

IAPH 2023 Sustainability Awards

Port: Mauritius Ports Authority

Country: Mauritius

Project Title: Port Energy Efficiency & Renewable Energy Strategic Planning - Feasibility Study and Elaboration of a Plan for the Set-up of an Onshore Power Supply (OPS) System

WPSP Area: Climate & Energy/Environmental Care

Project Background & Rationale

International shipping contributes with approximately 3 % of global anthropogenic greenhouse gas (GHG) emissions. Ships are recognised as major air polluters, with associated climate change, and adverse socio-economic and health related impacts as well. Amongst other measures to reduce ship emissions in port and city environments, Onshore Power Supply (OPS) has been suggested and implemented in many global advanced ports.

OPS aims to reduce emissions from vessels while at berth by replacing onboard-generated power from diesel auxiliary engines with electricity generated onshore. The primary motivation for installing OPS facilities in ports is the reduction of ship exhaust emissions (NO_x, SO_x, PM) and ship generated noise, thus improving the local air quality and quality of living in urban areas surrounding ports. Depending on the energy source used, the implementation of OPS also provides an opportunity to significantly reduce CO₂ emissions. While Mauritius emits 0.01% of the global carbon dioxide emissions, the government is committed to holding to its international commitment of reducing by 40% our GHG emissions by 2030. To this end, government has launched a multi-fold strategy aiming at increasing the contribution of renewable energy to 60% of the electricity mix by 2030.

Within the identified port actions to be promoted and facilitated by the International Maritime Organization (IMO) Resolution MEPC 323(74) of May 2019, is the provision of Onshore Power Supply (OPS) from renewable sources. The costs and benefits of OPS are dependent on characteristics such as grid factor, electricity price, grid conditions, etc. As a first step, the Mauritius Ports Authority decided to focus on cruise ships as it was on the point of developing the infrastructure for the Port Louis Cruise Terminal facility.

Overall Objective of Project and Potential Impact

The objective of the Feasibility Study was to evaluate the available options for in-berth vessel emission reductions at the Port Louis Cruise Terminal. Based on the results of the Study, the OPS has the potential to reduce approximately 3,000 tons of CO₂ annually. Recognizing that ships do not operate independently from shore-based entities in the

marine transportation systems, the Consultants were also required to analyse activities, more specifically those of harbour tugs and cargo handling equipment creating air pollutant emissions in Port Louis Harbour and examine various technological and operational solutions for reducing the pollution and compare their feasibility.

Introduction

The Indian Ocean Commission (IOC), through the AIODIS (Atlantic and Indian Ocean Developing Island States subcomponent of the World Bank-funded SWIOFish2 project, provided technical assistance to the Mauritius Ports Authority (MPA), to enable the completion in May 2022 of a pilot Feasibility Study and elaboration of a Plan for the set-up of an Onshore Power Supply (OPS) System. The proposed project is to have potential for replication in the other AIODIS.

A Consultant was appointed in January 2022 and the study was completed in May 2022. This initiative is also the result from an appreciation of increasing concerns regarding potential health and environmental implications. It was also believed that this project could be of benefit to the region if replicated as the promotion of Africa & the Indian Ocean region is at the heart of regional port associations' mission, which aim to transform it in an attractive zone. In this regard, cruise industry is an important area of cooperation between the different port authorities.

The objective of the Feasibility Study was to evaluate the available options for in-berth vessel emission reductions at the Port Louis Cruise Terminal. The scope was intentionally broad, aiming to cover a wide range of options to ensure the best available method is selected and implemented. In particular, the scope includes: (i) a review of all available emission reduction schemes and technologies to determine their suitability for Port Louis Cruise Terminal and (ii) an assessment of the feasibility and cost effectiveness of shore power for cruise ships berthed at Port Louis Cruise Terminal.

The Feasibility Study provided information to help decide on the actual viability of the provision of shoreside energy supply service from the Port Louis Cruise Terminal to vessels utilizing these facilities. The study also assessed how Port Louis Cruise Terminal facility could best support this service by realistically assessing the economic, social, environmental, and technical issues related to the installation of the necessary infrastructure. The output of the study provided the MPA with recommendations to help deliver long term sustainability goals that will reduce port's operations dependability on non-renewable energy sources.

How did the Mauritius Ports Authority find this opportunity?

IOC wished to provide technical support for initiating an innovative pilot project with replication potential in the other AIODIS. The AIODIS component of the SWIOFish2 project aims to support the development of the Blue Economy by providing opportunities for south-south exchange and increased access to needed expertise for the formulation of actions for the purpose. IOC had a limited funding, hence the need to trim the Terms of Reference of the study to accommodate a Feasibility Study for the OPS.

Where did this idea come from?

The above initiative falls under the purview of the project financed by the EU Technical Cooperation Facility in 2012 for the appointment of a Consultant to conduct a study with the objective of making Port Louis Harbour a Green Port. The initial study titled “Port Energy Efficiency & Renewable Energy Strategic Planning” focused on landside operations. Vessel side was not given priority. When this opportunity came, the gap for the vessel side was addressed.

What resources were provided from IOC/AIODIS/World Bank? What resources did MPA have or find to help understand shore power and the process of evaluating and implementing OPS?

