mineral resources & energy

Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

THE HANDBOOK

OF

IMPLEMENTATION GUIDELINES FOR THE INTEGRATED NATIONAL ELECTRIFICATION PROGRAMME (INEP).

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i. ABBREVIATIONS

Abbreviations	Description
CRU's	Communal Rental Units
DHS	Department of Human Settlements
DMRE	Department of Mineral Resources and Energy
DoRA	Division of Revenue Act
FBE	Free Basic Electricity
INEP	Integrated National Electrification Programme
LOA	Letter of Authority
MFMA	Municipal Finance Management Act
MoU	Memorandum of Understanding
NEAC	National Electrification Advisory Committee
NERSA	National Energy Regulator of South Africa
NRCS	National Regulator Compulsory Specification
PFMA	Public Finance Management Act
RCC	Regulatory Compliance Certificate
SABS	South African Bureau of Standards
SANS	South African National Standards

ii. INTRODUCTION

This handbook provides guidance on the implementation of the Integrated National Electrification Programme (INEP) as administered by the Department of Mineral Resources and Energy (DMRE).

INEP implementation guidelines are reviewed, updated, and approved on an annual basis through a consultative process, which includes the National Electrification Advisory Committee (NEAC). Over time, certain elements of the operational environment change and warrant changes by the INEP service delivery fraternity. The implementation guidelines should be aligned with current industry standards and national development priorities.

iii. BACKGROUND

In line with the Energy White Paper and the Electricity Pricing Policy (EPP), cognizance is taken of the fact that many people in South Africa are living below the poverty line and have limited ability to pay for goods and services. This fact guides the application of subsidies to lower the barriers of entry and reduce the price to low usage customers.

Without adequate and stable electricity infrastructure, South Africa would not be able to support its national targets, inspire investor confidence, or meet customer expectations. The Government must expand access to basic services for all citizens through building new assets or extending them, while local licensed utilities also have to maintain, rehabilitate or replace existing infrastructure assets to protect their value over time.

The Department of Mineral Resources and Energy (DMRE) has the mandate to ensure universal access to energy for households. Some of the challenges to achieving universal access include insufficient

programme funding; the building of new bulk electrification infrastructure in urban and rural areas; and inadequate refurbishment and rehabilitation of electricity infrastructure.

The National Energy Regulator of South Africa (NERSA) requires that all licensed electricity distributors monitor and maintain their networks to ensure the provision of good quality electricity supply.

The electrification programme has a goal of reaching universal access to energy by the year 2025. The rate of electrification needs to be accelerated to catch up with the rate of housing growth if universal access to energy is to be reached.

While a lot has been achieved over the past two decades since the inception of the programme, the rate of electrification over the recent years has slowed down due to the bulk infrastructure costs as a result of little or no available capacity in most substations and high/medium voltage lines.

The mass electrification through INEP has brought power to the rural areas, which means increased demand for electricity and overburdened electricity infrastructure.

The DMRE had previously only funded electrification connections, which led to the electrical infrastructure being overloaded. The DMRE has subsequently undertaken to fund bulk infrastructure for electrification purposes.

The DMRE has the mandate to ensure the provision of secure, sustainable, and affordable energy for socio-economic development.

These implementation guidelines outline the process and criteria for funding of bulk infrastructure projects, for new infrastructure as well as the refurbishment and upgrading of existing infrastructure.

The drive to make electricity accessible to all the people of South Africa includes the electrification of households occupied by farm dwellers on private farms. To show commitment to universal access for electrification, Government contributes considerably towards the cost of connection which are reported as part of Government's electrification achievements. Either the farm owner or the local licensed entity initiates the electrification of the farm dweller houses at the request of the farm workers. In addition to electrification, Government provides Free Basic Electricity (FBE) to indigent households. FBE covers indigent households connected to grid and non-grid energy.

The Department has a responsibility to co-ordinate the electrification programme including;

- Developing implementation guidelines and procedures,
- planning,
- setting of realistic targets,
- sourcing funding,
- determining criteria for allocation,
- allocation of funds,
- concluding agreements / Memorandums of Understanding (MOUs) with implementing agencies,
- monitoring and evaluation,
- reporting and auditing

This document will highlight issues related to capital expenditure; the suite of supply options; connection fees; the subsidies; options for an upgrade or down-grade; and the technical motivation for supplies that are currently limited. The INEP funding must be used only for the purpose for which it is allocated in order to provide access to electricity. Distributors (municipalities and Eskom) desiring to be funded by the DMRE through the INEP grant for the provision of basic access to electricity should follow these guidelines. The funding is not applicable to private distributors.

Although remarkable progress has been made in electrifying the country, the backlog of electrification, including the growth of homes due to informal settlements and the ongoing government housing development programme, means that there is still work to be done.

Furthermore, the need for integrated planning, coordination and collaboration between DMRE and (DHS) is acknowledged. The DMRE has partnered with the DHS to electrify houses once they are built, all in support for "providing homes, instead of houses" for the people. To fast-track housing delivery, the DHS has developed programmes such as the Integrated Residential Development Programme which proposes and advocates for mixed developments when housing people.

DHS, in its plight to provide homes, is also responsible for ensuring that each home handed over to the beneficiaries by government have all the basic services, including electricity. This in turn requires DHS to appoint service providers that will be executing the electrical Internal-Wiring of all homes built by DHS. However, there is a lack of capacity within DHS to monitor the electrical installation projects funded through its processes. This has led to homes with electrical installations not conforming to approved norms and standards being handed over to beneficiaries. Over the past few years, several homes that were already handed over to

beneficiaries have burnt thus placing the lives of the beneficiaries at risks. Evidence from the investigations on the above-mentioned cases have all suggested that the causes of fire in these homes were due to the wiring of the houses not conforming to approved norms and standards as outlined in the SANS 10142-1.

These implementation guidelines are applicable to all mixed housing development projects, including fully subsidized houses which are built by developers and wiring of the 40 and 45 square meter homes built by DHS in Municipal and Eskom areas of supply.

There has been a high increase in urban population due to the migration of people from rural areas to urban areas. The actual informal settlements electrification backlog in South Africa is hard to determine.

Informal settlements are increasing at an alarming rate and the limited budget/funds cannot cater for the growth and demand. Although they are generally considered 'temporary', informal settlements tend to be there for many years, some for up to 30 years. Living conditions in informal settlements are often poor. These informal, low income and often illegal settlement areas are normally not covered by infrastructure planning of Government and Service Providers.

According to the Constitution of the Country, every citizen has a right to basic services, and this includes electricity, and this is regardless of location. It is the responsibility of Government to ensure that people living in informal settlements are also provided with basic services as they form part of the country's society. This means municipalities, as an extension of Government, have a responsibility to ensure electrification of all citizens within their respective jurisdiction. However,

this does not mean that electricity must be provided in areas that would pose danger to the people of this country. In areas where it would not be safe to provide electricity, the best possible option would be to relocate the community and then provide electricity services.

The INEP focused only on electrifying formal housing in rural and urban areas. However, due to the growing trend in the increasing informal settlements and the Constitutional right of all citizens to basic services, the Department is obligated to provide energy solutions to informal settlements as well.

The most suitable method of electricity provision depends on a combination of the geographical context, the consumer needs, and the possibilities that are available and affordable to provide the energy requirements.

The low load demand, the dispersed nature of rural settlements, and the high fixed costs of grid extensions makes it nearly impossible for grid to reach most areas immediately.

Furthermore, the call to reduce carbon emissions makes off grid electrification more attractive where there are more environmental friendly non grid options available. Off grid electrification will also assist in reducing environmental issues such as pollution, health and safety issues associated with the use of paraffin, candles and wood which are common in un-electrified rural households.

The non-grid Solar Home Systems (SHS) has been identified as a suitable temporary alternative to grid electricity. The SHS offers both a technologically and viable alternative, providing basic electricity for essential services such as quality lighting and access to electronic

media to the rural consumer, where grid cannot be provided within reasonable cost norms.

