



จุฬาลงกรณ์มหาวิทยาลัย  
Chulalongkorn University  
Pillar of the Kingdom

Chulalongkorn University  
**Sustainability Report**  
2013-2014



## Contact Information

**Assoc. Prof. Boonchai Stitmannaithum, D.Eng.**  
Vice President for Physical Resources Management

**Chulalongkorn University**  
254 Phaya Thai Road, Pathumwan  
Bangkok 10330 THAILAND  
E-mail: [boonchai.s@chula.ac.th](mailto:boonchai.s@chula.ac.th)  
Tel: 02-218-3341





# Table of Contents

President's Statement	2
Introduction	6
About Chulalongkorn University	8
Sustainability at Chulalongkorn University	12
Principle 1 – Sustainability Performance of Buildings on Campus	15
Principle 2 – Campus-Wide Master Planning and Target Setting	23
Principle 3 – Integration of Facilities, Research and Education	32
Appendix A: Academic Programs with the Focus on Sustainability and Environment	36
Appendix B: Example of Courses with the Focus on Sustainability	37
Appendix C: Research Center and Initiatives on Sustainability and Environment	39
Appendix D: Related Activities, Projects and Programs on sustainability	42
Appendix E: Chemical Consumed by UN Class 2013-2014	44
Appendix F: Chulalongkorn University Chemical Waste Management Flow Chart	45
Appendix G: Faculty and Researcher Data 2013-2014	46
Appendix H: Student Data 2013-2014	47





# President's Statement

In recent years, "sustainability" has become the term whose meaning is critical to the development of Chulalongkorn University. From a segregated sustainable operation in the beginning stage that only focused on one operational area at one time, nowadays, Chulalongkorn University lays emphasis on an integrated sustainable operation concept which is not solely limited to energy and environment, but also to the understanding of interconnections between society, technology, culture, and the viability of future campus development. In 2014, many sustainable projects and programs were initiated. In addition, the concept of sustainability was fully integrated into teaching, research and operation of the University. This has resulted not only in the sustainable development of the campus, but has also raised awareness of sustainability among Chulalongkorn community members.

On behalf of Chulalongkorn University, it is my pleasure to present our ***2013-2014 Sustainability Report: Based on the ISCN-GULF Sustainable Campus Charter***. This report reflects our full commitment to sustainability. Our aim is to have our University shape a more sustainable future for Thailand and the world.



**Professor Pirom Kamolratanakul, M.D.**  
President of Chulalongkorn University



Arial view of Chulalongkorn University with Bangkok skyline in background.



# Introduction

Chulalongkorn University plays a major role in national and international development. Currently, Chulalongkorn University Strategies 2012 – 2016 has been undertaken to formulate guidelines for the University's development. The initiative focuses on different aspects of development and improvement with the objective of raising the University to a level of excellence that will qualify it as a "World Class National University". To fulfill its mission of becoming the "Pillar of the Kingdom", in commemoration of the 100th anniversary of its founding, Chulalongkorn University has employed six strategies, not only to promote advanced education in order to produce highly qualified graduates for Thai and global society and to become a center of wisdom for the kingdom but also to be the university of sustainability, with a mission to promote energy conservation, create a livable environment, establish good relationships with and support the career advancement of University personnel.

Chulalongkorn University is ranked first as the greenest university in Thailand according to UI Green Metric World University Ranking 2014. This award has boosted the level of awareness on sustainability practice on campus. While many sustainability activities have been integrated into our teaching, research, and extracurricular activities, it is clear that more sustainability related programs can be offered at all degree levels. We believe that by completing this sustainability report, we will know where we are on the sustainability track, which will help set pathway to achieving sustainable campus in the future.





"Phra Kieo", emblem of Chulalongkorn University at the pediment of Chulalongkorn University Auditorium



Courtyard at the  
Faculty of Arts

Chulalongkorn University (Chula) became a member of the International Sustainable Campus Network (ISCN) on July 10, 2014. This report is the first sustainability report to be published by Chulalongkorn University. Unless otherwise stated, performance information is provided for the reporting period of the fiscal year 2013-2014 (October 2013 – September 2014) or the academic year 2013 (August 2013–July 2014). The boundaries of this report encompass all units of Chulalongkorn University, except the Faculty of Medicine, Chulalongkorn University Demonstration Primary School, Chulalongkorn University Demonstration Secondary School, and the King Chulalongkorn Memorial Hospital.

# About Chulalongkorn University

Chulalongkorn University, the oldest and one of the most prestigious universities in Thailand, was founded in 1917 by King Vajiravudh (Rama VI). The University was named after his father, King Chulalongkorn (Rama V), who laid the foundations of modern education in Thailand. In keeping with the shared vision of both kings, Chulalongkorn University has maintained its reputation for academic excellence ever since, and has played a major role in national development.

From the first four faculties in 1917, today, Chulalongkorn University composes of 23 faculties, schools and colleges, and 9 research institutes. As a comprehensive public university, Chulalongkorn University offers 455 programs in almost all areas of study. Among them 88 are international programs using English as the medium of instruction. Currently, there are 38,941 students of whom about 65% are undergraduates and 35% are graduates. There are 2,866 faculty members and 5,142 supporting staffs.

The policy of Chulalongkorn University is to maintain its status as an outstanding national university while achieving standards at the international level. Chulalongkorn University has enjoyed high reputation for academic attainments. In 2014, the University was allocated approximately \$50 million Thai Baht in research funding to support about 1,500 projects.





Statue of King Chulalongkorn (Rama V) and  
King Vajiravudh (Rama VI)  
in front of Chulalongkorn University Auditorium



Traditional Thai House Complex at  
Chulalongkorn University Cultural Center



Chulalongkorn University Stadium

The announcement of the QS (Quacquarelli Symonds) World Ranking for 2014-2015 ranked Chulalongkorn University top in Thailand and in 243rd place among the world's top 2,000 universities. In addition, according to the Scimago Institutions Rankings based on research output, Chulalongkorn University has been placed first among Thai Universities for six consecutive years (2009-2014).

Located in the heart of Bangkok, Chulalongkorn University covers 1,862,560 square meter tract of land. The University has also established two Centers of Learning Network for the Region (CLNR) in Saraburi and Nan Province with the ultimate goal of establishing outreach programs to various regions of Thailand.

In recent years, the University has built a number of supporting facilities and established a range of services to meet the needs of faculty members, personnel, and students. These include dormitories for Thai and international students, dormitories for supporting staff, the Health Service Center, book centers, sport complex, cooperative stores, consultant services, and free on-campus transportation.

For more information on Chulalongkorn University, please visit the University's website: [www.chula.ac.th](http://www.chula.ac.th)

