Are renewable fuels part of the zero-CO$_2$ solution for (on-highway) transportation?

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- Emissions
  - EU Truck targets
  - Reductions until now
  - CO_2 calculation for trucks
- PACCAR Zero / low emission solutions
  - BEV, Hybrid, H_2 engine, FCEV
- Biofuels now
  - Technical
  - Availability
- Use of bio-fuels in upcoming legislation
- Route to 2030

EU CO$_2$ EMISSIONS TARGETS

- **-15% in 2025**
- **-30% in 2030**
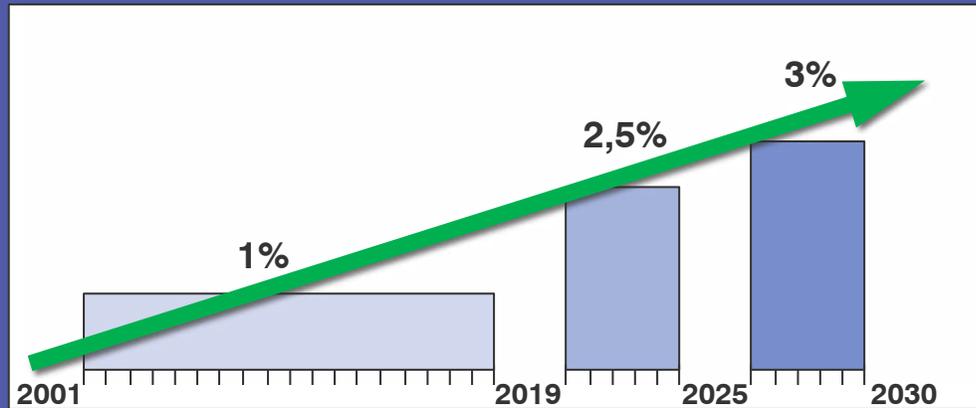
LARGEST EMISSIONS REDUCTION EVER

