GREEN HOUSE GAS EMISSIONS 2019

Siat Group

CONTENTS

Cover: Presco ltd Factory, cogeneration and biogas
P9: Seladamex sacred trees
Back cover: aerial view of Ologbo

ABSTRACT

In order to limit its carbon footprint and to comply with the RSPO requirements, the Siat group (Siat) has started evaluating the greenhouse gas (GHG) emissions of its activities. This information is used to develop a mitigation plan.
The implementation of the plan is monitored, and progress assessed on a yearly basis when the GHG assessment is repeated. From 2016 to 2019 the emissions in tons of equivalent CO_2 have slightly decreased for oil palm and are still negative. In 2019, calculations of GHG emissions for rubber have been done using the same methodology as for oil palm. Due to the huge areas of unexploited forests inside the Siat Gabon concessions and the use of renewable energy, the results in terms of total GHG emissions for the group are negative with a good sequestration of carbon.
Our commitment in terms of GHG is in line with the Sustainable Development Goals 9.4 (CO_2 emission per unit of value added).

METHOD

The GHG assessment is carried out using the RSPO's PalmGHG tool for Palm oil subsidiaries. For rubber subsidiaries, in the absence of a dedicated method for rubber, the simplified PalmGHG calculation has been adapted to rubber using allometric values available for rubber trees' carbon sequestration (other default values like conservation area sequestration are the same as the PalmGHG calculator). Data such as land usage, surfaces planted and surfaces of conservation areas, fertilizer and fuel usage, oil production, effluent and POME production and treatment, and electricity generation is gathered and used to calculate net carbon emissions. The results generated allow us to identify the most important emission sources and sinks and to develop a mitigation programme.
In 2019, GHG assessments were carried out for GOPDC in Ghana, Presco and SNL in Nigeria for oil palm and Siat Gabon and CHC respectively in Gabon and Ivory Coast for rubber (Sakponba estate just startyed to be included in 2019 as it's a new development that has started producing this year, CHP in Ivory Coast is not included). (Note: Siat plantations do not have peat soil). Emissions of out growers are captured as 3rd party.

LIST OF ABBREVIATIONS

RSPO	Roundtable on Sustainable Palm Oil	**POME**	Palm Oil Mill Effluent
GHG	Green House Gas	**PKO**	Palm Kernel Oil
CPO	Crude Palm Oil	**PKE**	Palm Kernel Expeller
PK	Palm Kernel	**OER**	Oil Extraction Rate
tCO2e	ton CO_2 equivalent	**KER**	Kernel Extraction Rate
PalmGHG	https://rspo.org/certification/palm-ghg-calculator		
SDGs	https://unstats.un.org/sdgs/indicators/indicators-list		

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The Siat Group supports the SDG 9.4

2019 KEY FIGURES - SIAT GROUP

Total area planted Oil palm + Rubber	67 704 ha *
Total conservation area	26 248 ha**
Land conversion	389 829 tCO2e
Crop sequestration	- 435 872 tCO2e
Net emissions 2019 Palm Oil & Dry Rubber	- 201 933 tCO2e
Net emissions 2019 Palm Oil	- 76 150 tCO2e
Net emissions 2018 Palm Oil	- 16 128 tCO2e
Net emissions 2017 Palm Oil	- 35 782 tCO2e

Graph 1.1: Comparison of SIAT subsidiaries' 2019 GHG emissions

*Presco, GOPDC, SNL, CHC, Siat Gabon, year of planting < 25years ** Conservation + not plantable forested areas

RESULTS – SIAT

These results combine those of **GOPDC**, **Presco**, **SNL**, **CHC**, and **Siat Gabon** to give a global overview of SIAT's activity emissions.

Description	Unit	Value 2017	Value 2018	Value 2019
Total Planted Area	ha	52 315	58 578	63 704
Conservation Area	ha	na	26 072	26 248
Total Planted Area oil palm	ha	39 450	39 794	46 564
Conservation Area oil palm	ha	5 881	5 826	6 002
Oil Extraction Rate	%	19,6	19,4	20,8
Total Planted Area rubber	ha	18 138	17 108	17 140
Conservation Area rubber	ha	na	20 246*	20 246*
Dry rubber / ha	t /ha	na	1,2	1,1

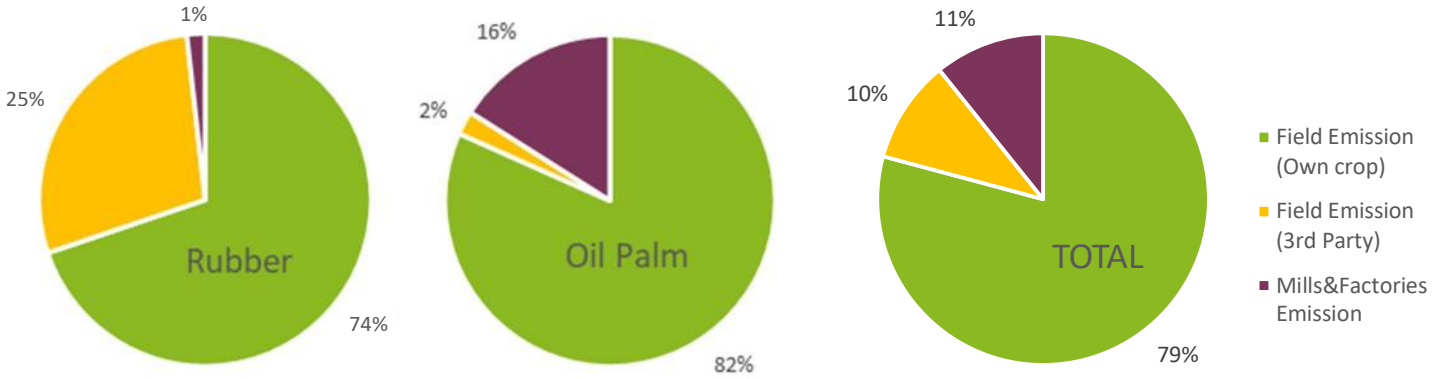
Table 1.1: SIAT key indicators

*unplanted areas outside the development programme

Product	tCO2e/t Product 2017	tCO2e/t Product 2018	tCO2e/t Product 2019
CPO	-0,26	-0,09	-0,62
PK	-0,26	-0,09	-0,62
PKO	0,49	0,98	-0,29
PKE	0,49	0,98	-0,29
Dry rubber	na	0,10	0,03

Table 1.2: SIAT emissions factories per ton of product

Graph 1.2: Distribution of SIAT's emissions (2019)



Description	TOTAL Own	Own Oil palm			3rd Party OP	Own Rubber			3rd Party Rub.
	tCO2e	tCO2e	tCO2e /ha	tCO2e /t FFB	tCO2e	tCO2e	tCO2e /ha	tCO2e /t rubber	tCO2e
Land Conversion	**389 829**	252 389	5,4	0,67	-	137 441	9,4	18,76	-
Fertilizer application	**7 599**	7 555	0,16	0,02	-	44	0,00	0,00	-
N_2O Emissions	**2 644**	2 644	0,06	0,01	-	13	0,00	0,00	-
Fuel Consumption	**12 153**	8 632	0,19	0,02	-	3 521	0,23	0,57	-
Crop Sequestration	**-435 872**	-347 216	-7,46	-0,92	-	-88 657	-6,08	-11,92	-
Sequestration in Conservation Area	**-231 746**	-52 775	-1,13	-0,14	-	-178 971	-10,44	-40,06	-
Total 2019	**-255 393**	-128 771	-2,77	-0,34	5 901	-126 622	-24,57	-32,65	46 469
Total 2018	**- 188 797**	-65 513	-1,66	-0,19	7 333	-122 284	-24,01	-25,44	59 042

