



Tender Technical Specification

Generation Division

Title: **INSULATION (SPF AND CEILING BOARDS), ELECTRICAL REWIRING AND THE SUPPLY OF LPG (LIQUID PETROLEUM GAS) HEATERS AND HYBRID STOVES WITH ASSOCIATED 9KG LPG CYLINDERS FOR THE AIR QUALITY OFFSET PROJECT ON AN "AS AND WHEN REQUIRED BASIS"**

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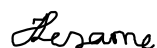
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Compiled by



Thapelo Lesame

LDE: Civil and Structural



Sakhy Mnguni

LDE: Electrical



Jan Strydom

LDE: LPS



Sibonelo Sibiya

LDE: Architectural

Functional Responsibility



Bryan McCourt

Middle Manager

Environmental

Authorised by

pp. 

Deidre Herbst

Senior Manager

Environmental

Date: **28 September 2022**

Date: **28 September 2022**

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1. INTRODUCTION

New emission legislation as instructed by the Department of Forestry, Fisheries and Environmental (DFFE) to the Employer's Power Stations (Air Quality Act, 2004 [Act 39/2004], Notice 248; 31 March 2010: Minimum Emission Standards) states that all operating plant shall conform to the new plant particulate emission limit of 50 mg/Nm³ by 2020.

Eskom is now embarking on the implementation of phase 2 on the roll-out of Air quality offset intervention, focussing on reducing household emissions in areas classified in the clusters outlined in the table 1 below.

Table 1: Cluster Allocation for Insulation and Draught Proofing

Cluster	Intervention Areas	Linked Stations	No of Households
A	Phola, Emalahleni & Masakhane	Kendal & Duvha	9 181
B	Emzinoni plus & Thubelihle	Matla & Kriel	7 287
C	Silobela, New Ermelo & Nederland	Arnot & Camden	5 099
D	Sivukile, Nthorwane & Refengkotso	Tutuka, Grootvlei & Lethabo	3 670
Total			25 237

The project addresses Eskom's strategic imperative of reducing the organization's environmental footprint and pursuing low-carbon growth opportunities. The aim is to reduce household emissions in the communities by swapping wood/coal burning stoves with a hybrid domestic cooking stove. In addition, the project aims to implement proposed alterations to these houses is to make the building thermally comfortable which will save cost of keeping the interior warm in winter and cool in summer thereby reducing household emissions.

The scope of work is therefore the Insulation (SPF and Ceiling boards), electrical rewiring and the supply of LPG (liquid petroleum gas) heaters, hybrid Stoves with associated 9kg LPG cylinders and asbestos roofing (If applicable) for the Air Quality Offset Project on an "as and when required basis" for a period of 3 years.

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2. SUPPORTING CLAUSES

2.1 SCOPE

The document covers the architectural, structural, electrical and gas requirements for the Insulation (SPF and Ceiling boards), electrical rewiring and the supply of LPG (liquid petroleum gas) heaters, hybrid Stoves with associated 9kg LPG cylinders and asbestos roofing for the Air Quality Offset Project.

2.1.1 Purpose

The aim of the document is to appoint a Contractor that will execute the scope contained herein.

2.1.2 Applicability

This document shall apply to the Phase 2 Air Quality offset Project only.

2.2 NORMATIVE/INFORMATIVE REFERENCES

2.2.1 Normative

Refer to Section 3.4

2.2.2 Informative

- [1] 240-51544462 Eskom Quality Requirements for Suppliers
- [2] ISO 9001 Quality Management Systems – Requirements
- [3] SO 10005 Quality Management Systems - Guidelines for Quality Plans

2.3 DEFINITIONS

Definition	Description
Supplier	A successful tenderer, with whom a supply contract is placed. In other words, all tenderers are potential suppliers.
Tenderer	Prospective service provider to bid for tender and submit as required
Employer	Refers to Eskom
Service Provider	Supplier

2.3.1 Disclosure Classification

Public domain: published in any public forum without constraints (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Description
LPG	Liquefied petroleum gas

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Abbreviation	Description
NG	Natural Gas
PMO	Project Management Office
SABS	South African Bureau of Standards
SANS	South African National Standard
SPF	Spray Polyurethane Foam
NHBRC	National Home Builders Registration Council

2.5 ROLES AND RESPONSIBILITIES

It is the role of the Generation Programme Management department to ensure that all architectural, structural, electrical and gas requirements are catered for in this scope, and that the scope is executed in accordance with this Technical Specification.

