Walailak University

Reporting Greenhouse Gas Emissions and Removals of Organization

Monitoring period

October 1, 2023 - September 30, 2024

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Climate change poses significant challenges to the global environment, economy, and society. Walailak University acknowledges the imperative of mitigating greenhouse gas emissions from the campus' operations. To this end, the university has conducted an assessment of the Carbon Footprint for Organization (CFO), a tool that quantifies the greenhouse gas emissions and removals associated with its activities, expressed in carbon dioxide equivalents (CO_2eq). This assessment adheres to the guidelines established by the Thailand Greenhouse Gas Management Organization or TGO (Public Organization), aligning with international standards such as ISO 14064-1 (2018), the GHG Protocol (2001, 2004), and selected examples from ISO/TR 14069 (2013).

Walailak University's organizational carbon footprint assessment encompasses greenhouse gas emissions across three scopes:

Scope1: Direct Emissions

These are emissions from sources owned or controlled by the university, including: fuel consumption in university vehicles, use of refrigerants in air conditioning systems, waste management, and application of chemical fertilizers.

Scope 2: Indirect Emissions Purchased Energy

This scope covers indirect emissions resulting from the university's consumption of purchased electricity used in buildings, offices, laboratories, and other public utility systems.

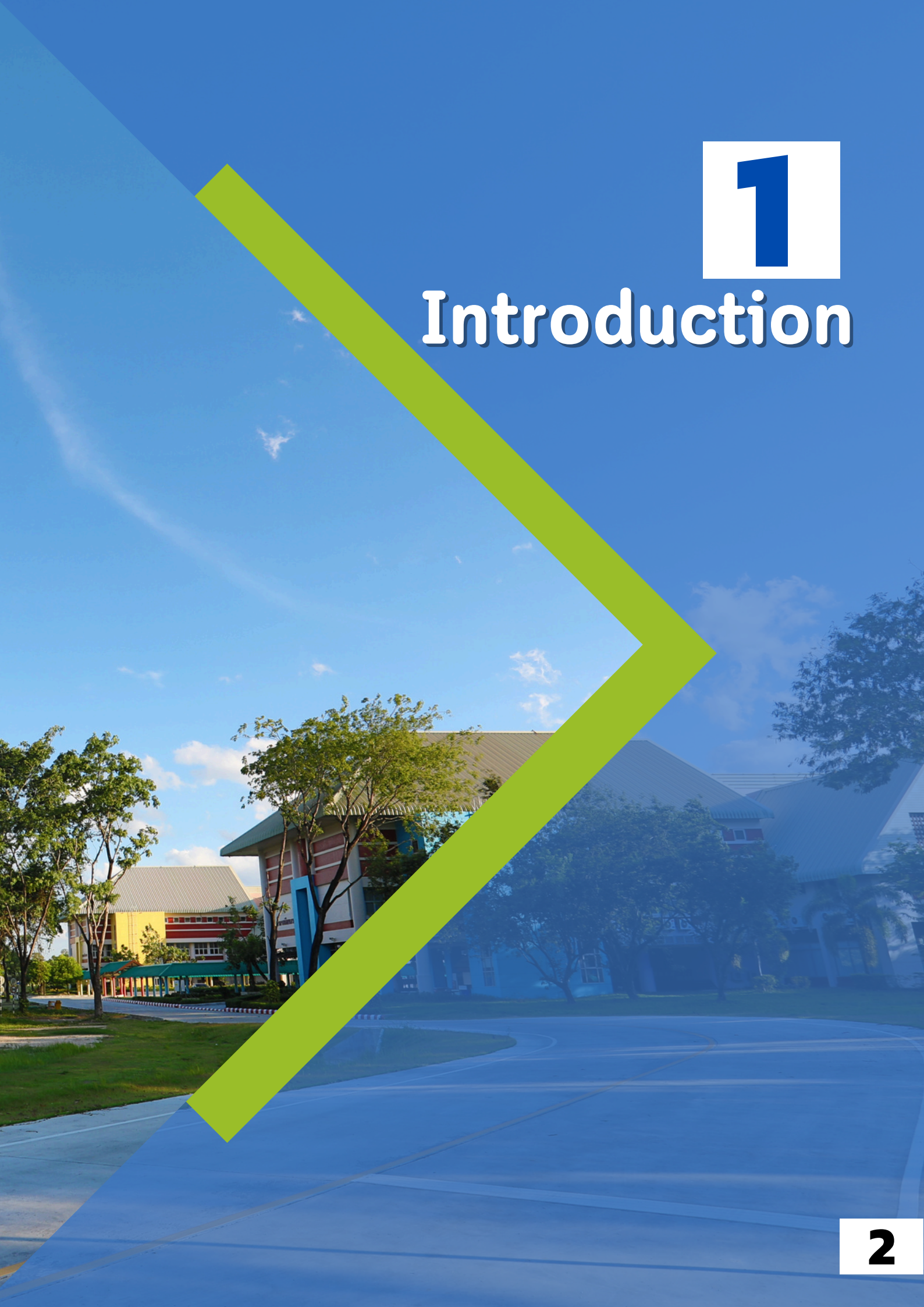
Scope 3: Other Indirect Emissions

This includes all other indirect emissions not covered in Scope 2, such as: travel by staff and students, air travel for official business, procurement of materials and equipment, waste disposal, and student travel for cooperative education programs.

The carbon footprint for organization (CFO) assessment seeks to pinpoint greenhouse gas emission sources, track emission trends, and formulate effective mitigation strategies. This initiative aligns with the university's sustainability objectives and international frameworks, notably the United Nations' Sustainable Development Goals (SDGs), with particular emphasis on SDG 13: Climate Action.

