NIKOLA

Jesse Schneider

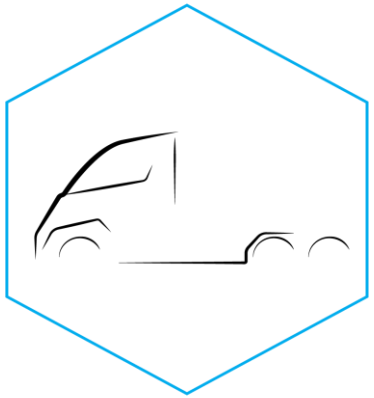
Executive Vice President, Hydrogen & Fuel Cell Technologies

The Road Towards Zero Emission Trucking & Low WTW GHG & NOx Emissions

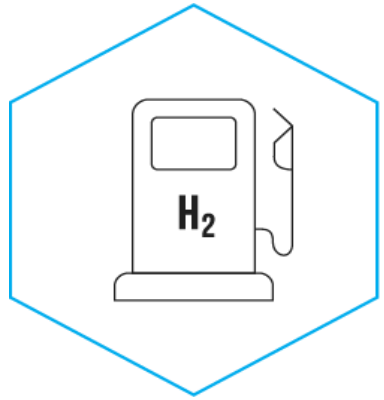
HYDROGEN @ SCALE: DISRUPTION THROUGH VERTICAL INTEGRATION

Nikola Motor

Zero Emission Trucking + Low Carbon H_2 :



+



Fuel cell 40t trucks

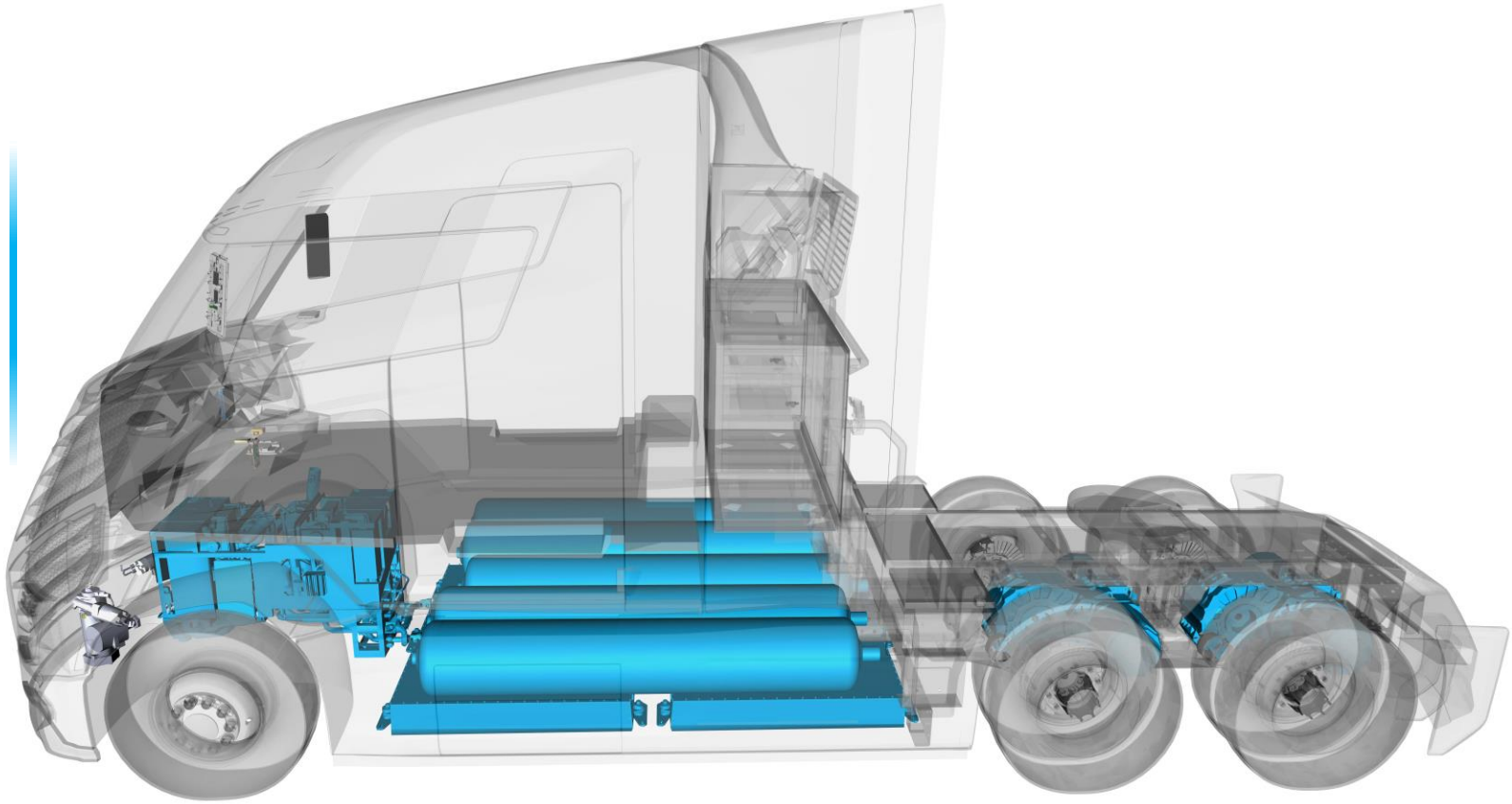
- Long Range, Heavy Duty 40T Commercial Vehicle
- High Torque & Horsepower
- Zero Tailpipe Emissions and very low WTW

