Shelburne Ship Repair Limited

Annual Report
On
Green House Gas Emissions
2024

29 Hero Road
Shelburne NS
B0T 1W0
Canada

Shelburne Ship Repair Limited

1. Purpose

To produce an annual report of the Green House Gas (GHG) emissions that have been produced by Shelburne Ship Repair Limited (SSR), over the period of 2024, and include data from previous years where available.

2. GHG Emissions

The GHG emissions have been broken down into three distinct categories, namely as follows:

1) Scope 1 – Direct Air Emissions
2) Scope 2 – Indirect Air Emissions
3) Waste Oil Emissions

Scope 1 – Direct Air Emissions

This deals with the GHG emitted by the equipment used onsite, and includes gasoline, diesel, and propane. Each GHG emission in metric tons is a product of the volume consumed and an Emission Factor which is a measure of grams/litre (g/Ltr).
In addition to the above, we have introduced an additional metric, based the total GHG and the average Gross Tonnage of the vessels that underwent repairs at SSR.
This metric is in the early stages of data collection, and we will require at least another year of data to see if this metric is a good indicator.

Scope 2 – Indirect Air Emissions

This deals with emissions that are based on Emission Factors supplied by Nova Scotia Power (NSP) and applied against the total electrical power consumed at SSR.
These Emission Factors deals with the emission of the following:

1. Mercury in grams/gigawatt hour (g/GWh)
2. Sulphur Dioxide in grams/kilowatt hour (g/kWh)
3. Carbon Dioxide in grams/kilowatt hour (g/kWh)
4. Nitrogen Oxide in grams/kilowatt hour (g/kWh)

The data for these metrics for the previous year is not normally available until at least the middle of the following year, therefore an approximation is used initially based on the running average of the Emission Factors until the true figure for the previous year is available.
In addition to the above metrics, we also include our annual electrical power consumption as a metric, which may in turn may be modified to be a measure of kWh against Gross Tonnage, as the number of vessels will influence the total electrical power consumed.

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Waste Oil Emissions

Environment Canada introduced a new calculator for the emissions from waste oil given that a significant number of companies are now recycling any waste oil to use as a fuel for waste oil furnaces to heat their premises.
The calculator takes into account 4 areas for metrics, namely:

a) Waste Oil Consumed – Quantity is measured in liters
b) Part 1A Substance Releases – This includes the emission of Chromium, Hydrochloric Acid, Manganese & Nickel
c) Part 1B Substance Releases – This includes the emission of Arsenic, Cadmium, Cobalt & Lead
d) Part 4 Criteria Air Contaminates (CAC) Releases – This includes the emission of Carbon Monoxide, Sulphur Dioxide, Oxides of Nitrogen, Total Particulate Matter, Particulate Matter Greater Than or Equal To 10µ & Particulate Matter Greater Than of Equal To 2.5µ.

SSR purchased and installed three waste oil furnaces alongwith a 25000 Ltr waste oil storage tank in Q4 of 2022.
Analysis of the waste oil stored within the tank is tested at least twice a year, dependent up the volumes added, and it is these analyses alongwith the quantities consumed in each furnace is used to track the waste oil emissions utilising the Environment Canada calculator.

The metrics tracked for these three areas are detailed in the following section.

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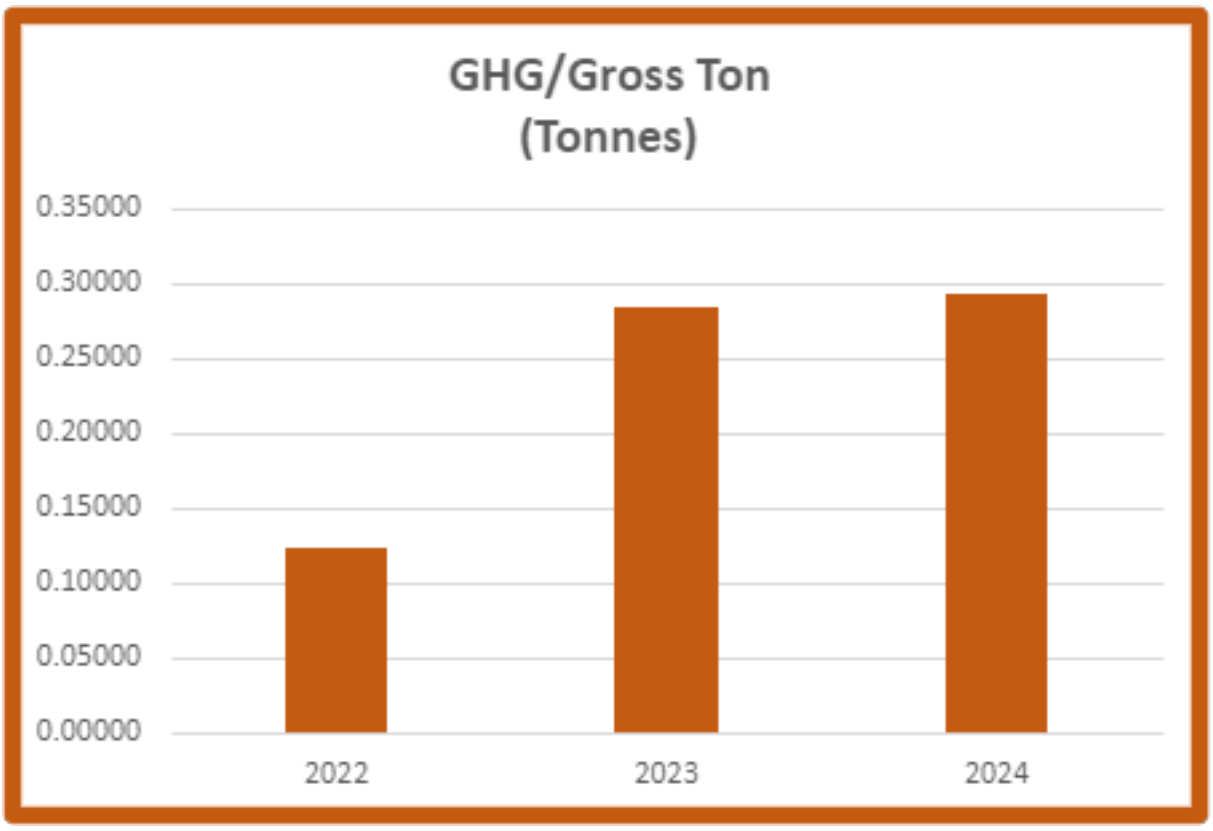
3. Scope 1 – Direct Air Emissions Metrics

