Maritime Decarbonization Research & Development: Pacific & Global Perspectives
Virtual Workshop: 12 August 2022
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EXECUTIVE SUMMARY

The IMO CARES (Coordinated Actions to Reduce Emissions from Shipping) Foundation Project is an expected long-term programme with the objective to accelerate demonstration of green technologies and their deployment globally in a manner that facilitates blue economic growth in developing regions such as the Pacific. It is funded by the Kingdom of Saudi Arabia and implemented by the International Maritime Organization (IMO).

The webinar was held virtually on the Zoom platform on the 12th of August 2022. It was attended by representatives from Pacific maritime administrations, ports authorities, ship operators and consultants. The purpose of the virtual workshop was to promote the IMO CARES programme and undertake regional and global consultation in decarbonization research and development (R&D). The objectives were as follows:

- Facilitate regional consultations on the IMO CARES concept
- Provide perspectives on R&D related to maritime decarbonization from Decarbonisation Centers
- Identify challenges related to decarbonization technology with the region
- Identify solutions to these challenges and discuss the way forward

It was held in three parts; the first session covered the theme “Overview of R&D related to maritime decarbonization - Global Perspectives” and consisted of three international speakers discussing key questions posed by IMO CARES; this was a pre-recorded segment. The second session covered the theme “Overview of decarbonization technology challenges from the Pacific region” and included five Pacific speakers who presented and provided insight. The final session was a concluding panel discussion hosting speakers from Sessions 1 and 2.

Workshop presentations from Session 2 are attached in Annex III in consecutive order as outlined in the agenda.
1. INTRODUCTION

The IMO CARES (Coordinated Actions to Reduce Emissions from Shipping) Foundation Project is an expected long-term Programme with the objective to accelerate demonstration of green technologies and their deployment globally in a manner that facilitates blue economic growth in developing regions such as the Pacific. It is funded by the Kingdom of Saudi Arabia and implemented by the International Maritime Organization (IMO).

The workshop was held virtually on the Zoom platform on the 12th of August 2022. It was attended by representatives from Pacific maritime administrations, ports authorities, ship operators and consultants. The list of participants is attached in Annex I. The purpose of the virtual workshop was to promote the IMO CARES Programme and undertake regional and global consultation in decarbonization research and development (R&D). Proceedings from this workshop is intended to assist in the 9-month preparatory phase of the project in developing and designing a long-term programme aimed at central coordination and knowledge partnership mechanisms1.

The workshop objectives were as follows and the agenda is attached in Annex II:

- Facilitate regional consultations on the IMO CARES concept
- Provide perspectives on R&D related to maritime decarbonization from Decarbonisation Centers
- Identify challenges related to decarbonization technology with the region
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Workshop presentations from Session 2 are attached in Annex III in consecutive order as outlined in the agenda. Annex IV provides a group snapshot of participants who joined on the day.

MTCC-Pacific is thankful to IMO CARES for the opportunity to facilitate this workshop through technical and organizational support and assist in coordination efforts in the Pacific region.

2. Webinar Preparation

Preparation for the IMO CARES Pacific webinar was undertaken in accordance with the guidance provided by the IMO CARES project coordinating unit (PCU). MTCC-Pacific activities included:

1. Coordinating and collating presentation material for the workshop;
2. Developing and preparing all communications and visibility materials;
3. Logistics for the webinar;
4. Conducting and moderating the webinar; and
5. Preparing and submitting a workshop report upon completion of the webinar.

1 https://www.imo.org/en/OurWork/PartnershipsProjects/Pages/IMO-CARES.aspx
3. Webinar Logistics

MTCC Pacific created the registration facilities, communicated with the registrants and compiled information related to the webinar. The zoom platform was used to host the webinar given MTCC’s familiarization with the platform and capacity to meet the needs of the webinar. The registration link was shared online and via email to the maritime stakeholders.

MTCC Pacific targeted webinar participation constituted the following categories of stakeholders:

- Maritime Administrations
- Governmental Agencies
- International Organizations
- Civil Society
- Maritime Training and Research Institutions
- Ports and Port Authorities
- Ship Owners/Operators
- Students
- All other maritime related stakeholders

In total, the webinar was subscribed by 52 registrants, and saw an active participation of 35 participants. The deferment of the webinar to a later date due to conflicting schedules may be a reason for the turnout of participants across the region. Annex I provides a screen grab of the webinar showing participants who remained online through to the conclusion of the workshop.

4. Webinar Programme

Lastly, MTCC Pacific was tasked with conducting and moderating the webinar following consultation with the IMO CARES PCU. In addition to this, MTCC Pacific provided technical expertise and organized the webinar content and discussion to ensure efficient delivery of the webinar. The following provides a narrative on each session of the webinar, including the key points made by the presenters, the questions raised by the participants and the solutions provided at the webinar.

4.1 Keynote Address

The workshop was opened by a short welcome and brief administrative remarks by the moderator, Ms Amelia Bola, the Maritime Greenhouse Gas Officer with MTCC-Pacific. The format of presenting and participation was explained, and it was also noted that this was the first IMO CARES Pacific workshop.

