



Technology Development and Deployment with SATREPS

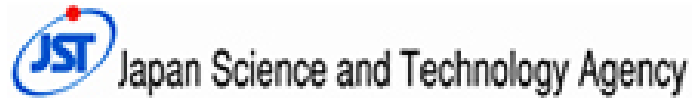


March 8, 2023

 **Xenesys**

with materials from the Institute of Ocean
Energy Saga University, University Teknologi
Malaysia, and Kumejima Town

Science and Technology Research Partnership for Sustainable Development (SATREPS)



SATREPS is a Japanese government program that promotes international joint research. Based on the needs of developing countries, the program aims to address global issues and lead to research outcomes of practical benefit to both local and global society.

Research Fields

- Environment and Energy
- Bioresources
- Disaster Prevention and Mitigation
- Infectious Diseases Control

<https://www.jst.go.jp/global/english/about.html>

Development of Advanced Hybrid Ocean Thermal Energy Conversion (OTEC) Technology for Low Carbon Society and Sustainable Energy System: First Experimental OTEC Plant of Malaysia

Research Institutions in Japan	Saga University / The University of Tokyo / AIST
Research Institutions in Malaysia	University of Technology, Malaysia(UTM) / University Putra Malaysia(UPM) / University of Malaya / University Kebangsaan Malaysia / University Malaysia Terengganu



On March 1, 2023 The Institute of Ocean Energy Saga University (IOES) won the Prime Minister's Commendation for Special Achievements in Promoting Japan as a Maritime Nation

Develop an OTEC Malaysia Model with an innovative hybrid ocean thermal energy conversion system at its core

