

The Namibian Coat of Arms to be Added once Approved

GOVERNMENT OF THE REPUBLIC OF NAMIBIA

MINISTRY OF MINES AND ENERGY

NATIONAL ELECTRIFICATION POLICY

FIRST DRAFT – REVISION 2

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[To be drafted once the Policy's main content has been finalised]

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Foreword

[To be drafted once the Policy's main content has been finalised]

Acronyms and Abbreviations

AC	Alternating Current
DC	Direct Current
DSM	Demand Side Management
DX	Distribution (of electricity)
ECB	Electricity Control Board
ECC	Environmental Clearance Certificate
EDI	Electricity Distribution Industry
EE	Energy Efficiency
Electricity Act	Electricity Act, 2007 (Act No. 4 of 2007)
Electricity Bill	Electricity Bill, 2019
ESI	Electricity Supply Industry
GRN	Government of Namibia
GX	Generation (of electricity)
HPP	Harambee Prosperity Plan
IEA	International Energy Agency
INDCs	Intended Nationally Determined Contributions
IPP	Independent Power Producer
kV	kilo-Volt
LA	Local Authority
Minister	The Minister of Mines and Energy (<i>unless indicated otherwise</i>)
MoF	Ministry of Finance
MoHE	Ministry of Higher Education, Training and Innovation
MME	Ministry of Mines and Energy
MoPE	Ministry of Public Enterprises
MTF	Multi-tier Electricity Services Framework (<i>as introduced in this Policy</i>)
MURD	Ministry of Urban and Rural Development
MW	Mega-Watt
MWT	Ministry of Works and Transport
NamPower	Namibia Power Corporation
NEF	National Energy Fund
NEI	Namibia Energy Institute
NELFP	National Electrification Funding Portfolio
NELP	National Electrification Policy
NEP	National Energy Policy
NERA	Namibia Energy Regulatory Authority
NEST	National Electricity Support Tariff
NIRP	National Integrated Resource Plan
NPC	National Planning Commission
NQA	Namibia Qualifications Authority
NSC	Namibian Standards Council
NSI	Namibian Standards Institution
NTA	Namibia Training Authority
NUST	Namibia University of Science and Technology
OGEMP	Off-Grid Energisation Master Plan
OMAs	Offices, Ministries and Agencies of the Government of Namibia
PPA	Power Purchase Agreement

PPP	Private-Public Partnership
QoSS	Quality of Supply Standard
RC	Regional Council
RE	Renewable Energy
RED	Regional Electricity Distributor
REFIT	Renewable Energy Feed-in-Tariff
REDMP	Rural Electricity Distribution Master Plan
REP	Renewable Energy Policy
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SDG	Sustainable Development Goals
SHS	Solar Home System
SME	Small and Medium Enterprise
SRF	Solar Revolving Fund
UNFCCC	United Nations Framework Convention on Climate Change
Utility	Licensed operator active in the Namibian electricity industry

Glossary and Definitions

Term	Definition
access to electricity	An end-user supplied by a power supply system that delivers Tier 3 or higher services on the multi-tier electricity service framework defined in this Policy.
access to modern energy *	A household has access to at least one type of electricity service, as well as clean cooking facilities.
affordable energy *	For households: using a reasonable amount of modern energy at a cost which is affordable to the household. For businesses and industries: using an efficient amount of energy at a cost that can be reasonably recovered from customers without rendering the business uncompetitive.
clean energy *	Energy that does not pollute the environment when used.
electrification	In the context of this Policy, electrification means the installation of technologies that provide access to electricity to unserved end-users, undertaken by or on behalf of the Government or a regulated electricity supplier.
eligible category	Electrification of customers in area categories B, C, D, E and F as referred to in Table 4 of this Policy.
grid electrification	An end-user receiving electricity services by way of a connection to the national electricity grid.
hybrid power system	The combination of two or more power supply sources (e.g. a solar PV system with a back-up generator and energy storage) of a mini-grid, micro-grid, or other stand-alone supply system.
home electricity supply system	An autonomous electrical power system that supplies a single household.
independent power producer *	A generation licence holder which is a separate legal entity from any public electricity utility, and which is not wholly owned by a public electricity utility.
mini-grid	An electricity supply system that is not connected to the main electricity grid, and feeds grid-code compliant local electricity distribution networks (at low voltage (up to 1 kV) and/or medium voltage (between 1 kV and 44 kV)) to provide electrical energy to multiple end-users.
modern energy *	In the context of access to energy, <i>modern energy</i> is used to describe energy carriers that do not involve the burning of non-sustainable supplies of wood, the use of candles or paraffin, or the reliance on non-reusable batteries.
off-grid	An electricity end-user, supply system or distribution network not connected to the national electricity grid, irrespective of the location or proximity to the grid.

Term	Definition
off-grid electrification	An end-user receiving electricity services from an autonomous electricity system such as a mini-grid or solar home system that are not connected to the national electricity grid.
Regulator	The authority responsible for the regulation of the country's electricity/energy industry.
renewable energy *	Renewable energy is energy that is derived from resources or processes that are naturally replenished on a human timescale. Solar, wind, hydropower, bioenergy, geothermal and ocean/wave power are examples of renewable energy sources.
rural area	For the purposes of this Policy, a rural area includes all areas that are located beyond the proclaimed areas of municipalities or town councils, and include the proclaimed areas of village and regional councils as well as commercial and communal farming areas.
single end-user	A single household, institutional, industrial, or commercial electricity end-user.
stand-alone power supply	An autonomous electrical power system supplying one or several end-users.
sustainable development *	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
universal access to electricity	Access to electricity services for all.
universal access to modern energy *	Every household has the opportunity to use at least one type of modern energy.
urban area	In the context of this Policy, an urban area is an area that is located within the promulgated area of a municipality or town council.

* Definitions as contained in the National Energy Policy of 2017

Executive Summary

[To be drafted once the Policy's main content has been finalised]

1. Introduction

1.1 Purpose

This document is **Namibia’s National Electrification Policy (NELP)** and communicates the Government of Namibia’s intent, direction and undertakings that relate to the country’s on-going electrification endeavours. The Policy highlights the importance of electrification, provides brief statements on the background and current status as well as the policy imperatives of electrification before presenting the objectives and strategies that are to underpin the country’s electrification approaches in future.

1.2 Legal Framework

Figure 1 summarises the main elements of Namibia’s legal framework as it pertains to electrification.

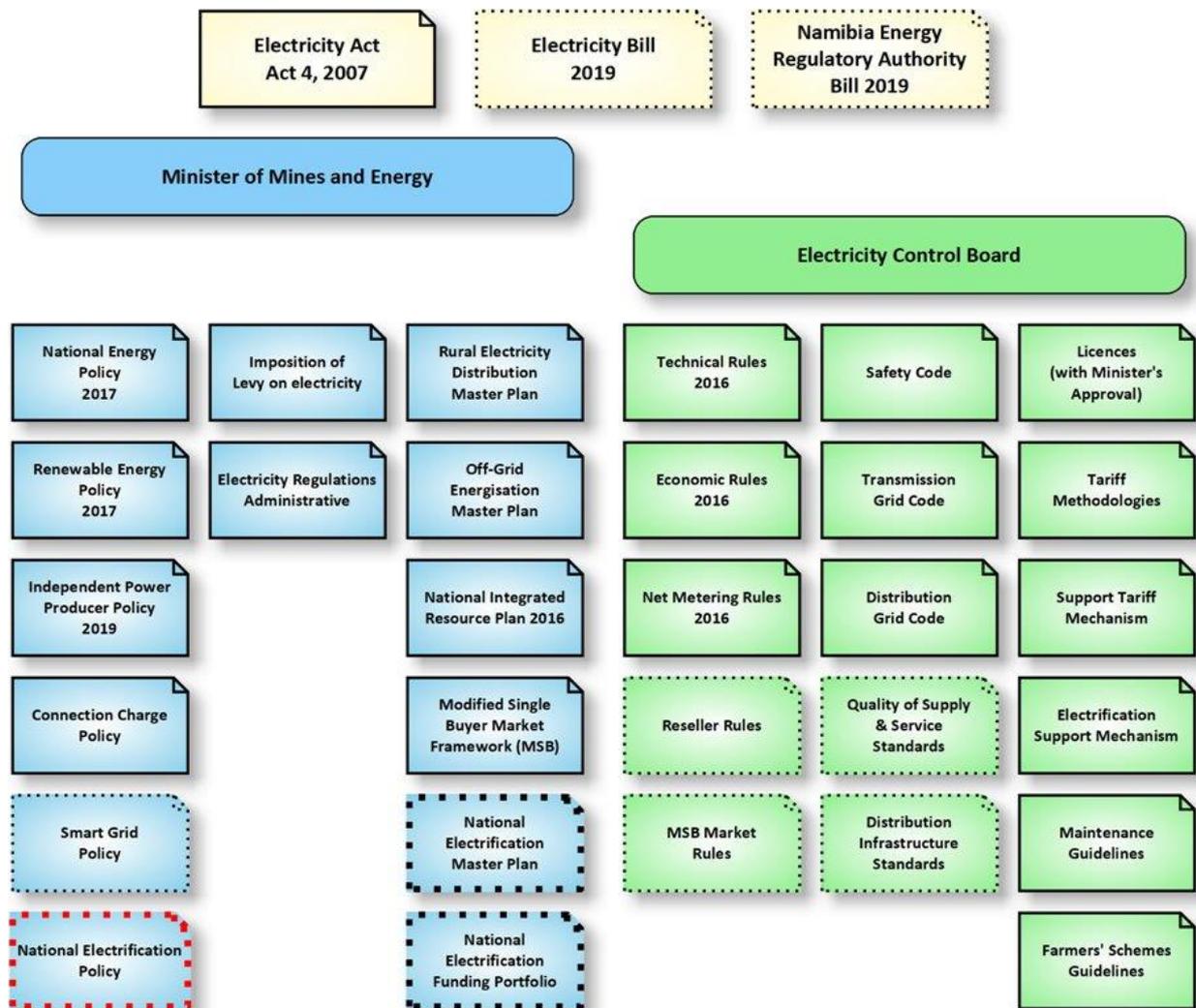


Figure 1: Namibia’s legal framework relating to electrification

1.3 Structure of this Document

The content of this document is structured as follows:

- **Section 2** describes the background and context of electrification in Namibia.
- **Section 3** presents the rationale for further electrification as is the aim of this Policy.
- **Section 4** highlights how the present Policy is aligned with the Government's vision, strategies and plans for the country's development.
- **Section 5** presents the key underpinnings of this Policy, including its principles, goal, vision and mission.
- **Section 6** presents the Policy's objectives and strategies.
- **Section 7** presents the implementation framework for this Policy.

2. Background and Context

This section describes the background and context of electrification in Namibia.

2.1 Problem Statement

To date, prioritised additional electrification is not the topic of a national policy, yet it plays a pivotal role in advancing Namibia's national and socio-economic development. As a direct consequence, the impacts associated with electrification seldom inform national, regional or local electrification planning efforts or the setting of priorities for allocating project funding. This is an impediment to that this Policy addresses.