Hydrogen stations

- Fast Fueling
- On-Site Hydrogen Generation from Grid with Supplemented Renewable Energy
- Onsite Storage
- Heavy Duty & Light Duty Fueling

PIONEERING A NEW TYPE OF ZERO EMISSION COMMERCIAL TRANSPORT

Nikola Motor,
World's First,
Purpose-Built
Class 8 (40T)
HD Fuel Cell
Electric Truck



NIKOLA TWO™

- 240 kW FUEL CELL POWER
- 125kW-250 kWh BATTERY
- Four Wheel Independent E-DRIVE
  - 1,000 HORSEPOWER
  - 2,000 FT. LBS TORQUE
- 600+ MILES OF RANGE
- AUTONOMOUS CAPABILITIES

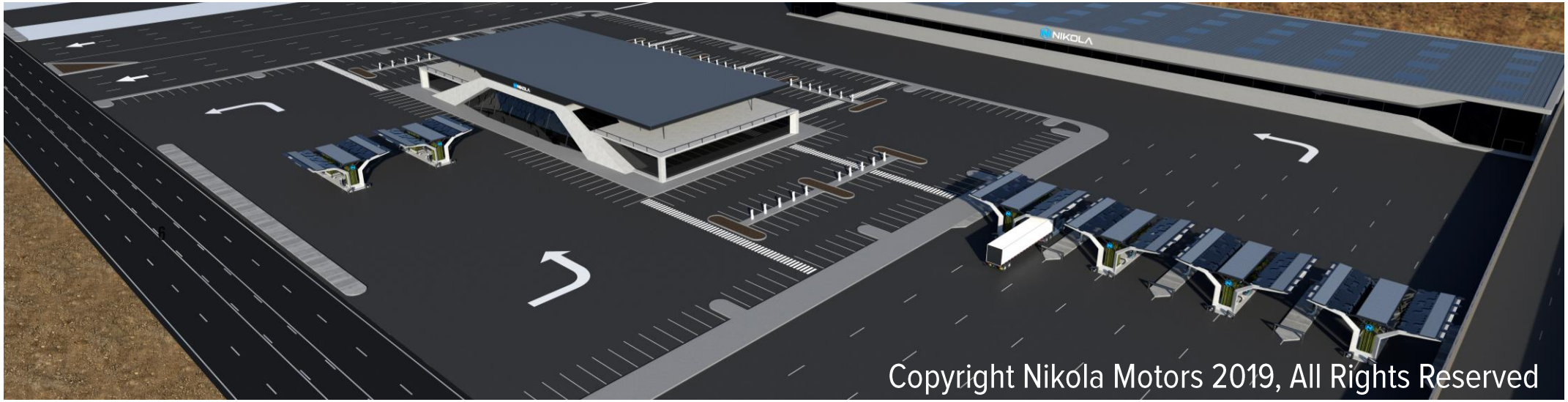
CLEAN FUEL, ZERO EMISSION, NO COMPROMISE: TCO LEASE

- Fuel Cell Electric Trucks sold with Total Cost of Ownership Lease (TCO) with 7 year [Use/ Maintenance/ Hydrogen Fuel]. Fuel Cell Trucks used only in fleets where the demand is matched by hydrogen supply. 14,000 Truck ordered.