Fuel Type	# of 33lb Propane Cylinders	# of 100lb Propane Cylinders	Annual Consumption (Litres)	Emission Factor (g/Litre)	Annual GHG Emissions (Tonnes)
Gasoline			6141.05	2307	14.17
Diesel			78599.86	2681	210.73
Propane	85	2	2764.62	1515	4.19
Natural Gas			0.00	1.9	N/A
Kerosene			0.00	2580	N/A
Light Fuel Oil			0.00	2735	N/A
Heavy Fuel Oil			0.00	3156	N/A
Total Emissions (Tonnes)					229.09
Total Emissions (Tonnes/Gross Ton)					0.29263



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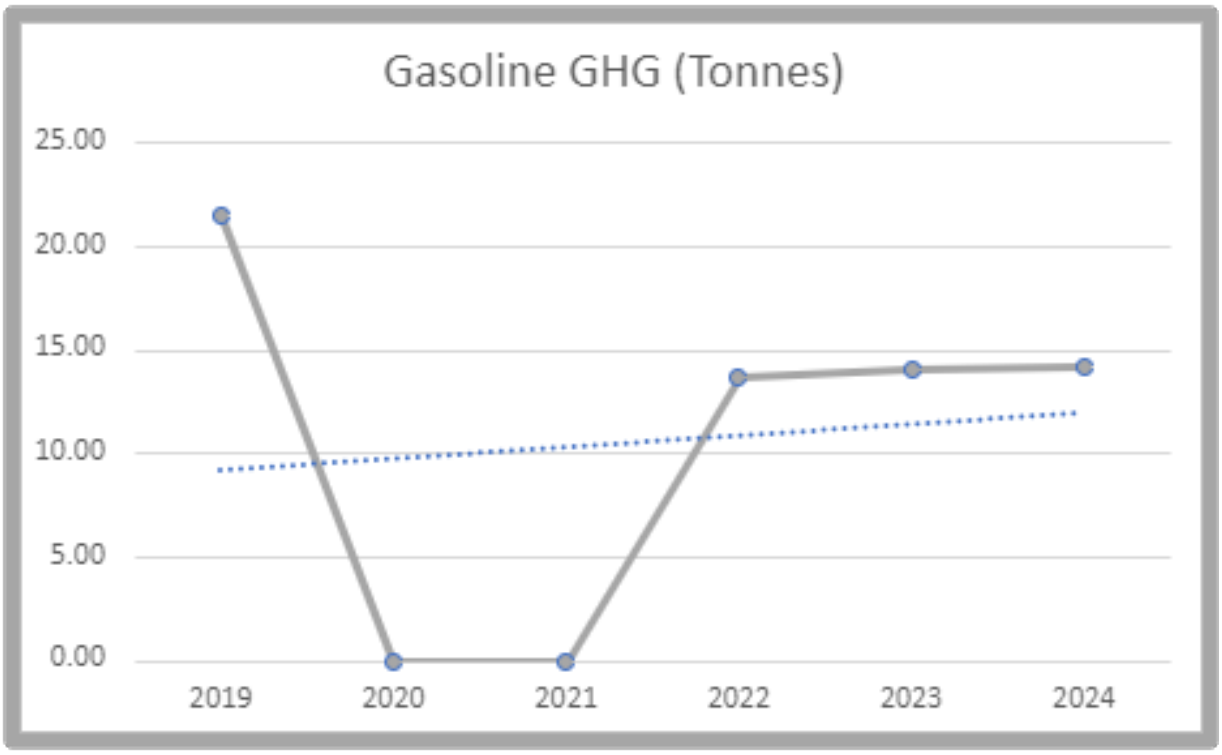

