20. SDGs achievement model using effluent from OTEC Power Plant - Introduction of SSUA (Sustainable Seawater Utilization Academy) -

°Hyeon-Ju Kim[1,2*], Deok-Soo Moon[1], Ho-Saeng Lee[1], Kang-Hee Lee[1,2]

[1]Seawater Energy Utilization Research Center, [2]Offshore Plant and Marine Energy Research Division, Korea Research Institute of Ships & Ocean engineering(KRISO), [1]Goseong, [2]Daejun, Korea

Ocean Thermal Energy Conversion (OTEC) is the ocean energy system which generate the electricity from thermal gradient between warm surface seawater andcold deep seawater. The OTEC system is closed cycle power plant which uses flow force of working fluid with the phase change in the power cycle. The kinetic energy of evaporated working fluid(R32, ammonia, etc.) operate turbine to produce electricity, and then it recirculate after condensed by cold deep seawater.

To operate OTEC system, large amounts of ocean surface water and deep sea water should be drawn and discharged. The temperature of effluent from the system can be influenced through evaporator and condenser. Therefore, it needs to consider environmental capacity of the discharge area.

To minimize this potential impact, there is a passive method that discharge into the water depth where the temperature is nearly same. However, there is also an active method to utilize the discharge, by extracting useful resources and utilizing low temperature of OTEC discharge to match temperatures similar to coastal surface water.

As known, the resource availability of discharged deep seawater can be used for energy and fresh water so on. Additionally, it also can be used for aquaculture and agriculture to produce food materials. Therefore, not only for the energy, OTEC power plant can be applied to improve the quality of life for residents along equatorial coastal zone by multi-purpose use of OTEC discharge.

To aware the usefulness of seawater resources and the proper way of utilizing OTEC discharge, KRISO established the systematic capacity building program named ‘Sustainable Seawater Utilization Academy (SSUA)’ to support local community in Pacific Islands Countries(PICs) to achieve SDGs.
The SSUA program was already delivered to residents of South Tarawa, Kiribati, by financial support of KOICA in 2016. Consecutive action project of hydroponic system was launched through Ministry of Fisheries(MOF)-ODA to assist SSUA Kiribati Association in 2018.

KRISO is trying to expand SSUA program and to extend action project with international volunteers to empower life resilience of coastal residents in PICs where are threaten by climate change and natural disasters.

Keywords : Ocean thermal energy conversion(OTEC), Cascade utilization, Sustainable Development Goals(SDGs), Sustainable Seawater Utilization Academy(SSUA), Capacity building

Acknowledgment: This work was financially supported by the National R&D project(PMS3890) of “Development of 1MW OTEC demonstration plant (3/5)” funded by the Ministry of Oceans and Fisheries of the Republic of Korea.