In addition, and despite the wide-ranging and significant impacts on national development, the responsibility for electrification continues to be shouldered by the line ministry and the country's electricity industry alone. These realities manifest themselves in a variety of ways, including as follows:

- In 2020, un-electrified schools, clinics and Government offices remain a reality, and more than one-half of the country's population do not have access to electricity.
- The sources of funding for electrification by the state and the country's utilities are limited, and remain inadequate to achieve universal access within the next two decades.
- Few distributors utilise any of the wide variety of international funding sources that are on offer.
- Electrification requirements are generally poorly quantified, especially in peri-urban areas and rural Namibia. Most contemporary survey data is unclear as to whether access has been achieved, which is in part due to the absence of a national definition of access to electricity.
- Extending the grid to provide additional access to electricity is costly. Therefore, providing a grid connection to everyone is generally considered unrealistic, but it is seldom acknowledged as such.
- Off-grid electrification options have neither been embraced nor are they actively used (except in pilot projects, for government institutions, and for a small number of mini-grids) to provide access to modern energy services in locations that are far away from the existing grid.
- Namibian utility business models make little or no provision for effectively providing electricity services to those that remain beyond the immediate reach of their grid infrastructure.
- In 2020, national electrification plans are outdated, are not being followed, do not integrate grid- and off-grid options, and do not include urban informal areas.
- Most national electrification efforts are not optimally supported by existing institutional, regulatory and governance arrangements.
- Current regulatory provisions do not compel licensed electricity distributors to contribute in a significant way to the Government's national electrification efforts.
- The licence conditions of electricity distributors related to electrification remain vague and are not strictly enforced.
- While grid-connected households benefit from cross-subsidies, non-electrified households do not benefit from such support measures.
- Existing cross-subsidies do not support the country's broader development objectives and defeat basic economic principles by distorting end-user prices and being poorly targeted.

2.2 Status of Electrification in 2020

In 2020, the Namibian electrification status is as follows:

- According to the 2011 National Census an estimated 71% (19%) of all households in urban (rural) areas have access to electricity (including off-grid sources).
- According to the National Household Income and Expenditure Survey of 2015/16, the country has a national electrification rate of approximately 45%. This means that more than half of Namibia's population does not reap the benefits of having access to electrical energy.
- Informal areas around urban centres (i.e. peri-urban areas) are rapidly expanding. In most instances, the rate at which such areas are electrified, if at all, is much lower than their growth.
- Most rural households do not have access to modern energy services, and contemporary rural electrification efforts have not been effective in significantly reducing either the existing backlog or growth in new rural households.
- In most instances, the electrification of low-income households requires a capital as well as an operational subsidy, due to low disposable incomes and the high cost of supply.
- For a variety of reasons, the commercial viability of most Namibian electricity distribution entities is marginal. This implies that the imposition of electrification obligations (e.g. as part of an electricity supplier's regulatory licence conditions) will most likely increase the risk of failure of such entities or increase electricity prices unless external funding is made available.

2.3 Access to Electricity

The Government of the Republic of Namibia has been committed to supporting and actively promoting rural electrification. Over the past decade, urban electrification has largely been the ambit of Regional Electricity Distributors (REDs) or local authority entities. In rural Namibia, electrification efforts were guided by successive Rural Electricity Distribution Master Plans (REDMPs), which are centred on the provision of electricity delivered by a connection to the national electricity grid.

Namibia's electricity supply industry (ESI) generally defines 'access to electricity' as being provided with grid or grid-equivalent services. However, in view of the rapid emergence of power supply options that offer alternatives to grid electricity, such definitions are no longer considered adequate. Today, a large variety of off-grid power supply options that have the potential to provide access to electricity exist.

Namibia's REDMPs define 'household access to electricity' in to-be-electrified localities as being within low voltage reach of a medium voltage transformation point (i.e. being within 500 metres from a transformation point). This definition implies that an end-user would not actually have to be connected to the grid to be considered as having access to electricity, and it only focuses on grid connections.

The above illustrates that past approaches to define access to electricity are no longer aligned with contemporary practice, and that an updated and more pragmatic metric is needed in order to recognise when and to what degree electricity services are actually provided to an end-user.

2.4 Grid Electrification

Electrification in urban and urban informal areas is undertaken by licensed distributors, which include Regional Electricity Distributors (REDs) and/or local authorities. Electricity infrastructure in urban formal

areas is usually paid for by end-users through the sale of serviced land, whereas in urban informal areas it is usually funded by the distributor.

The Ministry of Mines and Energy's electrification programme focuses mainly on the provision of grid electricity infrastructure to connect Government assets in rural areas to the national grid. In the past, the MME's grid electrification efforts were guided by Rural Electrification Master Plans (REDMPs); however, as these were last updated in 2010, they are outdated. An Off-Grid Energisation Master Plan (OGEMP) was developed in 2007; however, this is no longer implemented.

Currently, annual planning is conducted by the MME, which requests regional councils to identify priorities for electrification, which are vetted by the ministry prior to implementation. These projects are funded from the MME's annual budget. NamPower follows a similar process, which is funded from its capital budget and from the SIDA (Swedish International Development Corporation) and EIB (European Investment Bank) grant funds. Funding is usually made available for all regions.

Rural electrification assets funded by the MME or NamPower are handed over to the relevant distribution licensee, and are operated and maintained by the licensee in whose area of responsibility such infrastructure is located.

Over the past two decades, several farmer schemes have been developed by commercial farmers. These utilities are responsible for the installation and operation of grid electricity networks that serve the properties of those participants who contributed to the funding thereof.

2.5 Off-grid Electrification

Many of Namibia's un-electrified areas are far away from the grid, and are characterised by low population densities and/or highly dispersed settlements; therefore, it is often neither technically nor economically justifiable to provide access to modern energy services by means of a conventional grid connection. Taking this into account, it is imperative to advance electrification efforts other than only those provided by the grid.

This Policy interprets the term 'off-grid electrification' to mean the provision of electrification services to individual or institutional end-users, using autonomous electricity supply systems in the form of either mini-grids or other stand-alone electricity supply systems that are not connected to the grid.

The term 'off-grid' is therefore interpreted as an electricity end-user, supply system or distribution network not connected to the grid, irrespective of their location or proximity to the grid.

The provision of off-grid electrification services is not limited to rural areas, and may also be used:

1. in areas where low end-user densities and/or the remoteness from the grid render a grid electricity supply ineffective and/or too costly;
2. where the arrival of the grid is expected to be delayed for an extended period of time;
3. where a lack of land planning prevents the development of grid infrastructure (e.g. in informal areas within local authority jurisdictions); and
4. in other applications where off-grid electricity supplies offer an efficient and effective option to provide access to electricity.

What all off-grid electricity supply systems have in common is that they are not connected to the grid. The following sub-sections introduce the salient features of mini-grids and single end-user stand-alone power supply systems that are used to provide electricity services to end-users.

2.5.1 Mini-grids

This Policy does not distinguish between micro- and mini-grids because the former are essentially smaller versions of the latter, often with lower capabilities, and they supply end-users by means of a low voltage distribution system only. Often, mini-grids are powered by hybrid electricity generation systems. These systems use two or more electricity generating technologies (e.g. a diesel-powered generator and a solar photovoltaic generator, or a combination of wind and solar systems) to generate electricity. Mini-grids can enhance access to electricity services, thereby enabling end-users to experience the convenience, versatility and opportunities that such services offer. Mini-grids can be particularly relevant for the electrification of rural areas with sufficient clustering of households, institutions and businesses.

2.5.2 Stand-alone Single End-user Supply Systems

Stand-alone single end-user electricity supply systems (e.g. home electricity supply systems and others) provide electrical energy to individual end-users (e.g. the residents of a household). Such electricity systems are not connected to any electricity distribution network and operate as an autonomous power supply. A large variety of stand-alone power supply systems are available, and their output capacity and longevity vary considerably, emphasising the need for minimum standards for acceptable service delivery.

2.6 Defining Electricity Services

A large variety of electricity supply systems exist. The electricity services that such systems provide are classified using the Multi-Tier Framework (MTF) for electricity services. The MTF is based on distinct electricity service tiers. Tier 1 is the lowest service tier and corresponds to the most basic provision of electricity. Successively higher service tiers allow for additional electricity services. Tier 5 corresponds to service levels equivalent to a grid supply.

Table 1 summarises the characteristics associated with having ‘access to electricity’.

Table 1: Main characteristics of the MTF electricity service tiers

1. Availability	Services are available for a given period each day
2. Reliability	Services have a capped maximum number of disruptions per month
3. Quality	Voltage fluctuations do not negatively affect the use of applications or appliances
4. Affordability	Use of electricity costs less than a given percentage of an end-user’s income
5. Legality	Services are warranted by an authorised supply agent or their representative
6. Convenience	Services improve end-user experiences and perception of associated value
7. Health	Services do not increase the risk of exposure to negative health effects
8. Safety	Services do not increase the overall safety risk of end-users

The electricity requirements of schools, clinics or offices are different to those of a typical household, which means that their MTF is different (Annexure A details the MTF for institutions and households). Electricity services are provided by a connection to the grid, a mini-grid or other stand-alone supply. The MTF is based on electricity services rather than on supply technologies, and spans all technical supply options.

Electricity service tiers for public institutions (see Table 2) are guided by their service requirements and costs. The MTF includes three (3) tiers of electricity supply to schools, clinics and government offices:

1. **Tier 3 – essential electrical energy services:** This tier provides select basic electricity services only, and excludes thermal services. Only clinics are provided with essential refrigeration for medical supplies.
2. **Tier 4 – comprehensive electrical energy services:** This service tier provides complete coverage of all relevant electrical energy services, thereby rendering it fully functional in terms of lighting, communications, and IT services. Thermal services are excluded, except for refrigeration in clinics.
3. **Tier 5 – comprehensive plus thermal energy services:** As in Tier 4, this service tier is fully functional in terms of lighting, communications, and IT services, and also supplies all thermal energy services. This tier is equivalent to a reliable grid connection.

Table 2: Multi-tier electricity services framework for public institutions

	Tier 3: 12 hours/day	Tier 4: 16 hours/day	Tier 5: 24 hours/day
Electricity services	Essential electricity services, which includes limited lighting and essential equipment use, as required for administrative purposes.	Comprehensive electrical coverage, which includes all administrative and other rooms, as required.	Comprehensive electrical coverage plus thermal energy services to ensure that the entire facility is fully electrified.

The MTF for households has five (5) electricity service tiers, ranging from Tier 1 to Tier 5, refer to Table 3.

Table 3: Multi-tier electricity services framework for households

	Tier 1: 4 hours/day	Tier 2: 4 hours/day	Tier 3: 12 hours/day	Tier 4: 24 hours/day	Tier 5: 24 hours/day
Electricity services	Lighting, radio, and phone charging	Tier 1 services, plus a television and a fan	Tier 2 services, plus the use of select low-power appliances, as well as a small refrigerator	Tier 3 services, plus the moderate use of household power appliances	Tier 4 services, plus the full use of household appliances and power tools

2.7 Categorising Electrification Needs

Systematic electrification, including its planning, funding, implementation and reporting, can be additionally focused by using consistent terminology and a framework that categorise and describe the geographic and demographic characteristics of to-be-electrified households, businesses and institutions, as summarised in Table 4.