The integration of the available electrification technologies and electricity supply options on the basis of the most economical application will allow the provision of basic energy services to a larger portion of the population in the shortest possible time within the constraints of available funding.

iv. PURPOSE OF THE IMPLEMENTATION GUIDELINES

The purpose of these guidelines is to outline standards, processes, procedures, forms, and templates to facilitate compliance. These guidelines should be read together with other applicable government laws such as PFMA, DoRA, MFMA etc. The chapters of this handbook should not be read in isolation but should be read together in order to get a holistic view of the guidelines.

The following chapters are covered in the handbook:
Suite of supply, Informal settlements, Farm-dwellers, Backyard-dwellers, Bulk infrastructure, Mixed Development, and Developer projects, Non-grid and internal wiring for houses built by the DHS.

1 SUITE OF SUPPLY

1.1 SCOPE

The suite of supply implementation guidelines are applicable to all licensed entities implementing the INEP on behalf of the DMRE.

Supply to residential customers must meet the customers' basic essential electricity needs. This should be done at the lowest possible cost using appropriate technologies, supply sizes, and customer service options considering the full life cycle cost of the project.

For electrification to achieve the maximum number of connections based on available capital resources, there should be a mixture of differentiated supply capacities, based on customer needs and affordability within the area.

In order to make the costs per connection cheaper, a high number of connections need to be made in one area where practically possible.

1.2 PROJECT CATEGORIES

- Bulk Infrastructure (substations and lines)
- Households connections (Rural, urban, and extensions) (Fully subsidized low cost, Communal Rental Units)
- Infills / post connections
- Informal settlements
- Farm dweller houses
- Communal Property Associations (CPA's)
- Transit Facilities
- Backyard dwelling

Electrification customers exclude the following:

- Street lighting
- Commercial use of electricity typically requiring 3 phase supply
- Commercial farming

1.2.1 ELECTRIFICATION OF INFILLS / POST-CONNECTIONS

Infills refers to the houses that qualify to be electrified through INEP, but were not electrified during the electrification of the respective area due to various reasons such as the house not yet existing during electrification (house built on a stand that was not occupied during electrification) or the house not being occupied during electrification.

The Department requires clear identification of an infills project in order to account for the connections. Further, all applications for funding for infills should be accompanied by a beneficiary list with valid Identity Numbers (ID Nos), customer full names and surname, and customer locations (in a form of a physical address and/ GPS co-ordinates). The applications should clearly state the type of an infill applied for (Type 1, Type 2, or Type 3) and should also indicate to the DMRE if the project areas are either brown or green fields.

Any applications received by the DMRE without the required information may not be processed until all required information have been submitted.

1.2.2 ELECTRIFICATION OF BACKYARD DWELLINGS

In line with the Energy White Paper, Government supports the electrification of backyard dweller houses. The Government will contribute towards the cost of connection, and these connections will be treated as part of the Government's electrification targets.

The entities are allowed to approach the DMRE for the funding of backyard dweller houses. In electrified areas, any application submitted to the DMRE should be accompanied by detailed plans that highlight to the DMRE parts of the networks that will be upgraded in order to accommodate the extra load that will be placed on the network by connecting the backyard dwellers in the designated project areas. The DMRE will part-fund the costs associated with the upgrades based on the percentage increase of the total load/demand that will be placed by connecting the backyard dwellers in that particular project area. The funding for backyard dwellers will be limited to two (2) backyard dwellers per stand (excluding the main house) and will be supplied at a 20A connection.

The DMRE will also fund backyard dwellers in a newly electrified area at 20A. Entities are encouraged to design the electricity network to cater for the main house at 60A and the two backyard dweller houses at 20A. However, the DMRE will fund all three (3) connections at 20A in an area that was never electrified before. The DMRE will cover the costs of funding a newly electrified area through the INEP Grant.

1.2.3 ELECTRIFICATION OF HIGH-RISE BUILDING STRUCTURES

The DMRE acknowledges the new trend in the country wherein land has become very scarce, mainly around major cities, instead of building low cost houses/RDP on separate stands/erven, municipalities are opting to build these low cost homes through high-rise building structures because of the scarcity of land/ limited land available in major cities. The population density in these high rise buildings is often very high.

Subsidies for high-rise building structures are considered as part of INEP programme.

1.3 SUITE OF SUPPLY OPTIONS

Optimal pricing for electrification customers plays the most important role in linking affordability, customer needs and effective management of scarce capital resources. Where customers are subsidized, the pricing signal should encourage appropriate supply choices.

The rationale behind the suite of supply options:

- Reasonably assess and approve required network capacity to optimize investments in electrification capital infrastructure through the building of appropriate networks based on customer needs.
- The planning should be based on reasonable expectation of customer growth and final design for a minimum of 15 year period
- The need for government to meet the goal of universal access when providing basic electricity services within acceptable cost parameters.

In support of the above, a maximum limit on the capital expenditure will be set per type of supply to ensure that the defined economic viability criterion, subject to the stated subsidies, is met. Where customers require more than the minimum supply size, the additional costs will be charged to them.

Table 1: Grid Current Supplies

Supply	**Typical appliances**
20A	Radio + lights + television + fridge and one of the following at any one time: (iron + double hotplate) or (kettle + single bar heater) or (iron + two bar heater) or small geyser.

The 20 Amp limited supply is considered to be the basic service for the poorest sector where grid extension is feasible. Its availability allows settlements of sufficient density to be electrified by maximizing the number of connections, thereby bringing the average cost per connection within accepted norms.

Table 2 below outlines a supply size with typical appliances that can be used with the non-grid supply.

Table 2: Non-grid Current Supplies

Supply	**Typical appliances**
100Wp	Indoor lighting comprising of 6 x lights for 4 hrs./day Outdoor lighting of 2 x external lights for 12 hrs./day Energy for 1 x DC colour TV for 5hrs/day 2 x DC socket outlets providing energy for cell-phone charging (4hrs/day), audio-visual appliances and TV, or other small appliances (radio for 4hrs/day).

1.4 CONNECTION FEES AND TARIFFS

Table 3: Guiding principles for the different supply sizes

Size	Principles applied
20A	Nil connection fee is applied based on affordability thus catering for the target market, which is the poor. As the entry-level tariff, this tariff option will address the current backlog in response to Universal Access and quickly assist blanket connections without the delay of collecting connection fees.
40A	Affordability is considered to be less of an issue. The connection fee or contribution to be paid by the customer to the capital costs covers a portion of the difference between the total cost of providing electricity and the subsidy provided
60A	Affordability is not an issue. This supply size needs the biggest pricing signal due to potential impact on the network. Therefore the connection fee must cover the cost of full service connection but excluding the cost of infrastructure as it would have been provided for by the Department

1.4.1 SUPPLY OPTIONS, CONNECTION FEES

Table 4 below outlines the connection fees and the tariff rate per supply option for electrification.

Table 4: Connection fees

Supply type	Connection fee: (ZAR incl. VAT)	Tariff rate (ZAR incl. VAT)
NON GRID		
Non-grid 100Wp (intention is to have the majority of the CAPEX subsidized)	NIL	Monthly fixed service fee as based on the Business Plan of the approved service provider.

Non-grid higher service capacity	NIL	Monthly fixed service fee as based on the Business Plan of the approved service provider

GRID (lower level)		
Grid 1φ system 20A (typical consumption 60kWh - 120kWh)	Nil	kWh Tariffs as approved by NERSA

No customer will be forced to take a specific supply option as customers will always be given a choice. This, however, will be limited to what the local licensed entity or utility provides. Once a choice has been made, it can be upgraded on application and payment of the relevant connection fee must be made. Where grid supply is not possible, non-grid supply options will be offered.

1.4.2 DESIGNS

Cost has been an issue in implementing the programme due to designs that are not standard. A Universal design standard approach must be adopted, and the following must be taken into consideration:

- Road reserves to accommodate all services (Medium Voltage reticulation lines/cables, Low Voltage and service connection cables/lines, clean water reticulation, sewage pipelines and storm water drainage) – Human Settlements to take serious consideration of these as they impact on the electrification cost per connection.

