

CARNOT

The Future Of Sustainable Powertrains



FUTURE POWERTRAINS CONFERENCE

Archie Watts-Farmer (CEO/Co-Founder)

INTRODUCTION



$$\eta = \frac{T_h - T_c}{T_h}$$

85%

INTRODUCTION

Monsieur Carnot



85%



1824

INTRODUCTION

Monsieur Carnot

State-of-the-Art



85%



< 35%

1824

2020



INTRODUCTION

Monsieur Carnot

State-of-the-Art

CARNOT



85%

<35%

70%

1824

2020

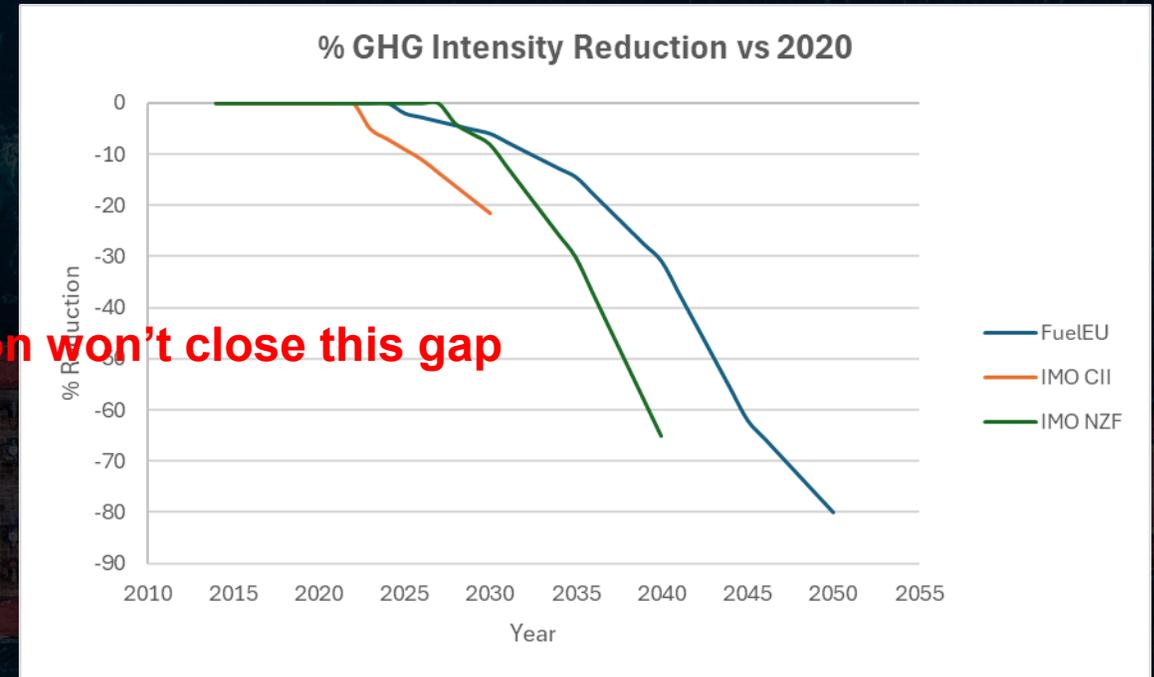
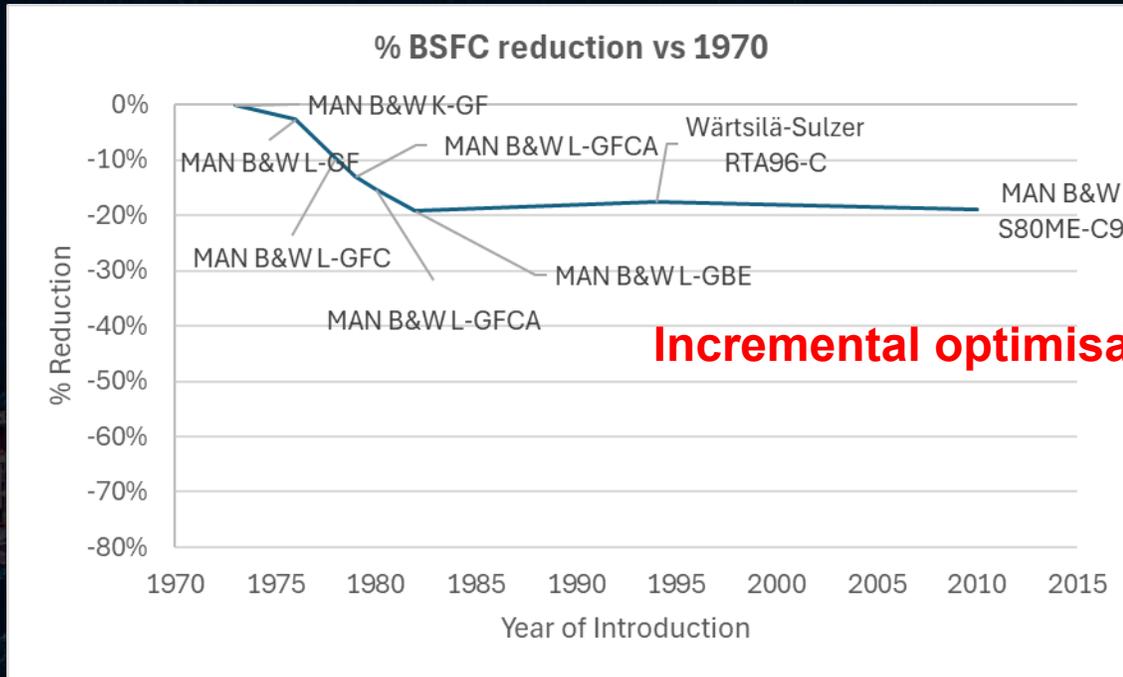
2026



