MTCC AFRICA

Maritime Technology Cooperation Centre

CAPACITY BUILDING FOR CLIMATE CHANGE MITIGATION IN THE MARITIME SHIPPING INDUSTRY

This project is financed by the European Union and implemented by the International Maritime Organization

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CAPACITY BUILDING FOR CLIMATE CHANGE MITIGATION IN THE MARITIME SHIPPING INDUSTRY

Implementation of the Pilot Projects under MTCC-AFRICA

Madagascar National Workshop | 16 – 17 May 2018 | Toamasina

Presented by: Michael Mbaru | Email: mmbaru@kma.go.ke

The Global MTCC Network (GMN) project is funded by the European Union and implemented by IMO
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Content Review

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1. Background
2. Brief description of pilot projects
3. Pilot projects implementation phase

1. Background

- GMN was established as a result of EU and IMO commitment towards Climate Change Mitigation in the Maritime Shipping Industry.
- Main aim being to help participating developing countries limit and reduce greenhouse gas (GHG) emissions from their shipping sectors through technical assistance and capacity building to promote energy efficiency and related technology diffusion and uptake.
- As such the MTCCs are to implement pilots projects that will demonstrate/promote the uptake of low carbon technologies and operations within the maritime transport sectors of their regions and assist with the related capacity-building efforts.
- In this regard MTCC-AFRICA contracted to undertake the following pilot projects;

a. Pilot project 1. Implementation of a demonstration pilot project on "uptake of low carbon ship energy efficient technologies and operations"(Shore Power / Cold Ironing)

b. Pilot project 11. Fuel Consumption Data Collection and Reporting (DCR)-Common pilot project to all other MTCCs. Under this project MTCC-AFRICA went a step further to include port area air quality monitoring with the help of Kenya Meteorological Department (KMD).

2. Brief description of the pilot projects

A. Implementation of a demonstration pilot project on "uptake of ship energy efficient technologies and operations"(Onshore Power Supply (OPS)/ Cold Ironing.

Objective: To demonstrate the viability of on-shore power supply at African ports in order to encourage the uptake of OPS as an energy efficient technology for reducing and limiting GHG emissions.

- MTCC-Africa, through the sponsorship of KPA and support from GMN, plans to install a shore power facility at the port of Mombasa to supply sea going vessels with shore power during their stay at the port on a pilot basis.

- The overall fuel quantity consumed by these vessels while in port will be compared to the total cost of these bunkers Vis a vis the cost of grid power and the social cost of carbon to determine the overall project viability.

- It will be undertaken at berth no. 1 at the Port of Mombasa, Kenya.

Onshore Power Supply (OPS)/ Cold Ironing cont.