## Vision 2012-2017

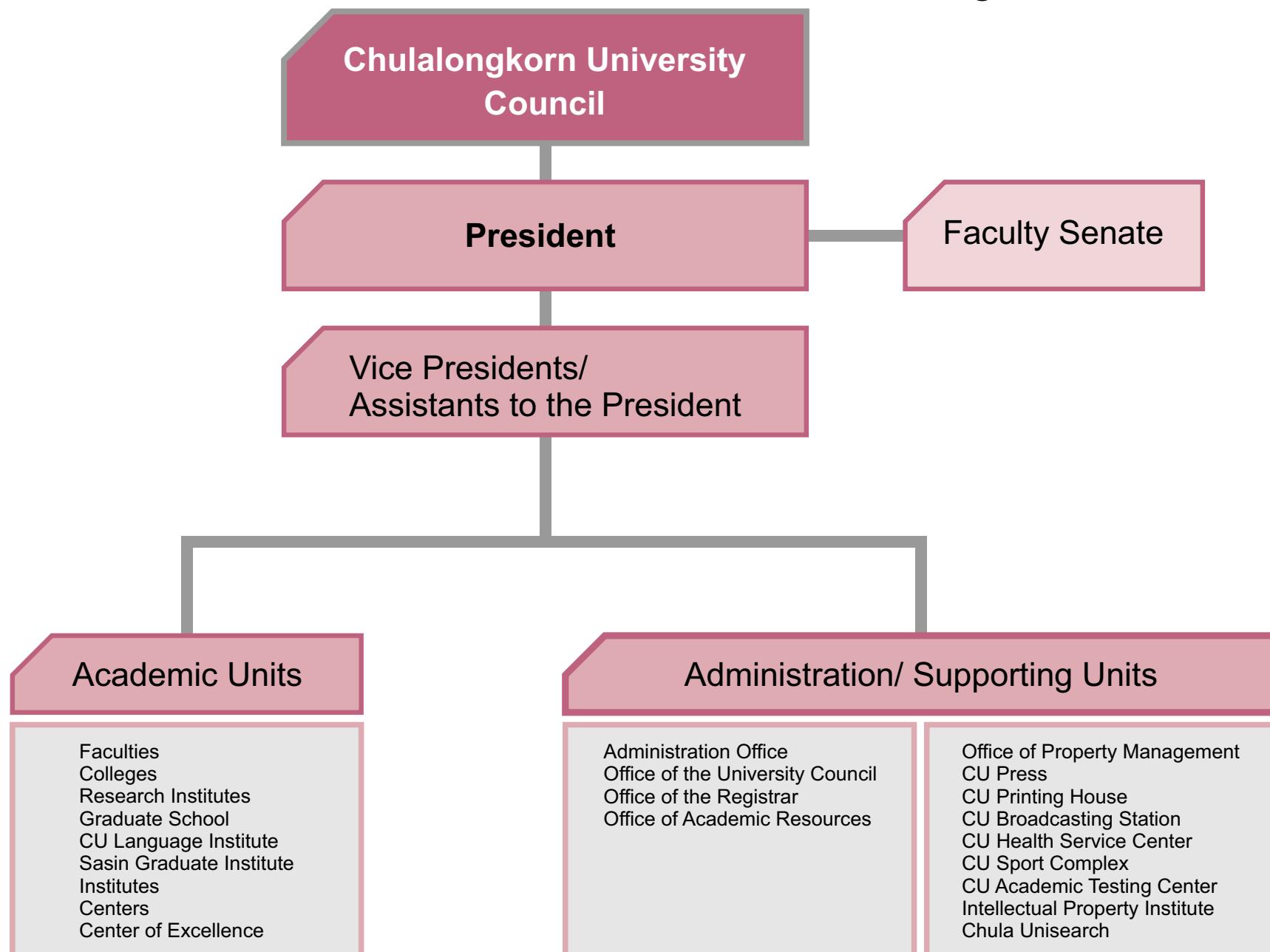
Chulalongkorn University is Thailand's source of knowledge and reference, a guiding light of wisdom for sustainable development.

The Faculty of Arts is housed in Boromrajakumari Building





# Chulalongkorn University Organizational Structure



# Sustainability at Chulalongkorn University

For Chulalongkorn University, the concept of sustainability has long been integrated into academic activities and operational practice. In 2000, the Chulalongkorn University Master Plan (in commemoration of the centenary of its founding) was developed in order to establish criteria and strategies for the development and management of Chulalongkorn University's physical resources. From an in-depth analysis and synthesis of past physical development data and public hearings with the Chulalongkorn University community, this Master Plan proposed directions for the development of the University which address optimization of existing resources and future education and operation trends. Explicitly, the concept of a "green campus" was proposed and this includes campus planning, building design, and campus operation and maintenance. The university's Office of Physical Resource Management has played a major role in the exercise of the green campus concept.

In 2008, Professor Pirom Kamonrattanakul, the President of the University, launched a green university initiative with the goal of becoming a sustainable university. Many projects and programs have been initiated to raise an awareness of sustainability on the Chulalongkorn University campus and surrounding community. The CU Committee of the Environment was established to overlook all sustainability aspects on campus.





Rain tree tunnel  
provides shade for on-campus road.



Five-line free university shuttle service connect the campus with nearby public transportation hubs.



University's bicycles are provided to Chulalongkorn University students and personnels.

In 2013, the Energy and Environmental Unit was developed under the Office of Physical Resource Management and began its work on sustainability operational practice. Under the Energy and Environmental Unit, representatives from various departments of Chulalongkorn University work collaboratively and form 'green teams' that promote sustainability in their own departments.

In 2014, the Environmental, Health, and Safety (EHS) Task Forces was established with its first mission to enhance safety practice in chemical laboratory. With a support from the National Research Council of Thailand (NRCT), the 'safe laboratory' project is expected to be launched in late 2015.

Also in 2014, Chulalongkorn University was the only Thai university that made it into the first 50 places in the global green university rankings with higher scores for most indicators, especially the education category that includes course descriptions, research and activities related to the environment and sustainability. According to the University of Indonesia's UI Green Metric World University Ranking 2014, Chulalongkorn University received a total score of 6,630 points, up from 6,122 in 2013 and 6,093 in 2012.

In early 2015, the President, Vice Presidents, and Deans of Chulalongkorn University participated in a sustainability workshop hosted by Sasin Center for Sustainable Management (SCSM). This marks the first event of its kind that confirmed the commitment to sustainability at top management level.

For more information on Chulalongkorn University sustainable campus, please visit the University's website: [www.green.chula.ac.th](http://www.green.chula.ac.th)



Rain tree (*Albizia saman*) is the university's symbol.

# 1

## Principle 1 - Sustainability Performance of Buildings on Campus

**Principle 1: To demonstrate respect for nature and society, sustainability considerations should be an integral part of planning, construction, renovation, and the operation of buildings on campus.**

A sustainable campus infrastructure is governed by respect of natural resources and social responsibility, and embraces the principle of a low carbon economy. Concrete goals embodied in individual buildings can include minimizing environmental impacts (such as energy and water consumption or waste), furthering equal access (such as non-discrimination of the disabled), and optimizing the integration of the build and natural environments. To ensure buildings on campus can meet these goals in the long term, and in a flexible manner, useful processes include participatory planning (integrating end-users such as faculty, staff, and students) and life-cycle costing (taking into account future cost savings from sustainable construction).

### Management Approach to Principle 1 Topics

Chulalongkorn University developed the CU Master Plan (in commemoration of the 100th anniversary of its founding) in which the concept of "green campus" was proposed. The green campus concept involves campus planning, building design, and campus operation and maintenance. Currently, this Master Plan serves as the framework for developing and evolving campus-wide sustainability plans.

With the goal of becoming a leading sustainable university in Thailand, the University's sustainable strategies focus on enhancing the quality of the campus infrastructure and buildings. Many initiatives were introduced in 2014 which affect not only reshaping the physical environmental condition of the campus, but also campus usage behavior. Admittedly, a few initiatives are still at a preliminary stage and focus on providing baseline data for further analysis.



**Chamchuri 10**,  
the newest high-rise building  
on campus, was built with  
an optimized floor area ratio  
(FAR) concept to preserve  
the university's green area.

The first management approach to ISCN principle 1 is to explore sustainable building design principles and apply those principles to new and existing building design. Given the limited space in the heart of Bangkok, the University emphasizes careful planning and management of university buildings. For new buildings, sustainable building design principles are integrated into the design. Unfortunately, as a public university with limited funding, only selected design principles have been successfully applied. Nevertheless, it is anticipated that these sustainable building design principles will be mandatory for all new construction in the future.

The second approach is to minimize the amount of resources used in buildings and campus operations. Firstly, electricity and water use inventories give an annual snapshot of campus energy and water usage that show the cost and how much in terms of resources is being used grossly, by faculties, or by building types. Energy and water use data were informed to the top-level management to raise awareness on the issue.

The third approach is to minimize the amount of waste and emissions to the environment. Currently, the focus is on two topics, the chemical waste from research and education activities, and the reduction and recycling of general waste. For example, the University enforces a hazardous waste management system which covers all aspects of hazardous waste management using a cradle-to-grave approach. Chemical and hazardous waste from laboratories is classified and treated according to the international standard. Non-hazardous waste is separated and treated accordingly.