Table 4: Categorisation framework for electrification needs

Category	Terminology	Attributes	Electrification Support Implications
A	Urban planned and serviced area, including areas that are	An urban area where land is planned and serviced by a local authority and/or developer	There is no need for external electrification support, as the electrification and service

Category	Terminology	Attributes	Electrification Support Implications
	designated for such development	<p>Serviced land is sold to recover the cost of infrastructure that provides services, including electricity</p> <p>Tenure is secured through registered land ownership; housing structures are mostly permanent and formal</p> <p>Provisions for businesses and institutions are the same as those for households</p>	<p>provision is adequately covered under existing provisions that govern local authorities and Regional Electricity Distributors (REDs), where these are operating.</p>
B	Urban semi-formal area (often a low-income area)	<p>An urban area, usually adjacent to planned and serviced areas, where land is planned by a local authority, and where select service infrastructure, such as roads, are in place and define a basic settlement structure</p> <p>Land is not sold at all, or is sold at prices that do not recover the cost of infrastructure</p> <p>Tenure or occupation is mostly secured through a rental arrangement with the local authority; housing includes a mix of formal and informal structures</p> <p>Provisions for small businesses and institutions may be included</p>	<p>Distributors without a customer base from whom adequate cross-subsidies can be generated may need external support to undertake electrification, particularly to cover the capital cost needed to establish the necessary infrastructure.</p>
C	Urban informal area (also referred to as peri-urban)	<p>An urban area that is not included in a local authority's land planning provisions and/or where land planning structures have not been implemented at all</p> <p>Informal housing is established and takes place in an unplanned manner</p> <p>Land tenure is not formalised, and the occupation of land is not legal under local authority provisions</p> <p>Basic infrastructure, such as roads, do not exist; the installation of fixed service infrastructure is considered to legitimise the right of occupation, and therefore remains contentious</p>	<p>To create the necessary electrification infrastructure, alternative funding including from external sources is usually required.</p> <p>It is usually not possible to recover any significant capital cost component from end-users, and its recovery through tariffs is unlikely due to low consumption.</p> <p>Distributors without a customer base from whom an adequate cross-subsidy can be generated will need</p>

Category	Terminology	Attributes	Electrification Support Implications
			external support to provide services.
D	Village or settlement	The proclaimed area of a village council or a proclaimed settlement under a regional council (the attributes may be a mix of those described in categories A, B and C above, with the associated implications)	As village and regional councils mostly lack the financial means to fund land development from their own resources, they therefore depend on external funding assistance. Electrification support implications are similar to those in categories A, B and C above.
E	Rural locality	A rural area with a concentration of multiple households and/or other structures, which often include institutions and/or businesses Land tenure may be fully formalised through registered ownership, or made legal under the regulations governing the allocation of land in communal areas, or not legalised at all and therefore informal Structures are usually clustered to allow them to be economically supplied with electricity from a common shared source such as the grid or a mini-grid	In order to introduce electricity infrastructure and provide services to a rural locality, external funding support is required. With limited exceptions, it is not possible to recover the full cost of services from the beneficiaries due to the high cost of introducing and providing rural services – many end-users living in such areas experience challenging economic circumstances.
F	Rural stand-alone households, institutions, farms or businesses	Dispersed households, institutions or businesses that cannot be economically clustered to provide an electricity supply from a common shared source such as the grid or a mini-grid	Unless end-users consume high amounts of electricity and are thereby able to pay for the necessary supply infrastructure and on-going service costs over time, external funding support is usually required to introduce electricity infrastructure and provide services.

Electrification, as intended in this Policy, includes and caters for categories B, C, D, E and F (referred to as eligible categories), but excludes category A.

2.8 Electricity Industry Stakeholders

The following key stakeholders are active and have responsibilities in Namibia's electricity industry:

2.8.1 Electricity End-users

This Policy aims to enhance national electrification in Namibia, thereby increasing the number of end-users who have access to modern energy services and strengthening national development efforts.

2.8.2 Ministry of Mines and Energy (MME)

The Ministry of Mines and Energy (MME) is responsible for all energy matters in the country, and it is the principal custodian of electrification, and therefore the National Electrification Policy (NELP). The ministry's mandate, as expressed in the MME's strategic plan for 2017/18 to 2021/22, states that:

"The Ministry of Mines and Energy was constitutionally established to take custody of the diverse geological, mineral and energy resources, and to ensure their contribution to the country's socio-economic development."

The ministry's mission statement affirms that the MME is:

"To formulate policies and legislations that effectively regulate activities in mining and energy sectors, generate knowledge and information on resources, and provide services to stimulate investment for sustainable economic development and benefit to all Namibians."

2.8.3 Ministry of Finance (MoF)

The Ministry of Finance (MoF) allocates the MME's annual budget, provides Government guarantees where needed, designs and implements fiscal incentives, provides input on electricity sector subsidies, and is responsible for the National Investment Policy.

2.8.4 Electricity Control Board (ECB – the Regulator)

The Electricity Control Board (ECB) is the statutory regulator for the electricity industry. The Regulator was established in 2000 under the Electricity Act of 2000, which was replaced by an updated Act in 2007. It is funded by the 'ECB Levy', which is imposed on electricity supply. The promulgation of the Energy Regulatory Bill and Electricity Bill will transform the ECB into the National Energy Regulatory Authority and expand the regulatory scope to include other forms of energy.

The Regulator currently regulates the technical and economic aspects of the electricity industry. It administers licensing of sector activities and makes recommendations to the Minister of the MME regarding the issuance of licences, while the Minister approves the licences.

2.8.5 Namibia Power Corporation (NamPower)

The Namibia Power Corporation (NamPower) is a state-owned electricity utility. It is registered as a private limited liability company under the Companies Act, with the Government as its sole shareholder.

NamPower is responsible for generation, transmission, trading, and importing and exporting of electricity. The utility owns and operates the major power stations in the country as well as the transmission grid, and it is involved in the distribution of electricity where other suitable suppliers are unavailable.

NamPower makes regular contributions to national electrification from its capital budget, while also administering grants from international funding agencies that benefit national electrification efforts.

2.8.6 Electricity Distributors

Electricity distributors are licensed to distribute and supply electricity. Most prominent amongst these are the three existing Regional Electricity Distributors (NORED, CENORED and Erongo RED) and the City of Windhoek. Local authorities and regional councils as well as NamPower Distribution distribute electricity in the Khomas, Omaheke, Hardap and //Karas Regions, while Oshakati Premier Electric distributes electricity in Oshakati only. In addition, several farmer electricity utilities and other privately owned commercial/residential suppliers are operational.

Generally, electricity distribution and supply entities could form partnerships between Government institutions, public utilities, private companies as well as new actors in the electrification space, which would then expand their roles into the management of new electrification activities within their respective licence areas, including off-grid electrification endeavours.

Several distribution licensees make capital budget allocations available for electrification. These are mostly focused on urban low income and/or informal areas.

2.8.7 Local, Regional and Traditional Authorities

Local and regional authorities are second-tier government structures whose mandate includes the provision of services and planning of land within their areas of responsibility. The main functions of these authorities, in the ambit of electrification, include:

- Assisting with the identification of off-grid target areas
- Authorising land use
- Awarding building contracts
- Awarding resource utilisation permits (e.g. water rights)
- Promoting electrification programmes
- Facilitating contact with electricity users
- Facilitating community engagement
- Managing resources allocated to electrification

2.8.8 National Planning Commission (NPC)

The mandate of the National Planning Commission (NPC) is derived from Article 129 of the Constitution of the Republic of Namibia, as well as the National Planning Commission Act, 2013 (Act No. 2 of 2013). The overarching mandate of the NPC is to “plan and spearhead the course of national development”, and its main functions include:

- Identifying Namibia’s socio-economic development priorities
- Formulating short-, medium- and long-term development plans in consultation with stakeholders
- Developing monitoring and evaluation mechanisms to ensure effective implementation of plans
- Evaluating the effectiveness of the Government’s socio-economic policies
- Coordinating the development of Government socio-economic policies to ensure consistency
- Mobilising, managing, and coordinating international development cooperation

2.8.9 Ministry of Environment, Forestry and Tourism (MEFT)

The Ministry of Environment, Forestry and Tourism’s (MEFT) responsibilities relate to ensuring that electrification activities meet environmental standards, issuing environmental clearances where relevant, and monitoring compliance with environmental regulations.

2.8.10 Ministry of Works and Transport (MWT)

The Ministry of Works and Transport (MWT) is responsible for the maintenance of power supply systems at Government offices, ministries, and agencies.

2.8.11 Namibian Standards Institution (NSI)

The Namibian Standards Institution (NSI) was established in terms of the Standards Act, 2005 (Act No. 18 of 2005) and is governed by the Namibian Standards Council (NSC). In relation to electrification, the NSI's roles and responsibilities include:

- Managing and coordinating the implementation of the National Quality Policy
- Developing, adopting, and publishing standards that meet World Trade Organisation requirements
- Certifying products and management systems through the Marks of Conformity

2.8.12 Tertiary Education Institutions

Tertiary education institutions offer various study and vocational training courses relevant to the supply of electricity and the electricity industry. Activities include setting and implementing educational curricula, programme standards and their accreditation, and promoting capacity and skills development.

2.8.13 Namibia Training Authority (NTA) and Namibia Qualifications Authority (NQA)

The Namibia Training Authority (NTA) and Namibia Qualifications Authority (NQA) support national study and training efforts by integrating them into national training and qualification frameworks, thereby assuring the quality of skills and qualifications.

2.8.14 Namibia Energy Institute (NEI)

The Namibia Energy Institute (NEI) is an institute housed at the Namibia University of Science and Technology (NUST). The NEI seeks to contribute to capacity building across the field of energy, and to contribute to Namibia's industrialisation by linking energy research, technology, policy, and education to the needs of all stakeholders.

2.8.15 Private Sector Actors

Private sector actors are the main providers of services and technologies in electrification, and they are the principal agents that introduce technologies and innovation into the electricity industry and have the potential to contribute to the funding of electrification.

3. Rationale

This section presents the rationale for this Policy, as well as the further electrification of the country.

Namibia's energy- and electrification-related policies do not include a national policy on electrification. The rationale for the present Policy is to address this present gap, to clearly and directly communicate the Government's intent to accelerate prioritised efforts to achieve universal access to electricity.

