

# NGVAMERICA

Natural Gas Vehicles for America

## Start Now. RNG is How.

Cleaner Trucks Initiative, OMB E.O. 12866 Meeting 2060-AU41

February 7, 2022



# About NGVAmerica

NGVAmerica is the national organization dedicated to the development of a growing, profitable, and sustainable marketplace for vehicles powered by natural gas and biomethane and for promoting the use of more natural gas in transportation... trucks, trash, transit, and even off-road uses like HHP marine, rail, and construction/mining applications.



# 200+

NGVAmerica represents 200+ companies,  
LDCs, fleets, OEMS, environmental and  
government organizations.



NGVAMERICA



# NGVAMERICA

Natural Gas Vehicles for America

## We believe:

- Climate change is real
- 135 million Americans live in communities with dangerous air quality
- The transportation sector can be cleaner and decarbonized
- Time is of the essence
- Renewable natural gas vehicles are an affordable, scalable, and immediate heavy-duty solution
- Early reductions matter – results compounded



NGVAMERICA

# Cummins **On-Highway** Renewable Natural Gas Engine Offerings

**X15N™**



**Due Early 2024**

**ISX12N™**



**L9N™**



**B6.7N™**



Certified Near Zero Optional Low NOx 0.02g/bhp-hr



# Cummins 15L Natural Gas Engine

- ✓ Scheduled to Release late 2023 / Early 2024
- ✓ Up to a 10% Fuel Economy/GHG improvement over ISX12N
- ✓ 15L Diesel matching ratings – 350hp/1450 lb ft to 500hp /1850 lb-ft of torque
- ✓ Ease of integration
  - ✓ Similar footprint as today's 13L diesel engines
  - ✓ with 15L displacement & capability
  - ✓ Engine weight = 300 lbs less than current ISX12N
- ✓ Integrated with
  - ✓ Cummins Proprietary NG Fuel Delivery System
  - ✓ Endurant 12 speed transmission today, 18 speed soon



# All Cummins RNG Engines Feature Maintenance & Fluid Free Exhaust Treatment System

- Lowest cost to operate in urban return to base operations with extended service life
- Similar to fluid free catalyst found on gasoline powered passenger cars
- Packaged as a muffler with vertical or horizontal mount
- Weighs ~100 pounds
- Benefits:
  - More reliable, no regen downtime
  - Maintenance-free, no filters to clean or replace
  - No active regeneration, downtime
  - No DEF fluid, filter or sensor replacement costs





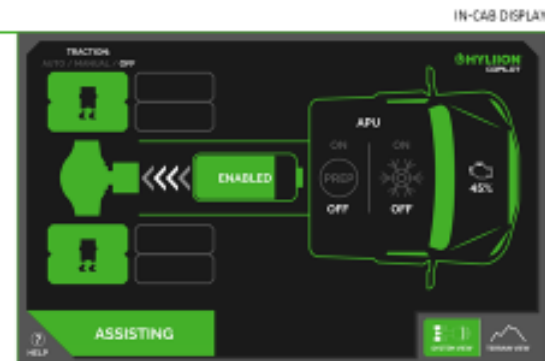
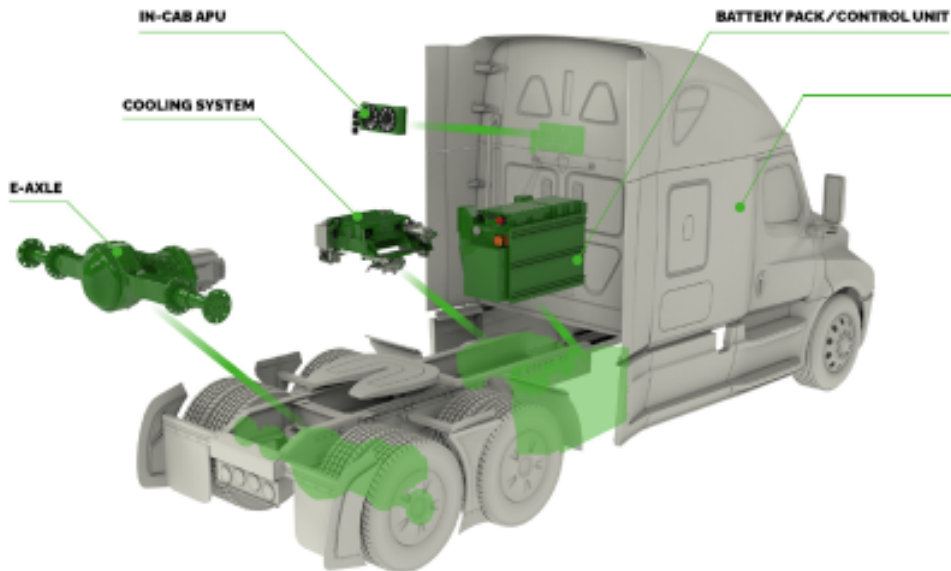
➤ Hybrid eX system available now, for CNG and diesel retrofit, on all leading OEM Class 8 tractors



