

# Performance report

## Agricultural and Biosystems Engineering Building

Agricultural and Biosystems Engineering Departmental Staff  
Building, University of Ilorin



Commercial/Institutional - Office building

Prepared for:

Agricultural and Biosystems Engineering (ABE)  
Department, University of Ilorin, Nigeria

Prepared by:

ABE Departmental Project Group

# Executive summary

This report was prepared using the RETScreen Clean Energy Management Software. The key findings and recommendations of this analysis are presented below:

## Performance tracker

		Fuel consumption kWh	Fuel cost \$	GHG emissions tCO <sub>2</sub>
Reference period	2024	409	0	0.18
Actual	2025	817	0	0.36
Savings		-408	0	-0.18
%		-99.7%		-99.7%

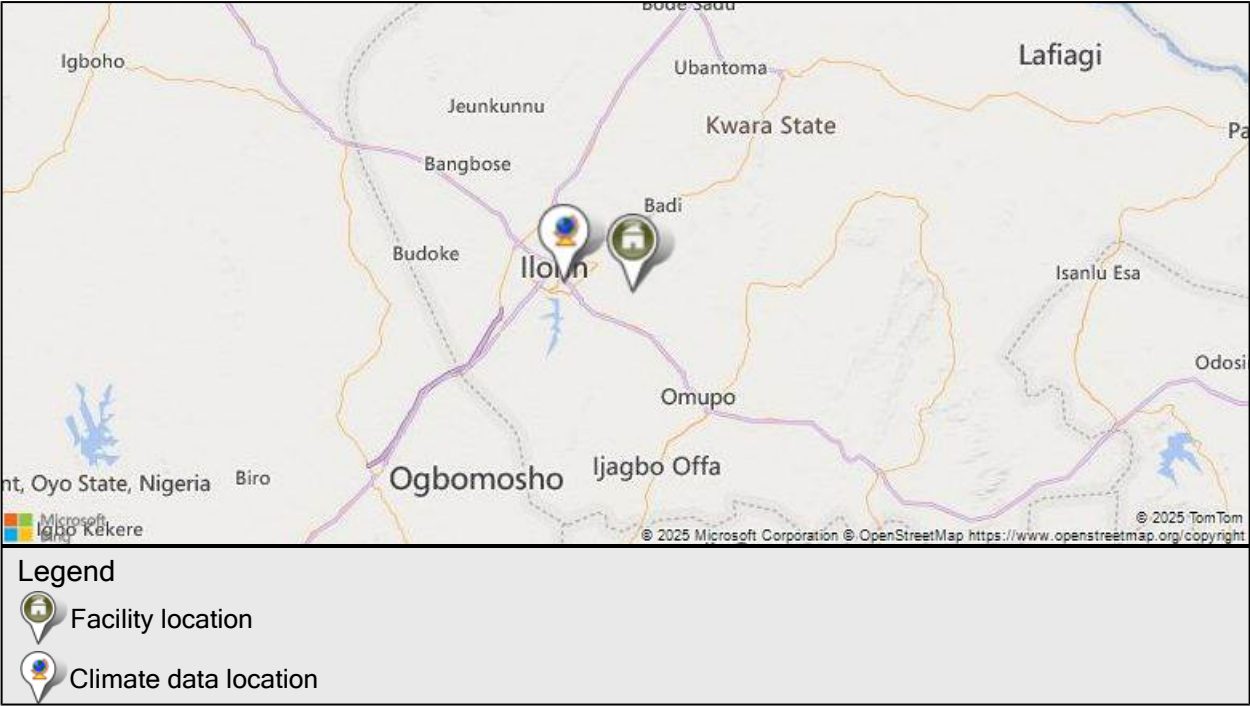
The main results are as follows:

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Subscriber:

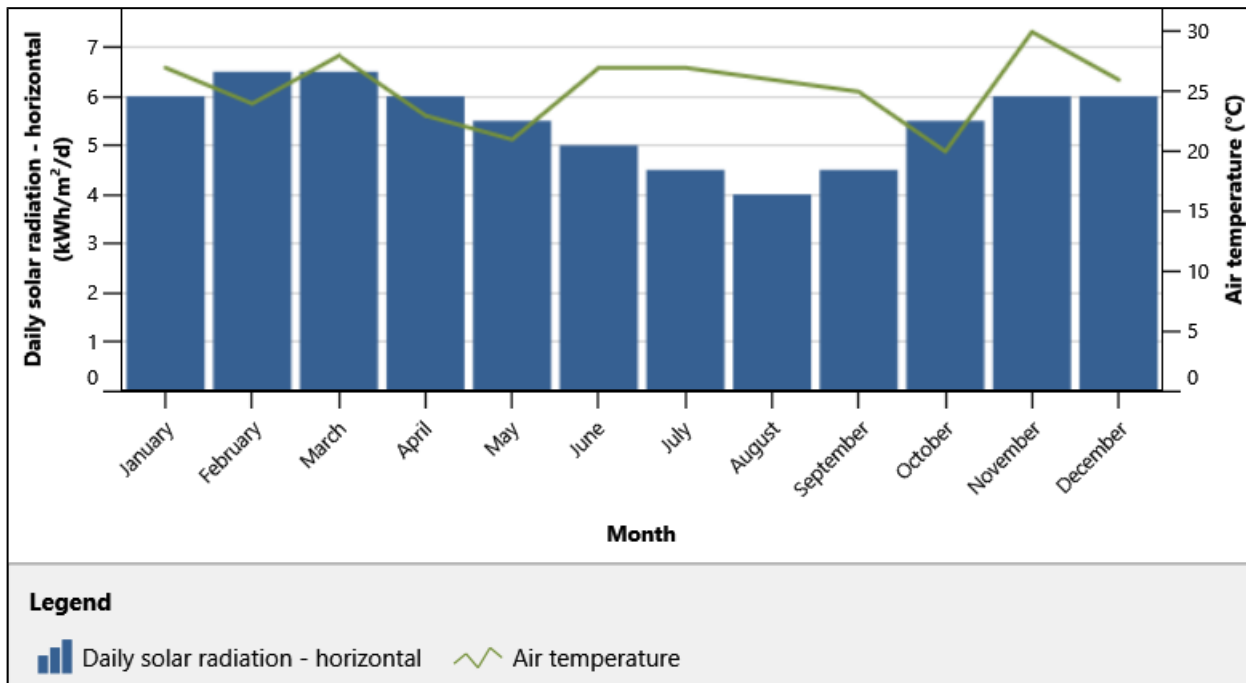
# Location | Climate data

## Location



	Unit	Climate data location	Facility location
Name		Nigeria - Kwara - Ilorin	University of Ilorin - Ilorin
Latitude	°N	8.5	8.5
Longitude	°E	4.6	4.7
Climate zone		1B - Very hot - Dry	1B - Very hot - Dry
Elevation	m	300	340