The rationale for further electrification is based on the following principal considerations:

- **Socio-economically**, access to affordable modern energy such as electricity is a pre-requisite to a more competitive economy, while universal access to electricity is a critical requirement for equality of opportunity within the economy. In addition, there is broad consensus that access to modern energy leads to positive socio-economic impacts and human development, which implies that this Policy focuses on how such socio-economic value is best created through electrification.
- **Environmentally**, displacing energy sources that emit particulate matter as well as noxious gases is achieved by switching to cleaner sources of energy. Modern technologies, including those benefitting from renewable sources, often lead to a reduction of such harmful emissions. This implies that electrification holds numerous environmental advantages over the use of other forms of energy, provided clean generation technologies are employed.
- **Legally**, Namibia's energy policies are clear about advancing national electrification efforts. In practice, however, numerous barriers continue to exist, which prevent a more pronounced roll-out of electrification projects. The rationale of this Policy is to address the key legal aspects in order to strengthen the legal and regulatory changes required to accelerate national electrification efforts.
- **Institutionally**, an accelerated approach to national electrification must be appropriately anchored, which this Policy addresses by way of identifying and describing the roles and responsibilities of all relevant actors that are to collaborate to achieve the desired outcomes.
- **Technically**, a wide variety of new technologies have become widely available to meet the electrification needs of end-users, including by way of mini-grids or stand-alone solar home systems, which broaden the technical scope to beyond supplying electricity by way of a connection to the national electricity grid.
- **Financially**, national electrification undertakings require long-term funding commitments other than from the Government. This necessitates a refocus of the traditional approach to funding electrification efforts, to broaden the funding approach to include national and international sources, as well as from revenues generated from within the electricity industry. This Policy provides a holistic view on how core funding by the Government can best be leveraged to optimise future national electrification outcomes.
- **Politically**, electrification continues to remain a high priority as it is widely recognised to positively impact the lives of those who have access to it.

4. Policy Alignment

This section highlights how the present Policy is aligned with the Government's vision, strategies and plans for the country's development.

Namibia's national development ambitions are guided by Vision 2030, which was adopted in 2004. Vision 2030 foresees the provision of secure and affordable energy to the country's developing economy and its people; it provides the overall long-term development goals for the country; and it subscribes to the principle of sustainable development. Specifically, Vision 2030 foresees "a prosperous and industrialised Namibia, developed by her human resources, enjoying peace, harmony and political stability".

The Government's medium-term goals and strategies are expressed in National Development Plans (NDPs), which are formulated in accordance with Vision 2030 and revised every five years. Regarding energy-related developments, the national development framework described above has the following implications:

1. An industrialised Namibia, as per Vision 2030, can only be realised provided secure, sufficient, and economically priced energy supplies are and remain available. This ambition has definite repercussions and implications for the country's on-going electrification and creation of access to modern energy services for its citizens, commerce, and industry.
2. Economic and social upliftment of the people of Namibia includes access to modern energy services, at fair and affordable prices. Without such access, the people of Namibia cannot realise their personal development ambitions. Again, it is the country's energy industry that must ensure that the energy resources are available to power the nation and her people.

In 2015, Namibia signed the Paris Climate Agreement, codifying its Intended Nationally Determined Contributions (INDCs) to the UNFCCC. Namibia's INDCs commit the country to increase the share of renewables in electricity production to 70%, to increase energy efficiency and demand side management measures, to implement mass transport, and to introduce car and freight pooling.

In 2016, the President released the Harambee Prosperity Plan (HPP) that sets out short-term development priorities, which include energy access targets.

The National Energy Policy (NEP) of 2017 foresees an increase in local, decentralised electricity generation using renewable resources by means of leveraging Namibia's natural resource endowments to increase energy self-sufficiency and promote the availability of affordable electricity for Namibia's economy and people. It also expresses the ambition of creating access to at least one form of electricity service for all Namibians.

The National Renewable Energy Policy (REP) of 2017 advocates the thrust towards increasing the renewable energy contribution to the country's electricity mix. Renewable energy generation technologies, such as those used for decentralised electricity generation and off-grid applications, have the potential to contribute to reaching the NEP goal of universal access to electricity in Namibia.

The Independent Power Producer Policy (IPPP) of 2018 foresees significant investments in renewable energy IPPs, in alignment with the National Integrated Resource Plan (NIRP). In addition, the IPPP envisages that IPPs will contribute to off-grid investments and the advancement of rural electrification.

In keeping with the key policies identified above, this National Electrification Policy (NELP) is informed by the requirements of sustainable development, where social, economic and environmental considerations are the pillars on which the actions towards enhancing access to electricity services for all Namibians are built.

5. Policy Framework

This section presents the key underpinnings of this Policy, including its principles, goal, vision and mission.

5.1 Principles

This Policy expresses the Government of Namibia's recognition and commitment to actively lead, support, and promote accelerated national electrification which is to be based on the following key principles:

Reaching Universal Access to Electricity

Access to electricity speaks to the nation's development objectives. Without universal access to modern energy, various human development related objectives are unlikely to be met, including the eradication of poverty and a significant reduction in inequality.

The social and economic benefits derived from access to electricity, especially for end-users who do not yet enjoy the multiple benefits of access to modern energy, will play a crucial role in addressing issues such as intergenerational poverty, inequality, improving the nation's competitiveness in an increasingly globalised world, and many others.

Enhancing National Competitiveness

Competitiveness feeds directly into Namibia's ambition to become "*a prosperous and industrialised nation, developed by her human resources, enjoying peace, harmony and political stability by the year 2030*", as articulated in Vision 2030. The improved outcomes (health and educational) as a result of increased access to electricity play a significant role in a more competitive workforce. Access to competitively-priced basic inputs, including electricity, are a core consideration for investment – which in turn leads to increased value addition and employment, resulting in greater economic benefits. Thus, access to competitively-priced inputs, such as electricity, is a catalyst for Namibia to attain her overarching development objectives.

Creating conducive framework conditions that incentivise investments in electrification

The Government will create the necessary legal and institutional requirements to attract and retain investments in off-grid electrification efforts, specifically focussing on the requirements for private sector investments and funding as well as access to international funding. This includes ensuring levels of transparency, stability and predictability required by investors and funders.

Applying holistic and prioritised planning, prudent funding and diligent implementation

Cognisant of the multitude of challenges associated with the provision of electricity services, the Government aspires to holistically address the on-going national electrification challenge to provide affordable and sustainable electricity for all. Prioritisation of electrification is to ensure that the maximum economic benefit is achieved for a given investment. All five eligible electrification support categories (i.e. categories B, C, D, E and F in Table 4) shall be simultaneously supported and benefitted, while ensuring that prioritisation is undertaken within each category.

Ensuring fit-for-purpose minimum service standards at lowest life cycle cost

Electricity services rolled out under this Policy must be appropriate and fit-for-purpose in order to meet end-user needs, and they must meet minimum service standards at the lowest possible life cycle cost. Government funding, subsidies and cross-subsidies are only to be used to provide end-users with the

minimum service tier so that end-users are classified as having access to electricity. Any additional requirements must be paid for by the end-user.

Designing for best use of funding and fair cost recovery from beneficiaries

The provision of affordable electricity consists of two core components: firstly, connectivity, which requires capital expenditure; and secondly, the sale of electricity units. Providing access to electricity implies that upfront capital is necessary, which has cashflow implications for a utility. In some instances, this cash outflows can eventually be recovered through the sale of electricity units; however, this is not true in all instances. The degree to which costs can be covered or recovered, and the potential loss or return generated from the capital investment, plays a vital role in determining the best possible funding option for the specific electrification project.

Focusing on supporting low-income consumers and productive uses of electricity

Any funding and/or subsidies benefiting electricity users or groups of users shall focus on supporting low-income consumers as well as the productive uses of electricity in areas where the full cost of electricity supply cannot be borne by the consumers, as defined in the eligible categories in Table 4.

Ensuring that cross-subsidisation is economically justified

Many Namibian households are located away from the national grid and have therefore traditionally had limited access to electricity. Moreover, many rural households do not have adequate cash incomes to be able to pay for the regular consumption of electricity at commercial prices. An economically sound cross-subsidisation approach is to be created to ensure broad household-level access to electricity at affordable prices for necessity-level use, as well as for commercially competitive prices for industrial users to ensure global competitiveness for Namibian products.

Protecting end-users

The interests and rights of all end-users that have access to electricity services are and remain protected, irrespective of the underlying business model used to provide such services.

5.2 Vision

The vision of the National Electrification Policy is to provide universal access to electricity in Namibia.

5.3 Mission

The mission of the National Electrification Policy is to create enabling conditions, and to provide guidance and support for existing and new electricity service providers in order to accelerate and broaden the delivery of electricity services to all end-users.

5.4 Goal

To increase access to electricity services using innovative technology, public and private sector participation and funding approaches, for the benefit of all end-users and Namibia's development, thereby reaching universal access to electricity by 2040.

6. Policy Objectives and Strategies

This section presents the Policy's objectives and strategies.

This Policy has eleven objectives to achieve the Policy's goal:

1. Affirm the Government's Commitment to Electrification
2. Optimise Institutional Anchoring and Increase Private Sector Participation
3. Create a Holistic Electrification Planning and Prioritisation Framework
4. Expand and Optimise Electrification Funding
5. Guide Electrification Cost Recovery, Charges and Subsidies
6. Develop and Implement Appropriate Minimum Standards
7. Expand Off-grid Electrification
8. Ensure Awareness, Communication and Expectation Management
9. Ensure Adequate and Timely Capacity Development
10. Establish Reliable Data Collection and Reporting Mechanisms
11. Enhance the Effective Delivery of Electrification

The following subsections provide the details for the eleven objectives. Each objective is introduced by a brief context and rationale and listing key issues and opportunities which are then addressed in the strategies for achieving the objective. The implementation modalities and actions for the strategies are discussed in the implementation plan section of this Policy.

It is to be noted that the sequence in which the objectives and strategies are presented does not reflect their relative importance.

6.1 Affirm the Government's Commitment to Electrification

Context and Rationale for this Policy Objective:

Electrification ambitions and intentions are best framed in a set of concise foundational statements. This Policy provides foundational statements in the form of commitments to electrification that are to anchor, motivate and guide these endeavours into the future.

Key Issues and Opportunities for this Policy Objective:

1. The Government's on-going commitment to electrification is essential and will remain a key prerequisite for future electrification programmes and projects in the country.
2. Both grid and off-grid electrification approaches have their strengths and weaknesses, but are essentially complementary.
3. Sustainable electrification is dependent on long-term benefits being maximised at minimum cost.
4. Electrification needs a national prioritisation and planning framework that guides all stakeholders towards increasing access to electricity in line with agreed-on principles and priorities.
5. Off-grid electrification has not been funded in the same way as grid supplies have, and therefore needs enabling provisions to play a more pronounced role in achieving electrification objectives.

Policy Objective 1: To affirm the Government's custodianship of and commitment to electrification.

