

## 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

### TUVALU NATIONAL WORKSHOP ON ENERGY EFFICIENT OPERATIONS OF SHIPS

Funafuti, Tuvalu

9-11 May, 2018



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## EXECUTIVE SUMMARY

The First National Workshop (NW) on Energy Efficient Operations of Ships was held in Funafuti, Tuvalu from 9-11 May 2018. The workshop was coordinated and facilitated by the Maritime Technology Cooperation Centre in the Pacific (MTCC-Pacific) and attended by representatives from the Ministry of Communication and Transport (MCT), Office of the Prime Minister, Tuvalu Electrical Corporation (TEC), Pacific Energy SWP Ltd, University of South Pacific (USP), and Departments of Fisheries, Tuvalu Police Force, Department of Energy, Department of Agriculture, Department of Meteorology Services, Pacific Direct Line (PDL), Tuvalu Maritime Training Institute (TMTI) and Pacific Energy. The list of participants is attached in Annex 1.

The purpose of the NW was to gain the Tuvalu government, its maritime administration and ship operators to agree on measures to improve energy efficiency of shipping (SEE) in Tuvalu. Also, to provide them with technical tools to progress toward energy efficient operations of ships (SEEO) to comply with the recent Marine Environment Protection Committee (MEPC) Resolution 72 (9-13 April 2018) 'IMO Strategy' to reduce greenhouse gas emissions by up to 50% by 2050 compared to 2008. The NW agenda is attached in Annex 2.

The NW was held in two parts; the first day consisted of discussions on the initial Drivers-Needs-Barriers-Actions (D-N-B-A) Matrix to identify what is important to Tuvalu's maritime sector. Then a comprehensive coverage on shore to ship interactions was presented. The second part consisted of technical matters relating to SEEO; climate change, greenhouse gas emissions (GHGE) and Shore to Ship Energy Management measures. There was capacity building on the Energy Efficiency Design Index (EEDI), Energy Efficiency Operational Indicator (EEOI), Ship Energy Efficiency Management Plan (SEEMP) and the overarching Pacific Islands Domestic Ship Safety (PIDSS) programme and potential technologies to reduce and improve energy use performance e.g. Propeller Boss Cap Fins (PBCF), Light Emitting Diodes (LED), Waste Heat Recovery System (WHRS) and such.

This culminated in a closing group discussion to finalise feedback from the participants. The participants agreed to implement relevant actions to progress toward a Green Maritime Industry (ships and ports) in Tuvalu in order to support a long-term objective for low-carbon maritime transport and contribute to the reduction of GHG emissions in Tuvalu and the Pacific. The NW Outcome Document is attached in Annex 3.

All NW presentations are attached in Annex 4 in consecutive order as outlined in the Agenda.

## INTRODUCTION

The National Workshop on Energy Efficient Operations of Ships was held in Funafuti, Tuvalu from 9-11 May 2018. The meeting was coordinated and facilitated by the Maritime Technology Cooperation Centre in the Pacific (MTCC-Pacific) and attended by representatives from Tuvalu maritime sector, and in particular their national ship operations. The list of NW participants is attached in Annex 1.

The purpose of the workshop was to gain the Tuvalu government, their maritime administration and ship operations to agree on measures to improve energy efficiency of shipping (SEE) in Tuvalu and provide them with technical tools to progress toward SEE. The national workshop agenda is attached in Annex 2.

The national workshop provided capacity building in the areas of ship energy efficiency operations (SEEO), operational measures (SEEOM), management plans (SEEMP) and systems (SEEMS). However, the key Pilot Project on SEE is based on the critical need for data collection (DC). The significant 'Outcome' process and resulting document was developed to enrol and enhance the local Tuvalu maritime sector who agreed to provide the essential baseline data on fuel oil consumption (FOC) for up to six months in order to gain an understanding of where they are now and then determine what could be done to improve SEE, reduce fuel, costs and greenhouse gas emissions (GHGE).

This ultimately fulfils the vision of the International Maritime Organization (IMO) implemented and European Union (EU) funded Global MTCC Network (GMN) for climate change mitigation established to assist the maritime transport sector of Small Island developing states (SIDS) and least developed countries (LDC).

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

### Group Discussions *(Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC)*

The facilitator opened the floor for discussion and the following notes were recorded:

- The maritime stakeholders present in this NW were receptive to the concept of SEEO confirming that shipping is vital to Tuvalu for their lively hoods and transportation of goods.
- MTCC-Pacific's initiative is beneficial in highlighting issues that will make the domestic shipping safer and efficient.
- MTCC-Pacific is here to assist Tuvalu government shipping to achieve the primary objective of reducing GHGE. However, it acknowledges the critical need for relevant and accurate data collection (DC) that will establish the base-line to fulfil this objective.
- Participants feel more needs to be done on implementation of regulations and enforcement on international vessels arriving in Tuvalu. They also suggest that more needs to be done on domestic vessels operational regulation and implementation of SOP's for safe and efficient journeys.

## Ship Energy Efficiency Operations (SEEO) Challenges & Ship Owner Issues with reference to the Drivers-Needs-Barriers-Actions (D-N-B-A) Matrix *(Mark Davis, Transport Greenhouse Gas Adviser, SPC)*

The Drivers-Needs-Barriers-Actions (D-N-B-A) Matrix was developed through group discussions

### Group Discussion:

- Tuvalu has only 6 vessels and its contribution to GHGE from the vessels are assumed to be very low. However, the emission from the fishing vessels at anchorage are deemed by the participants as the biggest contributors to marine pollution and is clearly evident from the black smoke and oil spills.
- Participants felt that fishing vessels need to be heavily regulated to reduce the emission from their vessels.
- Ships in Tuvalu need to implement safety regulations and also follow proper SOPs.
- The issues discussed are thoroughly highlighted in the Matrix of Drivers, Needs, Barriers and Actions (D-N-B-A).

## Energy Efficiency Operations Indicator (EEOI) on Data collection

- The project will initially commence with the collection of fuel oil consumption (FOC) data. Templates for this have been developed by MTCC-Pacific. The data serves to provide MTCC-Pacific with a way of quantifying GHGEs and will be used to build a baseline to enable the design of suitable technology and operational activities that will assist in reducing GHGEs.



