PROTON
Chemicals Ltd

DECARBONOX LLC

Mining & Heavy Equipment

Clean, cost-effective solutions for optimizing fuel efficiency, meeting decarbonization goals, and improving air quality

AGENDA

- Introduction
- Applications
  - Heavy Equip / Mining / Power
- Benefits
  - Economic, Safety, & Environmental
- Cost Savings
  - Fuel & Emission Savings
- How it Works
- Fleet Integration
- Company Trials
- Conclusions

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INTRODUCTION

Optimizing Diesel Fleets for Emission Compliance and Fuel Efficiency

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THE NEXT GENERATION – CLEANER GREENER SAFER

WHO WE ARE

Decarbonox is a team with proven track record who have new and world-leading, simple, globally-scalable, natural biodegradable products, to optimize combustion of liquid fossil and biofuels. Tests show unparalleled reductions in emissions, pollution, and fuel consumption, capable of significant environmental, health, and financial benefits.

THE NEXT GENERATION – BENEFITS SUMMARIZED

Utilizing proprietary combinations of safe naturally occurring ingredient that improves fuel efficiency and ESG outcomes by:

- Promoting a more complete burn of fuel,
- Harvesting energy from otherwise wasted unburnt fuel,
- Reducing Greenhouse Gas emissions and Ad-Blue or DEF consumption,
- Reducing harmful particulate matter, PM 2.5
- Improving air quality,
- Enhancing oil condition,
- Prolonged engine life,
- Increasing fleet reliability and availability

DECARBONOX OVERVIEW

- **Function**
  - Enhances combustion
  - Reduces emissions
  - Improves lubricity and engine wear-and-tear
  - Water emulsification / fuel stabilization (diesel bug)
- **Compatible Fuels**
  - Diesel / MGO / VLSFO / HFO
  - Biodiesel (FAME)
  - HVO and Advanced Biodiesels
  - Biofuel blends
- **Key Benefits**
  - Emission Reductions: >90% CO, NOx, HC, PM2.5, PM10
  - CO2 reductions proportional to fuel savings / 6-8% (+)
  - Biodegradable / No transport restrictions.
  - Tackles all major concerns required of a superior fuel additive. It is not a simple cetane booster or fuel detergent common in the market.
- **Dosage**
  - 1:2000

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DECARBONOX - BIODIESEL

BIO FUELS

- Require active detergency to counter greater fouling of engine components
- Require active anti-microbial agents
- Require stronger emulsifiers for increased water problems

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DECARBONOX – ARCTIC USE

- For extremely cold climates it is possible to use a tailored "bespoke" formulation
- Reduce fuel filter plugging from icing and sludge

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APPLICATIONS
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HEAVY EQUIPMENT / MINING


UNDERGROUND MINING

POWER GENERATION

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ENVIRONMENTAL IMPACT

- **CO Reduction** (smog reduction in urban areas)
  - 80% reduction from 1.1% to 0.22% in trials
  - Aligns with EPA Phase 3 standards
- **Depot Safety & Underground Mining cleaner air**
  - >90% reduction in PM emissions
- **Sustainability**
  - Supports 2030 zero-emission mandates
  - CO2 reductions proportional to fuel savings
  - 50-90% reduction in NOx emissions over baseline
- **Commercial and Eco-Branding**
  - Attracts eco-conscious customers and shippers
  - Fuel savings alone, far outweigh the cost of using Decarbonox, providing both an economic and environmental benefit

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CLEANER EMISSIONS - WORK PLACE SAFETY

- **Health Risks**
  - NOx and PM2.5 are detrimental to health at depots, terminals, and underground operations

  Decarbonox Results (past trial results)
  - PM: >90% reduction
  - CO: 96.5% reduction (637.69 to 22.32 ppm)
  - NOx: 50-90% reduction, helps meet low-NOx limit (0.02 g/hp-hour)
- **Impact**
  - Safer air quality at depots / underground mining
  - EPA Phase 3 compliance

