



EPA 2027 & CARB Product Communications

January 2023

Confidential

EPA / CARB Emission Regulation Prediction

Heavy Duty On-Highway

2022

2024

2027

2031

EPA

EPA 0.2 NOx
435k mi EUL
100k mi Warranty

EPA 0.2 NOx
435k mi EUL
100k mi Warranty

↓ **EPA 0.035 NOx**
650k mi EUL
450k mi Warranty

EPA 0.035 NOx
650k mi
450k mi Warranty

CARB

CARB 0.2 NOx
435k mi EUL
350k mi Warranty

↓ **CARB 0.05 NOx**
435k mi EUL
350k mi Warranty

*CARB waiver for 2024
under review*

↓ **CARB 0.02 NOx**
600k mi
450k mi Warranty

CARB 0.02 NOx
800k mi
600k mi Warranty

EPA / CARB Emission Regulation Prediction

Medium Duty On-Highway

2022

2024

2027

2031

EPA

EPA 0.2 NOx
185k mi EUL
100k mi Warranty

EPA 0.2 NOx
185k mi EUL
100k mi Warranty

↓ **EPA 0.035 NOx**
350k mi EUL
280k mi Warranty

EPA 0.035 NOx
350k mi
280k mi Warranty

CARB

CARB 0.2 NOx
185k mi EUL
150k mi Warranty

↓ **CARB 0.05 NOx**
185k mi EUL
150k mi Warranty

*CARB waiver for 2024
under review*

↓ **CARB 0.02 NOx**
270k mi
220k mi Warranty

CARB 0.02 NOx
350k mi
280k mi Warranty

CARB Omnibus Opt-In States Market

State decisions continue to be very fluid

Bold = Firm

** = Draft Ruling*

Not Bold = Potential

Year	States	States	States	States
2024	Pennsylvania			
	Oregon			
	California			
2025		New Jersey		
		New York		
		Maine		
		Pennsylvania		
		Massachusetts		
		Oregon		
2026			D.C.	
			Hawaii	
			Washington	
			Vermont	
			Rhode Island	
			North Carolina	
			Maryland	
			Colorado	
			Connecticut	
			New Jersey	
			New York*	
		Maine		
		Pennsylvania		
		Massachusetts		
		Oregon		
		California		
2027			D.C.	
			Hawaii	
			Washington*	
			Vermont	
			Rhode Island	
			North Carolina	
			Maryland	
			Colorado*	
			Connecticut	
			New Jersey*	
			New York*	
		Maine		
		Pennsylvania		
		Massachusetts		
		Oregon		
		California		

Additional States that have signed MOU to adopt CARB ACT and could consider adopting Low NOx




























Cummins Scenario interpretation. Please consult your compliance group before taking actions based on this information

1/12/23

Cummins Powered Availability in 2024

CARB 2024 Waiver Approval Scenario

 Available
  Limited Availability
  Unavailable

	B6.7™	B6.7N™	L9™	L9N™	ISX12N™	X12™	X15™	X15N™
Registration Non-CARB States   Required w/CARB Warranty								
								
CARB States 								
If CARB 24 Enforced								

Volume Limitations and Surcharge may apply within CARB States, exact quantities are TBD

*Clean Idle sticker not applicable for Natural Gas

**Available in CARB through Legacy Engine Provision and ≥525hp Exemption

Clarity Drives Updated Plan

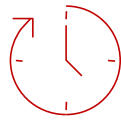
Our mission of powering a more prosperous world through our Destination Zero strategy guides everything we do

The EPA 2027 Low-NOx Final Rule provides clarity and allows Cummins to refine its product plan to provide the very best, long-term offering for our customers and concentrate our resources – and our vehicle OEM customers’ resources on delivering those solutions



Sustainability

Cummins is focused on achieving real-world NOx and greenhouse gas reductions possible. In 2026, the new X15 and X10 diesel powertrains will meet EPA 2027’s increasingly stringent regulations.



Longevity

The CARB-unique 2024 X15 is no longer necessary due to its limited lifespan. The next generation of MD & HD diesel products will carry us through the decade and well into the 2030s. Allowing for a reduction in future investment and new product programs.



Opportunity

Cummins is focused on maximizing customer value and reducing constraints. The new X15 and X10 will replace current MD & HD diesel offerings in 2026 and provide significant fuel economy improvements.