*Table 1. Matrix of Drivers, Needs, Barriers and Actions (D-N-B-A).*

Drivers	Needs	Barriers	Relevant action
<i>Tuvalu National Workshop on Energy Efficient Operations of Ships, Funafuti, Tuvalu, 9-11 May 2018</i>			
Capacity Building (C-B) e.g. HR Development and Awareness of Training opportunities	<ul style="list-style-type: none"> <li>• HR development</li> <li>• Tuvalu Maritime Training Institution's (TMTI) management continuity to build into an effective institution.</li> <li>• Continuity of maritime expertise within 'Maritime Department'.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of higher crew qualification</li> <li>• Although training provided under the PIDSS program no participants were aware or could recall attending training.</li> <li>• Limited on-ground inspection resources due to insufficient trained personnel.</li> </ul>	<ul style="list-style-type: none"> <li>• Building an adaptive capacity that will ensure application of PIDSS (SOP) &amp; SEEMP measures on board domestic vessels.</li> <li>• Government are considering the separation maritime roles e.g. port from admin of regulations.</li> <li>• Government support for increasing trained personnel.</li> </ul>
Carbon based incentives	<ul style="list-style-type: none"> <li>• To reduce GHGEs and conserve FO</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of understanding on environmental impacts.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide incentives (time in lieu, bonus, promotions) to crews to improve voyage efficiencies.</li> </ul>
Costs of fuel	<ul style="list-style-type: none"> <li>• Baseline data collection (DC) to show emissions from domestic shipping.</li> <li>• Proper recording of the fuel on-board and fuel discharge on the smaller islands.</li> <li>• Responsible person appointed.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of enforcement by operators on paper work</li> <li>• Lack of knowledge on the benefits and importance of data logging.</li> <li>• Proper voyage* report/log- FOC, weight (cargo, pax &amp; BW), time and distance (nm). *point to point.</li> </ul>	<ul style="list-style-type: none"> <li>• Captain conduct tool box meeting prior to departure of the vessels.</li> <li>• Implement safety &amp; energy management with the support of SPC (PIDSS and MTCC-Pacific)</li> <li>• Improve practices &amp; implement SOP &amp; SEEMP under the PIDSS program.</li> </ul>
Improve reliability, safety 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 Tuvalu (currently undergoing regulatory review by NZ team).</li> <li>• Training on safety, efficiency including SEEMP.</li> <li>• Despite weighing capability (currently not operational?), at the port no weighing is undertaken (as per checklist) and no weight declarations are provided. Weight usually calculated from the draught.</li> </ul>	<ul style="list-style-type: none"> <li>• Under-regulated &amp; not locally adapted</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of measures adapted to the Pacific domestic fleet.</li> <li>• Control domestic fleet cargo loading and pre-inspection /limitation based on load lines.</li> <li>• C-B of ship operators and crews on SEE measures and practises.</li> <li>• Biosecurity inspection.</li> <li>• Combined enforcement activities e.g. maritime police, especially marine pollution (Marine Resources Department?).</li> <li>• PSC/other authorities should be inspecting arriving/embarking vessels in lagoon and enforcing regulations. No port control.</li> </ul>

Legislation, Regulations and standards for domestic ships including safety, training, pollution prevention and efficiency	<ul style="list-style-type: none"> <li>• Awareness of compliance issues through the Maritime Department</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of support to provide information and technical tools on energy efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>• Technical support and C-B provided by MTCC-Pacific, and SPC to implement adapted measures</li> <li>• Incentives for SEE e.g. bonus.</li> </ul>
Traditional sustainable transport (canoe)	<ul style="list-style-type: none"> <li>• Ensure safety equipment on-board.</li> <li>• Support for traditional sailing skills for the younger generation.</li> </ul>	<ul style="list-style-type: none"> <li>• Cost.</li> <li>• Younger generation doesn't appreciate old skills etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide training and safety equipment incentive,</li> </ul>
Insufficient specialised staff	<ul style="list-style-type: none"> <li>• Lack of training</li> <li>• Retention of experienced staff</li> </ul>	<ul style="list-style-type: none"> <li>• Tuvalu and IDOs (IMO, ADB etc.) funding</li> </ul>	<ul style="list-style-type: none"> <li>• PIDSS (2010) &amp; MTCC-Pacific (2017) SEEO working in conjunction has been introduced by SPC in the Pacific.</li> </ul>

## DAY 1: TECHNICAL WORKSHOP

The following are the NW modules presented by the three MTCC-Pacific trainers as per the Agenda (Annex 1).

### 1 Ship Energy Efficiency Operations (SEEO) Challenges & Ship Owner Issues- D-N-B-A Matrix *(Mark Davis, Transport Greenhouse Gas Adviser, SPC)*

This session was covered above.

### 2 SEE Regulations & Related Guidelines *(Mark Davis, Transport Greenhouse Gas Adviser, SPC)*

This session provided an introduction to ship roles, responsibilities, SEE measures and maintenance.

#### Discussion

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

- The maritime division has not enforced regulations on the ship operators on safety and efficiency.
- Participants feel that more needs to be done by the maritime administration for ship operations.

### 3 SEEO & GHGE Management to Operation *(Mark Davis, Transport Greenhouse Gas Adviser, SPC)*

This session covered the origins of air pollution (Airpol), climate change (CC) and GHGEs, international global response; international shipping response and the main IMO instruments and historical developments.

#### Discussion

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

- The maritime GHGEs are small but there is no clarity on the total. Participants agree that data needs to be collected to understand the level of GHGEs.
- Participants feel that solar could be a beneficial technology for vessels in Tuvalu and build on the major island based and soon to be built, lagoon based, solar arrays to transition to 100% renewables.
- There are total of 6 vessels owned and operated by the Tuvalu government.
- Land transportation GHGEs is insignificant because the island primarily use scooters and bicycles. There are very few cars on the islands which have minimal impact on the environment as stated by the participants.

### 4 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 SEEMs; 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;

#### Discussion



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

- Slow steaming (reducing the steaming speed by 1 knot) in Tuvalu would be useful due to the nature of domestic shipping.
- Speed can be reduced on the return trip with lower cargo to offset operational costs. However, the participants feel that there will be a social backlash on the delayed ETA.
- Cargo are loaded on vessels by volume rather than by cost.
- Cargo loaded are not weighed.
- Ballast water discharged is not policed by any authority. The maritime administration has not regulated the ballast water discharge at the ports yet.
- International vessels are boarded by marine police, biosecurity, customs & immigration, and fisheries.
- Participants have reported significant marine weed growth in the lagoon. This could be from the untreated ballast water discharge from international vessels.
- Cargo loading is not optimized due to lack of knowledge and training of the ships' crew.
- Hull conditioning is done by divers on a 6 monthly basis.
- Tuvalu vessels are dry docked either yearly or on 2 yearly basis.

## 5 Ship-Port Interface & Energy Efficiency (*Ore Toua, Maritime Training 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/GHGE reductions; ship in-port operational energy efficiency measures (OEEM); and onshore power supply (OPS)/cold ironing.

### Discussion

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

- Cold ironing using renewable OPS would be beneficial given the high and increasing use of solar power.
- Feasibility assessment will need to be carried out if the islands electricity infrastructure can sustain additional load from the port.
- Airport, port and fisheries building have solar system installed on their roof tops.

## 6 Energy Management Plan (EnMP) & System (EnMS) (*Mark Davis, Transport Greenhouse Gas 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.