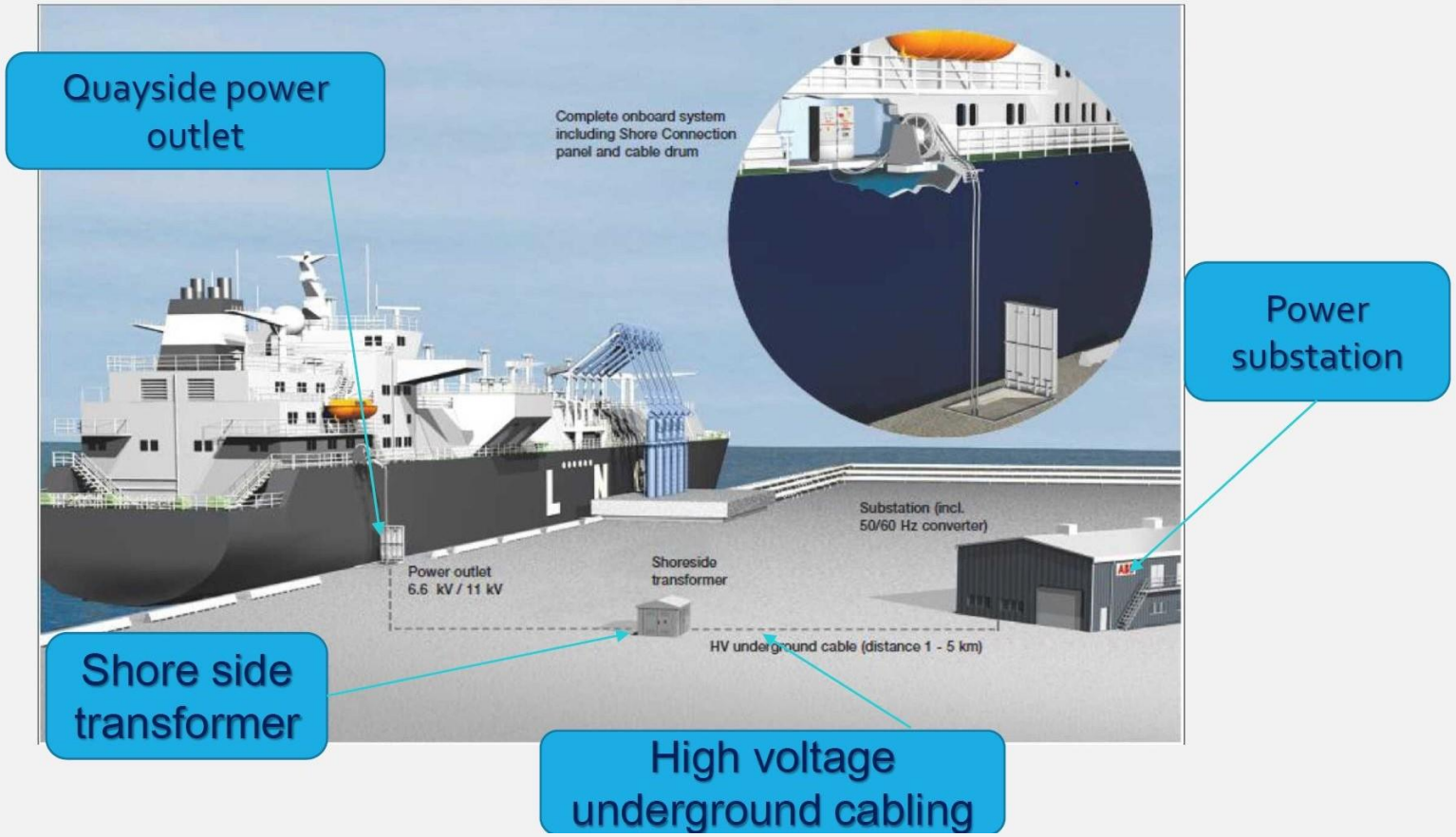
The infrastructure consists of four main components

(1)Power substation;

(2)Shore-side transformer;

(3)High voltage underground cabling and

(4)Quayside power outlet.



The infrastructure has been designed as per ISO/IEC/IEEE 80005-1:2012

Onshore Power Supply (OPS)/ Cold Ironing cont.

Challenges expected

- Frequency disparities between the vessel power systems and the utility supplier frequency;
- Different voltage levels required of different vessel types and the large variance in power requirements by sea going vessels;
- Unsteady mains power supply and inability by most ports to generate own electric power
- The high cost of installing an OPS system

Note: If you couple it with the shore connection, power generated from the ship (main and auxiliary) can be used to light up a whole town depending on the power needs.

B.Fuel Consumption Data Collection and Reporting (DCR).

Objective: To implement efficient voluntary 'Ship fuel consumption data collection and reporting' system in accordance to MARPOL Annex VI regulation 22A.

MEPCResolution278(70)

- Data collection system for fuel oil consumption of ships accepted on 1st September 2017
- Entered into force on 1st March 2018

Applicable

- Ships of 5000GT and above
- First data set expected-calendar year 2019

Ships

- Submit ship fuel oil consumption data to flag state administrations at the end of each calendar year

Member States

- Receive data from ships, verify and issue a statement of compliance
- submit verified aggregate data to IMO
- Ensure anonymity of the vessels submitting the data

IMO to establish the IMO Ship Fuel Oil Consumption Database-prototype already shared to member states by IMO

Fuel Consumption Data Collection and Reporting (DCR) cont.

Type of data reported by flag states to IMO

"Appendix IX

Information to be submitted to the IMO Ship Fuel Oil Consumption Database

Identity of the ship
- IMO number

Period of calendar year for which the data is submitted
- Start date (dd/mm/yyyy)
- End date (dd/mm/yyyy)

Technical characteristics of the ship
- Ship type, as defined in regulation 2 of this Annex or other (to be stated)
- Gross tonnage (GT)[1]
- Net tonnage (NT)[2]
- Deadweight tonnage (DWT)[3]
- Power output (rated power[4]) of main and auxiliary reciprocating internal combustion engines over 130 kW (to be stated in kW)
- EEDI (if applicable)
- Ice class[5]

Fuel oil consumption, by fuel oil type[6] in metric tonnes and methods used for collecting fuel oil consumption data

Distance travelled

Hours underway

MEPC R. 282 (70) : 2016 Guidelines for development of SEEMP Part II

On or before 31st Dec 2018;

incorporate data collection plan;

data collection methodology

data reporting process

5 Method to measure fuel oil consumption

The applied method for measurement for this ship is given below. The description explains the procedure for measuring data and calculating annual values, measurement equipment involved, etc.

