

We can all do more to reduce pollution & emissions

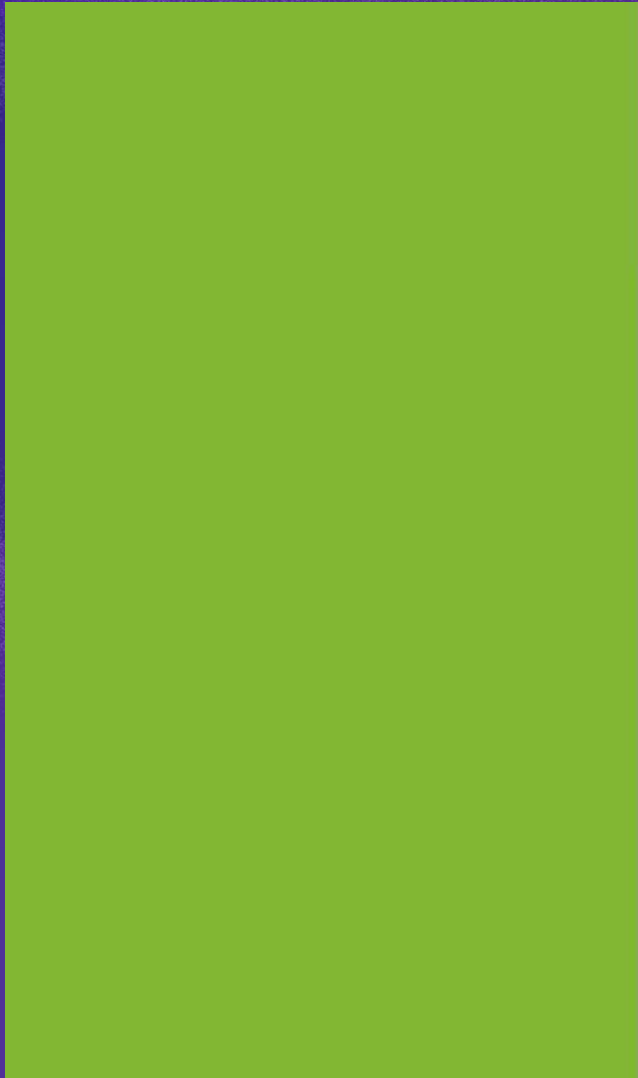


Ecomotus Ltd
Catalytic Hydrogen Electrolysers



We can all do more to reduce pollution & emissions

The EcoPro works by reducing emissions at the
heart of your engine,
significantly cutting pollution at the point of
combustion before the exhaust



Benefits...

Fuel Savings.

Emissions Reductions.

Reduced Engine Wear – less carbon deposits mean less internal wear on the engine and internal components stay cleaner for longer.