THE CHALLENGE: DECARBONISING MARINE PROPULSION

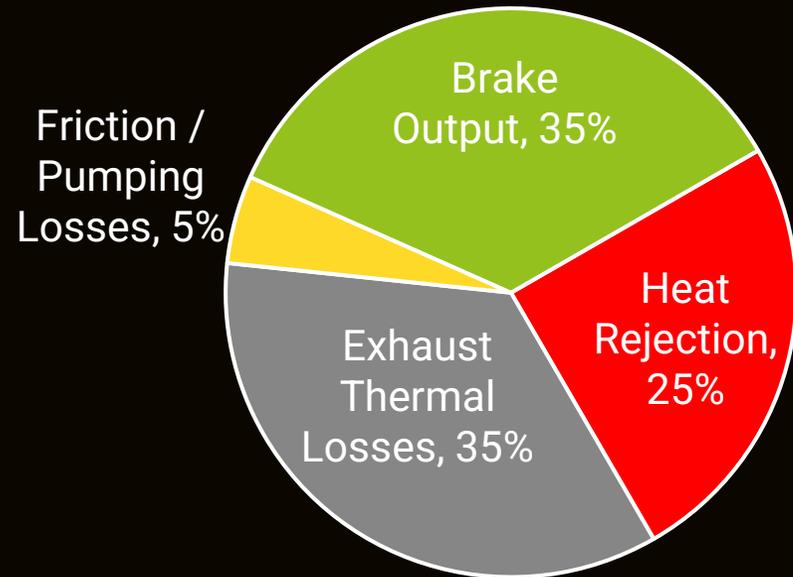
50 Years: ~20% Efficiency Gain

Next 25 Years: ~80% Required Reduction

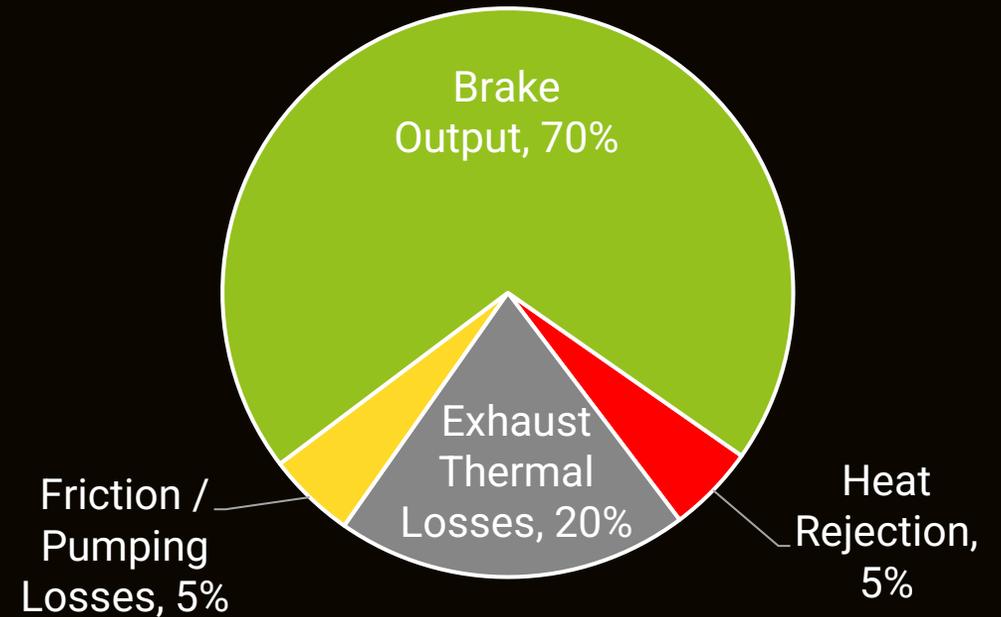


THE CARNOT SOLUTION

Conventional Engine



CARNOT Engine



Operating On Diesel, H₂, Ammonia, eFuels or Biofuels

COMPANY



FOUNDED 2019



£12.5M FUNDING RAISED



TEAM OF 15



INDUSTRY PARTNERSHIPS



BENCH TESTING

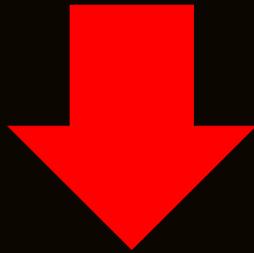


PATENT PENDING

WHY PREVIOUS ADIABATIC ENGINES FAILED

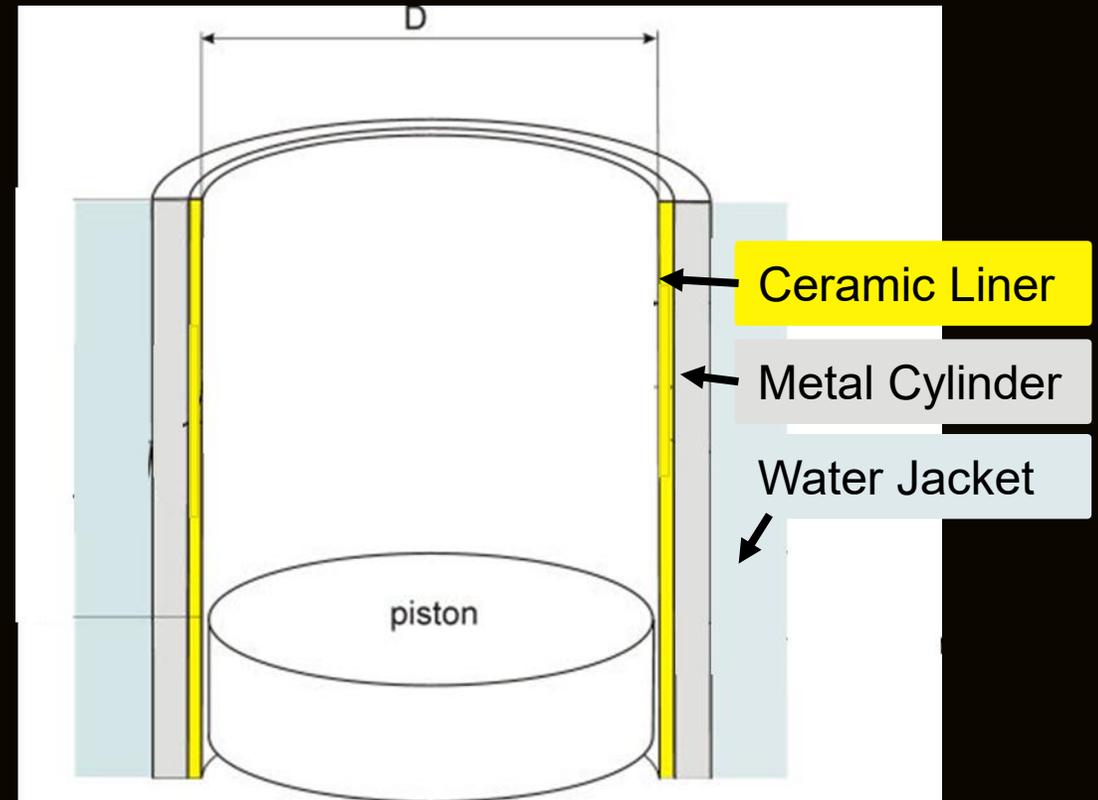
What they did: ENGINES

- ✗ Kept the same architecture
- ✗ Inserted ceramic liners into metal cylinders
- ✗ Retained cooling system

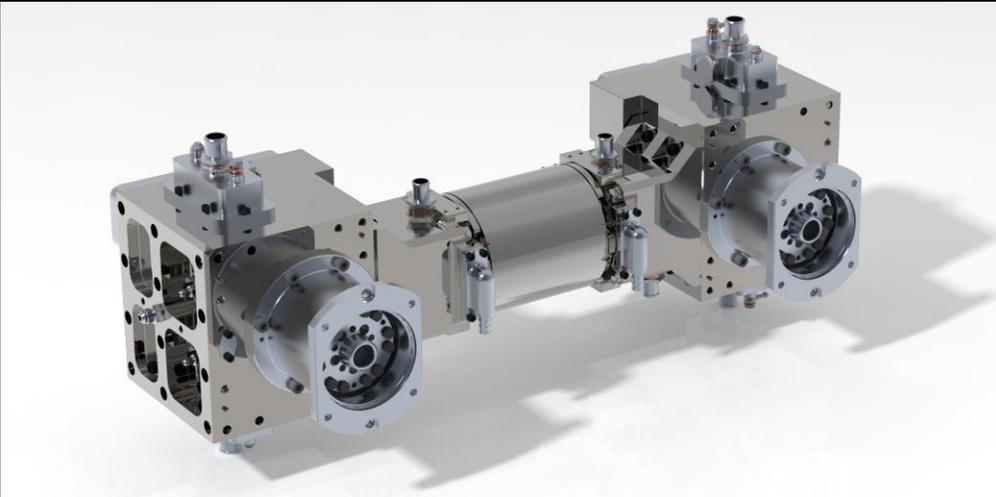


RESULTS

- ✗ Thermal Stress
- ✗ Poor durability
- ✗ Marginal efficiency gains

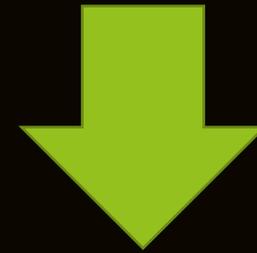


A NOVEL APPROACH



CARNOT APPROACH

- ✓ Materials asked to do ONE job only
- ✓ Simplified architecture
- ✓ Managed differential thermal expansion
- ✓ **Combustion system cooling eliminated**