Policy Strategies P1. Affirm the Government's Commitment to Electrification

Government:

- P1.a asserts its role as the national custodian and coordinator of efforts to enhance access to electricity throughout Namibia;
- P1.b prioritises and affirms its goal to achieve universal access to electricity;
- P1.c commits to remaining cognisant of the needs and wants of all electricity end-users;
- P1.d commits to creating and strengthening framework conditions to enable harmonised legal, regulatory, funding, and institutional environments to promote on-going electrification;
- P1.e will align the national development programmes to promote universal access to electricity services;
- P1.f embraces and utilises grid and off-grid approaches to expand access to electricity;
- P1.g pronounces the MTF Tier 3 as the minimum service level that is recognised to constitute access to electricity, while lower tiers will be available to end-users on request;
- P1.h promotes private sector involvement in electrification endeavours;
- P1.i encourages the adoption of innovative technological, institutional and funding approaches to achieve its electrification goals;
- P1.j commits to promoting the productive uses of electricity; and
- P1.k remains technology-neutral in its selection of least-cost on- and off-grid supplies.

6.2 Optimise Institutional Anchoring and Increase Private Sector Participation

Context and Rationale for this Policy Objective:

Given that more than one-half of the country's population remains without access to electricity, creating universal access to electricity is a formidable challenge. Two of the principal underpinnings necessary to upscale national electrification efforts from their current state relate to how such efforts are institutionally anchored, and how such endeavours are best supported by private sector participation.

Various institutional models exist to ensure that the roll-out of electrification is adequately anchored. In the past, Namibia opted for a model whereby the Government, through the MME budget allocations (as the country's overall custodian of energy), in collaboration with NamPower, the REDs and select local government entities, delivered such services as and when funding was available. The stagnation in the rate of electrification during the past decade is testimony of the fact that the existing institutional arrangements are unlikely to realise much higher electrification rates than those that have been achieved in the past.

The annual electrification achievements in urban areas do not keep up with population growth. This effect is particularly pronounced in and around urban centres, where the number of new households established is far higher than the number of connections made each year. It is also noteworthy that private sector involvement in these endeavours has been mostly limited to the provision of engineering services, and the supply and installation of technologies.

In Namibia's rural areas, electrification efforts are guided by the Rural Electricity Distribution Master Plan and Off-Grid Energisation Master Plan. However, these plans have generally not delivered the desired outcomes, and the estimated extent of households without access to electricity remains at 80%. It is important to note that most electrification efforts have focused on connecting end-users to the electricity distribution grid, while off-grid electrification efforts are limited to a handful of localities with limited participation by private sector actors.

According to the above, this Policy articulates the main institutional aspects that are to underpin the country's future electrification efforts, and elaborates on the roles that all key stakeholders, including private sector actors, play in the future.

Key Issues and Opportunities for this Policy Objective:

1. The design of institutional arrangements for the electricity distribution industry, in the form of the REDs model, is reasonably robust and can be considered successful. However, the REDs model has not been fully implemented and Namibia's central and southern areas continue to rely on local authorities, regional councils and NamPower Distribution providing electricity services.
2. Current distribution and supply licences extend across large geographic tracts, which include urban, informal and rural areas. Expanding the mandate of current distribution and supply entities would readily allow the licensees to become responsible for all electrification matters throughout their licence area, which would include those for on- and off-grid electrification.
3. Currently, the role of the private sector in delivering access to electricity is significantly limited. Leveraging private sector capacity therefore offers a multitude of untapped opportunities to expand the resource base of existing licensed operators.
4. Providing access to electricity results in materially negative cashflows for an extended period, even where consumers are able to purchase electricity at commercial rates. Private sector

funding, through various forms of patient capital, can alleviate this burden from the Government and other stakeholders.

5. To ensure that electrification is and remains sustainable, utilities must remain financially viable. Aggressive electrification targets or unrealistic return expectations by investors can readily undermine the financial viability of utilities, which would ultimately be to the detriment of electricity consumers.
6. Access to a broader pool of patient, private-sector capital can ensure expedited deployment of infrastructure to create access to electricity, as recoupment of invested capital on previous projects need not be achieved before new projects can be undertaken.
7. The Ministry of Mines and Energy is responsible for the implementation of the rural electrification programme. However, a variety of factors, including resource constraints and many others, have delayed the regular implementation of the REDMP, which is outdated.
8. The institutional and governance aspects that underpin national electrification efforts must be described for future national electrification strategies and plans, and integrated into the regulatory provisions to be developed for such purposes.
9. The deployment of off-grid electrification approaches often necessitates ownership modalities that differ substantially from those of the existing distribution licensees. If the licensees are to become responsible for on- and off-grid electrification in their areas of responsibility, it will be imperative that current ownership and business modalities accommodate the requirements of new entrants.
10. Accelerating grid and off-grid electrification requires current regulatory provisions to be updated.

Policy Objective 2: To optimise the institutional modalities for electricity distribution and supply to accelerate the delivery of electrification services throughout Namibia, including by active private sector participation.

Policy Strategies P2. Optimise Institutional Anchoring and Increase Private Sector Participation

Government:

- P2.a will empower licensed distribution and supply entities to implement electrification efforts, and support these entities in establishing the capacities required to undertake such efforts in the areas under their control, including the planning, prioritisation and funding thereof;
- P2.b in consultation with relevant stakeholders, will develop institutional principles, rules and models for increased private sector participation in the electricity distribution industry, particularly in off-grid electrification, without undermining the responsibilities and viability of existing licensees;
- P2.c will encourage the competitive selection of service providers for off-grid electrification, where relevant, to ensure the desired level of service provision at the best possible price and in the minimum possible time;
- P2.d supports the Regulator to strengthen the provisions that govern the electricity distribution industry to ensure the continued viability of licensed entities when they become responsible for all electrification efforts;
- P2.e supports the Regulator to develop enabling regulatory provisions to enhance the institutional, regulatory, accountability and governance provisions in order to provide upscaled electrification services;

- P2.f will ensure that future electrification strategies, plans and implementation provisions focus on the specification of realistic, tangible and affordable institutional and governance arrangements for both public and private sector entities and persons active in the electricity distribution industry;
- P2.g will incentivise investments by developers and new service providers and the establishment of viable and sustainable business models to invigorate the delivery of electrification services to end-users, taking the multitude of ownership arrangements that characterise contemporary supply technologies into account;
- P2.h will maximally leverage the roles, capacities and responsibilities in the electricity industry to ensure that accelerated electrification is implemented at the minimum achievable overall cost and complexity while ensuring appropriate standards are adhered to; and
- P2.i encourages and supports stakeholder use of a diversified portfolio of funding opportunities and options to ensure best-priced service delivery to consumers in the minimum possible time.

6.3 Create a Holistic Electrification Planning and Prioritisation Framework

Context and Rationale for this Policy Objective:

Despite the multitude of benefits of having access to reliable and affordable electricity supplies, their provision remains expensive. Therefore, electrification requires prudent planning and prioritisation.

In mid-2020, regular national electrification planning and prioritisation no longer occurs, and binding electrification targets are absent. These factors contribute to industry-wide uncertainties that pertain to the goals, responsibilities and efficacy of the majority of contemporary electrification undertakings. Also, as past plans did not integrate grid- and off-grid service options and focused on rural areas only, the growing needs in urban informal and other areas have not been addressed.

This section details how systematic planning processes are to lead to prioritised electrification targets.

Key Issues and Opportunities for this Policy Objective:

1. A holistic action plan that spells out how access to electricity is to be systematically increased throughout urban, informal, and rural areas is lacking, which leads to uncertainty throughout the electricity industry.
2. Bottlenecks in other service provisions (e.g. access to residential land in urban areas) constrain the provision of electrification services.
3. Electrification planning is to align with the objectives that guide Namibia's national development plans and should be based on best practice economic principles promoting sustainable production that creates local value.
4. The electrification plan is to set binding targets based on a transparent and dynamic prioritisation mechanism, which will result in a schedule of electrification activities and associated responsibilities for all major electricity industry actors.
5. Prioritisation must specifically include businesses, institutions and households in urban, informal, and rural areas, using their socio-economic impacts and contributions to national development as a guide.
6. Electrification beneficiaries are to be consulted as part of electrification planning and delivery to ensure their buy-in and support.
7. The National Electrification Master Plan must take the recent advances in cost-effective grid and decentralised power supply and electricity storage technologies into account.
8. High-level capital requirements due to grid extensions (e.g. those required to strengthen the transmission system and generation capacity) must be quantified in the National Electrification Master Plan.

Policy Objective 3: To create a holistic planning and prioritisation framework for electrification in Namibia.

Policy Strategies P3. Create a Holistic Electrification Planning and Prioritisation Framework

Government:

P3.a commits to prioritise, initiate, plan and execute electrification programmes and projects to maximise their beneficial impacts on the country's socio-economic development while minimising their long-term cost and reliance on subsidies;

- P3.b will prioritise electrification efforts based on relevant economic principles designed to maximise long-term benefits of end-users and investors;
- P3.c commits to developing a National Electrification Master Plan (NEMP) in consultation with all relevant stakeholders, which is to include all eligible categories as identified in this Policy and be based on both grid- and off-grid service delivery models, and to keeping it up to date;
- P3.d will treat on- and off-grid electricity supplies on a level playing field and will incorporate all relevant technical, operational and financial advances achieved in the development of decentralised power supply systems and electricity storage technologies; and
- P3.e will ensure that the NEMP sets realistic targets, and that their associated implementation timeframes are guided by national development objectives and informed by the electrification funding framework.

6.4 Expand and Optimise Electrification Funding

Context and Rationale for this Policy Objective:

The electrification of urban formal areas is mainly funded by electricity end-users through the sale of serviced land, whereas rural electrification efforts that focus on schools and clinics are funded by the Government, NamPower and to some extent by the REDs. Urban informal electrification is funded largely by the licensees (REDs and local authorities), sometimes with Government support. In the past, rural electrification endeavours benefitted substantially from donor funding, but while such opportunities still exist, their scale, nature and scope have changed over the last decade. Conventional donor funding is increasingly hard to come by as Namibia has graduated to an 'upper-middle income' status; however, concessional funding for developmental, environmental and climate change-related projects remains readily available.

Today's fragmented electrification responsibilities have resulted in an incomplete view of the funding required to advance national electrification efforts. Internationally, a large variety of new funding opportunities have become available, including funds that specifically focus on carbon-neutral and development-related electrification projects. Local funding opportunities, other than those generated from within the electricity industry and from Government allocations, have largely remained untapped.

Government acknowledges that fiscal support measures enhance an investment-friendly economy, and may even result in lowering end-user electricity charges. The lack of empirical data and coordination between role-players and decision-makers, confusion regarding regulation, procedural and approval delays, lack of suitable sources of funding, few or no subsidies and/or grants, inflexible tariffs, and the absence of other incentives are well-known impediments to investments in the electricity sector.

Namibia has a well-established albeit small financial market, which is made up of a handful of world-class financial institutions. However, for established and new players in the electricity industry to embark on further electrification incentives such as subsidies, grants, tax exemptions and others have mostly been unavailable. These factors as well as the availability and cost of capital and electrification support mechanisms must be addressed if electrification efforts are to be invigorated.

