

MARITIME TECHNOLOGY COOPERATION CENTRE FOR LATIN AMERICA

Fuel Oil Consumption Data Collection and Reporting



Pilot Project 2

Fuel Oil Consumption Data Collection and Reporting



MTCC Latin America - Pilot Project 2 Project purpose

The purpose of MTCC Latin America's Pilot Project 2, is to make use and perform detailed analysis of the fuel oil consumption, distance sailed and hours underway data collected over a reporting period of one year, with a scope of providing useful insights on:

♦ the effectiveness of processes followed for collecting, reporting and verifying fuel oil consumption data (in line with IMO DCS regulatory requirements)

- the completeness and accuracy of the relevant data collected and reported
- \$ conclusions drawn on:

a.the effectiveness of processes followed for data collections, reporting and verification

b.the reported data accuracy, through their comparison against estimated/calculated data through use of other independent data sources and empirical estimations

♦issues, problems and anticipated difficulties in the overall data collection, reporting and verification process, for all parties involved in it (ship managers, independent verifiers, flag administration).

best practices to collect the necessary data and development of the needed trends and data analysis routines



MTCC Latin America – Pilot Project 2 Methodology

1. Literature review

- **2.** Identification of key stakeholders
- **3.** Development of forms
- 4. Selection of participants
- **5. FO Consumption data collection**
- 6. Analysis of collected data
- **7.** Reporting on PP-II findings
- 8. Dissemination of project results

Methodology

The methodology followed was carefully designed and planned, to cover all stakeholders views and considerations as well as all aspects of the research subject, and comprises of the steps reflected in the table on the left.



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1. Literature review

Literature review on ships fuel oil consumption data collection and reporting

Through the literature review, as well as through the review of used practices and experience gained from the EU MRV regulation implementation for the reporting period of 01/01/2018 – 31/12/2018, the key stakeholders acting actively in the implementation of the fuel consumption data collection, reporting and verification process, as well as the subsequent data analysis for decision making, were identified:

-Maritime Administrations

-Ship Owners / Operators

-Recognized Organizations (ROs) acting on behalf of flag administrations

-National and International Policymakers (including IMO)



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2. Identification of key stakeholders

Identification of the key stakeholders acting actively in the implementation of the fuel consumption data collection, reporting and verification process, as well as the subsequent data analysis for effective decision making;

Stakeholders Categories:

Maritime Administrations
 Ship Owners / Ship Operators



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3. Development of Forms

Development of forms, for uniform collection of data

For the facilitation of Pilot Project 2, MTCC Latin America developed relevant forms, templates, guidelines or protocols for uniform collection of data. The formats were developed taking into account the requirements and guidelines of IMO DCS regulation.

The following forms (MS Excel format) were developed in order to be used in the context of this study:

- (a) General information on participating ships
- (b) Standardized fuel oil consumption data report

In addition, in support of the participating flag administrations, organizations and ships, relevant instructions specifying how to complete the above forms, were developed and shared with the involved parties.



FORM 1 – General information on participating ships

Ship Particulars	Ship Name
IMO Number	
Operator	
Ship Type	
Gross Tonnage	
Deadweight Tonnage	
Main Engine Rated Power	
Main Engine Fuel Type	
Auxiliary Engine Rated Power	
Auxiliary Engine Fuel Type	
Boiler (y/n)	
Boiler Fuel Type	
Inert Gas Generator (IGG)	
IGG Fuel Type	
EEDI (enter value)	
Last Hull Maintenance (enter date dd-mm-yy)	



FORM 2 – Standardized fuel oil consumption data report

Ship	Period: Methodology (y/n)			/n)	Fuel Oil Comsumption (tons)					Energy Savings Technologies Utilized During the Voyage (Yes/No)										Monitoring Tool					
Name of ship	Start Date (dd-mm-yy)	End Date (dd-mm-yy)	Hours Underway	Distance Traveled (nm)	Other (specify):	Bunker Delivery Notes (BDN)	Flowmeters	Tank monitoring	Diesel/Gas Oil	LFO	HFO	LNG	Other (specify):	Hull Air Lubrication	Waste Heat Recovery	Solar Electricity	Wind Power	Weather Routing	Autopilot	Trim/Draft Optimization	Optimum Ballast Condition	Other (specify):	Other (specify):	EEOI	Other (specify):