### Discussion

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

- Waste fuel oil is not properly stored at the ports and rusting 220L drums are leaking, contaminating ground and marine waters and require a proper storage facility. Plastic one tonne containers have been provided and all should be collected free of charge for transport to Fiji for reprocessing. However only 4 drums at a time are taken and not consistently.
- SoPs have not been developed for the vessels operated by Tuvalu maritime administration.
- An energy management policy exists within the administration but has yet to be enforced.

## 7 Pacific Island Ship Safety (PIDSS) Program *(Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC)*

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

### Discussion

- PIDSS is available to assist ship engineers to review and improve their SMS and implement safety measures on board vessels.
- The Tuvalu vessels are behind the world in maritime transport whereas they could be leading it and therefore it is time to catch up with recent technology developments.
- With the implementation of SoPs, from the PIDSS together with MTCC-Pacific pilot projects, Tuvalu could pave the way for safe and efficient sea travel.

## DAY 2: TECHNICAL WORKSHOP

All Day 2 sessions presented by Dr. M. A. Zullah, Maritime Industry Energy Efficiency Officer, SPC.

## 8 Energy Efficiency Design Index (EEDI) Guideline

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 calculation is used for new vessels only but depending on the availability of specific ship data, EEDI could be calculated for existing vessels.

## 9 Ship Energy Efficiency Management Plan (SEEMP) Guideline

In this session, the main elements of SEEMP, implementation aspects and EEOI calculation process was covered.

### Discussion

- For MTCC-Pacific SEE is central to its mission. Ship operators and engineers must first understand the concept of SEEMP and EEOI before moving forward to implementation to improve their SEE. MTCC-Pacific can assist shipping companies in developing SEEMPs, assessing vessels using this and developing ways to improve SEE.
- Participants are interested in implementing SEEMP to conserve FOC.

## 10 Ship Energy Efficiency Operations (SEEO) Measures

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.

## 11 Ship Energy Efficiency (SEE) Technical Measures

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.

## 12 Further SEE Measures

This session focused on the development of DCS for FOC; DC; data analysis; and lastly followed by decision making on what further measures are required, if any.

## 13 Potential Fuel-oil Consumption (FOC) & Green-house Gas Emission (GHGE) Reductions

This session explored the introduction and forecasting scenarios; simulation models; FOC and fuel cost forecasting.

## 14 Light Emitting Diodes (LED)

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

- Nivaga III has solar system already installed on the top deck.
- Tuvalu residents have first-hand experience and have seen benefits of the LED's in their home.
- Lower maintenance costs of LED
- Less energy consumption

## 15 Shaft Generators

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

### Discussion

- Useful to manage cargo loading, account for FOC and measure slow steaming benefits in Tuvalu vessels.
- Minimize interaction of human high risk operations due to low skill set of operators in Tuvalu (Operations and Maintenance)

## 16 Waste Heat Recovery Systems (WHRS)

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 3: WRAP-UP

The final day was focused on presenting, reviewing and adopting the *Outcomes* statement developed from two days of deliberations. This was also an opportunity for ship owners to express their views on the MTCC-Pacific program.

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

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

- Good overall attendance.
- Group discussion on issues relating to SEEO.
- Discussion on CC, GHGE and S/SEM measures.
- Interactive knowledge transfer on EEDI, EEOI, SEEMP and PIDSS.
- Energy saving devices such as PBCF, LED, WHRS, SG and PV.

### 18 Open table discussion

- Do not have resources to provide the members with maintenance programme for engineers
- Lack of appropriate training for crew
- Improvement of outer islands maritime Infrastructure especially on loading and keeping discharge cargo manifest
- Technical support and capacity building programme such as pilot training for outer islands

### 19 Review of Outcomes Document (*Mark Davis, Transport Greenhouse Gas Adviser, SPC*)

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

### 20 Closing Remarks (*Mr. Taasi Pitoi, Director of Marine , Ministry of Communications and Transport, Tuvalu*)

On behalf of the Tuvalu government, Mr. Taasi thanked MTCC-Pacific and SPC for the organizing of the national workshop on ship energy efficiency. He thanked all the participants for attending and supporting MTCC-Pacific with its initiative. He reiterated the importance of the data collection and contribution towards GHGE reduction and uptake of energy efficient operations. Tuvaluan's have been championing climate mitigation in international discussions and would like to see people's behaviour change towards conservation of energy usage generally in Tuvalu. Mr. Taasi also acknowledged the issues raised by the participants and informed them that the Marine Department has been doing its best to address them.

# ANNEXES

## ANNEX 1: Signed List of Participants



wed 09/05/18

[illegible]



[illegible]



Thursday 10/05/18

## TUVALU NATIONAL WORKSHOP ON EFFICIENT OPERATIONS OF SHIPS

[illegible]



[illegible]



FRIDAY 11/05/18

## TUVALU NATIONAL WORKSHOP ON EFFICIENT OPERATIONS OF SHIPS

[illegible]



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## ANNEX 2: Agenda



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**MTCC-PACIFIC – Tuvalu National Workshop on Ship Energy Efficient Operations (SEEO)**  
**Funafuti, Tuvalu, 8~18<sup>th</sup> May, 2018**

**PROGRAMME**

Time	Agenda item	Agenda issues	Presenters
<b>Day 1 – 8<sup>th</sup> May, 2018 – Technical Workshop (Ship Energy Efficient Operations)</b>			
<b>0800</b>		<b>Registration</b>	
<b>0830</b>		<b>Welcome Addresses:</b> <b>Ministry of Foreign Affairs, Trades, Tourism, Environment &amp; Labour (TBD)</b> <b>MTCC-Pacific Transport Greenhouse Gas Adviser</b>	
<b>0900 – 1030</b>	<b>1</b>	Ship Energy Efficiency Operation (SEEO) Challenges- Ship Owners Issues- Discussion of N-B-R-A Matrix: 'Outcome'	MTCC-Pacific
	<b>2</b>	Ship Energy Efficiency Regulations and Related Guidelines - Introduction to ship roles and responsibilities	MTCC-Pacific
<b>1030-1100</b>		<b>Tea Break</b>	
<b>1100 – 1230</b>	<b>3</b>	Ship Management to Operation - Origins of air pollution (airpol) and climate change (CC) - CC and GHG emissions (GHGE) - International global response - International shipping response - Main IMO instruments and historical developments	MTCC-Pacific
	<b>4</b>	Ship-Board Energy Management - IMO regulatory framework (FW)- ship energy efficiency (SEE) - MARPOL Annex VI Chapter 4 - Brief introduction to SEEMP GL - Brief introduction to SEE Operations Index (EEOI) GL	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	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
	7	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	8	Open Discussions	
1530- 1600	Tea Break		
End Day 1			