- Stands that have rental stock (formalized backyard dwellers), should not be accommodated in the designs for electrification and the relevant service authority should address the

challenge through their Electricity By-Laws, as these are also impacting on the electrification cost resulting in a very high cost per connection.

- Pole mounted boxes housing meters should also be of a protective structure nature to curb electricity theft.
- Electricity Split-Prepaid meters must be adopted and implemented as a measure to deal with meter tampering (by-passing), leading to revenue loss.
- Where distribution boards are supplied due to houses being internally wired (by Human Settlements) a CoC must be made available. There is no need to install ready boards where distribution boards are already supplied, and the DMRE will not cover the costs thereof.
- 7m, and 9m poles suspending the LVABC (low voltage aerial bundled conductor) in built-up areas (formalized townships/suburbs), should be used to avoid easy access to pole mounted meter boxes.

1.4.3 FIRM AND PREMIUM SUPPLY

The electrification programme of DMRE does not allow for firm supply in that only one transformer unit per substation is allowed and will be approved. This applies to high voltage lines as well (132, 88, 66, 44, 33kV). N.B. Recommendations

- Electrification in rural formations will continue as per the current practice.
- Medium voltage dual systems to be considered strictly in rural setups where villages to be electrified cannot develop further

(informed by spatial development framework). Where rivers, forests, and mountains gorges/cliffs are a hindrance to electrification, single and dual-phase systems must be employed. However, the backbone network should be 3 phases.

1.5 SUBSIDIES

INEP subsidizes a portion of the capital costs (bulk infrastructure) for the connections to be used towards meeting the electrification targets. This has been done in an attempt to support municipalities in the light of funding constraints that Municipalities face.

A level of service of 1.2kVA to 2.4kVA ADMD, 20A connection, should be provided in each household. No connection fee will be charged to the customers, as this is a minimum level of service.

Table 5 below outlines the respective approved subsidy levels for the 2022/23 financial year. These subsidies shall be reviewed annually.

Table 5: Subsidy levels for 2022/23

Category of connection	**2021/22 subsidy levels**	**Subsidy levels for 2022/23**
Rural Connection	R18,000.00	R20,000.00
Urban Connection	R17,000.00	R18,500.00
Extensions	R13,000.00	R14,000.00
Infill/Post Connection	R7,700.00	R8,000.00
High rise/ walk-up connections	R3.500	R8,000.00

NB: The table above will be reviewed annually based on Consumer Price Index

Where the cost per connection is higher than the approved subsidy, Municipalities are expected to fund the difference for those connections. Licensed municipalities should provide a full design report justifying the high cost per connection where designs are beyond the acceptable scope.

2. BULK INFRASTRUCTURE PROJECTS

2.1 SCOPE OF APPLICATION

These implementation guidelines are applicable to all licensed electricity distributors providing bulk infrastructure as part of the electrification programme of DMRE.

2.2 BULK INFRASTRUCTURE

In this document, bulk infrastructure refers to the backbone electrical infrastructure required to fulfil the Department's mandate of reaching universal access to energy. Bulk infrastructure includes distribution substations and distribution lines ranging between 1kV - 132kV.

Whilst the INEP programme has been very successful in increasing access to electricity, not enough attention has been given to improving the state of the distribution assets and their ability to guarantee reliable service in the future. The distribution industry is in a dilapidated state, posing a very real threat to the security of electricity supply to the end-user.

2.2.1 NEW BULK INFRASTRUCTURE

Bulk infrastructure is required to electrify an area that has never had grid electricity or to create new capacity to facilitate the connection of more households. This bulk infrastructure includes substations and/or distribution lines.

2.2.2 REFURBISHMENT

Assets continue to deteriorate and are perceived as unable to cope with the electricity demand.

Many of the assets are older than 40 years, with at least 50% requiring immediate attention and major refurbishment/replacement.

The need for refurbishment of infrastructure varies and depends on the initial quality of infrastructure that was installed. A balance must be struck between constructing new bulk infrastructure and refurbishing existing infrastructure to avoid adversely impacting the INEP programme.

Refurbishment of bulk infrastructure will be funded through INEP, only if it will support new electrification projects.

2.2.3 UPGRADING OF BULK INFRASTRUCTURE

To ensure sustainability and quality of supply, it is crucial that the existing electricity infrastructure be upgraded and strengthened when necessary.

The rapid rate of urbanization is increasing the overloading of the networks. An increased number of households that need to be connected require bulk infrastructure upgrade if the current network is not be able to cater for the increased number of connections.

Bulk infrastructure upgrading will be funded through INEP, only if it will support over 70% of new electrification load (projects). In cases where upgrading of existing network is required, funding will be shared on a pro-rata basis where new customers are less than 70%.

2.3 CRITERIA FOR FUNDING

The bulk electricity infrastructure projects must meet the following criteria to qualify for INEP funding:

Bulk infrastructure projects will be prioritized for funding provided they:-

- Will result in the reduction of the national electrification backlog, or;
- Are aligned with the DHS's plans for integrating fully subsidized houses, and Communal Rental Units (CRUs);
- Are proven to be critical by the municipality for unblocking housing delivery programmes which are stranded due to the lack of bulk electricity infrastructure; and
- Feeder line to the boundary of the electrification area should be classified as a bulk line irrespective of the distance.

The bulk infrastructure project must support the electrification projects that are in the municipality's Integrated Development Plan/Provincial Annual Plan before it can be approved.

The following considerations will form a major role in deciding the allocation of funding to licensed distributors:

- Past performance;
- Licensed authority support and capacity;
- Network capacity availability; and
- Viability and cost-effectiveness.

2.4 SUBSIDY LEVELS

- The Department will fund all qualifying and approved bulk infrastructure projects.
- The funds shall be administered by the DMRE as prescribed by the existing national legislative framework (such as the PFMA and DoRA).
- Bulk infrastructure projects will be proportionally funded to qualifying categories as outlined in the mixed development implementation guidelines and will be funded fully where new low-cost electrification projects will account for 70% percent of the capacity.
- Only non-firm substations will be funded.
- Ring feed networks will not be catered for distribution lines.

3. FARM-DWELLER HOUSES

3.1 SCOPE OF APPLICATION

In line with the Energy White Paper, Government supports the electrification of farm dwellers (including farmworker houses). The Government will contribute towards the cost of connection, and these connections will be treated as part of the Government's electrification targets.

DMRE is in the process of eliminating the indirect supply method that is currently used to supply farmworker houses. DMRE, through a licensed distributor, will provide a new point of supply that is dedicated to supplying the farmworker houses. The residence/occupants will automatically become the customers of the licence holder. This is because this method (indirect supply) is in contravention of Section 7 (1) of the Electricity Regulation Act of 2006, which states that:

"No person may, without the license issued by the Energy Regulator in accordance with this Act-

(a) Operate any generation, transmission, or distribution facility;
(b) Import or export any electricity; or
(c) Be involved in trading."

Therefore, the farm owners cannot distribute or sell electricity to anyone that occupies the farmworker houses. The farm owners do not adhere to the approved tariffs by the Energy Regulator, and it is also a challenge to hold them to these set tariffs as they do not hold a distribution licence, and the requirements of these licenses do not apply to them.

The Government subsidy will be channelled through the licensed electricity supplier in the area. The farmworker houses' electrification will be limited to the maximum payable subsidy for rural electrification or the actual costs incurred if it is lower than the applicable subsidy for the year of supply.

However, the farm owner has rights to the running of his/her farm. Furthermore, farm dwellers live on privately owned land and this means that the farm owner cannot be forced to have the farmworker houses electrified. However, in the interest of the farm dwellers, the supply authority must obtain permission, in writing, from the farm owner for the electrification of farm dweller houses in his/her farm/land.

