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NATIONAL AUDIT OFFICE

PERFORMANCE AUDIT REPORT

MOVING TOWARDS RENEWABLE ENERGY- SOLAR WATER HEATER GRANT SCHEME

Ministry of Social Security,
National Solidarity, and
Environment and
Sustainable Development
(Environment and Sustainable
Development Division)

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Environment and Sustainable Development
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ABBREVIATIONS AND ACRONYMS

CPU	Consumer Protection Unit
DBM	Development Bank of Mauritius
GoM	Government of Mauritius
LPG	Liquefied Petroleum Gas
LTES	Long Term Energy Strategy
MEPU	Ministry of Energy and Public Utilities
MESDDBM	Ministry of Environment, Sustainable Development, Disaster and Beach Management
MICCP	Ministry of Industry, Commerce and Consumer Protection
MID	Maurice Ile Durable
MoESD	Ministry of Environment and Sustainable Development
MoFED	Ministry of Finance and Economic Development
MoU	Memorandum of Understanding
MREPU	Ministry of Renewable Energy and Public Utilities
MSB	Mauritius Standards Bureau
NHF	National Habitat Fund
PMO	Prime Minister's Office
SWH	Solar Water Heater
SWHGS	Solar Water Heater Grant Scheme
UNDP	United Nations Development Programme

EXECUTIVE SUMMARY

In 2009, the then Ministry of Renewable Energy and Public Utilities (MREPU) developed a Long Term Energy Strategy (LTES) 2009-2025 and its related Action Plan with a view to promoting sustainable development in the energy sector. LTES emphasised on the development of renewable energy, reduction of our dependence on imported fossil fuel and promoting energy efficiency. The Renewable Energy Development Strategy of LTES provides a roadmap for the use of solar energy, whether for water heating or electricity production. Solar water heating, which is the most common solar energy conversion method in Mauritius, was not sufficiently tapped though the potential is high. A Solar Water Heater Grant Scheme (SWHGS) was set up to encourage householders to use solar energy and for Government to achieve its long-term strategic goals. During period 2008-2016, the Scheme was implemented in four Phases.

At the inception of Phase 1 in August 2008, SWHGS was expected to promote renewable energy with the following aims:

- encourage the use of renewable energy instead of fossil fuels;
- reduce greenhouse gas emissions;
- assist the long-term development of the solar water heater industry; and
- increase public access to and awareness of sustainable energy technology.

For the first three Phases, Government granted some Rs 573 million as subsidy for the purchase of Solar Water Heaters (SWHs) to some 57,000 householders. In July 2015, Phase 4 of the Scheme was launched to provide grant of some Rs 140 million to an additional 16,480 householders.

Issues relating to installed SWHs under the Scheme were reported in the media during the past years. The objective of this Performance Audit Report was to assess whether SWHGS was appropriately planned, designed, implemented and evaluated to support the achievement of the objectives of the Scheme.

Key Findings

SWHGS had to be supplemented by a range of complementary policies and incentives as enunciated in the LTES Action Plan. Allocation of grants along with such policies and incentives was expected to achieve a target of 50 per cent households and businesses using SWHs by end of 2012. As of end 2013, post Phases 2 and 3, the target achieved was only 22 per cent. No complementary policies and incentives for householders were yet developed as of March 2016.

Phases 2 and 3, implemented by the then Maurice Ile Durable (MID) Fund, did not link the grants disbursed to the LTES Action Plan. No target was set for promoting the use of SWHs when the LTES Action Plan was updated in April 2014. Phase 4 was launched by the Ministry of Environment, Sustainable Development, Disaster and Beach Management (MESDDBM) in July 2015 without any reference to the LTES Action Plan, and there was no

alternative target to be achieved through the Rs 175 million grant (including administrative expenses), provided for this Phase.

Promoting use of SWHs was exclusively dependent on the cash grant under SWHGS as most householders relied on the grants provided to buy them. As grants were not budgeted and allocated evenly over the financial years during period 2009 to 2016, householders would buy SWHs only on receipt of grant. This uneven allocation and reliance on grants did not contribute to stabilise the SWH market and eventually to its maturity. Hence, the potential for SWHGS to assist the long term development of the solar water heater industry was mitigated.

Though the objectives of SWHGS were linked to renewable energy policy and strategy, there was no indication as to which entity consistently owned the Scheme as the implementation of the Phases was entrusted to four distinct entities, namely the then Ministry of Renewable Energy and Public Utilities, Maurice Ile Durable (MID) Fund, National Habitat Fund and MESDDBM, with different mandates.

A report commissioned by MID Fund identified that costs savings on Liquefied Petroleum Gas (LPG) and oil (fossil fuel) imports were higher when gas water heaters and electric water heaters were replaced by SWHs. According to the report, householders using these devices had to be targeted in priority. Under Phase 4, only 18 per cent of the grant was allocated to householders with income higher than Rs 25,000. These householders were more likely to own an electric or gas heaters and greater benefit was expected in these cases.

In January 2013, MID Fund considered the necessity to carry out a full-fledged study on past Phases to provide input into a process on how to support and accelerate dissemination of SWHs, and identify savings on electricity or LPG through the allocated subsidies. However, no action was initiated to carry out this full-fledged study. Three distinct assessments with different scopes and objectives had been carried out, but these did not meet the requirements of the output of a full-fledged study which MID Fund had envisaged.

Though improvements were brought during successive Phases, issues in respect of quality of SWHs, implementation and post implementation reviews arising during past Phases were not appropriately addressed in Phases 3 and 4. This led to their recurrence which undermined the achievement of the objectives of the Scheme.

According to the LTES Action Plan, Government has to ensure that beneficiaries received good quality products by prescribing standards for SWHs and that there are necessary testing facilities at the Mauritius Standards Bureau (MSB) for implementation of the standards. In October 2010, MSB prescribed a standard for SWHs known as MS EN 12976-1:2006 which was aligned with that of European Standard. However, MID Fund did not adopt the Standard. Instead, it prescribed quality criteria based on thickness and stainless steel grade of the inner/outer tanks and frame, which were not stipulated in the Standard. MID Fund did not also confirm the suitability of these criteria from MSB. This set of criteria used for Phases 3 and 4 also, did not ensure safety, reliability with an acceptable lifetime and performance of SWHs. Though local testing of these criteria was available, no test was carried out.

The due diligence exercise to select potential suppliers of SWHs assessed the financial and legal standing of the suppliers rather than their ability to provide SWHs which satisfied the minimum criteria. Further, it did not ascertain their capability to provide quality installation and after sales services.

In the contract between the Development Bank of Mauritius (DBM) Ltd and the registered supplier, there was an ambiguity on the obligation of the registered SWH suppliers as to whether the warranty was on the whole device for seven years or only on major components. The effect was that beneficiaries were being charged for repairs of defective parts within the warranty period.

During Phase 2, a mechanism was in place within three months of the start of the Scheme to oversee its implementation effectively. This included survey on the compliance of installed SWHs to criteria set, registration and investigation of complaints and follow up with suppliers. However, these practices were not followed properly during Phase 3. In respect of Phase 4 launched in July 2015, an ad hoc Technical Committee was set up in September 2015 at MESDDBM to oversee its implementation. A Complaint Centre for the monitoring of complaints within MESDDBM was recommended to be set up as from September 2015. As of March 2016, nine months after initiation of Phase 4, some Rs 98.4 million have been disbursed for 9,840 SWHs already installed. Neither the Complaints Centre has been set up, nor random checks were carried out for quality control purposes.

Performance Securities submitted by suppliers were not adequate. In four cases, follow up was not being carried out to adjust the amount of security provided. In case of default, the amount of the securities held would be insufficient to compensate the beneficiaries adequately.

MID Fund paid a sum of Rs 883,666 in advance to DBM Ltd in respect of potential enforcement of performance securities without ensuring that there was proper mechanism at the Bank to monitor the performance of suppliers in respect of Phases 2 and 3. In September 2015, MESDDBM approved a similar fee to be paid to DBM Ltd for keeping the Cash Securities of Rs 15 million deposited by 15 suppliers without ascertaining the set up of such a mechanism.

Neither DBM Ltd nor MESDDBM was a party to any dispute that may arise between SWH suppliers and the beneficiaries. Any dispute had to be resolved through other legal provisions, such as those enforced by the Consumer Protection Unit (CPU) of the Ministry of Industry, Commerce and Consumer Protection. As CPU had not been included in the operation of the Scheme, it did not have details on the contractual obligations of suppliers to provide satisfactory after sales service. The absence of such details did not enable CPU to handle complaints effectively.

The performance of SWH suppliers in respect of after-sale services during the warranty period was not assessed as the Scheme did not provide for such assessment. Information obtained from entities involved in consumer protection showed that in several cases, the suppliers took between one to three months to address complaints relating to leaking tanks, rusting parts, SWHs not heating, defective floating device, and overflowing tanks.

It is important to assess whether installed SWHs were being maintained and were performing effectively. As of March 2016, no such assessment had yet been carried out.