2.6 PROCESS FOR MONITORING

Design review procedure

2.7 RELATED/SUPPORTING DOCUMENTS

Refer to Section 2.2 and Appendices.

3. SCOPE OF WORKS

3.1 GENERAL

The scope of work includes the Insulation (SPF and Ceiling boards), electrical rewiring and the supply of LPG (liquid petroleum gas) heaters and hybrid Stoves with associated 9kg LPG cylinders for the Air Quality Offset Project on an “as and when required basis”.

The *Contractor* is responsible for the procurement, supply and installation/construction of the *works* indicated herein. This includes

- Set up a project office local to site with adequate security (central to area of implementation, i.e same township)
- Provide a warehouse and ensure stock received is safe and secured at all times (As per warehouse specification to be provided by *Employer*). Provide the required insurance for the appliance stock in storage and ensure there is insurance cover for stock in transit from warehouse to the households for the entire duration of the contract.
- Setup an area in the warehouse specifically for inspection and testing (functionality) of the Gas-Electric (Hybrid) stoves and heaters supplied by the manufacturer prior to installation. The

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inspection of the delivered appliances is done within a week after delivery by the manufacturer.

The results of the test shall be reported to the *Employer*

- Ensure that the eligible participating households are registered for installation. The employer to provide the household participation criteria to the Contractor.
- The Contractor prepares the house for insulation by covering and moving furniture before work commence and also returns furniture and cleaning up site after completion of the work. The *Contractor* to note the removal and return of furniture should be done in one day so not to inconvenience the households.
- Ensure the removal of old stoves, incandescent lamps, corrugated steel roofing sheets and associated stove accessories (i.e chimney etc) from the household to where they will be temporarily stored before being recycled. The storage of the old coal stoves may be kept up to a month depending on the installation rate.
- Supply/procurement, delivery, off-loading and perform final inspection at the Settlements, temporary structures/ scaffolding, installation of hybrid domestic cooking stove (3 LPG x 1 Electric plate) and LPG heaters each with associated 9kg LPG (liquid petroleum gas) cylinder per household, finishing complete in every detail and final certification.
- Supply/procurement, delivery, off-loading and performs final inspection at the Settlements, temporary structures/ scaffolding, erection/ construction, installation of install ceiling insulation (SPF and Ceiling boards) final painting, and electrical re-wiring, finishing complete in every detail and final certification.
- Removal of incandescent lamps and replace with new CFLs within the households.
- Any damages incurred during transit must be managed through the appropriate transit insurance by the *Contractor*.
- Ensure recycling of the old stoves, incandescent lamps corrugated steel roofing sheets and associated stove accessories (i.e. chimney) at an Eskom approved facility in an environmentally responsible manner.
- Acquire a licenced recycling company with all necessary permits or licences to recycle the old coal stoves, incandescent lamps, corrugated steel roofing sheets and associated stove accessories (i.e chimney etc) and provide documentation (This will form part of the tender returnable by the *Contractor*)
- Full removal of the asbestos roofs that should then be replaced with corrugated roofing in households that have asbestos roofing.

The Contractor takes full professional accountabilities for all the works as per the scope contained herein.

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Any discrepancy or ambiguity between the Employer's Technical Specification is immediately brought to the attention of the Project Manager for clarification.

The Contractor repairs all damage caused to existing infrastructure resulting from the works.

