

X15N™

Update

David King

Product Manager – Natural Gas Engines
Cummins Inc.

September 2024



X15N™

The Future of Natural Gas Power IS NOW

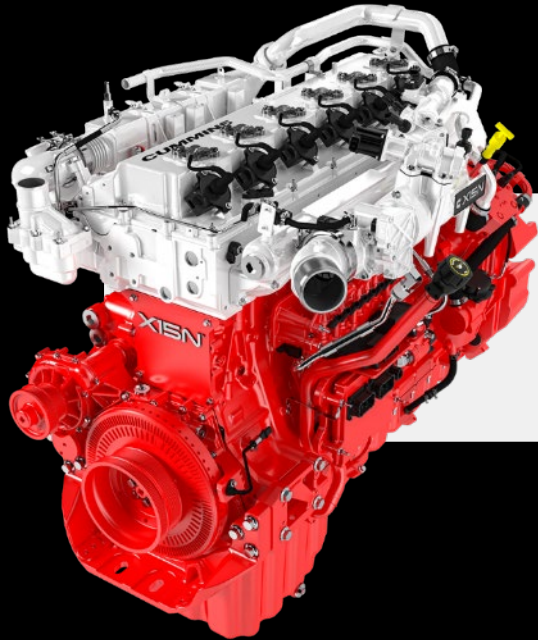


HELM™

HIGHER EFFICIENCY. LOWER EMISSIONS. MULTIPLE FUELS.