Eng. Essam Al-Ammari, the Permanent Representative of the Kingdom of Saudi Arabia to IMO, provided brief opening remarks noting the Pacific workshop is the fourth workshop in the collaborative series with Maritime Technology Cooperation centers (MTCCs) in assisting IMO CARES in developing and understanding of current issues, opportunities and interdependencies surrounding maritime decarbonization. He stated that maritime decarbonization is a long-term objective depending on close cooperation and collaboration between international organizations, IMO, regional groups, financial institutions and IMO Member States. With such a complex topic, regional and global understanding through this workshop is extremely important and all participants were thanked for their attendance. The Kingdom of Saudi Arabia has prioritized maritime affairs through innovation and investment and their support of the IMO CARES paves into this. Thus, Mr Al-Ammari was appreciative of the support towards working to build a strategic framework to
promote technology transfer and maritime decarbonization and work towards ensuring no one is left behind.

4.2 IMO CARES – Introduction

Ms Petra Ghassemi Ahari, the Acting Project Officer, Department of Partnerships and Projects, IMO provided an overview of the IMO CARES project and how it will benefit local stakeholders in the Pacific. The main driver for IMO CARES is the transition to zero carbon emission with no country or region left behind, especially Small Island Developing States (SIDS) and Least Developing Countries (LDCs). To coordinate decarbonization efforts so that finance and technology gaps are closed between global North and global South, Ms Ahari stated that IMO CARES intends to address this through the following: identify decarbonization challenges in developing regions and the types of technology solutions now available for demonstration; CARES will bring private sector and financing institutions to support this effort and the mechanism to drive this will be an innovation and finance hub for global R&D collaboration. CARES will yield and undertaking of activities with very specific targets and tangible outputs; these outputs should lead to technical solutions applied in developing regions.

Three key objectives on how CARES will be structured are: building partnerships, driving innovation, and mobilizing international finance. The project is currently in its planning phase and will launch in early 2023. The CARES networks consist of the IMO project team working with MTCCs and other IMO GHG initiatives. Its wider network for knowledge, expertise and sponsorship includes R&D Centers, academia, technology providers, participating countries, donors, and industry. Ms Ahari explained that with Pacific stakeholders, CARES, with MTCC-Pacific, will identify local decarbonization challenges; explore technology solutions available; link stakeholders to technology providers and global finance; develop bankable proposals and bring pilot demonstration and infrastructure projects. The result should showcase an inflow of finance and technology, speed up green maritime transition and meet national GHG reduction targets, reduce costs, and stimulate the maritime sector as a whole.

4.3 Session 1: Overview of R&D Related to Maritime Decarbonization – Global Perspective

The following segment was a pre-recorded Q&A consisting of three key speakers and four key questions around the theme. The key speakers were: Mr. Gavin Allright, Secretary General, International Windship Association (IWSA); Prof. Dr. Aykut Ölçer, Director of Research, Nippon Foundation Professorial/ Chair in Marine Technology and Innovation, World Maritime University (WMU); and, Mr. Christian Førhby, Regulatory Affairs Partner, Mærsk McKinney Møller Center for Zero Carbon Shipping.

Q1: Are you currently involved, or do you plan to be involved in the future R&D specific to SIDS & LDCs?

Mr. Allright stated that IWSA has over 40 technology providers, and ship operators of small and large vessels as members. There are small vessel projects currently underway, one in the Republic of Marshall Islands with the Micronesian Centre for Sustainable Transport (MCST) and the University of the South Pacific (USP), another project in Fiji and another in the Federated States of Micronesia, as well as LDCs such as Bangladesh and the Caribbeans to name a few. IWSA’s wind propulsion vessel designs can be scalable (both up and down) and applicable to all Pacific operations. His key message was that technology that may be appropriate in Western countries does not necessarily translate to LDCs and SIDS therefore we need to be keenly aware on technology application and project development in this region.

Prof. Ölçer mentioned the research at WMU in maritime energy management and maritime decarbonization such as LNG as an alternative and transitional fuel as well as work with IWSA on wind-assisted propulsion projects. Most recently, research into the life cycle of ammonia and hydrogen as alternative fuels and economic perspectives such as Emission Trading Systems and its impact on international shipping. More specific to the Pacific region, a study conducted in the Philippines on the safety
and energy efficiency profiles of domestic ferries may be relatable due to commonalities. WMU was also part of the “Comprehensive impact assessment of short-term measure approved by MEPC 75” and have recently tendered a bid with the European Union (EU) to conduct a similar study for the Pacific region.

Mr. Føhrby provided an overview of Mærsk McKinney Møller Center for Zero Carbon Shipping, a foundation with shipping competitors, such as Mærsk, Hapag-Lloyd and NYK Line and partner companies that address the interdisciplinary supply chain from green energy, fuel production, shipping and cargo owners. He spoke on three main components that there is possibility for the Pacific to uptake on: the first being fuel and fuel production diversification; the second was the “first mover projects” which are pilot demonstration projects highlighting “green corridors” or end to end routes that can be decarbonized, developed from a bottom-up approach with full analysis on types of cargo, types of fuel available; the final being Regulatory Affairs or market-based measures to regulate this whole space and a developing a reallocation mechanism so SIDS and LDCs can benefit off the market-based measures.