Besides, the data derived from this assessment will inform environmental policy decisions, facilitate the development of greenhouse gas mitigation strategies, and advance Walailak University's progression toward future carbon neutrality. Additionally, the university aims to serve as a model for other educational institutions, governmental agencies, private sector entities, and surrounding communities in systematically and concretely reducing greenhouse gas emissions sustainably. Beyond emission reductions, this initiative also promotes adaptation and resilience to the impacts of climate change within the community and the nation.

1 Introduction



General Information 2

Organization Name

Walailak University

Organization Address

222 Thaiburi Sub-district, Thasala District, Nakhon Si Thammarat 80160, Thailand

Industry Type

Educational Institution

Monitoring Period

October 1, 2023 - September 30, 2024

Monitoring Approach

Based on the 7th Edition of the Carbon Footprint Calculation and Reporting Requirements for Organizations (5th Revision, January 2021)

Level of Assurance

5% Materiality

Materiality Threshold

Limited Assurance

Scope 3

3.1 Organizational Boundary

Organizational Boundary Determination Approach

Operational Control

Facilities/Areas Covered in the Report

The report includes the following facilities/areas within the organizational boundary:

- School Building
- Administration Building
- Academic Office Building
- Thai Buri Hall
- Computer Center Building
- Scientific and Technological Equipment Center Building
- Staff Housing (Walainivas)
- Student Dormitory Buildings
- Chor Pradu Food Center & Canteen
- The Activity Building Food Center
- Wastewater Treatment Plant
- Botanical Center Building
- Smart farm Center
- Water supply plant Building
- Cultural Center Building
- Research Building
- Cooperative Education Building
- Architecture Building
- Informatics studio
- Walailak Club Building
- Sport Science Building
- Gymnasium Building
- Indoor Futsal Court Building
- Guest House Building
- Division of landscaping and building
- Science and Technology park
- Student Activity Building

Scope 3

3.1 Organization Structure

3.1.1 Administration Structure

Walailak Universirt

University Counsil
- Office of University Counsil
- Internal Audit Unit

President
- Academic Council

Vice President

Assistant to the President

Office of the President
- Division of Finance and Accounting
- Division of Human Resources and Organization
- Division of Student Support and Development
- Division of Corporate Communication
- Division of Planning and Strategy
- Division of Properties and Supplies
- Division of Correspondence and General Affairs
- Division of Landscaping and Building
- Division of Legal Affairs
- Division of Centralized Services

