Government of Nauru



NAURU
Economic Infrastructure Strategy and Investment Plan

November 2011


This is a publication of the Government of Nauru.

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PIAC operates under the coordination of the Pacific Region Infrastructure Facility (PRIF), a partnership for improved infrastructure in the Pacific Region between the Asian Development Bank, the Australian Agency for International Development, the European Commission, the European Investment Bank, the New Zealand Ministry for Foreign Affairs and Trade, and the World Bank Group.

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Annexes

Abbreviations

ADB	Asian Development Bank
AMU	Aid Management Unit
AusAID	Australian Agency for International Development
CIE	Ministry of Commerce, Industry and Environment
DOT	Department of Transport
DPPD	Development Planning and Policy Division
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
ICAO	International Civil Aviation Organization
ICT	Information & Communication Technology
IDG	Internationally-agreed Development Goals
IWRM	Integrated Water and Resources Management
lpd	Liters per person per day
MCA	Multi Criteria Analysis
MDG	Millennium Development Goal
MFEP	Ministry of Finance and Economic Planning
MTC	Ministry of Transport & Communications
NDC	National Development Committee
NICC	National Infrastructure Coordinating Committee
NEISIP	Nauru Economic Infrastructure Strategy and Investment Plan
NRC	Nauru Rehabilitation Corporation
NSDS	National Sustainable Development Strategy
NUA	Nauru Utilities Authority
O&M	Operation and Maintenance
PACTAM	Pacific Technical Assistance Mechanism (AusAID)
PIAC	Pacific Infrastructure Advisory Centre
PIPI	Pacific Infrastructure Performance Indicators
R/O	Reverse Osmosis Units
RoN	Republic of Nauru
RONPHOS	Republic of Nauru Phosphate Company
SOE	State Owned Enterprise
SOPAC	South Pacific Commission Applied Geo-science & Technology Division
SWM	Solid Waste Management
TA	Technical Assistance
TOR	Terms of Reference

CURRENCY EQUIVALENTS

(as of February 15, 2011)

Currency Unit – A$ (Australian dollar))

AUD 1.00 = USD 1.00

USD 1.00 = AUD 1.00

EXECUTIVE SUMMARY

Introduction

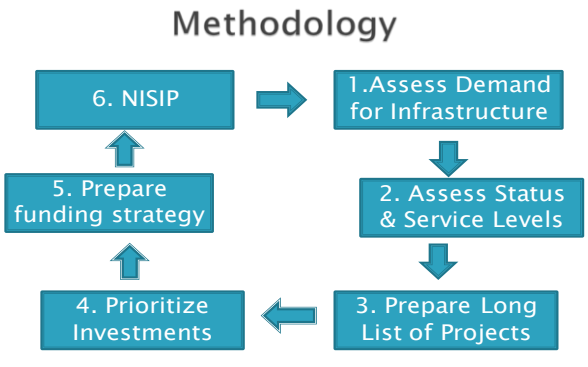
In the decade to 2005, financial mismanagement and government missteps caused Nauru incomes and living standards to plunge. In 2005, Nauru embarked on a program of change, including the development of a 20 year National Sustainable Development Strategy (NSDS). The NSDS, and its 2009 update, aim for Nauru to achieve growth by building on economic infrastructure and advancing structural reforms. As part of this effort, the Government of Nauru decided to formulate and develop a Strategic Plan for Economic Infrastructure in Nauru that would identify and prioritize infrastructure investments, and set out recommendations for addressing the country's infrastructure requirements for growth and economic development. Besides economic infrastructure, this plan also includes the infrastructure requirements of the social and health sectors.

Objectives

The Nauru Economic Infrastructure Strategy and Investment Plan (NEISIP) represents a country led and prioritized investment plan for economic infrastructure for the next 5-10 years. The plan identifies the needs and priorities for investments in economic infrastructure (including government buildings) and assesses the financial resources to support implementation. The NEISIP aims at improving coordination of planning and financing of infrastructure development and maintenance between national stakeholders and international development partners and *to strengthen the capacity of the Government to plan and manage the development of its economic infrastructure*.

Methodology

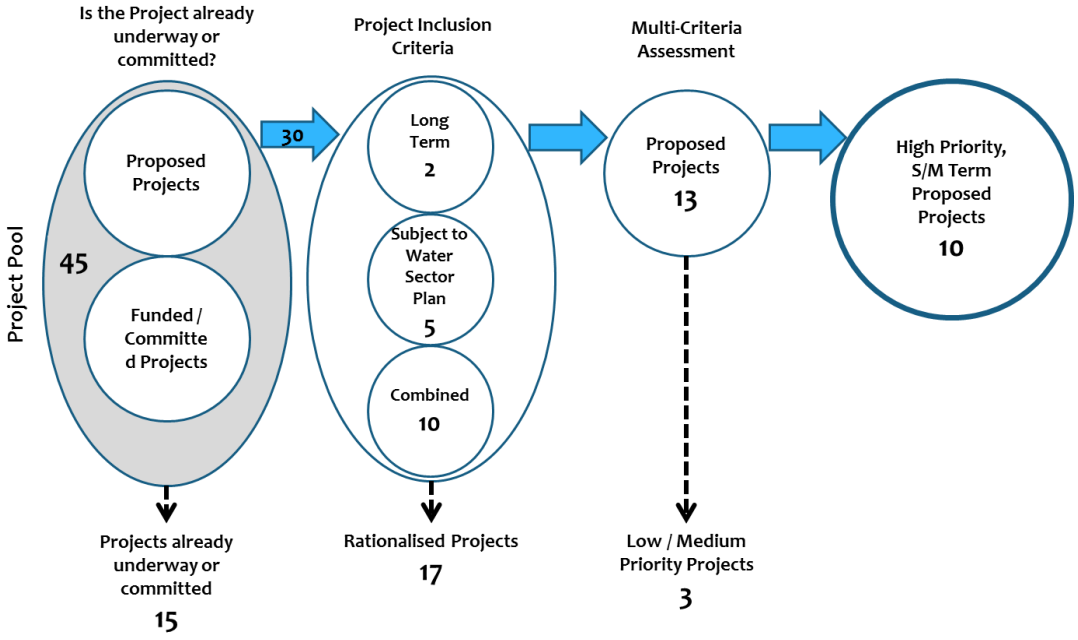
The NEISIP is closely linked to achieving the economic and social strategies of the NSDS. It is based on sector policies, targets and standards and assesses the economic and social drivers that determine the demand for infrastructure. Simultaneously an assessment of the current status and service levels in the various infrastructure sectors was carried out. This resulted in a long list of projects for each sector. A project prioritization tool using multi criteria analysis has been developed and projects were ranked resulting in a short list of high priority projects. Short project descriptions and "whole of life" cost estimates of the prioritized projects were prepared and based on this a funding strategy has been developed. The methodology is schematically presented in the figure below.



Infrastructure needs in Nauru are generally driven by social policies and objectives and economic developments. Nauru's economic prosperity is largely dependent on the success of the phosphate and dolomite quarrying industries. In addition, fisheries support and licensing can also bring much-needed revenue. Supporting these industries are the water, sanitation, power, telecommunication and transport infrastructure sectors. Education and Health also contribute to a strong community, with concomitant economic potential.

Project Prioritization

The process of project prioritization is presented in the figure below. Nauru's infrastructure steering committee undertook an analysis of each of the infrastructure sectors, comparing performance with relevant plans and policy targets. A long list of 45 projects was identified across 10 sectors that would address gaps and inadequacies and enhance Nauru's capacity to achieve its NSDS goals. The long list was rationalized, with some projects identified as already underway, others combined to enhance efficiency, and others removed due to their premature planning nature. The remaining list of projects was subjected to a multi-criteria analysis, which ranked projects based on their alignment with seven key selection criteria - policy, economic, financial, social, environmental, readiness, and maintenance. The draft list of priority project was subsequently presented and discussed in Cabinet which resulted in a final list of high priority actions and investments.



High Priority Actions and Investments

The following list of Actions and Investments were ranked as high priority, and prioritized for development in the next 5 years. They include (in no specific order):

Maritime Transport Sector:

- *Development of a new Quay wall - Scenario 2 & Anibare Mooring*

Aviation Sector:

- *Resurfacing and fencing of the Runway*
- *Supply of Navigational Aids (Distance Measuring Equipment) for the Airport*

Roads Sector

- *Road Rehabilitation (contingent on runway resurfacing)*

Water and Sanitation Sector

- *Preparation of a Master Plan for Water and Sanitation (including Solid Waste)*
- *Sludge "Alternative Disposal Options" Project*
- *Procurement of additional Water Tankers for water supply*

Power Sector

- *Preparation of a Strategy for Renewable Energy (with an emphasis on the use of solar power)*
- *Establishment of an O&M spare parts store and workshop for NUA*

Government Buildings

- *Development of a New Hospital*
- *Rebuilding of the Aiwo School*
- *Implementation of the Learning Village Project*

Complementary Planning and Capacity Building

In addition to the priority investment program are a number of complementary planning and capacity building activities. These include

- *Formulation of a feasible approach to contain oil spills in connection with the outsourcing of fuel supply and the management of fuel tanks*
- *Institutional reform of road maintenance and land transport with increased involvement of the private sector*
- *An assessment of the need for maintenance of roads and the vulnerability to coastal erosion*
- *Various operation, maintenance and corporatization programs.*

Funding Strategy

The government team then examined methods for scheduling and funding of the proposed, high priority infrastructure investments and actions. Whole of life costs were calculated for all projects taking into account capital expenditure, up-front planning & design costs and lifetime operating and maintenance costs. Taking into account the current capacity of government to obtain funds, the priority investments were assembled into a comprehensive and rational investment strategy.

Current and committed projects were costed at close to $11.3 million. High-priority projects total about $ 52 million in capital costs and an additional $9 million for planning, supervision during implementation and detailed design. All these investments are scheduled over the next five years until 2015. Based on whole of life costs until 2036, there is close to $199 million worth of investment (including operation and maintenance) required in the infrastructure sector with a present value of $104 million..

Ownership

The NEISIP has been formulated at the initiative of the Government of Nauru and with support of the Pacific Infrastructure Advisory Center (PIAC). Its preparation has been managed by the Planning and Aid Division of the Ministry of Finance and Economic Planning under the direction of an Infrastructure Steering Committee consisting of senior officials of each sector, which has also been responsible for the initial prioritization of the projects. The NEISIP has been developed in close consultation with government and private sector stakeholders who participated in a series of workshops conducted throughout its preparation. Cabinet and ministries have been briefed on various occasions and the document was formally approved by Cabinet in November 2011.

The Way Forward

The Government of Nauru intends to use the NEISIP to improve coordination of planning and financing of economic infrastructure development among national stakeholders and international development partners. Oversight and regular monitoring of the NEISIP will be the responsibility of the National Development Committee (NDC) with the support of the Planning & Aid Division (PAD) of the Ministry of Finance and Economic Planning.

The Government is committed to ensuring that the priority program is delivered as quickly and effectively as possible and is keen to enhance cooperation. The NEISIP is a means for Nauru to streamline the development of economic infrastructure by providing a clear direction and information about its infrastructure developments to its own departments, the private sector and the donor community.

I. INTRODUCTION

1. The Nauru Economic Infrastructure Strategy and Investment Plan (NEISIP) has been developed by the Planning and Aid Division (PAD) of the Republic of Nauru (RoN) Ministry of Finance and Economic Planning (MFEP). It has been coordinated by the infrastructure steering committee comprising heads of relevant departments and key technical specialists. A Technical Assistance (TA) consultant team was provided by the Pacific Infrastructure Advisory Centre (PIAC) to assist with the preparation.

2. The Plan was developed over a period of five months in late 2010 and early 2011, and comprised an infrastructure stock take, technical and economic analysis, and development of a prioritized list of infrastructure investments. In places, the report follows the outline, and draws upon methods, used in other Pacific Island infrastructure plans, including the Tonga National Infrastructure Investment Plan (PRIF, 2010) and the Cook Islands Preventative Infrastructure Master Plan (ADB, 2006).

A. Background to the NEISIP

3. In the decade to 2005, financial mismanagement and government mis-steps caused Nauru incomes and living standards to plunge. At that time, Nauru's key infrastructure was not maintained and public services were almost non-existent. In 2005, Nauru embarked on a program of change, including the development of a 20-year National Sustainable Development Strategy (NSDS). This strategy aims for Nauru to achieve growth by building on economic infrastructure and advancing structural reforms.

4. In 2009, progress towards the NSDS was assessed in detail, and refined goals and milestones were defined. However, the NSDS does not define specific programs or activities to achieve the milestones nor their budgetary requirements or implications. Furthermore, there has been limited progress in developing sector-level planning aligned to the NSDS.

5. The Government of Nauru decided to formulate and develop an Infrastructure Strategic Plan that would identify and prioritize infrastructure investments, and set out recommendations for addressing the country's infrastructure requirements for growth and economic development. It is the intention of government to update the NEISIP annually as part of the national planning and budgeting process in order to ensure its relevance for guiding sector planning and discussions with development partners.

B. Nauru Economic Infrastructure Strategy & Investment Plan (NEISIP)

6. This Plan aims to identify the Government's needs, strategies, policies, and immediate priorities in the infrastructure sector as well as identify the financial resources to support their realization. The plan assesses current status and needs in each infrastructure sector, and uses this assessment to review proposed projects. The development of a project prioritization tool and investment and funding strategies will assist Government to regularly update and utilize the Plan in an active manner.

7. The NEISIP includes the following key economic and social infrastructure sectors with a lower limit on individual project size of $250,000:

- Transport – Air, Road and Maritime
- Energy – Electricity and Fuel
- Water, Sanitation and Solid Waste Management
- Telecommunication – Telephone, Internet and Broadcasting
- Government Buildings - including Schools and Hospitals

8. Nauru's planning, institutional and implementation arrangements have often been haphazard. In most sectors, numerous studies and assessments have been undertaken in recent years, yet there is often political and development partner inertia to commit to sector master plans let alone comprehensive infrastructure investments. This is often due to a lack of financial and technical resources in Nauru to plan, manage, operate and maintain current infrastructure, let alone new investments. To ameliorate this inertia, the NEISIP was developed with the following principles:

9. ***Administrative Efficiency –*** Responsibility for infrastructure is often shared across multiple Government agencies and SOE's. The NEISIP focuses on rationalising stakeholder management, planning and operations within and across relevant sub-sectors.

10. ***Cross Sectoral Efficiency*** – where there is ability to combine construction/maintenance activities across multiple projects/sectors/agencies; or develop infrastructure for multiple purposes, these have been noted and given relevant priority.

11. ***Financial Responsibility –*** Current infrastructure is often not maintained in accordance with economic or technical standards, ensuring its depreciation is accelerated. New and replacement infrastructure needs to be able to be maintained and operated within the current budget envelope or attract additional revenue. Whole of life costs are calculated for new infrastructure and compared with current required expenditures.

12. ***Demand Driven –*** a shift in focus so that infrastructure planning is motivated by demonstrated demand and improved cost recovery rather than just supply

13. ***Development Partnership*** – enabling Government to determine its own development agenda and investment envelope so that it can move from being a donor recipient to an equal partner in negotiating international development assistance.

C. NEISIP & Nauru's Planning Framework

14. The NEISIP forms an integral part of the national planning and budgeting process, and provides an indication to development partners of the priority investments that Nauru wishes to pursue.

Figure 1 outlines how the NEISIP fits within the overall infrastructure planning, policy and operational framework in Nauru.

1. National Sustainable Development Strategy (NSDS)

15. The 2005 NSDS, and the revised 2009 NSDS, have a clear focus for the infrastructure sector and how it relates to achieving the vision and objectives for Nauru's sustainable growth. The NSDS is also consistent with a number of internationally agreed development goals (MDGs), the Pacific Plan, and Paris Declaration.

16. The Goal of the NSDS is "*A future where individual, community, business and government partnerships contribute to a sustainable quality of life for all Nauruans*". Of the five supporting long term goals, three are linked with the infrastructure sector:

a. Stable, trustworthy, fiscally responsible government
b. Provision of enhanced social, infrastructure and utilities services
c. Development of an economy based on multiple sources of revenue

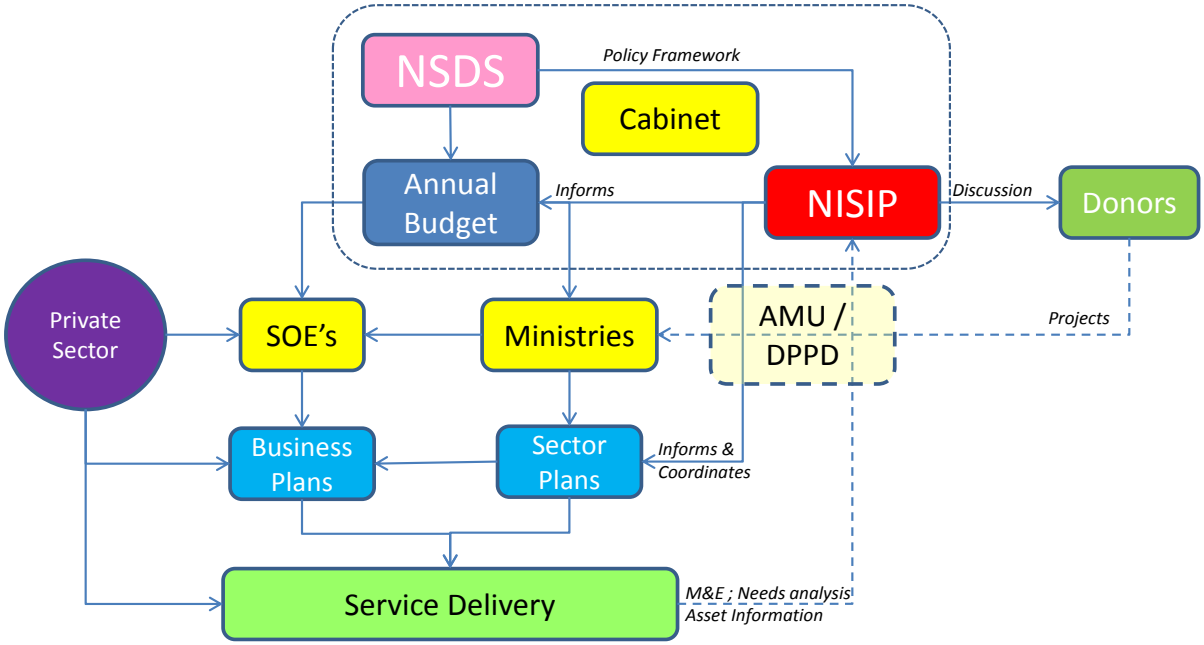


Figure 1 : NEISIP in Nauru Planning Structure

17. The NSDS groups key economic infrastructure into 5 areas which contain associated policies and milestones. These are:

1. *Energy* - Provide a reliable, affordable, secure and sustainable energy supply to meet socio-economic development needs;
2. *Water & Sanitation* - Provide a reliable, safe, affordable, secure and sustainable water supply to meet socio-economic development needs
3. *Waste & Sewerage* - Effective management of waste and pollution that minimizes negative impacts on public health and environment
4. *Transport* - Improve transport infrastructure and provide reliable and affordable public transport service
5. *Communications and Media* - Provide universal and reliable access to internationally competitive communication services and an independent and commercially viable media

18. The NSDS identified the key constraints to infrastructure development as:

- Lack of Funding
- Lack of Capacity
- Lack of Coordination
- Unclear goals
- Unclear land arrangements
- Lack of a sound business environment
- Governance

19. The NEISIP has been developed to integrate with the relevant NSDS long term goals (including relevant MDG's), strategies and milestones and incorporate approaches that ameliorate the key hindrances to infrastructure development. In setting priorities, projects that are closely aligned with and contribute to long term goals receive a high rating.