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SCR & ADBLUE/DEF CHALLENGE

- **Function**
  - Enhances combustion
  - Reduces emissions
  - Improves lubricity and wear-and-tear
  - Water emulsification
- **Compatible Fuels**
  - Diesel / VLSFO / HFO
  - Biodiesel (FAME)
  - HVO and Advanced Biodiesels
  - Biofuel blends
- **Key Benefits**
  - Emission Reductions: >90% CO, NOx, HC, PM2.5, PM10
  - CO2 reductions proportional to fuel savings (6-10%)
  - Biodegradable / no restrictions when transporting
- **Dosage**
  - 1:2000

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MAINTENANCE SAVINGS

- **Issues with Engine and Diesel Particulate Filters**
  - Carbon buildup in the engine
  - Injector wear over time
  - DPF clogging at high loads

- **Benefits of Decarbonox**
  - Cleans injectors, pistons, and DPFs
  - Reduces backpressure in the engine
  - Improves lubricity (verified HFRR testing)
  - Reduces carbon buildup on turbo
  - Formulated for long-time, constant use

- **Results of Using Decarbonox**
  - Less wear-and-tear / fewer repairs
  - Longer intervals between maintenance

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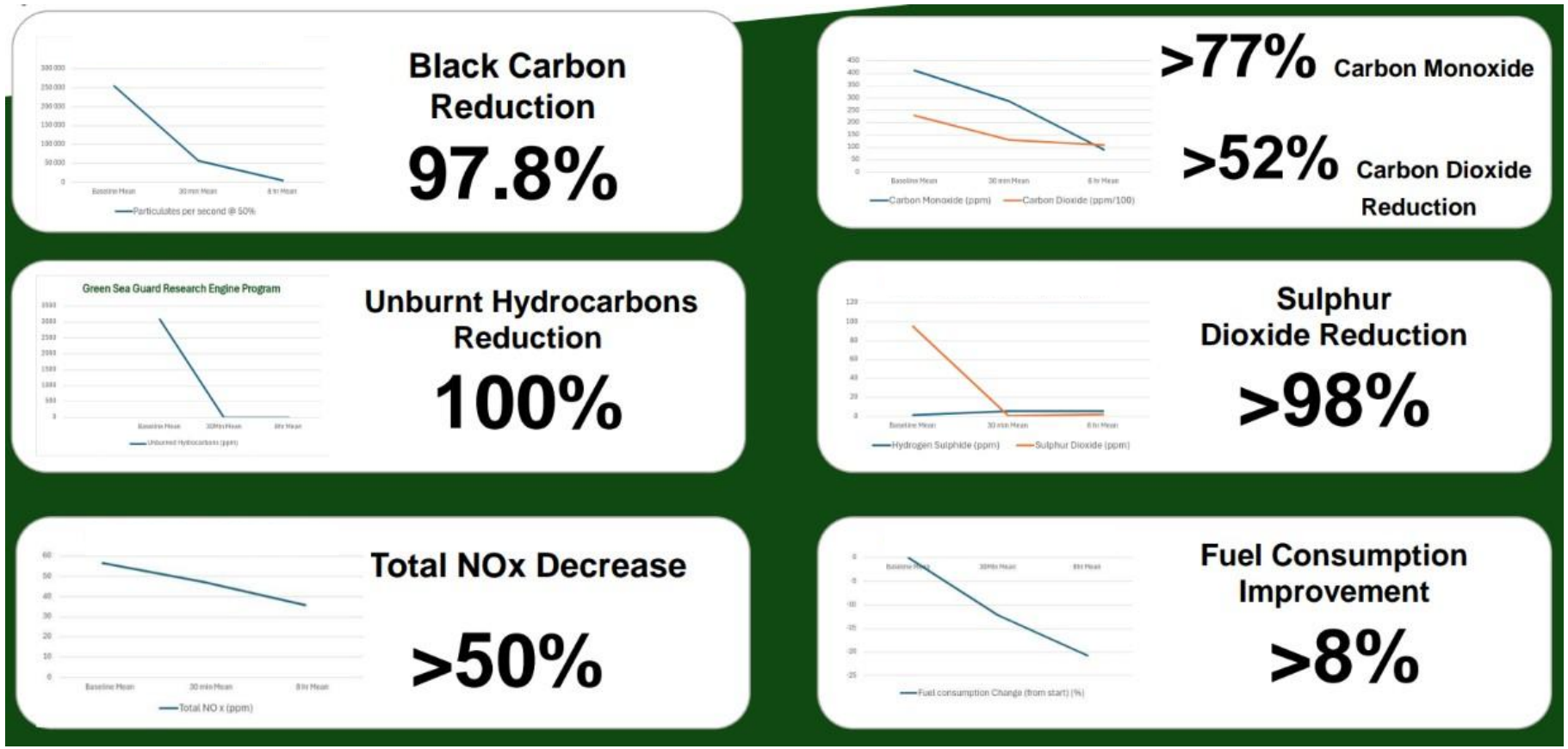
PARTICULATE EMISSIONS MONITORING PROGRAM