Q2. What type of technology do you see being adopted in developing countries in this case, through MTCC Pacific?

Mr. Allright stated wind propulsion as critical piece of the puzzle, especially in the Pacific where traditionally Pacific Island Countries are seen as leaders in wind propulsion over long distances on large vessels. Wind propulsion systems are passive, easy to replicate systems, can be retrofitted on any type of vessel and can be mass produced. It is compatible with any fuel or energy source. More importantly, these systems can be developed in the islands and fabricated in the larger SIDS, such as Fiji and PNG. It is important to investigate systems that not only save carbon but also fuel and costs. Mr. Allright stated that fitting these into a Pacific framework means not only piloting technology also systems, networks and ownership models required to maximize the impact of the adopted technology.

Prof. Ölçer discussed the harnessing of technical (design stage) and operational measures. Considering the Pacific region, operational measures such as speed reduction, trim optimization, ballast water related exchange processes is what Prof. Ölçer regards as “low-hanging fruit” that do not require major capital expenditure and investment. He also echoed Mr. Allright’s comments on renewable energy – wind and solar energy that can be used to propel small vessels and assist as hybrid models for medium and large vessels. Prof. Ölçer also highlighted the possibility in the Pacific region to use renewable energy in the production of alternative fuels such as ammonia and hydrogen fuels and more so becoming a hub for these types of fuels. Fleet replacement can also be considered in economies of scale. Human factor elements such as capacity building and awareness needs to be studied in parallel to technology adoption.

Mr. Føhrby furthered elaborated on alternative fuels, especially for short distances such as between islands, where he stated hydrogen fuel can be utilized as they preserve more energy and in that case is cheaper. For longer voyages, Mr Føhrby also agreed with Prof. Ölçer on the production of e-fuels and biofuels that the Pacific region can take the lead on. In addition to being an alternative fuel source, this provides an opportunity to export these types of fuel and generate a business chain.

Q3. What is the biggest challenge/barrier excluding the said type of technology adoption?

Mr. Allright discussed designing systems from a bottom-up approach looking at shipping as a whole system, not just as a vessel but also as the service it provides to island communities. He mentioned that SIDS and LDCs students’ studying at WMU are always eager to develop projects but do not have the tools, access or convening power to put projects together. Including these young people in all stages of the development of these types of projects ensure longevity. R&D of technology needs to be transferred to the islands where a cycle of aspirations for co-designing, technological knowledge and kick starts economic cycles in the region ensuring that technology is well and truly embedded in the communities.
Prof. Ölçer reiterated the “human factor”, that is, lack of awareness, information, capacity building, technical skills, trained human power and limited access to capital. Also, tailoring regulations to the local context with regards to content and timelines.

Mr. Føhrby elaborated on the market forces influencing supply and demand of fuels and the financing factors that create signals between supply and demand.

Q4. How do we improve the regional cooperation for maritime decarbonization?

Mr. Allright emphasized that trust is a critical if not fundamental element in building a circle of faith between all actors in the sector to move out of our individual silos and comfort zones and build towards a common goal of decarbonization rather than piecemeal projects. Additionally, he mentioned that funders and donors need to trust the local stakeholders and not be too controlling in projects and the need to move away from neo-colonialism as a region.

Prof. Ölçer also agreed that trust is essential, as well as a paradigm shift and a mindset shift when it comes to decarbonization. He stated that stakeholders need to be defined and that Pacific issues and solutions need to be detailed to these stakeholders. Finally, he mentioned that the educating of appropriate stakeholders will build greater awareness and ensure informed decisions are being made in the region; this can be in the form of regional workshops facilitated by MTCC-Pacific.

Mr. Føhrby underlined the importance of the “One Pacific Voice” that IMO would build into for their decarbonization plans. Furthermore, he emphasized the need for a market-based measure to generate pressure on fossil fuel users as well as generate revenue for green transformation in the sector. Finally, he stated a fuel index is required for fuel to be progressively cleaner towards 2050 and that a well-researched blueprint for green corridors needs to be put together to ensure uptake of this concept.

4.4 Session 2: Overview of decarbonization technology challenges from the Pacific region

The following segment consisted of five key speakers. The key speakers were Dr Zullah Mohammed, Head of Pacific Maritime Technology Cooperation Centre (MTCC Pacific); Mr Thierry Nervale, Director, Solomon Islands Maritime Authority (SIMA); Mr Vaelua Sonny Brown, Asst. CEO Maritime Division, Ministry of Works, Transport & Infrastructure, Samoa (MWTI); Ms Avnita Goundar, Asst Lecturer Marine Transport, The University of the South Pacific (USP); and, Mr Mollie Fong, Managing Director, GREENCO Fiji.

Speaker 1 - Dr Zullah Mohammed provided an update of MTCC-Pacific and the work carried out in Phase I from 2016-2021, which included capacity building in energy efficiency management, reduced carbon footprint, climate change and disaster risk management, waste management and pollution control in shipping and port operations. He mentioned the most recent project of the Centre, a demonstration project of a solar powered outboard motor in Tailevu, Fiji. The project demonstrated a 20HP outboard electric motor and battery power bank with marine accessories on an open fiberglass boat. It showcased the empowerment of the local community when the issue of fuel dependency is unburdened. These types of projects can be upscaled to all types of communities in the Pacific, where this mode of transportation is commonplace. Other lessons learned from the Centre were that emphasis on private sector and their engagement is critical in the move towards decarbonization as well as infrastructure development and standards for new technology in the maritime sector.