RESULTS

- ✓ Good durability
- ✓ Very high efficiency gains

TARGET MARKETS

40 kW Engine

500 kW Engine

Off-Grid Power

Off-Highway &
Industrial Equipment

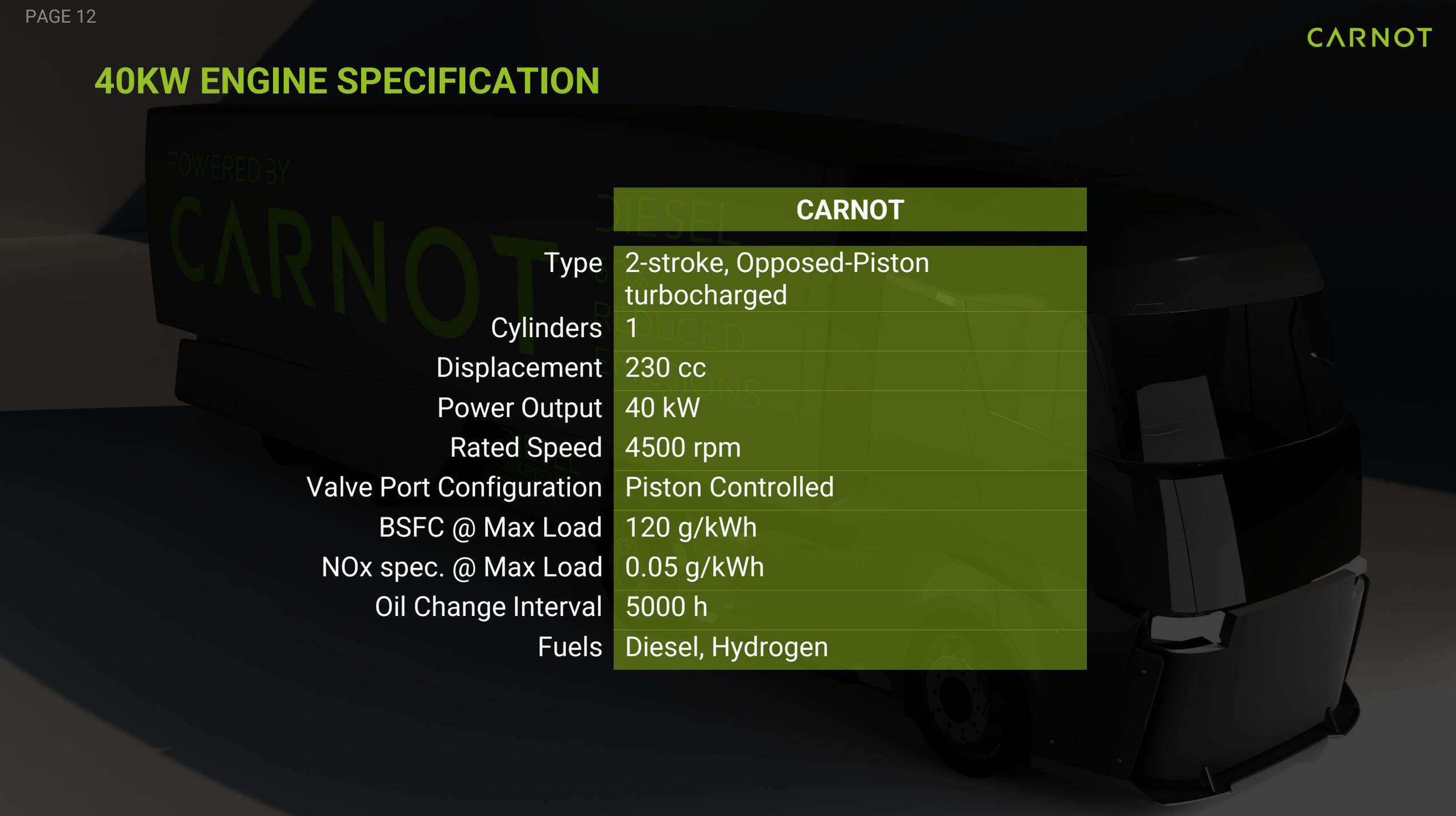
Marine Auxiliary
Engines

Modular Main
Propulsion

Heavy Duty
Vehicles

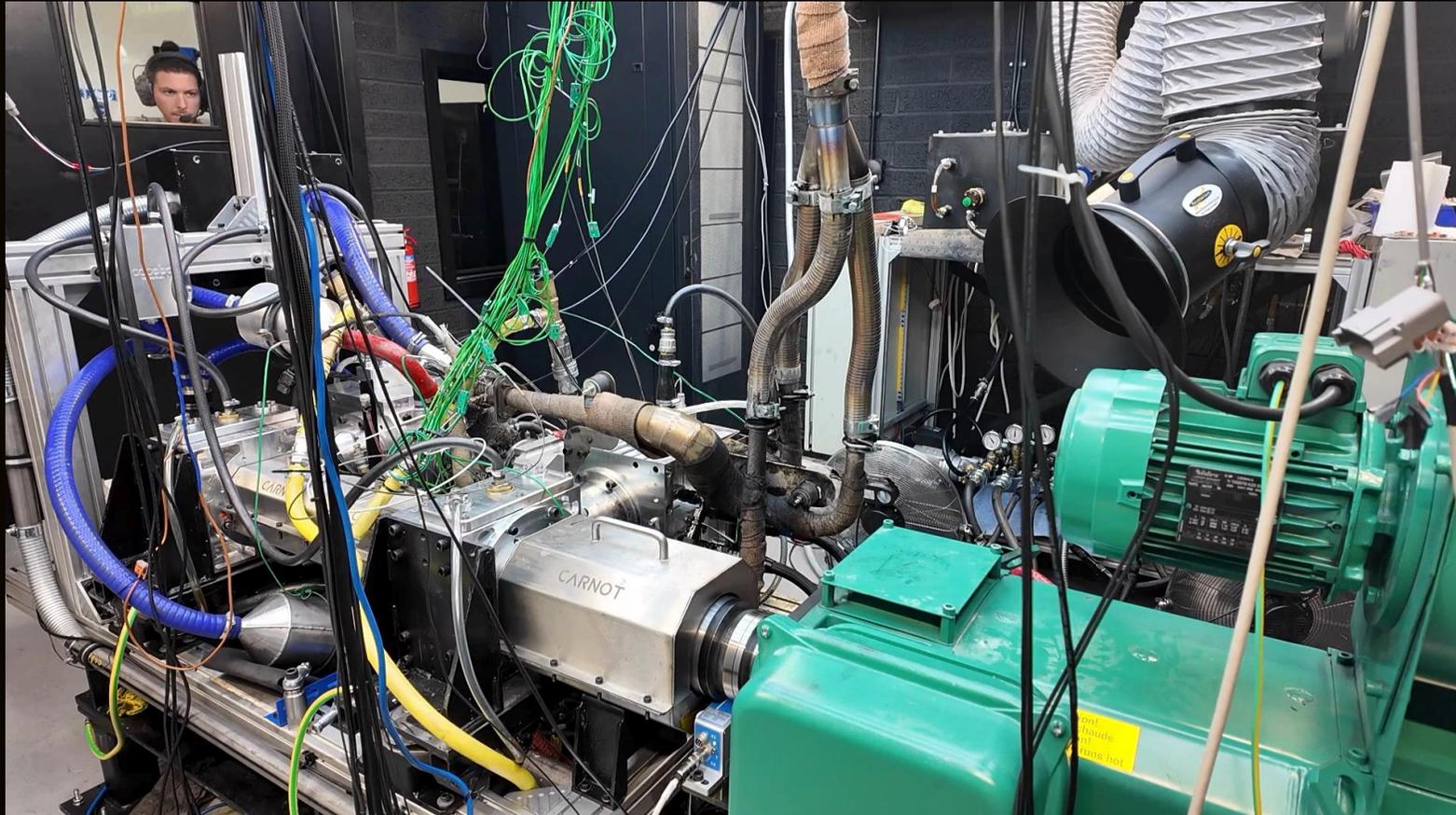


40KW ENGINE SPECIFICATION



