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The Future of European Diesel Traction

Fleet scenarios, emission reduction & energy efficiency potentials

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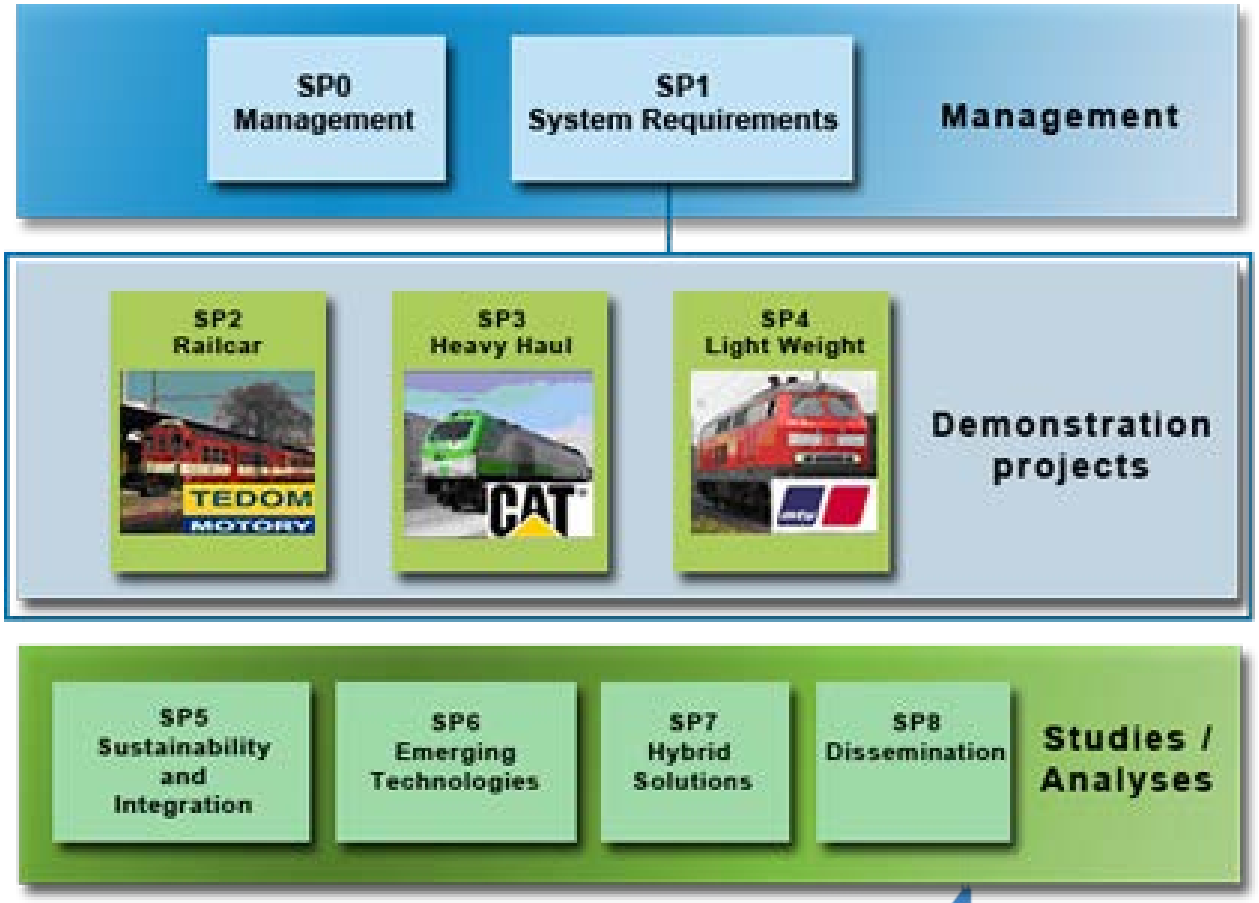
Presentation Outline

- Introduction
- Sustainability Study
- Sustainability Impact Assessment & EE
- Conclusions

