VRU
SUSTAINABILITY REPORT
2019




Valaya Alongkorn Rajabhat University under the Royal Patronage ,Thailand

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Preface

In 2019, Valaya Alongkorn Rajabhat University under the Royal Patronage, committed to sustainable management of environmental problems that are important in today's world. Environmental problems that are a direct result of human actions due to basic needs. This will encourage humans to develop scientific advancements in using natural resources more conveniently and easily. Also, it will help in developing industrial production processes that do not contaminate the environment via waste products, water or air.

Conservation of natural resources and the environment will be performed at the individual, organizational, and national levels. The key is to economically utilize reuse, restoration, substitution, surveillance and prevention practices. This will also include encouraging local people to participate in environmental preservation and maintain the original condition to prevent deterioration. Promoting research for methods to develop technology used to manage natural resources and the environment to maximize benefits both short-term and long-term, including preserving the quality of the environment utilizing sustainable management.

The importance of quality environmental management within the campus is realized by the university. Therefore, pursuing sustainable management through the use of worthwhile natural resources, creating saving measures, reducing the use of plastic bags, and single-use waste as well as publicizing environmental knowledge and information of waste separation, awareness of littering utilizing media in the form of infographics. This will help efficiently control and prevent environmental problems that occur with maximum effectiveness.

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1. Setting & Infrastructure

1.1 Type of higher education institution

Comprehensive

1.2 Climate

Tropical Wet

1.3 Campus site

Valaya Alongkorn Rajabhat University under the Royal patronage, there are 2 campuses with learning and teaching management. The two campuses are the main campus, located in Pathum Thani province and the Sa Kaeo campus.

Main campus at Pathum Thani province

Sa Kaeo Campus

1.4 Campus setting

The main campus at Pathum Thani province is located in a suburban area with surrounded by industrial areas and rural areas. Valaya Alongkorn Rajabhat University under the Royal Patronage is in the area between Pathum Thani Province and Phra Nakhon Si Ayutthaya Province, with a total area of 6.10 km² and a total population of 11,426 people, which means the population density of 1,873 people per km²

1.5 Green Space

- Total Area on Campus Covered in Forest Vegetation is 14,147 m^2
- Total Planted Vegetation area = 92,564.91 m^2

1.6 Population in University

Students of 10,380 people

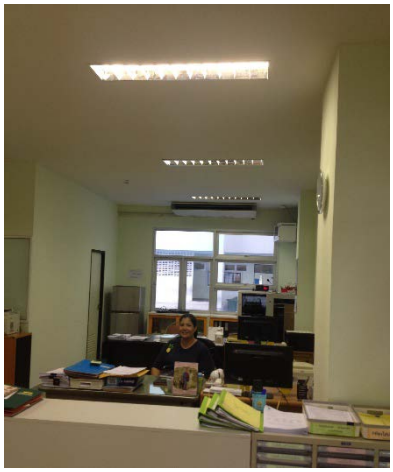
Staffs of 1,046 people

The university has a total population of 11,426 people, which means a total regular students (part time and full time) of 10,380 people , a total academic and administrative staff of 1,046 people.

2. Energy & Climate Change

2.1 Energy Efficient Appliances Usage

In 2017-2018, 226 air conditioners had been replaced with high efficiency models to reduce the electric power consumption in accordance with the energy conservation policy and uses electric appliances with energy-saving labels (Energy Saving Label 5). In addition, replacement of fluorescent lamps was conducted, which is a 7,420 energy-saving LED bulbs.



Energy Conservation Measures

6 procedures of VRU Energy Conservation

1. Appoint a working group responsible for energy
2. Assess initial energy management
3. Create energy management policies
4. Assess the energy conservation potential
5. Define energy conservation measures
6. Perform and monitor Energy management

including publicizing the value of energy saving

Awakening of energy saving with labeling and switch off when out of use. Switch on when needed including setting the temperature of the air conditioner to 26 ° C

2.2 Smart Building Implementation

VRU Hospitality Training Center	Science Learning Building
 	 
Social Complex Building	**ARIT Center of Knowledge**
	

Smart building elements

1. There is a building that uses natural air circulation (Natural Ventilation).

2. There is a building that uses sunlight for lighting inside the building

3. There is water conservation, such as using sanitary ware and water-saving taps, as well as rainwater.

4. Environmental protection, such as waste management, odor and smoke disposal systems, and wastewater treatment plant.

5. There is quality control being utilized in the indoor environment, such as filter film or open air campaign at 26° C etc.