Fuel Economy / CO$_2$

-21%
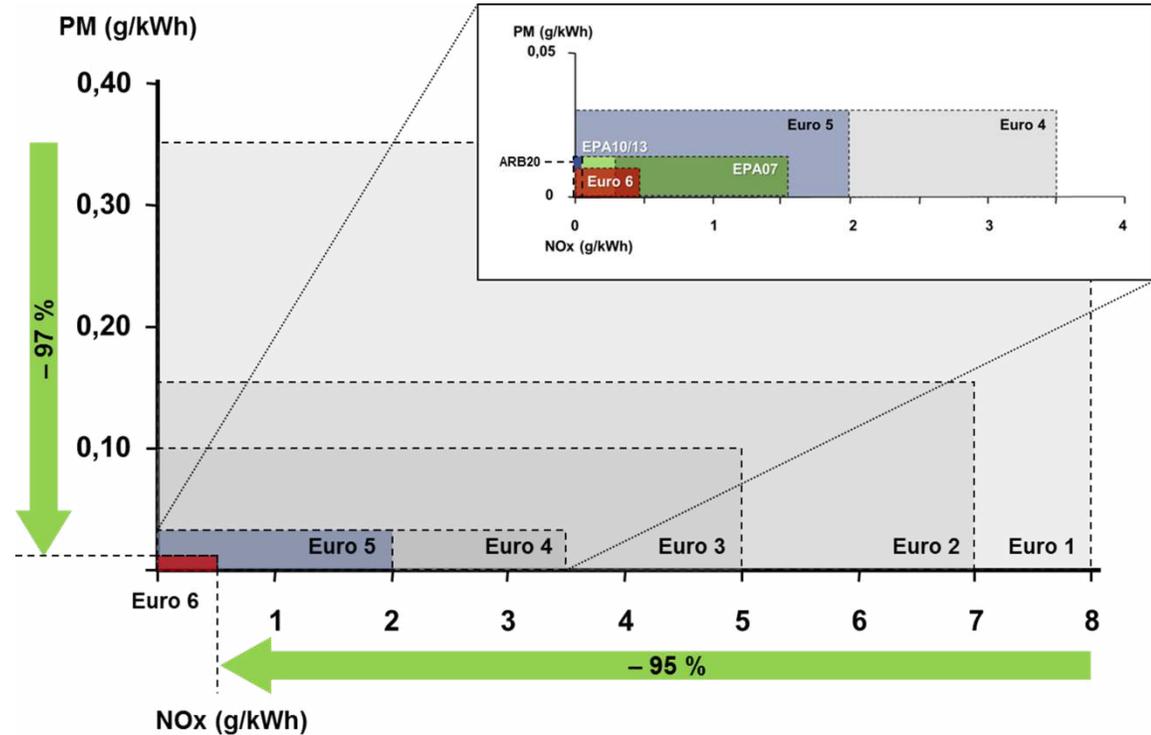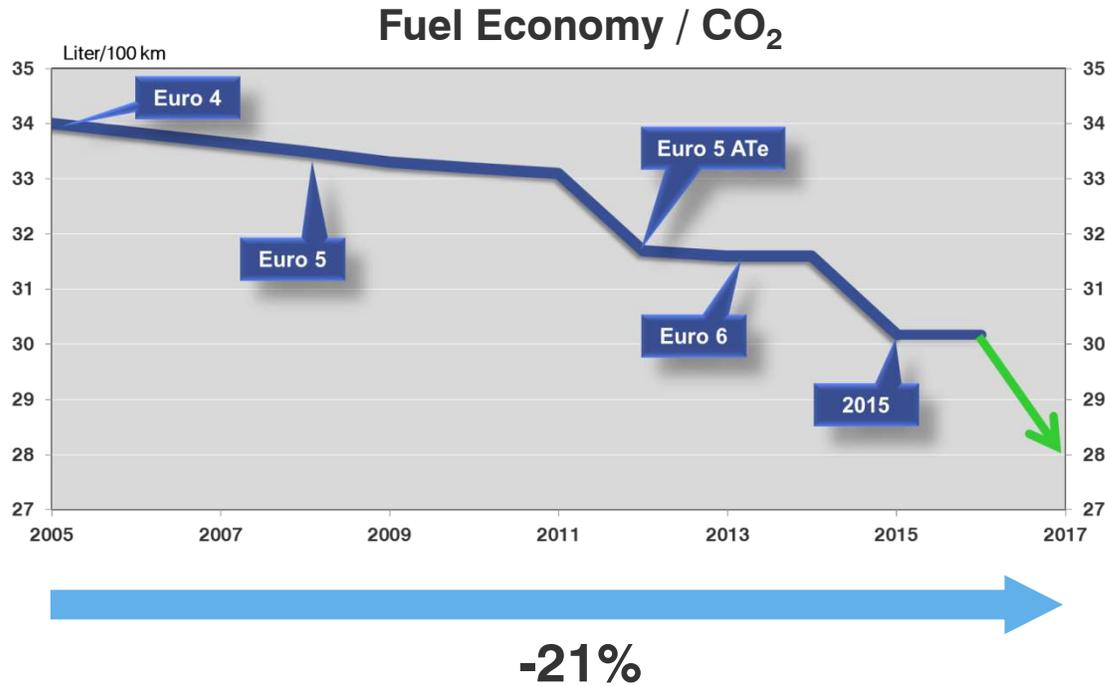
CO$_2$ LABELING *

- Truck CO$_2$-emissions are calculated with "VECTO"
  (Vehicle Energy Consumption Calculation Tool)
- Includes engines, gearboxes, axles, cabs, tires and accessories
- Declaration started in 2018
- Reference made mid-2019 to mid-2020
- Evaluation in 2022

➔ Renewable fuels cannot be accounted for !

