Accelerating Ocean Thermal Energy Conversion in SIDS

Friday 11 February 2022
12:00 AM (GST) to 2:00 AM (GST)
IRENA Overview

- Established in 2011
- Headquarters - Masdar City, Abu Dhabi, UAE
- IRENA Innovation and Technology Centre – Bonn, Germany
- Permanent Observer to the United Nations – New York, USA

Mandate

To promote the widespread adoption and sustainable use of all forms of renewable energy worldwide
38 SIDS and 31 Partners

- Addresses all elements of energy transition
- 11 priority areas
- Target of total installed RE capacity of 10 GW for all SIDS by 2030 forms the basis of the AOSIS-IRENA energy compact.
**Caribbean**
1. Antigua & Barbuda
2. Aruba
3. Bahamas
4. Barbados
5. Belize
6. British Virgin Islands
7. Cuba
8. Dominican Republic
9. Grenada
10. Guyana
11. Montserrat
12. St. Kitts and Nevis
13. St. Lucia
14. St. Vincent and the Grenadines
15. Trinidad and Tobago
16. Turks and Caicos

**Non-SIDS countries and Partner Organisations**
1. Denmark
2. France
3. Japan
4. Italy
5. Germany
6. Italy
7. New Zealand
8. Norway
9. United Arab Emirates
10. United States of America
11. Association of the Overseas Countries and Territories of the European Union
12. Caribbean Electric Utility Services Corporation
13. Clean Energy Solutions Center
14. Clinton Climate Initiative
15. ENEL
16. European Union
17. Greening the Islands
18. Indian Ocean Commission
19. International Renewable Energy Agency
20. Islands and Small States Institute
21. Island Innovation
22. Organisation of Eastern Caribbean States
23. Pacific Community
24. Pacific Islands Development Forum
25. Pacific Power Association
26. Rocky Mountain Institute - Carbon War Room
27. Solar Head of State
28. Sustainable Energy for All
29. Sur Futuro Foundation
30. United Nations Development Programme
31. United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and SIDS
32. World Bank

**Atlantic, Indian Ocean and South China Sea**
1. Cabo Verde
2. Comoros
3. Maldives
4. Mauritius
5. Sao Tome and Principe
6. Seychelles
7. Singapore

**Pacific**
1. Cook Islands
2. Federated States of Micronesia
3. Fiji
4. Kiribati
5. Republic of the Marshall Islands
6. Nauru
7. New Caledonia
8. Niue
9. Palau
10. Papua New Guinea
11. Samoa
12. Solomon Islands
13. Tonga
14. Tuvalu
15. Vanuatu
In brief:

- Collaborative Framework on Ocean Energy/Offshore Renewables covers:
  - Offshore and floating wind technology; ocean energy technologies; and Floating solar photovoltaic.
  - Co-facilitated by the Kingdom of Tonga and Italy
  - 40 member countries engaged at last two meetings + engagement from industry associations.
  - Suggested areas of work include exchange of good practices on: Marine spatial planning; Foster collaborative R&D programmes; Coupling of offshore renewables with power-to-X technologies; and Grid interconnection for offshore generation.

Aim:

- Agency to proactively function as a global network hub
- Facilitate government peer-to-peer collaboration and exchange of knowledge
Recent Strategic Engagements

- Collaboration with **UN-OHRLLS** on the SIDS Global Business Network Virtual Forum, 2021 and 2022
- **IRENA-AOSIS** Energy Compact and Memorandum of Understanding
- **IRENA-Global Wind Energy Council** Energy Compact and Cooperation Agreement
- **Palau Renewable Energy Roadmap** with inclusion of OTEC
Energy Transformation Tools and Services

- Renewable Readiness Assessment / Quickscans
- Grid Integration Analysis
- Renewable Energy Roadmaps
- Energy Transition and Climate Action Support
- Project Facilitation and Access to Finance

Knowledge Hub and Dissemination
https://islands.irena.org/
**Objective of the Webinar**

**Technical Webinar Series**  
*Accelerating Offshore/Ocean Energy Technologies in SIDS*

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<th>Offshore Wind and Floating Solar PV</th>
<th>Ocean Thermal Energy Conversion</th>
<th>Wave and Tidal</th>
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<td>16 December 2021</td>
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1. To promote OTEC in SIDS through the **sharing of global, regional and national experiences, best practices and lessons learned**.

2. To identify **enabling policy, regulatory, technology and financial frameworks** for increased deployment of OTEC.

3. To explore opportunities to advance OTEC beyond assessment to deployment through **investment**, **partnerships**, **R&D** and **demonstration projects**.
Resource Potential

**Figure 2: Ocean energy resource potential**
(TWh/year)

- **Salinity gradient**: 1,650 TWh
- **Tidal stream**: 1,200 TWh
- **Wave**: 29,500 TWh
- **OTEC**: 44,000 TWh

*Based on Nihous, 2007; Mørk et al., 2010; Skråmestø et al., 2009; OES, 2017*

Geographical Distribution of OTEC Projects

Figure 26: Global distribution of ocean temperature differences (°C) between 20 and 1,000 metre water depth

Source: Lewis et al., 2011

Figure 6: Geographic distribution of ocean energy projects

Status of OTEC Deployment

**Figure S1: Ocean energy deployment excluding tidal barrage (MW)**

- OTEC: 0.23 MW
- Salinity Gradient: 0.05 MW
- Wave: 2.31 MW
- Tidal stream: 10.60 MW
- Others: 13.2 MW

**Figure S2: Total ocean energy deployment (MW)**

- Tidal barrage: 521.5 MW

*Source: IRENA ocean energy database*
Offshore renewables powering a Blue Economy

Figure 33: Ocean energy coupled with other renewable energy sources to power the blue economy

Source: IRENA (2020), Innovation Outlook: Ocean Energy Technologies
Example 1 - OTEC coupled with cooling and water desalination

OTEC: electricity (kWh) + other revenues

Figure 38: Ways of coupling OTEC, desalination, cooling and aquaculture

Unlocking Ocean Energy potential in islands

Key Recommendations

**Technology:**
- Technology convergence and standardization
- Conduct resource assessment campaigns
- Support test centres
- Capital grant funding for R&D

**Policy:**
- Premium price MWh
- Promote innovative business models
- Compensate additional services (regulation)
- Innovative financial structures

**Environmental and Social:**
- Improve access to baseline data
- Consult and engage the public

**Infrastructure:**
- Availability of Networks
- Engage and inform the emerging supply chain
- Synergies with other RE technologies – firm generation

Thank You

Mr. Amjad Abdulla
Head of Partnerships,
Country Engagement and
Partnerships Division
aabdulla@irena.org

https://islands.irena.org

SIDS Lighthouses
Initiative

IRENA Headquarters,
Masdar City, P.O. Box 236,
Abu Dhabi
United Arab Emirates

islands@irena.org