EXECUTIVE SUMMARY

SulNOx Group Plc is a Greentech company which specialises in providing next generation, natural solutions towards decarbonisation of liquid hydrocarbon fuels, with the mission to provide immediate and tangible progression towards carbon neutrality for hydrocarbon fuel users.

Circumstances often dictate that the most feasible and cost-effective means to provide vital electricity is via diesel operated generators. Around the world, sectors such as mining, emergency services, cell phone tower communications, home electricity generation and so on are reliant on generator sets. This is especially true in locations where the infrastructure needed to harness nature's renewable energy resources are not yet ready.

In a study operated by third party companies, SulNOx EcoConditioner has recently demonstrated its ability to **reduce consumption of generator fuel by 14.5%.**

Huge reductions in carbon output were observed. Particulate matter output (both **PM2.5 and 10**) drastically **decreased by over 95%** whilst all other monitored **GHG emissions showed drops across the board.**

The added lubricity of SulNOx EcoConditioner also contribute to reduced maintenance costs and extended life of the generator.

SCOPE OF STUDY

SulNOx Group has, for some time, been documenting notable success with both land transport and marine vessels in reducing fuel consumption and emissions. This study was designed for two main reasons. First, to remove as much uncontrollable, environmental uncertainty that is encountered in the transport and marine sectors as possible by using a static, controlled generator. Secondly, this study was run and monitored by completely independent third parties to ensure its integrity and efficacy.

Templant (https://www.templant.co.uk/) are one of the UK's leading suppliers of generators. They supplied a 100kVA sound proof generator to Minton, Treharne & Davis Group (MTD) (https://www.minton.group/) to run for 5 weeks at 80% load conditions. Renowned emissions monitoring specialists Socotec (https://www.socotec.co.uk/) attended to monitor the trials alongside Templant at MTD in Cardiff, UK.

- MTD were the third-party site and oversaw the safe and independent running of the generator.
- Templant supplied the generator and fuel over 5 weeks and topped up with SulNOx EcoConditioner. Their fuel consumption data for their generator is reported herein.
- Socotec attended as an independent body to monitor the emissions and supply data for a baseline test of the standard EN590 diesel fuel on its own, the fuel with SulNOx EcoConditioner after 1 hour of consumption, and then repeat tests 5 weeks later.

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RESULTS – FUEL CONSUMPTION

Templant have the ability to remotely monitor their generator fuel consumption on their systems. They provided data for the initial consumption (shortly after the addition of SulNOx EcoConditioner), consumption after 2 further weeks of running, and then a final result 2 further weeks later making this approximately a 5 weeks study.

30/04/2024

Fuel Usage			
Starting Hours	3258	Starting Fuel	3000L
Current Hours	3404	Current % Left	37
Run Time	146	Fuel Used	1890
Ave L/H	12.94		

15/05/2024

SulNOx & Fuel Usage			
Starting Hours	3258	Starting Fuel	3000L
Current Hours	3766	Current % Left	46
Run Time	508	Fuel Used	5620
Ave L/H	11.06		

30/05/2024

SulNOx & Fuel Usage			
Starting Hours	3258	Starting Fuel	3000L
Current Hours	4121	Current % Left	39
Run Time	863	Fuel Used	9680
Ave L/H	11.22		

After just 2 weeks of running between the first and second readings, **Templant observed a drop in fuel consumption of 14.5%** from 12.9 l/h to 11.06 l/h. This new consumption figure stays steady for a further 2 weeks having consumed on average 11.22 l/h.

RESULTS – EMISSIONS AND PARTICULATE MATTER

Socotec visited on the initial drop off date of the generator to provide baseline readings for a 100kVA sound proof generator running standard EN590 diesel. They provided another complete data set after 1-hour post-addition of SulNOx EcoConditioner to see how quickly SulNOx EcoConditioner would begin conditioning the fuel and generator. Finally, they revisited approximately 5 weeks later to take a third and final full set of readings on particulate matter and GHG emissions.

Parameter	Units	Baseline	1 hour	Dif (%)	5 weeks	Dif (%)
PM10	mg/m3	7.59	3.05	-59.8	0.29	-96.2
PM10 Emission Rate	g/h	1.66	0.67	-59.6	0.06	-96.4
PM2.5	mg/m3	7.44	2.94	-60.5	0.17	-97.7
PM2.5 Emission Rate	g/h	1.63	0.64	-60.7	0.04	-97.5
SOx	mg/m3	50	2.29	-95.4	18	-64.0
SOx Emission Rate	g/h	3.16	0.14	-95.6	1.16	-63.3
NOx	mg/m3	456	437	-4.2	390	-14.5
NOx Emission Rate	g/h	100	96	-4.0	86	-14.0
CO	mg/m3	140	120	-14.3	133	-5.0
CO Emission Rate	g/h	31	26	-16.1	29	-6.5
CO2	%v/v	5.59	5.84	4.5	4.1	-26.7

The particulate matter (PM) reductions highlight the effectiveness of SulNOx EcoConditioner to promote a clean and complete combustion. **Both PM10 and PM2.5 emission were down by over 96% each.**

Reduction were observed by Socotec across the board for all Green House Gases. **SOx (down ca.64%), NOx (down ca.14% reduction) Carbon Monoxide (down ca.6%) and Carbon Dioxide (down ca. 27%)**

The initial small increase in CO_2 output is typical in the first few hours of using SulNOx EcoConditioner where carbon deposits in the engine and being cleaned by the detergency effect of SulNOx EcoConditioner and are being gently exfoliated, oxidised and released to provide a cleaner engine. This then drops away once the engine has been cleaned and conditioned with the added lubrication SulNOx EcoConditioner offers