Method	Description

6 Method to measure distance travelled

Description

7 Method to measure hours underway

Description

8 Processes that will be used to report the data to the Administration

Description

9 Data quality

Description

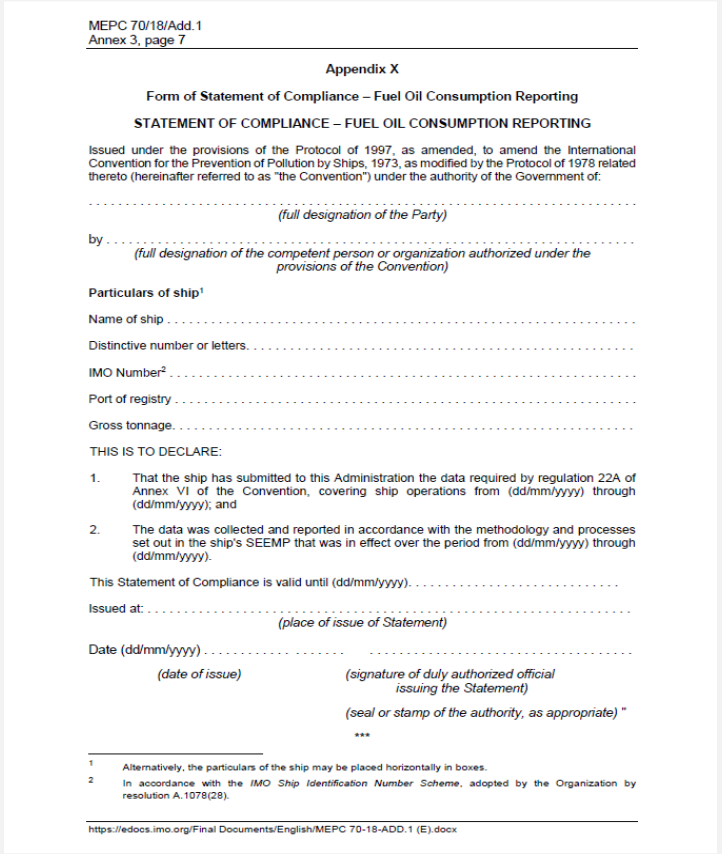
Fuel Consumption Data Collection and Reporting (DCR) cont.

Verification of reported Data

The administration should indicate what additional document to be submitted along with annual data report e.g.

- A copy of the ship's Data Collection Plan
- Summaries of bunker delivery notes (BDNs)
- Summaries of disaggregated data of fuel oil consumption, distance travelled and hours underway
- Information to demonstrate that the ship followed the Data Collection Plan set out in its SEEMP
- Copies of documents containing information on the amount of fuel oil consumption, distance travelled and hours underway for the ship's voyages during the reporting period (e.g. the ship's official logbook, oil record book, BDNs, arrival/noon/departure reports, etc.).

Statement of compliance



MEPC 70/18/Add.1
Annex 3, page 7

Appendix X

Form of Statement of Compliance – Fuel Oil Consumption Reporting

STATEMENT OF COMPLIANCE – FUEL OIL CONSUMPTION REPORTING

Issued under the provisions of the Protocol of 1997, as amended, to amend the International Convention for the Prevention of Pollution by Ships, 1973, as modified by the Protocol of 1978 related thereto (hereinafter referred to as "the Convention") under the authority of the Government of:

. . . . . .
(full designation of the Party)

by . . . . . .
(full designation of the competent person or organization authorized under the provisions of the Convention)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters. . . . . .

IMO Number[2] . . . . . .

Port of registry . . . . . .

Gross tonnage. . . . . .

THIS IS TO DECLARE:

1. That the ship has submitted to this Administration the data required by regulation 22A of Annex VI of the Convention, covering ship operations from (dd/mm/yyyy) through (dd/mm/yyyy); and

2. The data was collected and reported in accordance with the methodology and processes set out in the ship's SEEMP that was in effect over the period from (dd/mm/yyyy) through (dd/mm/yyyy).

This Statement of Compliance is valid until (dd/mm/yyyy). . . . . .