UNIFIED GLOBAL PLATFORM: X15 SERIES

Reliable | Durable | Scale | Common



Natural Gas



Advanced Diesel

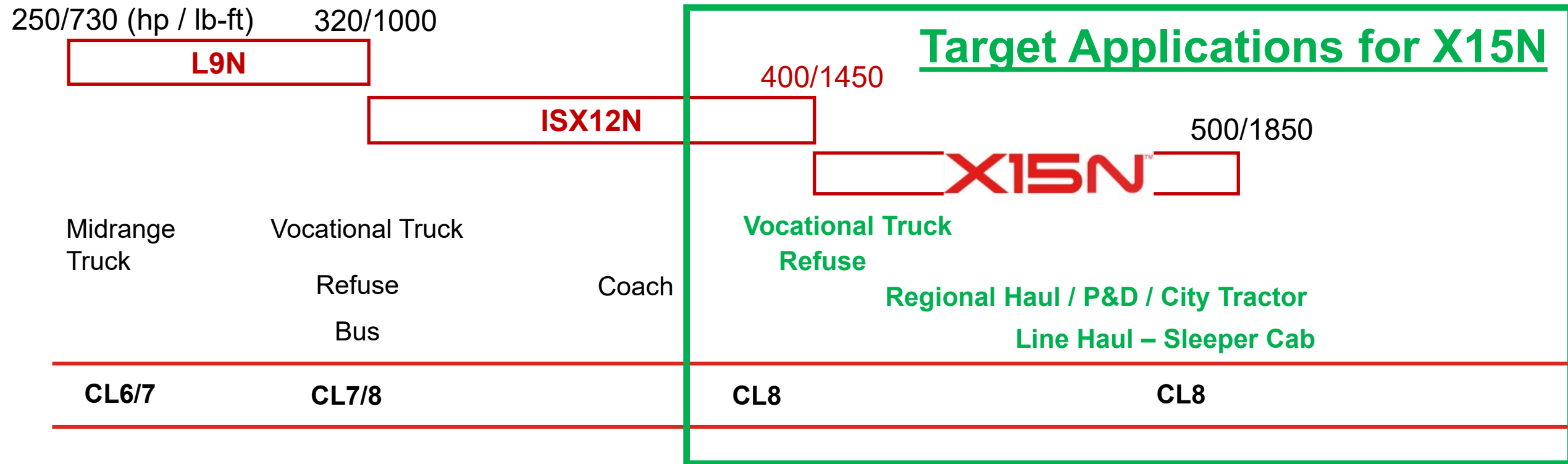


Hydrogen

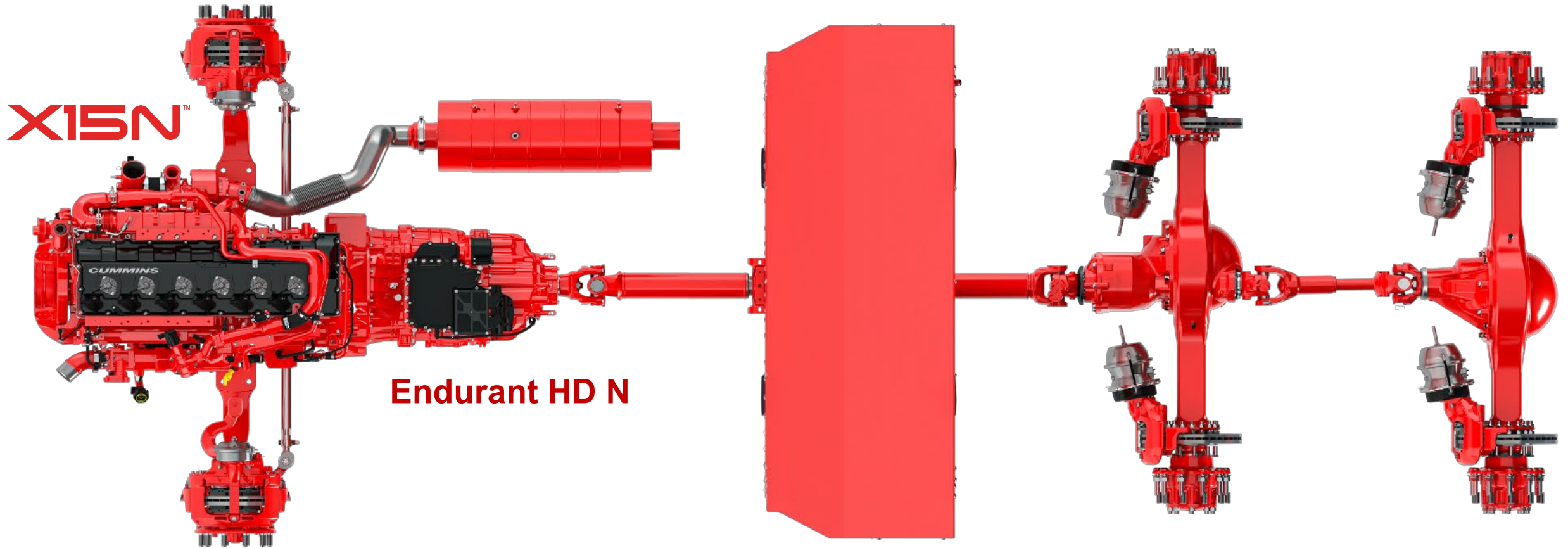


Natural Gas Applications

The Natural Gas Power Landscape

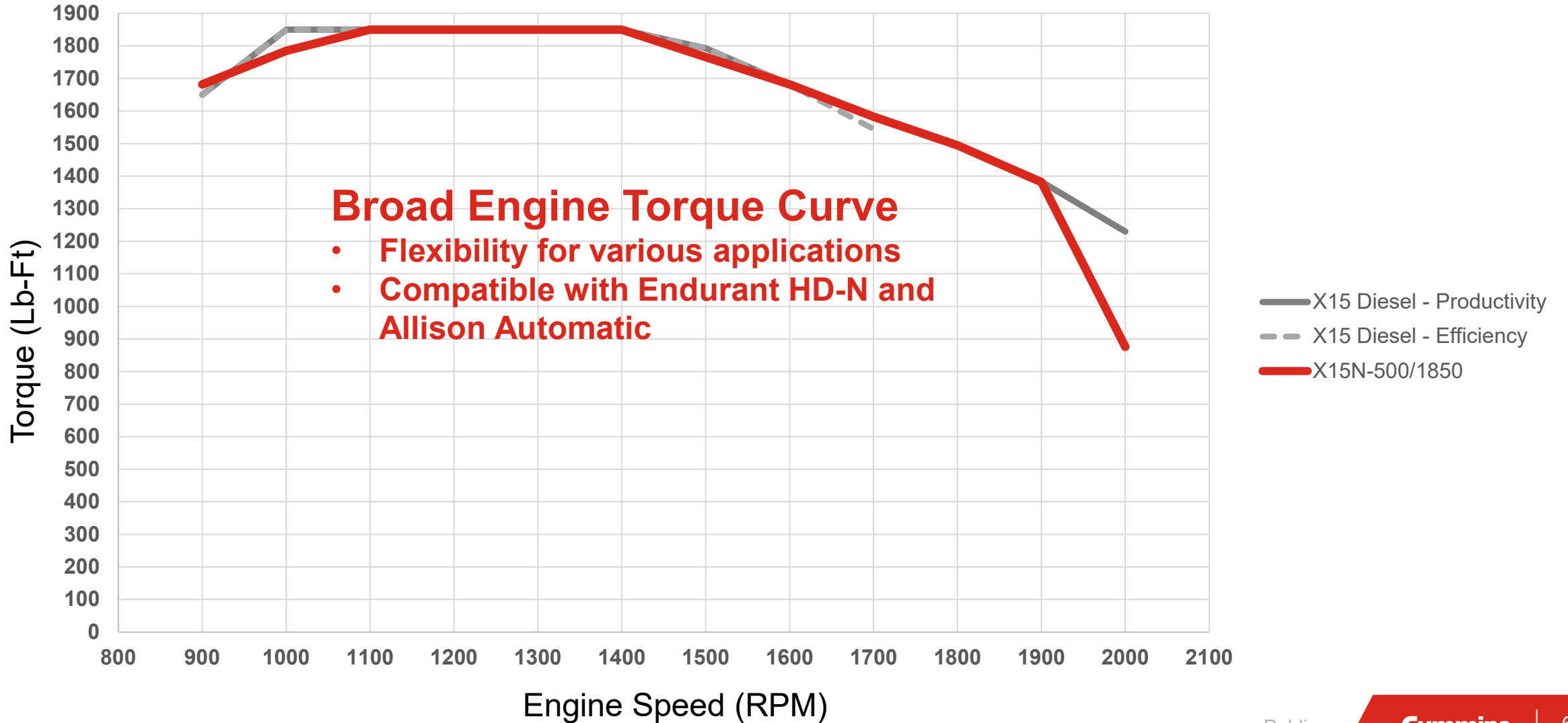


Cummins Integrated Powertrain

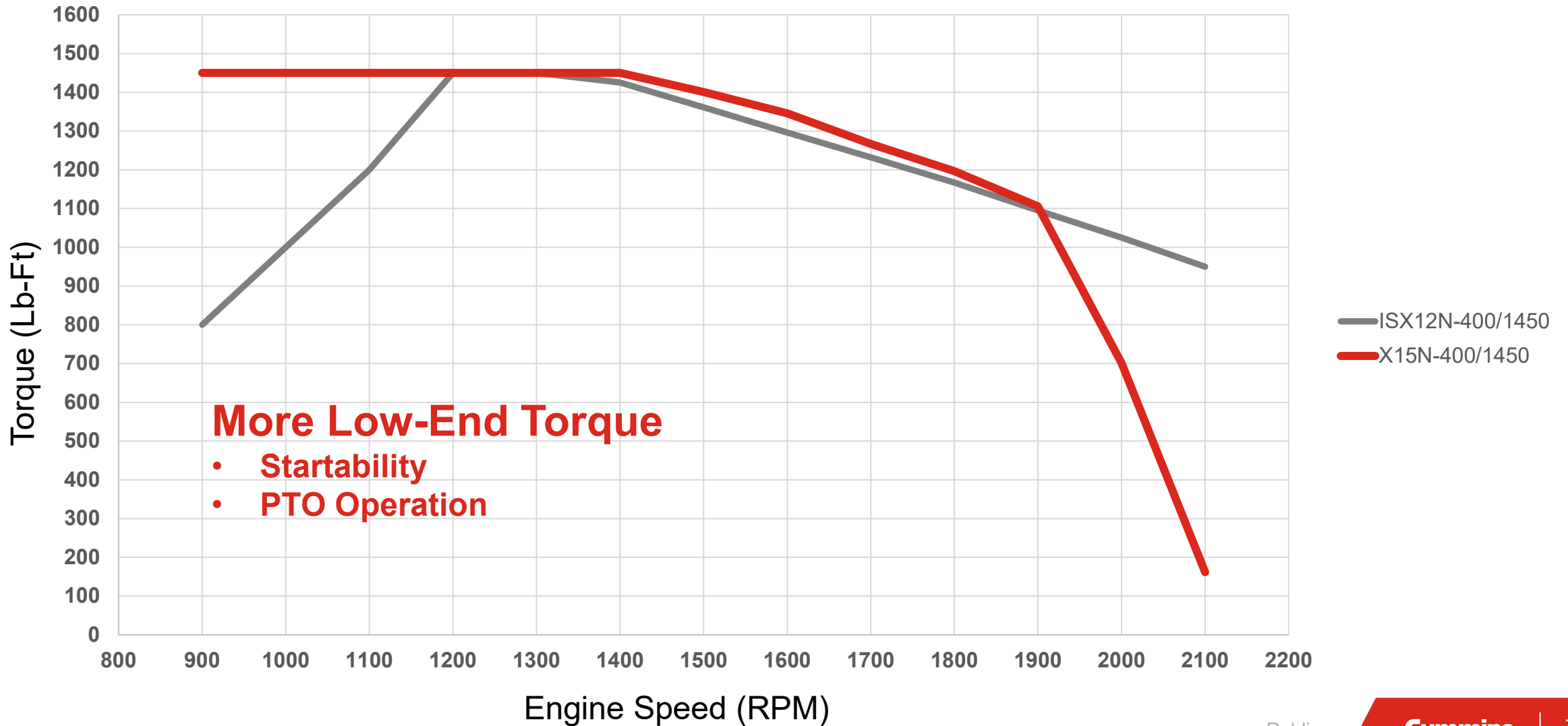


Endurant HD N

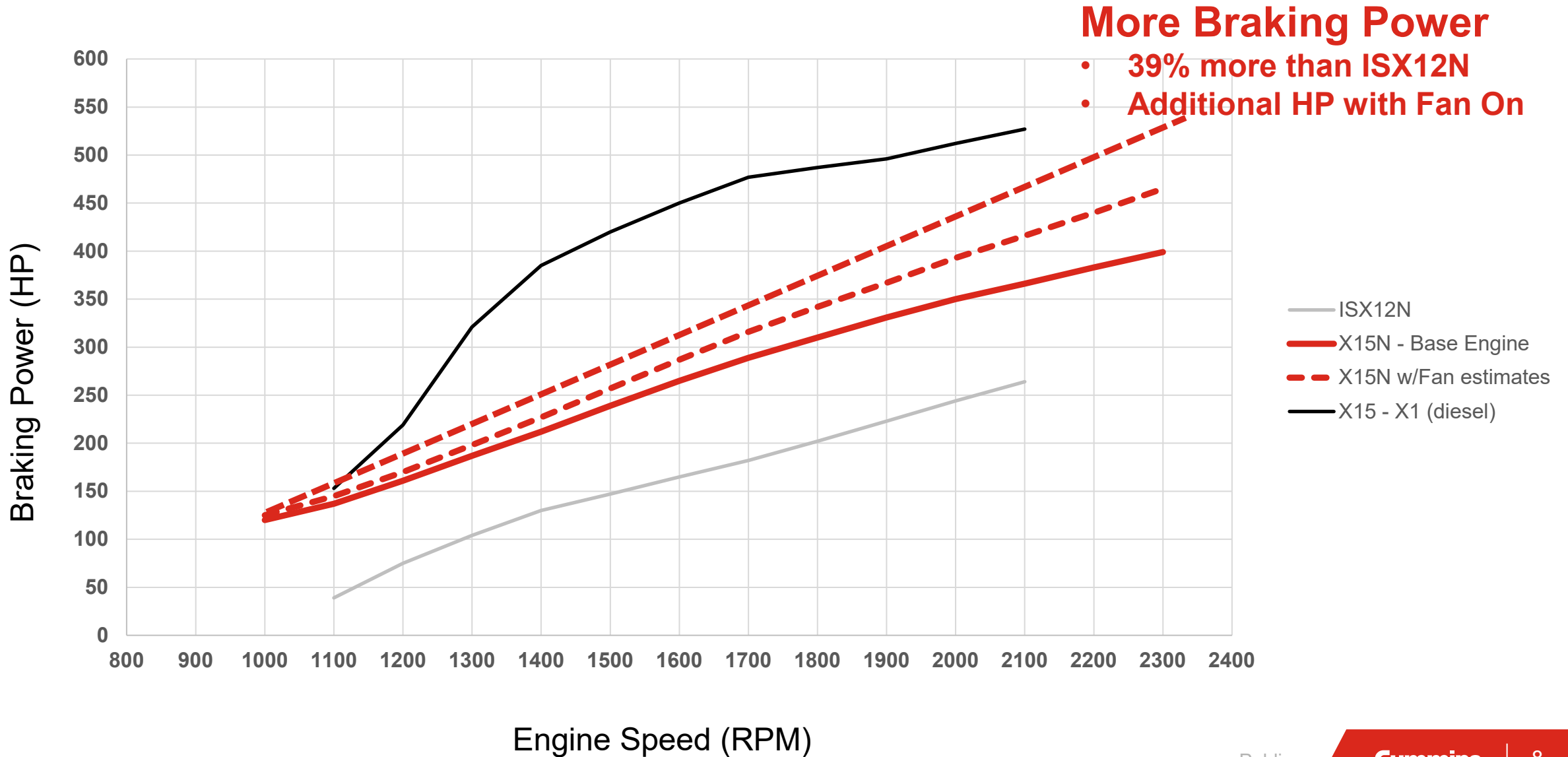




X15N™ COMPARISON TO ISX12N™ @ 400 hp / 1450 lb-ft