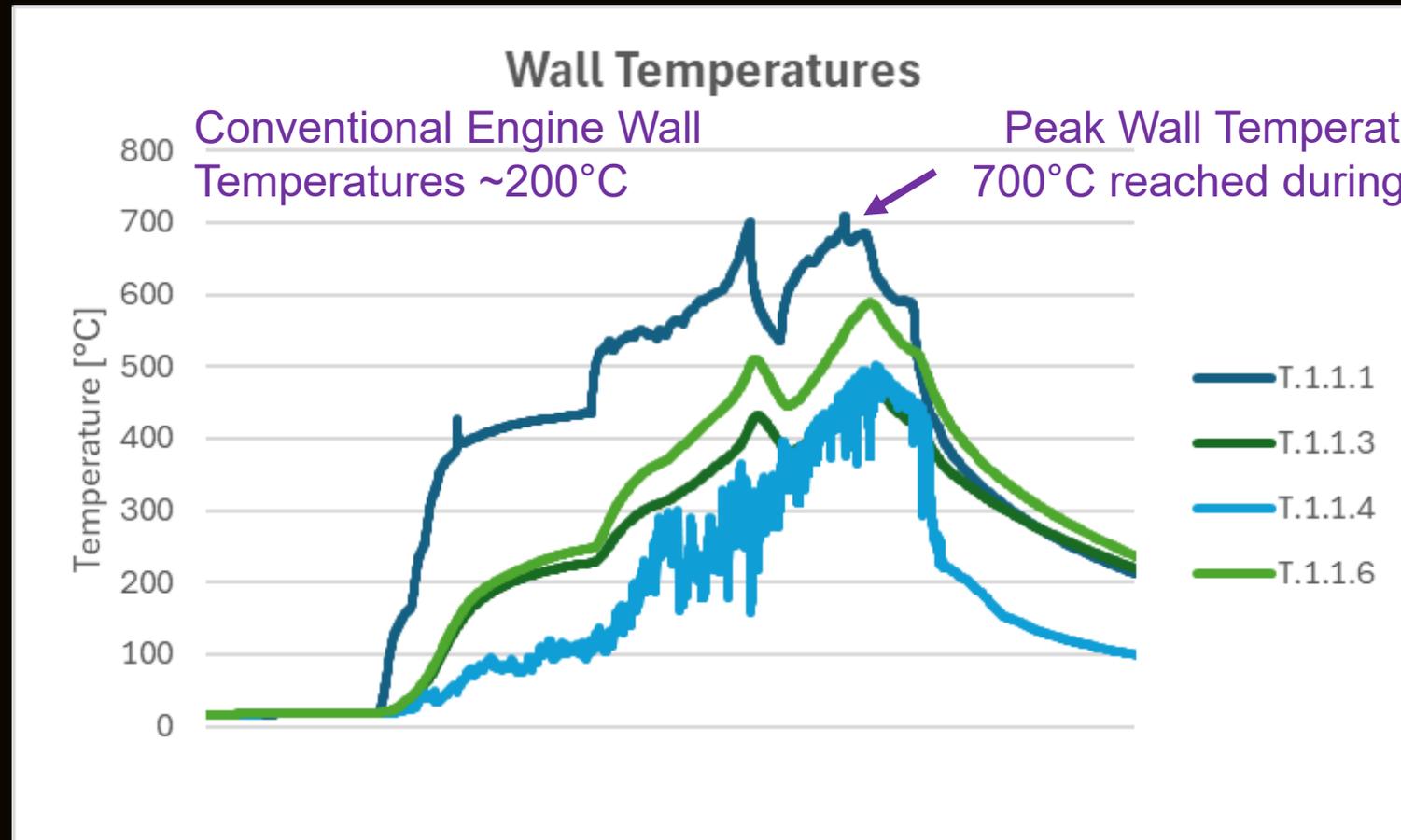
	CARNOT
Type	2-stroke, Opposed-Piston turbocharged
Cylinders	1
Displacement	230 cc
Power Output	40 kW
Rated Speed	4500 rpm
Valve Port Configuration	Piston Controlled
BSFC @ Max Load	120 g/kWh
NOx spec. @ Max Load	0.05 g/kWh
Oil Change Interval	5000 h
Fuels	Diesel, Hydrogen