Issued at: . . . . . .
(place of issue of Statement)

Date (dd/mm/yyyy) . . . . . .

(date of issue) *(signature of duly authorized official issuing the Statement)*

(seal or stamp of the authority, as appropriate)"

***

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[2] In accordance with the *IMO Ship Identification Number Scheme*, adopted by the Organization by resolution A.1078(28).

https://edocs.imo.org/Final Documents/English/MEPC 70-18-ADD.1 (E).docx

How does MTCC-AFRICA implements the Pilot project on Fuel Oil Consumption Data Collection and Reporting?

Manual fuel consumption data collection

- Data collection by use of Iridium tablets
- Tablets fitted with standardized e-forms in accordance to IMO requirements
- Data will be manually filled in by a designated crew member on board the vessel
- Data transmission through iridium satellite communication system to MTCC-AFRICA
- Data accessible remotely via a Themis platform developed for MTCC-AFRICA

Automated fuel consumption data collection

- Data will be collected on real-time basis
- On board fuel flowmeters will be fitted with sensors to collect real time fuel consumption data + RPM;
- Data transmission through iridium satellite communication system to MTCC-AFRICA
- Data accessible remotely via a Themis platform developed for MTCC-AFRICA

How does MTCC-AFRICA implements the Pilot project on Fuel Oil Consumption Data Collection and Reporting?

Manual fuel consumption data collection

Automated fuel consumption data collection

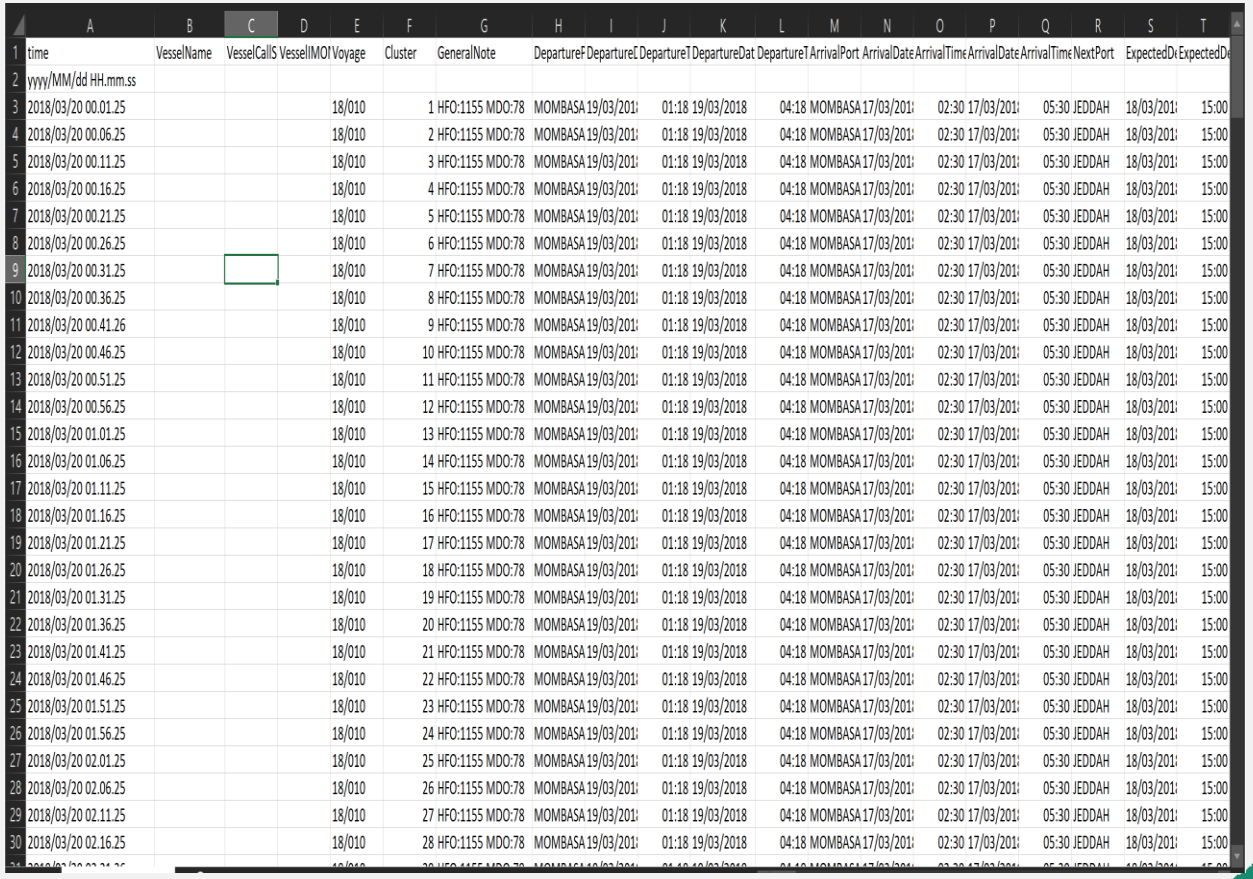
How does MTCC-AFRICA implements the Pilot project on Fuel Oil Consumption Data Collection and Reporting?