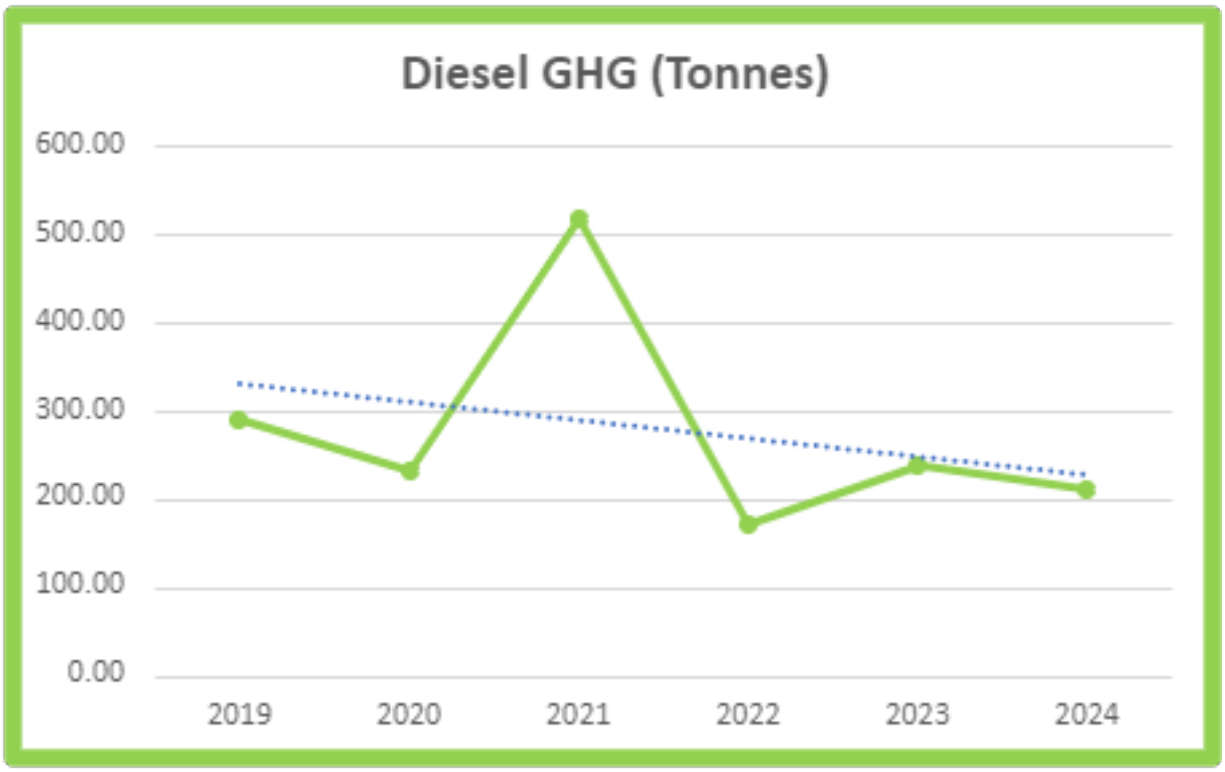

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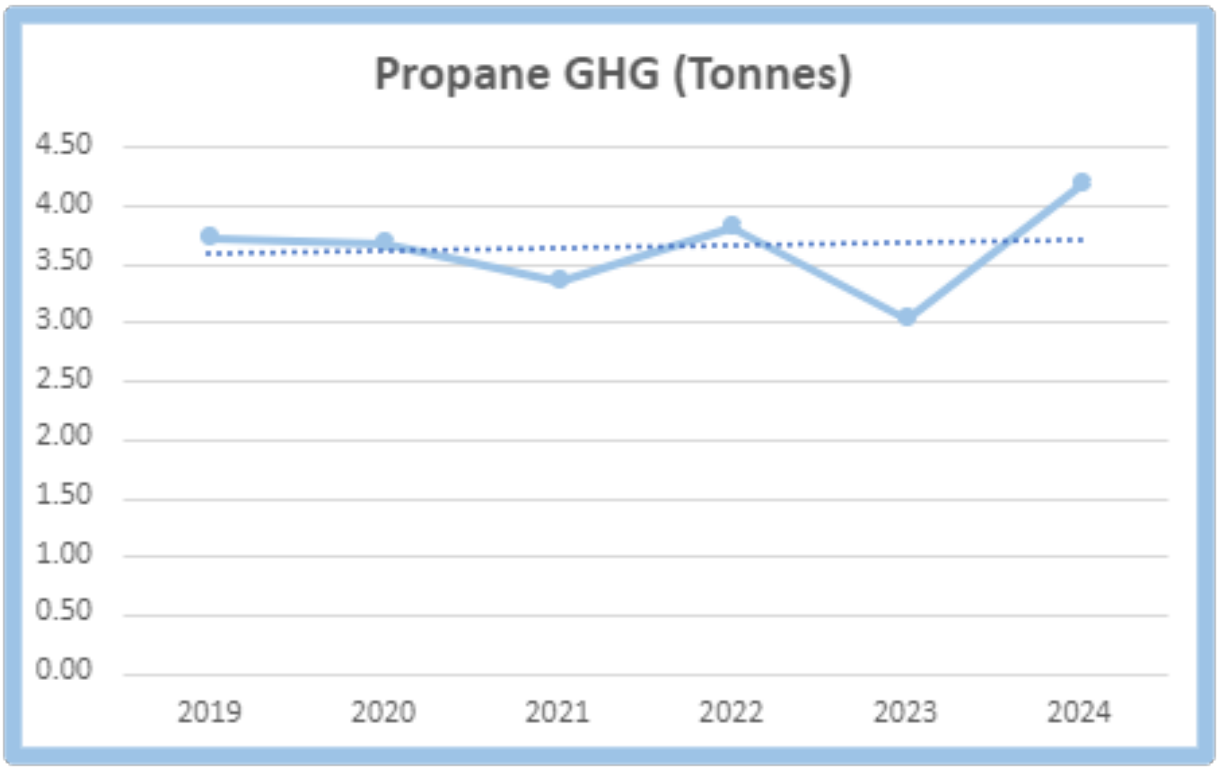

With regards to the various Scope 1 metrics, the trend lines are generally downwards, which is showing that we are improving in reducing the GHG emissions.
As previously noted, the metric of GHG/Gross Ton, is still in its infancy and at least one more year of data will be required.

4. Scope 2 – Indirect Air Emission Metrics

Year	SSR Annual kWh	Nova Scotia Power Emission Info											
		Mercury (g/GWh)			Sulphur Dioxide (g/kWh)			Carbon Dioxide Equivalent (g/kWh)			Nitrogen Oxide (g/kWh)		
		Published NS Emission Intensity	Running Average Emission Intensity	SSR Annual Emissions (kg)	Published NS Emission Intensity	Running Average Emission Intensity	SSR Annual Emissions (Tonnes)	Published NS Emission Intensity	Running Average Emission Intensity	SSR Annual Emissions (Tonnes)	Published NS Emission Intensity	Running Average Emission Intensity	SSR Annual Emissions (Tonnes)
2018	986760	6.0	0.0	0.006	5.9	0.0	5.822	654.9	0.0	646.229	1.4	0.0	1.381
2019	711000	5.6	0.0	0.004	4.9	0.0	3.484	630.9	0.0	448.570	1.4	0.0	0.995
2020	904320	6.0	0.0	0.005	5.1	0.0	4.612	629.7	0.0	569.450	1.4	0.0	1.266
2021	1832040	3.9	0.0	0.007	4.9	0.0	8.977	602.9	0.0	1104.537	1.2	0.0	2.198
2022	779199	4.9	0.0	0.004	4.8	0.0	3.740	557.2	0.0	434.170	1.1	0.0	0.857
2023	949400	3.6	0.0	0.003	3.3	0.0	3.133	450.6	0.0	427.800	0.8	0.0	0.760
2024	1059883		5.0	0.005		4.8	5.105		587.7	622.893		1.2	1.290