BENCH ENGINE DEVELOPMENT



BENCH TEST RESULTS

COMBUSTION CHAMBER COOLING ELIMINATED



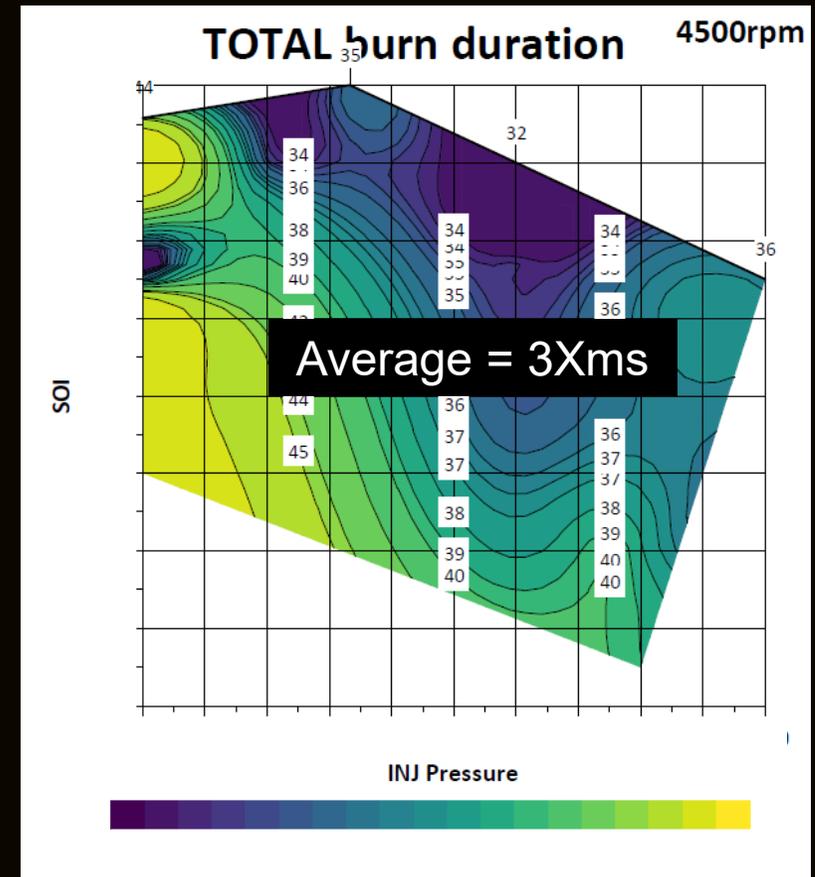
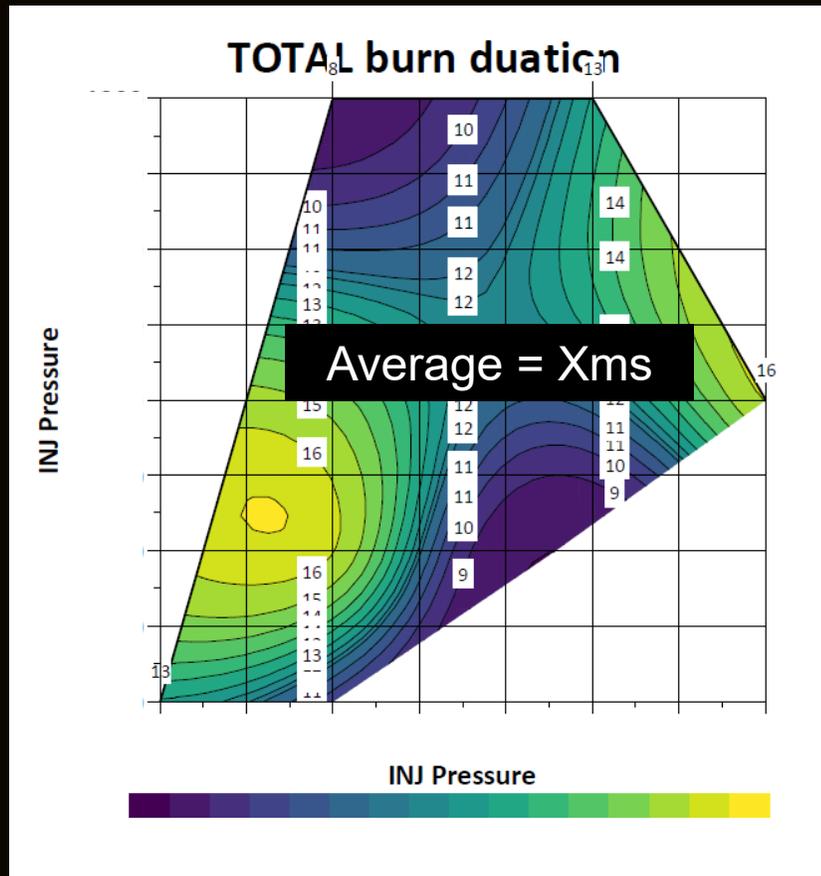
4500 RPM | 5 BAR IMEP | DIESEL