2. Sector Plans and Studies

20. There are no detailed or agreed sector plans or strategies for any infrastructure in Nauru. While education and health have formulated strong business plans, the infrastructure sectors only have had multiple project and sector studies undertaken. These have incorporated widely held standards for infrastructure provision, but mostly in the absence of a comprehensive and specific strategic plan. In quite a few cases these studies have been "pilot programs" or small scale improvements which have not been adequate to address the needs of all Nauruans and are inefficient uses of resources.

21. A list of the plans and studies that are available to date is contained in Annex D. The NEISIP incorporates key elements of these plans in the relevant sub-sector needs analyses. In most cases, these have formed outline sector strategies as an interim measure prior to the development of detailed sector master plans.

3. Institutional Arrangements

22. The ten infrastructure sub-sectors in Nauru are controlled by 7 separate SOE's and 5 Government ministries (see Figure 2). Some infrastructure sub-sectors have sections that are controlled and/or owned by three separate organisations – for example the Ministry of Transport, RONPHOS and NRC each control part of the road system on Nauru. The NEISIP has focussed on each sub-sector as a whole, engaging stakeholder agencies as a group in order to facilitate improved planning and to interact more effectively with development partners.

23. There are four main ministries involved in infrastructure provision. The two key ministries are Transport & Communications (MTC) and Commerce, Industry and Environment (CIE). The Chief Secretary is technically responsible for road maintenance. Home Affairs have undertaken a considerable strengthening of TV and Radio over the past 12-18 months.

24. Of the six relevant SOE's, four are solid commercial entities. Nauru Rehabilitation Corporation (NRC) is responsible for the development of the remaining phosphate reserves while also rehabilitating previous mining incursions. In this regard they are responsible for brackish water supply, solid waste management and the roads on Topside. NRC is a Government SOE run along commercial lines.

25. RONPHOS is also a commercially driven SOE responsible for actual mining operations. Much of their infrastructure (hospital, roads, rail and port) developed during the height of mining operations has been passed to the state for maintenance.

26. Although Digicel is not an SOE, it has recently been granted a licence to operate exclusively in the mobile phone sector in Nauru, and has been given all telecommunication infrastructure by the Government as part of the deal. The Government maintains a 20% stake in the private company. Our Airline is providing limited but sustainable air services to the country and the region, while slowly turning to profit under difficult economic circumstances.

27. The remaining 2 SOE's (Utilities and Eigigu) are struggling to become commercially viable entities, with capital, assets, planning and personnel only now beginning to be coordinated. While the outlook remains hopeful, there is still a need for government support in order to survive and provide much needed services.

28. Nauru has a small private sector comprising mostly service based enterprises – retail and trade services. There are few private professional services, as health professionals are

employed by the government and financial services are non-existent. There is a distinct lack of skilled and relevant tradespeople for constructing, maintaining and operating infrastructure.

29. The Government is pushing to move its SOE's further into the private sector, so that they are more economically rational, and stimulate private sector up-skilling. Its proposal to open up investment to foreign nationals may stimulate private capital and investment once banking and insurance services have been restored.

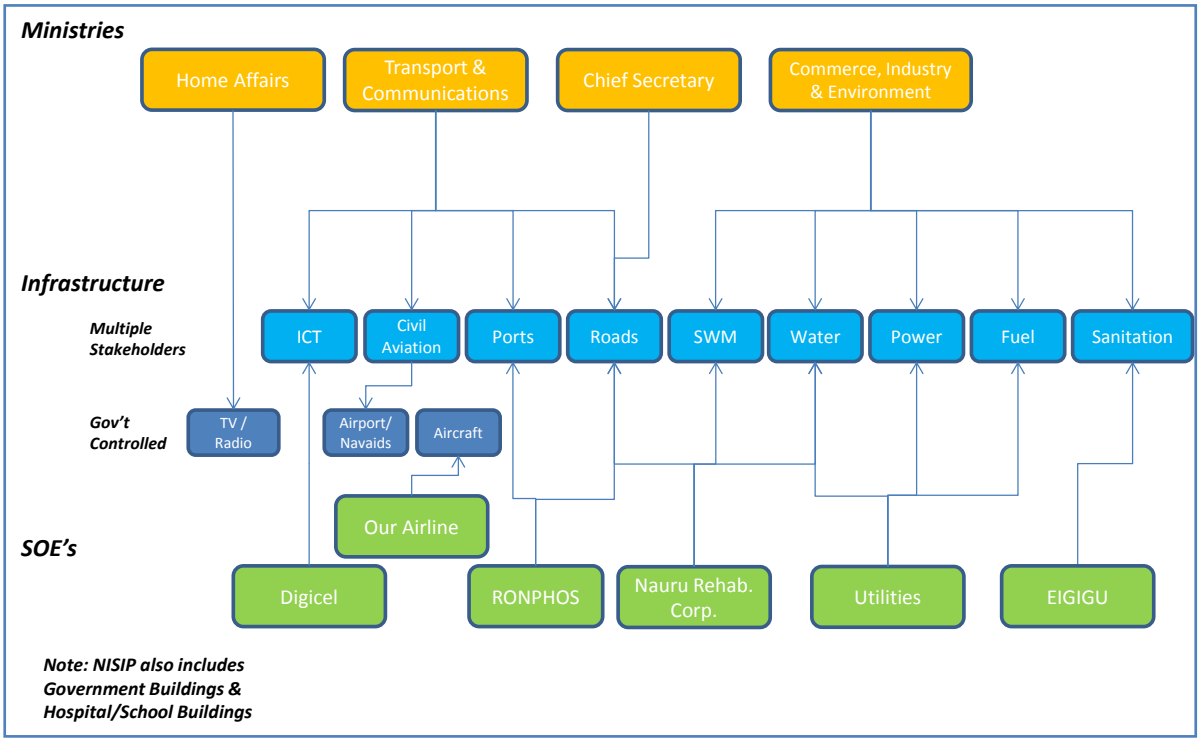


Figure 2: Institutional and SOE Infrastructure Responsibilities

D. Layout of the NEISIP

30. The NEISIP has been developed and is organized as follows:

31. ***Needs Analysis*** – this section assesses the need for infrastructure in the context of Nauru's national policy and economy; outlines the key drivers of infrastructure in Nauru and an outline of sector-wide needs.

32. ***Sector Analysis & Investment Plans*** – provides brief details about each sub-sector - policy, planning, financial and operational position. A gap analysis leads to a description of current and proposed projects and the proposed investment plans for each sub-sector.

33. ***Prioritizing Infrastructure Investment*** – This section outlines the details of the multi-criteria analysis (MCA) adopted by Government to rank projects and guide investment decision making. A prioritized list of infrastructure is developed.

34. ***Life Cycle Costs*** – This section outlines the life cycle costs of infrastructure and the current situation in Nauru. It examines the current balance between maintenance needs and maintenance expenditure and contrasts that with the potential operational and maintenance implications of the NEISIP infrastructure investment program.

35. ***Funding Strategy*** – The funding strategy outlines the projected demand for infrastructure related finance; the capacity of Government and SOE's to address total costs; and the interventions that Government can make to improve the infrastructure financing environment.

36. ***Sector Priority Programs*** – The section combines the prioritization, timing and investment analysis, and outlines the key program requirements and necessary supporting activities for each sector over the coming 5 years.

37. ***The Way Ahead*** - Outlines the key supporting activities that Nauru needs to undertake to plan, manage and deliver the infrastructure over the short to medium term.

II. INFRASTRUCTURE NEEDS

38. This section will outline the key drivers of infrastructure in Nauru and an outline of sector-wide needs.

A. Infrastructure Drivers

39. In order to develop a comprehensive infrastructure plan, it is necessary to understand the economic and social factors that drive the need for infrastructure in Nauru. This section will assess how infrastructure forms an integral part of National policy and is a positive driver for the economy. Each sub-sector will be analysed for its linkage with policy and planning outcomes, relevant demand drivers and potential investment directions.

40. Growth in demand for basic infrastructure capacity and services is driven by population growth and economic activity. Individuals want, as a minimum, for their basic needs to be met so that they have a good quality of life. In addition, the services delivered by economic infrastructure are an intermediate input into production, and affect business efficiency and economic growth.

41. There is general international consensus that there is a positive correlation between infrastructure and economic outcomes and that investment in infrastructure is a major driver of productivity. Core economic infrastructure (such as transport, electricity, telecommunications, sewerage and water systems) leads to the greatest levels of productivity, particularly when delivered with increased efficiency and reduced service prices.

42. Inadequate infrastructure is a bottleneck to economic activity. Inadequacy can be due to a lack of assets or where there is diminution of service due to poor management and maintenance. Appropriate maintenance is a much more cost effective approach to effective infrastructure than capital expenditure. Poor maintenance results in the compromise of service coverage, pricing and quality. As a result, the NEISIP focuses not just on physical infrastructure but also on the way that it is used and managed.

B. Key economic infrastructure drivers

43. Nauru has the same basic infrastructure drivers as other countries. However, due to the dilapidated nature of most of its infrastructure and the dominance of the mining and quarrying sector in determining economic growth, the priorities for new infrastructure are somewhat different to other countries. Also the dominance of aid to fund new projects means that Nauru must negotiate with donors whose requirements may not always fully align with the goals of the government. In addition, the country's dependence on highly volatile sources of revenue which includes fisheries licenses and phosphate, has led to a priority to broaden the economic base.

44. While the development of a fishing industry would seem sensible, there are many examples of attempts by Pacific island countries to develop local fishing industries only to fall well short of expectations because the risks cannot be adequately managed. Export of high value fish species requires excellent regular air connections to markets in Asia that are not possible for the foreseeable future for Nauru. Domestic on-shore processing facilities require large scale to be economically competitive. Running fishing boats out of remote islands like Nauru is relatively expensive compared with operating from a major regional base, as needed infrastructure is specialized and cannot survive on a small scale of operation.

45. The setting up of a national trust fund with international governance is a priority for the government to broaden the economic base. It is as a way of saving wind-fall gains and spreading the benefits over future years when times are economically difficult.

46. From an economic point of view, an important step in developing a prioritized infrastructure program is to identify the main sectors of economic growth and social development over the relevant period of 5-15 years. Nauru, unlike its near neighbors, is well placed to escape an aid dominated economy due to the potential of the remaining natural reserves of phosphate and dolomite. Efficient and effective exploitation of these reserves is a key driver for infrastructure development. Other sector opportunities leverage off this.

47. Nauru's economic prosperity over the NSDS timeframe is largely dependent on the success of the phosphate and dolomite quarrying industries. Now that primary phosphate mining has been completed and the feasibility of secondary mining confirmed, the next phase of development has a life of approximately 30 years over which time secondary phosphate reserves will be exhausted.

48. Access to the next layer of phosphate is dependent on the removal of the dolomite pinnacles to form a stable platform for heavy machinery to work. The Government's initiatives to create value from this process have borne fruit in that, rather than being a cost to mining, the value of the pinnacles has been identified and will be exploited and exported as aggregate and high value marble-like products. While exports of phosphate and aggregate will utilize the sectors' own infrastructure, these industries are dependent on the port to import necessary inputs of plant, equipment, spares and fuel. Air freight is also critical for small, high value urgently required items and for the movement of people. As major businesses, these industries need all the usual business services including telecommunications to be available at high service levels in order to run efficiently.

49. Integral to the mining operations is the rehabilitation of the mined areas for a range of post-mining activities including agriculture, horticulture, forestry, housing, industry, water storage and social infrastructure, including much needed burial ground.

50. Royalties, dividends and taxes associated with mining and quarrying will provide the revenue for the rebuilding of the Nauruan economy. Once stable revenue flows are established this will boost confidence for the private sector to take an increasing role in the economy.

51. The upstream and downstream economic benefits of mining and quarrying will reach into most other sectors, thus acting as a catalyst for the development of a more diversified and robust economy. In order to realize these benefits there will need to be a concurrent investment in infrastructure to enable the exploitation of the reserves, to build a new more diversified and resilient economy and realize cultural, social and environmental goals.

C. Key social infrastructure drivers

52. The ability to contribute to the growth of the economy and to benefit from the wealth created is closely tied to progress in the education and health sectors. As mining and quarrying ramps up again there will be an increasing demand for well educated people through the range of occupations from semi-skilled to highly technical. As the economy begins to diversify, increased opportunity will become available. Without Nauruans to fill these positions, many of the benefits will be captured by expatriates. Nauru has a very high population density (433 people/sq km), but population growth rate is relatively low (0.6%)[1].

[1] NSDS as revised 2009, p. 68

This means that while there is a high pressure on social infrastructure, the pressure will increase relatively slowly in the future.

53. The quality of education delivered depends not only on the quality of the teachers, but also on the quality of the learning environment. Thus the education infrastructure including school buildings, teaching materials and cultural and sport facilities are key drivers to achieve Nauru's vision.

54. Nauru is suffering from the same health challenges as other Pacific Island Countries, that is, deteriorating health indicators despite an increasingly monetized society. There seems to be a close correlation between increasing incomes and demand on health facilities. Much of this can be attributed to bad diet and a less active way of life.

55. Traditional food catching, gathering and production resulted in a much better quality and balance in the diet than today's store bought food. With increased paid work, the time available to participate in traditional food production decreases. Unfortunately, the replacement food from overseas that is available at prices people can afford, is much inferior to home grown natural food. In addition, the effort that goes into traditional food production burns fats and sugars. In contrast, sedentary occupations along with the little effort needed to buy and prepare store bought food results in these same fats and sugars being deposited in the body with resulting lifestyle diseases, poor quality of life and much shortened life expectancy.

56. Improved preventative health infrastructure and upgrading palliative care facilities are important components of the short term infrastructure requirements, while these health challenges are met and people's food habits are changed over time to more nutritious sources. Current supplies of potable water do not meet existing needs due to inadequate maintenance of existing storage and distribution of rain fed systems and deterioration of groundwater supplies. Poor water quality creates hidden health costs through water borne diseases that debilitate and result in general malaise so that the general population lacks energy and drive.

57. The 2005 National Sustainable Development Strategy is the key policy document behind Government decision making. The NSDS aimed to enhance infrastructure (utilities and transport services (including renewable energy, power, water, waste management, roads, sea and air) in partnership with economic, social and cross-cutting priorities to provide a higher quality of life.

58. The NSDS noted that "infrastructure sectors have a key role in underpinning development in the economic and social sectors of Nauru. In particular, transport, reliability of power, asset maintenance and the development of information and communications technology is critical to sustaining economic growth and the provision of social services"[2].

59. The NSDS was reviewed in 2009 and noted that there had been significant improvements in infrastructure in the intervening years, particularly in power and water. Moreover, the goals of enhanced utility and transport services remained unchanged – apart from a greater emphasis on renewable energy.

[2] NSDS, 2005

III. INFRASTRUCTURE ANALYSIS

60. The following is an overview of the current status, performance and needs of the infrastructure sector, followed by a brief analysis of each infrastructure sub-sector. The analysis generally takes the format:

- National Strategy & Policy
- Demand, targets, standards
- Sector strategy
- Current Sector performance
- Analysis of major gaps and needs
- Proposed investments and actions

61. Projects are listed at the end of each sub-sector analysis, and are based on identification by the relevant departments and through the infrastructure stock-take process. Their status is listed as Funded (and in progress); Committed (for funding by Government or donors); Planned (by departments); or Identified (at concept level). Proposed project costs and timing are outlined, with certainty increasing the closer the project is to being funded and implemented. Donors are identified where known.

A. Population

62. Infrastructure capacity has to account for a projected 2025 population[3] of approximately 12,300 people reflecting an annual increase of 0.6%. This equates to approximately 2,050 households with an average of 6.1 persons per household. While numbers of children remain generally constant over the next 15 years, there will be a significant increase in the working age population; and a five-fold increase in the elderly (over 65). Average annual household incomes in 2006 were $9,555.

63. Table 1 outlines the current infrastructure in Nauru and includes health and education buildings.

[3] Demographic and Health Survey 2007 (Department of Health and Statistics)

Table 1 : Overview of Economic Infrastructure

Sector	Brief Description of Key Infrastructure	2010 Performance (unless indicated)
Water	2 x Seawater intake pumps (100ML/d) 3x120 m3/day R/O Units Concrete & Steel storage (various states of repair) 2 x 10m3 & 1x 4m3 water delivery trucks Community and household storage	100% access to basic Government subsidised water delivery 80% Unaccounted For Water 12 lpd (12% of demand) delivered $20 / m3 cost of production and distribution $2.50 / m3 price
Sanitation	1 x dump operated by NRC; 3 x skip bin and 2 x flat-bed collection trucks No central sewage collection and treatment system (septic tanks) Sludge pump out vehicle – open ocean disposal	Estimated 2-5 year life span for dump 100% household access to SWM collection No recycling or cost recovery by SWM operator 50% access to improved sanitation(2008) <5% population access to uncontaminated groundwater (2010)
Power	5 x Main generators (total 10.5MW) 4 x backup generators (total 2.1MW) Fully Reticulated supply (100% coverage)	95% household access to reticulated power 8.6MW peak demand (2025) 12.6 MW rated peak supply capacity 4MW actual supply capacity 21 days load shedding per year $0.45 Cost per MWh production $0.28 Price per MWh consumer
Telecommunication	Privatised telecom and internet monopoly (Digicel) Access to mobile phone and Wi-max connections	0% commercial land lines 100% *access* to mobile service 95 (est) mobile connections / 100 adults $40 / month average spent by low volume user.
Airports	1 International Airport – 2100m asphalt runway DME/VOR	2 departures total per week
Roads	22 kms paved ring road 4 kms of community access roads Over 25 kms of unsealed mining access roads School bus and irregular public bus service	$0.00 road user charges Condition Primary Road – Good Condition Secondary Road – Poor Bus Fare - $0.60 per trip
Maritime	4 offshore "A" mooring buoys 1 harbour with no berthing facilities 1 small boat harbour Container shed	4-5 ships per month. 2-5 day loading/unloading depending on weather, utilities. No security of cargo area
Health	1 hospital (50 beds) with associated facilities 1 old hospital used as health clinic	85% Average Daily Bed occupancy <5% cost recovery
Education	1 high school 1 middle school (college) 3 higher primary 4 infants schools 4 kindergartens	Average classroom size • Primary – 20 • Middle – 22 • High - 26

B. Water

64. Nauru's development strategy for water is to provide a reliable, safe, affordable, secure and sustainable water supply to meet socio-economic development needs. The NSDS short term goal focuses on reliability and highlights improved water storage and rainwater harvesting capacity; optimal groundwater use; and cost effective reverse osmosis water production. Long term goals are that 50% of potable and non-potable water should emanate from rain water harvesting or groundwater extraction. Education should be improved to reduce water use through recycling.