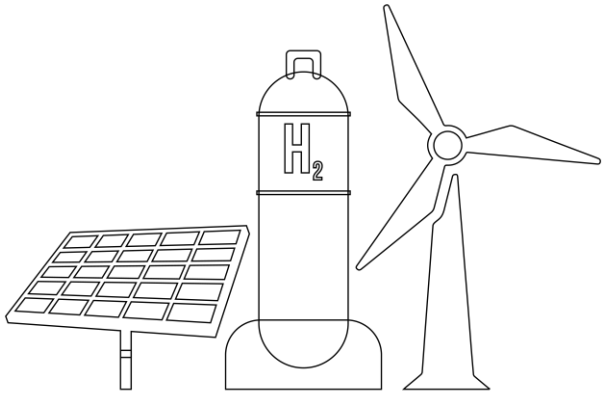
- Nikola stations (with NEL Technology) produce hydrogen on-site with renewable solar energy complemented by low-carbon grid energy. Dispensing hydrogen for both Heavy Duty and Dispensers for Light Duty.

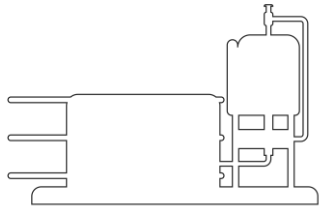
8T/DAY NIKOLA "STANDARD" HYDROGEN STATION VALIDATION IN 2020, OPERATION 2021 IN PHOENIX, ARIZONA

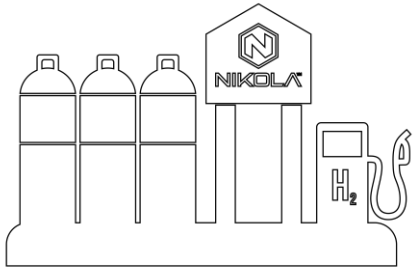
ONSITE RENEWABLE POWER GENERATION → ONSITE CONVERSION OF ELECTRICITY TO HYDROGEN VIA ELECTROLYSIS → ONSITE HYDROGEN STORAGE SUPPLY → FAST 70 MPA FUELING STATION → FAST 70 MPA HYDROGEN DISPENSER → HYDROGEN FUEL CELL VEHICLE



DIESEL FUEL COST PARITY POSSIBLE WITH LOW COST RENEWABLE ENERGY AVAILABILITY (AND/OR ASSISTANCE WITH GRID LOW CARBON TRADING)





