

“Let the oceans look after us.”

Peter Thomson, United Nations Special Envoy for the Ocean

The Global Partnership for Ocean Wave Energy Technology

A Sustainable Development Multi-Stakeholder Partnership

Stakeholder Forum for a Sustainable Future and Partners

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Introduction

The 2030 Agenda for Sustainable Development recognizes multi-stakeholder partnerships as vehicles for mobilizing and sharing knowledge, expertise, technologies, and financial resources to support the achievement of the Sustainable Development Goals (SDGs) in all countries, particularly developing countries. The Agenda further encourages and promotes effective public, public-private, and stakeholder partnerships, building on the experience and resourcing strategies of partnerships. These partnerships are now being re-emphasized as tools to realize the ‘Decade of Action to deliver the Global Goals’ by 2030 as the global community seeks ways to Build Back Better, greener, and more sustainably from the economic and societal ravages of the COVID-19 pandemic.

In the spirit of the seventeen interlinked SDGs¹ and targets as a blueprint for achieving a sustainable future, and with a focus on SDGs 6, 7, 8, 13 and 14, [Stakeholder Forum for a Sustainable Future](#) and partner [SurfWEC LLC](#) are in discussions with Caribbean island governments and other partners to register a new Sustainable Development Multi-Stakeholder Partnership (MSP) on the United Nations [Small Island Developing States Action Platform](#). If it is to contribute to the acceleration of the SDGs, the initiative will require diverse sectors and stakeholders to work in an integrated manner by assembling financial resources, knowledge, and expertise. Envisioned as a cross-sector partnership, SF believes that this MSP is especially suited for approaching the complex challenge posed by climate change and the interrelated impacts that go beyond the reach of individual stakeholders.

The Purpose of the Partnership and the Technology that Underpins it

The Global Partnership for Ocean Wave Energy Technology aims to identify the correct stakeholders, mechanisms, and funding sources required to develop zero-emissions technologies capable of utility-level electrical power generation from ocean waves. While a wide-range of ocean wave and tidal-energy capture technologies are reaching maturity, and are welcome to join this initiative, the concept underpinning this partnership is known as **SurfWEC - Surf-making Wave Energy Capture**. Deployed off-shore and with no anticipated impact on the tourism sector that many island states and coastal communities’ value, SurfWEC is a commercially viable wave energy capture (WEC) technology capable of utility-level electrical power generation. Once captured, that energy can be used to generate electricity for transfer by cable to an on-shore distribution hub for national grids or other land-based or ocean-based energy-intensive applications, but with up to twice the power generation potential of off-shore wind facilities in areas with suitable ocean wave frequency.

While economical as a stand-alone technology, SurfWEC can be co-located with wind power, solar power, tidal power, and battery-storage technology to meet the electric power load demands of a modern power grid. Further, should deployment of the SurfWEC system be realized it offers a pathway to the meaningful reduction of carbon emissions into the Earth’s atmosphere, and to:

- **Transform the energy supply of small island states (SIDS) and the coastal communities of other countries, including halving the cost per kilowatt-hour in five years in some areas;**
- **Diversification of the power grid to reduce outages at coastal communities struck by hurricane or cyclone;**
- **Be a pathway to electrify land and water transport, and various offshore platforms;**

¹ SDGs directly linked to the proposed MSP are 1, 3, 6, 7, 8, 9, 11, 12, 13, 14, 15, & 17

- **Be a zero-emissions renewable energy source** for multiple applications including the desalinization of seawater and the production of industrial hydrogen and oxygen;
- **Improvement of ocean health and biodiversity** as a reef-like wave farm; and
- A smart-technology **ocean-based climate change data capture and monitoring platform and tool** that can ‘learn’ over time to become a severe weather early warning system.

The resources required to manufacture, assemble, transport, and maintain SurfWEC will be conducted embracing the circular economy ethos. Fossil fuels used to manufacture, assemble, transport, and maintain SurfWEC will be offset by mechanisms agreed to by the Partnership and the governments of countries where it is commissioned, making deployment carbon neutral.

