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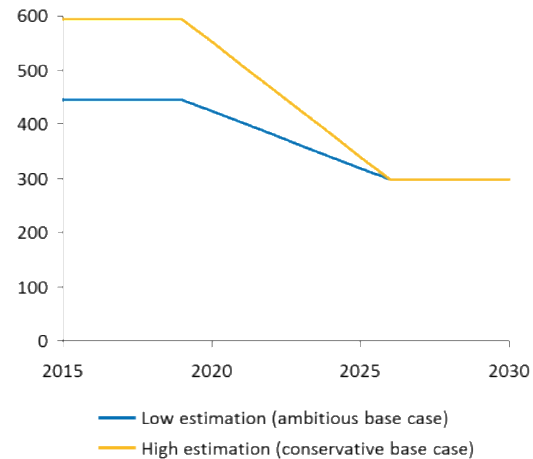


# ERTMS

## RUs associated costs

Valenciennes, October 16th 2019

On-board deployment cost (k€)



# International freight locomotives to be upgraded

Siemens  
BR189/F4



Bombardier  
TRAXX MS/DE



EMD Class 66



Alstom Br203



Vossloh G1206

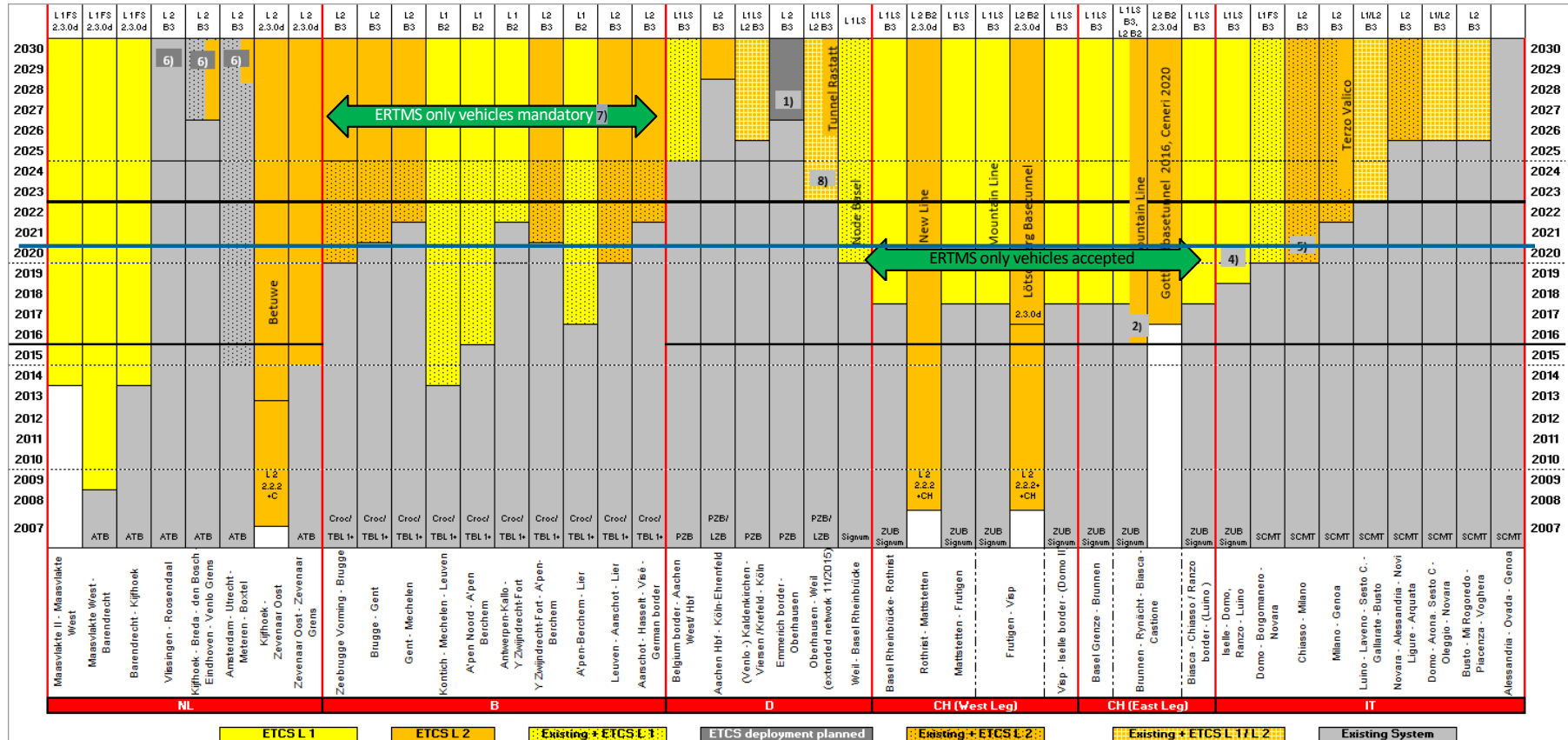


MAK 6400



- **355 international locomotives**
  - 239 MS locomotives, 116 diesels
- Configurations from DNL, DACHINL to DABNLCZSKH
