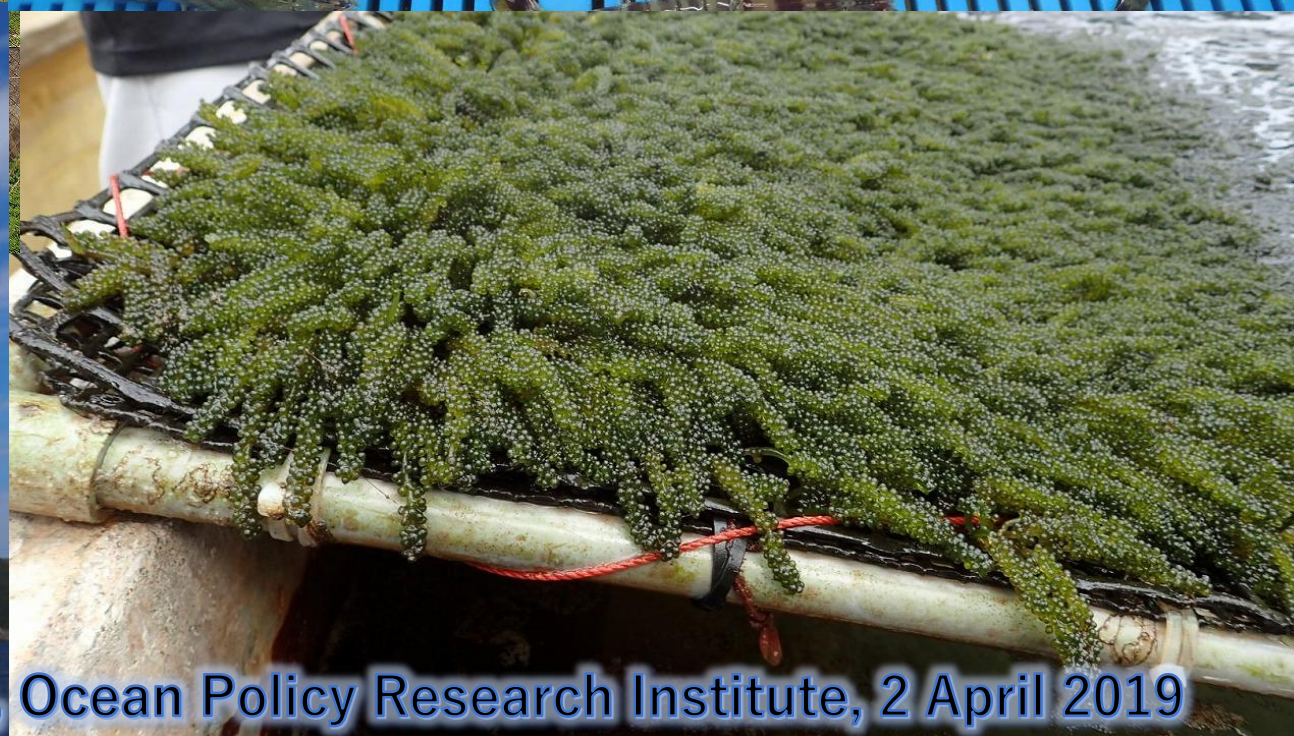
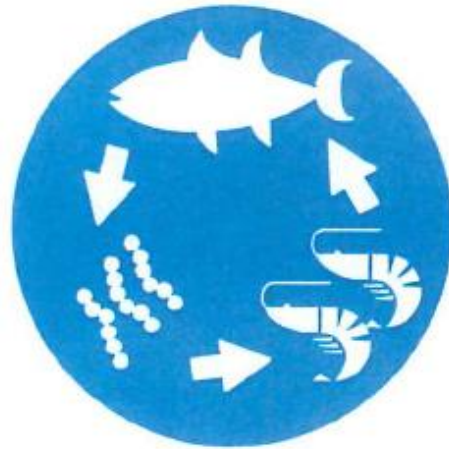


Renewable energy in coastal and off-shore areas - opportunities and challenges





14.1 Prevent and significantly reduce marine pollution



14.2 Sustainably manage and protect marine and coastal ecosystems



14.3 Minimize and address impacts of ocean acidification



14.4 End overfishing, IUU fishing, and destructive fishing practices



14.5 Conserve coastal and marine areas



14.6 End subsidies contributing to overcapacity, overfishing and IUU fishing



14.7 Increase economic benefits to SIDS and LDCs

14.a Increase scientific knowledge, develop research capacities and transfer marine technology

14.b Improve access of small-scale artisanal fishers to marine resources and markets