The SurfWEC technology - alone or with tidal, solar, wind, and other renewable energy technologies - can offer social, environmental, and economic benefits to support resilient societies and economies as they adapt to climate change. In addition to being emissions-free and carbon-neutral, applications to desalinate seawater and to produce industrial gases offer SIDS and other coastal countries entry to a lucrative marketplace as a commercial-scale supplier. Further, water-stressed islands can benefit from a new means to produce potable water for human consumption, agricultural, industrial, and tourism use. Once established, those applications will create new skilled jobs and new, sustainable revenue streams that offer the potential for the societal challenge envisioned in the 2030 Agenda.

Technology That is Unique, Practical, and Robust

It is unique: Unlike other wave energy capture technologies, the founding company holds the license to a patent that enables the SurfWEC platform to produce energy for 80% of the time by utilizing a wave shoaling² feature, projected to enable it to economically outperform existing utility-level wind and solar systems, which are productive for 50% and 30% of the time respectively³.

It is practical and scalable: The components needed to produce and deploy the SurfWEC system are readily available. The materials, technologies, transportation, maintenance systems, and skilled labor force already exist. ‘Wave farms,’ can meet the needs of a wide range of applications. And if co-located with wind farms, the SurfWEC Levelized Cost of Energy (LCOE) is reduced by using shared transmission infrastructure, further amplifying its cost competitiveness.

It is robust and designed to not be damaged by hurricanes or cyclones: Unlike other wave energy capture technologies, the SurfWEC platform is designed to remain productive in severe storm conditions to reduce outages. In the most severe conditions, the platform can be retracted (submerged) on-site, autonomously, and remain fully operational; it continues to produce electricity.

The Partners

Stakeholder Forum, benefited by scientific community support from the Earth System Governance Project,⁴ is the MSP’s originating NGO and a founding partner via an MOU with SurfWEC LLC, the privately-held US-based company developing the technology. The other current partners are:

- Martin, Ottaway, van Hemmen & Dolan, Inc., marine consultants and engineers since 1875;
- SkyRock Advisors, management consultants specializing in port and maritime infrastructure; and
- Weili Cui, Ph.D., Professor of Engineering, Maritime College, State University of New York.

The Partnership has invited several potential partners, including:

- Caribbean island UN Member States (discussions in progress);
- A Caribbean island utility company (discussions in progress);
- The Small Island Developing States (SIDS) Unit of UNDESA⁵ (providing guidance).

² Wave shoaling is the effect by which surface waves entering shallower water change in wave height.

³ Based on wave tank tests and NOAA data.

⁴ www.earthsystemgovernance.org

⁵ The United Nations Department of Economic and Social Affairs.

The Partnership is also approaching and developing relationships with other relevant partners:

- The International Renewable Energy Agency, IRENA
- The Alliance of Small Island States, AOSIS;
- The utility sector in the Caribbean and the eastern coast of the United States;
- Ocean Energy Europe;
- The Inter-American Development Bank (IDB);
- The United Nations Technology Bank for Least Developed Countries; and
- Other relevant development banks.

In addition, the Partnership will learn from other, similar multi-stakeholder partnerships and their way of working together, especially those with similar goals, to avoid duplication and past errors.

Proposed Government Partners - Why the Caribbean?

With the MSP's originating partners located in the New York Metro area, the identification of geographically near government partners is practical. Following that, based on US National Oceanic and Atmospheric Administration (NOAA) historical data, wave activity east of many Caribbean islands and coastal nations includes the highest average concentration of wave energy per kilometer of coastline. Moreover, research indicates that the most successful multi-stakeholder partnerships include government partners with a stake in the sustainability challenges being addressed, in this case, small island developing states and coastal countries, as respected allies to promote the Partnership and its potential.

Of equal importance, if the MSP is established partners will need to include stakeholders from government partner countries including coastal communities, their residents, stakeholders who depend on the ocean for their livelihoods, national electric-power generation bodies, independent energy producers if they operate in the country, and other relevant private sector entities.

Stakeholder Forum envisions additional partners with an interest in developing the MSP and in the potential development and deployment of the SurfWEC system, especially in the Atlantic, Indian Ocean, Mediterranean, and South China Sea (AIMS) and Pacific regions. Partners are also likely to include the supply-chain manufacturers of the components needed to deliver SurfWEC⁶ and ocean energy sector organizations such as Ocean Energy Europe. Other partners could be from United Nations and intergovernmental bodies such as UNEP, UNDP⁷, ESCAP and the World Bank, and might include Sustainable Energy for All.