Smart Building Area

Name	Smart Building Area
VRU Hospitality Training Center	10,921.14
Science Learning Building	13,410.96
Social Complex Building	6,913.50
ARIT Center of Knowledge	1,056.16
Total	32,310.76

$$= \frac{\text{Total smart building area}}{\text{Total Building Area}} \times 100\%$$

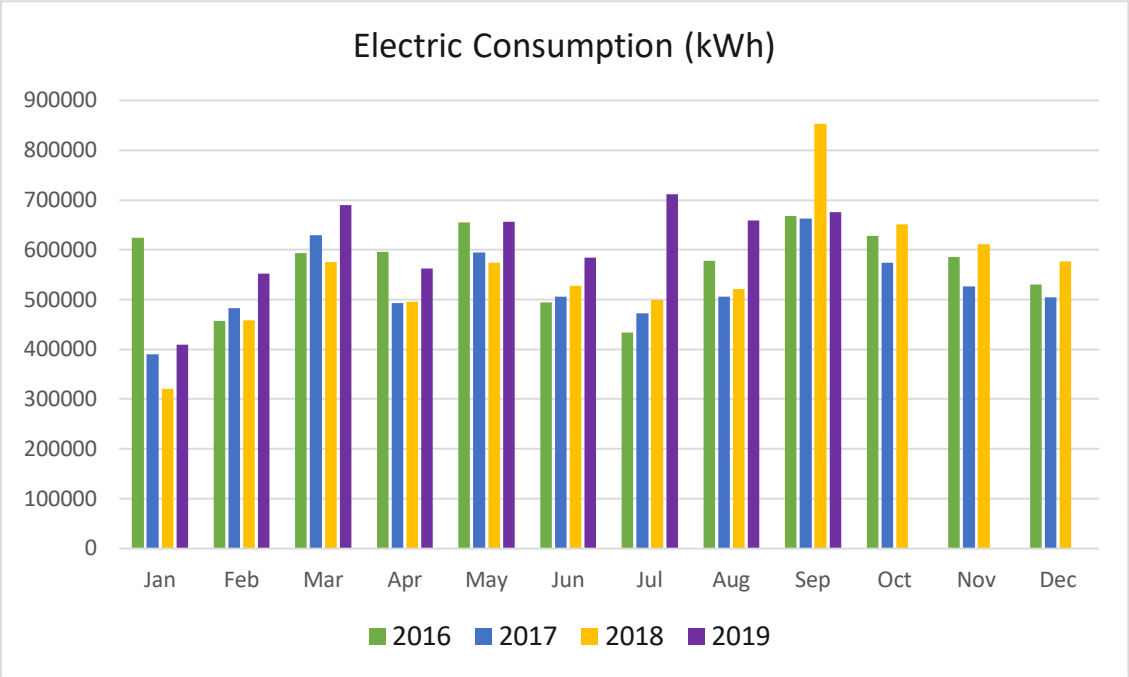
$$= \frac{32{,}310.76}{150{,}699.9} \times 100\%$$

Smart Building implementation = $21.44\ m^2$

2.3 Renewable Energy Sources in Campus

There are renewable energy resources in Campus which includes solar panels mounted on the rooftop of the library building ,Solar houses and 40 solar cell street lights on campus. It provide capacity produced of 10,200 kilowatt hour.

2.4 Electricity usage per year



In 2018, Electricity consumption (kWh) of Valaya Alongkorn Rajabhat University under the Royal Patronage,Pathumthani,Thailand about 6,665,036 kWh. The total electricity usage divided by total campus population of 583.32 kWh per person.

