

V O L V O

STATUS OF CLEAN TECHNOLOGY PROJECTS

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Volvo Group

2021-12-08

Trucks, buses, construction eqpt. and marine and industrial engines

Complete solutions for financing and service



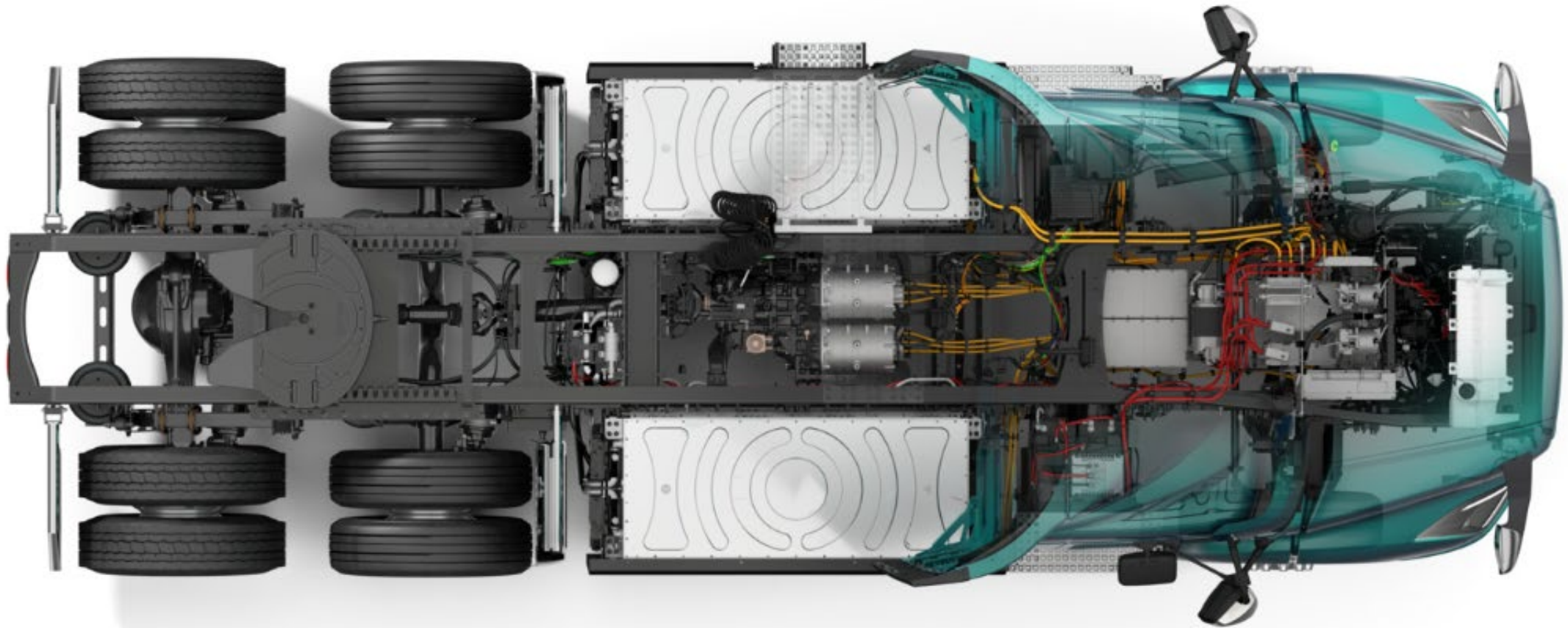
Electrification of commercial vehicles taking off globally

We've spent years developing complete solutions for electromobility



Proof of our commitment to reduce pollution (1/4)

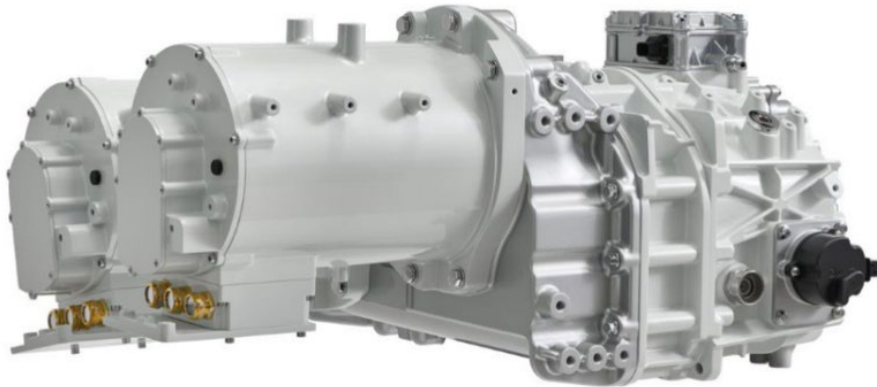
North America's first commercially available Class 8 vehicle



Proof of our commitment to reduce pollution (2/4)

Driveline and batteries designed to support vehicle operations by providing proven reliability for the demands of customer operations

Volvo Electric Driveline



- Dual Electric Motors (455 hp and 4,051 lb.-ft of torque)
- 2-speed I-Shift transmission
- Regenerative Braking

Li-ion Batteries



- 4 battery pack (= 264 kWh)
- Factory set state of charge
- Side impact protection barrier integrated into the mounting system

Proof of our commitment to reduce pollution (3/4)

A convenient location to the Charging area of the truck just underneath the driver's side door



Proof of our commitment to reduce pollution (4/4)

The VNR Electric is centered around pickup and delivery, local food and beverage, and also urban and regional distribution