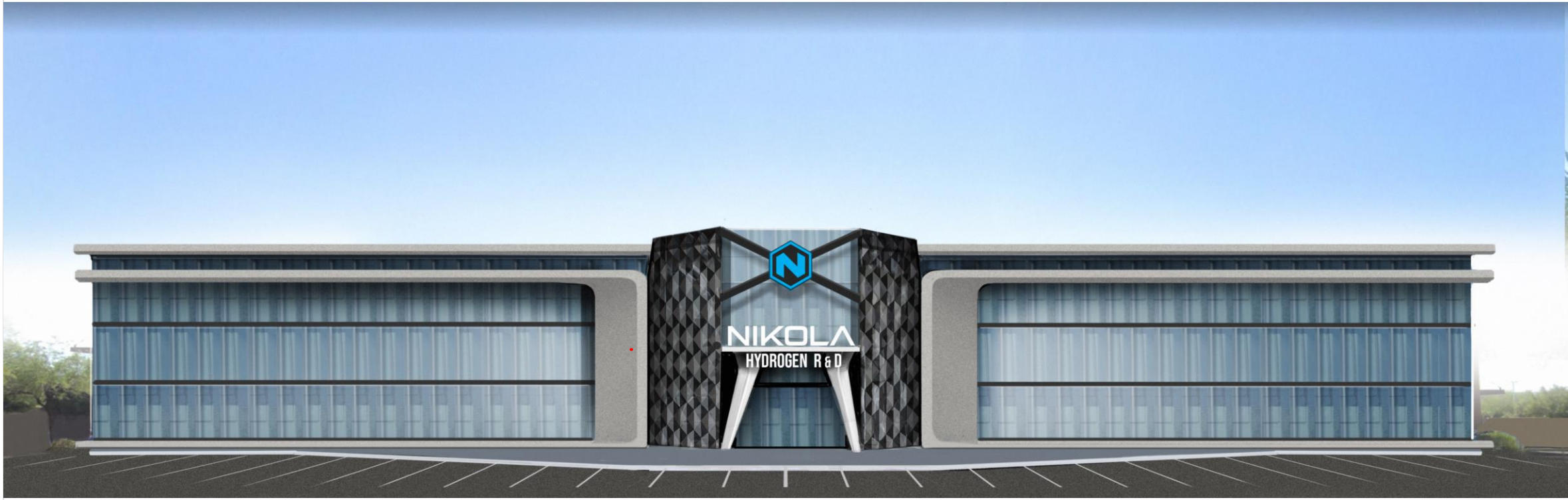


<$0.04 / kWh @Cost of electricity @ 20MW

Diesel Parity @ low cost electricity

<$6.00 / kg Sale price of hydrogen

NIKOLA HYDROGEN & FUEL CELL R&D CENTER IN ARIZONA, USA



8T / day hydrogen Development station for Fuel Cell Truck Fleet Testing

Advanced HD Fuel Cell Lab
Fuel cell & battery test stands

Extreme Environmental chambers:
Fuel cell systems
Battery & E-Motor
Vehicle Dynamometer

INDUSTRY CONSORTIUM TO DEVELOP A –COMMON– INTERFACE FOR HYDROGEN HEAVY DUTY FUELING

NIKOLA™ nel Air Liquide creative oxygen

HYUNDAI TOYOTA

Objective: Every Vehicle fills at every station.

Project funded by partners. HD hardware prototypes available by the end of 2019.

