

## MARITIME TECHNOLOGY COOPERATION CENTRE IN THE PACIFIC (MTCC-PACIFIC)

CAPACITY BUILDING FOR CLIMATE MITIGATION IN THE MARITIME SHIPPING INDUSTRY  
THE GLOBAL MTCC NETWORK (GMN) PROJECT

### FIJI NATIONAL WORKSHOP ON SHIP ENERGY EFFICIENT OPERATIONS (SEEO)

Suva, Fiji

24-25 October, 2017



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## **EXECUTIVE SUMMARY**

The First National Workshop on Energy Efficient Operations of Ships was held in Suva, Fiji from 24 to 27 October 2017. The meeting was coordinated and facilitated by the Maritime Technology Cooperation Centre in the Pacific (MTCC-Pacific) and attended by representatives from the Fiji Ministry of Infrastructure and Transport (MoIT), the Maritime Safety Authority of Fiji (MSAF), The Fiji Port Corporation Limited (FCPL), the Fiji Ships and Heavy Industry Limited (FSHIL), the Pacific Islands Development Forum (PIDF), Patterson Shipping/Searoad Shipping, Seaquest Fiji Ltd/Sealand Processors, Inter Link Shipping Line Ltd, Government Shipping Services, Tokalau Shipping, All Barging and Marine (Fiji) Limited, and Billett Wright & Associates (Fiji) Limited, Solander Pacific Limited. The list of participants is attached in Annex 1.

The purpose of the workshop was to gather Fiji government, the maritime administration and ship operators to agree on measures to improve energy efficiency of shipping in Fiji and provide them with technical tools to progress towards energy efficient operations of ships. The national workshop Agenda is attached in Annex 2.

The workshop was held in three parts; the first day consisting of high-level meeting that were provided with overviews of the MTCC-Pacific project, International Maritime Organization (IMO) approach through the Global MTCC Network (GMN) project and the approach of maritime Safety Authority of Fiji (MSAF). The managers also discussed issues, challenges and opportunities in the Fiji Maritime Industry and identified drivers, needs, barriers and relevant actions to climate mitigation in the Fiji maritime industry.

The second workshop consisted of shipping practitioners discussing issues relating Ship Energy Efficiency Operations (SEEO); climate change, greenhouse gas emission and Shipboard Shore Energy Management (SSEM) measures. There was also interactive knowledge transfer on Energy Efficiency Design Index (EEDI), Energy Efficiency Operational Indicator (EEOI), Ship Energy Efficiency Management Plan (SEEMP) and Pacific Islands Domestic Ship Safety (PIDSS). There was also IMO GMN technology transfer and technical cooperation – Propeller Boss Cap Fins (PBCF), Light Emitting Diodes (LED), Waste Heat Recovery System (WHRS) and such. The third part of the workshop was the gathering of both groups to agree and commit to the outcomes produced out of the previous three-day deliberations. All workshop presentations are attached in Annex 4 in consecutive order as outlined in the Agenda. Supporting images of some workshop activities are attached as Annex 6.

The national workshop participants then agreed to implement relevant actions to progress towards Green Maritime Industry (ships, shipyards and ports) in Fiji in order to support a long-term objective for low-carbon maritime transport and contribute to the reduction of GHG emissions in Fiji and the Pacific. The National Workshop Outcomes Document is attached in Annex 3.

## **INTRODUCTION**

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A media release was sent out at the end of the workshop noting the commitment of the workshop participants to addressing issues affecting domestic shipping in Fiji, taking into consideration the need to contribute to national efforts in reducing greenhouse gas emissions, and with the view to operate ships more efficiently and implement energy efficient measures. Several tweets/retweets and posts/re-posts were sent out as well on social media. Attached as Annex 7 are examples of communication and visibility activities that took place during this workshop.

## **DAY 1: HIGH LEVEL MEETING**

### **1. PRESENTATION OF THE GMN PROJECT – IMO APPROACH** (*Tamar Barabadze, Project Manager, GMN PCU Unit, IMO*)

GMN is an initiative funded by EU with total funding of Euro 10 million for a period of four years (January 2016 to December 2019). The overall objective of the project is to support selected developing countries in limiting and reducing GHG emissions from their shipping sector through technical assistance/capacity-building to promote shipping low carbon and energy efficient technologies and operations.

More specifically, the project has established five MTCCs one in each of the target regions (MTCC-Caribbean – at the University of Trinidad & Tobago, MTCC-Africa – Jomo Kenyatta University of Agriculture & Technology, MTCC-Asia – Shanghai Maritime University, MTCC-Pacific – Pacific Community and MTCC-Latin America – International Maritime University of Panama), which would act as centres of excellence to promote the uptake of low carbon technologies in maritime transport.

The project objectives will be achieved through a number of clearly defined actions and interventions that generally include capacity building, uptake of energy efficient technologies and operations pilot projects, data collection and reporting pilot projects and dissemination activities; all to be carried out within the framework of the newly established MTCCs.

### **2. OPEN DISCUSSION** (*Dr M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

The facilitator opened the floor for discussion and the following pointers were gleaned from the discussions:

- The national stakeholders present in this workshop were receptive to the concept of energy efficient operation of ships outlining that shipping is a vital component of this initiative hence it is vital that all shipping operators are involved in not only local inter-island shipping but also tourism and fishing industries.
- This MTCC-Pacific initiative is beneficial in that it draws all operators together. There is an existing local Ship Owners Association and Josateki Tagi, Director from Billett Wright & Associates will inform the association about MTCC-Pacific. MTCC-Pacific expressed its desire to present its initiative to the Shipping Owners Association and will provide tools to develop/improve energy management of vessels..
- MTCC-Pacific is here to assist the Pacific maritime sector in achieving the primary objective of reducing greenhouse gas emissions. However, it acknowledges the critical need for relevant and accurate data collection that will establish the baseline for this primary objective.



### **3. PRESENTATION OF THE MTCC-PACIFIC PROJECT** (*Thierry Nervale, Head of MTCC-Pacific, SPC*)

The MTCC-Pacific project, which has the vision of a Pacific low-carbon maritime transport that supports the sustainable development goals of Pacific Island countries and territories (PICTs) and the transition towards a greener economy in the Pacific.

The MTCC-Pacific will provide capacity-building activities to improve the capacity of PICTs to comply with international instruments and facilitate the implementation of energy efficient measures in the maritime industry. This complements the regional maritime capacity-building activities related to the mandate of both SPC and SPREP namely: maritime safety, security and governance; trade facilitation and port efficiency for SPC; and pollution prevention from ships for SPREP. The delivery of pilot-projects will also assist in the promotion of low-carbon technologies and operations in the maritime sector.

The MTCC-Pacific will form part of international and regional networks of centres of excellence to share information and experiences and promote the uptake of low carbon technologies and operations and energy efficient practises in the maritime industry. Target countries include Fiji, Samoa, Marshall Islands, Kiribati, Solomon Islands, Tuvalu and Vanuatu.

All Pacific Islands Countries have ratified the Paris Agreement including Fiji. Commitment to reduce GHG emissions through their Nationally Determined Contributions (NDC). All sectors contribute to reduce GHG emissions taking into account their own circumstances.

What does it mean for the Fiji maritime shipping sector?

- Energy efficient operation of ships
- Uptake of new technologies and new vessels concepts.

#### Discussion

The following points materialised from discussions in this session:

#### 1 Challenges:

- The PIDSS audit stage of measuring progress in terms of maritime safety.
- Influencing domestic vessels to implement MARPOL and use the best tools for progress in domestic ships.

#### 2 Data collection:

- The project will initially commence with the collection of fuel oil consumption data. Templates for this have been developed by MTCC-Pacific. The Ministry of Infrastructure and Transport will verify all data from shipping companies. The data serves to provide MTCC-Pacific with a way of quantifying GHG emissions in the Pacific. Further to this, this data will be used to build a baseline to enable the design of suitable technology and operational activities that will assist in reducing green-house gas emissions.

### **4. THE APPROACH OF THE MARITIME SAFETY AUTHORITY** (*Kalusiani Vuki, Legal Officer, MSAF*)

MSAF presented without the usage of a PowerPoint presentation and made the following statements:

- Fiji is dependent in standards applied abroad in relation to ships brought into the country.
- It is economical and feasible to bring in used vessels to Fiji because it is too expensive to buy and maintain new vessels.

- There are no legislative measures in place with respect to efficiency of the machinery on board domestic vessels.

With respect to MSAF's approach in energy efficient operation of ships:

- Government already has provisions, such as tax incentives, for the purchase of newer ships with energy efficient designs.
- Fiji has approximately 2000 vessels less than 15m with 2 stroke engines in operation. In the near future, the authority is looking at phasing out 2 stroke engines and introducing more efficient 4 strokes engines. However, it will be a big challenge and will require a clear plan on the implementation procedure.
- Revival of the ship building industry that incorporate local needs and adopts energy efficient designs/technologies suitable for the region.
- Introduction of eco-friendly sailing ships (similar to the drua *Uto ni Yalo*) to be used as training ship to advocate for energy efficiency.

### Discussion

The following points were gleaned from the discussions in this session:

- Fiji holds the presidency of COP23 and made a commitment to GHGE (NDC) reductions, climate impact mitigation and meet SDG14 on Oceans. Local entities must make every effort to fully and effectively support this. One mode highlighted was the provision for the usage of electrical outboard motors. MSAF and the Fiji Government must work towards proving and promoting this to the local ship/vessel operators. The Government stated to have included this in the Transport Action Plan in the coming year.
- There is a high number of small boats in operation, highlighting the issue of the lack of transport to remote islands.
- The replacement of two-stroke with four-stroke engines does not constitute elimination of GHGEs, renewable technologies do. The transport industry has legislation in place outlining biofuel and ethanol as alternatives to fossil fuels.
- This workshop has clearly demarcated the factors contributing to GHG emissions and the collective actions that need to be taken to address this. Some of the corrective actions that contribute towards the reduction GHG emissions are:
  - ✓ proper house-keeping and maintenance such as propeller polishing and balancing; hull conditioning, etc.;
  - ✓ use of alternate fuels such as biofuels etc.;
  - ✓ voyage planning: weather routing and speed adjustment on real time arrival (slow steaming).
  - ✓ trim optimization;
  - ✓ strengthening regulations and monitoring systems for proper and timely vessel maintenance and servicing;
  - ✓ development and adoption of ship energy efficiency management plans (SEEMP);
  - ✓ improving the infrastructure for docking ships in remote islands during inter-island trips e.g. four days of steaming to eight different islands, only one of which has a wharf, can waste up to 20 hours of fuel just holding position.
- Data collected should also be clearly demarcated such as:
  - ✓ Type of fuel oil used
  - ✓ Ship type
  - ✓ Main and auxiliary propulsion systems
  - ✓ Auxiliary and emergency generators
- Promotion of existing incentives in maritime transport to the ship owners.
- Subsidies to reduce the fuel oil consumption through operational and technical measures.
- Integrated data sharing from various sources:
  - ✓ MSAF will provide information on vessel specifications.
  - ✓ Vessel operators can provide information on fuel

- ✓ FSHIL can supply information on the consistency of maintenance and servicing of vessels.
- ✓ Port authorities can provide data for provision for OPS (cold ironing).
- During the workshop, discussions focused on the importance of decisions on the way forward and how all maritime industry entities can collaborate better in identifying constraints and new opportunities.
- Government policy should be developed for compliance of submissions on fuel oil consumption data.
- The Fiji Government is currently proposing amendments to the legislation on fuel standards. To change the current fuel standard of Euro 2 (500 ppm S) to Euro 4 (10 ppm S for diesel and 50 ppm S for unleaded fuel). The Euro 4 fuel standard contains less Sulphur.
- Data and information sharing is critical in establishing the baseline for further assessment and corrective actions.

## 5. CLIMATE CHANGE IMPACT RECAP (*Mark Davis, Transport Greenhouse Gas Adviser, SPC*)

MTCC-Pacific provided a recap on the impact of climate change and the increasing intensities of our cyclonic systems; increases in sea surface temperatures; increases in sea level and coastal hazards. MARPOL Annex VI Prevention of Air Pollution Chapter 4 - GHGs mandatory reporting stated that GHGE consist of carbon dioxide, nitrous oxide and carbon black. The MTCC-Pacific project's objective is to reduce the emission of GHGs via the improvement of ship/shore energy efficiency.

## 6. GROUP DISCUSSION AND FEEDBACK (*Thierry Nervale, Head of MTCC-Pacific, SPC*)

All Pacific Islands Countries have ratified the Paris Agreement, including Fiji, by commitment to reduce GHG emissions through their Nationally Determined Contributions (NDCs). All sectors contribute to reduce GHG emissions taking into account their own circumstances. What does it mean for the Fiji maritime shipping sector? Improve the energy efficient operation of ships and explore the uptake of new technologies and new vessel concepts.

The workshop was then divided into two groups to discuss climate mitigation in the Fiji maritime industry and to answer the following four questions to reduce fuel oil consumption and GHG emissions:

- What are the **drivers**?
- What are the **needs**?
- What are the **barriers**?
- What are the **relevant actions**?

The results of the discussion is tabulated below.

