Development of Maejo University to become a green university in a sustainable manner

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1) Development of Maejo University to become a green university in a sustainable manner

1.1 Organizational context

Maejo University is an international leading agricultural education institution. It was established in the year 1934 and is currently 85 years old. The university is located in San Sai District, Chiang Mai, providing Bachelor to Doctorate level of education consisting of 13 faculties and 3 colleges. It has 101 learning courses and classified as a mid-level university with a total of 1,465 academic and support personnel and having an approximately 15,710 students.

1.2 Physical and environmental

Maejo University has a total area of 12,161 rai, located in 3 areas - San Sai District, Chiang Mai Province (Maejo University),

ong Kwang District, Phrae District (Maejo Phrae-Chalermprakiet University) and Lamae District, Chumphon Province (Maejo University Chumphon). Mostly in mountainous area and plateau except at Maejo University - Chumphon which is in a beach area.

1.3 The use of utility resources

Electrical

Maejo University mainly uses electricity from the Provincial Electricity Authority, which has an electrical cost of approximately 60 million baht per year. During the peak electricity usage (on-Peak), the electricity usage is around 3 MW from solar power about 600 kW.

Water supply and wastewater systems

Maejo University produces tap water for their own use with an average consumption of 2,500 cubic meters per day. The wastewater generated (about 1,500 cubic meters) by the university are being treated with their central wastewater treatment system. The treated water is used to grow the lawn on the campus.

Garbage

Maejo University has an average of 3 tons of waste per day. Mostly consist of organic waste (waste scrap), biomass waste (wood waste, leaf), plastic bags/bottles/glass and steel. Organic and biomass waste has highest composition of about 60% of the total waste generation. In order to properly manage the waste, Maejo University has established the waste separation system: organic waste and recyclable waste. The recyclable waste are being sold every month and the organic and biomass waste are used for the creation of organic fertilizer. Toxic waste as well as other general waste are collected separately and delivered to the company for management.

Transportation

Currently, Maejo University does not have internal public transportation. However, there are available bicycles for university students and personnel that can be used to roam around the university. First-year students are prohibited from using motorbikes inside the university to reduce energy and release of air pollution. Students are encouraged to walk since the dormitory are situated 1 kilometer away from school buildings. For the rest

of other students and personnel transporting using motorbike, the university has set a central parking spot.

Relevant to the improvement of Maejo University in various field, it is found out that Maejo University has a high potential to develop into a sustainable green university. However, there is a need to evaluate the previous green university projects. Hence, Maejo University has created a development strategy (2020-2023) as a guideline for green university.

2) Green University Project Assessment, Maejo University

Maejo University has participated in the Green University Project since 2013. In 2018, Maejo University was ranked 215th in the world Green Metric World Ranking and 11th in Thailand with 5,525 points. In Thailand.

Figure 1 Past operations and green university policies Maejo University

Table 1 Green University Ranking Results Maejo University 2018

Category	Point	Maximum Point	Percentage
Setting and Infrastructure (SI)	1,000	1,500	66.67 %
Energy and Climate Change (EC)	950	2,100	45.25%
Waste (WS)	975	1,800	54.17%
Water (WR)	725	1,000	72.50%
Transportation (TR)	825	1,800	45.83%
Education (ED)	1,050	1,800	58.33%

Total Score	5,525	10,000	55.25%

From the overall ranking presented in Table 1, setting and infrastructure and water management has the highest percentage among other categories. However, these categories constitutes only to 10% and 15% proportion in overall ranking. Therefore, Maejo University must focus on the development of other categories such that of energy and climate change and transportation that has high evaluation ratio and impact to teaching systems. These categories received the lowest percentage of 45%. Consequently, in order to improve the overall green university ranking, improvements and adjustments are required to each category to be done as follows:

Table 2 Evaluation of the Performance of the Green University Maejo University, 2018, separated by category

Category		Maximum Point	Point	Percentage (%)
Setting and	Sl.1	300	225	75.0

Infrastructure (SI)	SI.2	200	100	50.0
	SI.3	300	225	75.0
	SI.4	200	100	50.0
	SI.5	300	150	50.0
	SI.6	200	200	100.0
	Total	1,500	1,000	66.7
Energy and Climate Change (EC)	EC.1	200	50	25.0
	EC.2	300	75	25.0
	EC.3	300	225	75.0
	EC.4	300	75	25.0
	EC.5	200	50	25.0
	EC.6	300	300	100.0
	EC.7	200	100	

				50.0
	EC.8	300	75	25.0
	Total	2,100	950	45.2
Waste (WS)	WS.1	300	75	25.0
	WS.2	300	300	100.0
	WS.3	300	150	50.0
	WS.4	300	150	50.0
	WS.5	300	150	50.0
	WS.6	300	150	50.0
	Total	1,800	975	54.2
Water (WR)	WR.1	300	300	100.0
	WR.2	300	225	75.0
	WR.3	200	100	50.0