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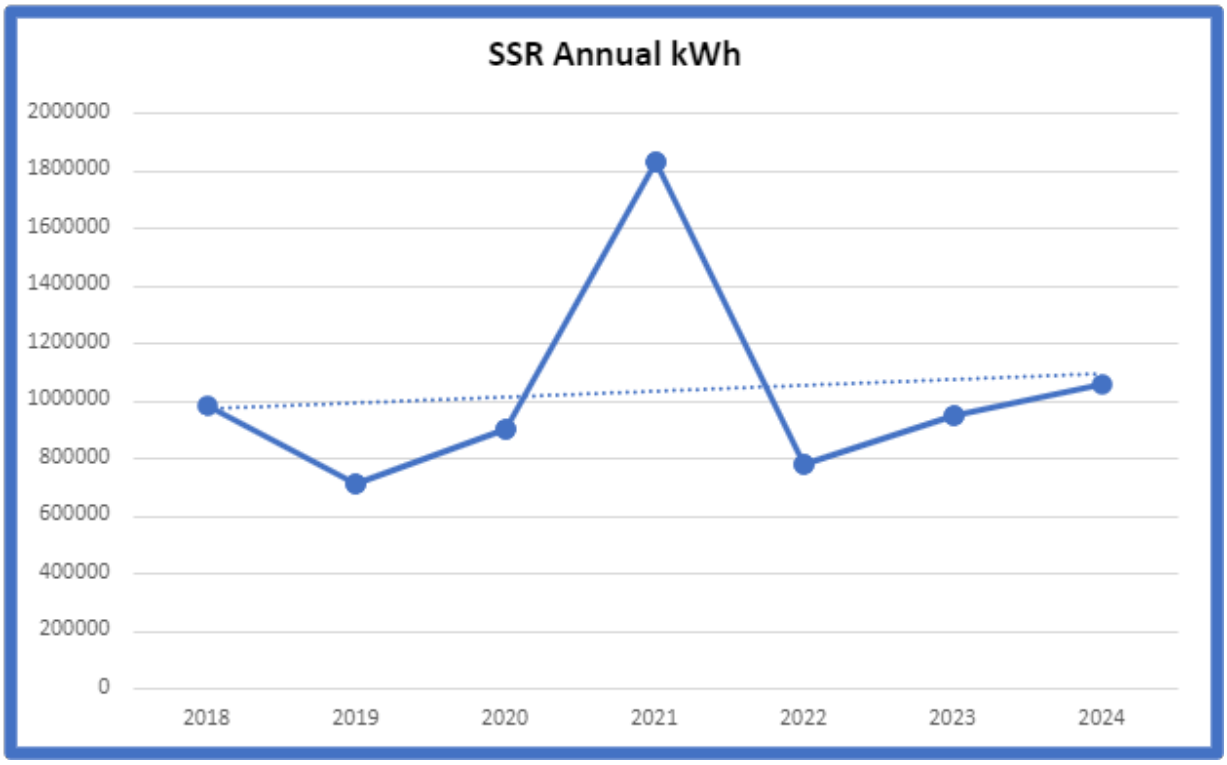

