

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.

In the spirit of the 17 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 a Caribbean island government and other partners to initiate a new Sustainable Development Multi-Stakeholder Partnership (MSP). Aimed at making a contribution during the coming 'Decade of Action' to achieving the SDGs by 2030, 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 the MSP is especially suited for approaching the complex challenge posed by climate change and 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 a zero-emissions technology capable of utility-level electrical power generation from ocean waves. The concept that underpins the partnership is known as **SurfWEC - Surf-making Wave Energy Capture**. Deployed off-shore and therefore with no anticipated impact on the tourism industry 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 from ocean waves. 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 than wind power in areas with suitable ocean wave frequency.

While deployable as a stand-alone technology, SurfWEC can also be joined-up with wind power, solar 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 means by which to begin a 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** on small island states and at coastal communities struck by hurricane or cyclone;
- **Become an off-grid, zero-emissions renewable energy source** for multiple applications including the desalination of seawater, the production of industrial hydrogen, and as an alternative source of electricity for land and water transport, and for various offshore platforms;
- **Improvement of ocean health and biodiversity** as a reef-like environment; and
- A smart-technology **ocean-based climate change data capture and monitoring tool** that can also 'learn' over time to become a severe weather early warning system.

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

Apart from the resources required to manufacture, assemble, transport, and maintain SurfWEC, which will be conducted embracing the circular economy ethos, it will be a zero-emissions energy source. The use of fossil fuels 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.

On top of the environmental benefits of being emissions-free and carbon-neutral, applications to desalinate seawater and to produce industrial hydrogen offer SIDS and other coastal communities' entry to the marketplace as a commercial-scale supplier. Further, water-stressed islands can benefit from a new source of potable water for human consumption and agricultural, industrial, and tourism use. Land-based and ocean-based transport systems can be electrified. 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. In short, SurfWEC provides social, environmental, and economic benefits to support resilient societies and economies as they adapt to climate change.

Technology That is Unique, Practical, and Robust

It is unique: Unlike other WEC technologies, the founding company holds the license to a patent that enables the production of 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. Multiple units, 'wave farms,' can meet the needs of a wide range of applications. In addition, when co-located with wind farms, the SurfWEC levelized cost of energy (LCOE) is reduced by using shared transmission infrastructure, further amplifying the SurfWEC concept's cost competitiveness.

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

The Partners

Stakeholder Forum is the MSP's originating NGO and backbone organization, benefited by scientific community support from its partner the Earth System Governance Project.⁴

Early Stage Partners:

- SurfWEC LLC, the privately-held US-based company developing the technology;
- Martin, Ottaway, van Hemmen & Dolan, Inc., marine consultants, engineers, surveyors, naval architects, and appraisers;
- A Caribbean Island UN member state (discussions in progress);
- A Caribbean utility company (discussions in progress);
- The SIDS Unit of UNDESA⁵ (discussions in progress);
- Stevens Institute of Technology, SurfWEC's New Jersey, USA university partner (discussions in progress); and
- The International Renewable Energy Agency, IRENA (discussions in progress).

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.

Potential partners to guide the MSP and foster networking with other fitting partners:

- The Caribbean Community, CARICOM;
- The Alliance of Small Island States, AOSIS; and
- The utility sector in the Caribbean and the eastern coast of the United States
- The United Nations Conference on Trade and Development (UNCTAD);
- 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 partnerships and their way of working together, especially those with similar goals, to avoid duplication and past errors.

Proposed Government Partner - Why the Caribbean?

With the MSP's originating partners located in the New York Metro area, the identification of a geographically near government partner is practical. Following that, based on US National Oceanic and Atmospheric Administration (NOAA) historical data, wave activity east of many Caribbean islands includes the highest average concentration of wave energy per kilometer of coastline. Moreover, research indicates that the most successful MSPs include a government partner with a stake in the sustainability challenges being addressed, in this case, a SIDS State, as a 'door opener' to promote the partnership and its attractiveness.

Of equal importance, if the MSP is established partners will need to include stakeholders from the SIDS government partner country, including coastal communities, their residents, stakeholders who depend on the ocean for their livelihoods, the electric generation companies on the island, and independent energy producers if they operate in the area.

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 SurfWEC.⁶ Other partners could be from the United Nations and intergovernmental bodies such as UNEP, UNDP⁷, ESCAP and the World Bank, and might include Sustainable Energy for All. As of yet, none of these have been approached.

Proposed Outcomes of the MSP

Deliverable outcomes of the MSP could include but are not limited to:

1. A demonstration project in the waters off of the eastern coast of the Caribbean island state partner to:
 - a. Demonstrate the practicality and effectiveness of the SurfWEC concept;
 - b. Assess how SurfWEC, if scaled up, could meet Small Island Developing States clean renewable energy needs;
 - c. Should the effectiveness of SurfWEC be proven, deploy and assess 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.

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 effects could be seen:
 - a. The economic impact that utility-scale deployment of SurfWEC would have on deployment country job growth, commerce, and gross domestic product;
 - b. The impact on nearby marine and coastal systems; and
 - c. The impact on island air quality and human health.

The Partnership's Progress So Far

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

After that positive reception at the STI Forum, Stakeholder Forum was invited by UNDESA to introduce the partnership to the Global Multi-stakeholder Small Island Developing States Partnership Dialogue held at the 10 July 2019 UN High-level Political Forum on Sustainable Development. Following that, the partnership was present at the SAMOA Pathway High-Level Midterm Review 2019 on 27 September 2019 at the UN in New York, was introduced to and well-received at the Caribbean Community (CARICOM) at the Barbados Sustainable Energy Conference: Roadmap to 2030 on 2 October 2019, and at the Energy Harvesting from Infrastructure and Ocean Systems conference at the Stevens Institute of Technology on 5 November 2019.

Future steps

Working with the cooperation and guidance of the SIDS Unit of UNDESA, the partnership hopes to secure one or more Member State partners, one or more university partners, and the cooperation of IRENA so that it can soon be registered as a new partnership on the UN's Small Island Developing States Action Platform.

The partnership also hopes to make a contribution to the knowledge needed to build a public-private partnerships (PPP) toolkit for future sustainable development multistakeholder partnerships.

In conclusion

Stakeholder Forum seeks guidance from governments, related intergovernmental bodies, universities, research institutes, utility companies, and others to develop and deploy an innovative technology to support resilient societies and economies on small island developing states and other vulnerable coastal communities in their efforts adapt to climate change.

For more information please contact:

Charles Nouhan, Chairman, Stakeholder Forum for a Sustainable Future at charles.nouhan@stakeholderforum.org or +1 201 674-7088

and visit www.surfwec.com and www.stakeholderforum.org