RESULTS MEASURED ON A WITH RESEARCH ENGINE RUNNING AT CONSTANT SPEED AND LOAD



2024 Engine Test bed trial using low sulphur diesel

Green Sea Guard | Emission Monitoring Systems

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DECARBONOX RESULTS

	Particulate Matter (#/cm^3)	Carbon Monoxide (ppm)	Carbon Dioxide (%)	Fuel Consumption (l/h)
Sulzer Generator (4 stroke)	90%	96%	80%	5%
Kohler Generator	53%	9%	95%	10%
Landini Tractor	4%	32%	45%	**
Ashok Leyland Bus	48%	45%	64%	19%
VW Vehicle Engine	78%	78%	52%	12.2%
Scania R460	*	*	*	10%
Iveco S-way	*	*	*	10%
Stralis 480	*	*	*	10%
FAW 500	*	*	*	10%

* Pilot program excluded emissions monitoring
** Pilot program excluded fuel consumption monitoring

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Independent Certificates of Standards

BUREAU VERITAS GAZELLE (PTY) LTD

Certificate of Analysis

BUREAU VERITAS GAZELLE (PTY) LTD

Certificate of Analysis

Safety Data Sheet

Optimizer HF

Safety Data Sheet

SECTION 1: Identification

SECTION 2: Hazards identification

SECTION 3: Composition/information on ingredients

Fuels Remain Compliant

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COST SAVINGS
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Cost and Benefits Analysis for 100,000 Liters of Diesel

Metric	5% Savings Scenario	8% Savings Scenario
Total Diesel Cost (ZAR)	2,198,000	2,198,000
Decarbonox Required (L)	50	50
Treatment Cost (ZAR)	27,500	27,500
Gross Fuel Savings (ZAR)	109,900 (2,198,000 × 0.05)	175,840 (2,198,000 × 0.08)
Net Savings (ZAR)	82,400 (109,900 – 27,500)	148,340 (175,840 – 27,500)
Fuel Saved (L)	5,000 (100,000 × 0.05)	8,000 (100,000 × 0.08)
CO2 Reduction (tons)	50 (5,000 L × 10 kg/L ÷ 1,000)	80 (8,000 L × 10 kg/L ÷ 1,000)

Based on the latest available data as of October 2025, the average diesel pump price in South Africa is ZAR 21.98 per liter