**VNR 300 4X2
TRACTOR**



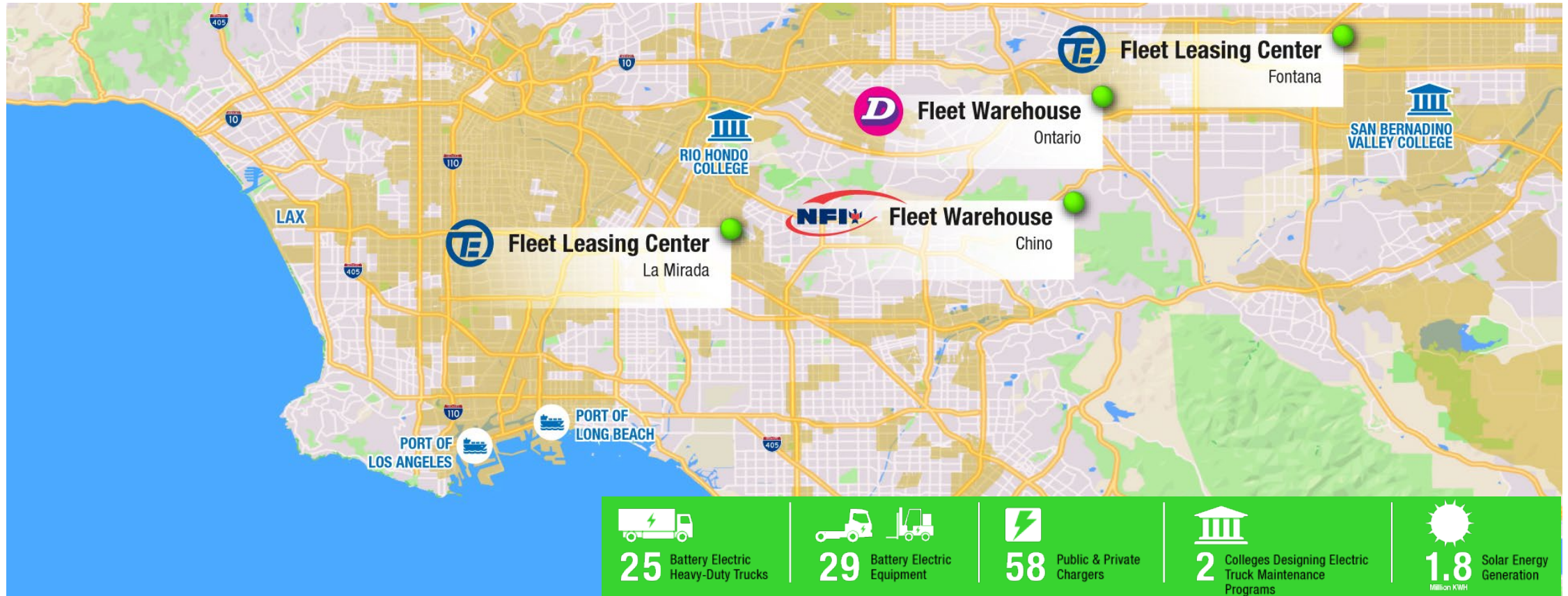
**VNR 300 6X2
TRACTOR**



**VNR 300 4X2
STRAIGHT TRUCK**

Volvo LIGHTS provided a template for modernizing freight facilities

Deployed battery-electric Class 8 trucks, yard and warehouse equipment, charging infrastructure, solar panels, and more



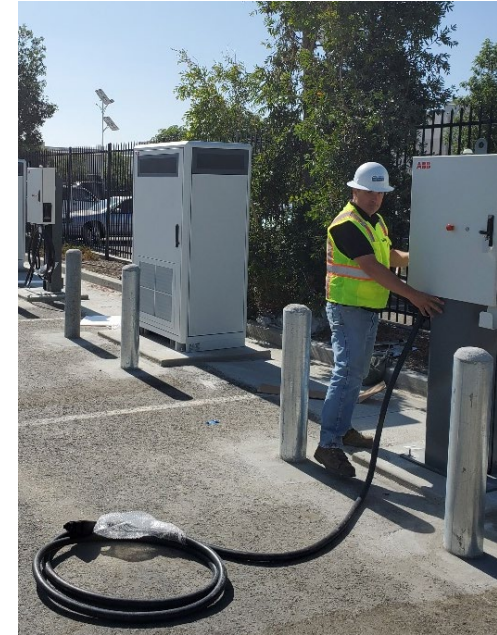
Volvo LIGHTS provided a pathway to commercialize the VNR Electric

25+ Class 8 battery-electric trucks deployed today



Deployment of charging infrastructure is expensive and will take time

14 charge ports for Class 8 battery-electric trucks have been installed, 6 of them are semi-public



0 months

16 months

This paradigm shift in commercial trucking is happening now

But will take time and requires sustained incentives for vehicles and infrastructure

- Divergence in routes and operating factors can drastically alter the use case for battery-electric Class 8 trucks
- TCO parity with diesel truck-based operations will need more time (> 5 yrs.)
 - Interdependent charging factors - charging rates, impact on batteries, energy costs, etc.
 - Residual value are unknown today – marketplace and speed of technology development will determine this
 - Maintenance costs (for trucks and chargers) are unknown
- Small operators cannot assume cost and risk of battery-electric Class 8 trucks without a significant discount on the trucks and access to charging ports
 - 0 publicly accessible chargers today
- Policies needed to accelerate/prioritize the infrastructure installation timeline are critical to the timely adoption of battery-electric Class 8 trucks

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THANK YOU

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