



Review of the Nauru Energy Road Map 2014 - 2020



A Pwiyey bwio – light up my land

Nauru Energy Road Map 2014 – 2020
An Implementation Plan for Energy Sector Development

Final Draft

10th February 2014

January 2018

About this Report

UNDP has commissioned IT Power Australia's (ITP) Projects Manager, Mr Joseph Wyder to undertake the *Nauru Energy Road Map (NERM) Review* assignment.

This document is the **Review of the NERM 2014 - 2020**

Cover Image

The cover of the NERM - Final Draft, 10 February 2014.

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Glossary

ADB	Asian Development Bank
AUD	Australian Dollar
CIE	Department of Commerce, Industry and Environment
CoP	Conference of the Parties
DoA	Department of Agriculture
DoF - PAD	Department of Finance – Planning and Aid Division
DoJ	Department of Justice
DoT	Department of Transport
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoN	Government of Nauru
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
ITP	IT Power Australia
kl	kilolitres
kV	kilovolts
kW	kilowatt
kWh	kilowatt hour
LPG	Liquid Petroleum Gas
MDG	Millennium Development Goals
MW	Megawatt
MWh	Megawatt hour
NEPF	National Energy Policy Framework
NERM	Nauru Energy Road Map
NGO	Non-governmental Organisation
NIANGO	Nauru Island Association of Non-governmental Organisations
NRC	Nauru Rehabilitation Corporation
NSDS	National Sustainable Development Strategy
NUA	Nauru Utilities Authority
NUC	Nauru Utilities Corporation
ODA	Overseas Development Assistance
PPA	Pacific Power Association
PV	Photovoltaic
RE	Renewable Energy
RO	Reverse Osmosis
RONPHOS	Republic of Nauru Phosphate Company
RPC	Regional Processing Centre
SE4ALL	United Nations Sustainable Energy for All initiative
SIDS	Small Island Developing States
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Regional Environment Programme
TWGE	Technical Working Group on Energy
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

The Nauru Energy Road Map (NERM) 2014 - 2020 was developed in 2013-14. This report reviews this document and its implementation to 2017 with the aim of facilitating feedback to inform the development of the updated NERM 2018 to 2020.

The Republic of Nauru is the smallest state in the Pacific with an area of around 21 km² and a 2011 estimated population of more than 10,000 people.

The NERM 2014 - 2020 indicates that it builds upon the energy sector development agenda outlined in the National Sustainability Development Strategy (NSDS) and National Energy Policy Framework (NEPF). The NSDS is being reviewed in 2017-18.

The NEPF is driven by its vision statement:

'Reliable, affordable and sustainable energy, enabling the socio-economic development of Nauru.'

The NERM 2014 - 2020 builds on the energy sector development agenda outlined in the NSDS and NEPF. It has seven expected outcomes;

1. A reliable, affordable and safe power supply and services.
2. A reliable and safe supply of fossil fuels.
3. Universal access to reliable and affordable energy services.
4. An efficient supply and use of energy.
5. A significant contribution from renewable energy towards electricity supply.
6. Financial sustainability of the energy sector.
7. Efficient, robust and well-resourced institutions for energy planning and implementation.

The specific targets of the NERM by 2020 are:

- 24/7 grid electricity supply with minimal interruptions.
- 50% of grid electricity supplied from renewable energy sources.
- a 30% improvement in energy efficiency in the residential, commercial and government sectors.

The NERM 2014 - 2020 provides details for six Action Plans, 19 Strategies and 110 Activities. It also includes a Monitoring, Evaluation and Reporting Framework.

Consultations were held with Lead Agencies in October 2017 to assess the Activities' progress, priority and review Time Frames. While Nauru Utilities Corporation (NUC) has made progress in implementing several of its Activities, progress on the Department of Commerce, Industry and Environment's (CIE) Activities has been more limited mainly due to delays associated with appointing dedicated energy sector staff.

Some of the Activities that agencies thought were no longer a priority relate to wind energy, bioenergy and biofuel investigations. The Department of Agriculture indicated that food production is a higher priority than bioenergy.

The review made 10 recommendations that are summarised below.

For the Updated NERM consider:

1. Publishing it on an appropriate GoN website with links to all relevant supporting documents.
2. Making it a shorter document focused on the Action Plans, Strategies, Activities as well as the Monitoring, Evaluation and reporting framework with an Appendix for outlining key background and other analysis.
3. Using the following order and new names (previous name in brackets) for the Action Plans with the associated Activity identifiers.
 - Capacity – Activities C1.1 to C4.3, (institutional strengthening and capacity building)
 - Power – Activities P1.1 to P5.6, (power - electricity)
 - Renewables – Activities R1.1 to R3.2, (renewable energy)
 - Efficiency – Activities E1.1 to E3.5, (demand side energy efficiency)
 - Fuels – Activities F1.1 to F2.4, (petroleum)
 - Transport – Activities T1.1 to T2.1, (transport)
4. Listing Activities by Lead Agency and Priority with their locations in the Action Plans documented by their unique Activity identifier.
5. Listing Activities' Time Frames by calendar year quarters, e.g. Activity R1.2 will be completed by Q4 2018.
6. Documenting if the Estimated budget is Departmental or aid funding. If it is aid funding, a note could be added on status and organisation.
7. Documenting the name of the report where the indicator can be found as well as when and where this report is published, e.g. the Power Sector's Total System Losses is documented in NUC's annual reports which are typically published on NUC's website 5 months after the close of the financial year on 30 June.
8. Refining the definitions of the monitoring indicators and their targets.
9. Whether NUC's Activities need to be documented in detail or whether attaching their Strategic Plan is more appropriate.
10. Whether wind and bioenergy should be removed. A similar consideration is also required for Ocean Thermal Energy Conversion.

These were discussed at the workshop in Nauru on 14 November 2017 and the feedback provided used to inform the drafting of the updated NERM 2018 to 2020.

1. Introduction

The Nauru Energy Road Map (NERM)¹ was developed in 2013-14 through a consultative process involving a range of stakeholders. The process was led by the Department of Commerce, Industry and Environment (CIE) and a Technical Working Group on Energy, (TWGEn).

The TWGEn involved representatives from the:

- CIE,
- Nauru Utilities Corporation (NUC),
- Planning and Aid Division (PAD) of the Department of Finance (DoF), and
- The Department of Foreign Affairs (DoFA).

These stakeholders were supported in the development of the NERM by a team of regional and international specialists from a range of organisations.

The NERM was designed to be the Government of Nauru's official energy sector document serving as an implementation plan for the 2009 National Energy Policy Framework.

1.1 NERM Review Assignment

The UNDP has engaged Mr Joseph Wyder to assist with the review and update of the NERM.

This report is the deliverable, 'Review Report of the NERM 2014-2020'. A workshop in Nauru was held on 14 November 2017 to discuss this report and the updating of the NERM.

This review report examines the NERM across six key areas:

- i) process of developing,
- ii) structure,
- iii) reflection of higher level planning,
- iv) implementation progress covering the period 2014-2017,
- v) integration into Government planning, and
- vi) recommendations for the updated NERM.

1.2 Nauru Energy Sector Overview

Nauru is located just south of the equator about half way between Sydney and Honolulu. It is the smallest state in the Pacific with an area of around 21 square kilometres and a 2011 estimated population of more than 10,000 people. In addition, there are around 1,000 people housed in the Regional Processing Centres.

NUC is the government-owned utility responsible for supply of electricity and water. Vital Energy operates the fuel tank farm, (diesel, petrol and kerosene) and LPG is sold by separate, private importers.

¹ <http://prdrse4all.spc.int/node/4/content/nauru-energy-road-map-2014-2020-second-draft>

NUC’s powerhouse is located in Aiwo and is being upgraded in 2017-18. The NUC Annual Report 2016 indicated annual:

- electricity sales of 20,026 MWh,
- powerhouse diesel generation of 31,400 MWh, and
- solar PV generation of 337 MWh.

