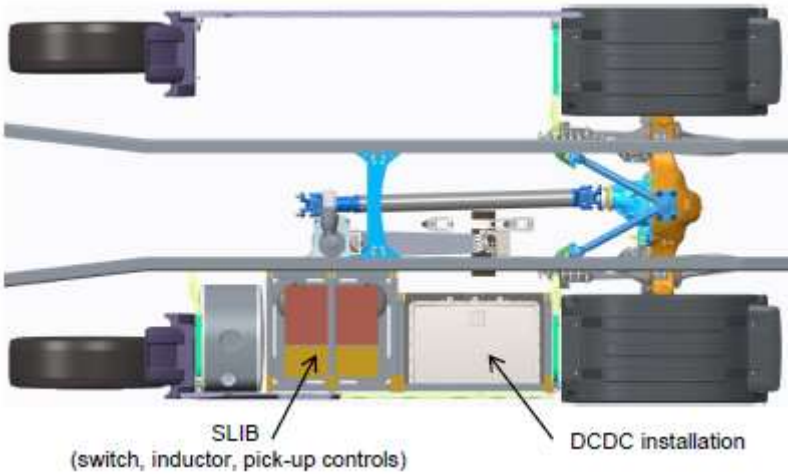
Solution to decarbonize the road freight transport

Integration on the hybrid truck developed by Volvo





Alstom solution to decarbonize the road freight transport

- **Strengths of this ERS solution:**
  - Experience from tramway application
  - Safety
  - High power transfer
  - High efficiency (97% for the power transfer)
  - Compatible with all type of vehicles (from HDV to cars)
  - Aesthetic
  - No gauge limitation
  - Easy integration in the road and in the vehicles
  - Very low maintenance needs
  - Standardization in progress

Thank you very much for your attention

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