Table 1.3: SIAT plantation emissions – sources and sinks (2018 & 2019)

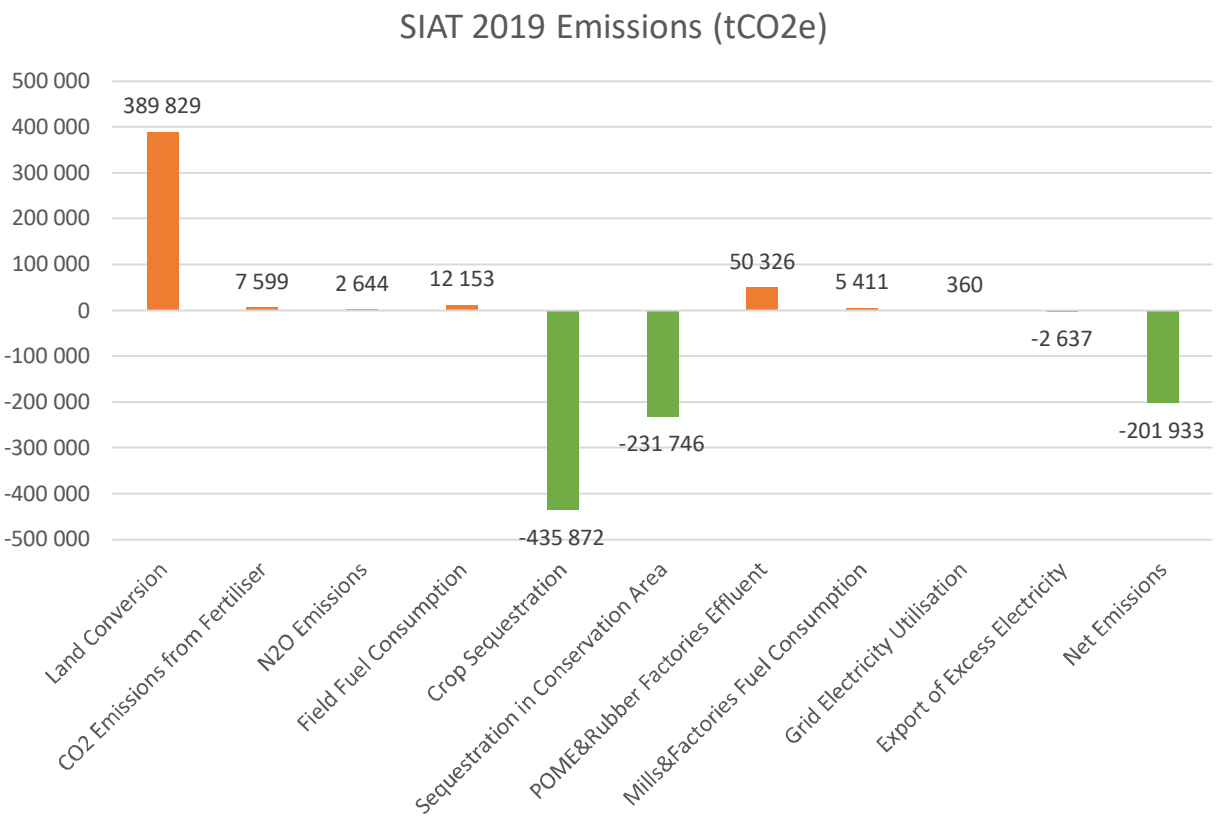
Description	TOTAL	Oil palm		Rubber	
	tCO2e	tCO2e	tCO2e /t FFB	tCO2e	tCO2e /t rubber
POME & Effluent	50 326	50 251	0,11	74*	0,00
Fuel Consumption	5 411	3 599	0,01	1 812	0,06
Grid Electricity Utilization	360	360	0,00	0	0,00
Export of Excess Electricity to Housing & Grid	-2 637	-1 589	0,00	-1 048	-0,03
Total Mill emissions 2019	53 459	52 621	0,12	838	0,03
Total Mill emissions 2018	51 894	36 283	0,09	2 509	0,10

Table 1.4: SIAT palm oil mills & rubber factories emissions (2018 & 2019)

*evaluation of GHG for effluent will be improved in the future

Emission Source	tCO2e
PK from own mill	-6 702
PK from other sources	324
Fuel consumption	806
Total crusher emissions 2019	-5 572
Total crusher emissions 2018	24 522

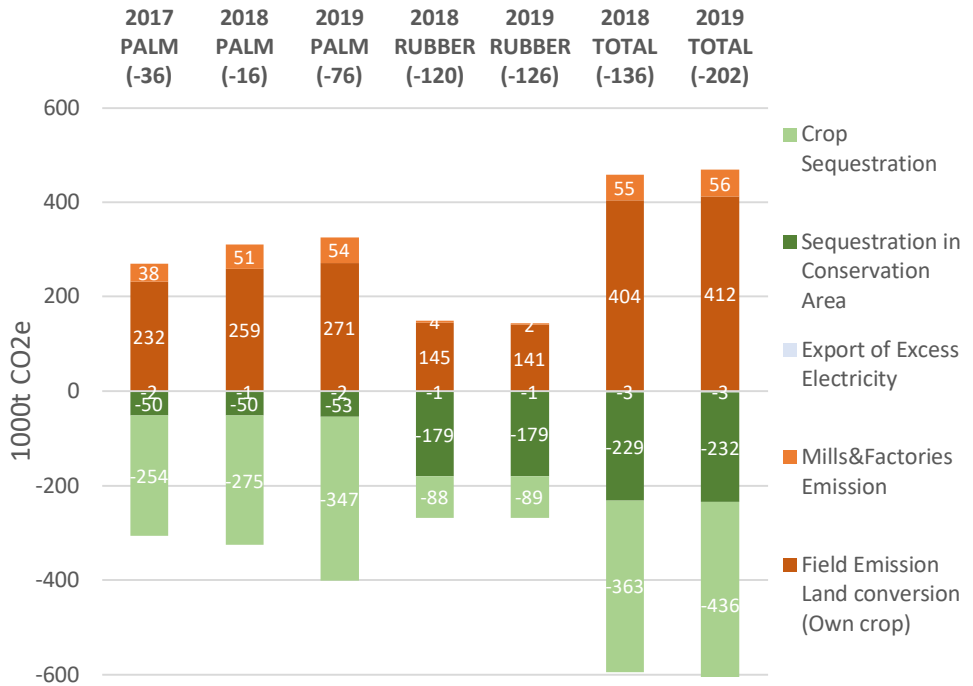
Table 1.5: SIAT crusher emissions (2018 & 2019)



