



Nordic HCT Conference 2023

Gothenburg 11th October

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Truck with trailer e-axle



eTrailer - benefits

- Decreased fuel consumption
- Same GTW reached with downsized engine + assisting e-axle
- Improved traction at start
- Improved traction when TC engaged (at least at slow speeds)





eTrailer with ICE vehicle (Internal Combustion Engine)

- To decrease fuel consumption in some transport operations
 - Truck can be specified with only one driven axle for operations, which are driven a lot without a trailer or with a low GTW, but occasionally need a high GTW up to 76 tonne (for example milk transport, general cargo etc.). Otherwise the truck needs 2 driven axle (bogie driven) -> Higher fuel consumption, when driven without trailer, when 1 driven axle is enough.
- To be able to specify the truck with smaller engine for some transport operations
 - Eu6 diesel engines (Exhaust aftertreatment systems) are sensitive for exhaust temperatures
 - Some operation (truck with trailer) the truck are driven a lot without trailer or empty/low load -> In this case the big engines are on the limit to maintain sufficient exhaust gas temperature required by the exhaust gas aftertreatment system -> High fuel consumption
- To reach higher GTW with gas engines -> To fulfill legislation demand 5 kW / tonne
 - For Gas engines (Otto engines) the Power is still limited around 460 hp
 - According 5 kW /tonne 460 hp means 338,3 kW – 76 ton GTW needs 380 kW / 517 hp
 - With 460 hp engine GTW is max up to 68 ton GTW (340 kW), actually up to 67 ton GTW



eTrailer with BEV (Battery Electric Vehicle)

- To reduce energy consumption in some transport operations
 - To be able to specify the truck with only one driven axle for operations, which are driven a lot without a trailer or with a low GTW, but occasionally need a high GTW up to 76 tonne (For example combinations, which are driven with full load one way and one way empty)
 - Increased range, lower energy consumption
- To reach higher GTW with only one driven axle on truck -> To fulfill legislation demand 5 kW / tonne
- To reach HCT GTW:s with BEV in the future