Conclusion

SWHGS has been successful in increasing the percentage of householders using solar energy for domestic water heating. During the initial Phase, the Scheme was not appropriately planned, designed and implemented. Improvements were made to the Scheme in subsequent Phases, but these were not sufficient to support the achievement of its objectives.

The criteria and procedures established by MID Fund/ MESDDBM have to be in line with sound managerial practices in order to plan, design, implement and monitor each Phase of SWHGS effectively. The current practices are not adequate to address critical issues, such as the capability of suppliers to provide quality SWHs, installation and after sales services. The Scheme as it is, does not guarantee that beneficiaries obtain a quality SWH which has been properly installed and commissioned, as well as satisfactory after sales service.

Since its inception, Government has disbursed some Rs 670 million to about 67,000 beneficiaries of the Scheme. The extent to which the objectives of the Scheme have been achieved and the resulting associated benefits have not been assessed.

Key Recommendations

There is a need to have an arrangement that provides for a structure which owns the Scheme consistently, with clearly defined objectives, and appropriate mechanism to implement each forthcoming Phase effectively. This structure will be responsible to plan, design and manage each Phase. Benefits in terms of enhanced accountability, reprioritised objectives, capacity building to implement and follow up forthcoming Phases will be ensured.

Planning should align forthcoming Phases with the policies and objectives of the revised LTES Action Plan. Also, the target for each Phase should be linked to LTES overall target. Complementary policies and incentives to promote SWHs should be developed by respective stakeholders as recommended in the Action Plan. Alternatives to direct subsidies to householders, as operated in other countries, should be considered.

The initiative of MESDDBM to seek assistance to design a SWH Standard, appropriate for a developing country like Mauritius, especially adapted to its climatic conditions and more specifically in respect of cyclones, needs to materialise. Pending the implementation of a SWH Standard, the adequacy of the current quality criteria for SWH, particularly in relation to health aspects and cyclonic conditions, needs to be re-assessed. The minimum criteria currently being used should be vetted by MSB and testing of same should be carried out as local testing facilities are available.

There is a need to have personnel with the appropriate expertise in project management to address effectively issues identified during previous Phases. They should also ensure that beneficiaries obtain a quality SWH which has been properly installed and commissioned, as well as satisfactory after sales service.

The due diligence exercise should focus on the ability of suppliers to provide quality SWHs, properly installed and commissioned, as well as after sales services rather than solely on legal and financial standing. The requirements (list of sales, maintenance interventions, track

record and availability of trained personnel) listed in the criteria for registration should be assessed.

Complaints monitoring and random checks should be an integral part of the implementation process and should accompany the installation and commissioning of SWHs. MESDDBM may have recourse to the services of CPU to provide a mechanism whereby complaints after implementation of each Phase are attended effectively. This will also provide an independent and reliable feedback for enforcing Performance Securities against defaulting suppliers.

MESDDBM needs to establish an appropriate post implementation review mechanism to obtain feedback for planning of forthcoming Phases. Information in respect of condition and performance of installed SWHs, the quality and level of after sales services of suppliers will also be available. This will help to assess the deliverables of that Phase.

MESDDBM needs to evaluate the Scheme. The outcome of the evaluation will ascertain, among others, to what extent the objectives of the Scheme have been achieved, and what changes are needed to improve it.

Ministry's Reply

The Ministry had taken note of the key recommendations, and as an immediate measure arrangements were being made to carry out a post implementation survey.

CHAPTER ONE

INTRODUCTION

1.1 Background

In 2009, the then Ministry of Renewable Energy and Public Utilities (MREPU) developed a Long Term Energy Strategy (LTES) 2009-2025 and its related Action Plan with a view to promoting sustainable development in the energy sector. LTES emphasised on the development of renewable energy, reduction of our dependence on imported fossil fuel and promoting energy efficiency. The Renewable Energy Development Strategy of LTES provides a roadmap for the use of solar energy, whether for water heating or electricity production. Solar water heating, which is the most common solar energy conversion method in Mauritius, was not sufficiently tapped though the potential is high. A Solar Water Heater Grant Scheme (SWHGS) was set up to encourage householders to use solar energy and for Government to achieve its long-term strategic goals.

For the first three Phases, Government had granted some Rs 573 million as subsidy for the purchase of Solar Water Heaters (SWHs) to householders. However, several issues on the implementation of SWHGS were raised in the media. Some of the issues included the low usage of SWHs among householders, and adverse reports on their quality.

It was against this background that the National Audit Office carried out this Performance Audit on SWHGS.

1.2 Audit Objective

The audit objective was to assess whether SWHGS was appropriately planned, designed, implemented and evaluated to support the achievement of the objectives of the Scheme.

1.3 Audit Design

To form a conclusion against the audit objective, the audit examined whether:

- The planning of each Phase of the Scheme has been aligned with the objectives of LTES and Action Plan targets?
- Each Phase has been designed on the basis of lessons learned on the previous Phase and improved to achieve fully the objectives and targets?
- Each Phase has been implemented as per established procedures and criteria?
- Post-implementation reviews have been carried out under each Phase to assess the benefits achieved?

1.4 Audit Scope

This Report focussed on the operation of SWHGS in the mainland of Mauritius. Grants to householders under Social Housing Schemes were excluded. The processes and practices relating to planning, design, implementation and post-implementation under the purview of the Ministry of Environment, Sustainable Development, Disaster and Beach Management (MESDDBM) were examined.

The audit covered the period January 2013 to March 2016 relating to completed Phase 3 and ongoing Phase 4. Follow up was carried out on issues raised during Phases 1 and 2 with a view to ascertaining whether they had been appropriately addressed in subsequent Phases.

1.5 Audit Methodology

The audit was conducted in accordance with International Standards of Supreme Audit Institutions and Guidelines relating to Performance Audit. Those Standards and Guidelines require that the audit should be planned in a manner which ensures that an audit of high quality is carried out in an economic, efficient and effective way and in a timely manner. Different methodologies were used for the audit to understand the audit area, along with obtaining sufficient, relevant and reliable audit evidence that support the conclusions and recommendations.

1.6 Methods of Data Collection

In order to carry out the audit, data was collected from files and documents review and interviews. Site visits were also carried out at suppliers' place of business to confirm information in files and to get acquainted with the activities carried out and to support our conclusions.

1.6.1 Documents Review

Data was collected mainly through review of Ministry's documents. Information relating to SWHGS, such as the objectives, strategies, targets, systems, procedures, consultancy reports and amount spent was collected through review of files and documents.

1.6.2 Personnel Interviewed

Interviews were carried out with key personnel of the Ministry of Energy and Public Utilities (MEPU), MESDDBM, Development Bank of Mauritius (DBM) Ltd, Ministry of Finance and Economic Development (MoFED), Mauritius Standard Bureau (MSB) and Consumer Protection Unit (CPU) of the Ministry of Industry, Commerce and Consumer Protection (MICCP) for information on the operation of the Scheme.

1.7 Sampling

Non-statistical sampling was used to select a sample of registered suppliers from a list of 15 suppliers. The selected sample of registered suppliers had supplied some 50 per cent of SWHs under completed Phase 3 and ongoing Phase 4, and were paid some 50 per cent of the grant.

1.8 Assessment Criteria

Criteria from the following sources were used to assess SWHGS.

- *Legislations* – Regulations made under the Finance and Audit Act, Energy Efficiency Act and Consumer Protection Act;
- *Government Approved Strategic Documents* - LTES 2009-2025 and the related updated Energy Strategy 2011-2025 Action Plan and Budget Speeches during period 2008 to 2015, and Maurice Ile Durable (MID) Fund Strategic Plan;
- *Contract Documents and Memorandum of Understanding (MoU)* - These included MoU between MESDDBM and DBM Ltd, contracts between registered suppliers and DBM Ltd, and contracts between registered suppliers and householders;
- *Consultant Report* – “Assessment of the Solar Water Heater Grant Scheme in Mauritius” commissioned by the then MREPU in 2009 to create a standard on the quality of SWHs and report “An Assessment of Phase 2 of Solar Water Heating Scheme” (June 2013) requested by MID Fund; and
- *Report of the World Energy Council on “Policy Measures to Support Solar Water Heating: Information, Incentives and Regulations” of 2007* - The criteria used from the Report are grouped as follows:
 - economic incentives to lower the investment barrier and improve cost effectiveness in promoting the use of SWHs;
 - regulations requiring new buildings to be equipped with solar energy systems; and
 - strategies to improve the quality of equipment and installations through the use of technical standards and quality labels.

Other details on assessment criteria used are in the relevant Sections in this Report.

1.9 Data Validation Process

Management of MESDDBM was provided with the audit criteria, findings and recommendations to confirm their relevance, accuracy and suitability.

CHAPTER TWO

DESCRIPTION OF THE AUDIT AREA

This Chapter describes the phases, objectives, roles and responsibilities of the different stakeholders and players involved in the Solar Water Heater Grant Scheme. It also describes the processes for selecting eligible beneficiaries, suppliers, system description for the disbursement of grant and related conditions attached.

