



CHAPTER

2



NAMIBIAN POLICY PERSPECTIVES ON SOLAR ENERGY

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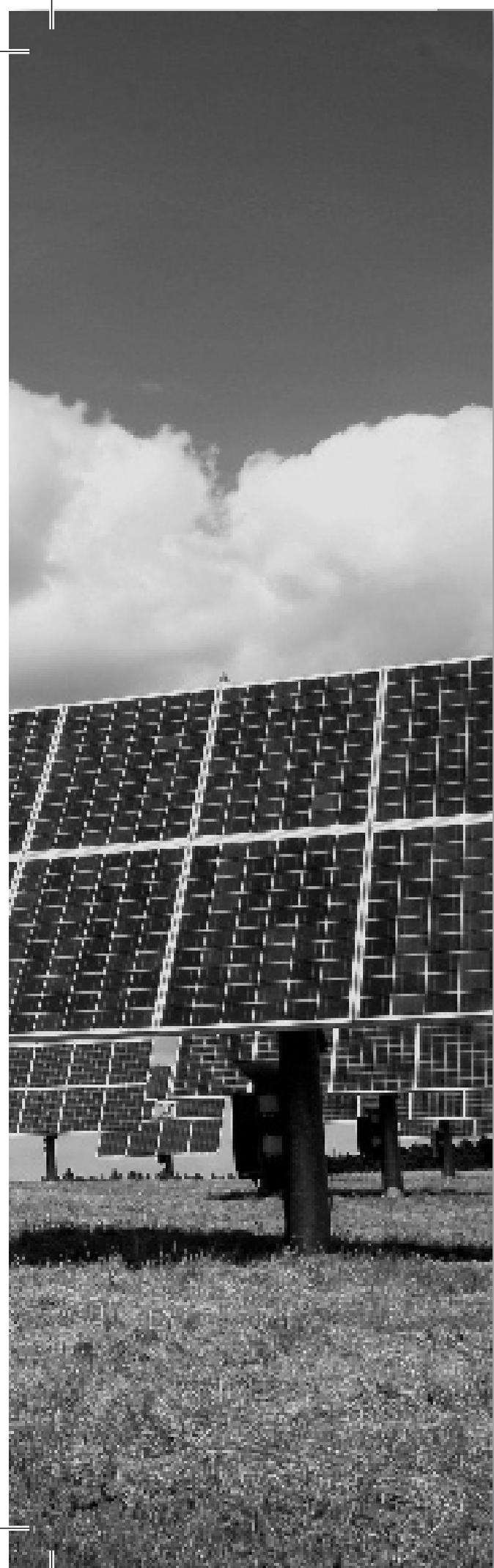
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ABSTRACT

Namibia's policy priorities on energy and its development are based on the White Paper on Energy Policy of 1998. The White Paper sets six strategic goals:

1. Effective governance
2. Security of supply
3. Social upliftment
4. Investment and growth
5. Economic competitiveness and efficiency
6. Sustainability.

The White Paper also recognises the importance of renewable energy and energy efficiency in Namibia's socio-economic development as providing 'sustainability' and 'security of supply' by virtue of diversification and the use of locally available resources.

Since the launch of the Policy Paper in 1998, a number of initiatives and renewable energy programmes have been set in motion in partnership with various local and international groups.

The country, like most developing countries, faces immense challenges in providing basic infrastructure such as electricity and energy services, in general, to previously disadvantaged communities. Many of these communities reside in communal areas, and they are far too displaced for grid electrification to be deployed cost-effectively.

This paper analyses some of these initiatives, especially those that are focussed on solar energy. Some of the key questions to be addressed in the paper are as listed below.

1. What key strategic initiatives and their specific objectives have been implemented so far in the fulfillment of the Policy Paper?
2. How effective and efficient have these initiatives been?
3. What is the level of wider stakeholder involvement in the initiatives?

4. How is financing and quality assurance of solar energy technologies being addressed through the policy framework?
5. What are the inadequacies in the Policy Paper to address the current and future challenges in the solar energy sector?