Speaker 2 - Mr Thierry Nervale gave an overview of SIMA and the structure and work they carry out. He then spoke on the changes and upgrades needed in policies and plans for the uptake of new technologies and new vessels. One challenge Mr Nervale highlighted was the issue of reconciling investing in new technologies/ships while also addressing the issue of uneconomical routes that Pacific domestic vessels service. Another challenge was the low investment capacity and high risks due to economic uncertainties.
further exacerbated by COVID19 especially in Solomon Islands. A final challenge Mr Nervale discussed was the aging fleet and the pattern of purchasing secondhand vessels and how the right standards to regulate new technology/vessels is needed. He then concluded that development partners, robust climate financing to ensure facilitation of private sector investment as well as demonstration projects are key elements for decarbonization.

Speaker 3 – Mr Brown provided another point of view from a regional maritime administration. He mentioned that technology and regulation need to work together to effectively provide momentum in the right direction without distorting market forces. He spoke on transport optimization and energy efficiency in the Samoan fleet which included slow steaming, use of LED lights, use of renewable energy such as the solar panels installed onboard MV Lady Samoa III through MTCC-Pacific and route selection. He outlined the challenges in the Samoan maritime administration being limited capacity of officials in maritime technical areas; no equipment or expertise to use or understand monitoring data; the absence of decarbonization technical expertise; lack of resources to monitor ship carbon emissions; little to no local interest in maritime affairs; lack of support to provide information and technical tools on energy efficiency; new amendments of MARPOL Convention not reflected in national legislations and the need to review existing legal framework.

Speaker 4 – Dr Goundar presented on the important aspect of political will in maritime decarbonization. Pacific states are highly influential players in the IMO shipping emissions negotiations. She stated that many Pacific states do not contain provisions in their sector policies to support a transition to net zero emissions future in shipping save for National Energy Policies. She listed five many challenges being: financing, community uptake of such projects, capacity building for operations, maritime administrations, drafting legislation and regulations, collaboration between relevant stakeholders and reviewing policy and legislation.

Speaker 5 – Mr Fong spoke on the current trends of decarbonization in the maritime sector. He highlighted the opportunity given to GREenco to work with MTCC-Pacific being contracted on the solar-powered outboard engine demonstration project. He explained that GREenco is the distributor of Torqedo in Fiji. Other trends he mentioned were propeller modifications such as the Sharrow Propellers, Propeller Boss Cap Fins and High Fins. Going back to the MTCC-Pacific project, the challenges they faced were financing, technical expertise and delivery of technology and technical expertise. However, Mr Fong mentioned a growing interest in solar-powered outboard engines with increasing prices in fuel making local communities look for alternative power sources.

Main Discussions

A question was raised on corrosion problems with the solar-power system on the outboard to which was answered that no main issues with corrosion in marine environment on electric/hybrid motor and battery for Fiji outboard motor project. Another question raised was on the type of capacity building for the local community to which was answered that the local community were trained in maintenance and repair of these new technologies as well as upskilling in small boat handling under the Fiji Maritime Safety Authority of Fiji (MSAF)’s Boat Master Licence (BML) training course.

4.5 Session 3: Panel Discussion

The following three questions were posed to the five panelists consisting of Mr Thierry Nervale, Mr Sonny Brown, Ms Avnita Goundar, Mr Mollie Fong and Mr Gavin Allright.

1. Maritime Decarbonization needs a global effort. How do we mitigate the technology gap between the developed and developing economies?
Mr Nervale stated regional cooperation is one such method as we Pacific countries are reliant on one another as well as on Australia and New Zealand. Developed countries must look at their decarbonization processes and involve Pacific Island Countries in these processes to ensure that all are moving at the same pace. There is also a need to look at pilot projects to assess financing options, such as loans for domestic shipping operators, increase their investment capacity and grants to test feasibility.

Mr Brown discussed the issues of maintenance and upkeep of ships and machinery. He stated that improvement of technical knowledge and awareness is a way to mitigate global effort.

Dr Goundar re-emphasized the phrase “what works in developed countries, may not work in developing countries”, i.e. being mindful of the type of technology being brought into the region. She concurred with Mr Nervale on mitigation efforts being done regionally or bi-laterally, e.g., the formation of the “SHAC” group at IMO negotiations. It is important to form relationships as some Pacific maritime administrations are small and need much assistance and capacity building.

Mr Fong answered that for the private sector, government concessions would allow new technology to be more readily available.

Mr Allright agreed with Dr Goundar on the need for a trusted convener or organization such as IMO CARES and MTCC-Pacific as high-capacity organizations which have the authority and networks to convene projects and bring together finance and investment as well as technology providers and the communities that will utilize this technology. He underscored the importance and value of trust in the whole process of moving towards decarbonisation.