65. The key agencies in the sector are the Ministry of Commerce, Industry and Environment (CIE) which is responsible for sector policy; the Ministry of Health is responsible for quality and standards; the Nauru Utilities Authority (NUA) is the operator; and the Menen Hotel, and Nauru Rehabilitation Corporation (NRC) provide supplementary and mutually cooperative assistance to NUA. Together, they are meant to comprise a water sector working group and guide future sector investment and management – however, so far this has not occurred.

66. Nauru is without an approved water policy that outlines demand targets. However, there is Government acceptance of WHO (2002) and AusAID (2003) set targets of 100L of potable water per person per day (comprising 30L for drinking and 70L for cooking and washing); and 70L of non-potable water for toilet and other uses.[4] There is strong agreement from all stakeholders that these targets are quite high compared to other Pacific countries, and reiterates the necessity for them to be subject to stringent re-assessment during the development of the water resource policy by SOPAC in 2011 and the subsequent water master planning process. Until that has been undertaken, this report will utilise agreed targets determined by Government in the NSDS.

67. In addition to household demand, a further 370 m3 of water per day is expected to be demanded by commercial and public service entities.[5] Assuming that non-potable water can continue to be supplied from groundwater, seawater and other activities (such as reduced flush sanitation), this equates to a total (2025) demand of 1,600 m3 per day of which 800 m3 is to be through rainwater collection and 800 m3 from RO.[6]

68. With no defined and agreed water policy, a dis-jointed institutional structure and lack of revenue, there has been no ability to develop a sector master plan or coordinated approach to sector investments. Instead, provision is left to individual households, who can avail themselves of water deliveries from the NUA, collect rainwater, or pump (mainly) contaminated groundwater. All stakeholders emphasise the urgent need for a coordinated water supply master plan that comprehensively assesses sustainable demand, production and storage requirements; develops options for investment, tariffs and delivery; and garners political and community support for a detailed and sustainable strategy.

69. Potable water production is from either rainwater or reverse osmosis. SOPAC undertook a preliminary review of potential household rainwater collection[7] through inspection of roofs and tanks. Utilising historical rainfall data, they estimated that every household could collect enough water (140L/p/d) for its own use through rainfall in an average year. This drops significantly to 50% of demand in 1 in 5 rainfall year and 25% in a 1 in 10 rainfall year. Calculations also assume that all roofs, gutters and tanks are in working

[4] Based on WHO 2002 and AusAID 2003 calculations.
[5] AusAID 2003
[6] It is suggested that these targets be reviewed as they are significantly higher than many other Pacific Islands, particularly dry atolls; and they do not accurately reflect the implications of subsidized RO supply and supply ability from other sources.
[7] Nauru IWRM Diagnostic Report, SOPAC 2007

condition, and that there is enough storage to last through dry spells. Unfortunately, it is estimated that less than 40% of households have adequately maintained collection and storage. Combined with less than average rainfalls, rainwater collection in Nauru is severely diminished. Although the restricted supply of RO water contributes to increasing rainwater demand, this is outweighed by the subsidised price of delivered water which reduces household incentives to maintain rainwater collection infrastructure.

70. The data does indicate that the strengthening of rainwater harvesting capability and capacity by households and communities has extraordinary potential, and be extremely cost-effective. Combined with changes in tariff structures for RO water, it should be a major focus in the proposed water sector master plan that is to be prepared in 2011.

71. NUA operates three 120 m3/day reverse osmosis units, with a rated production of 360 m3 per day. Actual production in 2009/10 was estimated at 228 m3 per day due to ongoing and significant repair and maintenance issues, with one unit out of service for over 4 months.[8] NUA also collects small amounts of rainwater from its own and nearby commercial premises. Water is sometimes purchased from the Menen hotel (which has another 120 m3/day RO unit) to supplement production.

72. All NUA water is stored in nearby tanks. Water storage acts as a buffer between fluctuating RO supply and demand. NUA controls approximately 28,000 m3 of storage tanks comprising C1-C6, B13, B5, B4, the hospital and Menen Hotel. Most of these tanks have significant leaks, with current estimates indicating that from 30-40% of water is lost. There are further bulk storage tanks that could be refurbished to act as long term emergency water supply dumps (golf course tanks). If leaks in the current tanks are repaired, current storage capacity would be equivalent to 35 days supply, exceeding the WHO (2001) recommended target of 20 days supply.

73. Water is delivered at subsidised cost (both the water price and the delivery charge) to household and community tanks utilising 2 x 10m3 and 1 x 4m3 delivery trucks which operate 16 hours a day, 6 days a week. Delivery is supplemented on a commercial basis by trucks from NRC, RonPhos and private operators such as Capelle. An average of 73m3 of water per day was sold in 2009/10 based on water receipts by NUA[9]. The average delivery during the current year is 304 m3 per day[10]. There is a current backlog of over 3 weeks for requested deliveries, utilising either public or private tankers.

74. Based on this data, actual water sold is only 12% of current demand[11]. Actual RO water production is at just over 63% of potential 24 hour/7 day hour. Given that stored water has remained relatively constant over this time, the difference between produced and delivered water indicates an Unaccounted For Water (UFW) and Non-Revenue Water (NRW) of over 76%[12]. Including NUA estimates of their rainwater collection from nearby buildings, this raises the UFW/NRW to over 80%. The majority of this “loss” is through significant leakages in storage tanks and the inability to store or distribute excess production/harvesting. In addition, water theft through unaccounted water deliveries, free water (as part of Government policy) and water filling of storage containers (which is provided free from a public tap) is considerable and may contribute up to 20-40% of UFW/NRW.

[8] RO production was also purposely reduced, as there was a significant rainy season, and an inadequate storage and delivery system to distribute the available water.
[9] This data was prior to the new 10m3 and 4m3 trucks which began operations in 2010.
[10] This is based on a double shift. Also much of the water is free due to Government policy and is not invoiced.
[11] Based on a 2009 population of 9,300
[12] Statistics are based on very rough estimates by NUA. Given the paucity of data collected by NUA, it is impossible to determine actual figures for MRW or UFW. Simple data collection at key points in the production and delivery system of NUA will be an important component of the Water Sector Master Plan.

75. Given the significant water losses, the calculated cost of water per m3 sold is $20. If leakages were fixed, and all water invoiced, UFW/NRW could feasibly be reduced to less than 20% - resulting in a revised cost of $4 per m3. Benchmarked averages for similar RO units[13] range from an average $2 to a high of $5.80 per m3, depending on fuel price and the salinity of water treated. NUA currently sells water at Government regulated rate of $2.50 per m3 plus delivery charge, with the remainder of the cost provided by Government subsidy.

76. The main activities in the sector are currently through EU and SOPAC. Their IWRM project has two components: the EU IWRM planning component, dealing with policy and legislation in 14 countries including Nauru and a GEF IWRM demonstration project component. AusAID is also providing technical assistance to NUA through PACTAM.

77. The major issue in the water sector is ***maintenance*** – of both rainwater collection infrastructure at the household level and the RO units by NUA. In line with the NSDS short and long term goals, the EU and SOPAC are currently undertaking the Disaster Risk Mitigation Project to repair and improve rainfall collection and storage by over 300 households, communities and commercial establishments. This will improve households ability to collect and store rainwater, but maintenance needs to be encouraged by Government though policy, regulation and incentives.

78. The EU/SOPAC project is also repairing the NUA and Hospital storage tanks, which are expected to save significant amounts of water wasted through leakages. This is a 2015 milestone in the NSDS, and will ensure a more cost effective supply.

79. There is an urgent need to repair and maintain the RO units, which are relied upon to produce much of the islands potable water supply. With spare parts often taking months to arrive due to delays in Government approval, lack of funds and supplier backlogs, the requirement for a store of inventoried major spare parts is seen as critical for rapid repairs and maintenance. A dedicated workshop to train operators and undertake repairs would complement the store project. To increase efficiency, it is proposed that the workshop/store be shared with the power generation arm of NUA. Security must also be increased, given current reports of theft of major parts from NUA stocks

80. Overall, it is essential that there is adequate funding to repair and maintain all public equipment and inventory in the water sector, particularly the proposed O&M workshop and store. This must emanate from either increased tariffs to NUA or a dedicated budget line. This issue is a key priority as the development of water sector policy and planning occurs over the coming year.

81. The second major issue is ***supply***. With delivery trucks currently operating at near full capacity; demand exceeding available supply; and, an expected increase in available water (due to storage tank leakage repairs) – there is an urgent need for additional capacity to deliver water options. While consideration is being given to the feasibility of fully reticulated supply through an island ring main or various gravity-fed pipe options to communities such as Location, the complexity of the sector, stakeholder and policy implications (such as subsidies, linkage with salt and brackish water options, sanitation) means that these ideas need to be comprehensively assessed in a proposed water master plan before any further commitment.

82. In the interim, until agreement is reached on optimum water delivery options, additional tanker trucks are required. In order to meet increased supply, and ameliorate current demand, NUA has proposed to provide an additional 1 x 10m3 & 2 x 4m3 tanker

[13] Economic and Technical Assessment of Desalination Technologies in Australia, URS, 2002

trucks. This plan should be in conjunction with NUA improving its water inventory control to deter theft. All delivery vehicles also should be subject to adequate operation and maintenance to enhance sustainability, which may require increased delivery tariffs to match those of the private sector.[14] The proposed water master plan should also give consideration to eventual privatisation of water delivery to allow NUA to focus on its core business of production and supply.

83. Currently, ***sector planning and management*** is fragmented and haphazard, and subject to significant political involvement, particularly with tariffs. Donors interact with some departments and not others, and often agree to fund investments in-line with their own priorities in the absence of a consistent and comprehensive integrated water sector plan. A Nauru water sector policy and master plan have been prioritised activities for over 12 years, yet work has been slow and unsystematic due to its perceived complexity. Without clear policy guidelines for sustainable demand and supply; a clear understanding of the implications of options such as reticulation versus delivery, or subsidisation versus economic tariffs etc; there cannot be a clear vision of how NSDS water targets can be met, let alone the justification and scheduling of major infrastructure works. SOPAC is funding a water sector policy process in 2011 through its Integrated Water Resource Management (IWRM) process in conjunction with other water and sanitation pilot studies. It is proposed that a separate consultancy be engaged to cooperate with this work and develop a detailed water and sanitation master plan in the short term, using the IWRM approach and providing a detailed investment and management strategy for the sector. Sanitation is included due to the clear integrated nature of sanitation and water initiatives and impacts in Nauru.

84. Another issue is ***production.*** Adequate maintenance of the RO units and storage tanks is expected to reduce UFW to approximately 10-20%. This is still not adequate to supply the Government-accepted demand projections. With this in mind, the Government has committed to purchase a 300m3 RO unit in FY 2011, which should almost double current theoretical production. A 96 m3 solar power unit is also being funded by JICA. Combined, theoretical RO water production will be over 750 m3/day, approaching the Government's target of 50% water needs from RO by 2025. It will be more than adequate if water demand targets are revised downwards to reflect more sustainable and realistic levels and water conservation education activities are successful.

85. However, these additional RO units will significantly increase operation and maintenance cost implications for NUA, particularly if tariffs and Government subsidies remain low. Of greater concern, is the ability for NUA power generation to meet the significant increase in demand for the additional 300m3 RO unit. The requirements for sustainable RO production will be addressed in the investment planning section, and must be systematically addressed in the proposed WSS master plan.

86. There is also an issue of ***water quality*** and its relationship to health. SOPAC reports that there is a serious water safety risk at holding and transfer points, and there have been recent examples of recontamination of clean RO water stored in dirty tanks. While standards are being developed with PIAC technical assistance, CIE recognizes that achieving these standards in practice will be difficult, and is currently exploring options to address them. SOPAC strongly advocates the benefits of a drinking water safety planning approach in deriving improvements to water supply, and feels that this approach is particularly relevant to Nauru. Incorporating such an approach into the proposed Water and Sanitation Master Plan, supported by reliable data, would result in a more integrated and effective investment strategy.

[14] Capelle currently charges a delivery fee 5 times greater than NUA government-regulated charges.

87. While most studies have shown that proper rainwater harvesting can provide adequate supplies of basic residential water needs in average to partially dry years, there is still a need to produce and store water for emergency purposes. WHO (2001) suggests a minimum storage of 20 days supply, which should be achieved in 2011 with tank repairs and increased RO production. The WHO, SOPAC and EU reports all suggest examination of options to increase central, household and community storage, combined with improved rainwater catchment, particularly the use of the runway to collect bulk emergency supplies. These options should all be considered and evaluated in the proposed water master plan.

88. In summary, Table 2 outlines projects that are underway or are being proposed for consideration. Consideration of sector- or community-identified projects, such as runway rainwater harvesting, large community water tanks and bulk storage tank rehabilitation, is seen as premature prior to full assessment during the proposed water and sanitation sector master plan.

Table 1 : Current & Proposed Water Projects

Ref	Project	Est. Cost ($m)	Status	Fund	Proposed Timing					
					11	12	13	14	15	16+
W1	EU Envelope B - Risk Reduction Project (C1-C6) & water tankers (1@10m3)	0.76	F	EU						
W2	Solar Power RO Unit	3.00	F	PEC						
W3	Supply and commissioning of 300m3 RO Unit (AusAID	0.60	C	AusAID						
W4	Water Delivery - Additional Water tankers (1 x 10 & 2 x 4m3)	0.50	P	U						
PW1	NUA O&M Workshop and Parts Store	3.0	P	U						
W5	*Repairs and Upgrade Tanks (B13, B4, B5)[2]*	*0.40*	*I**	*U*	*Subject*					
W6	*Runway rainwater harvesting (* contingent on Runway resurfacing A3)*	*8.00*	*I**	*U*	*To*					
W7	*Additional large community rainwater storage tanks (15x100m3)*	*0.80*	*I**	*U*	*Proposed*					
W8	*Rehabilitation & filling of bulk storage tanks (golf course) for emergencies*	*0.40*	*I**	*U*	*IWSSSMP*					

*Note: * - Subject to proposed Integrated WSS Sector Master Plan*
F – Funded; C – Committed; P – Planned; I – Identified; U - Unfunded

C. Sanitation and Waste Management

89. Nauru's strategy for sanitation and waste aims for effective management of waste and pollution that minimizes negative impacts on public health and the environment. In particular that raw sewage and grey water be properly managed. The long term goal is for pollution and waste management efforts to become environmentally sustainable.

90. The key agencies involved in this sector are CIE as the policymaker and NRC as the "unofficial" operator. Eigigu[15] was active in sanitation before transferring its operations to NRC. There is scope for them and other private operators to be involved in future service provision.

91. Nauru is currently in the process of developing some sanitation standards, through the baseline assessment and preparation of an integrated water resource management (IWRM) policy – expected to be completed by mid-2011. This will link with the proposed Water and Sanitation Master Plan and be supplemented by further trials of sewage and grey water treatment options such as sealed septic tanks, composting toilets, biogas and composting of sludge. Although solid waste management has significant commercial,

[15] Eigigu is the ex-Public Works Department turned SOE.

environmental and community issues, it is not seen as a significant priority by Government at this time.

92. Following the closure of the saltwater supply to the flush system in Location, there remains no centralised sewerage system in Nauru. Residents there are reported to still use brackish water to flush to the original outfall, however water volumes are not enough to sustain adequate flows, resulting in blocked pipes. Assessments by CIE indicate that the saltwater and waste piping is still usable.

93. The majority of Nauru households have a cesspit or septic tank. A recent analysis by SOPAC indicates that many tanks have not been maintained and are leaking, with many close to groundwater sources for household washing and cleaning. While there is no documentary evidence of health issues arising from contaminated groundwater, Nauru has one of the higher rates of hospitalized diarrhoea in the Pacific region.[16]

94. The provision of a new sewage (sludge suction) truck in 2007 by NRC, provides households with access to a cost-effective sewage removal service. Despite this, estimates by CIE place adequate tank maintenance at less than 30% of households. As such, the service is running at a loss to NRC and therefore the maintenance of the vehicle is poor and sustainability is in doubt. Furthermore, disposal of sludge is directly into the ocean near the port, and close to the densely populated Location community.

95. The NRC controls the current dump on Topside, although this is not part of its mandate. The dump has no liner, and meagre processing equipment. Attempts have been made to instigate at-source and post-collection sorting of recyclables and green waste, with limited success. It is expected that there will be further assessments by SOPAC in the coming years to determine the environmental impact of the dump and options for its replacement. Reports by NRC indicate that the dump has less than 2-3 years life, before a new site is to be selected. This would provide an opportunity for an improved landfill to be developed that is more environmentally sustainable.

96. The NRC, as part of its community responsibilities, provides a weekly garbage collection service to households and communities for a fixed fee that is affordable, but is well below cost. Most households have been provided 200L wheelie-bins which are then hand-loaded onto a flat-deck truck and transported to the dump, before being returned to the household. The operation is unwieldy, costly and inefficient. Commercial premises are able to access bulk skip bins which are cleared on-demand by skip trucks for a higher fee.

97. Although there is an old incinerator at the dump site for disposal of hospital hazardous waste, it has not been used since the death of the sole operator a few years ago. It has now fallen into disrepair. Instead, hazardous waste is wrapped and buried in a separate section of the dump.

98. There are numerous opportunities around the island for recycling old equipment and materials, or refurbishment through re-use, painting or maintenance. There is also a concern with the high incidence of asbestos sheets for housing and roofing and the lack of capacity for removal and disposal.

99. Without investment in alternative sanitation options, contaminated groundwater will continue to be a serious issue in Nauru, as it contributes to some 70% of household water needs where wells exist. While improved pump-out practices are clearly needed, they will do little to address the contamination issue (particularly as many existing tanks are unlined and even fully functional septic tanks do not significantly remove pathogens). As cesspits

[16] SOPAC, 2010

and septic tanks are the main contributor to contaminated groundwater, a strategic, planned approach to sanitation options is needed. Improving sanitation infrastructure could make groundwater a safe and viable non-potable option for more households, open up the possibility of other innovative supply technologies, and alleviate many of the water stresses on Nauru.

100. An important issue in the sanitation and waste management sector is the lack of policy and regulations, allowing the environment to be degraded, and placing public health in jeopardy. The Government has committed to SOPAC mainstreaming IWRM through the development of sanitation and water resource policy and plans in 2011, and supporting on-going community education programs. Regulations will be prepared regarding sanitation management in new and existing structures. The IWRM efforts should begin to address deficiencies in the operation and preventative maintenance of septic tanks, which has led to the contamination of the water lens. Although it is expected that this will increase households to avail themselves of the "sludge removal service", it will take many years before there is an appreciable impact on contaminated ground water resources. SOPAC is also exploring the use of composting toilets as a means to reduce water use and reduce environmental contamination.