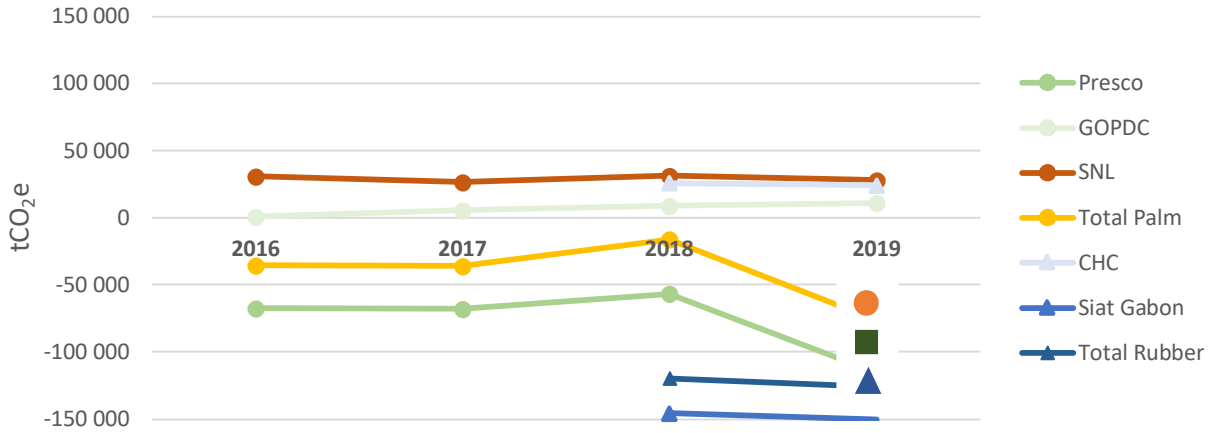
Graph 1.3: Summary of SIAT emissions – sources and sinks (2019)

The emissions from the above table 1.5 are not included in the total net emissions of the graphs 1.2 and 1.3 as the RSPO has not yet made it compulsory for mills to estimate their palm kernel crusher emissions. Nevertheless, we choose to start assessing them before the obligation comes into effect.

SIAT contributes to sequestering carbon through its plantations (crop sequestration) and conservation areas particularly in Siat Gabon, whilst its mill emissions are limited by the installation of biomethanation plants. Nevertheless, SIAT will strive to improve further its emission results in the years to come!



Graph 1.4: Emission comparison (2017, 2018 & 2019) for palm oil and global result of the Siat group (2019)



Graph 1.5: Three years emission comparison (2016, 2017, 2018 & 2019) per subsidiary


RESULTS BY SUBSIDIARY

RESULTS – GOPDC

Description	Unit	Value 2016	Value 2017	Value 2018	Value 2019
Total Planted Area	ha	7 831	7 831	8 059	7 994
Conservation Area	ha	824	640	673	673
OER	%	21,6	21,7	21,8	21,7

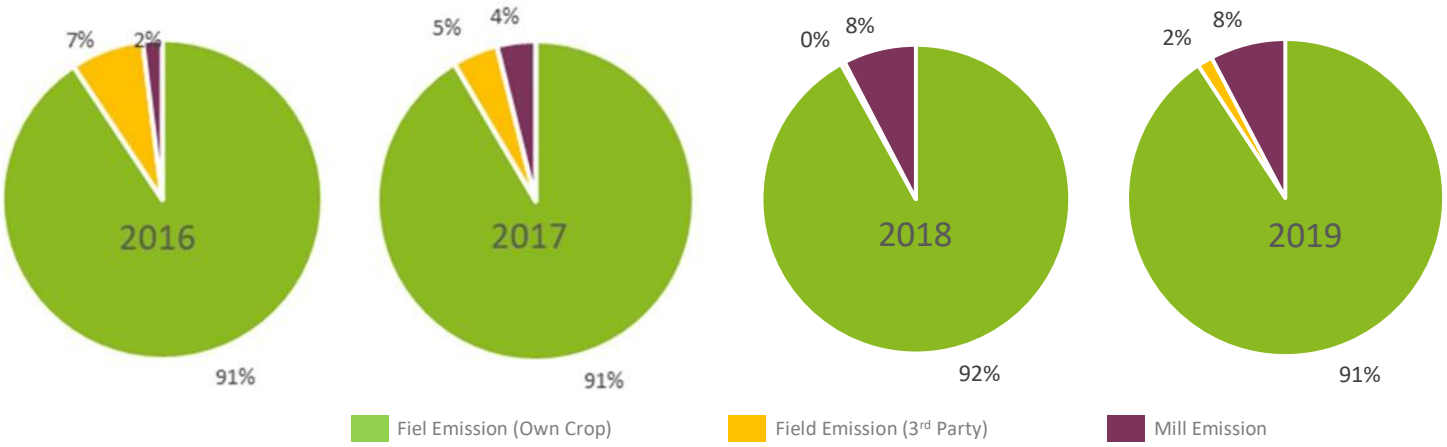
Net emissions 2019	tCO2e	11 179
Net emissions 2018	tCO2e	8 955
Net emissions 2017	tCO2e	5 459
Net emissions 2016	tCO2e	870

Table 2.1: GOPDC key indicators (2016, 2017, 2018 & 2019)

Product	tCO2e /t Product 2016	tCO2e /t Product 2017	tCO2e /t Product 2018	tCO2e /t Product 2019
CPO	0,21	0,31	0,31	0,36
PK	0,21	0,31	0,31	0,36
PKO	0,31	0,43	0,63	0,38
PKE	0,31	0,43	0,63	0,38

Table 2.2: GOPDC emissions per ton of product (2016, 2017, 2018 & 2019)

Graph 2.1: Distribution of GOPDC's emissions (2016, 2017, 2018 & 2019)



Description	Own			3rd Party
	tCO2e total	tCO2e /ha	tCO2e /t FFB	tCO2e total
Land Conversion	79 759	9,98	0,72	-
Fertilizer application	1 409	0,18	0,01	-
N_2O Emissions	675	0,08	0,01	-
Fuel Consumption	3 379	0,42	0,03	-
Crop Sequestration	-74 834	-9,36	-0,67	-
Sequestration in Conservation Area	-5 945	-0,74	-0,05	-
Total Plantation emissions 2019	4 442	0,56	0,04	1 489
Total Plantation emissions 2018	2 766	0,34	0,03	434
Total Plantation emissions 2017	2 581	0,33	0,03	4 144
Total Plantation emissions 2016	-391	-0,05	-0,01	6 511

Table 2.3: GOPDC plantation emissions – sources and sinks (2019)