Data collection through the ship's normal reporting schedules to the head office:

Ships send data to their head office everyday; most common known as the noon reports

Fuel consumption is sometimes captured for reporting during;

- Standby for departure to full away
- From full way to noon
- Noon to noon while the ship is still underway
- Noon to end of passage
- End of passage to alongside/anchorage



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	time	VesselName	VesselCallS	VesselIMOI	Voyage	Cluster	GeneralNote	DepartureF	DepartureD	DepartureT	DepartureDat	DepartureT	ArrivalPort	ArrivalDate	ArrivalTime	ArrivalDate	ArrivalTime	NextPort	ExpectedDe	ExpectedDe
2	yyyy/MM/dd HH.mm.ss																			
3	2018/03/20 00.01.25				18/010	1	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
4	2018/03/20 00.06.25				18/010	2	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
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6	2018/03/20 00.16.25				18/010	4	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
7	2018/03/20 00.21.25				18/010	5	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
8	2018/03/20 00.26.25				18/010	6	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
9	2018/03/20 00.31.25				18/010	7	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
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17	2018/03/20 01.11.25				18/010	15	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
18	2018/03/20 01.16.25				18/010	16	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
19	2018/03/20 01.21.25				18/010	17	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
20	2018/03/20 01.26.25				18/010	18	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
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22	2018/03/20 01.36.25				18/010	20	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
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25	2018/03/20 01.51.25				18/010	23	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
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29	2018/03/20 02.11.25				18/010	27	HFO:1155 MDO:78	MOMBASA	19/03/201	01:18	19/03/2018	04:18	MOMBASA	17/03/201	02:30	17/03/201	05:30	JEDDAH	18/03/201	15:00
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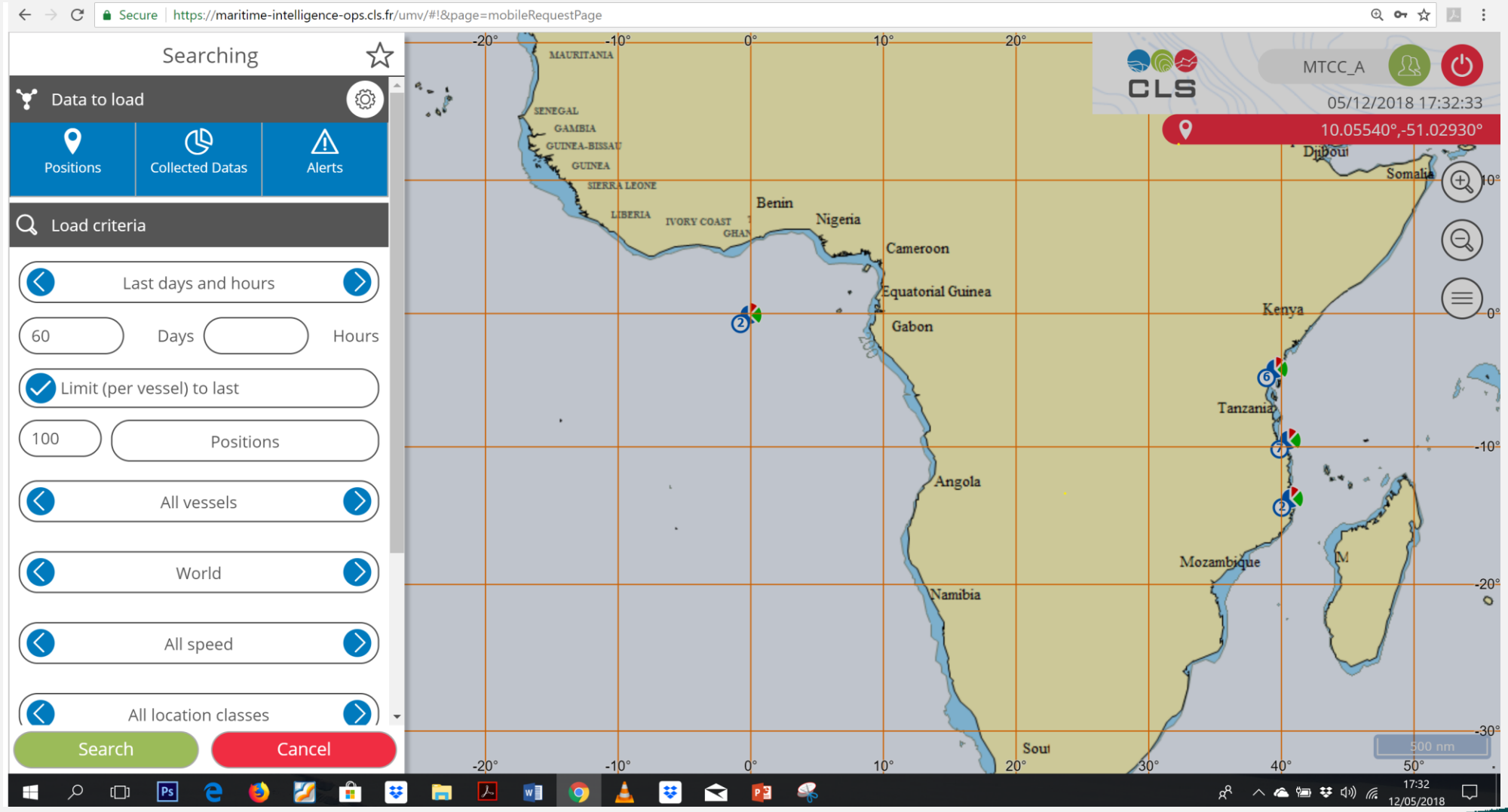
Themis Platform