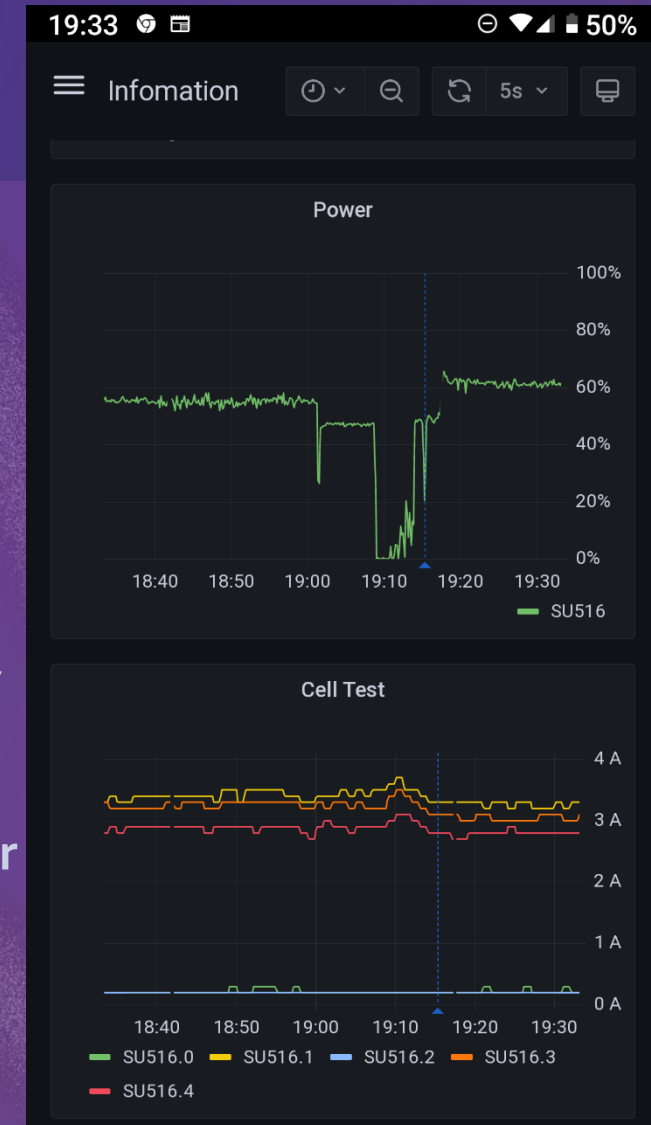
Monitoring and Maintenance

Monitoring and maintenance costs cover your EcoPro for all remote monitoring, calibration and optimisation as well as parts and labour in the event of a warranty fault.

We will tell you how to access the EcoPro dashboard so that you can see the live data showing that your EcoPro is adjusting and working with your engine.

Should we feel that a component needs replacing we will contact you to agree a time when the vessel will be in port to allow us to come aboard and make any modifications.

Paid by direct debit, monthly costs are calculated on a fuel saving share basis or if preferred, can be combined with the purchase cost for a one-off payment covering the first 3 years of monitoring.



• 5 Gas Analyser

Hand Held 5 Gas Analyser measures - CO, HC, CO₂, O₂ & NO_x

For Petrol/Gasoline, LPG, CNG & Diesel engines

Annual recalibration and certification



Diesel Smoke Meter

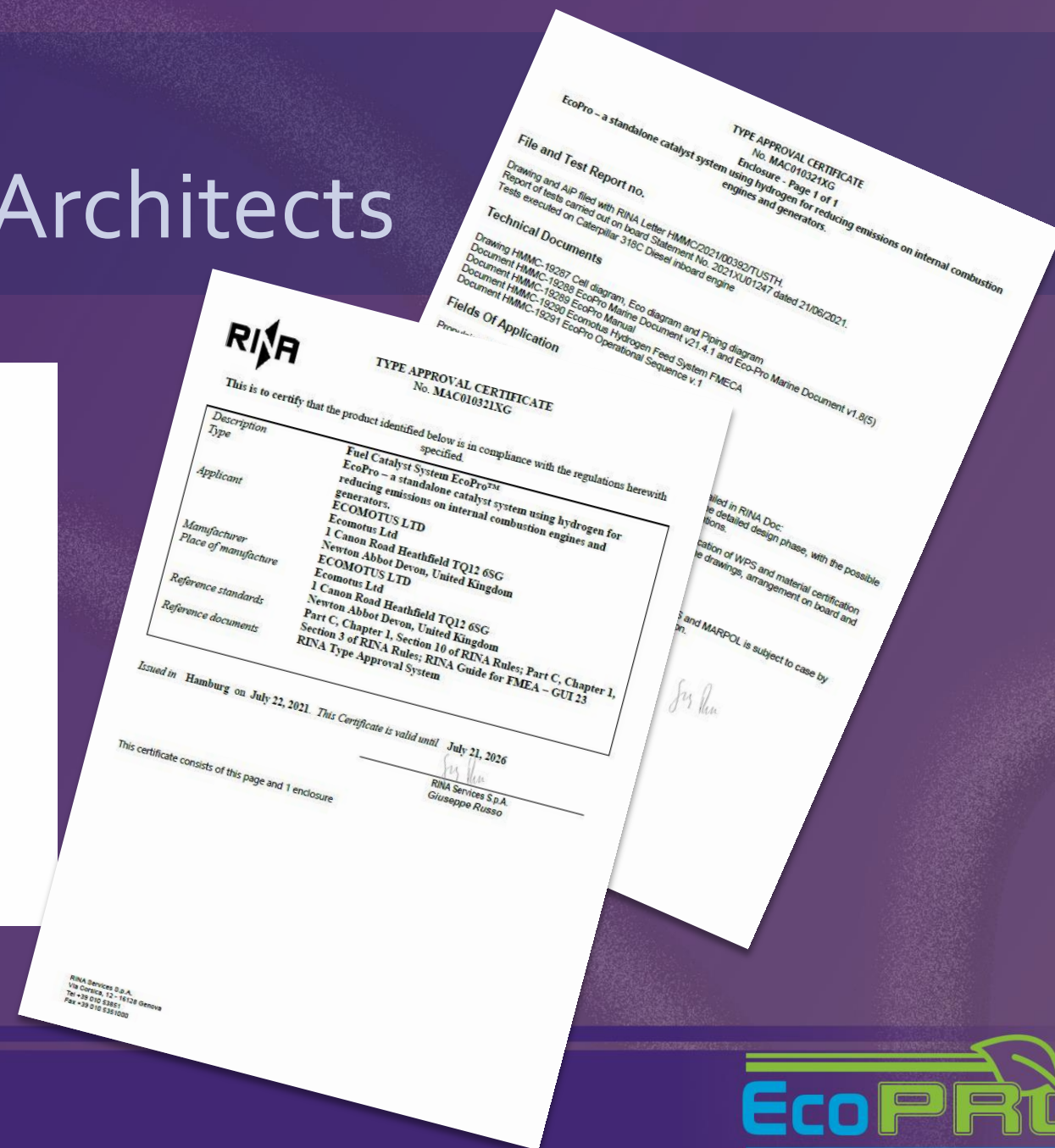
Local Authority and Environmental Testing