Institute

Researh and Innovation Institute of Excellence

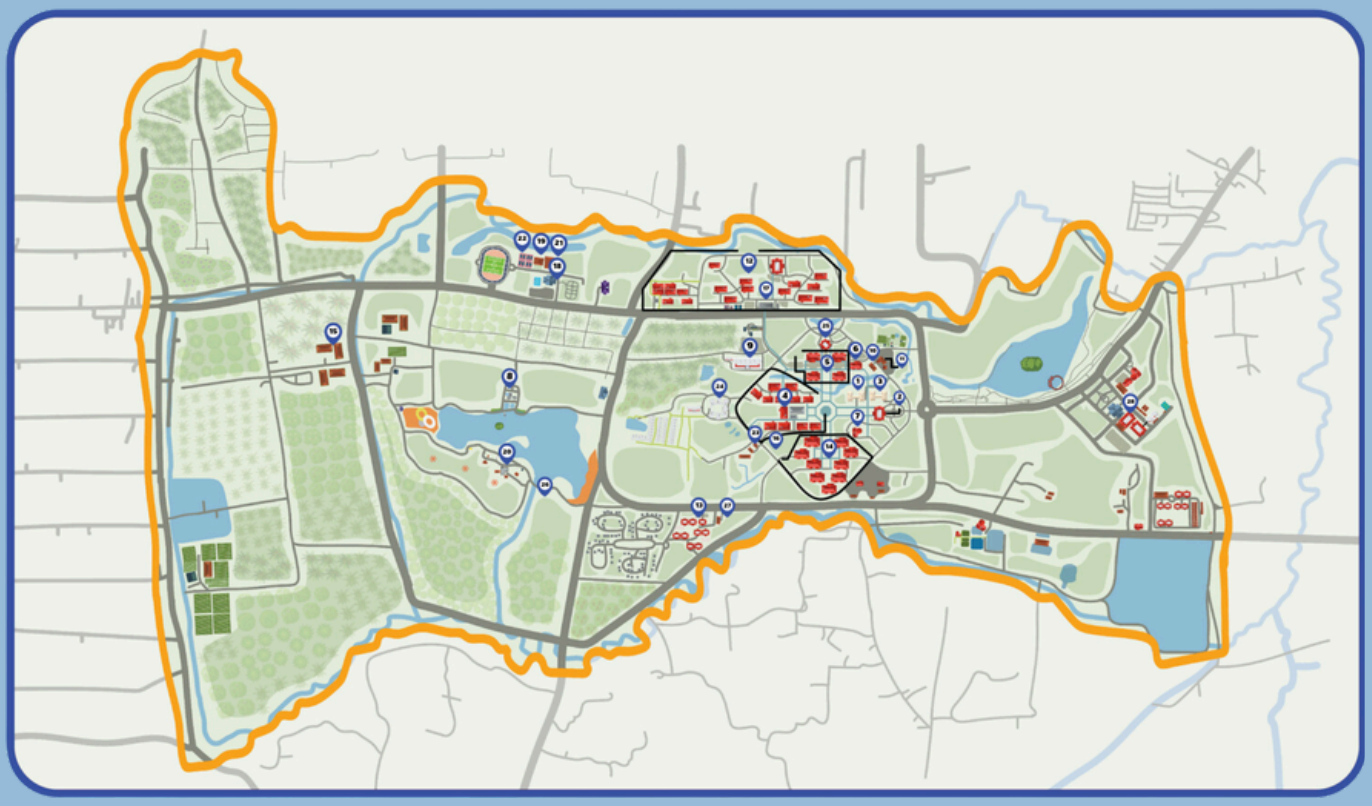
The Center
- The Center for Scientific and Technological Equipment
- The Center for Digital Technology
- The Center for Library Resources and Educational Media
- Center for Educational Services
- Center for Academic Services
- Center for Cooperative Education and Career Development
- Center of Cultural and Sports Promotion
- Walailak University Hospital
- The Center for International Affairs
- The Center for Learning and Teaching Excellence
- The Center for Property Management
- The Center for Smart Farming and Landscaping Architecture
- Science and Technology Park
- Botanic Park

Schools/College
- School of Management
- School of Accountancy and Finance
- School of Education and Liberal Arts
- School of Polical Science and Public Administration
- School of Law
- School of Nursing
- School of Allied Health Sciences
- School of Medicine
- School of Pharmacy
- School of Public Health
- School of Agricultural Technology and Food Industry
- School of Science
- School of Engineering and Technology
- School of Informatics
- School of Architecture and Design
- School of Languages and General Education
- International College
- Akkhraratchakumari Veterinary College
- Walailak University International College of Dentistry
- College of Graduate Studie