# Main initiatives and results in 2014

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	
<b>1.1 Resource Use</b>			
1.1.1 Energy use (per floor area)	To provide baseline energy consumption data of buildings on campus.	<ol style="list-style-type: none"> <li>Analysis of energy consumption is performed.</li> <li>Metering infrastructure: installation of meters in all buildings on campus to enable energy monitoring.</li> <li>Sustainable building design guideline is introduced for new construction.</li> </ol>	Average consumption 91.51 kWh/m <sup>2</sup> /yr
1.1.2 Embedded (grey) building energy		Evaluation of embedded building energy is planned for FY2014-2015 ISCN report.	No data
1.1.3 Water use	To provide baseline water usage on campus.	<ol style="list-style-type: none"> <li>Campus-wide drainage and storm drainage master plan to manage on-campus water runoff</li> <li>Construction of regulating reservoirs to store water during the rainy period and release extra water when needed.</li> <li>Reduction of water consumption for campus landscape using rain water from on-campus reservoirs.</li> </ol>	Total consumption 1,538,736 m <sup>3</sup> /yr  
1.1.4 Energy and Water costs, and saving achieved			Total electricity cost 10,512,469.01 USD (315,374,070 THB) Total water cost: 893,375.10 USD (26,801,252.86 THB)
1.1.5 Overall purchased products/material			Total printing paper used: ~43,630 ream* * approximated data

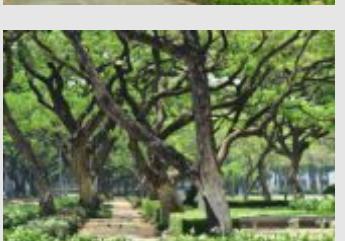
Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	
<b>1.2 Waste, recycling, local emissions, and non-compliance</b>			
1.2.1 Waste and recycling		<ul style="list-style-type: none"> <li>1. Recycling of on-campus leaf waste for soil fertilizer.</li> <li>2. Reduction of polystyrene foam food containers from on-campus canteens.</li> <li>3. Establishment of on-campus recycle center.</li> <li>4. Recycling of cellphones put in place since 2010</li> </ul> 	<p>1. 3600 m<sup>3</sup> of leaf and branch waste were decomposed naturally annually.</p> <p>2. Since 2011, canteen food venders were prohibited from using polystyrene foam food container. Biodegradable bagasse food containers were used as replacement.</p> <p>3. On-campus recycle center was established in 2013. Profit from recycling activities was used to provide educational funding for university staff.</p>
1.2.2 Waste costs, and saving achieved			Cost of hazardous waste disposal (by incineration): 11,145.83 USD/yr/25t (334,375 THB/yr/25t)
1.2.3 Emission contribution to local air pollution			No data
1.2.4 Incidents of non-compliance with environmental regulations			No data
<b>1.3 Research/IT Facilities and Sustainability</b>			
1.3.1 Energy use in laboratories/IT facilities		Preliminary data of 2013-2014 were analyzed to provide baseline energy consumption data. A detailed analysis is planned for 2014-2015 ISCN report.	Average consumption 130.51 kWh/m <sup>2</sup> /yr (Median consumption 96.55 kWh/m <sup>2</sup> /yr)

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	Performance 2013-2014
1.3.2 Chemical consumed		Chemtrack and Wastetrack, chemical and waste inventory program, were used to manage chemical inventory. A chemical hygiene plan was established and enforced for all students receiving grants from the Graduate School.	<p>Amount of chemical consumed by phases of chemical matter:</p> <p>Solid 9,910.21 kg</p> <p>Liquid 9,358.86 litre</p> <p>Gas 463.28 m<sup>3</sup></p> <p>(See Appendix E for more details)</p>
1.3.3 Hazardous waste from research/IT facilities	To raise awareness about hazardous substances and to reduce the amount of hazardous waste from research/IT facilities.	<p>1. The University uses "Wastetrack", a chemical waste inventory program, to identify hazardous waste for transportation and treatment. Major faculties including the Faculty of Science, the Faculty of Engineering, and the Petroleum and Petrochemical College use "wastetrack" for chemical waste inventory.</p> <p>2. Hazardous waste was classified into 14 classes according to UN</p>	<p>Total solid and liquid chemical waste:</p> <p>2,576.04 kg of solid waste</p> <p>31,711.05 litre of liquid waste</p> <p>(see Appendix F for more details on the chemical management flow chart)</p>
<b>1.4 Users</b>			
1.4.1 Handicapped access		<p>Architectural Design for All: New and existing buildings as well as campus infrastructure are required to incorporate 'universal design' principles. Examples of universal design principles are:</p> <ul style="list-style-type: none"> <li>- to provide handicapped parking</li> <li>- to provide handicapped access to buildings and public spaces on campus.</li> <li>- to provide tactile paving surface for people who are blind or visually impaired.</li> </ul>  	

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	
1.4.2 Indoor air quality		Currently, there is no systematic management of indoor air quality for buildings on campus. Nevertheless, four units, including, the Faculty of Science, the Faculty of Economics, the Center of Excellence on Hazardous Substance Management, and CU Laboratory Animal Center have established indoor air quality program.	
1.4.3 Stakeholder participation in planning (integrated design)			No data

## 1.5 Building Design Aspects

1.5.1 Sustainable building standards applied and explored	<p>To reduce the University's electricity charges, each building's energy consumption has to be closely monitored with the goal of reducing energy consumption by at least 10% in accordance with the policy implemented by the Energy Policy &amp; Planning Office of the Ministry of Energy, which requires an automated energy management system that can accurately record the energy consumption of the various university buildings and give directions and methods for conserving energy for sustainability. Policy objectives are summarized as follows:</p> <p>1. To reduce demand charges by closely monitoring air conditioning systems</p>	<p>Chulalongkorn University has its buildings regulated by the Energy Conservation Promotion Act of 1992. The University has implemented a plan to conserve energy according to the Energy Conservation Promotion Act of 1992 by developing 3-year plans, which are submitted to the Develop Renewable Energy and Conserve Energy Department. Currently amendments have been enacted to the Energy Conservation Promotion Act (Second Amendment) 2007 to control buildings' energy consumption each year in order to conserve energy consumption for long-term sustainability.</p> <p>In addition to existing law and regulations, Chulalongkorn University has begun to promote an integration of green design concept to new building construction. From 2013-2014 the University's architects have familiarized themselves with green design principles, such as LEED and TREES.</p>	<p>Green design principles were integrated into the design of new buildings on Chulalongkorn University campus.</p>  
---	--	---	---

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	Performance 2013-2014
	2. To manage energy consumption with the highest efficiency through an energy management program.	These principles are tested to see their applicability to the construction practice of University buildings. It is anticipated that in the future, green design principles will be mandatory for all new buildings on campus.	
1.5.2 Long-term use flexibility		For new and renovated buildings, construction materials are selected based on a durability, low-toxicity, low-maintenance level and functional use. Being a university in a tropical climate, extra considerations are given to shrinkage, leakage, and moisture control problems.	 
1.5.3 Life-cycle costing			No data
1.5.4 Landscape integration of building design		<p>In 2011, Building and Landscape Design Standards were set and a manual was produced for architectural design, landscape design, and building system design to ensure that University buildings and grounds are used effectively as well as to conserve resources and the environment.</p> <p>Examples of landscape design standards include: alignment with the University's Master Plan, site survey and environmental analysis, the use of local plant materials, the preservation of existing trees.</p>	  

# 2

## Principle 2 - Campus-wide Master Planning and Target Setting

**Principle 2: To ensure long-term sustainable campus development, campus-wide master planning and target-setting should include environmental and social goals.**

Sustainable campus development needs to rely on forward-looking planning processes that consider the campus as a whole, and not just individual buildings. These processes can include comprehensive master planning with goals for impact management (for example, limiting the use of land and other natural resources and protecting ecosystems), responsible operations (for example encouraging environmentally compatible transport modes and efficiently managing urban flows), and social integration (ensuring user diversity, creating indoor and outdoor spaces for social exchange and shared learning, and supporting ease of access to commerce and services). Such integrated planning can profit from including users and neighbors, and can be strengthened by organization-wide target setting (for example greenhouse gas emission goals). Existing low-carbon lifestyles and practices within individual campuses that foster sustainability, such as easy access for pedestrians, grey water recycling and low levels of resource use and waste generation, need to be identified,

### Management Approach to Principle 2 Topics

The Chulalongkorn University 100th Anniversary Model Plan focuses on sustainable development and the importance of maintaining the quality of the University's grounds and environment. The development strategy for this plan consists of five main points as follows:



Former 25m swimming pool was turned into Chulachakrabongse Plaza, a public park between the Faculty of Science and the Faculty of Engineering



The exercise plaza in front of the CU Sport Complex.



Traditional Thai House cluster was erected to promote arts and cultural activities.



Two former Faculty of Science Chemistry buildings were converted into the University Arts and Culture Building (left) and the University Museum (right).



## **1. Land Use**

- Using the University grounds appropriately as there is very limited open space. New buildings should be built to replace older, deteriorating structures.
- Land should be allocated to answer the demands of the majority and the needs of the University as a whole. The open areas within faculties, institutes and departments should be conveniently linked to the University's public grounds.
- As an institute of higher learning, Chula must also work to serve and integrate well with the surrounding community, to ensure the utmost benefit for all, the University, government agencies located on university property and the surrounding community.
- New buildings should be designed to best relate to and interact with nearby buildings to create the most impressive esthetic as this reflects the image of the University.

