

December 2020

Nauru Utilities Corporation

Business Plan 2021-2023



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Abbreviations

AA ADB CAPEX DIBP UAE EU FEA HV kI kW kWh KPI LV NWSHP NWSMP NERM NIEP NSDS NUC OH&S OPEX PPA PPE PWWA ML MW MWh RON	Australian Aid Asian Development Bank Capital Expenditure Dept of Immigration & Boarder Protection, Australian Government United Arab Emirates European Union Fiji Electricity Authority High Voltage kilolitres kilowatt kilowatt hour Key Performance Indicators Low Voltage National Water Sanitation & Hygiene Policy National Water Sanitation Master Plan. Nauru Energy Road Map National Integrated Environment Plan National Integrated Environment Plan National Sustainability Development Plan Nauru Utilities Corporation Occupational Health and Safety Operational Expenditure Pacific Power Association Persona Protective Equipment Pacific Water & Wastewater Association Mega Litres Megawatt Megawatt Hour Republic of Nauru Government
MWh RON SAIDI SAIFI SPC SWP	Megawatt Hour Republic of Nauru Government System Average Interruption Duration Index System Average Interruption Frequency Index South Pacific Commission Safe Work Procedures
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Executive Summary

Introduction

The purpose of Nauru Utilities Corporation's (NUC) 3-year Business Plan 2021 - 2023 is to implement and deliver on NUC's strategic and operational projects and activities.

The Business Plan 2021-2023 articulates NUC's Vision, Mission, Strategic Objectives, Targets and Key Performance Indicators (KPIs). It similarly, presents the main strategic and operational activities of NUC for the next three-year period. Being a rolling plan, it is subject to annual reviews and updating to make it more responsive to changes in the operating environment.

Our Business Plan 2021-2023 is aligned with key national development frameworks particularly the Government's National Sustainability Development Strategy 2005 – 2025 which aims:

In the case of energy:

Provide a reliable, affordable, secure and sustainable energy supply to meet socioeconomic development needs.

♣ In the case of Water & Sanitation:

Provide a reliable, safe, affordable, secure and sustainable water supply to meet socio-economic development needs; and

It enables NUC to effectively and efficiently perform its core functions in line with the *Nauru Utilities Corporation Act 2011*; *Nauru Utilities Corporation Amendment Act 2016*; Nauru Energy Road Map 2018-2020; and Nauru National Energy Policy 2009.

More specifically, in accordance with section 22 of the *Public Enterprise Act 2019*, NUC's primary objective is to be a successful business.

The Act establishes two measures for the NUC to demonstrate its achievement of the objective:

- it is at least as profitable and efficient as comparable businesses in the private sector; and
- it generates, for each financial year, a net operating profit after tax that is not less than its weighted average cost of capital prescribed as a percentage.

Vision

NUC's 3-year Business Plan is guided by the following vision:

"Makur Dogin Naoero"

Makur Dogin Naoero meaning "Work for Nauru" appeals to the heart of employees, to give meaning to their work and to inspire exceptional performance.

In order to be a high performing organisation, one that delivers exceptional service to the people of Nauru our vision encapsulates that our people are working for their fellow Nauruans, for their families, especially their children, grandchildren and for future generations.

Mission

In line with the vision, the mission of the NUC is:

For Nauru we will Achieve, with a United effort and doing things Right first time, Utopia: providing safe, reliable, affordable, secure and sustainable electricity and water supply.

Core Values

In pursuit of its mission, NUC will continue to be guided by the following six (6) core values - defining its desired corporate culture:

	Core Value	Description
1	Impartiality	NUC staff shall treat all customers, stakeholders and each other with fairness. NUC provides safe, reliable, affordable
		customers.
2	Morality	NUC staff shall ensure they uphold standards of right and good conduct.
3	Professionalism	NUC staff shall perform their duties with the highest degree of competence and skills.
4	Accountability	NUC staff shall perform their duties in a manner that shows readiness to take full accountability and responsibility for their actions.
5	C onsistency	NUC staff shall ensure uniformity, predictability and coherence in accordance with our Code of Conduct and Core Values.
6	Transparency	NUC staff shall operate in a fair and open manner and without prejudice in delivering safe, reliable, affordable and sustainable electricity and water services.

Motto

In line with its core values – NUC shall use the following motto to rally employees, consumers, suppliers, and stakeholders, in general, behind its vision and mission:

"Safe reliable, affordable and sustainable services with positive IMPACT"

Business Objectives and Implementation Plan

During the three-year period, 2021 - 2023, the NUC through its Business Plan will pursue the following five (5) Business Objectives:

Customer Focus: NUC shall implement strategies to shift from an "operational" focus to a customer centric organisation. NUC is committed to improving our service delivery to benefit our customers and stakeholders. Underpinning our approach are our fundamental commitments which lay the foundation for our strategic priorities and initiatives.

They are:

- Delivering Safe, Reliable, Affordable and Sustainable Electricity and Water Services
- o Communicating and Engaging with Customers and Stakeholders
- Delivering Customer Outcomes
- A High Performing Organization
- Human Resources: NUC shall continue to develop and up-skill leaders and staff to ensure enhanced operational safety, improved operational performance and customer service outcomes.

Through an efficient, robust and well-resourced organisation, our Finance, Human Resource, Procurement and Technical Operations Teams are committed in working together to deliver safe, reliable, affordable and sustainable electricity and water services to our customers.

Environment: NUC shall ensure sustainable use and management of the environment and natural resources for the benefit of present and future generations.

NUC's commitment to implementation of large-scale solar and the investigation and implementation of other renewable energy sources coupled with an efficient supply and use of energy will reduce our carbon footprint and subsequent impact on our environment.

Safety: An integral part of delivering electricity and water services to our customers is ensuring that it is carried out in a safe and sustainable way. The health, safety and well-being of our staff and customers are paramount.

NUC shall provide all systems, equipment and Personal Protective Equipment (PPE) necessary for employees to carry out their work safely.

NUC staff continuously identify hazards, report incidents and learn from mistakes, making changes to operations to ensure safety of personnel and the public. It will become a way of life.

Operational Performance: Ensuring a safe reliable, affordable and sustainable provision of electricity and water services in Nauru is central objective of Government. An efficient electricity and water utility play a primary role in ensuring this objective is met.

Knowing how well NUC is operating, and where it stands in comparison to other similar utilities helps NUC's staff, stakeholders and Government adjust existing practices and set future targets.

Information on the operation of NUC systems, inputs and outputs helps to establish good management practices, effective oversight, and enhanced financial sustainability.

NUC utilises a range of performance measures and indicator to assess its operational performance. These include, among other things:

- core indicators such as operating cost per connection;
- performance scores based on production or cost estimates;
- benchmarking; and
- customer survey benchmarking by identifying customer perceptions.

The Business Plan has translated each strategic objective into key strategies, output targets, KPIs as well as operational activities. Accordingly, two detailed implementation activity schedules have been presented in the Plan including:

- Summary of Proposed Initiatives and Projects (Appendix 1)
- Operational Performance Parameters (Appendix 2)
- Current Electricity and Water Charges (Appendix 3)
- Financial Projections to 2025 (Appendix 4)

COVID-19 Pandemic

In developing this plan, regard has been given to the current pandemic and its impact on our organisation.

The Asian Development Bank has forecast that developing Asia will contract by 0.7% this year, its first contraction in six decades, however growth will rebound to 6.8% in 2021.

According to ADB, the downturn is broad-based—three-fourths of the region's economies are expected to contract this year with the exception of the People's Republic of China (PRC).

ADB has indicated that depressed demand and low oil prices have offset supply disruptions, keeping regional inflation at 2.9% in 2020, and trimming it to 2.3% in 2021.

The threat of a prolonged COVID-19 pandemic is the main risk to our outlook. A return to more stringent containment measures could slow or even derail recovery and possibly trigger financial turmoil.

There remains uncertainty around the cost impact of the pandemic and it is not clear whether those costs could be mitigated by NUC. In addition, NUC is concerned about the adverse effect that the pandemic may have on future prices faced by customers.

COVID-19 has delayed implementation of some planned RE and other systems in Nauru. It has severely damaged some Pacific Island Countries' economies, particularly those highly dependent on tourism, and caused considerable financial stress to some power utilities (as customers cannot easily pay their bills) and to Pacific national airlines.

The longer-term impacts could include a lower 'normal' level of tourism generally, government and aid resources diverted from energy to other sectors, and potentially global recurrences of other pandemics, with serious effects on our economy and the ability to finance investments, including the energy sector.

The COVID-19 pandemic potentially affects all of our operations in NUC and all of our customers. It has become clear that the impacts of COVID-19 are substantial, and further consideration will need to be made during the 2021-2023 period.

A balanced treatment of all the impacts of the pandemic will require NUC to undertake adequate consultation with affected stakeholders.

	2019		2020			2021	
		April	June	Sept	April	June	Sept
Pacific	3.5	-0.3	-4.3	-6.1	2.7	1.6	1.3
Nauru	1.0	0.4	-1.7	-1.7	1.1	0.8	0.5

Outlook (Source ADB Website)

GDP Growth Rate (% per year). Inflation rate for 2020 is set at 2.9% while 2021 is forecast to be 2.3%

1. Introduction

The Nauru Utilities Corporation (NUC) was established under the *Nauru Utilities Act* 2011 (the Act) and commenced operations on 1 August 2011. NUC succeeded the Nauru Utilities Authority.

The Act sets out the functions of the Corporation with respect to electricity and water services.

In relation to electricity our functions are:

- (a) to generate, acquire, exchange, transport, distribute, market and otherwise supply electricity;
- (b) to undertake, maintain and operate any works, system, facilities, apparatus or equipment required for any function mentioned in paragraph (a); and
- (c) to do anything that the Corporation determines to be conducive or incidental to the performance of a function mentioned in paragraph (a) or (b).

In relation to water our functions are:

- (a) to acquire, store, treat, distribute, market and otherwise supply water for any purpose;
- (b) to undertake, maintain and operate any works, system, facilities, apparatus or equipment required for any purpose mentioned in paragraph (a); and
- (c) to do anything that the Corporation determines to be conducive or incidental to the performance of a function mentioned in paragraph (a) or (b).

In 2019 the *Public Enterprise Act 2019* identified NUC as a state-owned enterprise for the purposes of the Act.

The introduction of the *Public Enterprises Act 2019* requires NUC to provide its strategic plan, business plans and annual and bi-annual reports including financial statements to Government.

A Statement of Corporate Intent detailing the purpose and main operational activities of NUC is also required for approval by Government.

NUC's primary objective as a State-owned enterprise under the Public Enterprise Act 2019 is to be a successful business, that it is at least as profitable and efficient as a comparable business in the private sector and must conduct its business and operations with a view to being a successful business.