2.1 Promoting Use of SWHs Through Four Phases of SWHGS

The incentives for promoting solar water heating started in 1992 with DBM Ltd Loan Scheme at concessionary rate of interest for purchase of SWHs. However, with the setting of MID Fund under the aegis of the then MREPU in July 2008, the Solar Water Heating Promotion Scheme was revisited. The Scheme was based on the grant of an approved fixed sum to an eligible householder for the purchase of a SWH from a registered supplier. This comprises a system of allocations (termed as Phase) in a financial year, by directly fixing the number of SWHs that will be distributed and the amount of grant allocated for each unit.

As of March 2016, three Phases have already been implemented, and one was ongoing. Details are as per Table 1.

Table 1: Details of the four Phases of SWHGS

	Phase 1	Phase 2	Phase 3	Phase 4
Funding Body	Government of Mauritius (GoM) through then MREPU	GoM through MID Fund under aegis of then Ministry of Environment and Sustainable Development (MoESD)	GoM through MID Fund under aegis of then MoESD	GoM through MESDDBM
Grant disbursed through DBM Ltd	Rs 240 million for 24,000 householders	Some Rs 135 million for 13,508 householders	Some Rs 198 million for 19,762 householders	Ongoing - some Rs 140 million to 16,480 householders
Scheme started/closed in	May 2009 / December 2009	January 2012 / July 2012	January 2013 / August 2013	July 2015/ ongoing

Source: MID Fund and MESDDBM Files

57,270 householders were granted subsidies of some Rs 573 million as financial incentives for the purchase SWHs under the first three Phases of SWHGS. In July 2015, Phase 4 of the Scheme was launched to grant some Rs 140 million to an additional 16,480 householders.

2.2 Purpose of SWHGS

In June 2008, MID Fund was set up by regulations under the Finance and Audit Act, as a Special Fund, with objectives to finance projects, schemes or programmes under Maurice Ile Durable. MID was a long term vision strategy to promote sustainable development by making Mauritius less dependent on fossil fuel through increased utilisation of renewable energy technologies and energy efficiency measures. The strategy had a component on solar water heating with the objective to switch from domestic electricity and gas water heaters. The overall effect was to achieve a reduction in electricity consumption, carbon dioxide emission, and at the same time, provide the comfort of having access to warm water to householders.

At the inception of Phase 1 in August 2008, SWHGS was expected to promote renewable energy with the following aims:

- encourage the use of renewable energy instead of fossil fuels;
- reduce greenhouse gas emissions;
- assist the long-term development of the solar water heater industry; and
- increase public access to and awareness of sustainable energy technology.

Also, LTES, formulated in 2009, comprised a Solar Energy Strategy and an Action Plan to promote the use of solar energy for water heating through solar water devices. Details on the action and target are as per Table 2.

Table 2: Action Plan for Promoting Use of Solar Water Heating Systems

Action	Description	Target
Solar Hot Water Promotion	Introduce a range of complementary policies, incentives to promote solar water heating systems to achieve in a short to medium term the target of 50 per cent households and businesses, and in the longer term near eliminating the use of Liquefied Petroleum Gas (LPG) and electricity for water heating purposes.	End 2012

Source: LTES –Action Plan

In the Solar Energy Strategy, it was also recommended that Government had to ensure that customers received good quality products by prescribing standards for SWHs and to provide the necessary testing facilities at MSB for implementation of the standards.

2.3 Stakeholders and their Roles and Responsibilities in the Scheme

There are several stakeholders involved in the planning, design, implementation and post-implementation review of the Scheme. Their roles and responsibilities are described in the paragraphs below.

2.3.1 Ministry Energy and Public Utilities

The main activities of this Ministry revolve around formulating policies in the energy, water and wastewater sectors and the establishment of a responsive legal framework to govern development of these sectors. One of its corresponding objective is to maximise the use and benefits of indigenous renewable sources of energy which were expressed in the Renewable Energy Development Strategy of LTES 2009-2025 Action Plan.

MEPU owned Phase 1 of SWHGS which was implemented in collaboration with DBM Ltd. Following complaints received on the poor quality of SWHs installed during that Phase, MEPU commissioned a report to formulate recommendations to safeguard the expected market growth and to enlarge the level of knowledge on the thermal solar technology in Mauritius in 2010.

Since 2009, MEPU has the overall responsibility to update the Action Plan through contributions from individual Ministries, Departments and other entities. In November 2012, a Steering Committee was set up at MEPU to act as a focal point for updating the Action Plan. The last update was carried out in April 2014. Currently, LTSE and Action Plan are being revised through the technical support of a Consultant.

2.3.2 Maurice Ile Durable Fund

Following the setting up of MID Fund, a Steering Committee, comprising representatives of various Ministries and Departments, was constituted to manage and administer the Fund. In July 2011, the Steering Committee was converted into the Commission on MID which operated under the aegis of the Prime Minister's Office (PMO) in collaboration with the then MoESD (now MESDDBM). From July 2011 to December 2013, the Fund was operating under the aegis of the then MoESD. SWHGS was one of its priorities, and it was also responsible for its funding, planning, design, implementation, and post-implementation of Phases 2 and 3.

In January 2014, the Fund was transferred to PMO, and SWHGS assigned to the National Habitat Fund (NHF). In January 2015, MID Commission was dissolved and the Fund was scheduled to be wound up by June 2016. Since then, the ongoing projects under the Fund were being managed by MESDDBM, and Phase 4 of SWHGS was launched in July 2015 by the latter.

2.3.3 Development Bank of Mauritius Ltd

DBM Ltd has been implementing SWHGS as defined in MoU with MID Fund. MoUs for Phase 2 and Phase 3 involved MID Fund, whereas for Phase 4, MoU was with MESDDBM.

The main tasks of DBM Ltd involved the registration and processing of application for grants from householders, registration of SWH suppliers, disbursement of grants, monitoring of complaints and management of Performance Securities. For Phase 1, the applicant paid DBM Ltd a fee for processing the application and disbursement of grant. For Phases 2 and 3, all processing fees were met from the sums budgeted for SWHGS grants from MID Fund, whereas for Phase 4, the fees were charged to the Consolidated Fund.

2.3.4 Ministry of Environment, Sustainable Development, Disaster and Beach Management

As MID Fund was operating under the aegis of MESDDBM, the latter had oversight functions for Phases 2 and 3. With the dissolution of MID Commission in January 2015, MESDDBM has taken over the funding, planning, design, implementation and post implementation of Phase 4. Also, it has the responsibility to provide annual updates on promoting use of solar water heating in the LTES Action Plan at the level of the Steering Committee chaired by the then MREPU.

2.3.5 Ministry of Finance and Economic Development - National Habitat Fund

The National Habitat Fund Regulations 2014 made under the Finance and Audit Act provided for the setting up of a new Solar Water Heater Scheme to be financed under the Special Fund - NHF. A budgetary provision of Rs 100 million was made whereby a householder with an income threshold not exceeding Rs 15,000 would receive a grant of Rs 10,000 for the purchase of a SWH. The Fund had to design and implement a new Phase of the Scheme.

2.4 Players and their Roles and Responsibilities in the Scheme

There are other entities which are involved in the operation of SWHGS. Their roles and responsibilities are described below.

2.4.1 Ministry of Industry, Commerce and Consumer Protection

MICCP has responsibilities, among others, to enhance market access through internationally recognised standards and provide an interactive communication platform for the information, protection and education of consumers. MICCP's intervention was solicited during implementation of Phase 2 when complaints were received on the quality of SWHs being installed under that Phase.

2.4.2 Mauritius Standard Bureau

MSB is a corporate body, operating under the aegis of MICCP, responsible for standardisation, quality assurance, testing and metrology. It also operates a certification marking scheme for products and a national management system certification scheme.

MSB was requested to develop standards which might be used for certification purposes for both locally manufactured and imported SWHs in 2009 by the then MREPU. The Standard “MS EN 12976-1:2006 – Thermal Solar Systems and Components – Factory Made Systems – Part 1: General Requirements”, has been adopted and gazetted as Mauritian Standard on 13 February 2010. As per MSB, the Standard MS EN 12976-1:2006 which is based on the European Standard specifies requirements on durability, reliability and safety for factory made thermal solar heating systems. Such system is considered as a single product and is assessed as a whole. The Standard also includes provisions for evaluation of conformity to these requirements, and it also makes provisions for the documentation for the installer and the user which is delivered with the system.

2.4.3 Consumer Protection Unit

CPU which operates under the aegis of MICCP has among others, the responsibilities to protect consumers through enforcement of laws, educate consumers of their rights and responsibilities, and settle disputes between traders and consumers by mutual agreement or in case of deadlock through a court of justice.

CPU was involved in the handling of complaints arising from the different Phases of SWHGS.

2.5 Beneficiaries (Householders)

Under Phases 2 and 3, any Mauritian citizen could benefit from a grant of Rs 10,000 to purchase a SWH from a registered SWH supplier if he/she satisfied the four criteria as listed in Appendix 1.

However, for Phase 4, the following additional criteria had to be satisfied:

- Householders whose salary did not exceed Rs 25,000 would receive a grant of Rs 10,000;
- Those with salaries exceeding Rs 25,000 would receive Rs 5,000.