The reported monthly generation for July 2015 to June 2017 was used to produce the following average daily generation by month figure.

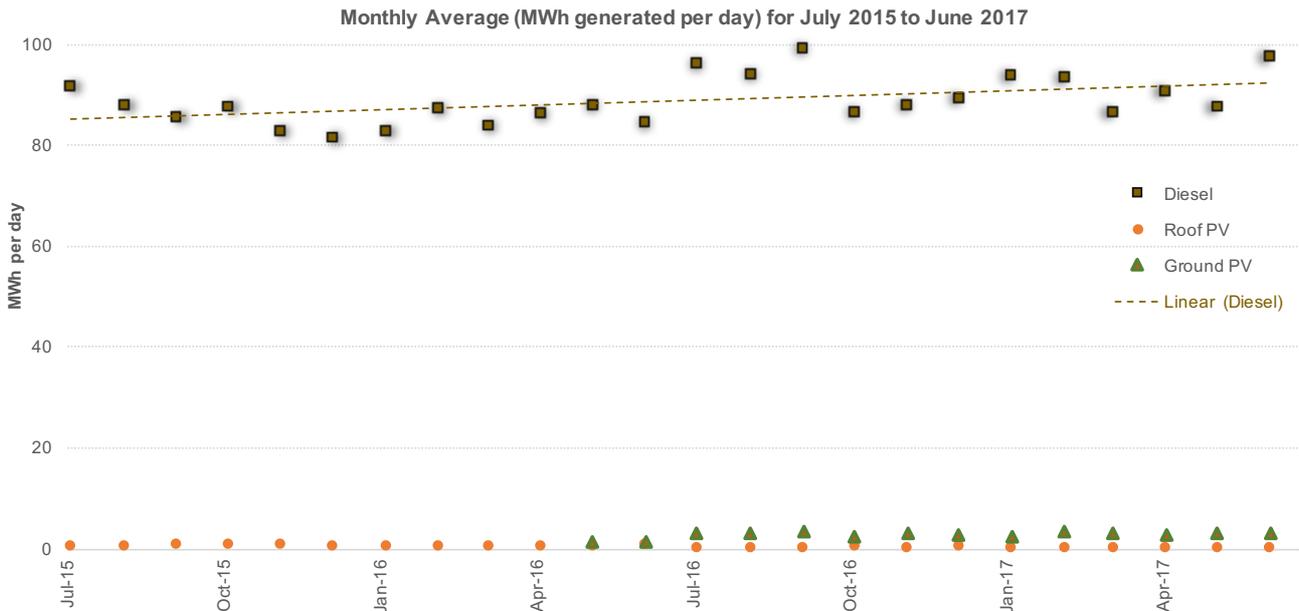


Figure 1: Monthly averages of daily generation, calculated from NUC Annual Report 2016 and draft data for NUC Annual Report 2017.

The peak load is reportedly 5.2 MW and the average load in 2015-16 was 3.9 MW, (after factoring in the ~568² hours of supply interruptions). The 500 kW Buada solar PV system was commissioned in May 2016 and its contribution can be seen starting in that month.

The annual contribution from renewable energy generation in 2015-16 was around 1.1%.

In 2016-17, the Buada solar PV system generated 869 MWh, (1,738 kWh / kW / year). Combined with the rooftop PV, this lifted the annual renewable energy contribution to around 3.5% in 2016-17.

For a day with a low load such as a Sunday, with a noon load of around 4 MW, the total instantaneous PV penetration could be as high as 15%.

On the Topside of the island, there are several sites that self-generate, these include the:

- RONPHOS phosphate mine,
- Australian Government’s Regional Processing Centres (RPCs), and
- new jail.

² Calculated from the System Average Interruption Duration Index (minutes) reported in the NUC Annual Report 2016.

The distribution system is currently a loop network and includes 11kV, 3.3kV and 415V sections. The EU is funding a new 11kV transmission line through the centre of the island. This line is scheduled to be constructed in 2018 and it is planned for this line to allow for connection of the above Topside loads.

It has been forecasted that these new connections will almost double the annual generation to around 60 GWh per year. However, there is a large amount of uncertainty with this forecast due to a wide range of factors including the phosphate mine's operational life and scale as well as the population of the RPCs and new jail. It has been reported that the additional loads are:

- RONPHOS, 500 kW crusher, 300 kW dryer and field workshop,
- RPCs, one site with 1,000 kW and two sites of 500 kW average load, and
- New jail, 100 kW average load.

The connection of the Reverse Osmosis (RO) desalination units to the grid will also increase the annual load.

1.3 Meneng Solar PV Tender

A key technical challenge of renewable energy-based power generation projects on diesel mini-grids is the integration with the diesel generators.

The New Zealand Ministry of Foreign Affairs and Trade has tendered for the supply and installation of a 1 to 2 MW solar PV farm in the Meneng District of Nauru. The tender specification was drafted by a consulting company (Elemental Group Ltd) and it states,

'The new loads in addition to increases in consumer demand are expected to increase electricity demand to around 9-10 MW from current 4-5 MW, or annual generation from 32 GWh to 60 GWh. Elemental would see these figures as optimistic given the likelihood of RPC activities decreasing.'

While this tender specification requires at least 100m² of rain water harvesting, it does not include any advanced grid-integration technologies such as cloud monitoring cameras or batteries to control ramp rates³. While this is unlikely to cause problems if the load increases as forecast, there is some peak PV penetration and integration risks if the load does not increase by as much as expected.

1.4 Methodology

The methodology for undertaking this review involved:

- Analysing relevant background documents, and
- Consulting with key national and external stakeholders across the six key areas of the review.

A workshop was held on 14 November 2017 in Nauru to allow for further input from key stakeholders.

³ Horizon Power uses the term Generation Management for controlling PV ramp rates on high-penetration diesel mini-grids and the concept is outlined here: <https://horizonpower.com.au/solar/generation-management/>

1.5 Acknowledgements

This report has been compiled with the assistance and contribution of a wide range of national and external stakeholders. Some of the stakeholders are outlined in the following table.

Organisation	Name	Title
UNDP	Thomas Jensen	Regional Energy Programme Specialist
	Manuel Soriano	Senior Technical Advisor. Energy, Infrastructure, Transport & Technology
	Kevin Petrini	Resilience & Sustainable Development Team Leader
	Emma Mario	Environment Programme Analyst
	Melaia Tarogi	
UN JCO	Erana Aliklik	Un Coordination Officer
ADB	Camilla Solomon	
CIE	Mavis Depaune	Secretary
	Reagan Moses	Director, Climate Change & Energy
	Miniva Harris	Energy Project Officer
DoA	Marissa Cook	Director
	Lisa Jacobs	
DoE	Dr Maria Gaiyabu	Secretary for Education
DoF - PAD	Herny Cocker	Secretary, Planning and Aid Division
	John Leeman	
DoJ	Kerryn Kwan	Principal Government Lawyer (Legislative Drafting)
DoT	Lesi Olsson	Secretary, Department of Transport
Eigugu Energy	Raymond Eutanes	GM
NRC	Clarissa Jeremiah	Secretary, Nauru Rehabilitation Corporation
NUC	Abraham Simpson	CEO
RONPHOS	Charlene Gadabu	Acting CEO
	Anthony Bussain	Chief Electrician
Vital Energy	Adonis Demauna	

2. Government of Nauru Planning

Nauru is a republic with a parliamentary system of government. The Government of the Republic of Nauru website⁴ provides an overview of six Departments:

- Department of Chief Secretary,
- Department of Foreign Affairs and Trade,
- Department of Justice,
- Department of Education,
- Department of Finance, and
- ICT Department (Department of Telecommunications).