Key Issues and Opportunities for this Policy Objective:

1. As Government is cognisant of the considerable funding challenges that exist in order to achieve universal access to electricity, it is therefore developing the National Electrification Funding Portfolio, in tandem with this Policy, to create a broad new approach that can fund future electrification initiatives.
2. Today, urban electrification is funded largely by select licensed electricity utilities, with some support from the Ministry responsible for urban development. These entities have limited incentives and no compulsory targets to invest in large-scale electrification.
3. Electrification in informal areas has seen very little investment by utilities and the Government.
4. The electrification of rural and informal areas is often not considered commercially viable. High upfront investment and operating requirements, and generally low electricity consumption rates, often imply that subsidies are required to achieve cost recovery and some marginal viability.
5. Funding for rural electrification is mostly from Government sources, while licensed distribution and supply entities contribute little to rural electrification in their areas of responsibility.

6. A multitude of development- and climate-related funding sources exist. Internationally, private investments are increasingly supplementing limited public funding for electrification. Tapping into such sources requires local framework conditions to be tailored to their requirements.

Policy Objective 4: To create conducive conditions for a diverse funding portfolio supporting electrification.

Policy Strategies P4. Expand and Optimise Electrification Funding

Government:

- P4.a will provide regular core funding from the national annual budget to support the planned electrification efforts as identified in the National Electrification Master Plan;
- P4.b will ensure that the core funds provided are utilised as a catalyst to attract further funds from private and international sources in order to multiply their effectiveness in terms of service delivery, as described in the NELFP;
- P4.c commits to initiating and providing support to efforts in order to attract donor-, grant-, investment- and climate-related funding for direct investments as well as the co-funding of electrification initiatives;
- P4.d commits to establishing suitable support mechanisms to enhance private sector involvement and investments in broadening the national electrification funding portfolio;
- P4.e will ensure that the National Electrification Funding Portfolio, developed in tandem with this Policy, is kept up to date, and caters for the funding requirements of electrification undertakings as laid down in the National Electrification Master Plan; and
- P4.f commits to providing access of relevant information to prospective investors of electrification programmes and projects.

6.5 Guide Electrification Cost Recovery, Charges and Subsidies

Context and Rationale for this Policy Objective:

Namibian electricity tariffs are calculated to reflect the total inherent cost of supply. In other words, electricity tariffs at an aggregated level are cost-reflective. The tariff determination methodology is set by the Regulator and it guides how tariffs are calculated, which ensures consumer protection. Licensed electricity utilities may only use tariffs that have been approved by the Regulator (i.e. tariffs are regulated and not directly subject to market forces that determine the price of many other goods or services).

Often, direct and/or indirect subsidies are a part of an end-user's electricity tariff, thereby reducing or increasing the total price of electricity. While there is broad agreement that subsidies are a legitimate tool to reduce the cost burden of some end-users, it is also clear that other end-users must pay on top of the cost-reflective price to generate the subsidy. End-user subsidies are common, even though they are known to dilute the price signal and to distort the economics that underlie the price of a traded commodity.

An electricity tariff is formed by taking the total cost of supply and different cost drivers into account. This implies that tariffs for grid-supplied electricity are usually quite different when compared with tariffs from off-grid sources. This is because off-grid electricity tariffs, by their nature, have markedly different costs and cost drivers to those of conventional grid electricity supplies. From an equitability and fairness perspective, however, grid- and off-grid tariffs ought to be similar if the services that they provide are comparable, which is a common entry point for introducing subsidies. To illustrate, tariffs for electricity services provided by mini-grids or stand-alone supply systems must consider that such systems often have energy and/or capacity constraints. Off-grid tariffs and connection options must therefore also take the underlying system limitations into account, in addition to their inherent costs and cost drivers.

Where off-grid services are provided to low-income communities or households, the affordability of services is critical. Innovative approaches to packaging services and setting tariffs are therefore required to optimise cost recovery by maximally responding to the end-users' energy needs and the affordability of tariffs. As off-grid systems often have distinctly different capital and operational cost requirements compared with grid-supplied electricity services, tariffs for off-grid systems must be focused on the services and service levels they provide. In case subsidies/cross-subsidisation of services are required, suitable subsidisation mechanisms must be devised in order to attract non-state funded electricity services to end-users.

Key Issues and Opportunities for this Policy Objective:

1. The principle of payment for services is well established in Namibia. However, there is a need to further clarify how this is to be applied regarding electricity services from off-grid supplies.
2. Access to subsidies and financial support for grid- and off-grid electrification efforts remain disproportionately in favour of grid electrification.
3. Many rural supply options, including off-grid supplies, are unlikely to allow the full recovery of costs from end-users, which implies that such services can only be made available if they are subsidised.
4. Uniform tariffs per distribution utility have long been the objective and the norm. These must be re-examined in the light of off-grid and accelerated on-grid electrification efforts.
5. While the overall objective of full cost recovery (of a regulated cost base) from tariffs is well established, its application to individual customer classes in informal and rural areas is unclear.

6. Contemporary rural grid supplies receive capital and operational subsidies, although the latter are not quantified. Off-grid services need to follow a similar approach to be viable and affordable.
7. A tariff methodology is in place for the regulation of tariffs related to grid-delivered electricity services. However, for off-grid services it is often not useful to formulate tariffs based on energy consumption; instead, they must be based on service levels, which is not yet available in Namibia.
8. Contemporary grid-supplied household tariffs benefit from cross-subsidies that are part of utility tariffs. These are not formally designed, nor have they been fully quantified, which implies that their impact on the electricity industry and economy remains unclear. How such benefits could be extended to off-grid services remains unknown.
9. While a national connection charge policy exists, the application thereof to electrification services has not been elaborated and needs to be reviewed. This specifically applies to a uniform approach to connection charges for electrification beneficiaries, both for grid and off-grid services.
10. The National Electricity Support Tariff (NEST) mechanism has been approved, and it is being implemented for grid connected households. Its application to households that take off-grid supplies has not been determined.

Policy Objective 5: To guide the cost recovery, charge and subsidy approaches for electrification beneficiaries.

Policy Strategies P5. Guide Electrification Cost Recovery, Charges and Subsidies

Government:

- P5.a supports the Regulator to ensure that electricity tariffs and associated charges balance the needs of end-users with the sustainability of utilities;
- P5.b supports the Regulator to develop a pragmatic and flexible off-grid tariff methodology that meets the needs and requirements of end-users as well as service providers and their investors;
- P5.c supports the development and implementation of innovative and sustainable electricity service provision approaches that minimise the long-term cost of supply;
- P5.d encourages existing and new electricity utilities and their investors to propose business modalities that result in the accelerated delivery of both on- and off-grid electricity services;
- P5.e requests the Regulator to ensure that all new grid electrification household connections are implemented using a uniform connection charge approach;
- P5.f supports the Regulator to ensure that subsidies and cross-subsidies are comprehensively quantified, and that their purpose and magnitude is and remains economically justifiable; and
- P5.g supports the Regulator to ensure that electrification-related subsidies and cross-subsidies are applied to those electricity services that meet well-defined and broadly communicated support and equitability criteria, and that they are informed by best economic practice.

6.6 Develop and Implement Appropriate Minimum Standards

Context and Rationale for this Policy Objective:

Funding used for electrification must result in long-lived infrastructure that satisfies the requirements of end-users while advancing national development objectives. Minimum standards are important safeguards because they ensure that the cost of electrification services deliver long-term benefits.

Key Issues and Opportunities for this Policy Objective:

1. Namibia's technical standards guiding grid electrification are well developed. However, in view of the many technical advances in electrification, regular in-depth reviews will ensure that these continue to meet end-user needs as well as the evolving requirements of the electricity industry.
2. In contrast to grid standards, local off-grid electrification standards have not been developed, and relevant international standards have not been adapted to local conditions and requirements.
3. Existing quality of supply and service standards are aimed at grid electricity supplies and need to be expanded to fully accommodate the multitude of capabilities of contemporary off-grid electricity supply systems that are to be used in future electrification undertakings, and to ensure the affordability of electricity services.
4. This Policy includes the Multi-Tier Framework (MTF) for electricity services for institutions and households, which defines the minimum requirements for access to electricity. Minimum service standards for the operation and maintenance of off-grid electricity supply systems must be elaborated to ensure that systems employed in the future meet the minimum requirements as laid down in MTF Tier 3.
5. Mini-grids should be designed and built according to grid-compatible standards, and their reliability and safety should be compatible with contemporary grid requirements.
6. Contemporary standards for the grid connection of a household include a consumption meter and ready-board, which provide a basic connection point without requiring further formal in-house wiring. This minimum standard is to be extended to connections from mini-grid systems. Connection standards for households supplied by stand-alone electricity systems are as yet unavailable and require further elaboration.

Policy Objective 6: To establish a set of minimum standards for electrification assets and services.

Policy Strategies P6. Develop and Implement Appropriate Minimum Standards

Government:

- P6.a commits to ensuring technology neutrality and supporting all electrification approaches that fulfil minimum service standards;
- P6.b supports the Regulator to expand the system of recognised quality and technical standards to cover all relevant electrification technologies, including quality controls, equipment certification, and to develop, promulgate and enforce relevant technical standards for grid and off-grid supplies;
- P6.c encourages the Regulator to ensure that the network design, operational, maintenance and safety standards for mini-grids are compatible with the standards and codes as are applicable for the main grid infrastructure; and

P6.d supports the Regulator to develop appropriate minimum service standards for stand-alone supply systems.

6.7 Expand Off-grid Electrification

Context and Rationale for this Policy Objective:

Electrification is achieved by connecting end-users to the national grid, mini-grid or a stand-alone power supply system. Presently, regulated and licensed supply entities, such as the Regional Electricity Distributors (REDs), select local and regional authorities, NamPower and others, provide electricity to end-users by way of grid connections. Examples of off-grid electricity supplies (e.g. such as Tsumkwe and Gam) exist, but they are not part of the standard services offered by supply entities.

These electricity supply entities operate under business models that have evolved over time and ensure that they remain compliant with the regulatory provisions that govern the industry. In contrast, business models for off-grid electrification have not found their way into the day-to-day operations of local electricity utilities, and their regulatory requirements remain vague. This implies that the mainstreaming of off-grid electrification efforts requires the development and implementation of suitable off-grid electrification business models and associated regulatory provisions.

This section focuses on the terms and conditions that are to underpin the business models according to which off-grid electrification efforts are to be undertaken.

Key Issues and Opportunities for this Policy Objective:

1. Contemporary Namibian electricity utilities are almost exclusively focused on grid-connected operations, and their underlying business is centred on operating grid infrastructure.
2. To date, more than half of Namibia's population does not benefit from access to electricity. It is generally accepted that grid supplies cannot effectively be made available to everyone. In view of the Government's universal access goal, this implies that a marked increase of conventional grid connections is unlikely, and that other approaches will have to be developed and implemented.
3. A large variety of cost-competitive off-grid technologies exists, which can form part of an integrated approach to create universal access to electricity.
4. While conventional electrification has had limited success in attracting private sector participation, off-grid electrification can open the playing field to new entrants who offer innovative and competitive alternatives to traditional grid supplies. Such entry, however, necessitates the creation of enabling framework conditions to attract investors and the application of business models that result in the supply of electricity to those who remain unserved.
5. The design of off-grid electrification business models must be sufficiently flexible to stimulate interest and investment, and to cater for the different needs and circumstances that characterise off-grid end-users.
6. Grid encroachment in areas where off-grid investors are active must be managed; for this purpose, transparent rules, procedures and standards are required. The premature/late arrival of grid services in areas benefitting from off-grid supplies is unlikely if the National Electrification Master Plan is followed.