	WR.4	200	100	50.0
	Total	1,000	725	72.5
Transportation (TR)	TR.1	200	50	25.0
	TR.2	300	150	50.0
	TR.3	200	200	100.0
	TR.4	200	100	50.0
	TR.5	200	0	-
	TR.6	200	100	50.0
	TR.7	200	0	-
	TR.8	300	225	75.0
	Total	1,800	825	45.8
Education (ED)	ED.1	300	150	50.0
	ED.2	300	150	50.0
	ED.3	300	150	

				50.0
	ED.4	300	225	75.0
	ED.5	300	225	75.0
	ED.6	200	100	50.0
	ED.7	100	50	50.0
	Total	1,800	1,050	58.3

Table 3 Assessing the strengths and weaknesses of the green university Maejo University, Year 2651

Indicators	Strengths & Weaknesses
Setting and Infrastructure	Improvements : Planting areas

(SI)	(SI.4) and water absorption areas apart from green water areas to total areas (SI.5) Advantage : Budget for sustainable operations / total budget (SI.7) and open space to all areas (SI.1)
Energy and Climate Change (EC)	Improvement : Energy saving equipment (EC.1), the proportion of total electricity consumption per population (EC.4), The ratio of renewable energy consumption to total exhausted energy consumption (EC.5), carbon footprint ratio per population (EC.6) Advantage : Green building elements (EC.6)
Waste (WS)	Improvements : Reducing paper

	and plastic use (WS.1) Advantage : Waste recovery (WS.2)
Water (WR)	Improvement : Water saving equipment (WR.3), treated water use (WR.4) Advantages : Water conservation (WR.1) and water recycling (WR.2)
Transportation (TR)	Improvements : Vehicle to population ratio (TR.1), transportation to reduce personal cars on campus (TR.5), shuttle services (TR.7) Advantage : Bicycle usage ratio per population (TR.3), Pedestrian or bicycle policy (TR.8)

Education (ED)	Improvements : The proportion of sustainability-related funds to all courses / programs (ED.1), the proportion of sustainability research funds to the total research funds (ED.3) Advantage : Publication of sustainability academic paper (ED.4), student organization concerning sustainability (EC.5)

3) Strategy for sustainable green university development Maejo University

Sustainable Green University Strategy Maejo University

(4 years 2020-2023)

OKR: Received UI Green Metric World Ranking no more than 5 (Thailand) in 2023

From the potential of Maejo University and evaluating the operations of the green university. In order to efficiently drive the University in strengthening the physical environment to be suitable for teaching of students and personnel, Maejo University established a green development strategy framework in accordance with the 6 areas. According to the assessment in 6 areas, the established strategies to achieve OKR in the year 2023 for 6 strategies and 30 projects as follows :

Strategy 1: Physical development

1.1 Create a master plan for land use towards Maejo University for 100 years

1.2 Adequate space for playing sports and recreation for students and faculty

1.3 Develop new rice fields and renovate existing buildings into smart buildings

1.4 Improve the Maejo University school building that has been used for over 15 years into modernized and stable building

1.5 Develop the building and construction design center system for long-term budget procurement

Strategy 2: Developing landscape and environment systems

2.1 Develop green spaces by improving the campus landscape in a landmark and learning center (Maejo Botanic Park)

2.2 Develop waste water management systems for agriculture and landscape

2.3 Develop and improve the Huai Jo River to use water for agriculture and as a student recreation area

2.4 Develop biogas and fuel production system from food scraps, university cafeteria wastes, and full heated kitchen

2.5 Developing Zero Waste Management in the College as a Model for the Community

Strategy 3: Development of public utilities and facilities

3.1 Develop a pilot for the use of underground power transmission systems for prohibited cars

3.2 Develop and improve the water supply system of the University

3.3 Develop smart street lighting system

3.4 Develop and improve personnel dormitory for personnel welfare

3.5 Encourage personnel to build their own residence in the form of a village as Maejo personnel welfare

Strategy 4: Development of traffic and communication systems: Set up zones for prohibiting cars from entering

4.1 Develop the area or building of 3-point centralized parking lot (Bang Khen Gate, Chao Mae Shrine Gate, Vivek Gate)

4.2 Develop the electric traffic system within the Maejo University and promote the use of bicycles and electric motorcycles to reduce pollution

4.3 Develop pedestrian pathways, bicycle paths, and develop bicycle use systems on the campus (Zero Car)

4.4 Develop and improve road systems and traffic within the university

4.5 Improve the efficiency of telephone and wifi access systems for communication in the area

Strategy 5: Development of alternative energy use and increase energy efficiency

5.1 Develop and supplement the departments of the university to use renewable energy

5.2 Develop a prototype of a zero energy building

5.3 Develop and support equipment to reduce energy consumption and create energy conservation awareness

5.4 Develop biodiesel production systems for agricultural vehicles

5.5 Develop systems for measuring and reducing energy use in air conditioning systems

Strategy 6: Sustainable curriculum development

6.1 Add a new teaching and learning style, focusing on learning throughout the age.

6.2. Develop the module curriculum and short course on sustainability

6.3 Improve the library to be a Leaning Space for student learning

6.4 Merging courses with similar sciences

6.5 Developing distance learning curriculum