## Climate data

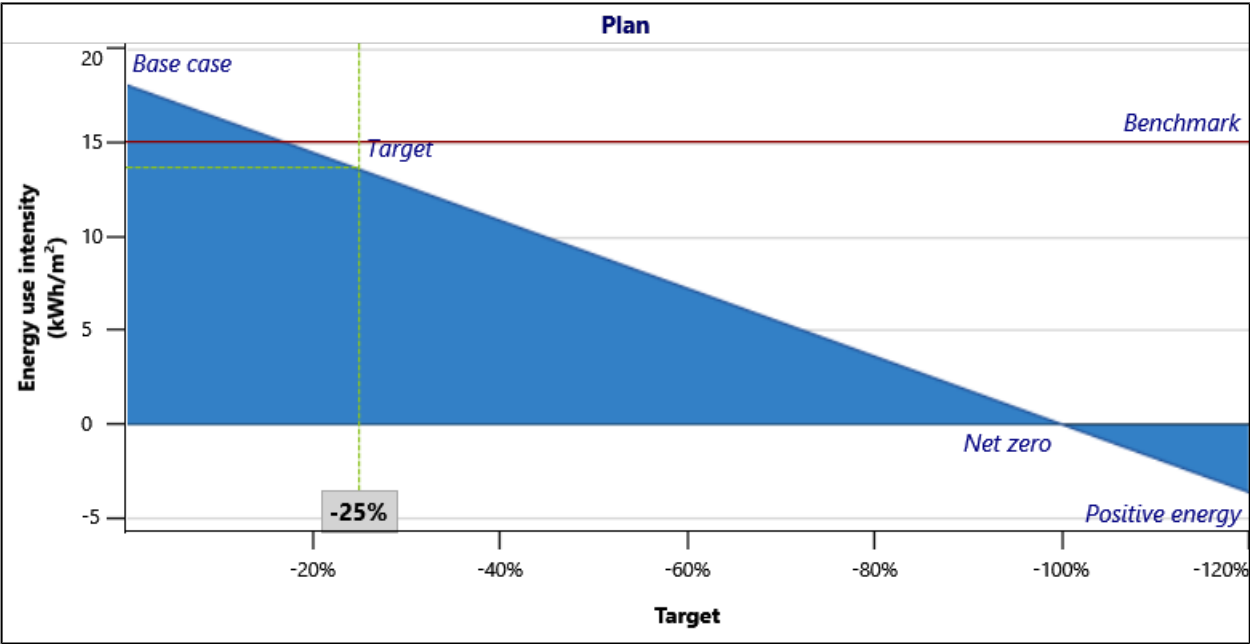


Heating design temperature		26.0							
Cooling design temperature		16.0							
Earth temperature amplitude		24.4							
Month	Air temperature	Relative humidity	Precipitation	Daily solar radiation - horizontal	Atmospheric pressure	Wind speed	Earth temperature	Heating degree-days	Cooling degree-days
	°C	%	mm	kWh/m²/d	kPa	m/s	°C	°C-d	°C-d
January	27.0	55.0%	1.00	6.00	101.2	2.5	30.0	0	480
February	24.0	57.0%	12.00	6.50	101.1	2.7	31.0	0	510
March	28.0	62.0%	41.00	6.50	101.0	2.8	31.0	0	550
April	23.0	70.0%	93.00	6.00	100.9	2.5	30.0	0	510
May	21.0	75.0%	141.00	5.50	100.8	2.3	29.0	0	496
June	27.0	79.0%	163.00	5.00	100.7	2.0	28.0	0	450
July	27.0	81.0%	144.00	4.50	100.6	2.0	27.0	0	450
August	26.0	81.0%	136.00	4.00	100.6	2.0	27.0	0	450
September	25.0	81.0%	224.00	4.50	100.7	2.2	28.0	0	450
October	20.0	79.0%	136.00	5.50	100.9	2.5	29.0	0	480
November	30.0	70.0%	17.00	6.00	101.1	2.5	30.0	0	480
December	26.0	61.0%	7.00	6.00	101.2	2.5	30.0	0	465
Annual	25.3	71.0%	1,115.00	5.49	100.9	2.4	29.2	0	5,771

Subscriber:

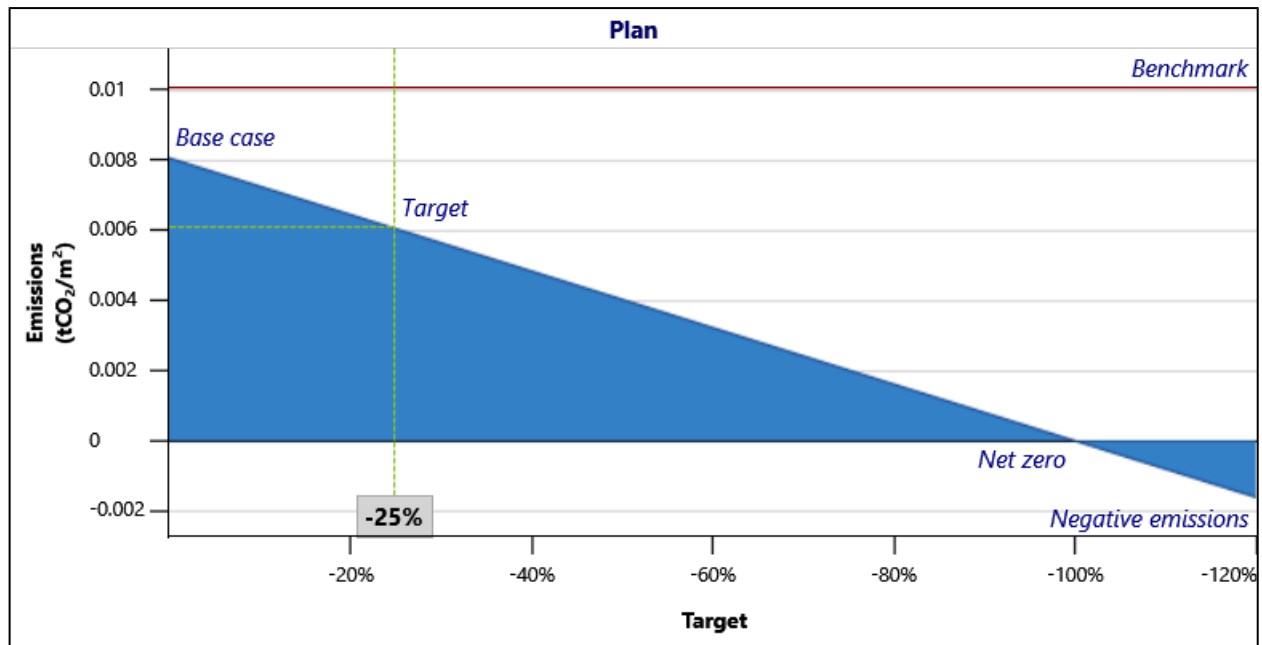
# Benchmark

## Fuel consumption



Facility size	622	m <sup>2</sup>
Benchmark	15	kWh/m <sup>2</sup>
Minimum - average	10	kWh/m <sup>2</sup>
Maximum - average	30	kWh/m <sup>2</sup>
Base case	18.1	kWh/m <sup>2</sup>
Reference year	2025	
Set target	Target	
Year		
Target	-25%	
Proposed case	13.6	kWh/m <sup>2</sup>
Facility - Plan		
Fuel consumption	Annual	
Base case	11,267	kWh
Proposed case	8,450	kWh
Fuel saved	2,817	kWh

## Emissions



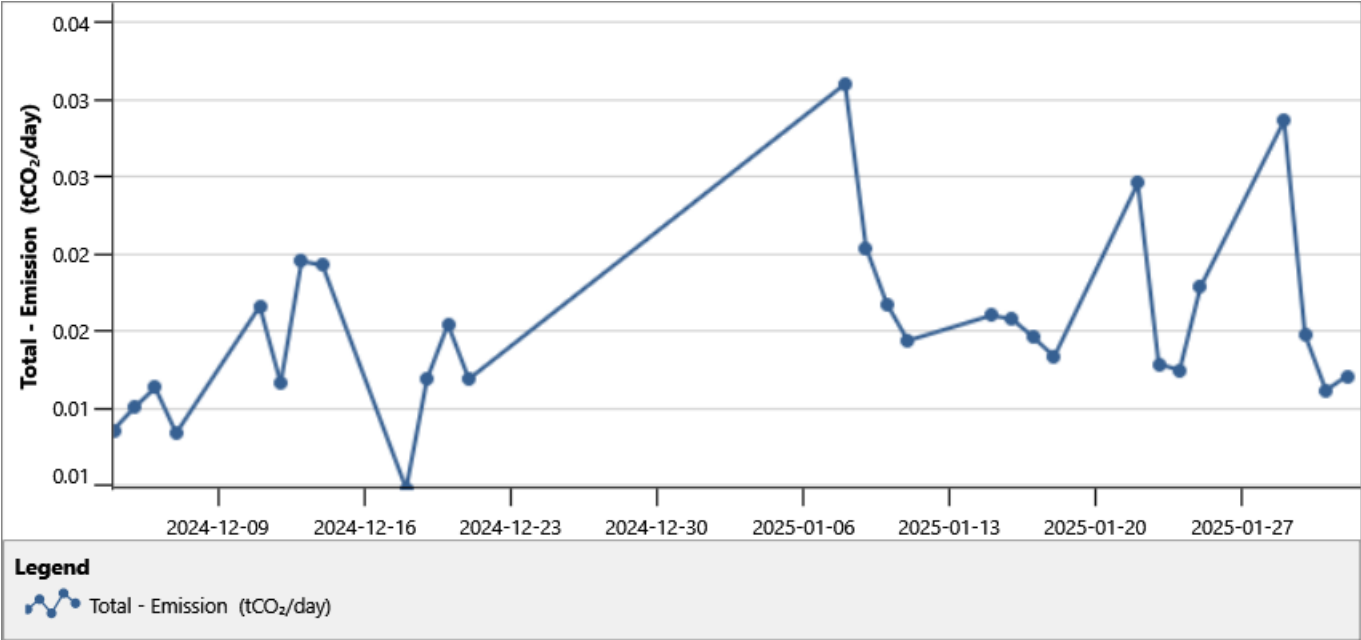
Facility size	622	m <sup>2</sup>
Benchmark	0.01	tCO <sub>2</sub> /m <sup>2</sup>
Minimum - average	0.005	tCO <sub>2</sub> /m <sup>2</sup>
Maximum - average	0.03	tCO <sub>2</sub> /m <sup>2</sup>
Base case	0.008	tCO <sub>2</sub> /m <sup>2</sup>
Reference year	2025	
Set target	Target	
Year		
Target	-25%	
Proposed case	0.006	tCO <sub>2</sub> /m <sup>2</sup>
Facility - Plan		
Emissions	Annual	
Base case	5	tCO <sub>2</sub>
Proposed case	3.8	tCO <sub>2</sub>
Fuel saved	1.3	tCO <sub>2</sub>