Policy Objective 7: To create enabling conditions to attract and retain investments in off-grid electrification.

Policy Strategies P7. Expand Off-grid Electrification

Government:

- P7.a recognises and supports innovative and cost-competitive off-grid electrification approaches undertaken by established as well as new operators, and their potential to broaden access to electricity;
- P7.b encourages the Regulator to develop and enact pragmatic regulatory provisions that attract investments in off-grid electrification and enable the introduction of off-grid businesses and business models to broaden the creation of access to electricity;
- P7.c supports the introduction of mini-grids as well as stand-alone power supplies where end-user densities or related considerations favour such technologies, and as a complement to grid services;
- P7.d will develop and provide a suite of targeted support measures and fiscal incentives for which off-grid electrification investors can apply, which may include tax incentives, guarantees, top-up payments where funding gaps exist and compensation for political and natural force majeure and others, as appropriate;
- P7.e supports the development of business models to stimulate off-grid electrification undertakings by making efficient use of existing institutions, in close collaboration with all relevant stakeholders; and
- P7.f will mitigate the loss of income or unmet returns on investment of off-grid service businesses included in the National Electrification Master Plan as may be brought about by the unplanned arrival of grid supply infrastructure.

6.8 Ensure Awareness, Communication and Expectation Management

Context and Rationale for this Policy Objective:

End-users must have the requisite knowledge in order to make informed choices about electricity-related products and services. An increasing number of electricity-related supply and product options are available. These options require a basic level of end-user awareness for them to be able to comprehend and rationally act on the features and financial implications that best meet individual requirements.

A lack of awareness and/or communication relating to services or unrealistic expectations may lead to poor choices, unnecessary expenditure and consumer dissatisfaction, which could otherwise have been minimised had adequate and timely information been pro-actively communicated.

Key Issues and Opportunities for this Policy Objective:

1. National awareness campaigns targeting electricity end-users have not been systematic.
2. While select distributors give advice, it remains unclear whether this has improved consumers' awareness of electricity-related products, services and choices that are on offer.
3. Access to information is often more challenging for persons living in strained socio-economic settings, which requires targeted pro-poor awareness campaigns.
4. Consumer awareness of energy-saving opportunities, energy efficiency options, energy safety, the productive use of electricity, and the related tariff/costing implications is critically important.
5. To date, little tangible data on electricity end-user needs, preferences and opinions is available, which is required to design targeted energy awareness campaigns.
6. Electrification services offered in conjunction with the National Electricity Support Tariff (NEST) mechanism need to be understood by consumers, particularly the cost-saving benefits afforded by having access to such services.
7. Having an electricity supply is often associated with a connection to the grid. However, as new supply options become available, access to electricity can be achieved by means other than a grid connection (e.g. taking supplies from a mini-grid or a stand-alone power supply system).
8. Adopting the MTF Tier 3 as the national minimum standard for being recognised as having access to electricity requires that end-users are made aware of this definition. It will be important that expectations regarding access to electricity are managed in order to minimise controversy or end-user rejection, and special emphasis needs to be placed on the fact that an MTF Tier 3 supply is significantly different from a grid connection.
9. Many off-grid electricity solutions require some or even substantial limits on the amount of energy that can be drawn at a particular time. This implies that consumer consultations and education are required to minimise the possible misuse or rejection of such supply systems.
10. Consumer awareness and education on the cost of electricity, irrespective of how it is provided, is of critical importance to ensure that end-users maximise the economic opportunity offered by having access to electricity while minimising the cost incurred for such services.

Policy Objective 8: To ensure that customers are adequately informed about electrification.

Policy Strategies P8. Ensure Awareness, Communication and Expectation Management

Government:

- P8.a will broadly communicate and raise awareness on the MTF Tier 3 standard;
- P8.b will conceptualise and launch a national assessment of electricity consumers' awareness, needs and wants in relation to the products, services and choices offered by the electricity industry;
- P8.c commits to initiating and supporting – in collaboration with electricity industry stakeholders – a consumer awareness campaign on electrification, which targets all consumer groups and places special focus on the information requirements of poor and marginalised communities;
- P8.d encourages the Regulator to ensure that all licensed electricity entities are mandated to implement regular consumer education and awareness programmes, which focus on the requirements, benefits, costs, options and limitations of all grid and off-grid electrification supplies that are offered and also include energy savings and energy efficiency options, safety tips when using electricity, advice on the productive use of electricity and consumer rights and duties; and
- P8.e commits to making the National Electrification Master Plan and planned electrification programmes and projects publicly available, and to broadly disseminating all relevant information related to such plans, programmes and projects.

6.9 Ensure Adequate and Timely Capacity Development

Context and Rationale for this Policy Objective:

The availability of adequately capacitated human resources is central to successful electrification planning, funding, implementation and operations that provide services. Except for a few in-house training programmes, the electricity industry mostly relies on external education and training providers to ensure that the necessary human capacity can be procured, as and when required.

Key Issues and Opportunities for this Policy Objective:

1. While most of the large distributors are considered to be reasonably resourced in terms of their human capital, the same cannot be said for many pre-RED-area distributors, whose operations continue to be constrained by the limitation of available skills, experience and capacities.
2. The availability of suitably skilled and experienced human resources remains a challenge throughout Namibia's electricity industry, and the market continues to be constrained by the absence of suitably skilled persons.
3. Tertiary education and training facilities must be aware of and actively participate in the identification and development of the electricity industry's efforts to continuously enhance its capacities and upskill its workforce.
4. For utilities to take a more active role in electrification, their human resource base must be broadened, specifically in the field of planning, funding and the roll-out and operation of off-grid electricity supplies.
5. The existing utilities are not experienced to deal with off-grid electricity service models and their technical and operational requirements. This presents opportunities to further involve the private sector, where such skills exist. However, it is important to note that it is doubtful whether the private sector's current resource base is sufficient to support the large-scale roll-out of off-grid electricity systems, particularly in remote areas.
6. Community involvement in electrification may create opportunities for skills development and thereby invigorate rural economic activities.

Policy Objective 9: To ensure the adequate development of capacities to accelerate electrification.

Policy Strategies P9. Ensure Adequate and Timely Capacity Development

Government:

- P9.a commits to engaging with relevant stakeholders to ensure that appropriate local capacity is developed and adequately skilled in order to meet the changing needs of the electricity industry;
- P9.b prioritises electricity-related capacity building and training at technical, vocational and tertiary institutions, and the pro-active engagement of these providers with the electricity industry;
- P9.c supports relevant endeavours to secure adequate human, financial and technical resources for tertiary capacity development and training for electrification, as envisaged in this Policy;
- P9.d supports the Regulator to ensure that all electricity industry actors including the private sector contribute to the on-going development and upskilling of staff, and the provision of practical training opportunities; and

P9.e supports the Regulator to ensure the involvement and training of communities as part of the roll-out of electrification.

6.10 Establish Reliable Data Collection and Reporting Mechanisms

Context and Rationale for this Policy Objective:

The planning, funding and provision of electrification services must be based on reliable and timely data, which must encompass common and uniformly defined terminology. To date, the Regulator collects, collates and reports on select data from throughout the industry; other entities also report on aspects relating to electrification.

However, considerable data gaps remain, which include the perceptions, preferences and behaviour of electricity consumers, the use of appliances, dynamic load patterns, self-generation, and many others. For effective planning, such electricity-related data is essential, as it forms the backbone of load forecasting, the design of new services and economically efficient tariffs, charges and subsidies, and others.

Key Issues and Opportunities for this Policy Objective:

1. Comprehensive, accurate and timely electricity-related industry-wide data is lacking, which challenges policy making, forecasting, planning, and reliable performance assessments.
2. Despite regulatory oversight, data provided by electricity utilities is often inaccurate and unreliable in terms of customer base and number of connections served, the location and stratification of such connections, and other critical indicators.
3. The promulgation of town councils in areas that were previously classified as rural presents an additional challenge when reporting on electrification efforts. As connections in these areas are no longer classified as rural, they are not reported as rural electrification achievements.
4. Rural to urban migration has significant impacts on the electrification needs of urban informal areas, and is inadequately reported on. As a dynamic phenomenon, it challenges the traditional approach to planning, which leads to the inaccurate and out-dated reporting of electrification needs.
5. When rural electrification assets created by or on behalf of the line ministry are handed over to licensees, information on the number of connections served and the total investment made is not reliably transferred between the parties; as a result, this leads to inaccurate planning and reporting.

Policy Objective 10: To establish a framework that enables systematic and reliable electrification-related data collection and reporting throughout the electricity industry.

Policy Strategies P10. Establish Reliable Data Collection and Reporting Mechanisms

Government:

P10.a will develop and implement a national data collection mechanism to enable the regular collection, collation, analysis, quality assurance, verification and reporting of electrification data throughout the electricity industry, leveraging existing capacities where feasible;

P10.b encourages the Regulator to require licensees to collect and retain information on electrification investments made under the National Electrification Master Plan and to identify associated customers, operational costs, sales and revenues, and to annually report thereon;

- P10.c supports the Regulator to ensure that all distribution and supply licensees keep records of customers and electrification activities, using the eligible categories as introduced in this Policy;
- P10.d requests the Regulator to provide all relevant electricity-related data to the national energy data custodian, as directed in the National Energy Policy;
- P10.e commits to publishing an annual State of the Electricity Industry report, which should be publicly available and include reporting on the electricity access status and progress; and
- P10.f will ensure that the data used in the development and regular update of the National Electrification Master Plan is quality-assured, comprehensive and up to date.

6.11 Enhance the Effective Delivery of Electrification

Context and Rationale for this Policy Objective:

This section raises several essential collateral matters that are vital for the effective delivery of accelerated electrification services.

Access to reliable and affordable electricity is a key requirement for socio-economic development. It is therefore important that electrification-related considerations are adequately addressed and integrated into the country's main economic, social and environmental policies and planning documents. National development can be stifled by conflicting or competing interests between different economic activities; therefore, the need for development-related programmes and projects to be maximally integrated and harmonised amongst each other is vital. This means that the national development planning processes must ensure that integration and harmonisation is achieved.

The past decade has vividly illustrated that the urban delivery of serviced land does not meet growing demands. This increasing backlog leads to sprawling informal areas that offer limited or no access to formal services, including the supply of electricity. The systematic release of adequately serviced land remains a critically important issue that requires national corrective actions.

Electricity generation and supply technologies have undergone considerable development during the past decades, and offer a wide variety of new and improved approaches to providing access to affordable electricity services. This change is not slowing, and further evolution can be expected during the coming years. Participating in these developments would offer an opportunity for the promotion of local innovation, which can support the economic development of the country.