Key Words Off-grid energisation master plan, rural electrification and distribution master plan, White Paper on Energy Policy, solar revolving fund, national integrated resource plan

INTRODUCTION

Namibia, like most developing countries, faces immense challenges in providing basic infrastructure, such as electricity and other energy services, to disadvantaged communities. The disadvantaged position arose from the colonial and apartheid political systems that were practised before independence in 1990. The country covers an area of 24,000 km² and has a population of approximately 2 million people. Two-thirds of the country's population reside in communal areas where residents largely survive on rain-fed agricultural activities and cattle farming. Namibia practises sound macro-economic policies and has thus achieved stable economic growth rates.¹ According to the United Nation's classification, Namibia is a 'middle income' country with per capita gross domestic product value of about US \$3000. This, however, is contrary to the fact that more than 28% of the population is poor (National Planning Commission, 2008).

Energy is a cross-cutting issue when it comes to the fulfillment of the millennium development goals and is undoubtedly an important ingredient for sustainable development. Provision of clean, reliable, and affordable energy is, therefore, a prerequisite to any country's sustainable development agenda.

Namibia's rural communities are far too displaced for grid electrification to be deployed cost effectively, and it is difficult to economically justify because the load factors of these communities are typically low. A number of activities have been initiated since 1996 to address the energy challenges in the rural areas. These initiatives have attained different degrees of success, while some of them are still at a nascent stage to undertake an evaluation. Some of the initiatives have progressed from isolated projects such as donor-supported village solar electrification projects to systematic programmes galvanised by national policies such as the Rural Electrification and Distribution Master Plan and the Off-Grid Energisation Master Plan (OGEMP).

¹ According to the Bank of Namibia 2008 Annual Report, the economic growth rate decelerated to 4.1% in 2007 from a higher growth rate of 7.1% in 2006 and was expected to moderate at 2.7% in 2008. (Bank of Namibia, 2008)

The national institutional and policy frameworks have been established to specifically drive renewable energy programmes. Namibia has adopted a market approach in solar electrification. To ensure sustainability, most of the state-driven programmes have involved the private sector, including financial institutions, with the end users owning and operating and maintaining the installed systems.

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1. Effective governance
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4. Investment and growth
5. Economic competitiveness and efficiency
6. Sustainability.

The Policy Paper recognises the importance of renewable energy in Namibia's socio-economic development as providing 'sustainability' and 'social upliftment', especially in rural areas where it will complement grid electrification, and provide 'security of supply' to the country's energy situation by virtue of diversification and the use of locally available resources.

STRATEGIC INITIATIVES IN THE NAMIBIA SOLAR ENERGY SECTOR

The Beginning of Coordinated Solar Programmes

The journey for coordinated solar programmes in Namibia began in 1993 when the Ministry of Mines and Energy (MME) launched a programme called the 'Promotion of the Use of Renewable Energy Sources in Namibia', which was supported by the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH (IPPR, 2009). In 1996, the Government launched the first solar revolving fund under the Home Power Project with the support of the US-based Renewable Energy for African Development (REFAD). The REFAD model focussed on sustainable development through multi-pronged efforts targeting financial infrastructure development, capacity building, and rural community empowerment (Johns and Thomson, 1995). Under REFAD, loans were granted to interested rural households for the purchase of photovoltaic (PV) solar home systems (SHS). The loans were designed to ensure affordability of the systems to the purchasers. Over 600 units were sold through the project. REFAD marked the first solar revolving fund model in Namibia as a first step to address the financing barriers associated with renewable energy technologies (RETs).

Subsequent programmes such as the Namibia Renewable Energy Programme (NAMREP), the Renewable Energy and Energy Efficiency

and Energy Efficiency Capacity Building Programme (REEECAP), and OGEMP soon followed with the overall goal of increasing the diffusion of RETs in Namibia’s energy provision albeit with different specific objectives and strategies.

All these programmes and other developments have seen a big surge in both demand and installations of RETs, especially in SHS for low-voltage electricity. Other technologies such as photovoltaic water pumping (PVP) and solar water heating (SWH) have equally benefitted.