In cases where the DMRE is assisting a licensed entity to take-over the electricity supply that belonged to a private individual/entity that is not licensed, the DMRE will cover costs associated with the distribution network, including the actual physical connection of a 20A (meter and a ready board) to a residence. The following will not be covered:

- Any internal wiring beyond the meter;
- Electrical appliances; and
- A distribution box

The farm houses that are within the farm also qualifiy to be funded through the INEP Grant. DMRE advises all implementing agencies to provide a connection (point of supply) to all kitchens within one homestead. Each point of supply will be countered as a connection. The providence of a point of supply for each kitchen will ensure that illegal connections are avoided after the contractor have concluded electrification, and the cost per connection in the designated project area will be drastically reduced while at the same time achieving more connections.

3.4 NON-GRID SUPPLY

This type of supply allows for electrification of farm dweller houses where the farm does not have electricity at all and grid connections are not cost effective or feasible. The Solar Home System offers a technologically and economically viable alternative to provide basic electricity for essential services such as lighting and electronic media where grid connections cannot be done within acceptable cost norms.

The non-grid method will be subsidized at a maximum equal to the non-grid subsidy applicable in that particular year of supply.

Non-grid installations for farm dweller houses will form part of the annual electrification planning process.

Licensed electricity distributors can approach farmers with information on the subsidy from Government.

Government retains the right to inspect the systems from time to time.

Non-Grid electrification of farm dweller houses must be aligned to Non-Grid Implementation guidelines.

3.5 THE SUBSIDY

To facilitate the process of electrification, Government provides subsidies. Currently, the subsidy for electrification of farm dwellings is linked to the subsidy provided for electrification in rural areas. The subsidy is based on the cost of the lowest supply size stated in the suite` of supply options and a network built in accordance with relevant industry standards. This amount will be determined on an annual basis.

The subsidy will not be given for the electrification of holiday cottages, dairies, sheds, and water pumps.

The Department will use an approved service provider within the panel of service providers appointed to install the Solar Home Systems in the designated farmer dweller houses. The service charge to be paid by farm dwellers will be in line with the service charge determined by the municipality providing services in that jurisdiction.

3.6 CLAIMING THE SUBSIDY

This section only applies to the farm dweller installations that were executed before the approval of the current Guidelines on Farm Dwellers.

For all installations that were done using the indirect method of supply prior to the approval of this guideline, the claiming of the subsidy will be done in accordance with the previous guidelines.

4. MIXED DEVELOPMENTS AND DEVELOPER PROJECTS

4.1 RATIONALE

Mixed developments refer to a development where an area is developed to build fully subsidized houses, social housing (CRUs), and partially and fully bonded houses. These types of developments are done by developers in partnership with Government.

A Mixed development project should be necessitated by the fact that all housing categories are to be supported by a common Bulk Infrastructure i.e. municipality is avoiding building two separate bulk projects where it is more economical to build a common bulk infrastructure that can be shared by all beneficiaries.

A developer is a person or entity who undertakes the required activities in developing a particular area for settlement purposes and this could include the rezoning of land to meet all the requirements of township establishment.

The minimum level of service that is provided in electrification has to keep up with the current trends and meet the needs of the people.
All electrification connections made through developer projects and funded through INEP will be counted as INEP achieved connections.

4.2 CRITERIA FOR ALLOCATION

The following criteria should be met for any developer project to be considered:

- The proposed project must form part of the municipal Integrated Development Plan (IDP) and or Provincial Government Plans;
- Fully subsidized houses have to form part/portion of the development for the DMRE to consider electrification funding on a pro-rata basis;
- The area being developed must be a formalized township/suburb with surveyor general approved plan;
- The developer must enter into a service agreement with the DHS (National/Provincial) and or the local municipality;
- A municipality must apply for the funding of the developer project as per the INEP application process and funding thereof will be allocated pro-rata based on the requirements of the fully subsidized houses;
- The DMRE will evaluate the project application and once the department is satisfied that all the minimum funding requirements are met, funding will be made available to the municipality/Eskom through the memorandum of agreement.;
- The developer will be paid by the respective licensed entity once the connections have been done and energized and the customer has been registered on the billing system of the responsible license distributor;
- The licensed authority must provide proof to DMRE that they have adequate electrical network capacity to supply the development; and
- The licensed entity must apply to NERSA for the inclusion of the said area in schedule 1 of their distribution license. Design package and scoping reports to be submitted to the DMRE before execution.

4.3 ALLOCATION/DISBURSEMENT OF FUNDS

The project will be budgeted for, and funds will be released to the developer by the licensed entity on the following conditions;

- Conditions set under section 4.2 above are met;
- Once the bulk infrastructure scope of work that is agreed upon for specified period is done and audited (funds towards the bulk infrastructure will be in line with the percentage that the Department would have approved prior the project started); and
- Once the connections have been completed, energized and the customer has been registered on the billing system of the responsible licensed distributor.

4.4 SUBSIDY

The houses that qualify for the electrification subsidy are as follows:

Type of housing	**Definition**	**INEP Status**
Fully subsidized houses (including high rise structures /walk-ups)	Government fully funded houses for the poor. (Income: R0 – R3,5k)	Subsidized
Communal Rental Units (CRUs)	Community rental units (hostels) (Income < R3, 5k)	Subsidized
Rental Housing (including high rise structures /walk-ups)	Social housing (Income: R 3,5k – R7,5k) Family units (3 – 5 floors)	Not Subsidized
Partially bonded house(GAP) or FLISP	Income > R15k	Not subsidized
Fully bonded house	Income > R20k	Not subsidized

4.4.1 THE RATE OF SUBSIDY FOR HOUSEHOLDS

Each energised connection will be subsidized at actual cost up to the maximum amount as approved in the suite of supply implementation guidelines as revised annually.

4.4.2 THE SUBSIDY FOR BULK INFRASTRUCTURE

The DMRE, Licensed entity, Developers and other role players will contribute proportionately towards the costs of building a distribution substation and distribution network required for a development where the subsidized units account for less than 70% of the installed capacity.
Where the subsidized units account for 70% or more of the installed capacity, the DMRE contributes fully towards the costs of bulk infrastructure.

The DMRE will not fund any electrification infrastructure more than once for an area that has already been funded, this includes any vandalised and/or stolen infrastructure.
Where there is a potential for future sharing of a substation in order to supply other customers, a prorated cost of the substation will be allocated to the licensed entity.

Bulk funding is dependent on the submission of a business plan. The business plan must indicate the potential beneficiaries (both immediate and future) of the infrastructure. An application for funding for bulk infrastructure by the developer should be submitted to the respective licensed entity.

4.5 LEVEL OF SERVICE

A level of service of 1.2 kVA to 2.4kVA ADMD, 20A should be provided in each household. No connection fee will be charged to the customers as this is a minimum level of service.

A hybrid system (a combination of underground and overhead) is recommended in such projects. The use of underground reticulation versus overhead reticulation will depend on various variables such as a road reserve, trenching requirements, and maintenance requirements, amongst other things.

Prepaid meters are to be installed in the fully subsidized houses.

The design of the network should be at 1.2 – 2.4 kVA ADMD. An increased level of service will be at the cost of the developer or the respective licensed entity.

A civil contractor should appoint an electrical contractor for the installation of the internal wiring. The electrical contractor appointed by a civil contractor should issue the certificate of compliance (CoC) for all electrical installations.

5. INFORMAL SETTLEMENTS

5.1 SCOPE OF APPLICATION

This document will discuss the rationale for electrifying informal settlements; the criteria for electrification; interim services; the design and construction standards.

The electrification of informal settlement areas is applicable to all electricity distribution licensed entities implementing INEP on behalf of DMRE.

5.2 RATIONALE

In this document, informal settlements are defined as residential areas that do not comply with local authority requirements for conventional/formal townships. They exist because urbanization has grown faster than the ability of Government to provide land, infrastructure, and homes.

The provision of energy solutions to the informal settlement areas should, preferably, be part of urban infrastructure development and not be treated as a stand-alone activity.

The DHS has a housing programme which also looks at eradicating informal settlements.

Informal settlements can either be upgraded or relocated. The housing plan supports the eradication of informal settlements through in-situ upgrading in desired locations, coupled with the relocation of households where development is not possible or desirable.