The Contractor submits ALL reports, documents, drawings (detailed, fabrication, etc) and certifications to the Project Manager for record keeping, both in soft and hard copy formats.

The Contractor takes note that review and acceptance of any document or drawing by the Employer in no way relieves the Contractor of his liability for the works. The Contractor remains liable for all works conducted as per this scope.

The Contractor ensures that the households understand the terms and conditions of the contract to be entered with them and also that there will be surveys conducted.

3.2 PROPOSED LAYOUT

The *Contractor* is issued the google site layout drawing for each settlement which depicts the co-ordinated locations of the various communities that have been identified for each cluster.

3.3 Risk of Asbestos

The *Contractor* is made aware of the possibility of certain household having asbestos roofing. The contractor is required to have a resource or a contractor that is competent in asbestos Roofing safe handling, removal and disposal as per South African environmental requirements and regulation on handling Asbestos material.

3.4 CODES & STANDARDS TO BE USED IN THE WORKS

The *Contractor* adheres to the latest edition of all applicable SANS standards, Eskom standards and other codes of practice, regulations & standards. This includes but is not limited to:

- [1] SANS 10400 (all parts)
- [2] SANS 1539, Appliances operating on liquefied petroleum gas (LPG) or natural gas (NG) - Safety aspects.
- [3] SANS 1156-2, Hose for natural gas and liquefied petroleum gas (LPG) Part 2: Hose and tubing for use in natural gas and liquefied petroleum gas vapour phase.
- [4] SANS 1237, Single-stage regulators for liquefied petroleum gas (LPG).
- [5] SANS 10019, Transportable pressure receptacles for compressed, dissolved and liquefied gases — Basic design, manufacture, use and maintenance
- [6] SANS 199, Shut-off valves for transportable, refillable liquefied petroleum gas cylinders

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2.5 INSULATION (SPF AND CEILING BOARDS) AND ELECTRICAL REWIRING

3.5.1 General Requirements

The average household at identified communities is to be regarded as 60m². This average household measurement is to be used to propose cost/pricing of delivering a full insulation and rewiring of household.

The *Contractor* is responsible for taking actual measurement of houses as per signed work instruction(s) from the project manager and in line with the database list of household participants. The *Contractor* is responsible for preparing the BOQ for actual cost per household and submits this to the project Manager for approval before continuing with other activities of the work. The *Contractor* is responsible for ensure that each house has been sanitized before any work can proceed.

The *Contractor* shall identify households with asbestos roofing as well as those that require draught proofing. The cost for asbestos removal and disposal thereof and the cost associated with draught proofing shall be included and clearly marked as “ad hoc” activity in the BOQ for actual cost that will be submitted to the project manager for approval. Where draught proofing is not possible, the contractor is to replace broken windowpanes and doors with significant gaps, this cost is to be also clearly indicated on the BOQ for actual cost.

3.5.2 Architectural design construction and finishes

The purpose of the proposed alterations to these household is to make the building thermally comfortable which will save cost of keeping the interior warm in winter and cool in summer. All new architectural works to be done is to comply with all parts of SANS 10400.

Construction and architectural finishes:

Ceiling

6.4 mm thick rhinoboard and an R value of 2 or above to be nailed to 38x38mm SA pine brandering at max. 400mm c/c with ceiling nails and other accessories supplied by manufacturer, prime ceilings with plaster primer and 2 finishing coats of PVA fire resistant paint as per the manufacturer's instructions. Finishing strips/cornices 76mm coved cornice should be fixed to ceiling boards (and not to walls),

The ceiling must perform adequately in terms of fire propagation properties according to the SANS 428 protocol, using the test specifications as contained in SANS 10177-10:2007 SOUTH AFRICAN NATIONAL STANDARD. Fire testing of materials, components and elements used in buildings. Part 10: Surface burning characteristics of building materials using the inverted channel tunnel test.