Shore Monitoring and Data Analytics

Monitoring data collected from on-board operations, and processing data analytics towards fuel consumption reduction, energy efficiency and GHG emissions reduction.

CLS Themis platform allow shore based operators to display and process data collected (reporting) in order to edit data analytics as well as raise alerts to ship upon a set of standards regarding the different indicators collected.

Processing of collected data i.e. calculation of EEOI

Data Analysis

Trend charts/Data display

EEOI target settings

Comparison of EEOI of volunteer ships under study

EEOI comparison with average EEOI curves (and EEDI if available)

GHG efficiency alerts generated and communicated to affected ships pronto.

Monitoring of NOx, SOx, Particulate Matter and GHG threshold from the port area-especially berth 1

SAMPLE OF THE COLLECTED DATA SUMMARIES

Date from (dd/mm/yyyy)	Date to* (dd/mm/yyyy)	Distance Travelled (n.m)	Hours Underway (hh:mm)	Fuel Consumption (Metric tons)						
				DO/GO	LFO	HFO	LPG(P)	LPG(B)	LNG	Others(Cr)
01/01/2019		210	24:00	2	3	19	0	0	0	0
02/01/2019		283	24:00	2	0	20	0	0	0	0
03/01/2019		321	24:00	2	0	18	0	0	0	0
04/01/2019		221	24:00	1	0	19	0	0	0	0
05/01/2019		320	18:00	2	0	13	0	0	0	0
06/01/2019		302	24:00	2	0	17	0	0	0	0
07/01/2019		210	24:00	1	0	19	0	0	0	0
08/01/2019		302	24:00	1	0	20	0	0	0	0
09/01/2019		280	24:00	2	0	21	0	0	0	0
10/01/2019		50	01:00	3	0	2	0	0	0	0
11/01/2019		198	24:00	3	0	21	0	0	0	0
.		.	.	.	.	.	.	.	.	.
.		.	.	.	.	.	.	.	.	.
.		.	.	.	.	.	.	.	.	.
30/12/2019		320	24:00	0	0	20	0	0	0	0
31/12/2019		213	24:00	1	0	17	0	0	0	0
Annual Total										

C. Air quality monitoring within the Port of Mombasa

The Kenya Meteorological Department (KMD) mobile Air Pollution Laboratory will be used to carry out general air quality monitoring in the port as part of the implementation of the MTCC- Africa projects.

The air quality monitoring is intended to generate a baseline data for priority pollutants in the port.

The major pollutants to be measured by the laboratory include; carbon dioxide, carbon monoxide, Nitrogen Oxide, Nitrogen Dioxide, Sulfur dioxide and Particulate matter.

The mobile Laboratory will be stationed at each site for 48 hours.