## **2. Space Allocation & Landscape**

- The University's campus has been divided into two areas: the East Side and the West Side of Phaya Thai Road. The new plan includes more links between the two sides while preserving open areas and implementing a plan that will provide maximum benefit for all.
- The campus landscape, though divided into sections, must provide a single, overall impression created by the natural greenery and other materials maintained at the highest quality levels under one system.

## **3. Building Maintenance and Art & Cultural Promotion**

- The University landmarks include the University Auditorium, Maha Chulalongkorn Building, Maha Vajiravudh Building and other important preserved buildings located in green areas of the campus, the Sala Phra Kiew student activities complex and Chulachakrabongse Building, the first buildings of the Faculty of Engineering and the Faculty of Science, which reflect the University's earliest architecture. These buildings create an image for the university that must be carefully maintained.

- The University is committed to preserving and promoting art and culture. Currently, it has buildings used for social, art and cultural activities. Furthermore, it is protecting important landmarks to promote the University's architectural cultural history. As the University constructs more facilities, these facilities must be integrated with current buildings as well as the landscape to create the best of images and impressions.

#### **4. Traffic and Parking**

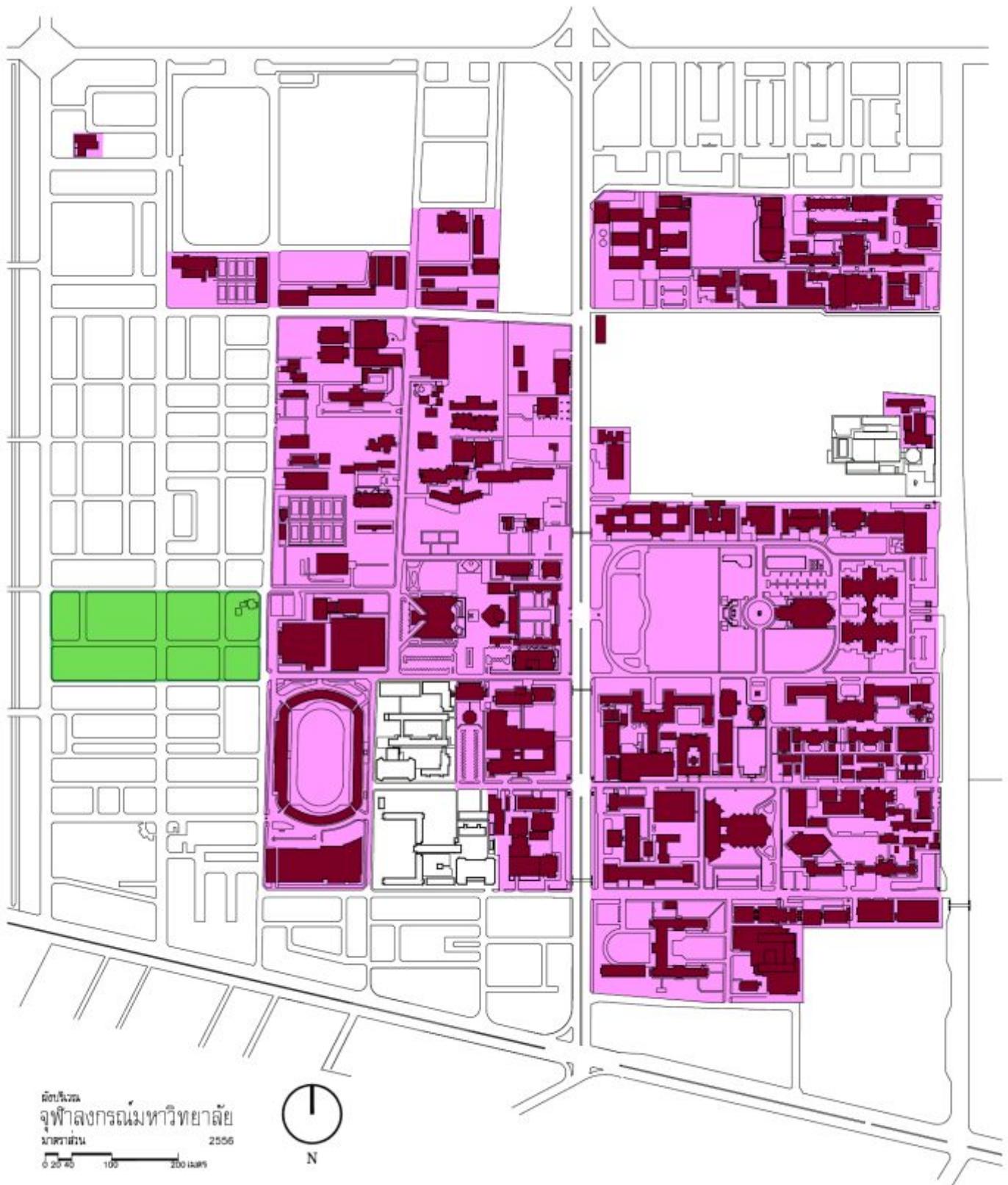
- The University has developed a new traffic system to link both side of the campus in order to achieve a sustainable system. Areas at the corners of the university have been allocated for parking and there are plans to link blocks and adjust roadways.
- Signage is being improved to provide better directions and information.

#### **5. University Central Service Center**

- A plan has been developed to manage human resources and physical property assets at the highest efficiency to support current and future education and related activities.
- To ensure that the University is safe, it is important that the model plan addresses the development of a security center responsible for the safety and security of the grounds, buildings, infrastructure, technical systems, communications and people.

A bicycle lane is provided to promote the use of environmental-friendly mode of transportation.





Chulalongkorn University campus map shows buildings (dark pink) and open area (light pink). The green shaded area shows allocated area for the 100th Anniversary Park which was once an auto-part salvage yard.

# Overview of Chulalongkorn University's Principle 2 Goals

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	
<b>2.1 Institution-wide carbon target</b>			
2.1.1 Carbon emissions		<p>GHG Emissions program was initiated in FY2013-2014. The first phase was to evaluate GHG emissions from transport-related activities on campus.</p> <p>It is anticipated that GHG emissions from other sources will be calculated and reported in the future.</p>	<p>GHG emissions from transportation:</p> <p>3,281.35 KgCO<sub>2</sub>eq/day (984.408 t CO<sub>2</sub>eq/yr))</p>
<b>2.2 Master Planning</b>			
2.2.1 Coverage of campus area (in %) by master planning initiative		The Campus Master Plan specified that in 2016 Chula will have 23-25% campus coverage area	Coverage of campus area: 27.26%
<b>2.3 Transportation</b>			
2.3.1 Frequency of traffic surveys		Traffic survey program was initiated in 2013. Traffic was surveyed in August 2013.	Average number of vehicles that entered campus per day: 23,323
2.3.2 Bicycle and pedestrian access	To reduce automotive traffic between buildings on campus.	<ol style="list-style-type: none"> <li>Development of traffic, bicycle and pedestrian systems within the campus in accordance with the Campus Master Plan</li> <li>Provision of free university shuttle bus service.</li> </ol>	<ol style="list-style-type: none"> <li>A dedicated campus-wide bike lane is completed.</li> <li>Covered walkway is built enabling students and staff to move from one place to another while being protected from the sun and rain.</li> <li>University shuttle bus service consists of electric powered vehicles and gasoline powered vehicles. A total of 5 bus routes provide ease of access between various parts of the campus, as well as connection to the Bangkok mass transit system.</li> </ol>

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	Performance 2013-2014
2.3.3 Estimated commute distance or commute energy use per person			No Data
2.3.4 Urban mobility integration planning			<ul style="list-style-type: none"> <li>1. Provide university shuttle bus service between major Bangkok Mass Transit System and campus center.</li> <li>2. Independently operated shared-van (car pool) system.</li> </ul>
2.3.5 Campus fleet			<p>Number of : Cars 53, Vans 97, Utility trucks 14, Motorcycles 107, Trucks 14, Buses 10</p> <p>All are powered by gasoline or diesel.</p>
<b>2.4 Food</b>			
2.4.1 Food supply chain and environmental impacts (e.g. carbon intensity)			No data
2.4.2 Fair trade food sourcing			No data
<b>2.5 Social inclusion and protection</b>			
2.5.1 Diversity (faculty, staff, and students)  	<ul style="list-style-type: none"> <li>1. To become a world-class national university.</li> <li>2. To stimulate a multi-cultural learning experience.</li> </ul>	<ul style="list-style-type: none"> <li>1. Increase the number of inbound international students and faculty to participate in short-term and long-term academic programs.</li> <li>2. Increase the number of outbound exchange students to partner universities.</li> </ul>	<ul style="list-style-type: none"> <li>1. Number of international students: 589</li> <li>2. Number of international faculty members/researchers: 61</li> <li>3. Various types of scholarships were available for international students, especially students from ASEAN countries.</li> </ul>