2.6 Registered Suppliers

A householder could only benefit from the grant under Phases 2, 3 and 4, if SWH was purchased from a registered supplier. The criteria for a registered supplier under Phases 2 and 3 are as per Appendix 1. For Phase 4, additional criteria as follows were set:

- After sales service will be a priority in this Scheme, and proof of sales, maintenance and after sales service will be examined (list of existing sales since 2014 and maintenance interventions, etc);
- Availability of trained installers or plumbers for SWHs;
- Track record from previous SWH Schemes Phases 1, 2 and 3;

- Supplier to provide a Cash Security of Rs 1 million to DBM Ltd for a period of seven years;
- Family sized systems with minimum 150 litres tank capacity, with at least 15 tubes;
- Frame of stainless steel or aluminium alloy or galvanised steel, with minimum thickness 1.2 mm;
- Designed to meet all relevant plumbing standards and regulations;
- Warranty for a minimum of seven years with at least one year for all major components; and
- Supplier must have the spare parts, such as float valves/ vacuum tubes/ header tanks/ silicon seals/ electric elements.

2.7 System Description

The main activities under Phases 2, 3 and 4 of SWHGS are described below.

2.7.1 Initiation of the Process

The process is initiated with the provision of funds in the budget of MID Fund (for Phases 2 and 3) or MESDDBM (for Phase 4) to finance the allocation of the grant. The number, beneficiaries' criteria and modalities of registration (that is, first come first serve basis) are defined. A MoU is entered between MID Fund or MESDDBM (acting as the funding agency) and DBM Ltd operating the Phase on behalf of the former.

2.7.2 Registration and Selection of Registered Suppliers

DBM Ltd invites application for registration from prospective suppliers. The applications received are processed, and a due diligence exercise to confirm compliance with the criteria imposed is carried out by the MID Fund/ MESDDBM. The results of the exercise are submitted to a joint committee, comprising MID Fund/ MESDDBM and DBM Ltd, for approval of registration. If registration is approved, the supplier is informed accordingly and a contract is signed with DBM Ltd.

The contract entails the suppliers' responsibilities and undertakings made in the application form for registration and agreements reached between the supplier and DBM Ltd. Failure to adhere to the conditions and undertakings may lead to cancellation or suspension of registration and the forfeiture of Performance Security.

Once a supplier has been registered, his/her name will appear in a list of registered SWH suppliers. The list will then be made available to beneficiaries who have been selected under the Scheme.

2.7.3 Grant to Beneficiaries and Issue of Coupons for Delivery and Installation

The process from application up to disbursement of the grant is described in Appendix II. The eligible applicant is issued a grant coupon in two copies – original for applicant (now referred as Client) and copy for the registered supplier.

The Client selects and obtains quotation from the registered supplier, confirms order and finalises deal. The latter receives copy of coupon and proceeds with delivery, installation and commissioning of SWH.

An agreement is entered between the registered supplier and Client as per prescribed format. The supplier declares that SWH has been delivered, installed and commissioned and is as per required specifications and warranty. Also, any amount in excess of the value of the coupon (Rs 10,000 or Rs 5,000) has to be paid to the supplier by the Client before installation. Client confirms the declaration of the supplier. The latter then returns the duly signed agreement, original coupon, quotation and part payment receipt (if any). DBM Ltd proceeds with the disbursement of the grants upon verification of the documents.

2.7.4 Conditions Imposed upon Clients

DBM Ltd or MESDDBM or any of its agents may visit the principal residence of the client to confirm delivery, installation and commissioning of SWHs to the client's satisfaction. It is the client's sole responsibility to ensure that SWH conforming to the specifications as per the official quotation of the registered supplier is delivered, installed and commissioned at his principal residence to his satisfaction.

The Grant Coupon shall remain valid for a maximum period of three months as from the date of issue or up to the date of closure of the Scheme as shall be decided by DBM Ltd or MESDDBM, whichever is earlier, and shall be considered null and void and of no effect thereafter.

The Client shall make provision for the required water piping system so that the new SWH can be commissioned immediately upon its delivery and installation by the supplier.

The Client shall not move SWH to another residence or building without prior approval of DBM Ltd or dispose of SWH within three years from date of installation and commissioning.

CHAPTER THREE

FINDINGS

This Chapter presents the findings on whether Phases 3 and 4 of the Solar Water Heater Grant Scheme were appropriately planned, designed, implemented and evaluated to ascertain that the objectives were being achieved. The highlights of the findings precede the relevant Sections.

3.1 Planning for Phases 3 and 4

This Section examines whether at planning stage of each Phase, SWHGS was aligned with policies and objectives, and allocation of grants was linked to target that had to be achieved. It also examines whether these objectives were consistently put in focus during execution of each Phase by different entities, and whether there was a feedback mechanism to support planning. The Scheme did not achieve the target as set in the LTES Action Plan. This was mainly due to an absence of complimentary policies and incentives that should have been developed concurrently and changes in ownership of the different Phases that have not kept the main objectives in focus.

3.1.1 Planning to Align with Policies, Objectives and Targets

SWHGS provides Government with the opportunity to show its interest in promoting solar water heating as part of its renewable energy strategy. The Scheme has to be supplemented by a range of complementary policies and incentives as enunciated in the LTES Action Plan (paragraph 2.2 refers). Allocation of grants combined with such policies and incentives were expected to achieve a target of 50 per cent households and businesses using SWHs by end of 2012. In the longer term, the use of LPG and electricity for water heating purposes would be nearly eliminated.

Phases 2 (2012) and 3 (2013) were launched by MID Fund. The targeted percentage in the LTES Action Plan of 50 per cent households using SWHs by end of 2012 was not achieved. As of end 2013, the target achieved for Phases 1, 2 and 3 was only 22¹ per cent.

The number of beneficiaries under each Phase was based on budgetary allocations. These allocations were not linked to target set in the LTES Action Plan.

Promoting use of SWHs was exclusively dependent on grant administered by DBM Ltd, and as of March 2016, no complementary policies and incentives for householders were yet developed. Administrative costs paid for Phases 1, 2 and 3 totalled some Rs 40 million.

In the most recent update of the LTES Action Plan (April 2014), no target was set in respect of the diffusion percentage across householders and businesses for the short to medium term. Thereafter, in July 2015, Phase 4 was launched by MESDDBM without any reference to the LTES Action Plan, and there was no alternative short to medium term target to be achieved through the Rs 175 million (including administrative expenses) provided for this Phase.

¹ As per Report "Support to Structuring the Sector of Solar Water Heater and Developing Energy-Efficient Domestic Appliances in Mauritius" commissioned by Agence Française de Développement

SWHGS was based on the long term vision of MID Fund when Phase 1 was launched by the then MREPU in 2009. MID Fund had run Phases 2 and 3 of SWHGS under the aegis of the then MoESD, but when the Fund was transferred to PMO in January 2014, SWHGS was transferred to NHF. The latter planned to implement Phase 4 based on new criteria during 2014, but it did not materialise. In January 2015, SWHGS was transferred to MESDDBM. Though the objectives of SWHGS were linked to renewable energy policy and strategy, there was no indication as to which entity consistently owned the Scheme during implementation of the different Phases.

3.1.2 Development of a Stable Local SWH Market

According to Experts from International Organisations, such as the World Energy Council², exclusive reliance on grants to promote SWHs has the following disadvantages:

- it has a negative impact on demand, on network of contractors/ manufacturers and importers if grants are withdrawn too rapidly in markets which have not yet been established. This prevents the market to achieve a reasonable level of maturity;
- anticipation or withdrawal of grants leads to a rush to buy or a waiting game; and
- cost of SWH may increase if suppliers raise their prices in anticipation of grants on purchase of SWHs.

During the period 2008 to 2013, grants totalling some Rs 573 million were disbursed in three different financial years to 57,000 householders. This uneven disbursement of funds led to a rush to buy SWHs and waiting game by householders as per Table 3, and the unintended disadvantages mentioned above.