Scope 3

3.1 Organization Structure

3.1.2 University Map



1. Library Resources and Education Media Building
2. Administration Building
3. Computer Center Building
4. Scientific and Technological Equipment Center Building
5. School Building 1,3,5,7
6. School Building 6
7. Research Building
8. Water supply plant Building
9. Architecture Building
10. Informatics studio
11. Cooperative Education Building
12. Student Dormitory Buildings 1-18
13. Staff housing (Walainivas 1-10)
14. Academic Office Building (1 - 9)
15. Smart Farm Center
16. Walailak Culinary Training Center
17. Student Activity Building
18. Sports Science Building
19. Gymnasium Building
20. Botanical Park Office Building
21. Cultural Center Building
22. Indoor Futsal Court Building.
23. Division of landscaping and building
24. Science and Technology park
25. Thai Buri Hall
26. Guest House Building
27. Walailak Club Building
28. Walailak University Hospital

3.1.3 Specification of Included or Excluded Organizational Boundaries (Specify the Facilities) with Explanation

The activities of Walailak University Hospital or WUH are excluded from this assessment. The center provides medical services to the general public, resulting in significant external utilization of its resources. This operational model differs from other campus areas, which primarily focuses on educational and research resource utilization.

Scope 3

3.2 Scope of Operations

Greenhouse Gases Considered

- Carbon Dioxide (CO2)
- Methane (CH4)
- Nitrous Oxide (N2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF6)
- Nitrogen Tri fluoride (NF3)

Additional Greenhouse Gases Considered

HCFC-22

Global Warming Potential (GWP) Reference

IPCC Fifth Assessment Report (AR5)

3.2.1 Identification of Scope 1 Greenhouse Gas Emission Sources in the Organization

1. Stationary Combustion Emissions

Diesel (Flood Drainage Pumps)

Activity Description: Diesel B7

Source of Evidence: Invoice

Quantity 4,700 Liters

Responsible Agency

Water Supply and Sanitary Maintenance Division of Landscaping and Buildings

Diesel (Generator)

Activity Description: Diesel B7

Source of Evidence: Invoice

Quantity 18,438 Liters

Responsible Agency

Electrical Maintenance Division of Landscaping and Buildings

Diesel (Incinerator)

Activity Description: Diesel B7

Source of Evidence: Data Records

Quantity 973.55 Liters

Responsible Agency

Center for Smart Farming and Landscaping Architecture

LPG (Incinerator)

Activity Description: LPG

Source of Evidence: Data Records

Quantity 4,910.07 Kilograms

Responsible Agency

Center for Smart Farming and Landscaping Architecture

Scope 3

3.2 Scope of Operations

3.2.1 Identification of Scope 1 Greenhouse Gas Emission Sources in the Organization

2. Mobile Combustion Emissions

Diesel (Vans & Minibuses)

Activity Description: Diesel B7
Source of Evidence: E-Car system
Quantity 62,149.55 Liters
Responsible Agency: Information Systems Development and Research The Center for Digital Technology

Diesel (Garbage Trucks)

Activity Description: Diesel B7
Source of Evidence: Data Records
Quantity 7,514.26 Liters
Responsible Agency: Center for Smart Farming and Landscaping Architecture

3. Fugitive Emissions & Other Emissions

Refrigerant

Activity Description: R410
Source of Evidence: Data Records
Quantity 217 Kilograms
Responsible Agency: Air Conditioning Maintenance and Service Outsourcing Division of Service Central

Refrigerant

Activity Description: R32
Source of Evidence: Data Records
Quantity 108 Kilograms
Responsible Agency: Air Conditioning Maintenance and Service Outsourcing Division of Service Central

Producing Water supply

Activity Description: PAC
Source of Evidence: Chemical Usage Report
Quantity 62,232 Kilograms
Responsible Agency: Water Supply and Sanitary Maintenance Division of Landscaping and Buildings

Producing Water supply

Activity Description: NaOH
Source of Evidence: Chemical Usage Report
Quantity 65,970 Kilograms
Responsible Agency: Tap Water Plant Division of Landscaping and Buildings

Producing Water supply

Activity Description: Cl
Source of Evidence: Chemical Usage Report
Quantity 5,356.22 Kilograms
Responsible Agency: Tap Water Plant Division of Landscaping and Buildings