BENCH TEST RESULTS

~3X INCREASE IN COMBUSTION DURATION

Initial Run

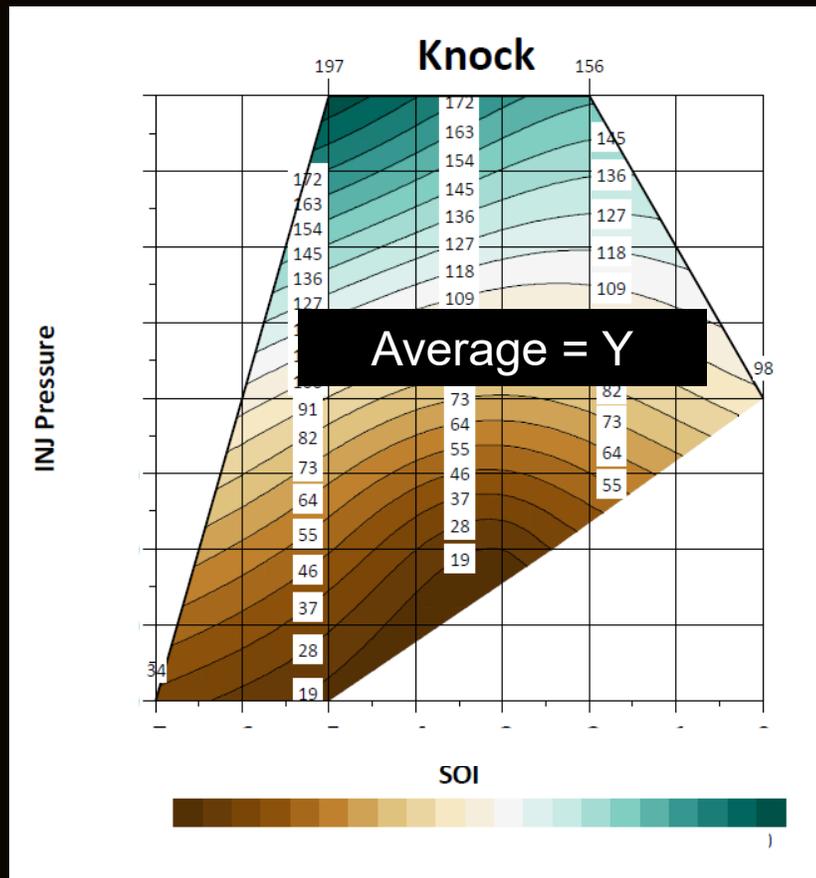
Post-Engine Characterisation



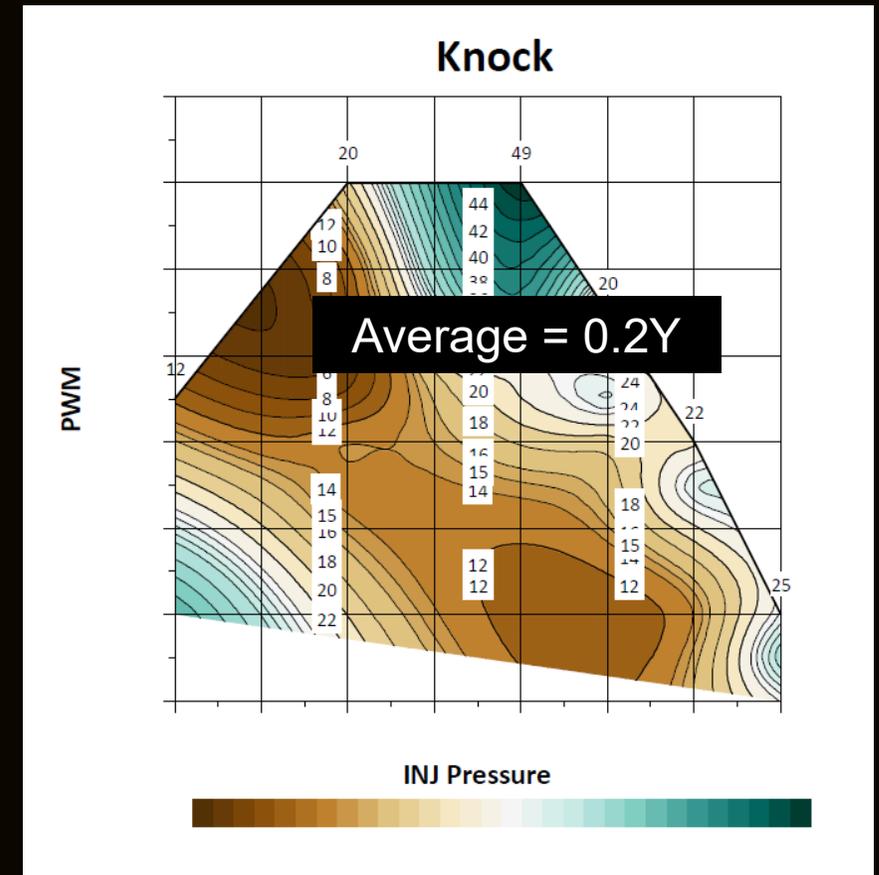