The first quarter monitoring covering six sites was carried out from 27th February to 9th March 2018.

3. Pilot projects implementation phase

A. **Implementation of a demonstration pilot project on "uptake of ship energy efficient technologies and operations"(Onshore Power Supply (OPS)/ Cold Ironing.**

- Berth identified-berth 1.
- Funding secured from Kenya Ports Authority.
- Project design developed and agreed.
- Tendering process underway-bidders to undertake the works already evaluated.
- Award of the contract expected in one month time if all goes well.

B. Fuel Consumption Data Collection and Reporting (DCR).

Delivery of the Pilot Project and Timelines

TYPE OF DATA	PHASE I	PHASE II
Automated data collection using standardized e-forms and Thorium X tablets	March 2018 to 31st January 2019 (about 10 months)	1st February 2019 to 31st July 2019 (6 months)
Real time data collection using CLS Sat-Box devices	1st June 2018 – 31st January 2019 (8 months)	1st February 2019 to 31st July 2019 (6 months)

B. Fuel Consumption Data Collection and Reporting (DCR).

1. Identification of voluntary ships;

Pacific International lines (PIL)

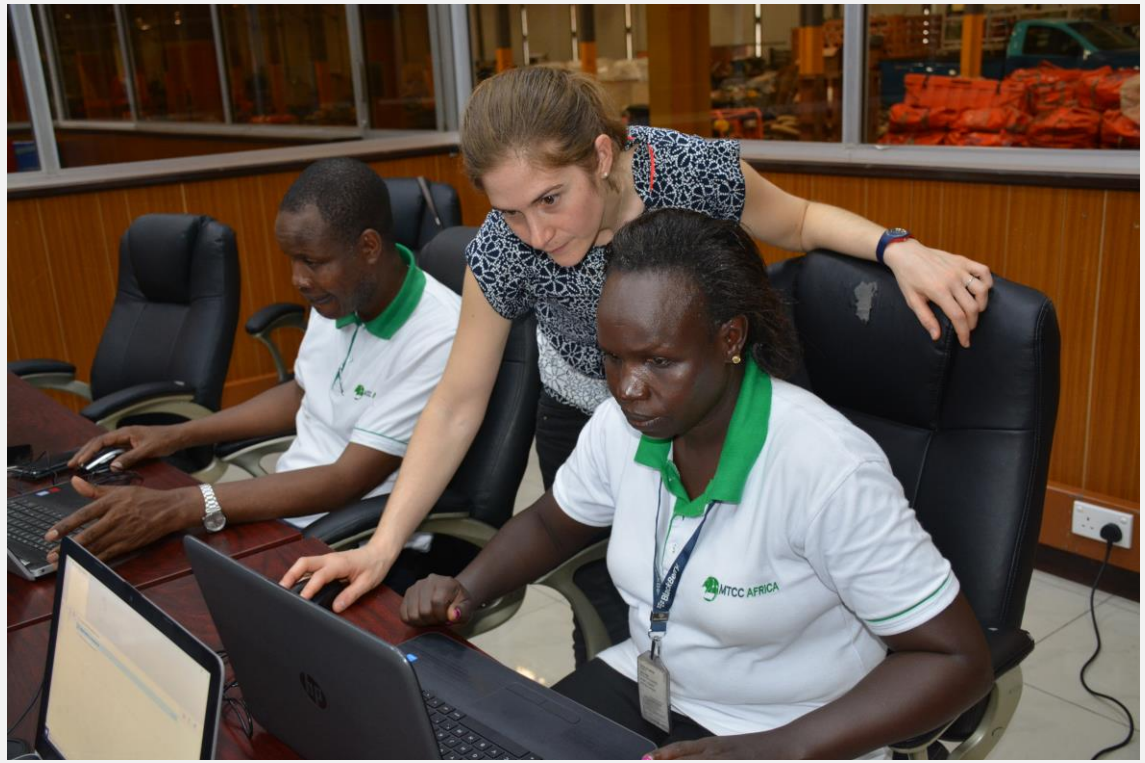
CMA CGM

Messina

Mediterranean Shipping Company (MSC)

14 ships volunteered out of targeted 20.