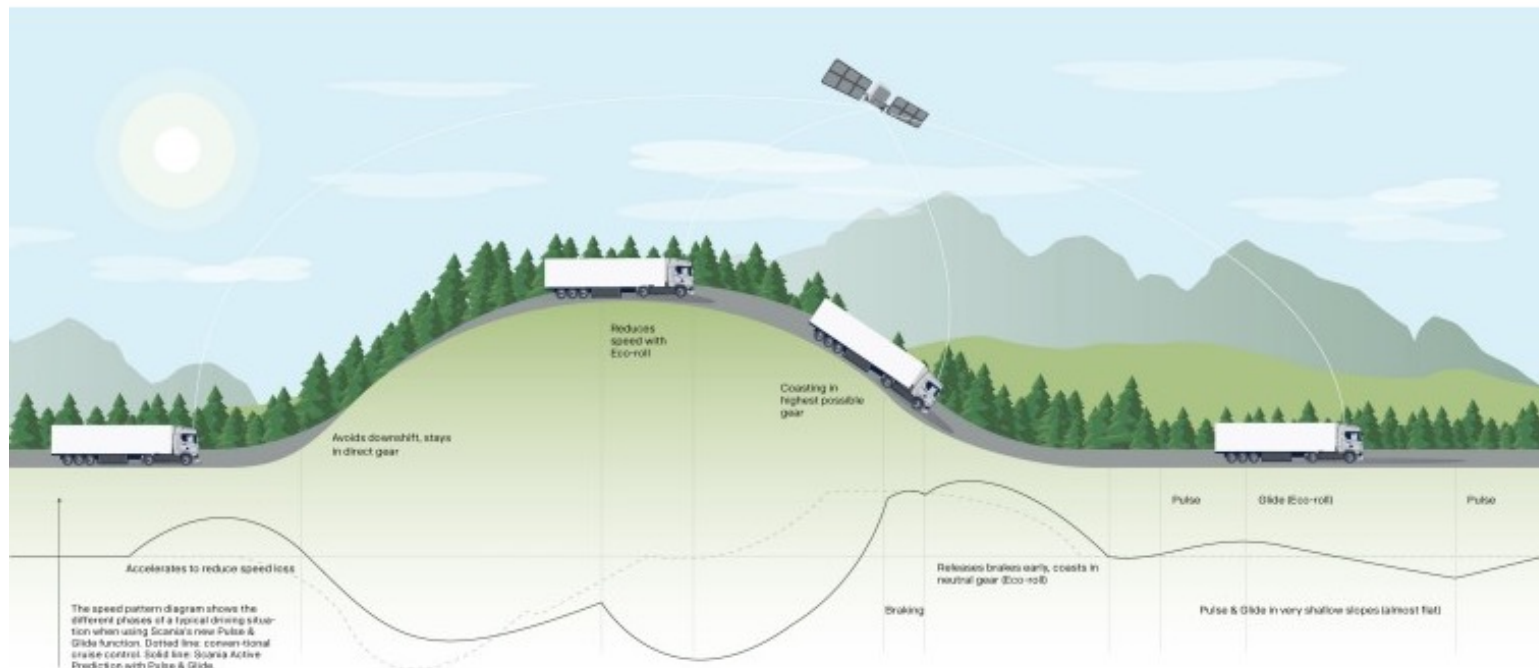
Trailer eAxle – Safety / Possibilities

- **SAFETY FIRST:**

- Main principle: No thrust, if vehicle is not pulling or the driver is braking
- ESP, ABS/EBS activation switches off the eAxle support – no thrust towards towing pin.

- **POSSIBILITIES:**

- EBS/FMS CAN interface allows possibilities – to be figured out
- Fine-tune controls in relation to EcoRoll / CCAP (Cruise Control Active Prediction) to maximize efficiency





Finnish HCT combination

- Wood chip transport (similar combinations for general cargo / grocery products)
- GTW: 85 tonne with single tyre trailer / 92 tonne with twin tyre trailer
- Length: 33 meter.
- Volume: 205 m³