2. We often hear that Financing for maritime decarbonization is not easily available. Given this lack of availability of funding / financing for maritime decarbonization for Pacific economies, what can be done to attract funding and investments in the region?

Mr Nervale stated that financing is an essential issue to discuss when regarding decarbonization. He mentioned that at national level, the need to prioritize climate mitigation in maritime in government priorities. At the recent Oceans Conference, Solomon Islands made specific commitments to reduce greenhouse gas emissions from domestic and international shipping. Mr Nervale once again stressed the need to look at solutions through regional cooperation and ensuring projects at the regional level as a regional response to global maritime decarbonization. He stated that this combined regional effort will ensure better access to climate financing.

Mr Brown stated that he was unsure of Samoa government’s processes with regards to accessing global financing, but the Ministry continues to push for decarbonization priorities with assistance from IMO. Dr Goundar expressed the need for a proper and clear financing plan at the regional or national level, especially to attract donors. In terms of accessing climate funding, she stated that a mechanism similar to the Green Climate Fund could be explored for IMO and be made available to developing countries.

Mr Allright explained at the macro level with climate financing, the developed worlds must live up to its obligations and fully fund these mechanisms. Accessing climate institutional financing is also set quite steeply and with small maritime administrations can prove constraining. He posed the question on whether having piecemeal projects across the Pacific fairer better than a collective effort by the region to state exactly how much and what the region needs. He also spoke on the sustainability of decarbonization projects, noting that payback for these projects, local community buy-in and local community financial resources are all set up to weather such projects.
Mr Nervale once again reiterated the importance of regional governance towards maritime decarbonization and the need to create a clear framework for Pacific maritime decarbonization priorities that includes consultations, technical assistance, collective project designing and more importantly to have common objectives and targets. He also stated the importance of including the maritime industry in regional governance, established through alliances and/or regional associations.

Dr Goundar shared on the importance of recognizing the work being done by various organizations and R&D centers such as the Sustainable Sea Transport Initiative, USP’s Micronesian Centre for Sustainable Development, MTCC-Pacific as well as noting the voyaging societies such as Fiji’s Uto Ni Yalo. She then posed the question of whom to lead the work towards decarbonization in the Pacific.

Mr Allright seconded Dr Goundar’s note on the importance of identifying a convening body for all parties involved in this space. He also stated the significance of ensuring trust and equal status amongst all stakeholders as sustainability is a collective balancing act. He mentioned that while the Pacific voice has strengthened at the IMO in terms of decarbonization, Pacific ambitions and sense of urgency may be deemed deficient. Maritime transport is an existential issue for all Pacific counties therefore a systemic change is required with a triple-bottom line approach.

4.6 Closing remarks

The workshop was concluded by Dr Zullah who thanked all participants and the panelists for their time and the scope and breadth of knowledge sharing on maritime decarbonization. While the many challenges faced in the Pacific region were noted, he stated that the IMO CARES provides a platform for inclusive innovation and this workshop then fueled the unique Pacific flavour that will assist with the programme for the project in working with SIDS and LDCs.

5. Workshop Conclusion and Future Outlook

MTCC Pacific in collaboration with the IMO CARES PCU, expertly facilitated the IMO CARES webinar for the Pacific and focused on facilitating regional consultations on the IMO CARES concept, providing perspectives on maritime decarbonization R&D and identifying challenges and solutions related to maritime decarbonization technology within the region.

The successful completion of the webinar represents the MTCC Pacific and the IMO’s unwavering commitment to initiating and maintaining engagement with maritime stakeholders in the local, regional and international arenas, while continuing to build capacity across all mediums. Stakeholder engagement and active discussions during the webinar have provided both regulators and industry with a sound foundation to stimulate the transfer and uptake of energy efficiency technologies and low carbon fuels and move towards the successful implementation of the Initial IMO GHG Strategy.

MTCC Pacific will build on the momentum generated by the webinar to continue its maritime decarbonization effort in the region and stands ready to offer to support the IMO CARES Foundation project in the delivery of its long-term programme of action.

6. List of Annexes

   I. List of Participants
   II. Agenda
   III. Session 2 Presentations
   IV. Group Photo
# Maritime Decarbonization – R&D
## Pacific and Global Perspectives
### 12th August 2022
#### 11:00 AM – 1:10 PM (FJT)

## Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Item</th>
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<tbody>
<tr>
<td>11:00 AM – 11:10 AM</td>
<td><strong>Keynote Address (IMO)</strong>&lt;br&gt;Mr. Jose Matheickal, <em>Deputy Director/Head (Major Projects)</em>, <em>IMO</em> – 5 mins&lt;br&gt;Eng. Essam Al-Ammari, <em>Permanent Representative of the Kingdom of Saudi Arabia to IMO</em> – 5 mins</td>
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<td>11:10 AM – 11:15 AM</td>
<td><strong>IMO CARES – Introduction</strong>&lt;br&gt;Ms. Petra Ghassemi Ahari, <em>Atg. Project Officer, IMO</em> – 5 mins</td>
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<td>11:15 AM – 11:30 PM</td>
<td><strong>Session 1: Overview of R&amp;D related to maritime decarbonization - Global Perspectives</strong>&lt;br&gt;Mr. Gavin Allright, <em>Secretary General - International Windship Association (IWSA)</em> – 5 mins&lt;br&gt;Prof. Dr. Aykut Ölçer, <em>Director of Research, Nippon Foundation Professorial/ Chair in Marine Technology and Innovation, World Maritime University (WMU)</em> – 5 mins&lt;br&gt;Mr. Christian Føhrby, <em>Regulatory Affairs Partner, Mærsk McKinney Møller Center for Zero Carbon Shipping</em> - 5 mins</td>
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<td>11:30 PM – 11:50 PM</td>
<td><strong>Session 1 Q&amp;A</strong></td>
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<td>11:50 PM – 12:15 PM</td>
<td><strong>Session 2: Overview of decarbonization technology challenges from the Pacific region</strong>&lt;br&gt;Mr Zullah Mohammed, <em>Head of Pacific Maritime Technology Cooperation Centre (MTCC Pacific)</em> – 5 mins&lt;br&gt;Mr Thierry Nervale, <em>Director, Solomon Islands Maritime Authority (SIMA)</em> – 5 mins&lt;br&gt;Mr Vaelua Sonny Brown, <em>Asst. CEO Maritime Division, Ministry of Works, Transport &amp; Infrastructure, Samoa (MWTI)</em> – 5 mins&lt;br&gt;Ms Avnita Goundar, <em>Asst Lecturer Marine Transport, The University of the South Pacific (USP)</em> – 5 mins</td>
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<td>12:15 PM – 12:35 PM</td>
<td><strong>Session 2</strong></td>
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<td>12:35 PM – 1:05 PM</td>
<td><strong>Session 3: Panel Discussion</strong></td>
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<td>1:05 PM – 1:10 PM</td>
<td><strong>Closing remarks (IMO)</strong></td>
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Pacific Maritime Technology Cooperation Centre (MTCC Pacific)

Maritime Decarbonization – R&D Pacific and Global Perspectives

12th August 2022
“Very informative workshop considering it is the first of its kind in the Pacific. I believe further workshops of this kind will be very useful to PICTs in keeping up to date with knowledge on energy efficiency for ships and continuous interest in data collection and analysis.” – MTCC Pacific Regional Workshop, Samoa, 2019

“More demonstration projects are needed for ship owners.” – National Workshop II on Energy Efficient Operations of Ships, Honiara, 2021

“Exciting news from our women in the shipping industry who managed to take up some male roles and responsibilities which is a huge achievement to them as we all know that the maritime industry is male nominated – PACWIMA virtual “tok tok” series, 2020
Innovation for Sustainability

Project
Electric outboard

Demonstrate a solar powered outboard motor on an outboard belonging to a rural maritime community in Fiji.

Issue
2 stroke engine

With the increasing fuel cost and difficulty in accessing fuel means that this service is at times not provided and hinders the progress and function of the school and community in executing their duties.

Solution
Renewable energy

A 20HP hybrid outboard electric motor and battery power bank with marine accessories for a fiberglass open boat. This will include an advanced power component such as fast solar and battery charge controllers.

Scale up
Sustainable and environmentally friendly

The project’s success will encourage local fisherman and water taxi operators in the delta and island communities to transition to electric engines for economic growth and social inclusion.

Outboard Motors is the main mode of transport for the communities of all the 150 inhabited islands of Fiji.
Challenges and Regional Cooperation

**Long term goals:**
Pacific Maritime transport have *embraced low-carbon development and innovation to reduce GHG emissions* and contribute to the Pacific Islands Countries emissions reduction targets.

**Inputs**
- SPC expertise
- Networking & Partnerships
- Data management systems
- Training
- MEL methods
- Comms & Visibility

**Outputs**
- Capacity building
- Demonstration projects
- Drafted policies/laws
- Analysed data

**Short – term Outcomes**
- Improved capacity
- Demonstration projects show benefits
- PICs adopted polices/laws/standards

**Medium – term Outcomes**
- PICs maritime industry uptakes low-carbon technologies
- PICs maritime administrations improved capacity and systems
Thank You

zullahm@spc.int
DECARBONIZATION TECHNOLOGY CHALLENGES FROM THE REGION JULY 2022

BY THE MARITIME DIVISION, MINISTRY OF WORKS, TRANSPORT & INFRASTRUCTURE
PRESENTATION OUTLINE

1. Introduction
2. Regulation and Responsibility
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INTRODUCTION

In order to limit the effects of climate change, the carbon dioxide emissions associated with the energy sector need to be reduced. Significant reductions can be achieved by using appropriate technologies and policies.

The process of decarbonization involves many technical, economic and social aspects. The transition to cleaner energy is a complicated process with numerous ramifications for the environment, society and the economy.

There are several ways to reduce the carbon footprint of the Pacific Region, but the process must be accelerated and sustainable. Decarbonization is an important goal, and it is not going to happen overnight.

The world cannot simply abandon coal and fossil fuels. If all power plants stopped most office buildings, hospitals and homes would be without power and many would face serious problems and people will even die.

Furthermore, the global population continues to grow, making it difficult to achieve climate goals. However, there are ways to make decarbonization a reality. The first step to decarbonize a business is to understand the major challenges that it faces.