Plans for relocation are usually motivated on grounds of unsuitability of the occupied land for residential occupation. In support of in-situ upgrading, the housing programme also makes funds available for land rehabilitation. In certain cases, upgrading may be possible if extensive land rehabilitation is undertaken to make the land suitable for settlement.

Challenges or constraints with housing delivery include:

- Shortage of sufficient suitable and affordable land;
- Lack of suitable relocation destinations (for example, areas which are suitably located to job opportunities and social services such as schools and health care);
- Slow approval process with regards to planning and proclamation of land for development;
- Availability of finance & escalating building costs; and
- Constraints in terms of adequate existing bulk services.

The programme categorizes the informal settlements when planning to eradicate them. The categories are as follows:

5.2.1 CATEGORY A: IMMINENT FULL UPGRADE

Settlements for which housing subsidies and infrastructure funding are already approved, and which are already scheduled for full upgrading or relocation with a suitable destination already or imminently available.

5.2.2 CATEGORY B1: INTERIM BASIC SERVICES

Settlements that do not warrant immediate relocation but for which there is not yet any approved or imminent funding for full scale upgrading or relocation. These settlements require some form of interim servicing or

emergency relief. With these settlements, upgrading is possible in the medium to long term and often through a process of incremental upgrading. Or alternatively, a settlement may be difficult or impossible to fully upgrade due to difficult topography or very high densities.

5.2.3 CATEGORY B2: EMERGENCY BASIC SERVICES (EVENTUAL RELOCATION WHEN TIME AND RESOURCES PERMIT)

These are informal settlements where sites are not viable for long-term upgrading but there is no urgent need for relocation (e.g. material and immediate threat to safety through flooding, slope instability, toxic waste exposure, etc).

5.2.4 CATEGORY C: IMMINENT RELOCATION

Settlements where the residents are in immediate danger or at high risk, for example, due to regular flooding or toxic waste exposure or where land is urgently required for other purposes. Urgent action needs to be taken in order to enable rapid relocation, such as identification, acquisition, and planning of alternative land.

Relocation destinations available (either in situ upgrade of green-fields projects with unallocated sites OR site for emergency transit camp and emergency funding available from Province or DHS).

The electrification programme has a goal of reaching universal access to energy. This can only be achieved by ensuring that all residential areas (formal/informal) are included on INEP and have access to electricity.

Electrifying informal settlements will improve living conditions and reduce the number of accidents caused by illegal connections. Furthermore, the poor people in these settlements will benefit from the free basic electricity that they are entitled to.

There is a high rate of illegal connections in un-electrified informal settlements. These settlements overload the network and do not pay for the electricity consumed. Electrifying these areas will address this and also generate revenue for the licensed entity.

5.3 CRITERIA FOR ELECTRIFICATION

There are criteria that must be met before an informal settlement will be subsidized by the Department for electrification. The Municipality must check that the settlement area is not be encumbered by any of the following elements:

- Under high and medium voltage lines;
- road or rail reserve and other servitudes - subject to permission to the relevant entity;
- flood-prone area or flood plain;
- environmental issues;
- stormwater retention or detention pond;
- private land - subject to the permission of the land owner;
- unstable land; -subject to geo-technical studies; and
- in an area that poses any other health or safety hazard such as dump sites.

There must be a guarantee in writing with the signature of the Municipal Manager, supported by a Council resolution for the electrification of the settlement.

The municipality must confirm the following in writing to the Department:

- The area has not been identified for upgrading or redevelopment within three years or be relocated in the next 3 years;

- The municipality has consulted the Ward Councilors regarding the electrification of the settlement; and
- The municipality has gained the community's support and the community is willing to co-operate with the opening up of access roads where necessary and keep these access roads clear.

It is recommended that an integrated approach to the servicing of informal settlements, whereby all relevant service providers are consulted with a view to co-ordinate a range of services, is followed.

Municipalities should evaluate all their informal settlements to ensure appropriate response. In the light of limited funding, Municipalities need to prioritize their informal settlements considering the characteristics of the land and area, their housing plans, and municipal plans.

Municipalities need to prioritize informal settlements according to these categories when electrifying informal settlements. These categories will also be used to determine allocations for funding by the Department.

Table 1: Categories of informal settlements

Category	**Condition/Status**	**Response**
Category A:	On suitable land (complies with the set criteria and is likely to go through in situ upgrading)	Will be Subsidized for electrification.
Category B1:	Settlements that do not need immediate relocation and will therefore go through the process of regularization which is pre-formalization (putting basic services	Will be subsidized if the settlement will not be relocated in the next 3 years.

Category B2:	- Site NOT viable for long term upgrading; BUT, - No urgent need for relocation (e.g. material and immediate threat to safety through flooding, slope instability, toxic waste exposure, etc.	- Emergency basic services - Land identification
Category C:	On unsuitable land (do not comply with the set criteria, areas such as on dolomite land, in toxic areas, or in a dangerous area) and need relocation	Settlements that have been there for a reasonable amount of time will be considered on a case by case basis upon application to the DMRE.

It is important to note that where a subsidized connection has been given to a dwelling that is then replaced with permanent (or other) structure, the cost of the relocation will be at the cost of the respective local municipality.

Furthermore, in areas where the settlement will be relocated, the Department will only subsidize once to avoid wasteful expenditure (as prescribed in the PFMA). The municipality will have to fund the electrification of the relocation.

5.4 FUNDING

Government will make a contribution towards the cost of connection and these connections will be treated as part of Government's electrification targets.

Limited funding is available from DMRE for qualifying electrification projects through INEP. The amount allocated is determined by available funds and the allocation per connection is restricted to the cost of a

connection to national minimum design standards.

The DMRE will fund the electricity reticulation and service connections of qualifying informal settlements. The DMRE will only provide funding for the electrification of settlements in informal areas when the criteria (referred to under no. 6) for the electrification of such settlements are met and considering the 3 categories of informal settlements.

5.5 DESIGN AND CONSTRUCTION STANDARDS

The design of the reticulation network should comply with the recommendations of NRS 034 and system reliability with NRS 048 in order to meet the quality of service standards prescribed by NRS 047.

The minimum service connection capacity shall be in compliance with the suite of supply options and the option to be used shall be agreed upon upfront with the license entity.

In areas where the medium voltage network is overhead, a bare conductor overhead line extension of the network will be considered.

6. NON-GRID

6.1 SCOPE OF APPLICATION

These implementation guidelines are applicable to all licensed entities and service providers providing non-grid electrification to households on behalf of DMRE.

It is widely acknowledged that the grid electrification programme currently fails to recover the operational costs of supplying electricity to rural communities. Provision of grid electricity of households in rural areas is likely to be uneconomical and unsustainable in the long term.

The non-grid SHS has been identified as a suitable temporary alternative to grid electricity. The SHS offers both a technologically and viable alternative, providing basic electricity for essential services such as quality lighting and access to the electronic media to the rural consumer, where grid cannot be provided within reasonable cost norms.

The integration of the available electrification technologies and electricity supply options on the basis of the most economical application will provide the provision of basic energy services to a larger portion of the population in the shortest possible time within the constraints of available funding. It is regarded as the only viable way of bringing the goal of sustainable "universal access to electricity" within reach over the longer term.

6.2 THE NON-GRID ELECTRIFICATION PROGRAMME

Households in rural areas are typically sparsely settled, which makes the extension of grid networks to connect those areas economically unviable. The electrification programme would not be able to ensure grid

electrification of all remote rural areas in the short or medium-term, and therefore non-grid electrification was identified as an alternative.

The non-grid electrification programme is designed to temporarily give household's access to limited electricity until such time that grid connections are possible. The SHS is given to households as part of the non-grid electrification programme.

A solar home system is an environmentally friendly technology and it involves low operation and maintenance costs. The solar home system is designed to serve one individual household.