The CleanERD Project

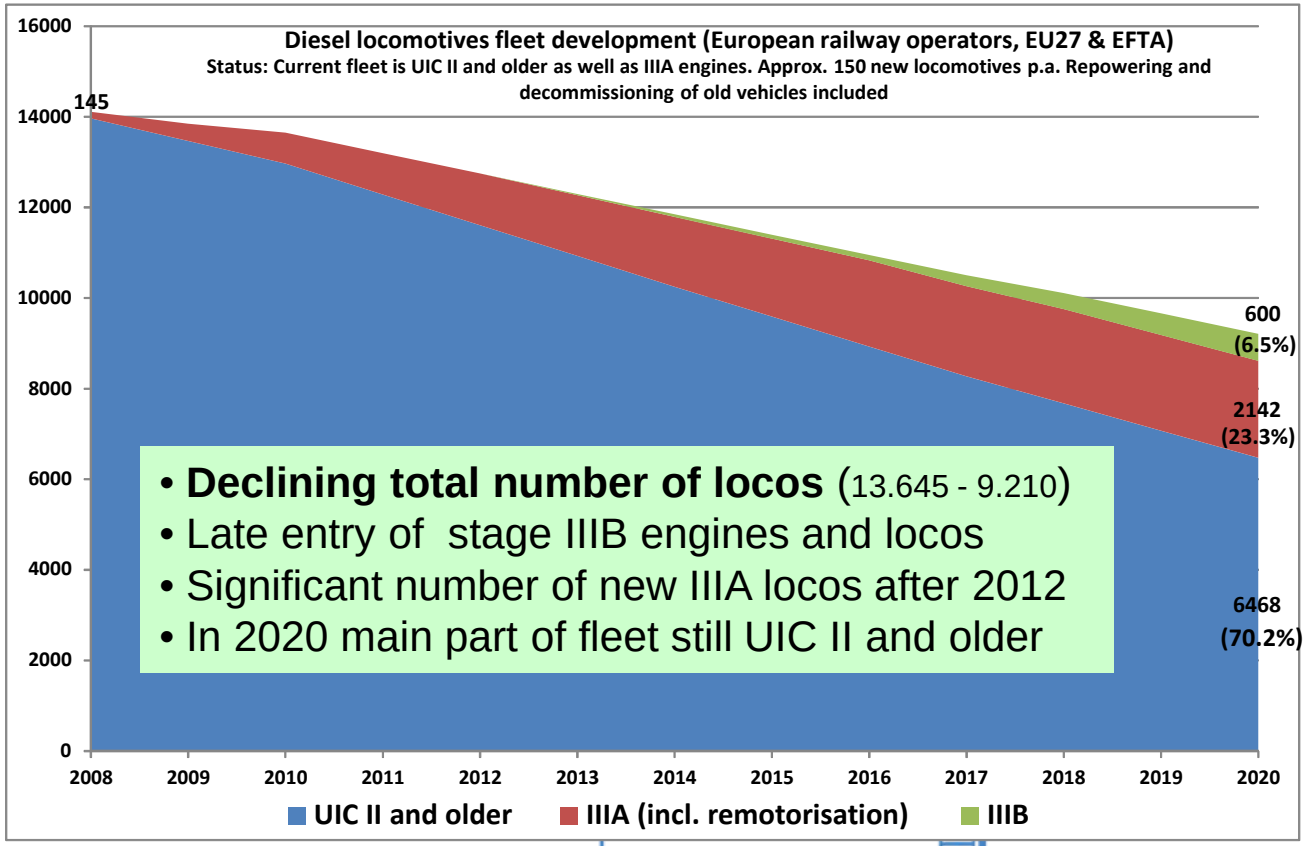
- Demonstrate feasibility & reliability of railway rolling stock powered with stage IIIB diesel engines
- Elaborate reliable rail diesel **fleet & emissions scenarios**
- Develop scenarios beyond stage IIIB
- Cost/ Benefit Analysis and **Sustainability Impact Assessment**
- **Recommendations** on future emission reduction approaches