Why not BEV in the future



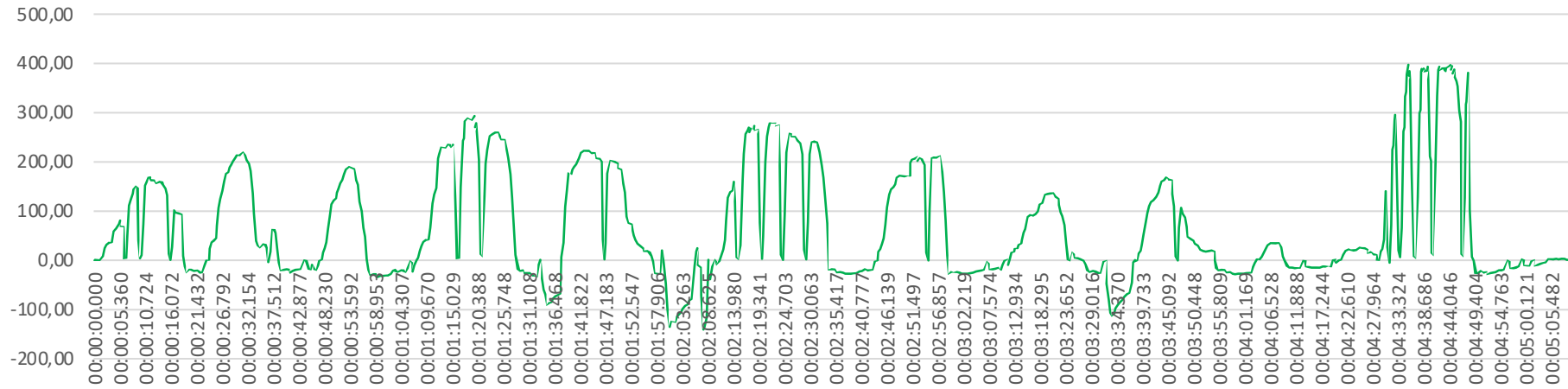
e-axle

ALASTARO RACEWAY

tests

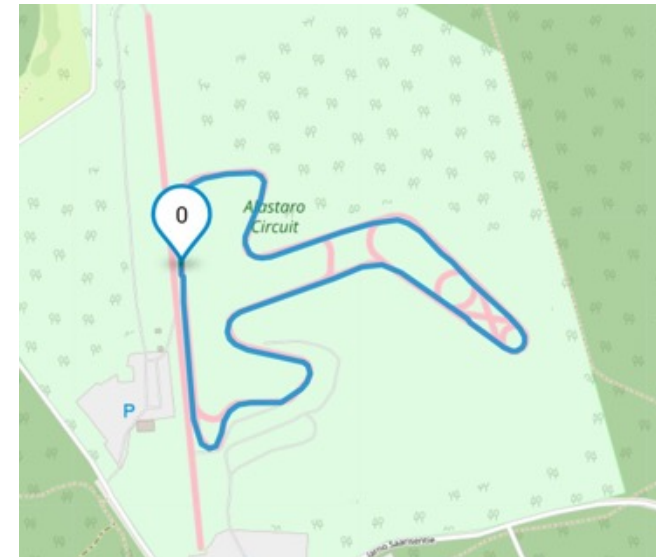
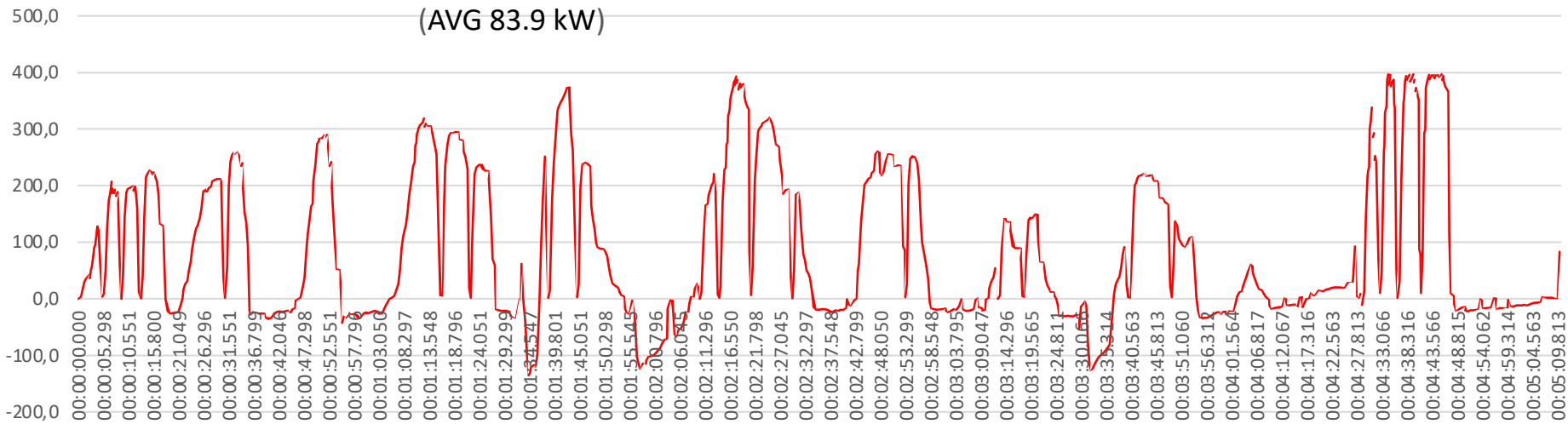


Engine power consumption [kW] - Trailer eAxle active
(AVG 65.6 kW)



Tractor unit: ch. 2178738
payload: 20,5 ton

Engine power consumption [kW] - Trailer eAxle inactive
(AVG 83.9 kW)





e-axle PUBLIC ROAD TEST

Start:

2023-04-25 09:57:05.000



End:

2023-04-25 10:52:56.999

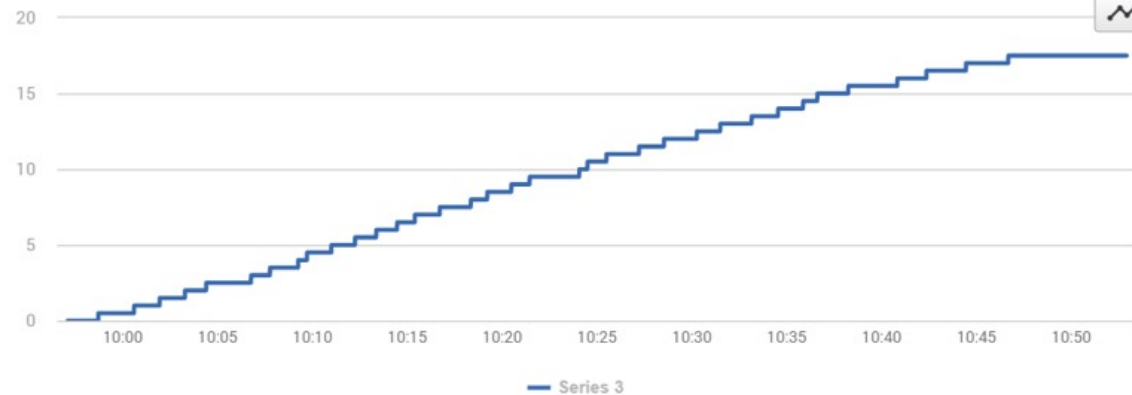


Main trailer eAxle mechanically disconnected

Speed: (smart zooming)



17.50 L (Total fuel)



Distance
 Altitude
 Fuel Total
 Weight

Update

Start:

2023-04-25 13:00:05.000



End:

2023-04-25 14:06:52.999

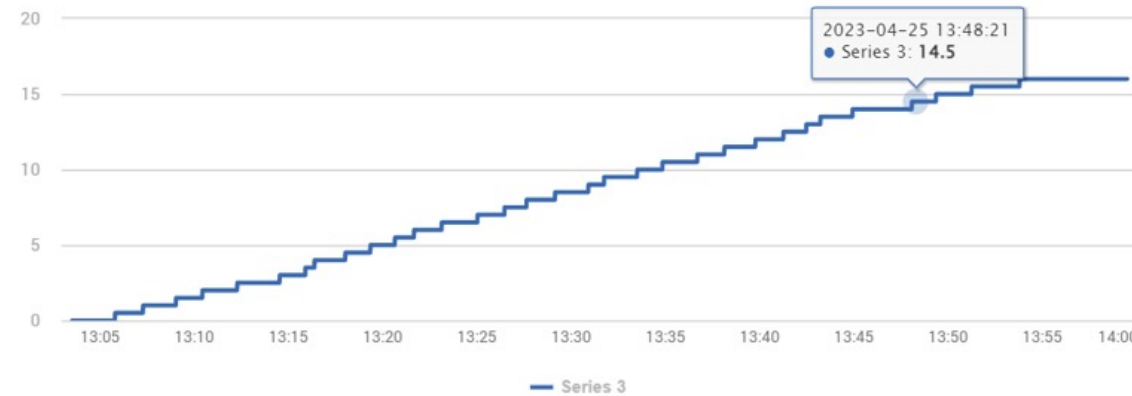


Main eTrailer active

Speed: (smart zooming)



16.00 L (Total fuel)



Distance
 Altitude
 Fuel Total
 Weight

Update

Tractor unit, ch. 2178738; Combination weight: 32,2 ton (10,2 + 17 ton); flat topography

Note: Actual fuel consumption values 17,9 L vs. 15,9 L.

11th October 2023

e-Thank You