BENCH TEST RESULTS

~4.5 REDUCTION IN KNOCK INTENSITY

Initial Run

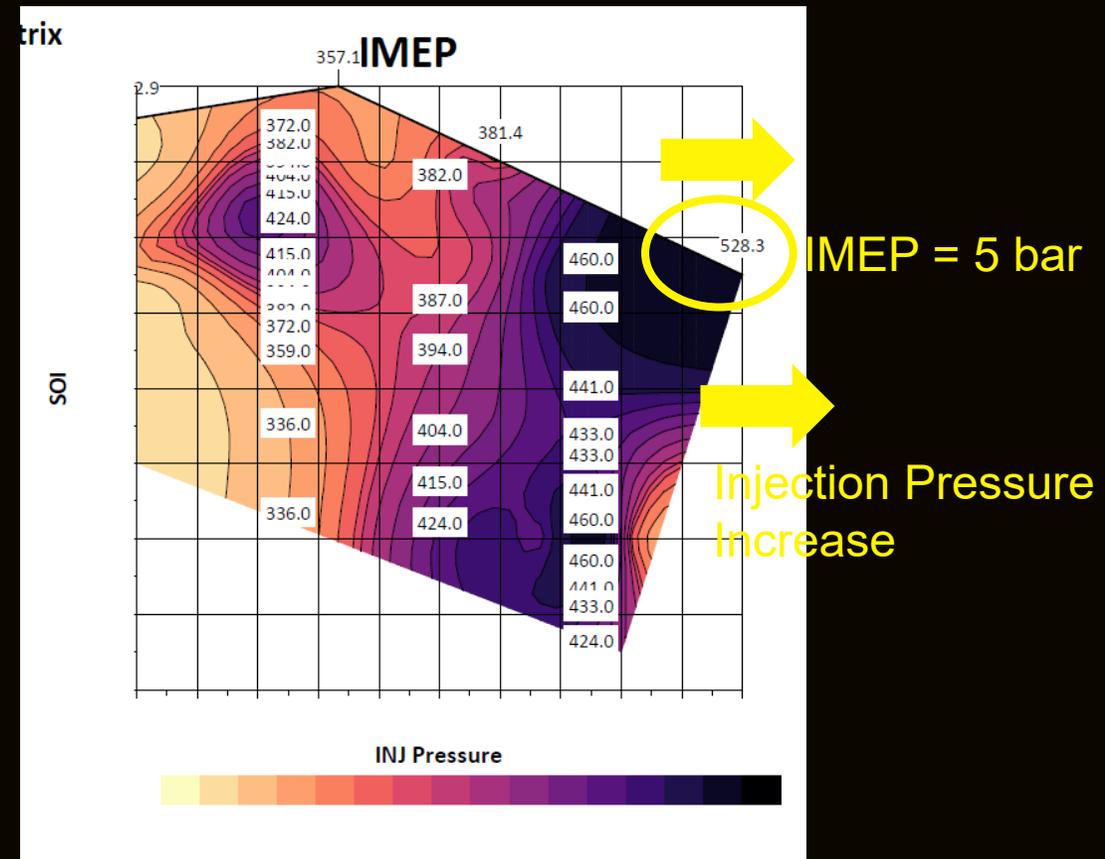
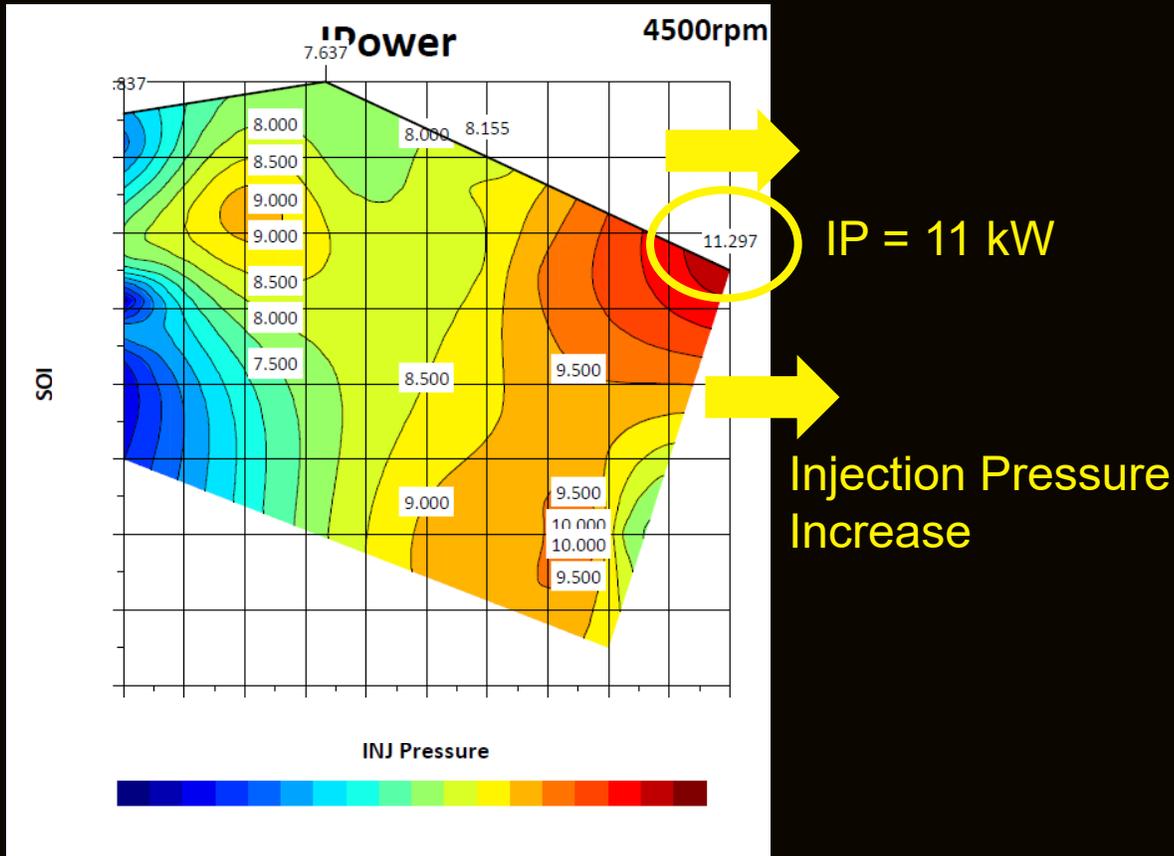