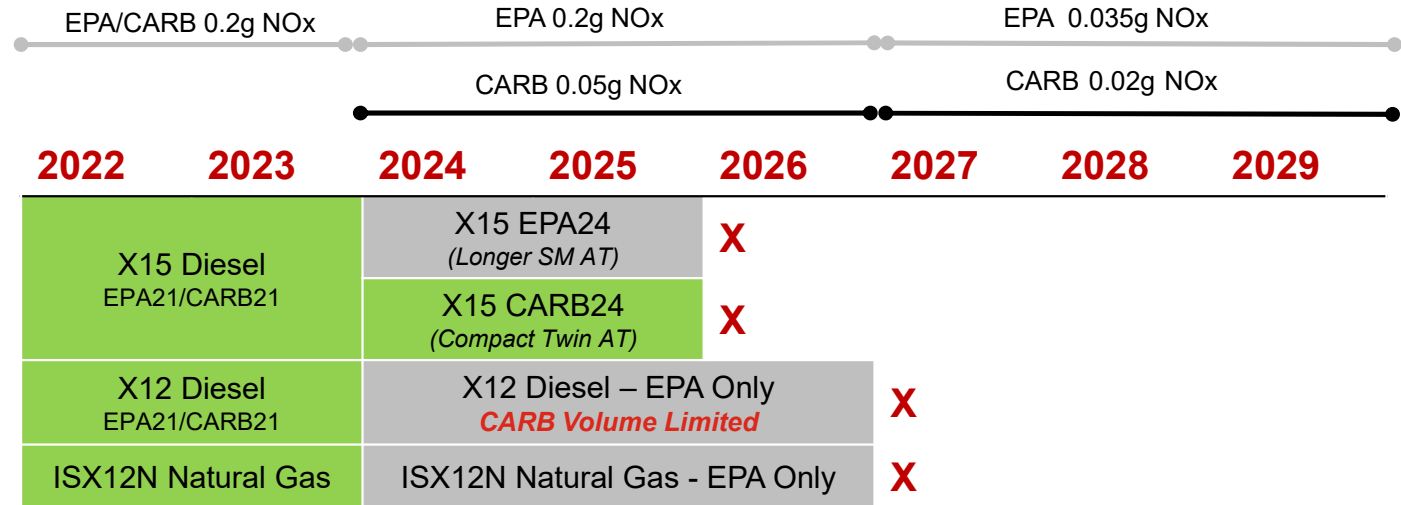
X Platform Product Plan – North America

Previous Plan

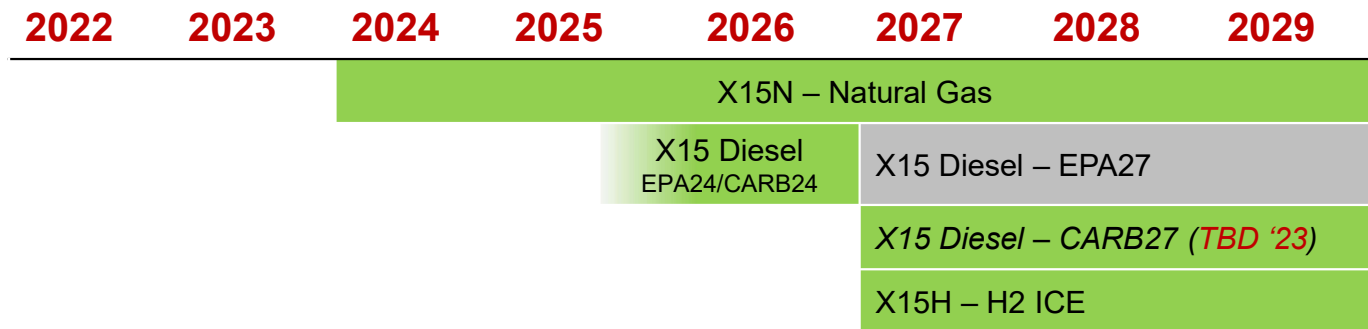
EPA & CARB Certified

EPA Only Certified

CARB Legacy Provision



Next Gen X15



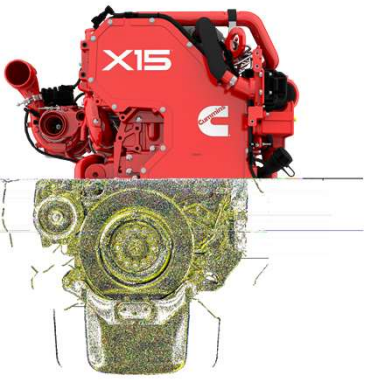
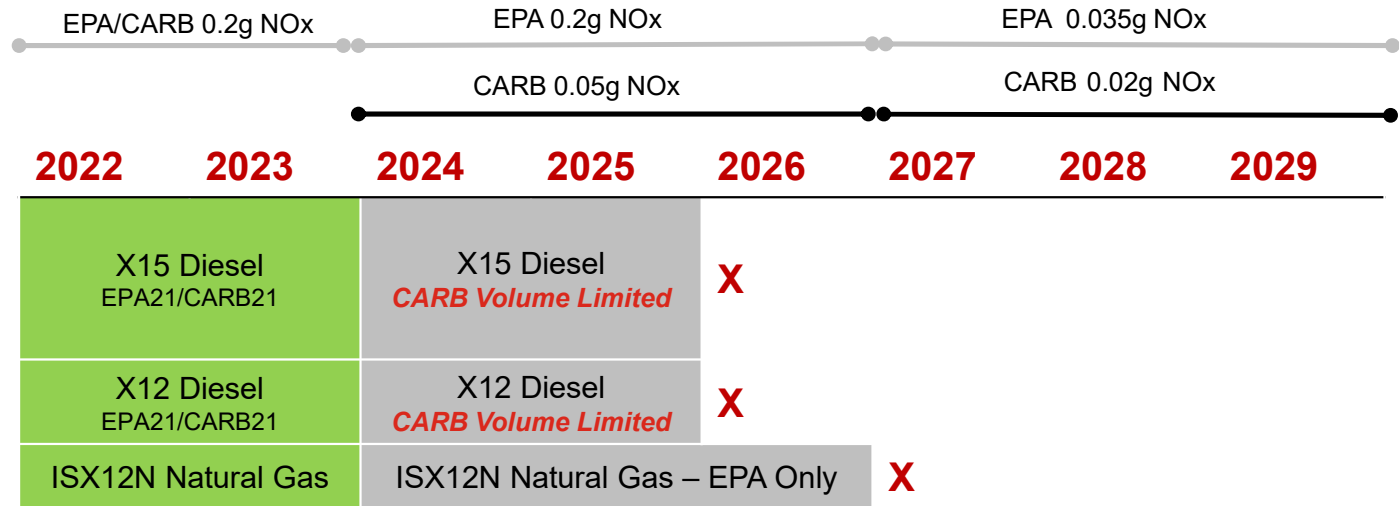
X Platform Product Plan – North America

New Plan

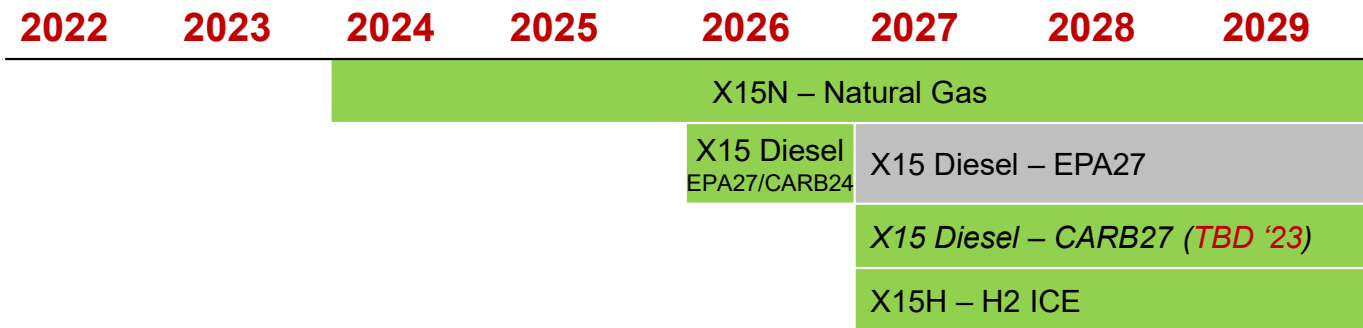
EPA & CARB Certified

EPA Only Certified

CARB Legacy Provision



Next Gen X15



12/19/2022

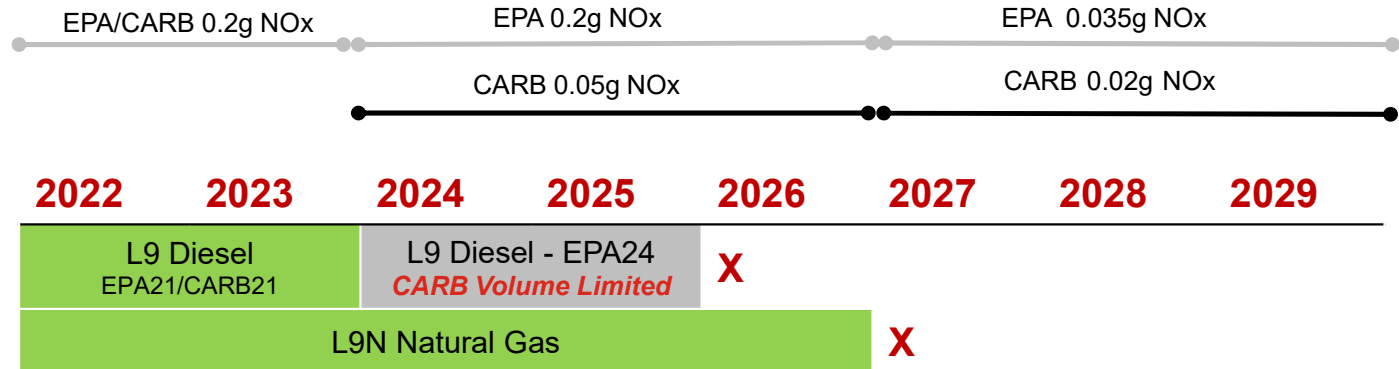
L/X Platform Product Plan – North America