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	
			<p>5. Established grants to support international faculty.</p> <p>6. Provided exclusive dormitory for international students.</p> <p>* Please see faculty and student data in Appendix G and H, respectively.</p>
2.5.2 Incidents of discrimination			No data
2.5.3 Access to education (in case of substantial fees)	To extend educational opportunity to exceptional students with limited financial support.	Establishing full and partial scholarship programs for qualified students.	<p>Number of scholarship: 1,564</p> <p>Amount of scholarship: 1,184,840.84 USD (35,5845,225.00 THB)</p>
2.5.4 Open access spaces for interaction	To foster cross-disciplinary interaction	Establishing 8 research clusters which provide platform for faculties and students to collaborate and exchange research ideas on an issue-based basis.	
2.5.5 Access to services and commerce		Supporting facilities are provided to all staff and students, and they including the CU Health Service Center, the CU Sport Complex, dormitories, copy centers, banks, and etc.	  
2.5.6 Participative campus planning integrating users and neighbors		In order to assure that campus planning and the built environment are driven by the needs of users and neighbors, a special committee is appointed by the University to oversee campus planning and architectural design. The committee consists of relevant faculty members and staff. The committee meets once a month to discuss any issues that are related to campus planning and built environmental design.	

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	
2.5.7 Work conditions, including minimum wages, collective bargaining, and health and safety	To provide a safe and healthy work environment.	Establishing the CU Environmental, Health, and Safety Task Force. The first task is to enhance safety practice in chemical laboratories.	
<b>2.6 Land use and biodiversity</b>			
2.6.1 Land and building reuse (brownfield development, adaptive renovations)		<p>To celebrate Chulalongkorn University's centenary, the University has proceeded with a new Master Plan which includes a number development projects.</p> <p>1. 100th Anniversary public park: the park is a brownfield development, built on reclaimed land that used to be an auto salvage yard district. The park is expected to be completed in 2016.</p> <p>2. Chulachakrabongse Plaza: a development project that turned a former 25m swimming pool to a public park.</p> <p>3. The Faculty of Engineering Water Reservoir: Former site for parking lot and a temporary cafeteria was turned into a water reservoir for flood protection and to reduce campus water runoff to public roads.</p>  	
2.6.2 Landscaping impacts and biodiversity			No data

# **Principle 3 – Integration of Facilities, Research, and Education**

**Principle 3: To align the organization's core mission with sustainable development, facilities, research, and education should be link to create a "living laboratory" for sustainability.**

On a sustainable campus, the built environment, operational systems, research, scholarship, and education are linked as a "living laboratory" for sustainability. Users (such as students, faculty, and staff) have access to research, teaching, and learning opportunities on connections between environmental, social, and economic issues.

Campus sustainability programs have concrete goals and can bring together campus residents with external partners, such as industry, government, or organized civil society.

Beyond exploring a sustainable future in general, such program can address issues pertinent to research and higher education (such as environmental impacts of research facilities, participatory teaching, or research that transcends disciplines). Institutional commitments (such as a sustainability policy) and dedicated resources (such as a person or team in the administration focused on this task) contribute to success.

## **Management Approach to Principle 3 Topics**

Chulalongkorn University realizes the importance of environmental education as a critical tool in promoting sustainability on campus. The first approach to principle 3 is the promotion of interdisciplinary education and research through existing and emerging educational programs and research clusters. Promotional schemes have been introduced to boost the number of research publications on sustainable development. Behavioral programs provide support aiming at more sustainable actions by students, staff, or external community members.

On the operational side, the approach to principle 3 is to establish a new operational unit, the Energy and Environment Unit. Working under the Office of Physical Management, the Energy and Environmental Unit is fully dedicated to the campus management of energy and the environment. Full-time staff are allocated to overlook sustainability issues as well as to facilitate various sustainable campus activities.

# 3

Linking Chula and community: A field research project in Nan Province that received funding through Climate Change and Disaster Management Cluster of Chulalongkorn University.



# Overview of Chulalongkorn University's Principle 3 Goals

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	
<b>3.1 Topic Integration</b>			
3.1.1 Programs and projects that connect facilities, research, and education		Office of the Physical Resources Management has initiated many research projects that connect facilities, research, and education on sustainability issues.	<ul style="list-style-type: none"> <li>1. Research project: Energy conservation of buildings on campus.</li> <li>2. Research project: Evaluation of Green Architecture Design for buildings on campus.</li> <li>3. Research project: Chulalongkorn University Traffic Survey and Green House Gas Emission</li> </ul>
3.1.2 Labeling and number of courses that have an integrated perspective on sustainability as a key component	To increase students' awareness of perspective on sustainability.	Providing sustainability-focused programs ranging from a Bachelor's degree to a Doctoral degree. Please see Appendix A for more details.	<p>Number of courses that have an integrated perspective on sustainability as a key component: 596 courses 358 courses were offered during the academic year 2013 Total courses offered: 11,603 courses Appendix B shows a list of selected courses that integrate sustainability as a key component.</p>
3.1.3 Courses and/or research that transcends disciplines		Establishing research clusters that integrate perspectives on sustainability as a major or minor component since 2008.	<p>Chulalongkorn University Research Clusters consisting of the following:</p> <ul style="list-style-type: none"> <li>1. Energy</li> <li>2. Food and Water</li> <li>3. Climate Change and Disaster Management</li> <li>4. Health</li> <li>5. Aging Society</li> <li>6. Advanced Materials</li> <li>7. Social Development and Human Security</li> <li>8. ASEAN Studies</li> </ul>

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	
<b>3.2 Social Integration</b>			
3.2.1 Programs and projects that connect campus users with industry, government, and/or civil society	To connect campus users with industry, the government, and/or civil society.	A number of programs and projects have been developed with our partners, including industry, the government, and/or civil society with the ultimate goal of raising awareness of campus social responsibility.	<p>Examples of projects include:</p> <ol style="list-style-type: none"> <li>1. Environmental Development of Three Communities around Chulalongkorn University Campus: students/staff volunteer to promote environmental-friendly approach for pollution reduction.</li> <li>2. Sustainable Integrated Water Resources Management around the Facilities Land Development of Chulalongkorn University in Kaengkhoi District, Saraburi Province</li> <li>3. Development of Green Society and Green Economy: A Pilot Project of Chulalongkorn University at Amphoe Kaeng Khoi District, Saraburi Province</li> </ol>
3.2.2 Programs to further students interaction and social cohesion on campus			No data
3.2.3 Courses that use participatory and project-based teaching	To stimulate and motivate students in workshops and lectures	0201151 Our Environment 0201251 Pollution Control	
3.2.4 Behavioral programs aiming at more sustainable actions by students, staff, or external community members		Each year, Chulalongkorn University students from various faculties set up many projects that aim specifically to reach out to external communities. For example, students from the Faculty of Architecture set up 'design-built' projects, constructing small buildings for communal purposes. Students from the Faculty of Veterinary Science have set up a free Rabies vaccine clinic, providing a service to communities near and far from Chulalongkorn University. Many groups of student and staff across the campus have set up reforestation projects to bring the forests back to life and health.	