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4. Selection of participants

Selection of participating maritime administrations and shipping companies and agreement on uniform collection of data, focusing only on ships of 5,000GT and above;

Having the necessary forms and guidelines for project implementation formed, the MTCC Latin America selected the participating maritime administrations (Panama, Peru, Chile) and as a first step established cooperation with them.

After that, shipping companies managing ships of 5,000GT and above flying their flag, were approached by the MTCC Latin America and relevant agreements on uniform collection and reporting of data from some of their ships for the reporting period 01/01/2018 – 31/12/2018 were established as well.



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5. FO Consumption data collection

The data collection process for the reporting period 01/01/2018 - 31/12/2018 was initiated, with the shipping companies reporting for each ship to either the flag administration or directly to the MTCC Latin America.

For each participating ship, the following information were received:

(a) The General information on participating ships form, containing details on their main particulars (once)

(b) The Standardized fuel oil consumption data report, containing details on fuel oil consumption, distance sailed, hours underway as well as on energy efficient measures implemented during the voyage duly updated, on a daily basis or weekly basis.

All reports submitted and data collected, were securely stored by MTCC-Latin America.



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6. Analysis of collected data

Once the reporting period was completed (01/01/2018 - 31/12/2018) the aggregated data report for each ship was developed, simulating the reporting from shipping companies to the flag administration.

The disaggregated data collected per participating ship were then verified against independently obtained AIS positioning data and Port Calls, to establish their completeness and accuracy. This was actually a simulation of the verification process to be carried out in reality.

The verified aggregated and disaggregated data, were then used for performing the detailed qualitative and quantitative analysis.



MTCC Latin America – Pilot Project 2 Sources of data

The sources of data for analysis are:

Primary Data Sources

Ships primary details and collected data

(for the reporting period 01/01-31/12 2018)

Primary data include:

(i) the detailed responses in the duly filled in General Particulars Forms, as obtained by the participating companies, for the 68 participating vessels which form part of this study.

(ii) the detailed responses in the duly filled in Fuel Oil Consumption Reports as obtained by the participating companies, for the 68 participating vessels which form part of this study.

Secondary Data Sources

Historic Port Calls and AIS (hourly) positioning data

(for the reporting period 01/01-31/12 2018)

Secondary data include:

(i) Historic port calls data (for each participating ship, for the entire reporting period)

(ii) AIS (hourly positions) data (for each participating ship, for the entire reporting period)

obtained independently for simulating the verification process and assessing the completeness and accuracy of the reported data.



a.Primary Data Sources: Ships primary details and collected data

Ships primary details & collected data (01/01/2018—31/12/2018) Primary data: Provided by shipmanagement companies, using the developed forms

- > Ships primary details
- (i) Ship principal particulars
- (ii) Details on fuel consumers & fuel types used
- (iii) Details on energy efficiency technologies used
- > Ships collected data

(i) Annual collected IMO DCS data (methodology, fuel consumption, hours underway, distance sailed) reported as aggregated annual or disaggregated daily, monthly and/or per voyage data



b.Secondary Data Sources:

(i) Historic port calls data

Historic port calls data (01/01/2018-31/12/2018)

Primary data: independently obtained AIS data, as a .csv file of raw data for the entire fleet Data analysis: Syndeseas Integrated Solution (Syndeseas mrv_log, Historic data function)

- > Identification data: MMSI No. / IMO No.
- > Port of call data: Port name, Country Code
- > Operational data: Arrival / Departure / Anchorage
- > Timestamp data: UTC date/time of Port Call report



b.Secondary Data Sources:

(ii) AIS (hourly positions) data

Historic AIS (hourly positions) data (01/01/2018—31/12/2018) Primary data: independently obtained AIS data, as a .csv file of raw data for the entire fleet Data analysis: Syndeseas Integrated Solution (Syndeseas mrv_log, Historic data function)

- > Identification data: MMSI No. / IMO No.
- > Positioning data: Latitude, Longitude, Course, Heading
- > Timestamp data: UTC date & time of AIS report
- > Speed data: Speed, in knots x10
- > Operational data: ie vessel underway/anchored/moored, through AIS Navigational status codes

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MTCC Latin America – Pilot Project 2

Data enrichment:

The primary collected reports, were stored by MTCC Latin America.

Based on them, the following were developed:

- (i) A list of participating vessels and their principal particulars
- (ii) Separate annual aggregated data for each vessel obtained
- (iii) Separate annual disaggregated data for each vessel as reported

For the collected data analysis, special algoritms and a specific software were utilized, for aggregating, enriching and returning detailed results, after comparison against the collected independently obtained AIS positioning and Port Calls data, for assessing the completeness and accuracy of the reported data.



Data enrichment:

Syndeseas data enrichment (using Syndeseas methodology and algorithms)

- Utilizing historic port calls data
- > Voyage specific data
- (i) Identification of Departure and Arrival Ports, including anchorages in between
- (ii) Duration of voyage, based on departure / arrival date & time of port call
- (iii) Estimation of distance sailed, based on most frequently used route
- Utilizing historic AIS (hourly positions) data
- > Distance covered, between any two AIS reports
- > Time spent sailing / anchored / moored, based on the AIS reported navigational status
- > Speed, between any two AIS reports, using distance covered and time lapsed

> Estimated fuel consumption, for any time period, based on assumptions deriving from IMO 3rd GHG Study and other reliable models

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MTCC Latin America – Pilot Project 2

General Analysis:

The pilot project I participation goals were far exceeded, as 68 ships flying the flags of 3 participating countries, formed part of pilot project I.

Participating Ships per Ship Type

The list of participating ships per country is as follows:

Panama: 43 ships, Peru: 10 ships, Chile: 8 ships, Other flags: 7 ships

Other Gas Carriers 22 Container Ships 6 Chemical Tankers 10 Oil Tankers **Bulk Carriers** 25 Passenger Ships 5 10 15 20 25



General Analysis:

Summary on fuel consumption data results of participating ships, per ship type

Ship Type	Nos.	Distance Hrs u/w		anchor/port	HFO Cons.	DO/MGO Cons.	LFO Cons.	Total FO Cons.	CO2 Emissions	Transport Work	
		(nm)	(hrs)	(hrs)	(MT)	(MT)	(MT)	(MT)	(MT)	(DWT.nm)	
Passenger Ships	25	2386056.13	207832.90	19927.10	700951.34	199287.93	0.00	900239.27	2821679.58	23599852376.61	
Bulk Carriers	2	91735.00	9090.00	8430.00	11321.00	112.00	0.00	11433.00	35612.67	7039651639.00	
Oil Tankers	10	270072.00	23730.40	63869.60	41023.92	7396.77	0.00	48420.69	151462.53	13010069606.60	
Chemical Tankers	6	137956.00	11340.00	41220.00	21912.44	1758.12	0.00	23670.56	73871.87	5261098100.00	
Container Ships	22	1867102.00	139624.00	53096.00	227672.00	47009.00	23585.00	298266.00	933997.80	99083856282.00	
Gas Carriers	2	13892.00	956.00	16564.00	4941.90	105.78	0.00	5047.68	15728.21	465222178.00	
Other	1	25749.00	3759.00	5001.00	2328.00	428.00	0.00	2756.00	8621.56	329535702.00	
Total Fleet	68	4792562.13	396332.30	208107.70	1010150.60	256097.60	23585.00	1289833.20	4040974.21	148789285884.21	



General Analysis:

Fuel Consumption by Ship Type (per fuel type)





General Analysis:





Reference to the detailed tables with analyzed data (named below):