AUTOMATIC  
OPERATION

OVER-THE-AIR  
UPDATES

PREDICTIVE  
TERRAIN



# HYPERTRUCK ERX OVERVIEW

Hypertruck ERX system is under development, w/ customer roadshow demonstration events in progress



## OPERATING COST <sup>1</sup>

Offers a reduced cost of ownership vs. diesel



< DIESEL



## RANGE <sup>1</sup>

Long-haul and BEV capable

**1,000+**  
Hybrid miles

up to **75**  
All electric miles



## PAYLOAD <sup>4</sup>

Fleets can haul more freight, not battery weight



## DRIVER EXPERIENCE

Improved driving experience and operational performance

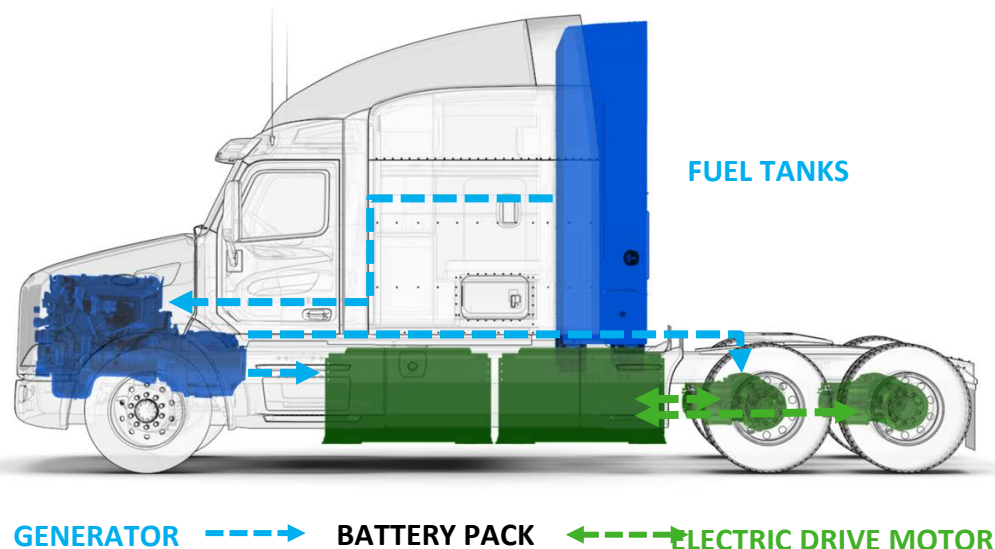
**670** Peak HP



## INFRASTRUCTURE <sup>3</sup>

Non-stop performance that leverages existing nationwide RNG network

**700+**  
Existing heavy-duty natural gas stations



## ZERO-EMISSION EV DRIVE

The Hypertruck ERX powertrain provides pure electric vehicle (EV) drive capability, with zero tailpipe emissions. This feature allows fleets to make deliveries within city limits or at ports and terminals without producing any emissions and eliminating the need to swap trucks. Power for this feature can come from DC fast-charging or the onboard generator.



1. Based on vehicle configuration and real-world conditions - results may vary depending on a number of factors, including but not limited to, exact route, road conditions, driver, load and fuel pricing 3. US & Canada [https://afdc.energy.gov/fuels/natural\\_gas\\_locations.html#analyze?fuel=CNG&cng\\_vehicle\\_class=HD&cng\\_fill\\_type=Q&cng\\_psis=3600](https://afdc.energy.gov/fuels/natural_gas_locations.html#analyze?fuel=CNG&cng_vehicle_class=HD&cng_fill_type=Q&cng_psis=3600) 4. Assumes maximum hauling capacity of 80,000lbs, 500+ mile range BEV, Hypertruck ERX vehicle weight based on Company estimates, BEV vehicle weight based on published report from the Department of Mechanical Engineering at Carnegie Mellon University



Fueling with  
natural gas  
reduces CO<sub>2</sub> and  
greenhouse gas  
emissions



## Natural Gas Reduces WTW Greenhouse Gas Emissions

Compared to Diesel:



**11% reduction**



**17% reduction**



Source: NGV America Emissions Whitepaper based on CARB LCFS

\*Numbers compared to diesel emissions (well-to-wheel)

# A Fuel in Transition

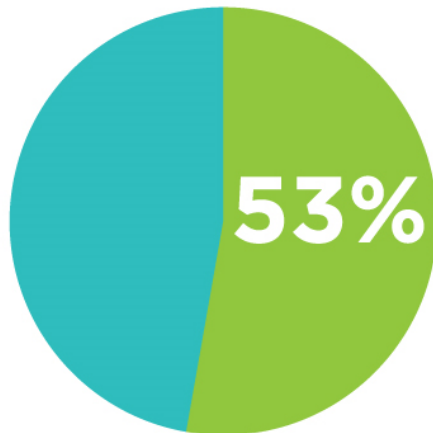
## RNG is Now the Majority NGV Fuel in U.S.