EPA & CARB Certified

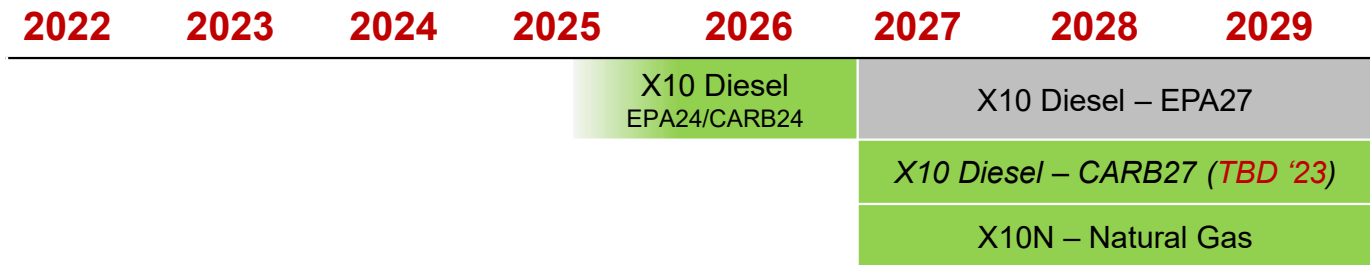
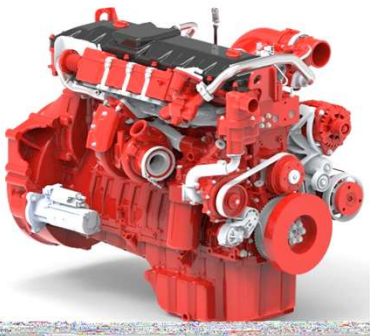
EPA Only Certified

CARB Legacy Provision

Previous Plan



Next Gen X10



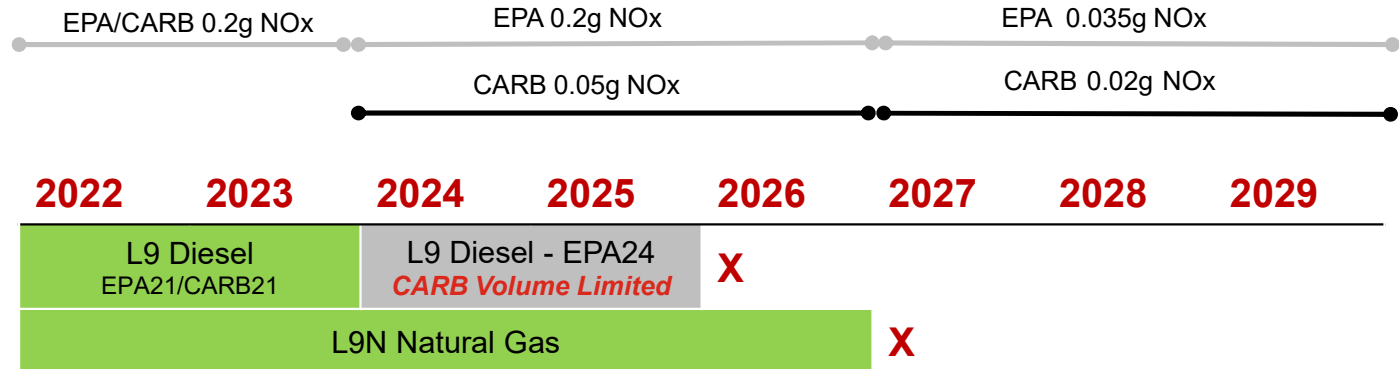
L/X Platform Product Plan – North America

New Plan

EPA & CARB Certified

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CARB Legacy Provision



Year	2022	2023	2024	2025	2026	2027	2028	2029
L9 Diesel	EPA21/CARB21		L9 Diesel - EPA24 CARB Volume Limited		X			
L9N Natural Gas						X		

Next Gen X10



Year	2022	2023	2024	2025	2026	2027	2028	2029
X10 Diesel					EPA27/CARB24	X10 Diesel – EPA27		
X10 Diesel						X10 Diesel – CARB27 (TBD '23)		
X10N – Natural Gas								

12/19/2022

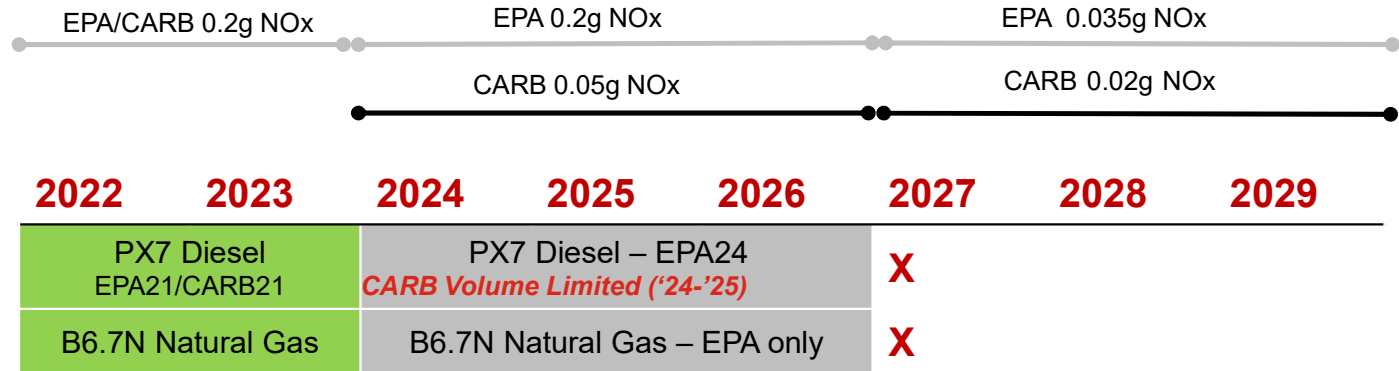
B Platform North America Product Plan

No Change to Plan

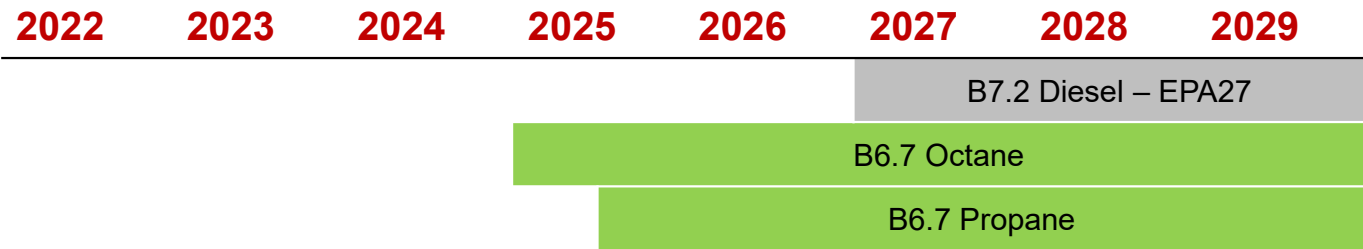
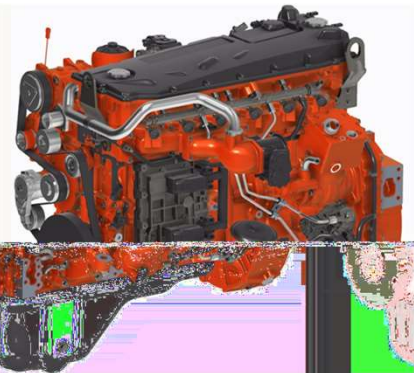
EPA & CARB Certified