Project Overview



Future of European Rail Diesel

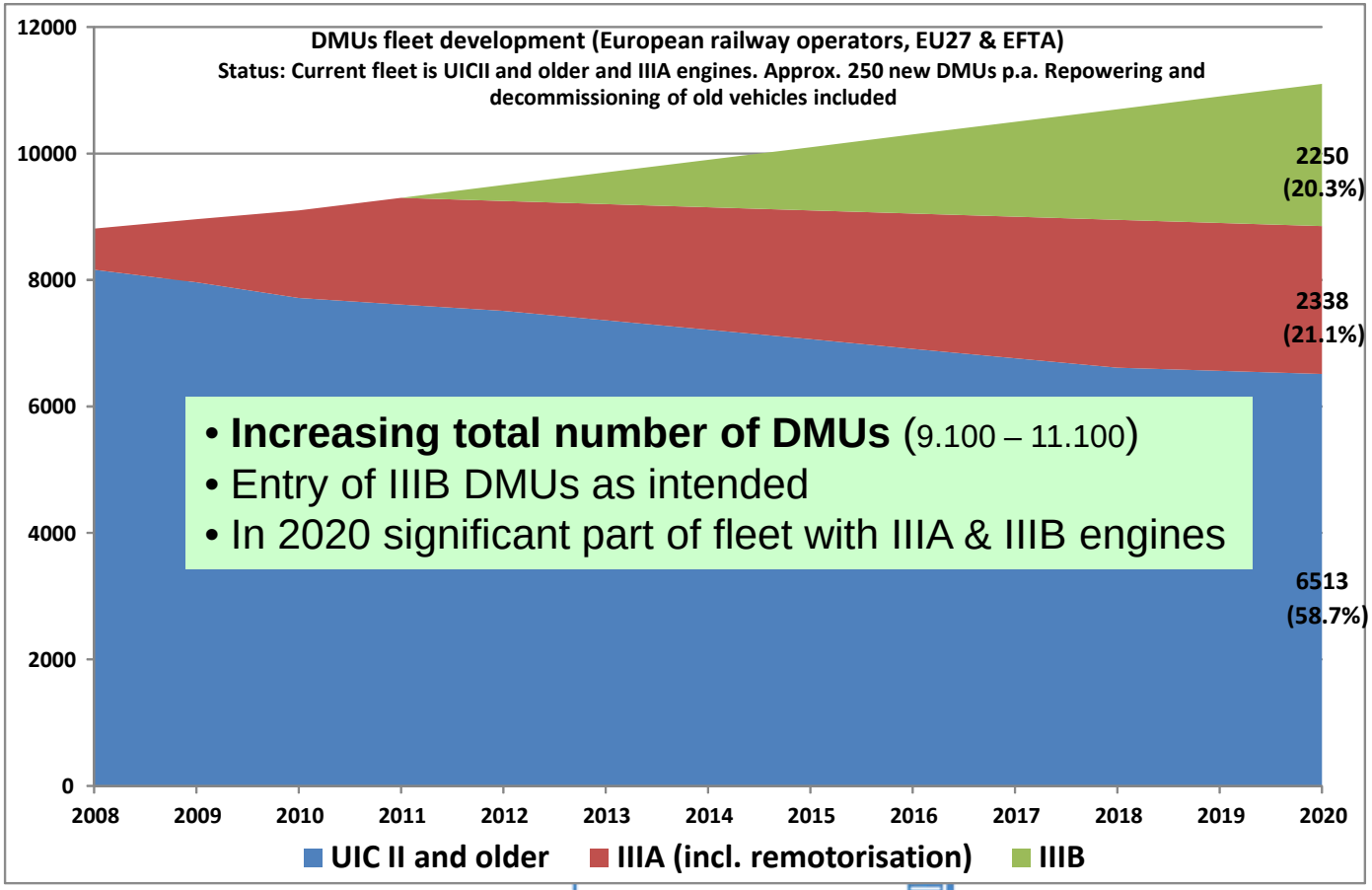
Locomotives , 2008-2020



- **Declining total number of locos** (13.645 - 9.210)
- Late entry of stage IIIB engines and locos
- Significant number of new IIIA locos after 2012
- In 2020 main part of fleet still UIC II and older