# Performance tracker

## Summary - Consumption

		Fuel consumption	Fuel cost	GHG emissions
		kWh	\$	tCO <sub>2</sub>
Reference period	2024	409	0	0.18
Actual	2025	817	0	0.36
Savings		-408	0	-0.18
%		-99.7%		-99.7%

Moving graph - Line

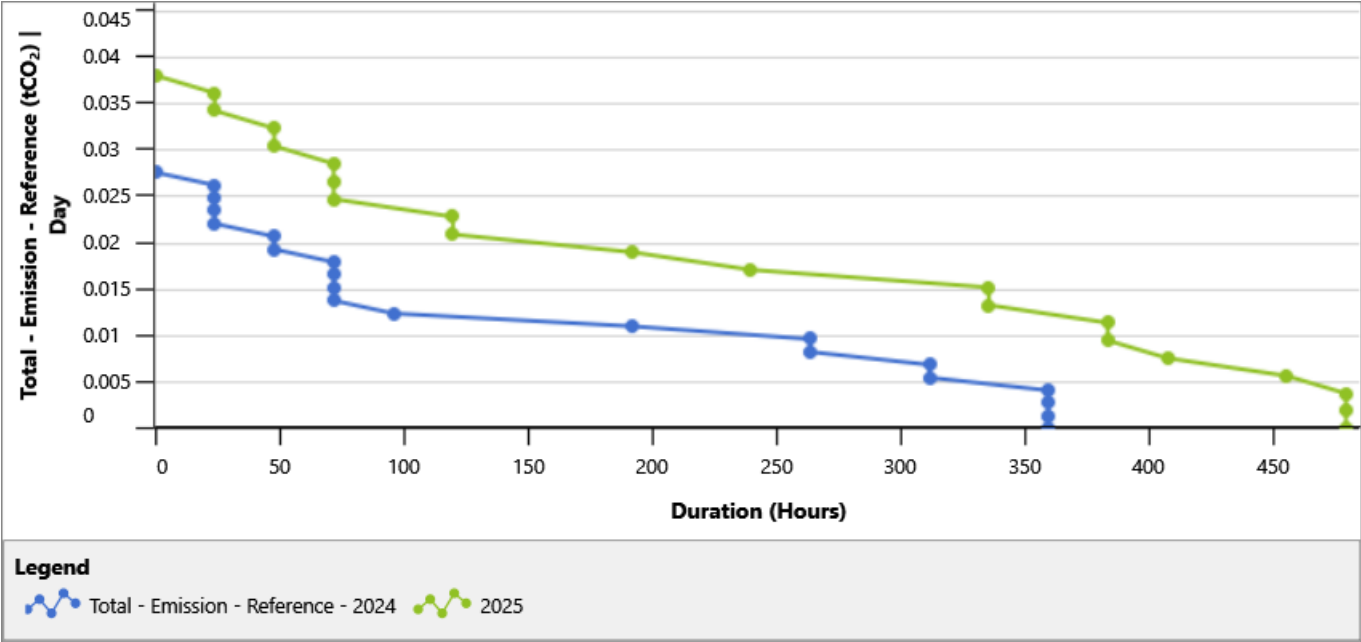




Period	Begin	End	Total - Emission (tCO <sub>2</sub> )	Total - Emission (tCO <sub>2</sub> /day)	Total - Emission (tCO <sub>2</sub> /day) Daily average
1	2024-12-02	2024-12-03	0.00990	0.00990	
2	2024-12-03	2024-12-04	0.00724	0.00724	0.00857
3	2024-12-04	2024-12-05	0.01285	0.01285	0.01005
4	2024-12-05	2024-12-06	0.00977	0.00977	0.01131
5	2024-12-06	2024-12-07	0.00698	0.00698	0.00838
6	2024-12-07	2024-12-08			
7	2024-12-08	2024-12-09			
8	2024-12-09	2024-12-10	0.02145	0.02145	
9	2024-12-10	2024-12-11	0.01177	0.01177	0.01661
10	2024-12-11	2024-12-12	0.01147	0.01147	0.01162
11	2024-12-12	2024-12-13	0.02760	0.02760	0.01954
12	2024-12-13	2024-12-14	0.01094	0.01094	0.01927
13	2024-12-14	2024-12-15			
14	2024-12-15	2024-12-16			
15	2024-12-16	2024-12-17	0.00494	0.00494	
16	2024-12-17	2024-12-18	0.00461	0.00461	0.00478
17	2024-12-18	2024-12-19	0.01915	0.01915	0.01188
18	2024-12-19	2024-12-20	0.01171	0.01171	0.01543
19	2024-12-20	2024-12-21	0.01206	0.01206	0.01188
20	2024-12-21	2024-12-22			
21	2024-12-22	2024-12-23			
22	2024-12-23	2024-12-24			
23	2024-12-24	2024-12-25			
24	2024-12-25	2024-12-26			
25	2024-12-26	2024-12-27			
