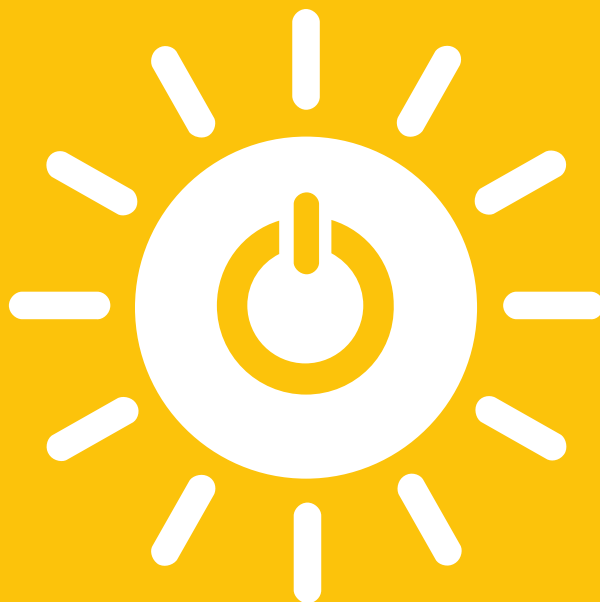
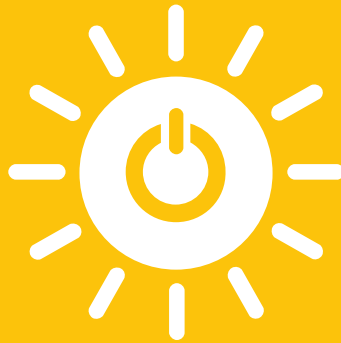




7 AFFORDABLE AND CLEAN ENERGY



7.2 University measures towards affordable and clean energy

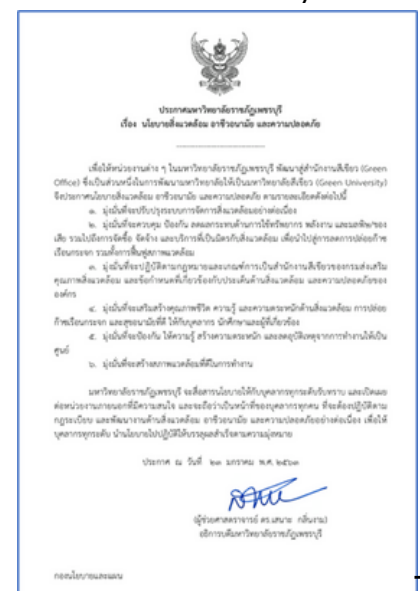


7.2.1 Energy-efficient renovation and building

Phetchaburi Rajabhat University has implemented environmental, occupational health, and safety policies to move toward becoming a “Green University” and to encourage internal departments to develop into “Green Offices.” The university places great importance on the efficient use of energy and resources, the reduction of greenhouse gas emissions, and the promotion of clean and renewable energy to support sustainable development at both the institutional and community levels.

In the fiscal year 2025 (B.E. 2568), Phetchaburi Rajabhat University carried out renovation projects for the Phet Nam Nueng Building and the Demonstration School Building of the university. The renovation was designed with energy efficiency principles and included plans to install a solar cell system to serve as an alternative energy source within the buildings. This initiative helps reduce reliance on external electricity sources, lower energy costs, and enhance the efficiency of the university’s energy management system toward greater sustainability.

In addition, Phetchaburi Rajabhat University organized a seminar titled “Transforming Higher Education Institutions and Rajabhat Strategies for Local Development: Toward the Implementation Plan for Fiscal Year 2025.” The seminar brought together executives, office heads, program chairs, and relevant departments to set the direction of the university’s operations in alignment with institutional policies, strategic plans, and overall development goals. This included a strong emphasis on energy and environmental conservation, which forms a key component of the university’s integrated and sustainable management framework.





7.2.2 Upgrade buildings to higher energy efficiency

Phetchaburi Rajabhat University has developed an Operational Efficiency Enhancement Plan for 2024 and implemented building renovation projects to improve energy efficiency. The initiative focuses on systematic electricity management and reducing energy loss across university buildings, including lighting systems, air conditioning, and office equipment.