The ratio of renewable energy production divided by total energy usage per year of 0.15%

2.5 Carbon footprint

The Total Carbon Footprint (CO_2 emission in the last 12 months, in metric tons)

CO_2 (electricity)

$$= \frac{\text{electricity usage per year (kWh)}}{1000} \times 0.84$$

$$= \frac{6{,}665{,}036 \text{ kWh}}{1000} \times 0.84$$

= 5,598.63 metric tons

CO_2 (car)

$$= \frac{\text{Number of Car entering x 2 x t distance inside campus x 240}}{100} \times 0.02$$

$$= \frac{570 \text{ x } 2 \text{ x } 4.6\text{km x } 240}{100} \times 0.02$$

= 251.712 metric tons

CO_2 (bus)

$$= \frac{\text{Number of shuttle bus x total trip each day x distance inside campus x 240}}{100} \times 0.02$$

$$= \frac{2 \text{ x } 15 \text{ x } 2.17 \text{ x } 240}{100} \times 0.02$$

= 3.125 metric tons

CO_2 (motorcycle)

$$= \frac{\text{Number of motorcycle entering x 2 x t distance inside campus x 240}}{100} \times 0.01$$

$$= \frac{319 \text{ x } 2 \text{ x } 4.6\text{km x } 240}{100} \times 0.01$$

= 70.435 metric tons

CO_2 (total)

= 5,598.63 + 251.712 + 3.125 + 70.435

= 5,923.902

Description : Carbon footprint in 2019 = 5,923.902 metric tons

Total Carbon Footprint (CO_2 emission in the last 12 months, in metric tons)

3. Waste

3.1 Recycling Program for University Waste

The university plans to recycle waste that is generated on campus with activities according to the project as follows ;

1. Separation of preliminary recyclable waste before selling to some parts. The rest are fabricated (DIY).

2. Waste separation campaign to help reduce the amount of single use plastic.

3. Waste processing activities, such as making bags from milk boxes, chairs from plastic water bottles, etc.

4. Invention of weaving from water hyacinth

	Collecting water hyacinth, which is used in treating waste water
	The selection of water hyacinths on the stem
 	Clean and desiccate

4. Invention of weaving from water hyacinth (Continue)

<table>
<tr><td>  </td><td>Exposing to the sun for 36hours or until it is dry</td></tr>
<tr><td>  </td><td>Bring to weave and knit into boxes, bags and baskets</td></tr>
<tr><td colspan="2">  
Water hyacinth products</td></tr>
</table>

3.2 Program to Reduce the Use of Paper and Plastic on Campus

The university considers to reduce the occurrence of waste occurring within the university utilizing activities according to the project as follows;

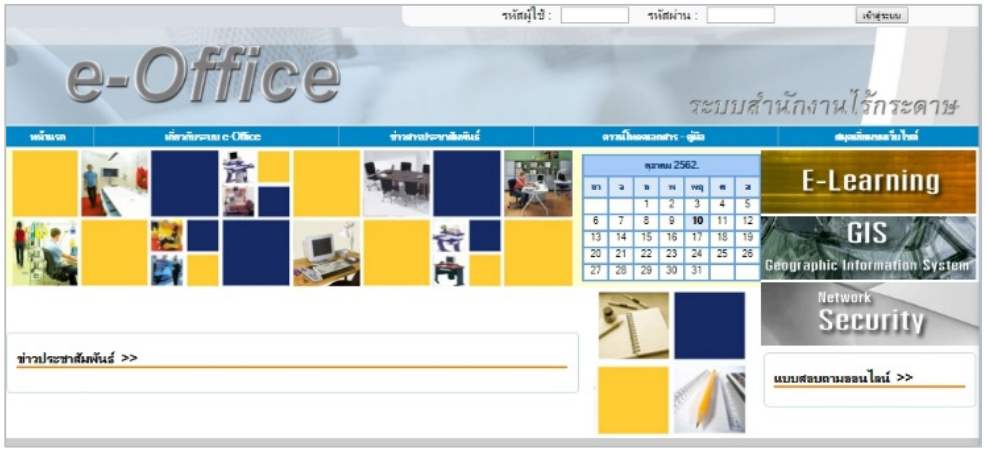
1. A campaign to use cloth bags instead of plastic bags

2. A policy of that will discontinue the use of foam boxes for food and refraining from distributing plastic bags from stores throughout the university.