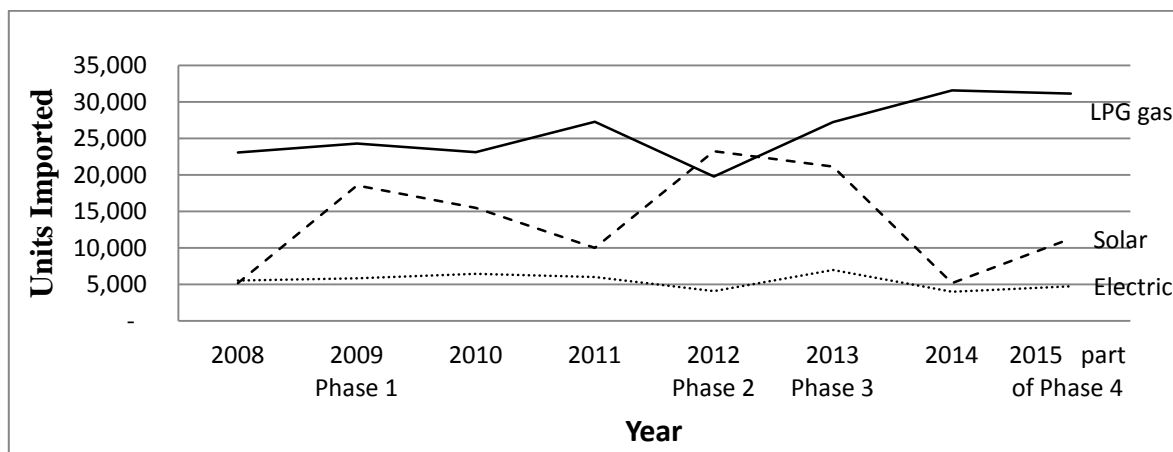
Table 3 Pending Applications

	Phase 1	Phase 2	Phase 3	Phase 4
Applications received by closing date	49,000	18,823 out of the 20,000 pending of Phase 1	42,131	27,750
Scheme started/ closed	May 2009 / December 2009	January 2012 / July 2012	January 2013/ August 2013	July 2015/ ongoing
Pending applications	20,000	-	Some 19,000	Some 11,000

Source: MESDDBM's Records

Most householders relied on SWHGS to buy SWHs. As grants were not budgeted and allocated evenly over financial years, they would buy SWHs only on receipt of grant rather than using alternative financing means. This led to SWH market picking up when the Scheme is implemented through Phases, and plunging when there was none as illustrated in Figure 1. In contrast, the markets for gas and electric water heaters were rather stable.

² Policy Measures to Support Solar Water Heating: Information, Incentives and Regulations, May 2007



Source: Statistics Mauritius – Detail Trade Data

Figure 1 Types of Water Heaters (Household Type) Imported - Period 2008 to 2015

The above mentioned conditions did not contribute to stabilise the SWH market and eventually to its maturity, and hence did not assist the long term development of the solar water heater industry.

3.1.3 Objectives of the Scheme

SWHGS, when launched in 2008 under the then MREPU, was focussed on renewable energy. The objective was to switch from domestic electricity and gas water heaters. The overall effect was to achieve a reduction in electricity consumption, carbon dioxide emission, and at the same time, provide the comfort of having access to warm water to householders.

Grants for Phases 1, 2 and 3 were available to householders irrespective of income level. In respect of Phase 4, eligibility for the quantum of grant was determined by the income level of the householder. Grant payable and number of beneficiaries from each income level for Phase 4 are as shown in Table 4.

Table 4 Phase 4 - Eligibility Criteria, Grant Payable and Number of Beneficiaries

Eligibility Criteria	Grant Payable (Rs million)	Number of Beneficiaries	Percentage of Grant Payable (%)
Earning monthly income < Rs 25,000	114.8	11,480	82
Earning monthly income > Rs 25,000	25.0	5,000	18
Total	139.8	16,480	100

Source: MESDDBM's Records

Householders with income higher than Rs 25,000 are more likely to own an electric or gas heaters. The Consultant appointed by MID Fund identified that costs savings on LPG and oil imports were higher when gas water heaters and electric water heaters were replaced by SWHs. They recommended that householders using these devices be targeted as priority.

Under this Phase, only 18 per cent of the grant was payable to beneficiaries deriving a monthly income of more than Rs 25,000. These householders were more likely to own an electric or gas water heater and greater benefit was expected in these cases.

3.1.4 Comprehensive Assessment of the Scheme to Support Planning

In January 2013, MID Fund considered the necessity to carry out a full-fledged study on Phases 1 and 2 at an estimated cost of US \$ 70,000 (some Rs 2.1 million). The objective of the study was to provide input into a process on how to support and accelerate dissemination of SWHs, and thereby reduce carbon dioxide emissions and consumption of electricity and LPG. Also, savings on electricity or LPG through the allocated subsidies would have been identified. The findings and recommendations of the study could have been used in the next Phase of SWHGS. However, no further action was initiated to carry out this full-fledged study.

As of March 2016, in the absence of a full-fledged study, three assessments with different scopes and objectives were carried out as shown in Table 5.

Table 5 Title, Objectives and Scopes of Assessments

Title	Commissioned by	Objectives	Scope of Assessment
Assessment of the Solar Water Heater Scheme in Mauritius	Then MREPU (February 2010)	Formulate recommendations to safeguard the expected market growth, and to enlarge the level of knowledge on the thermal solar technology in Mauritius	The scope was limited to Phase 1, and was focussed on quality of installed SWHs and processing time for application of grants.
An Assessment of Phase 2 of the Solar Water Heating Grant Scheme	MID Fund (September 2013)	Assessment of Phase 2 to estimate the overall performance, savings and benefits on 13,508 beneficiaries	The free 40-hour assessment was limited to a review of information gathered by MID Fund on a sample of 427 SWHs installed, based on a number of assumptions in the absence of firm data.
Support to Structuring the Sector of Solar Water Heater and Developing Energy-Efficient Domestic Appliances in Mauritius	MoFED (October 2014)	Explore innovative incentive schemes that would allow, with maximum leverage of public funds, the wide dissemination of SWHs and other energy efficient equipment at the domestic level	The study was not an assessment of the three Phases.

Source: MESDDBM's Files

These assessments, which had limitations in scope as described above, did not meet the requirement of the output of a full-fledged study as envisaged by MID Fund.

In August 2014, MID Fund reiterated the need to assess the benefits obtained and the savings made by individual households in their electricity bills. As of March 2016, this has yet to be done.

3.2 Design of Phases 3 and 4

This Section examines whether at the times the operational aspects of each Phase were designed, lessons learned from past Phases were duly incorporated. One area dealt in detail is whether the quality aspect of SWHs which is crucial to achieve long term benefits of SWHGS has been adequately considered at design stage. Issues raised during Phases 1 and 2 were not addressed appropriately in the subsequent Phases. Though a Standard was developed for SWHs, it was not adopted. Instead, the quality criteria used did not form part of the Standard and were inadequate to ensure reliability, safety and performance of SWHs. Moreover, SWHs were not tested to ascertain whether they complied with the minimum criteria during registration of suppliers.

3.2.1 Lessons Learned from Phases 1 and 2

Several loopholes identified during Phase 1 were taken on board to revise Phase 2. For example

- Suppliers of SWHs had to register under a new set of criteria, with application closed at the start of application by householders;
- Warranty of at least seven years had to be offered on SWHs to offset the recurrence of low quality SWHs without warranty offered previously;
- SWHs were at times not installed, but delivered in box. Suppliers now have to fix SWHs on roof and to connect or prepare to be connected to water pipes; and
- Serial number of SWHs would need to be certified by the supplier.

Phase 3 was a continuation of Phase 2. The same MoU with DBM Ltd, eligibility criteria of suppliers and householders, list of registered suppliers and disbursement mechanism were used. In Phase 4, new eligibility criteria of householders were set (as per paragraph 2.5). Minor changes were brought to the eligibility of suppliers in respect of security deposits and warranties on SWHs (as per paragraph 2.6).

Though improvements were brought during successive Phases, issues in respect of quality of SWHs, implementation and post implementation reviews were not appropriately addressed. These issues are elaborated in the paragraphs below.

3.2.2 Design of the Quality Criteria for SWH

The performance of a good solar thermal system relies largely on the quality of the equipment and the installation. It is therefore important to ensure that equipment and installations both comply with adequate quality standards. According to the LTES Action Plan, Government has to ensure that beneficiaries received good quality products by prescribing standards for SWHs and that there are necessary testing facilities at MSB for implementations of the standards. Findings relating to the quality issues are presented in the paragraphs below.

Formulation of a Quality Standard for SWH

In 2009, the then MREPU appointed a Consultant (through UNDP assistance) to formulate recommendations to safeguard the expected market growth of SWHs by defining criteria on product quality. This was in response to SWHs imported under Phase 1 which were reported to be of unknown quality. The Consultant recommended that MSB be involved in the formulation of standards that would cover quality aspects, such as safety, reliability with an acceptable lifetime and performance. Three special issues had to be addressed, namely:

- Wind Load - The support frame of SWH should be able to withstand the exceptionally high wind loads of cyclones common in Mauritius.
- External Corrosion – As Mauritius is a tropical island, there are specific requirements on the materials used in the device. Also, all such materials and piping network that come in direct contact with drinking water, should not lead to potential effects on the quality of water intended for human consumption. The device and piping network should be designed to avoid water contamination for backflow from all circuits to the drinking main.
- Climate and Hot Water Use (Performance) - The number of hours of radiation, air and cold water temperatures are the parameters that should be taken to test SWHs.

In October 2010, MSB prescribed a standard for SWHs known as MS EN 12976-1:2006 – Thermal Solar Systems and Components, which was aligned with that of European Standard. Initially, Phase 2 was launched with the prescribed Standard in 2010. Following the response of different stakeholders, MID Fund did not adopt the Standard mainly because

- There was a risk for a serious demand-supply mismatch of SWHs;
- MSB had no equipment to test compliance with the EN Standard and the testing of the SWH would be expensive if undertaken abroad;
- SWHs conforming to EN Standard would be included in the list of controlled items under Import Regulations of MICCP. The price of such SWH would be on the high side, and not within the purchase range of households for which this Scheme was meant for; and
- The then MoESD was negotiating with Agence Française de Développement for assistance to design a SWH Standard appropriate for a developing country like Mauritius, especially adapted to climatic conditions and more specifically in respect of cyclones.