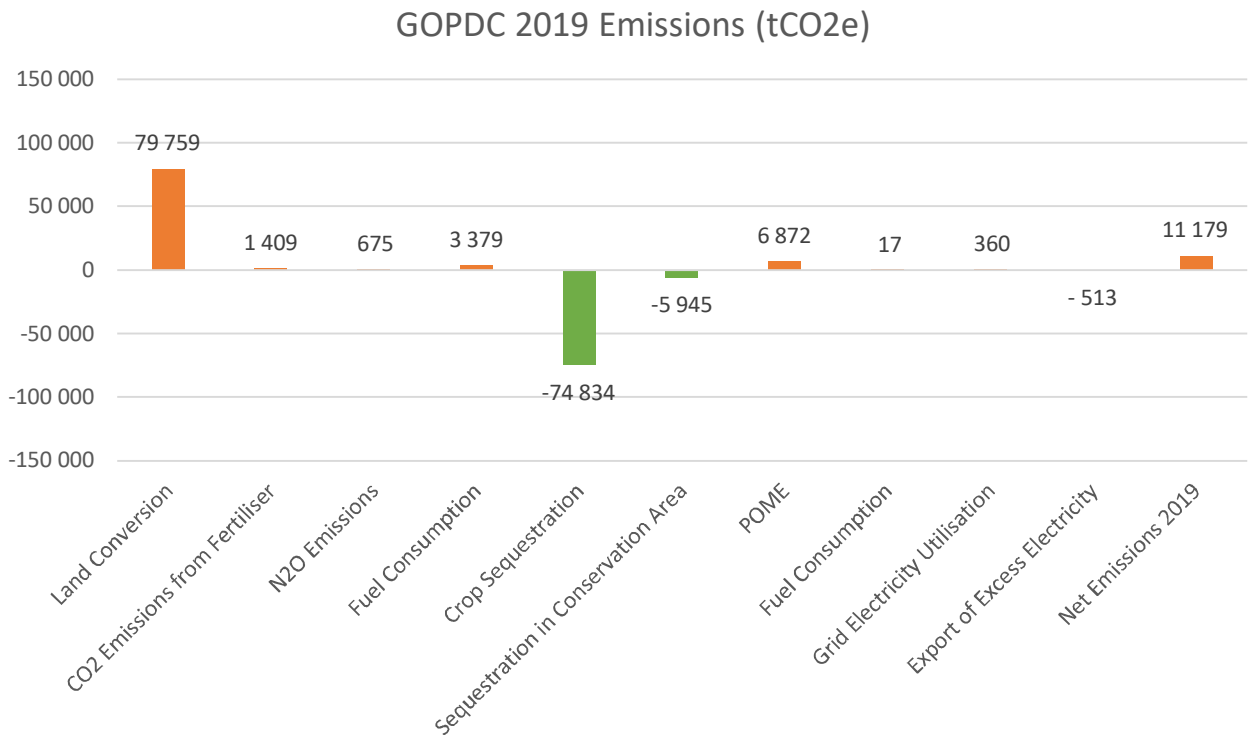
Description	tCO2 total	tCO2e /t FFB
POME	6 872	0,05
Fuel Consumption	17	0,03
Grid Electricity Utilization	360	0,00
Export of Excess Electricity to Housing & Grid	-513	0,00
Total Mill emissions 2019	6 737	0,05
Total Mill emissions 2018	6 189	0,06
Total Mill emissions 2017	2 879	0,02
Total Mill emissions 2016	1 261	0,01

Table 2.4: GOPDC mill emissions (2019)

Emission Source	tCO2e total
PK from own mill	1 774
PK from other sources	0
Fuel consumption	3*
Total crusher emissions 2019	1 777
Total crusher emissions 2018	3 277
Total crusher emissions 2017	2 481
Total crusher emissions 2016	1 935

* Gensets were out of order in 2019

Table 2.5: GOPDC crusher emissions (2019)



Graph 2.2: Summary of GOPDC emissions – sources and sinks (2019)

The results show that the most important source of emissions is land conversion. However, these emissions are compensated by the carbon sequestered by the oil palms, as well as the conservation areas spread across the plantation. Fertilizer usage and fuel consumption on the plantation are also sources of emissions. At the mill, the palm oil mill effluent (POME) is the biggest source of emissions, although these emissions are already greatly decreased by the use of a biodigester to treat the POME and produce biogas for energy generation. The GOPDC mill continues to increase its usage of green energy, thereby decreasing its emissions linked to grid electricity usage. However, in 2018 and 2019 grid electricity consumption were a bit higher than expected due to technical problems with boilers.

RESULTS - Presco

Description	Unit	Value 2016	Value 2017	Value 2018	Value 2019
Total Planted Area	ha	16 388	16 388	16 553	23 348
Conservation Area	ha	5 343	4 810	4 818	5 006
OER	%	21,6	22,2	22,4	23,9

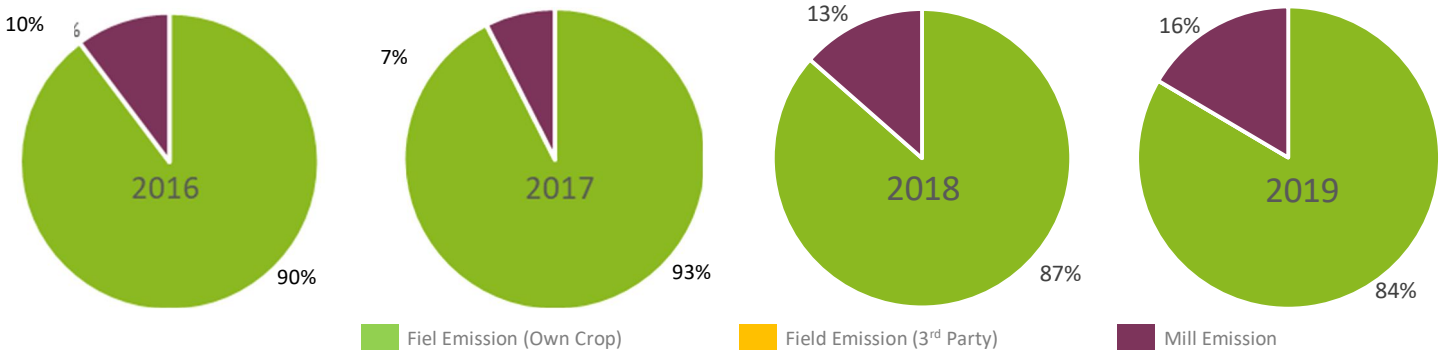
Net emissions 2019	tCO2e	-115 181
Net emissions 2018	tCO2e	-56 567
Net emissions 2017	tCO2e	-67 947
Net emissions 2016	tCO2e	-67 217

Table 3.1: Presco key indicators (2016, 2017, 2018 & 2019)

Product	tCO2e /t Product 2016	tCO2e /t Product 2017	tCO2e /t Product 2018	tCO2e /t Product 2019
CPO	-1,50	-1,45	-1,10	-2,04
PK	-1,50	-1,45	-1,10	-2,04
PKO	-1,49	-1,43	-1,08	-2,02
PKE	-1,49	-1,43	-1,08	-2,02

Table 3.2: Presco emissions per ton of product (2016, 2017, 2018 & 2019)

Graph 3.1: Distribution of Presco's emissions (2016, 2017, 2018 & 2019)



Description	Own			3rd Party
	tCO2e total	tCO2e /ha	tCO2e /t FFB	tCO2e total
Land Conversion	107 521	4,61	0,54	na
Fertilizer application	4 328	0,19	0,02	na
N_2O Emissions	1 186	0,05	0,01	na
Fuel Consumption	3 826	0,16	0,02	na
Crop Sequestration	-210 667	-9,02	-1,05	na
Sequestration in Conservation Area	-43 973	-1,88	-0,20	na
Total Plantation emissions 2019	-137 778	-5,90	-0,69	na
Total Plantation emissions 2018	-73 622	-4,45	0,38	na
Total Plantation emissions 2017	- 76 151	-4,65	-0,45	na
Total Plantation emissions 2016	-79 093	-4,83	-0,48	na