Scope 3

3.2 Scope of Operations

3.2.1 Identification of Scope 1 Greenhouse Gas Emission Sources in the Organization

4. Waste Management

Rubber/Leather

Source of Evidence: Data Records

Quantity 7,244.25 Kilograms

Responsible Agency: Center for Smart Farming and Landscaping Architecture

Fabric

Source of Evidence: Data Records

Quantity 7,244.25 Kilograms

Responsible Agency: Center for Smart Farming and Landscaping Architecture

Others

Source of Evidence: Data Records

Quantity 7,244.25 Kilograms

Responsible Agency: Center for Smart Farming and Landscaping Architecture

5. Chemical Fertilizer Usage

46-0-0

Source of Evidence: Data Records

Quantity 500 Kilograms

Responsible Agency: Center for Smart Farming and Landscaping Architecture

15-15-15

Source of Evidence: Data Records

Quantity 400 Kilograms

Responsible Agency: Center for Smart Farming and Landscaping Architecture

Scope 3

3.2 Scope of Operations

3.2.2 Identification of Other Direct Greenhouse Gas Emissions Separately Reported

1.Fugitive Emissions & Other Emissions

Refrigerant

Activity Description: R22

Source of Evidence: Data Records

Quantity 216 Kilograms

Responsible Agency: Air Conditioning Maintenance and Service Outsourcing Division of Service Central

3.2.3 Identification of Scope 2 Greenhouse Gas Emission Sources in the Organization

Electrical

Activity Description: Electricity consumption of each building within the university

Source of Evidence: University Electricity Bill

Quantity 10,301,818.73 kWh

Responsible Agency: Air Conditioning Maintenance and Service Outsourcing Division of Service Central

3.2.4 Identification of Scope 3 Greenhouse Gas Emission Sources in the Organization

Electrical

Activity Description: Electricity consumption of each building within the university

Source of Evidence: University Electricity Bill

Quantity 2,816,322.72 kWh

Responsible Agency: Air Conditioning Maintenance and Service Outsourcing Division of Service Central

Student Cooperative Education Travel (Vans)

Activity Description: Diesel B7

Source of Evidence: Data Records

Quantity 127,910.98 Liters

Responsible Agency: Center for Cooperative Education and Career development

Student Cooperative Education Travel (Domestic Flights)

Source of Evidence: Data Records

Quantity 1,532,498 pkm

Responsible Agency: Center for Cooperative Education and Career development

Student Cooperative Education Travel (Short-term International Flights)

Source of Evidence: Data Records

Quantity 174,135.44 pkm

Responsible Agency: Center for Cooperative Education and Career development

Student Cooperative Education Travel (Long-term International Flights)

Source of Evidence: Data Records

Quantity 73,438 pkm

Responsible Agency: Center for Cooperative Education and Career development

Monitoring 4

4.1 Scope 1 Greenhouse Gas Emission Sources

Emission Source	Activity Data – Source of Activity Data: Measured Data	Activity Data – Source of Activity Data: Data from Payment Evidence	Activity Data – Source of Activity Data: Estimated Data	Emission Factor (EF)
Diesel (Flood Drainage Pumps)		✓		IPCC Vol.2 table 2.2, DEDE
Diesel (Generator)		✓		IPCC Vol.2 table 2.2, DEDE
Diesel (Incinerator)		✓		IPCC Vol.2 table 2.2, DEDE
LPG (Incinerator)			✓	IPCC Vol.2 table 2.2, DEDE LPG 1 litre = 0.54 kg
Diesel (Vans & Minibuses)		✓		IPCC Vol.2 table 3.2.1, 3.2.2, DEDE
Diesel (Garbage Trucks)		✓		IPCC Vol.2 table 3.2.1, 3.2.2, DEDE
Refrigerant (R410)		✓		IPCC 2013, AR5
Refrigerant (R32)		✓		IPCC 2013, AR5
Refrigerant (R32)		✓		IPCC 2013, AR5
Producing Water supply (PAC)		✓		Ecoinvent, IPCC2013 GWP100a, Poly aluminum chloride {GLO}, production
Producing Water supply (NaOH)		✓		Ecoinvent, IPCC2013 GWP100a
Producing Water supply (Cl)		✓		Ecoinvent 2.2, IPCC 2007 GWP 100a, Carbon Footprint of Product Assessment Guideline (March 2021)
Waste Management (Rubber/Leather)			✓	2006 IPCC Volume 5: Waste
Waste Management (Fabric)			✓	2006 IPCC Volume 5: Waste
Waste Management (Other)			✓	2006 IPCC Volume 5: Waste
Chemical Fertilizer Use (46-0-0)	✓			Calculation
Chemical Fertilizer Use (15-15-15)	✓			Calculation