NUC is required under the Act to publish and give effect to its Statement of Corporate Intent, and publish its business and strategic plans.

NUC's 3-year Business Plan 2021 – 2023 is aligned with key national development frameworks, particularly the *Pubic Enterprise Act 2019* and National Sustainability Development Plan, which aims at:

"A future where individual, community, business and government partnerships contribute to a sustainable quality of life for all Nauruan's"

For NUC this means providing reliable, affordable, secure and sustainable energy and water supply to Nauru.

The Business Plan 2021 – 2023 aims to enable NUC to effectively and efficiently perform its functions in delivering power and water services to the people of Nauru.

Overall, the Plan embraces comprehensive planning and organizational development towards supporting the Government's efforts to enhance the quality of life for all Nauruan's through the provision of safe, reliable, affordable, secure and sustainable electricity and water supply.

Purpose of the Business Plan

The Business Plan takes into account NUC's ten (10) year strategic 2031 Future Operating Model and our 5-year Strategic and Operational Plan 2021-2025.

Thus, the Business Plan articulates NUC's Vision, Mission, Strategic Objectives, Targets and Key Performance Indicators (KPIs) for 2021 – 2023. It likewise presents the main operational activities of the NUC for the three-year period.

The Plan considers the current state, and maps out our journey over the next three years to achieving our objectives. The Plan is a 'living' document and will be continuously reviewed and adjusted to ensure progress towards implementing our vision, is preserved.

Organization of the Business Plan 2021-2023

The remaining part of this document is divided into the following sections:

Section 1 - begins with a brief history of the NUC, our corporate governance and organisation structure including our management team and lines of business.

Section 2 – explains NUC's Electricity Generation Management Plan, strategies and activities proposed to enhance our electricity generation capabilities including our renewable energy generation strategies.

Section 3 - outlines NUC's Distribution Network Management Plan, strategies and activities proposed to enhance our poles and wires distribution network.

Section 4 – Describes NUC's Water Production and Storage Management Plan, strategies and activities proposed to enhance our water business activities.

Section 5 – presents NUC's Water Distribution Management Plan, strategies and activities proposed to enhance our water delivery services to customers.

Section 6 – provides our financial projections for year 1 and the following 2 years of the Business Plan 2021-2023.

Role and Function of Nauru Utilities Corporation

The main roles and functions of NUC as spelt out in the Act are:

In relation to electricity

(a) to generate, acquire, exchange, transport, distribute, market and otherwise supply electricity;

(b) to undertake, maintain and operate any works, system, facilities, apparatus or equipment required for any function mentioned in paragraph (a); and

(c) to do anything that the Corporation determines to be conducive or incidental to the performance of a function mentioned in paragraph (a) or (b).

In relation to water

(a) to acquire, store, treat, distribute, market and otherwise supply water for any purpose;

(b) to undertake, maintain and operate any works, system, facilities, apparatus or equipment required for any purpose mentioned in paragraph (a); and

(c) to do anything that the Corporation determines to be conducive or incidental to the performance of a function mentioned in paragraph (a) or (b).

Governance and Organisational Structure

NUC is governed by the Board of Directors consisting of a Chairman and four members, including the Chief Executive Officer. The Board provides oversight over the business of the NUC, while the Chief Executive Officer manages the day-to-day operations and activities of the Corporation.

The Board of Directors comprise five members:

Mr. Abraham Aremwa	Chairperson
Mr. Tim Aingimea	Deputy Chairperson
Ms. Ivy Cook	Director
Mr. Leo Scotty	Director
Mr. Jon Tagamoun	Director

Under the current NUC organizational structure, there is one General Manager Operations, four Corporate Services Managers, and five Engineering Managers who assist the Chief Executive Officer.

NUC operates primarily from its head office at the Power Station site and a customer service office located at the Civic Centre Complex in Nauru.

Figure 1: NUC's Organization Chart.



The NUC Management Team comprise:

Mr. Carmine Piantedosi	Chief Executive Officer
Mr. Ali R Mohammed	General Manager Operations
Mr. Naibuka Sigasiganavanua	Chief Financial Controller
Ms. Sinderina Adeang	Human Resource Manager
Mr. Damasus Ika	Acting Manager Power Generation
Mr. Taumanu Haulangi	Acting Manager Power Distribution
Mr. Apenisa Manuduitagi	Metering Regulatory & Renewable Energy Manager
Mr. Mark Hiram	Water Services Manager
Mr. Dacor Ratabwiy	Safety and Security Manager
Mr. Timoci Nanovo	Acting Manager ICT
Ms. Mesha'h Denuga	Contracts and Procurement Manager
Mr. Timoci Bavadra	Planning Manager
Mr. Sankey Deluckner	Project Manager

2. Electricity Generation Management Plan

Electricity Demand Forecast

This section sets out the energy demand analysis and forecasts for NUC.

The electricity demand forecast is critical to the development of generation and distribution capacity plans and the estimated revenue and costs forecast for the provision of electricity.

A lower and upper demand forecast is used to determine the sensitivity of the generation capacity argumentation program to the demand. The sales categories are Domestic, Commercial, Government and Industrial.

Using a variety of inputs including third-party forecasts and the most up-to-date data available, our outlook provides:

- Expected growth in electricity demand, and timing
- Anticipated demand for generation capacity
- Potential types and locations of new generation

The growth rate for domestic demand is set at 3% per annum. While this may appear to be conservative, in the current economic environment many Nauruans continue to acquire a range of electrical appliances for the home such as air conditioning, televisions, household items and other white goods that are expected to contribute to the growth in demand. New domestic customer connections over the previous period indicated an average increase in demand of 1.2 MWh per year.

The following table describes the types and number of electricity customers served by NUC.

	Total Number of Customer - Electricity														
Type Domestic Commercial Industrial Government T															
Post Paid	34	43	5	50	132										
Prepaid	3032	370	21	6	3429										
Fixed Rate	0	0	4	1	5										
Total	3066	413	30	57	3566										

Table 1: Total number of Customers by Type and Meter Classification

The trends for Commercial, Industrial and Government demand that is currently on the system remains flat with minimal growth.

However, consideration is given to potential growth with proposed developments in the Ports and Fisheries sector including secondary mining activities. The following table illustrates the previous 5-year period of energy sales (in kWh) and shows a trend-line projection based on available historic data.

			Previous 5-y	ear Period					Period 2021 - 202	5	
Energy Sales	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Domestic prepaid lifeline				4,591,928	5,125,886	5,695,711	5,980,496.55	6,279,521.38	6,593,497.45	6,923,172.32	7,269,330.93
Domestic prepaid regular				6,661,502	7,229,749	8,166,725	8,575,061.25	9,003,814.31	9,454,005.03	9,926,705.28	10,423,040.54
Total Domestic Prepaid	10,463,444	11,018,151	11,572,400	11,253,430	12,355,635	13,862,436	14,555,557.80	15,283,335.69	16,047,502.47	16,849,877.60	17,692,371.48
Domestic - Postpaid	800,225	979,277	1,158,321	2,367,688	2,645,990	2,470,735	2,594,271.98	2,723,985.58	2,860,184.86	3,003,194.10	3,153,353.81
Commercial - Prepaid	2,438,559	3,083,551	4,179,284	4,501,145	4,148,735	4,030,352	4,231,869.60	4,443,463.08	4,665,636.23	4,898,918.05	5,143,863.95
Commercial - Postpaid	2,054,317	2,144,102	4,813,726	4,549,054	4,787,602	4,048,691	4,251,125.95	4,463,682.25	4,686,866.36	4,921,209.68	5,167,270.16
Government	1,924,393	2,000,473	2,525,363	3,717,647	4,152,479	4,497,641	4,722,523.05	4,958,649.20	5,206,581.66	5,466,910.75	5,740,256.28
Industrial- Prepaid	199,626	238,435	200,827	136,244	117,042	214,341	225,058.05	236,310.95	248,126.50	260,532.83	273,559.47
Industrial- Postpaid	910,067	561,903	472,873	826,313	1,814,249	1,221,825	1,282,916.25	1,347,062.06	1,414,415.17	1,485,135.92	1,559,392.72
Total Domestic	11,263,669	11,997,428	12,730,721	13,621,118	15,001,625	16,333,171	17,149,829.78	18,007,321.27	18,907,687.33	19,853,071.70	20,845,725.29
Total Commercial	4,492,876	5,227,653	8,993,010	9,050,199	8,936,337	8,079,043	8,482,995.55	8,907,145.33	9,352,502.59	9,820,127.72	10,311,134.11
Total Government	1,924,393	2,000,473	2,525,363	3,717,647	4,152,479	4,497,641	4,722,523.05	4,958,649.20	5,206,581.66	5,466,910.75	5,740,256.28
Total Industrial	1,109,693	800,338	673,700	962,557	1,931,291	1,436,166	1,507,974.30	1,583,373.02	1,662,541.67	1,745,668.75	1,832,952.19
Total Energy Sales	18,790,631	20,025,892	24,922,794	27,351,521	30,021,732	30,346,022	31,863,322.68	33,456,489	35,129,313	36,885,779	38,730,068

Table 2: Energy Sales Trend-line Projections to 2025

The following <u>likely</u> base demand projection assumes that:

- Domestic demand will reduce over the 5-year period to 2025 from 4% in 2021 to less than 1% towards the end of 2025.
- Commercial customer demand remains flat over the 5-year period to 2025.
- Industrial customer demand remains flat over the 5-year period to 2025.
- Government demand is 2% per year over the 5-year period to 2025.