The website doesn't specify where the Departments of Commerce, Industry and Environment, Agriculture or Transport fit within this arrangement.

A number of development frameworks, strategies, and policies and legislation have been introduced by the Government of Nauru since 2005. These include:

- National Sustainable Development Strategy (NSDS) 2005 - 2025 (revised 2009),
- Nauru's Utility Sector - A Strategy for Reform,
- National Energy Policy Framework (NEPF),
- National Energy Road Map (NERM) 2014 - 2020,
- Nauru Utilities Cooperation Act, and
- Climate Change Adaptation and Disaster Risk Management Framework (RONAdapt).

However, Nauru's means of implementation of these strategies requires assistance through finance, technology transfer and capacity building to achieve tangible outcomes.

2.1 Intended Nationally Determined Contribution

The Republic of Nauru is fully committed to supporting successful outcomes from the annual Conference of the Parties (CoP) under the United Nations Framework Convention on Climate Change (UNFCCC). The Government of Nauru submitted its Intended Nationally Determined Contribution⁵ (INDC) in November 2015. This document states that Nauru's INDC hinges on its:

- NSDS 2005 - 2025, revised 2009,
- NERM 2014 - 2020,
- Second National Communication (SNC), submitted 2015, and
- RONAdapt.

⁴ <http://www.naurugov.nr/government/departments.aspx>

⁵ http://www4.unfccc.int/ndcregistry/PublishedDocuments/Nauru%20First/Nauru_NDC.pdf

The INDC also states, 'The main mitigation contribution is to achieve the outcomes and targets under the National Energy Road Map (NERM), NSDS and recommendations under the SNC and is conditional on receiving adequate funding and resources.'

The Mitigation section from the INDC is reproduced below.

Mitigation Contribution	
Time Frame	2020 - 2030
Type of Contribution	<p><u>Conditional Reduction based on identified mitigation actions</u></p> <p>To replace a substantial part of electricity generation with the existing diesel operated plants with a large scale grid connected solar photovoltaic (PV) system with an estimated cost of 42 million US\$ which would assist in reducing the emissions from fossil fuels.</p> <p>Concurrent to the above there needs to be put in place extensive demand side energy management improvements with an estimated cost of 8 million US\$ which will complement the PV installation. The demand management improvements are expected to reduce emissions by bringing down diesel consumption further.</p> <p>The conditional mitigation contribution discussed above would require a total investment estimated at 50 million US\$ including substantial technical, capacity building and logistical assistance due to the limited capacity on the island.</p> <p><u>Unconditional Reduction</u></p> <p>The unconditional contribution includes a secured funding of US\$5 million for implementation of a 0.6 MW solar PV system which is expected to assist in unconditional reduction of CO₂ emissions marginally. This initiative will be used as a model project for the larger Solar PV plant and in addition assist in terms of technology transfer and institutional learning.</p>

2.2 National Sustainable Development Strategy 2005 - 2025

The National Sustainable Development Strategy 2005-2025 (NSDS) outlines Nauru's energy vision as:

'Provide a reliable, affordable, secure and sustainable energy supply to meet the socio economic development needs of Nauru.'

The NSDS⁶ is 90 pages and was revised in 2009. It is being reviewed and updated in 2017-18.

⁶ [https://pafpnet.spc.int/pafpnet/attachments/article/224/Nauru%20NSDS%202005-2025%20\(2009\)%20cobb-nau-2012-2014-oth.pdf](https://pafpnet.spc.int/pafpnet/attachments/article/224/Nauru%20NSDS%202005-2025%20(2009)%20cobb-nau-2012-2014-oth.pdf)

The NSDS illustrates the national level policy development and implementation framework as per the following figure.

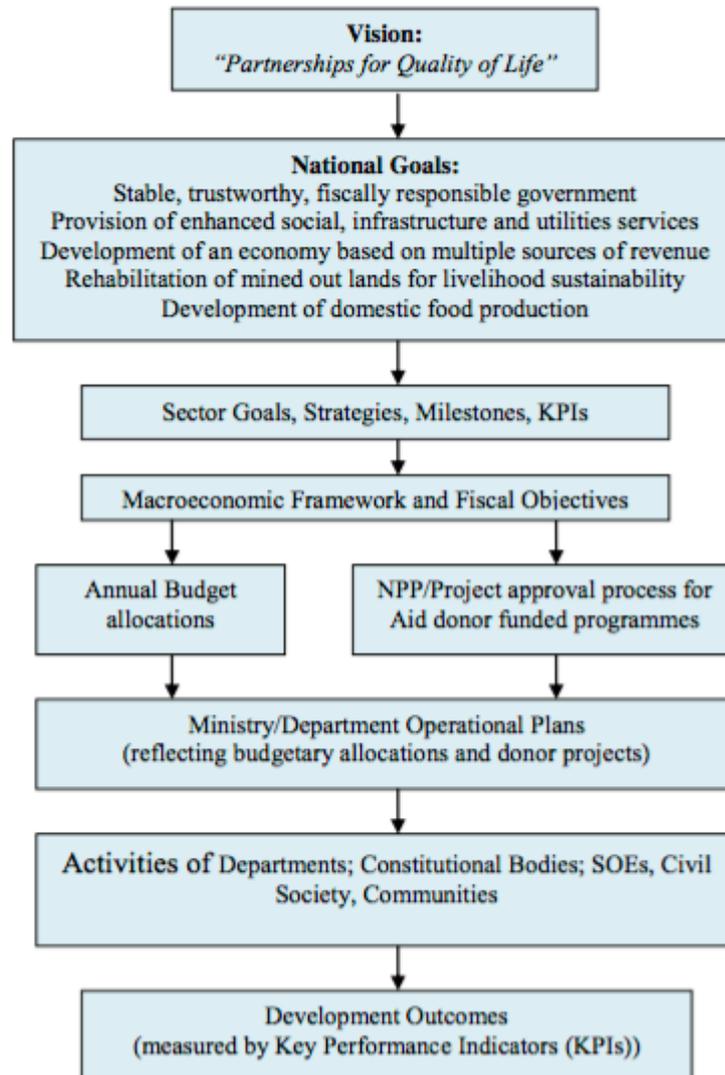


Figure 2: NSDS Policy Development and Implementation Framework

This figure highlights the importance of Department Operational Plans. Another figure in the NSDS on monitoring policy implementation highlights the importance of Department Annual Reports.

The Energy section of the NSDS has the following Strategies:

‘Implement National Energy Policy Framework (NEPF) addressing:

- i) cost effective, secure and sustainable procurement and supply of fuel,
- ii) reliable and efficient energy supply and distribution,
- iii) management of demand focussing on consumption efficiency and conservation, and
- iv) increased use of renewable energy and other alternative forms of energy.’

There are some milestones associated with these strategies but they are mostly open to interpretation due to the lack of specific baselines. The NSDS set a goal of meeting 50% of Nauru's energy needs through renewable energy by 2015.

The 2017-18 review of the NSDS is expected to refine the performance targets and indicators to more specific outputs.

2.3 National Energy Policy Framework

The Nauru National Energy Policy Framework⁷ (NEPF) was developed through a consultative process involving stakeholders from the public sector, private sector and civil society groups. The NEPF aimed to provide a guideline for the development of the energy sector in Nauru for the immediate future and mid and long term. It is dated May 2009 and is 24 pages.

The NEPF is driven by its vision statement:

'Reliable, affordable and sustainable energy, enabling the socio-economic development of Nauru.'

The NEPF identified seven strategic policy areas as critical to achieving the overall vision of the NEPF. These are briefly discussed along with their associated strategies below.

Power – a reliable, affordable and safe power supply and services.

Outlines several major issues with the electricity sector. Provides the following strategies for improvements.