EPA Only Certified

CARB Legacy Provision



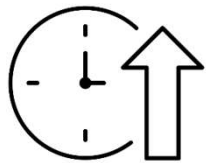
Next Gen B



12/19/2022

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X15N VALUE DRIVERS



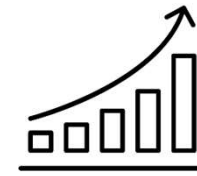
Enhanced Reliability (More Uptime)

- 50+ years of natural gas knowledge and know-how integrated into uptime design
- Reliability-enabling digital features
- Cummins service & support network



Lower Total Cost of Operation*

- Up to 10% GHG/FE improvement
- Increased oil drain intervals
- Increased spark plug life
- Lower weight than ISX12N enables increased payload



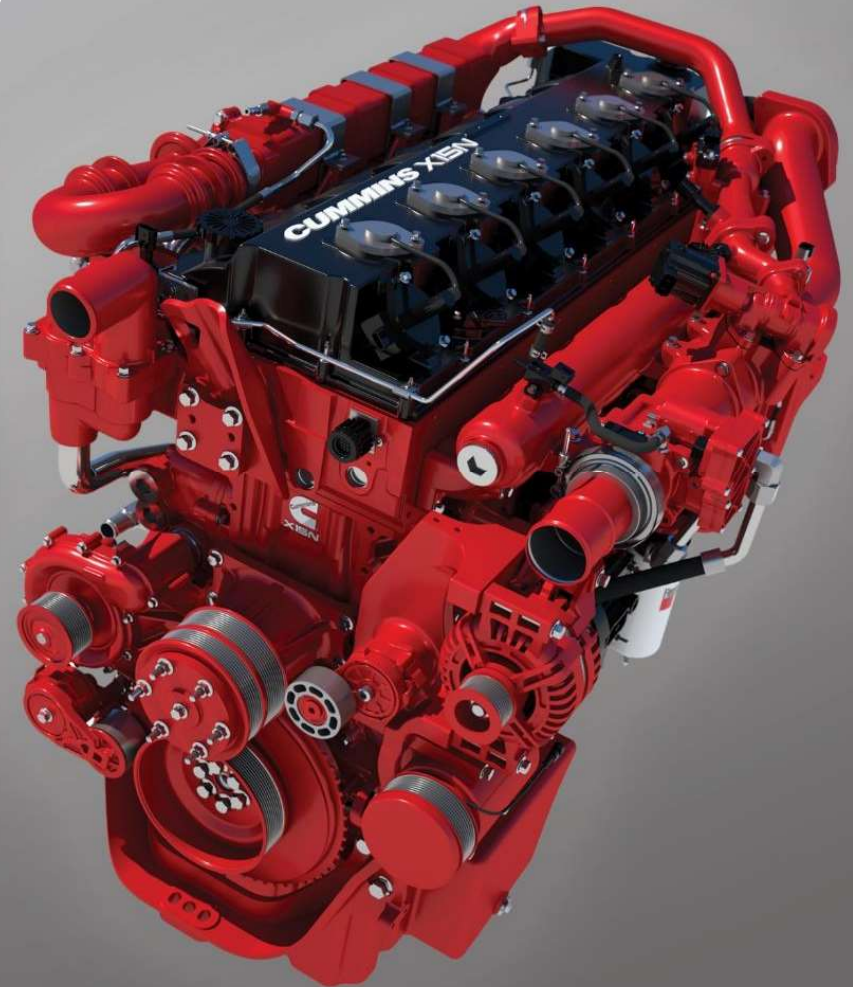
Better Performance*

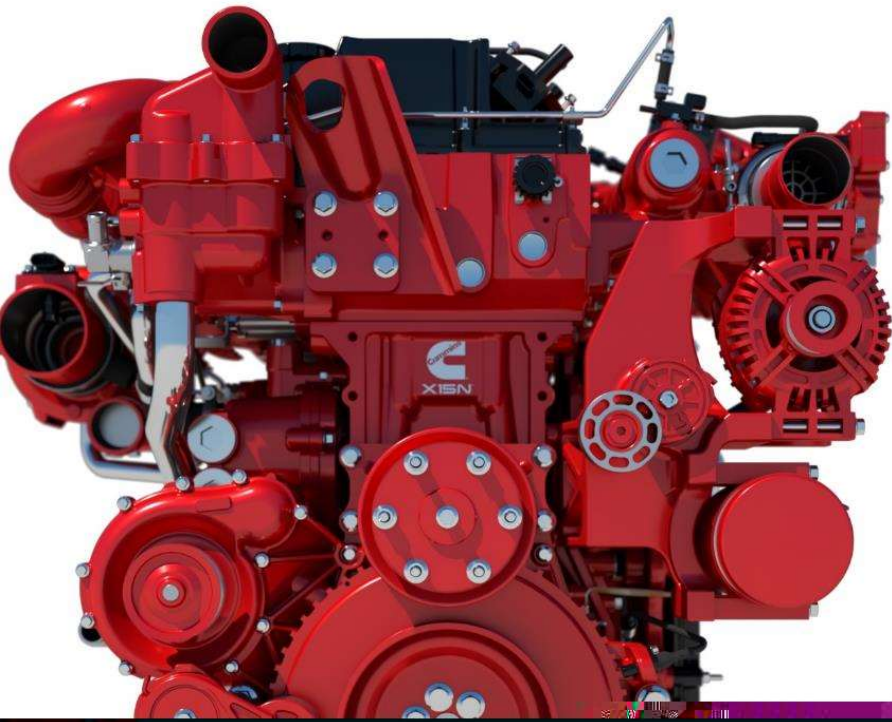
- Increased power/torque
- Up to 500 hp/1850 lb-ft
- Broader peak torque speed band
- Improved transient response
- Increased braking power
- Endurant Transmission Integration