Continuous, Peak and Average readings K (M-1) & %(Hu)

Self calibration after each test maintains accuracy



Type Approval Royal Institute of Naval Architects



• MCA Exemption MSF 1261



Maritime &
Coastguard
Agency

Vessel owner must complete and return to the MCA to ensure that the system is covered by the exemption

Maritime & Coastguard Agency

Equivalence / Exemptions / Alternative Design Arrangement (ADA) from Statutory Requirements

Doc No MSF 1261

Vessel Subject

Installation of the Ecomotus EcoPro – a standalone catalyst system using hydrogen for reducing emissions on internal combustion engines

This form has been revised to bring it in line with the Initial Approval and Issue of Exemption/Equivalence/ADA as indicated by MSIS 23 Part B Ch 4.2.

Version 4.0

Ship Identification and General Data

IMO No.	Official No.	
Type of vessel*	Fishing Vessel	Length (registered) *
UK Class*	Choose an item.	MCA File reference*
Gross Tonnage*		No. of Crew*
Operating Area (Category of water / at sea) *	Choose an item.	No. of Passengers*
Keel laying date*		No. of Special Personnel*
Hull material*		No. of Industrial Personnel*
(General description of operation of vessel - include geographical location and any existing operational limits).		

Part A: Completed by Owner/Operator/Managing Company in conjunction with RO where applicable

A1 Background Case / Provisions in place

Description of non-compliance*: Installation of a standalone catalyst system that uses non pressurised hydrogen, produced on-demand, for reducing emissions on internal combustion engines

Explanation of why the vessel cannot be made compliant*:

What arrangement/provisions are in place as an alternative*:

Supporting Documentation and comments: (please note plans associated with the item(s) being requested must be supplied e.g. nav light drawing for a nav light exemption, if not supplied the application will be returned); add more lines to the document list and free text below as required.

Supporting document list

e.g. Drawing/ material or equipment approval cert/ existing exemption/ misc / etc	Title & Document Reference
Type Approval Certificate	e.g. Navigation light arrangement diag reference 12345-00.
EcoPro Diagrams and photo	Rev A / letter ref XX dated DDMMYY / material cert XXX / DAD XXX etc.
	Ecomotus-EcoPro Type Approval.pdf
	Ecomotus-EcoPro Diagram.pdf

Favis of Salcombe

Emma Jane

MARINE EXAMPLE

- 🇬🇧 Size 19m
 - Engines 1 x CAT C-18, plus 2 x CAT-C4.4
 - Cruising speed 8.55kts
- 🇬🇧 Fitted with
 - 1 x EcoPro-4 fitted to main engine
 - EcoPro-S to the auxiliary engines
- 🇬🇧 Running approximately 24 hours per day, 312 days per year



Favis of Salcombe Emma Jane



Favis of Salcombe

Emma Jane

Engine	Idle		1300 rpm	
	CO ₂	NO _x	CO ₂	NO _x
No EcoPro	1.3	294 ppm	4.8?	356 ppm
With EcoPro	0.5	81 ppm	1.2	78 ppm
Emission Reduction	62%	72%	75%	78%