1. Ensure a financially strong and robust 'Utilities'.
2. Fair and equitable access to any subsidised basic supply of power to households with pre-payment meters.
3. Ensure an appropriate regulatory framework exists to govern the operation and management of Utilities.

Petrol – a reliable and safe supply of fossil fuels.

Outlines some of the governance issues around importing fuels and the lack of regulations for standards. Provides the following strategies for improvements.

1. Secure supply and storage of fossil fuels.
2. Ensure fuel receiving and distribution infrastructure meet international standards.
3. Reduce dependence on fossil fuels by investing in renewable energy projects.

Renewables – 50% of energy used in Nauru comes from renewable sources by 2015.

Outlines that solar is the only renewable source that has the potential to contribute significantly to Nauru's energy mix. Provides the following strategies for improvements.

1. Encourage the use of renewable energy as an alternative source of power generation.
2. Build in-country capacity in renewable energy technologies.

⁷ <http://prdrse4all.spc.int/node/4/content/nauru-energy-policy-framework>

Customers – universal access to reliable and affordable energy services.

Outlines the customer classes of residential, government, commercial and industrial. Indicates that energy services, and the means by which they are provided to each different customer group, will need to be assessed carefully. Provides the following strategies for improvements.

1. Ensure the provision of electricity to all customers is financially sustainable.
2. Ensure the different energy needs are equally addressed and promoted at all levels of society.
3. Ensure dissemination of relevant information to the public.

Finance – financial sustainability of the energy sector.

Outlines that finance is a fundamental problem. Indicates that for the NEPF to be effective, financial resources will have to be secured from donors and the private sector. Provides the following strategy for improvements.

1. Ensure a robust financial framework is in place.

Institutional – efficient, robust and well-resourced institutions for energy planning and implementation.

Outlines the need to build in-country capacity. Indicates the government agency tasked with formulating the energy sector plan must be well staffed with suitably qualified personnel and be provided with enough resources for proper functioning. Provides the following strategies for improvements.

1. Ensure appropriate policies and legislations are in place.
2. Ensure appropriate skill base is available.
3. An institutional structure that is accountable.
4. Encourage stakeholder partnerships.

Efficiency – an efficient supply and use of energy.

Outlines the first step towards achieving energy security as making the production and use of energy more efficient. Indicates that strict measures should be put in place to discourage wastage and the importance of public awareness and education campaigns. Provides the following strategies for improvements.

1. Encourage at all levels the use of energy efficient appliances and equipment.
2. Promote energy conservation and efficiency at all levels of society.
3. Promote environmentally friendly and sustainable use of energy.

While the NEPF strategies outlined all appear reasonable, their level of implementation since publication of the NEPF is variable.

3. Summary of NERM

The Nauru Energy Road Map (NERM) 2014 - 2020 (second draft, 7 January 2014) is available on the Pacific Regional Data Repository, (see Footnote 1). This version is 103 pages and 32,018 words.

There is also a 10 February 2014 'Final Draft' version which was provided by email. This version is 102 pages and 31,455 words. The Ministerial Foreword is absent from both versions. A comparison of the two documents reveals mainly cosmetic changes. For the purposes of this review, the Final Draft version has been used.

The Nauru Bulletin⁸ (20 January 2015) has an article on the cooperation agreement with the United Arab Emirates for the grant for the Buada 500 kW solar PV system. This article states, President Waqa also announced that Nauru has adopted its Energy Road Map for 2014-2020. "The document itself provides a guideline to implement goals with development partners and donors for the development of the energy sector in Nauru, especially in achieving a sustainable energy policy and development strategy," President Waqa said.

The NERM indicates that it builds upon the energy sector development agenda outlined in the NSDS and NEPF.

The NERM has seven expected outcomes;

1. A reliable, affordable and safe power supply and services.
2. A reliable and safe supply of fossil fuels.
3. Universal access to reliable and affordable energy services.
4. An efficient supply and use of energy.
5. A significant contribution from renewable energy towards electricity supply.
6. Financial sustainability of the energy sector.
7. Efficient, robust and well-resourced institutions for energy planning and implementation.

The specific targets of the NERM by 2020 are:

- 24/7 grid electricity supply with minimal interruptions.
- 50% of grid electricity supplied from renewable energy sources.
- a 30% improvement in energy efficiency in the residential, commercial and government sectors.

3.1 Action Plans, Strategies and Activities

Chapter 13 of the NERM provides details for six Action Plans, 19 Strategies and 110 Activities. The Action Plans are listed in the following section with their Policy Statement followed by a list of their Strategies and number of Activities (in brackets).

⁸ http://www.naurugov.nr/media/44538/nauru_20bulletin_20_01_20jan2015_20_28119_29.pdf

Power Sector (5 Strategies with total of 35 Activities)

A reliable, affordable and safe power supply and services.

- i) Upgrade assets (7),
- ii) Improve planning and management (10),
- iii) Improve supply-side efficiency (6),
- iv) Move toward full recovery of operating and maintenance costs (6),
- v) Develop and safeguard NUC staff (6).

Petroleum Sector (2 Strategies with total of 12 Activities)

A reliable and safe supply of fossil fuels.

- i) Establish an economically efficient, secure and safe National Fuel terminal and fuel supply (8),
- ii) Investigate ways to reduce use of or find alternatives to liquid fuels (4).

Renewable Energy (3 Strategies with total of 16 Activities)

50% of electricity used in Nauru comes from renewable energy sources by 2020.

- i) Phased implementation of large-scale solar up to 8.5 MW (8),
- ii) Investigation and implementation of other renewable energy resources (6),
- iii) Build in-country capacity to operate and maintain solar PV systems (2),

Demand Side Energy Efficiency (3 Strategies with total of 17 Activities)

An efficient supply and use of energy.

- i) Data collection and analysis for preparation for DSM implementation (5),
- ii) Implementation of demand side energy efficiency (7),
- iii) Introduction of energy labeling and minimum energy performance standards (5).

Transport (2 Strategies with total of 11 Activities)

To be developed as part of Road Map implementation.

- i) Implementation of energy efficiency in transport (9),
- ii) Investigate substitutes to diesel and petrol for transport (2).

Institutional Strengthening and Capacity Building (4 Strategies with total of 19 Activities)

Efficient, robust and well-resourced institutions for energy planning and implementation.

- i) Establish appropriate policies, regulations and legislation for the energy sector. (5),
- ii) Facilitate development of appropriate local skill base to meet ongoing demand in the energy sector (4),
- iii) Improve governance and accountability in the energy sector (7),
- iv) Foster a culture of partnerships between public and private sectors including the community (3).

Each of the 110 Activities is given a priority, timeframe and estimated budget. The estimated budgets are summarised by Action Plan and Strategy in the following table.

Sector and Strategy	Estimated Budget \$,000
Power	
Upgrade assets	7,400
Improve planning and management	665
Improve supply-side energy efficiency	850
Move toward full recovery of operation and maintenance costs	580
Develop and safeguard NUC staff	150
Sub-total	9,645
Renewable Energy	
Phased implementation of large-scale solar up to 8.5 MW _p	50,125
Investigation and implementation of other renewable energy resources	1,190
Build in-country capacity to operate and maintain solar PV systems	60
Sub-total	51,375
Demand Side Energy Efficiency	
Data collection and analysis for preparation for DSM implementation	200
Implementation of demand side energy efficiency	335
Introduction of energy labelling and minimum energy performance standards	170
Sub-total	705
Petroleum	
Establish an economically efficient, secure and safe National Fuel Terminal and fuel supply	345
Investigate ways to reduce use of or find alternatives to liquid fuels	80
Sub-total	425
Transport	
Implement energy efficiency in transport	280
Investigate substitutes to diesel and petrol for transport	50
Sub-total	330
Institutional Strengthening and Capacity Building	
Establish appropriate policies, regulations and legislation for the energy sector	430
Facilitate development of appropriate local skill base to meet ongoing demand in the energy sector	160
Improve governance and accountability in the energy sector	140
Foster a culture of partnership between the public and private sector, including communities	90
Sub-total	820
TOTAL \$,000 (AUD)	63,300

Table 3: NERM Action Plans, Strategies and Estimated Costs

The NERM also includes a Monitoring, Evaluation and Reporting Framework. This section states, ‘With regard to reporting, this may include inception reports, work plans (quarterly and/or yearly), substantial and financial progress reports (quarterly and/or yearly), audits (yearly), etc. Gender disaggregation should be considered in designing data collection programmes and reporting on activities. Copies of such reports will be provided to CIE, which will act as a central repository and share these with the Technical Working Group on Energy.’