26	2024-12-27	2024-12-28			
27	2024-12-28	2024-12-29			
28	2024-12-29	2024-12-30			
29	2024-12-30	2024-12-31			
30	2024-12-31	2025-01-01			
31	2025-01-01	2025-01-02			
32	2025-01-02	2025-01-03			
33	2025-01-03	2025-01-04			
34	2025-01-04	2025-01-05			
35	2025-01-05	2025-01-06			
36	2025-01-06	2025-01-07	0.03804	0.03804	
37	2025-01-07	2025-01-08	0.02405	0.02405	0.03104
38	2025-01-08	2025-01-09	0.01679	0.01679	0.02042
39	2025-01-09	2025-01-10	0.01672	0.01672	0.01675
40	2025-01-10	2025-01-11	0.01203	0.01203	0.01438
41	2025-01-11	2025-01-12			
42	2025-01-12	2025-01-13			
43	2025-01-13	2025-01-14	0.02049	0.02049	
44	2025-01-14	2025-01-15	0.01154	0.01154	0.01601
45	2025-01-15	2025-01-16	0.02000	0.02000	0.01577
46	2025-01-16	2025-01-17	0.00920	0.00920	0.01460
47	2025-01-17	2025-01-18	0.01747	0.01747	0.01334
48	2025-01-18	2025-01-19			
49	2025-01-19	2025-01-20			
50	2025-01-20	2025-01-21	0.02963	0.02963	
51	2025-01-21	2025-01-22	0.01954	0.01954	0.02458
52	2025-01-22	2025-01-23	0.00619	0.00619	0.01286
53	2025-01-23	2025-01-24	0.01873	0.01873	0.01246
54	2025-01-24	2025-01-25	0.01698	0.01698	0.01786
55	2025-01-25	2025-01-26			
56	2025-01-26	2025-01-27			
57	2025-01-27	2025-01-28	0.03327	0.03327	
58	2025-01-28	2025-01-29	0.02404	0.02404	0.02865
59	2025-01-29	2025-01-30	0.00547	0.00547	0.01475
60	2025-01-30	2025-01-31	0.01684	0.01684	0.01115
61	2025-01-31	2025-02-01	0.00731	0.00731	0.01208