Future of European Rail Diesel

DMUs , 2008-2020



- **Increasing total number of DMUs** (9.100 – 11.100)
- Entry of IIIB DMUs as intended
- In 2020 significant part of fleet with IIIA & IIIB engines

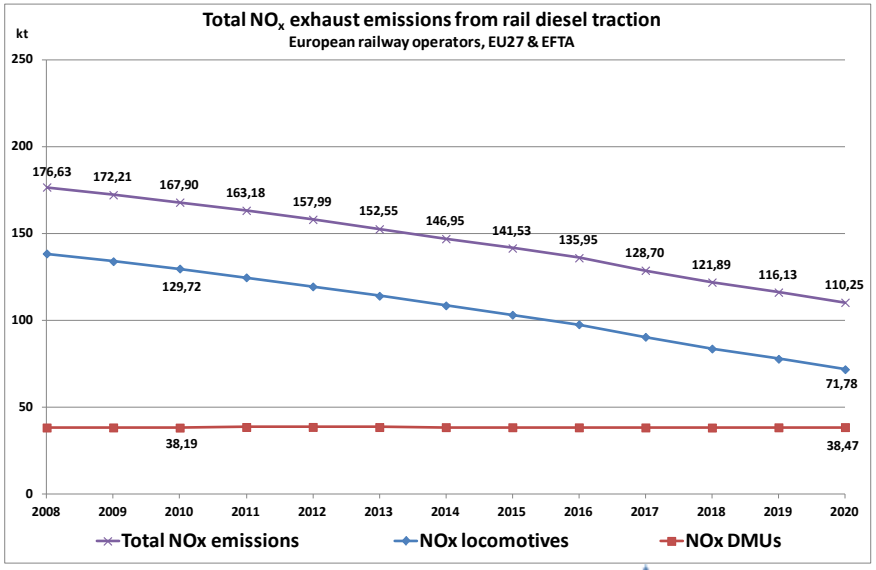
Rail Diesel Emissions 2020

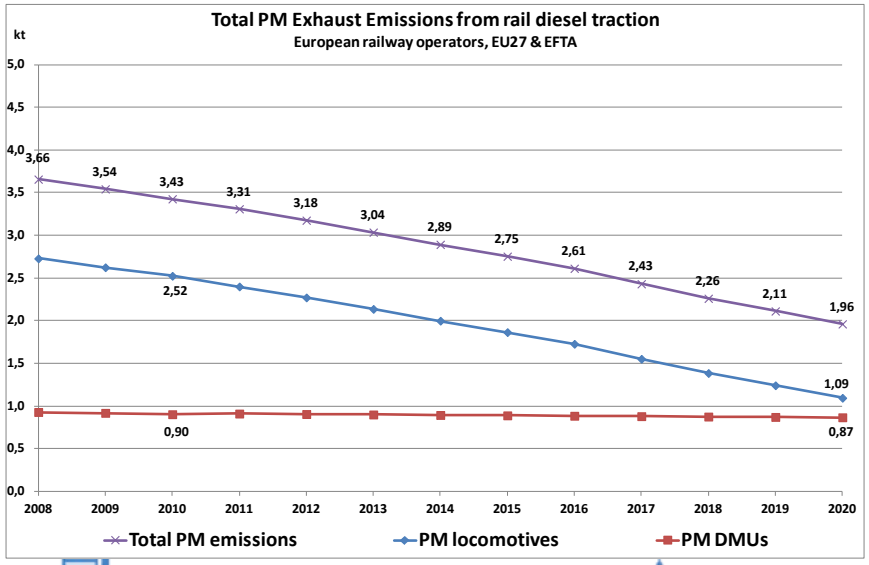
Total NO_x reduction > 35% until 2020

- Decreasing loco numbers
- Introduction of IIIA & IIIB
- Stable NO_x emissions from DMUs despite growing fleet and mileage