	Energy Forecast: Most Likely																						
Year							Sales						Non Revenue	Losse	s	Total			Total				
	Domest	ic	RPC 2	RPC 3	Commer	ercial RPC1		Government Indu		Industria	ndustrial Total Sales		Energy			Demand on	Auxilla	ries	Generation	MD	Load Factor	Loss	Year
	kWh	G%	kWh	kWh	kWh	G%	kWh	kWh	G%	kWh	G%	kWh	kWh	kWh	% Sales	kWH	kWh	%	kWh	MW	%	% Gen	
2015	11,263,669				4,492,876			1,924,393		1,109,693		18,790,631		12,323,924		31,114,555	312,390	1.00%	31,426,945	4.85	74%	39%	2015
2016	11,997,428	6.5%			5,227,653	16%		2,000,473	4%	800,338	-28%	20,025,892	544,907	11,018,058	66%	31,588,857	283,300	0.90%	31,872,157	4.8	76%	35%	2016
2017	12,730,721	6.1%			8,993,010	72%		2,525,363	26%	673,700	-16%	24,922,794	793,446	8,909,590	55%	34,625,830	188,700	0.54%	34,814,530	5.03	79%	26%	2017
2018	13,621,118	7.0%			9,050,199	1%		3,717,647	47%	962,557	43%	27,351,521	738,305	7,723,250	36%	35,813,076	362,520	1.01%	36,175,596	5.30	78%	21%	2018
2019	15,001,625	10.1%	-	-	8,936,337	-1%		4,152,479	12%	1,931,291	101%	30,021,732	1,779,977	4,327,292	26%	36,129,001	366,000	1.01%	36,495,001	5.30	79%	12%	2019
2020	16,333,171	8.9%		-	8,079,043	-10%		4,497,641	8%	1,436,166	-26%	30,346,021	1,832,990	6,775,290	14%	38,954,301	366,000	0.94%	39,320,301	5.55	81%	17%	2020
2021	16,986,498	4.00%	-	-	8,079,043	0%	2,392,991	4,587,594	2.0%	1,450,528	1%	33,496,653	1,832,990	5,024,498	15%	40,354,141	353,040	1.00%	40,707,181	5.96	78%	12%	2021
2022	17,326,228	2.00%	-	-	8,079,043	0%	3,988,319	4,679,346	2.0%	1,450,528	0%	35,523,463	1,832,990	3,552,346	10%	40,908,799	353,040	1.00%	41,261,839	6.04	78%	9%	2022
2023	17,499,490	1.00%	-	-	8,079,043	0%	3,988,319	4,772,933	2.0%	1,450,528	0%	35,790,312	1,832,990	2,863,225	8%	40,486,527	353,040	1.00%	40,839,567	5.98	78%	7%	2023
2024	17,516,990	0.10%	-		8,079,043	0%	3,988,319	4,868,391	2.0%	1,450,528	0%	35,903,270	1,832,990	2,513,229	7%	40,249,489	353,040	1.00%	40,602,529	5.94	78%	6%	2024
2025	17,534,507	0.10%	-	-	8,079,043	0%	3,988,319	4,965,759	2.0%	1,450,528	0%	36,018,155	1,832,990	2,521,271	7%	40,372,416	353,040	1.00%	40,725,456	5.96	78%	0%	2025

Table 3: Base Energy Demand Forecast.

The following lower demand projection assumes that:

- Domestic demand is lower than 1% over the 5-year period to 2025.
- Commercial customer demand remains flat.
- Industrial customers demand remains flat.
- Government demand is lower than 1% over the 5-year period to 2025.

	Energy Forecast: Low																						
Year							Sales						Non Revenue	Losse	!S	Total			Total				
		Domest	tic		Co	mmerci	al	Government Industrial		rial	Total Sales	Energy			Demand on	Auxilla	aries	Generation	MD	Load Factor	Loss		
	kWh	RPC2	RPC3	G%	kWh	G%	RPC 1	kWh	G%	kWh	G%	kWh	kWh	kWh	% Sales	kWH	kWh	%	kWh	MW	%	% Gen	
2015	11,263,669				4,492,876			1,924,393		1,109,693		18,790,631		12,323,924		31,114,555	312,390	1.00%	31,426,945	4.85	74%	39%	2015
2016	11,997,428	6.5%			5,227,653	16%		2,000,473	4%	800,338	-28%	20,025,892	544,907	11,018,058	66%	31,588,857	283,300	0.90%	31,872,157	4.8	76%	35%	2016
2017	12,730,721	6.1%			8,993,010	72%		2,525,363	26%	673,700	-16%	24,922,794	793,446	8,909,590	55%	34,625,830	188,700	0.54%	34,814,530	5.03	79%	26%	2017
2018	13,621,118	7.0%			9,050,199	1%		3,717,647	47%	962,557	43%	27,351,521	738,305	7,723,250	36%	35,813,076	362,520	1.01%	36,175,596	5.30	78%	21%	2018
2019	15,001,625	10.1%	-	-	8,936,337	-1%		4,152,479	12%	1,931,291	101%	30,021,732	1,779,977	4,327,292	26%	36,129,001	366,000	1.01%	36,495,001	5.30	79%	12%	2019
2020	16,333,171	8.9%	-	-	8,079,043	-10%		4,497,641	8%	1,436,166	-26%	30,346,021	1,832,990	6,775,290	14%	38,954,301	366,000	0.94%	39,320,301	5.55	81%	17%	2020
2021	16,349,504	0.10%	-	-	8,079,043	0.0%	2,267,044	4,520,129	0.5%	1,436,166	0%	32,651,887	1,832,990	4,897,783	15%	39,382,660	353,040	1.00%	39,735,700	5.82	78%	12%	2021
2022	16,365,854	0.10%	-	-	8,079,043	0.0%	3,778,407	4,542,730	0.5%	1,436,166	0%	34,202,200	1,832,990	2,736,176	8%	38,771,366	353,040	1.00%	39,124,406	5.73	78%	7%	2022
2023	16,382,220	0.10%	-	-	8,079,043	0.0%	3,778,407	4,565,444	0.5%	1,436,166	0%	34,241,279	1,832,990	1,712,064	5%	37,786,333	353,040	1.00%	38,139,373	5.58	78%	4%	2023
2024	16,398,602	0.10%	-	-	8,079,043	0.0%	3,778,407	4,588,271	0.5%	1,436,166	0%	34,280,489	1,832,990	1,714,024	5%	37,827,503	353,040	1.00%	38,180,543	5.59	78%	4%	2024
2025	16,415,000	0.10%	-	-	8,079,043	0.0%	3,778,407	4,611,212	0.5%	1,436,166	0%	34,319,829	1,832,990	1,715,991	5%	37,868,810	353,040	1.00%	38,221,850	5.59	78%	4%	2025

Table 4: Low Energy Demand Forecast.

The following Upper demand projection assumes that:

- Domestic demand will reduce over the 5-year period to 2025 from 5% in 2021 to less than 1% towards the end of 2025.
- Commercial customer demand will be 1% per year over the 5-year period to 2025.
- Industrial customer demand will be 1% per year over the 5-year period to 2025.
- Government demand will be less than 1% per year over the 5-year period to 2025.

	Energy Forecast: High																						
Year							Sales						Non Revenue	Losse	es	Total			Total				
		Domest	tic		Co	mmerci	al	Government Ir		Indust	rial	Total Sales	Energy			Demand on	Auxilla	aries	Generation	MD	Load Factor	Loss	
	kWh	G%	RPC 2	RPC 3	kWh	G%	RPC 1	kWh	G%	kWh	G%	kWh	kWh	kWh	% Sales	kWH	kWh	%	kWh	MW	%	% Gen	
2015	11,263,669				4,492,876			1,924,393		1,109,693		18,790,631		12,323,924		31,114,555	312,390	1.00%	31,426,945	4.85	74%	39%	2015
2016	11,997,428	6.5%			5,227,653	16%		2,000,473	4%	800,338	-28%	20,025,892	544,907	11,018,058	66%	31,588,857	283,300	0.90%	31,872,157	4.8	76%	35%	2016
2017	12,730,721	6.1%			8,993,010	72%		2,525,363	26%	673,700	-16%	24,922,794	793,446	8,909,590	55%	34,625,830	188,700	0.54%	34,814,530	5.03	79%	26%	2017
2018	13,621,118	7.0%			9,050,199	1%		3,717,647	47%	962,557	43%	27,351,521	738,305	7,723,250	36%	35,813,076	362,520	1.01%	36,175,596	5.30	78%	21%	2018
2019	15,001,625	10.1%	-		8,936,337	-1%		4,152,479	12%	1,931,291	101%	30,021,732	1,779,977	4,327,292	26%	36,129,001	366,000	1.01%	36,495,001	5.30	79%	12%	2019
2020	16,333,171	8.9%			8,079,043	-10%		4,497,641	8%	1,436,166	-26%	30,346,021	1,832,990	6,775,290	14%	38,954,301	366,000	0.94%	39,320,301	5.55	81%	17%	2020
2021	17,149,830	5.00%	•	-	8,159,833	1.0%	2,518,938	4,520,129	0.5%	1,450,528	1%	33,799,258	1,832,990	5,069,889	15%	40,702,137	353,040	1.00%	41,055,177	6.01	78%	12%	2021
2022	17,664,324	3.00%	-	-	8,241,432	1.0%	4,198,230	4,542,730	0.5%	1,465,033	1%	36,111,749	1,832,990	3,611,175	10%	41,555,914	353,040	1.00%	41,908,954	6.13	78%	9%	2022
2023	17,840,968	1.00%		-	8,323,846	1.0%	4,198,230	4,565,444	0.5%	1,479,683	1%	36,408,171	1,832,990	3,640,817	10%	41,881,978	353,040	1.00%	42,235,018	6.18	78%	9%	2023
2024	17,858,809	0.10%		-	8,407,085	1.0%	4,198,230	4,588,271	0.5%	1,494,480	1%	36,546,874	1,832,990	3,654,687	10%	42,034,552	353,040	1.00%	42,387,592	6.20	78%	9%	2024
2025	17,876,667	0.10%		•	8,491,155	1.0%	4,198,230	4,611,212	0.5%	1,509,425	1%	36,686,690	1,832,990	3,668,669	10%	42,188,349	353,040	1.00%	42,541,389	6.23	78%	9%	2025

Table 5: High Energy Demand Forecast



Figure 2: Energy Demand Forecasts (kWh)



Figure 3: Capacity Demand Forecast (MW)

Diesel Generation Capacity

The current installation of diesel generation capacity adequately meets the maximum demand with an N-2 security.

The current diesel generating capacity status and availability is summarized in the following table.

Conora	Generation Data									Station									
INSIDE POWER STATION (MEDIUM/LOU					LOW SPEE	EED ENGINES) OUTSIDE HIGH SPEED ENGINES				STANDBY ENGINES AT ESSENTIAL SERVICES									
Set Number	G1	G2	G3	G4	G5	G6	LACKSTAR	G2A	G2B	G3	G5	GON	MENENG	AIRPORT	S/CAMP	RON HO	OSPITAL	PRISON 1	PRISON 2
Engine Model	Ruston	MAN	MAN	Ruston	Cummins	Ruston	Cummins	Cummins	Cummins	Cummins	Cummins	Cummins	Cummins	Cummins	Cummins	Caterpillar	Caterpillar	Caterpillar	Caterpillar
Installed capacity Kw	2.40	2.85	2.85	3.00	1.00	2.40	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.32	0.50	0.50	0.10	0.10
Rated Capacity Kw	2000	2500	2500	2800	850	2000	800	800	800	800	850	450	450	450	300	450	450	100	100

Table 6: Current Diesel Generator Capacity

The current available capacity for high-speed diesel generators is 4 MW. The current available capacity of medium speed diesel generators is 15 MW.

The following table illustrates NUC's usage of diesel fuel and oil stocks over the previous 5-year period to 2021.