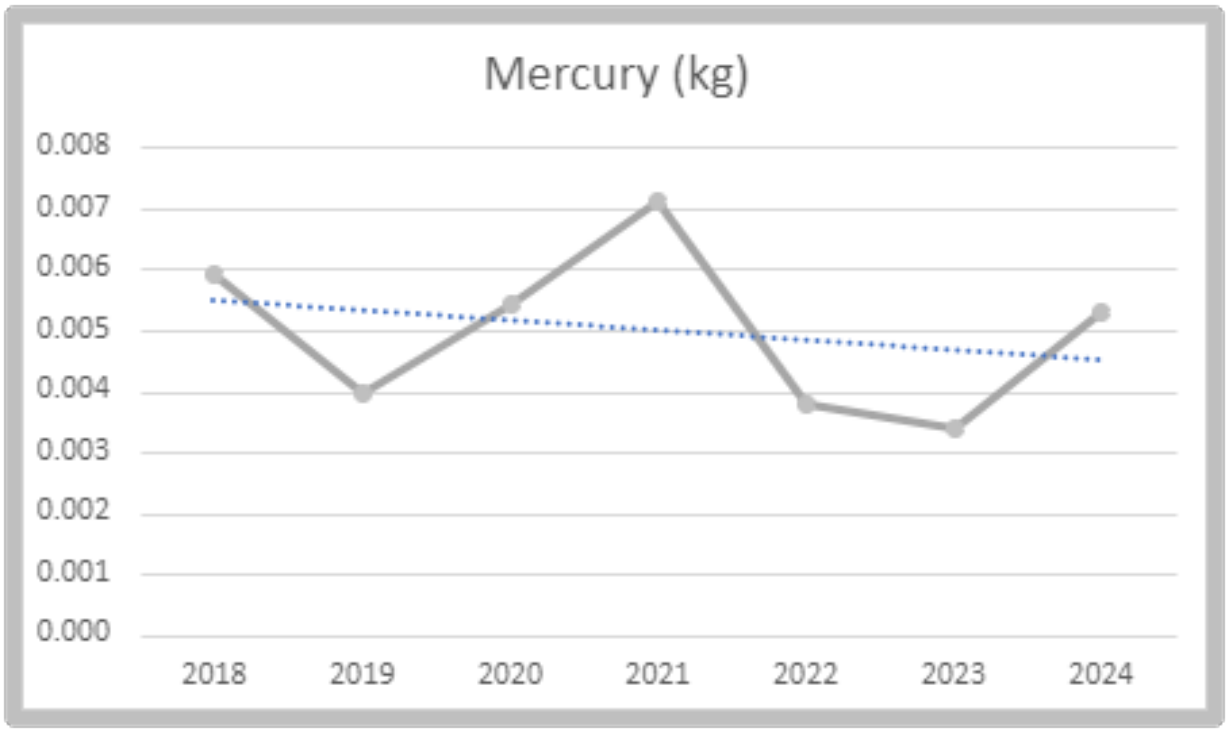

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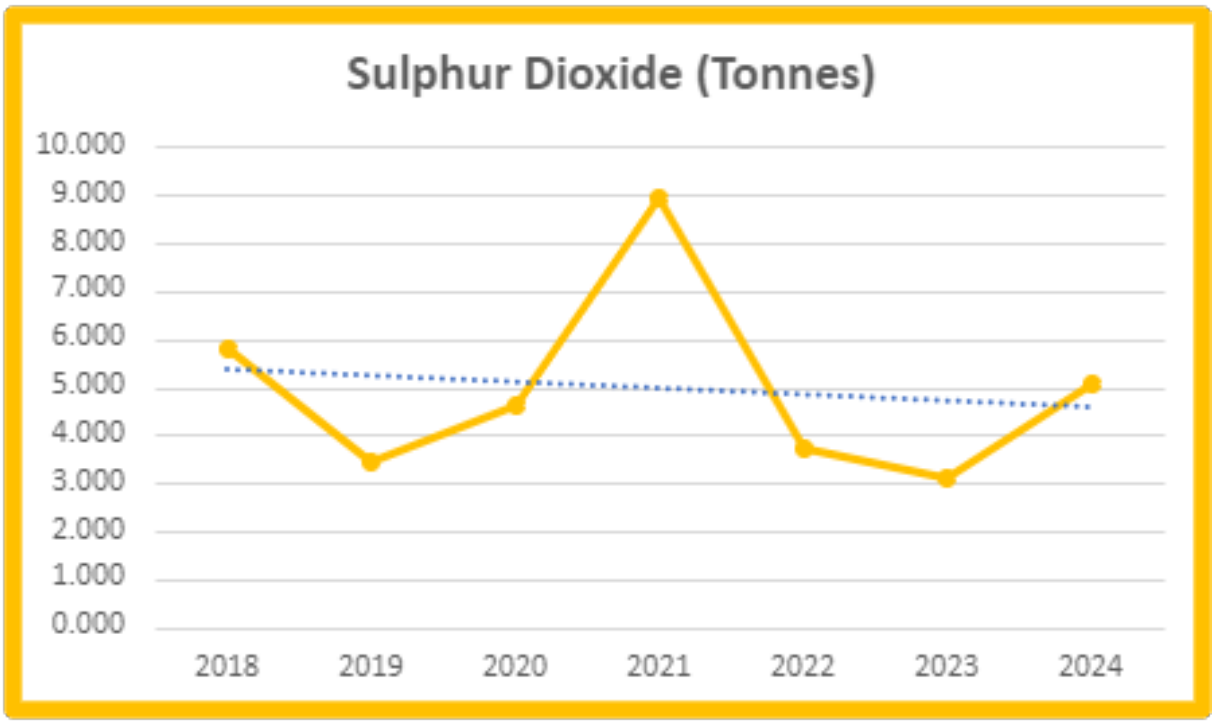