101. Despite the success of the sludge truck operated by NRC, the inherent health and environmental risks of pump out near Location are enormous. CIE is proposing the development of alternative waste disposal options. This would assess the potential for, and implement options for utilizing sludge in a composting or biogas facility adjacent to the dump, to be operated by either NRC or a private entity. The aim would be to reduce the amount of untreated waste being dumped on the reef nearby residences.

102. While NRC is currently operating the nearly full landfill and inefficient flatbed collection trucks, NSDS policy indicates that this should be upgraded to a sustained basis and privatized. How feasible privatization of all or part of SWM infrastructure in Nauru needs to be explored. There is a need to first assess the current dump site, assess its true life and potential rehabilitation measures, and then prepare plans for its closure and replacement on a new site. The new landfill should be lined to prevent leachate escape, and be served by more efficient collection trucks to enhance services. There may be some ability for it to be built and operated through a private contract, if commercial rates were able to be charged. It would be efficient to re-commission the Hospital Hazardous Waste Incinerator at a similar time (or relocate to the newly planned hospital) and operate within the new landfill agreement.

103. Although earlier studies have indicated that reconnecting the Location reticulated saltwater flush system may be unfeasible, this was mainly due to a lack of adequate saltwater storage. CIE have identified that the actual piping can be rehabilitated to good condition. The main issue therefore has been adequate saltwater volume to re-establish flows. With the identification of significant spare capacity in the existing NUA saltwater intake pump, plans are in place for saltwater storage on command ridge to address emergency response needs of the tank farm. This storage did and could still be used to provide gravity feed to the hospital and Location reticulated sanitation system – servicing almost 20% of Nauru's population.

104. The Water Resource Policy being developed by SOPAC in 2011, and the proposed Water and Sanitation Master Plan will specifically address many of the sanitation issues outlined, and will be a precursor for integrating further investment. Table 3 shows projects that have been identified for assisting the sanitation and waste management sector achieve its NSDS goals.

Table 3 : Current & Proposed Sanitation & Waste Management Projects											
Ref	**Project**	**Est. Cost ($m)**	**Status**	**Fund**	**Proposed Timing**					
					11	**12**	**13**	**14**	**15**	**16+**
S1	Mainstreaming IWRM (sanitation components)	0.30	F	EU						
S2	New lined Landfill & Compactor Trucks	1.40	P	U						
S3	Sludge "Alternative Disposal Options" Study	0.50	I	U						
S4	Location Saltwater flush (* contingent on P2)	0.30	I	U						
S5	Hospital Hazardous Waste Incinerator	0.30	F	Taiwan						

F – Funded; P – Planned; I – Identified; U - Unfunded

D. Power

105. The Nauru development objective for the power sector is to provide a reliable, affordable, secure and sustainable energy supply to meet socio-economic development needs. The short term milestone is for households and businesses to receive 24 hours / 7 days a week electricity at an affordable cost. In the longer term, the milestone is for 50% of power to be from alternative (including renewable) sources. This is an ambitious target set by ESCAP and the Government, and much will need to be done to achieve this outcome. Other milestones aim to enhance education and management in order to reduce demand and improve efficiency.

106. The main sector agencies are CIE (policy), NUA (power production & distribution, fuel management); and NRC, Menen and RonPhos who have backup generators.

107. Daily peak demand in 2006[17] was estimated to be 6-7 MW which can be extrapolated to a maximum of 8.6 MW in 2025 – based on current population and business projections. However, a prepaid billing system has been introduced, using installed meters, which has been estimated to have reduced demand by over 23%, as households have responded to the price signals.

108. The sector is guided by broad approaches to energy management outlined in the National Energy Policy Framework, 2007 developed by SOPAC. The Nauru Energy Efficiency Action Plan, 2008-2015 was also developed by SOPAC under EU funding in order to explore methods for conserving power. This formed the basis for the 50% alternative energy targets in the NSDS set in 2009. The key sector planning document is a Utilities assessment report funded by AusAID in 2008 which recommended improved NUA management and business practices, and a comprehensive demand assessment. ADB is currently funding an analysis of corporatization options of NUA in order to increase sustainability and effectiveness.

109. Current projects in the sector are mainly confined to EU funding for the rehabilitation of the distribution network and a smaller amount for demand-side efficiency. AusAID is also providing technical assistance to NUA through PACTAM.

110. Since 2005, there have been significant electricity generation achievements towards the NSDS goals. There is now the capacity for 24 hour supply and the power station is no longer dependent on leased generators. There is a theoretical total of 12.6 MW of generating power available. This is within demand forecasts, and allows for operation at 80% capacity and allowances for extended maintenance if necessary. However due to generator breakdowns and lack of spare parts, actual generation is closer to 4 MW peak, and an annual average of 58 MWH per day. NUA reports mechanical breakdowns due to the

[17] Reform of NPC, ADB, 2006

absence of key maintenance personnel and non-availability of parts resulted in over 500 hours of load shedding spread over more than 60 days during 2010.

111. There are immense direct costs to the economy of poorly maintained power equipment. During a few days' power outages in January 2011, it is reported that phosphate ships charged RonPhos over $250,000 in demurrage charges as there was not enough capacity to run the kilns and loader due to the breakdown of generator units. Parts are difficult to source quickly for repairs due to the age of the units, instead requiring special machining.

112. Electricity generation costs per unit delivered are $0.45 per MWH, with residential consumers charged $0.28 and commercial entities $0.34 per MWH.[18] The remainder is subsidised by Government. Electricity distribution systems (lines, poles and transformers) are in workable condition, and are undergoing incremental replacement as needed under funding from the EU.

113. Pilot projects with solar power, wind and water power are being trialed for their output capacity, feasibility to connect to the existing grid, and ability to be consistently maintained. These may eventually form the basis of investment proposals in the future and based on the findings a strategy for increasing the use of renewable energy needs to be formulated.

114. NUA is also responsible for fuel stock management. This has improved in recent years and purchasing arrangements have reduced fuel losses, strengthened safety measures, and capability. The tank farm manages storage of fuel for power generation and distribution to vehicle service stations at cost – roughly $1.25 per litre (of petrol) delivered. Aviation gas (Jet A1) is now stocked (early 2011) with the upgrade of pipeline and storage infrastructure. It allows Our Airline to re-fuel in Nauru and uplift full passenger and increased freight loads (compared with 50% loading previously), generating more than an additional $50,000 per week in revenue. Despite these improvements, the inability to adequately maintain infrastructure or respond to emergencies, means that there are still significant risks to Nauru's fuel supply. In particular, there is an urgent need for bulk water to comply with emergency safety (fire fighting) preparations. Also equipment is needed to respond to possible oil spills and a project for this purpose is under preparation and a description of this project is provided in Annex A. The government is currently working on outsourcing of the supply of fuel for Nauru to a private sector operator.

115. The key issue for the power sector is routine maintenance and parts availability. With properly maintained equipment, power demand is well within the limits of generation capacity. NUA needs to engage adequate personnel to routinely monitor generators in order to prevent major equipment failure. There is also a need to rapidly access spare parts and specialized workshop facilities in order to reduce system down time. The O&M spare parts store and workshop would provide NUA with access to critical spares and backup generators and a capability to rapidly repair generation units. This facility would be co-located and developed to link with the NUA water division providing consolidated skills, equipment and economies of scale. Eventually it could also service other entities on a cost recovery basis.

116. Significant funds have been spent over the past 4 years to rehabilitate the generators to capacity. Despite their need for consistent maintenance and management, these funds would be wasted if the generators were to be replaced in the short term. However, planning and budget allocation must be made for their eventual replacement in around 2022-2025. This should take the form of a comprehensive engineering assessment of the current power

[18] These figures reflect current levels of repair and maintenance, which are currently inadequate to sustain average performance.

generation capacity given expected future demand, and to map out a long term strategy to address this issue.

117. Tank farm management has identified that it is required to develop an emergency response system for the fuel storage tanks. Although it is envisaged that fresh water could be used, its proposal is to utilize spare capacity in the NUA RO sea-water intake pumps to supply the bulk water required to store for emergency response. Salt water foaming agents would be used for emergency fire-fighting. Although this is proposed as a stand-alone project, its return may be amplified by linking it with saltwater reticulation (for the existing toilet piping) to Location, the hospital sanitation system, nearby planned aquaculture farms and to the Airport RFS unit.

118. Although the Nauru Utility Authority is generally keeping pace with demand, Table 4 outlines projects to consider as part of their program for achieving NSDS and corporate goals.

Table 4 : Current & Proposed Power & Energy Projects

Ref	Project	Est. Cost ($m)	Status	Fund	Proposed Timing					
					11	12	13	14	15	16+
P1	Jet A1 Fuel Supply	0.40	F	AusAID	■					
P2	Bulk Saltwater Emergency Response	1.00	P	U		■				
PW1	NUA O&M Workshop and Parts Store	3.00	P	U	■	■				

F – Funded; P – Planned; U - Unfunded

E. Telecommunication and Media

119. Nauru's policy for the telecommunication sector is to provide universal and reliable access to internationally competitive communication services and an independent and commercially viable media.

120. The Ministry of Transport and Communications is responsible for policy in the sector. Digicel Nauru, a joint venture private operator, is the monopoly telecom provider in Nauru. At present, there is no overall public telecommunication strategy for Nauru, planning wholly resting with the operator.

121. Public radio and TV services are professionally delivered by Government, with the development of new studio facilities, transmission capability and technical assistance. Coverage is over the entire island and paid commercials have recently been introduced. In addition, there is significant local content in the media with weekly news programs as well as presentations for special events of local interest. Print media is not as well developed due to the failure of the printing facility soon after it was commissioned in late 2009. This is being repaired and will soon be operational as a weekly newspaper.

122. The Government and Digicel entered a joint agreement for the provision of telecommunication services in 2009. Digicel gained ownership over all Government owned ICT infrastructure so that they could provide commercial telecom and internet services to Nauru. The agreement includes a profit sharing arrangement of 20%, providing dividends to the Government commensurate with the value of the assets transferred as a fraction of total investment. Under this arrangement there are now reliable mobile telephone services, 3G data and WiMax Internet (launched October 2010). There are no landline telephone services. Digicel will remain a monopoly in Nauru until at least 2012, when the Government is considering opening the market to competition.

123. Nauru's move to digital cellular phone and wireless internet systems places the country at the forefront of telecommunications in the region. A key consequence has been the savings in operating costs associated with the "antiquated" land line system, resulting in savings for the Government. Also, as tariffs are pitched to ensure full cost recovery and users must pre-pay for service, there is an expectation that telecommunications in Nauru will be maintained at a high service level.

124. Prices for average, low volume mobile phone use are approximately $40 per month[19] comparable with medium to high tariff countries in the Pacific such as PNG and Vanuatu.[20] Internet data prices are amongst the most expensive, yet may be considered reasonable given the small subscriber base. Services are quite reliable and efficient for a remote atoll country. Although exact numbers are kept private, anecdotal evidence suggest over 90% of households, and over 95% of adults own a mobile phone and are connected to the network. The significant uptake of mobile and internet services indicates that there is a high capacity and capability for households to pay for services.

125. Digicel's monopoly licence requires that Government must ensure that pricing be monitored and remains competitive. Government is proposing the development of a telecommunications policy and regulations in 2011/12, prior to the opening of the market to competition. The policy will need to address barriers to entry and technical upgrade which may limit any competitive development of internet/phone capacity or pricing.

126. Government is keen to ensure 100% coverage of internet and mobile communications and ensure that any black spots are covered. With the provision of a monopoly concession to Digicel to provide private telecommunications, much of the investment will occur commercially. However, Government has been asked by Digicel to maintain its level of shareholding (20%) through commensurate investment. In particular they have been asked to fund two new telecom towers in Ibwenape and Baiti to cover two black-spots on the island which have large populations and a school. Although the project has been proposed by Government, full disclosure of economic and cost information cannot be provided due to commercial-in-confidence reasons. It has therefore only been listed in this study for information purposes and has not been assessed or ranked.

127. Table 5 outlines the telecommunications and media projects that are being proposed.

Table 5 : Current & Proposed Telecommunication Projects

Ref	Project	Est. Cost ($m)	Status	Fund	Proposed Timing					
					11	12	13	14	15	16+
T1	New Telecom Towers	0.35	P	U						

P – Planned; U - Unfunded

F. Airports

128. Nauru's strategy for the air transport sector is for infrastructure to be improved to provide a reliable and affordable service. The emphasis is on the maintenance of safe, reliable and economically sustainable air services.

129. The Ministry of Transport, Department of Civil Aviation (DCA) is responsible for air transport infrastructure. The infrastructure and operations are subject to safety oversight audits by the International Civil Aviation Organization (ICAO) to maintain standards. DCA has a maintenance agreement with Airways (NZ) to maintain navigation aids and essential equipment.

[19] Based on 25 calls, connection charges and 30 sms messages per month
[20] "Progress of competition in Pacific Islands mobile markets", Network Strategies, NZ, 2010.

130. Nauru International Airport consists of a terminal building, control tower, runway and apron, basic navaids and lighting. Improvements have recently been made to emergency equipment, baggage screening machines and GPS charts. It currently hosts only two regular flights a week, and the occasional charter aircraft. DCA provides navaids such as the VOR[21] to assist with managing its remote, high-altitude airspace, which provides a consistent revenue stream from over-flights.

131. The Government, with the assistance of a loan from Taiwan, purchased an aircraft and launched services to Nauru under the new SOE brand name "Our Airline" in 2008. In addition to this, Nauru acquired a second aircraft through an external loan. Both aircraft are managed efficiently so as to generate revenue and profit; including charter and leasing to generate further revenue. The repayment of the original loans indicates that major economic infrastructure can be profitable and generate considerable revenue if utilised efficiently.

132. A major issue for Our Airline has been the inability of the island to store aviation fuel (Jet Avgas fuel) due to a major leak in the main tank. This resulted in the airline only being able to lift 50% load (freight and passengers) on flights to Australia and Fiji, resulting in a loss of a potential $50,000 every week. The tank and associated pipes were repaired in early 2011 and full operations can now occur.

133. The main priority for DCA is to maintain facilities to an appropriate ICAO standard in order to maintain authorisation for international operations. Based on the recent ICAO assessment (2009)[22] the runway urgently needs resurfacing (within 1-2 years) to maintain it at international standards. The original runway was overlaid in 1993, almost 18 years ago. Most runways in the Pacific require resurfacing every 10-15 years. Low traffic volumes into and out of Nauru have resulted in the aging runway surface remaining in a reasonable condition, however there are increasing signs of erosion of the binder and fine aggregate. This erosion is leading to the loss of some large aggregate particles which pose a significant risk of jet engine ingestion. Immediate and significant damage to the engines could occur, and in the worst case, could lead to a catastrophic engine failure on take-off or landing. DCA's original plan was to patch surface cracks and holes in order to temporarily extend life for 2-3 years prior to a complete resurface. However, with the ability now to source crushed aggregate on island (from RonPhos), complete resurfacing costs have dropped and make it a competitive and preferred option.

134. Although ICAO's safety oversight audit (2007) outlined the need for security fencing, the requirements are not practical for Nauru given local land owner access and amenity issues. Since the Nauru International Airport (NIA) is located in a residential area, and in close proximity to a school, the airport and the runway continue to be accessed by the general public and in some cases house-hold pets. Since there are presently only two flights per week, the runway is almost daily used for recreation by nearby residents. Garbage and rubbish is an on-going pre-flight problem as a result. In addition there are instances of vandalism which contribute to the breaking down of posts, mesh and gates.

135. DCA is therefore proposing a simple fence, with regular gates, at defined community access points. This would protect the runway from foreign objects, small animals and children during operations. Given some fencing would be removed during the proposed runway resurfacing, a fencing sub-component has been included in the runway resurfacing proposal.

[21] VHF Omni-Directional Range

[22] Pacific Aviation Safety Office (PASO) Safety Report – Civil Aviation Directorate, Aerodrome Inspection - Part 139, Inspection Date: 3 September 2010. PASO is designated by ICAO as the Pacific regional aviation safety oversight organization

136. Apart from runway and terminal maintenance, DCA's other major concern is with maintaining adequate navaids. On the advice of Airways Corporation (NZ) DCA has begun the installation of the PAPI[23] landing assistance system using AusAID Assistance. This will enhance the current visual-only approach, improving safety.

137. Airways Corporation (NZ), which has been maintaining all other navaids have recently (December, 2010) reported the imminent failure of Distance Measuring Equipment (DME) and 5 year serviceability of the VHF Omni-directional Range (VOR). Despite its best efforts, these aging basic navaids are nearing the end of their useful life. Although GPS systems are becoming commonplace in aircraft navigation, DME/VOR is still seen as essential basic equipment in case of differential terrestrial or on-board GPS failure. Furthermore, DME/VOR is essential for Nauru to continue to service and collect revenue from the numerous over flights in its territorial high-altitude air space. The proposal is to replace the DME immediately, and plan for VOR replacement within 5 years.

138. In order to support the operations of "Our Airline", other potential export industries and the NSDS strategy, the Air transport sector has identified a program of investments as shown in Table 6.

Table 6 : Current & Proposed Air Transport Projects

Ref	Project	Est. Cost ($m)	Status	Fund	Proposed Timing					
					11	12	13	14	15	16+
A1	PAPI System	0.10	P	AusAID						
A2	Runway Resurfacing & Fencing	3.80	P	U						
A3	Navaids Distance Measuring Equipment (DME)	0.40	P	U						
A4	Navaids VHF Omni-directional Range (VOR)	0.40	I	U						

P – Planned; I – Identified; U - Unfunded

G. Roads and Land Transport

139. The Government of Nauru's road and land transport policy is to achieve improved road infrastructure and provide a reliable and affordable public transport service. The Government's short term strategies indicate a preference to increasingly contract-out road maintenance and to facilitate the establishment of privately managed public transport services.

140. Although road assets are theoretically owned by Government, RONPHOS and NRC, the main ring road is maintained by the Department of Transport. Similarly DOT operates the various public and school bus services. There are no studies supporting any plans for privatisation or contracting of assets or operations.

i. Roads

141. The main roads were built over 20 years ago by the Government of Japan. The overall quality of the main island ring road network (22 kms) is reasonable although distribution roads (29 kms) are in very poor condition. The main ring road is currently suffering some surface and sub-surface degradation, and repairs and maintenance in the coming years will be important. Repair and maintenance of drainage is crucial if further deterioration is to be avoided. A section of the main ring road (hospital to phosphate loader) is prone to flooding during heavy rain with negative impacts on the hospital – despite Government funded repairs. The main topside roads, although gravel, are maintained to a satisfactory standard by the NRC.

[23] Precision Approach Path Indicator

142. The current state of the ring road owes a lot to the original construction rather than to its maintenance, which has been minimal. Comparing its condition to the poor state of secondary roads, highlights the importance of undertaking quality construction works at the outset. Clearing of channels along the ring road needs to be extended to storm water drains which are invariably blocked. This is a key aspect of road maintenance that has been lacking. Although the Government has provision and systems for road user fees, it currently does not collect any licence, registration fees or regulation enforcement which could be utilised for road funding.