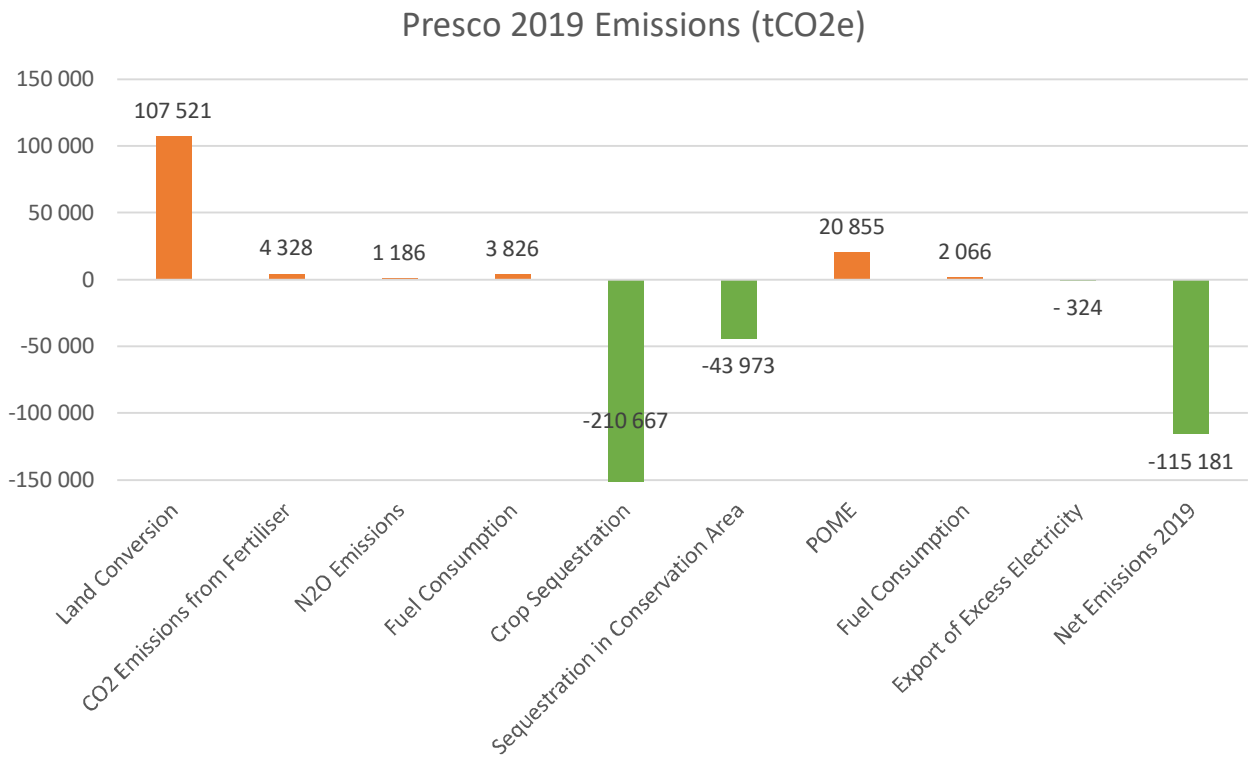
Table 3.3: Presco plantation emissions – sources and sinks (2019)

Description	tCO2 total	tCO2e /t FFB
POME	20 855	0,10
Fuel Consumption	2 066	0,01
Grid Electricity Utilization	0	0,00
Export of Excess Electricity to Housing & Grid	-324	0,00
Total Mill emissions 2019	22 597	0,11
Total Mill emissions 2018	17 055	0,09
Total Mill emissions 2017	8 203	0,05
Total Mill emissions 2016	11 876	0,07

Table 3.4: Presco mill emissions (2019)

Emission Source	tCO2e total
PK from own mill	-17 557
PK from other sources	0
Fuel consumption	250
Total crusher emissions 2019	-17 307
Total crusher emissions 2018	-9 030
Total crusher emissions 2017	-13 163
Total crusher emissions 2016	-13 851

Table 3.5: Presco crusher emissions (2019)



Graph 3.2: Summary of Presco emissions – sources and sinks (2019)

Presco is the palm oil SIAT subsidiary with the best overall results. Indeed, its emissions are negative – it sequesters carbon rather than emitting it! The highest contributor of emissions, land conversion emissions, is largely compensated by crop sequestration and sequestration in conservation areas. The sequestration in conservation areas is more important here than in GOPDC and SNL as Presco has a large conservation area, a big part of which is situated in its Ologbo estate, this area have increased in 2019 with new conservation areas in the Sakponba estate. Sakponba estate has been planted on grassland which gives Presco a better sequestration potential. Furthermore, as in GOPDC, emissions resulting from POME are limited by treatment in a biomethanation plant.

RESULTS - SNL

Description	Unit	Value 2016	Value 2017	Value 2018	Value 2019
Total Planted Area	ha	15 216	15 231	14 858	15 222
Conservation Area	ha	321	431	352	335
OER	%	16,4	14,1	13,3	14,4

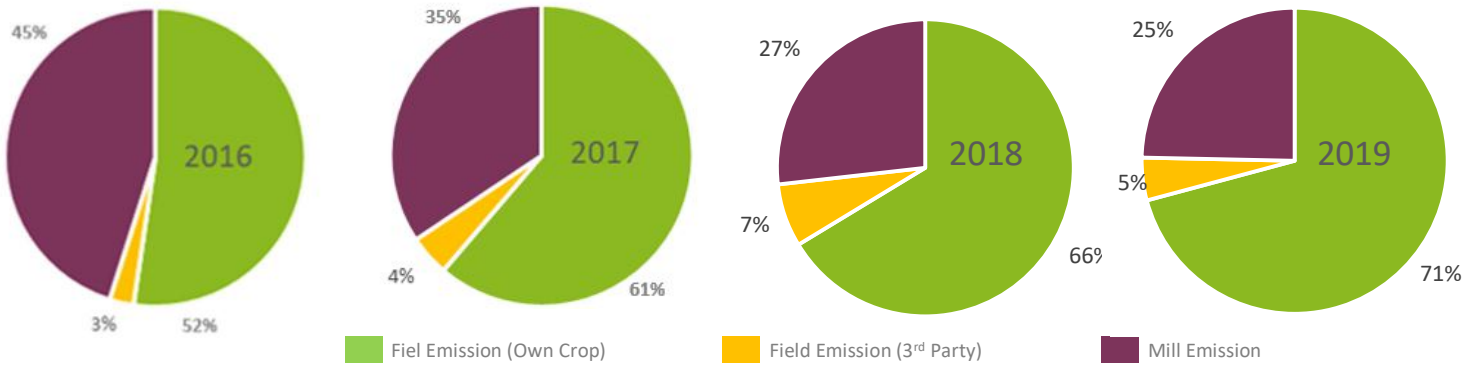
Net emissions 2019	tCO2e	27 853
Net emissions 2018	tCO2e	31 484
Net emissions 2017	tCO2e	26 706
Net emissions 2016	tCO2e	30 713

Table 4.1: SNL key indicators (2016, 2017, 2018 & 2019)

Product	tCO2e /t Product 2016	tCO2e /t Product 2017	tCO2e /t Product 2018	tCO2e /t Product 2019
CPO	1,04	0,92	1,84	1,50
PK	1,04	0,92	1,84	1,50
PKO	1,66	1,84	2,67	1,64
PKE	1,66	1,84	2,67	1,64

Table 4.2: SNL emissions per ton of product (2016, 2017, 2018 & 2019)

Graph 4.1: Distribution of SNL's emissions (2016, 2017, 2018 & 2019)



Description	Own			3rd Party
	tCO2e total	tCO2e /ha	tCO2e /t FFB	tCO2e total
Land Conversion	65 109	4,28	0,99	-
Fertilizer application	1 818	0,12	0,03	-
N_2O Emissions	783	0,05	0,01	-
Fuel Consumption	1 427	0,09	0,02	-
Crop Sequestration	-61 714	-4,05	-0,94	-
Sequestration in Conservation Area	-2 857	-0,19	-0,04	-
Total Plantation emissions 2019	4 566	0,30	0,07	4 412
Total Plantation emissions 2018	5 343	0,34	0,09	6 899
Total Plantation emissions 2017	1 505	0,10	0,02	3 276
Total Plantation emissions 2016	5 371	0,35	0,05	1 486