	Year	2015	2016	2017	2018	2019	2020
Fuel Received	L					8,968,740	9,200,874
Fuel in Stock (Month End)	L						
Fuel Used	L	8,912,059	9,154,148	9,611,760	9,207,805	9,174,031	9,262,280
DeleGold 15W40 Oil Received	L					26,000	8,200
15W40 Oil in Stock (Month End)	L						
15W40 Oil Used	L	67,301	77,724	64,236	41,131	20,668	16,616
MG412 Oil Received	L						10,520
MG412 Oil in Stock (Month End)	L						
MG412 Oil Used	L	67,301	77,724	64,236	41,131	20,786	16,330
Total Oil Used	L					41,454	32,946
Water Usage	L			2,238,182	1,898,132	1,644,510	3,188,275
Diesel Energy Produced	kWh	31,122,200	31,399,967	33,516,670	34,998,930	35,503,000	36,147,000
Power Station Auxillary	kWh	312,390	283,300	188,700	362,520	366,000	426,100
Net Diesel Energy Production	kWh	30,809,810	31,116,667	33,327,970	34,636,410	35,137,000	35,754,700
Maximum Demand	MW				5.30	5.3	5.55

Table 7: Diesel Fuel and Oil Usage 5-year Period 2015-2020.

The following shows projected trend in diesel prices based on Singapore price forecast over the next 10 years to 2030.

NUC's diesel price is based on the Singapore diesel price (in USD/bbl)



Figure 4: Diesel Price Projections to 2030.

Beyond 2030 to 2040 the International Monetary Fund (IMF) projections for crude oil price is that it will be increasing over time.

Thus, the NUC price for diesel fuel is more likely to be increasing beyond 2030.

As NUC reduces its dependency on diesel fuel (as part of our climate change response), the fuel price is expected to increase to cover the fixed cost of importing the fuel.



Figure 5: NUC Diesel Price Projections

Power Generation Projects

Installation of SCADA – Supervisory Control & Data Acquisition

SCADA currently installed within the diesel power station and solar generation plant has enabled NUC to control and monitor in real time the operations remotely from the field.

This has provided safe and secure control and monitoring capabilities of our diesel generators, transformers and switch gear within the power generation sites.

Our SCADA system allows us to monitor and gather process data (in real time), interacting with field devices and control station displays, recording system events, and enabling the control of our network either locally or from our control centre.

The information gathered is analysed in order to identify opportunities for improved efficiency and to expedite the communication of issues within the system to reduce the amount of time required to repair key pieces of equipment.

The installation of SCADA in monitoring and controlling our network has been a phased development and implementation. The current SCADA system provides monitoring and control capabilities for our generation plant (both solar and diesel plants), the 3.3kV bus network and water production facilities.

There is a need to expand SCADA capabilities to accommodate the additional 6 MW Solar Farm, the 33kV interconnector and switchgear (to be commissioned as part of the new Solar Farm and include the monitoring and control of system reliability and security when the proposed new Kinetic Power Plant is established in 2023.

In addition, there is an opportunity to provide SCADA capability for the existing 11kV distribution network. This would enhance the safe, reliable and secure operation of the grid.

The need to extend SCADA capabilities to the grid will require additional communication link, the replacement of switchgear to enable remote control of the equipment.

It is envisaged that this development in SCADA capability will also be undertaken in a phased approach to enable staff to be fully trained in the new technology.

Renewable Energy Generation Strategy

The following table illustrates the increase in renewable energy generation over the 5-year period to 2020.

The total installed capacity of 2.32MW comprises both roof top installations and 2 ground mounted solar farms of 500kW and 1.125MW sites respectively.

Facility	Installed Capacity	Mounting	Connection Point	Commissioning Date	2015	2016	2017	2018	2019	2020
Energy Produced (kWh)	kW				365	366	365	365	365	366
Buada	500	Ground	Grid. RMS	Apr-16			869,126	862,304	738,469	773,500
Site 1 MZMFAT/EU Solar	1125	Ground	Grid Field	Oct-19						1,267,620
Noddy/ C Tank Building	138	Roof	P/Station	Oct-13	193,933	188,890	212,853	201,443	126,067	162,910
NUC Office	20	Roof	P/Station					34,692	28,572	30,434
Government Solar	52	Roof	RME			33,588	49,944	65,482	61,499	56,965
NGH (Hospital) (22kW)	22	Roof	RMN	Apr-18			18,414	21,882	13,199	26,011
RON Hospital	25	Roof	RMN					8,967	45,970	85,847
Odin Aiwo Hotel (5KW)	5	Roof	RME						4,714	8,393
Nauru College (30 kW)	30	Roof	RMN				57,710	60,232	51,076	53,908
Capelle Warehouse (97kW)	97	Roof	RMN						102,983	134,247
Capelle Apartments (30 kW)	30	Roof	RMS				13,627	41,527	32,794	37,780
Capelle Main Store (230 kW)	230	Roof	RMN						44,796	315,317
Meneng Disable Peoples Centre (1.5 kW)	1.5	Roof	RMS					1,632	1,348	1,431
Meneng Disables school (1.5 kW)	1.5	Roof	RMS					1,296	2,491	1,951
Angelique Ika (6.3 kW)	6.3	Roof	RMN					7,043	8,127	7,733
Joseph Deireragea (9.1kW)	9.1	Roof	RMN						8,597	12,075
Meda Deireragea (3.9 kW)	3.9	Roof	RMN						2,794	4,474
Tim Ika (6.3 kW)	6.3	Roof	RMN						7,270	9,839
Raymond Ika (6.3 kW)	6.3	Roof	RMN						6,788	9,564
Dodo Tanang	1.1	Roof								636
Dewa Danang	2.2	Roof								1,165
Ludwig Scotty	1.1	Roof								576
Jad Denuga	2.2	Roof								1,142
Leo Scotty	1.1	Roof								512
Morley Thoma	1.1	Roof								512
Taiwan Farm Buada	5.2	Roof	RMS							356
Total Capacity	2322.9				138	190	817	826.3	1,184	2,323
Total Energy					193,933	222,478	1,221,674	1,306,500	1,287,554	3,004,898
Capacity Factor					16%	13%	17%	18%	12%	15%

Table 8: Renewable Energy Generation 2015 - 2020

Table 8 shows an increase in renewable energy generation exported into the grid over the 5-year period to 2020 with an average capacity factor of 15%.

With the increase of solar renewable energy generation being exported to the grid, NUC will need to further consider the use of additional technology for voltage and network stability in the form of battery energy storage system. This may require a storage capacity of several hours to maintain the system and provide sufficient time to bring on-line diesel generation or other base load generation when there are prolonged reductions in solar energy.

New 6 MW Solar Farm

The project includes the construction of a 6MW grid-connected solar power plant and a 2.5MWh, 5MW battery energy storage system to supply continuous power when solar energy is interrupted by cloud cover and to maintain network stability.

The system will be fully automated and integrated with the existing diesel generation system to optimise solar energy use, enable optimal battery energy storage system charging and discharging, and allow optimal shut-off of the diesel engines, which will reduce Nauru's reliance on diesel for power generation and decrease production costs.

The design and development work have commenced on the installation of a 6MW solar power project funded by ADB and Government of Nauru. The project is scheduled for completion by the end of 2022.

The new 6 MW Solar Farm will provide surplus energy capacity, further reducing fuel costs incurred by NUC to run diesel generators.

However, the generation investment strategy shall be to ensure sufficient diesel capacity to meet the N-2 security requirement and install solar and other renewable generation to reduce diesel fuel usage. The avoidance of investing in diesel generation capacity will require the investment in battery storage system to provide for up to 5 days of supply with minimum recharge for system stability.

The project is expected to strengthen the institutional capacity of the Nauru Utilities Corporation by training staff in the operation and management of the solar plant and the battery energy storage system. It will also support gender-mainstreaming efforts and provide project implementation assistance.

The 6MW Solar Power Project will help boost the capacity of electricity generation from renewable sources from 3.0% to 47%.

Kinetic Power Plant

On 10 September 2020, Cabinet approved the signing of a Power Purchase Agreement between the NUC and Green Pacific Energy (GPE) of Fiji to facilitate the development of a 3MW kinetic power plant in Nauru.

The installation and operation of the new generation will enable Nauru to generate the majority if not all of its power from renewable sources. This will significantly decrease NUC's reliance on diesel fuel generation and subsequently reduce fuel costs.

The new kinetic power plant will be producing base load capacity with potential availability of 97%. NUC will need to ensure that the grid is able to accept up to 3 MW of power and establish grid operating procedures to enable the power plant to connect safely to our network.

It is envisaged that a minimum of 23,000 MWH per year of operations. This equates to 87% of the maximum production of the power plant.

The introduction of 100% renewable energy generation with both solar and kinetic power production is estimated to save approximately \$2M per year based on fuel price projections described above in figure 4 and figure 5.

3. Distribution Network Management Plan

The Distribution Network Strategy

The low voltage distribution network is in a state of deterioration and poses a risk to the safety of workers, the general public and equipment. As a result, there are frequent individual customer power outages which could be avoided if the network was upgraded. While much work has been done to improve the state of the high voltage network beginning with the more serious issues, there remains much rehabilitation work to upgrade the remaining low voltage network to acceptable standards.

The objective of this strategy is to:

- upgrade the LV network to acceptable standards of engineering. Australian & New Zealand standards have been adopted for network design and equipment specifications.
- improve reliability of supply and minimise the frequency and duration of power outages by:
 - improving standards of construction and maintenance to minimise the risk of faults; and,
 - reducing outage times by improving response to system events when faults do occur.
- improve the health and safety of our workers, the general public and equipment on the network.

	Ring Main North Feeder	Budget Est.	Fund
1.	Upgrade Domestic feeder to 11 kV and install a transformer at D3	\$1.5M	EU/AA
	Ring Main South Feeder	-	-
	-	-	-
	Ring Main East	-	-
2	Aiwo Hotel – Relocate transformer and RMU to roadside and reticulate LV to AIWO North	\$50k	NUC
		-	-

Some minor works remain to be completed; these include:

Other projects planned for the high voltage network are:

Installation of an additional 2.5MVA transformer and associated switchgear and busbar at the power station site for the Ports supply as well as providing additional security of supply in the event of an existing transformer being out of service for prolonged periods.

- Circuit breakers at the 3.3 kV substations are old and appear not to have been serviced for a long time. An assessment shall be done of all the 3.3 kV substations and switchgears to determine whether to replace or service and maintain.
- Construction manual shall be developed to standardise all construction works on the network. Meanwhile the construction standards for the FEA network have been adopted.

Low Voltage Network

The low voltage network (415/240V) supplies the vast majority of household customers throughout Nauru, each with their own distinct level of consumption, and with most of the low voltage cables and conductors that are at least 40 years old.

As residential demand for electricity increases over time, the low voltage electrical network will be put under considerable strain. Without considerable investment in the existing networks – or application of smart network management – outages are likely to become more common.