Table 11 in the NERM outlines the monitoring plan and key aspects of it are reproduced below.

Indicator	Baseline (year)	Relevant Target(s)	Means of Verification	Planned Reporting Frequency
Power				
Hours of interruption per customer	0.92 (2010)	N/a	- NUC reports - PPA Benchmarking reports - SPC Nauru Country Energy Security Indicators	Yearly
Price of electricity	Domestic first 300 kWh per month 10c/kWh > 300 kWh 25c/kWh Commercial 30c/kWh Industrial 50c/kWh	N/a	- NUC reports - PPA Benchmarking reports - SPC Nauru Country Energy Security Indicators	Yearly
Household electricity expenditure load	Data not available	N/a	- Bureau of Statistics Household Income and Expenditure Survey - Dedicated household energy survey reports	Approx every 5 years (or more often if dedicated surveys are carried out)
Total system losses	22.41% (2009)	30% improvement in EED by 2020	- NUC reports - PPA Benchmarking reports - SPC Nauru Country Energy Security Indicators	Yearly
Non-technical losses	15.77% (2009)	N/a	- NUC reports - PPA Benchmarking reports - SPC Nauru Country Energy Security Indicators	Yearly
Petroleum				
Fuel supply security (days)	73 (2009)	N/a	- NUC Reports - SPC Nauru Country Energy Security Indicators	Yearly
Fuel imports as a percentage of GDP	8.5% (2009)	N/a	- Bureau of Statistics - MoF - SPC Nauru Country Energy Security Indicators	Yearly

Renewable Energy				
% of NUC electricity generated or sent out by renewable sources	0.3% (2009)	50% of electricity generation to come from renewable sources by 2020	- NUC reports - PPA Benchmarking reports - SPC Nauru Country Energy Security Indicators	Yearly
Demand Side Efficiency				
NUC and CIE annual budget allocations for DSM	Baseline indicator us to be collected for 2013.	30% improvement in EE by 2020	- NUC Reports and Budget - MoF Reports and National Budget - CIE Reports and Budget	Yearly
NUC and CIE fulltime equivalent employees engaged in DSM	Baseline indicator us to be collected for 2013.	30% improvement in EE by 2020	- NUC Reports and Budget - CIE Reports and Budget	Yearly
One more indicator to be developed for residential EE once more info becomes available	This will be established once the household energy use survey has been carried out.	30% improvement in EE by 2020	N/a	Yearly
Transport				
To be developed once more info becomes available	N/a	N/a	N/a	Yearly
Institutional and Capacity				
CIE annual budget allocation from Govt budget	AUD \$448,996 (2012-13)	N/a	- MoF, National Budget	Yearly
Status of Govt energy administration	No unit within Govt dedicated to energy sector planning and development (2009)	Established unit (or equivalent within Govt dedicated to energy sector planning and development	- CIE Reports - Public Service Reports - MoF, National Budget - SPC Nauru Country Energy Security Indicators	Yearly
NUC specific fuel consumption (kWh/litre)	3.54 (2011)	30% improvement in EE by 2020	- NUC Reports - PPA Benchmarking reports	Yearly
NUC generation labour productivity	1.16 (2011)	N/a	- NUC Reports - PPA Benchmarking reports	Yearly
NUC training expense as a per cent of payroll	7.63 (2010)	N/a	- NUC Reports - PPA Benchmarking reports	Yearly

4. Review of the NERM

Nauru is a small country with limited resources and numerous social, environmental and economic challenges. The main purpose of reviewing the NERM is to constructively explore implementation issues with the aim of preparing a practical and useful updated NERM.

The 2017 update of the NERM will also need to consider load changes, technology advances and renewable energy cost reductions since the original was drafted in 2013-14. The review of the NSDS that is underway provides opportunities for potential synergies and inputs to the update of the NERM. The relevant sections of the updated NSDS are provided at Appendix A.

This Review and the Updated NERM will be refined and further developed with the input of key stakeholders. A workshop was held on 14 November 2017 at CIE's office to facilitate this.

4.1 Process of developing

The NERM was prepared under the guidance of the TWGEn, led by CIE.

Assistance was provided by a dedicated technical assistance team which consisted of:

- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ),
- the Secretariat of the Pacific Community (SPC, and
- the International Renewable Energy Agency (IRENA).

Additional support was provided by the:

- Pacific Power Association (PPA),
- International Union for the Conservation of Nature (IUCN),
- United Nations Development Programme (UNDP),
- Asian Development Bank (ADB),
- Secretariat of the Pacific Regional Environment Programme (SPREP), and
- Pacific Islands Forum Secretariat (PIFS).

Views of other stakeholders were sought through a participatory consultation process that involved national and community consultation workshops. This broad consultation process included three National Consultation Workshops and as well as one community consultation.

Page 15 of the NERM states:

'This energy Road Map is accompanied by the following preparatory and supporting documents:

- National Stakeholder Consultation Workshop Report, May 2012 – Records the outcomes of the first national consultation workshop on the Road Map development.
- Second national consultations on the Nauru energy report map report, November 2012 – Records the feedback, discussions and outcomes of the second national consultation workshop and of two community consultation workshops.
- Third national consultations on the Nauru energy road map first draft, October 2013 - Records the feedback, discussions and outcomes of the third national consultation workshop.
- Power Utilities Assessment Report, February 2013 – Assesses the status of power generation, transmission and distribution at NUC.
- Energy Sector Overview Report, August 2013 – Assesses the status of the energy sector in Nauru in 2013.
- Solar Pre-feasibility study, September 2013 – Provides a preliminary assessment of the feasibility of introducing large-scale solar energy installations for electricity supply.'

The process of developing the NERM appears to have been consultative and thorough. The issues that can be observed include:

- i) The TWGEn consists of agencies and it may have been useful to document the positions and names of the participants to assist with ongoing functions of the group. This is probably recorded in the 'accompanying' documents.
- ii) Where the accompanying documents are published or are accessible from isn't documented.
- iii) Considering Transport is one of the Action Plans, having the Department of Transport as a member of the TWGEn may have been beneficial.
- iv) While the Cabinet of the Government of Nauru approved the NERM in mid 2014, the publication of the Final Draft, with a Ministerial Forward, as a hardcopy and on an appropriate Government of Nauru website does not appear to have occurred.

Recommendation

1. For the Updated NERM, consider publishing it on an appropriate GoN website with links to all relevant supporting documents.

4.2 Structure

The NERM consists of 14 Chapters and their order appears logical in that issues and options are analysed before the Action Plans are discussed. However, the document is 102 pages with the most important aspects appearing at the end. Some stakeholders indicated that they only read the first half of the document before other work priorities took precedence.

Recommendation

2. For the Updated NERM, consider making it a shorter document focused on the Action Plans, Strategies, Activities as well as the Monitoring, Evaluation and Reporting framework with an Appendix for outlining key background and other analysis.

The Action Plans are presented in the following order:

- i) power,
- ii) petroleum,
- iii) renewable energy,
- iv) demand side energy efficiency,
- v) transport, and
- vi) institutional strengthening and capacity building.