Table 1 - Participating Fleet analysis: Primary List of Ships -anonymized

Table 2 – Summary of details on fuel consumers available onboard participating ships

Table 3 – Summary on Energy Efficient Measures implemented onboard participating ships

Table 4 – Summary of aggregated reported data for the reporting period01/01/2018 – 31/12/2018

Table 5 – Summary of analysis of aggregated reported data for the reportingperiod 01/01/2018 – 31/12/2018 - CO2 Emissions & EEOI insights

Table 6 – Summary on EEOI & average energy efficiency results of participating ships

See also EU MRV Analysis



Added value insights (EU MRV reported data analysis)



EU MRV Fleet (per Ship Type)



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Added value insights (EU MRV reported data analysis)

EU MRV - CO2 Emissions Distribution, per ship type





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7. Reporting on PP-2 findings

Report on the findings of the project together with description of methodologies used



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8. Dissemination of project results

Preparation of material and dissemination activities of project results throughout the project's implementation to build interest and engage stakeholders.



MTCC Latin America - Pilot Project 2 Dissemination activities





MTCC Latin America – Pilot Project 2 Dissemination activities



Website

https://mtcclatinamerica.com/

Details on project development and obtained results, were shared through the dedicated MTCC Latin America website

Newsletter

Details on project development and obtained results, were shared through the issued MTCC Latin America newsletters

Social Media

Details on project development and obtained results, were disseminated through active presence in social media: -Twitter -Linkedin -Facebook -Flickr -Instagram

Other

Details on project development and obtained results, were disseminated also by the following ways: -Emails -Personal interactions with representatives of key stakeholders



MTCC Latin America – Pilot Project 2 PP-2 Results:

Pilot Project 2 Results

The results of Pilot Project 2, reveal that existing technologies and reporting systems implemented onboard, if utilized correctly, may offer immediate positive impact.

The shipping sector's contribution towards tackling climate change, can only be facilitated and enhanced through a combination of:

-enhanced regulatory compliance

-ship performance optimization

Regulatory compliance may be the key for ship performance optimization, if effectively implemented and results exploited.

With the exact same data sets utilized for regulatory compliance (and the exact same effort and administrative burden by companies and crew), and the utilization of existing technology onboard (AIS), it is possible to automate and optimize the regulatory process and provide the means for effective utilization of data for simultaneous ships performance optimization.

The Pilot Project 2 goes beyond simple data collection: we tried to get a glimpse on how the regulations could better be implemented, for all parties involved.

To have a meaningful impact, it is not sufficient to concentrate on the ships, with more advanced technology levels and more resources / capabilities.

We need to address shipping as a whole, and offer the means to all companies/ships, to make the most out of their data, in order to better facilitate and enhance the shipping sector's contribution towards tackling climate change.



MTCC Latin America – Pilot Project 2 Summary: PP-2 on a glimpse

Participating Countries:

3 countries

-Panama

-Peru

-Chile

Stakeholders engaged:

Organizations -Maritime Administrations -Ship Owners / Operators Energy Efficient Measures assessed:

a. Mature technology-Hull Coating
-Autopilot
-Weather Routing

b. Semi-mature technology
-Trim/Draft Optimization
-Speed management
-Hull Air Lubrication
-Waste Heat Recovery

c. Non-mature technology-Solar Electricity-Wind Power



MTCC Latin America – Pilot Project 2 Summary: PP-2 on a glimpse

Project totals for reporting period: 01st Jan 2018 - 31st Dec 2018



 ◆ 80 ships (over 5,000GT) provided details on the fuel consumers and energy efficient measures implemented onboard.

68 ships (over 5,000GT) reported data in line with IMO DCS regulation

Fuel Oil Consumption HFO: 1,010,150 MT LFO: 23,585 MT DO/MGO: 256,098 MT Total FO Cons.: 1,289,833 MT

Distance sailed: 4792562 nm Hours underway: 396,332.50 hrs



Tr. Work: 148,789,285,884 DWT.nm

Thank you for your attention!