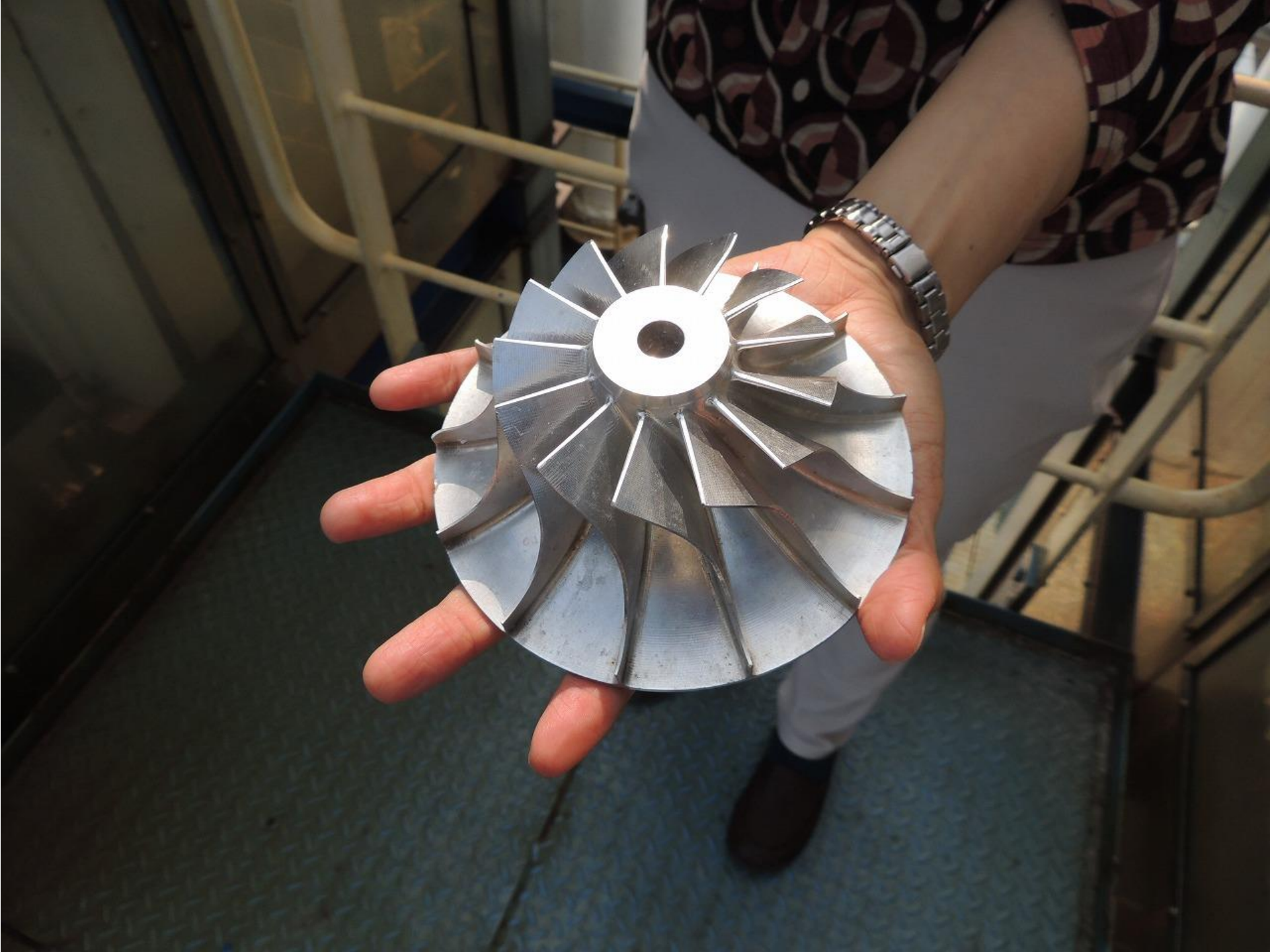
14.c Enhance conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS

Ocean Thermal Energy Conversion (OTEC) and multi-level use of deep sea water in Kumejima, Okinawa, Japan

- Conducted survey on the suitable site for using deep sea water in 1994; three sites reviewed,
- Okinawa Prefecture adopted the master plan in 1996.
- Okinawa Prefectural Deep Sea Water Research Institute was established in 2000.
- Technology was developed to apply deep sea water to shrimp farming in 2003.
- The OTEC facility was established in 2013.
- Using Started in April 2013 at the Okinawa Prefectural Deep Sea Water Research Institute established in 1994.
- HFC134a is used to turn turbines.
- 2 units of turbines were installed; each has 50kW capacity.