Topic	Goals and Initiatives		Results
	Objectives and Targets	Key Initiatives	
<b>3.3 Research and education projects on laboratory/IT facilities and sustainability</b>			
3.3.1 Research and education on mitigating energy use in laboratories/IT facilities	To benchmark energy consumption of the buildings on campus	Providing support for a master thesis on the Energy Benchmarking of Chulalongkorn University Buildings	Preliminary data were collected from the Office of the Physical Resources Management. Expected date of thesis completion is 2015.
3.3.2 Research and education on mitigating hazardous waste from research/IT facilities		The Vice-President of Research Affairs provides full support to the Enhancing Safety Practice in Research Laboratory (ESPReL) Project. (sponsored by the National Research Council of Thailand)	Pilot survey of safety practice in laboratories (mitigation of hazardous waste included) was conducted in FY 2013-2014.
<b>3.4 Commitments and resources for campus sustainability</b>			
3.4.1 Existence of an organization-wide sustainability policy that integrates academic with operational issues.		1. "Happiness", one of six strategies that Chulalongkorn University currently employs, stating that Chulalongkorn University will be a university of sustainability, with a mission to promote energy conservation, build a livable environment, establish good relationships with and support career advancement of the university personnel.  2. Chulalongkorn University 100th Year Anniversary Master Plan specifies various items that are related to sustainability policy.	
3.4.2 Commitment to external sustainability principles or initiatives (this Charter and others)	To introduce sustainability into education as well as campus operation through partnership with external organization	1. ISCN-GULF Sustainable Campus Charter  2. UI Green Metric World University Ranking  3. Thai Green Building Institute: Thailand Rating of Energy and Environment System (TREES)  4. Sasin Center for Sustainability Management	
3.4.3 Dedicated resources (processes, human and financial resources) for campus sustainability		Setting up the Energy and Environment Unit under the Office of Physical Resources Management of Chulalongkorn University to oversee issues that are related to campus sustainability.	Total research funds dedicated to environmental and sustainability research: 20,624,057.67 USD (618,721,730 THB)

## Appendix A: Academic Programs with Focus on Sustainability and the Environment

Academic Unit	Degree	Program
Graduate School	M.A., Ph.D.	Program in Environment Development and Sustainability <a href="http://www.eds.grad.chula.ac.th">http://www.eds.grad.chula.ac.th</a>
	M.Sc., Ph.D.	Program in Environmental Management <a href="http://www.hsm.chula.ac.th">http://www.hsm.chula.ac.th</a>
	M.Sc.	Program in Energy Technology and Management <a href="http://www.eri.chula.ac.th">http://www.eri.chula.ac.th</a>
	M.Sc., Ph.D.	Program in Environmental Science <a href="http://www.grad.chula.ac.th/program_inter/graduate/envsci.html">http://www.grad.chula.ac.th/program_inter/graduate/envsci.html</a>
Faculty of Architecture	M.Arch, M.Sc., Ph.D.	Program in Architecture (Architecture and Environmental Technology) <a href="http://www.archdept.com">http://www.archdept.com</a> Program in Architecture (Innovative Design and Ecological Architecture) <a href="http://www.specialprogram.arch.chula.ac.th/idea/home.php">http://www.specialprogram.arch.chula.ac.th/idea/home.php</a>
	M.URP., Ph.D.	Program in Urban and Regional Planning <a href="http://www.cuurp.org/">http://www.cuurp.org/</a>
	M.L.A.	Program in Landscape Architecture <a href="http://www.land.arch.chula.ac.th/">http://www.land.arch.chula.ac.th/</a>
Faculty of Science	B.Sc.	Program in Environmental Science <a href="http://www.envisci.sc.chula.ac.th">http://www.envisci.sc.chula.ac.th</a>
Faculty of Engineering	B.Eng., M.Eng., Ph.D.	Program in Environmental Engineering <a href="http://www.env.eng.chula.ac.th">http://www.env.eng.chula.ac.th</a>
	B.Eng., M.Eng., Ph.D.	Program in Water Resources Engineering <a href="http://www.water.eng.chula.ac.th">http://www.water.eng.chula.ac.th</a>
	B.Eng, M.Eng.	Program in Geo-Resources Engineering <a href="http://www.mining.eng.chula.ac.th">http://www.mining.eng.chula.ac.th</a>

## **Appendix B: Example of Courses with Focus on Sustainability**

### **GRADUATE SCHOOL: MASTER OF ARTS PROGRAM IN ENVIRONMENT, DEVELOPMENT AND SUSTAINABILITY**

- 2023601 RESEARCH METHODOLOGY IN ENVIRONMENT, DEVELOPMENT AND SUSTAINABILITY  
2023602 UNDERSTANDING ENVIRONMENT, DEVELOPMENT AND SUSTAINABILITY  
2023603 UNDERSTANDING ENVIRONMENT, DEVELOPMENT AND SUSTAINABILITY  
2440601 DEVELOPMENT THEORY AND PRACTICE  
2009520 ENVIRONMENTAL POLICY, LAWS AND ECONOMICS  
2016511 SOCIAL IMPACT OF DEVELOPMENT  
2016611 LOCAL WISDOM AND SUSTAINABLE DEVELOPMENT  
2016612 URBAN DEVELOPMENT AND PLANNING  
2023501 EARTH'S CLIMATE SYSTEM  
2023502 ENERGY, ENVIRONMENT AND CLIMATE CHANGE  
2023503 RENEWABLE ENERGY RESOURCES AND UTILIZATION  
2023504 ENERGY PLANNING AND MANAGEMENT  
2023506 SELECTED TOPICS IN ENERGY UTILIZATION TECHNOLOGY  
2023507 CLIMATE SCIENCE, IMPACTS, ADAPTATION AND MITIGATION  
2023508 MANAGING BIODIVERSITY IN A CHANGING CLIMATE  
2023509 ADAPTATION POLICY FRAMEWORK - CLIMATE CHANGE IMPACTS AND POLICY  
2023510 VULNERABILITY STUDY FOR SUSTAINABLE DEVELOPMENT PLANNING  
2023511 CLIMATE AND HUMAN SETTLEMENT  
2023512 URBAN CLIMATE  
2023513 STRATEGIC ENVIRONMENTAL ASSESSMENT  
2107607 ENVIRONMENTAL ANALYSIS  
2440602 GLOBALIZATION AND DEVELOPMENT IN THE ASIA AND PACIFIC  
2440608 ENVIRONMENTAL POLITICS AND POLICY  
2503636 RESOURCES AND ENVIRONMENTAL MANAGEMENT  
2503680 ENVIRONMENTAL EVALUATION FOR PLANNING  
2602502 BUSINESS STRATEGY FOR ENVIRONMENTAL MANAGEMENT  
2948605 THEORIES OF ECOLOGICAL ECONOMICS  
2948606 THEORIES OF COLLECTIVE ACTION AND APPLICATION TO ENVIRONMENTAL  
MANAGEMENT

## **FACULTY OF ARCHITECTURE**

- 2502246 SUSTAINABLE DESIGN  
2541634 SUSTAINABLE TECHNOLOGIES FOR ARCHITECTURAL AND URBAN DESIGN  
2503212 ENVIRONMENTAL DESIGN PRINCIPLES II  
2503262 STUDIO IN ENVIRONMENTAL DESIGN II  
2503433 ENVIRONMENTAL PLANNING AND MANAGEMENT  
2503680 ENVIRONMENTAL EVALUATION FOR PLANNING

## **FACULTY OF SCIENCE**

- 2309540 CLIMATE CHANGE  
2107220 ENVIRONMENTS AND DAILY LIFE  
2107482 ENVIRONMENTAL ENGINEERING PROJECT I  
2107607 ENVIRONMENTAL ANALYSIS  
2107622 ENVIRONMENTAL CONTROL PLANNING  
2308319 PRINCIPLES OF ENVIRONMENTAL SCIENCE INSTRUMENTATION  
2308351 ENVIRONMENTAL SCIENCE I  
2308355 ENVIRONMENT AND SUSTAINABLE DEVELOPMENT  
2308410 ENVIRONMENTAL MONITORING AND AUDITING  
2308418 ENVIRONMENTAL REMEDIATION TECHNOLOGY  
2308421 ENVIRONMENTAL MANAGEMENT SYSTEM  
2308428 ENVIRONMENTAL RISK MANAGEMENT  
2308435 ENVIRONMENTAL SCIENCE COMMUNICATION

## **FACULTY OF EDUCATION**

- 2722326 ENVIRONMENTAL EDUCATION  
2722643 ENVIRONMENTAL EDUCATION FOR SOCIAL DEVELOPMENT  
2723254 ENVIRONMENT FOR HEALTH  
2723657 ENVIRONMENTAL HEALTH SCIENCE  
2736336 ENVIRONMENTAL ART  
2736702 ENVIRONMENT AND CULTURE IN ART EDUCATION

## **FACULTY OF LAW**

- 3400725 3400725 ENVIRONMENTAL LAW  
3904303 3904303 ENVIRONMENTAL HEALTH SCIENCE

## **FACULTY OF SPORT SCIENCE**

- 3913302 ENVIRONMENTAL HEALTH SCIENCE

## **Appendix C: Research Center and Initiatives on Sustainability and Environment**

### **Environmental Research Institute (ERIC)**

<http://www.eric.chula.ac.th>

In response to the increasing significance and necessity for environmental research in national development and academic progress at the graduate level, the Environmental Research Institute, Chulalongkorn University was officially established and announced in the Government Gazette on October 5th, 1974. It is a high ranked academic institute committed to and valued for the relationship between humans and the environment. The main duty of the institute is to conduct research on environment-related problems in order to provide information for planning the mitigation and prevention of environmental problems, and encouraging environmental conservation and the development of a better environment and quality of life for Thai society. From its initial tasks and operations, the institute has become aware of the large scale and diverse nature of environmental problems that occur with national development and result in damage to human health and living conditions.