The contribution of renewable energy to national energy mix is far less than one per cent despite all these and other efforts. Figure 1 illustrates the contribution of renewable energy to Namibia’s overall energy mix, including petroleum, in 2006. The peak electricity demand in 2006 was 490 MW against an available power generating capacity of 393 MW, while the capacity of the installed solar electricity at that time was less

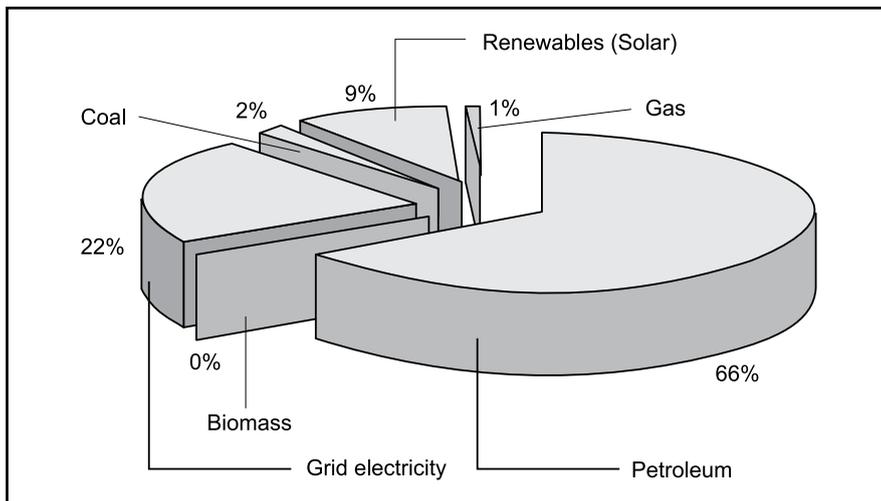


Figure 1 Namibia’s energy consumption by resources in 2006

than 300 kW. In 2009, the peak demand was 517 MW down from 533 MW and 539 MW in 2008 and 2007, respectively (NamPower, 2009). At the same time, the installed PV-based electricity and solar water heaters increased their capacities to 700 kW and 3 MW, respectively, in 2007.

Role of National Institutions in Supporting Renewable Energy

The White Paper on Energy Policy (WPE) of 1998 identifies and categorises challenges to renewable energy development in Namibia as being institutional and developmental. To address these challenges, the Government of the Republic of Namibia set a number of strategic objectives where they would:

- 1 ‘ensure that institutional and planning frameworks treat renewable energy on an equal footing with other forms of energy when assessing their financial, economic, and social costs and benefits.

- 2 ensure that education in renewable energy and the rational use of energy are included in the curricula of schools, universities, polytechnics, vocational training centres, and other institutions of instruction.
- 3 develop and implement renewable energy awareness programmes.

In that regard, the MME established the Renewable Energy Division under the Directorate of Energy. The division is headed by a deputy director and its mandate is to promote renewable energy as a complement to rural electrification and coordinate its financing. The division has acted as a link between different donors and donor-driven projects such as NAMREP with government agencies. It is presently administering the solar revolving fund (SRF).

The Renewable Energy and Energy Efficiency Institute (REEEI) was established in 2006 to promote renewable energy and energy efficiency through research and development of materials, standards, and reports and to disseminate the information amongst others. The institute was not only established in collaboration with the Polytechnic of Namibia and but is also based at the polytechnic. The institute has, since its inception, initiated and coordinated a number of projects in fulfillment of its mandate. The projects include REEECAP, the national wind resource assessment, the establishment of the National Technical Committee of Renewable Energy for quality standards development and promotion, the energy regulatory framework, and concentrating on solar power development, amongst others.

Renewable Energy Programme

NAMREP was launched in 2004 to address some of the barriers experienced in the dissemination of RETs in Namibia. The programme, which was divided into two phases running from 2004 to 2007 and from 2007 to 2010, was supported to the value of US \$14 million by the Global Environment Facility (GEF) through the United Nations Development Programme. Phase 1 was designed to address policy and regulations governing renewable energy through the removal of financial and technological barriers and to help build capacity in government, non-governmental organisations (NGOs), and the private sector. Most of the activities in this phase were focused on raising public awareness of RETs as well as capacity building at both political and technical levels.

Phase 2 was aimed at speeding up the implementation of solar energy activities that had impacts as identified in Phase I, stimulated by financing schemes for appropriate product delivery mechanisms.

The Renewable Energy Financing (REF) programme, similar to the solar revolving fund (described in Section 2.4) was established in commercial banks to address the financing barriers of RETs. NAMREP pro-

vided loan guarantees to commercial banks to finance RETs. Interests for these loans were drastically reduced in the process.

As NAMREP came to an end, it was realised and planned that the programme's activities and achievements required institutional support for sustainability beyond its term. The MME's Renewable Energy Division and REEEI were therefore tasks with inheritance from NAMREP's mandate.