*When compared to ISX12N

**THE CUMMINS
X15N**

**BRINGS IT ALL
TOGETHER**



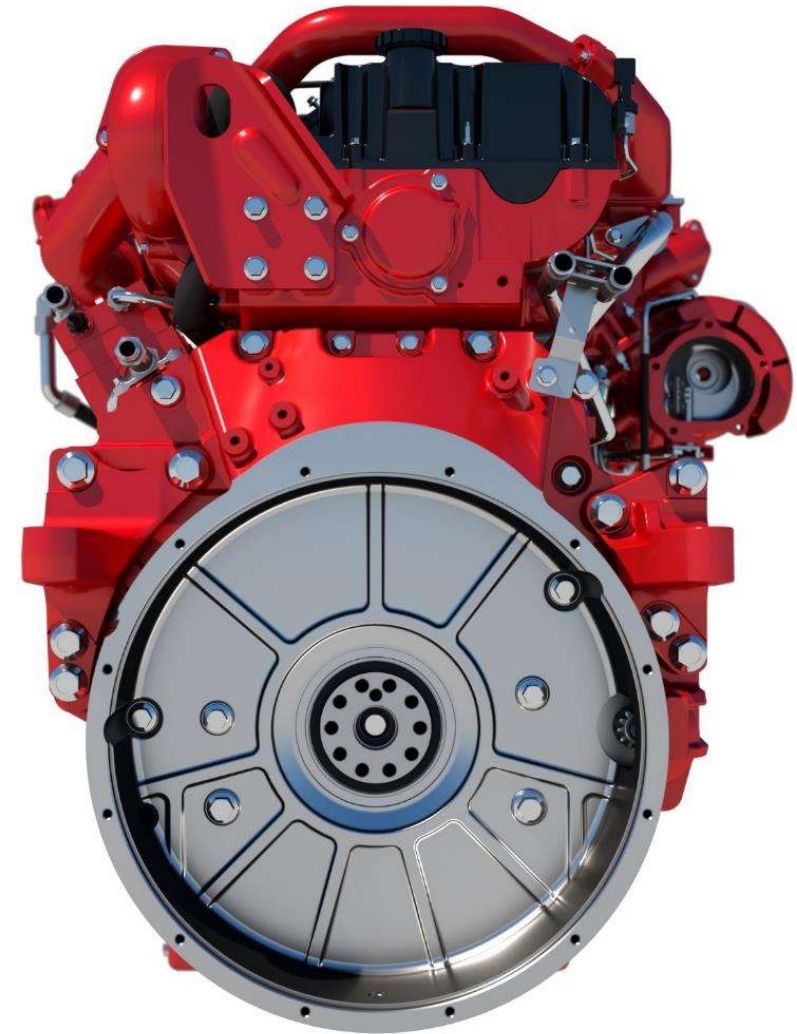


X15N HIGHLIGHTS

- The industry's first big-bore natural gas powertrain
- Designed for linehaul heavy duty applications
- Capable of meeting stringent CARB24/27 and future EPA NOx regulations
- Up to 500 hp /1,850 lb-ft of torque
- Compact 15 Liter – targeting ISX12N and 13L chassis installations

X15N HIGHLIGHTS

- ~500 lbs lighter than diesel 15L engine
- Can utilize RNG for carbon-negative well to tailpipe emissions
- Maintenance-free passive aftertreatment system
- Manufactured in Jamestown, NY along with other heavy duty Cummins engines



X15N PRODUCT FEATURES

Base Engine

- EPA and CARB certified
- Rear Geartrain
- Advanced combustion management

Air Handling

- Dual Wastegate Turbocharging
- Advanced Cooled EGR

Lube and Cooling

- Closed Crankcase Breather
- Elimination of Coolant Filter



Vehicle Integration

- Integrated with Endurant (& Allison) transmissions
- Full powertrain feature suite

Fuel System

- Next generation fuel system
- Integrated with vehicle fuel system partners

Electronics System

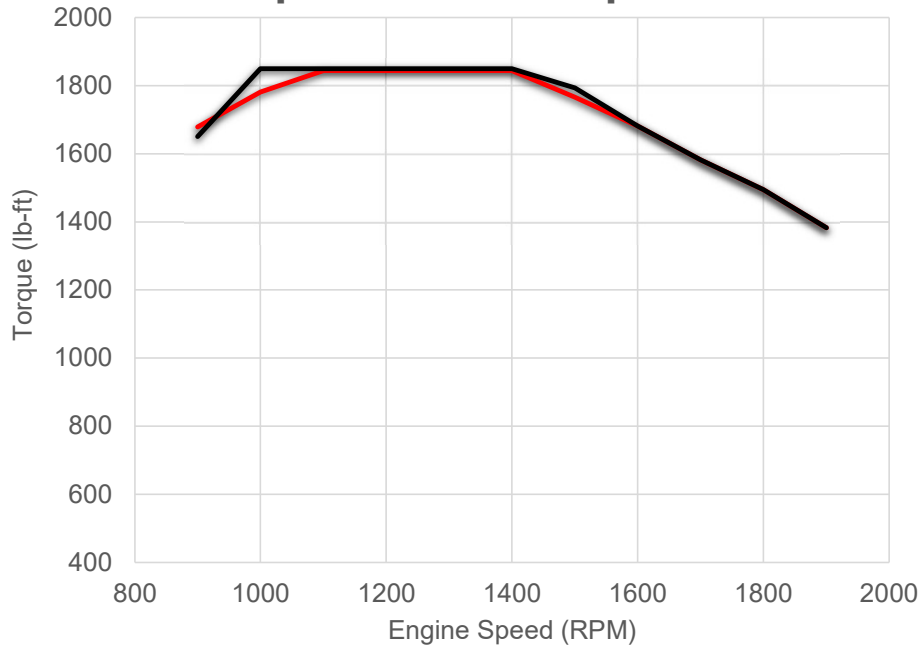
- CM2380 ECM
- Next generation connectivity solutions