In the fiscal year 2024, the university installed a solar cell system on the roof of the Phet Nam Nueng Building to generate clean energy as an alternative to external electricity sources. This installation helps reduce energy costs and greenhouse gas emissions while increasing the university's self-sufficiency in renewable energy production.

In addition, the university upgraded its lighting system by replacing traditional fluorescent bulbs with energy-saving LED lighting, and encouraged all departments to use electrical appliances with energy efficiency labeling. These initiatives aim to enhance energy efficiency across all campus facilities as part of the university's ongoing commitment to energy conservation.

The implementation is an integral part of Phetchaburi Rajabhat University's Operational Efficiency Enhancement Plan for Fiscal Year 2024, emphasizing energy conservation and supporting the goal of becoming a Green University.

7.2.3 Carbon reduction and emission reduction process

Phetchaburi Rajabhat University operates under a systematic energy and environmental management framework, aiming to reduce carbon dioxide (CO₂) and greenhouse gas (GHG) emissions in all organizational processes. These actions are guided by the concept of a "Low Carbon and Green Campus", promoting a balance between development and environmental sustainability.

The university has implemented an Energy Management System (EMS) to continuously monitor, analyze, and report on campus energy usage. It also promotes the use of energy efficient technologies, such as replacing all lighting with LED systems in buildings and public spaces, and upgrading air conditioning and cooling systems to more energy efficient models.

To reduce carbon emissions from transportation, the university supports low carbon transport systems, including the use of electric shuttle vehicles (EV Shuttles) for short-distance travel and the installation of EV charging stations to facilitate the transition to clean energy vehicles.

Furthermore, Phetchaburi Rajabhat University places strong emphasis on waste management and green space expansion to help absorb carbon and reduce greenhouse gas emissions. Key initiatives include the Tree for Carbon Offset Project, which involves reforestation and tree-planting activities, and the Zero Waste Campus Project, which promotes waste segregation and recycling. Both initiatives play a significant role in reducing the university's carbon footprint.



In terms of participation and awareness, the university regularly conducts training sessions and awareness campaigns for staff and students to encourage responsible energy use and behavioral change.

Phetchaburi Rajabhat University has set a long-term goal to increase the proportion of renewable energy usage continuously, aiming to achieve 100% renewable energy consumption by 2037. This commitment reinforces the university's role as a leading higher education institution in sustainable and environmentally friendly energy management.



7.2.4 Plan to reduce energy consumption

Phetchaburi Rajabhat University has developed the Operational Efficiency Enhancement Plan 2024 (Fiscal Year 2024: B.E. 2567) as a strategic framework for effective management of energy and resources within the university. The plan aims to reduce the consumption of electricity, water, and fuel by at least 5% compared to the previous fiscal year, thereby supporting long term energy conservation and environmental sustainability initiatives.

The plan comprises the following key measures:

1. Electricity-Saving Measures

Efficient management of electricity usage across all departments, including:

- Adjusting air-conditioning temperatures to between 25 – 26 °C.
- Turning off electrical systems during lunch breaks and after office hours.
- Replacing electrical equipment with energy saving devices to optimize power efficiency.



2. Fuel-Reduction Measures

Promoting the use of Electric Vehicles (EVs) on campus and encouraging staff and students to participate in carpooling programs to reduce carbon emissions from daily commuting.

3. Reduction in Office Equipment Usage

Implementing the Electronic Document System (E-Document System) to replace paper-based processes, reduce material consumption, and improve operational efficiency.

4. Fuel and Official Travel Efficiency Measures

Planning travel routes in advance and maintaining vehicles in good condition to minimize fuel waste and ensure efficient energy use in official operations.

5. Communication Cost Reduction Measures

Encouraging the use of digital communication platforms such as email and video conferencing applications instead of telephones or postal services to reduce operational costs and resource consumption.

6. Water Conservation Measures

Conducting regular inspections and maintenance of water systems, installing water saving devices, and promoting water conservation awareness across all departments.

As a result of implementing these measures, the cost per production unit of Phetchaburi Rajabhat University in Fiscal Year 2024 showed a downward trend compared to Fiscal Year 2023, reflecting the effectiveness of the university's energy conservation strategies and the collective efforts of its personnel at all levels. This demonstrates the university's strong commitment to becoming a model institution for efficient and sustainable energy management.