- HD H70HF Fueling Nozzle
- Receptacle
- Hose
- Breakaway

DEVELOPING IN ARIZONA : HD FAST FUELING TO PREPARE FOR THE STANDARD

70 *MPa*
High flow

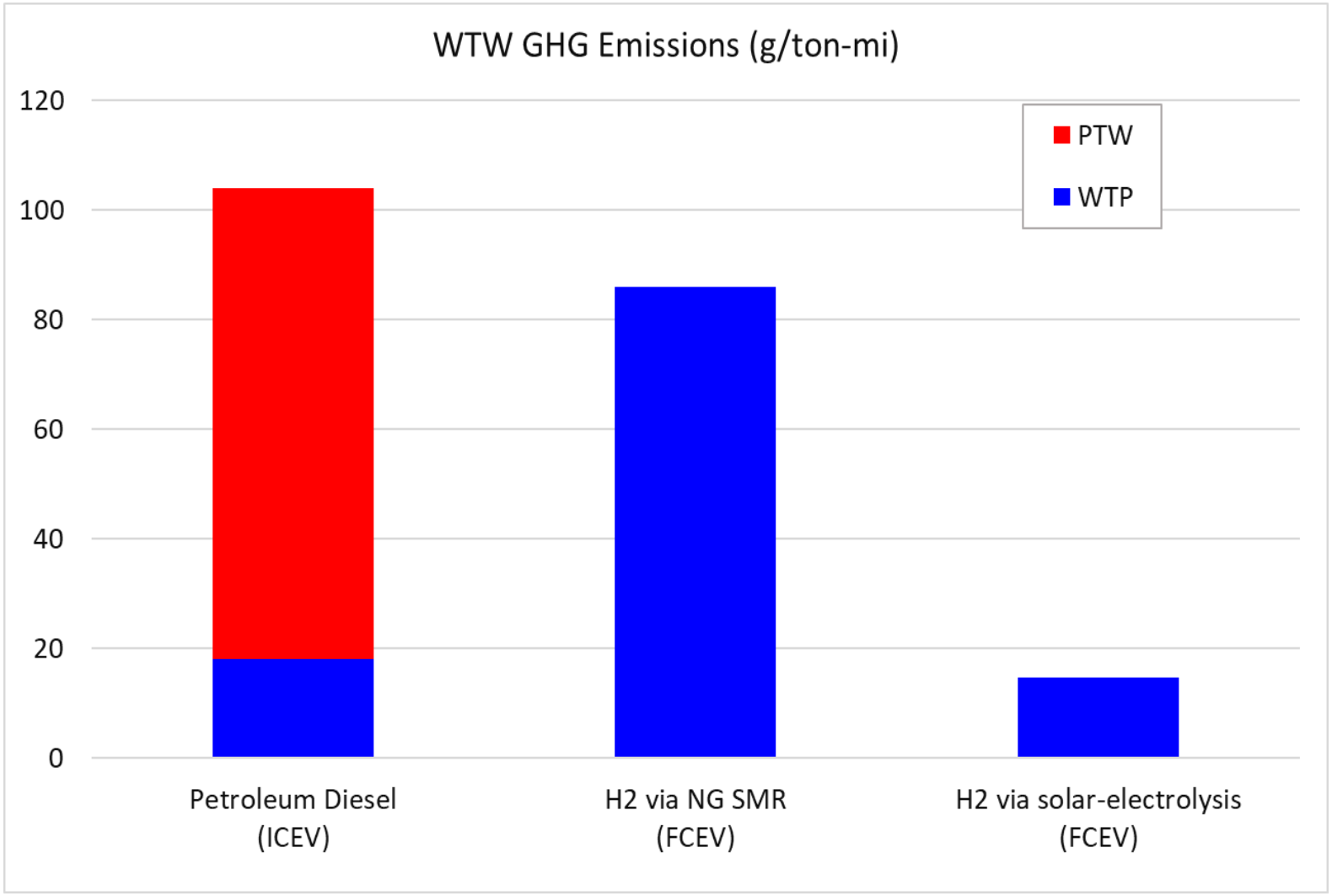
15 *min*
HD fueling

80 *kg*
Full fill

- Collaborating with the industry to develop a HD fueling protocol & communications
- Data to be provided to the standards ISO & SAE
- US DOE Project with NEL & Nikola to develop high throughput hydrogen compressor starting in 2020

ENVIRONMENTAL IMPACTS: GHG EMISSIONS*

-CLASS 8B (40T) DIESEL VS. FCEV LONG-HAUL TRUCKS



Lower WTW GHG Emissions By a Factor of 10x by using Renewable Hydrogen & FCET

Acronyms:
WTW: Well-to-Wheels
GHG: Greenhouse Gas
WTP: Well-to-Pump
PTW: Pump-to-Wheels
ICEV: Internal Combustion Engine Vehicle
H2: Hydrogen
NG: Natural Gas
SMR: Steam Methane Reforming
FCEV: Fuel Cell Electric Vehicle