Proposed Outcomes of the MSP

Deliverable outcomes of the multi-stakeholder partnership could include but are not limited to:

1. A demonstration project in the waters off of the eastern coast of a Caribbean island or another suitable regional Member State partner to:
 - a. Demonstrate the practicality and effectiveness of the SurfWEC concept;
 - b. Assess how SurfWEC platforms, if scaled up, could meet SIDS and coastal community nations' clean renewable energy needs;
 - c. Deployment and assessment of a pre-commercial scale off-grid hydrogen production facility; and
 - d. Provide a cost-benefit analysis to determine the practicality of SurfWEC's scalability and deployment elsewhere in the world, including being co-located and paired with tidal, wind, and solar renewable technologies if appropriate.

⁶ Bosch Rexroth, ISCO Industries, HYDAC, Airline Hydraulics, Wire Co./Lankhorst, and InterOcean Systems LLC.

⁷ United Nations Environment Programme, United Nations Development Programme, and the United Nations Department of Economic and Social Affairs.

2. Other outcomes will be determined as the Partnership develops, but might include assessments of areas where meaningful long-term transformative societal effects could be seen:
 - a. The economic impact that utility-scale deployment of SurfWEC and other platforms would have on deployment country job growth, commerce, and gross domestic product;
 - b. The impact on nearby marine and coastal systems, such as pollution reduction; and
 - c. The impact on island air and freshwater quality, especially on human health.

Partnership Milestones to Date

Stakeholder Forum introduced the Global Partnership for Ocean Wave Energy Technology to the international community in May 2019 at the UN's 4th annual Multi-stakeholder Forum on Science, Technology, and Innovation for the Sustainable Development Goals - the STI Forum. Speakers included SurfWEC concept inventor Mr. Michael Raftery, Chief Technology Officer for SurfWEC LLC and the Partnership, and Mr. Sainivalati S. Navoti, Chief of the Small Island Developing States Unit (SIDS Unit), Division for Sustainable Development Goals, UNDESA, as Respondent for the session.

After a positive reception at the STI Forum, UNDESA invited Stakeholder Forum to introduce the Partnership to the Global Multi-stakeholder Small Island Developing States Partnership Dialogue during the 2019 UN High-level Political Forum on Sustainable Development. Following that, the Partnership attended the SAMOA Pathway High-Level Midterm Review 2019 in September at the UN and was later invited by the Inter-American Development Bank to introduce the Partnership and the SurfWEC technology at the 'Barbados Sustainable Energy Conference: Roadmap to 2030' on 2 October 2019. While in Barbados, representatives of the Partnership had informative follow-up meetings at the offices of the Barbados National Oil Company and the Barbados Light and Power Company. November 2019 saw the Partnership present to the Energy Harvesting from Infrastructure and Ocean Systems conference at the Stevens Institute of Technology, and in February 2020 the team attended the UN's two-day preparatory meeting for the 2020 UN Ocean Conference held in New York.

Most recently, a [2020 High-level Political Forum on Sustainable Development webinar side event](#), hosted by the Permanent Mission of Barbados to the United Nations and Stakeholder Forum, offered insights to the benefits that can be realized by expanding ocean energy technologies to the global renewable energy mix to build a blue economy in all regions of the world.

Future Steps

Working with the cooperation and guidance of the SIDS Unit of UNDESA and Member States, a key goal is to secure government partners and the cooperation of IRENA so that we can officially register as a new multi-stakeholder partnership on the UN's [Small Island Developing States Action Platform](#).

The Partnership also hopes to contribute to the knowledge needed to build public-private partnerships (PPP) toolkit for future sustainable development multistakeholder partnerships.

In conclusion

Stakeholder Forum seeks guidance from governments, intergovernmental bodies, universities, utility companies, and others to develop and deploy innovative technologies to support resilient societies and economies on small island developing states, and for other vulnerable coastal communities, in their efforts adapt to climate change and to Build Back Better from the COVID-19 pandemic.

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