## Matrix of drivers, needs, barriers and relevant action

| Drivers  | Needs   | Barriers   | Relevant action   |
|--|---|--|---|
| <i>First National Workshop on Energy Efficient Operations of Ships, Suva, Fiji, 24-27 October 2017</i> |   |  |   |
| Costs of energy  | <ul style="list-style-type: none"> <li>Reduced fuel oil consumption from domestic ships</li> <li>Collect data for baseline to show reduction in fuel consumption</li> <li>Cold ironing to save energy/costs</li> <li>Implement Energy Management Systems in shipping companies to improve practices</li> </ul>  | <ul style="list-style-type: none"> <li>No transparency in the use of data collected to improve systems – lack of open and timely process</li> <li>Transition costs for additional or change of equipment</li> <li>No SOPs and standards set for all Fiji fleet</li> </ul>  | <ul style="list-style-type: none"> <li>Collect data and provide accessibility to data to use in fuel savings measures through a Public Website with dedicated independent data</li> <li>Infrastructure development in Fiji ports to provide onshore power supply – support from Fiji Government</li> <li>Implement SMS/MMS including energy management with the support of SPC (PIDSS and MTCC-Pacific and MSAF jointly)</li> </ul>   |
| Improve profitability of ships, reliability and efficiency of domestic shipping                        | <ul style="list-style-type: none"> <li>Appropriate/relevant legal, regulatory and technical measures adapted to the size of the vessels and the capacity and resources of Fiji shipowners</li> <li>Training on safety, efficiency including energy efficiency, etc.</li> <li>Reduced competition that can compromise safety, efficiency and reliability of shipping services provided in Fiji</li> <li>Reduce lost time for berthing</li> </ul>   | <ul style="list-style-type: none"> <li>Over-regulation and not locally adapted measures that are too prescriptive</li> <li>Lack of crew qualification</li> <li>Measures are often adapted to vessels of more than 50 meters while most of domestic vessels are under this size and old</li> <li>Lack of infrastructure in outer islands to accommodate domestic vessels</li> </ul>   | <ul style="list-style-type: none"> <li>Government financial through subsidies and incentives</li> <li>Waiver depending the size and age of vessels</li> <li>Implementation of measures adapted to the Pacific domestic fleet</li> <li>Control domestic fleet tonnage and pre-inspection/limitation for vessels purchase overseas</li> <li>Capacity building of ship operators and crews on energy efficiency measures and practises</li> <li>Infrastructure development in outer islands to facilitate domestic shipping</li> </ul> |
| Improved standards of domestic ships including safety, training, pollution prevention and efficiency   | <ul style="list-style-type: none"> <li>Consider the inclusion of outboard small vessels in measures to reduce fuel consumption and GHG emissions taking into account the basic needs of communities mobility (4-stroke engines, electric outboard engines)</li> <li>Regular hull cleaning with adapted hull coating systems compliant with best standards and independent inspection</li> <li>Reduced competition that can compromise safety, efficiency and reliability of shipping services provided in Fiji</li> <li>Financial support from Fiji Government to support new measures</li> <li>Revive or develop capabilities in Fiji to build and maintain new concept equipment and vessels</li> </ul> | <ul style="list-style-type: none"> <li>Awareness and practices in communities that must travel between islands and use small outboard powered vessels</li> <li>Lack of dry-dock facility</li> <li>Lack of infrastructure in outer islands to accommodate domestic vessels</li> <li>Lack of support to provide information and technical tools on energy efficiency</li> <li>No government support/incentive to revive/develop ship building and maintenance in Fiji</li> </ul> | <ul style="list-style-type: none"> <li>Availability of new equipment affordable to communities</li> <li>Technical support and capacity building provided by MTCC-Pacific, SPC, MoIT and MSAF to implement adapted measures</li> <li>Infrastructure development in outer islands to facilitate domestic shipping and in Fiji ports to provide onshore power supply</li> <li>Support from government through subsidies and tax incentives for safety, energy efficiency equipment, ship building and maintenance</li> </ul>           |
| Reputation   | <ul style="list-style-type: none"> <li>Improve the reputation of shipping with regards to the protection of the environment and the emissions of GHG</li> </ul>   | <ul style="list-style-type: none"> <li>Lack of cooperation between all shipowners due to high competition</li> </ul>   | <ul style="list-style-type: none"> <li>Communicate efforts to implement energy efficient measure in Fiji domestic shipping</li> <li>Revive the Fiji Ship Owners Association to support Green Shipping in Fiji</li> </ul>  |

## **7. WRAP-UP – MEETING OUTCOME** (*Thierry Nervale, Head of MTCC-Pacific, SPC*)

Productive discussions during MTCC-Pacific's Auckland Port Energy Management Workshop and this National Workshop on the main drivers, needs, barriers and relevant actions has enabled us to put together an Regional Action Plan for the coming two to three years.

The two-day workshop was more technical and on the last day a proposal was made to have another high level meeting where an outcome document, prepared by MTCC-Pacific from the first 3 days of the workshop, were reviewed and endorsed by every participant.

## **DAY 2 – 3: TECHNICAL WORKSHOP**

### **8. CLIMATE CHANGE AND SHIPPING RESPONSE** (*Mark Davis, Transport Greenhouse Gas Adviser, SPC*)

This session provided an overview of shipping operations, including operation segments, ship and cargo types, and the ports role; of shipping contracts such as contract of carriage, bill of lading; and of ship loading such as cargo management and load lines.

### **9. SHIP ENERGY EFFICIENCY REGULATIONS AND RELATED GUIDELINES** (*Mark Davis, Transport Greenhouse Gas Adviser, SPC*)

This session provided an introduction to ship roles and responsibilities; the importance of good communication between engine and deck department; ship energy efficiency (SEE) measures and ship maintenance.

### **10. SHIP MANAGEMENT TO OPERATION** (*Ore Toua, Maritime Training Adviser, SPC*)

This session deliberated on the origins of air pollution (airpol), climate change (CC) and GHG emissions, international global response; international shipping response and the main IMO instruments and historical developments.

#### Discussion

The following points came out of the discussion within this session:

- Fiji does not have the technical capacity to de-rate main engines and also there is lack of support from the engine manufacturers.
- In terms of the frequency of cleaning fuel tanks, most local ships have their own SOPs which state how often they are supposed to clean the sludge tanks, service engines and so forth.

### **11. SHIP-BOARD ENERGY MANAGEMENT** (*Ore Toua, Maritime Training Adviser, SPC*)

This session focused on the following aspects of ship-board energy management:

- ship-board organisation, roles and responsibilities;
- overview of main ship-board EEMs;
- trim optimisation, its impact and best practice;
- ballast water management;



- hull and propeller roughness and fouling;
- engines and machinery utilization management;
- fuel management: storage, treatment and purification;
- technology upgrade; and
- steam system and boilers.

#### Discussion

- Fiji ship owners do utilize divers to inspect and clean the hull and propellers by scraping off the bio-fouling.
- SOPs are mostly handled by MSAF whereas Fiji Maritime Academy looks after the training.
- Most common measures taken by ship owners in Fiji to increase efficiencies of their vessels are hull conditioning, propeller blade polishing and balancing.

#### **12 SHIP-PORT INTERFACE AND ENERGY EFFICIENCY** (*Mark Davis, Transport Greenhouse Gas Adviser, SPC*)

This session introduced ports and port area emissions, ship time in port (TIP) and just-in-time (JIT) operations; technologies for port air quality (AQ)/GHGE reductions; ship in-port operational energy efficiency measures (OEEM); and onshore power supply (OPS)

#### **13 FIJI PORT APPROACH ON ENERGY EFFICIENCY** (*Nanise Kabakoro, Trainee Ports Engineer, FPCL*)

The Fiji Port, with the support of SPC, underwent an energy audit in July 2017 to identify energy reduction opportunities with an aim to reduce operational costs and associated greenhouse gas emissions. As a result, an energy management plan was implemented that included the upgrade of lights to LEDs costing approximately \$23,000. One year onwards FPCL has witnessed positive outcomes such as the significant drop in the Muaiwalu House electricity bills. Furthermore FPCL has forecasted a savings of \$31,000 and have an improved target to reduce energy usage by 30% by 2022 compared with 2016.

FPCL then ended the presentation outlining the benefits of energy efficiency such as:

- Implementation of Energy Policy and Energy Management program can embed efficient energy management practices in an organization.
- The 2016 audit has identified that good energy management has the potential to cost effectively provide large energy savings in ports.

#### **14 ENERGY MANAGEMENT PLAN (EnMP) AND SYSTEM (EnMS)** (*Ore Toua, Maritime Training Adviser, SPC*)

This session provided a brief overview of various ship-board management systems; company level energy management; energy audits and reviews, types and processes; and ship performance, monitoring and voyage performance analysis.

## 15 PACIFIC ISLAND DOMESTIC SHIP SAFETY (PIDSS) (*Omirete Tabureka, Ship Safety Audit Adviser, SPC*)

This was an introductory PIDSS session for participants defining the PIDSS programme, its goals, objectives and outcomes; defining PIDSS safety management systems; components and status of PIDSS and issues and lessons learnt.

### Goals, Objectives & Outcomes

|   |   |
|---|---|
| <ul style="list-style-type: none"><li>• <b>Goal</b><ul style="list-style-type: none"><li>- strengthen maritime safety in domestic shipping.</li></ul></li><li>• <b>Objectives:</b><ul style="list-style-type: none"><li>– Document the status of domestic ships;</li><li>– Provide safety advice, technical support, and assessment/audit services; and</li><li>– Conduct maritime safety audits.</li></ul></li></ul> | <ul style="list-style-type: none"><li>• <b>Outcomes</b><ul style="list-style-type: none"><li>✓ Higher safety standards,</li><li>✓ Reduction in the number of unseaworthy ships,</li><li>✓ Reduction in the number of maritime accidents and incidents,</li><li>✓ A robust national and regional vessel safety monitoring and evaluation system.</li></ul></li></ul> |
|---|---|

#### Discussion

- Having a good safety management system such as the ISM will ensure that safety procedures are adhered to.
- PIDSS is available to assist ship engineers to review and improve their SMS and implementation of safety measures on board vessels. MSAF will audit the system once a good SMS is in place.

## 16 GUIDELINES FOR ENERGY EFFICIENCY DESIGN INDEX (EEDI) (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

This session provided an overview of the EEDI formula; EEDI calculation parameters; EEDI factors and correction factors; and example of a sample EEDI calculation

#### Discussion

- EEDI is carried out in new vessels only.
- The conversion of fishing vessel to passenger vessel is of great concern. Seemingly, it is safety issue and MSAF to shed some light into this.

## 17 GUIDELINES FOR SEEMP (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

In this session, the main elements of SEEMP, implementation aspects and EEOI calculation process was deliberated upon. The SEEMP concept was then solidified with a video for best practice for fuel-efficient operation.

#### Discussion

- For MTCC-Pacific energy management is central to the work it encompasses. Ship operators, engineers must first understand the concept of SEEMP and EEOI before moving forward to implementation to improve the energy efficiency of the vessels. MTCC-Pacific can assist shipping companies in developing

energy management plans, measuring vessels according to this and develop ways to improve energy efficiency.

- MTCC-Pacific will obtain more information on the quality standard for fuel from MSAF.
- Euro 4 contains less Sulphur than Euro 2 fuel standards, but the main concern is that Euro 4 is less lubricating because of the reduction in Sulphur. Fuel suppliers can add fuel additives to improve the fuels lubrication capacity.

**18 OPERATIONAL ENERGY EFFICIENCY MEASURES** (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

This session focused on operational energy efficiency measures with respect to operational management; maintenance and condition monitoring; auxiliary load management; trim/ballast optimization; hull and engine conditions; and system planning and reduced demand.

Discussion

- The trim of a ship describes its floating position length wise, namely if the bow or the aft of the ship is more deeply submerged into the water. The trim can have a significant impact on a vessel's energy demand for propulsion during sailing. The most efficient trim for a particular ship depends on its design, operational draft and speed.
- Hull and propeller conditioning can be enforced periodically by the regulatory body. According to SOLAS regulation, every sea-going vessel has to undergo two dry docks within a period of 5 years.

**19 TECHNICAL ENERGY EFFICIENCY MEASURES** (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

This presentation focused on EEDI reduction method; ship hydrodynamics; propeller and propulsion system; engines and power systems; auxiliary machinery; economic assessment; and a case study on futuristic concept ships.

**20 FURTHER MEASURES TO ENHANCE THE ENERGY EFFICIENCY OF SHIPS** (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

This session focused on the development of data collection systems (DCS) for fuel consumption; data collection; data analysis; and lastly followed by decision making on what further measures are required, if any.

**21 POTENTIAL TO REDUCE EMISSIONS AND FUEL CONSUMPTION** (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

This session explored the introduction and forecasting scenarios; simulation model; fuel consumption and fuel cost forecast.

**22 LIGHT EMITTING DIODES (LED)** (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

This presentation focused on LED lightings, its efficacy and the cost evaluation of LED. LEDs for lighting solutions are gaining increasing importance in the shipping industry, based on their energy-saving potential and long service life. Any reduction in electricity consumption for lighting leads to a positive impact on the ship's operating costs, as well as reducing the environmental impact.

## Discussion

- Marine lighting consumes a large part of the electricity of the ship. This lighting for the most part is supplied with a voltage of 220 V. As light sources mainly use fluorescent lamps with an efficiency of 60 Lm/W (lumens per watt), which replaced traditional incandescent bulbs in almost all newly built ships. In the old vessels, certain measures should be taken when installing new advanced lighting system.
- Ship owners were very interested to install solar panels on top deck connected to the LED lights to minimize generator operation. Success stories from private companies installing solar panels to reduce electricity consumption has gained a big interest in this technology.

### **23 SHAFT GENERATORS** (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

This session focused on what a shaft generator is; vessels currently using shaft generators; energy saving; cost effectiveness and risk.

### **24 WASTE HEAT RECOVERY SYSTEMS (WHRS)** (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

This presentation focused on heat balance for engine without and with WHRS; PTG (Power Turbine & Generator) WHRS; STG (Steam Turbine & Generator) WHRS; and PT-ST combined waste heat recovery systems.

## **DAY 4: WRAP UP (HIGH LEVEL)**

The final day was again a high-level session with the aim of presenting, reviewing and adopting the outcomes document developed from the three days of deliberations. This was also an opportunity for ship owners to express their views on the MTCC-Pacific project.

### **25 OVERVIEW OF THE FIJI NATIONAL WORKSHOP** (*Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC*)

MTCC-Pacific provided a summary on the deliberations of the workshop:

- 95% overall attendance as anticipated.
- Group discussion on issues relating to SEEO.
- Discussion on CC, GHGE and S/SEM measures.
- Interactive knowledge transfer on EEDI, EEOI, SEEMP and PIDSS.
- Interactive sessions on IMO GMN technology transfer and technical cooperation
- Energy saving devices such as PBCF, LED, WHRS, SG and PV.

### **26 PRESENTATION BY SHIP OWNERS**

- a) Fiji Local Ship Owners (*Josateki Tagi, Director of Billett Wright & Associations*)

Josateki provided an overview of this workshop from the local ship owner's perspective.

*Issues – Fiji Ship Operators*

- How to reduce GHGs
- Energy management system
- Ship husbandry (critical)
- Program maintenance – engineers
- Lack of appropriate training
- Improvement of outer islands maritime Infrastructure
- Difficulty to follow regulatory compliance from MSAF
- Technical support and capacity building programme
- Loss of faith in the Local Ship Owners Association (LSOA)
- Quota system (study)

#### *Way Forward*

- High Level Lead Role
  - ✓ MoIT
  - ✓ MTCC-Pacific
- Focus on sustainability and profitability
- Revise freights and charges to ease burden on operators
- Uneconomical routes to have more subsidies
- Infrastructure improvement of the outer islands
- Tax Incentives for getting more energy efficient vessels and vessel spare parts

#### *Outcomes*

- Members to take ownership
- Fully support MTCC-Pacific on data collection and pilot projects
- Should not rely only on MTCC-Pacific to implement change in EE
- Achieve COP 23 Goal – Minimize Carbon Emissions

##### *i. Patterson Brothers Shipping (David Patterson)*

- Patterson Brothers Shipping acknowledges this noble cause by MTCC-Pacific project. The Pacific's impact is near negligible; however, it would be good to show the global leaders that Pacific is making efforts to combat climate change.
- Recognizes and support the data collection initiative by MTCC-Pacific and request the ship owners to support MTCC-Pacific in moving forward.
- Acknowledges the diverse expertise present in this workshop and learnings of energy efficient technologies.
- Requests to the group to first improve their operational techniques and locally available avenues before exploring implementation of new technologies
- Disagrees with the notion where the legislation is the reference to which the maritime industry must align itself to. He proposes that it must be the other way around where legislations are developed to suit the evolving maritime industry.
- Expressed caution in the speed of developments on this new innovative project and would like the progress to be set at a pace suitable to all stakeholders.

##### *ii. Solander Pacific (Robert Kubukawa)*

- Solander Pacific is fully supportive of the MTCC-Pacific initiative and is happy to provide data and support to implement SEEMP.
- This diverse group of expertise must put its resources together and take the first step to the common goal of reducing GHGs.