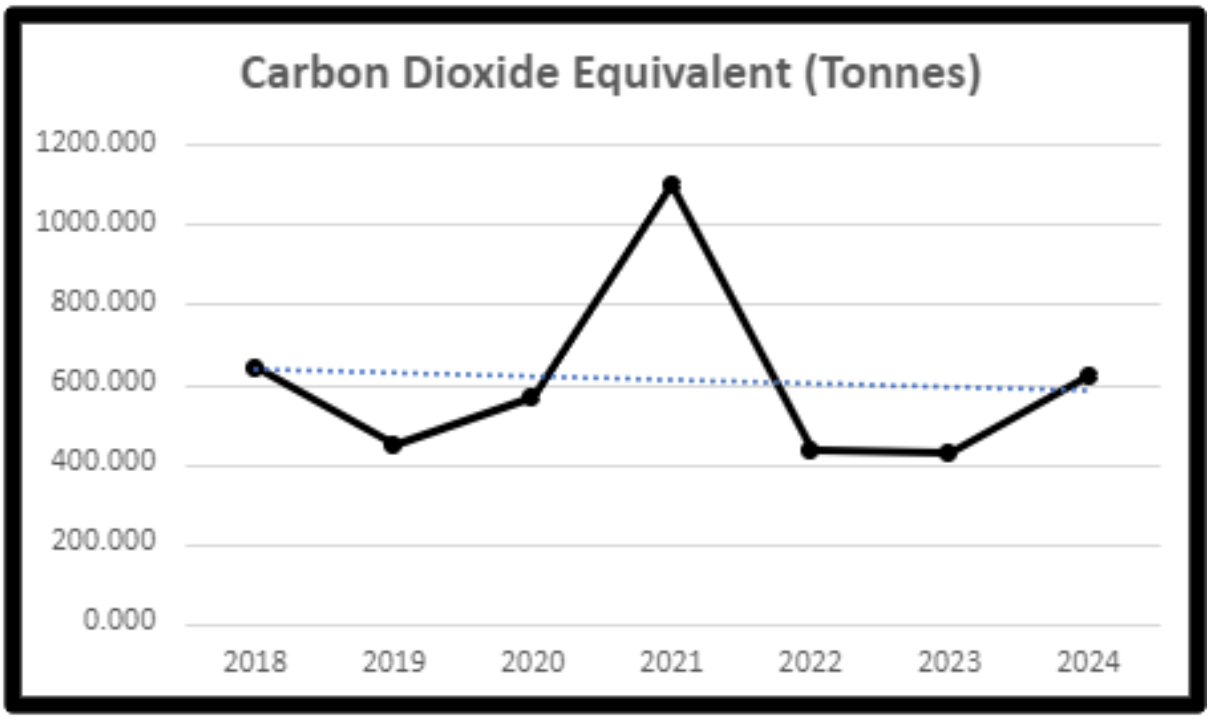

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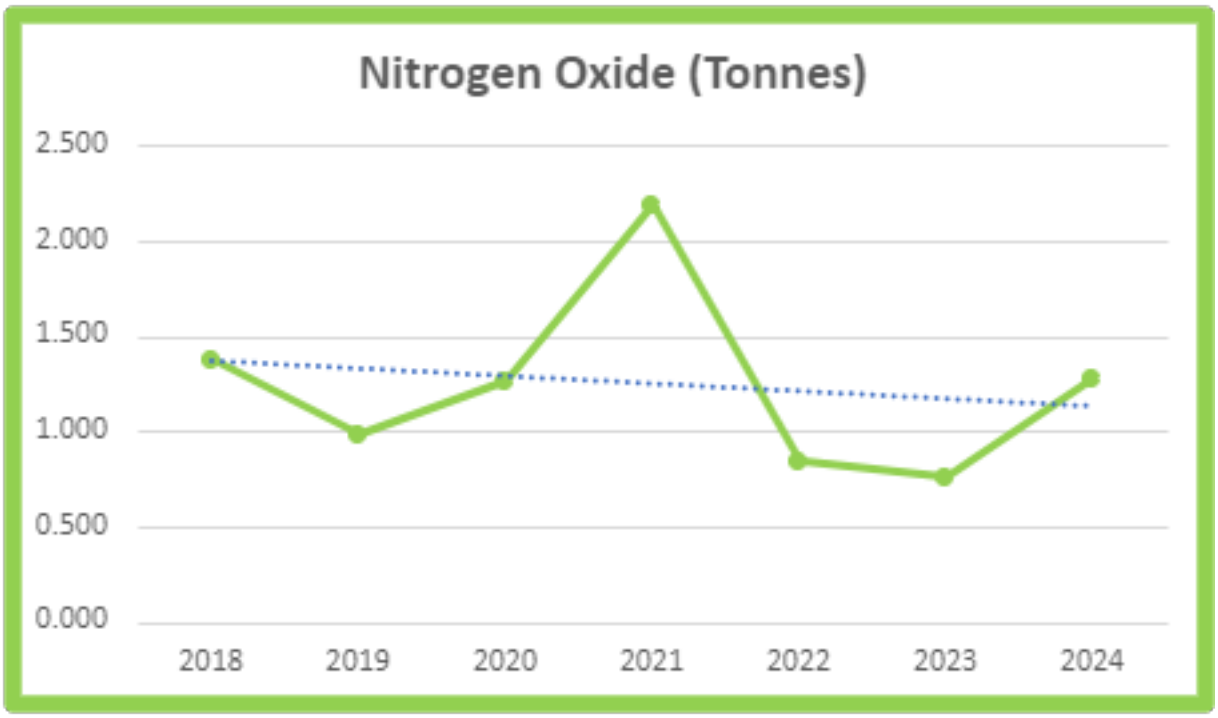

In general the Scope 2 metrics are trending downwards, however the metrics for 2024 are based on the running averages rather than a true figure, which will not be available until NSP releases them, and as a consequence this is only an indication rather than fact.
Once the 2024 NSP figures are available, then the data will be updated, and the actual metrics will be known.
As regards the total power consumption at SSR, this is wholly influenced by the number of vessels that have been supplied with electrical power, and for 2025, a more useful metric may be developed e.g. one that combines total kWh, with Gross Tonnage and length of time that power was supplied.

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5. Waste Oil Emissions

Year	Interval	Waste Oil Consumed (Ltrs)
	Q4	3920
2022	**Total**	**3920**
	Q1	11996
	Q2	7821
	Q3	0
	Q4	7271
2023	**Total**	**27088**
	Q1	19284
	Q2	6057
	Q3	0
	Q4	14763
2024	**Total**	**40104**

Part 1A Substance Releases							
Chromium (Tonnes)		Hydrochloric Acid (Tonnes)		Manganese (Tonnes)		Nickel (Tonnes)	
Emission Factor	Quantity	Emission Factor	Quantity	Emission Factor	Quantity	Emission Factor	Quantity
0.0024	0.009	0.10202	0.400	0.00815	0.032	0.00132	0.005
	0.009		**0.400**		**0.032**		**0.005**
0.0024	0.029	0.08146	0.977	0.00815	0.098	0.00132	0.016
0.0024	0.019	0.08541	0.668	0.00815	0.064	0.00132	0.010
0.0024	0.000	0.08541	0.000	0.00815	0.000	0.00132	0.000
0.0024	0.017	0.08541	0.621	0.00815	0.059	0.00132	0.010
	0.065		**2.266**		**0.221**		**0.036**
0.0024	0.046	0.02689	0.519	0.00815	0.157	0.00132	0.025
0.0024	0.015	0.00712	0.043	0.00815	0.049	0.00132	0.008
0.0024	0.000	0.00712	0.000	0.00815	0.000	0.00132	0.000
0.0024	0.035	0.00870	0.128	0.00815	0.120	0.00132	0.019
	0.096		**0.690**		**0.327**		**0.053**