- BEV on fossil electricity is considered "zero emission"
- Combustion engine on renewable fuel is not

VECTO

Vehicle Energy Consumption Calculation Tool

BATTERY ELECTRIC TRUCKS

- Batteries: expensive, heavy and low density
    - Limited payload and range
- Production/recycling of lithium/ion batteries complicated
- Electricity primarily generated using fossil fuels
- Motivation is local air quality
- Only option for entering 'zero emission' zones from 2025 on
- Electric network not in place
- **Already available!**

HYBRID ELECTRIC TRUCKS

- Urban : Full Electric = 'zero emissions'
- Non-Urban :
  - Diesel = maximum range and flexibility
  - Electric motor supporting
    - Greater fuel efficiency, less CO_2
- Plug-in technology provides additional savings and CO_2 reduction
- Customer field test ongoing

HYDROGEN COMBUSTION ENGINE

Various options possible
- Spark ignited
- Diesel engine technology
  - Dual fuel H_2 / diesel
- Hybrids with electric engine

- Advantages H_2-engine over Fuel Cell
  - Vehicle cost
  - Payload - No batteries
  - Proven technology / endurance
  - Hydrogen quality

Photo : Keyou

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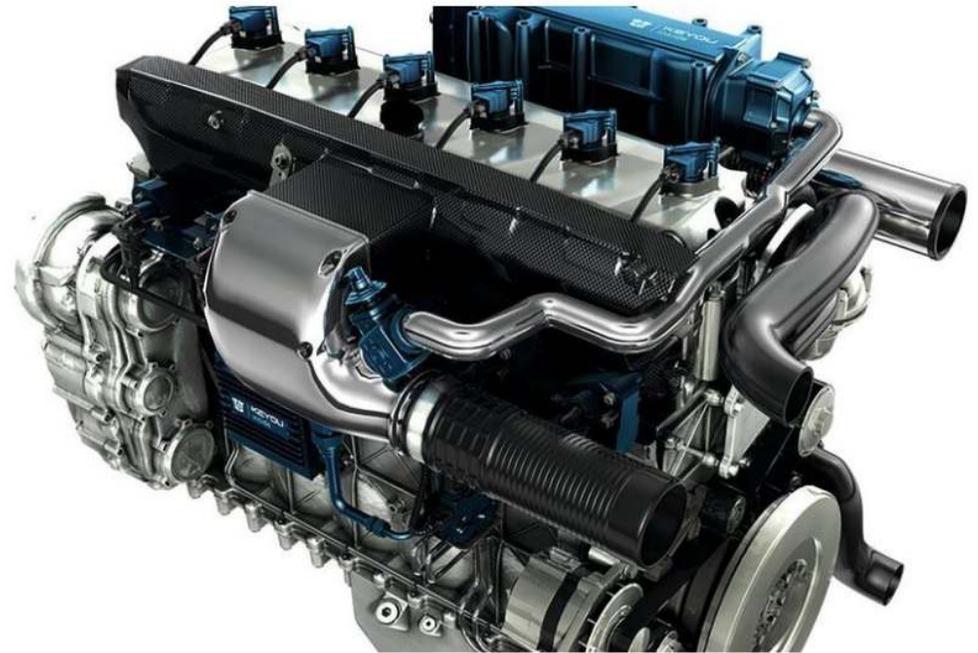
PACCAR FUEL CELL & EV

- Kenworth T680 Fuel cell - 470 HP
  563 km range - 15 minutes fueling time

- Peterbilt Model 579EV – 670 HP
  Li-Fe phosphate battery
  250 km range - 3-4 hours charging
  Regenerative braking

WHERE ARE WE NOW WITH BIO-FUELS?

Certified fuels * :
- Diesel - max. 7% FAME
- HVO
- B30

Increased maintenance costs with high FAME blends
- o <u>Not</u> with HVO
- o Advanced engines need quality fuel!

- Increased efficiency with synthetic diesel
- Other fluids ?