While this isn't a priority order, it is human nature to assign a higher priority to the Action Plans near the top of the list. Thus it may be worth changing the order of the Action Plans to provide more emphasis on the importance of institutional strengthening and capacity building.

In addition, the Activities across the six Action Plans have the same numbering system, i.e. there are six Activities numbered 1.1. To allow for unique identifiers, new names for the Action Plans and a new numbering system is proposed.

Recommendation

3. For the Updated NERM, consider using the following order and new names (previous name in brackets) for the Action Plans with the associated Activity identifiers.
 - i) Capacity – Activities C1.1 to C4.3, (institutional strengthening and capacity building)
 - ii) Power – Activities P1.1 to P5.6, (electricity)
 - iii) Renewables – Activities R1.1 to R3.2, (renewable energy)
 - iv) Efficiency – Activities E1.1 to E3.5, (demand side energy efficiency)
 - v) Fuels – Activities F1.1 to F2.4, (petroleum)
 - vi) Transport – Activities T1.1 to T2.1, (transport)

The Activities are allocated a Lead Agency and Activity Importance. To allow for Agencies to easily find Activities they are leading and participating in, the Activities could be listed by Lead Agency and Priority as well as by Action Plan.

Recommendation

4. For the Updated NERM, consider listing Activities by Lead Agency and Priority with their locations in the Action Plans documented by their unique Activity identifier.

The Time Frames for the Activities are mostly given in months or years with no start date specified. Only one Activity (R2.3) has a partially definitive date 'by 2020', although even this is open to interpretation. Definitive deadlines may not always be met but may improve focus on the timeframes for action.

Recommendation

5. For the Updated NERM, consider listing Activities' Time Frames by calendar year quarters, e.g. Activity R1.2 will be completed by Q4 2018.

Each Activity has an estimated budget in the Action Plan tables. It is unclear if this estimated budget is to come from Departmental budgets or aid funders. If it is aid funding, then it may be useful to know if discussions have commenced with particular aid funders or if particular aid funders are going to be approached. For example, NUC is in detailed discussions with ADB to secure funding for Activities R1.5 to R1.7 from the Global Climate Fund.

Recommendation

6. For the Updated NERM, consider documenting if the Estimated budget is Departmental or aid funding. If it is aid funding, a note could be added on status and organisation.

The Monitoring Plan (Table 11) contains 15 indicators with two indicators to be developed. For the two indicators to be developed, there is no documentation of who is responsible for developing them. The Means of Verification lists various locations including NUC Reports, CIE Reports, Public Service Reports and Bureau of Statistics with the frequency of reporting given as yearly. Reports is a fairly vague description of where the key indicators can be found.

Recommendation

7. For the Updated NERM, consider documenting the name of the report where the indicator can be found as well as when and where this report is published, e.g. the Power Sector's Total System Losses is documented in NUC's annual reports which are typically published on NUC's website 5 months after the close of the financial year on 30 June.

The first Power Sector indicator is labelled 'Hours of Interruption per customer' and this is footnoted as System Average Interruption Duration Index (SAIDI). The 2010 baseline figure of 0.92 needs to be checked as NUC's 2015-16 Annual Report indicates a SAIDI of 34,097 minutes and a target of <700 minutes.

There are also issues with interpreting the ‘30% improvement in energy efficiency by 2020’ targets and indicators, e.g. NUC’s 2011 specific fuel consumption of 3.54 kWh/l is aiming for ‘30% improvement in energy efficiency by 2020’. Does this mean that diesel generated electricity is aiming for 4.6 kWh/litre by 2020 or all electricity (solar and diesel generated) is aiming for this ‘fuel consumption’ figure?

Recommendation

8. For the Updated NERM, consider refining the definitions of the monitoring indicators and their targets.

4.3 Reflection of higher level planning

The NERM’s Action Plans, Strategies and Activities are consistent with the visions, aims and strategies documented in the NSDS and NEPF. The strategies are mainly high level with wordings like ‘appropriate’, ‘affordable’, ‘reliable’ and ‘safe’ which are not defined in detail. The update of the NSDS may tighten the definitions and provide more specific targets in areas not covered in detail in the original NERM, e.g. electric vehicles.

How the NERM is reflected in the Annual Operating Plans of CIE, DoF and DoT has not yet been assessed. It is planned to discuss this at the workshop on 14 November 2017 and update this section.

NUC has a Strategic Plan 2015 to 2020 which was published in September 2014, (Appendix B). NUC utilises this document (rather than the NERM) and it is due to be updated in February 2018. The Strategic Plan is 55 pages long and is broadly consistent with the NERM. However, it does discuss the many challenges to achieving the 50% renewable electricity by 2020 target in more detail than the NERM.

Recommendation

9. For the Updated NERM, consider whether NUC’s Activities need to be documented in detail or whether attaching their Strategic Plan is more appropriate.

4.4 Implementation progress

The first mission involved consulting with Lead Agencies on their assessment on the implementation of the 110 Activities outlined in the NERM, (listed in Appendix C with their timeframes). The number of Activities with timeframes of three years or less is 96. The implementation progress assessment for these Activities is summarised by Action Plan and Strategy in the following table and figure.

Electricity					Renewables			Demand			Petrol		Transport		Institutional			
1.1	2.1	3.1	4.1	5.1	1.1	2.1	3.1	1.1	2.1	3.1	1.1	2.1	1.1	2.1	1.1	2.1	3.1	4.1
1.2	2.2	3.2	4.2	5.2	1.2	2.2	3.2	1.2	2.2	3.2	1.2	2.2	1.2	2.2	1.2	2.2	3.2	4.2
1.3	2.3	3.3	4.3	5.3	1.3	2.3		1.3	2.3	3.3	1.3	2.3	1.3		1.3	2.3	3.3	4.3
1.4	2.4	3.4	4.4	5.4	1.4	2.4		1.4	2.4	3.4	1.4	2.4	1.4		1.4	2.4	3.4	
1.5	2.5	3.5	4.5	5.5	1.5	2.5		1.5	2.5	3.5	1.5		1.5		1.5		3.5	
1.6	2.6	3.6	4.6	5.6	1.6	2.6			2.6		1.6		1.6				3.6	
1.7	2.7				1.7				2.7		1.7		1.7				3.7	
	2.8				1.8						1.8		1.8					
	2.9												1.9					
	2.10																	
Total Number of Activities 35					16			17			12		11		19			

	Complete
	Underway
	Not started yet
	No longer a priority
	Not assessed
	Longer than 3 years' timeframe

Where stakeholders indicated that an Activity was thought to be no longer relevant, it has been classified as 'No longer a priority'. Two of the Petrol Activities weren't assessed during the first consultations and their status will be updated after the 14 November 2017 workshop.

For the 14 Activities with timeframes longer than 3 years, their progress assessment is summarised in the following table.