Various entities, including the National Commission on Research, Science and Technology, as well as various innovation and research units have been established at the country's universities, as promoted by the Ministry of Higher Education, Training and Innovation, the Ministry of Trade, Industrialisation and SME development, the Business and Intellectual Property Authority, and others. It is important that electrification-related research and development is further supported, and that national priorities focus on providing incentives to support these endeavours.

Key Issues and Opportunities for this Policy Objective:

1. Electrification can be a powerful instrument for socio-economic upliftment, job creation and poverty reduction. However, it is important to recognise that these are national development imperatives that cannot be shouldered by the electricity industry alone.
2. Every five years, Namibia's national development planning efforts culminate in updated National Development Plans. The underlying planning process offers opportunities to harmonise national development goals that lead to tangible programmes and projects. Electrification is an important and recognised driver of national development efforts; therefore, it must be an integral part of all updated national development plans.
3. The scope and ambition of future electrification undertakings should not be limited to only meeting the basic energy needs of people. An additional focus on the productive uses of electricity also offers the potential to create jobs and promote further social upliftment.
4. Rapid rural to urban migration creates significant social, funding and infrastructure challenges. Rural electrification efforts are aimed at providing services in rural areas. These efforts have been inadequate with regard to counteracting rural-to-urban population flows, and have contributed

to an ever-increasing backlog of un- or under-serviced households in and around most urban centres.

5. The inability to provide sufficient serviced land in local authority areas remains a major impediment to service delivery, including the provision of electrification. The ever-increasing spread of informal areas is associated with unresolved questions relating to the legitimacy of such land occupation, all of which remain urgent and important national matters. While the electricity industry is a key actor, the provision of serviced land has many dimensions that the country's electricity industry cannot effectively address without the active input and support of other stakeholders.
6. National research and innovation capacities are limited, and they need further strengthening. The electricity industry is favourably positioned to initiate cooperative efforts to promote targeted research and support innovation that focuses on broadening and improving the provision of electricity services and related aspects.

Policy Objective 11: To initiate and support efforts to enhance the effective delivery of electrification.

Policy Strategies P11. Enhance the Effective Delivery of Electrification

Government:

- P11.a will ensure that all programmes and projects relating to electrification are comprehensively integrated, planned, funded, and monitored and evaluated as part of the design and implementation of the National Development Plans and National Electrification Master Plans;
- P11.b will create and implements a programme to promote and advance the productive uses of electricity, with specific focus on the creation of jobs and upliftment of livelihoods in Namibia's informal and rural areas;
- P11.c commits to integrate electricity access needs and prerequisites when addressing the pragmatic and accelerated delivery of serviced land in and around urban areas;
- P11.d will invest in electrification-related research, development and innovation; and
- P11.e will support the electricity industry to regularly allocate resources and provide opportunities for research and innovation, in collaboration with tertiary and vocational training institutions, independent experts, non-governmental organisations, and other relevant actors.

7. Implementation Framework

[To be drafted once the Policy's main content has been finalised]

Annexure A: Multi-tier Framework for Electricity Services

Table 5: Multi-tier electricity services framework for institutions

	Tier 3: 12 hours/day	Tier 4: 16 hours/day	Tier 5: 24 hours/day
Electricity service(s)	Essential electricity services, which include limited lighting and essential equipment use, as required for administrative purposes	Comprehensive electrical coverage, which includes all administrative and other rooms, as required	Comprehensive electrical coverage plus thermal energy services to ensure that the entire facility is fully electrified
1. <i>Availability</i>	12h/d ¹ at 200W ² or more	16h/d at 1 000W or more; scaled to size of institution	24h/d at 2 000W or more; scaled to size of institution
2. <i>Reliability</i>	Minimum 50% ³ of service available under any normal ⁴ environmental conditions	Complies with grid quality of service standard and technical rules; scaled to 16h ⁵ supply per day with energy/capacity constraints	Complies with grid quality of service standard and technical rules
3. <i>Quality</i>	Electrical equipment can be used without risk of damage due to supply quality deviations	Complies with grid quality of supply standard and technical rules	Complies with grid quality of supply standard and technical rules
4. <i>Affordability</i>	Less than twice the cost of obtaining the same capacity and energy from the grid	Regulated tariffs for consumption and capacity	Standard regulated grid electricity tariffs
5. <i>Legality</i>	3-year service warranty	Subject to regulated licensee supply conditions	Subject to regulated grid licensee supply conditions
6. <i>Convenience (expressed as a service level)</i>	Lighting of 2 000lh/d ⁶ and an average draw of 200W over 12h/d	Unconstrained efficient lighting and an average draw of 1 000W over 16h/d	Unconstrained efficient lighting and an average draw of 2 000W over 8h/d
7. <i>Health</i>	No additional indoor particulate emissions because of such services	No additional indoor particulate emissions because of such services	No additional indoor particulate emissions because of such services
8. <i>Safety</i>	Overload, earth leakage (where applicable) and short-circuit protection	Overload, earth leakage and short-circuit protection	Overload, earth leakage and short-circuit protection
A. <i>Services to Schools</i>	Lighting, Internet connection and Wi-Fi hotspot, one computer, and one laser printer in admin. office for 8h/d	Tier 3 plus room lighting in all classrooms for 8 h/d, plus one low amperage socket per classroom, plus one small refrigerator in office	Full lighting and appliance use, as well as water heating and space cooling/heating
B. <i>Services to Clinics</i>	Lighting, Internet connection and Wi-Fi hotspot, one computer, and one laser printer in admin. office for 8h/d, plus one small refrigerator for essential medicines for 24h/d	Tier 3 plus the use of low power appliances and medical equipment for 16h/day, and a full refrigerator for 24h/d	Full lighting and appliance use, as well as water heating and space cooling/heating
C. <i>Services to Offices</i>	Lighting, Internet connection and Wi-Fi hotspot, one computer, and one laser printer in one office for 8 office hours	Tier 3 plus lighting in all office rooms, one computer per room, and other basic non-thermal office appliances	Full lighting and appliance use, as well as water heating and space cooling/heating
D. <i>Additional Services</i>	None	Staff houses have at least Tier 3 household access	Staff houses have Tier 5 household access, and water supply is electrified, where applicable

¹ h/d = hours per day

² W = Watt

³ For 50% of the daily electrical energy requirement, at full power rating (i.e. if the norm is 4h/day at 5W, then 50% means 2h/day at 5W).

⁴ 'Normal environmental conditions' include events, such as intermittent cloud cover, which affect the performance of solar PV systems.

⁵ h = hours

⁶ lh/d = lumen hours per day

Table 6: Multi-tier framework for households

	Tier 1: 4 hours/day	Tier 2: 4 hours/day	Tier 3: 12 hours/day	Tier 4: 24 hours/day	Tier 5: 24 hours/day
Electricity services	Lighting, radio, and phone charging	Tier 1 plus a television and a fan	Tier 2 plus use of select low-power electrical appliances	Tier 3 plus moderate use of select electrical household appliances	Tier 4 plus full use of common electrical household appliances
1. <i>Availability</i>	4h/d at 5W or more in the evening (~20Wh/d) ⁷	4h/d at 50W or more in the evening (~200Wh/d)	12h/d at 180W or more with at least 4 hours during the evening, plus sufficient capacity to operate a small refrigerator (~2.2kWh/d) ⁸	24h/d at 600W or more (~9.6kWh/d)	24h/d at 2 000W or more
2. <i>Reliability</i>	Minimum 50% of service available under any normal environmental conditions	Minimum 50% of service available under any normal environmental conditions	Minimum 50% of service available under any normal environmental conditions	Complies with grid quality of service standard and technical rules; scaled to 16h supply per day with energy and capacity constraints	Complies with grid quality of service standard and technical rules
3. <i>Quality</i>	Electrical equipment can be used without risk of damage due to supply quality deviations	Electrical equipment can be used without risk of damage due to supply quality deviations	Electrical equipment can be used without risk of damage due to supply quality deviations	Complies with grid quality of supply standard and technical rules	Complies with grid quality of supply standard and technical rules
4. <i>Affordability</i>	Less than 5% of household income	Less than 5% of household income	Less than 5% of household income	Less than 5% of household income	Less than 5% of household income
5. <i>Legality</i>	2-year service warranty	3-year service warranty	4-year service warranty	Subject to regulated licensee supply conditions	Subject to regulated grid licensee supply conditions
6. <i>Convenience (expressed as a specific service level)</i>	Lighting of more than 500lh/d	Lighting of 1 000lh/d, and 4h/d for a television and fan	Lighting of 1 500lh/d, 8h/d for a television and fan, and 12h/d for other limited low power electricity use, which includes a small refrigerator	Unconstrained efficient lighting, a television, a fan, and moderate appliance use	Unconstrained efficient lighting, 5h/d for a television and fan, and 12h/d for electrical appliance use as well as thermal use
7. <i>Health</i>	No additional indoor particulate emissions because of such services	No additional indoor particulate emissions because of such services	No additional indoor particulate emissions because of such services	No additional indoor particulate emissions because of such services	No additional indoor particulate emissions because of such services

⁷ Wh/d = watt hour per day

⁸ kWh/d = kilo-Watt hours per day

	Tier 1: 4 hours/day	Tier 2: 4 hours/day	Tier 3: 12 hours/day	Tier 4: 24 hours/day	Tier 5: 24 hours/day
Electricity services	Lighting, radio, and phone charging	Tier 1 plus a television and a fan	Tier 2 plus use of select low-power electrical appliances	Tier 3 plus moderate use of select electrical household appliances	Tier 4 plus full use of common electrical household appliances
8. Safety	Overload, earth leakage (where applicable) and short-circuit protection	Overload, earth leakage (where applicable) and short-circuit protection	Overload, earth leakage (where applicable) and short-circuit protection	Overload, earth leakage and short-circuit protection	Overload, earth leakage and short-circuit protection
A. Anticipated practical service provided	1 to 2 hours task lighting from a single light source, allowing reading in reasonable light levels ⁹ , plus one smartphone charged per day	2 to 4 hours task lighting from a single light source, allowing reading in reasonable light levels, plus one smartphone charged per day, one small television for 4 hours per day, and one small fan for 4 hours per day	Up to 5 hours room lighting for 1-2 rooms, plus two smartphones charged per day, one medium television for 4 hours per day, one medium fan for 4 hours per day, small appliances for 2 hours per day, and the ability to operate a small energy-efficient refrigerator	Grid equivalent but energy and capacity constrained, moderate appliances only, no thermal use	Grid or grid equivalent supply, not energy constrained (capacity constrained only)
B. Likely delivery method	Stand-alone Pre-packaged Solar lantern with phone charging, DC only	Stand-alone Pre-packaged Large solar lantern, pico-solar kit or small SHS, DC only	Stand-alone installation (large SHS) or limited micro- or mini-grid, DC and/or AC	Limited mini-grid, AC	Grid or near-grid-equivalent mini-grid, AC
C. Government target	Voluntary option only	Voluntary option only	Default off-grid supply option, representing the minimum option adopted by the Government	Default mini-grid supply option	Default on-grid supply option

⁹ 'Reasonable light levels' means a lighting intensity that allows for reading without incurring damage to eyesight.