Project Start: 2019

https://www.jst.go.jp/global/english/kadai/h3003_malaysia.html

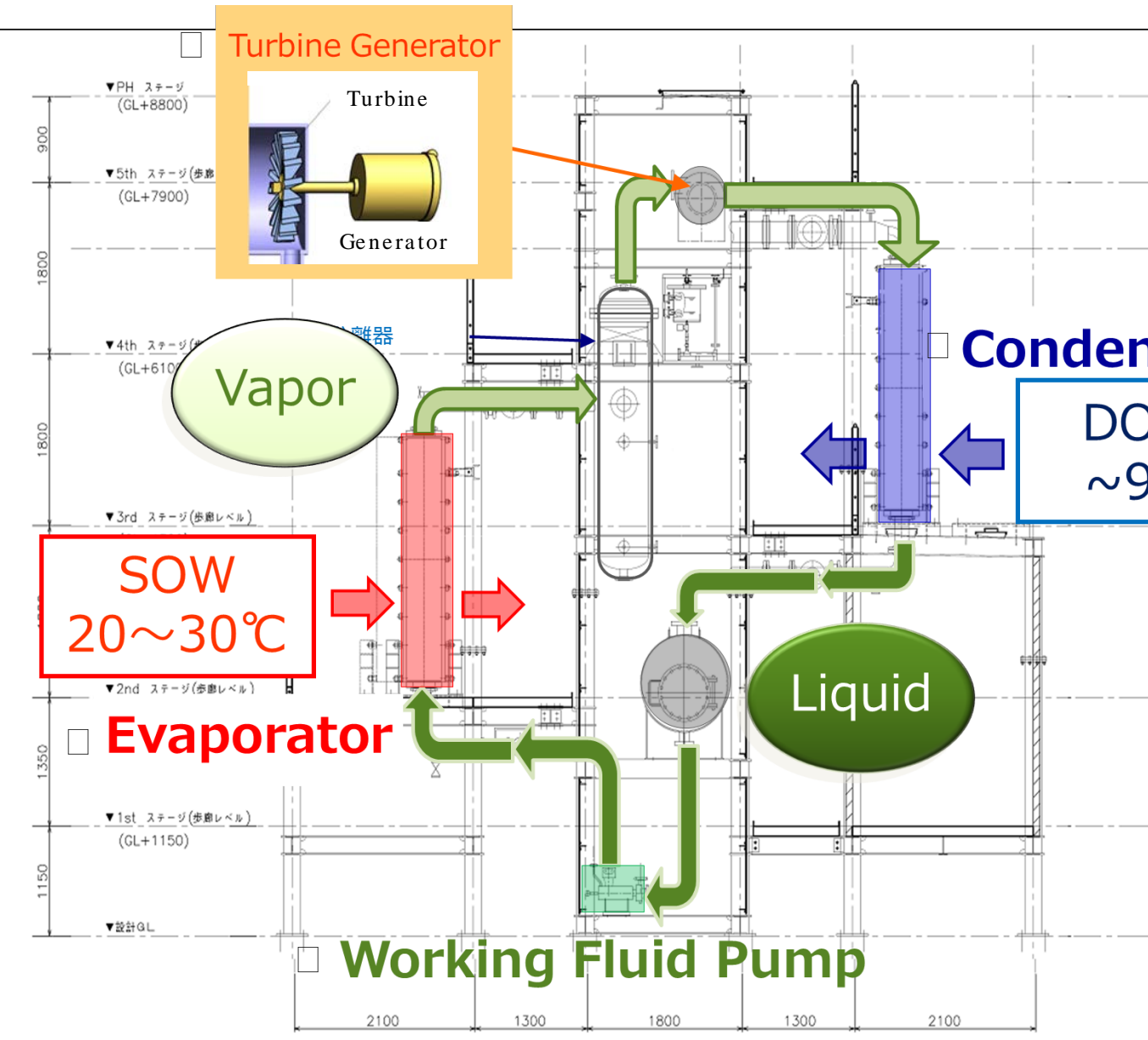
Hybrid OTEC SATREPS – Ten Projects

1. UTM-UPM OTEC CENTRE - OCEAN ENERGY R&D FACILITY
2. HYBRID OTEC PLANT – OPERATIONAL EXPENDITURE AND EXPERIMENTAL ACTIVITIES ON THE TEST RIG
3. HYBRID OTEC - NOVEL, ENHANCED THERMAL CONDUCTIVITY HEAT EXCHANGER, LIFE-CYCLE-ANALYSIS (LCA) EVALUATION FOR H-OTEC AND MALAYSIA MODEL (TECHNICAL)
4. H-OTEC ENVIRONMENT - SURFACE / DEEP SEA WATER ANALYSIS, ENVIRONMENTAL DNA (eDNA), OCEANOGRAPHY
5. H-OTEC SYSTEM - 3kW TURBINE FOR ORC SYSTEM
6. H-OTEC - SPIN-OFF - GROWTH OF VARIOUS NEW FLORAS THAT USE COLD DEEP SEAWATER
7. UTILIZATION OF H-OTEC PRODUCED WATER FOR THE CULTIVATION OF HIGH VALUE COMMERCIAL FISH AND INVERTEBRATE SPECIES
8. ASSESSMENT OF SPATIAL AND SEASONAL VARIATIONS OF WATER QUALITY FOR USE IN ADVANCED HYBRID OTEC TECHNOLOGY AND APPLICATIONS OF ITS WASTEWATER FOR AQUACULTURE LIVE-FEED PRODUCTION
9. HYBRID OTEC - OVERALL PERFORMANCE ENHANCEMENT AND COST REDUCTION, ORC SYSTEM ENHANCEMENT AND RESEARCH ON NANOFUIDS
10. HYBRID OTEC - DEVELOPMENT OF MALAYSIA MODEL

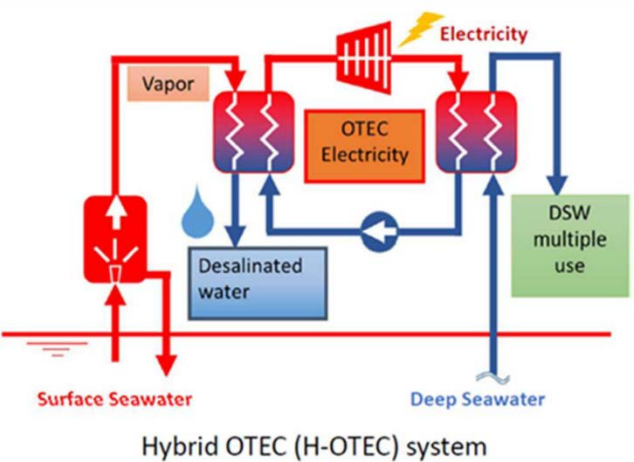
Renewable Energy from the Ocean: OTEC

OTEC is a simple Rankine Cycle with a low-boiling-point working fluid. Titanium Heat Exchangers extract heat from the ocean to vaporize the fluid which drives a turbine generator.

- The working fluid pump transfers a low-boiling-point liquid to a heat exchanger
- Warm Ocean Water in an evaporator heats the working fluid which vaporizes
- Vapor expands in a turbine, driving a generator, creating electricity.
- A condenser cools the vapor back into a liquid for reuse with naturally cold DOW.