Improving the capacity of the local electricity network, its ability to cope with load issues and being able to quickly identify and reduce outages will be crucial to the success of our electrical future.

With the predicted uptake of additional solar installations or potentially the use of electric vehicles, a key challenge will be creating a robust network with distributed grid connected solar to generate the right amount of power to maintain reliable supply to our customers.

The refurbishment and augmentation of the low voltage network has progressed as funding has been made available. However, rusted steel pole structures still remain and poor design of underground installations and overhead network require further attention.

The current condition of the low voltage conductors, many with broken strands, incorrectly sized conductors and high resistant joints and connections reduce the capacity of the lines and increase technical losses on the network. It is estimated that 22% of energy generated does not earn revenue for NUC due to high losses on the network.

The refurbishment of the LV network would reduce such losses caused by these technical losses i.e. old conductors, poor connections and joints and inferior public lighting system.

Non-technical losses on the low voltage network also contribute to lost revenue for NUC, which include, electricity theft and meter by-pass, billing and accounting errors, or under-estimation of electricity bills.

A detailed program has been developed to determine the full scope of work to upgrade the network to the required standard. The cost of the work is estimated to be \$4M spread over the next two years.

There is further opportunity to introduce LV network monitoring to enhance network performance. Improved monitoring of the network would provide for detailed analysis of transformer utilisation, station voltage, voltage unbalance and power factor for parts of the low voltage network, enabling NUC to better respond to voltage fluctuations and customer loading issues.

NUC will need to further investigate the requirement to implement such technologies within the low voltage network.

Customer Connections and Installations

The wiring of customer premises needs to be regulated to ensure safety of people and property. The quality of wiring carried out on premises in Nauru is not governed by regulations and can be carried out by anyone. It is most fortunate that not many more dwellings and homes are destroyed by fire caused by electrical short circuits.

Although many new dwellings are now being constructed to AS/NZ 3000 electrical wiring standards, the majority of existing houses are below standard.

There are no enacted Regulations that govern the wiring of houses, licensing of electrical contractors, electrical inspections of premises and approvals for connection to the grid.

In addition, the metering of energy sales is an area where further improvement needs to be made.

There is a need to implement additional revenue assurance monitoring on energy usage to reduce the likelihood of electricity theft, faulty metering and other discrepancies in the sale and use of electricity. NUC currently tracks and monitors meter installations and customer usage patterns on a fortnightly basis to reduce the incidents of electricity theft or non-technical losses.

Proposed initiatives include:

- Development of Regulations that govern the wiring of houses, licensing of electricians, inspections of premises and approvals before connection. The regulations shall also cover the technical quality of service and other technical requirements for the safety and efficient operations of electricity supply.
- Install metering at specified nodes in the network to monitor energy flow and usage. The data will be used to assess energy production and distribution to customer's connections and assessments made on non-technical losses due to theft.
- Review and implement Energy Theft Policy and Procedures to discourage nontechnical losses.

Energy Efficiency and Demand Side Management Strategy

NUC's energy efficiency and demand side management strategies will require further policy development, programming and technical support for the development and implementation of energy efficiency programs.

Specialist skills in the area of residential energy use, for both appliances and building shells and enhanced experience in the area of commercial and industrial equipment efficiency will be required to assist customers with identifying and addressing energy efficiency opportunities.

Our aim is to develop, implement and maintain various energy information programs, particularly those related to energy labelling and building audits. There is a need to further develop and assess energy efficiency standards and performance requirements for appliances, equipment and buildings.

To assist customers in accessing affordable energy supply, NUC will support programs that encourage use of energy efficient applicances and electronics, use energy efficient cooling, refrigeration and washing applicances, the installation of energy efficient lighting and use of renewabe energy.

NUC administers an energy efficiency rebate scheme funded by the IUCN which supports customers who wish to purchase energy efficient washing machines, refrigerators and freezers by providing a 30% rebate on the purchase price of the item if it meets the energy efficient set for that particular appliance. Uptake of the scheme has progressed slowly with total payout of approx. \$10,000 to date.

Improvements in energy efficiency and energy conservation will also be considered during tariff reviews and our price setting approach.

As discussed previously, reducing technical and non-technical losses associated with the generation, distribution and supply of electricity is an important factor to reducing costs and reducing our impact on the environment.

Continuing our review of NUC's metering and connection processes, upgrading our HV and LV network of poles and wires including monitoring of energy flows and non-technical losses will ensure efficient supply and usage of energy.

4. Water Production & Storage Management Plan

Existing Water Production and Supply

NUC's current maximum desalination treatment capacity is approximately 2350 kl/day or 2.35 megalitres per day. The current capacities of operational RO's are provided in Table 15 of the following section.

Water Demand Forecast

Water production and delivery data for the 5-year period between 2016 - 2020 is provided the below tables.

			Year								
Water Production		2020	2019	2018	2017	2016					
Osmoflow 900	Litres	50390600	115719300	127909520	246859640	100705000					
Avenale 800	Litres	138071700	78574870	103636000	196112100	29696500					
Avenale 480	Litres	37746200	12782300	69498000	133818900	77151900					
Hitachi 110	Litres	2358000	3630000	4825940	9651880	12691200					
Meneng 100 (old)	Litres		8251756								
TOTAL PRODUCTION	Litres	235942500	218958226	305869460	586442520	220244600					

Table 9: Total water production 2016 - 2020

			Year									
Water Delivery		2020	2019	2018	2017	2016						
RPCs	Litres	73030300	101802500	142199009		148158083						
NUC	Litres	110789000	79363500	108409000	115921000	41484500						
Hired Tanker	Litres	8421060	4789435									
NUC Tanker	Litres	102367940	74574065									
TOTAL DELIVERY		183819300	181166000	250608009		189642583						

Table 10: Total water deliveries 2016 - 2020

The total demand for water in 2021 was 183ML with an average daily demand for water for all customers around 403kL. RPC demand was 73ML in 2021, which was 30% less than the previous year of 101ML. NUC's demand increased from 79ML in 2019 to 110ML in 2021 which equates to a 40% increase over the period.

At the time of developing this plan the total number of water customers was 1594 comprising 1569 domestic and 25 commercial customers.

In determining customer demand for potable water, the following assumptions have been taken into account:

- 4 the forecast considers previous years trends in production and delivery
- population growth is considered to remain flat. For the purpose of demand forecasts, it is assumed to be around 2%.
- water usage per household (comprising family of 4 persons) is assumed to be 44 litres per day. This equates to 18kL per year.

- rainfall per year is assumed to be low to allow for long periods of drought that has been forecast by the Bureau of Meteorology for Nauru.
- the planning criteria adopted assumes capacity for production, storage and delivery to be sufficient for extended drought periods.
- Demand for water by commercial customers is assumed to increase by 1% annually.
- Demand for water by Government is fixed at 20,000kL per year.
- **4** Demand for water by industrial customers is estimated to be 3,000kL per year.
- **4** The Regional Processing Centre demand is assumed to be 50,000kL per year.

Table 11 below sets out the average demand for water over the next five years based on population growth of 2 percent and average daily usage of 11 litres of water per person per day.

	D		Damaand	1
	Population	Residential	Demand	/person
Year	#	KL	L/person-yr	L/person-d
2015	11,181	26,029	2,328	6
2016	11,459	28,781	2,512	7
2017	11,737	75,383	6,423	18
2018	12,014	61,447	5,115	14
2019	12,292	40,089	3,261	9
2020	12,570	58,692	4,669	13
Average demand			4,051	11
2021	12,854	66,861		
2022	13,145	72,344		
2023	13,442	77,952		
2024	13,746	83,686		
2025	14,057	89,550		

Table 11: Water demand and residential population growth.

Figure 9 below provides a graphical representation of the 5-year demand forecast for residential customers based on population growth and average water usage in kilolitres per year



Figure 6: Population versus Residential Water Demand 2021 – 2025.

The following tables sets out the various scenarios for water demand over the 5-year period to 2025. Three scenarios are considered from the most likely, to both a low-and high-level demand forecast.

The scenarios are based on the assumptions described above and categorised by customer type i.e. domestic, commercial, industrial and government.

					Likely Fore	cast 2020 - 2	025						
												Fresh Water	Sea water
Voor	Domestic	Commercial	Industrial	Government	Meneng Fresh	Total Sales	Losses	NUC	Eiro	NUC		Total	
icai	Domestic	Commercial	muustnai	Government	Water	i otal Jaies	103363	NOC	rite	Demand	NFC 3	Demand	
2015	26,029	13,086		2,995		42,110				42,110	148,158	190,268	
2016	28,781	5,107		12,194		46,082	43,179			89,261	131,884	221,145	
2017	75,383	18,782		16,919		111,085	26,231	3,217		140,533	166,336	306,868	
2018	61,447	24,375	3,348	27,060		116,230	39,621	3,436	2,838	162,124	142,199	304,323	
2019	40,089	20,774	2,033	21,979		84,874	29,155	2,300	826	117,156	101,803	218,958	108,553
2020	58,692	15,274	2,731	19,113	19,360	115,170	62,290	3,945	867	182,272	73,030	255,302	107,704
2021	66,861	15,427	3,000	20,000	19,360	124,647	40,000	3,500	850	168,997	50,000	218,997	108,000
2022	72,344	15,581	3,000	20,000	19,360	130,285	40,000	3,500	850	174,635	50,000	224,635	108,000
2023	77,952	15,737	3,000	20,000	19,360	136,049	40,000	3,500	850	180,399	50,000	230,399	108,000
2024	83,686	15,894	3,000	20,000	19,360	141,940	40,000	3,500	850	186,290	50,000	236,290	108,000
2025	89,550	16,053	3,000	20,000	19,360	147,963	40,000	3,500	850	192,313	50,000	242,313	108,000

Table 12: Likely forecasted demand for water 2021 - 2025

	Low Forecast 2020 - 2025												
												Fresh Water	Sea Water
Voor	Domostic	Commercial	Inductrial	Government	MH Froch	Total Sales	Lossos				PDC's	Total	
Teal	Domestic	Commercial	muustnai	Government	WIN FIESH	Total Sales	LUSSES				NFC 5	Demand	
2015	26,029	13,086		2,995		42,110				42,110	148,158	190,268	
2016	28,781	5,107		12,194		46,082	43,179			89,261	131,884	221,145	
2017	75,383	18,782		16,919		111,085	26,231	3,217		140,533	166,336	306,868	
2018	61,447	24,375	3,348	27,060		116,230	39,621	3,436	2,838	162,124	142,199	304,323	
2019	40,089	20,774	2,033	21,979		84,874	29,155	2,300	826	117,156	101,803	218,958	108,553
2020	58,692	15,274	2,731	19,113	19,360	115,170	62,290	3,945	867	182,272	73,030	255,302	107,704
2021	53,488	15,427	3,000	20,000	19,360	111,275	30,000	3,500	850	145,625	50,000	195,625	97,200
2022	57,875	15,581	3,000	20,000	19,360	115,816	30,000	3,500	850	150,166	50,000	200,166	97,200
2023	62,361	15,737	3,000	20,000	19,360	120,458	30,000	3,500	850	154,808	50,000	204,808	97,200
2024	66,949	15,894	3,000	20,000	19,360	125,203	30,000	3,500	850	159,553	50,000	209,553	97,200
2025	71,640	16,053	3,000	20,000	19,360	130,053	30,000	3,500	850	164,403	50,000	214,403	97,200