- Very supportive of the EnMS system.
- Fiji holds the presidency for COP23; hence we must work together to increase energy efficiency, not only in the maritime sector but beginning from home.

b. Regulatory Compliance (*Kalusiani Vuki, legal Officer, MSAF*)

- MSAF acknowledges the importance of data. Policies are also reliant on data and cannot be implemented without it. Fuel data is needed to move forward with this initiative.
- MSAF has taken the first step in writing to ship owners asking for their fuel data for the past 10 years.
- Legislation should only be in place if it suits the country and must be consistent to the circumstances of a country. Extensive consultation is conducted before passing any legislation.
- Word of caution to ship owners that there are provisions in place under the Maritime Transport Act on the illegal discharge of harmful substances which include fuels that they are using. Penalties for this is can reach up to \$200,000FJD or 2 years imprisonment.

### Discussion

Procedure for implementation begins with a drafting committee that will need to draft regulation and conduct several rounds of industry hearing (consultation) before passing. Consultation is mostly conducted at high level with the shipping industry.

## **27 REVIEW OF OUTCOMES DOCUMENT** (*Thierry Nervale, Head of MTCC-Pacific, SPC*)

MTCC-Pacific presented a draft Outcomes Document for review and adoption; and edits were actively made on the document. The Outcomes Document was then adopted with the consideration that slight wordsmithing may take place. The finalized document is attached as Annex 3.

## **28 AWARDING OF CERTIFICATES**

The Permanent Secretary for the Ministry of Infrastructure and Transport, Paul Bayly and Director of the Geoscience, Energy and Maritime Division, Dr. Andrew Jones were invited to present Certificates of Attendance to all participants.

## **29 CLOSING REMARKS** (*Paul Bayly, Permanent Secretary of the Ministry of Infrastructure and Transport*)

The Fiji Government thanked MTCC-Pacific and SPC for the organization of this workshop and also the participants for their contribution to its successful completion. Fiji then reiterated the importance of the MTCC-Pacific project in relation to its COP23 Presidency and urged all participants to collectively collaborate in this noble cause. Fiji looks forward to more dialogue and collaboration in the near future.

# **ANNEXES**

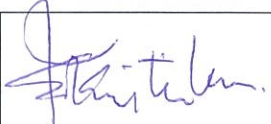
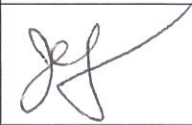




## **ANNEX 1: Signed List of Participants**



### Fiji National Workshop on Energy Efficient Operation of Ships: High Level Meeting


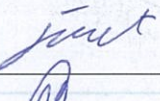
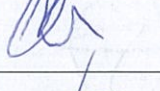
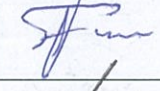
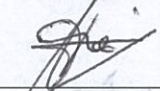
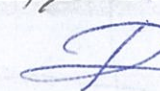

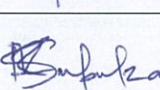
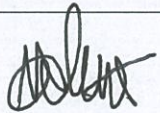
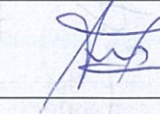
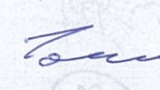
|    | Name                   | Job Title                              | Organisation                            | Gender | Line 1 address                             | Line 2 Address                    | City | Country where based | Telephone     | Mobile Number | Email Address  | Source of Funding | Role        | SIGNATURE   |
|----|------------------------|--|---|--------|--|-----------------------------------|------|---------------------|---------------|---------------|--|-------------------|-------------|---|
| 1  | Paul Bayly             | Permanent Secretary                    | Ministry of Infrastructure & Transport  | M      | 84 Ratu Mara Road                          |                                   | Suva | Fiji                | (679) 3389547 |               | <a href="mailto:paul.bayly@govnet.gov.fj">paul.bayly@govnet.gov.fj</a>   | INCOUNTRY         | Participant |    |
| 2  | Philip Hill            | Manager Safety Compliance and Response | Maritime Safety Authority of Fiji       | M      | 414 Victoria Parade                        | PO Box 326                        | Suva | Fiji                | (679) 3315266 | 9906331       | <a href="mailto:phill@msaf.com.fj">phill@msaf.com.fj</a>   | INCOUNTRY         | Participant |   |
| 3  | Kalusiani Vuki         | Legal Officer                          | Maritime Safety Authority of Fiji       | M      | 414 Victoria Parade                        | PO Box 326                        | Suva | Fiji                | (679) 3315266 |               | <a href="mailto:kvuki@msaf.com.fj">kvuki@msaf.com.fj</a>   | INCOUNTRY         | Participant |    |
| 4  | Lui Tuisiga Naisara    | Deputy Secretary Policy & Planning     | Ministry of Infrastructure & Transport  | M      | 84 Ratu Mara Road                          |                                   | Suva | Fiji                | (679) 3389547 | 9904282       | <a href="mailto:lui.naisara@moit.gov.fj">lui.naisara@moit.gov.fj</a>   | INCOUNTRY         | Participant |    |
| 5  | Faranisese Kinivuwai   | Acting Director Transport & Policy     | Ministry of Infrastructure & Transport  | F      | 84 Ratu Mara Road                          |                                   | Suva | Fiji                | (679) 3389769 | 9904889       | <a href="mailto:faranisese.kinivuwai@govnet.gov.fj">faranisese.kinivuwai@govnet.gov.fj</a>   | INCOUNTRY         | Participant |    |
| 6  | Lesi Vuatalevu         | Acting Principal Transport Planner     | Ministry of Infrastructure & Transport  | F      | 84 Ratu Mara Road                          |                                   | Suva | Fiji                | (679) 3384111 | 7342176       | <a href="mailto:lesi.vuatalevu@moit.gov.fj">lesi.vuatalevu@moit.gov.fj</a>   | INCOUNTRY         | Participant |    |
| 7  | Joji Wata              | Research Officer                       | Ministry of Infrastructure & Transport  | M      | 84 Ratu Mara Road                          |                                   | Suva | Fiji                | (679) 3384111 | 9443387       | <a href="mailto:joji.wata@moit.gov.fj">joji.wata@moit.gov.fj</a>   | INCOUNTRY         | Participant |  |
| 8  | Mark Borg              | Team Leader Programme Management       | Pacific Islands Development Forum       | M      | 56 Domain Road                             |                                   | Suva | Fiji                | (679) 9907633 | 9907633       | <a href="mailto:markborg@pacificidf.org">markborg@pacificidf.org</a><br><a href="mailto:mborg@pacificidf.org">mborg@pacificidf.org</a> | PIDF              | Participant |  |
| 9  | Alifereti Koroilavesau | Marine Operations Manager              | Captain Cook Cruises Fiji Ltd           | M      | Port Denarau Terminal, Denarau Island      | PO Box 23                         | Nadi | Fiji                | 6701823       | 9992445       | <a href="mailto:marineops@captaincook.com.fj">marineops@captaincook.com.fj</a>   | INCOUNTRY         | Participant |   |
| 10 | Lopeti Radravu         | Operations Manager                     | Fiji Ships and Heavy Industries Limited | M      | Lot 1 Eliza St WBay Suva, Fiji             |                                   | Suva | Fiji                | 3306229       | 9907176       | <a href="mailto:lopeti@fijiports.com.fj">lopeti@fijiports.com.fj</a>   | INCOUNTRY         | Participant |  |
| 11 | David Patterson        | Assistant General Manager              | Patterson Shipping/Searoad Shipping     | M      | Nina St Suva, Fiji                         | PO Box 1041                       | Suva | Fiji                | 3315644       | 7324330       | <a href="mailto:fijisearoad2@gmail.com">fijisearoad2@gmail.com</a>   | INCOUNTRY         | Participant |  |
| 12 | Netane Waqalala        | Manager                                | Sequest Fiji Ltd/Sealand Processors     | M      |  | GPO Box 16964                     | Suva | Fiji                | (679) 3312001 | 7079042       | <a href="mailto:netane@sequest.com.fj">netane@sequest.com.fj</a>   | INCOUNTRY         | Participant |  |
| 13 | Deepak Kumar           | Director                               | Inter Link Shipping Line Ltd            | M      | Shop 10. South Mall City                   |                                   | Suva | Fiji                | 9992026       | 9996218       | <a href="mailto:ashish@raiwaqabuses.com.fj">ashish@raiwaqabuses.com.fj</a>   | INCOUNTRY         | Participant |   |
| 14 | Manoj Kumar            | Operational Manager                    | Inter Link Shipping Line Ltd            | M      | Shop 10, South Mall City                   |                                   | Suva | Fiji                | 9992026       | 9990493       | <a href="mailto:operations@interlinkshipping.com.fj">operations@interlinkshipping.com.fj</a>   | INCOUNTRY         | Participant |  |
| 15 | Josese Lawaniasana     | Acting Director                        | Government Shipping Services            | M      | Governments Wharf Off Amra Street Wala Bay | PO Box 2603, Government Buildings | Suva | Fiji                | (679) 3314322 | 9906553       | <a href="mailto:josese.lawaniasana@moit.gov.fj">josese.lawaniasana@moit.gov.fj</a>   | INCOUNTRY         | Participant |  |






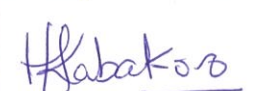

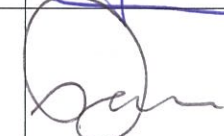
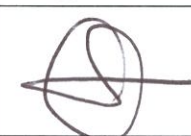


|                             |                      |   |   |   |                  |              |      |      |               |         |  |           |             |   |
|-----------------------------|----------------------|---|---|---|------------------|--------------|------|------|---------------|---------|--|-----------|-------------|---|
| 16                          | Isireli Mokunitulevu | Manager                                     | Tokalau Shipping                              | M | Walu Bay         | Po Box 19606 | Suva | Fiji |               | 7652118 | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a> | INCOUNTRY | Participant |    |
| 17                          | Sakaraia Saubalavu   | Master                                      | Tokalau Shipping                              | M | Walu Bay         | Po Box 19606 | Suva | Fiji |               | 7732402 | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a> | INCOUNTRY | Participant |   |
| 18                          | CHARC. DEWHIRST      | MANAGER                                     | ALL BARGING & MARINE                          | M | LAUTOKA          |              |      |      |               | 8669572 | all projects @ all engineering . com . fj  | -         | -           |    |
| 19                          | JOSATEK TAGI         | DIRECTOR                                    | BUCKET WRIGHTS & ASSOC LTD<br>VICTORIA MARINE | M | W/BAY            | P.O. Box 327 | Suva | Fiji |               | 7776979 | b.lett@unwired.com.fj  | ✓         | /           |    |
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| 18                          | Andrew Jones         | GEMD Director                               | The Pacific Community                         | M | Private Mail Bag | Suva         | Suva | Fiji | (679) 3370733 |         | <a href="mailto:andrewj@spc.int">andrewj@spc.int</a>                             |           | Resource    |    |
| 19                          | Thierry Nervale      | MTCC-Pacific Head                           | The Pacific Community                         | M | Private Mail Bag | Suva         | Suva | Fiji | (679) 3370733 |         | <a href="mailto:thierryn@spc.int">thierryn@spc.int</a>                           |           | Resource    |    |
| 20                          | Mark Davis           | Transport Green House Gas Adviser           | The Pacific Community                         | M | Private Mail Bag | Suva         | Suva | Fiji | (679) 3370733 |         | <a href="mailto:markd@spc.int">markd@spc.int</a>                                 |           | Resource    |   |
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| 24                          | Lore Croker          | Administrative and Information Assistant    | The Pacific Community                         | F | Private Mail Bag | Suva         | Suva | Fiji | (679) 3370733 |         | <a href="mailto:lore@spc.int">lore@spc.int</a>                                   |           | Resource    |  |



### Fiji National Workshop on Energy Efficient Operation of Ships: Technical Workshop

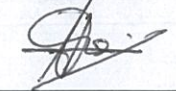
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|----|----------------------|------------------------------------|--|--------|--|-----------------------------------|------|---------------------|---------------|---------------|--|-------------------|-------------|---|
| 1  | Kalusiani Vuki       | Legal Officer                      | Maritime Safety Authority of Fiji      | M      | 416 Victoria Parade                        | PO Box 328                        | Suva | Fiji                | (679) 3315268 | 976249        | <a href="mailto:kvuki@msaf.com.fj">kvuki@msaf.com.fj</a>                                     | INCOUNTRY         | Participant |    |
| 2  | Faranisese Kinivuwai | Acting Director Transport & Policy | Ministry of Infrastructure & Transport | F      | 84 Ratu Mara Road                          | PO Box 328                        | Suva | Fiji                | (679) 3389769 | 9904889       | <a href="mailto:faranisese.kinivuwai@govnet.gov.fj">faranisese.kinivuwai@govnet.gov.fj</a>   | INCOUNTRY         | Participant |   |
| 3  | Lesi Vuatalevu       | Acting Principal Transport Planner | Ministry of Infrastructure & Transport | F      | 84 Ratu Mara Road                          | PO Box 328                        | Suva | Fiji                | (679) 3384111 | 7342176       | <a href="mailto:lesi.vuatalevu@moit.gov.fj">lesi.vuatalevu@moit.gov.fj</a>                   | INCOUNTRY         | Participant |   |
| 4  | Joji Wata            | Research Officer                   | Ministry of Infrastructure & Transport | M      | 84 Ratu Mara Road                          | PO Box 328                        | Suva | Fiji                | (679) 3384111 | 9443387       | <a href="mailto:joji.wata@moit.gov.fj">joji.wata@moit.gov.fj</a>                             | INCOUNTRY         | Participant |    |
| 5  | Vishal Prasad        | Policy Analyst                     | Ministry of Infrastructure & Transport | M      | 84 Ratu Mara Road                          | PO Box 328                        | Suva | Fiji                | (679) 3384111 | 9634766       | <a href="mailto:vishal001.prasad@govnet.gov.fj">vishal001.prasad@govnet.gov.fj</a>           | INCOUNTRY         | Participant |    |
| 6  | Viliame Ratakalovo   | Technical Officer II               | Ministry of Infrastructure & Transport | M      | 84 Ratu Mara Road                          | PO Box 328                        | Suva | Fiji                | (679) 3384111 | 7894103       | <a href="mailto:viliame.finau@moit.gov.fj">viliame.finau@moit.gov.fj</a>                     | INCOUNTRY         | Participant |    |
| 7  | Josefa Baleinukulala | Assistant Lecturer                 | Fiji Maritime Academy                  | M      | Queen Elizabeth Road                       | PO Box 10963                      | Suva | Fiji                | (679) 3315979 | 9038881       | <a href="mailto:josefa.baleinukulala@fnu.ac.fj">josefa.baleinukulala@fnu.ac.fj</a>           | INCOUNTRY         | Participant |   |
| 8  | Rusiate Lomanibasa   | Lecturer                           | Fiji Maritime Academy                  | M      | Queen Elizabeth Road                       | PO Box 10964                      | Suva | Fiji                | (679) 3315115 | 9567034       | <a href="mailto:rusiate.lomani@fnu.ac.fj">rusiate.lomani@fnu.ac.fj</a>                       | INCOUNTRY         | Participant |  |
| 9  | Thomas Patterson     | Assistant Operations Manager       | Patterson Shipping/Searoad Shipping    | M      | Nina St Suva, Fiji                         | PO Box 1041                       | Suva | Fiji                | 3315644       | 9222714       | <a href="mailto:fijisearoad2@gmail.com">fijisearoad2@gmail.com</a>                           | INCOUNTRY         | Participant |  |
| 10 | Robert Kubukawa      | Assistant Fleet Engineer           | Solander Pacific Ltd                   | M      | Rona Street                                | PO Box 178                        | Suva | Fiji                | (679) 3314819 | 9993271       | <a href="mailto:robert@solander.com">robert@solander.com</a>                                 | INCOUNTRY         | Participant |  |
| 11 | Deepak Kumar         | Director                           | Inter Link Shipping Line Ltd           | M      | Shop 10. South Mall City                   |                                   | Suva | Fiji                | 9992026       | 9996218       | <a href="mailto:ashish@raiwaqabuses.com.fj">ashish@raiwaqabuses.com.fj</a>                   | INCOUNTRY         | Participant |   |
| 12 | Manoj Kumar          | Operational Manager                | Inter Link Shipping Line Ltd           | M      | Shop 10, South Mall City                   |                                   | Suva | Fiji                | 9992026       | 9990493       | <a href="mailto:operations@interlinkshipping.com.fj">operations@interlinkshipping.com.fj</a> | INCOUNTRY         | Participant |   |
| 13 | Viliame Malumalumu   | Chief Officer/Captain              | Inter Link Shipping Line Ltd           | M      | Shop 10, South Mall City                   |                                   | Suva | Fiji                | 9992026       | 9990493       | <a href="mailto:operations@interlinkshipping.com.fj">operations@interlinkshipping.com.fj</a> | INCOUNTRY         | Participant |  |
| 14 | Josese Lawaniasana   | Acting Director                    | Government Shipping Services           | M      | Governments Wharf Off Amra Street Walu Bay | PO Box 2603, Government Buildings | Suva | Fiji                | (679) 3314322 | 9906553       | <a href="mailto:josese.lawaniasana@moit.gov.fj">josese.lawaniasana@moit.gov.fj</a>           | INCOUNTRY         | Participant |   |
| 15 | Sakaraia Saubalavu   | Master                             | Tokalau Shipping                       | M      | Walu Bay                                   | Po Box 19606                      | Suva | Fiji                |               | 7732402       | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             | INCOUNTRY         | Participant |  |
| 16 | Tomasi Delai         | Chief Engineer                     | Tokalau Shipping                       | M      | Walu Bay                                   | Po Box 19606                      | Suva | Fiji                |               | 7732402       | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             | INCOUNTRY         | Participant |  |