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Time	Agenda item	Agenda issues	Presenters
<b>Day 2 – 9<sup>th</sup> May , 2018 – Technical Workshop (Ship Energy Efficient 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 - Development of a data collection system (DCS) for fuel consumption o data collection; o data analysis; and o followed by decision-making on what further measures, if any, are required	MTCC-Pacific
	6	Potential to reduce emissions and fuel consumption - Introduction and forecasting scenarios - Simulation model - Fuel consumption and fuel cost forecast	MTCC-Pacific
	7	LED - What is LED? - Efficacy of led - Cost evaluation for LED application	MTCC-Pacific
	8	Shaft Generators - What is shaft generator system? - Vessels using shaft generator - Energy saving - Cost effect - Risk	MTCC-Pacific
	9	Waste Heat Recovery System (WHRS) - Heat Balance for Engine without & with WHRS - PTG(Power Turbine & Generator) WHRS - STG(Steam Turbine & Generator) WHRS - PT-ST Combined Waste Heat Recovery System	MTCC-Pacific
1545- 1600	10	Open Discussions	
1600- 1630	Closing Remarks		
End Day 2			

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](mailto:mtcc-pacific@spc.int) | Web: [www.spc.int](http://www.spc.int)

Time	Agenda item	Agenda issues	Presenters
<b>Day 3 – 10<sup>th</sup> May, 2018 – Technical Workshop (Ship Energy Efficient Operations)</b>			
0845		<b>Participants arrive</b>	
0900 – 1030	1	Overview of the Vanuatu Islands National Workshop	MTCC-Pacific
	2	Update by the Marine Department	MoCT
1030 – 1000		<b>Tea Break</b>	
1100 – 1230	3	Discussion of the workshop Outcome document	MTCC-Pacific
	4	Certificate of Attendance Awarded	Permanent Secretary
	5	Closing remarks	PS/MTCC-Pacific
<b>Lunch &amp; End Day 3</b>			
<b>11<sup>th</sup> – 16<sup>th</sup> May, 2018 – Onboard Ship visits</b>			
0800 – 1600		Introduction of onboard data collection template and development of ship energy efficiency management plan (SEEMP)	MTCC-Pacific / MoCT

## ANNEX 3: Outcomes Document



## FIRST NATIONAL WORKSHOP ON ENERGY EFFICIENT OPERATION OF SHIPS

Funafuti, Tuvalu, 9-11 May 2018

### OUTCOMES

1. The First National Workshop on Energy Efficient Operations of Ships was held in Funafuti, Tuvalu from 9-11 May 2018. The workshop was coordinated and facilitated by the Maritime Technology Cooperation Centre in the Pacific (MTCC-Pacific) and attended by representatives from the Ministry of Communication and Transport (MCT), Office of the Prime Minister, Tuvalu Electrical Corporation (TEC), Pacific Energy SWP Ltd, University of South Pacific (USP), Department of Fisheries, Tuvalu Police Force, Department of Energy, Department of Agriculture, Department of Meteorology Services, Pacific Direct Line (PDL), Tuvalu Maritime Training Institute (TMTI) and Pacific Energy. 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) that form part of the Global MTCC Network (GMN), a project implemented by the International Maritime Organization (IMO) and funded by the European Union (EU) with the aim of building capacity of small island developing states (SIDS) and least developed countries (LDC) for climate mitigation in the maritime industry.
3. The welcoming speech was delivered by the Tuvalu's Acting Chief Operating Officer of the Ministry of Communication and Transport, Mr. Falasese Tupau, where he recapped Tuvalu's Prime Minister, Hon. Enele Sopoaga concern for the need of the shipping industry to reduce the greenhouse gas emissions.. *"We need to quantify the emissions from our vessels through MTCC-Pacific's data collection regime and address and further reduce our greenhouse gas emissions from the shipping industry. I hope this workshop will lay the foundation for innovation in the shipping industry to be more environmentally friendly in terms of fuel consumption, energy consumption and uptake of energy efficient technology."*
4. In his opening address, MTCC-Pacific (Maritime) Transport Greenhouse Gas Advisor recapped the commitments from MTCC-Pacific, its Host Institutions and its partners to assist the Pacific region in climate mitigation in the maritime transport sector and was *"pleased with the commitment shown by leaders in Tuvalu and confident that the knowledge shared during this week will make a positive impact toward greenhouse gas emission targets"*.
5. The purpose of the meeting was to gather the relevant maritime transport sector stakeholders, government and ship operators to agree on measures to improve energy efficiency of shipping in Tuvalu and provide them with technical tools to progress toward ship energy efficient operations (SEEO).

**The participants:**

6. Agreed to take relevant action to mitigate greenhouse gas (GHG) emissions and create awareness amongst the ship operators in Tuvalu on the benefits of ship energy efficient operations (SEEO) toward reduction of fuel oil consumption (FOC) and reduction of GHG emissions;
7. Recognize the drivers, needs, barriers and relevant actions stated in Annex 2 that include:
  - i. Capacity Building (C-B) e.g. HR Development and Awareness of Training opportunities;
  - ii. Carbon based incentives;
  - iii. Costs of fuel;
  - iv. Improve reliability, safety and efficiency of domestic shipping;
  - v. Legislation, Regulations and standards for domestic ships including safety, training, pollution prevention and efficiency;
  - vi. Traditional sustainable transport (canoe); and
  - vii. Insufficient specialized staff.
8. Agreed to participate 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 domestic ships in Tuvalu and port operations;
9. Agreed to collect and share relevant data on fuel oil consumption (FOC) and request MTCC-Pacific to provide templates and assist in collection and reporting, ensuring confidentiality and accessibility of information;
10. Agreed to continue efforts to implement Safety Management Systems and planned maintenance on board domestic ships in Tuvalu under the PIDSS Programme.