Solar Revolving Fund

The cost associated with the procurement of RETs, especially solar, is one of the biggest barriers to the uptake of the technology. Financial institutions have always considered the end of the market as a risky area. Moreover, there is very little experience in the development of financial packages for RETs with the country's financial market. Punitive interest rates have dissuaded beneficiaries from accessing loans to finance their systems.

The White Paper on Energy states that 'Government will facilitate adequate financing schemes for renewable energy applications, and will encourage government agencies, investors, and users to make decisions based on the life-cycle costs of alternative energy options.'

The SRF, which emerged from the REFAD programme, basically provides loans at subsidised interest rates to end users of three technologies, namely SHS, SWH, and PVP. The MME has been providing finance to a private fund administrator to administer the loan scheme. The SRF is run on the 'Ownership Model', where the end user purchases a solar system by making use of the revolving credit fund loan facility and, thus, becomes the owner of the system. The owner of the system is responsible for the system and its maintenance.

Different private-sector-based administrators have managed the SRF on behalf of the MME, since 2001. Since February 2010, the SRF is now under the administration of the MME itself and is now part of the OGEM. The current contribution of the MME to the fund is about N \$2 million per annum.

The Off-grid Energisation Master Plan

The Scope of Off-grid Energisation Master Plan

Electricity plays a very important role in bridging the gap in economic development and quality of life between the rural and urban populations. With electrification rates of around 30% and 15% for national and rural households, respectively, rural electrification remains a challenge in Namibia. The infrastructure associated with rural electrification is expensive, at least in the Namibia context, largely due to the low population density (approximately 2.4 people per square kilometre) and low economic activities in the areas requiring electricity to support the cost

of bringing the grid to those areas. The Rural Electricity Distribution Master Plan (REDMP) – developed by the MME in 2000, and updated in 2005 – identified areas where grid electrification will remain unfeasible in the foreseeable future.

OGEMP was designed by the MME and launched in 2007 to ensure that those areas where grid electrification is unfeasible will be appropriately developed through off-grid energy solutions based largely on solar energy technologies.

The overall objectives of OGEMP are to:

- 1 promote off-grid rural electrification through the use of renewable energy systems;
- 2 promote and utilise indigenous Namibian renewable energy resources for energy provision; and
- 3 improve the quality of rural life through the provision of energy services.

These objectives are being addressed through the ‘Energy Shops Concept’. The concept advocates for the establishment of at least one energy shop in each of the 13 gubernatorial regions of the country with the key responsibility to stock and supply RETs.

OGEMP has two components: the SRF and the Public Institutions Solar Electrification Programme. In providing access to energy, OGEMP puts unelectrified areas into three categories: off-grid, pre-grid, and grey areas. Off-grid areas are those areas that will not have access to electricity within 20 years. Pre-grid areas are those that would not have access to electricity within 5 years. Grey areas are locations where it is not clear in the 2005 REDMP how or if access to electricity will be provided.

Examples of grey areas include:

- 1 informal settlements, where the majority of the inhabitants either do not have access to electricity or clearly cannot afford it, and
- 2 the farm worker settlements on commercial farms. (Although... the farm owner may have access to electricity, the farm worker families most often do not. OGEMP will focus on providing informal settlements with access to energy).

OGEMP focuses on off-grid and pre-grid areas. However, OGEMP will only focus on providing access to pre-grid areas that would not have access to electricity within 10 years in the updated REDMP GIS database.

Energy Shop Approach

The plan is to establish energy shops from existing businesses within a reasonable distance of the targeted communities. Figure 2 illustrates the networks in the operation of OGEMP with the involvement of the energy

shop. The energy shops would stock and sell suitable approved energy products (mainly RETs and energy-efficient technologies) and compatible appliances modelled as ‘energy baskets’. The energy shops are expected to also serve as information collection centres for the SRF as illustrated in Figure 3. It is envisaged that each region will have one energy shop in the first year of implementation.