### **Energy Research Institute (ERI)**

<http://www.eri.chula.ac.th>

The Energy Research Institute (ERI) was established as an institute under Chulalongkorn University on April 18<sup>th</sup>, 1991 based on the University policy to emphasize research as an equal to teaching and learning and also to address energy issues after the world energy crises in 1973 and 1979. At first, a committee on energy research was set up to identify and promote research concerned with energy issues. Later, it became the Energy and Training Center in 1982 and, finally, the Energy Research Institute (ERI) in 1991.

Since then, the ERI has conducted activities, including policy research on energy and environment issues, and provided academic services to the public in the field of energy efficiency and conservation as well as alternative energy. These activities have been largely supported by government agencies, international agencies, and the private sector.

In addition, the ERI has been involved in the issues related to Climate Change and CDM Business Opportunities with the objective of assisting Thailand to promote clean energy projects.

With all the main activities mentioned above, the ERI has built up strong networks with key institutions related to energy and the environment, including not only government agencies, the private sector, and universities in Thailand, but also international agencies.

**Climate Change and Disaster Management Cluster (CCDM)**

<http://www.climate.eric.chula.ac.th>

The Climate Change and Disaster Management Cluster is one of ten research clusters that were established in 2011. The mission of the CCDM cluster is to provide a platform for faculty members and researchers throughout the Chulalongkorn University campus to exchange knowledge and ideas on various topics that are related to climate change and disaster management.

**Center of Excellence on Hazardous Substance Management (HSM)**

<http://www.hsm.chula.ac.th>

The Center of Excellence on Hazardous Substance Management (HSM), formerly the Center of Excellence for Environmental and Hazardous Waste Management (EHWM), was officially launched in 1999 under the Higher Education Development Project (HEDP). The Center has operated as a consortium of renowned universities both in Thailand and from overseas under the supervision of the Science and Technology Postgraduate Education and Research Development Office (PERDO) and the Office of the Higher Education Commission (OHEC). Activities of HSM encompass research, human resource development programs and academic consultation. HSM's direction and focus covers pollution prevention, right through to treatment, remediation and public outreach. The Center thrives on building and maintaining a fruitful collaboration with industry, government offices, overseas universities and international organizations. The common goal is to drive multi-disciplinary research in the direction of excellence with the aim of moving the country and the region forward towards sustainable growth in the middle of various challenges.

**"Sustainability @ Chulalongkorn University" Website**

<http://www.green.chula.ac.th>

Chulalongkorn University's website solely dedicates to promoting sustainability on campus. The website contains information about various "green" projects and activities.

**Energy and Environment Unit, Office of the Physical Resources Management**

<http://www.prm.chula.ac.th>

Established in 2014, the Energy and Environmental Unit, an operational unit under the Office of the Physical Resources Management (PRM), is responsible for defining goals and executing on-campus activities that relates to energy conservation, renewable energy, and environmental management.

**Green Chula Award**

<http://www.green.chula.ac.th/GCA.html>

The Green Chula Award is the energy and environmental management Project that was set up in 2014 to promote energy efficiency and environmentally friendly operational practices on campus. All academic and operational units are asked to set up "green team" to oversee green operations and raise the "green" awareness level of their personnel.

## **Chulalongkorn University Green Policy**

Chulalongkorn University initiated its “Green University” policy 2004 in preparation for its centenary celebrations. During the first phase, 2004 – 2009, the goal was to transform the University into a ‘green’ and eco-friendly campus by planting more trees to increase shaded areas, expanding lawns and gardens to improve the drainage system and limit construction areas. In addition, the University started to offer an electric shuttle bus service within the campus to reduce traffic congestion and pollution. We also started a project to compost all leaves and cuttings to produce fertilizer for the grounds.

During Phase Two, 2009 – 2014, we continued to adhere to our Green policy. Firstly, we have been constructing new parking garages at the corners of campuses to reduce traffic within the university. We have also been expanding our electric shuttle bus service to accommodate drivers and passengers as well as the university population living on campus and commuting by the BTS Skytrain, MRT subway and public buses. We also made this service free, and, thereby, more popular among students, staff and faculty members. To encourage walking, the university has erected covered walkways throughout the campus. We have also launched our “Chula Loves the Planet” project that promotes riding bicycles as well as replanting trees and creating new green areas to replace some of the older buildings in order to decrease temperatures and provide pleasant areas for students to relax. The university is also expanding our recycling of a variety of materials, including leaves and grass, paper, plastics and leftover food. We have also implemented a policy to ban the use of Styrofoam packaging for takeaway food. At the same time, Chula is concentrating more on our energy-saving policy by installing new lighting and air conditioning systems as well as promoting an energy-saving campaign among students, staff and faculty.

During Phase Three, 2014-1019, Chula will amend the “Green University” policy to a “Sustainable University”. Under this, we will continue to strengthen the projects and programs we have implemented and we will also conduct research to set new standards for green buildings within the campus and then we shall undertake the necessary renovations and changes to make buildings more energy efficient. We will also conduct research into finding solutions of reducing our carbon footprint and improving water drainage and storage for wastewater recycling.

## Appendix D: Related Activities, Projects, and Programs on Sustainability

Throughout 2014, many activities, projects, and programs related to sustainability were initiated. Below is a partial list of activities, projects, and programs from various units of Chulalongkorn University.