- Fleet size owner between 1 and 67
- First retrofit in 2008
- First upgrade in 2012
- Average age 15 years
- Owners are small, medium and large RU's, leasing companies and track maintenance companies

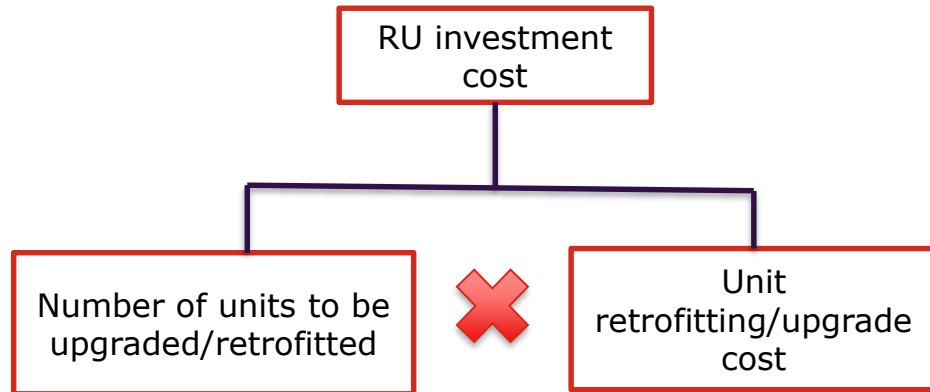
# International context on the TEN-T corridors



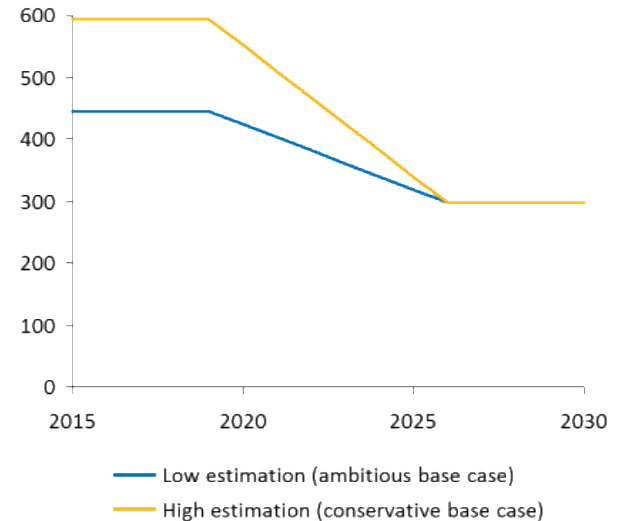
# ERTMS business case on the 9 core network corridors

Key figures used are:

- Average value for retrofits is €450k /vehicle
- BL3 Upgrades are between €350k and €200k/ vehicle
- "Regular" upgrades €50k / vehicle