We need a mix of solutions and natural approaches to reduce carbon emissions. To ensure the decarbonization of our societies, we need long-term financing and the support of governments. For this, we need long-term solutions that are both socially and environmentally sustainable.
REGULATION AND RESPONSIBILITY

- Technology and regulation need to work together effectively to help provide momentum in the right direction but without distorting market forces.

- Today, subsidizing electric vehicles effectively benefits the wealthy who can afford them. Subsidizing the scrappage of old polluting vehicles instead would enable the less wealthy to be able to afford cleaner, more efficient, vehicles, which can have a bigger impact on emissions than increasing the number of EVs on the road.

- Road transportation makes up 20% of global carbon emissions, so clearly it needs to be addressed, but electrifying transportation simply moves emissions up the supply chain to power generation, which today produces 40% of GHG emissions.
SHIPPING EMISSIONS CONTRIBUTE TO CLIMATE CHANGE BY PRODUCING GREENHOUSE GASSES.

• **Slow steaming** (ships operate at slow speeds, reducing their fuel consumption considerably) and route optimisation.

• Reduce emissions per vessel by as much as 5%. These include improving hull design, propeller optimisation and waste heat recovery.

• Renewable energy – the use of wind-assist, or wind power, for propulsion. Installed different rotor designs on ships.

• Solar panel has been installed onboard MV Lady Samoa III

• Energy storage using batteries and cold ironing (the process of providing shoreside electrical power to a ship at berth while its main and auxiliary engines are turned off). This would enable the sector to decarbonise by allowing it to run off electricity produced via a low carbon grid.

• Fuel switch to lower carbon fuels for propulsion.

• Ship Shaft Generator – help to limit shipping emission
Reducing energy consumption by improving energy efficiency of the systems or technology employed—at its simplest level LED lighting is a good example.

Reducing energy consumption by improving efficiency through driver behavior changes, for example minimizing & encouraging drivers to drive to engine optimum efficiency specification.

Reducing energy consumption through optimization of the system—for example route selection.
SAMOA SHIPPING CORPORATION & ELECTRICAL POWER CORPORATION SOLAR PROJECT IN SAMOA

- Installed solar panel on the MV. Lady Samoa III vessel
- Installed 5.0MW solar power station across two sites in Samoa
  1. Faleolo International airport has a 3MWp solar PV ground mount system.
  2. Faleata Racetrack has a 2MWp solar PV ground mount system.
CHALLENGES IN THE DECARBONIZATION OF THE ENERGY MARITIME TRANSPORT

• Review of technological options for decarbonizing in each energy sector.

• Economic & social issues, energy supply security & sustainability

• A global carbon tax can accelerate the decarbonization process

• Long-term decision making in energy & political stability need to be considered

• The competing energy sectors need to be prioritized for decarbonization.
CHALLENGES AS A REGULATOR / MARITIME ADMINISTRATION

• Limited capacity of officials in maritime technical areas

• No equipment or expertise to use & understanding monitoring data

• Absence of decarbonization technical expertise

• Lack of resources used to monitor ship carbon gases

• Little or no local interest in maritime affairs

• Lack of support to provide information & technical tools on energy efficiency

• New amendments of MARPOL Convention not reflected in the national legislations

• Review of the Shipping Act & the existing legal framework
COVID-19 border restrictions has delayed the following activities:

- Classification surveys of domestic cargo and passenger vessels
- The conduct of marine oil spill response equipment training and exercises for Samoa Response Team by the Maritime New Zealand

Insufficient Maritime Administration Staff to carry out Maritime mandates

Need more capacity building training for Maritime Technical Staff
WAY FORWARD

• Upgrade decarbonization technology knowledge & skills of Ship Industries
• Strengthen ship emission control policy and regulation
• Targeted capacity building initiatives e.g., modern decarbonization vessel design
• Strengthen maritime domain awareness of high carbon
• Conduct regular drills e.g., response to marine pollution, ship in distress
• Strengthen inter-agency collaboration with decarbonization technology
Thank You
Maritime Decarbonisation – R&D Pacific and Global Perspectives

Dr Avnita Goundar
Discipline of Marine Studies
The University of the South Pacific, Suva, Fiji
Role and influence of Pacific states in international shipping emissions negotiations

- Pacific states are highly influential players in the IMO shipping emissions negotiations.
- Trends: Increase in attendance at MEPC meetings, increase in submissions, increase in number of Pacific states supporting setting of an emission-reduction target.
- The Pacific-led drive that began in 2015 at MEPC 68 delivered a strong outcome three years later (adoption of IMO GHG Strategy), in collaboration with many other like-minded IMO member states.
Figure 1: Trends in overall attendance of Pacific states per MEPC session (MEPC 61–72). Source: Goundar, 2020
Figure 2: GHG-emissions submissions involving Pacific states (joint/individual) versus other IMO members (MEPC 68-72). Source: Goundar, 2020
National policy landscape in Pacific states to support a transition to net zero emissions future in shipping

- In many Pacific states, sector policies do not contain provisions to support a transition to net zero emissions future in shipping. Fiji and the Marshall Islands display a strong policy landscape for decarbonising the shipping sector.