3. Green meeting promoting by considering the use of resources are friendly environment.

- Invitations and public relations meetings
- Preparation of meeting documents with QR code scanning
- Giving water bottles to attendees by using a container to drink water throughout the meeting instead of using a glass of plastic water
- Use biodegradable and friendly environment natural materials for food such as banana leaves, paper.

4. Use public relations channels for internal departments via online systems or e-office to reduce the use of paper in the office.



3.3 Organic Waste Treatment

- Food scraps, vegetable / fruit scraps: Prepare food waste container in the cafeteria to separate for sale as animal feed, and the use of bins for organic waste.
- Remnants of leaves and branches: gathering to make fertilizer

3.4 Inorganic Waste Treatment

There are inorganic waste collection operations for inorganic waste treatment as followings;

- Gather car batteries and sell them, especially battery companies.
- Computers and copiers expired will be sold back to the purchased company.
- Printer cartridge Collected can be resold

3.5 Toxic Waste Treatment

There is a hazardous waste collection and every 3 months must be disposed of with an authorized company. The dangerous waste in the university is the lamp, battery, spray can and spray bottle.

3.6 Sewage Disposal

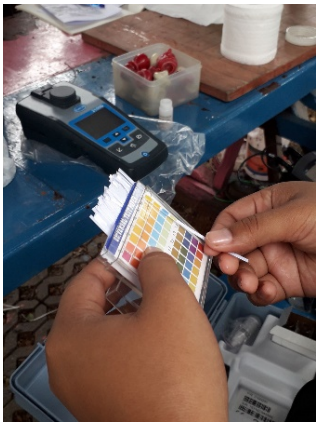
There is a wastewater treatment system in the building and canteen before being discharged into the public drain. With methods of fat degradation and aeration, increasing the efficiency of enzyme microbes for helping to break down fats.

4. Water

4.1 Water Conservation Program Implementation

The university has a policy, activities, and projects to reduce water using for saving water and conserving water. The activities and projects carried out are as follows:

1. Water pipe system leak inspection system
2. Monitoring and analysis of water quality in surface water sources
3. Water saving campaign


4.2 Water Recycling Program Implementation

The treated water is reused, such as watering plants, pumping in the treated pond and cleaning the road surface.

4.3 Water Efficient Appliances Usage

With the use of hand washing faucets, water-saving sensor systems. Because the water will flow only when it is used (1 time can be used for 30 seconds).

5. Transportation

5.1 Number of Vehicle In The University

Number of cars owned by your university	Number of cars entering the university daily	Number of motorcycles entering the university daily
34	570	319

5.2 Shuttle Services

The university has activities and projects for arranging transportation within the university for 2 vehicles. These are free service to avoid using private vehicles of staff, instructors and students. Average number of passengers of each shuttle are 1,750 person per day

5.3 Zero Emission Vehicles (ZEV) Policy on Campus

Due to the buildings within the university are not very far apart from each other. Therefore, cycling and walking are promoted within the university. It is also an exercise.

5.4 Ratio of Parking Area to Total Campus Area

Total Parking area : 12,502.49m^2

Ratio parking area : .....2.05.....%

5.5 Transportation Initiatives to Decrease Private Vehicles on Campus

1. Shuttle/bus campus inside campus

2 .Walking

3. Public transportation station

4. Electric vehicle charging station

5. The use of public vehicles in the office

- Link : http://vehicle.vru.ac.th/

5.6 Pedestrian Path Policy on Campus

1. Pedestrian is developed that can walk along the building.

2. Separator between road for vehicle and pedestrian path.

3. Street lamp for pedestrian in night use solar energy by focusing on safety and orderliness.

6. Education

6.1 Number of Courses/Subjects Related to Sustainability Offered

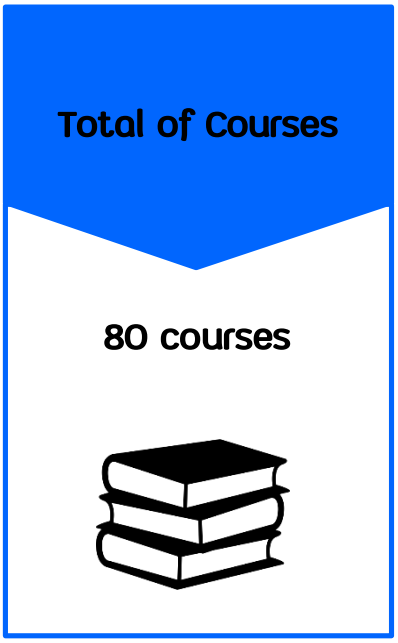
Total number of courses Related to Sustainability offered in 2019 of 4 courses and 65 subjects.