7.2.5 Energy wastage identification

Phetchaburi Rajabhat University places strong emphasis on efficient energy management and the reduction of energy wastage across all operations. The university implements the Significant Energy Use (SEU) Assessment Criteria, in accordance with the Ministerial Regulation published in the Royal Gazette, to evaluate its performance and capacity for systematic energy efficiency improvement.

The university collects and analyzes energy consumption data from all departments, covering information such as electricity usage, operating hours of major equipment, and energy system efficiency measurements. This analysis identifies energy loss points and prioritizes areas for improvement, ensuring that energy use aligns with equipment functionality, operational requirements, and national energy efficiency standards.

Based on the evaluation results, the university has formulated and implemented Energy Conservation Measures and Energy Efficiency Improvement Plans, with continuous monitoring and assessment to ensure achievement of the goals set under its Green University Policy.

In addition, Phetchaburi Rajabhat University has installed a Supervisory Control and Data Acquisition (SCADA) System for real-time monitoring and control of energy use in key campus buildings and facilities. This system enables the detection of abnormal electricity consumption patterns, facilitates energy trend analysis, and allows for timely adjustment of energy control measures.

Regarding clean energy quality assurance, the university underwent an evaluation of its Solar Rooftop Power Generation Project, with a total installed capacity of 478.80 kilowatts across six buildings. The assessment was conducted by Active Consultant Co., Ltd. under the Thailand Voluntary Emission Reduction (T-VER) Program, confirming the effectiveness of the university's renewable energy system in reducing dependency on the Provincial Electricity Authority (PEA) grid and achieving tangible reductions in carbon dioxide emissions.

These initiatives demonstrate Phetchaburi Rajabhat University's strong commitment to developing an Integrated Energy Management System (IEMS) capable of effectively identifying and minimizing energy loss, while steering the institution toward the long-term goals of clean energy utilization and low-carbon operations.





7.2.6 Divestment policy

Phetchaburi Rajabhat University manages its financial and physical resources based on the principles of good governance, transparency, and environmental responsibility, with a strong commitment to sustainable development. The university does not hold shares, engage in joint ventures, or provide financial support to businesses related to fossil fuels, including coal, oil, and natural gas, or to any enterprises that may cause negative environmental impacts. Instead, the university prioritizes environmentally friendly and sustainable approaches in all its operations, expenditures, and procurement activities.

Under this commitment, Phetchaburi Rajabhat University has established an Energy Management Policy aligned with the principles of the Divestment Policy, as follows:

1. Prohibition of Investment in Fossil Fuel Industries

The university does not invest in businesses or funds related to fossil fuel energy. It encourages the allocation of budgets toward clean energy and environmental sustainability projects instead.

2. Promotion of Clean Energy Investment

Phetchaburi Rajabhat University has invested in solar rooftop systems across six buildings, with a total installed capacity of 478.80 kilowatts, and established EV charging stations on campus to promote renewable energy use and reduce dependence on external power sources.

3. Implementation of the Thailand Voluntary Emission Reduction (T-VER) Program

Program

The university participates in the T-VER scheme as an economic mechanism to demonstrate measurable reductions in carbon emissions and effective environmental investment.

4. Support for Green Finance and ESG-Oriented Investment

The university prioritizes budget allocation for green and sustainable projects, including energy efficient building construction, waste management system development, and the promotion of renewable energy usage, ensuring that all university operations align with the principles of Environmental Governance.

Through these measures, Phetchaburi Rajabhat University demonstrates its commitment to responsible investment and sustainable energy management under the vision of becoming a Green University, serving as a role model for advancing society toward a sustainable future.

7.3 Energy use density

7.3.1 Energy usage per sqm.

In Fiscal Year 2024 (B.E. 2567), Phetchaburi Rajabhat University had a total usable area of 228,395.09 square meters, with an overall electricity consumption of 22,400 gigajoules per year (GJ/year) equivalent to an average of 1,866 GJ per month and a total electricity expenditure of 28,177,406.84 baht.

This level of energy consumption reflects the university's effective energy management practices under its energy conservation policy, in line with the university's Green University development approach. Efforts are continuously made to reduce the energy use density per square meter through the installation of renewable energy systems, energy-efficient building renovations, and awareness campaigns promoting responsible energy use across all departments.