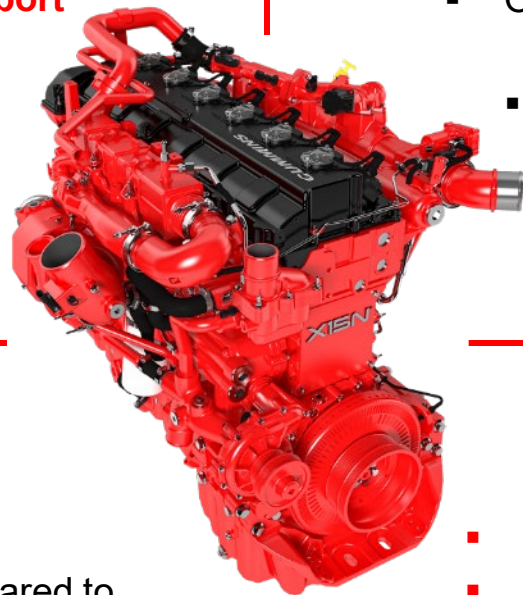
X15N™ BRAKING POWER





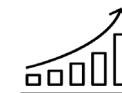
RELIABLE AND DURABLE

- **Power, torque and performance for the HD market**
- Built on 30+ years of natural gas experience
- Integrated powertrain for a full Cummins solution
- **Full OE network and Cummins service channel support**
- Known maintenance practices
 - Simple aftertreatment
 - Familiar engine technology
 - Extended Service Intervals vs. ISX12N
- Reliability improvements over ISX12N



X15N™

SCALABLE



- **Natural Gas is the least disruptive alt fuel technology**
- **1-to-1 vehicle replacement for diesel**
- Established supply chain for product production
- Over 800 + public stations
 - Behind the fence refueling options
- Known technology
 - Familiar engine architecture
 - Incremental technician training



COMMERCIALLY VIABLE

- **Over 1,000-mile range for line-haul applications²**
- Lower incremental acquisition cost for the vehicle compared to BEV and fuel cell
- **Multi-shift operation capable**
 - No additional downtime
 - Fast fill refueling time
- **Stable, low-cost fuel means price predictability**
- Natural Gas is available NOW
 - 70,000+ vehicles operating in North America today

SUSTAINABLE



- **Best well-to-wheel GHG reduction option**
- **Net carbon negative solution when using RNG**
- ~ 750 new RNG production projects coming online³
- Up to 10% fuel economy & GHG improvements over ISX12N⁴
- CARB and EPA emissions solution for '24 at launch