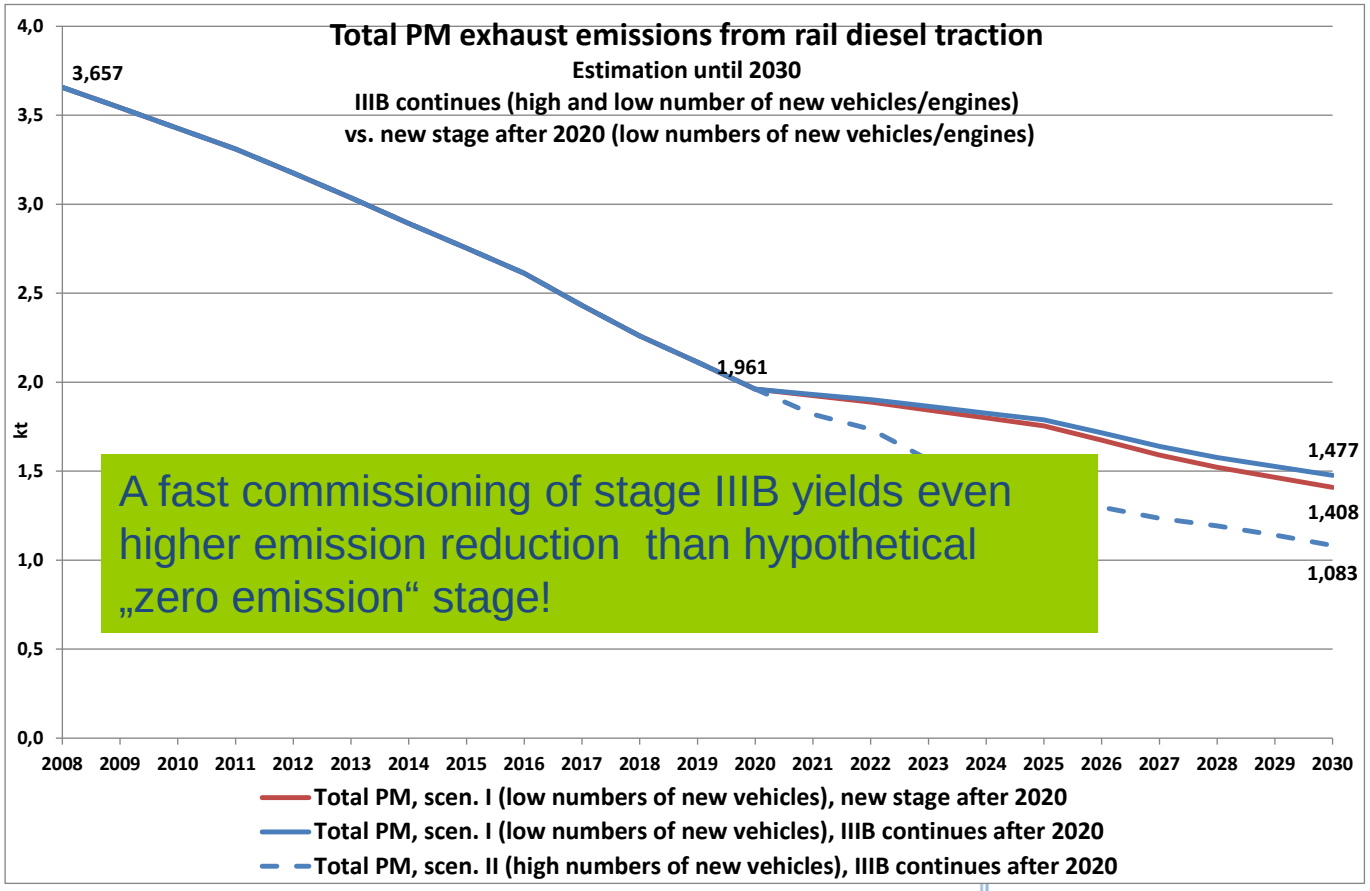
Total PM reduction > 45% until 2020

- Decreasing loco numbers
- Introduction of IIIA & IIIB
- Stable PM emissions from DMUs despite growing fleet and mileage