143. With the proposal by DCA to begin airport runway re-surfacing, the opportunity arises to utilize machinery that will be on island at that time to also rehabilitate the road network. It is likely that this would include basic road resurfacing and minor upgrades to selected secondary roads. Any works would have to be in conjunction with concomitant curb/footpath repair and high pressure storm-water drainage cleaning. There are also certain locations in the road network which suffer from coastal erosion. It will be necessary to carry out an assessment and inventory of vulnerable and weak spots in the road network.

144. The government is working on the contracting-out of road maintenance services which it is hoped will reduce costs and improve efficiencies. However, the capacity and capability of Nauru's private sector to absorb such work is poor, and it is unclear how the Government would manage performance. It is proposed that a "road maintenance and land transport privatization" technical assistance be undertaken to assess the management of road maintenance privatization in line with Government strategy.

145. The Government has also agreed to accept the provision by Taiwan in 2011 of 150 solar street lights which will aid its goals of improving road safety and energy efficiency. Whole of life costs and repair and maintenance requirements are yet to be budgeted.

ii. Land Transport

146. The Government policy is to provide minimum transport needs for school bus services, and privatise public transport. There is intermittent public transport services provided to individuals who are charged a fee of $0.60 for a trip around the Island. Since the introduction of increased fees, usage has dropped substantially. Services to school children and public servants have been improved; however maintenance of existing and new buses is still problematic. The Government has accepted the donation of 5 buses from the Government of Azerbaijan in 2011 to supplement its existing fleet. Additional operational and maintenance costs for these vehicles are yet to be budgeted.

147. DOT has proposed that the TA to facilitate road maintenance privatisation also examine options for public - private or public-community partnerships for land transport as part of an integrated road and transport master plan. This would be undertaken in conjunction with any further capital investment in roads or land transport.

148. Table 7 outlines the projects that are being proposed for consideration in the roads & land transport sector.

Table 7 : Current & Proposed Air Transport Projects										
Ref	**Project**	**Est. Cost ($m)**	**Status**	**Fund**	**Proposed Timing**					
					11	**12**	**13**	**14**	**15**	**16+**
R1	Solar Street Lighting	0.30	F	ROC						
R2	Fleet Augmentation	0.15	F	AZB						
R3	Road Rehabilitation (contingent on A2)	1.00	P	U						

F – Funded; P – Planned; U - Unfunded

H. Maritime

149. The NSDS goal for maritime transport is to improve infrastructure and provide reliable and economical freight services. The short term strategy is to refurbish and develop port infrastructure for vessel handling – comprising the deep sea mooring initially; and followed by the construction of the wharf, port and cargo handling equipment.

150. The main agency involved in maritime is the Port Authority of the Ministry of Transport, however RonPhos and NRC are major stakeholders and utilize the cantilevers and adjacent land for their own operations.

151. Nauru imports over 95% of its goods by sea transport. It is also the vital link for the country's current and potential exports (phosphate, dolomite aggregate and fish), all of which require bulk transport. According to Government statistics an average of 5-7 vessels visit Nauru per month. A regular shipping service is set to begin in partnership with other small island nations in the region (including Kiribati and Tuvalu) which will require a regular schedule unaffected by mooring restrictions or weather.

152. A recent ADB report[24] indicated that "the additional costs associated with running the port in its run down state are considerable and limits the ability of the country to tap into the full benefits associated with mining operations and the opening of the regional fishing resources."[25]

153. The mooring system is the key maritime infrastructure in Nauru in the absence of a wharf. It has been maintained and upgraded with the assistance of Taiwan and Russia in 2009/10 resulting in a reduction in demurrage charges. The upgraded mooring can accommodate ships up to 35 tonnes. Unloading containers from moored vessels can take up to 5 days depending on weather conditions, and the operation of power generation and container handling equipment. Average unloading times are in the order of 1-2 days.

154. The Government has identified the major upgrade of the existing port to improve turnaround of vessels, reduce demurrage and improve safety as a key priority. The ADB-financed study to assess port development options (2009) suggested 6 alternatives. Government selected a preferred option based on the proposed alternative's cost effectiveness. This option would provide a "New Quay Wall" constructed on the edge of the reef north of the existing harbor and accessible by causeway. This scenario does not provide any opportunity for replacing the existing phosphate loading arrangements, and hence high maintenance costs for the mooring buoy system will continue. The proposed multi-vessel quay would reduce demurrage times to one quarter, and improve the efficiency and flexibility of the port.

155. Two further port development options have been prioritized by Government for long-term future consideration. These include the "All-Season Berthing facility comprising a new

[24] ADB Scoping Study For Nauru Port Development, Oldfield, 2009
[25] ADB Mission Report from Donor Roundtable Meeting, November 2009

enclosed harbor basin excavated from the reef and coastal land north of the existing boat harbor. The other is an "All-Vessel Quay wall" constructed on the edge of the reef beneath the phosphate cantilevers, to accommodate all vessels visiting Nauru. Both additional options provide an all-weather facility, but were ranked as supplementary due to their large capital and recurrent costs. These two additional projects have not been considered further at this time, due to their large cost and long time horizon.

156. In order to reduce weather delays on the currently proposed quay wall (40-50 days), the Department of Transport has proposed that the current outer buoys (which will become redundant) be moved during construction to Anibare Bay to provide alternate mooring capacity. It would allow boats to be moored and unloaded in Anibare during 40% of the adverse weather restrictions of the proposed new quay wall.[26]

157. Apart from major infrastructure investments, the key issue with maritime is maintenance of existing equipment and facilities. The main port building is close to collapse and inadequate for existing operations. Part of the structure is now on privately re-claimed land, inhibiting operations. Security fencing is completely degraded. There has been the commissioning of two new work boats in 2010, and the funding of a replacement Pilot Boat in 2011, that are central to port operations. However, there are inadequate funds for their correct maintenance. A crane procured in 2008 has still not been erected as it is perceived as inadequate for the job. A larger 65 tonne Omega crane is now proposed to be purchased by Maritime.

158. As the port is improved, demurrage charges and handling times should decrease as efficiency improves. While this should have carry-on benefits to consumers and exporters, it is essential that some proportion of this saving is retained by Maritime for correct maintenance. The development of a Port Operations Master Plan and possible corporatization should be considered as part of any future detailed design.

159. Maritime transport is the critical sector for the economy, being the source of imported goods, and the export of revenue raising phosphate and aggregate. Mining and quarrying sectors provide their own facilities to export products, but rely on the port for imports. Rehabilitation of secondary mined areas is a crucial strategy of the government to lessen the reliance on imported food and beverages, which are the source of much of the lifestyle health problems facing Nauru. Financing the port as a gateway for imports should thus be directed to ensure the full cost of imports including food are passed on through port charges. Co-funding of the port by local industries does not seem to be a sensible way forward. On the other hand co-funding of improved port facilities may be attractive to donors with different donors funding different aspects of port development such as design, physical construction, navigation aids and stevedoring facilities, for example. Table 8 outlines the projects proposed for maritime transport.

Table 8 : Current & Proposed Maritime Transport Projects

Ref	Project	Est. Cost ($m)	Status	Fund	Proposed Timing					
					11	12	13	14	15	16+
M1	Omega 65 tonne Crane	0.50	P	U						
M2	New Quay wall and Anibare Mooring	14.40	P	U						

P – Planned; U - Unfunded

I. Government Buildings

160. The Government aims to undertake essential repairs and refurbishment of Government buildings with a particular emphasis on schools and medical facilities. The

[26] Reducing from 40-50 days to 20-28 days non access due to weather.

NSDS defines a 2010-2015 milestone, whereby all buildings are rehabilitated and maintained to a "standard" that is yet to be defined.

161. The following outlines the current situation and proposed building construction and refurbishment programs in the administrative, health and education sectors. The key issue across all sections is the ongoing lack of funding for basic repairs and maintenance. Instead, structures are poorly maintained, resulting in the increasingly frequent need for critical repairs and refurbishments which are then usually undertaken with donor assistance. The funding strategy (Chapter VI) outlines how the Nauru Government proposes to take an increasing responsibility for funding repairs and maintenance over the medium to long term.

i. Administration

162. The central Government buildings are managed by the Department of Home Affairs, and are subject to incremental and irregular maintenance due to a lack of budget. Recent refurbishment of the central air-conditioning has resulted in some energy savings. Outside of the main Government area, buildings seem to be the responsibility of the user department – resulting in many buildings being either abandoned or operating in less than ideal conditions.

163. The construction of the new Police Headquarters building, funded by the Australian Federal Police, is due to be completed in early 2011 and will provide improved quarters for police operations. A police youth club facility is to be funded by AusAID and attached the police HQ.

164. The Government has also proposed the development of a National Indoor Sports Stadium and Outdoor Playing Field. This would support the NSDS goals of improving community health through the delivery of a coordinated fitness and sports program. In addition, it provides the potential to host regional weightlifting, boxing and volleyball tournaments which would add to National revenue and local spending. The proposal is still at the concept stage.

ii. Health

165. The Ministry of Health is responsible for the operations and maintenance at all health care facilities. The NSDS health strategy prioritizes the development of a new integrated hospital and public health facility by 2015. In the shorter term, it aims to improve facilities to an appropriate standard.

166. Nauru's health buildings consist of the old Nauru General Hospital (now the Naero Public Health Center and health administrative building) and the Republic of Nauru Hospital (formerly the Nauru Phosphate Corporation Hospital). The Republic of Nauru Hospital (RONH) is located at Denigomodu District. It provides accident and emergency, acute clinic and operation theatre, and other curative services, as well as the standard clinical support services (laboratory, blood bank, x-ray, pharmacy, physiotherapy). Both are subject to ongoing critical refurbishments funded by AusAID[27] as the buildings are inadequate for improved equipment and modern procedures and standards. There is a fire hazard and infection control risk due to inadequate budget for cleaning and maintenance.

167. Rather than maintain antiquated buildings, the MOH is committed to planning for the construction of a new hospital, with fewer beds, which would house the acute and the public health sectors co-located on one site. This would reduce rehabilitation costs, and save revenue from overseas referrals. There would be more efficient use of human and material resources, and the centralized location of critical equipment such as resuscitation machines.

[27] Approximately $300,000 per year

AusAID agreed to fund a hospital assessment and development plan in 2011, which would present development alternatives for consideration by Government. The eventual selected alternative is planned to be constructed in 2013-2015.

168. In the interim period, a program of critical refurbishments is required to enable the current buildings to maintain services. Government has indicated that this is a priority request in the Bilateral Aid program with Australia. The expected $1.2 million over 3-4 years will be incorporated in funding projections.

iii. Education

169. The NSDS aims to bring all school buildings to a recognized Pacific standard. The NSDS calls for a rationalization of schools to be undertaken in order to reduce the number of sites prior to further investment. It also highlights the needs of disabled students and adult learners to be accommodated.

170. Despite attempts to rationalize the number of schools, nothing has occurred. Instead, classes have been re-configured at each school so that each has three year-levels. School-age population projections[28] indicate that student numbers will remain flat over coming years. Reported classroom sizes across the island remain small to average compared to other regional countries. Participation rates in primary school are average for the Pacific at 74%, with less than 23% completing primary school (2008). There is very little difference between male and female rates. Literacy in people over 15 is reported at 99%.[29]

171. School maintenance and repair of ageing buildings is an ongoing issue. There are inadequate funds provided by the GoN and buildings are often old and run down. AusAID has provided interim refurbishment assistance over the past 3 years; however there are still at least 5 that require upgrading and critical repairs. Combined with an improved maintenance program, the school refurbishment program will allow the education sector to achieve and maintain a core standard for school infrastructure. The GoN has indicated that this program will be sourced through the bilateral aid program with Australia and that they will not be ranked within this plan. However, the expected $150,000 cost per annum will be incorporated in funding projections.

172. Recently, AusAID completely rebuilt the Nauru Central High School for $12 million. Although providing important facilities to educate Nauruan children, there has been little to no additional budget allocation to DOE, or consideration of an on-going maintenance program to sustain this structure in the immediate future.

173. Destruction of Aiwo Primary school in 2010 resulted in its temporary relocation to the State House site. The Department of Education commissioned a scoping study for rebuilding and this was conducted in early 2011. A number of options were presented to Cabinet. Cabinet's preferred option was the amalgamation of Yaren and Aiwo Primary schools and the Able Disable Centre onto one site (State House site). Such an option clearly meets the NSDS priority of rationalization of schools; The proposed project would also include a sub-component to ensure all school buildings in Nauru are accessible to both able and disabled students, through a program of classroom and playground retro-fitting and access ramps. Consideration is also being given to including an island-wide tuck shop development sub-component to address health needs of island children.

In 2006, the Government developed the concept of a Learning Village. The Learning Village is a concept that fits the social and economic profile of Small Island States. The Nauru

[28] Nauru Bureau of Statistics, Demographic and Health Survey, 2007
[29] Key Indicators for Asia and the Pacific, 2010. ADB

Learning Village integrates the facilities of the Nauru Secondary School, TVET Facility, University Campus, Public Library and Teacher Training Centre on the same site or Village. A scoping activity has been completed and draft sketches were completed. Provision of training facilities would benefit public and private sector and promote public/private sector partnerships and it will contribute to achieving expanded use of NSS facilities after hours and access to additional learning facilities at the learning village.

174. Table 9 outlines the current and proposed buildings projects in the administrative, health and education sectors.

Table 9 : Current & Proposed Administrative, Health and Education Building Projects

Ref	Project	Est. Cost ($m)	Status	Fund	Proposed Timing					
					11	12	13	14	15	16+
Administrative Buildings										
BA1	Police HQ	2.70	F	AFP	■					
BA2	Police Youth Club	0.20	C	AusAID	■					
BA3	National Indoor Stadium and Playing Fields	0.60	C	U		■				
Health Buildings										
BH2	Annual Refurbishment to Hospital	1.10	C	AusAID		■	■	■	■	
BH3	New Hospital		P	U			■	■	■	
Education Buildings										
BE1	Schools Annual Refurbishment Program	0.60	C	AusAID		■	■	■	■	
BE2	Aiwo School Rebuilding and Disability Access	14.1	P	U		■	■	■		
BE3	Learning Village Project	3.6	P	U		■	■	■		

F – Funded; C – Committed; P – Planned; U - Unfunded

J. Overview of Planned Investments

The NEISIP identified a list of 37 planned economic infrastructure investments, totalling around $75 million over the next 5-10 years; and an additional $50 million in years 10-15 (Table 10). Of this figure, there are projects worth $12 million that are currently funded and/or in progress. The remaining projects are proposed projects that generally do not have a confirmed funding source.

175 Over the next 3-5 years, there is expected to be a peak in infrastructure investment as a number of major projects are implemented. Government will make the investments mostly with assistance from grants from development partners. Planning is less well advanced for the period 2016 – 2020. At this stage around $40 million of planned investments have been identified and this is expected to increase as medium – longer term planning solidifies.

Table 10: Nauru Economic Infrastructure - Major Current & Proposed Projects

Ref	Project	Cross Sectoral	Estimated Cost ($m)	Status	Funding Source
WATER					
W1	EU Envelope B - Risk Reduction Project (C1-C6) & water tankers (1@10kl)	S1	0.76	F	EU
W2	Solar Power RO Unit	P5	3.00	F	PEC
W3	Supply and commissioning of 300kL RO Unit (AusAID	W2	0.60	C	AusAID
W4	Water Delivery - Additional Water tankers (3 x 4kl)	S2	0.50	P	U
W5	Repairs and Upgrade Tanks (B13, B4, B5)[2]	S1	0.40	I	U
W6	Runway rainwater harvesting (* contingent on Runway resurfacing A3)	A3, R3	8.00	I	U
W7	Additional large community rainwater storage tanks (15x100kL)	W2	0.80	I	U
W8	Rehabilitation & filling of bulk storage tanks (golf course) for emergencies	W2	0.40	I	U
POWER & WATER					
PW1	O&M spare parts store and workshop (shared with Utilities and Menen Hotel)	W4	3.00	P	U
POWER & ENERGY					
P1	Jet Fuel Supply		0.40	F	AusAID
P2	Bulk Saltwater Emergency Response	S4	1.00	P	U
SANITATION & WASTE MANAGEMENT					
S1	Mainstreaming IWRM	W2, W3	0.30	F	GEF
S2	New lined Landfill & Compactor Trucks (BOT??)	S5	1.40	I	U
S3	Pump Out "Alternative Disposal Options" Recycling Project	S3	0.50	P	U
S4	Location Saltwater flush (* contingent on P2)	P3	0.30	I	U
S5	Hospital Hazardous Waste Incinerator	BH2	0.30	C	?
TELECOMMUNCIATIONS & MEDIA					
T1	New Telecom Towers		0.15	C	AusAID
AIRPORTS					
A1	PAPI System		0.10	F	AusAID
A2	Runway Resurfacing & Fencing	W6, R3	3.80	P	U
A3	Navaids -DME		0.40	I	U
A4	Navaids -VOR		0.40	I	U
ROADS & ROAD TRANSPORT					
R1	Solar Street Lighting	W2	0.30	F	ROC
R2	Fleet Augmentation		0.15	F	Azerbaijan
R3	Road Rehabilitation (* contingent on Runway resurfacing (A3) & (R4)	W6, A3	1.00	P	
MARITIME					
M1	Omega 65 tonne Crane		0.50	P	AusAID
M2a	New Quay wall - Scenario 2 & Anibare Mooring		14.40	P	
M2b	All Season Berthing Facility - Scenario 4 (Stage 2 contingent on M2a)		32.00	P	Long term
M2c	All-vessel quay wall - - Scenario 3		14.00	P	long term
BUILDINGS - ADMINISTRATIVE					
BA1	Police HQ		2.70	F	AFP
BA2	Police Youth Club		0.20	C	AusAID
BA3	Indoor Stadium and sports field		0.60	C	U
BUILDINGS - HEALTH					
BH2	Annual Refurbishment to Hospital		1.10	C	AusAID
BH3	New Hospital		12.00	P	U
	Hospital refurbishment funds (2011 - 2015)		1.20	P	AusAID
BUILDINGS - EDUCATION					
BE1	Schools Annual Refurbishment Program		0.60	C	AusAID
BE2	Aiwo School Rebuilding and Disability Access		14.10	P	U
BE3	Learning Village Project		3.60	P	U
	School Refurbishing Funds (2011 - 2015)		0.60	P	AusAID

I	Identification	**C**	Commmitted
P	Planned	**F**	Funded

IV. PRIORITIZING INFRASTRUCTURE INVESTMENT

175. The full list of identified investment projects for the next five years includes more than $12 million in projects that are already underway or committed, and an additional $52 million of proposed projects for which funding is not confirmed. It is unlikely that it will be possible to fund all of these proposed projects within this timeframe from resources available to Government. Therefore priorities need to be set.

176. This part of the NEISIP brings together the results of the analysis of infrastructure needs and challenges, planned investments and supporting measures to identify a set of initiatives that Government sees as priority areas for development of the economic infrastructure sector over the next 5-10 years. It uses a tool called Multi-criteria (MCA) to assist in the setting of priorities.