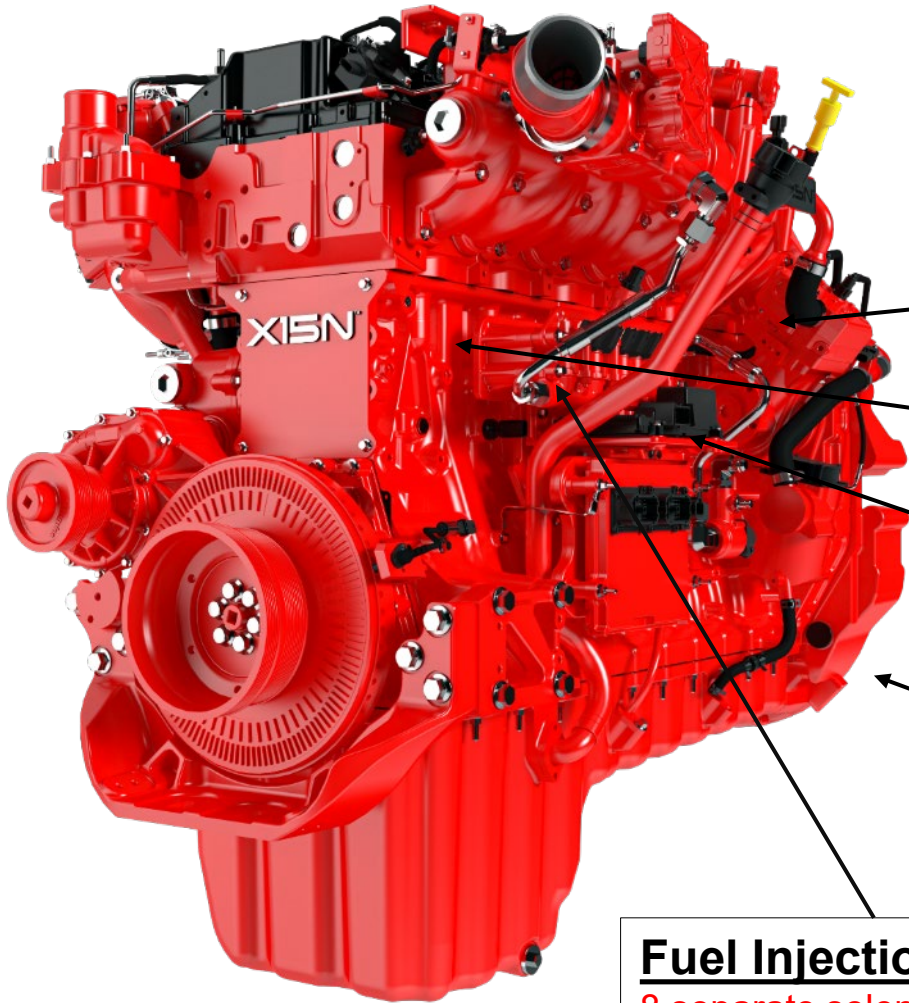
¹ Driver education needed

² Dependent on tank configuration, driving behavior

³ Includes sites that are currently operational, under construction or planned

⁴ With equivalent rating and comparable duty cycle

X15N™ ENGINE WALKAROUND



Increased Power & Torque

New platform with 15L displacement and engine management system to deliver up to **500 hp / 1850 lb-ft** of torque

Power Cylinder

Improved oil control – **Improved Oil drain intervals, reduced oil consumption** and improved combustion control

Pistons

Steel pistons for durability and improved combustion chamber and component temperature control

Ignition and Injection Control System

New integrated ignition and injector control system vs two independent systems

CCV System

Incorporates **improved motor, bearing system** from ISX12N

Fuel Injection System

8 separate solenoids vs. large single fuel control valve for improved fuel control

X15N™ ENGINE WALKAROUND

Turbocharger

Dual entry wastegate and upgraded materials for improved durability and altitude capability and performance

Spark Plugs

Increased ceramic strength and electrode geometry and material for improved spark plug life

Cylinder Head

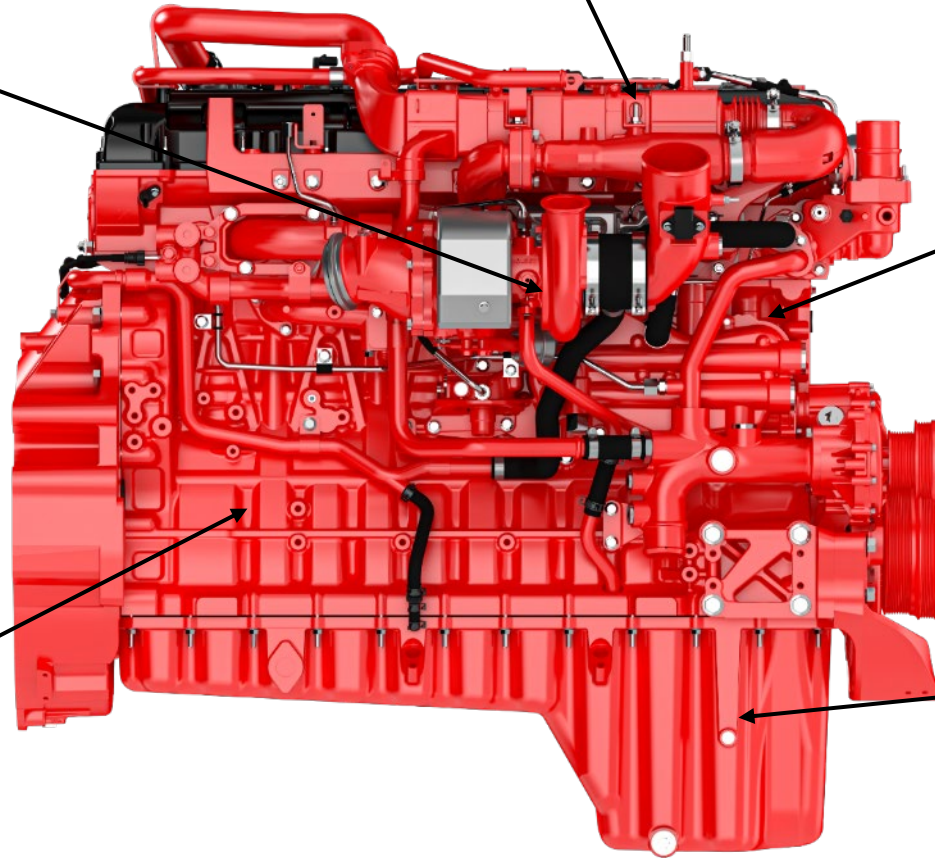
Natural gas specific head allowing for improved thermal distribution and improved spark plug life