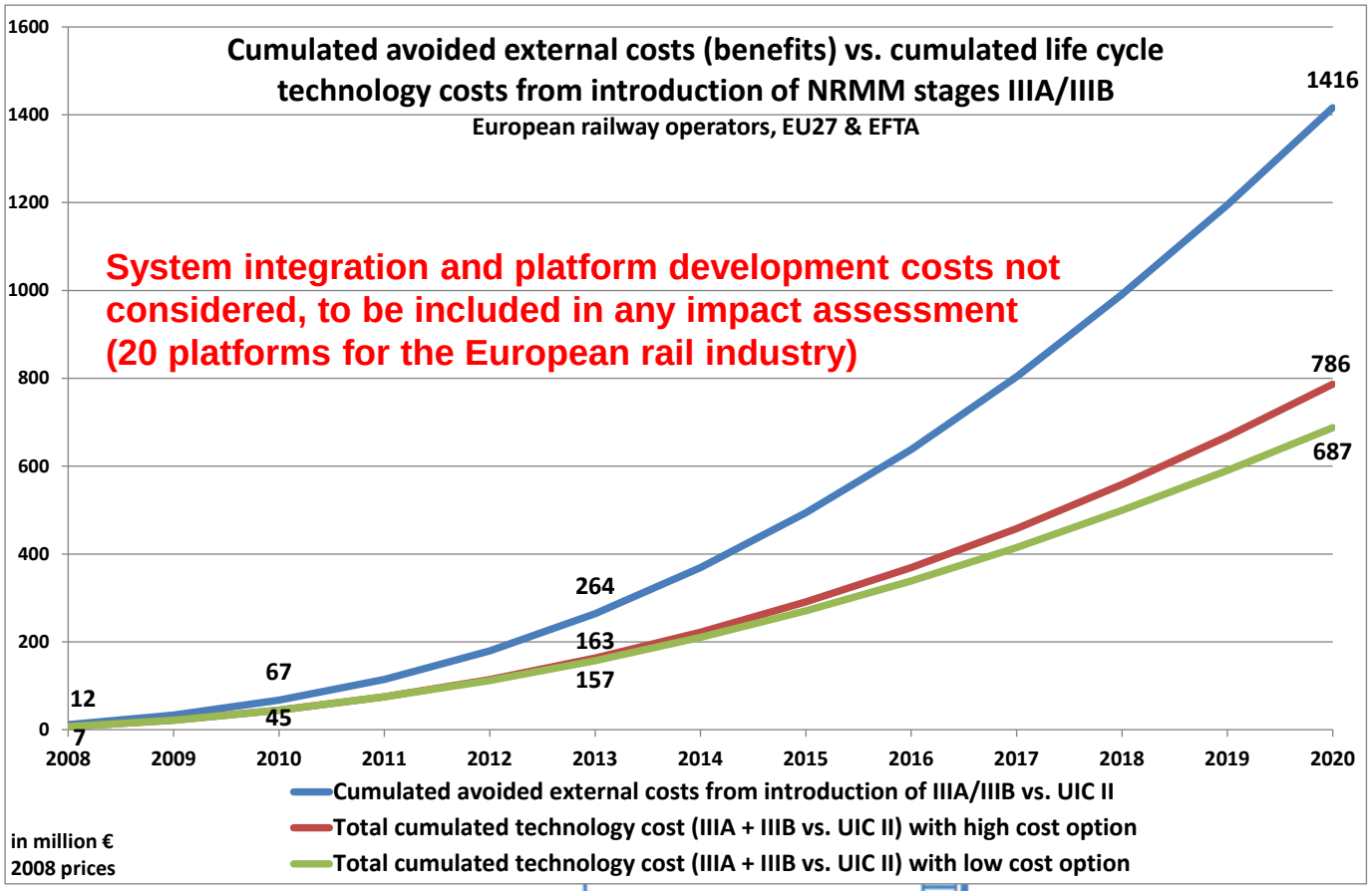
Rail Diesel Emissions 2030



A fast commissioning of stage IIIB yields even higher emission reduction than hypothetical „zero emission“ stage!