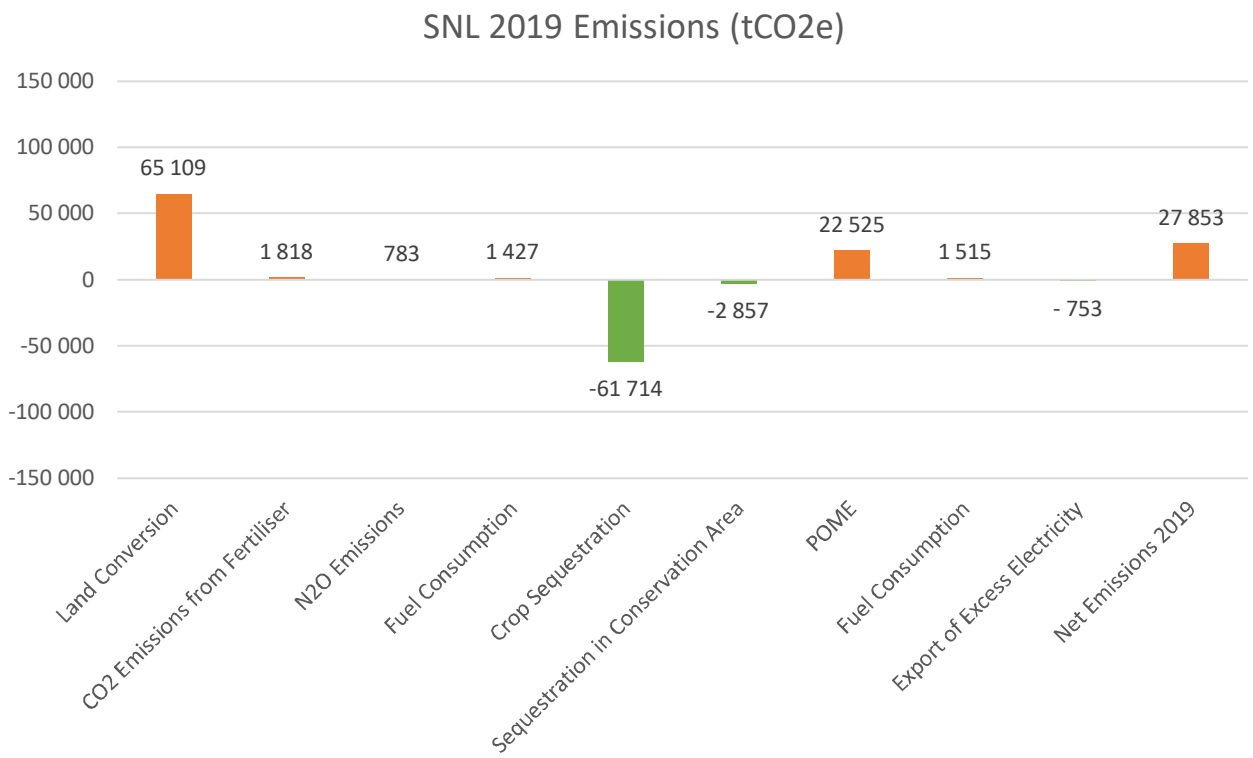
Table 4.3: SNL plantation emissions – sources and sinks (2019)

Description	tCO2 total	tCO2e /t FFB
POME	22 526	0,20
Fuel Consumption	1 515	0,01
Grid Electricity Utilization	0	0,00
Export of Excess Electricity to Housing & Grid	-753	-0,01
Total Mill emissions 2019	23 287	0,20
Total Mill emissions 2018	26 141	0,19
Total Mill emissions 2017	25 201	0,20
Total Mill emissions 2016	25 341	0,21

Table 4.4: SNL mill emissions (2019)

Emission Source	tCO2e total
PK from own mill	9 081
PK from other sources	324
Fuel consumption	554
Total crusher emissions 2019	9 959
Total crusher emissions 2018	30 312
Total crusher emissions 2017	24 665
Total crusher emissions 2016	18 041

Table 4.5: SNL crusher emissions (2019)



Graph 4.2: Summary of SNL emissions – sources and sinks (2019)

The results for SNL show that a majority of emissions come from the POME and land conversion. This differs from GOPDC and Presco where biomethanation plants were installed to treat the POME and use the methane produced as an energy source. SNL does not yet have such an installation and therefore its POME emissions are much higher.

As for GOPDC and Presco, SNL's land conversion emissions are almost entirely compensated by the carbon crop sequestration and the sequestration in conservation areas.

RESULTS - CHC

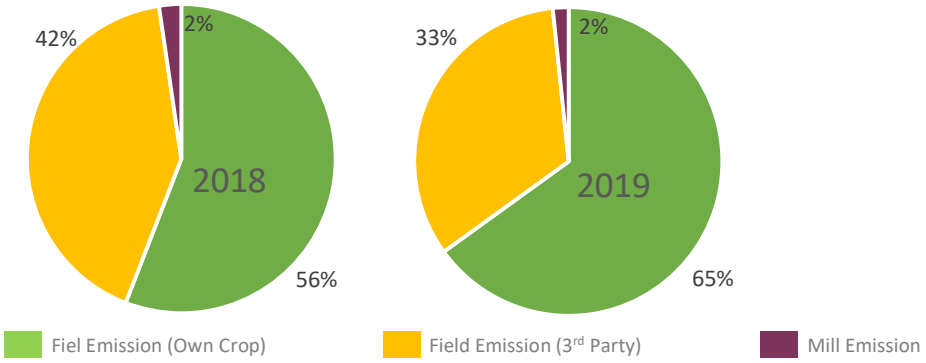
Description	Unit	Value 2018	Value 2019
Total Planted Area	ha	5 179	5 188
Conservation Area	ha	10	10
Dry rubber / ha	t / ha	1,84	1,90
Net emissions without 3rd Party	tCO2e	25 885	24 294
Net emissions with 3rd Party	tCO2e	76 566	58 808

Table 5.1: CHC key indicators (2018 & 2019)

Description	tCO2e / t Dry rubber 2018	tCO2e / t Dry rubber 2019
Dry rubber without 3rd Party	2,71	2,47
Dry rubber with 3rd Party	3,15	2,88

Table 5.2: CHC emissions per ton of product (2018 & 2019)

Graph 5.1: Distribution of CHC's emissions (2018 & 2019)