Course Title	Subjects
1.Bachelor of Science (Environmental science)	- Basic Science in Environment - Environmental technology - Environment and sustainable development - Monitoring of environmental quality - Sustainable development of environment and ecology - Land resources and environment - Energy conservation and management - Environmental models - Environmental risk assessment - Control of solid waste and hazardous waste - water pollution - Air pollution - Green technology - Environmental management system and international standards - Environmental management according to the King's science - Environmental economy - Environmental policy and laws - Environmental impact assessment - Environmental Ethics - Sampling and environmental pollution analysis - Environmental pollution and control - soil pollution - water pollution - Noise pollution - Environmental toxicology
2.Bachelor of Science (Environmental Health)	- Solid Waste and Excreta Management - Wastewater Treatment Technology - Environmental Health Toxicology - Water Supply - Environmental Sampling and Analysis - Principle of Air Pollution Control - Hazardous Waste Management - Seminar in Environmental Health - Disaster Preparedness and Response - EnvironmentaL Health Management - Food Sanitation and Food Safety - Environment and Health Impact Assessment

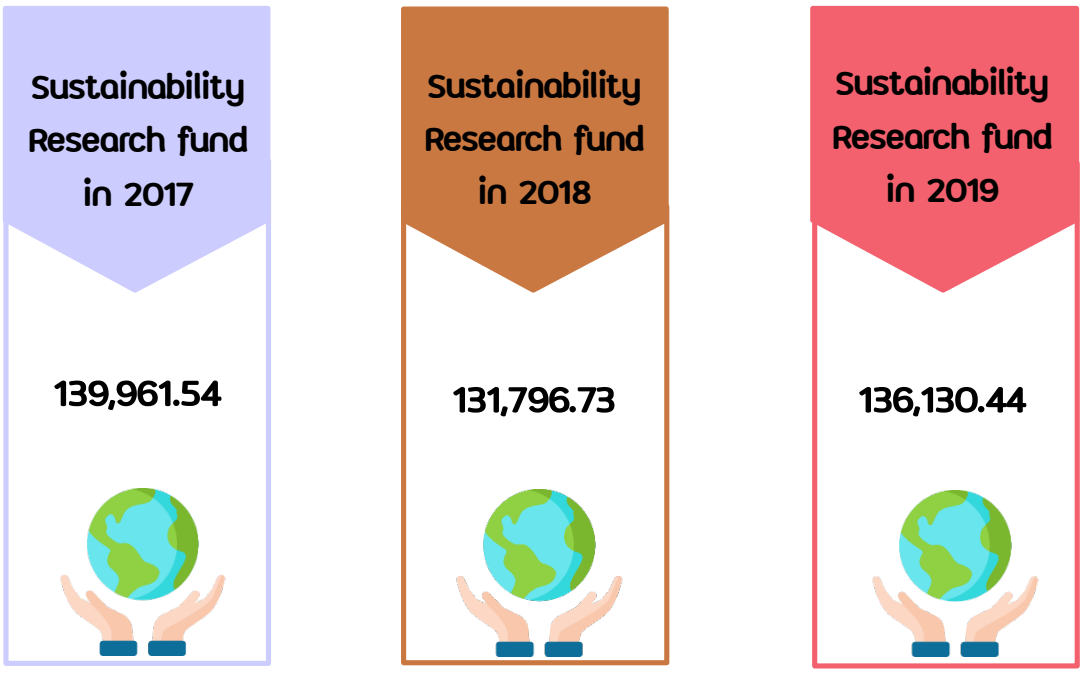
6.1 Number of Courses/Subjects Related to Sustainability Offered (Continue)