11 May 2018

## Annex 1 – List of participants

#	Name	Job Title	Organisation	Email Address/ Phone Number
1	Taimaitasi Paelate	Deputy CEO/Chief Engineer	Tuvalu Maritime Technical Institute (TMTI)	tpaelate@yahoo.com / 688 20039
2	Sione Paueli	Chief Officer	TMTI	pauelisione@gmail.com / 688 20039 / 7006149
3	Timona Talava	Engineer	Taimanino	timtpatala@gmail.com
4	Moepeau Luka	Chief Engineer	Tala Moana	lmoepeau@yahoo.com
5	Apisai Kilima	Agent & Manager	Transam	apisai166@gmail.com / 688 20646
6	Ielemia	Engineer	Tuvalu Fisheries	ielesaitala@gmail.com / 688 20050
7	Matio L	Acting Director	Tuvalu Agriculture	matiolala@gmail.com / 688 20836
8	Koloa Tofaga	Skipper	Fisheries (MNR)	knofoala@gmail.com / 688 20219
9	Puafolau Malu	Petroleum Specialist	Department of Energy	pfolau@gmail.com / 688 20056
10	Tala Fou Esekiaia	Maritime Commander	Tuvalu Police Service	talaloi@yahoo.com.au / 688 20060
11	Jamie N. Ovia	Climate Mitigation Policy Advisor	CC Policy & Disaster Coordination Unit (PM's Office)	jammin.ovia537@gmail.com / 699 2057
12	Tinapa Faletute	Principal Technical Officer	Meteorological Department	faletute@gmail.com / 688 20736
13	Teafa Tautu	Distribution Manager	Tuvalu Electrical Corporation (TEC)	ttautu@gmail.com / 688 20357
14	Fatoga Talama	Generation Manager	Tuvalu Electrical Corporation (TEC)	fatoga.talama@gmail.com / 688 20357
15	Salolo Tepoga	Marine Engineer	Marine & Port Services	siaositepoga@gmail.com / 688 20744
16	Taasi Pitoi	Director	Marine & Port Services	taasi.pitoi@gmail.com / 688 20055
17	Jack Mataio	AB Seaman	LCV Taimanino	matiolnln@gmail.com
18	Tuivaituru Evi	Captain	RV Tala Moana	tuievi@gmail.com / 688 20343 / 7005670
<b>ORGANISER</b>				
1	Mark Davis	Transport Green House Gas Adviser	MTCC-Pacific	markd@spc.int
2	Ore Toua	Maritime Training Adviser	MTCC-Pacific/The Pacific Community	oret@spc.int
3	Zullah M. A	Maritime Industry Energy Efficiency Officer	MTCC-Pacific	zullahm@spc.int

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

Drivers	Needs	Barriers	Relevant action
<i>Tuvalu National Workshop on Energy Efficient Operations of Ships, Funafuti, Tuvalu, 9-11 May 2018</i>			
Capacity Building (C-B) e.g. HR Development and Awareness of Training opportunities	<ul style="list-style-type: none"> <li>HR development</li> <li>Tuvalu Maritime Training Institution's (TMTI) management continuity to build into an effective institution.</li> <li>Continuity of maritime expertise within 'Maritime Department'.</li> </ul>	<ul style="list-style-type: none"> <li>Lack of higher crew qualification</li> <li>Although training provided under the PIDSS program no participants were aware or could recall attending training.</li> <li>Limited on-ground inspection resources due to insufficient trained personnel.</li> </ul>	<ul style="list-style-type: none"> <li>Building an adaptive capacity that will ensure application of PIDSS (SOP) &amp; SEEMP measures on board domestic vessels.</li> <li>Government are considering the separation maritime roles e.g. port from admin of regulations.</li> <li>Government support for increasing trained personnel.</li> </ul>
Carbon based incentives	<ul style="list-style-type: none"> <li>To reduce GHGs and conserve FO</li> </ul>	<ul style="list-style-type: none"> <li>Lack of understanding on environmental impacts.</li> </ul>	<ul style="list-style-type: none"> <li>Provide incentives (time in lieu, bonus, promotions) to crews to improve voyage efficiencies.</li> </ul>
Costs of fuel	<ul style="list-style-type: none"> <li>Baseline data collection (DC) to show emissions from domestic shipping.</li> <li>Proper recording of the fuel on-board and fuel discharge on the smaller islands.</li> <li>Responsible person appointed.</li> </ul>	<ul style="list-style-type: none"> <li>Lack of enforcement by operators on paper work</li> <li>Lack of knowledge on the benefits and importance of data logging.</li> <li>Proper voyage* report/log- FOC, weight (cargo, pax &amp; BW), time and distance (nm).</li> <li>*point to point.</li> </ul>	<ul style="list-style-type: none"> <li>Captain conduct tool box meeting prior to departure of the vessels.</li> <li>Implement safety &amp; energy management with the support of SPC (PIDSS and MTCC-Pacific)</li> <li>Improve practices &amp; implement SOP &amp; SEEMP under the PIDSS program.</li> </ul>
Improve reliability, safety 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 Tuvalu (currently undergoing regulatory review by NZ team).</li> <li>Training on safety, efficiency including SEEMP.</li> <li>Despite weighing capability (currently not operational?), at the port no weighing is undertaken (as per checklist) and no weight declarations are provided. Weight usually calculated from the draught.</li> </ul>	<ul style="list-style-type: none"> <li>Under-regulated &amp; not locally adapted</li> </ul>	<ul style="list-style-type: none"> <li>Implementation of measures adapted to the Pacific domestic fleet.</li> <li>Control domestic fleet tonnage and pre-inspection /limitation based on load lines.</li> <li>Capacity building of ship operators and crews on SEE measures and practises.</li> <li>Biosecurity inspection.</li> <li>Combined enforcement activities e.g. maritime police, especially marine pollution (Marine Resources Department will be formed under new regulation).</li> <li>PSC/other authorities should be inspecting arriving/embarking vessels in lagoon and enforcing regulations. No port control.</li> </ul>
Legislation, Regulations and standards for domestic ships including safety, training, pollution prevention and efficiency	<ul style="list-style-type: none"> <li>Awareness of Maritime compliance through 'MSA'.</li> </ul>	<ul style="list-style-type: none"> <li>Lack of support to provide information and technical tools on energy efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>Technical support and C-B provided by MTCC-Pacific, and SPC to implement adapted measures</li> <li>Incentives for SEE e.g. bonus.</li> </ul>

Traditional sustainable transport (canoe)	<ul style="list-style-type: none"> <li>• Ensure safety equipment on-board.</li> <li>• Support for traditional sailing skills for the younger generation.</li> <li>• Infuse the traditional sea transport knowledge with modern technology to promote safety</li> </ul>	<ul style="list-style-type: none"> <li>• Cost of safety equipment's.</li> <li>• Younger generation doesn't appreciate old skills etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide training and safety equipment incentive,</li> </ul>
Insufficient specialised staff	<ul style="list-style-type: none"> <li>• Lack of training</li> <li>• Retention of experienced staff</li> </ul>	<ul style="list-style-type: none"> <li>• Tuvalu and International development organisation (IMO, ADB etc.) funding</li> </ul>	<ul style="list-style-type: none"> <li>• PIDSS (2010) &amp; MTCC-Pacific (2017) SEEO working in conjunction has been introduced by SPC in the Pacific.</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 NATIONAL WORKSHOP ON ENERGY EFFICIENT OPERATIONS OF SHIPS