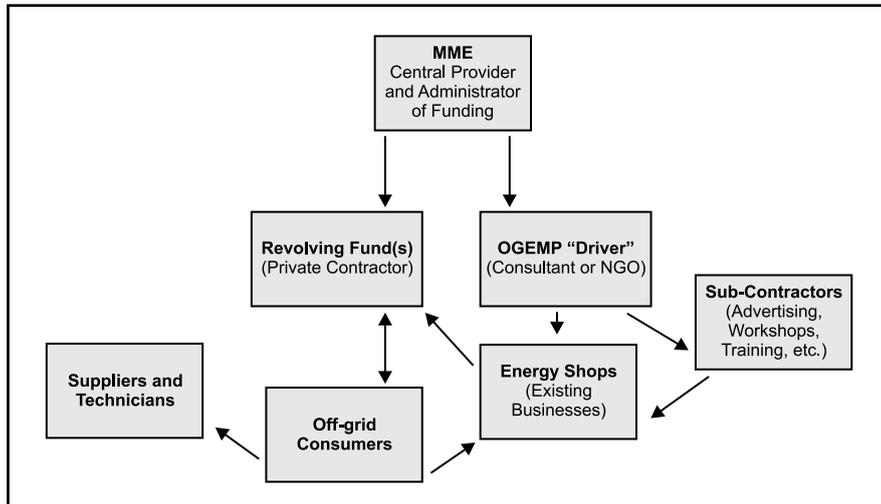


Figure 2 Interrelationships of stakeholders of RETs under OGEMP
Source: OGEMP

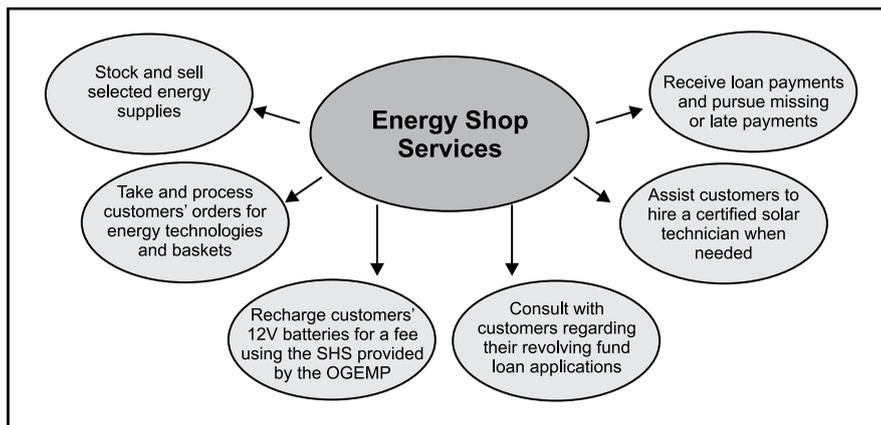


Figure 3 Products and services provided by energy shops
Source: OGEMP

The energy shops will cater largely to the needs of private end users of RETs. The MME will intensify the electrification of public institutions that fall under the domain of OGEMP with solar energy. These institutions include clinics, schools, and police base-stations.

DISCUSSION ON ACHIEVEMENTS OF THE POLICIES

The use of solar energy in Namibia's energy provision has been necessitated by favourable conditions on both the demand and supply ends of

the energy market. The policies and programmes initiated towards the fulfillment of the White Paper on Energy have achieved some relative success despite numerous barriers. The programmes and projects initiated have tried to focus primarily on addressing the financial, technical (capacity), policy, and public awareness barriers. This is evidenced by programmes such as NAMREP, REEECAP, and OGEMP.

Of all the projects that were initiated towards solar energy provision, NAMREP had a relatively good degree of success. REEECAP focussed on decision makers but was implemented over a brief period of two years, which is quite short a duration to secure solid involvement of policy makers. OGEMP is still in formative stages and is struggling with internal administrative and technical capacities.

NAMREP managed to train over 80 solar installers across the whole country on the theory, design, and installation of solar technologies. Efforts were also made to provide business management skills to the installers, including assistance to establish *bona fide* businesses. The trained installers were then linked to the SRF, REF Programme, and suppliers of solar energy technologies (SETs). Most of the small installations (50–500 W) were then carried out by the trained installers. The activities of NAMREP may be attributed to the sudden surge in demand and subsequent deployment of SETs in the country. Between 2004 and 2007, there was a five- to eight-fold growth in installations of SETs, as shown in Figure 4.