|                             |                    |   |                                       |   |                  |      |      |      |               |         |  |           |             |   |
|-----------------------------|--------------------|---|---------------------------------------|---|------------------|------|------|------|---------------|---------|--|-----------|-------------|---|
|                             | YOGESH RAICHA      | SHORE ENGINEER                              | All Barge & Marine                    | M | Lautoka          |      |      |      |               |         | allprojects@alleengineering.com.fj                         | Incountry | Participant |    |
|                             | ISIRILI .A         | MANAGER                                     | TOKALAN SHIPPING                      |   |                  |      |      |      | 7732402       | 7652118 | isirchinokuntulem@yahoo.com                                |           |             |    |
|                             | IGNESIO MOW        | FOREMAN ENGINEER                            | Fiji SHIPS & HEAVY INDUSTRIES LIMITED | M | Suva             |      |      |      | 3306426       | 9907180 | Ignesio@fijiports.com.fj                                   | Incountry | Participant |    |
|                             | NANISE KABAKORO    | TRAINEE PORT ENGINEER                       | Fiji PORTS CORPORATION LIMITED        | F | Suva             |      |      |      |               | 9908598 | nanise@fijiports.com.fj                                    | Incountry | Presenter   |    |
|                             |                    |   |                                       |   |                  |      |      |      |               |         |  |           |             |   |
|                             |                    |   |                                       |   |                  |      |      |      |               |         |  |           |             |   |
|                             |                    |   |                                       |   |                  |      |      |      |               |         |  |           |             |   |
|                             |                    |   |                                       |   |                  |      |      |      |               |         |  |           |             |   |
| THE PACIFIC COMMUNITY STAFF |                    |   |                                       |   |                  |      |      |      |               |         |  |           |             |   |
| 17                          | Thierry Nervale    | MTCC-Pacific Head                           | The Pacific Community                 | M | Private Mail Bag | Suva | Suva | Fiji | (679) 3370733 |         | <a href="mailto:thierryn@spc.int">thierryn@spc.int</a>     |           | Resource    |   |
| 18                          | Mark Davis         | Transport Green House Gas Adviser           | The Pacific Community                 | M | Private Mail Bag | Suva | Suva | Fiji | (679) 3370733 |         | <a href="mailto:markd@spc.int">markd@spc.int</a>           |           | Resource    |  |
| 19                          | Ore Toua           | Maritime Training Adviser                   | The Pacific Community                 | F | Private Mail Bag | Suva | Suva | Fiji | (679) 3370733 |         | <a href="mailto:oret@spc.int">oret@spc.int</a>             |           | Resource    |  |
| 20                          | Zullah M. A        | Maritime Industry Energy Efficiency Officer | The Pacific Community                 | M | Private Mail Bag | Suva | Suva | Fiji | (679) 3370733 |         | <a href="mailto:zullahm@spc.int">zullahm@spc.int</a>       |           | Resource    |  |
| 21                          | Francesca Pradelli | Policy and Legal Officer                    | The Pacific Community                 | F | Private Mail Bag | Suva | Suva | Fiji | (679) 3370733 |         | <a href="mailto:francescap@spc.int">francescap@spc.int</a> |           | Resource    | Attended  |
| 22                          | Lore Croker        | Administrative and Information Assistant    | The Pacific Community                 | F | Private Mail Bag | Suva | Suva | Fiji | (679) 3370733 |         | <a href="mailto:lore@spc.int">lore@spc.int</a>             |           | Resource    |  |



# Day 5

|    | Name                 | Job Title                          | Organisation                           | Gender | Line 1 address           | Line 2 Address | City    | Country where based | Telephone     | Mobile Number | Email Address  | Source of Funding | Role        | SIGNATURE   |
|----|----------------------|------------------------------------|--|--------|--------------------------|----------------|---------|---------------------|---------------|---------------|--|-------------------|-------------|---|
| 1  | Paul Bayly           | Permanent Secretary                | Ministry of Infrastructure & Transport | M      | 84 Ratu Mara Road        |                | Suva    | Fiji                | (679) 3389547 |               | <a href="mailto:paul.bayly@govnet.gov.fj">paul.bayly@govnet.gov.fj</a>                       | INCOUNTRY         | Participant |   |
| 2  | Kalusiani Vuki       | Legal Officer                      | Maritime Safety Authority of Fiji      | M      | 414 Victoria Parade      | PO Box 326     | Suva    | Fiji                | (679) 3315266 |               | <a href="mailto:kvuki@msaf.com.fj">kvuki@msaf.com.fj</a>                                     | INCOUNTRY         | Participant |    |
| 3  | Lui Tuisiga Naisara  | Deputy Secretary Policy & Planning | Ministry of Infrastructure & Transport | M      | 84 Ratu Mara Road        |                | Suva    | Fiji                | (679) 3389547 | 9904282       | <a href="mailto:lui.naisara@moit.gov.fj">lui.naisara@moit.gov.fj</a>                         | INCOUNTRY         | Participant |   |
| 4  | Faranisese Kinivuwai | Acting Director Transport & Policy | Ministry of Infrastructure & Transport | F      | 84 Ratu Mara Road        |                | Suva    | Fiji                | (679) 3389769 | 9904889       | <a href="mailto:faranisese.kinivuwai@govnet.gov.fj">faranisese.kinivuwai@govnet.gov.fj</a>   | INCOUNTRY         | Participant |   |
| 5  | Lesi Vuatalevu       | Acting Principal Transport Planner | Ministry of Infrastructure & Transport | F      | 84 Ratu Mara Road        |                | Suva    | Fiji                | (679) 3384111 | 7342176       | <a href="mailto:lesi.vuatalevu@moit.gov.fj">lesi.vuatalevu@moit.gov.fj</a>                   | INCOUNTRY         | Participant |   |
| 6  | Vishal Prasad        | Policy Analyst                     | Ministry of Infrastructure & Transport | M      | 84 Ratu Mara Road        |                | Suva    | Fiji                | (679) 3384111 | 9634766       | <a href="mailto:vishal001.prasad@govnet.gov.fj">vishal001.prasad@govnet.gov.fj</a>           | INCOUNTRY         | Participant |    |
| 7  | Joji Wata            | Research Officer                   | Ministry of Infrastructure & Transport | M      | 84 Ratu Mara Road        |                | Suva    | Fiji                | (679) 3384111 | 9443387       | <a href="mailto:joji.wata@moit.gov.fj">joji.wata@moit.gov.fj</a>                             | INCOUNTRY         | Participant |    |
| 8  | Viliame Ratakalo     | Technical Officer II               | Ministry of Infrastructure & Transport | M      | 84 Ratu Mara Road        |                | Suva    | Fiji                | (679) 3384111 | 7894103       | <a href="mailto:viliame.finau@moit.gov.fj">viliame.finau@moit.gov.fj</a>                     | INCOUNTRY         | Participant |    |
| 9  | Mark Borg            | Team Leader Programme Management   | Pacific Islands Development Forum      | M      | 56 Domain Road           |                | Suva    | Fiji                |               | 9907633       | <a href="mailto:markborg@pacificidf.org">markborg@pacificidf.org</a>                         | PIDF              | Participant |   |
| 10 | Chris Dewhirst       | Shipping Manager                   | All Barging and Marine (Fiji) Ltd      | M      | 12 Ravouvou Street       | P.O.Box 1546   | Lautoka | Fiji                | (679) 6652696 | 8669512       | <a href="mailto:allprojects@allengineering.com.fj">allprojects@allengineering.com.fj</a>     | INCOUNTRY         | Participant |  |
| 11 | Yogesh Naicker       | Shore Engineer                     | All Barge and Marine (Fiji) Ltd        | M      | 12 Ravouvou Street       | P.O.Box 1546   | Lautoka | Fiji                | (679) 9382262 | 9478396       | <a href="mailto:allbarge@allengineering.com.fj">allbarge@allengineering.com.fj</a>           | INCOUNTRY         | Participant |  |
| 13 | Josefa Baleinukulala | Assistant Lecturer                 | Fiji Maritime Academy                  | M      | Queen Elizabeth Road     | PO Box 10963   | Suva    | Fiji                | (679) 3315979 | 9038881       | <a href="mailto:josefa.baleinukulala@fnu.ac.fj">josefa.baleinukulala@fnu.ac.fj</a>           | INCOUNTRY         | Participant |  |
| 14 | Rusiate Lomani       | Lecturer                           | Fiji Maritime Academy                  | M      | Queen Elizabeth Road     | PO Box 10963   | Suva    | Fiji                | (679) 3315115 | 9567034       | <a href="mailto:rusiate.lomani@fnu.ac.fj">rusiate.lomani@fnu.ac.fj</a>                       | INCOUNTRY         | Participant |  |
| 15 | David Patterson      | Assistant General Manager          | Patterson Shipping/Searoad Shipping    | M      | Nina St Suva, Fiji       | PO Box 1041    | Suva    | Fiji                | 3315644       | 7324330       | <a href="mailto:fijisearoad2@gmail.com">fijisearoad2@gmail.com</a>                           | INCOUNTRY         | Participant |   |
| 16 | Thomas Patterson     | Assistant Operations Manager       | Patterson Shipping/Searoad Shipping    | M      | Nina St Suva, Fiji       | PO Box 1041    | Suva    | Fiji                | 3315644       | 9222714       | <a href="mailto:fijisearoad2@gmail.com">fijisearoad2@gmail.com</a>                           | INCOUNTRY         | Participant |  |
| 17 | Netane Waqalala      | Manager                            | Seaquest Fiji Ltd/Sealand Processors   | M      |                          | GPO Box 16964  | Suva    | Fiji                | (679) 3312001 | 7079042       | <a href="mailto:netane@seaquest.com.fj">netane@seaquest.com.fj</a>                           | INCOUNTRY         | Participant |   |
| 18 | Robert Kubukawa      | Assistant Fleet Engineer           | Solander Pacific Ltd                   | M      | Rona Street              | PO Box 178     | Suva    | Fiji                | (679) 3314819 | 9993271       | <a href="mailto:robert@solander.com">robert@solander.com</a>                                 | INCOUNTRY         | Participant |  |
| 19 | Deepak Kumar         | Director                           | Inter Link Shipping Line Ltd           | M      | Shop 10, South Mall City |                | Suva    | Fiji                | 9992026       | 9996218       | <a href="mailto:ashish@raiwaqabuses.com.fj">ashish@raiwaqabuses.com.fj</a>                   | INCOUNTRY         | Participant |   |
| 20 | Manoj Kumar          | Operational Manager                | Inter Link Shipping Line Ltd           | M      | Shop 10, South Mall City |                | Suva    | Fiji                | 9992026       | 9990493       | <a href="mailto:operations@interlinkshipping.com.fj">operations@interlinkshipping.com.fj</a> | INCOUNTRY         | Participant |   |