4.2 Scope 2 Greenhouse Gas Emission Sources

Emission Source	Activity Data			Emission Factor (EF)
	Source of Activity Data			
	Measured Data	Data from Payment Evidence	Estimated Data	
Electricity consumption of each building within the university		✓		Thai National LCI Database, TIISMTEC-NSTDA, AR5 (with TGO electricity 2016-2018)

4.3 Scope 3 Greenhouse Gas Emission Sources

Emission Source	Activity Data			Emission Factor (EF)
	Source of Activity Data			
	Measured Data	Data from Payment Evidence	Estimated Data	
Electricity Use from Rental Shops & Residences		✓		Thai National LCI Database, TIISMTEC-NSTDA, AR5 (with TGO electricity 2016-2018)
Student Cooperative Education Travel (Vans)		✓		IPCC Vol.2 table 3.2.1, 3.2.2, DEDE
Student Cooperative Education Travel (Domestic Flights)		✓		Defra, 2010
Student Cooperative Education Travel (Short-term International Flights)		✓		Defra, 2010
Student Cooperative Education Travel (Long-term International Flights)		✓		Defra, 2010

Monitoring

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4.4 Greenhouse Gas Emission Sources from Operational Boundaries by Additional Reporting Category

Emission Source	Activity Data			Emission Factor (EF)
	Source of Activity Data			
	Measured Data	Data from Payment Evidence	Estimated Data	
Refrigerant (R22)	✓			IPCC 2013, AR5

Summary of Greenhouse Gas Emissions

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5.1 Greenhouse Gas Emissions from Scope 1 Operational Boundary

Greenhouse Gas Emission Sources	Greenhouse Gas Emissions Quantity (Ton CO_2eqq)								Total GHG Emissions (Ton CO_2eq)
	CO_2	Fossil CH_4	CH_4	N_2O	SF_6	NF_3	HFCs	PFCs	
Diesel (Flood Drainage Pumps)	12.68	0.02		0.03					12.73
Diesel (Generator)	49.76	0.06		0.11					49.93
Diesel (Incinerator)	2.63	0.00		0.01					2.64
LPG (Incinerator)	15.27	0.01		0.01					15.29
Diesel (Vans & Minibuses)	167.72	0.27		2.35					170.33
Diesel (Garbage Trucks)	20.28	0.03		0.28					20.59
Refrigerant (R410)							834.80		834.80
Refrigerant (R32)							73.12		73.12
Producing Water supply (PAC)	33.05								33.05
Producing Water supply (NaOH)	73.54								73.54
Producing Water supply (Cl)	5.65								5.65
Waste Management (Rubber/Leather)	22.67								22.67
Waste Management (Fabric)	14.49								14.49
Waste Management (Other)	16.81								16.81
Chemical Fertilizer Use (46-0-0)	0.75								0.75
Chemical Fertilizer Use (15-15-15)	1.47								1.47

Total 1,347.84

Summary of Greenhouse Gas Emissions

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5.2 Greenhouse Gas Emissions from Scope 2 Operational Boundary

Greenhouse Gas Emission Sources	Greenhouse Gas Emissions Quantity (Ton_2CO eq)
Electricity consumption of each building within the university	5,149.88

5.3 Greenhouse Gas Emissions from Scope 3 Operational Boundary

Greenhouse Gas Emission Sources	Greenhouse Gas Emissions Quantity (Ton_2CO eq)
Electricity Use from Rental Shops & Residences	5,149.88
Student Cooperative Education Travel (Vans)	350.55
Student Cooperative Education Travel (Domestic Flights)	265.58
Student Cooperative Education Travel (Short-term International Flights)	17.07
Student Cooperative Education Travel (Long-term International Flights)	8.39