Post-Engine Characterisation



BENCH TEST RESULTS

TARGET: 40 KW @ 15 BAR IMEP BY INCREASING INJECTION PRESSURE



FUEL FLEXIBILITY IN PRACTICE



CMDC 3 PROJECT

Carnot High Efficiency Hydrogen Combustion Engine Demonstrator

- 6800 DWT K-class
- Containerised Plant + Hydrogen Fuel Storage
- Trial Duration: 2 weeks
- Charterer & Port Approvals obtained
- AIP / ADA Approval
- Sea Trial July 2026



500KW AUXILIARY ENGINE PROJECT

- CMDC6
- 4-Cylinder 500kW Auxiliary Engine Demonstrator
- Diesel + Ammonia
- 180,694 DWT Capesize bulk carrier



CARNOT®

500kW Engine Concept
Design & Validation



Vessel identification,
interfaces & duty cycle



Integration



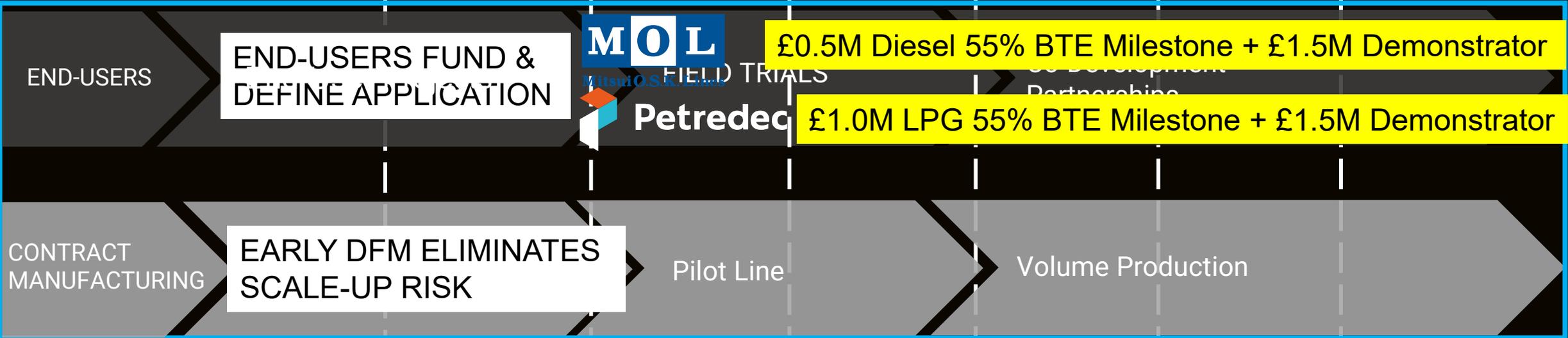
Regulatory
Compliance

PARTNERSHIP-LED COMMERCIALISATION

CARNOT



PARTNERS



REVENUE GENERATION BEGINS PRE-VOLUME

CARNOT

The Future Of Sustainable Powertrains



Contact Us:
archie@carnotengines.com