Paint color – crisp white

All electrical rewiring is to be done before installation of ceiling board.

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Roof sealing

In existing IBR roof sheeting prepare, remove dust and repair any defect that causes leaks to existing roof and timber/metal rafters. The houses with Asbestos Roofing will require Total roof replacement.

All metal roof sheeting is required to be the "IBR" type profile. The sheets are laid down, fastened and sealed in strict accordance with the manufacturer's specifications. Finish colour of sheeting is to match existing on site.

A competent person is to spray paint polyurethane foam on the inside of the roof according to specialist's directions/manufacturer's instructions. This is to be 20-30mm thick and as per requirements for the application of the SPF Foam.

Draught proofing

The *Contractor* provides permanent ventilation in all rooms where permanent ventilation is required in accordance with SANS 1539. The *Contractor* uses a heater heat input of at least 4.5 kW when determining the need for permanent ventilation and assumes that the heater can be used in the same room as the hybrid stove.

Windows - window frames to be clean, dry and sound, internally and externally, acrylic sealant to be applied using caulking gun at the meeting sections of frame and wall, surface of joint to be smoothed by spatula, this installation is to be done according to manufacturer's instructions.

Colour of sealant - white

Doors- 10x10mm flexible sealant to be stuck on the door frame using self-adhesive tape, this is to be applied in accordance with manufacturer's instructions.

Colour of tape – black

Painting

In kitchen, living area, bathroom and bedrooms walls are to be cleaned free of dust and defects, apply water based bonding liquid and add a coat of PVA paint according to manufacturer's instructions.

Paint finish – Sheen

Paint colour – beige

2.6 ELECTRICAL WIRING

2.6.1 Scope of Work

The Scope of work includes design, supply, install, commission and provide a certificated of compliance of a specific building in compliance with the requirements of SANS 10142-1, SANS 10400XA and SANS 204.

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General

The *Contractor* remains liable to hand over a complete and functioning electrical installation system for a specific building as per the requirements of SANS 10142-1.

The *Contractor* submits equipment data sheet for any equipment to the *Employer* for acceptance before installation. It is the *Contractor's* responsibility to confirm that equipment provided for the installation is accepted by the *Employer* prior to construction or installation.

The *Contractor* provides all tools, equipment and personnel required to execute and implement the Scope of Works.

The *Contractor* remains liable for all works conducted as per the requirements of the Scope of Works.

The *Contractor* submits a fully detailed Method Statement and Quality Control Plan (QCP) to the *Employer* in two weeks' time prior commencing of work, for review and acceptance.

The *Contractor* provides and submits the detail design report and drawings to the *Employer* for review and acceptance, hard copy formats. The hard copy drawings need to be A3 size and in Eskom template. The accepted drawings will be use as "Construction Copy" and can be revised, if need be, using alphabets as revision number.

The *Contractor* submits the installation layouts and drawings as part of a handover to the *Employer* for his record keeping, in hard copy formats. Three A3 hard copies drawings need to have an "As Build" stamp and signed by a competent ECSA registered engineer or technologist. All hand over drawings need to be revision one (Rev 1).

Any discrepancy or ambiguity between the *Employer's* Scope of Works is immediately brought to the attention of the *Employer* for clarification.

The *Contractor* submits Certificate of Compliance (CoC) after commissioning the installation in compliance with the SANS 10142-1.

Distribution Board

The *Contractor* designs, provides, installs, tests and commissions sufficient distribution board for a specific installation in accordance with the accepted detail design drawing and in compliance with the requirements of SANS 10142-1.

A distribution board need to be functioning and acceptable, it is the *Contractor's* responsibility to conduct an inspection and test (QCP to be compiled, accepted and applied) before delivery on site, in the present of the *Employer's* technical and quality representatives.

Lighting Fittings

The *Contractor* determines, provides, installs, tests and commissions sufficient lighting for a specific installation in accordance with the accepted detail design drawing and in compliance with the requirements of SANS 10142-1, SANS 10400XA and SANS 204.