|                             |                      |   |  |   |                          |                                   |      |      |               |         |  |           |             |                             |
|-----------------------------|----------------------|---|--|---|--------------------------|-----------------------------------|------|------|---------------|---------|--|-----------|-------------|-----------------------------|
| 21                          | Viliame Malumalumu   | Chief Officer/Captain                       | Inter Link Shipping Line Ltd           | M | Shop 10, South Mall City |                                   | Suva | Fiji | 9992026       | 9990493 | <a href="mailto:operations@interlinkshipping.com.fj">operations@interlinkshipping.com.fj</a> | INCOUNTRY | Participant |                             |
| 22                          | Josese Lawaniyasana  | Acting Director                             | Government Shipping Services           | M | Walu Bay                 | PO Box 2603, Government Buildings | Suva | Fiji | (679) 3314322 | 9906553 | <a href="mailto:josese.lawaniyasana@moit.gov.fj">josese.lawaniyasana@moit.gov.fj</a>         | INCOUNTRY | Participant |                             |
| 23                          | Isireli Mokunitulevu | Manager                                     | Tokalau Shipping                       | M | Walu Bay                 | Po Box 19606                      | Suva | Fiji |               | 7652118 | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             | INCOUNTRY | Participant | <i>Isireli Mokunitulevu</i> |
| 24                          | Sakaraia Saubalavu   | Master                                      | Tokalau Shipping                       | M | Walu Bay                 | Po Box 19606                      | Suva | Fiji |               | 7732402 | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             | INCOUNTRY | Participant | <i>Saubalavu</i>            |
| 25                          | Tomasi Delai         | Chief Engineer                              | Tokalau Shipping                       | M | Walu Bay                 | Po Box 19606                      | Suva | Fiji |               | 7732402 | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             | INCOUNTRY | Participant | <i>Tomasi Delai</i>         |
| 26                          | Josateki Tagi        | Director                                    | Billett Wright & Associates (Fiji) Ltd | M | Walu Baly                | PO Box 327                        | Suva | Fiji |               | 7776919 | <a href="mailto:billett@unwired.com.fj">billett@unwired.com.fj</a>                           | INCOUNTRY | Participant | <i>Josateki Tagi</i>        |
| 27                          | Ignesio Mow          | Foreman Engineer                            | Fiji Ships & Heavy Industries Limited  | M | Suva                     |                                   | Suva | Fiji | 3306426       | 9907180 | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             | INCOUNTRY | Participant | <i>Ignesio Mow</i>          |
| 28                          | Nanise Kabakoro      | Trainee Port Engineer                       | Fiji Port Corporation Limited          | F | Suva                     |                                   |      |      |               | 9908598 | <a href="mailto:nanise@fijiports.com.fj">nanise@fijiports.com.fj</a>                         | INCOUNTRY | Participant |                             |
| 29                          | BRIGHT HART          | EU Delegation                               |  | F | Suva                     |                                   |      |      |               | 8696560 |  |           |             | <i>Ref</i>                  |
| 30                          | SWINNEN INGRID       | EU Delegation                               |  |   | Suva                     |                                   |      |      |               | 9929941 |  |           |             | <i>INGRID</i>               |
| 31                          | Nikhil Lal           | Program Coordinator                         | PINF                                   | M | Suva                     |                                   |      |      | 9236043       |         | <a href="mailto:nlal@pacificidf.org">nlal@pacificidf.org</a>                                 |           |             | <i>Nikhil Lal</i>           |
|                             |                      |   |  |   |                          |                                   |      |      |               |         |  |           |             |                             |
|                             |                      |   |  |   |                          |                                   |      |      |               |         |  |           |             |                             |
| THE PACIFIC COMMUNITY STAFF |                      |   |  |   |                          |                                   |      |      |               |         |  |           |             |                             |
| 31                          | Andrew Jones         | GEMD Director                               | The Pacific Community                  | M | Private Mail Bag         | Suva                              | Suva | Fiji | (679) 3370733 |         | <a href="mailto:andrewj@spc.int">andrewj@spc.int</a>   |           | Resource    |                             |
| 32                          | Thierry Nervale      | MTCC-Pacific Head                           | The Pacific Community                  | M | Private Mail Bag         | Suva                              | Suva | Fiji | (679) 3370733 |         | <a href="mailto:thierryn@spc.int">thierryn@spc.int</a>                                       |           | Resource    | <i>Thierry Nervale</i>      |
| 33                          | Mark Davis           | Transport Green House Gas Adviser           | The Pacific Community                  | M | Private Mail Bag         | Suva                              | Suva | Fiji | (679) 3370733 |         | <a href="mailto:markd@spc.int">markd@spc.int</a>   |           | Resource    | <i>Mark Davis</i>           |
| 34                          | Ore Toua             | Maritime Training Adviser                   | The Pacific Community                  | F | Private Mail Bag         | Suva                              | Suva | Fiji | (679) 3370733 |         | <a href="mailto:oret@spc.int">oret@spc.int</a>   |           | Resource    | <i>Ore Toua</i>             |
| 35                          | Zullah M. A          | Maritime Industry Energy Efficiency Officer | The Pacific Community                  | M | Private Mail Bag         | Suva                              | Suva | Fiji | (679) 3370733 |         | <a href="mailto:zullahm@spc.int">zullahm@spc.int</a>   |           | Resource    | <i>Zullah M. A</i>          |
| 36                          | Francesca Pradelli   | Policy and Legal Officer                    | The Pacific Community                  | F | Private Mail Bag         | Suva                              | Suva | Fiji | (679) 3370733 |         | <a href="mailto:francescap@spc.int">francescap@spc.int</a>                                   |           | Resource    | <i>Francesca Pradelli</i>   |
| 37                          | Lore Croker          | Administrative and Information Assistant    | The Pacific Community                  | F | Private Mail Bag         | Suva                              | Suva | Fiji | (679) 3370733 |         | <a href="mailto:lore@spc.int">lore@spc.int</a>   |           | Resource    | <i>Lore Croker</i>          |

Don't

## **ANNEX 2: Agenda**

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**MTCC-PACIFIC - Fiji National Workshop on Ship Energy Efficient Operations (SEEO)**  
**Suva, Fiji, 24~25 October, 2017**

**PROGRAMME**

| Time  | Agenda item | Agenda issues   | Presenters           |
|---|-------------|---|----------------------|
| <b>Day 1 – 24th October, 2017 – High-level Workshop</b> |             |   |                      |
| <b>0830</b>   |             | <b>Registration</b>   |                      |
| <b>0900 – 0910</b>                                      |             | Welcome address   | MTCC-Pacific/<br>SPC |
| <b>0910 – 0920</b>                                      |             | Opening address   | MTCC-Pacific         |
| <b>0920 – 0930</b>                                      |             | Keynote address   | Fiji MoIT            |
| <b>0930 – 1000</b>                                      | <b>1</b>    | Presentation of the GMN project – IMO approach  | IMO                  |
| <b>1000 – 1030</b>                                      |             | Open Discussion   | All                  |
| <b>1030 – 1100</b>                                      |             | <b>Tea Break – Group Photo</b>  |                      |
| <b>1100 – 1130</b>                                      | <b>2</b>    | Presentation of the MTCC-Pacific project  | MTCC-Pacific         |
| <b>1130 – 1230</b>                                      | <b>3</b>    | The approach of the Maritime Authority  | MSAF                 |
| <b>1230 – 1330</b>                                      |             | <b>Lunch</b>  |                      |
| <b>1330 – 1400</b>                                      | <b>4</b>    | Collecting data for informed decision-making  | MTCC-Pacific         |
| <b>1400 – 1500</b>                                      | <b>5</b>    | Group Discussion - issues, challenges and opportunities in the Fiji Maritime Industry | All                  |
| <b>1500 – 1530</b>                                      | <b>6</b>    | Group feedback – issues, challenges and opportunities in the Fiji Maritime Industry   | Groups               |
| <b>1530 – 1600</b>                                      |             | <b>Tea Break</b>  |                      |
| <b>1600 – 1700</b>                                      |             | Wrap-up – meeting outcome   | MTCC-Pacific         |
| <b>End Day 1</b>  |             |   |                      |
| <b>Cocktail Party Hosted by SPC</b>                     |             |   |                      |

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| Time   | Agenda item | Agenda issues   | Presenters   |
|--|-------------|---|--------------|
| <b>Day 2 – 25th October, 2017 – Technical Workshop (Energy Efficient Ship Operation)</b> |             |   |              |
| <b>0845</b>  |             | <b>Participants arrive</b>  |              |
| <b>0900 – 1030</b>   | <b>1</b>    | Climate Change and Shipping Response <ul style="list-style-type: none"> <li>- Overview of shipping operations, including operation segments, ship and cargo types, and the ports role</li> <li>- Shipping contracts, contract of carriage, bill of lading</li> <li>- Ship loading, cargo management and load lines</li> </ul>     | MTCC-Pacific |
|  | <b>2</b>    | Ship Energy Efficiency Regulations and Related Guidelines <ul style="list-style-type: none"> <li>- Introduction to ship roles and responsibilities</li> <li>- Importance of good communication between engine and deck department</li> <li>- SEE measures</li> <li>- Ship maintenance</li> </ul>                                  | MTCC-Pacific |
| <b>1030-1100</b>   |             | <b>Tea Break</b>  |              |
| <b>1100 – 1230</b>   | <b>3</b>    | Ship Management to Operation <ul style="list-style-type: none"> <li>- Origins of air pollution (airpol) and climate change (CC)</li> <li>- CC and GHG emissions (GHGE)</li> <li>- International global response</li> <li>- International shipping response</li> <li>- Main IMO instruments and historical developments</li> </ul> | MTCC-Pacific |
|  | <b>4</b>    | Ship-Board Energy Management <ul style="list-style-type: none"> <li>- IMO regulatory framework (FW)- ship energy efficiency (SEE)</li> <li>- MARPOL Annex VI Chapter 4</li> <li>- Brief introduction to SEEMP GL</li> <li>- Brief introduction to SEE Operations Index (EEOI) GL</li> </ul>                                       | MTCC-Pacific |
| <b>1230 – 1330</b>   |             | <b>Lunch</b>  |              |



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|            |           |  |                                |
|------------|-----------|--|--------------------------------|
| 1330- 1500 | 5         | Ship-Port Interface and Energy Efficiency <ul style="list-style-type: none"><li>- Introduction to ports and port-area emissions</li><li>- Ship time in port and just-in-time (JIT) operations</li><li>- Technologies for port air quality (AQ)/GHGE reductions</li><li>- Ship in-port operational energy efficiency measures (OEEM)</li><li>- Onshore power supply (OPS)</li></ul> | MTCC-Pacific                   |
|            | 6         | Fiji Port approach on Energy Efficiency <ul style="list-style-type: none"><li>- Energy Savings since 2016 Audit</li><li>- Energy Policy</li><li>- Energy Management action Plan</li><li>- Energy Data/ Energy Documentation</li><li>- Fuel meter trial</li></ul>   | Fiji Ports Cooperation Limited |
|            | 7         | Energy Management Plan (EnMP) and System (EnMS) <ul style="list-style-type: none"><li>- Brief overview of various ship-board management systems</li><li>- Company level energy management</li><li>- Energy audits and reviews, types and processes</li><li>- Ship performance, monitoring and voyage performance analysis</li></ul>  | MTCC-Pacific                   |
|            | 8         | Pacific Island Domestic Ship Safety (PIDSS) <ul style="list-style-type: none"><li>- Goals, Objectives &amp; Outcomes</li><li>- PIDSS SMS</li><li>- Components</li><li>- Status</li><li>- Issues and Lessons Learnt</li></ul>   | MTCC-Pacific                   |
| 1500- 1530 | 9         | Open Discussions   |                                |
| 1530- 1600 | Tea Break |  |                                |
| End Day 2  |           |  |                                |
|            |           |  |                                |

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| Time   | Agenda item                | Agenda issues   | Presenters   |
|--|----------------------------|---|--------------|
| <b>Day 3 – 26th October, 2017 – Technical Workshop (Energy Efficient Ship Operation)</b> |                            |   |              |
| <b>0845</b>  | <b>Participants arrive</b> |   |              |
| <b>0900 – 1030</b>   | <b>1</b>                   | Guidelines for EEDI <ul style="list-style-type: none"> <li>- Overview of EEDI formula</li> <li>- EEDI calculation parameters</li> <li>- EEDI factors and correction factors</li> <li>- Example of a sample EEDI calculation</li> </ul>  | MTCC-Pacific |
|  | <b>2</b>                   | Guidelines for SEEMP <ul style="list-style-type: none"> <li>- Main elements of SEEMP</li> <li>- Implementation aspects</li> <li>- EEOI calculation process</li> <li>- Video - Best Practice For Fuel-Efficient Operation</li> </ul>   | MTCC-Pacific |
| <b>1030-1100</b>   | <b>Tea Break</b>           |   |              |
| <b>1100 – 1230</b>   | <b>3</b>                   | Operational energy efficiency measures <ul style="list-style-type: none"> <li>- Operation management</li> <li>- Maintenance and condition monitoring</li> <li>- Auxiliary load management</li> <li>- Trim/ballast optimization</li> <li>- Hull and engine conditions</li> <li>- System planning and reduced demand</li> </ul> | MTCC-Pacific |
|  | <b>4</b>                   | Technical energy efficiency measures <ul style="list-style-type: none"> <li>- EEDI reduction method</li> <li>- Ship hydrodynamics</li> <li>- Propeller and propulsion system</li> <li>- Engines and power systems</li> <li>- Auxiliary machinery</li> </ul>   | MTCC-Pacific |
| <b>1230 – 1330</b>   | <b>Lunch</b>               |   |              |





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|             |           |  |              |
|-------------|-----------|--|--------------|
| 1330 – 1545 | 5         | Further measures to enhance the energy efficiency of ships<br>- Development of a data collection system (DCS) for fuel consumption<br>o data collection;<br>o data analysis; and<br>o followed by decision-making on what further measures, if any, are required | MTCC-Pacific |
|             | 6         | Potential to reduce emissions and fuel consumption<br>- Introduction and forecasting scenarios<br>- Simulation model<br>- Fuel consumption and fuel cost forecast  | MTCC-Pacific |
|             | 7         | LED<br>- What is LED?<br>- Efficacy of led<br>- Cost evaluation for LED application  | MTCC-Pacific |
|             | 8         | Shaft Generators<br>- What is shaft generator system?<br>- Vessels using shaft generator<br>- Energy saving<br>- Cost effect<br>- Risk   | MTCC-Pacific |
|             | 9         | Waste Heat Recovery System (WHRS)<br>- Heat Balance for Engine without & with WHRS<br>- PTG(Power Turbine & Generator) WHRS<br>- STG(Steam Turbine & Generator) WHRS<br>- PT-ST Combined Waste Heat Recovery System  | MTCC-Pacific |
| 1545- 1600  | 10        | Open Discussions   |              |
| 1600- 1630  | Tea Break |  |              |
| End Day 3   |           |  |              |

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| Time  | Agenda item | Agenda issues   | Presenters                   |
|---|-------------|---|------------------------------|
| <b>Day 4 – 27th October, 2017 – Technical Workshop (Energy Efficient Ship Technologies)</b> |             |   |                              |
| <b>0845</b>   |             | <b>Participants arrive</b>  |                              |
| <b>0900 – 1030</b>  | <b>1</b>    | Overview of the Fiji national workshop  | MTCC-Pacific                 |
|   | <b>2</b>    | Presentation by Ship Owner<br>- Patterson Brothers Shipping<br>- Solander Shipping<br>- All barge Engineering Limited | Ship-owners                  |
|   | <b>3</b>    | Regulatory Compliance   | MSAF                         |
| <b>1030 – 1100</b>  |             | <b>Tea Break</b>  |                              |
| <b>1100 – 1230</b>  | <b>4</b>    | Fiji Local Ship Owners  | Billett Wrights & Associates |
|   | <b>5</b>    | Remarks from SPC partner  | PIDF                         |
|   | <b>6</b>    | Certificate of Attendance Awarded   | Permanent Secretary (PS)     |
|   | <b>7</b>    | Closing remarks   | PS/ MTCC-Pacific             |
| <b>Lunch &amp; End Day 4</b>  |             |   |                              |

## **ANNEX 3: Outcomes Document**



## FIRST NATIONAL WORKSHOP ON ENERGY EFFICIENT OPERATION OF SHIPS

Suva, Fiji, 24-27 October 2017

### OUTCOME

1. The First National Workshop on Energy Efficient Operations of Ships was held in Suva, Fiji from 24 to 27 October 2017. The meeting was coordinated and facilitated by the Maritime Technology Cooperation Centre in the Pacific (MTCC-Pacific) and attended by representatives from the Fiji Ministry of Infrastructure and Transport (MoIT), the Maritime Safety Authority of Fiji (MSAF), The Fiji Port Corporation Limited (FCPL), the Fiji Ships and Heavy Industry Limited (FSHIL), the Pacific Islands Development Forum (PIDF), Patterson Shipping/Searoad Shipping, Seaquest Fiji Ltd/Sealand Processors, Inter Link Shipping Line Ltd, Government Shipping Services, Tokalau Shipping, All Barging and Marine (Fiji) Limited, Billett Wright & Associates (Fiji) Limited and Solander Pacific Limited. The list of participants is attached in Annex 1.
2. MTCC-Pacific is hosted by the Pacific Community (SPC) in collaboration with the Secretariat of the Pacific Regional Environment Programme (SPREP) and forms part of the Global MTCC Network (GMN), a project implemented by the International Maritime Organization (IMO) and funded by the European Union with the aim of building the capacity of developing countries for climate mitigation in the maritime industry.
3. The Director of the SPC's Geoscience, Energy and Maritime (GEM) Division, Dr. Andrew Jones welcomed the participants on behalf of SPC as the MTCC-Pacific Host Institution and recalled that shipping remains the lifeblood of the Pacific but like all sectors has to participate in national efforts to reduce greenhouse gas (GHG) emissions. The SPC's Deputy Director Transport, Head of MTCC-Pacific, Thierry Nervale revealed the objectives and expected results from MTCC-Pacific in terms of capacity building for climate mitigation in the maritime industry. The Fiji Permanent Secretary for Infrastructure and Transport, Paul Bayly provided the keynote remarks enhancing Fiji Government commitment to raise awareness and build the capacity to implement energy efficient measures in the Fiji maritime industry. Lastly, GMN project Manager from IMO, Tamar Barabadze, highlighted that the establishment of MTCC-Pacific will assist the region by providing expert support to industry and Governments and is now playing a key role in the region and as part of the wider GMN.
4. The purpose of the workshop was to gather Fiji government, the maritime administration and ship operators to agree on measures to improve energy efficiency of shipping in Fiji and provide them with technical tools to progress towards energy efficient operations of ships.