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Part 1B Substance Releases							
Arsenic (kg)		Cadmium (kg)		Cobalt (kg)		Lead (kg)	
Emission Factor	Quantity	Emission Factor	Quantity	Emission Factor	Quantity	Emission Factor	Quantity
0.01318	51.67	0.00111	4.37	0.00003	0.10	0.00264	10.33
	51.67		**4.37000**		**0.10**		**10.33**
0.01318	158.12	0.00111	13.37	0.00003	0.30	0.00395	47.44
0.01318	103.09	0.00111	8.72	0.00003	0.20	0.00264	20.62
0.01318	0.00	0.00111	0	0.00003	0.00	0.00264	0.00
0.01318	95.84	0.00111	8.1	0.00003	0.18	0.00264	19.17
	357.05		**30.19**		**0.68**		**87.23**
0.01318	254.18	0.00111	21.49	0.00003	0.49	0.00000	0.00
0.01318	79.84	0.00111	6.75	0.00003	0.15	0.00000	0.00
0.01318	0.00	0.00111	0	0.00003	0.00	0.00000	0.00
0.01318	194.59	0.00111	16.45	0.00003	0.37	0.00000	0.00
	528.61		**44.690**		**1.01**		**0.00**

Part 4 Criteria Air Contaminants (CAC) Releases											
Carbon Monoxide (Tonnes)		Sulphur Dioxide (Tonnes)		Oxides of Nitrogen (Tonnes)		Total Particulate Matter (Tonnes)		Particulate Matter <= 10µ (Tonnes)		Particulate Matter <= 2.5µm (Tonnes)	
Emission Factor	Quantity	Emission Factor	Quantity	Emission Factor	Quantity	Emission Factor	Quantity	Emission Factor	Quantity	Emission Factor	Quantity
0.59913	2.349	0.00773	0.030	2.27670	8.925	3.75776	14.730	2.99446	11.738	1.69099	6.629
	2.349		**0.030**		**8.925**		**14.730**		**11.738**		**6.629**
0.59913	7.187	0.00617	0.074	2.27670	27.311	0.00000	0.000	0.00000	0.000	0.00000	0.000
0.59913	4.686	0.00647	0.051	2.27670	17.806	3.91113	30.589	3.11669	24.376	1.76001	13.765
0.59913	0.000	0.00647	0.000	2.27670	0.000	3.91113	0.000	3.11669	0.000	1.76001	0.000
0.59913	4.356	0.00647	0.047	2.27670	16.554	3.91113	28.438	3.11669	22.661	1.76001	12.797
	16.229		**0.172**		**61.671**		**59.027**		**47.037**		**26.562**
0.59913	11.554	0.00204	0.039	2.27670	43.904	0.00000	0.000	0.00000	0.000	0.00000	0.000
0.59913	3.629	0.00054	0.003	2.27670	13.790	0.00000	0.000	0.00000	0.000	0.00000	0.000
0.59913	0.000	0.00054	0.000	2.27670	0.000	0.00000	0.000	0.00000	0.000	0.00000	0.000
0.59913	8.845	0.00066	0.010	2.27670	33.611	0.00000	0.000	0.00000	0.000	0.00000	0.000
	24.028		**0.052**		**91.305**		**0.000**		**0.000**		**0.000**

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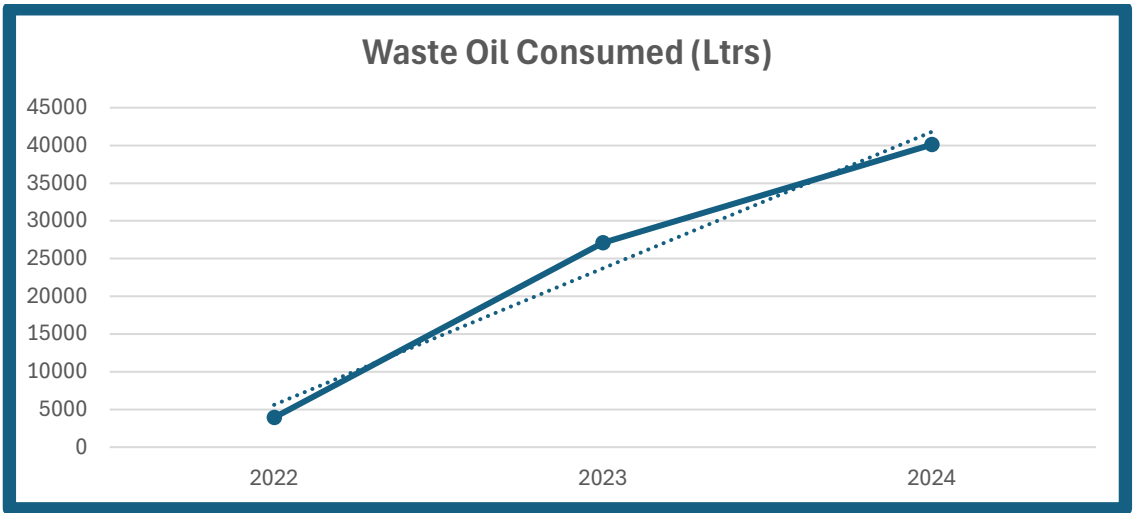