High-Capacity Oil Pan

Increased oil capacity for extended oil drain intervals

Sculpted Block

Compact design and reduced weight vs ISX12N



X15N™ Maintenance Intervals

| Oil Drain Interval by Fuel Consumption | | | | | |
|---|-----------------------------|-----------------------|-----------------------------|---------------------|-------------------------|
| | Extreme Severe (< 3 mpg) | Severe (< 3-5 mpg) | Short Haul (5 – 5.9 mpg) | Normal (> 6 mpg) | |
| Oil Classification | Miles (Kilometers) | Miles (Kilometers) | Miles (Kilometers) | Miles (Kilometers) | ISX12N Hours (Miles) |
| CES 20092 | 15,000 (24,000) | 25,000 (40,000) | 50,000 (81,000) | 60,000 (97,000) | 1000(40,000*) |
| Valvoline™ Premium Blue™ One Solution™ Gen 2 | 15,000 (24,000) | 30,000 (48,000) | 55,000 (89,000) | 65,000 (105,000) | N/A |

* Assumes average speed of 40mph for Regional and Line-haul truck

Spark Plug Life:

- X15N - 60K miles on a Normal duty cycle (aligned with ODI)
 - ISX12N – 1000HRS(assume 40K* miles) on a Normal duty cycle (aligned with ODI)

Over-head Reset:

- X15N - 60K miles for the initial reset
 - ISX12N – 1000HRS(Assume 40K* miles) for the initial reset
- X15N -180K for subsequent resets
 - ISX12N – 3000HRS(assume 120K* miles) for subsequent resets