Subsequently in 2012, MID Fund developed quality criteria based on thickness and stainless steel grade of the inner/outer tanks and frame. This was used to re-launch Phase 2. According to MSB, these criteria were not stipulated in Standard MS EN 12976-1:2006. The Fund did not confirm from MSB on the suitability of these criteria prior to launching Phase 2.

Adequacy of the Quality Criteria for SWHs

The criteria set for Phases 2, 3 and 4 did not cover essential parameters, such as wind load to ensure safety, reliability with an acceptable lifetime and performance of SWHs.

For example, the seven year warranty on SWHs provided by suppliers did not cover damage of the devices by cyclonic winds. One of the conditions of the grant requires that every beneficiary has to insure the new SWH against fire and allied perils (that is lightning, cyclone and explosion) over a minimum period of five years starting as from the date of installation of SWH. The first year insurance premium had to be collected by the supplier before delivery, installation and commissioning of SWH. For the remaining four years, the beneficiary had to renew the insurance cover on his own. However, MID Fund did not follow up on whether the cover was renewed over the four years. Insurance cover for SWHs was not included as a condition for disbursement of grants for Phases 3 and 4. As of March 2016, SWHs installed under Phases 1 to 4 have not yet been certified on their ability to withstand cyclonic conditions.

Appropriate quality criteria in Standards, such as MS EN 12976-1:2006, provide assurance that hot water from the SWHs is suitable for human consumption. The criteria used for SWHs by MID Fund/MESDDBM did not provide for such assurance and hence exposed users to potential health risks. Moreover, user manuals on SWHs provided by suppliers drew attention that the hot water from SWH could not be used for drinking or cooking.

Testing of SWH and Registration of Suppliers

Following a due diligence exercise, DBM Ltd registered a list of suppliers authorised to sell SWHs to beneficiaries. The due diligence exercise carried out assessed the financial and legal standing of the suppliers rather than on their ability to provide SWHs which satisfied the minimum criteria.

As soon as Phase 2 was launched in July 2012, MICCP received several complaints on the poor quality of SWHs supplied despite minimum quality criteria were imposed. MID Fund contemplated the local testing of SWHs for compliance to set criteria in August 2012. The services of MSB were sought, and the latter quoted a sum of Rs 12,800 per unit to carry out the test. However, MID Fund did not proceed with the testing exercise.

3.3 Implementation of Phases 3 and 4

This Section examines whether Phases 3 and 4 were implemented as per designed criteria, conditions, procedures and good practices. The set up of an appropriate mechanism to oversee the implementation of the Phases, selection and registration of suppliers, monitoring of warranty of SWHs, follow up on customer complaints, and submission and enforcement of Performance Securities are addressed. The due diligence exercise did not assess the ability of registered suppliers to provide quality SWHs and installation, and there was inadequate

monitoring on the warranty of SWHs, follow up on customer complaints, and submission of Performance Securities.

3.3.1 Due Diligence Exercise on Potential Suppliers

In respect of Phase 4, a due diligence exercise was initiated by MESDDBM in May 2015 to select suppliers as per criteria mentioned in paragraph 2.6. The workshops and showrooms of 23 potential suppliers were visited and assessed. Subsequently, the legal and financial standing of these potential suppliers were assessed by DBM Ltd. An Evaluation Committee comprising officers of MESDDBM and DBM Ltd then shortlisted 22 suppliers who satisfied all the criteria to be enlisted as Registered Suppliers. According to an analysis of Evaluation Sheets, suppliers were not assessed on the following mandatory criteria stipulated in MoU:

- Though after sales service was considered as a priority in the selection criteria, the list of sales since 2014 and maintenance interventions were not requested from the potential suppliers for assessment purposes at the Evaluation Committee level;
- The track record of the potential suppliers from the past Phases was not included in the criteria during the evaluation; and
- The availability of trained installers or plumbers was also not assessed.

In addition to the inability of the due diligence exercise to register the quality of SWHs being offered (paragraph 3.2.2 refers), it was also unable to assess the capability of the potential suppliers to provide quality installation and after sales services.

3.3.2 Warranty on SWH

According to the Terms and Conditions for Registration of the Contract between DBM Ltd and Registered Suppliers for Phases 3 and 4, the latter has to provide the householders a warranty for a period of seven years for SWH as a whole, during which period the supplier shall:

- have to ensure that SWH is in good operational order;
- as and when required, effect any repair/s which may become necessary at its (the Supplier's) sole costs.

However, another paragraph of the same Contract states that the supplier should provide “warranty for a minimum of seven years with at least one year for all major components”. The “major components” was not defined in the Contract. This led to an ambiguity on the obligation of the suppliers as to whether the warranty was on the whole part for seven years or only on major components. The effect was that beneficiaries were being charged for repairs of defective parts within the warranty period. For example, from a sample of complaints examined, the most common problem reported was damage of “ball cock” valve in the assisted tank of the SWH within the warranty period of seven years. If not repaired, water continuously overflowed from the SWH. Suppliers charged beneficiaries for the cost of the “ball cock” and transport.

3.3.3 Mechanism to Oversee the Implementation of Phases 3 and 4

There were practices during Phase 2 which provided for a mechanism to oversee its implementation effectively. Some salient practices were as follows:

- As per MoU between MID Fund and DBM Ltd, the latter had the responsibility to oversee the Scheme and address all complaints during implementation. Processes, procedures and follow up were documented and filed. MID Fund Board during its monthly meetings monitored progress and made relevant decisions accordingly;
- Site visits to inspect SWHs installation within three months of the start of the Phase were pro-actively effected by MID Fund. Non-compliance with the contractual obligations by suppliers was promptly addressed. These included issues such as non-submission of Warranty Certificates and SWHs installed not conforming to criteria. Payments of grants to these suppliers and acceptance of their quotations were suspended, and were restored upon necessary remedial actions;
- In June 2012, DBM Ltd stopped taking complaints from householders. MID Fund set up a hotline for receiving complaints and designed a Complaint Form for recording same. Spot checks were made by MID Fund and the complaints were referred to suppliers through mails and letters for remedial actions. After attending to the complaints, suppliers had to report back to MID Fund whether the householders were satisfied with their interventions.

The monitoring mechanism put in place in Phase 2 did not operate appropriately in Phase 3 during the period January to December 2013. From a sample of complaints examined, the following were observed:

- Within six months of the initiation of Phase 3, random checks (each costing Rs 400) on SWHs already installed were carried out and recorded complaints were investigated by MID Fund. However, no follow up was carried out to ascertain whether suppliers attended to these complaints satisfactorily.
- Complaints about SWHs not satisfying criteria and inadequate suppliers' responses were continuously recorded after June 2013. These complaints were not investigated.

In respect of Phase 4, an ad hoc Technical Committee was set up in September 2015 at MESDDBM to oversee its implementation. Since then, the Committee had two meetings (September and November 2015). As regards monitoring of the implementation of the Scheme, a Complaint Centre within MESDDBM was recommended to be set as from September 2015.

As of March 2016, nine months after initiation of Phase 4, some Rs 98.4 million have been disbursed for 9,840 SWHs already installed. Neither the Complaints Centre has been set up, nor were random checks carried out for quality control purposes.

3.3.4 Submission and Execution of Performance Securities/ Bank Guarantees

As per contract for Phase 2, each registered supplier had to provide a Performance Security/ Bank Guarantee of Rs 500,000 for the due performance of its obligations. As and when required, the supplier had to increase the quantum of the Performance Security/ Bank Guarantee to such amount which shall equal to five per cent of the quoted price of all SWHs financed under that Phase. However, MID Fund Board decided to set a ceiling of Rs 3.5 million on Performance Security for Phases 2 and 3 combined per supplier. In respect of Phase 4, each supplier had to provide a cash security of Rs 1,000,000 at start, and as and when required to increase the quantum of the cash security to an amount equal to but not exceeding five per cent of the quoted price of all its SWHs supplied under that Phase.

A scrutiny of the Performance Securities kept at DBM Ltd revealed that adequate follow up was not being carried out as follows:

- Two suppliers did not submit additional amount of Rs 80,000 and Rs 300,000 respectively in respect of Phase 3. These sums were outstanding since November 2013; and
- As of March 2016, two suppliers had already installed more than 2,000 SWHs each during Phase 4. As the quoted price of the cheapest SWH was in the range of Rs 12,000 (as ascertained during our visit to both suppliers), there was a shortfall of some Rs 800,000 on the Performance Security submitted.

In case of default on the part of the suppliers which would necessitate the forfeiture of the security, the amount of the securities held would be insufficient to compensate the beneficiaries adequately.