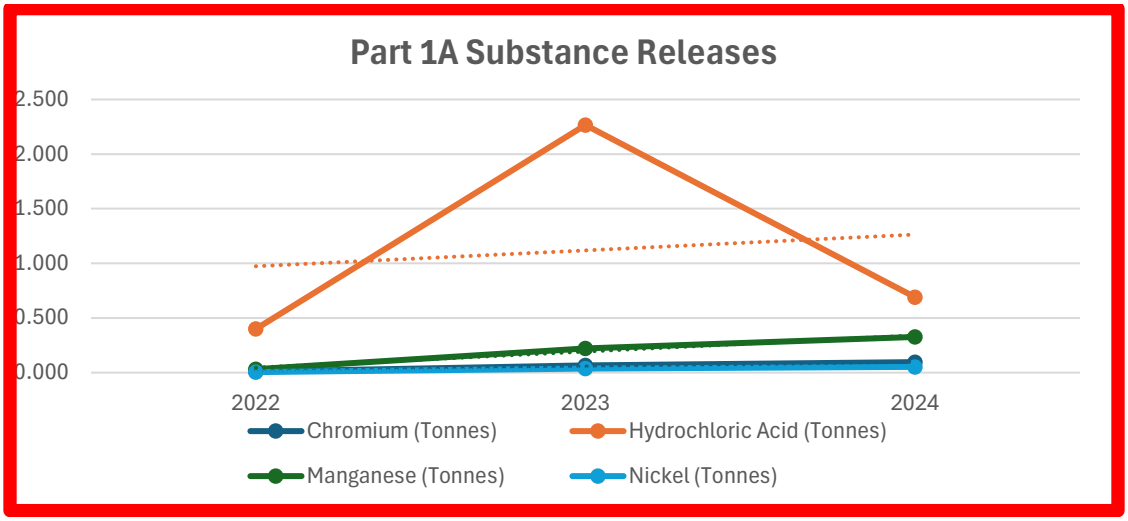

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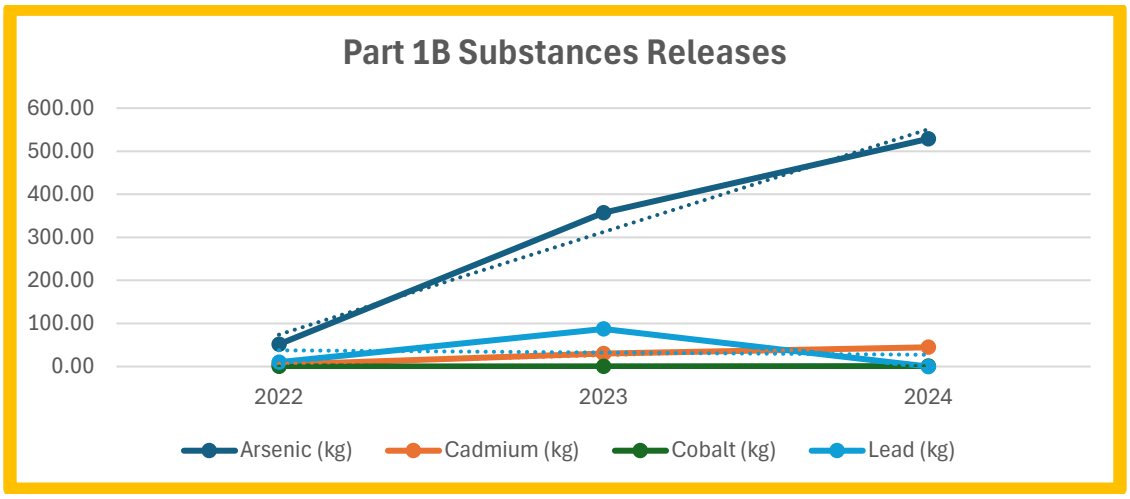

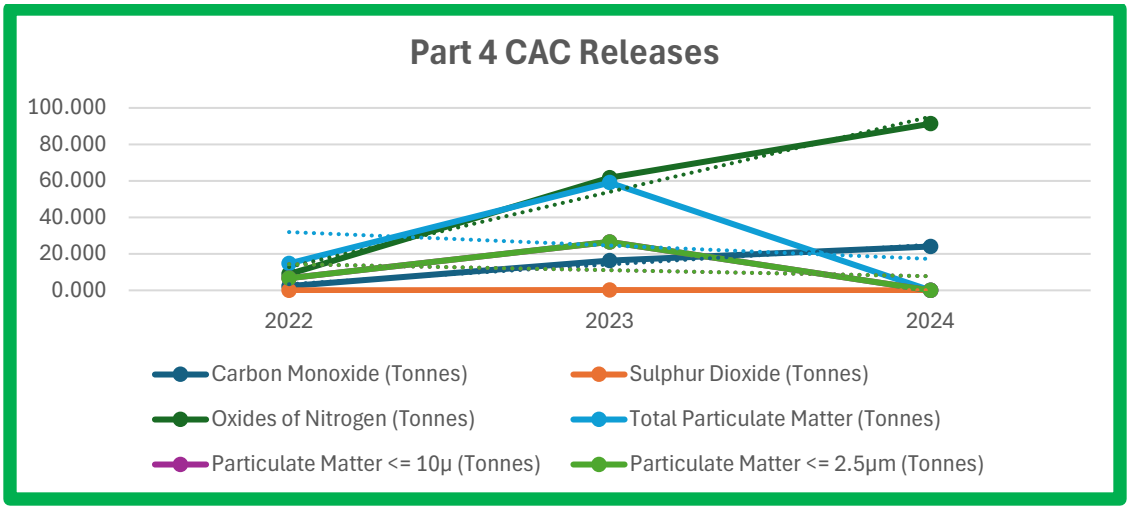

Despite the increase in consumption of waste oil in 2024 due to much lower temperatures, results can be interpreted as follows:

Part 1A Substance Releases – The trend remains relatively flat, with the exception being Hydrochloric Acid, but this would be dependent upon the composition of the waste oil being consumed, and in 2024, the acid content was greatly reduced.

Part 1B Substance Releases – The trend remains relatively flat, with the exception being Arsenic which again would be dependent upon the composition of waste oil being consumed.

Part 4 CAC Releases – The trend again remains relatively flat, with the exception being Carbon Monoxide, which would not be unexpected given the increase in waste oil consumed.

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In general the bulk of the waste oil being consumed is either ultra low sulphur diesel or marine gas oil, with the reminder being a mixture of hydraulic and engine oils.

It should be noted that as of July 2023, SSR became completely self sufficient and was heating the main workshop for zero cost in fuel to the company. At present the only costs that relate to the heating of the main workshop is the annual maintenance of the furnaces, which is carried out carried out in the spring of each year by the company that supplied the furnaces.
This has had the effect of reducing heating fuel costs by between $40000 & $60000 per year.

6. Conclusion

In general the GHG emissions remain at steady levels with the exceptions being Arsenic & Hydrochloric Acid, both of which would be dependent upon the composition of the waste oil, as well as Carbon Monoxide, which is a function of the quantity of waste oil consumed.

If there are any question, please contact me at:

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