

RATCH PATHANA ENERGY PCL.

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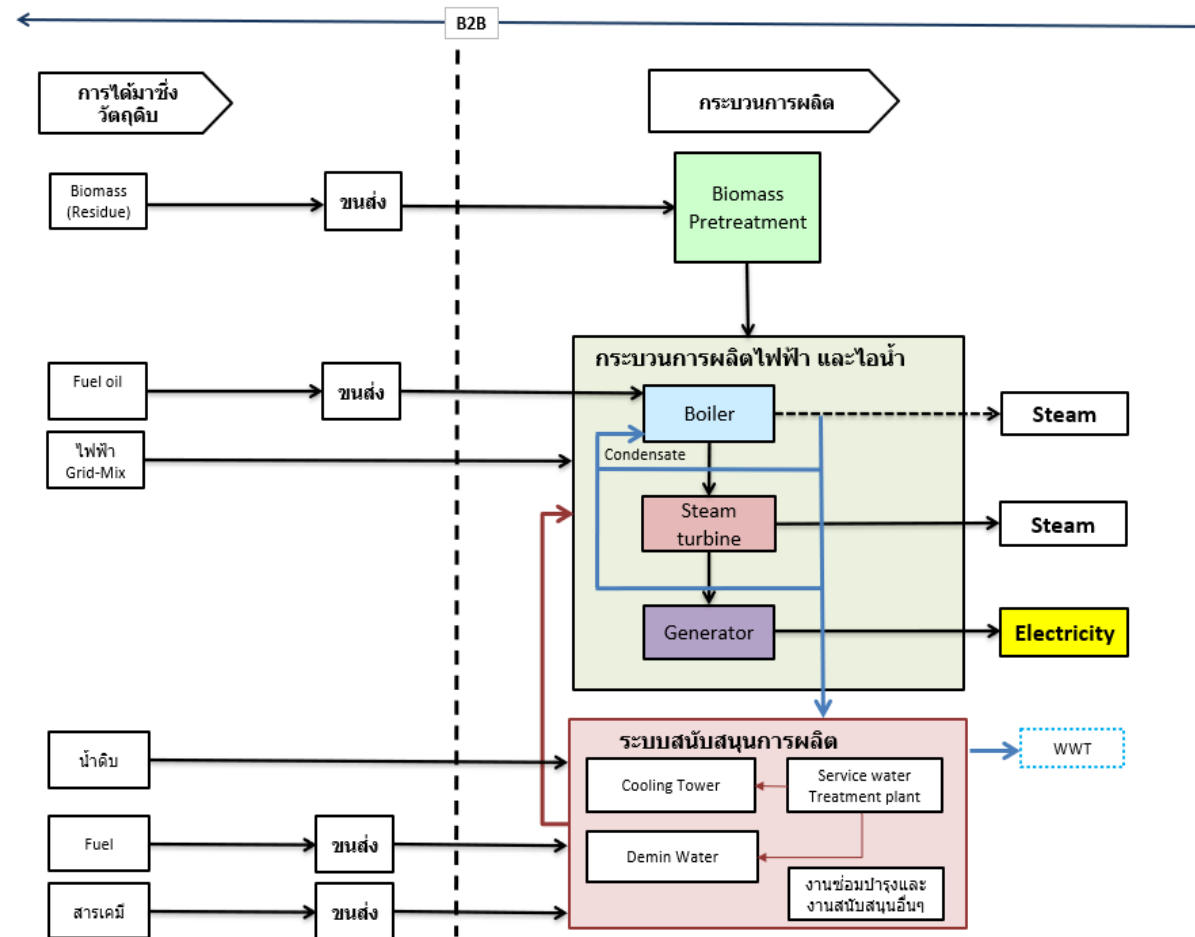
Carbon Footprint Assessment of Electricity and Steam Products

Sahagreen Forest Co., Ltd.