- DAF sees liquid bio-fuels as a part of sustainable options for the foreseeable future.

INCREASED COSTS WITH FAME BIODIESEL

- Fuel injector wear
- Oil drain interval reduction
- Air intake: inlet manifold including grid heater
- Exhaust Gas Recirculation blocking
- Exhaust After-treatment System fouling
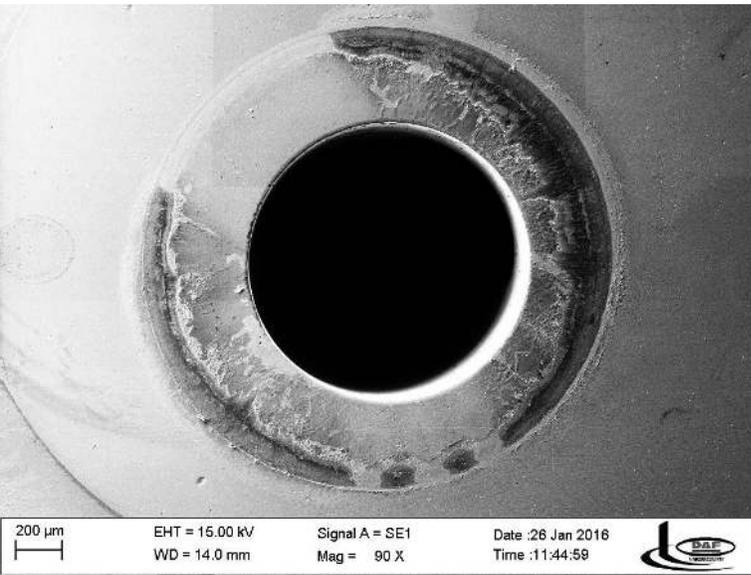
ENERGY IN TRANSPORT DISTRIBUTION
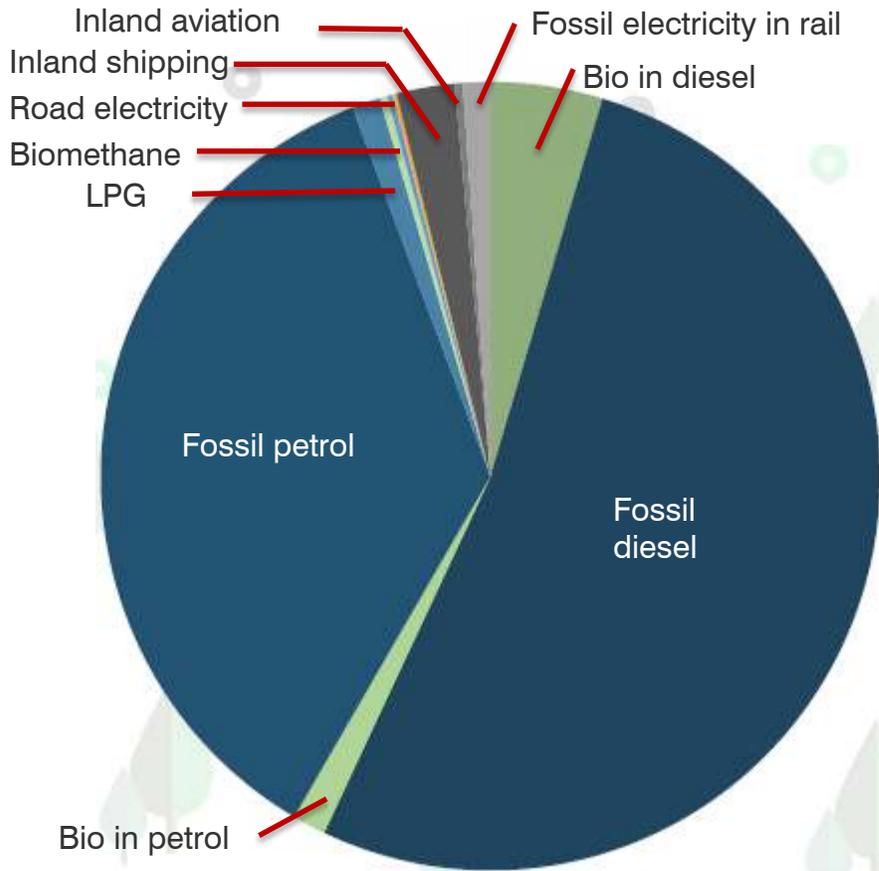
Energy consumption in 2019 NL transport, 491 PJ
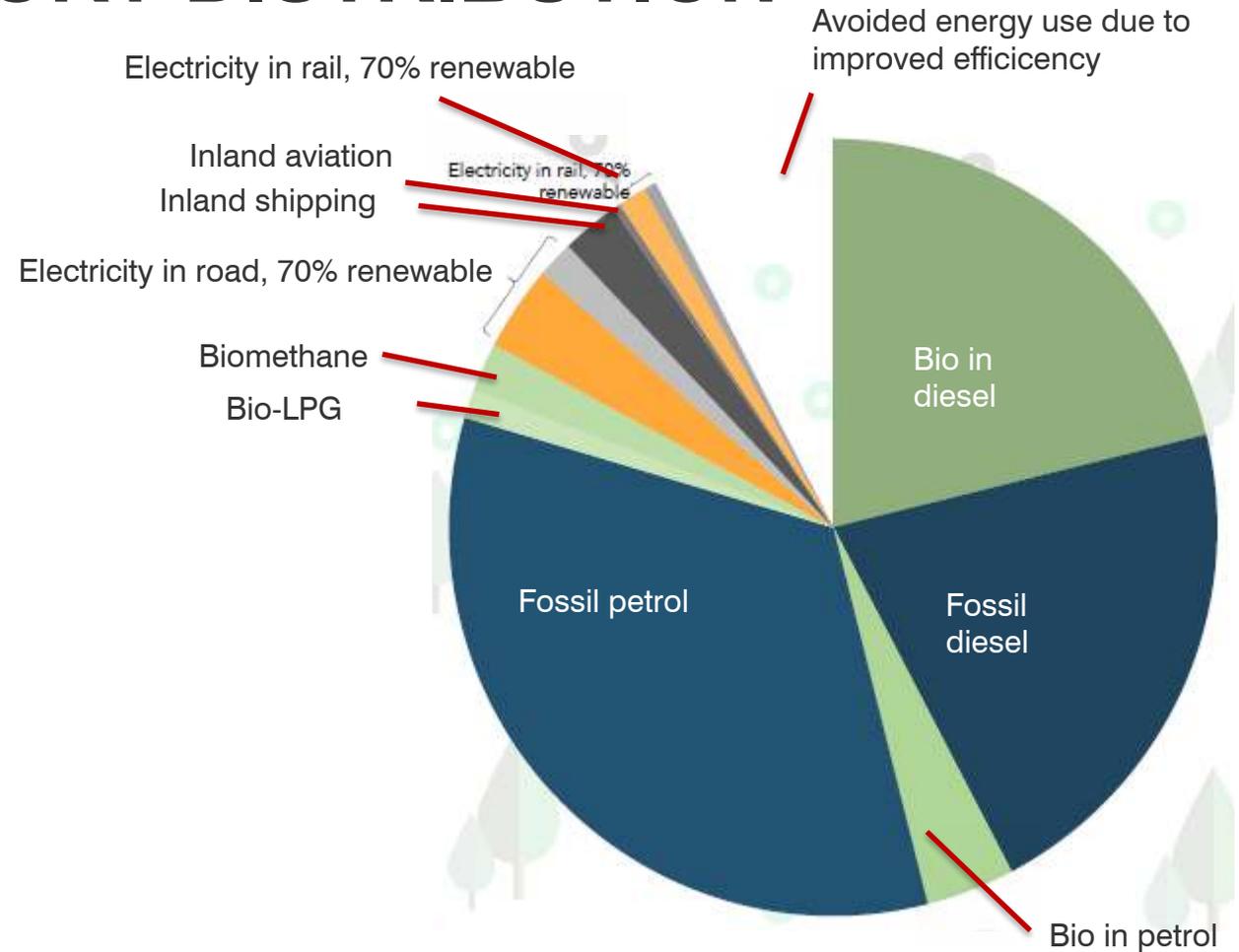
PDB 2030 scenario for "Paris"