3.3.5 Execution of Performance Securities

As per the two MoUs with DBM Ltd, there was no provision for any advance payment of fee in respect of legal costs to DBM Ltd. The registration of suppliers included the receipt and verification of Performance Securities. The overall management fee of Rs 600 per disbursement of grant made provision for payment for this task. For Phases 2 and 3, some Rs 23 million had been paid as management fees.

In February 2014, MID Fund Committee approved an additional payment of a fee of 0.5 per cent per annum over seven years for holding and executing of Performance Securities totalling Rs 27,393,325. These Securities were provided through Bank Guarantee documents from different local banks for a period of seven years in respect of Phases 2 and 3 by the 32 suppliers. MID Fund paid a sum of Rs 883,666 in advance to DBM Ltd in respect of potential enforcement of performance securities without ensuring there was proper mechanism at the Bank to monitor the performance of suppliers. During execution of Phases 2 and 3 (January 2012 to December 2013), several suppliers installed SWHs which did not satisfy the contractual criteria, and even one supplier was de-registered from the list of suppliers. However, in these cases, the Performance Securities were not executed. The sum paid to DBM Ltd included fees (some Rs 250,000) for two years during which no bond was executed.

Moreover, in September 2015, MESDDBM approved a similar fee to be paid to DBM Ltd for keeping the Cash Securities of Rs 15 million deposited by 15 suppliers without ascertaining the set up of such mechanism.

3.4 Post Implementation Reviews

This Section presents the findings on the mechanisms set up to handle complaints, provide feedback on the condition and performance of installed SWHs after completion of the different Phases. No appropriate mechanism was in place and no feedback was available in respect of condition and performance of SWHs.

3.4.1 Mechanism to Handle Complaints After Implementation

As per the Contract with the beneficiaries, neither DBM Ltd nor MESDDBM was a party to any dispute that may arise between SWH suppliers and the beneficiaries. Any dispute had to be resolved through other legal provisions, such as those enforced by CPU of MICCP. CPU has responsibility of enforcing the various consumer legislations and of providing overall consumer satisfaction and security.

From a sample of complaints in respect of SWHs for period 2013 to 2015 handled by CPU, the following were observed:

- CPU was not included in the operation of the Scheme. However, it had received some 100 complaints in respect of SWHs annually which were investigated by its officers. As far as possible, it settled disputes by mutual agreement or in case of deadlock through a Court of Justice. To settle dispute amicably and effectively, it requires details on the rights and obligations of each party. In respect of the obligations of SWH suppliers, CPU did not have details, such as obligations to provide satisfactory after sales service and enforcement of Performance Securities in case of default;
- There was no sharing of information between CPU and DBM Ltd to provide a feedback on the performance of after-sales services of SWH suppliers;
- SWH suppliers took between one to three months to address complaints, such as leaking tanks, rusting parts, SWHs not heating, defective floating device, and overflowing tanks.

The non availability of information on the suppliers' obligations did not enable CPU to handle complaints effectively.

3.4.2 Review on the Condition and Performance of Installed SWHs

The Consultant appointed by MID Fund assessed that the implementation of the grant system would lead to a payback period of some 2.7 years of the installed SWHs. Also, net positive benefits would be achieved as SWHs have life expectancy of 20 - 25 years provided they maintain their performance effectively throughout their lifetimes.

SWHs of relatively low quality were reported to have been installed during Phase 1 whereby no quality criteria were prescribed. Though quality criteria were prescribed for Phases 2, 3

and 4, no pre-installation testing was carried out. The random checks carried during the implementation of Phases 2 and 3 were limited to visual inspection of size of SWH tanks, number of tubes, serial number, etc. Moreover, several of the SWHs were not yet commissioned during the random checks to assess their performance though the contract between DBM Ltd and the supplier stipulates that the latter has to ensure that the beneficiary has already made provision for the required piping system. It was only through householders' complaints that poor performances were reported. However, it could not be ascertained whether, these were resolved effectively, as reported in paragraph 3.4.1.

One important aspect is the requirement to carry out maintenance/ servicing of SWHs every four to five years as per manufacturers' recommendations. This involves draining hot water tank, change silicon insulation, clean-up vacuum tube and standing frame, which will help to maintain the useful lives of the SWHs.

As of March 2016, no post implementation survey had yet been carried out to provide a feedback on whether SWHs installed were being maintained and were performing effectively, which brand and models had major performance issues and whether after sales services were being carried out satisfactorily.

CHAPTER FOUR

CONCLUSION

Government took a laudable initiative to set up SWHGS to support renewal energy development in Mauritius. The aim of the Scheme was to encourage more householders to use renewable energy through solar water heaters. SWHGS has been successful in increasing the percentage of householders using solar energy for domestic water heating. During the initial Phase, the Scheme was not appropriately planned, designed and implemented. Improvements were made to the Scheme in subsequent Phases, but these were not sufficient to support the achievement of its objectives.

SWHGS supports LTSE Action Plan to promote use of solar energy. Householders relied heavily on the grants for procuring SWHs. However, on its own, SWHGS was insufficient to achieve the targeted percentage of householders using SWHs by end of 2012 as concurrent complementary policies and incentives were not developed. The budget for each Phase was not linked to the target in the Action Plan. In respect of Phase 4, only a small proportion of the budget was payable to those beneficiaries who were more likely to be using gas and electrical water heaters and have shifted to SWHs. Greater benefits were expected to be derived from such a shift in usage.

The criteria and procedures established by MID Fund/ MESDDBM have to be in line with sound managerial practices in order to plan, design, implement and monitor each Phase of SWHGS effectively. The current practices are not adequate to address critical issues, such as the capability of suppliers to provide quality SWHs, installation and after sales services. The Scheme as it is, does not guarantee that beneficiaries obtain a quality SWH which has been properly installed and commissioned, as well as satisfactory after sales service.

Since its inception, Government has disbursed some Rs 670 million to about 67,000 beneficiaries of the Scheme. It is therefore important for Government to assess the achievement of the objectives of the Scheme and the benefits obtained. In 2013, MID Fund identified the importance of carrying out a full-fledged study on the Scheme. The Fund reiterated the need to carry out an assessment on the saving achieved on electricity bills of beneficiaries of the Scheme in 2014. No such study or assessment has yet been carried out.

CHAPTER FIVE

RECOMMENDATIONS

In the light of the audit findings and conclusion, hereunder are the recommendations.

5.1 Ownership of the Scheme

There is a need to have an arrangement that provides for a structure which owns the Scheme consistently, with clearly defined objectives, and appropriate mechanism to implement each Phase effectively. The structure will be responsible to plan, design and manage forthcoming Phases. This will lead to the following benefits:

- Enhanced accountability in terms achievement of objectives and target;
- Re-prioritise the objectives and ensure that grants are allocated where there are greater benefits to be obtained;
- Increased in-house capacity in terms of human resources to implement the Phases; and
- Appropriate mechanism to continuously plan, design, implement and follow up of the Phases.

5.2 Planning

Currently, the LTES Action Plan is being revised by MEPU. Planning should align each forthcoming Phase with the policies, objectives and target of the revised Plan.

Complementary policies and incentives to promote SWHs should be developed by respective stakeholders as recommended in the Action Plan. Alternatives to direct subsidies to householders should be considered. Complementary policies and incentives (for example Value Added Tax remission, Tax Credit Scheme and loans at concessionary rate with grace period for repayment) implemented in countries, such as Tunisia, South Africa and India, can be envisaged.

5.3 Design

There is still need to ensure that customers receive good quality SWHs by prescribing standards and providing the necessary testing facilities at MSB for implementation of the standards. The initiative of MESDDBM to seek assistance to design a SWH Standard, appropriate for a developing country like Mauritius, especially adapted to climatic conditions and more specifically in respect of cyclones, needs to materialise.

Pending the implementation of such Standard, the adequacy of the current quality criteria for SWH, particularly in relation to health aspects and cyclonic conditions, needs to be re-assessed.

The minimum criteria set up by MID Fund and currently being used by MESDDBM should be vetted by MSB and testing of same should be carried out as local testing facilities are available.

5.4 Implementation

The structure mentioned at paragraph 5.1 above needs to be staffed with personnel having the appropriate experience in project management to address effectively issues raised during previous Phases. The personnel should also ensure that beneficiaries obtain a quality SWH which has been properly installed and commissioned, as well as satisfactory after sales service.

In order to address the issues raised during implementation, MESDDBM should consider the following:

- The due diligence exercise should focus on the ability of suppliers to provide quality SWHs, properly installed and commissioned, as well as after sales services rather than solely on legal and financial standing. The requirements (list of sales, maintenance interventions, track record and availability of trained personnel) listed in the criteria for registration should be assessed;
- The ambiguity in warranty conditions specified in suppliers' contract with DBM Ltd should be addressed. This should be reconciled with what suppliers are proposing to householders;
- Complaints monitoring and random checks should be an integral part of the implementation process and should accompany the installation and commissioning of SWHs;
- MESDDBM should appropriately follow up on the submission and execution of Performance Securities/ Bank Guarantees. Related fees should only be paid on execution of a Performance Security and that should be paid from the Security deposited;
- The practice of requiring Cash Guarantees from suppliers for forthcoming Phases should be continued.