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Item	Description
Product Name	1. Electricity 2. Steam
Assessment Boundary	B2B (Business-to-Business)
Functional Unit	1. Electricity: 1 kWh (kilowatt-hour) 2. Steam: 1 GJ (gigajoule)
Main Raw Materials	Biomass and deionized water
Production Process	Biomass combustion and electricity generation using a thermal power plant
Data Collection Period	1 January 2023 – 31 December 2023

Data Collection Boundary



Compliance with Product Category Rules (PCR)

Item	PCR Requirements	Description
Reference PCR	Product Category Rules for Electricity and Steam (2016)	Specify the name of the PCR used as a reference for the calculation.
Functional Unit	Electricity: kWh Steam: GJ	Specify the functional units defined by the PCR.
Assessment Boundary	B2B (Business-to-Business)	Specify the assessment boundary defined by the PCR.

Data Collection Methods and Assumptions

Life Cycle Stage	Primary Data	Secondary Data	References
Raw Material Acquisition	- Fuel consumption for electricity and steam generation - Water consumption for steam generation - Transportation distances of raw materials	- Emission Factors (EF) for liquid and gaseous fuel production - EF for biomass production - EF for chemicals used in water treatment - EF for transportation	TGO CFP EF (July 2022)
Production Process	- Electricity consumption from the grid mix - Raw water production data - Combustion data for various fuel types used in production - Biomass fuel combustion data - Auxiliary material consumption - Waste generated from production processes	- EF for electricity - EF for chemicals used in raw water treatment - EF for fuel combustion - EF for biomass combustion - EF for auxiliary materials - EF for waste management	TGO CFP EF (July 2022) TGO CFO EF (April 2022)

Summary of Carbon Footprint of Product (CFP) Assessment Results

No.	Product	Total CFP/FU	Raw Material Acquisition	Production Process	Distribution	Use Phase	End-of-Life Management
1	Electricity	57.70 gCO ₂ eq	7.64	50.10	–	–	–
2	Steam	4.48 kgCO ₂ eq	0.59	3.89	–	–	–

Note: Hotspot percentages represent the contribution of each activity within its respective life cycle stage.

No.	Product	Raw Material Acquisition – Hotspot Items	Hotspot (%)	Production Process – Hotspot Items	Hotspot (%)	Total CFP/FU
1	Electricity	Deionized water production	90.80%	Biomass combustion	70.07%	57.70 gCO ₂ eq
		Biomass production	9.20%	Diesel combustion for production support	18.54%	
2	Steam	Deionized water production	90.80%	Biomass combustion	70.12%	4.48 kgCO ₂ eq
		Biomass production	9.20%	Diesel combustion for production support	18.55%	

Carbon Footprint of Product (CFP) Certification Document

Certificate Number:
TGO CFP FY24-125-1517

THAILAND GREENHOUSE GAS
MANAGEMENT ORGANIZATION
(Public Organization) TGO

CONGRATULATE

Sahagreen Forest Company Limited

For
Successfully meeting the requirements of
the Carbon Footprint Label Scheme for

Electricity 1 kWh

B2B Scope: 73.1 gCO₂e

as certified by TGO

 73.1 gCO₂e

Registration Date: 9 May 2024 Expiration Date: 8 May 2027


Mr. Katchai Malliwong
Executive Director
Thailand Greenhouse Gas Management Organization (Public Organization)

Certificate Number:
TGO CFP FY24-125-1518

THAILAND GREENHOUSE GAS
MANAGEMENT ORGANIZATION
(Public Organization) TGO

CONGRATULATE

Sahagreen Forest Company Limited

For
Successfully meeting the requirements of
the Carbon Footprint Label Scheme for

Steam 1 GJ

B2B Scope: 5.69 kgCO₂e

as certified by TGO

 5.69 kgCO₂e

Registration Date: 9 May 2024 Expiration Date: 8 May 2027


Mr. Katchai Malliwong
Executive Director
Thailand Greenhouse Gas Management Organization (Public Organization)