X15N™ Reliability & Durability

HELM™ PLATFORM

10 Years of research and development

57K+ Hours of in-house and overload testing

13M Miles of global pre-production on-road testing

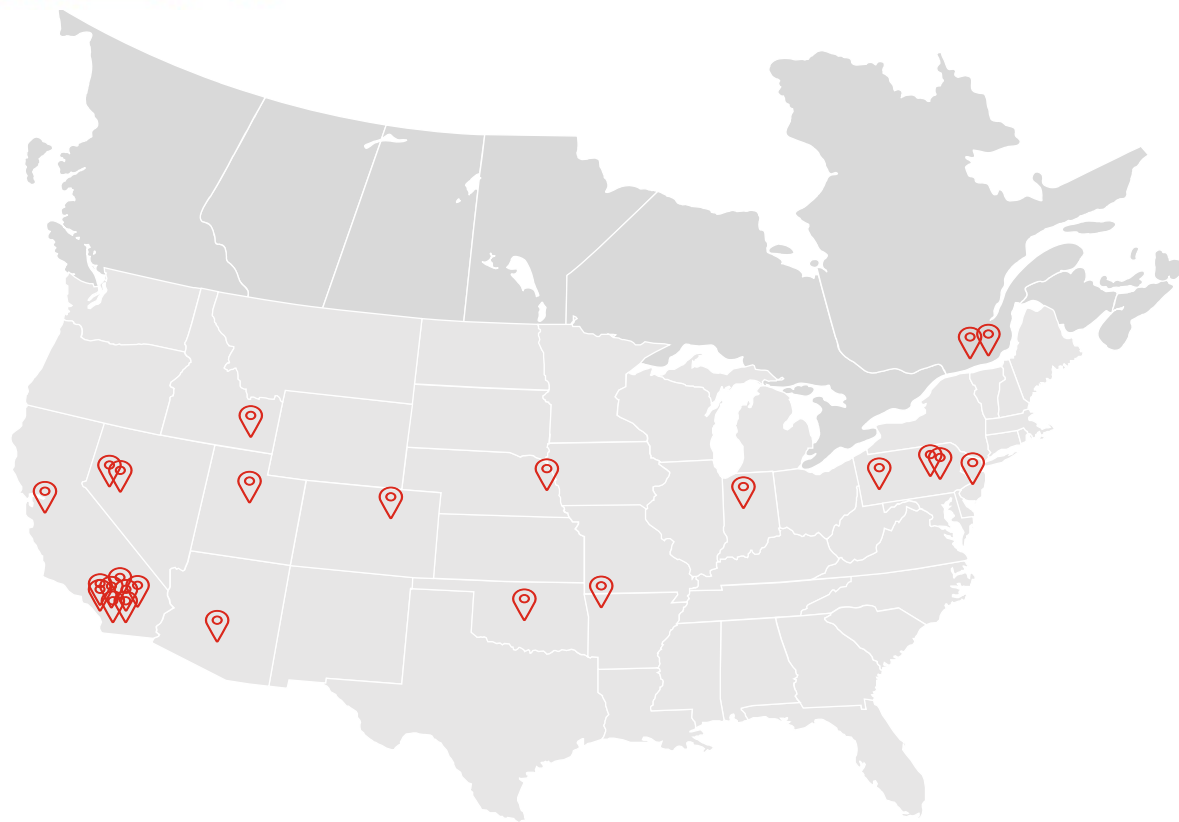
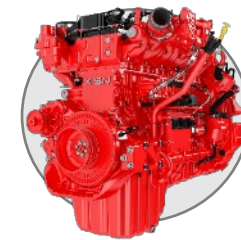
15N PLATFORM

45 K+ Production engines operating globally

4 B+ Miles logged by production engines globally

**As of July 2024*

X15N™ NORTH AMERICA FIELD TEST UNITS



3 Applications

- Linehaul
- Regional Haul
- Vocational - Refuse

24 Units

16 Fleets

1.6+ Million miles* driven

12,000 ft. of elevation – Loveland Pass, CO

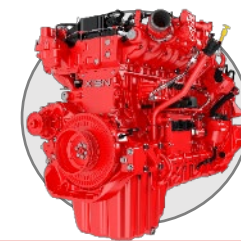
107° F – Summer test (Las Vegas, NV)

- 5° F Winter Test (Jackson, WY)



*Mileage accumulation as of August 2024

X15N™ FIELD TEST FLEETS



OZINGA®

WWM®

Ryder®

ROBERT



Walmart 

WERNER
ENTERPRISES

KNIGHT
TRANSPORTATION



NATIONAL
Ready Mixed Concrete Company

FXI
FOOD EXPRESS, INC.

SWIFT
TRANSPORTATION

X15N™ FIELD TEST FEEDBACK



“Very viable option.”

“It shifts better and better each time it gets driven.”

“I love this truck.”

***“Pulled 55 (mph) up Donner Pass fully loaded.”
(7,056 ft elevation)***

“Really good on the highway.”

“The more they drive it, the better it’s getting all the way around.”

“The drivers love the truck. The engine has a nice pull, very quiet, plenty of torque.”

“It feels and drives like a diesel which is a good thing.”

“Pulling power like diesel. Quiet. Short refueling times.”

“They love the torque of the engine - noticeably different compared to the ISX12N”

“The truck responded well and handled the load similarly to the X15s he has driven. All while being noticeably quieter.”

X15N™ Cummins User Experience (UX) Fleet

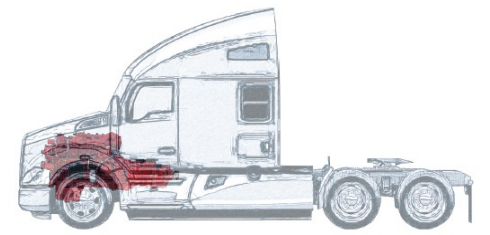


Peterbilt 579



Kenworth T680





Interested in being part of the X15N UX Fleet program?

Contact your Cummins Account Executive to learn more