Funafuti, Tuvalu, 9-11 May, 2018

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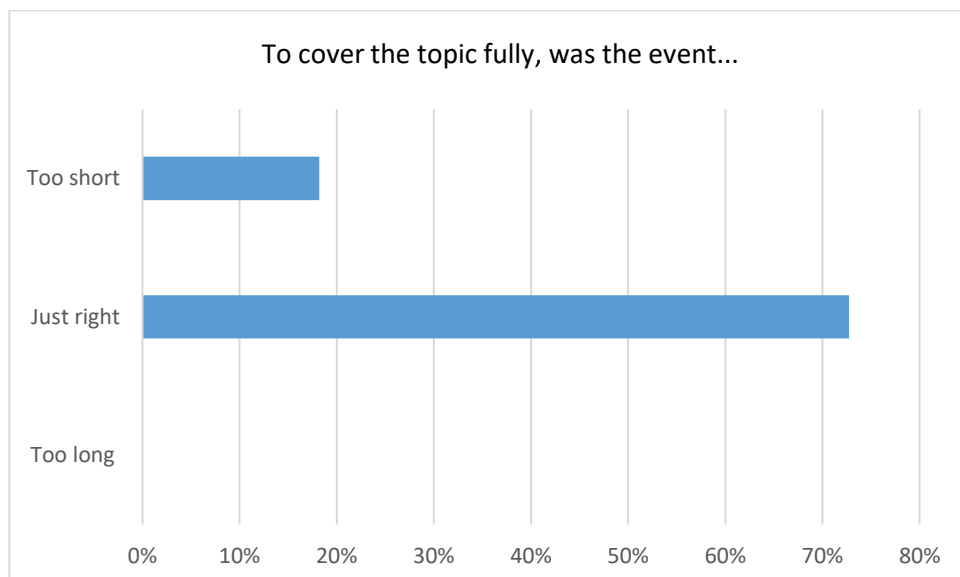
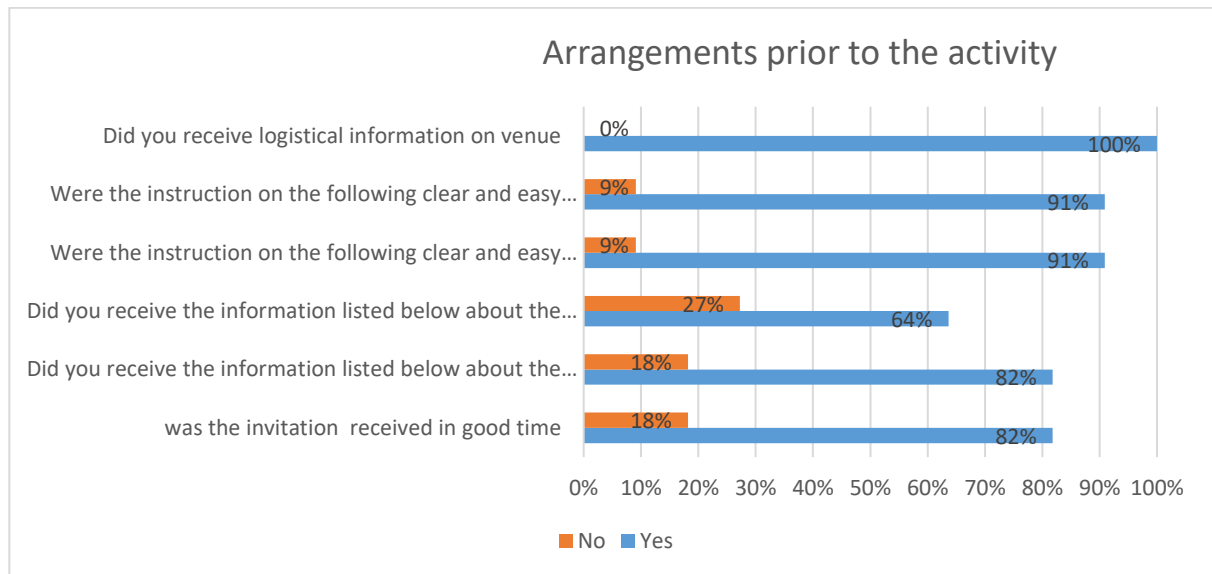
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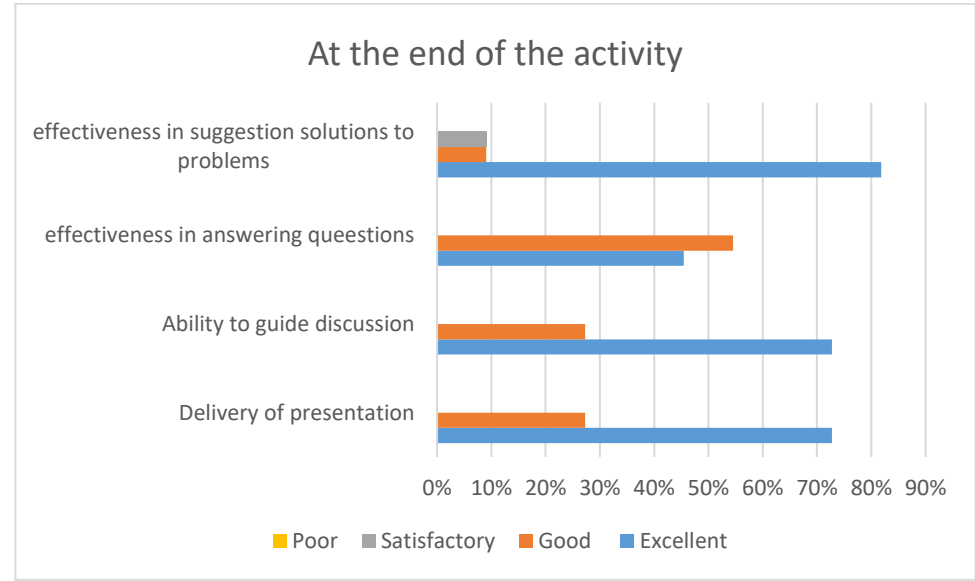
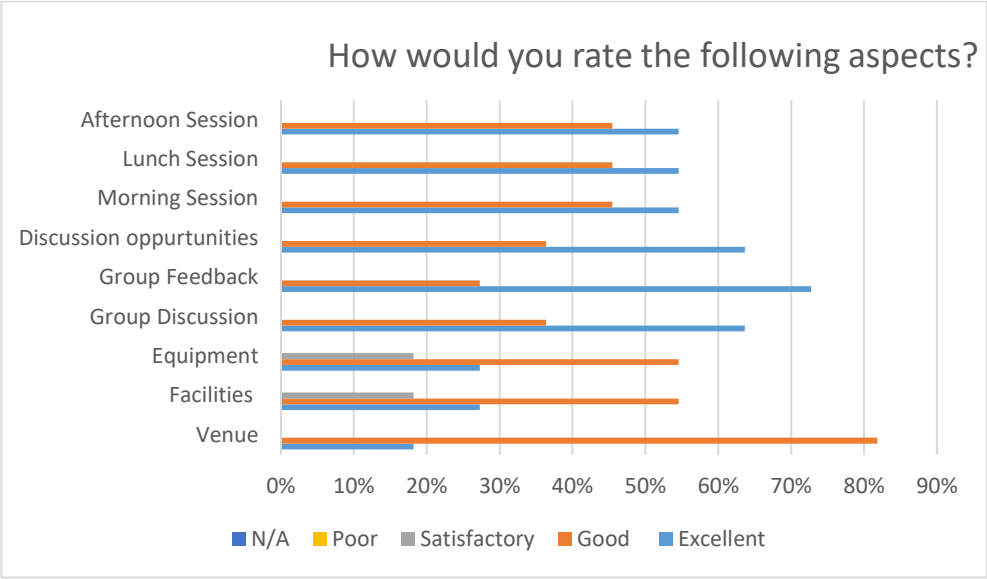
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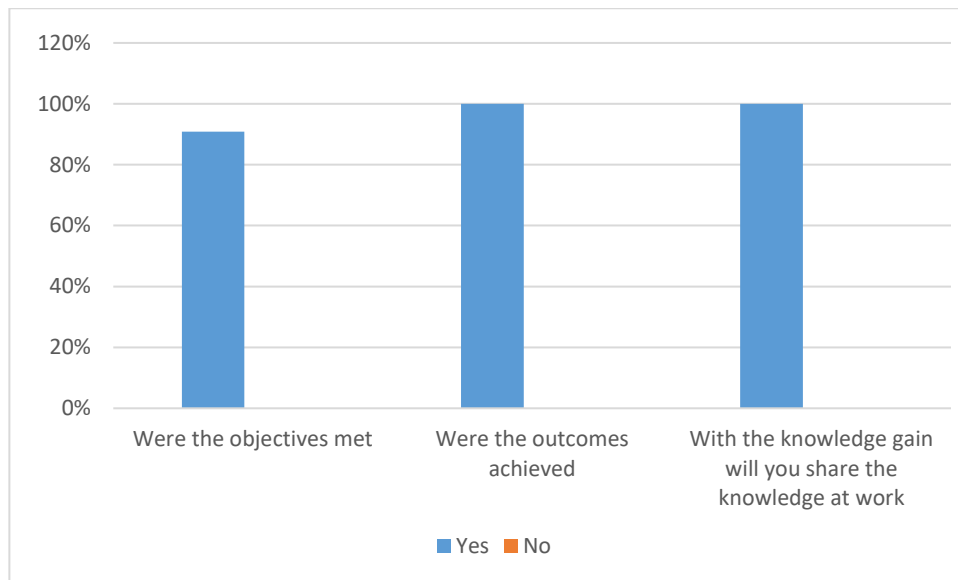
We greatly appreciate your time in completing this evaluation questionnaire. It contains important information that will assist the MTCC team in determining the success and impact of the activity.