### 2020 NGV Fuel Use

**646 Million GGE Total**

In 2020, **53%**, of all on-road fuel used in natural gas vehicles was RNG

- Conventional Natural Gas  
**301 Million GGE**
- Renewable Natural Gas  
**345 Million GGE**



### RNG Growth (2016-2020)

RNG use as a transportation fuel grew **25% over 2019** volumes, increasing **267%** over the last five years and eliminating **3.5 million tons** of carbon dioxide equivalent (CO<sub>2</sub>e).



Note: GGE = gasoline gallon equivalent. EGE = ethanol gallon equivalent. EGE units are converted to GGE using a 0.69 multiplier (77,000 Btu/1121,400 Btu). Total Natural Gas in Transportation Figure derived from U.S. EIA's Annual Energy Outlook (2021) and RNG numbers derived from U.S. EPA RFS Reporting with adjustments made based on fueler member reporting. Total greenhouse gas emissions and associated carbon dioxide equivalent (CO<sub>2</sub>e) metric tons identified using average carbon intensity (CI) scores of 4.89 g/MJ for Bio-CNG and 54.93 g/MJ for Bio-LNG as reported for the last four quarters under the California LCFS and based on the percentage of RNG reported under the RFS Program - CNG (82%) and LNG (18%).

# Achieve even greater CO<sub>2</sub> and GHG emission reductions with RNG

- Q3 2021 data confirms the energy weighted carbon intensity (CI) value of California's RNG vehicle fuel portfolio is below zero at **-62.7 gCO<sub>2</sub>e/MJ** (negative CI for last 5 reporting quarters)
- ***California fleets that fueled with bio-CNG in 2020 achieved carbon negativity in 2020 for the first time ever***, with an annual average CI score of **-5.845 gCO<sub>2</sub>e/MJ**
- Renewable CNG (dairy gas) close to **-600 gCO<sub>2</sub>e/MJ**

<https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>

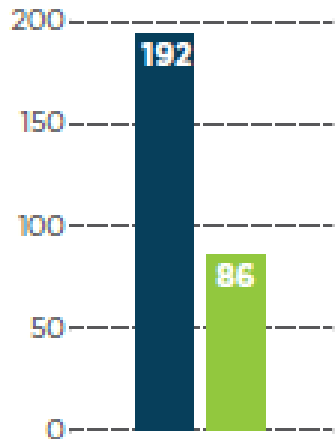


# Get More Clean HD Trucks and Buses on Road & Have a Greater Environmental Impact

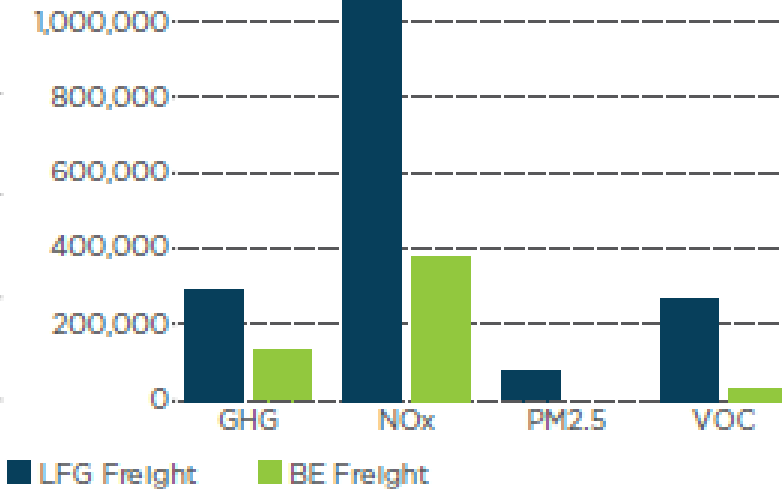
*\$25 million investment*

## Class 8 Freight

# of Freight Trucks



Freight Truck  
WTW Lifetime Emission Reduction



*Note: LFG = landfill gas, or renewable natural gas (RNG) produced from landfill waste. BE = battery electric vehicle. GHG reduction figures in tons. Criteria pollutant (NOx, PM2.5, VOC) reduction figures in pounds. The well-to-wheel (WTW) reductions for criteria pollutants and GHG emissions including benefits associated with landfill gas were calculated utilizing Argonne National Laboratory's AFLEET tool. GHG emission reduction figures will improve dramatically when refueling with RNG derived from agricultural waste.*

<https://ngvamerica.org/wp-content/uploads/2021/02/NGV-Greener-Future-February-2021.pdf>

# Proven, Scalable and On Road Today





# Thank You

## For more information:

Jeff Clarke – [jclarke@ngvamerica.org](mailto:jclarke@ngvamerica.org)

Visit: [www.ngvamerica.org](http://www.ngvamerica.org)

# NGVAMERICA

Natural Gas Vehicles for America