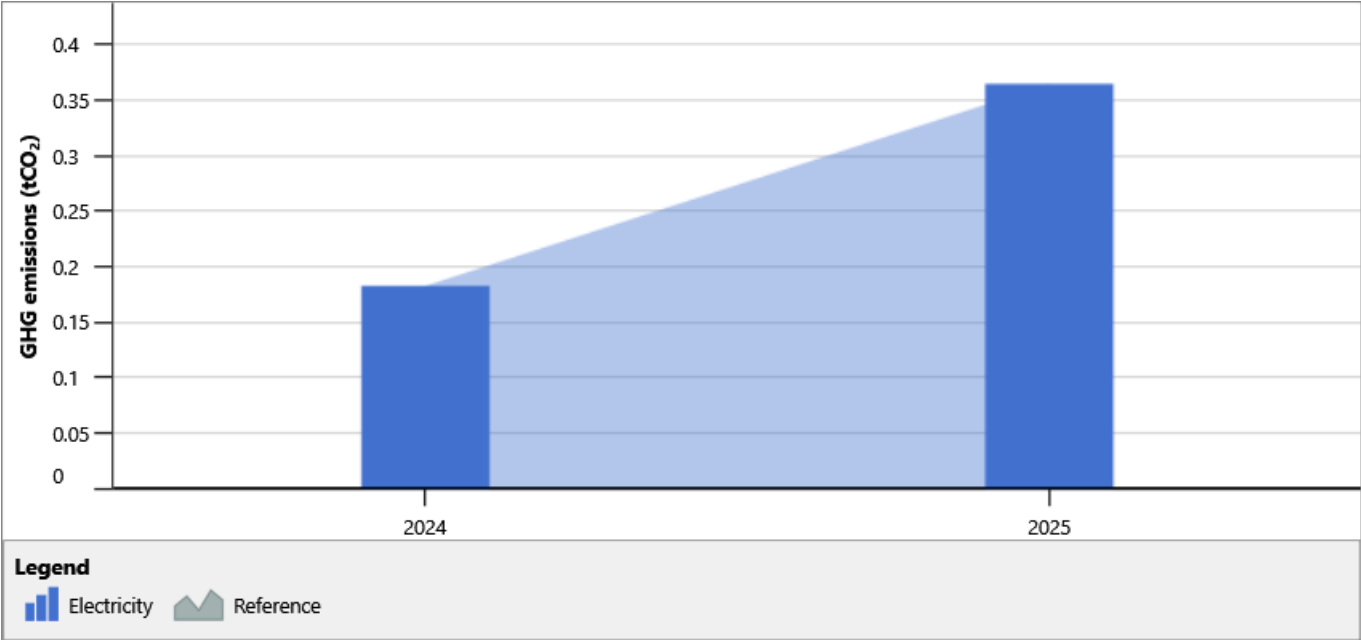
Subscriber:

Duration curve



Percentage of peak (%)	Total - Emission - Reference 2024 (tCO <sub>2</sub> )	Duration 2024 (%)	Duration 2024 (Hours)	Total - Emission - Reference 2025 (tCO <sub>2</sub> )	Duration 2025 (%)	Duration 2025 (Hours)
100%	0.03	0.00%	0	0.04	0.00%	0
95%	0.03	6.67%	24	0.04	5.00%	24
90%	0.02	6.67%	24	0.03	5.00%	24
85%	0.02	6.67%	24	0.03	10.00%	48
80%	0.02	6.67%	24	0.03	10.00%	48
75%	0.02	13.33%	48	0.03	15.00%	72
70%	0.02	13.33%	48	0.03	15.00%	72
65%	0.02	20.00%	72	0.02	15.00%	72
60%	0.02	20.00%	72	0.02	25.00%	120
55%	0.02	20.00%	72	0.02	25.00%	120
50%	0.01	20.00%	72	0.02	40.00%	192
45%	0.01	26.67%	96	0.02	50.00%	240
40%	0.01	53.33%	192	0.02	70.00%	336
35%	0.01	73.33%	264	0.01	70.00%	336
30%	0.01	73.33%	264	0.01	80.00%	384
25%	0.01	86.67%	312	0.01	80.00%	384
20%	0.01	86.67%	312	0.01	85.00%	408
15%	0.00	100.00%	360	0.01	95.00%	456
10%	0.00	100.00%	360	0.00	100.00%	480
5%	0.00	100.00%	360	0.00	100.00%	480
0%	0.00	100.00%	360	0.00	100.00%	480

Bar graph | Consumption summary



Year	Electricity (tCO <sub>2</sub> )	Total (tCO <sub>2</sub> )	Electricity - Reference (tCO <sub>2</sub> )	Total - Reference (tCO <sub>2</sub> )
2024	0.1824	0.1824	0.1824	0.1824
2025	0.3643	0.3643	0.3643	0.3643

Analysis type

Performance