Primary Initiative - Hybrid OTEC Research Lab



Concept



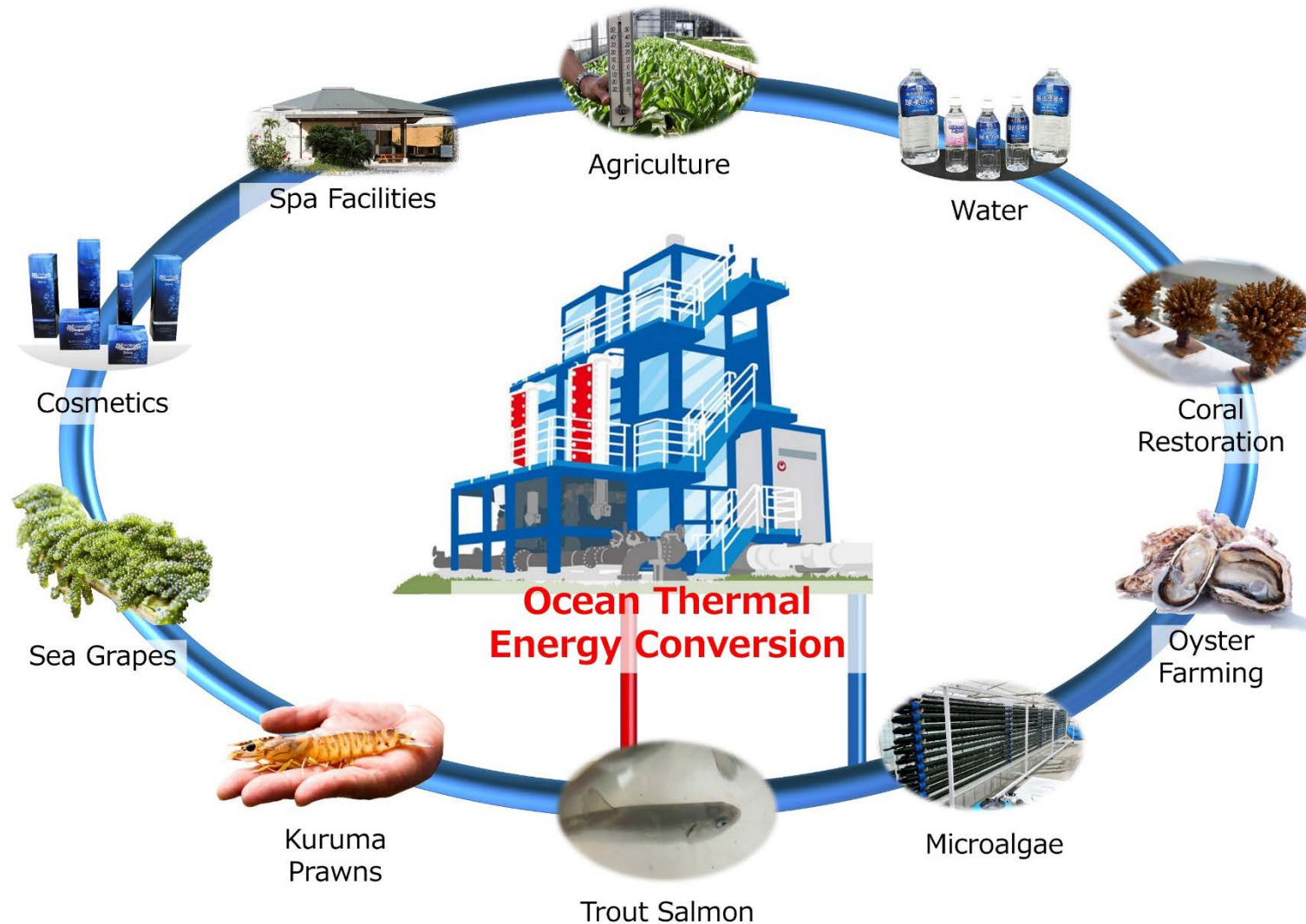
Research

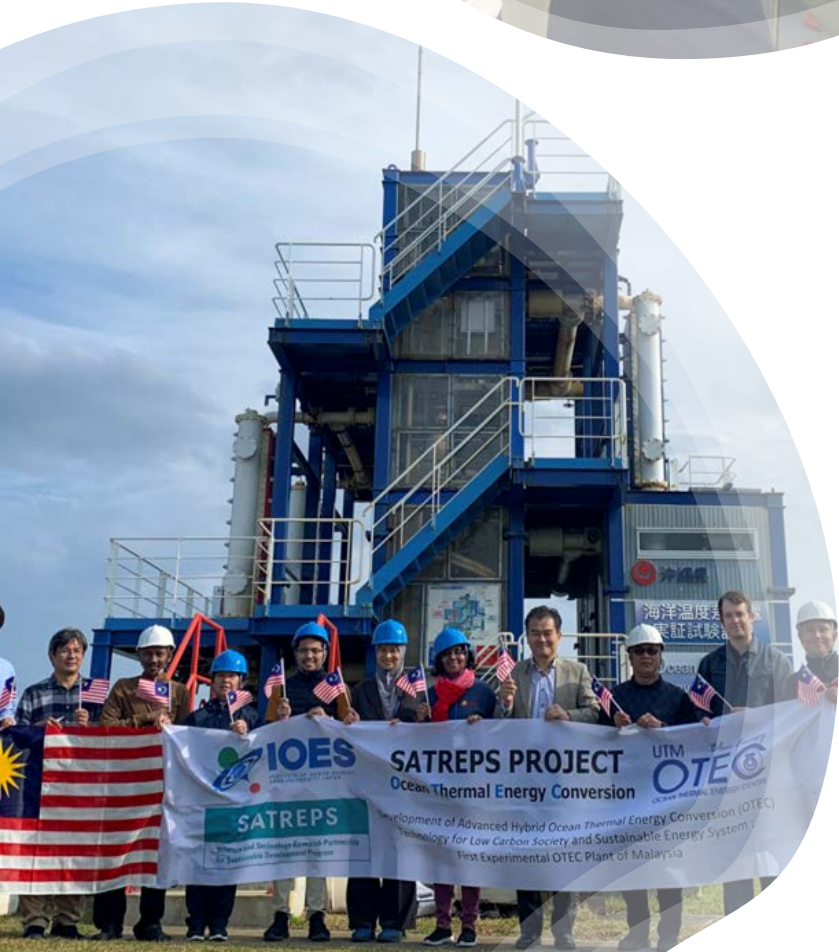
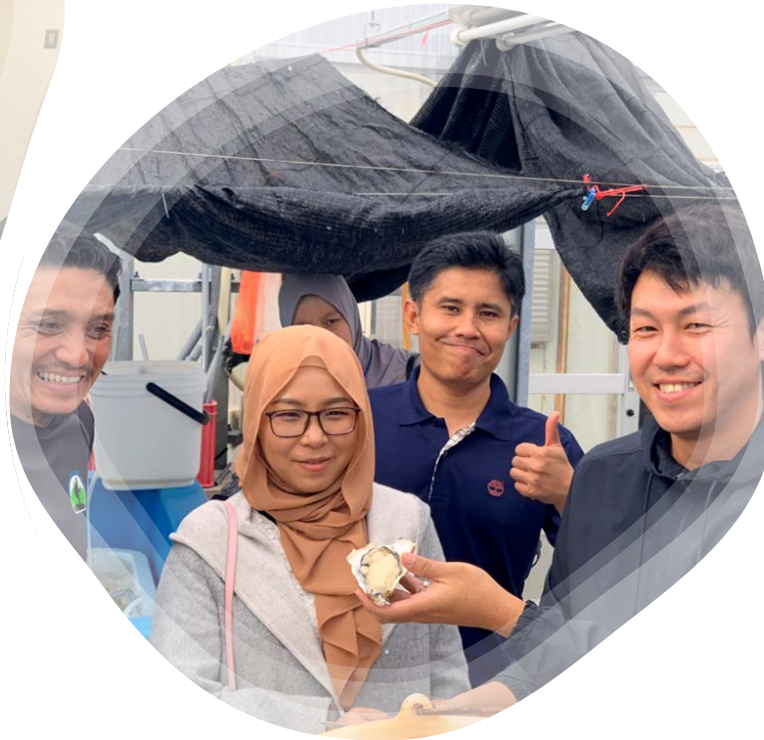


Development

Secondary Initiative

– Adaptation of the Kumejima Model for Malaysia





Personnel Development – Onsite Training

JICA's Support



**SATREPS-related Event February
2023, Malaysia**

- JICA's worldwide offices provide a wide range of knowledge, support, and knowhow
- Project Governance and Guidance
- Crosscutting agencies and fields connecting Japan to local needs.



Thank You

