ASEAN IVO New Projects 2025

Project leader indicated in **bold**

1 Smart Energy-Sharing and Management Devices for a Low Carbon Society

Topic: ICT for a Secure and Smart Community

Members: NECTEC (THA), NUOL (LAO), UCSY (MMR), CADT (KHM), NICT (JPN)

Many areas across the ASEAN region still rely on isolated off-grid systems that lack connectivity and the ability to share energy. This often leads to a mismatch in energy availability—some systems experience significant energy waste, while others suffer from insufficient power supply.

This project introduces Energy-Sharing Devices (ESDs) and an Energy Management Box (EMB), leveraging IoT technologies to enable energy transfer between isolated offgrid systems. These innovations help optimize the use of available resources and enhance energy reliability in remote communities.

By fostering collaboration among ASEAN countries—particularly Thailand, Cambodia, Myanmar, and Laos—and Japan, the project promotes regional knowledge sharing and supports the widespread adoption of smart, cost-effective, and sustainable off-grid energy solutions.

2 SLOPE-AI (Smart Landslide Observation and Prediction Enhanced with AI) for Reliable and Economical IoT-Based Landslide Monitoring

Topic: ICT for Environment Protection and Disaster Prevention

Members: UKM (MYS), MAPUA (PHL), USK (IDN), NUOL (LAO), Consultface (MYS), Geoventure Solutions (MYS), PWD (MYS)

Landslides are among the most destructive natural hazards, causing loss of life, property damage, and environmental degradation, especially in tropical ASEAN regions where heavy rainfall and seismic activity are frequent triggers. Effective monitoring and early warning systems are essential for reducing risks. However, traditional geotechnical tools such as inclinometers and piezometers, although accurate, are expensive and require complex installations, making them impractical for widespread use in high-risk areas.

To address these limitations, this project proposes SLOPE AI, or Smart Landslide Observation and Prediction Enhanced with AI, an IoT-based landslide monitoring and early warning system. It incorporates low-cost IoT sensors including tilt, moisture,

rainfall, and seismic vibration sensors, which will be calibrated against conventional instruments using machine learning to ensure accuracy. Sensor placement will be based on geotechnical assessments conducted in the early phase of the project. The system uses AI to analyse historical and real-time data to predict landslide events and generate timely alerts. Communication between sensors and microcontrollers will rely on a low-energy peer-to-peer network, and alerts will be transmitted in real time through mobile networks to enable rapid response.

3 ICT-Driven Water Quality Monitoring Systems: Enhancing Precision and Sustainability under the Climate Change

Topic: ICT for a Secure and Smart Community

Members: USM (MYS), NICT (JPN), TDTU (VNM), CADT (KHM)

Climate change exacerbates river water quality degradation through increased temperatures, altered rainfall patterns, and extreme weather events, leading to higher pollutant loads and reduced water availability. This necessitates more energy-intensive water treatment processes, significantly increasing the carbon footprint of public water supply systems. Hence, effective water quality monitoring systems are indispensable for safeguarding public health, supporting sustainable water management, and protecting aquatic ecosystems. This project is focused on the calibration process to correct systematic errors in IoT water quality sensors, embedding the machine learning technique to learn and adjust the measurements to non-linear patterns. Using the machine learning calibrated sensors, proper monitoring and control of water quality can be employed to gain insights into the water quality of the Mekong River and assess its impact on the sustainability of the river under climate change.

4 Cloud-Based Hazard Analysis and Critical Control Points (HACCP) Management System for Improving Food Safety implementation and Compliance among Local Food Manufacturers

Topic: ICT for Food

Member: UPM (MYS), UB (IDN), KIT (JPN)

Food safety systems are essential for protecting public health by ensuring food products are free from hazards. The Hazard Analysis and Critical Control Points (HACCP) system is a globally recognized for managing food safety risks, but local ASEAN food manufacturers often face challenges with its implementation due to limited know-how, resources, inadequate infrastructure, and lack of digital tools. The extensive documentation, hazard analysis, monitoring, as well as verification are particularly overwhelming for small manufacturers, leading to non-compliance and increased risks of foodborne illnesses. As ASEAN food products have the enormous potential to access global markets, non-compliance to HACCP restricts growth and

national income. To address these issues, a cloud-based and intelligent HACCP Management System is proposed to simplify implementation for local manufacturers by providing analysis assistance, real-time monitoring, streamlined documentation, and user-friendly dashboards. This digital solution will enhance food safety compliance, facilitates global market access and strengthens supply chain resilience. It also aligns ASEAN food industries with international standards, reinforcing regional food safety governance and public health.

5 IoT Road Health Monitoring Platform for Secure Urban Mobility in Smart Communities

Topic: ICT for a Secure and Smart Community

Members: SUM (MYS), ITB (IDN), UCSY (MMR)

Urban road maintenance in many ASEAN countries remains a critical challenge, requiring solutions that go beyond patchworks fixes. Existing practices, which rely on periodic inspections and user reports, are reactive, inefficient, and insufficient to meet the demands of rapid urbanization and increasing traffic loads. Authorities often face difficulties in budget planning and resource allocation due to a lack of timely and accurate road condition data. This problem is compounded by the strain on infrastructure, leaving large sections of urban roads under-monitored and poorly maintained.

This project aims to develop an innovative IoT-based road health monitoring platform that will transform how urban road infrastructure is maintained in ASEAN countries. The platform is designed to measure the International Roughness Index (IRI) using accelerometer, camera and GPS data, classify road defects, and prioritize maintenance activities with precision.