Table 13: Low forecast demand for water 2021 – 2025

					High forecast	Demand 2020	- 2025						
												Fresh Water	Sea Water
Voor	Domostic	Commercial	Industrial	Covernment	MU Frach	Total Salas					PDC's	Total	
Tear	Domestic	Commercial	muustriai	Government	IVIN FLESH	TOLdi Sales					RPCS	Demand	
2015	26,029	13,086		2,995		42,110				42,110	148,158	190,268	
2016	28,781	5,107		12,194		46,082	43,179			89,261	131,884	221,145	
2017	75,383	18,782		16,919		111,085	26,231	3,217		140,533	166,336	306,868	
2018	61,447	24,375	3,348	27,060		116,230	39,621	3,436	2,838	162,124	142,199	304,323	
2019	40,089	20,774	2,033	21,979		84,874	29,155	2,300	826	117,156	101,803	218,958	108,553
2020	58,692	15,274	2,731	19,113	19,360	115,170	62,290	3,945	867	182,272	73,030	255,302	107,704
2021	73,547	15,427	3,000	20,000	19,360	131,333	50,000	3,500	850	185,683	50,000	235,683	118,800
2022	79,578	15,581	3,000	20,000	19,360	137,520	50,000	3,500	850	191,870	50,000	241,870	118,800
2023	85,747	15,737	3,000	20,000	19,360	143,844	50,000	3,500	850	198,194	50,000	248,194	118,800
2024	92,055	15,894	3,000	20,000	19,360	150,309	50,000	3,500	850	204,659	50,000	254,659	118,800
2025	98,505	16,053	3,000	20,000	19,360	156,918	50,000	3,500	850	211,268	50,000	261,268	118,800

Table 14: High forecast demand for water 2021 - 2025

Figure 7 and 8 below show the total demand forecast for likely, low and high scenarios including the RPC1 compared to NUC water demand without RPC1.



Figure 7: Total Water Demand (Likely Low and High including RPC 1) 2021 – 2025



Figure 8: NUC Water Demand (Likely Low and High excluding RPC1) 2021 - 2025

Reverse Osmosis (RO) Plant Capacities

Plant No.	Plant Manufacturer	Capacity (kL/day)	Status
1	Osmoflo 900	900	Operational
2	Avenale 800	800	Operational
3	Avenale 480	480	Operational
4	Hitachi	120	Operational
5	Meneng Old	50	Operational
6	Meneng Avenale 480	480	Installation in progress

The current capacity of available RO plant is illustrated in the following table.

Table 15: Reverse Osmosis (RO) Plant capacities

The Meneng Avenale 480 plant, is being progressed, however is subject to a number of constraints which currently delay the completion of the project in 2021. NUC is working through the issues to finalise the project.

The current Meneng (Old) 50 kl/day plant although operational at reduced capacity, will be unable to meet the increasing demand for Meneng Hotel, which is currently around 250kl/month.

Due to a lack of space at the NUC power station site at Aiwo, to accommodate additional RO's NUC has considered a further option to relocate additional RO's to the Meneng hotel site which already has sea water intakes and water storage capacity of 1.2 million litres. This option remains under review and consideration.

Reverse Osmosis (RO) Sea Water Piping and Pump Capacities

The four RO plants are fed via sea water intake pumps. A new pump rated at 200 kL per hour has been installed. The current configuration comprises two by 200 kL per hour pumps in parallel as depicted in the following figure 12. The total intake demand for the RO's is 290 kL per hour.

This installation has been constructed as a temporary arrangement, while the Ports Development Project is constructed. There are plans to re-instate a new sea in-take system as part of the Ports Project. This was to be completed by 2020 however due to delays in the Ports development it's planned completion is due end of 2021.



Figure 9: Sea Water Intake for the RO Plants

Water Tanks Storage Capacity

The current tank capacities available to NUC are set out in Table 16 below.

Tank (ID)	Capacity (kL)	Operational Status
C1	275	Operational
C2	275	Operational
C3	275	Operational
C4	275	Operational
C5	275	Operational
C6	275	Operational
B13	4,000	Operational
B10	3,000	Installation to be progressed
C7	275	Need to assess condition and viable options for refurbishment
C8	275	Need to assess condition and viable options for refurbishment
C9	275	Need to assess condition and viable options for refurbishment
C10	275	Need to assess condition and viable options for refurbishment
C11	275	Need to assess condition and viable options for refurbishment
C12	275	Need to assess condition and viable options for refurbishment

Tank B13 is constructed of steel and requires regular maintenance and condition monitoring. B10 has been removed and replacement is currently planned with a 3,000kL capacity tank. This is programmed for completion by 2022

Tanks C7 to C12 are concrete tanks which require condition assessment to determine viable options for reuse. Increased storage availability provides higher levels of water security as it provides a buffer should a catastrophic failure occur with the RO Plants or prolonged power outages.

Donor funding may be required to refurbish tanks C7 to C12 to improve security of supply.

There is additional storage capacity for the Refugee Processing Centres spread over numerous tanks which total approximately 2.5 megalitres.

5. Water Distribution Management Plan

NUC's current trucking capacity is detailed in the following table.

Vehicle	Capacity (Litres)	Status
Truck 1	4,000	Operating
Truck 2	5,000	Operating
Truck 3	8,000	Operating
Truck 4	8,000	Operating
Truck 5	10,000	Operating
Truck 6	10,000	Operating
Hire Vehicles		
Truck 1	8,000	Operating
Truck 2	7,500	Operating
Truck 3	7,500	Operating
Truck 4	4,500	Operating
Truck 5	5,000	Standby availability for peak demand periods
Truck 6	8,000	Standby availability for peak demand periods

Table 17: NUC Vehicle including Hire Vehicles Truck Capacity 2020

Figure 10 below provides a graphical representation of the demand for total number of trips over the 5-year period to 2025 for all three scenarios.

Likely Scenario						
Likely Scenario		Numbe	r of Trips			
Year	Domestic	Combine Comm & Owner UL	Commercial	Owner Uplift	Government	Total Trips
2020	10,253	1,220	117	1,103	2,313	13,786
2021	11,680	2,879	276	2,603	2,420	16,980
2022	12,638	2,903	278	2,625	2,420	17,962
2023	13,618	2,928	281	2,647	2,420	18,966
2024	14,619	2,952	283	2,669	2,420	19,992
2025	15,644	2,977	286	2,692	2,420	21,041
Low Scenario						
Year	Domestic	Combine Comm & Owner UL	Commercial	Owner Uplift	Government	Total Trips
2020	10,253	1,220	117	1,103	2,313	13,786
2021	9,344	2,879	276	276 2.603		14,644
2022	10,110	2,903	278	2,625	2,420	15,434
2023	10,894	2,928	281	2,647	2,420	16,242
2024	11,695	2,952	283	2,669	2,420	17,068
2025	12,515	2,977	286	2,692	2,420	17,912
High Scenario						
Year	Domestic	Combine Comm OUL	Commercial	Owner Uplift	Government	Total Trips
2020	10,253	1,220	117	1,103	2,313	13,786
2021	12,848	2,879	276	2,603	2,420	18,148
2022	13,902	2,903	278	2,625	2,420	19,225
2023	14,979	2,928	281	2,647	2,420	20,327
2024	16,081	2,952	283	2,669	2,420	21,454
2025	17,208	2,977	286	2,692	2,420	22,605

Table 18: Forecast Truck Deliveries (Likely, Low and High) 2021 – 2025



Figure 10: Forecast NUC Delivery Demand (Likely Low and High) 2021 - 2025

6. Customer Service Management Plan

This section describes the NUC's commitment to our customers and stakeholders. It details what our customers can expect when dealing with us and the level of service we aim to provide.

Performance Indicator	2021-22	2022-23	2023-24	2024-25
Continually increase our online transaction capability for your convenience	80%	85%	90%	95%
Answer telephone calls in an average of 10 seconds	80%	85%	90%	95%
Serve you in person within 10 minutes	80%	85%	90%	95%
Respond to emails within 3 working days	80%	85%	90%	95%
Respond to written correspondence within 7 working days	80%	85%	90%	95%
Reduce waiting time at NUC Offices	80%	85%	90%	95%
Give out accurate information	80%	85%	90%	95%
Reduce response time on complaint and referrals (external/internal)	80%	85%	90%	95%

The NUC's customer service performance metrics is set out below.

- 4 Cashflow revenue
- Complaints Escalation Rates:
 - Number of complaints for this period
 - Number of complaints last period
 - o % increase/decrease in number of complaints since last month
 - o increase/decrease in number of complaints year to date
- Employee retention / turnover rate (explain whether due to resignation, retirement or termination)
- Employee productivity
- Wumber of active issues, resolved issues and average resolution time.