The basic solar home system to be used would comprise of the following:

- A photovoltaic (PV) panel (95Wp equates to approximately 475Wh/day);
- A charge controller;
- Wiring & outlets for small appliances;
- A battery (105Amp-hour);
- 2x external lights for 12 hours/day;
- 6x internal lights for 4 hours/day; and
- Solar lanterns.

Solar home systems must satisfy the specification NRS 052 photovoltaic systems for use in individual homes. Deviations from this specification may be accepted, provided such deviations are clearly explained, reasons for the deviations are given and support warranties are issued.

Experience from previous electrification projects in rural areas has shown that initially, customers use very little electricity. The main cause for low consumption is limited financial resources due to the poverty levels in the rural areas.

A solar home system can be used for the following: (i) a DC colour television for four hours; (ii) four hours of quality lighting using high-efficiency lights; (iii) a portable radio for ten hours; and (iv) charging of cell phones.

However, a solar home system cannot be used for thermal energy needs such as cooking, heating, ironing, and refrigeration. Other energy sources such as firewood, biomass, coal, paraffin, oil, and liquid petroleum gas have to be used.

6.3 THE CRITERIA FOR NON-GRID ELECTRIFICATION

Prior to providing non-grid electrification to certain areas, communities, or households, one of the following conditions must be met:

- An area where the electrical network is constrained and available plans will be realized in 3 year period;
- Non-grid systems should not be installed within 2km from a grid line;
- Consider future grid electrification plans. The area falls outside of the 3-year grid plan;
- The identified areas must be included in the Municipal IDP;
- Eskom or licensed distributor in that area must confirm areas or households that would not receive grid electricity in the foreseeable future;. or
- A cost-benefit analysis will also be considered to determine whether an area will be electrified via non-grid or not.

The cost of reticulation is extremely high in rural areas because there are no bulk infrastructure lines in most cases and the population density in deep rural areas makes grid electrification extremely uneconomical. The cost of supply must be compared against the lowest grid supply options available to more dense settlements.

6.4 NON-GRID ELECTRIFICATION PROGRAMME ROLLOUT

To fast track service delivery and meet the universal access target, the Department is rolling out the non-grid electrification programme to other areas that fall outside of the concession areas.

The benefit of the non-grid electrification programme rollout is two-fold. There is an energy poverty alleviation benefit and an energy efficiency benefit in cases where non-grid electrification is provided to supplement grid electricity in certain areas.

This rollout can be initiated and facilitated by Municipalities making applications for non-grid electrification in their respective areas to the Department. The Department will appoint service providers to provide non-grid to the areas that qualify.

6.4.1 THE APPLICATION PROCESS FOR MUNICIPALITIES

The application process is as follows:

- The respective Municipality must submit an application form to DMRE, requesting approval and support for providing non-grid in their area.
- Requests should be submitted to DMRE by 30 June of each year.
- Upon receiving the request, the Department will conduct site verifications to confirm that the intended area meets the non-grid criteria.

- Should the area meet the criteria, it will be included in the non-grid plan for the following financial year.

- DMRE will give a formal response to the Municipality, informing them of the outcome of their request by the end of March.

6.5 FUNDING

6.5.1 THE SUBSIDY

Subsidies are essential for increasing rural electrification access to the poor. However, subsidies should be temporary in nature and be evaluated on a regular basis.

The Department will subsidize 100% for the provision of non-grid solar home systems.

6.5.2 FREE BASIC ELECTRICITY

Every poor household is entitled to free basic electricity, which is subsidized on a monthly basis. In 2003, a free basic electricity (FBE) implementation guideline was introduced to support the low-income households as a key strategy for improving availability and access to energy services for the poor.

The implementation of FBE is the responsibility of the Municipality, making sure that poor households benefit from the subsidy. The provision of FBE is informed by the indigent implementation guideline of the respective Municipality.

Municipalities therefore need to pay the FBE, as set out on the FBE implementation guideline, for qualifying beneficiaries thus making sure that electricity is affordable and really benefits the poor.

6.6 CONTRACTUAL AGREEMENTS

6.6.1 CONTRACTS

The Department signs contractual agreement with each of the successful bidders to provide non-grid electrification to all participating provinces.

6.6.2 LEVEL OF SERVICE AGREEMENTS

To ensure clear understanding of what is expected from all parties, there should be an agreed upon level of service agreement between the following parties:

- Between DMRE and the service provider; and
- Between the service provider and the local municipality.

6.7 MAINTENANCE

Maintenance is a prerequisite for an effective, successful and sustainable non-grid electrification programme. The solar home systems need to be regularly maintained. Therefore, the maintenance requirements for the solar home systems should be clearly stipulated in the contract. However, maintenance requirements can be facilitated through service level agreement as stipulated in paragraph 9.2, i.e. between service providers and local municipalities.

6.8 COMMUNITY AWARENESS AND EDUCATION

There often are negative perceptions amongst potential end-users on the characteristics, durability and utility of these technologies, which need to be combated through the availability of maintenance services, focused, and sustained public education and marketing campaigns.

Energy is only useful when it is affordable and sustainable and when safe, easy-to-use, efficient appliances, consumer information, and technical advice are available from service providers.

There should be information sharing and sensitization of local communities.
Customers must be educated on how the system works and how to use it, what maintenance is needed, and what the installation and service costs are.

End-users/ customers must be trained on system operations and minor troubleshooting. This will increase the customers' confidence about the system, as they know what they are using.

7. INTERNAL WIRING FOR HOUSES BUILT BY THE DHS

7.1 SCOPE OF APPLICATION

These implementation guidelines are applicable to all housing development projects, incorporating fully subsidized houses which are built within the Municipal and Eskom areas of supply and are funded by DHS.

Must be read in conjunction with the compulsory standards listed under **Annexure 1**.

7.2 RATIONALE

The minimum level of service that is provided in electrification has to keep up with the current trends and meet the needs of the people.

All electrification connections made through DHS and funded through INEP will be counted as INEP achieved connections.

7.3 COMPLIANCE REQUIREMENTS OF THE MATERIAL

All material used in the internal wiring of the houses built should comply as follows, as the general requirements of both SANS 62208:2012

Edition.2 and IEC 62208:2011 Edition 2, SABS, Empty enclosures for low-voltage switchgear and control gear assemblies:

a. Non-flammable materials
b. Non rustable materials

c. All electrical equipment that are installed shall have the following certificates:
   i. SABS (South African Bureau of standards)
   ii. LOA (Letter of Authority)
   iii. RCC (Regulatory compliance certificate)
   iv. NRCS (National regulator compulsory specification)

7.4 PRODUCTS THAT COMPLY ACCORDING TO THE REQUIREMENTS OF THE MATERIAL

Products that comply according to the requirements mentioned above are as follows:

a. 13-way Distribution board made from DMC polyester material that is non-flammable, non-conductivity of electricity and non-rustable with 960 degrees Celsius glow wire test, with SABS certificate and NRCS.
b. Light gallery made from polycarbon that is non-flammable with a glow wire test of 960 degrees Celsius, with the following certificates:
   (i) SABS and;
   (ii) LOA both approved by NRCS
c. A new design of a Junction box 12-way type special made for suffix twin and earth, made from polycarbon that is non-flammable, non-conductivity of electricity and non-rustable with 960 degrees Celsius glow wire test, with the following certificate:
   (i) SABS and;
   (ii) RCC both approved by NRCS

7.5 COMPULSORY CABLE SPECIFICATION

The cable specification to be used for wiring is the one that was amended by standard writers from **SANS 1507-2:2018 Edition 1.3 and gazetted with the gazette number: 21759, SABS Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 2: Wiring cables**. The details of the cables are as listed below:

a. flat suffix twin and earth for the lights are as follows:
   i. 1.5mm/sq. = red, black + earth
   ii. 1.5mm/sq. = red, blue + earth
   iii. 1.5mm/sq. = blue, black + earth

b. Compulsory specification for flat suffix twin and earth 2.5mm/sq. is for plugs only.

c. Compulsory specification for flat suffix twin and earth 4mm/sq. is for stove only.

See attached **Annexure 2 for the SANS 1507-2: Core Colours** for the above-mentioned cables.