深層水入口
DSW Inlet

深層水中間
DSW Middle

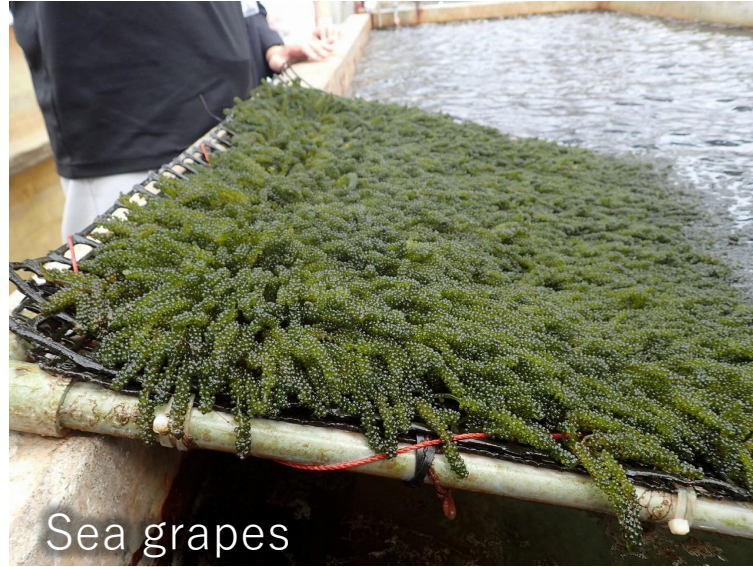
深層水出口
DSW Outlet

水道水
Tap Water

OTEC and deep sea water application in Kumejima, Okinawa, Japan



Shrimp farm



Sea grapes



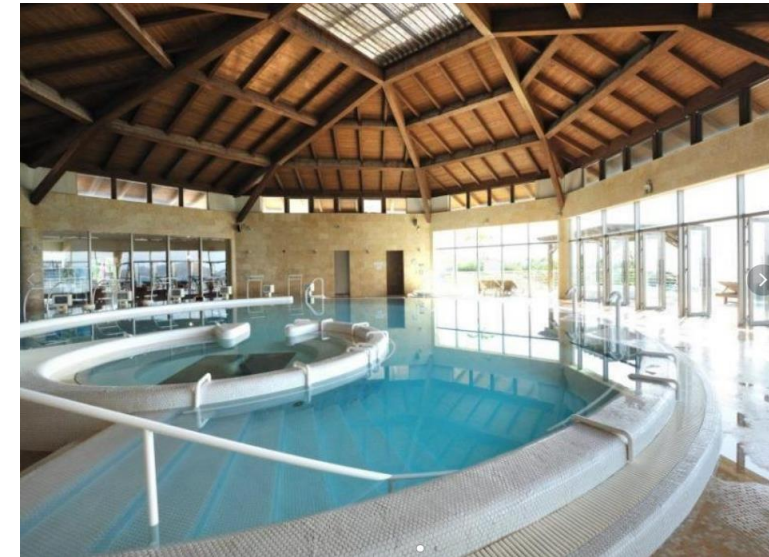
Cosmetics



Shrimps

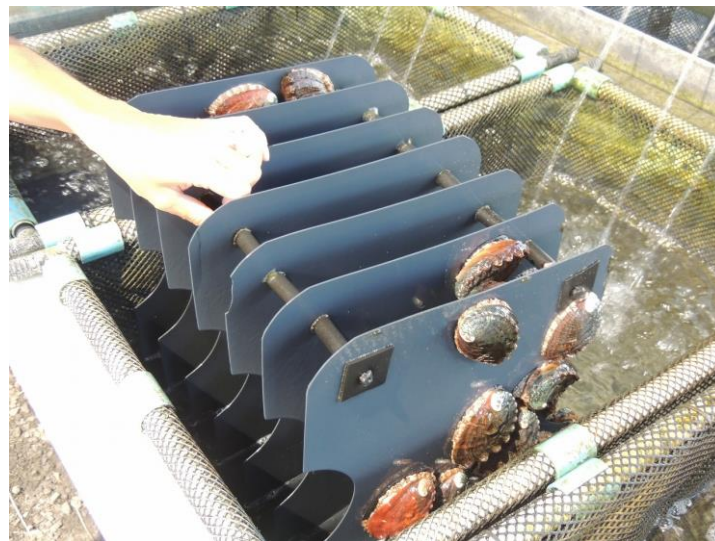


Cooling pipe system



Spa - tarsotherapy

Ocean Thermal Energy Conversion (OTEC) in Kona, Hawai'i, USA





Off-shore wind turbine in Goto Islands, Kagoshima, Japan

- 2MW turbine was installed in 2013,
- Technical aspects were clarified and ready to move on to the upscale project.
- The area was where 1 fisherman possess the fishing right and doesn't practice fishing,
- The turbine has an effect of fish aggregation.
- The fishermen operating adjacent to the wind turbine were not allowed to fish in the area of the wind turbine due to the lack of fishing right.

Controversy in Akita Prefecture, Japan over the plan to develop large offshore windfarms



- Akita Prefecture having long coastal line and good winds throughout the year.
- Some fishermen were in favor of having offshore windmills to enhance fishery efficiency,
- Some fishermen object the large scale windfarm development plan that can install up to 500 units of wind turbine offshores.
- Tourism sector also concerns over the destruction of landscape
- Difficult to have consensus among the key stakeholders

Lessons and future perspectives

- Considerable synergies and co-benefits between SDG13 and SDG14,
- Deep sea water has multiple use for fishery and non-fishery sector,
- OTEC multi-benefits with multi-stakeholder/cross sectoral collaboration,
- OTEC requires sharp underwater cliff from the shore,
- Uncertain cost-benefit projections (17 – 48 cents/kwh, Kumejima),
- Wind turbine co-benefits restrained by institutional impediments,
- Limited education and awareness raising,
- Competition and patent issues restrain the sharing of information withheld by the private sector and researchers,
- Identifying prospective resources and exploring multiple benefits through stakeholder partnership
- Requiring innovation in policies, technology application, stakeholder mobilization and partnership building
- Useful to have external facilitators to provide options.