It is the *Contractor's* responsibility to conduct a lux level simulation and submit a report to the *Employer's* Electrical Engineer for acceptance before installation.

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Wiring

The *Contractor* determines, provides, installs, tests and terminates (both ends) a sufficient wiring cable for a specific installation in accordance with the accepted detail design drawing and in compliance with the requirements of SANS 10142-1.

Wiring shall be carried out in PVC conduit. All conduits shall be clear of moisture and debris before any wiring is commenced.

Socket Outlet

The *Contractor* determines, provides, installs, wires and tests a sufficient socket outlet for a specific installation in accordance with the accepted detail design drawing and in compliance with the requirements of SANS 10142-1.

Switch

The *Contractor* determines, provides, installs, wires and tests a sufficient switch for a specific installation in accordance with the accepted detail design drawing and in compliance with the requirements of SANS 10142-1.

Certificate of Compliance

The *Contractor's* competent person shall perform illumination measurements (as recommended in SANS 10114 -1) and submitted illumination measurement reports to the *Employer*. Measurements shall be performed once the installation has been completed.

On completion of the installation, The *Contractor* issued an Electrical Certificate of Compliance (CoC) to the *Employer* in terms of the Occupational Health and Safety Act, (OHS Act 85 of 1993).

2.7 LPG (LIQUID PETROLEUM GAS) HEATERS AND HYBRID STOVES WITH ASSOCIATED 9KG LPG CYLINDERS

2.7.1 General Requirements

Each gas appliance is provided with a dedicated pressure regulator and flexible hose.

The Contractor submit compliance certificates for the following:

- Roll-about heater compliance to SANS 1539;
- Hybrid stove compliance to SANS 1539
- Pressure regulator compliance to SANS 1237
- Flexible hose compliance to SANS 1156-2
- Gas cylinder compliance to SANS 10019
- Gas cylinder shut off valve to SANS 199
- Hybrid stove to VC 8055 from the National Regulator of Compulsory Specifications (NRCS)

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2.7.2 Roll-about heaters

Requirements:

- Comply to SANS 1539.
- Suitable for use with 9kg LPG cylinder.
- Heat input between 4 kW and 4.5 kW
- Three (3) Ceramic Panels
- Three (3) different heat settings.
- Fitted with built in manual ignition device.
- Fitted with bullnose and other accessories
- Flame failure protection mechanism during operation.
- Flame cut-out when the heater is tilted.
- Regulator complying to SANS 1237
- Flexible hose complying to SANS 1156-2.
- Dimensions
 - Total height (Ht) not exceeding 800 mm,
 - Width (W) not exceeding 500 mm,
 - Depth (D) not exceeding 450 mm.

2.7.3 Hybrid Stoves

Requirements:

- Comply to SANS 1539.
- Comply to VC 8055 from the National Regulator of Compulsory Specifications (NRCS)
- Suitable for use with standalone 9kg LPG cylinder.
- Fitted with 3 gas burners and one electrical plate with independent variable temperature control knobs for the gas burners and electrical plate.
- Integrated electrical oven with its variable control knobs (i.e. Grill and Bake functions)
- Storage/Utility compartment.
- Large standard dimension electrical plate, solid or spiral continuous top, with maximum output rating not exceeding 2 kW.
- Electrical functions compatible to the South African electrical network (50Hz and 230V).
- Plug-in cable compatible to South African electrical plugs.
- Electronic Burner Ignition
- Fitted with bullnose and other accessories
- The maximum operating temperature of the integrated oven does not exceed 250°C, with grill and bake functionalities as standard.