DECARBONOX cost at ZAR 550,000 per 1,000-liter IBC

ZAR; no VAT/ taxes included

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HOW IT WORKS
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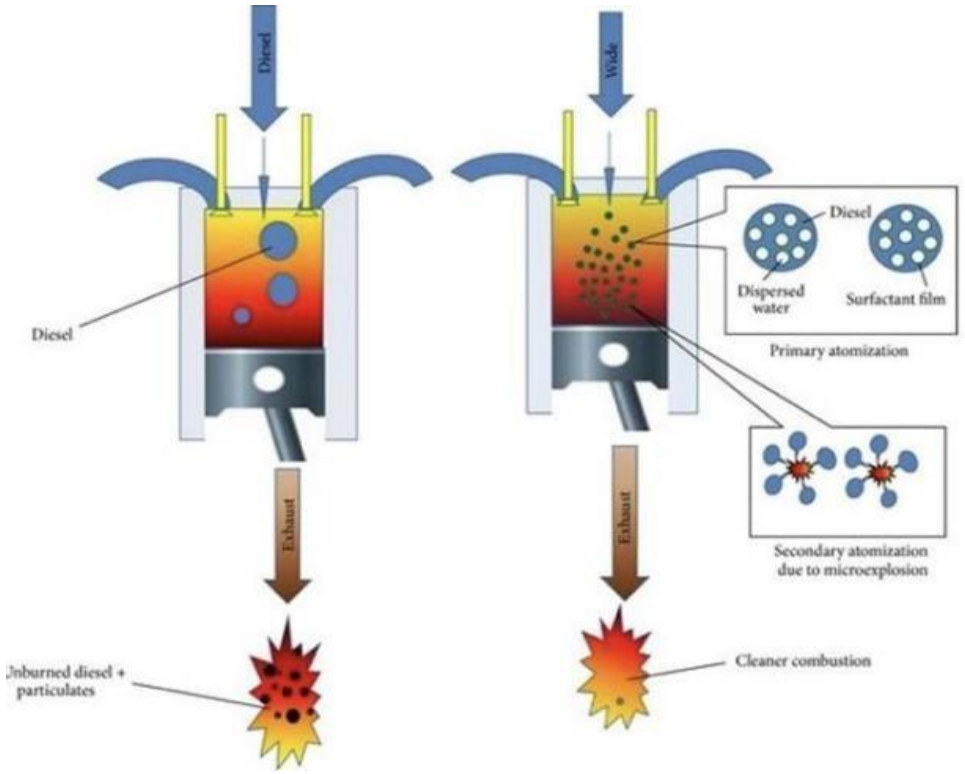

HOW IT WORKS

1. Emulsifiers use free water naturally found in the fuel and fuel tanks to improve fuel stability and combustion via “secondary expansion” (steam expansion within the combustion gases). Emulsifiers atomize and encapsulates water that help control microbial growth (‘diesel bug’) and reduce tank corrosion.

2. Emulsification is used to disperse the inherent condensate water in fuels into micro-size particles. As the fuel is combusted, these fine water particles expand into vapour and aid overall combustion properties.

3. Surfactants and Detergents: Cleans away deposits on injectors, cylinder walls, and pistons.

4. Advance lubricity allows more efficient engine operation of fuel pump, EGR, valves, sensors, particulate filters, piping, fuel tanks and other components. Improved lubricity helps lower the frictional resistance of engine parts which in turn lowers overall operating / exhaust temperatures.