Appendix 1: Proposed Program of Work 2021 - 2023

#	Initiative / Project	Budget	Date to	Funding
			e	
Corp	orate Governance			
1	Revise Nauru Utilities Corporation Act 2011 to clarify the functions and responsibilities of NUC as a Corporation.	-	Q3 2021	GoN/NUC
2	Revise Nauru Utilities Corporation (Amendment) Act 2016 to clarify the role and functions of the Board of Directors.	-	Q3 2021	GoN/NUC
3	Review, develop and enact Electricity Regulations under the Act.	-	Q3 2021	GoN/NUC
4	Review, develop and enact Water Regulations under the Act.	-	Q3 2021	GoN/NUC
5	Review NUC Organisational Structure.	-	Q1 2021	NUC
6	Develop and implement Organisational Risk Management Policy.	\$5k	Q2 2021	NUC
7	Develop and implement Quality Management System.	\$5k	Q2 2021	NUC
8	Develop Conflict of Interest and Gifts Policy for NUC.	\$5k	Q2 2021	NUC
9	Identify and develop policies, procedures, codes and guidelines (Fraud Control Policy, Sponsorship Policy, Probity Policy, Social Media Policy, etc).	\$5k	Q2 2021	NUC
10	Develop Service and Installation Rules for electricity.	\$10k	Q3 2021	NUC
11	Country Strategy Development Energy and Water Sectors (Technical Review) (DCIE) Dept of Energy	-	Q2 2021	ADB
_				
Corp	orate Culture & Business Ethics	AC 1	04.0004	
1	Conduct for employees and management.	\$5K	Q1 2021	NUC
2	Review and implement Equal Opportunity Policy.	\$5k	Q2 2021	NUC
3	Review and implement Sexual Harassment Policy.	\$5k	Q2 2021	NUC
4	Design and implement Annual Employee Satisfaction Survey.	\$5k	Q2 2021	NUC
Hum	an Resources			
1	Review Human Resource Management Manual Policies and Procedures.	\$5k	Q1 2021	NUC
2	Review, develop and implement employee Performance Review & Development Plans	\$5k	Q1 2021	NUC
3	Review and implement Selection and Recruitment Policy and Procedures	\$5k	Q1 2021	NUC
4	Develop Annual Refresher training modules for First Aid & CPR, Fire-Fighting, Driver Awareness, Emergency Response, OH&S, etc. for all staff.	\$5k	Q1 2021	NUC
5	Review Position Descriptions and Salary Bands to reflect accountabilities and responsibilities.	\$5k	Q1 2021	NUC

6	Integrate and develop policies and procedures	\$5k	Q2 2021	NUC
	on gender equality, social inclusion and			
	environmental awareness in line with relevant			
	policies and standards.			
Final	and & Dragurament			
	Tariff Daviaw and Deast	¢50k	04 2022	NUC
1	Paview develop and implement Einangial and		Q4 2022	NUC
2	Contractual Delegation Policy and Procedures	φοκ	Q12021	NUC
3	Establish Tenders and Contracts Review	\$5k	02 2021	NUC
Ŭ	Committee including processes and procedures.	ψοιτ	Q2 2021	1100
4	Review, develop and implement Purchasing and	\$5k	Q2 2021	NUC
	Contracts Management Manual.	*		
5	Review, revise / update Financial Management	\$5k	Q2 2021	NUC
	Manual.			
6	Review and develop Internal Audit processes	\$5k	Q3 2021	NUC
	and procedures.			
Infor	mation Management & ICT		-	
1	Establish secondary back-up safe server room	\$159k	Q3 2021	NUC
2	Review of Navision software for suitability	\$50	Q3 2021	NUC
3	Second PC for Suprima pre-paid software for	\$10k	Q4 2021	NUC
	(On-line backup)	#40 1/	0.1.0001	
4	Review of ICT network and scope upgrade	\$10K	Q4 2021	NUC
5	Establish back-ups storage for Navision and	\$10K	Q4 2021	NUC
6	Acquisition of AutoCAD drawing coffware	¢50k	01 2021	NUC
0	including bardware	JOOK	Q12021	NUC
7	Acquisition of software to support condition-	\$20k	04 2021	NUC
'	based monitoring and maintenance of ICT	ΨΖΟΚ	Q7 2021	NOO
	assets			
8	Introduce on-line banking for power top-up and	\$10k	Q1 2022	NUC
	water orders.			
9	ICT Staff Training in SCADA administrative	\$30k	Q1 2022	NUC
	functionality.			
Powe	er Generation			
1	Expand SCADA Capabilities to include	\$500k	Q4 2024	NUC
	Distribution Network (Phased Implementation			
2	Approach)	¢1.05M	04 2024	Deper
2	6 MW Solar Farm site	φ1.20IVI	Q4 2024	Donor
3	Document NLIC Grid Operating Procedures for	\$30k	03 2023	NILIC
5	Third Party Access	ψOOK	QU 2020	NOC
4	Establish Grid Connection for IPP – Kinetic	\$50k	Q4 2024	NUC
	Power Plant	φοοιτ	Q 1 202 1	1100
5	Review Generation & Network Protection co-		Q4 2024	NUC
	ordination			
6	Install HV cable, switchgear and 1 MVA	\$250k	Q4 2022	NUC
	transformer station for Nauru Ports			
	redevelopment.			
Rene	ewable Energy Generation			
1	Grant 0664 Solar Farm Project 6 MW	US\$22M	Q4 2023	ADB
2	Kinetic Power Producer – IPP 3 MW	IBD	Q1 2021	199
3	Root Top Solar Installations Connection and	-	On-going	NUC
4	Netering	¢4 514	04 000 4	Danar
4	Solar Faim Project Battery Storage Capacity 5	βI.SIVI	Q4 2024	DOUOL
	INING TO POLICAGE AND IDAU CONTINU			

5	Solar Farm Rain Water Harvesting Project	\$1.5M	Q4 2024	Donor
Ener	gy Efficiency & Demand Side Management			
1	Support the development of Energy Efficiency Policy	-	Q1 2021	NUC
2	Support the development of Energy Efficient Appliance Standards	-	Q1 2021	NUC
3	Support Customers with Energy Efficiency Audits	-	Q1 2021	NUC
Build	lings, Facilities & Fleet			
1	Security perimeter fence - Power Station Compound	\$100	Q1 2021	NUC
2	Security perimeter fence – Power Distribution Area	\$100	Q1 2021	NUC
3	Refurbishment of ablution – Power Station Building	\$100	Q2 2021	NUC
Dietr	ibution Notwork (LIV 8 1 V)			
	Deview develop and implement Distribution	Ф <i>Е</i> Ц	02 2022	
1	Network Safety and Reliability Standards	\$5K	Q3 2022	NUC
2	Review, develop and implement Asset Management Strategy	\$5k	Q3 2022	NUC
3	Review, develop and implement OH&S Manual	\$5k	Q2 2021	NUC
4	Low Voltage Rehabilitation Project	\$1.5M	Q2 2021	Donor
5	Review and implement Grid Extension Policy	\$5k	Q4 2021	NUC
6	Review, develop and implement Distribution Network budget and costing methodology	\$5k	Q4 2021	NUC
7	Develop and implement Project Management Methodology	\$5k	Q1 2021	NUC
8	High Voltage Network Rehabilitation – Ports Area	\$250k	Q3 2021	Donor
9	33kV Interconnector Upgrade (T/F's Protection, Switchgear and Control System)	\$250k	Q3 2021	Donor
Moto	ring & Pevenue Protection			
	Install maters for sustamore whose hills are	¢20k	02 2021	NUC
1	estimated	φ20K		
2	and procedures	\$5K	Q4 2021	NUC
Wate	r Production & Delivery			
1	Construct new Water Office & Workshop	\$50k	02 2021	NUC
2	Install new RO plant at Meneng Hotel with 480kl/day capacity	\$250k	Q1 2021	NUC
3	300kl treatment tank to be installed at Meneng Hotel with piping direct to Hotel	\$350k	Q1 2021	NUC
4	Assess condition of 3MI Tank at Meneng Hotel – Inspect and maintain to optimal level.	\$300k	Q3 2021	NUC
5	Establish Re-mineralisation plant at both Meneng and Aiwo sites	\$250k	Q4 2022	NUC
6	Relining of C-Tank at Power Station site	\$150k	Q1 2021	Canstruct/A BF
7	Complete 20-year water Master Plan.	\$100k	Q4 2023	Donor
8	Install 2 x 300kl (disinfectant) tanks at B13 and Meneng Hotel sites	\$750k	Q4 2022	NUC
9	Design, Construct and Maintain piped water system to RON Hospital Facility.	\$2.5M	Q4 2024	Donor

10	Design, Construct and Maintain Storage Tank Facilities from Water Harvesting Project (Re: 6 MW Solar Farm Site)	\$1.5M	Q3 2023	Donor
11	Assessment and Refurbishment of C7 – C12 Storage Facilities to enhance security of supply	\$1.5M	Q3 2022	Donor
Cust	omer Management			
1	Review, develop and implement Customer Management System (Enquiries, Complaints, Grievances and Disputes)	\$5k	Q2 2021	NUC
2	Develop and implement NUC Customer Charter	\$5k	Q1 2021	NUC
3	Develop and implement Customer Communication and Engagement Strategy	\$5k	Q2 2021	NUC
4	Develop and implement Stakeholder Management Strategies	\$5k	Q1 2021	NUC
5	Review and implement Energy Theft Policy and Procedures	\$5k	Q1 2021	NUC
6	Develop and establish KPI monitoring and evaluation process and procedures	\$5k	Q2 2021	NUC

Notes:

- 1. Costs are indicative only.
- 2. NUC funded works forms part of NUC's operational budget.
- 3. Capital projects generally funded by donors through donor agencies.
- 4. Dates reflect proposed commencement of individual projects

Appendix 2: Current Electricity and Water Charges 2020

Electricity & Water Fees and Charges								
Note Tariff/ Rate Unit								
Electricity			•					
Residential Lifeline	A	\$	0.22	kWh				
Residential Prepaid	Α	\$	0.47	kWh				
Residential Postpaid	A	\$	0.48	kWh				
Commercial		\$	0.70	kWh				
Industrial		\$	0.70	kWh				
Government		\$	0.70	kWh				
Feed In Tariff	В	\$	0.20	kWh				
Reconnection Fee		\$	15.00	per event				
Meter Tampering/ By Pass Fine Residential		\$	1,000.00	per meter				
Meter Tampering/ By Pass Fine Commercial		\$	10,000.00	per meter				
Reconnection after Tampering		\$	100.00	per meter				
Single Phase meter		\$	120.00	per meter				
Three Phase meter		\$	445.00	per meter				
New Single Phase Pole Connection		\$	50.00	per connection				
New Three Phase Pole Connection		\$	100.00	per connection				
New Connection Single Phase		\$	50.00	per connection				
New Connection Three Phase		\$	150.00	per connection				
Water								
Residential		\$	0.0084	Litre				
Commercial/ Industrial		\$	0.0118	Litre				
Government		\$	0.01553	Litre				
Residential Delivery < 5,000 L		\$	5.00	per truck				
Residential Delivery > 5,000 L		\$	10.00	per truck				
Commercial Delivery		\$	263.49	per truck				
Government Delivery		\$	165.00	per truck				
Truck Owner Delivery		\$	117.25	per truck				
Fresh Water Delivery via Pipe		\$	0.0118	Litre				
Sea Water Delivery via Pipe		\$	0.0030	Litre				
·								
Corporate								
Cash Power After Hours		\$	15.00	per Top Up				
Labour Hire		\$	15.00	per man hour				
Cherry Picker Hire		\$	90.00	per hour				
Crane Truck Hire		\$	100.00	per hour				
Excavator Hire		\$	90.00	per hour				
Fork Lift 3.5T Hire		\$	60.00	per hour				
Fork Lift 2.5T Hire		\$	45.00	per hour				
Note A								
Each Residential pre-paid customer is provided 20	0kWh per	mont	n at the res	idential life line				
tariff. Usage in excess of 200kWh during the mont	h is charge	d at tl	ne resident	ial tariff.				
Note B								
Feed-In tariff applies to excess energy supplied to	the grid by	custo	omers who	have installed				
grid connected roof ton solar nanels	0,							

grid connected roof top solar panels.