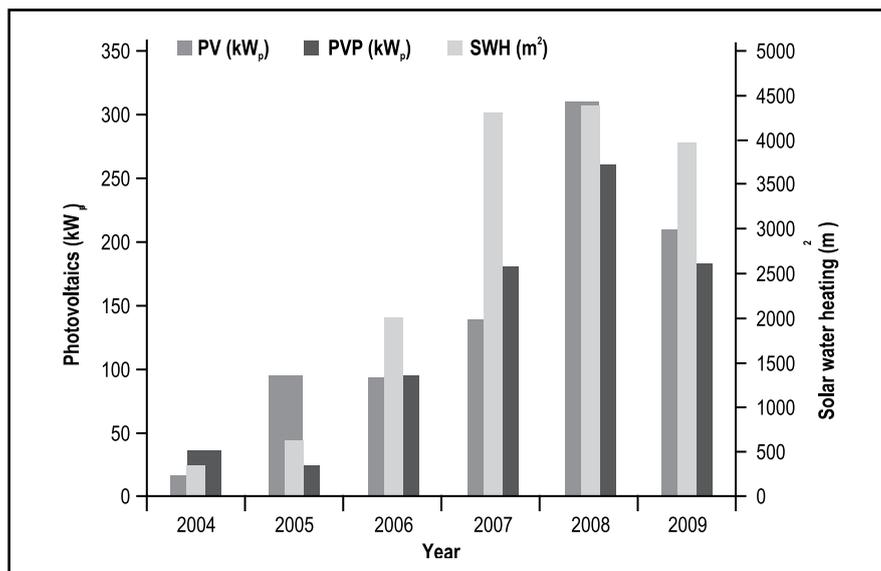


Figure 4 Solar energy technologies installed in Namibia, 2004–2009.

To a limited extent, NAMREP managed to influence policies and regulations on solar energy through cabinet directives such as OGEMP and SWH. In 2007, the cabinet of the Government of Namibia issued a directive to the effect that all new public buildings that require warm wa-

ter must meet that need with solar and if an existing electric geyser needs replacement it must then be done with a solar geyser. That directive has also spurred the growth of the solar warm-water industry and subsequent installations.

The SRF, as currently resourced, cannot sustain the demand for RET loans. The high influx of qualifying applications received cannot be accommodated from the annual monetary contribution allocated to this purpose by the Ministry. The last SRF private administrator financed over 892 solar systems in a period of five years. A backlog of over 1000 applications was cleared within that period. A commercial bank, under the REF programme, financed solar systems for 116 households in one year, and the funds were immediately exhausted. The current backlog of applications to both the SRF and REF is estimated at over N \$20 million.

Given the growing interest and awareness and systems in place, to ensure effective distribution of RETs, the demand for subsidised renewable energy financing is high. Systematic and sustainable funding strategies are, therefore, required to fulfil the demand created by the two financing and other awareness programmes. The focus of OGEMP on off-grid, leaving out the ballooning peri-urban and grey areas, creates a potential regression to the socio-economic gains currently being experienced.

REEEI was established with the mandate to conduct research, create materials, and standards and promote awareness of sustainable energy technologies and practices. The institute is still grossly under-resourced and is struggling to fulfil its role in the energy sector. The institute has, since its inception, assumed the responsibilities of NAMREP and is undertaking projects and programmes on capacity building, solar and wind-resource assessments, and piloting concentrated solar power plants. It is also developing a renewable energy regulatory framework in partnership with the national electricity regulator, the Electricity Control Board, with financial support from the Renewable Energy and Energy Efficiency Partnership. The mandate of REEEI is onerous and requires adequate funding and human capacity.

INADEQUACIES OF SOLAR ENERGY POLICIES

Strategic Planning

The White Paper on Energy Policy of 1998 has provided a sound basis for solar energy and the development of energy, in general, in Namibia. Most of the planning and implementation of solar programmes and projects have been based on this policy. This policy requires immediate review to capture the current trends and developments in the energy sector. For example, the carbon market and the various instruments used in the procurement of renewable energy, such as feed-in tariffs, need to be incorporated. Namibia lacks a strategic energy planning tool such as an

integrated resource plan. A national integrated resource plan (NIRP) is an implementation plan for national energy policy that combines energy supply options and energy efficiency measures, including demand-side management (DSM), to provide energy services at a minimum cost, including environmental and social costs.

Some of the benefits of national integrated resource planning are as listed below.