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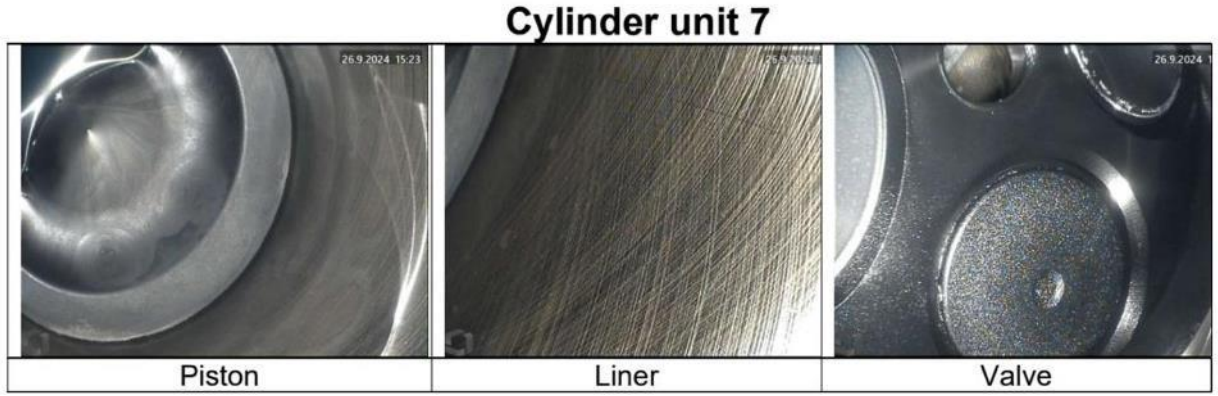
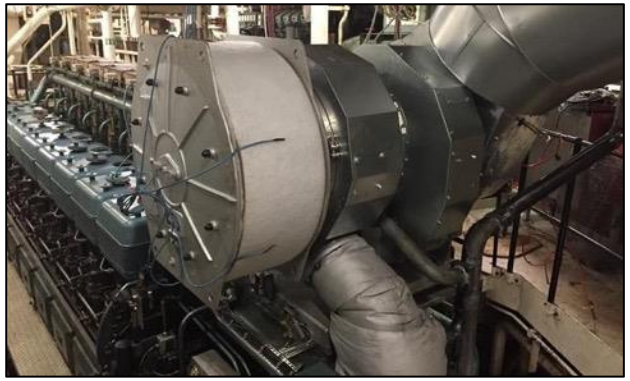
WHAT DECARBONIZATION LOOKS LIKE WITH DECARBONOX





Cleaner, decarbonized combustion components

- Cleaner oil on dipstick from reduced soot load in cylinder blow-by
- Reduction in upper cylinder wear & metal in engine oil
- Cleaner turbo / scavenge ports
- Cleaner EGR system components
- Cleaner particulate filters
- The amount of

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FLEET INTEGRATION
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FLEET INTEGRATION

- **Application**
  - Added during fueling (1:2000)
  - Blends homogeneously
  - Formulated for continuous use
- **Compatibility**
  - Diesel
  - Biodiesel (FAME)
  - HVO and Advanced Biodiesels
  - Biofuel blends

  Decarbonox will not impact fuel properties or standards
- **Safety / Environmental**
  - Biodegradable
  - Non-toxic

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NEXT STEPS

- **Trial Offer**
  - 50% Discount for 1– 10 vehicles
- **Commitment**
  - Approximately ~1 hours per vehicle
  - Provide fuel data (Fuel receipt, calorific value)
  - Trip information / data
  - Emission analyzer data / details (if available)
- **Timeline**
  - 4–8 weeks for trial
- **Deliverables**
- **Decarbonox Team Support**

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PROOF-OF-CONCEPT PROTOCOL

Objective: Measure Emissions and Performance

- Emissions: CO, NOx, HC, PM
- Performance: Fuel use, engine performance (% MCR)

Process Overview

- Baseline Phase **WITHOUT**
  (2 weeks)
  (~1-2 hours/truck)
  Measure emissions first and last day
- Application Phase **WITH**
  (4-8 weeks)
- Post-Test
  (Week 8, ~1 hours/truck)

Effort Required

- ~1-2 hours/truck
- Provide fuel data (fuel receipt, calorific info) w/ dates
- Provide vehicle specifications, and monitoring data (if available)
- Recording values for; load (light, loaded, or partially loaded) w/ or w/o pup, and daily trip data (date, ambient temp start/end, distance(s)

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CONCLUSION

Why Decarbonox?

- Reduces > 90% … PM CO, NOx; alongside 5–8% fuel savings (possibly even greater)
- Reduces fuel / CO2 emission
- Decreases DEF use, eases SCR system load
- Helps comply with EPA Phase 3, low-NOx rules
- Fleet maintenance benefits

Lead the Industry

- Aligns with ESG, Clean Air, and emissions reduction
- Commercial benefits from reduced fuel consumption and overall fleet operational costs

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YOUR PREMIUM ALL-IN-ONE FUEL ADDITIVE SOULTION

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