Engine	1500		Full Steam	
	CO ₂	NO _x	CO ₂	NO _x
No EcoPro	3.5	607 ppm		
With EcoPro	1.2	212 ppm	5.6	564 ppm
Emission Reduction	66%	65%	?%	?%



Trawler - based in Salcombe

🌱 Over a 10-week period a trawler fitted with the EcoPro sees a fuel saving of between 10% and 15% having used 47,000 litres.
(CO₂ is calculated at 2.68 kg per litre)

**10% sees a saving of 5222 litres
= just under 14 tons of CO₂ saved**

**15% sees a saving of 8294 litres
= just over 22 tons of CO₂ saved**



Beam Trawler - based in Brixham

- Following installation the skipper reported that when refuelling they had saved approximately 5000 litres in the first week
 - a saving of just over 29%



Wind Farm Crew Transfer Vessel

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Size

20m x 8m,

Engines

2 x V12 MAN engines

Cruising speed

25kts

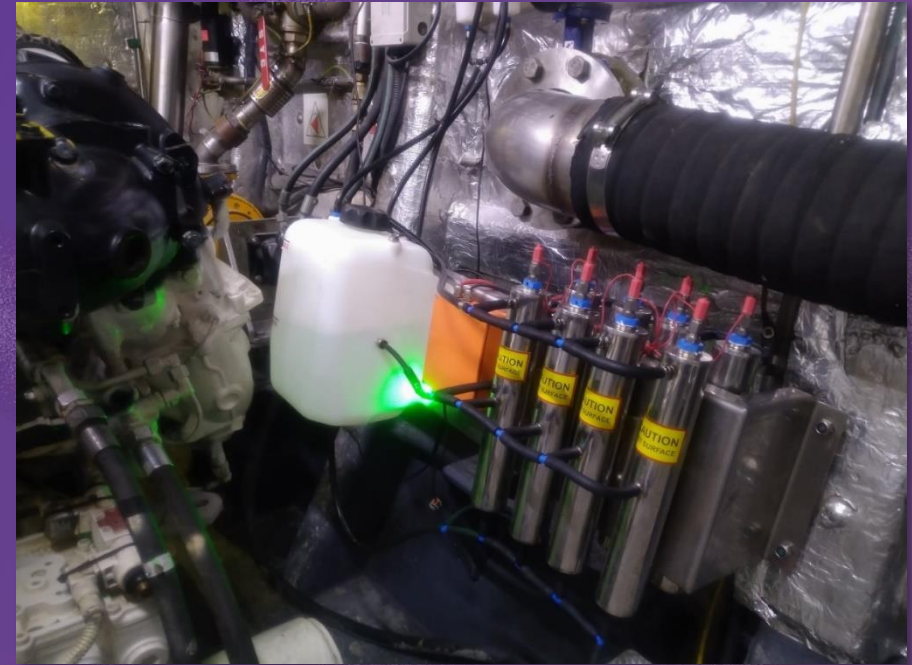


Fitted with

2 x EcoPro-8 fitted to main engines
EcoPro-S to the auxiliary engine



Running approximately 12 hours per day,
250 days per year



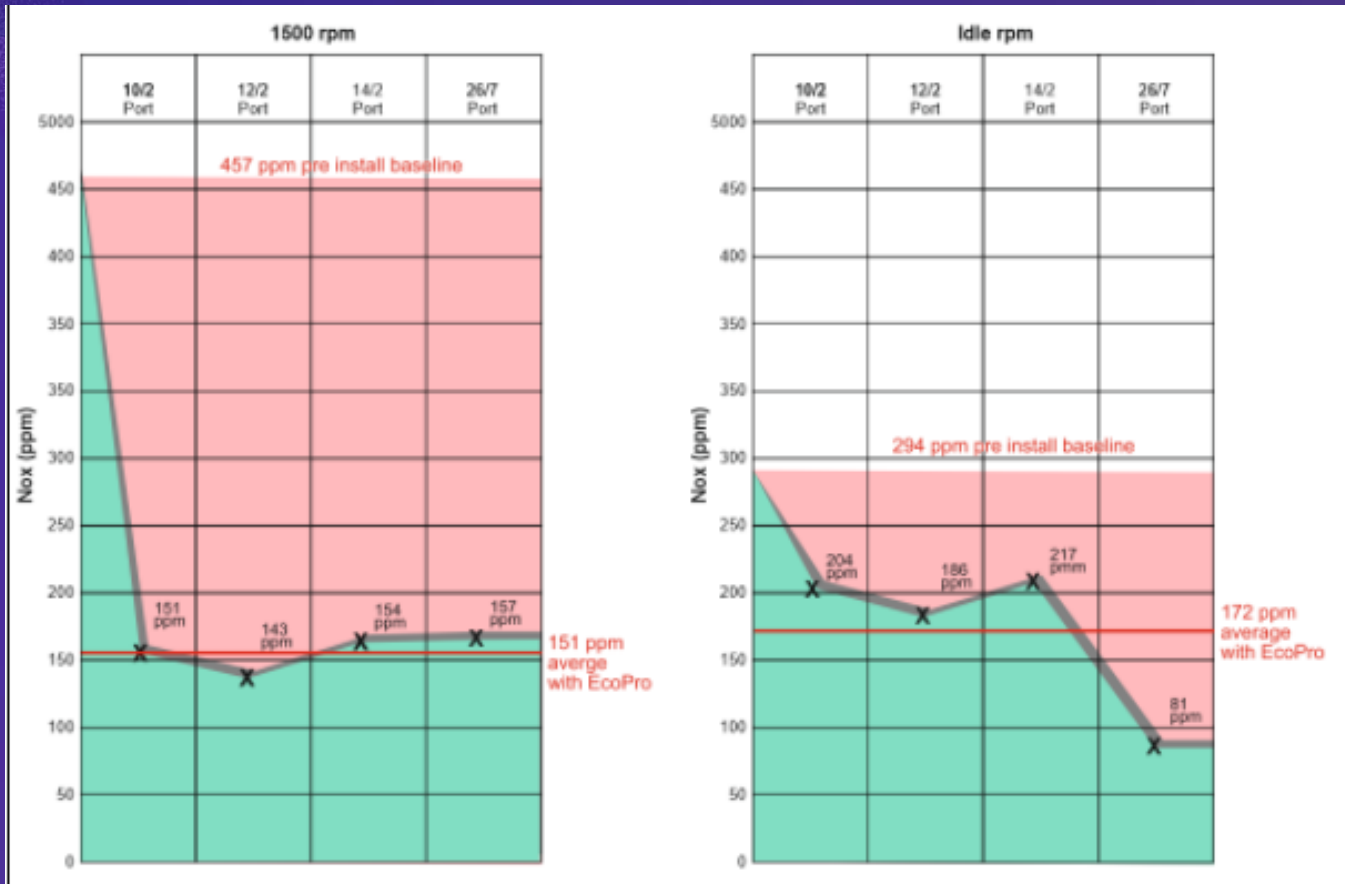
Wind Farm Crew Transfer Vessel

EXAMPLE

Port Engine	Idle		1500 rpm	
	CO ₂	NO _x	CO ₂	NO _x
No EcoPro	1.3	294 ppm	1.1	457 ppm
With EcoPro	0.5	81 ppm	1.4	157 ppm
Emission Reduction	62%	72%	27%	66%

Starboard Engine	Idle		1500 rpm	
	CO ₂	NO _x	CO ₂	NO _x
No EcoPro	1.2	197 ppm	1.4	157 ppm
With EcoPro	0.5	70 ppm	1.1	171 ppm
Emission Reduction	58%	64%	21%	9%

Wind Farm Crew Transfer Vessel



Emission tests were undertaken during trials to calculate a pre-install baseline for 1500 rpm and Idle