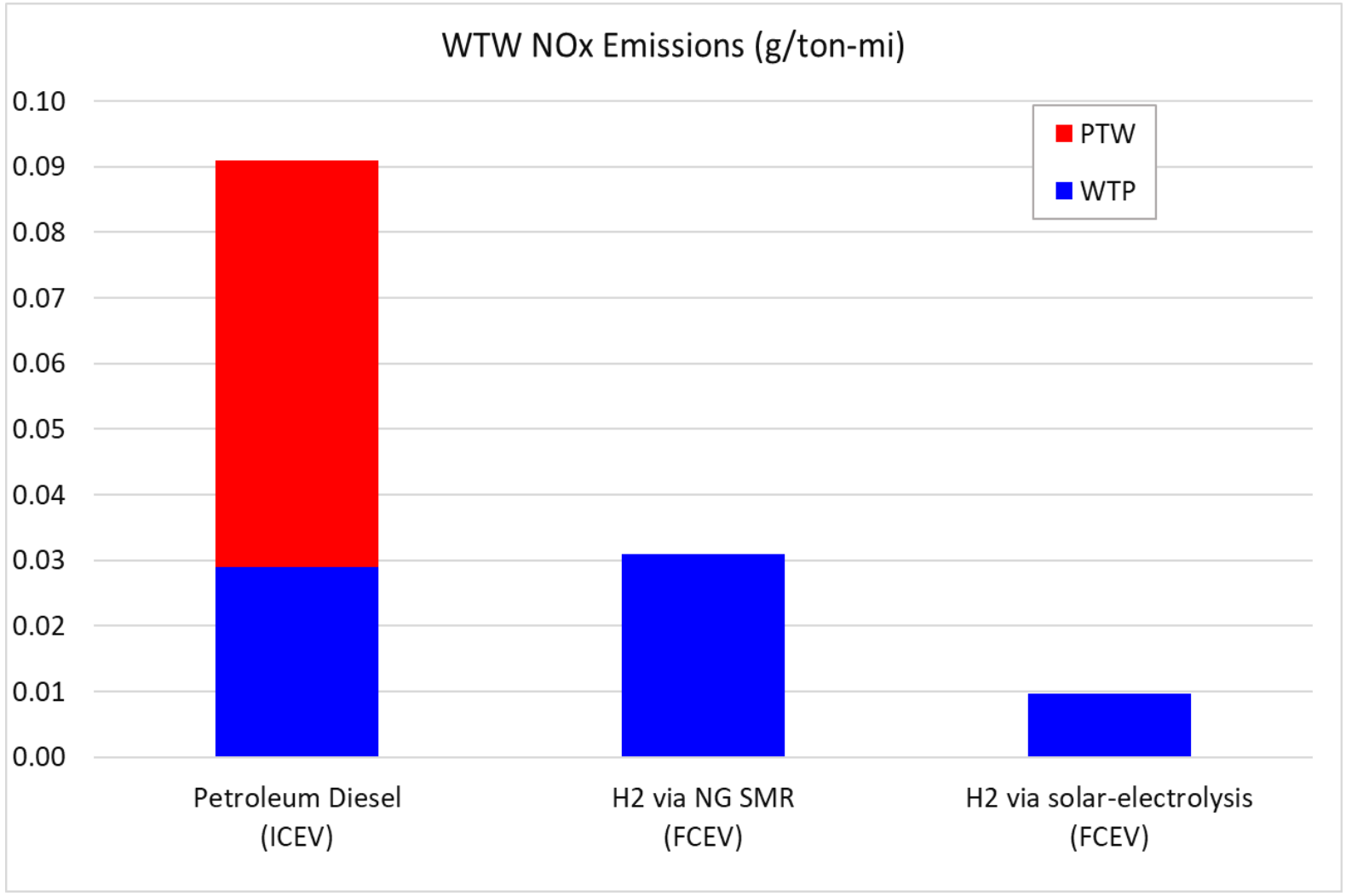
*Using Argonne National Laboratory GREET® (2019) model https://greet.es.anl.gov/

Argonne NATIONAL LABORATORY

ENVIRONMENTAL IMPACTS: NO_x EMISSIONS*

-CLASS 8B (40T) DIESEL VS. FCEV LONG-HAUL TRUCKS

Lower WTW NO_x Emissions
By a Factor of 10x by using
Renewable Hydrogen & FCET



Acronyms:
WTW: Well-to-Wheels
NOx: Nitrogen Oxides
WTP: Well-to-Pump
PTW: Pump-to-Wheels
ICEV: Internal Combustion Engine Vehicle
H2: Hydrogen
NG: Natural Gas
SMR: Steam Methane Reforming
FCEV: Fuel Cell Electric Vehicle

*Using Argonne National Laboratory GREET® (2019) model https://greet.es.anl.gov/

Argonne NATIONAL LABORATORY

ACCELERATING HD FUEL CELL & HYDROGEN COMMERCIALIZATION:

Let us work together between Governments & Companies to accelerate this transition towards Zero Emission Trucking to significantly reduce GHG & NOx WTW (10x) in HD 40T/ Class 8 Transportation.

What is needed:

1) Global Standards for FCEV Safety & Hydrogen
2) Assistance to Accelerate Technology with Vehicle Fleet & H2 Infrastructure Demonstrations
3) Assistance with Coupling Low Cost Renewables and Carbon Trading for fueling Zero Emission Vehicles to enable fuel parity with Diesel.
4) Governments & Industries working close together!