Total 2,049.47

5.4 Greenhouse gas emissions from additionally reported operational boundary categories

Greenhouse Gas Emission Sources	Greenhouse Gas Emissions Quantity (Ton_2CO eq)
Refrigerant (R22)	426.82

Summary of Greenhouse Gas Emissions

5.5 Carbon Intensity

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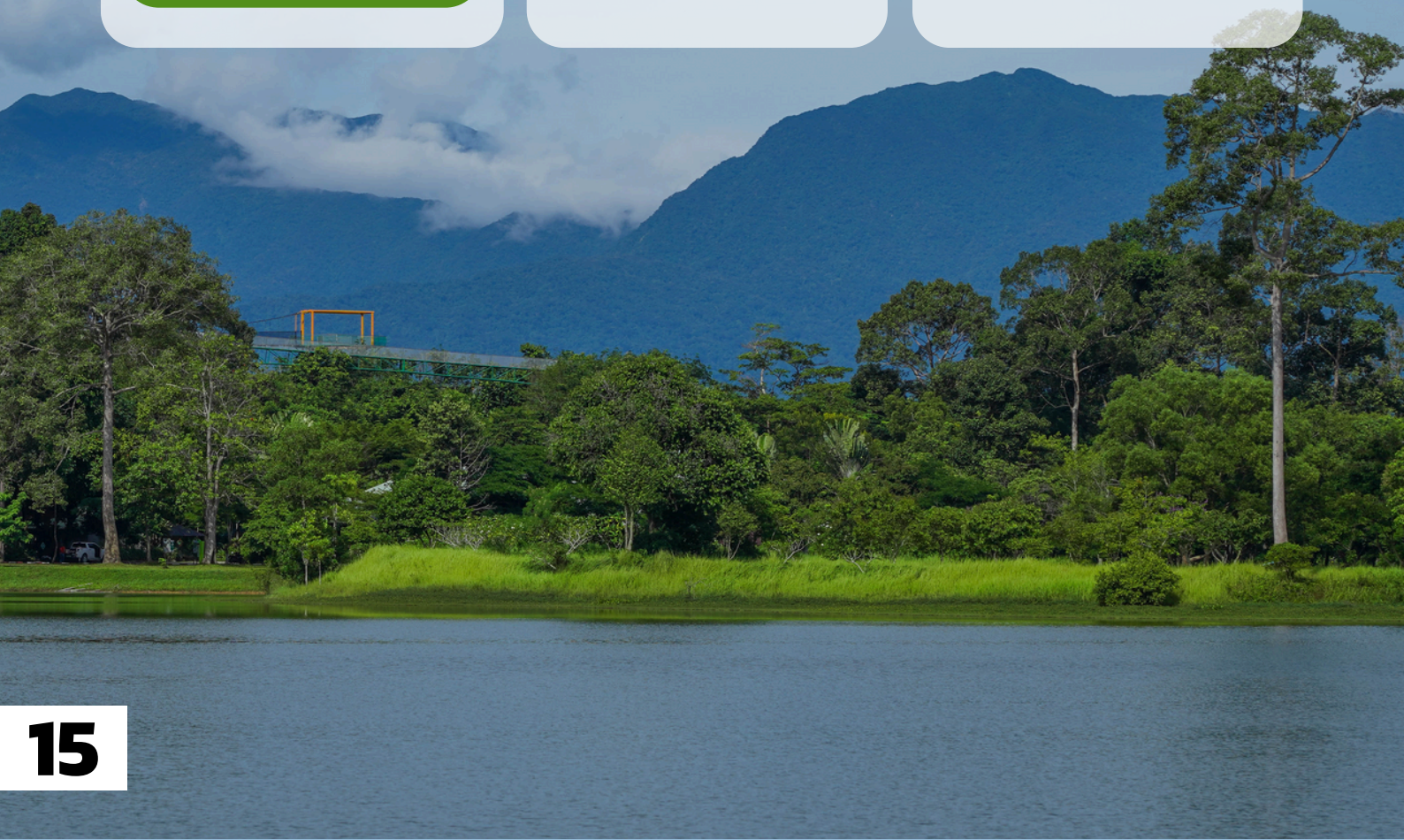
Greenhouse Gas Emission Sources	Quantity	Unit
Scope 1	1,348	Ton CO_2eq
Scope 2	5,150	Ton CO_2eq
Scope 3	2,050	Ton CO_2eq
Total (Scope 1+2)	6,498	Ton CO_2eq
Total (Scope 1+2+3)	8,548	Ton CO_2eq
Output	15,860	Persons
Carbon Intensity (Scope 1+2)	0.41	Ton$_2$COeq / Persons
Carbon Intensity (Scope 1+2+3)	0.54	Ton$_2$COeq / Persons