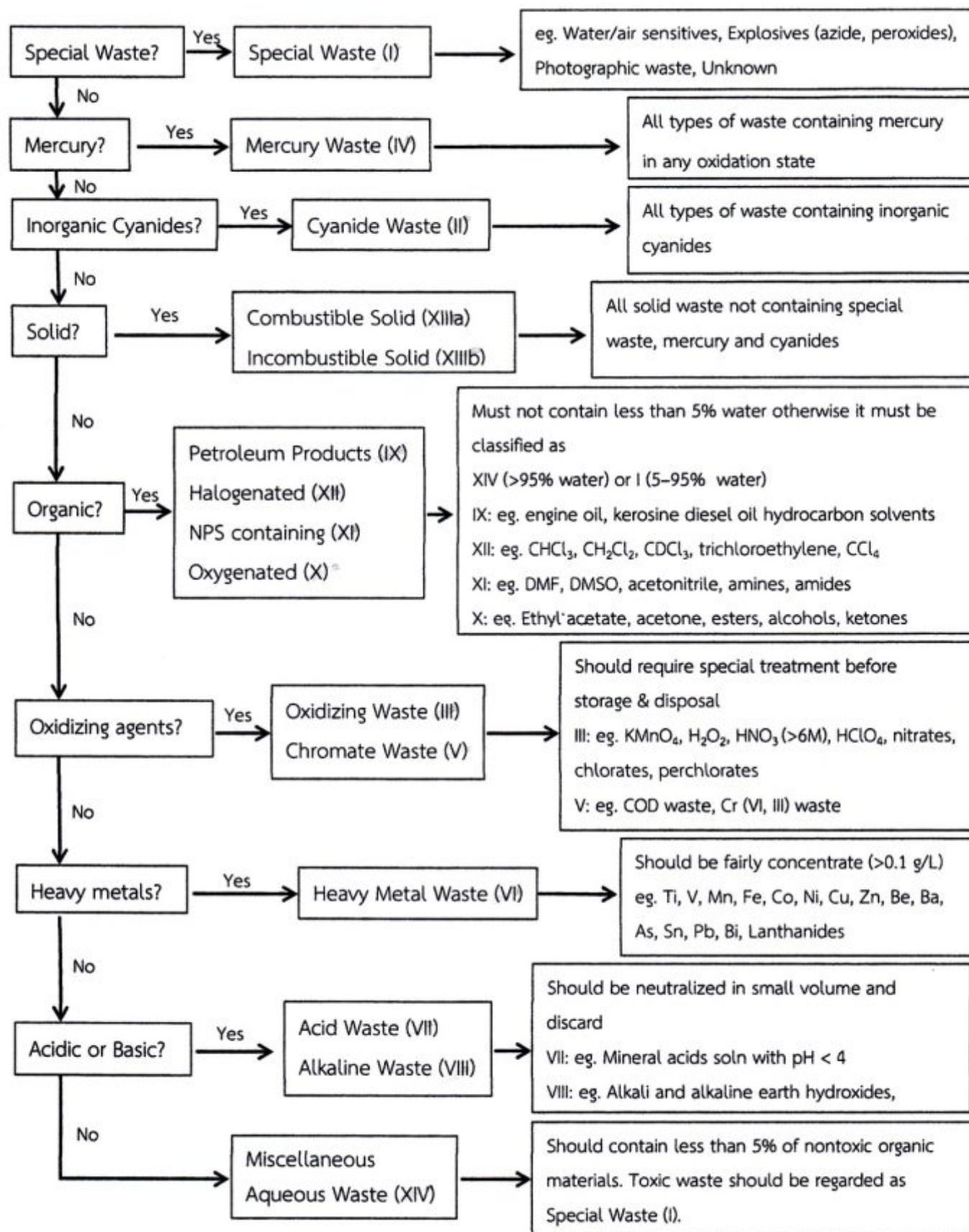
Unit	Activity, Project, & Program
Sasin Graduate Institute of Business Administration of Chulalongkorn University	"How Green Can We Make the Green Economy?: Shaping the Future We Want" July 4, 2014
College of Population Science	"Demographic Differential Vulnerability to Natural Disasters in the Context of Climate Change Adaptation" April 23-25, 2014
Office of International Affairs and Global Network	"VISIONS Asia Resilience Forum" September 12-24, 2014
Chulalongkorn University Social Research Institute	Winter School "Transformative Social Sciences for Sustainability and Social Justice" December 9 – 23, 2013
Office of International Affairs and Global Network	"Waste-to-Energy Education Program through Multilateral Cooperation" November 24-30, 2013
Office of International Affairs and Global Network	International Workshop "Urban Climate Change and Community Resilience" October 24-25, 2013
Office of International Affairs and Global Network	Workshop on "Tackling Environmental Problems and Consumption Society: Development of Environmental Sociology" September 9, 2013
Office of International Affairs and Global Network	Seminar on "Grid Integration and Business Models for Thailand's Solar Power Market Development" November 21, 2013
Center of Excellence on Hazardous Substance Management	"Recycle a Phone and Adopt a Tree" Program, Launched October 5, 2011 <a href="https://www.facebook.com/ChulaLovestheEarth">https://www.facebook.com/ChulaLovestheEarth</a>
Center for Ethics of Science and Technology (CEST), Faculty of Arts, Chulalongkorn University	"The First International Conference of the Asia-Pacific Society for Food and Agricultural Ethics (APSAFE 2013)" November 28, 2013
Faculty of Engineering, Chulalongkorn University.	Seminar "Typhoon Haiyan: Losses and Tears in the Philippines, Who's Next?" November 29, 2013
Office of International Affairs and Global Network	Public Lecture "Gross National Happiness: Vision for a Turbulent World" December 9, 2013

<b>Unit</b>	<b>Activity, Project, &amp; Program</b>
Center of Excellence on Hazardous Substance Management	Enhancement of Safety Practice in Research Laboratory (ESPReL) Project Funding from the National Research Council of Thailand <a href="http://esprel.labsafety.nrct.go.th/home.asp">http://esprel.labsafety.nrct.go.th/home.asp</a>
Metallurgy and Material Science Research Institute	Seminar on "Construction Technology and Innovation: Eco-Friendly Materials"
Social Research Institute	Seminar on Lead-free Paint Policy October 21, 2013
OCARE	Workshop on "Production of Soil Fertilizer from agricultural waste" May 24, 2013
Energy Research Institute	Workshop on "Solar PV Scenarios to 2035, Development Objectives, and Action Plans" March 31, 2014
Most, if not all, units	Afforestation & Reforestation Programs Community Volunteer Programs

## Appendix E: Chemical Consumed by UN Class 2013-2014

UN Class	Solid (kg)	Liquid (litre)	Gases (m <sup>3</sup> )
Class 1: Explosive	-	-	-
Class 2: Gases	1,025.50	60.00	330.70
Class 3: Flammable Liquids	353.18	4,222.04	-
Class 4: Flammable Solids	160.06	0.10	-
Class 5: Oxidizing Substance	231.85	67.59	-
Class 6: Toxic and Infections	183.69	384.86	-
Class 7: Radioactive materia	-	-	-
Class 8: Corrosive Substances	1,803.41	1,088.44	-
Class 9: Miscellaneous Dangerous Substances and Articles	46.76	15.7	7
Others (None Class)	6,105.76	3,535.83	125.58
<b>Total</b>	<b>9,910.21</b>	<b>9,358.86</b>	<b>463.28</b>

# Appendix F: Chulalongkorn University Chemical Waste Management Flow Chart



## Appendix G: International Faculty Members and Researcher Data 2013-2014

Full-Time Faculty Members	Number
Total Number of Full-Time Faculty	2730
Total Number of Thai Full-Time Faculty	2723
Total Number of Non-Thai Full-Time Faculty	7
- French	1
- German	1
- Korean	1
- American	2
- Chinese	1
- Romanian	1
Adjunct Faculty Members	
Total Number of Part-Time Faculty	87
Total Number of Thai Part-Time Faculty	34
Total Number of Non-Thai Part-Time Faculty	53
- American	15
- Australian	4
- Austrian	2
- British	10
- Canadian	4
- Ecuadorian	1
- Filipino	1
- French	2
- German	2
- Irish	2
- Italian	2
- Japanese	3
- Korean	1
- Moroccan	1
- Russian	1
- Spanish	2
Researchers	
Total Number of Researcher	113
Total Number of Thai Researcher	112
Total Number of Non-Thai Researcher	1 (Chinese)

## Appendix H: Student Data 2013-2014

Students	Number
Total Number of Student	38481
Total Number of Thai Student	37892
Total Number of Non-Thai Student	589
- Afghan	3
- American	24
- Australian	2
- Austrian	3
- Bangladeshi	5
- Belizean	1
- Bhutanese	19
- British	5
- Burmese	6
- Cambodian	45
- Canadian	3
- Chinese	79
- Danish	2
- Filipino	17
- French	4
- German	4
- Ghanaian	1
- Icelander	1
- Indian	19
- Indonesian	55
- Iranian	1
- Italian	1
- Japanese	19
- Kenyan	1
- Korean	35
- Laotian	44
- Malaysian	7
- Maldivian	1
- Mexican	1
- Mozambican	2

<b>Students</b>	<b>Number</b>
- Myanmar	52
- Nepalese	4
- Nigerian	3
- Norwegian	1
- Pakistani	5
- Russian	1
- Singaporean	2
- Sri Lankan	1
- Sudanese	5
- Swiss	4
- Taiwanese	12
- Timor-Leste	2
- Tswana	2
- Vietnamese	85





## **Imprint**

Content:

**Assoc. Prof. Boonchai Stitmannaithum, D.Eng.**

Vice President for

Physical Resources Management

With Support from: **Asst. Prof. Vorapat Inkarojrit, Ph.D.**

Faculty of Architecture

**Suthirat Kittipongvises, Ph.D.**

Environmental Research Institute

**Korb Limsuwan**

Energy and Environment Unit,

Office of Physical Resources Management

**Sarin Pinich**

**Warakul Tantanatewin**

**Pongpipat Sriwaralak**

Graduate Student Researchers

Office of the Registrar

Office of Student Affairs

Office of Human Resources Management

Office of Physical Resources Management

Office of Research Affairs

Office of Academic Affairs

Office of International Affairs

Chulalongkorn University Communication Center

Center of Excellence in Hazardous Substance

Management

Layout and Design: **Prajak Pornprasertthavorn**

Photos:

**Pongpipat Sriwaralak**

@ Chulalongkorn University, May 2015

Contact:

**Assoc. Prof. Boonchai Stitmannaithum, D.Eng.**

Vice President for

Physical Resources Management

**Chulalongkorn University**

254 Phayathai Road, Wang Mai, Pathumwan

Bangkok 10330 THAILAND

Email: [boonchai.s@chula.ac.th](mailto:boonchai.s@chula.ac.th)

Tel: (+66)2-218-3341

Chulalongkorn University  
**Sustainability Report**  
2013-2014

**Chulalongkorn University**  
254 Phaya Thai Road, Pathumwan  
Bangkok 10330 THAILAND  
[www.chula.ac.th](http://www.chula.ac.th)  
[www.green.chula.ac.th](http://www.green.chula.ac.th)