7.6 PROPOSED WIRING METHOD

The wiring method will be **the harness format as depicted in Annexures A1 and A2.**

7.7 SPECIFICATION TO BE USED FOR THE 40 AND 45 SQUARE METER RDP HOUSES

Description	***Quantities***
The Universal Distribution Board made out of DMC polyester material must have SABS certificate and NRCS. The breakers that will be in the board are as follows:	1
1x double pole isolator 63A as a main, 1x63A EL, 1x32A or 40A for stove, 2x20A for plugs, 1x10A for lights	
Socket outlet single type 4x4	5
Ball fitting with poly-carbon gallery. The gallery must have SABS certificate and LOA approved by NRCS.	5
Single lever switches	3
Two lever switches	2
Bulkhead fitting outside light	2
Stove isolator	1
Ext Box 4x4	6
Ext Box 4x2	5
20mm conduit PVC	10 length
Saddles 20mm PVC	50
Adaptor 20mm PVC	50
Lights CFL 11Watts BC	7
Wall plug + Screw 6x35mm	100

NB: Electrical contractor to make provision for a 3 Core 10mm² cable running from the distribution box through a 4x4 box and terminated on a 60A circuit breaker mounted outside the house as a coupling point/point of supply.

7.8 COMPARISON BETWEEN THE PROPOSED WIRING METHOD AND THE CONVENTIONAL WIRING METHOD

7.8.1 Advantage of using flat suffix twin and earth:

a) The approved cable as per SANS 1507-2: Core Colours, is a universal cable that can be used for both open wiring and wiring done using the conventional tubing method;

b) The approved/ recommended cable, when connected in junction boxes using push-in connectors, limits the presence of loose connections;

c) The approved cable, together with the proposed wiring method will reduce the time spent on site and there-by assisting the government in realising cutting costs per household wired; and
d) With the proposed wiring method as outlined in these guidelines, it is easy to see the beginning and the ending of the wires.

7.8.2 DISADVANTAGE OF USING CONDUIT TUBING WITH GP WIRE:

a) Contractors tend to use insulation tape inside the junction boxes instead of the approved termination methods;
b) In some cases, the GP wire is joined with wires meant for electronic uses, for example, speaker wires;
c) Loose connections are often noted during inspections as connections are not executed in line with the requirements of SANS 10142-1;
d) Appointed contractors tend to use semi-skilled personnel that are left unsupervised by a qualified electrician during the project execution period;
e) Most electrical installations that have been audited have indicated that the wires used for certain circuits are of the incorrect capacity rating.

7.9 MONITORING OF THE ELECTRICAL INSTALLATIONS

It is recommended that DHS capacitate the monitoring team by seeking the expertise of qualified installation electrician inspectors that will be conducting verifications of the submitted projects.

The above-mentioned, will, on sample basis, in the presence of the electrical contractor that executed the installations, conduct inspections, and verify the results of the tests as recorded in the Certificate of Compliance (CoC). The appointed installation electrician inspectors will also recommend payments based on conformance of the electrical installations to these guideline and/ approved wiring codes standards as outlined in the SANS 10142-1.

The Contractor shall test the entire installation in terms of Regulation 7 of the Electrical Installation Regulations 1992 of the Occupational Health and Safety Act 1993 and shall issue a Certificate of Compliance on the official form, Annexure 1, obtainable from the Electrical Contracting Board of South Africa.

All 230 V socket outlets shall be tested for polarity, and the sensitivity of the earth leakage protection equipment shall be tested by means of an approved instrument.

If there is no power on the day of the test, the contractor shall supply a 3 kW, 230V generating plant for testing purposes.

"DANGER" notices shall be displayed at remote ends of cables under test.

The electrician inspector reserves the right to witness all tests. The Contractor shall advise the Inspector in writing of all results and furnish copies of all certificates.

Load balancing shall be undertaken by the Contractor in conjunction with the Inspector. The Contractor shall provide all the necessary instruments for the proper testing of the complete installation. If there is reason to

doubt the accuracy of such instruments, the Contractor shall take the necessary action to prove their accuracy.

The Inspector will accept zero minor defects during the final inspection. Should this number of defects be exceeded at the final inspection then the Inspector will terminate that inspection and request that another inspection be conducted.

7.10 GLOSSARY

SANS 10142-1

This vital standard is used in South Africa for all types of low voltage electrical installations. The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) (OHS Act), which is administered by the Chief Inspector of Occupational Health and Safety of the Department of Labour, requires that electrical installations comply with the requirements of SANS 10142-1. It also requires that a registered person, as defined (master installation electrician, installation electrician or electrical tester for single phase), will issue a Certificate of Compliance for an electrical installation in line with the requirements set out in SANS 10142-1.

The Letter of Authority (LOA):

issued in good faith by the National Regulator for Compulsory Specifications (NRCS) on the strength of a product's test report by an accredited laboratory, is usually produced by distributors as proof of compliance with regulations and their safety requirements.

National Regulator for Compulsory Specifications (NRCS)

The broad mandate of the NRCS is to promote public health, safety and environmental protection through the development and enforcement of compulsory specifications and legal metrology technical regulations.

SABS Approval

The term "SABS Approved" refers only to products that have been submitted for and successfully attained the SABS mark, a product certification scheme offered by the SABS. For the consumer, the SABS approval means that **the product complies with a standard specification** and are safe for use.

Wire Harness

A wire harness, often referred to as a cable harness or wiring assembly, is a systematic and integrated arrangement of cables within an insulated material. The purpose of the assembly is to transmit signal or electrical power. Cables are bound together with straps, cable ties, cable lacing, sleeves, electrical tape, conduit, or a combination thereof. The wire harness simplifies the connection to larger components by integrating the wiring into a single unit for “drop-in” installation.

Regulatory Compliance

In general, compliance means conforming to a rule, such as a specification, policy, standard or law. Regulatory compliance describes the goal that organizations aspire to achieve in their efforts to ensure that they are aware of and take steps to comply with relevant laws, policies, and regulations.

IEC 60208:2011 & SANS 60208:2012

The above two, addresses the general requirements for empty enclosures for low-voltage switchgear and control gear assemblies. Included in these requirements are the tests that should be conducted on the enclosures and switchgear as well as the desired tests results for the equipment to be considered safe for use.

ANNEXURE 1

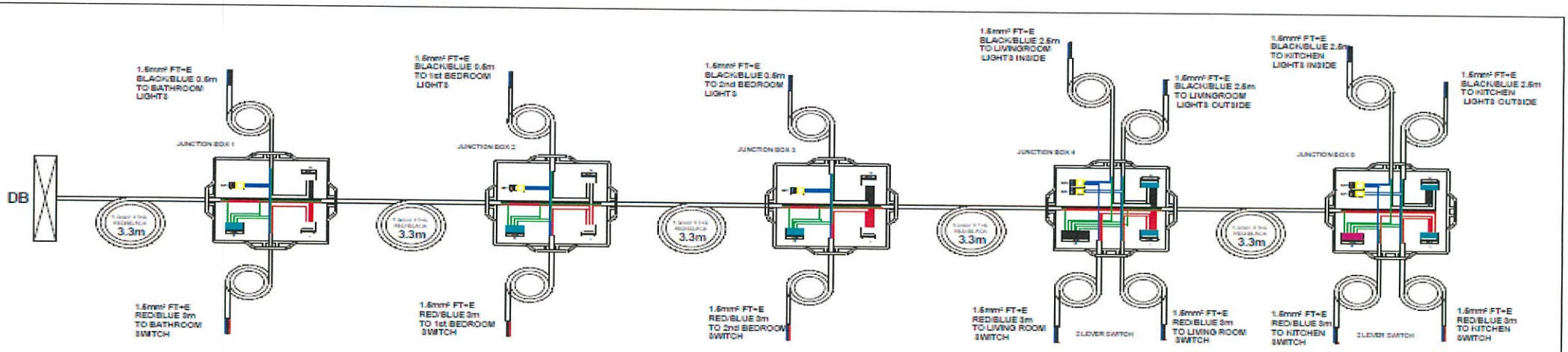
Compulsory Standards

- *Compulsory specification for circuit-breakers*, as published by Government Notice No. R. 967 (Government Gazette 29265) of 6 October 2006. (VC 8036)
- *Compulsory specification for earth leakage protection units*, as published by Government Notice No. 2286 (Government Gazette 10987) of 16 October 1987. (VC 8035)
- *Compulsory specification for manually operated switches for fixed installations*, as published by Government Notice No. R. 438 (Government Gazette 18779) of 3 April 1998. (VC 8003)
- *Compulsory specification for plugs, socket-outlets and socket-outlet adaptors*, as published by Government Notice No. R. 1075 (Government Gazette 33763) of 19 November 2010. (VC 8008)
- *Compulsory specification for safety of flexible cords for electrical appliances*, as published by Government Notice No. R. 1079 (Government Gazette 33763) of 19 November 2010. (VC 8006)
- South African and International Standards