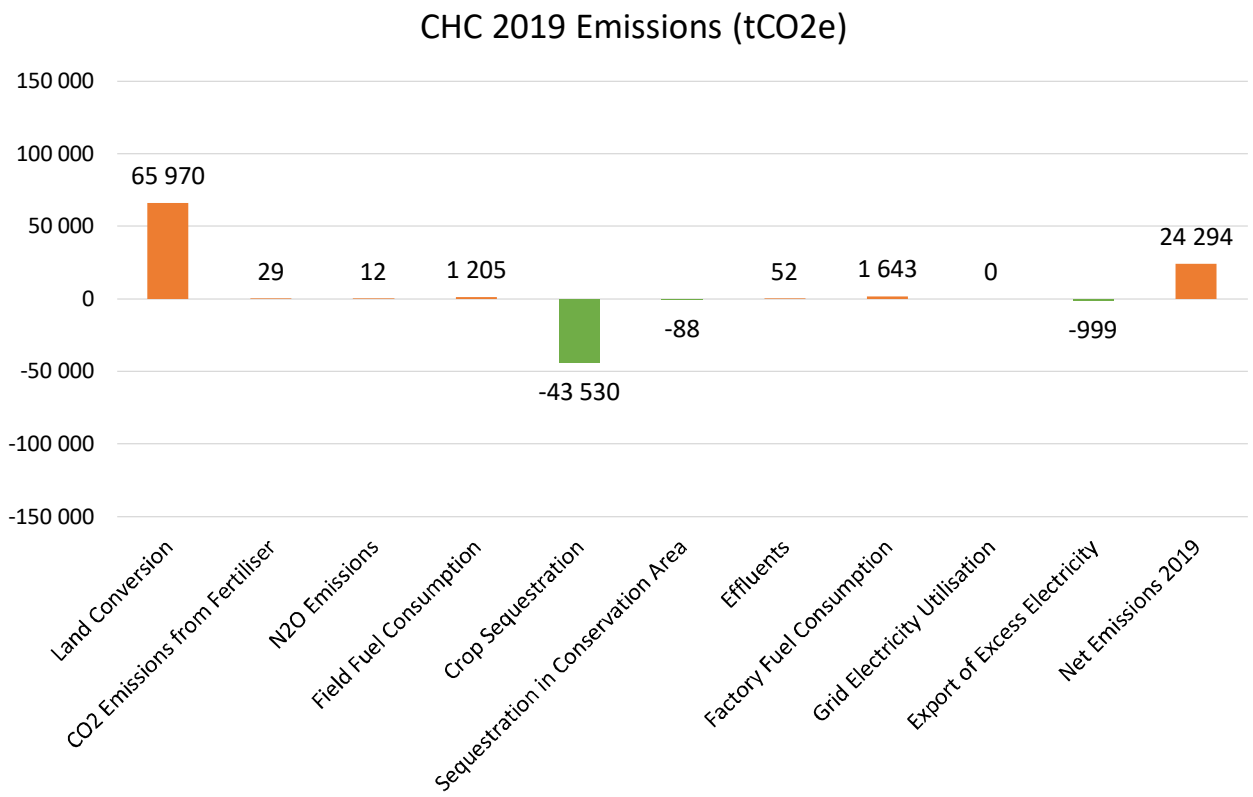


Description	Own			3rd Party
	tCO2e total	tCO2e /ha	tCO2e /t rubber	tCO2e total
Land Conversion	65 970	17,26	9,10	-
Fertilizer application	29	0,01	0,00	-
N_2O Emissions	12	0,00	0,00	-
Fuel Consumption	1 205	0,32	0,17	-
Crop Sequestration	-43 530	-11,39	-6,00	-
Sequestration in Conservation Area	-88	-0,02	-0,01	-
Total Plantation emissions 2019	23 598	6,17	3,25	34 514
Total Plantation emissions 2018	24 078	6,30	3,42	50 681

Table 5.3: CHC plantation emissions – sources and sinks (2019)

Description	tCO2 total	tCO2e /ha	tCO2e /t rubber
Effluent	52	0,01	0,01
Fuel Consumption	1 643	0,43	0,17
Grid Electricity Utilization	0	0,00	0,00
Export of Excess Electricity to Housing & Grid	-999	-0,26	-0,10
Total factory emissions 2019	696	0,18	0,07
Total factory emissions 2018	1 807	0,35	0,19

Table 5.4: CHC factory emissions (2019)



Graph 5.2: Summary of CHC emissions – sources and sinks (2019)

The results for CHC show that most emissions come from the land conversion. Crop sequestration does not compensate the land conversion.

Effluent emissions are underestimated due to a lack of data regarding such type of emissions in literature.

Electricity production from cogeneration is not included as it is self-consumption, it's the same for oil palm, only exported electricity is accounted for.

RESULTS – Siat Gabon

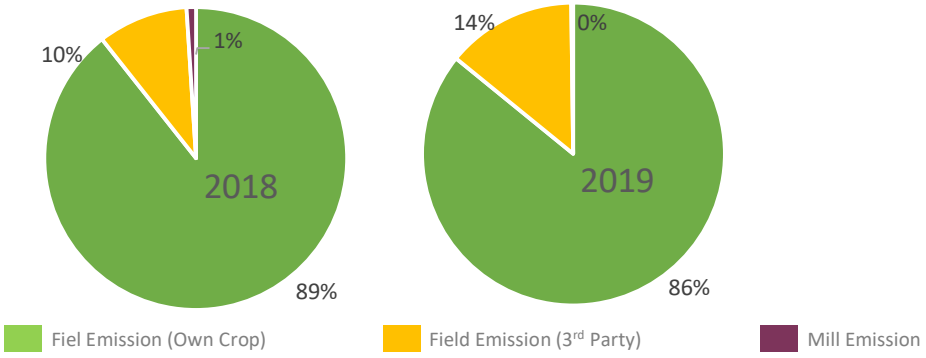
Description	Unit	Value 2018	Value 2019
Total Planted Area	ha	11 928	11 953
Conservation Area	ha	20 236	20 236
Dry rubber / ha	t / ha	0,98	0,79
Net emissions 2018 without 3rd Party	tCO2e	-145 298	-150 077
Net emissions 2018 with 3rd Party	tCO2e	-136 937	-138 123

Table 6.1: Siat Gabon key indicators (2018 & 2019)

Description	tCO2e / t Dry rubber 2018	tCO2e / t Dry rubber 2019
Dry rubber without 3rd Party	-12,45	-15,97
Dry rubber with 3rd Party	-10,82	-12,91

Table 6.2: Siat Gabon emissions per ton of product (2018 & 2019)

Graph 6.1: Distribution of Siat Gabon's emissions (2018 & 2019)



