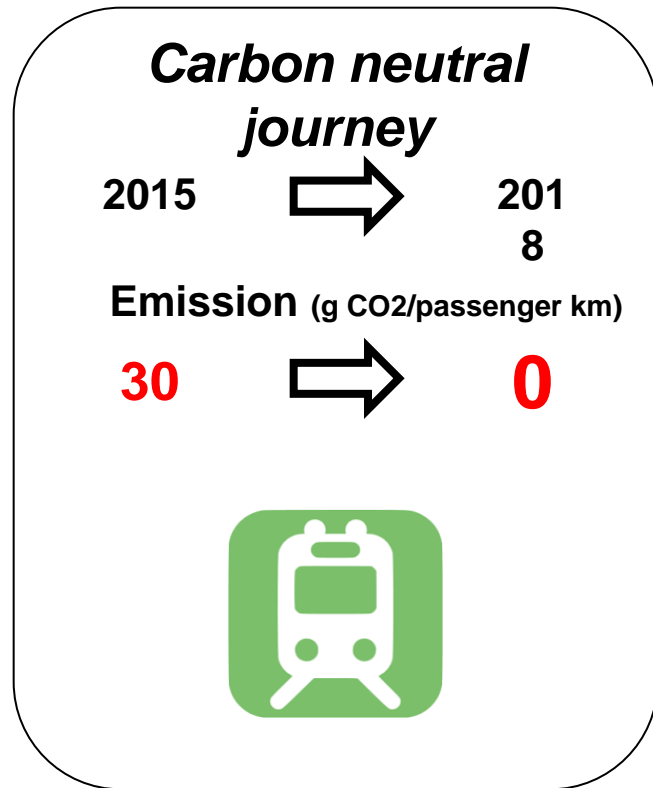
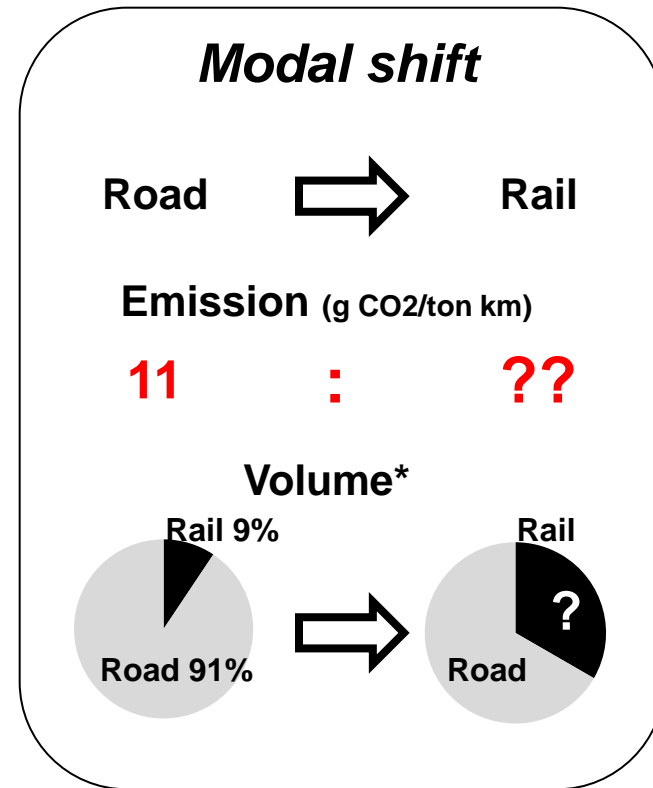


**Roel Wachelder  
Project Manager Fleet  
DB Schenker Rail Nederland NV  
15 November 2015**

### Passenger



### Freight



\*Source: CBS Statline

# Current Rail network

## Diesel consumption on freight will remain

### Non-electrified lines & cargo corridors\*



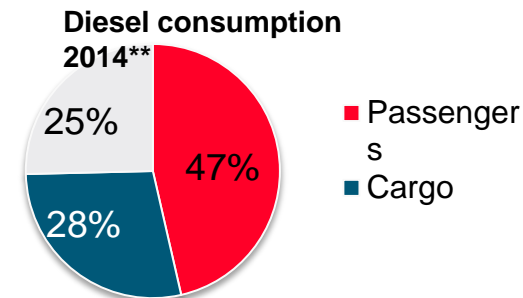
— un-electrified rail  
— Key freight routes

\* Source: Prorail: ontwikkelingen spoorgoederenverkeer in Nederland 2014

\*\* Source: Vivens: volume per Fuel station 2014

### Observations:

- Over 47% of diesel consumption is for Passenger transportation and 28% for cargo