#### The participants:

5. Agreed to implement relevant actions to progress towards a Green Maritime Industry (ships, shipyards and ports) in Fiji in order to support a long-term objective for low-carbon maritime transport and contribute to the reduction of GHG emissions in Fiji and the Pacific.

6. Recognize the drivers, needs, barriers and relevant actions stated in Annex 2 that should include:
  - i. Capacity building and awareness;
  - ii. Policy and legislation review;
  - iii. Incentives towards energy efficiency and use of new technologies;
  - iv. Private-public partnerships; and
  - v. Ship maintenance and use of energy efficient equipment on board existing vessels.
7. Agreed to lead by example and be involved in MTCC-Pacific pilot-projects on energy efficient operations of ships and data collection that will assist in implementing immediate actions adapted to Fiji registered vessels, ports and shipyards.
8. Agreed to collect and share relevant data on fuel consumption through protocols with MoIT and MTCC-Pacific and request MTCC-Pacific to provide templates and assist in the collection and reporting, ensuring confidentiality and accessibility of information.
9. Recognized existing capabilities and future opportunities in Fiji to build and maintain energy efficient vessels or produce and use alternative fuels that require support from the Government of Fiji.
10. Noted existing incentives in Fiji that can maximize opportunities for energy efficient operations of ships but recognized the need for improved awareness and further incentives adapted to the special circumstances of domestic shipping in Fiji.
11. Raised the issue of lack of infrastructure in outer islands to facilitate shipping services and reduce fuel oil consumption and the opportunity to explore onshore power supply at domestic wharves.
12. Invited all ship owners to contribute to the revival of the Fiji Ship Owners Association to champion a Green Maritime Industry in Fiji.
13. Requested MTCC-Pacific to coordinate and facilitate a follow-up workshop to present and discuss progress in measures implemented in 2017-2018 related to energy efficiency and data collection in Fiji maritime industry.

## Annex 1 – List of participants

| #                          | Name                 | Job Title                                   | Organisation                            | Email Address  |
|----------------------------|----------------------|---|---|--|
| <b>HIGH-LEVEL WORKSHOP</b> |                      |   |   |  |
| 1                          | Paul Bayly           | Permanent Secretary                         | Ministry of Infrastructure & Transport  | <a href="mailto:paul.bayly@govnet.gov.fj">paul.bayly@govnet.gov.fj</a>                       |
| 2                          | Kalusiani Vuki       | Legal Officer                               | Maritime Safety Authority of Fiji       | <a href="mailto:kvuki@msaf.com.fj">kvuki@msaf.com.fj</a>                                     |
| 3                          | Lui Tusiga Naisara   | Deputy Secretary Policy & Planning          | Ministry of Infrastructure & Transport  | <a href="mailto:lui.naisara@moit.gov.fj">lui.naisara@moit.gov.fj</a>                         |
| 4                          | Faranisese Kinivuwai | Acting Director Transport & Policy          | Ministry of Infrastructure & Transport  | <a href="mailto:faranisese.kinivuwai@govnet.gov.fj">faranisese.kinivuwai@govnet.gov.fj</a>   |
| 5                          | Lesi Vuatalevu       | Acting Principal Transport Planner          | Ministry of Infrastructure & Transport  | <a href="mailto:lesi.vuatalevu@moit.gov.fj">lesi.vuatalevu@moit.gov.fj</a>                   |
| 6                          | Joji Wata            | Research Officer                            | Ministry of Infrastructure & Transport  | <a href="mailto:joji.wata@moit.gov.fj">joji.wata@moit.gov.fj</a>                             |
| 7                          | Mark Borg            | Team Leader Programme Management            | Pacific Islands Development Forum       | <a href="mailto:markborg@pacificidf.org">markborg@pacificidf.org</a>                         |
| 8                          | Lopeti Radravu       | Operations Manager                          | Fiji Ships and Heavy Industries Limited | <a href="mailto:lopeti@fijiports.com.fj">lopeti@fijiports.com.fj</a>                         |
| 9                          | David Patterson      | Assistant General Manager                   | Patterson Shipping/Searoad Shipping     | <a href="mailto:fijisearoad2@gmail.com">fijisearoad2@gmail.com</a>                           |
| 10                         | Netane Waqalala      | Manager                                     | Sequest Fiji Ltd/Sealand Processors     | <a href="mailto:netane@sequest.com.fj">netane@sequest.com.fj</a>                             |
| 11                         | Manoj Kumar          | Operational Manager                         | Inter Link Shipping Line Ltd            | <a href="mailto:operations@interlinkshipping.com.fj">operations@interlinkshipping.com.fj</a> |
| 12                         | Josese Lawaniyasana  | Acting Director                             | Government Shipping Services            | <a href="mailto:josese.lawaniyasana@moit.gov.fj">josese.lawaniyasana@moit.gov.fj</a>         |
| 13                         | Isireli Mokunitulevu | Manager                                     | Tokalau Shipping                        | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             |
| 14                         | Chris Dewhirst       | Shipping Manager                            | All Barging and Marine (Fiji) Ltd       | <a href="mailto:allprojects@allengineering.com.fj">allprojects@allengineering.com.fj</a>     |
| 15                         | Josateki Tagi        | Director                                    | Billett Wright & Associates (Fiji) Ltd  | <a href="mailto:billett@unwired.com.fj">billett@unwired.com.fj</a>                           |
| <b>ORGANISER</b>           |                      |   |   |  |
| 1                          | Andrew Jones         | GEMD Director                               | The Pacific Community                   | <a href="mailto:andrewj@spc.int">andrewj@spc.int</a>   |
| 2                          | Thierry Nervale      | MTCC-Pacific Head                           | MTCC-Pacific                            | <a href="mailto:thierryn@spc.int">thierryn@spc.int</a>                                       |
| 3                          | Mark Davis           | Transport Green House Gas Adviser           | MTCC-Pacific                            | <a href="mailto:markd@spc.int">markd@spc.int</a>   |
| 4                          | Ore Toua             | Maritime Training Adviser                   | MTCC-Pacific/The Pacific Community      | <a href="mailto:oret@spc.int">oret@spc.int</a>   |
| 5                          | Zullah M. A          | Maritime Industry Energy Efficiency Officer | MTCC-Pacific                            | <a href="mailto:zullahm@spc.int">zullahm@spc.int</a>   |
| 6                          | Francesca Pradelli   | Policy and Legal Officer                    | The Pacific Community                   | <a href="mailto:francescap@spc.int">francescap@spc.int</a>                                   |
| 7                          | Lore Croker          | Administrative and Information Assistant    | MTCC-Pacific                            | <a href="mailto:lore@spc.int">lore@spc.int</a>   |
| <b>TECHNICAL WORKSHOP</b>  |                      |   |   |  |
| 1                          | Kalusiani Vuki       | Legal Officer                               | Maritime Safety Authority of Fiji       | <a href="mailto:kvuki@msaf.com.fj">kvuki@msaf.com.fj</a>                                     |
| 2                          | Joji Wata            | Research Officer                            | Ministry of Infrastructure & Transport  | <a href="mailto:joji.wata@moit.gov.fj">joji.wata@moit.gov.fj</a>                             |
| 3                          | Vishal Prasad        | Policy Analyst                              | Ministry of Infrastructure & Transport  | <a href="mailto:vishal001.prasad@govnet.gov.fj">vishal001.prasad@govnet.gov.fj</a>           |
| 4                          | Viliame Ratakalovo   | Technical Officer II                        | Ministry of Infrastructure & Transport  | <a href="mailto:viliame.finau@moit.gov.fj">viliame.finau@moit.gov.fj</a>                     |
| 5                          | Josefa Baleinukulala | Assistant Lecturer                          | Fiji Maritime Academy                   | <a href="mailto:josefa.baleinukulala@fnu.ac.fj">josefa.baleinukulala@fnu.ac.fj</a>           |
| 6                          | Rusiate Lomanibasa   | Lecturer                                    | Fiji Maritime Academy                   | <a href="mailto:rusiate.lomani@fnu.ac.fj">rusiate.lomani@fnu.ac.fj</a>                       |
| 7                          | Thomas Patterson     | Assistant Operations Manager                | Patterson Shipping/Searoad Shipping     | <a href="mailto:fijisearoad2@gmail.com">fijisearoad2@gmail.com</a>                           |
| 8                          | Robert Kubukawa      | Assistant Fleet Engineer                    | Solander Pacific Ltd                    | <a href="mailto:robert@solander.com">robert@solander.com</a>                                 |



|    |                      |                       |                                       |  |
|----|----------------------|-----------------------|---------------------------------------|--|
| 9  | Viliame Malumalumu   | Chief Officer/Captain | Inter Link Shipping Line Ltd          | <a href="mailto:operations@interlinkshipping.com.fj">operations@interlinkshipping.com.fj</a> |
| 10 | Sakaraia Saubalavu   | Master                | Tokatau Shipping                      | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             |
| 11 | Tomasi Delai         | Chief Engineer        | Tokatau Shipping                      | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             |
| 12 | Yogesh Naicker       | Shore Engineer        | All Barge and Marine (Fiji) Ltd       | <a href="mailto:allbarge@allengineering.com.fj">allbarge@allengineering.com.fj</a>           |
| 13 | Isireli Mokunitulevu | Manager               | Tokatau Shipping                      | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             |
| 14 | Nanise Kabakoro      | Trainee Port Engineer | Fiji Port Corporation Limited         | <a href="mailto:nanise@fijiports.com.fj">nanise@fijiports.com.fj</a>                         |
| 15 | Ignasio Mow          | Foreman Engineer      | Fiji Ships & Heavy Industries Limited | <a href="mailto:isirelimokunitulevu@yahoo.com">isirelimokunitulevu@yahoo.com</a>             |

## Annex 2 – Matrix of drivers, needs, barriers and relevant action

| Drivers  | Needs   | Barriers   | Relevant action   |
|--|---|--|---|
| <i>First National Workshop on Energy Efficient Operations of Ships, Suva, Fiji, 24-27 October 2017</i> |   |  |   |
| Costs of energy  | <ul style="list-style-type: none"> <li>Reduced fuel oil consumption from domestic ships</li> <li>Collect data for baseline to show reduction in fuel consumption</li> <li>Cold ironing to save energy/costs</li> <li>Implement Energy Management Systems in shipping companies to improve practices</li> </ul>  | <ul style="list-style-type: none"> <li>No transparency in the use of data collected to improve systems – lack of open and timely process</li> <li>Transition costs for additional or change of equipment</li> <li>No SOPs and standards set for all Fiji fleet</li> </ul>  | <ul style="list-style-type: none"> <li>Collect data and provide accessibility to data to use in fuel savings measures through a Public Website with dedicated independent data</li> <li>Infrastructure development in Fiji ports to provide onshore power supply – support from Fiji Government</li> <li>Implement SMS/MMS including energy management with the support of SPC (PIDSS and MTCC-Pacific and MSAF jointly)</li> </ul>   |
| Improve profitability of ships, reliability and efficiency of domestic shipping                        | <ul style="list-style-type: none"> <li>Appropriate/relevant legal, regulatory and technical measures adapted to the size of the vessels and the capacity and resources of Fiji shipowners</li> <li>Training on safety, efficiency including energy efficiency, etc.</li> <li>Reduced competition that can compromise safety, efficiency and reliability of shipping services provided in Fiji</li> <li>Reduce lost time for berthing</li> </ul>   | <ul style="list-style-type: none"> <li>Over-regulation and not locally adapted measures that are too prescriptive</li> <li>Lack of crew qualification</li> <li>Measures are often adapted to vessels of more than 50 meters while most of domestic vessels are under this size and old</li> <li>Lack of infrastructure in outer islands to accommodate domestic vessels</li> </ul>   | <ul style="list-style-type: none"> <li>Government financial through subsidies and incentives</li> <li>Waiver depending the size and age of vessels</li> <li>Implementation of measures adapted to the Pacific domestic fleet</li> <li>Control domestic fleet tonnage and pre-inspection/limitation for vessels purchase overseas</li> <li>Capacity building of ship operators and crews on energy efficiency measures and practises</li> <li>Infrastructure development in outer islands to facilitate domestic shipping</li> </ul> |
| Improved standards of domestic ships including safety, training, pollution prevention and efficiency   | <ul style="list-style-type: none"> <li>Consider the inclusion of outboard small vessels in measures to reduce fuel consumption and GHG emissions taking into account the basic needs of communities mobility (4-stroke engines, electric outboard engines)</li> <li>Regular hull cleaning with adapted hull coating systems compliant with best standards and independent inspection</li> <li>Reduced competition that can compromise safety, efficiency and reliability of shipping services provided in Fiji</li> <li>Financial support from Fiji Government to support new measures</li> <li>Revive or develop capabilities in Fiji to build and maintain new concept equipment and vessels</li> </ul> | <ul style="list-style-type: none"> <li>Awareness and practices in communities that must travel between islands and use small outboard powered vessels</li> <li>Lack of dry-dock facility</li> <li>Lack of infrastructure in outer islands to accommodate domestic vessels</li> <li>Lack of support to provide information and technical tools on energy efficiency</li> <li>No government support/incentive to revive/develop ship building and maintenance in Fiji</li> </ul> | <ul style="list-style-type: none"> <li>Availability of new equipment affordable to communities</li> <li>Technical support and capacity building provided by MTCC-Pacific, SPC, MoIT and MSAF to implement adapted measures</li> <li>Infrastructure development in outer islands to facilitate domestic shipping and in Fiji ports to provide onshore power supply</li> <li>Support from government through subsidies and tax incentives for safety, energy efficiency equipment, ship building and maintenance</li> </ul>           |
| Reputation   | <ul style="list-style-type: none"> <li>Improve the reputation of shipping with regards to the protection of the environment and the emissions of GHG</li> </ul>   | <ul style="list-style-type: none"> <li>Lack of cooperation between all shipowners due to high competition</li> </ul>   | <ul style="list-style-type: none"> <li>Communicate efforts to implement energy efficient measure in Fiji domestic shipping</li> <li>Revive the Fiji Ship Owners Association to support Green Shipping in Fiji</li> </ul>  |