ANNEXURE 2

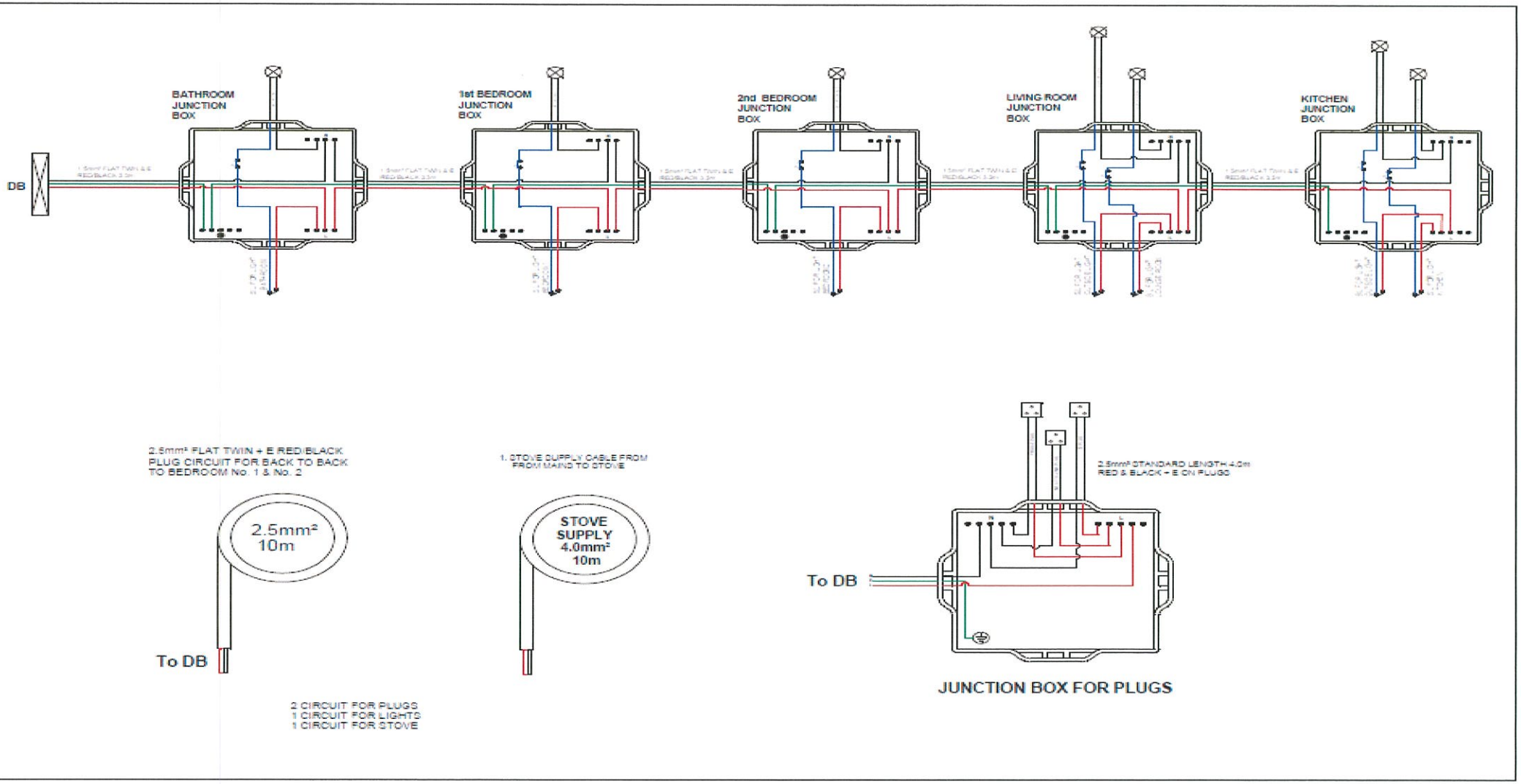
SANS 0157-2: Cable Core Colours

ANNEXURE A1



	PARTS LIST	PART NUMBER	QTY
1	1.5mm² Flat Twin + Earth 300/500V 17A White with Blue & Black Cores L:0.500	COL-ZUTFTE3G15WBB0.5	5 O/FF
1	1.5mm² Flat Twin + Earth 300/500V 17A White with Blue & Black Cores L:2.500	COL-ZUTFTE3G15WBB2.5	2 O/FF
2	1.5mm² Flat Twin + Earth 300/500V 17A White with Blue & Red Cores L:3.000	COL-ZUTFTE3G15WBR3	7 O/FF
3	1.5mm² Flat Twin + Earth 300/500V 17A White L:3.300	COL-ZUTFTE3G15WE3.3	5 O/FF
4	2.5mm² Flat Twin + Earth 300/500V 23A White L:3.500	COL-ZUTFTE3G25WE3.5	1 O/FF
5	2.5mm² Flat Twin + Earth 300/500V 23A White L:4.000	COL-ZUTFTE3G25WE4.0	4 O/FF
6	2.5mm² Flat Twin + Earth 300/500V 23A White L:4.600	COL-ZUTFTE3G25WE4.6	2 O/FF
7	2.5mm² Flat Twin + Earth 300/500V 23A White L:10.000	COL-ZUTFTE3G25WE10	1 O/FF
8	4.0mm² Flat Twin + Earth 300/500V 30A White L:10.000	COL-ZUTFTE3G40WE10	1 O/FF
9	RDP House Hamess Junction Box (CUST. SUPPLY)	CO-ZUTRDPJB-CS	6 O/FF
10	2 Way Helacon Plus Connector PC352 Yellow	CT-HECP2YW	7 O/FF
11	4 Way Helacon Plus Connector PC352 Clear	CT-HECP4CR	6 O/FF
12	5 Way Helacon Plus Connector PC355 Blue	CT-HECP5BE	10 O/FF
13	6 Way Helacon Plus Connector PC356 Purple	CT-HECP6PE	1 O/FF
14	8 Way Helacon Plus Connector 0.5 - 2.5 Wire Black	CT-HECP8BK	1 O/FF
15	Bulk Double Wall Box 450mm X 315mm X 330mm	CB-BDWB453133	1 O/FF

ANNEXURE A2


DB
BATHROOM JUNCTION BOX
1st BEDROOM JUNCTION BOX
2nd BEDROOM JUNCTION BOX
LIVING ROOM JUNCTION BOX
KITCHEN JUNCTION BOX
2.5mm² FLAT TWIN + E RED/BLACK PLUG CIRCUIT FOR BACK TO BACK TO BEDROOM No. 1 & No. 2
2.5mm² 10m
To DB
1. STOVE SUPPLY CABLE FROM FROM MAINS TO STOVE
STOVE SUPPLY 4.0mm² 10m
2.5mm² STANDARD LENGTH 4.0m RED & BLACK + E ON PLUGS
To DB
JUNCTION BOX FOR PLUGS
2 CIRCUIT FOR PLUGS
1 CIRCUIT FOR LIGHTS
1 CIRCUIT FOR STOVE