7.4 Energy and the community

7.4.1 Local community outreach for energy efficiency

In Fiscal Year 2024, Phetchaburi Rajabhat University continuously implemented community engagement and academic service projects aimed at transferring knowledge on renewable energy and energy efficiency to local communities. These initiatives were designed to promote public understanding of clean energy technologies and innovations, improve quality of life, and foster sustainable energy development at the community level.

Key activities conducted in 2024 included:

1. Workshop on "Renewable Energy Applications for Agriculture and Household Energy Cost Reduction"

Organized by the Faculty of Engineering and Industrial Technology at Bang Khem Subdistrict, Khao Yoi District, Phetchaburi Province, this project educated community members on the use of solar and biomass energy in agriculture, such as small-scale solar panel installation and biofuel production from household waste materials. The initiative aimed to reduce household energy costs and strengthen local energy security.



2. Community Forum on Renewable Energy Technology for Snake-Skin Gourami Production and Processing

Conducted under the Local Development Strategic Project in collaboration with the Bang Khem Snake-Skin Gourami Farmers and Processors Community Enterprise, the forum explored renewable energy applications such as solar and biomass energy to enhance production efficiency, reduce energy costs, and increase product value in the fish processing sector.



3. Training Program on “Adaptive Ethical Agriculture Skills”

Organized by the Faculty of Information Technology under the Lifelong Learning and Future Skills (Upskill/Reskill) initiative, this program focused on smart agriculture and the use of sensor-based control systems powered by solar energy for water management and production control. The program promoted energy efficiency and sustainability in agricultural practices.



4. Capacity Development for Village Environmental Volunteers (TASOM) in Prachuap Khiri Khan Province

Conducted by the Institute of Research and Promotion of Arts and Culture, this program trained community environmental volunteers in waste separation, carbon calculation, and data collection for certification under the Low Emission Support Scheme (LESS). Implemented in cooperation with Prachuap Khiri Khan Municipality and the Provincial Office of Natural Resources and Environment, the project strengthened community capacity in sustainable waste management and greenhouse gas reduction.





5. Community Service Project for Women's Career Development in Khao Yoi Municipality

Organized by the Department of Energy Engineering, Faculty of Engineering and Industrial Technology, this project provided vocational workshops for women in Khao Yoi Municipality, covering topics such as banana sheath and water hyacinth product making, material drying, and the use of natural substitutes. The initiative aimed to add value to local waste materials, promote sustainable livelihood opportunities for women, and encourage eco-friendly occupational practices consistent with the principles of sustainable resource utilization.



7.4.2 100% renewable energy pledge

Phetchaburi Rajabhat University has made a firm commitment to achieving 100% renewable energy use across its operations in pursuit of sustainability, greenhouse gas reduction, and energy conservation under the Sustainable Development Framework.

The university has formulated clear policies and operational strategies for clean energy management aligned with its goals of becoming both a Green University and a Green Office. These policies emphasize the reduction of dependence on fossil fuels and the continuous increase in the proportion of renewable energy used in all aspects of university operations.

Phetchaburi Rajabhat University has engaged in discussions with the Thailand Greenhouse Gas Management Organization (Public Organization) to develop operational frameworks under the Thailand Voluntary Emission Reduction Program (T-VER). The objectives of this collaboration include improving energy efficiency, reducing electricity costs, and minimizing the university's greenhouse gas emissions.

Under this framework, the university implemented a Solar Rooftop Power Generation Project across six campus buildings, with a total installed capacity of 478.80 kilowatts (kW). This renewable energy system provides an alternative source of clean electricity, reducing reliance on the Provincial Electricity Authority (PEA) grid while decreasing long-term carbon dioxide emissions and operational energy costs. The project has been certified under the Thailand Voluntary Emission Reduction (T-VER) standard, confirming its contribution to verified emission reduction.

In addition to solar energy utilization, the university actively promotes other forms of clean energy through the following initiatives:

1. Installation of Electric Vehicle (EV) Charging Stations within the university campus to support the transition toward clean energy transportation.
2. Research and Development of Renewable Energy Innovations, such as solar-powered water pumps for agricultural use and clean energy drying systems, which serve as both practical learning resources for students and transferable technologies for local communities.