## ANNEX 4: Workshop Presentations

(Please refer to our website:  
<http://mtccpacific.spc.int/>)

Under the Resources Tab → Documents  
→ Templates → Training materials)

## **ANNEX 5: Workshop Evaluation Analysis**



Maritime Technology Cooperation Centre - Pacific  
Pacific Community, Suva Regional Office  
Private Mail Bag, Suva, Fiji  
Tel: (679) 337 0733 | Fax: (679) 337 01 46  
Email: mtcc-pacific@spc.int | Web: www.spc.int

## MTCC-PACIFIC - Fiji National Workshop on Ship Energy Efficient Operations (SEEO)

Suva, Fiji, 24~25 October, 2017

### Arrangements prior to the activity

- 1 Was the invitation received in good time? Yes ☐ No ☐
- 2 Did you receive the information listed below about the event before your participation
  - on its objective and scope Yes ☐ No ☐
  - subject areas and programme Yes ☐ No ☐
- 3 Were the instructions on the following clear and easy to understand?
  - profile required of participant Yes ☐ No ☐
  - completion and submission of the nomination form Yes ☐ No ☐
- 4 Did you receive logistical information on
  - venue Yes ☐ No ☐

### During the activity

- 5 To cover the topics fully, was the event (*please check the appropriate box*)  
(1) too long ☐ (2) just right ☐ (3) too short ☐
- 6 How do you rate the event with regard to the following? (*tick one box in each case*)
 

|            | excellent                | good                     | satisfactory             | poor                     |
|------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Venue      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Facilities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
- 7 How would you rate the following aspects? (*tick one box in each case*)
 

|                          | excellent                | good                     | satisfactory             | poor                     |                              |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------------|
| Group discussion         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | N/A <input type="checkbox"/> |
| Group Feedback           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | N/A <input type="checkbox"/> |
| Discussion opportunities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | N/A <input type="checkbox"/> |
- 8 How would you rate the following sessions according to the day's agenda? (*tick one box in each case*)
 

|                   | excellent                | good                     | satisfactory             | poor                     |                              |
|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------------|
| Morning session   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | N/A <input type="checkbox"/> |
| Lunch session     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | N/A <input type="checkbox"/> |
| Afternoon session | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | N/A <input type="checkbox"/> |

**At the end of the activity**

- 9 Please rate each facilitator with regard to the following (*check one box in each case*)
- |                                    |                          |                          |                          |                          |                              |
|------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------------|
| • delivery of presentation         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | N/A <input type="checkbox"/> |
| • ability to guide discussions     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                              |
| • effectiveness in:                |                          |                          |                          |                          |                              |
| • answering questions              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                              |
| • suggesting solutions to problems | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                              |

- 10 What topics were of most interest and relevance to your Administration?

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- 11 Are there any topics which should be added? Yes ☐ No ☐  
If yes, please list them:

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- 12 Do you consider that the objective of the event was met? Yes ☐ No ☐

- 13 Are the outcomes achieved likely to be useful to your Administration? Yes ☐ No ☐

- 14 Will you have the opportunity to transfer the knowledge gained to your colleagues at work? Yes ☐ No ☐

Comments:

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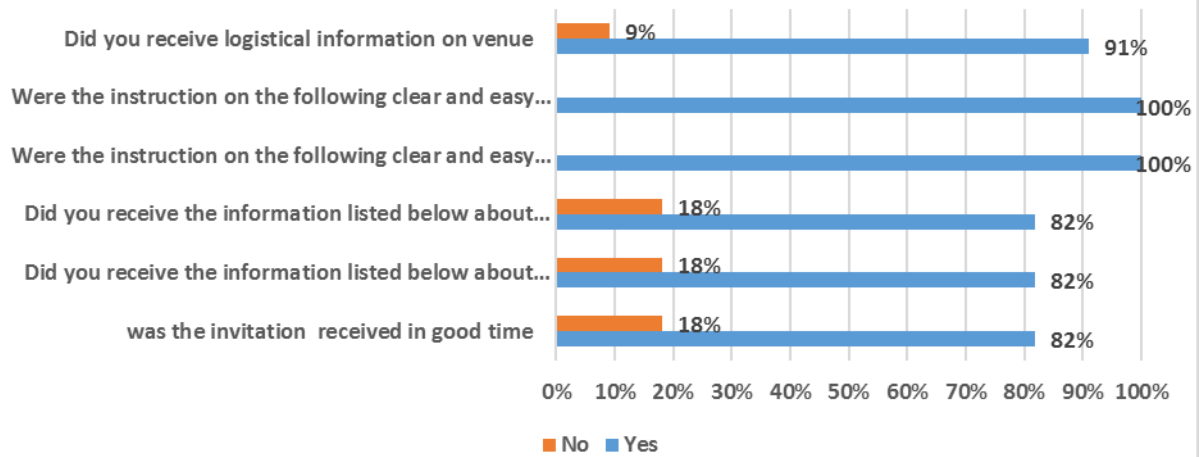
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We greatly appreciate your time in completing this evaluation questionnaire. It contains important information that will assist the MTCC team in determining the success and impact of the activity.

Thank you.

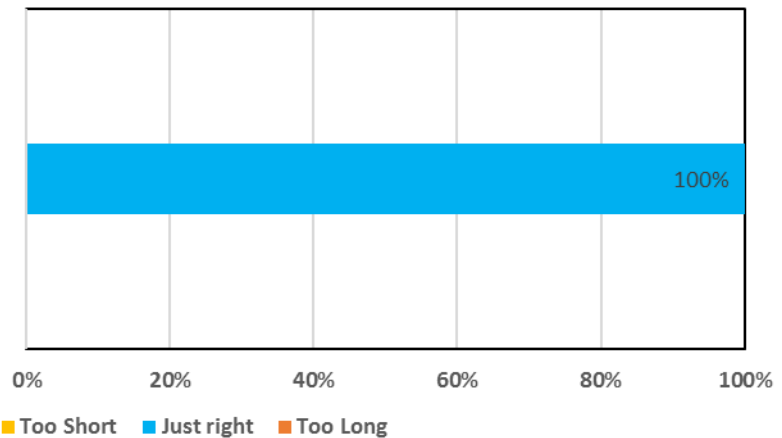
## Evaluation Questionnaire Analysis for High-level meeting

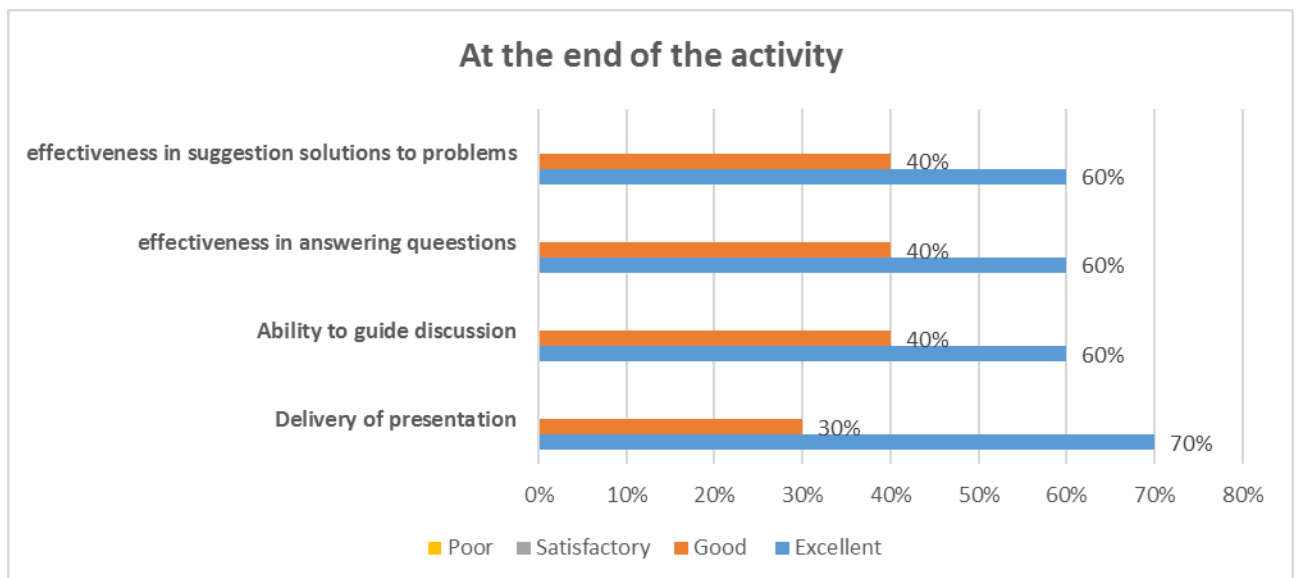
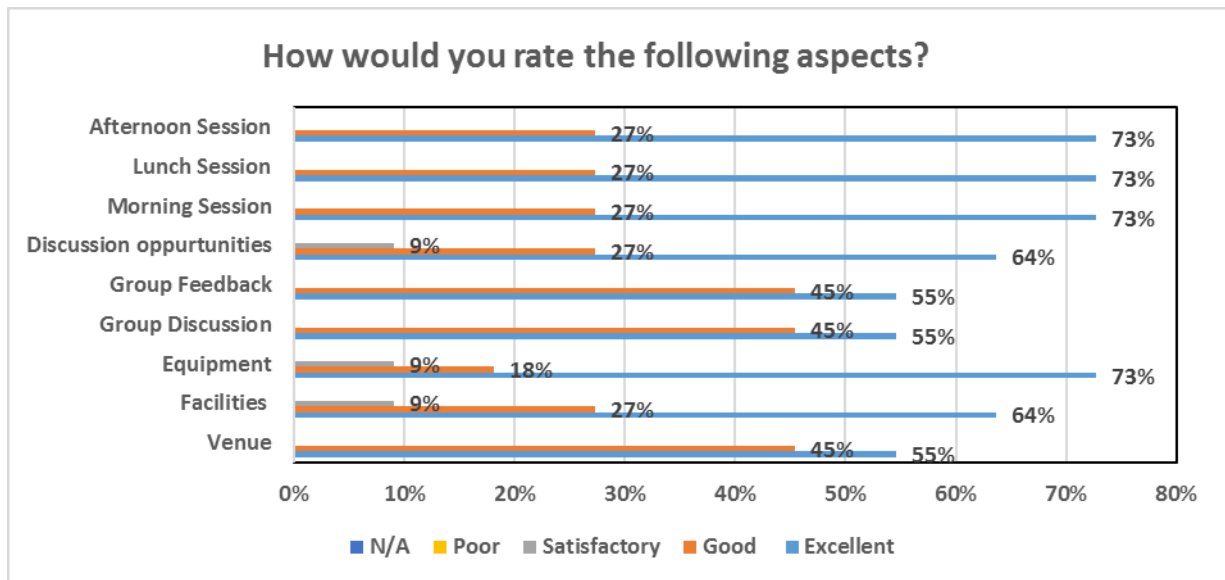
### Arrangement prior to the activity



### During the Activity

To cover the topic fully, was the event

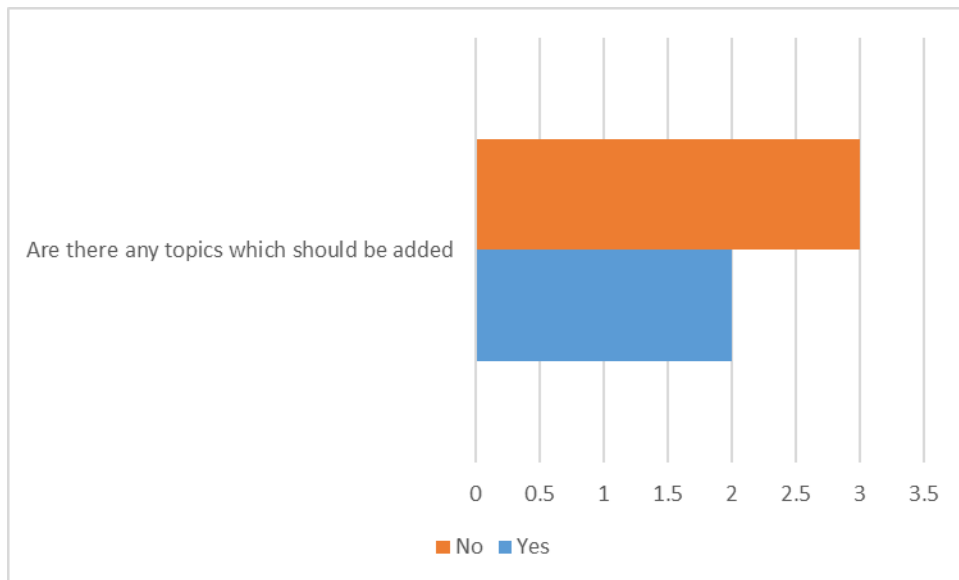




#### What topic were the most interest and relevance to your administration

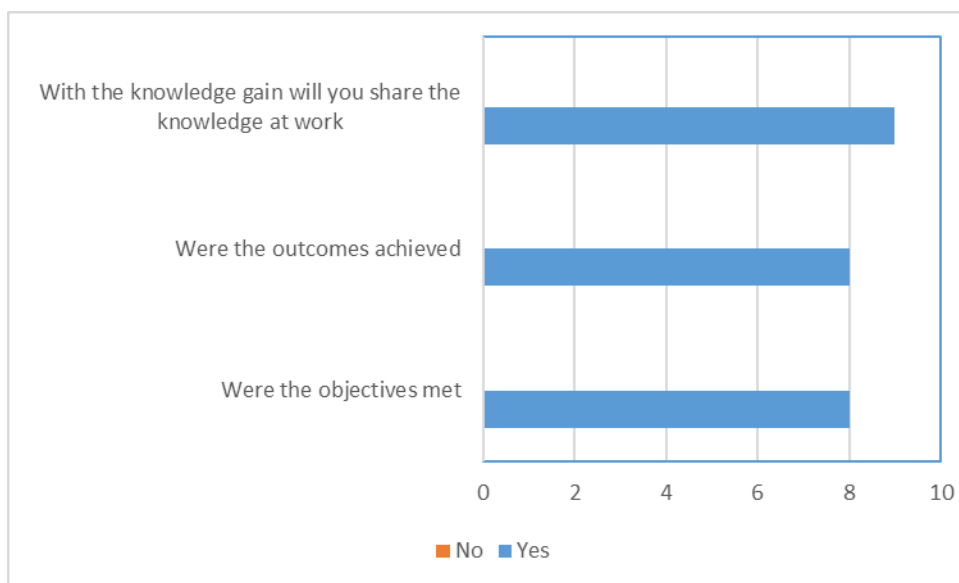
- Ship Maintenance Plan
- All
- Identify current barriers to implementing energy efficiencies changes
- Policy opportunities
- stakeholders issues
- collecting data for informed decision
- Identify drivers, needs, barriers and nations towards the reduction of GHG emission





For yes, list them:

New technological opportunities towards energy efficient ship operations.