- 1 Easy and quick decision making for both investor and regulator for business proposals and projects that are in line with national interests.
- 2 Coherency in planning and resource allocation, increasing efficiency in resource allocation and prioritisation.
- 3 Less cost, reliable, and clean energy supply for comprehensive sustainable development.

Training

NAMREP can be adjudged to have the hallmarks of success in smart collaborations between the governments and development partners. The programme was well-resourced and well- capacitated. On training and capacity building, the programme, however, focussed more on PV than SWH. Some of the trainees lacked fundamentals or knowledge of the principles of physics, making the technical training part difficult, as also delivering quality installations. Solar installation is a hands-on activity, which calls for practical orientation for the trainee. SWH requires additional knowledge of plumbing skills. Solar energy training and renewable energy training, in general, need to be embedded into the vocational and tertiary training framework. This will blend well with the practical training offered in these institutions.

Regulatory Framework

The contribution of solar energy and renewable energy to Namibia's energy mix is negligible. The persisting barriers to the development of renewable electricity and the low level of investment in the market certainly indicate the need for political intervention in the form of an enabling regulatory environment. The purpose of the regulatory framework is to govern the direction of renewable energy and energy efficiency market development in Namibia by facilitating fair market access, return on investment, quality of supply, standards, market support structures and incentives, and legal issues. Countries that have managed to develop their mainstream renewable energy industry and record significant capacity have enacted pro-renewable energy regulatory frameworks and instruments such as feed-in tariffs, obligations, and, to a limited extent, tendering. It is envisaged that such strategic and binding policies will create a critical mass that will eventually lead to a self-sustaining clean energy market.

Quality Standards

The sharp increase in demand for SETs and their installations in the country has necessitated the need for regulation of the industry to ensure quality service and to protect the interests of the consumer. The regulation of such a small and distributed industry poses enormous challenges. The current efforts are aimed at governing the renewable energy industry through the National Technical Committee on Renewable Energy (NTCRE), which is one of the technical committees of the Namibian Standards Institution. The NTCRE –established in 2008 through the efforts of MME, NAMREP, REEEI, and the renewable energy industry– is a renewable energy industry-wide representative group. The mission of this committee is to ensure that an environment exists for the growth of the renewable energy industry in Namibia, within a framework that protects consumers and also the environment by promoting the quality of renewable energy products and services. The committee currently runs a registration scheme for installers and suppliers of RETs. After adopting appropriate standards, the NTCRE aims to certify personnel and processes to ensure that the end users of RETs receive quality products and services.

Sustainable Financing

Financing is a global barrier to the diffusion of RETs. The SRF, as currently resourced, cannot sustain the demand for SET loans. The high influx of qualifying applications received cannot be accommodated from the annual monetary contribution allocated for the purpose by the MME. The overwhelming interest from rural, farming, and urban communities created by both NAMREP's REF and SRF has gone beyond expectation and far outweighs both the current and foreseeable future financing capacity. It is, thus, imperative that funding strategies are adopted and implemented to mitigate a potential failure of renewable energy development programmes. National renewable energy programmes can be properly packaged and promoted to the international community and the carbon market to provide adequate and sustainable financing.

CONCLUSIONS

The White Paper on Energy Policy has created a good footing for the development of solar energy and other RETs in Namibia. Through projects such as NAMREP, REEECAP, and OGEMP, the development of SETs has experienced phenomenal growth, at least by Namibia's standards, and created a small but vibrant industry. Amongst the barriers that have been partially addressed are those pertaining to public awareness, institutional frameworks, and financing.

The sustainability of these initiatives and the programmes on specific elements such as financing, capacity building, and quality standards is

still under threat, especially in the absence of obligatory policies such as the renewable energy regulatory framework and the national integrated resource plan. Once these measures are enforced, it is expected that concerted efforts from government, the civic society, financiers, planners, and training institutions will be focussed on the realisation of the national agenda. Recent financing initiatives for RETs by the private sector are encouraging and must be supported.

As Namibia is experiencing high unemployment levels, among the social criteria, a new policy framework needs to emphasise on creating local jobs. RETs and projects that have high potential for creating jobs during and after construction must be prioritised; for example, designing tax incentives for the use of labour-intensive technologies. Local and foreign direct investments should be shored up by promoting the use of local resources, which would also mitigate foreign exchange risks for local companies.

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