A. The MCA Process

177. The multi criteria analysis prioritization process is a tool that can be used to rank projects across sectors. The objective of this tool is to enable quick prioritization of projects in the "absence" of a detailed national economic policy being in place. It is a rapid approach in lieu of a full social Cost Benefit Analysis (CBA). It is not a substitute for objective assessment, and it is not a project feasibility evaluation tool.

178. The MCA is intended to be used for the development of the NEISIP, but also as a tool that PAD can use on a regular basis to update the plan and coordinate its comments on the annual budget. Because of this, the MCA needs to be simple but not simplistic, with only the minimum but necessary criteria to achieve agreed results. In order for it to be sustained in the future it must also be easy to apply, able to be improved, transparent and repeatable. It needs to be a tool that is owned by the stakeholders.

179. The MCA process includes steps shown in Table 11:

Table 11: The MCA Process

i.	***Initial screening*** to separate those that are underway or committed, from those that are in the planning stage;
ii.	***Criteria selection*** - Develop, outline and discuss weighting for key criteria
iii.	***Scoring*** - Key Stakeholders individually score (1-4) each project using Q&A matrix.
iv.	***MCA Rating*** - Each project achieves a final Project Rating of High Medium or Low based on the banding of scores.
v.	***Sanity checking*** - the final list is subject to a group discussion of scores, bands and ranking as a sanity check.

i. Initial Screening

180. The prioritization focuses on screening the planned investments to identify those that align strongly with national priorities and deliver significant benefits to the Nauru people, the economy and the environment. The overall pool of projects (funded, committed, proposed, identified) is first split into two components:

- Those that are funded and underway or have been committed to by development partners.
- Those that remain – planned and identified.

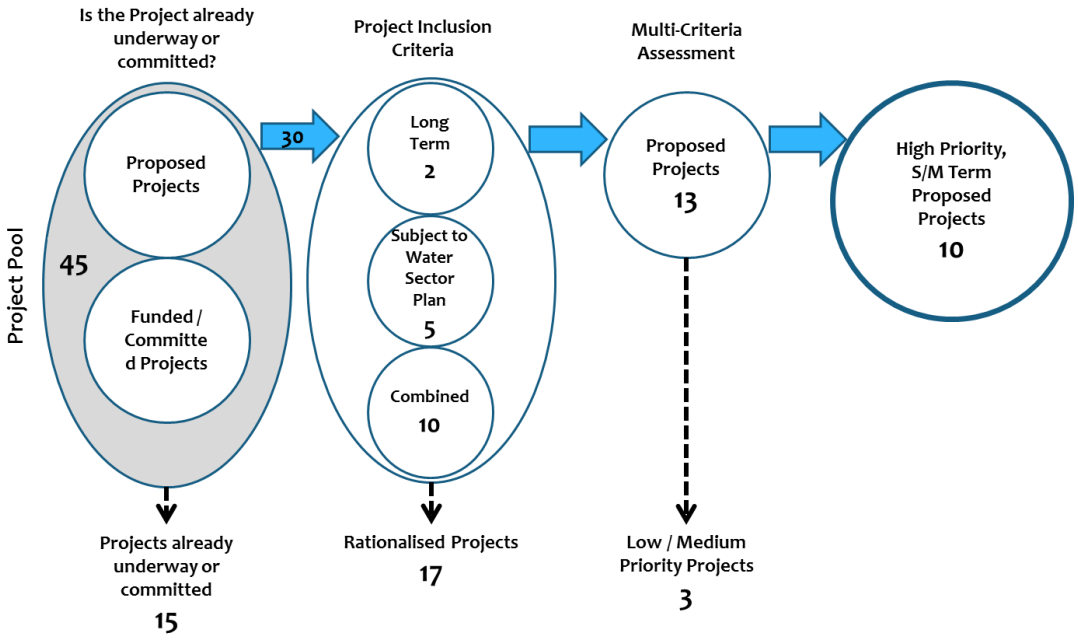
181. The immediate priority of Government is to complete investment projects already underway or committed. Therefore, those projects automatically become part of the NEISIP priorities. Of the 45 originally proposed projects, 15 are already underway or funded, leaving 30 projects to be further screened.

182. The planned and identified projects were then progressively screened and rationalized to identify projects that have the ability to proceed in the next five years. Additional screening criteria included:

- Deferral until after comprehensive master plan
- Long Term (10 + years)
- Combined with other projects

A further 17 projects were rationalized, leaving 13 projects to proceed to ranking. These are shown in Annex E. Figure 3 outlines the MCA screening process.

Figure 3: The MCA Screening Process



ii. Criteria Selection

183. The key criteria for the MCA include 7 thematic areas:

- *Policy* – Link with NSDS existing plans
- *Economic* – Contribution to Growth
- *Financial* – O&M costs, ability to pay
- *Social* – Basic services, level of service, living standards
- *Environmental* – protecting or improving environment
- *Readiness* – Preparation
- *Maintenance* – adequate

184. The criteria are assessed using a number of questions to inform an average ranking for those criteria. The detailed questions are outlined in Table 12.

185. Although the criteria can be subject to weighting to enable more emphasis to be placed on one versus another, the Government determined that each of the 7 criteria should be weighted evenly, given there was already an emphasis on financial, economic and readiness factors.

Table 12 : The MCA Tool

1.	**Policy - Will the project contribute towards meeting long term National Sustainable Development Plan goals?** • Addresses Long Term Goals • Addresses Short Term Goals
2.	**Economic - Will the project contribute to national economic development and growth?** • Does it add to Exports – Foreign Exchange • Potential to enhance private sector activity and jobs • Is this project critical to continuing an existing essential service? • Does the project contribute to other sectors?
3.	**Financial - Will the project contribute to national revenue?** • Is there potential for user charges to cover full cost of service? • Does the project cover O&M? • Have all other refurbishment and repair options been exhausted for this service?
4.	**Social - Will the project lead to improved living standards?** • Contributes to meeting minimum level of service standards • Does it enhance service delivery? • Does it lead to health improvements
5.	**Environmental - Will the project contribute to a better environment?** • Directly improves the physical environment • Has no negative environmental impacts
6.	**Readiness - What is the Project's readiness?** • How advanced in the planning stage? • How advanced is ID of a donor. • Are there land or social owner impacts
7.	**Maintenance will be adequate?** • Is there the current technical capability to maintain infrastructure? • Is there an appropriate organizational structure to maintain infrastructure? • Is there the financial capacity to maintain infrastructure?

iii. MCA Scoring Process

186. The scoring process was through the use of a modified Delphi Technique. This utilizes individual scoring, compiled into anonymous results. This is followed by group discussion of results where there are major outliers (e.g. One respondent scored one criteria outside 1 standard deviation). When fully discussed, the process is repeated until results are smoothed – representing consensus.

187. Each project was first presented to the group. Each member then scored the project by providing a number (1-4) against each question in the criteria. The score of 1 meant the project did not satisfy the question in any way. A score of 4 indicated that it fully or strongly satisfied the question. Scores of 2 and 3 indicated less confirmation, with no allowance for a middle score. To work consistently, each member needs to score each question for each project.

188. The final scores were entered into a spreadsheet and then averaged across all respondent for each question. The average scores for each question were then averaged for each of the seven thematic criteria resulting in 7 scores for each criteria under each of the 14 projects.

189. Within each criterion, the range between maximum and minimum scores across the projects were assessed and divided by three – allowing for a high, medium or low band. Each project's criteria were then identified in which band they fell. This allowed for project ranking to be smoothed. Projects were then ranked by the number of high, medium and low scores it received.

iv. Sanity Check

190. To complete the modified Delphi technique, the ranking process and results was reviewed by participants. The standard deviation across aggregated and averaged scores was presented to indicate where there were significant differences of opinion. Scores were discussed by the group as a whole, to ensure that everyone understood the questions and was happy with the resultant score. The final ranking was discussed as to whether it made sense within their own understanding of the needs of Nauru.

191. The final list of high priority projects and actions was ranked into high, medium and low categories.[30] Ten projects were ranked as high, and prioritized for development in the next 5-7 years. They included (in no specific order):

Investment Projects

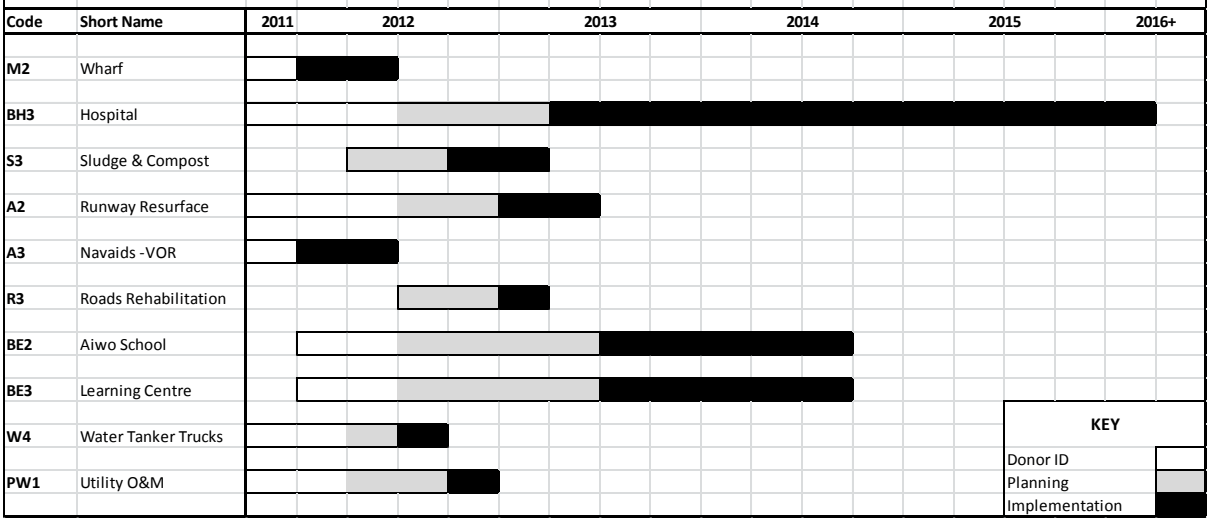
M2 New Quay wall - Scenario 2 & Anibare Mooring
BH3 New Hospital
S3 Sludge "Alternative Disposal Options" Project
A2 Runway Resurfacing & Fencing
A3 Navaids – Distance Measurement Equipment (DME)
R3 Road Rehabilitation (contingent on runway resurfacing)
W4 Water Delivery - Additional Water tankers (1 x 10m3 & 2 x 4m3)
BE2 Aiwo School rebuilding and disability access project
BE3 Learning Village Project
PW1 O&M spare parts store and workshop for NUA

B. Options Development

192. The final ranked projects were then subject to timing and funding implications. Some projects have significantly longer lead times (planning and design) than others. Some required significant funding commitments, while others could be spread over numerous years. Figure 4 shows the potential project timing for the highest ranked projects.

[30] Refer to Annex F for a full list of the project rankings.

Figure 4: Potential Project Timing



193. Requirements for funding options and investment strategies were then developed, and are outlined in Section V.

V. LIFE CYCLE COSTS

194. This section outlines the life cycle costs of infrastructure and the current situation in Nauru. It examines the current balance between maintenance needs and maintenance expenditure and contrasts that with the potential operational and maintenance implications of the NEISIP infrastructure investment program.

A. Whole of Life Costs

195. The costs associated with new infrastructure; do not end with the purchase or construction. It is one step in the life cycle of an asset that begins with the initial identification of needs through to the disposal of the asset at the end of its useful life. The stages of the asset life cycle are set out below. Each stage requires planning and coordination; and involves costs and time.

- **Concept and planning**: the costs and time involved in planning and investigations, development of the design concept, and associated studies such as environmental impact assessment.
- **Detailed design specification**: the costs and time required for preparing detailed designs and/or specifications and contract documentation.
- **Construction/supply**: includes an allowance for contingencies and cost escalation over the period of supply. For a major infrastructure project, the combined duration of planning, detailed design/specification, contracting and delivery can amount to several year to over a decade.
- **Contract supervision**: includes the technical, financial and legal costs to ensure that the work is carried out to the required standard and in compliance with contract requirements
- **Operation and maintenance**: operating costs over the life of an asset include labor, energy and consumables. Maintenance costs are required to keep it in good condition. This includes small scale routine activities to minimize wear and tear, and larger scale activities such as the routine replacement of moving parts to maintain operational status. The economic life of infrastructure can range from 5-10 years for plant and equipment to 100 years for major civil works
- **Disposal/decommissioning**: costs include demolition or dismantling and removing the asset from the site and disposing/recycling materials. Significant environmental costs may occur such as removal of toxic wastes.

196. When all these costs are combined, the total may be more than double the cost of the initial purchase/construction price. This fact is often overlooked in decision making on new assets, particularly in developing countries. The outcome is under-budgeting of on-going costs, with key maintenance not being undertaken, resulting in a much shorter life than expected. This is wasteful of scarce resources and imposes an unnecessary burden on future budgets where money could be better utilized elsewhere. Typical lifecycle costs are shown in Table 13.

Table 13: Indicative analysis of life cycle costs (%) per $100 of Investment

Stage	Rate (%) [a]	Construct/ Supply only	+ other up front	20 year Operating & maintenance
Concept & planning	2-5		$2-5	
Detailed Design Specification	5-10		$5-10	
Construction/ Supply		$100	$100	
Contingency/ escalation	10		$10	
Contract supervision	2-5		$2-5	
Operating [b]	0-20			$0-400
Maintenance – Routine [c]	0-5			$0-100
Maintenance – Periodic [d]	5-10			$10-20
Disposal & Decommissioning [e]	0-100			$0-100
TOTAL		$100	$119-130	$10-620

Notes:
a. Based on typical infrastructure costing parameters
b. Varies from zero (e.g. for buried pipes) to 20% pa for mobile plant and equipment
c. Varies from zero to 5% pa for routine maintenance of assets such as roads
d. Based on 20 year asset life with periodic maintenance every 7 years
e. Varies from zero to 100% (e.g. clean up of toxic chemical sites)

B. Current Operating and R&M expenditure

197. The concept of life cycle costs is new to Nauru. It will take some years and a concerted effort to change old habits, where the expectation is that donors will provide new infrastructure and when it breaks down they will replace it. In the present environment budgeting for life cycle costs beyond the initial capital purchase or construction is not given the necessary priority in Nauru. Short term considerations over-ride medium to long term thinking in most cases.

198. Information available to assess current allocations to operating and repairs and maintenance (R&M) expenditure is limited to that contained in the 2009-10 and 2010-11 Budgets. The Budget does not include the state owned enterprises (SOEs). None of which were able to provide expenditure data that could be analyzed for comparative purposes.

199. Seven sub-heads in the Budget can be related to total domestic expenditure within years and compared with the same sub-head between years for both initial Budget and Revised Budgets. Table 14 shows available expenditure data along with the percentage of each sub-head compared with total domestic expenditure[31].

[31] A further breakdown of expenditure by cost centre within departments was not possible as data was not available from Finance. It is expected that technical assistance to Finance over coming months will result in better financial information with a breakdown by department for the cost centers related to infrastructure management.

Table 14. Operations and R&M expenditure by Sub-head: 2008-09 to 2010-2011 ($)

	2008-09		2009-10				2010-11	
Sub Head	Rev. Budget	% of Dom Exp	Budget	% of Dom Exp	Rev. Budget	% of Dom Exp	Budget	% of Dom Exp
311 R&M office equipment	17,205	0.0%	22,690	0.0%	7,297	0.0%	16,578	0.1%
312 R&M office premises	13,600	0.0%	13,034	0.0%	13,157	0.0%	56,213	0.2%
353 R&M plant	186,793	0.3%	256,246	0.4%	2,755,658	8.7%	328,634	1.1%
354 R&M buildings	300,600	0.5%	166,600	0.3%	183,600	0.6%	205,865	0.7%
355 Fuel & oil	11,664,037	20.8%	6,633,050	11.5%	6,499,664	20.6%	4,780,353	16.4%
452 R&M Aerodrome	38,362	0.1%	38,362	0.1%	38,362	0.1%	50,000	0.2%
502 Plant & Equip	3,184,897	5.7%	2,108,300	3.7%	2,117,514	6.7%	2,095,439	7.2%
Sub-total	15,405,494	27.5%	9,238,282	16.5%	11,615,252	20.8%	7,533,082	13.5%
Domestic Exp Total	55,969,789	100.0%	57,749,902	100.0%	31,583,988	100.0%	29,070,699	100.0%

200. Confounding the analysis is a 45% decrease in total domestic expenditure between the Budget and Revised Budget 2009-10 brought about by the necessity to balance the Budget as a result of the global financial crisis impacting negatively on Nauru.

201. The most significant change in dollar terms between the Revised Budget 2008-09 and the Budget for 2009-10 was a cut back on imported fuel and oil expenditure by $5.2 million or 44% reducing its share of total domestic expenditure from 20.8% to 11.5%. On the other hand R&M on plant increased by $2.6 million, up from $187,000. This is an example of delayed maintenance catch up. Plant and equipment expenditure was also cut back by 34% (see Table 15 below). Other items including R&M on office equipment, office premises, plant, buildings and the airport are very small in comparison with none over 0.5% of domestic expenditure (see Table 14). At these levels there will be a considerable under-spend to ensure these assets are properly maintained.

Table 15. Revised Op and R&M expenditure by Sub-head: 2009-10 compared with 2008-09 ($)

	2008-09	2009-10	
Sub Head	Rev. Budget	Rev. Budget	% change RB'10 cf RB'09
311 R&M office equipment	17,205	7,297	-57.6%
312 R&M office premises	13,600	13,157	-3.3%
353 R&M plant	186,793	2,755,658	1375.2%
354 R&M buildings	300,600	183,600	-38.9%
355 Fuel & oil	11,664,037	6,499,664	-44.3%
452 R&M Aerodrome	38,362	38,362	0.0%
502 Plant & Equip	3,184,897	2,117,514	-33.5%
Domestic Exp Total	55,969,789	31,583,988	-43.6%

202. The leap in R&M on plant in the revised budget for 2009-10 from 0.4% to 8.7% of domestic expenditure highlights the impact unforeseen repairs and maintenance expenditure (see Table 16 below) can have on the Budget. More emphasis on a planned maintenance program would go a long way to avoiding such budget blow outs.

Table 16. Op and R&M expenditure by Sub-head: 2009-10 Revised compared with Budget ($)

Sub Head		Budget 2009-10	Rev. Budget 2009-10	% change RB'10 cf B'10
311	R&M office equipment	22,690	7,297	-67.8%
312	R&M office premises	13,034	13,157	0.9%
353	R&M plant	256,246	2,755,658	975.4%
354	R&M buildings	166,600	183,600	10.2%
355	Fuel & oil	6,633,050	6,499,664	-2.0%
452	R&M Aerodrome	38,362	38,362	0.0%
502	Plant & Equip	2,108,300	2,117,514	0.4%
	Domestic Exp Total	57,749,902	31,583,988	-45.3%

203. Comparing the Budget for 2010-11 with 2009-10 shows a 28% decrease in expenditure of fuel and oil (see Table 17 below). The reduction from $11.7 million budgeted in 2008-09 to $4.8 million budgeted in 2010-11 is a function of a change in the tariff structure with consumers reacting to price signals provided by the installation of pre-paid meters as well as the global downturn.