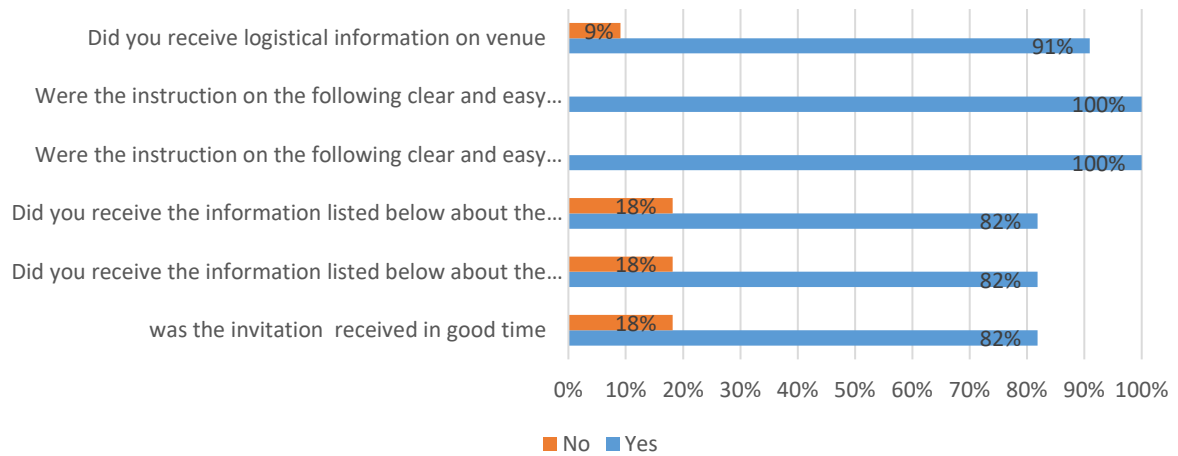


### Additional Comments

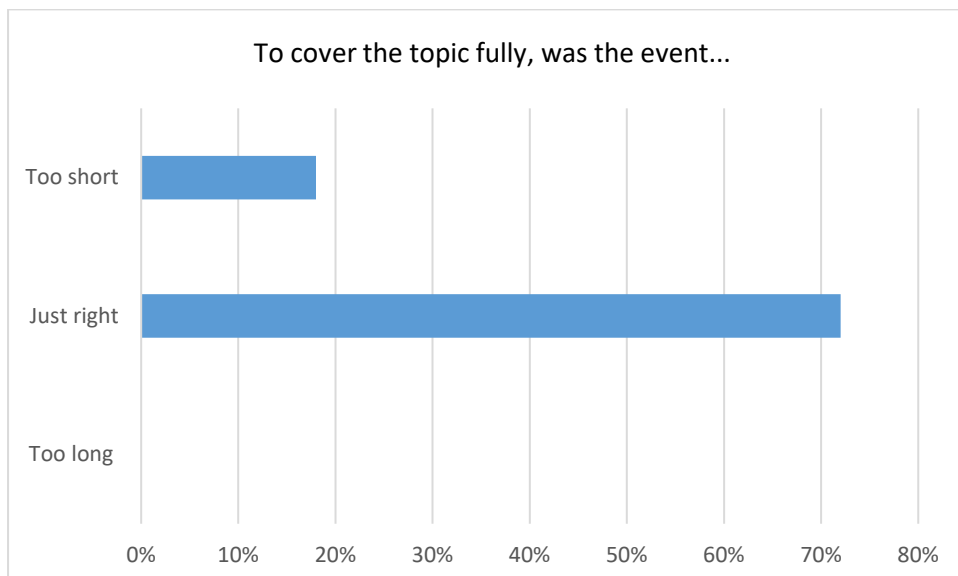
- Rope in foreign fishing vessel
- Good Opportunity for stakeholders, government and regulators to discuss opportunities in the shipping industry
- Excellent start for the local(Fiji) shipowner
- Effective implementation and dissemination of information, step forward for Fiji and the region

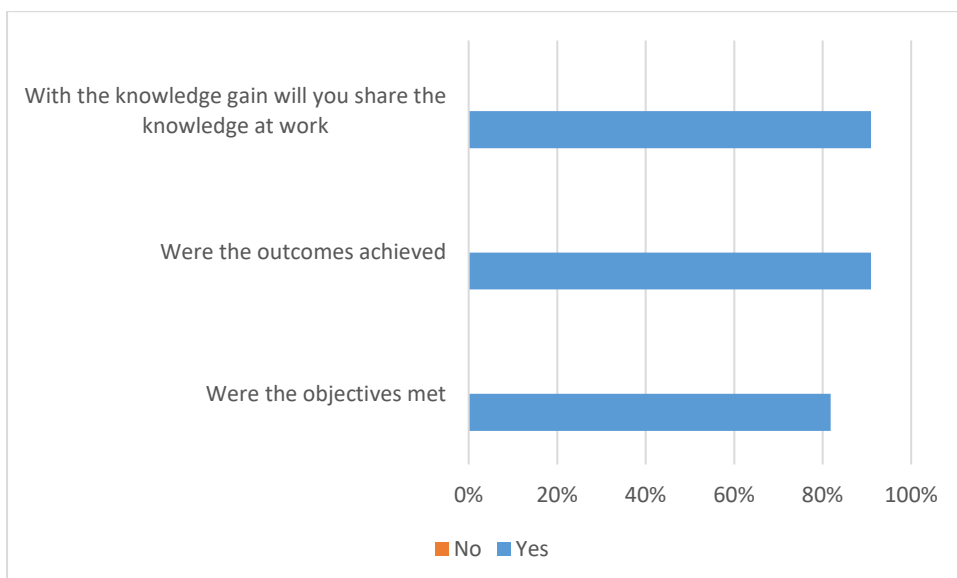
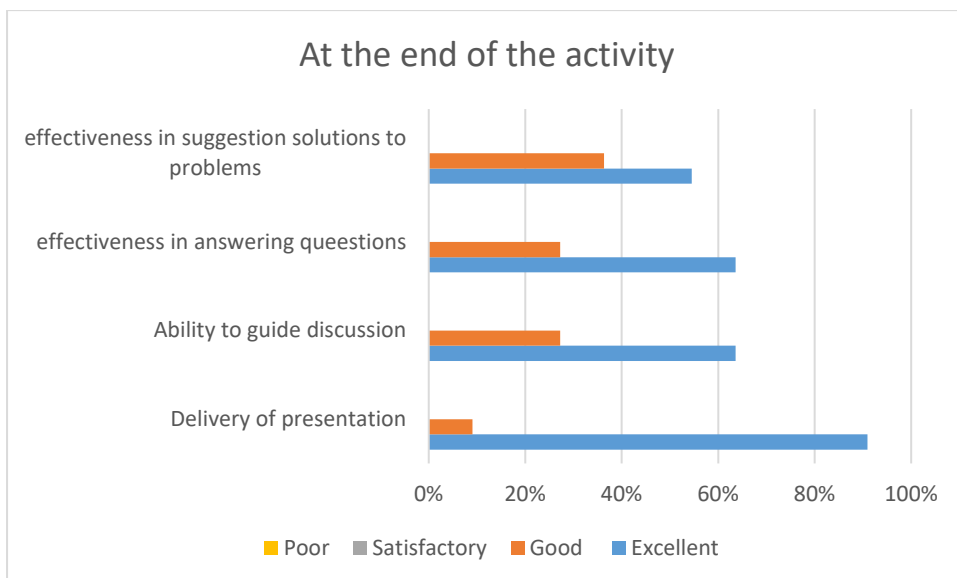
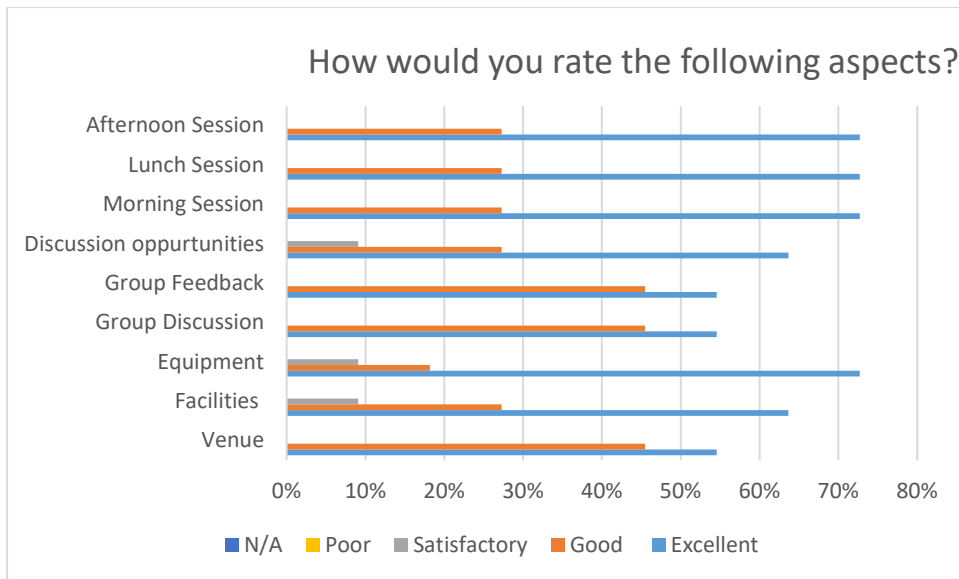
## Evaluation Analysis for the Technical Workshop

### Arrangement prior to the activity



### During the activity





## **Additional Comments**

- 1 All the information that I've gathered during this training I will use it as one of the tool for teaching preparation.
- 2 If SPC could help in the consultation and fund in our propeller, any means of our light, servicing of our fuel pump and injector as it is from Nisata Japan (Tokalau Shipping).
- 3 A good workshop for it shows me some new mechanism of improving our operations. Some of the things we see and do in everyday working onboard are not in the way it should be done or should be taken away with. It is an eye opener to me and would be very grateful if invited to attend such workshop to upgrade my vessel operation.
- 4 Very eye-opening workshop and also very informative.
- 5 Thanks MTCC-Pacific for the Fiji national workshop.
- 6 Excellent workshop and needs to be ongoing to keep pushing the idea of gaining more energy efficient, for the lower costing and clean environment.
- 7 Eye opening especially on energy management.



## **ANNEX 6: Photos**

Group discussion of issues, challenges and opportunities in the Fiji Maritime Industry during the high-level meeting



Remarks at the opening and closing of the workshop



Presentation of Pacific Island Domestic Ship safety and EEIO discussions at the technical workshop



Group photo

## **ANNEX 7: Communication and visibility activities**

**From:** press-releases-bounces@lists.spc.int  
**Subject:** [SPC-News] Media Release: Fiji maritime industry calls for energy efficient operations to reduce greenhouse gasses  
**Date:** Friday, 27 October 2017 11:30:28 AM  
**Attachments:** [image001.png](#)  
[ATT00001.txt](#)

## MEDIA RELEASE



Pacific Community  
Communauté  
du Pacifique

### Fiji maritime industry calls for energy efficient operations to reduce greenhouse gasses

27 October 2017

**Fiji, Suva** – Fiji Ministry of Infrastructure and Transport, Maritime Safety Authority of Fiji (MSAF) and ship operators convened this week for the First National Workshop on Energy Efficient Operations of Ships delivered by the Maritime Technology Cooperation Centre in the Pacific (MTCC-Pacific). The workshop participants agreed to address issues affecting domestic shipping in Fiji, taking into consideration the need to contribute to national efforts in reducing greenhouse gas emissions, and with the view to operate ships more efficiently and implement energy efficient measures.

The three and a half day Fiji National Workshop provided the participants with an understanding of the latest developments at the international level; new technologies, tools and methods available to monitor and reduce fuel oil consumption from the operations of ships in Fiji, in order to contribute to national efforts to reduce greenhouse emissions.

During his remarks, Fiji's Permanent Secretary for the Ministry of Infrastructure and Transport, Paul Bayly, highlighted the importance of maritime energy efficiency saying, "The Fiji Government is proud to be the host of MTCC-Pacific and is committed to raise awareness and build our capacity to implement energy efficient measures in the Fiji maritime industry."

In his opening address, SPC's Director of Geoscience, Energy and Maritime Division, Dr Andrew Jones reiterated the need for maritime energy efficiency stating that, "Reducing fuel oil consumption and adopting new maritime technologies will make an important contribution to reducing greenhouse gas emissions in Fiji, and meeting its Nationally Determined Contributions. The maritime sector has a critical role to play in national efforts and MTCC-Pacific has been established to build the capacity of Pacific Islands countries and lead by example in this goal".

An estimated 2,131 vessels are operated in Fiji waters each day. That includes 1,890 vessels of 15 meters and less and 241 vessels of more than 15 meters including 25 vessels of 50 meters and above. All of them use fossil fuels for their operations.

MTCC-Pacific is one of five centres of excellence in the world and forms part of the Global MTCC Network (GMN), which aims to build the capacity of developing countries for climate mitigation in the maritime shipping industry. The Global MTCC Network is implemented by the International Maritime Organization (IMO) and funded by the European Union. MTCC-Pacific provides capacity-building activities and will implement its pilot-projects on data collection and energy efficiency in the Fiji, as the MTCC-Pacific Host Country.

The GMN Project Manager, Tamar Barabadze said that, "the establishment of MTCC-Pacific will assist the region by providing expert support to industry and Governments, acting as a bridge between key stakeholders and helping to drive forward international standards on energy efficiency for the shipping sector. MTCC-Pacific is now playing a key role in the region and as part of the wider Global MTCC network".

Similar national workshops will be organised in other Pacific Islands Countries in 2018 to raise awareness and provide similar tools to reduce fuel oil consumption and greenhouse gas emissions.

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Fiji Ministry of Infrastructure and Transport, Maritime Safety Authority of Fiji (MSAF) and ship operators convened this week for the First National Workshop on Energy Efficient Operations of Ships delivered by the Maritime Technology Cooperation Centre in the Pacific (MTCC-Pacific). The workshop participants agreed to address issues affecting domestic shipping in Fiji, taking into consideration the need to contribute to national efforts in reducing greenhouse gas emissions, and with the view to operate ships more efficiently and implement energy efficient measures.

[http://www.spc.int/.../fiji-maritime-industry-calls-for-ener...](http://www.spc.int/.../fiji-maritime-industry-calls-for-ener.../)



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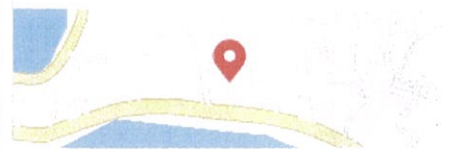
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#MTCCPacific pleased to host ship owners, Fiji Govt and MSAF on Fiji's very first national workshop on Energy Efficient Operation of Ships



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