5.5 Post-Implementation Review

MESDDBM needs to establish an appropriate post implementation review mechanism to obtain feedback for planning of forthcoming Phases. Information in respect of condition and performance of installed SWHs, the quality and level of after sales services of suppliers will also be available. This will help to assess the deliverables of the Scheme.

Complaints monitoring is an important part of the post implementation review. The Ministry may have recourse to the services of CPU to provide a mechanism whereby complaints after implementation of each Phase are attended effectively. It will also provide an independent and reliable feedback for enforcing Performance Securities against defaulting suppliers.

Post implementation surveys may be carried out to provide information on whether SWHs installed are being maintained, any major performance issues being encountered and whether after sales services are being carried out satisfactorily.

5.6 Evaluation of the Scheme

As some Rs 670 million have been disbursed, MESDDBM needs to evaluate the Scheme. The outcome of the evaluation will ascertain, among others, to what extent the objectives of the Scheme have been achieved, and what changes are needed to improve it.

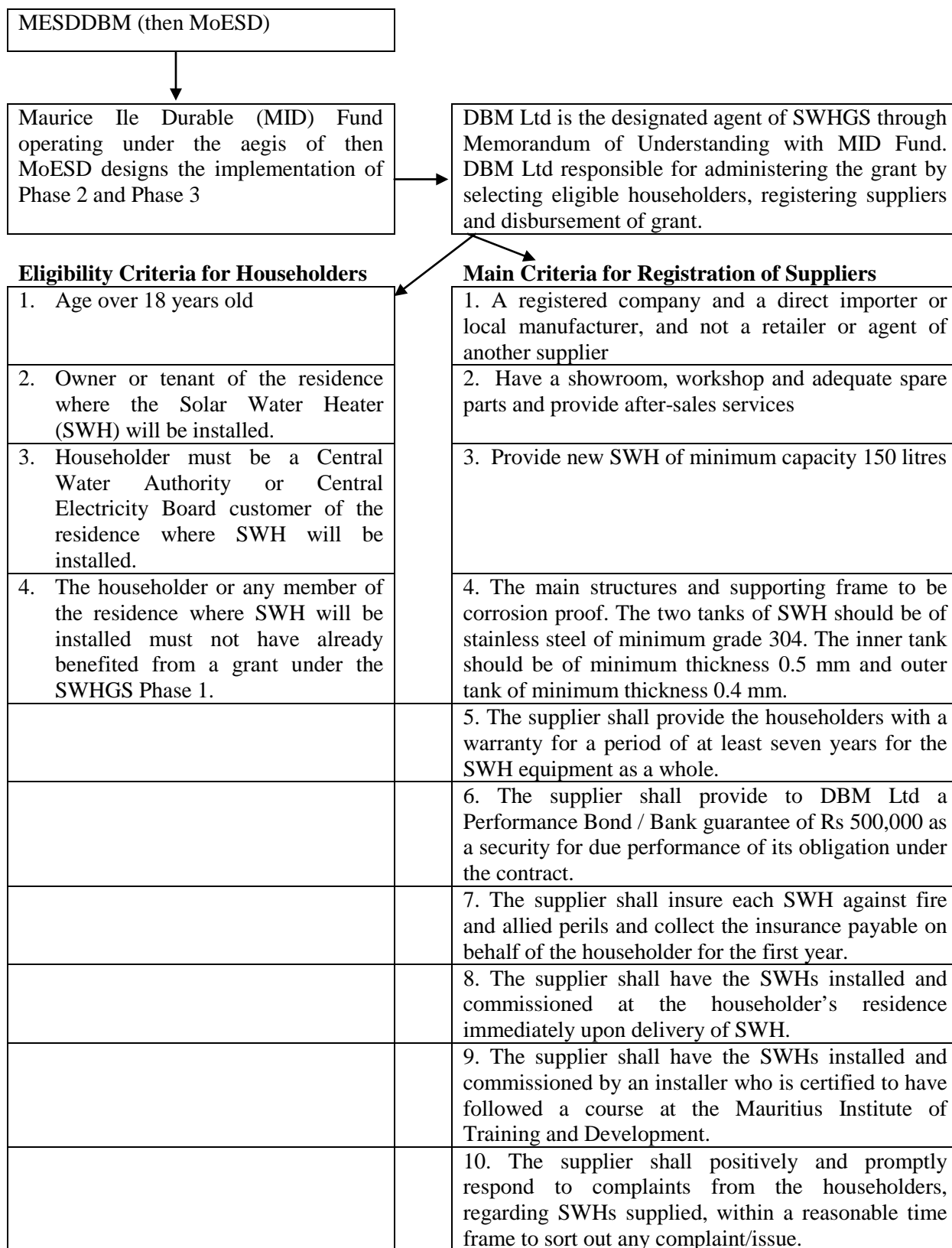
Ministry's Reply

The Ministry's reply is reproduced below:

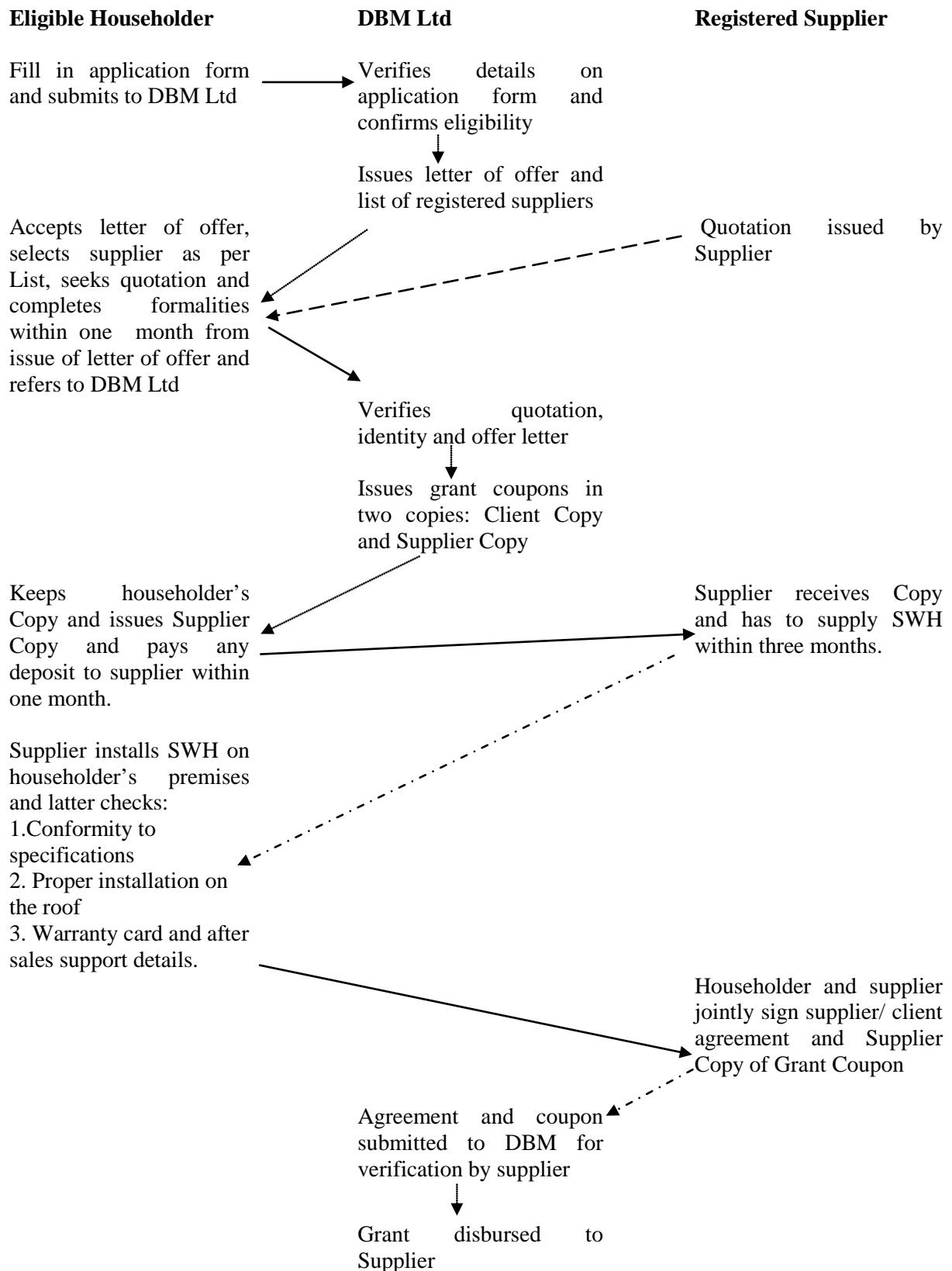
“The Ministry had taken note of the key recommendations contained in the above-mentioned Report.

As an immediate measure arrangements are being made to carry out a survey as recommended”.

Eligibility Criteria for Householders and Registration of Suppliers for Phase 2 and Phase 3



Steps in Phase 2, Phase 3 and Phase 4 of SWHGS



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