Table 17. Op and R&M exp by Sub-head: 2010-11 Budget compared with 2009-10 Budget ($)

Sub Head		2009-10 Budget	2010-11 Budget	% change B'11 cf B'10
311	R&M office equipment	22,690	16,578	-26.9%
312	R&M office premises	13,034	56,213	331.3%
353	R&M plant	256,246	328,634	28.2%
354	R&M buildings	166,600	205,865	23.6%
355	Fuel & oil	6,633,050	4,780,353	-27.9%
452	R&M Aerodrome	38,362	50,000	30.3%
502	Plant & Equip	2,108,300	2,095,439	-0.6%
	Domestic Exp Total	57,749,902	29,070,699	-49.7%

204. Such large variability in expenditure highlight a number of critical infrastructure issues. Firstly, the vulnerability of Nauru to external forces; secondly, the lack of resilience in the economy to accommodate them; and thirdly, the budgeting problems caused by the lack of a planned maintenance program.

205. Overall government expenditure on R&M is very low and falls far short of that necessary to ensure capital assets provide the services that could be expected over a standard lifetime. Lack of maintenance and preventative maintenance in particular, has resulted in substantially shortened life times of service in Nauru with much higher costs to keep assets working towards the end of their shortened lives. The perception that donors will replace capital assets when they no longer perform, is well entrenched.

206. In general, cost recovery has not been a feature of Nauruan government budgeting. The recent change in electricity tariffs is a step in the right direction, but there is still some way to go before full cost recovery is achieved. Other sectors have yet to address cost recovery in any tangible way.

207. At the beginning of this section, reference was made to short-term thinking. As well as the government, donors also need to take a longer term view. In Nauru where the Budget is severely constrained, life cycle costs should be a serious consideration in all capital purchases. If life cycle costs cannot be accommodated within the budget for a particular capital asset then consideration should be given to down grading the functionality of capital expenditure until these costs can be accommodated. If this is not done then lack of maintenance will inevitably be perpetuated in the future.

208. Potential implications for the NEISIP are a function of external and internal factors. External forces, including global economic cycles, will continue and impact negatively on Nauru at times. Improving the resilience of the economy to these shocks is very dependent on the performance of the mainstay of the economy, the phosphate industry, generating the funds to invest in activities that will broaden the base of the economy. Better management of assets will ensure that what scarce capital to which Nauru has access, gives the greatest economic and social return. Ensuring that new infrastructure is engineered to the needs of Nauru will be a good start. It should be functional and recognize that Nauru does not have a culture of maintenance. Changing that culture to one that recognizes the benefits of preventative maintenance and timely and regular maintenance will take some time and will take a concerted effort at all levels.

VI. FUNDING STRATEGY

209. The funding strategy outlines the projected demand for infrastructure related finance; the capacity of Government and SOE's to address total costs; and the interventions that Government can make to improve the infrastructure financing environment.

A. Demand for Infrastructure Finance

210. The overall demand for financing new projects is divided not only between financing new projects but also maintaining and operating these new projects.

211. Table 18 shows the total projected demand for infrastructure financing over the next five years, covering projects that are underway or committed, and high priority investments. Total demand for finance over the next five years amounts to $83.4 million, of which 7.9% is for maintenance, 3.9% is for operating expenditure and 88.1% is for new capital investment.

Table 18: Projected expenditure by activity ($m)

	Total	2011	2012	2013	2014	2015
Capital*	73.11	11.81	28.60	9.45	16.35	6.90
Maintenance	6.89	0	1.27	1.83	1.83	1.97
Operating	3.40	0	1.20	1.69	1.69	-1.19
Total	83.40	11.81	31.07	12.97	19.87	7.68

Note * Capital includes concept planning and detailed design plus supervision and contingency escalation

i. Maintenance

212. Maintenance and the broader issues of asset management and sustainability are critically important issues for the Government and are a key focus of the NEISIP. There is a history of under-performance in this area (shared with other Pacific Island Countries) which in Nauru's case appears to arise for the following reasons:

- Intergenerational cultural factors that stem from the natural basis of island infrastructure (e.g. houses built of local materials had a finite life unless destroyed by weather and when that point came a new house was built).
- Experience that if a donor-provided asset became unusable, eventually the donor would replace it.
- Budget policies that do not allow for all operating and maintenance expenses from revenues based on fully costed tariffs
- Insufficient cash in the budget after salaries and other fixed costs (in the short term) are met and often leaving urgent preventative maintenance delayed for another day or year or decade.
- A culture of "fix it when it is broken" rather than applying preventative maintenance practices.
- Budgets that do not allow for fully-funded maintenance from revenues.
- Service prices that do not adequately provide for maintenance.

- Investment decisions being made on the basis of the supply price only and not whole of life costs, leading to the purchase of cheaper, poor quality assets with a shorter economic life.

213. In order to have an efficient and effective infrastructure program, changes are needed in a way that addresses the above factors. Ideally, this means that at least the full cost of operating and maintaining economic infrastructure should be funded from operating revenues and recovered through user charges. This will involve strengthening the financial performance of SOEs and Ministries. It could also involve setting aside money in a reserve account for known periodic major maintenance events. In the short term the priority is to cover routine operating and maintenance costs. This should be followed by the replacement of smaller capital items. In the medium to long term the Government needs to take increasing responsibility for infrastructure. This will extend full cost recovery to the replacement of smaller infrastructure leading to major items as capacity grows. The Government has already started on this process by implementing market related pricing policies for electricity, bus fares, telecommunications and Our Airline tickets. By charging realistic prices consumers are better able to manage their demand for government services and at the same time it provides funding for O&M.

214. As part of this process of taking full responsibility for infrastructure the following seven point plan is proposed as a possible basis to start improved maintenance performance and be adopted by all those in control of economic assets in Nauru:

1. Each asset owner should conduct (with expert assistance if necessary) a review of their operations, investment plans and tariffs to ensure that adequate service prices are planned;
2. Submission and review of these plans to an independent regulator to make a determination of appropriate tariffs;
3. Establishment of a maintenance reserve account (with appropriate controls on how the money can be used) for periodic major maintenance;
4. Provision of advice on planning and implementing improvements in operational efficiency;
5. Application of whole of life investment planning principles;
6. Development of asset management plans that provide for preventative maintenance, including training; and,
7. Conversion of accounting standards to International Financial Reporting Standards (IFRS) to ensure maintenance spending is recorded properly.

215. Implementation of these measures is expected to be largely funded from existing resources in the short term. Successful implementation will require leadership from the Government and technical assistance grants from development partners, at least in the short to medium term.

ii. Capital expenditure

216. Nauru's capital expenditure requirements are set out in Section V. This expenditure is divided between projects that are underway or committed and NEISIP priority projects. Table 19 shows the projected capital expenditure by project category over the next five years.

Table 19: Projected capital expenditure* by priority ($m)

	Total	2011	2012	2013	2014	2015
Committed and/Funded	12.14	10.79	0.45	0.45	0.45	0
High priority	60.97	1.02	28.15	9.00	15.90	6.90
Total	73.11	11.81	28.60	9.45	16.35	6.90

Note * Capital includes concept planning and detailed design plus supervision and contingency escalation

217. Funding for the high and medium priority projects is uncertain as they are either at the planning or identification stages.

iii. Life cycle costs

218. The capital cost of the NEISIP over the first five years amounts to $63.06 million and when concept planning and detailed design plus supervision and contingency escalation are added the sum increases to $73.11 million (as shown in Table 18). Maintenance and operating costs in the first five years are small in comparison at $6.9 million and $3.4 million respectively. However when maintenance and operating costs are taken over the 20 year life of the projects the total life cycle costs of the NEISIP amount to $198.97 million with maintenance amounting to $60.88 million and operating expenditure $64.98 million. This highlights the hidden cost of infrastructure, which over the lifetime of the projects in the NEISIP amounts to almost four times the initial capital cost. Details of the breakdown of these life time costs project by project are set out in Table 20 with a further breakdown separating out Capital, Maintenance and Operating costs in Appendix E.

219. Just adding the dollar amounts over a 20 year period to give a total is misleading from a capital budgeting perspective, because a dollar today is worth more than a dollar in 20 years' time. This is because the dollar today can be used for consumption or investment while the dollar in the future is less certain to be available and cannot be used until a number of years have passed. The way that this time value of money is accounted for is to discount future cash flow streams. The choice of discount rate is controversial. From the perspective of an investor the appropriate rate is the expected return on investment given by the weighted average cost of capital. Typically this would give a real discount rate of 8% or higher. Another perspective is to adopt a social time preference rate, which is usually taken to be the long term sustainable growth rate of the economy. Typically this would give a rate of around 2%. Adopting a high discount rate implies a high regard for dollars in the near term while adopting a low rate implies a high regard for the longer term future.

220. In Nauru's present situation, where capital is severely constrained and there are many competing users for scarce capital it may be appropriate to use a high discount rate as this puts emphasis on the near term. On the other hand investment is also required for a long term sustainable future implying a low discount rate. In order to highlight the real cost over a 20 year life for the NEISIP cash flows are discounted at 8% and 2%. This shows the effect of taking a short term view in contrast to a long term view. The undiscounted total cost of the NEISIP over 20 years is $194.91 million. At a discount rate of 8% the present value (PV) is $104.09 million.

Table 20	Nauru Infrastructure Priority Scheduling																			
	Ref	Project	Estimated Capital Cost ($m)	Estimated life cycle costs ($m)	Status	Funding Source	2011 - 2038													
TOTAL COST							**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**31**	**32**	**33**	**34**	**35**
Committed and Funded																				
	W2	Solar Power RO Unit	3.00	24.36	F	PEC	3.36	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05				
	W3	Supply and commissioning of 300kL RO Unit	0.60	4.87	C	AusAID	0.67	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21				
	W1	EU Envelope B - Risk Reduction Project (C1-C6) & water tankers (1@10kl)	0.76	2.36	F	EU	0.84	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08				
	P1	Jet Fuel Supply	0.40	1.64	F	AusAID	0.44	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06				
	S1	Mainstreaming IWRM	0.30	0.63	F	GEF	0.33	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02				
	T1	New Telecom Towers	0.15	0.53	C	AusAID	0.17	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02				
	A1	PAPI System	0.10	0.33	F	AusAID	0.11	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01				
	R1	Solar Street Lighting	0.30	0.63	F	ROC	0.33	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02				
	R2	Fleet Augmentation	0.15	1.07	F	Azerbaijan	0.17	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05				
	BA1	Police HQ	2.70	8.37	F	AFP	2.97	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27				
	M1	Omega 65 tonne Crane	0.50	2.56	P	AusAID	0.56	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10				
	S5	Hospital Hazardous Waste Incinerator	0.30	1.24	I	U	0.00	0.05	0.05	0.05	0.38	0.05	0.05	0.05	0.05	0.05				
	BA2	Police Youth Club	0.20	0.82	C	AusAID	0.22	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03				
	BH2	Annual Refurbishment to Hospital	1.20	1.32	C	AusAID	0.42	0.30	0.30	0.30										
	BE1	Schools Annual Refurbishment Program	0.60	0.66	C	AusAID	0.21	0.15	0.15	0.15										
	Sub-total		**11.26**	**53.11**			**10.79**	**2.50**	**2.50**	**2.50**	**2.05**	**2.05**	**2.05**	**2.05**	**2.05**	**2.02**	**0.00**	**0.00**	**0.00**	**0.00**
		PV		**29.69**																
Priority	**High**																			
	M2a	New Quay wall - Scenario 2 & Anibare Mooring	14.40	30.82	P				9.00	9.00	-2.74	-2.74	-2.74	-2.74	1.58	1.58	1.58	1.58		
	BH3	New Hospital	12.00	55.80	P	U				6.90	6.90	0.00	0.00	0.00	0.00	3.00	3.00	3.00		
	S3	Pump Out "Alternative Disposal Options" Recycling Project	0.50	4.08	P	U		0.58	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18			
	A2	Runway Resurfacing & Fencing	3.80	12.05	P	U		4.45	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38			
	A3	Navaids -VOR	0.40	1.34	P	U	0.46	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.00			
	R3	Roads Rehabilitation	1.00	3.14	P			1.24	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00			
	BE2	Aiwo School Rebuilding	12.60	16.02	P			14.52	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08			
	BE3	Learning Centre	3.60	9.61	P			4.21	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27			
	W4	Water Delivery - Additional Water tankers (3 x 4kl)	0.50	3.50	P	U	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.00	0.00			
	PW1	O&M spare parts store and workshop (shared with Utilities and Menen H	3.00	8.36	P	U		3.36	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25			
	Sub-total		**51.80**	**145.86**			**1.02**	**28.57**	**10.47**	**17.37**	**5.63**	**-1.27**	**-1.27**	**-1.27**	**3.05**	**5.88**	**5.73**	**4.86**	**0.25**	**0.25**
		PV		**74.40**																
	TOTAL	**Ongoing and Priority Projects**	**63.06**	**198.97**			**11.81**	**31.07**	**12.97**	**19.87**	**7.68**	**0.78**	**0.78**	**0.78**	**5.10**	**7.90**	**5.73**	**4.86**	**0.25**	**0.25**
		TOTAL PV		**104.09**																
		Discount rate	**8.0%**																	

Note: PV is the present value of the cash flow over time discounted at 8%

F – Funded; C – Committed; P – Planned; I – Identified; U - Unfunded

221. What this means for the NEISIP is that a long term sustainable future requires a focus on maintaining infrastructure assets, as these are the costs that occur in the future and impose a real burden on society. The estimated maintenance costs in the NEISIP are based on a planned approach. If actual maintenance is neglected, then costs will be higher due to the shortened life of the assets and the costs imposed on the economy of poor performance or non-performance.

222. The next section looks at the overall capacity for funding the NEISIP investments from local or other sources.

B. Current Capacity of Capital Markets

i. National Situation

223. The Nauruan Government prepared its budget for 2010-2011 with the world slowly climbing out of the deepest global recession since the Great Depression. Nauru is not immune to the ongoing negative effects, a key one of which was the abrupt reduction in demand for phosphate.

224. As the Minister of Finance said in his Budget speech, the Nauruan economy is in a fragile state. The Government is not in a position to fund a stimulus package or to run a deficit to maintain high levels of expenditure. Rather, the Government's Budget must be fully funded through cash reserves. Nauru's limited and volatile revenues from non-donor sources, like fisheries license revenue and phosphate related payments, continue to be difficult to forecast; and, both are subject to forces that are beyond the control of the Government. A major priority of the Government is to broaden Nauru's economic base to insulate against these forces.

225. The 2010-11 Budget adopts an overall balanced stance, continuing the prudent fiscal management that has been maintained since 2004. Expenditure continues to be focused on core areas of basic and essential public services, consistent with NSDA goals. The 2009-10 approved Budget allowed for domestic expenditure of $31.6 million along with donor funded expenses of $29.2 million, leading to an overall net financial position of $460,000 after drawing on cash reserves of $3.4 million. The actual outturn was a net cash position of $7.7 million after domestic expenditure of $20.2 million and donor funded expenditure of $11.2 million. Actual domestic revenue in 2009-10 was down by 31% to $18.7 million and donor revenue down 45% to $17.0 million compared to Budget (see Table 21).

Table 21. Budget Summary 2009-10

	2009-10 Approved	2009-10 Actual
Domestic Revenue	27.11	18.66
Donor Revenue	30.74	16.99
Total Revenue	57.85	35.65
Domestic Expenditure	31.58	20.16
Donor Expenditure	29.19	11.16
Total Expenditure	60.77	31.32
Net Budget Position	-2.92	4.33
Cash Reserves	3.39	3. 39
Net Financial Position	0.46	7.71

Source: 2010-11 Budget

226. The 2010-11 Budget is estimated to generate total revenue of $28.9 million (including general budget support but excluding donor revenue) and total expenditure of $29.0 million

(excluding donor funded projects), a decrease of 9% on the previous year. This results in a small projected deficit of $144,000 that will be funded from cash reserves of $900,000 brought forward from 2009-10, leaving an overall net financial position of $756,000. Donor funded budget support is expected to be $32.8 million and donor expenditure $31.0 million. Without this generous level of support, Nauru's already low standard of living (GDP per capita in 2009 was estimated by ADB at US$2,240) would be more than halved.

227. In addition, Nauru faces an enormous burden of debt. Previous Nauruan administrations spent recklessly and borrowed excessively in areas that provided no long-term benefits to the Nauruan people. Beginning in November 2006, the Government has worked with AusAID funded consultants to develop a debt management strategy and is now addressing this burden. In 2010, the estimated external debt owed is $261 million. There is a further $265 million of internal debts owed mainly to depositors in the insolvent Bank of Nauru. Also, debts of about $368 million are owed between and among SOEs and the Government of Nauru. This situation precludes Nauru from further borrowing for the foreseeable future.

228. This means that Nauru will remain dependent on external relationships with its donor partners. Ideally, appropriate support from these parties will be in the form of grants and technical assistance, which would be best directed towards financing complementary activities and those projects that are financially viable. In the long term, Government reforms, debt repayments and a revitalized mining and quarrying sector along with a broadening of the basis of the economy should result in opportunities for local funding.

ii. Debt Management

229. The debt situation of the country is dire, with Nauru being described as a small island state in severe debt distress.[32] This is due to the accumulation of massive amounts of debt relative to its size, all being in arrears or default. By the usual ratios (Net Present Value of debt to exports, debt service to GDP and debt service to government revenue excluding grants) Nauru's debt is overwhelming, being more than 2,500% on the debt to GDP ratio. The estimated sustainable debt burden is equivalent to 185% of GDP, but this assumes a net Budget surplus of $2.2 million. This does not seem feasible without reductions in government services from their already low levels.

230. In general, ability to service debt is based on projected free cash flows from operations and the value of assets that can be liquidated. In Nauru's case there are no assets that can be liquidated to satisfy creditors. Action over the past two decades by creditors has stripped away any marketable assets. Remaining significant assets including Our Airline's aircraft, Bank of Nauru's advances to individuals, SOE plant and machinery, and NRC's funds and future NACOS payments due from the legal action against Australia can be assumed to be safeguarded against claims. Other less-tangible assets such as Government investments in PHILPHOS, long-term fishing and mining rights, and land are also in this category.

231. Free cash flows from operations do not hold promise either, except possibly in the long term. Currently, and for the foreseeable future, the Government will rely heavily on its donor partners to balance the Budget and maintain core services. Also, the future dividends of SOEs are needed to fund core services.