Sustainability Impact Assessment

Cost/Benefit of IIIA/IIIB



EE Potential of Rail Diesel

- Ecodriving & DAS
  - Saving Potentials 5 - 20 %, Traffic flow management
- Parked Train Management
  - From low tech to system solutions, 3-10% energy savings
- Reuse of Braking Energy
  - Different Storage Options, 3-10% energy savings
- Smart Energy Management
  - Software changes to systemic approaches, up to 10% savings

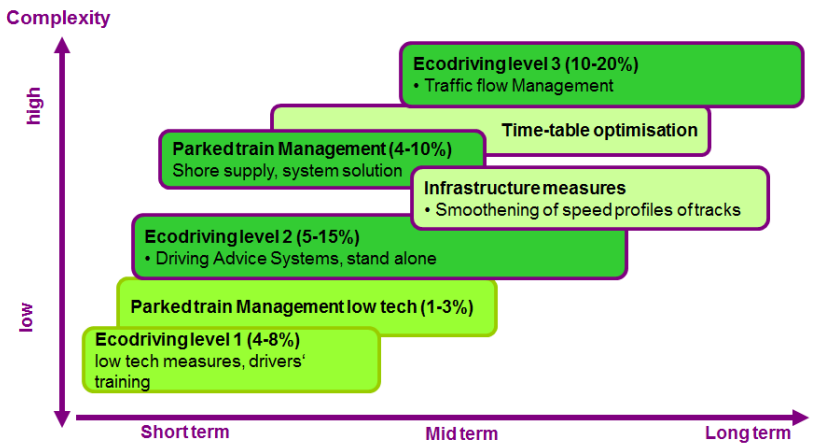
EE Potentials of Hybrids

- High Energy Efficiency Potentials of Hybridization
  - Reduction of fuel consumption & CO_2 up to 20 %
  - Best for Regional Services & Shunters
  - Reduction of NOx and PM but: needs good management strategies
- Energy management strategies can improve the benefits
  - Electrification of auxiliaries is necessary
  - Downsizing and replacement is possible
  - Example Shunter: 1.000 kW-560 kW; PM –73%, NOx –57%, Energy –34%

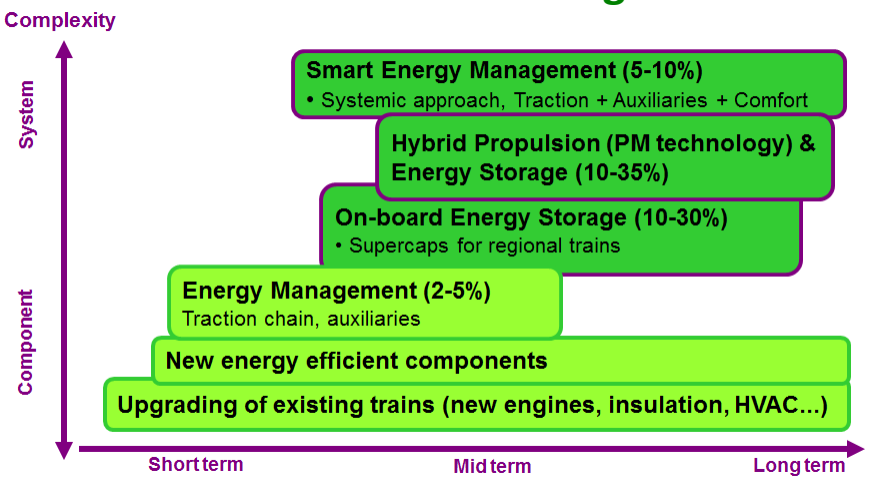
Conclusions

- Significant Reduction Emissions & Energy til 2020
- Additional Reduction: Accelerated migration of technologies into fleet + innovation
- Promising Energy Efficiency Potentials for Diesel Traction

Smart Operation



Innovative Rolling Stock



Contact

Thank you very much for your attention!

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