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- Purchase details for future reference written on the stove i.e. – Serial Number.
- Regulator complying to SANS 1237
- Flexible hose complying to SANS 1156-2.
- The stove with an integrated oven dimensions are as follows:
 - Total height (Ht) not exceeding 1200 mm,
 - Floor to cooking level height (Hfc) not exceeding 950 mm,
 - Width (W) not exceeding 500 mm and,
 - Depth (D) not exceeding 650 mm.
 - Electrical plate's diameter (d) to be large standard dimension
 - The LPG plates' diameter (d) to be a combination of large and small standard dimensions.
 - The integrated oven volume not smaller than 57 Litres.

2.7.4 9KG LPG CYLINDER

The Contractor supplies one 9 kg LPG cylinder for each stove and one 9 kg LPG cylinder ~~with~~ for each heater. The *Contractor* is responsible for the first fill of the cylinders

The LPG cylinders are accepted for exchangeable at a minimum of two local LPG retailers. The cylinder complies with SANS 10019. The *Contractor* provides written proof of exchangeability and the details for the local LPG retailers.

2.8 TRANSACTIONAL AND AFTER SERVICE SPECIFICATIONS

Eskom will require an unconditional product guarantee against latent defects inclusive to all parts (Gas and Electrical) for a period of 12 months.

Eskom will not accept any failure for the first year of operation. Should there be any failures within the first twelve (12) months of delivery; the Supplier is liable to replace all failures with new working products at their own costs.

The Supplier shall provide a written commitment to train 10 (ten) personnel, specified by Eskom. The trainers shall have relevant experience and be competent to provide the training.

As part of after-sale support, the Supplier shall provide technical support as follows for the entire warranty period of 12 months:

- Telephonic support within 24 hours after a reported fault/failure
- Based on the outcome of the telephonic support if call out support is required the Supplier needs to give on-site support within 48 hours from the reported fault.
- The Supplier shall indicate the lead time on all spares, with a maximum of 48 hours.
- If, within the first six months of the guarantee period, 20 % or more of any class of installed equipment fails, Eskom may, at their sole discretion, have the right to demand the replacement of all that class of component or materials for the entire set of unit installations at the cost of the Supplier.

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2.9 USER MANUALS (USER INSTRUCTIONS)

The following topics are covered in the user manuals:

- Safety Instruction,
- Installation Instruction,
- Operation Instruction,
- Maintenance,
- List of required spares/parts and
- Warranty.

Manuals to be submitted in both hardcopy and Electronic copy and written in English.

Manuals must be included in the tender submission.

2.10 DELIVERABLES/ SUBMISSIONS BY THE CONTRACTOR

The *Contractor* is responsible for the following deliverables. The *Contractor* is to note that all documents are submitted to the *Project Manager* for review and acceptance prior to implementation. This includes:

- a) Fire Test
- b) Data Base
- c) Product Technical Specification for stove and heater
- d) Installation/ Construction Quality Plan;
- e) Electrical Design Drawings
- f) Electrical COC
- g) Gas COC
- h) Asbestos Disposal Permit

Certification is done in accordance with SANS 10400.

All submitted drawings and documents including the concept and detailed design reports (as stated above) are to be signed by an ECSA professional-engineer. The Professional Engineer's ECSA registration number is stated on drawing/ document.

All deliverables are to be submitted in both hard and soft copy (USB/CD) formats. All documents are to be in searchable PDF.

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3. AUTHORISATION

Name	Designation
Thapelo Lesame	Engineer – Civil Engineering Lead
Jan Strydom	Engineer – Low Pressure Services Lead
Sakhy Mnguni	Engineer – Electrical Engineering Lead
Sibonelo Sibiya	Architect

4. REVISIONS

Date	Rev.	Compiler	Remarks
September 2022	1.0	T Lesame S Sibiya S Mnguni J Strydom	First Issue

5. DEVELOPMENT TEAM

The following people were involved in the development of this document:

- Thapelo Lesame
- Sibonelo Sibiya
- Sakhy Mnguni
- Jan Strydom

6. ACKNOWLEDGEMENTS

- Collen Chauke
- Ronald Mandavha

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