Phetchaburi Rajabhat University has set a long-term goal to continuously increase the share of renewable energy in its total energy mix, with the target of achieving 100% renewable energy use by 2037. This commitment underscores the university's determination to serve as a leading example among higher education institutions in sustainable and environmentally responsible energy management.



7.4.3 Energy efficiency services for industry

Phetchaburi Rajabhat University provides academic services and technical consultancy to local industries and entrepreneurs to promote energy efficiency and reduce environmental impacts. These services include solar cell installation training, energy-saving drying technology transfer, industrial energy audits, and consulting for greenhouse gas reduction projects (T-VER). Such initiatives help enhance energy performance, reduce production costs, and support the development of clean and sustainable industries.

1. Faculty of Engineering and Industrial Technology represented the university at Farm Expo 2025, where it showcased the innovation "Coco Move: Coconut Inflorescence Water Conveyance System." The system was designed and developed to improve the efficiency of collecting and transporting coconut inflorescence sap from production sites. It significantly reduces both energy consumption and labor requirements in the production process, thereby lowering operational costs for agricultural entrepreneurs. This innovation exemplifies the university's role in developing and transferring technology to enhance energy efficiency in the production sector, aligning with the goals of modern agriculture and clean industry development.





2. The Department of Mechanical Engineering, Faculty of Engineering and Industrial Technology, participated in the 39th Conference of the Mechanical Engineering Network of Thailand (ME-NETT 39) under the theme “Mechanical Engineering Innovation in the AI Era.” The university was honored to serve as Co-Chairman of the conference, reflecting its academic excellence and leadership in promoting engineering innovations related to energy efficiency in industrial applications.

The conference provided an important platform for knowledge exchange among researchers, academics, students, and industrial practitioners to advance clean energy innovations and sustainable engineering technologies.



7.4.4 Policy development for clean energy technology

Phetchaburi Rajabhat University is committed to promoting the development of clean energy technologies and sustainable energy use as part of its institutional policy on becoming a Green University. This commitment is embedded within the university's Clean Energy Management Policy, which aims to increase the use of renewable energy sources and reduce dependence on fossil fuels across all campus operations.

Under this policy, the Department of Energy Engineering, Faculty of Engineering and Industrial Technology, in collaboration with the Vocational Training and Skill Testing Center, organized a practical workshop on “Solar Rooftop Installation.” The workshop was designed to enhance participants' knowledge and skills in clean energy technologies, particularly in solar photovoltaic systems, including principles of operation, system design, and installation in accordance with industrial standards.

The project was conducted in cooperation with private sector partners, who shared their real-world experience and technical expertise in renewable energy. This collaboration enabled participants including students, university personnel, and community members to apply the acquired knowledge and skills in their daily lives and professional practices sustainably.

The initiative represents a key component of Phetchaburi Rajabhat University's Clean Energy Technology Development Policy, driving forward the Clean Energy Transition through capacity building and practical implementation at both institutional and community levels.



7.4.5 Assistance to low-carbon innovation

Phetchaburi Rajabhat University promotes the development of low-carbon social innovations through collaborative projects with local agencies and communities. These initiatives aim to enhance environmental management, reduce greenhouse gas emissions, and drive the transition toward a green economy at the local level.

1. Establishment of a Community Environmental Management and Low-Carbon Learning Center, Yakao Subdistrict, Prachuap Khiri Khan Province

The Institute of Research and Cultural Promotion, in collaboration with the Village Natural and Environmental Conservation Volunteer Network (NECVN) and relevant government agencies, developed a waste management center into a model low-carbon community learning center. The center serves as a hub for disseminating knowledge on waste segregation, greenhouse gas reduction, and the implementation of the Low Emission Support Scheme (LESS) in local communities.



2. Development of Ban Khong Tabang Community Learning Center, Phetchaburi Province, into a Comprehensive Carbon Credit Learning Hub

In partnership with the Faculty of Humanities and Social Sciences, the university transferred knowledge related to Community Forest Carbon Credit development to strengthen the capacity of community leaders and local trainers in sustainable natural resource management. The project also supports income generation through forest conservation and aims to establish the center as a national model for community-based carbon credit learning.



