

Title: "Empowering Climate Action and Partnerships for Sustainability: Clean Energy Solutions for Community Fisheries at Ban Laem Homestay"

Walailak University, led by Asst. Prof. Dr. Kamon Thinsurat and a team from the School of Engineering and Technology, in collaboration with the Academic Service Center, initiated a clean energy project for the Ban Laem Homestay community in Nakhon Si Thammarat. This project aimed to solve environmental and economic challenges by using renewable energy to power an aquatic animal shelter, which would cut energy consumption and boost the economic stability of this fishing community.

Fishing is the primary livelihood for Ban Laem, but economic instability often arises from the high mortality rate of marine animals before they can be sold. This mismatch between fishing times and market demand reduces income. The community sought assistance from Walailak University to develop a system that would lower animal mortality and manage the aquaculture more efficiently. However, they were also concerned about the increasing energy costs from operating such systems, which relied on the Provincial Electricity Authority's grid. The solution required lowering energy costs, environmental impact, and ensuring energy security.

The project's objectives included designing an aquatic animal shelter powered by solar energy and battery storage, reducing greenhouse gas emissions, and educating the community on clean energy use and how to deal with the effects from climate change. To meet these goals, the university worked with community leaders to understand their specific needs, designing a solar-powered shelter with energy storage for continuous operation. Training sessions were provided to increase awareness of energy efficiency and climate change.

The project was integrated with university courses such as Energy Conservation and Renewable Energy, providing students with hands-on experience installing solar panels and storage systems. Students gained practical skills in working with communities, developing teamwork, and contributing to real-world solutions. The aquatic animal shelter typically consumes 100 watts of power over a 24-hour period. A sensor system was introduced to monitor the oxygen needs of marine animals, only activating the oxygen pump when required. This optimization allowed the system to run entirely on renewable energy from a 550W solar

panel, reducing carbon emissions by approximately 418 kgCO₂eq annually. The reduced mortality rates of marine animals enabled the community to sell higher-quality products, boosting their income and economic resilience.

Beyond powering the aquatic shelter, the project reduced the community's reliance on grid electricity and decreased overall energy costs as Walailak University supported all the cost that occur in this project for free. It also significantly enhanced Ban Laem community's energy security. Walailak University plans to extend this clean energy solution to other parts of the community, including fish processing and tourism services. The university also aims to replicate the model in other fishing communities across Thailand to further reduce greenhouse gas emissions and promote the use of renewable energy on a broader scale.

This project aligns with several Sustainable Development Goals (SDGs), particularly SDG 7: Affordable and Clean Energy, by promoting solar energy use, reducing dependence on fossil fuels, and improving energy security. SDG 13: Climate Action is addressed by reducing greenhouse gas emissions and managing marine life to minimize losses before sale. Additionally, the project promotes awareness of energy management and climate change at the community level through training and education, enhancing the community's energy management capacity and encouraging the sustainable use of clean energy. SDG 17: Partnerships for the Goals is also emphasized through the collaboration between the university, the community, government agencies, and the private sector.

Furthermore, the project supports the Thailand Greenhouse Gas Management Organization's LESS program by promoting community involvement in reducing emissions. The clean energy model established in Ban Laem aligns with Thailand's environmental goals and serves as a positive example for other communities facing similar challenges related to climate change adaptation.