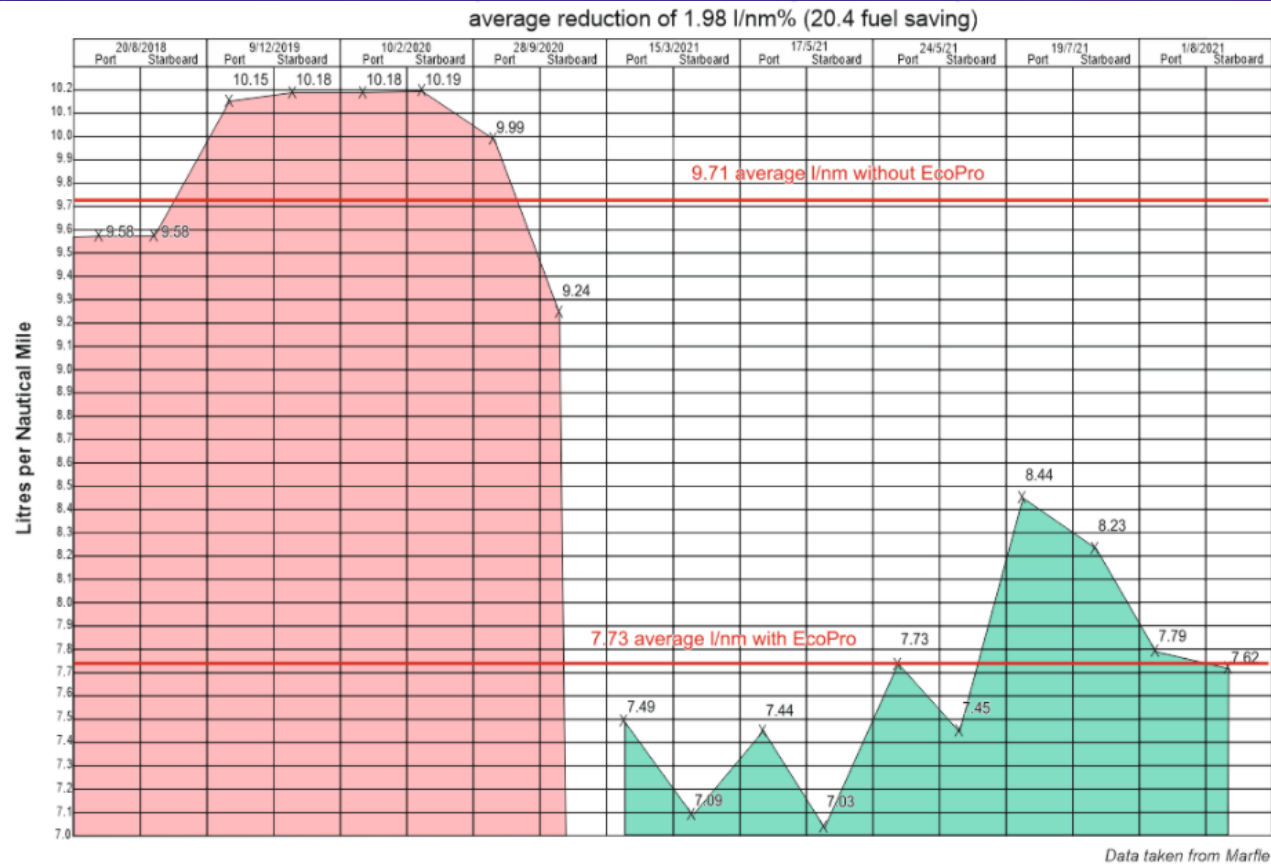
Results –
Red - NOx emissions pre install calculated;
Green - reduced NOx with EcoPro.

**Average NOx reduction at 1500 rpm = 306 ppm
= 67% reduction**

**Average NOx reduction at Idle = 122 ppm
= 41% reduction**

Data recorded using Kane Autoplus Analyser

Wind Farm Crew Transfer Vessel



Results vary depending upon driving style and sea conditions, for the purposes of this trial an average has been calculated.

Optimum efficiencies can be achieved by balancing the throttle position with hull speed in relation to the extra torque produced.

9.71 average before install


7.73 average post install


**Average fuel improvement = 1.9 l/nm
= 20.39%**

Data recorded using Marfle Analytics

Wind Farm Crew Transfer Vessel

			10%		15%		20%	
Running cost and litres	Without EcoPro £	Without EcoPro L/h	With EcoPro £	With EcoPro L/h	With EcoPro £	With EcoPro L/h	With EcoPro £	With EcoPro L/h
Per hour	£154.00	200	£138.60	180	£130.90	170	£123.20	160
Per day	£1,848.00	2,400	£1,663.20	2,160	£1,570.80	2,040	£1,478.40	1,920
Per month	£38,500.00	50,000	£34,650.00	45,000	£32,725.00	42,500	£30,800.00	40,000
Per year	£462,000.00	600,000	£415,800.00	540,000	£392,700.00	510,000	£369,600.00	480,000
Potential Saving per Month			£3,850.00	5,000	£5,775.00	7,500	£7,700.00	10,000
Potential Saving per Year			£46,200.00	60,000	£69,300.00	90,000	£92,400.00	120,000
Running Costs without EcoPro			£462,000.00					
Potential Running Costs per Year			£415,800.00		£392,700.00		£369,600.00	
Potential CO2 Saving per Year (kg)			158,400		237,600		316,800	
Potential Saving after Install and Maintenance	12 Months		£6,733.33		£29,833.33		£52,933.33	
	24 Months		£28,400.03		£74,600.03		£120,800.03	
	36 Months		£61,800.04		£131,100.04		£200,400.04	
	48 Months		£95,200.05		£187,600.05		£280,000.05	
	60 Months		£128,600.06		£244,100.06		£359,600.06	