Baseline Year 6

6.1 Reference Baseline year

Walailak University has designated 2022 as the baseline year for the carbon footprint for organization (CFO) assessment. This selection reflects a return to standard greenhouse gas emission levels following the disruptions caused by the COVID-19 pandemic. During 2020 and 2021, the university implemented measures such as travel restrictions, remote work (Work from Home), and online learning, which significantly altered operational activities. Consequently, data on energy consumption, travel, and other activities from those years do not accurately represent typical operations. By choosing 2022 as the baseline year, the university ensures that the data collected is stable and provides a more precise representation of its greenhouse gas emissions.

Baseline Year 6

6.2 Scope of Operations in the Baseline Year

Scope	Greenhouse Gas Emission Sources	Greenhouse Gas Emissions Quantity (Ton CO_2eq)
Scope 1	Diesel (Flood Drainage Pumps)	30.33
	Diesel (Generator)	29.24
	Diesel (Incinerator)	6.50
	LPG (Incinerator)	14.94
	Diesel (Vans & Minibuses)	170.33
	Diesel (Garbage Trucks)	8.99
	Refrigerant (R410)	238.51
	Refrigerant (R32)	19.63
	Producing Water supply (PAC)	36.45
	Producing Water supply (NaOH)	55.28
	Producing Water supply (Cl)	2.83
	Waste Management (Rubber/Leather)	17.63
	Waste Management (Fabric)	11.27
	Waste Management (Leaves)	37.52
	Waste Management (Other)	13.07
	Chemical Fertilizer Use (46-0-0)	1.72
	Chemical Fertilizer Use (15-15-15)	4.19
	Chemical Fertilizer Use (25-5-5)	0.04
	Chemical Fertilizer Use (14-14-14)	0.01
	Chemical Fertilizer Use (8-24-24)	0.04

Baseline Year 6

6.2 Scope of Operations in the Baseline Year

Scope	Greenhouse Gas Emission Sources	Greenhouse Gas Emissions Quantity (Ton CO_2eq)
Scope 2	Electricity consumption of each building within the university	8,558.07
Scope 3	Electricity Use from Rental Shops & Residences	3,058.90
	Student Cooperative Education Travel (Vans)	175.05
	Student Cooperative Education Travel (Domestic Flights)	51.69
	Student Cooperative Education Travel (Short-term International Flights)	1.06
	Student Cooperative Education Travel (Long-term International Flights)	6.89
Additionally reported operational boundary categories	Refrigerant (R22)	738.61

Baseline Year

6.3 Specifying Differences Between Baseline and Current Year Greenhouse Gas Emission Reports with Explanations

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A comparative analysis report between the baseline year (2022) and the current year (2024) reveals a significant reduction in greenhouse gas emissions, amounting to a 31.89% decrease. This substantial decline is likely attributable to the implementation of energy conservation measures, increasing the proportion of renewable energy sources, and other effective greenhouse gas reduction initiatives.

Walailak University has implemented several sustainability measures, including:

- Clean Energy Measures: The university has increased the use of renewable energy sources, such as solar power, to reduce emissions from energy consumption.
- Reduction of High-Energy Travel: Efforts have been made to minimize energy-intensive travel, including reducing air travel and promoting online meetings and remote work (Work from Home).
- Efficient Waste Management: Improved waste management practices, including recycling and waste reduction, have led to decreased greenhouse gas emissions.
- Expansion of Green Spaces: The university has increased green areas on campus to absorb carbon dioxide, contributing to lower greenhouse gas emissions.

These initiatives align with Walailak University's commitment to becoming a Green University and achieving carbon neutrality, in accordance with SDG 13: Climate Action. The reduction in greenhouse gas emissions reflects the effectiveness of these measures and underscores the university's dedication to sustainable development.