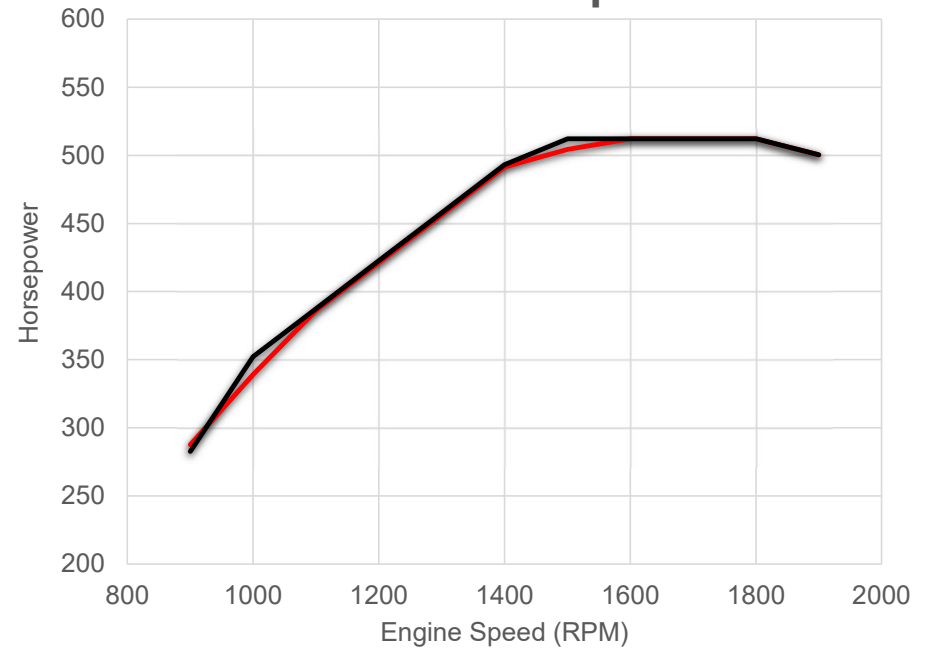
Passive AT System

Diesel Like Power and Torque

Torque Curve Comparison



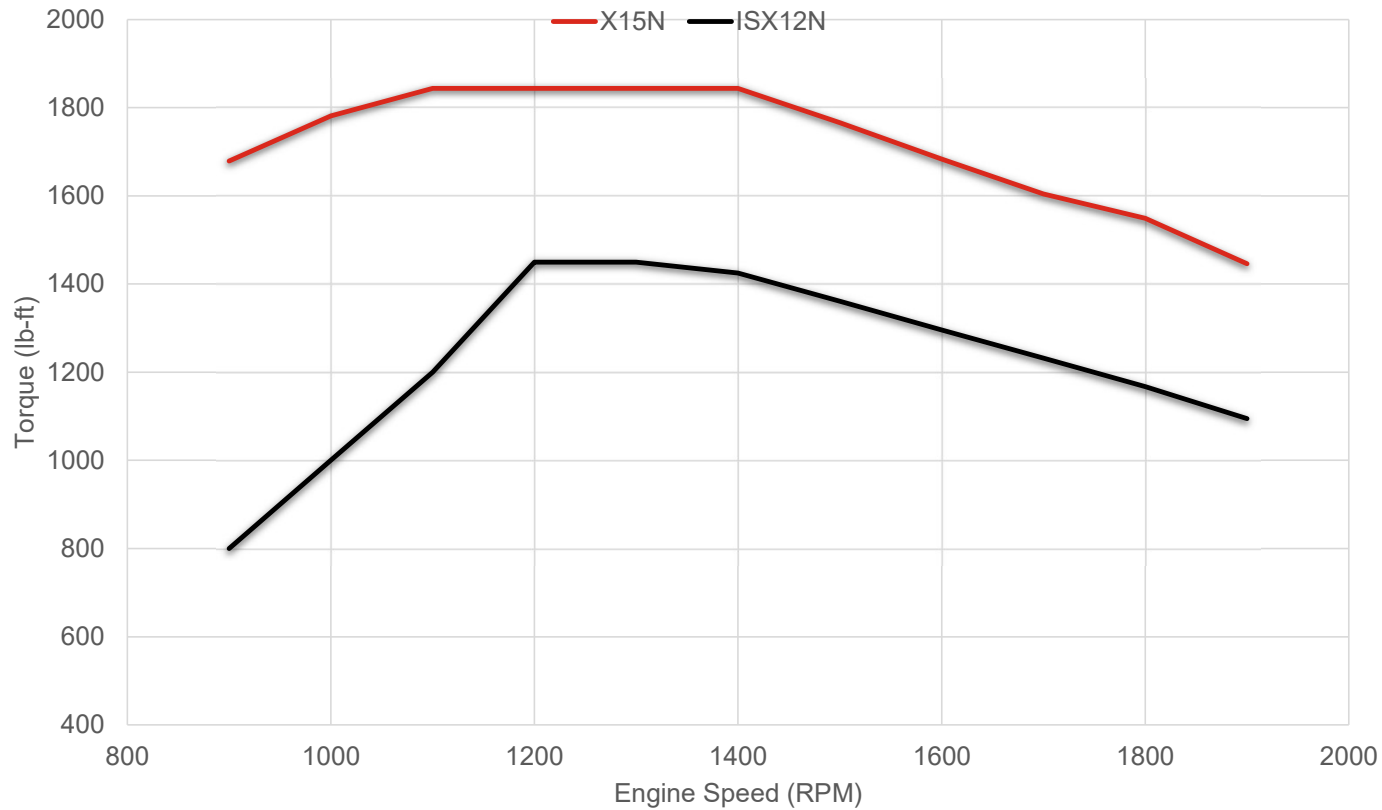
Power Curve Comparison



— New X15N — X15 Diesel

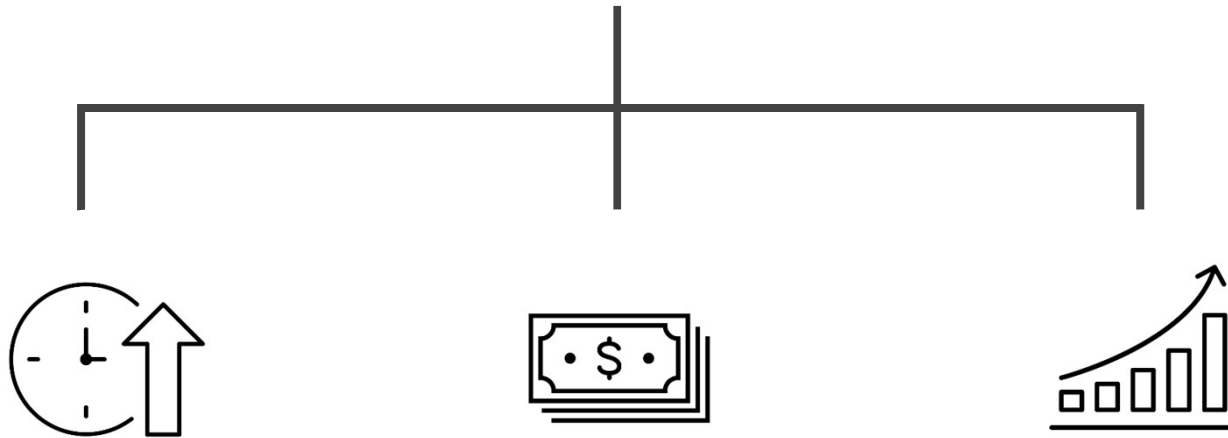
X15N™ vs. ISX12N

Torque Curve Comparison



ADDITIONAL VALUE FOR FLEETS ON THE PATH TO ZERO

X15N™

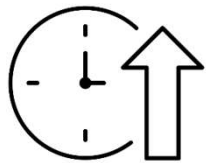


**Enhanced Reliability
(More Uptime)**

**Lower Total Cost
of Operation**

**Better
Performance**

X15N VALUE DRIVERS



Enhanced Reliability (More Uptime)

- 50+ years of natural gas knowledge and know-how integrated into uptime design
- Reliability-enabling digital features
- Cummins service & support network



Lower Total Cost of Operation

- Up to 10% GHG/FE improvement
- Increased oil drain intervals
- Increased spark plug life
- Lower weight than ISX12N enables increased payload
- Cummins resale value



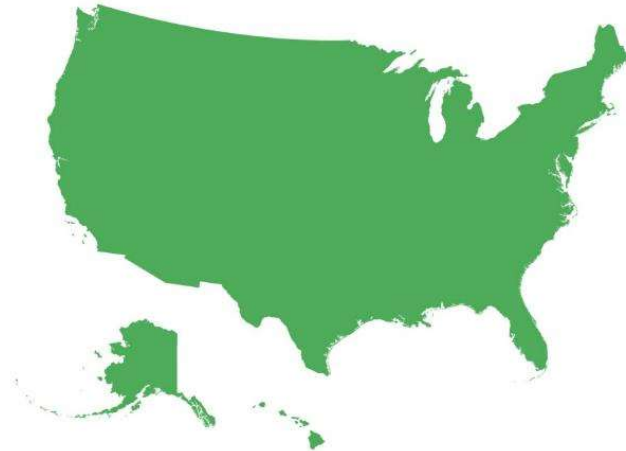
Better Performance

- Increased power/torque
- Up to 500 hp/1850 lb-ft
- Broader peak torque speed band
- Improved transient response
- Increased braking power
- Endurant Transmission Integration