- Provisions for reducing shipping emissions are better captured in the national energy policies of Pacific states than other sectoral policies.

- Challenges: Resource constraints, technical expertise limitations, potential impact on trade, inter-agency communication issues, open registry dynamics, and the gaps in national policy landscape.
Number of Pacific states with shipping emissions provisions in relevant national policies and strategies (Source: Goundar, 2020)

<table>
<thead>
<tr>
<th>Policy Category</th>
<th>Number of countries with international shipping emissions provisions/direct references</th>
<th>Number of countries with domestic shipping emissions provisions/direct references</th>
</tr>
</thead>
<tbody>
<tr>
<td>National development plan</td>
<td>1 (Fiji)</td>
<td>1 (Fiji)</td>
</tr>
<tr>
<td>National transport/maritime policy</td>
<td>0</td>
<td>4 (Fiji, PNG, Samoa, Solomon Islands)</td>
</tr>
<tr>
<td>National energy policy</td>
<td>0</td>
<td>8 (Fiji, Kiribati, Marshall Islands, Niue, PNG, Samoa, Tuvalu and Vanuatu)</td>
</tr>
<tr>
<td>National climate change policy/strategy</td>
<td>2 (Fiji, Marshall Islands)</td>
<td>3 (Fiji, Marshall Islands, Vanuatu)</td>
</tr>
<tr>
<td>Nationally Determined Contributions</td>
<td>0</td>
<td>1 (Marshall Islands)</td>
</tr>
</tbody>
</table>
Domestic shipping projects undertaken in the 1980s showed strong potential, were achievable with relatively minimal financial investment, and were only curtailed because of the global fall in oil prices.

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>Description</th>
<th>Outputs</th>
<th>Agencies</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji soft sail retrofit</td>
<td>Auxiliary rig retrofitted to two government vessels of ~300t. Rigs built and installed in-country</td>
<td>Fuel savings 23-30%, but also 30% engine/prop wear reduction, greater stability, incr passage times. IRR on best route = 127%, average route = 33%</td>
<td>ADB, Southampton University, McAllister Elliot</td>
<td>Southampton University collated historical wind data for all Fiji routes and produced fuel saving ratios for all routes.</td>
</tr>
<tr>
<td>Lau Passenger / cargo</td>
<td>50 ton primary sail powered trading vessel, designed and built on Kabara by local builders (1984-87). First of 3 planned vessels to service Lau and Lomaiviti Groups.</td>
<td><em>Tai Kabara</em> became the main vessel operating on the Southern Lau route until she was scuttled in 2006. Used local materials wherever possible.</td>
<td>European Union</td>
<td>Construction of the other two ships was cancelled when the oil crisis abated.</td>
</tr>
<tr>
<td>Ha’apai Freighter</td>
<td>Needs assessment and design analysis led to commissioning of build plans for a 100 ton energy efficient freighter</td>
<td>Needs assessment, transport census and full build plans for a 100 ton energy efficient freighter.</td>
<td>UNESCAP, UNCTAD, UNDP, ADB</td>
<td>Vessel never constructed due to end of crisis. Similar needs assumed today.</td>
</tr>
<tr>
<td>SCF/Jim Brown</td>
<td>Save the Children Fund Tuvalu employed catamaran designer Brown to develop locally built boats for Tuvalu/Kiribati</td>
<td>A range of designs and processes for locally built/operated catamarans for artisanal and commercial fishing and local and inter-island transport. Training of local shipwrights. Local materials favoured</td>
<td>SCF</td>
<td>This project closely associated with the FAO/UNDP project. Local build/materials used wherever possible. Fuel savings of up to 60%.</td>
</tr>
<tr>
<td>FAO/UNDP (1982-1989)</td>
<td>A multi-county fisheries programme to develop RE artisanal and small-scale commercial vessels for local community benefit.</td>
<td>A portfolio of 10 designs from single dugouts to 11m trimarans. 350 vessels built in 8 countries. Demonstrated need for vessels to be affordable and locally appropriate.</td>
<td>FAO UNDP</td>
<td>Uptake ceased with end of project and falling fuel prices. Communities with ‘living tradition’ of sail had greatest uptake.</td>
</tr>
</tbody>
</table>
FAO/UNDP Artisanal Fishing Boat project
1982-1989

350 boats built in eight PICs.

Communities with ‘living tradition’ of sail had greatest uptake.
Solar-powered electric boat in Fiji: Case study of Matanitokalau Princess (Rajput et al., 2022)
Majority prefer use of solar-powered boat because of the many benefits.
Reviving traditional sailing and boatbuilding practices in Fiji: A case study of *Uto Ni Yalo*

(Inatoa et al., 2022)
Challenges

• Lack of legislation dealing with traditional vessels
• Inter-island border restrictions
• Operational and maintenance costs –
  • Skilled crew cost more.
  • The renovation of the canoe can cost around FJ$40,000–60,000 annually
• Funding for expansion
  • The Uto Ni Yalo Trust is working with communities to promote use of shunting canoes for inshore fisheries sea transportation needs.
  • New projects require funding.
Issues

FINANCING
COMMUNITY UPTAKE
CAPACITY BUILDING
COLLABORATION
POLICY AND LEGISLATION
Thank you