- Passenger related Diesel volume is decreasing due to the further electrification of tracks.
- Diesel volume for Cargo is growing due to a shift from road to rail.
- Around 77% of cargo rail traffic in NL is from or to Rotterdam harbour

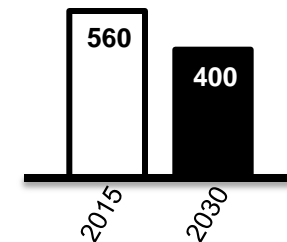
# Challenge: Currently still 33 million liters of diesel used annually

## Current NL Rail action plan\*:

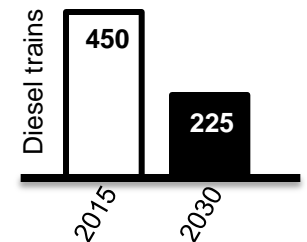
- ① Zero emissions electrified Rail ✓ 2018
- ② Energy Savings Ongoing
- ③ Supporting action (modal shift) Ongoing
- ④ Lower emissions non-electrified rail FOCUS

## Projections 2030\*:

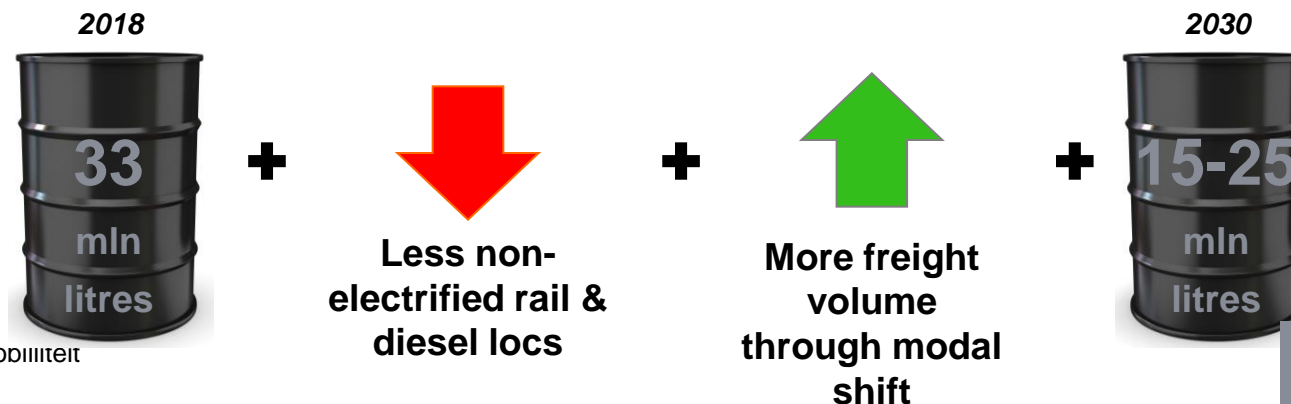
Non-electrified Rail (km)



# diesel traction equipment



## Diesel demand\*:



\* Bron: SER brandstofvisie mobiliteit

\*\*Bron: SER rail rapport

\*\*\* Vivens & GoodFuels estimate

## **Life time, hybrid, retrofit or drop in**

**Technical life of a locomotive..... 30 years**

**Hybrid locomotives available (multiple engines, combination diesel/ battery power, electrical locomotive with small diesel generator) but only a serious option after end of life of existing fleet (or new leased???)**

**Retrofit options (battery packages, generators, LNG tanks, modern diesel engines) very costly, many locomotives have no space to equip for retrofit, certification very difficult...**

**Drop in (meaning no or only small technical modifications, no infra modifications) available?**

# Renewable diesel as primary short-to mid-term solution

For the short term renewable diesel is the solution if electrification is not an option

## Diesel

## Alternatives

## Evaluation



	CO2 reduction	Commercially ready	Existing Fleet	Implementation
Partial electrification	<i>depends</i>	✓	✗	Mid-long term
LNG	20%	✓	✗	Mid/long term
Bio-LNG	~90-95%	✗	✗	Long term
Renewable diesel	~80%	✓	✓	Short term

## Conclusion

- Renewable diesel is the only sustainable option today. It is available and easily scalable because of drop-in and blending qualities; pros & cons 1<sup>st</sup> and 2<sup>nd</sup> generation
  - LNG is long term also possible, but has short term some major challenges:
    - Bio-LNG is required to fully benefit from CO2 reductions
    - Retrofitting is no option due to the size of the LNG-tank
  - Required fleet renewal costs will prevent a full transition in the short-term