RNG IS ALREADY THE MOST USED FORM OF CNG



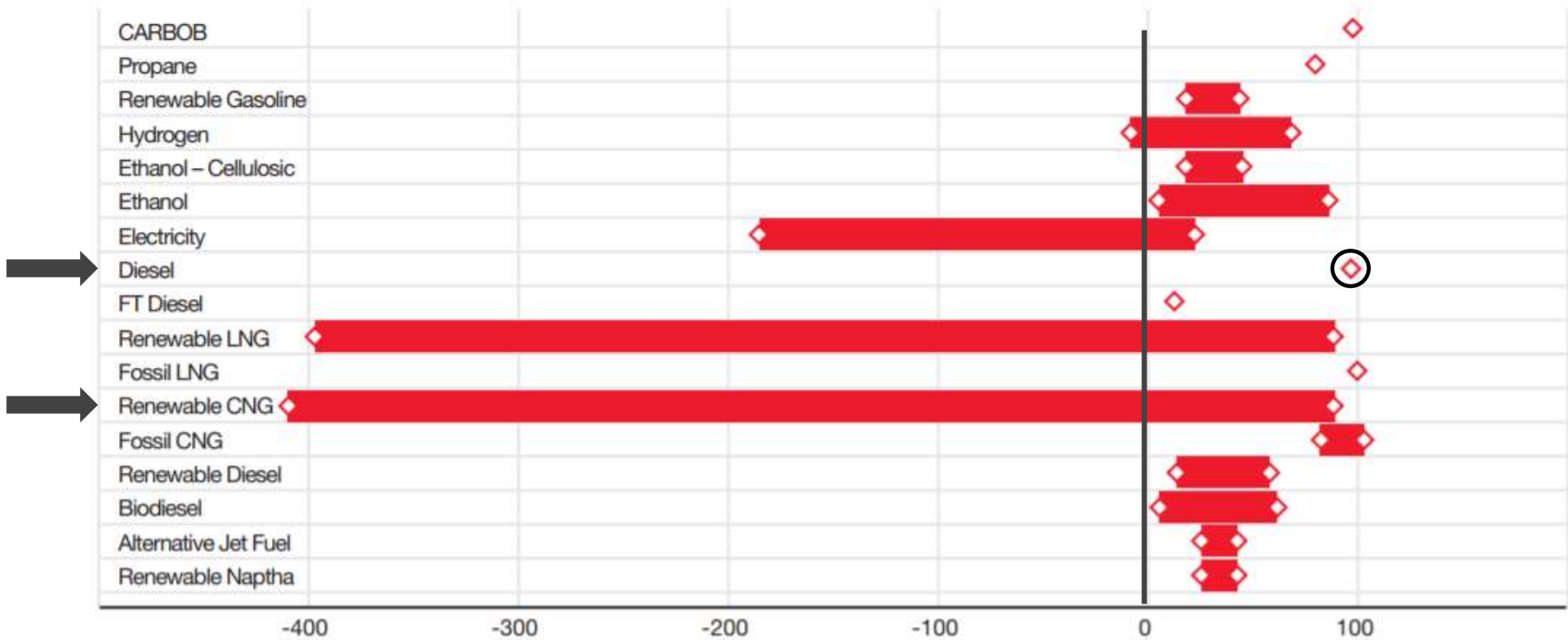
98% of all CNG used for transportation
in California in 2021



64% of all CNG used for transportation
in the U.S. in 2021

Source: Natural Gas Vehicles America, "Decarbonize Transportation with Renewable Natural Gas," May 2022, accessed at <https://ngvamerica.org>.

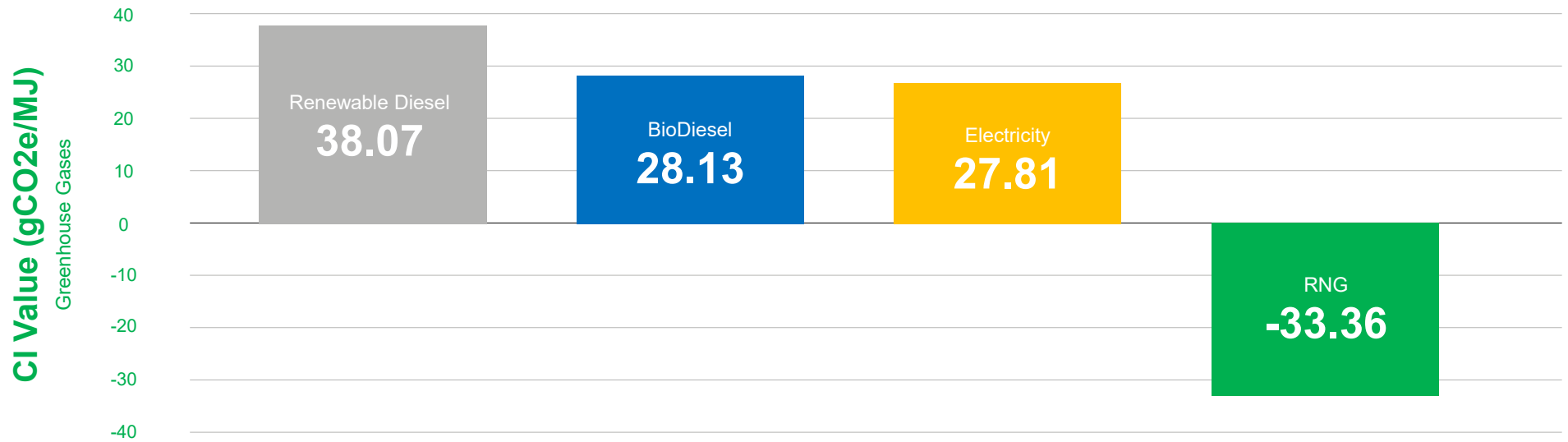
CALIFORNIA AIR RESOURCES BOARD CARBON INTENSITY VALUES BY ENERGY SOURCE



EER-Adjusted CI (gCO₂/MJ)