IOC/AIODIS/World Bank provided technical expertise through a consultancy. MPA had technical knowledge of requirements that were formulated in a Terms of Reference (ToR), which was reviewed and approved before an open international call for Expression of Interest (EOI) for the Feasibility Study for OPS at the Port Louis Cruise Terminal.

Replication of the Study in other Ports

The results of the Port Louis OPS Feasibility Study were disseminated to other AIODIS countries through their AIODIS National Focal Points (NFP). Cabo Verde’s NFP expressed interest in replicating study for an upcoming cruise terminal project. Later Seychelles also expressed interest for its multi-purpose terminal.

IOC led the discussions with Cabo Verde and Seychelles with technical input and experience from Mauritius Ports Authority. Kick-off meetings were held with port authorities following introduction by NFP. The ToR were suitably modified and adapted to local context and requirements of the country’s ports. Prior review and approval of the revised ToR by World Bank was a requirement (as per procurement procedures) for extension of contract of the Consultant to conduct the Feasibility Study in Cabo Verde and in Seychelles.

What outreach has been done?

- (i) A presentation was made at the IAPH World Ports Conference in May 2022 at Vancouver.
- (ii) Experience of Mauritius was shared at the UNCTAD Multi-year Expert Meeting (July 2022).
- (iii) Experience of Port Louis Harbour was shared with the Food & Agricultural Organisation (FAO) in the Blue Ports Initiative (July 2022)
- (iv) A newsletter article for World Bank SWIOFish2 newsletter article was written in June 2022.
- (v) A Facebook post on IOC's website in August 2022.
- (vi) Presentation of project at AIODIS high-level meeting in Mauritius in Dec 2022.
- (vii) The International Maritime Organisation (IMO) through the Programme for Coordinated Actions to Reduce Shipping (IMO CARES) and the Maritime Technology Cooperation Centre [MTCC Latin America]/International Maritime University of Panama (UMIP) had invited MPA's representative as Keynote Speaker & Panellist to their International Virtual Workshop on "Maritime Decarbonisation – R&D In Latin America and Global Perspectives". to talk about "Results, challenges and recommendations associated with transition to Green Ports". The event was held on 9 February 2023.
- (viii) The initiatives of Mauritius Ports Authority were also presented at the Workshop on the Establishment of African Green Ports Forum (AGPF) organised by the African Union Commission in Addis Ababa, Ethiopia, in March 2023.

Key Takeaways

Most of the Small Island Developing States (SIDS) have historically been net energy importers of fossil fuels. Fuel importation takes a major share of the national budgets. The main utilization of energy is in the power generation and transportation sectors. Many islands with tourism and hospitality dependent economies require high energy intensities to sustain these industries including others such as manufacturing and agriculture.

It is crucial for small island developing states to improve access to renewable energy sources, as this will enable them to increase energy security, develop sustainability, as well as help in the worldwide effort to mitigate the impact of climate change. In order to further promote RE in SIDS and in particular in the context of the OPS, the emissions could be reduced by providing electricity to the ships from a hybrid renewable energy system with wind turbines and/or photovoltaics, connected to the grid. With this configuration, renewable energy will meet or even exceed the ships' electricity needs for most of the time in order not to increase the power station's load. The excess energy could be fed to the islands' grid, so a costly battery storage system is not necessary to handle the variations of alternative energy. In this way, a considerable reduction of CO₂ and PM10 emissions by the ships in the port occurs, providing a viable solution for a cleaner and healthier environment. This is where IMO could come with policies in the form of a

package to develop OPS based on the Renewable Energy systems. Appropriate funding is key to the success of RE and potentially to the implementation of the OPS in this context. Notwithstanding the above, there is an ongoing effort to train technical staff in the application of renewable energy technologies at the MPA.

Green Port Initiatives at Port Louis Harbour

(i) Renewable Energy Measures

Leveraging the substantial energy savings that can be obtained through adoption of new technologies and use of renewable energy sources, MPA has installed a Solar Photo Voltaic (SPV) plant of 10 kWp capacity at the Oil Jetty to power the electrical system. The power produced from Solar PV is monitored through a SCADA system.

MPA is pursuing its efforts towards sustainability and in this context, it has embarked on a solar PV project for its buildings at three sites. A feasibility study has already been carried out by an engineering consulting firm and based on the results of the technical, financial and economic assessment, the total capacity that is proposed to be installed at the three sites is around 400 kW. From an environmental perspective, the proposed SPV Project will bring an annual reduction of about 680 tons of carbon emissions.

(ii) Energy Efficiency Measures

Under the Green Port Initiatives, the focus is not only on Renewable Energy but also on the application of energy efficient lighting and air conditioning systems which have the potential to bring huge energy savings and reduce its impact on the environment. Steps have been taken for the replacement of energy efficient air conditioning systems in the administrative buildings and street lighting by LED. In the operational areas, the Terminal Operator is gradually replacing bulbs on the high masts for terminal lighting by LED – about 30% of the lights have been replaced as at date and upon completion, the impact of energy consumption is substantial and the related CO2 emissions is around 1000 tons annually.

7 June 2023