Course Title	Subjects
3.Master of Science Program in Environmental Education	- Environmental Ecology - Environmental Disaster and Management - Seminar on Environmental Problems - Study of Environmental Impact - Remote Sensing of Environment - Environmental Law for Graduate Students - Holistic Environmental Management - Administration for Environmental Education Workshop - Environmental Photography Techniques - Concepts and Theories in the Royal Initative for Environment - Policy and Plan on Environmental - Environmental Economics
4.Doctor of Philosophy Program in Environmental Education	- Environmental Ethics and Practice - Environmental Education - Research Methodology in Environmental Education - Community Environmental Studies - Environmental Pollution and management - The Philosophy of Environmental Education - Environmental Learning and Learning Management - Advanced Statistics for Environmental Education - Measurement and Evaluation in Environmental Education - Environmental Education and Sustainability - Administration for Environmental Education - Seminar on Environmental Problems - Holistic Environmental Management - Community Environmental Curriculum Development - Leadership in Environmental Education - Qualitative Research for Environmental Education

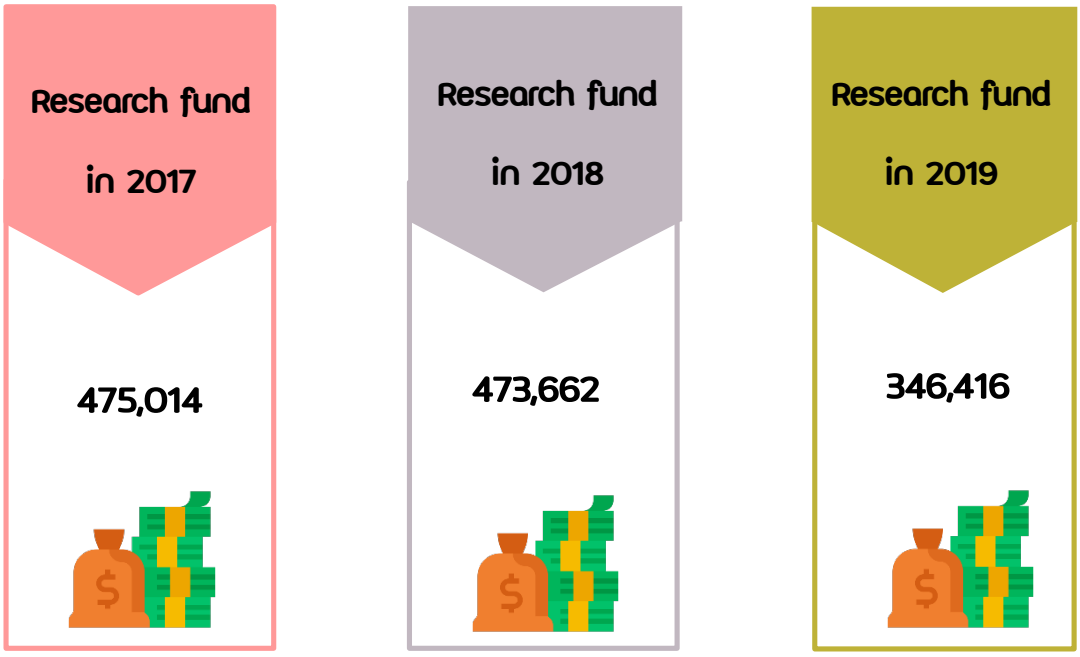
6.2 Total Number of Courses/Subjects Offered



6.3 Total Research Funds Dedicated to Sustainability Research (in US Dollars)



6.4 Total Research Funds (in US Dollars)



6.5 Events Related to Sustainability

1. Meeting to Sun Thailand (Sustainable University Network of Thailand)

2. Events related to environment and sustainability organized by student organization

3. DIY By water hyacinth

4. Am Green Heart

There are exchange activities to learn about energy conservation and environmental conservation such as green office training.

5. GO GREEN@ARIT :VRU

There are activities of energy and environment conservation training for the personnel of the Bureau.

6. DIY by ARIT

There are artifacts from full waste materials.

- Piggy bank from plastic bottles
- Savings from vinyl core
- Chair from plastic bottles
- Flowers from coffee tubes
- Bags from milk boxes
- Bags from coffee sachet

Valaya Alongkorn Rajabhat University under the Royal Patronage

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