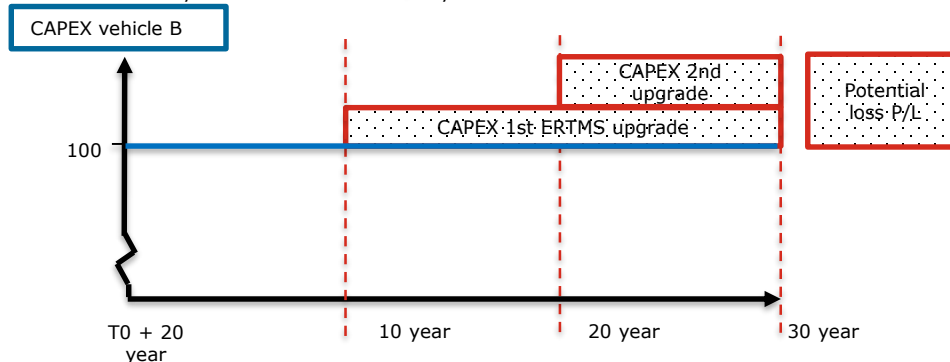
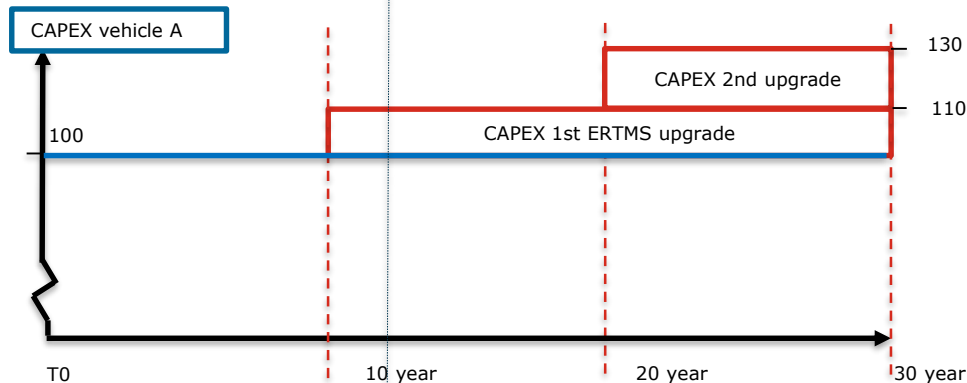
On-board deployment cost (k€)



# Impact retrofit and upgrade on CAPEX

CAPEX: capital expenditures

- CAPEX vehicle A
- 4 mio
- 30 years
- ERTMS 350k€



In year T0+20, vehicle A with APEX = 130 has to compete with vehicle B with APEX = 100

# Comments to the calculation structure in EU business case

- **Retrofitting or upgrading affects competitiveness of middle aged vehicles** compared to new builds. Risk of impairment due to limitation of utilisation (less network access). Impairment risk shall be part of the calculation structure

Example: locomotive (15 yr. old) with configuration ERTMS B2 DACHINL will lose Italy (I) due to lack of B3 radio infill option. Impairment (immediate impact P/L) €500k and need for additional locomotive

- **Write-off obsolete hardware**, e.g. DMI, modem, class B, due to ERTMS retrofit or baseline upgrade shall be included in the calculation structure

Example: replacement DMI, modems, PCB's in EVC causes a immediate P/L loss of 50 k€ per unit on top of investment

## Key question: why RU's/owners do not invest in retrofit/upgrade?

- **Investment in ERTMS OBU (retrofit or upgrade) is an investment in a vehicle** between 10 and 20 years old. Investment has a negative NPV or the risk of impairment of the vehicle itself
- **Long term (> 5 yr.) and moving planning infra** for necessity to have ERTMS or next baseline allows RU's to "gamble" not to invest
- **Continuous evolution of TSI's and NTR's** triggers the question: when will I have have the most future proof and mature version? When will the industry, both ETCS suppliers and vehicle manufacturers, have an industrial fit for purpose product? What in case of vendor lock in?
- **Cannot invest** because no supplier is offering due to e.g. small fleet size, unique vehicle type, lack of technical staff at RU/owner, exceptional offers ...

>>>>>> **Freeze in decision making**

# Recommendations

- **New build locomotives:** prevent future baseline upgrades from having an impact on risk of impairment. Concrete: make planned baseline upgrades accessible for all owners of these vehicles
- **Retrofit/upgrade:** develop financial instruments keeping the net-effect of the investment neutral or compensate the decrease of configuration in case of unavoidable impairment of the vehicle
- **Develop public budgets and financial instruments to** retrofit/upgrade or phase out, these shall become part of the national deployment plans supported with EU funding



>>>>>> **Unfreeze (not force!) decision making**



Thank you!

ERTMS\_ \_ \_