Electricity					Renewables			Demand			Petrol		Transport		Institutional			
1.1	2.1	3.1	4.1	5.1	1.1	2.1	3.1	1.1	2.1	3.1	1.1	2.1	1.1	2.1	1.1	2.1	3.1	4.1
1.2	2.2	3.2	4.2	5.2	1.2	2.2	3.2	1.2	2.2	3.2	1.2	2.2	1.2	2.2	1.2	2.2	3.2	4.2
1.3	2.3	3.3	4.3	5.3	1.3	2.3		1.3	2.3	3.3	1.3	2.3	1.3		1.3	2.3	3.3	4.3
1.4	2.4	3.4	4.4	5.4	1.4	2.4		1.4	2.4	3.4	1.4	2.4	1.4		1.4	2.4	3.4	
1.5	2.5	3.5	4.5	5.5	1.5	2.5		1.5	2.5	3.5	1.5		1.5		1.5		3.5	
1.6	2.6	3.6	4.6	5.6	1.6	2.6			2.6		1.6		1.6				3.6	
1.7	2.7				1.7				2.7		1.7		1.7				3.7	
	2.8				1.8						1.8		1.8					
	2.9												1.9					
	2.10																	
No. of longterm Activities 6					5			0			1		2		0			

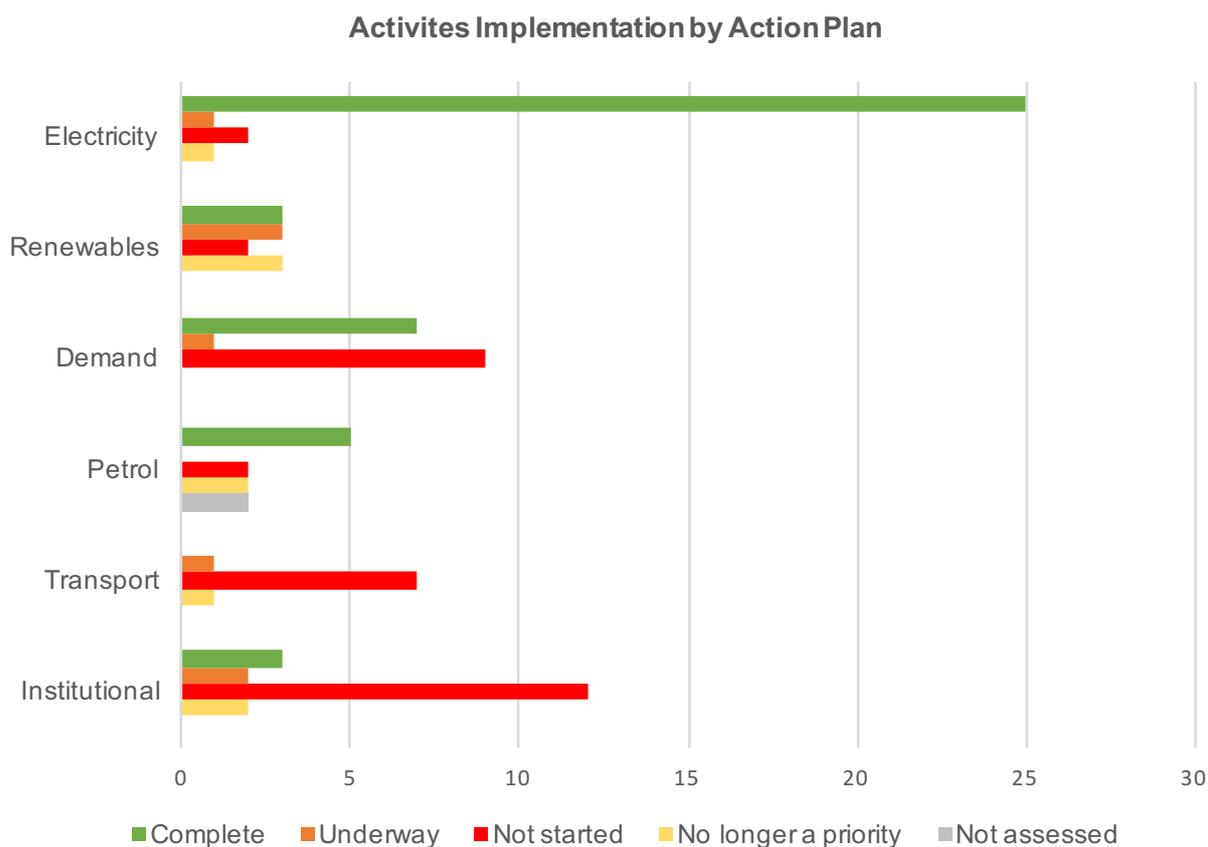


Figure 3: NERM Activities Implementation, (for the 96 with timeframes less than 3 years)

It should be noted that this is mainly a self-assessment of progress that has not been independently verified. It is also feasible that there are various interpretations of ‘underway’ and ‘completed’. However, it does provide an indicative overview of progress in implementing the Activities that had timeframes of three years or less.

The majority of the not started Activities are the responsibility of CIE. However, it should be noted that the Energy Unit at CIE envisaged to be established six (6) months into the NERM implementation did not materialise until July 2017. Not surprisingly this significant delay, including associated dedicated energy sector staff (Energy Coordinator) has negatively affected implementation of activities where CIE was designated as Lead Agency.

Some of the Activities that agencies now thought were no longer a priority relate to wind energy, bioenergy and biofuel investigations. The Department of Agriculture indicated that food production is a much higher priority than bioenergy.

Recommendation

10. For the Updated NERM, consider whether wind and bioenergy should be removed. A similar consideration is also required for Ocean Thermal Energy Conversion.

The Activity implementation assessments were utilised to develop the following overview per Strategy.

Yes	Completed
Partly	Underway
No	Not started yet

NERM Strategy	Implementation Status (as of Nov 2017)	Explanation	Relevant to future?
Electricity			
1 Upgrade assets	Partly	NUC has made significant progress in upgrading the powerhouse and network. Work is ongoing.	Y
2 Improve planning and management	Yes	NUC's Strategic Plan has been developed and it has improved governance.	Y
3 Improve supply-side energy efficiency	Partly	Fuel and network improvements have been made. Still further work to be done on water and efficiency Activities.	Y
4 Move toward full recovery of operating and maintenance costs	Yes	NUC has made significant progress in improving financial management and minimising its annual subsidy.	Y
5 Develop and safeguard NUC staff	Yes	NUC has made staff management, training and safety a priority.	Y
Renewables			
1 Phased implementation of large-scale solar up to 8.5 MWp	Partly	Tender for next solar PV farm currently underway, planning for much larger solar PV farm progressing.	Y
2 Investigation and implementation of other renewable energy resources	No	Interest in progressing wind and bioenergy is limited.	N
3 Build in-country capacity to operate and maintain solar PV systems	No	Local providers do not provide solar PV training. Some external supported solar PV training has occurred, most recently in November 2016.	Y

Demand			
1	Data collection and analysis for preparation for DSM implementation	Partly	Household energy survey undertaken in June and July 2015. Limited efforts to address commercial and industrial efficiency.
2	Implementation of demand side energy efficiency	Partly	Progress on energy efficiency has been limited. With support from the IUCN/UNEP/GEF Low Carbon Islands (LCI) project, a low carbon fund (LCF) of approximately US\$80,000 was launched in January 2017 to provide an incentive for the private sector (businesses and households) to switch towards energy efficient washing machines, fridges, and freezers. Specifically, LCF provides a 30% capital subsidy when buying new appliances. The fund is managed by NUC and back in June 2017 NUC informed that so far no payments have been made. Among others this is due to low awareness or interests among retailers.
3	Introduction of energy labeling and minimum energy performance standards	No	While there are energy rating labels on some imported appliances (refer to 2015 household energy survey), that is not due to a national mandatory MEPS and labeling scheme in Nauru.
Petrol			
1	Establish an economically efficient, secure and safe National Fuel Terminal and fuel supply	Yes	Responsibility for fuel has been outsourced to Vital Energy.
2	Investigate ways to reduce use of or find alternatives to liquid fuels	No	Limited interest in LPG or bioenergy from stakeholders. Further information on opportunities is available in the LPG and Natural Gas as Alternative Energy Sources for the Pacific Report, (April 2016).
Transport			
1	Implementation of energy efficiency in transport	No	Public transport buses operate but Activities to promote and improve transport efficiency have been limited.
2	Investigate substitutes to diesel and petrol for transport	No	Limited interest in LPG, electric vehicles or biofuels.
Institutional			
1	Establish appropriate policies, regulations and legislation for the energy sector	No	CIE's Energy Unit was established in July 2017.
2	Facilitate development of appropriate local skill base to meet ongoing demand in the energy sector	No	A MoU has been signed with an Australian Technical College to provide training materials. The Nauru Training Needs and Gap Analysis (2015) provides further information.
3	Improve governance and accountability in the energy sector	Partly	CIE is building capacity. The Energy Unit was formally established in July 2017. The Energy Unit consists of a Director, Climate Change and Energy and an Energy Officer (currently a vacant position). In addition, as part of the Enabling the Implementation of the Nauru Energy Road Map project, a project manager (based at CIE) began work based in September 2017.
4	Foster a culture of partnerships between public and private sectors including the community	No	Activities yet to commence.