Thank you.

## Workshop Evaluation Analysis







### Topic of most interest

- Ship board energy management
- Guidelines for EEDI
- Importance of communication between departments and shipping companies
- Ship energy efficiency as it assists Tuvalu in achieving its national obligations
- Integration of renewable energy on ships
- Ship energy efficiency and also how to choose energy efficient appliances
- Fuel consumption on ships, data collection template, LED, installation of solar systems on ships
- Topics are all important
- Ship management, planning, operation and communication
- Operational energy efficiency measures and technical energy efficiency measures

### Topics that should be added

- Implementation of Annex IV and MARPOL Annex 1
- Follow up on topics discussed



## **Additional comments**

- Very good exchange of ideas. Request for follow up to be done for better improvement. Hope that action will take place as according to IMO regulations.
- Need more of these workshops, very useful and important for the national especially the awareness toward GHGE.
- Very good initiative that assists Tuvalu in identifying its GHGE for sea transport and help mitigate its emissions.
- Workshop was conducted accordingly. However, the participants should have been dominated by Marine Department personnel at all levels.
- Workshop is well organised and also learnt lots of new things such as ship energy efficiency.
- Overall workshop was excellent.
- All topics covered was of interest to everyone. More time should be allocated for this workshop. We look forward to seeing all of you in the near future.
- Hope to have a longer workshop in future. Thank you very much.
- Workshop has been successful and training useful for Tuvalu especially for us working at the Marine Engineers and how we can manage our fuel consumption well and to reduce HGH emission.

## ANNEX 6: Photos





## ANNEX 7: Communication and Visibility Activities



Activity Calendar - Activi... mtcc-pacific - Twitter See... x

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Sea transportation is crucial to the economic dev & sust of #PICs  
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10 28

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**Dr. M. A. Zullah** @DrZullah · May 10  
"You cannot manage what you cant measure" Importance of data collection and

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**Dr. M. A. Zullah** @DrZullah · May 10  
"You cannot manage what you cant measure" Importance of data collection and SEEMP discussed during the second day of #MTCCPacific workshop in funafuti, Tuvalu @spc\_cps @SprepChannel @IMOHQ @EUPasifika @ThierryNervale @ore\_toua



7 9

Ore-Toua and 3 others Retweeted

**Thierry Nervale** @ThierryNervale · Apr 25  
A community-based approach towards Safe Accessible2All Efficient & Green



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"Politics just isn't her jam": Q&A panel reflects on One Nation implosion

Bernedine Managrevu and 2 others Retweeted

**Dr. M. A. Zullah** @DrZullah · May 8

Mr. Falasese Tupau, Act. CEO of **Tuvalu MCT**, said "We need to quantify the emissions from our vessels through **MTCC-Pacific's** data collection project, address & further reduce GHGE from the shipping industry" #MTCCPacific @sps\_live @SprepChannel @IMOHQ @EUPacific @ThierryNervale



5 6

Activity Calendar - Activi... Pacific Community (@spc - X

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**Pacific Community** @spc\_cps · May 15

Sea transportation is crucial to the economic dev & sust of #PICs @TuvaluGov has called upon the #maritimetransport sector to make shipping more #energy efficient during the National Workshop on Ship Energy Efficient Operations, delivered by #MTCCPacific [googlyDZJKL](https://www.google.com/search?q=googlyDZJKL)




IMO, SPREP and EU Pacific

11 15

Pacific Community Retweeted

**Pacific Live tweets** @sps\_live · May 14

The 28th Meeting of the Council of Pacific Arts and Culture commenced today in Nadi, Fiji with regional discussion on #Pacific Cultures from 2010 to 2020, mainstreamin culture across sectors in the region and @spc\_cps support for culture in the Pacific.



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**Attachments:** ATT00001.txt



## MEDIA RELEASE

### **MTCC-Pacific supports Energy Efficiency within the Tuvalu Maritime Sector**

**Funafuti, Tuvalu** – Sea transportation is crucial to the economic development and sustainability of Pacific Island countries (PICs) and the Tuvalu government has called upon the maritime transport sector to make shipping safer and more energy efficient. The call was made at the National Workshop on Ship Energy Efficient Operations, delivered by the Maritime Technology Cooperation Centre in the Pacific (MTCC-Pacific) 9-11 May, 2018.