Both initiatives reflect the pivotal role of Phetchaburi Rajabhat University as a hub for environmental innovation and low-carbon community development. They contribute to advancing the transition toward a Low-Carbon Society through education, technology transfer, and local empowerment.



7.5 Low-carbon energy use

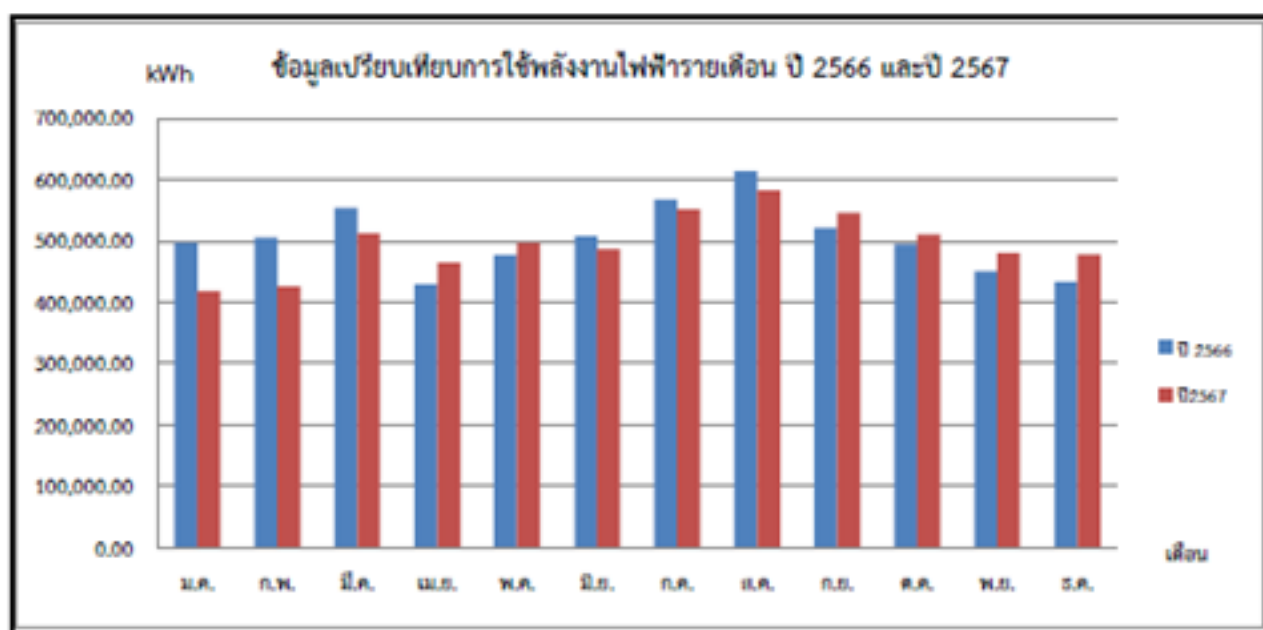
7.5.1 Total energy used

Phetchaburi Rajabhat University continuously monitors and records its internal energy consumption to assess energy efficiency and reduce greenhouse gas emissions in alignment with the Sustainable Development Goals (SDGs).

In fiscal year 2024 (B.E. 2567), the university recorded a total electricity consumption of 6,617,857.21 kilowatt-hours (kWh), equivalent to 23,824 gigajoules (GJ). In addition, the university promotes the use of low-carbon energy sources through the Solar Rooftop Power Generation Project, which currently operates across six buildings with a total installed capacity of 322,280 kilowatt-hours (kWh), or approximately 1,154 GJ per year. This initiative contributes to reducing dependence on fossil fuels and lowering long-term carbon dioxide emissions.

These efforts demonstrate Phetchaburi Rajabhat University's continued commitment to decreasing overall energy consumption while increasing the proportion of renewable energy use. The university's ongoing initiatives support its transformation into a "Green University" and advance the transition toward a sustainable low-carbon society.

กราฟแสดงการเปรียบเทียบข้อมูลการใช้พลังงาน



รูปที่ 6-5 กราฟแสดงข้อมูลเปรียบเทียบการใช้พลังงานไฟฟ้ารายเดือน ปี 2566 และปี 2567