2. Training of MTCC-AFRICA staff on use of tablet and Themis platform

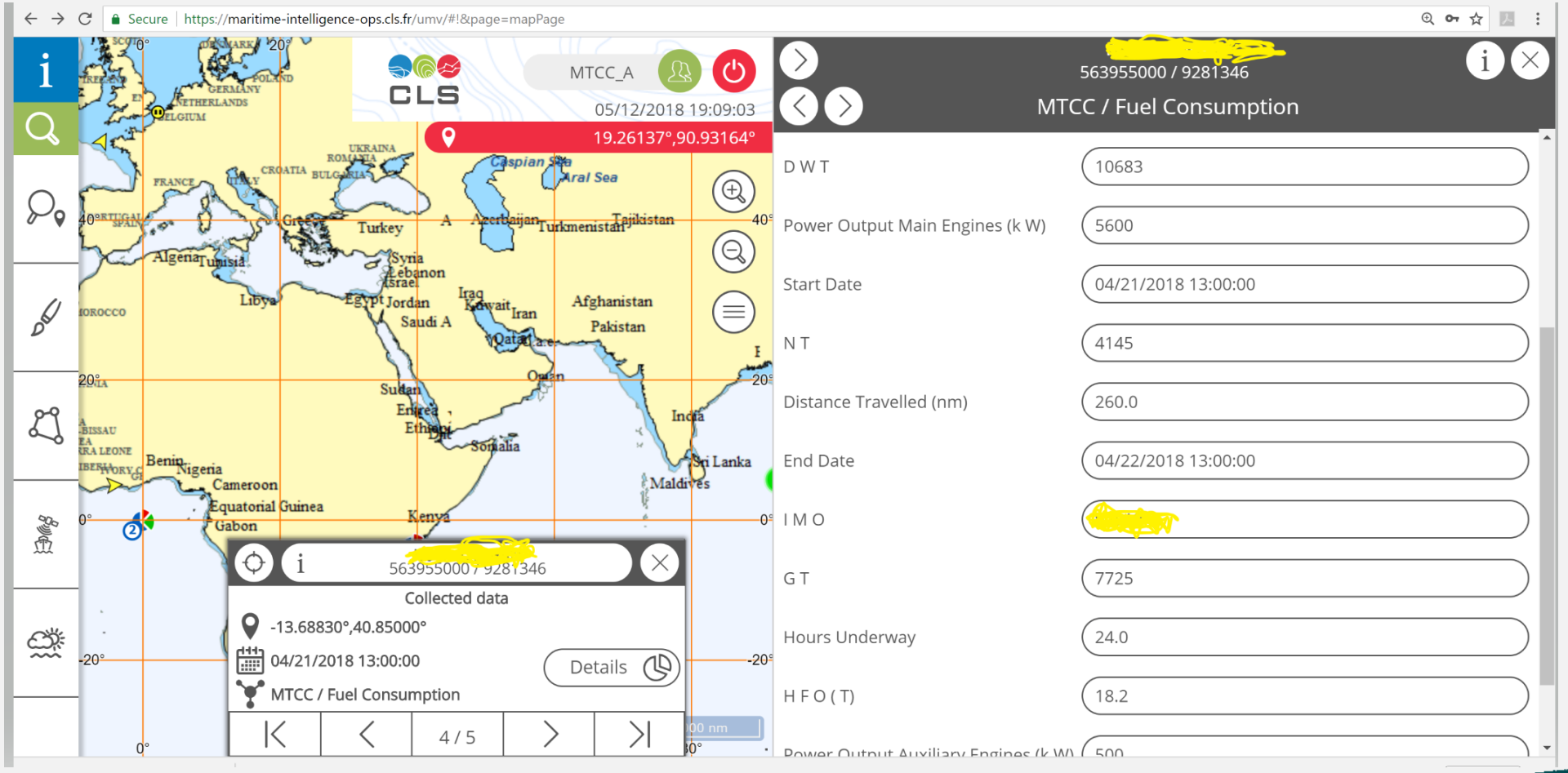


B. Fuel Consumption Data Collection and Reporting (DCR).

3.Delivery of tablets to ships;

B. Fuel Consumption Data Collection and Reporting (DCR).

4. Data already being collected-more tablets to be delivered.



C. Air quality monitoring within the Port of Mombasa

The first quarter monitoring covering six sites was carried out from 27th February to 9th March 2018.

Final report for the air quality monitoring has been prepared for review.

Question & Answer Session

This project is financed by the
European Union
and implemented by the
International Maritime Organization

GMN | The Global MTCC Network

A global network for energy-efficient shipping

👍 THANK YOU!

This project is financed by the European Union
and implemented by the International Maritime Organization

MTCC-Africa Consortium Members

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

Host Institution

Kenya Maritime Authority (KMA)

KMA

Kenya Ports Authority (KPA)

KPA