 A 10% improvement means a saving of over **158,000kg of CO2** every year, (792,000kg in 5 years) with the company saving nearly **£7000**, rising to over **£128,000** after 5 years.

 A 20% improvement means a saving of nearly **317,000kg of CO2** every year, (1,584,000 kg in 5 years) with the company saving nearly **£53,000 in the first year**, rising to nearly **£360,000** after 5 years.

Glasgow City Council

St Mungo – a Water Witch Surface Dredger

MARINE EXAMPLE

- 🌿 The Water Witch features a powerful front-end loader which can lift-up to 1000kg and reach to 3.65m below the waterline.
- 🌿 Fitted with
EcoPro-3 to the main engine
EcoPro-1 to the auxiliary engine



Volvo D13 6-Cylinder 450hp Emission test results

Fishing Stern Trawler - based in Plymouth

MARINE



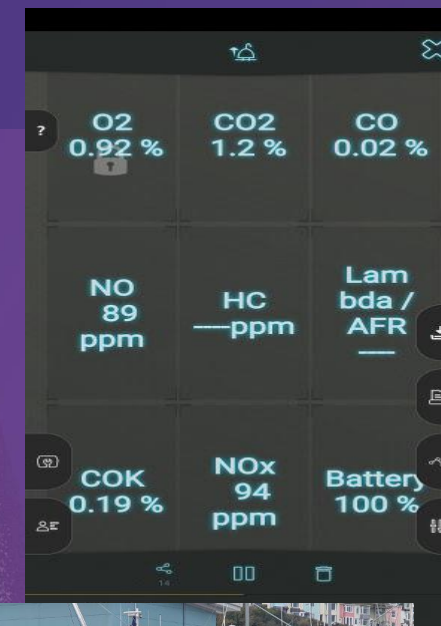
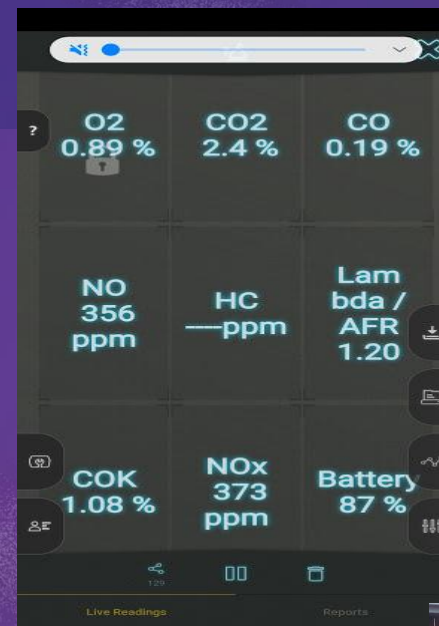
Volvo D13 6-Cylinder 450hp Emission test results

Fishing Stern Trawler - based in Newlyn

	Idle		1400 rpm	
	CO ₂	NO _x	CO ₂	NO _x
No EcoPro	2.4	373 ppm	1.6	247 ppm
With EcoPro	1.2	94 ppm	0.8	89 ppm
Emission Reduction	50%	75%	50%	64%

 Fuel savings in excess of 10%

 Engine temperatures 10% lower



EcoPro - a patented standalone transitional catalytic hydrogen system

🇬🇧 The global clean-energy transition is underway and here at Ecomotus, our vision is to help you to do your bit to make the world a cleaner place.

🇬🇧 We know that to clean up its act, the world needs to buy some time – change is not going to happen overnight. The EcoPro as a transitional technology - bridging the gap between fossil fuels and the future of a hydrogen/electric economy. A way to use hydrogen to immediately reduce pollution and improve mpg, cleaning up existing engines, increasing efficiency, and eliminating the majority of their air pollution now.





Ecomotus Ltd

Catalytic Hydrogen