AVAILABILITY OF BIO-FUELS CONCERNS

- National Renewable Action Plan targets ask for bio-fuels
- REDII is not enough
  - 2030 HVO predictions*
  - No PTL incentive
  - REDIII >2030 ?
- Bio-fuels
  - Plans I&W Department**
  - Emphasis on existing infrastructure
  - Emphasis on existing technology
  - International corridors
- Competition with other sectors?
  - Which fuel for what modality
- More BEV needs more electricity
  - % fossil?
  - Infrastructure for HD trucks?

* NESTE on HVO capacity and feedstock estimates / EU-28 Biofuels Annual 2019
** kabinet creëert ruimte voor meer biobrandstoffen in vrachtautos

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BIO-FUELS IN UPCOMING LEGISLATION ?
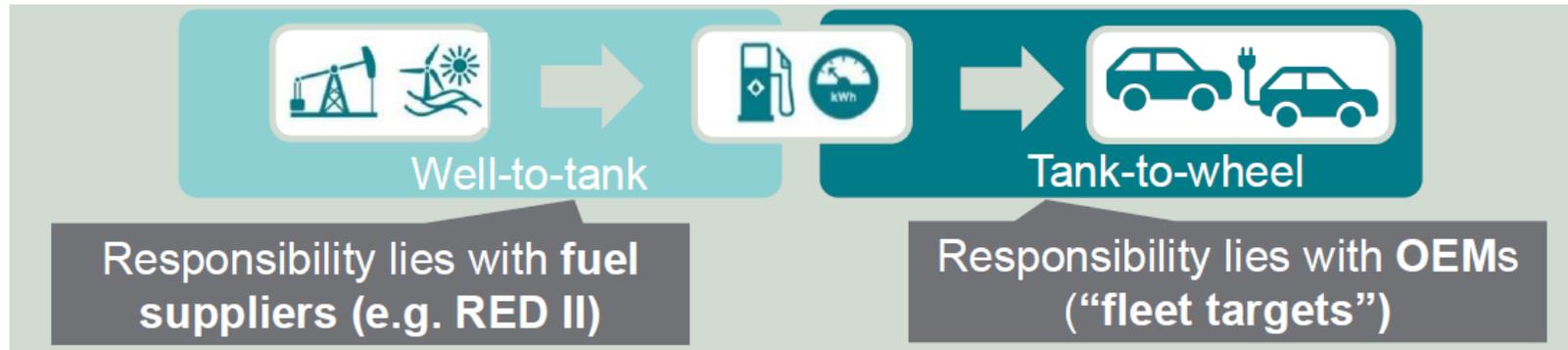
- OEM legislation is TTW
- Options to WTW route?
    1. Include alternative fuels in VECTO
    2. Renewable fuels crediting
    3. Through Fuels Quality Directive

- No decisions yet – to be considered

HOW CAN WE ACHIEVE THE TARGETS FOR 2030?

-30%

2025

Pursue all available options:

- Increase fuel efficiency
- Reduce CO_2 emissions
- New legislation Masses & Dimensions = Aerodynamics
- More efficient drivelines
- Tyres with lower rolling resistance
- Further development of support systems
  - Predictive Cruise Control
  - EcoRoll
- Part of production to be 'zero emissions'

2030

- Electric/hybrid drivelines
- New generations of fuels
- 20% of production to be 'zero emissions'

THANK YOU