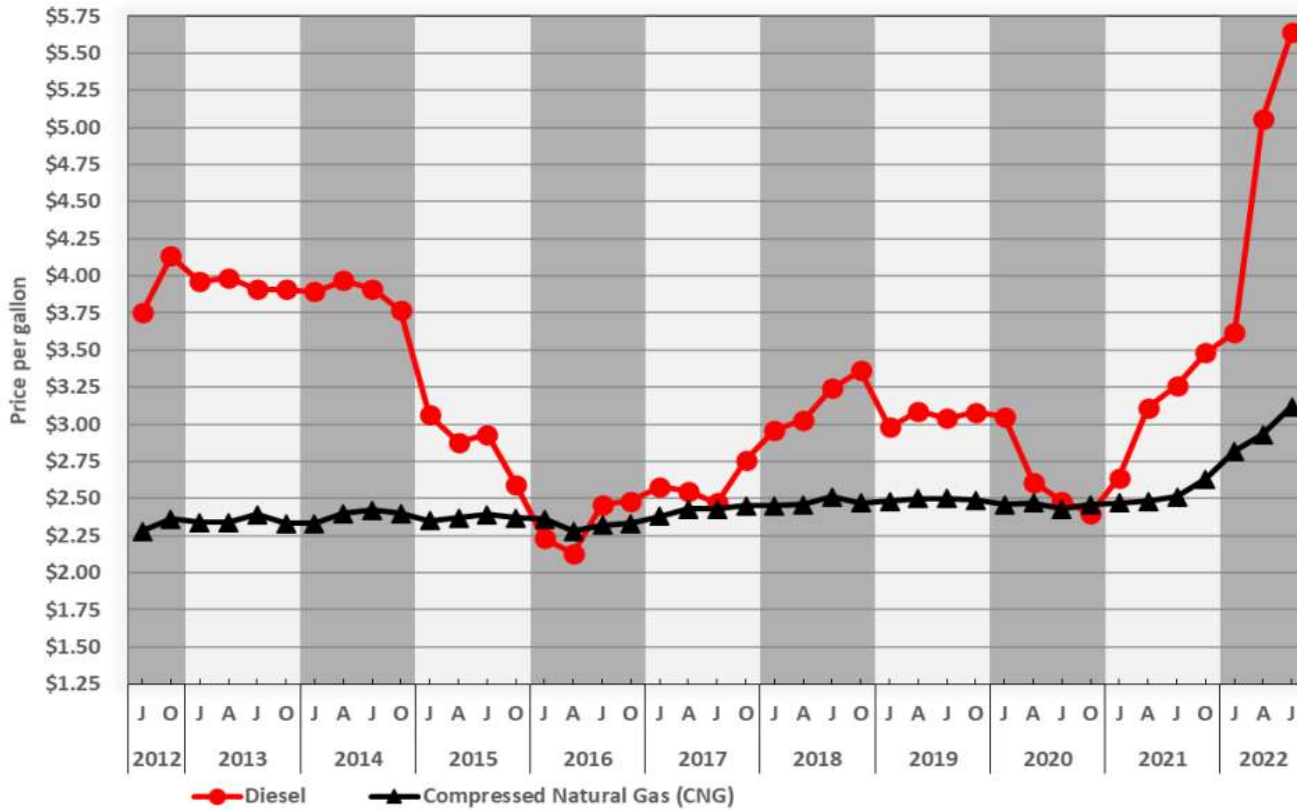
Source: California Air Resources Board, April 2020

GO CARBON NEGATIVE NOW - WITH RNG



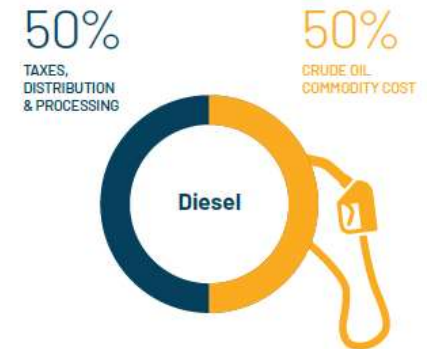
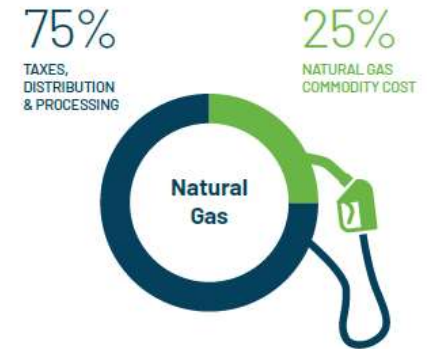
Source: California Air Resources Board Low Carbon Fuel Standard Program 2021 Data
<https://cngvp.org/wp-content/uploads/2022/06/CARB-Data-Fact-Sheet-July.pdf>

FUEL PRICE STABILITY



https://afdc.energy.gov/files/u/publication/alternative_fuel_price_report_july_2022.pdf
Pg 9, CNG prices in DEG – Diesel equivalent gallon

WHAT MAKES UP THE TOTAL PRICE AT THE PUMP?

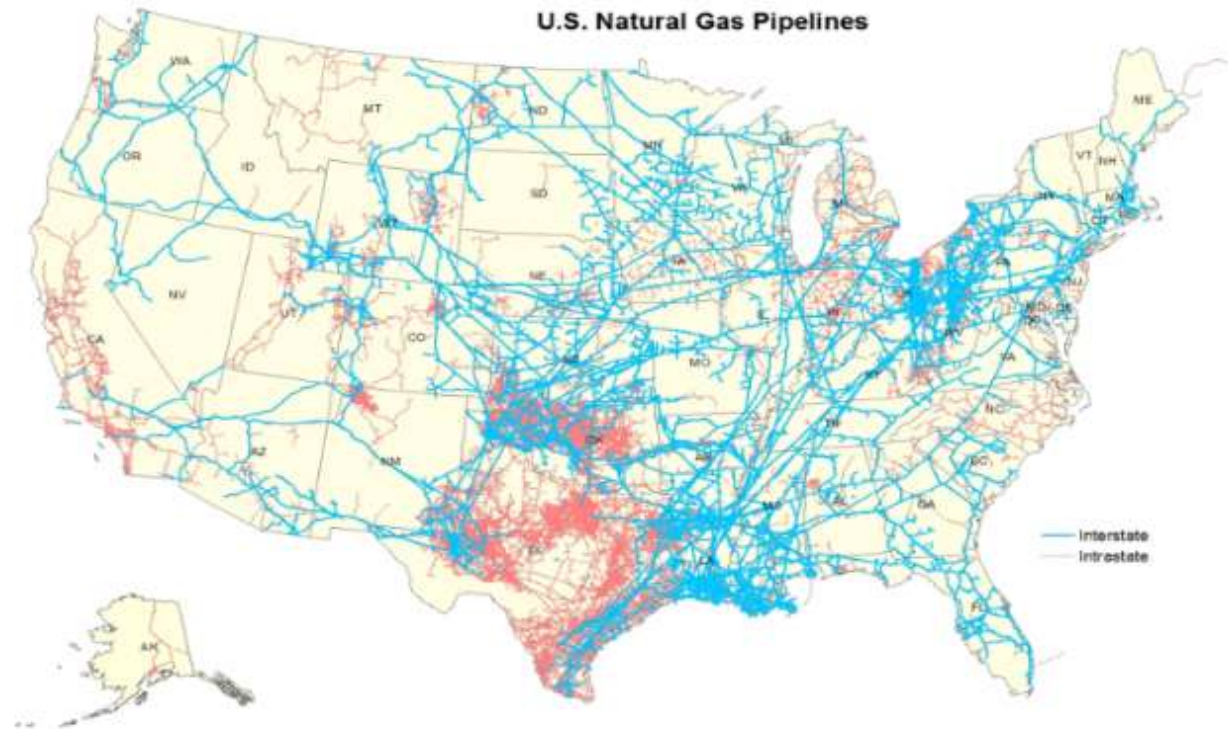


Natural Gas Vehicles America, "Decarbonize Transportation with Renewable Natural Gas"

US NATURAL GAS INFRASTRUCTURE

Pipeline

- 305,000 miles of inter- and intrastate natural gas pipeline
- 2.5 million miles of underground natural gas distribution lines



US NATURAL GAS INFRASTRUCTURE



Fueling Stations

- **Current**
 - 1,680 CNG Stations
 - 144 LNG Stations
- **Additional Planned by 2025**
 - 50 CNG
 - 38 LNG

Source: [Alternative Fuels Data Center: Natural Gas Fueling Station Locations \(energy.gov\)](https://www.energy.gov/alternative-fuels-data-center/natural-gas-fueling-station-locations)