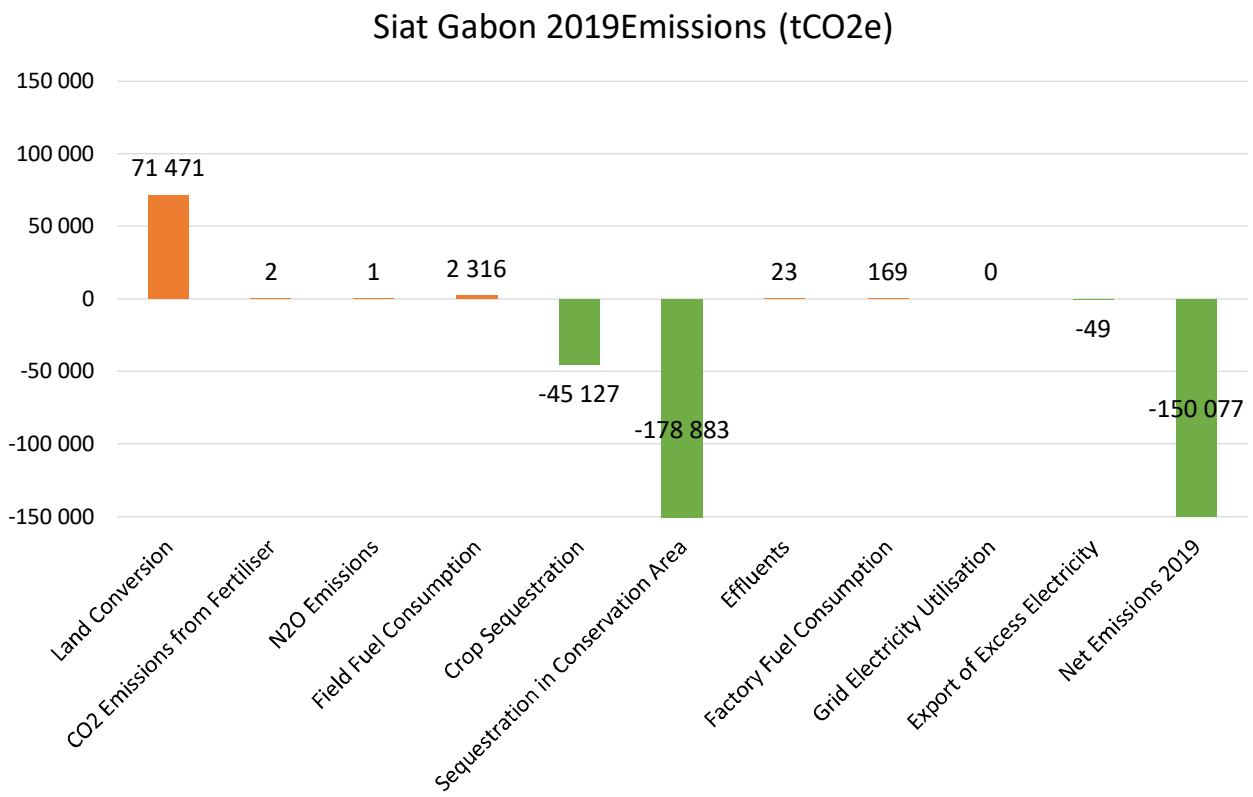
Description	Own			3rd Party
	tCO2e total	tCO2e /ha	tCO2e /t rubber	tCO2e total
Land Conversion	71 471	5,98	22,95	-
Fertilizer application	2*	0,00	0,00	-
N_2O Emissions	1	0,00	0,00	-
Fuel Consumption	2 316	0,19	0,74	-
Crop Sequestration	-45 127	-3,78	-14,49	-
Sequestration in Conservation Area	-178 883	-14,97	-57,44	-
Total Plantation emissions 2019	-150 220	-37,92	-48,23	11 955
Total Plantation emissions 2018	-146 362	-37,17	-37,98	8 361

Table 6.3: Siat Gabon plantation emissions – sources and sinks (2019)

* No fertilizers in 2019

Description	tCO2 total	tCO2e /ha	tCO2e /t rubber
Effluent	23	0,00	0,00
Fuel Consumption	169	0,01	0,02
Grid Electricity Utilization	0	0,00	0,00
Export of Excess Electricity to Housing & Grid	-49	0,00	-0,01
Total factory emissions 2019	142	0,01	0,02
Total factory emissions 2018	703	0,06	0,06

Table 6.4: Siat Gabon factory emissions (2019)



Graph 6.2: Summary of Siat Gabon emissions – sources and sinks (2019)

The results for Siat Gabon show that its good result is due to the sequestration in conservation areas. Due to the landscape, the land conversion's emissions will increase a lot if any new land clearing starts.

The good overall result of the Siat Group is mainly due to the Gabonese conservation areas.

Furthermore, sequestration in conservation areas will decrease drastically if illegal logging continues inside the undeveloped areas.

Effluents emissions are underestimated due to a lack of data regarding such type of emissions in the literature.

Electricity production from cogeneration is not included as it is self-consumption, the same applies for oil palm, only exported electricity is accounted for.

MONITORING AND MITIGATION

Based on the above results and aiming towards continuous improvement, Siat group subsidiaries develop and implement greenhouse gas mitigation plans. The actions detailed in the plans will contribute to decreasing overall emissions. These include:

- Not converting High Conservation Value (HCV) and High Carbon Stock Areas (HCSA) in new planting developments.
- Forbidding burning for land preparation.
- Carrying out leaf sampling and analysis on a yearly basis to assess quantities of fertilizer required and adjust to the actual needs of the crops so as to avoid applying fertilizer in excess.
- Carrying out experiments to assess optimal fertilizer dosage to use on oil palms for a maximized yield, thereby also adjusting fertilizer usage to actual needs.
- Maintaining and increasing conservation areas.

Where a biogas plant or cogeneration plant are running:

- Ensuring that it always operates at its optimum level to capture the maximum CH_4 before effluent is released.
- Avoiding flaring by installing machines that run on gas
- Implementing fertigation projects: using sludge from the biogas reactors and treated effluent for oil palm fertilizing and irrigation.
- Carrying out regular maintenance to ensure that the boiler and turbine constantly operate at optimum efficiency in order to avoid using grid electricity or generators for power production.

USE OF RENEWABLE ENERGY

The Siat Group decided to promote the use of renewable energy as an alternative to fossil energy: operating in rural areas where access to state supplied energy is not always possible, the Siat Group previously relied heavily on fossil energy to run its operations. For financial reasons, and as part of its environmental strategy, Siat has developed an ambitious renewable energy program. For the oil palm subsidiaries, in addition to the use of steam boilers and steam turbines that run on solid waste, the group has invested in biogas plants that treat effluent in bio digesters to produce methane used as an energy source. The two rubber factories get their electricity supply from their own cogeneration plants that are fed with wood coming from old rubber plots. In 2018, 74% of the energy for mills and factories was renewable energy? 70% in 2019.

Electric resources used and renewable energy production	GOPDC			PRESCO			SNL			CHC			Siat Gabon		
Renewable source	Cogeneration and Biomethanation			Cogeneration and Biomethanation			Cogeneration			Cogeneration			Cogeneration		
Year	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
Total Mwh used per year	11 735	11 917	12 039	10 201	10 857	10 599	7 754	7 745	6 052	13 002	10 895	9 817	2 561	6 658	6 342
Renewable energy produced	9 344	7 811	5 980	6 850	8 837	6 960	6 405	6 295	4 558	5 459	7 125	8 235	0	5 655	5 783
% of renewable energy used	80%	66%	50%	67%	81%	66%	83%	81%	75%	42%	65%	83%	0%	85%	91%

Table 8.1: Use of renewable energy (2017, 2018 & 2019)

Best International Agricultural Plant – SIAT, First Large-Scale AD & Biogas Plants in West Africa

Our future is turned towards energy mixes and the use of renewable energies.
In recent years, the Siat group has invested heavily in these fields (see Focus on cogeneration).
In 2018, the group was awarded the prize: "**Best International Agricultural Plant – SIAT, First Large-Scale AD & Biogas Plants in West Africa: A Hope for the Palm Oil Sector**", awarded jointly by the World Biogas Association and the UK Anaerobic Digestion & Bioresources Association (ADBA). This award recognizes the two biogas plants installed at GOPDC (Ghana) and Presco (Nigeria) to recover, by anaerobic fermentation, methane from organic sludge contained in oil mill effluents. Methane, a very strong greenhouse gas, is captured, used as energy and effluents and sludge are treated.

SOURCES AND DEFAULT DATA

Description	Value	Units
Previous land use		
Undisturbed forest	983	tCO2e /ha
Disturbed forest	470	tCO2e /ha
Shrubland	169	tCO2e /ha
Grassland	18	tCO2e /ha
Tree crops	275	tCO2e /ha
Annual/food crop	31	tCO2e /ha
Oil palm	234	tCO2e /ha
Rubber	285	tCO2e /ha
Data		
Conservation sequestration values	8,84	tCO2e /ha.yr
POME	13,1	Kg CH4 /t POME
Factory effluents	0,15	t CO2e /m^3 of wastewater
Diesel	3,12	Kg CO2e /l

www.rspo.org/certification/palmghg/palm-ghg-calculator - palm GHG.
www.rspo.org/certification/palmghg/ghg-assessment-procedure - New Development GHG Calculator-English.

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