4.5 Integration into planning

The NERM's integration into Government planning, budgeting and expenditures appears to have been limited. For example, CIE's section in the 2015-16 Nauru Public Service Annual Report states, 'Most of the work under the Energy Road Map is implemented by NUC'.

NUC's Strategic Plan (Appendix B) summarises NUC's vision and strategy for 2015 to 2020. This document acknowledges the NERM twice. Firstly, to document the Government of Nauru's target of 50% renewable energy generated from renewable sources by 2020. The second mention states,

'The NUC's role in implementing the Energy Road Map for Nauru is to support the installation of the projects with the technical and operational expertise. The policy recommended for adoption for solar panel renewable projects are:

1. Utilize rooftops for solar installations wherever possible.
2. For installations above the stability limit, battery storage systems with capacity for maintaining up to 2 hours of energy supply shall be installed to maintain system stability.
3. Consider buy-back tariff to encourage the private sector and individuals to invest in rooftop solar power installations.
4. Solar power installations shall not be used for diesel capacity displacement. This shall be continuously reviewed as battery costs fall and it becomes economic to do so.
5. Sufficient diesel generation capacity shall be maintained to meet the maximum demand of the power system.'

While the NERM does not receive any other mentions, the Strategic Plan outlines many of the Activities allocated to NUC in the NERM. NUC is making progress on implementing its Strategic Plan which reflects most of its responsibilities under the NERM.

Monitoring and Reporting

The lack of an Energy Unit at CIE until July 2017 has meant that the monitoring and reporting aspects of the NERM have been limited.

The Monitoring and Reporting at Activity Level section of the NERM states, 'Copies of such reports will be provided to CIE, which will act as a central repository and share these with the Technical Working Group on Energy.'

CIE has no plans to develop its own website and does not appear to have a central computer server. These issues may need to be addressed, before any reports are handed to CIE for placing in the 'central repository'.

The NUC website (www.nuc.com.nr) has not been accessible since at least 1 September 2017. This issue also needs to be addressed.

4.6 Recommendations for Updated NERM

The recommendations for the Updated NERM have been provided in the previous sections after the issue being addressed was described. They are repeated here so they are all compiled in the one location.

For the Updated NERM consider:

1. Publishing it on an appropriate GoN website with links to all relevant supporting documents.
2. Making it a shorter document focused on the Action Plans, Strategies, Activities as well as the Monitoring, Evaluation and reporting framework with an Appendix for outlining Background and other analysis.
3. Using the following order and new names (previous name in brackets) for the Action Plans with the associated Activity identifiers.
 - Capacity – Activities C1.1 to C4.3, (institutional strengthening and capacity building)
 - Power – Activities P1.1 to P5.6, (power - electricity)
 - Renewables – Activities R1.1 to R3.2, (renewable energy)
 - Efficiency – Activities E1.1 to E3.5, (demand side energy efficiency)
 - Fuels – Activities F1.1 to F2.4, (petroleum)
 - Transport – Activities T1.1 to T2.1, (transport)
4. Listing Activities by Lead Agency and Priority with their locations in the Action Plans documented by their unique Activity identifier.
5. Listing Activities' Time Frames by calendar year quarters, e.g. Activity R1.2 will be completed by Q4 2018.
6. Documenting if the Estimated budget is Departmental or aid funding. If it is aid funding, a note could be added on status and organisation.
7. Documenting the name of the report where the indicator can be found as well as when and where this report is published, e.g. the Power Sector's Total System Losses is documented in NUC's annual reports which are typically published on NUC's website 5 months after the close of the financial year on 30 June.
8. Refining the definitions of the monitoring indicators and their targets.
9. Whether NUC's Activities need to be documented in detail or whether attaching their Strategic Plan is more appropriate.
10. Whether wind and bioenergy should be removed. A similar consideration is also required for Ocean Thermal Energy Conversion.

5. Conclusions

This NERM Review report has assessed the process of developing the NERM and the structure and format of the NERM to highlight any opportunities for improvement.

The six Action Plans and 110 Activities' implementation progress and the NERM's compatibility with higher level planning documents was also assessed. Implementation has been varied and lack of an Energy Unit within CIE until recently has delayed implementation of many Activities.

The NERM Review report has listed 10 recommendations for the updated NERM 2018 to 2020 and these were discussed at the workshop with stakeholders in Nauru on 14 November 2017. This report has been revised as a result of feedback from this workshop.

6. References

Nauru Energy Road Map (Jan 2014)

http://prdrse4all.spc.int/system/files/second_draft_nauru_energy_road_map_v6_0.pdf

National Sustainable Development Strategy 2005 – 2025 (revised 2009)

<https://www.adb.org/sites/default/files/linked-documents/cobp-nau-2015-2017-sd-02.pdf>

National Energy Policy Framework (2009)

http://prdrse4all.spc.int/system/files/nauru_policy-_final.pdf

Nauru Framework for Climate Change Adaptation and Disaster Risk Reduction (2015)

http://reliefweb.int/sites/reliefweb.int/files/resources/NRU_2015_RONAdapt_Framework.pdf

Nauru's Intended National Determined Contribution (2015)

http://www4.unfccc.int/ndcregistry/PublishedDocuments/Nauru%20First/Nauru_NDC.pdf

Nauru 2015 Household Electrical Appliances, Lights, and End-use Survey - Background, Process, and Findings (Dec 2015)

https://drive.google.com/open?id=0Bw-_5ajzuswuMkNKVxkxkWUx5ZW8

Nauru Training Needs and Gap Analysis (2016):

http://prdrse4all.spc.int/sites/default/files/nauru_0.pdf

Pacific Climate Change Finance Assessment Nauru Case Study (2013)

http://prdrse4all.spc.int/system/files/pacific_climate_change_finance_assessment_nauru_case_study.pdf

Comparative Report Pacific Region Electricity Bills (2015)

http://prdrse4all.spc.int/system/files/electricity_price_comparison_-_pacific_area_2015_final_20150615_2.pdf

Pacific Power Utilities Benchmarking Report for 2015 Fiscal Year (2017)

https://www.ppa.org.fj/wp-content/uploads/2017/08/2015-FY-Benchmarking-Report_Final-updated-100817.pdf

Stocktake of Energy Sector Institutions, Legislation, Policies and Fiscal Incentives in Fourteen Pacific Island Countries (2016)

http://prdrse4all.spc.int/sites/default/files/energy_stocktake_report_web.pdf

Legislative Drafting Manual (2015)

http://ronlaw.gov.nr/nauru_lpms/Links/LEGISLATIVE-DRAFTING%20MANUAL-Nauru.pdf

In addition, the following documents have been received and examined.

- Nauru Utilities Corporation water and electricity rates (July 2017).
- Nauru Utilities Corporation Annual Report 2015-16.
- Nauru Utilities Corporation Strategic Plan 2015 to 2020, (November 2014).
- Nauru Utilities Corporation Act (2011) and Amendment (2016).
- Feasibility Study: Solar Photovoltaics for Replacing up to 50% of Diesel Generation in Nauru, (July 2013).

APPENDIX A: NUC Strategic Plan 2015 to 2020

This November 2014 document is provided as a separate pdf.

APPENDIX B: NERM 2014 - 2020 Activities List

Provided as a separate spreadsheet.



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