Domestic ships' fuel oil consumption and greenhouse gas (GHG) emissions could be reduced significantly by applying ship energy efficient operational measures and retrofitted technologies. MTCC-Pacific is on the cutting edge of climate-change mitigation and, at the same time, is opening up a world of opportunities for those who participate. The 2.5-day workshop provide participants with an understanding of the latest developments at the international level; new technologies, tools and methods available to monitor and reduce energy from the operations of ships in Tuvalu, in order to contribute to national efforts to reduce GHG emissions.

The Workshop participants agreed to implement relevant actions to continue progress towards safe and energy efficient shipping in Tuvalu and recognised priority actions such as capacity building, implementation of laws and standards and gaining access to new technologies.

In his welcome remarks, Mr. Falasese Tupau, Acting CEO of Ministry of Communication and Transport, reiterated that more needs to be done to account for emissions from the global shipping industry. "We need to quantify the emissions from our vessels through MTCC-Pacific's data collection regime and address and further reduce our GHG emissions from the shipping industry. I hope this workshop will lay the foundation for innovation in the shipping industry to be more environmentally friendly in terms of fuel oil consumption, energy consumption and uptake of energy efficient technology."

SPC's (Maritime) Transport Greenhouse Gas Advisor recapped the commitments from MTCC-Pacific, its Host Institutions and its partners to assist the Pacific region in climate mitigation in the maritime industry and

was “pleased with the commitment shown by leaders in Tuvalu and confident that the knowledge shared during this week will make a positive impact toward energy efficiency targets”.

MTCC-Pacific is one of the five centres established worldwide and forms part of the Global MTCC Network (GMN), implemented by the International Maritime Organization (IMO) and funded by the European Union. The Pacific Community (SPC) host MTCC-Pacific in collaboration with the Secretariat of the Pacific Regional Environment Programme (SPREP) as part of its approach to support sustainable maritime transport in the Pacific with a focus on safety and energy efficiency of domestic shipping and port.

MTCC-Pacific technical assistance is provided in conjunction with the SPC’s Pacific Islands Domestic Ship Safety (PIDSS) programme that aims at supporting domestic ship operators implement safety management systems on board their vessels. This constitutes a consistent approach in raising safety and efficiency standards in domestic shipping. PIDSS is implemented in 8 countries, 66 companies and 114 domestic ships in the Pacific.

The recent Marine Environment Protection Committee (MEPC) Resolution 72 (9-13 April 2018) ‘IMO Strategy’ to reduce greenhouse gas emissions by up to 50% by 2050 compared to 2008. In its first 12 months of operations, the Centre has made significant progress and is already having a major influence in the region.

The Centre has provided training to more than 100 people in 4 targeted countries in the Pacific on shore and ship energy efficiency operations and carried out capacity building and technical support activities on board 9 vessels total in Fiji, its host country, Marshall Islands, Solomon Islands, Vanuatu, and Tuvalu now, with Samoa, and Kiribati to follow.

**Media contacts:**

Lore Croker, Administration and Information Assistant, [lore@spc.int](mailto:lore@spc.int)

**Useful links:**

<http://mtccpacific.spc.int/>

<http://gmni.imo.org/>

**About SPC:**

The Pacific Community (SPC) is the principal scientific and technical organisation in the Pacific. Established in 1947, it gathers 26 Member Countries and Territories and works for the development and advancement of the Pacific peoples. For more information, please visit our [website on www.spc.int](http://www.spc.int).

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## MTCC-Pacific supports Energy Efficiency within the Tuvalu Maritime Sector

**Funafuti, Tuvalu** – Sea transportation is crucial to the economic development and sustainability of Pacific Island countries (PICs) and the Tuvalu government has called upon the maritime transport sector to make shipping safer and more energy efficient. The call was made at the National Workshop on Ship Energy Efficient Operations, delivered by the Maritime Technology Cooperation Centre in the Pacific (MTCC-Pacific) 9-11 May, 2018.

Domestic ships' fuel oil consumption and greenhouse gas (GHG) emissions could be reduced significantly by applying ship energy efficient operational measures and retrofitted technologies. MTCC-Pacific is on the cutting edge of climate-change mitigation and, at the same time, is opening up a world of opportunities for those who participate. The 2.5-day workshop provide participants with an understanding of the latest developments at the international level; new technologies, tools and methods available to monitor and reduce energy from the operations of ships in Tuvalu, in order to contribute to national efforts to reduce GHG emissions.

The Workshop participants agreed to implement relevant actions to continue progress towards safe and energy efficient shipping in Tuvalu and recognised priority actions such as capacity building, implementation of laws and standards and gaining access to new technologies.

In his welcome remarks, Mr. Falasese Tupau, Acting CEO of Ministry of Communication and Transport, reiterated that more needs to be done to account for emissions from the global shipping industry. "We need to quantify the emissions from our vessels through MTCC-Pacific's data collection regime and address and further reduce our GHG emissions from the shipping industry. I hope this workshop will lay the foundation for innovation in the shipping industry to be more environmentally friendly in terms of fuel oil consumption, energy consumption and uptake of energy efficient technology."

SPC's (Maritime) Transport Greenhouse Gas Advisor recapped the commitments from MTCC-Pacific, its Host Institutions and its partners to assist the Pacific region in climate mitigation in the maritime industry and was "pleased with the commitment shown by leaders in Tuvalu and confident that the knowledge shared during this week will make a positive impact toward energy efficiency targets".

MTCC-Pacific is one of the five centres established worldwide and forms part of the Global MTCC Network (GMN), implemented by the International Maritime Organization (IMO) and funded by the European Union. The Pacific Community (SPC) host MTCC-Pacific in collaboration with the Secretariat of the Pacific Regional Environment Programme (SPREP) as part of its approach to support sustainable maritime transport in the Pacific with a focus on safety and energy efficiency of domestic shipping and port.

MTCC-Pacific technical assistance is provided in conjunction with the SPC's Pacific Islands Domestic Ship Safety (PIDSS) programme that aims at supporting domestic ship operators implement safety management systems on board their vessels. This constitutes a consistent approach in raising safety and efficiency standards in domestic shipping. PIDSS is implemented in 8 countries, 66 companies and 114 domestic ships in the Pacific.

The recent Marine Environment Protection Committee (MEPC) Resolution 72 (9-13 April 2018) 'IMO Strategy' to reduce greenhouse gas emissions by up to 50% by 2050 compared to 2008. In its first 12 months of operations, the Centre has made significant progress and is already having a major influence in the region.

The Centre has provided training to more than 100 people in 4 targeted countries in the Pacific on shore and ship energy efficiency operations and carried out capacity building and technical support activities on board 9 vessels total in Fiji, its host country, Marshall Islands, Solomon Islands, Vanuatu, and Tuvalu now, with Samoa, and Kiribati to follow.

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### Useful links:

<http://mtccpacific.spc.int/>  
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### About SPC:

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