Appendix 3: Operational Performance Indicators

		-
Sector	Description	Unit/Measure
Electricity		(24)
Renewable Energy Capacity Factors	Total grid connected solar generated	(%)
	Total government solar energy generated	(%)
	Total solar energy generated exported to grid	(%)
	Total private sector solar energy generated	(%)
	Total private sector energy generated exported to grid	(%)
Enorgy Salos and	Total dissal anargy produced	(/0)
Production		
	Total renewable energy produced	(kWh)
	Total renewable energy exported to grid	(kWh)
	Total auxiliary power consumed power station supply	(kWh)
	Total sales	(kWh)
	Total revenue from energy sales	(((((((((((((((((((((((((((((((((((((((
	Total lassas	(+) (I/)A/b)
	LOSSES	renewable energy exported to the grid) (%)
Water Production and Delivery	Total produced, stored and delivered (volume)	(Litres)
	Availability of reverse osmoses units	(%)
	Total electricity used for water production	(kWh)
	Production efficiencies	(litres/kWhe)
	SWIRO Availability	% time available for operations
	Water Tanker Availability	% time available for operations
	Vehicle Fleet Availability	% time available for operations
Water sales and deliveries	Water volume sales	(litres)
	Water tank trin sales	(number of deliveries)
	Water losses in litres	(%) Losses = (water loss) / (water production
		storage)
Financial Performance		
Electricity	Weighted Average Per Unit Cost	(Total Power Exported) / (Energy Sales + Production)
	Weighted Average Per Unit Revenue	(Sales) / (Energy Sales + Production)
Water	Weighted Average Volume Unit Cost	(Total Water Expenses) / (Water Sales + Deliveries)
	Electricity Cost for Water Production and Delivery	0.7 / (Water Production + Storage)
	Total Unit Cost of Water Production and Delivery	(Weighted average volume unit cost) /
	· · · · · · · · · · · · · · · · · · ·	(Electricity cost for water production and
	Weighted Average Water Revenue / Litre	(Total Water Income) / Water Sales + Delivery)
	Monitor Assets, Liabilities, equity and Cashflow of the organisation	(\$)
Network Performance	System Average Interruption Duration Index (Planned	SAIDI
Indicators	and/or Unplanned)	
	System Average Interruption Frequency Index (Planned and/or Unplanned)	SAIFI
Human Resources	Labour Work Hours/Labour Paid Hours	Overtime ratio
	Employee Attendance per section	(%)
ІСТ	Complaints, outages, internal network faults, system	Number resolved, number unresolved,
Procurement	Orders placed, delivered, outstanding and delivery duration	Number of orders, deliveries, outstanding. Delivery duration in days.

Appendix 4: Financial Projections 2021 - 2023

ELECTRICITY SALES FORECAST	, i i i i i i i i i i i i i i i i i i i					
			Foi	recast (Years	5)	
ENERGY SALES	Units	2021	2022	2023	2024	2025
Residential @ \$0.22/kWh - prepaid	\$	1,355,318	720,098	720,818	721,538	722,260
Residential @ \$0.47/kWh - prepaid	\$	4,306,629	4,692,090	4,696,782	4,701,479	4,706,181
Domestic - Postpaid @ \$0.48/kWh	\$	1,231,901	1,492,566	1,494,058	1,495,552	1,497,048
Commercial - Prepaid	\$	2,078,119	3,023,650	3,023,650	3,023,650	3,023,650
Commercial - Postpaid	\$	1,997,174	2,905,075	2,905,075	2,905,075	2,905,075
Government - Prepaid	\$	221,888	227,136	228,272	229,414	230,561
Government - Postpaid	\$	1,996,992	2,044,228	2,054,450	2,064,722	2,075,045
Industrial- Prepaid	\$	116,980	136,436	136,436	136,436	136,436
Industrial- Postpaid	\$	479,349	581,647	581,647	581,647	581,647
Total Domestic	\$	6,893,848	6,904,754	6,911,658	6,918,570	6,925,489
Total Commercial	\$	4,075,293	5,928,725	5,928,725	5,928,725	5,928,725
Total Government	\$	2,218,880	2,271,365	2,282,722	2,294,135	2,305,606
Total Industrial	\$	596,329	718,083	718,083	718,083	718,083
Total Electricity Income	\$	13,784,350	15,822,927	15,841,188	15,859,513	15,877,903

Note: Community Service Obligations are not included.

WATER SALES FORECAST						
			<u>Fo</u>	orecast (Year	<u>s)</u>	
WATER SALES VOLUME	Units	2021	2022	2023	2024	2025
Total Domestic	\$	902,715	486,152	523,835	562,369	601,776
Total Commercial	\$	172,279	183,857	185,696	187,553	189,428
Total Government	\$	414,342	194,000	194,000	194,000	194,000
Total Industrial	\$	46,350	35,400	35,400	35,400	35,400
Menen Hotel - Fresh Water	\$	144,102	228,448	228,448	228,448	228,448
Menen Hotel - Sea Water	\$	43,008	291,600	291,600	291,600	291,600
Total Water Volume Sales	\$	1,722,796	1,419,457	1,458,978	1,499,370	1,540,652
WATER SALES DELIVERY						
Domestic Water Deliveries < 5000L	\$	96,958	69,446	74,829	80,334	85,963
Domestic Water Deliveries > 5000L	\$	24,240	17,362	18,707	20,083	21,491
Commecial Water Deliveries	\$	98,839	73,362	73,978	74,599	75,226
Government Water Deliveries	\$	447,480	526,352	526,352	526,352	526,352
Water Own Uplift	\$	264,657	307,760	310,341	312,947	315,580
Total Water Delivery Income	\$	932,174	994,282	1,004,207	1,014,315	1,024,612
Total Water Domestic	\$	1,023,913	572,960	617,371	662,787	709,230
Total Water Commercial	\$	458,228	777,268	779,721	782,200	784,703
Total Water Government	\$	861,822	720,352	720,352	720,352	720,352
Total Water Industrial	\$	311,007	343,160	345,741	348,347	350,980
Total Water Income	\$	2,654,971	2,413,740	2,463,185	2,513,686	2,565,264
			2,413,740	2,463,185	2,513,686	2,565,264

Notes:

Demand for water is dependent upon environmental factors such as drought, and rain periods.

Water delivery charges for residential customers are cross subsidised by large customers and do not cost recover for the service.

Revenue from water sales is dependent upon customer demand, however increases in demand for residential water consumption may increase revenue which is offset by increased costs.

Operating Expenditure Forecast										
	Forecast (Years)									
	2021		2022		2023		2024		2025	
Employment Expenses	\$ 3,318,958	\$	3,375,380	\$	3,432,761	\$	3,491,118	\$	3,550,467	
Financial Expenses	\$ 298,536	\$	303,611	\$	308,773	\$	314,022	\$	319,360	
Fuel & Oil Expenses	\$ 9,787,230	\$	9,953,613	\$	10,122,825	\$	2,573,728	\$	2,617,482	
ICT Expenses	\$ 272,270	\$	276,898	\$	281,605	\$	286,393	\$	291,261	
Repairs & Maintenance Expenses	\$ 953,536	\$	969,746	\$	986,232	\$	1,033,088	\$	1,050,650	
Board Expense	\$ 33,920	\$	34,497	\$	35,083	\$	35,679	\$	36,286	
General & Administrative Exp	\$ 2,853,143	\$	2,901,646	\$	2,950,974	\$	3,001,141	\$	3,052,160	
TOTAL EXPENSES	\$ 17,517,593	\$	17,815,392	\$	18,118,254	\$	10,735,169	\$	10,917,667	
Depreciation	\$ 2,350,000	\$	2,350,000	\$	2,350,000	\$	2,350,000	\$	2,350,000	

In determining the operating expenditure forecasts for 2021-2025 the following assumptions were made:

- Inflation is set at 1.7% based on Asian Development Bank projections for Nauru.
- Gross Domestic Product is assumed to be 0.5% based on Asian Development Bank projections for Nauru.
- Renewable energy penetration through solar which includes the new 6 MW solar development project will be in full operation in 2024-25 financial year which is forecast to offset diesel fuel usage by up to 25%.

Forecast Profit and Loss Statement Forecast 2021 - 2025											
	<u> </u>					Forecast (Years)					
		2021		2022		2023		2024		2025	
Electricity Income	\$	13,784,350	\$	15,822,927	\$	15,841,188	\$	15,859,513	\$	15,877,903	
GON CSO	\$	1,388,213	\$	1,457,624	\$	1,530,505	\$	1,607,030	\$	1,687,382	
Water Income	\$	2,654,971	\$	2,413,740	\$	2,463,185	\$	2,513,686	\$	2,565,264	
TOTAL REVENUE	\$	17,827,533	\$	19,694,290	\$	19,834,878	\$	19,980,229	\$	20,130,548	
Employment Expenses	\$	3,318,958	\$	3,375,380	\$	3,432,761	\$	3,491,118	\$	3,550,467	
Financial Expenses	\$	298,536	\$	303,611	\$	308,773	\$	314,022	\$	319,360	
Fuel & Oil Expenses	\$	9,787,230	\$	9,953,613	\$	10,122,825	\$	5,147,456	\$	5,234,963	
ICT Expenses	\$	272,270	\$	276,898	\$	281,605	\$	286,393	\$	291,261	
Repairs & Maintenance Expenses	\$	953,536	\$	969,746	\$	986,232	\$	1,033,088	\$	1,050,650	
Board Expense	\$	33,920	\$	34,497	\$	35,083	\$	35,679	\$	36,286	
General & Administrative Exp	\$	2,853,143	\$	2,901,646	\$	2,950,974	\$	3,001,141	\$	3,052,160	
TOTAL EXPENSES	\$	17,517,593	\$	17,815,392	\$	18,118,254	\$	13,308,897	\$	13,535,149	
EBITDA	\$	309,940	\$	1,878,898	\$	1,716,625	\$	6,671,332	\$	6,595,399	
Depreciation	\$	2,350,000	\$	2,350,000	\$	2,350,000	\$	2,350,000	\$	2,350,000	
EBIT	-\$	2,040,060	-\$	471,102	-\$	633,375	\$	4,321,332	\$	4,245,399	

The following assumptions are considered for the above forecast:

- The Government of Nauru's Community Service Obligations to increase as per forecasted GDP growth of 0.5%.
- Deficit after Depreciation is noted in the first three years of the forecast; however, it picks up in Year 4 onwards due to the assumption that the increase renewable energy solar penetration will reduce fuel expenditure by 25%.
- The Repair and Maintenance for solar infrastructure is factored at 3% from 2024 onwards.
- Although a deficit after depreciation is noted in the first three years, EBITDA is positive from 2021 to 2025. i.e., NUC is able to continue to cover its operating costs only.