232. As Nauru does not qualify for any of the debt relief provisions of the major multilateral finance organizations (IDA, IMF, Paris Club), the debt management strategy will have to rely

[32] Storkey, I. and T. Robinson (2007). Comprehensive debt management strategy for the Government of Nauru, prepared under AusAID contract No. 39878, April 2007.

on negotiations with individual creditors or with groups of creditors where possible. The basis of a negotiating strategy may include creditors making deep concessions on write-downs, extending repayment schedules, refinancing, debt swaps and possibly netting off of Bank of Nauru liabilities after deep discounting. Experience in the Solomon Islands shows that an important component of a strategy is robust and comprehensive communications with all creditors and regular information on debt reduction progress, backed by good record keeping.

233. The Government is severely constrained as to its ability to balance debt obligations against ability to pay, while providing services to its people. It faces a formidable ongoing balancing act. In this context the NEISIP will rely heavily on the support of Nauru's donor partners.

iii. State Owned Enterprises

234. Significant progress in service delivery has been made by the SOEs in recent years, but all rely on significant donor support to make further progress. The capacity and capability of key staff is inadequate and struggles without technical assistance. This situation is expected to continue for the foreseeable future. Set out below is an overview of the financial status of each of the SOEs and where possible an indication of their ability to self-finance maintenance of assets and growth over the next five years.

235. The NRC estimates of revenue and expenditure indicate that the SOE should be profitable over the next five year period.[33] This is despite a poor performance in 2009-10 due to low productivity, lack of demand for phosphate rock and much lower than projected sales of aggregates and boulder rock resulting in an operating loss after depreciation of around $2 million. Sales of primary phosphate rock in 2010-11 are projected to be around 320,000 tonnes (wet basis) up from 280,000 tonnes in 2009-10 and tapering off to 60,000 tonnes in 2013-14 and zero thereafter. Secondary phosphate sales are expected to rise from 120,000 tonnes in 2009-10 to 600,000 tonnes by 2014-15. Aggregate and rock sales are expected to rise from 20,000 tonnes in 2009-10 to a little over 100,000 tonnes by 2013-14, of which around 50,000 tonnes is expected to be from exports. Earnings after provision for depreciation are projected to rise from about $1 million in 2010-11 to $2.8 million in 2014-15. Net cash flow (operating revenues less operating costs less capital expenditures) is projected to rise from $1.2 million in 2010-11 to $4.1 million in 2014-15.

236. NRC estimate that after allowing for a dividend to the Government, cash reserves (including the NACOS payments) are expected to be more than sufficient to finance operating costs and replacement expenditure. Capital expenditure in 2010-11 is expected to be around $1.6 million then fall to around $0.9 million for the remainder of the five year period. Purchase costs of a bulldozer, rollers, tractors and a service truck boost 2010-11 expenditure by $0.7 million. The revenue projections are based on significant improvements in productivity and demand for phosphate and aggregate.

[33] NRC estimates of revenue and expenditure for FY 2010-11

Table 22. NRC Production and Earnings estimates

Financial year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Sales Primary P (wet t)	280,000	320,000	233,000	147,000	60,000	0
Sales Secondary P (wet t)	120,000	216,000	312,000	408,000	504,000	600,000
Sales Aggregate/Rock (t)	20,000	40,000	60,000	80,000	100,000	100,000
Earnings Depreciation ($m)	-2.0	1.0	na	na	na	2.8
Net cash flow ($m)	na	1.2	na	na	na	4.1
Capex ($m)	na	1.6	0.9	0.9	0.9	0.9

Source: NRC and project interpellations
na – not available

237. RONPHOS, which relies on NRC to deliver rock phosphate to its screening, grading and drying facilities before export, teeters on the edge of collapse. Its buildings, plant and machinery are run down and well past that for an efficient and effective operation. It is kept running by stop gap measures and the skill and experience of its engineers making do with minimum resources. It will probably be able to continue operating for a further five or so years before a complete rebuild is required.

238. The Nauru Utilities Authority (NUA) reported a nominal surplus of $0.2 million in 2009-10 based on income of $1.9 million and expenditure of $1.7 million[34]. Subsidies amounted to $2.3 million. Outside this, fuel to run generators (which is donor funded) amounted to $7.8 million.. Budgeted R&M amounted to $1.2 million and actual R&M $0.2 million. Budgeted income for 2010-11 amounts to $3.1 million, slightly more than budgeted expenditure. Subsidies are expected to double, increasing to $4.6 million (see Table 23). The replacement cost of the 10MW generating capacity is estimated at $6 million and is required every ten years. This equates to around $0.5 million per annum as a contribution to a capital replacement fund, which is currently not budgeted. The current domestic tariff of 10 cents/unit for up to 300 units/household/month, is 38% of full cost recovery; and for more than 300 units (at 20 cents/unit) it is 76% of full cost recovery. Average household consumption is around 400 units / month. Industrial users are not subsidized, but commercial users pay the same as the higher domestic rate. As the NUA is currently running at about 20% of full cost recovery there is a long way to go before basic utilities of electricity and water are self-sustaining from tariffs[35].

[34] NUA Proposed Budget 2010-11

[35] The NUA budget for water is constructed from estimates of output and there is an urgent need for real performance data, especially metering of all production units, to determine efficiency levels, leakage and non-payment for service.

Table 23. NUA Budget 2009-10 and 2010-11 (A$m)

	2009-10 Estimated	2010-11 Budget
Income		
Electricity sales		2.816
Water sales		0.700
Tank Farm income		0.204
Other		0.017
Total income	**1.900**	**3.107**
Expenditure		
General & Admin		0.400
Employment		1.415
Occupancy		0.171
R&M	0.200	1.024
Total Expenditure	**1.700**	**3.008**
Nominal Surplus	**0.200**	**0.099**
Subsidies		
Electricity		2.699
Water		0.947
Tank Farm		0.703
Other		0.300
Total Subsidies	**2.300**	**4.649**

Source: NAU Proposed Budget FY 2010-11

239. Nauru Airline Corporation, trading as Our Airline, is recovering from a slump in revenues in 2007 and expects to reach breakeven on an EBIT basis in 2010-11.[36] This is based on receiving a capital injection to secure additional profitable revenue streams from charter and scheduled operations. Critical to the airline's operation are upgrades to supporting infrastructure which are the responsibility of the Directorate of Civil Aviation including the recommissioning of Aviation fuel storage, and immediate stop-gap repairs to the runway followed by a full resurfacing within 2-3 years. In addition, landing safety aids are required to ensure a safe operating environment.

240. Eigigu Holdings, comprising Eigigu Enterprises (a construction, civil engineering, project tendering, furniture making and warehousing operation), Eigigu Imports, Eigigu Civic Centre and Menen Hotel has a long history of poor profitability. Estimated revenue in 2010-11 amounts to $2.4 million, with expenditure of $2.7 million leaving a net loss of around $300,000.[37] All the operations are staggering along with insufficient revenues to cover the full cost of services plus a profit on capital invested. Assets are in a run-down state, with a backlog of serious deferred maintenance issues.

241. The arrival of Digicel in Nauru has transformed telecommunications on the island. There is now an excellent cellular phone and wireless internet service, replacing the slow and erratic land line and cable system. Digicel took over the telecommunication assets of the Government in exchange for a 20% share of the company. Further developments in the service will require additional contributions from the Government to retain its share of the company. As the company is a private sector monopoly provider a careful watch will be needed to ensure the operation remains competitive with other regional telecommunication systems in terms of price and service delivery.

[36] Nauru Airline Corporation 2010-11 Budget submission
[37] Eigigu Holdings 2010-11 Budget

242. In summary, the SOEs, apart from Digicel which is largely offshore owned and operated, are all struggling to be viable and sustainable. Service delivery has significantly improved over the last few years due to the reforms of the Government, the efforts of staff and inputs from donors. Financially, it is difficult to assess sustainability as the NEISIP team was unable to view balance sheet information. Good information on the financial position of the SOEs is a prerequisite to the establishment of sound operating and maintenance policies.

C. Overall Funding Strategy

243. It is clear that Nauru does not have the capacity to finance infrastructure projects from its own resources and it will have to rely on donors and off-shore investors. The latter group includes businesses associated with the phosphate industry. In addition, there is a place for investors that can deduct payment for services at source or on pre-paid basis as has been demonstrated by Digicel in the telecommunications sector. In summary:

- The Government Budget is already heavily supported by donors with internal sources of funding severely constrained
- Government debt is at extremely high levels leaving no margin for additional borrowing for the foreseeable future
- The SOEs are a long way from being commercial propositions for funding
- The local business environment lacks fundamental banking, insurance and other critical services.

244. Given these constraints, Nauru is seeking to adopt reforms that will improve the performance of existing infrastructure assets as well as adopting measures that will see future infrastructure expenditure better utilized. The aim is to progressively take responsibility for the operation and maintenance of infrastructure. The benefits of reforms can occur quite quickly as seen by the immediate and major reduction in electricity demand following the introduction of pre-paid metering of domestic electricity along with a progressive tariff structure. In this case a basic block of power was provided at heavily subsidized rates with consumption in excess of this charged at a much higher rate. Such reforms not only provide price signals to consumers about purchasing decisions, but also provide revenue for operating, maintaining and improving services. Nauru has just begun the move to full cost recovery and still has a long way to go. Nevertheless, the benefits of these initial reforms have been impressive and highlight the need to continue the process of reform as the economy grows.

245. In sectors where government already charges for services including electricity, bus fares and Our Airline tickets, there will be a progressive move to full cost recovery. Water is a key sector where reforms are urgently needed. Currently there is no metering of water produced by RO units or water delivered to consumers by tanker, which makes it impossible to gauge efficiency levels and determine what full cost recovery would be. There is a huge gap between the expected level of water production and sales revenue. Considerable quantities of water appear to be lost through leakage, but lax implementation of charging for water and non-payment are also important factors. Proper monitoring procedures are the first step towards establishing the real cost of water production and distribution.

246. Service provision for these important social services will be structured in such a way that households will receive a basic level of service at reduced rates and those who use additional quantities will meet the full cost on an increasing scale. Not only will this ensure basic needs are met, but assets will be maintained and demand moderated. The experience in the electricity sector shows that this strategy can have immediate benefits in reducing demand by sending signals on the real cost of service provision thus easing the pressure on stretched resources. Where it is difficult to directly charge for service provision in areas such

as roads and buildings, alternative charging mechanisms need to be sought. For example, a fuel tax collected at the pump could be considered as a way of raising revenue for the upkeep of roads.

247. Nauru will need the support of donors to follow through on this strategy. It will require a close working relationship between government, public enterprises, private sector providers, donors and investors. There are a number of areas where improved efficiencies can be made through the contracting out of services to the private sector, such as road maintenance, airport and port management and the collection and disposal of solid waste. It is important to ensure that there is an open competitive bidding process with regular contract reviews so that an efficient and effective service is provided on an ongoing basis. The government should consider a review to determine where the greatest gains can be made from the involvement of the private sector and progressively move in this direction. There will be benefits not only in a more efficient and ultimately more cost effective service delivery, but also it will help expand the role of the private sector providing jobs and growing the economy.

248. In the medium to long term what can be done will depend on the success of the phosphate industry. The more successful this is the sooner Nauru can contemplate taking a greater role in funding infrastructure. While exports of phosphate will continue to occur using the cantilever/mooring system there is the possibility in the medium to long run that the mooring system will be replaced by ships docking alongside a sea wall and being loaded from there. In addition, the export of aggregate and dolomite rock could be undertaken directly from trucks unloading on to ships docked at the sea wall. This raises the possibility of NRC being a co-financier of port construction and operation. An alternative that is likely to be preferable to NRC (as port ownership is not core business) is for each tonne exported to be levied based on a capital charge for construction and provision for ongoing operation and maintenance costs. With such a system in place this would encourage donors to contribute to components of port construction as referred to previously.

VII. SECTOR PRIORITY PROGRAMS

249. This section combines the prioritization, timing and investment analysis, and outlines the key program requirements and necessary supporting activities for each sector over the coming 5 years.

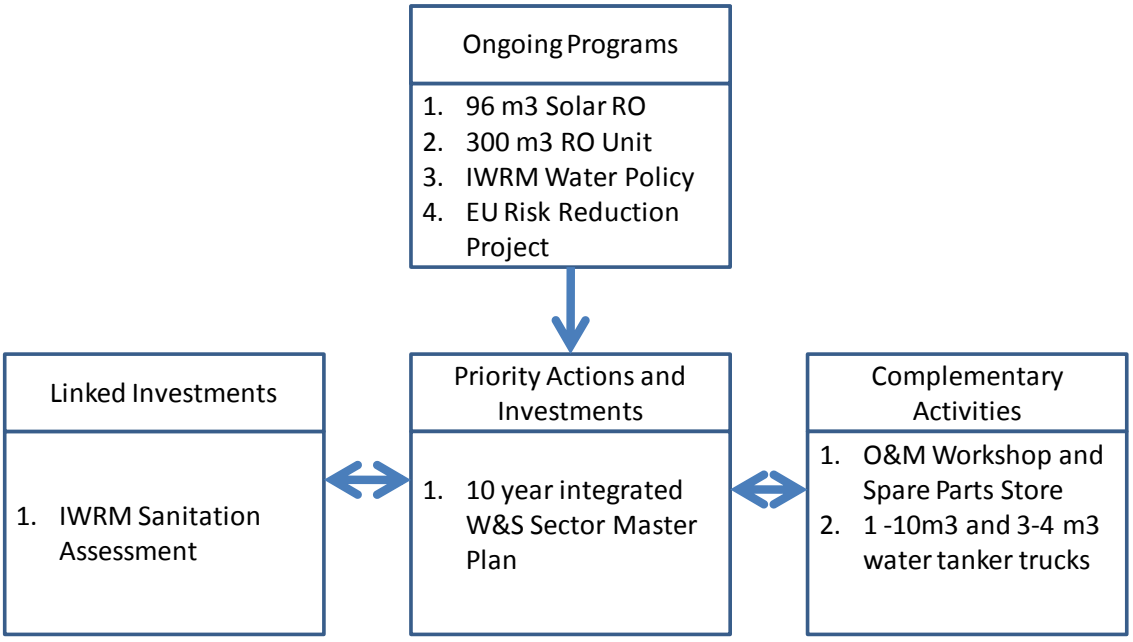
A. Water

250. A Water & Sanitation Sector Master plan is essential for the comprehensive assessment of the sector, and the detailed analysis of investment alternatives. It should begin with filling in the baseline information gaps (such as volumes of water produced, stored and delivered; household usage benchmarks, water quality etc) so that policy can be based on realistic figures. A range of investment alternatives (such as rainwater tanks; reticulated supply, gravity-fed supply lines) should be analyzed using economic, financial and community criteria and integrated into an overall master plan for implementation. Financial sustainability, cost recovery, O&M and management capacity should be carefully considered in the plan. Government should approve each stage of the planning process and ensure that cost recovery and tariff structures are adequate for ongoing maintenance and sustainable future investment.

251. Figure 5 outlines the proposed water investment program. As outlined above the key program activity for the water sector is to prepare a master plan for the sector. Furthermore investment is needed in providing NUA with an Operation and Maintenance Workshop and a secure store for adequate spare parts, and a revolving fund for procurement of non-stocked items. It is critical that this project be coordinated with improved staffing capacity and funding for maintenance. A review of tariffs and funding will be part of the water & sanitation sector master plan.

252. Given the enhanced RO water production and rehabilitated storage capacity projects currently underway, water delivery becomes the critical path. The proposal to augment delivery capacity with new trucks does not impact proposals that may eventuate from the master plan, and provide a means for addressing critical household demand for water.

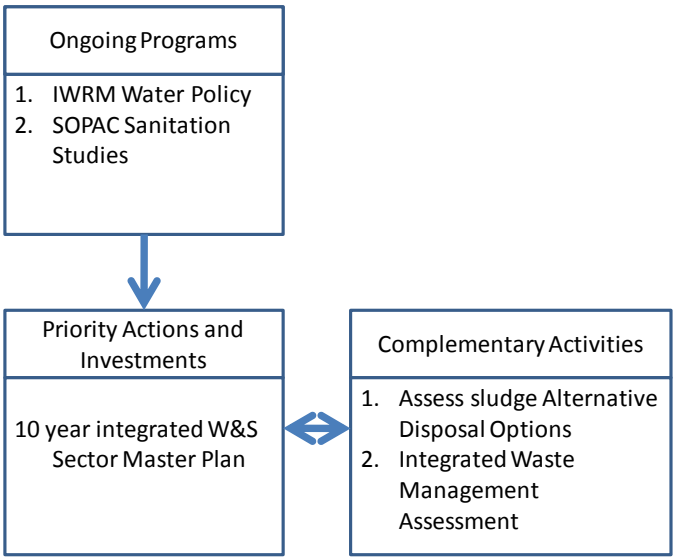
Figure 5: Water Investment Program



B. Sanitation & Waste Management

253. Figure 6 outlines the proposed sanitation and waste management investment program. The program rests on a range of proposed and on-going studies and planning activities. The IWRM policy project will complement the development of the Integrated Water and Sanitation Master Plan, ensuring that investments, operations and practices are within a coordinated water resource management framework. Financial sustainability, cost recovery, O&M and management capacity will be carefully considered in the plan.

Figure 6: Sanitation and Waste Investment Program



254. Following the conclusion of the policy and planning development, the logical next step is the development of alternative solutions for sludge disposal. This has environmental, health and business benefits and will be used by CIE to develop longer term solutions for sanitation in Nauru.

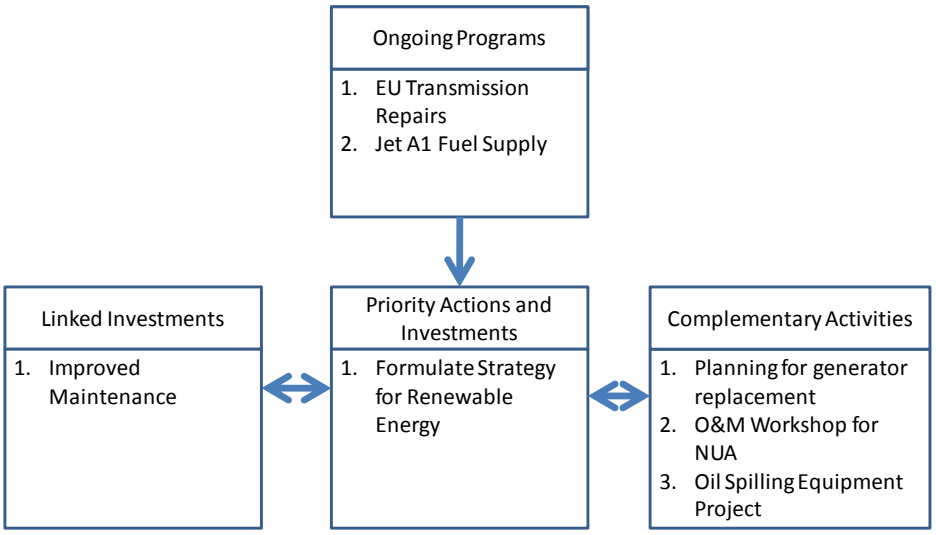
C. Power

255. Figure 7 outlines the proposed power investment program. Based on the government policy to achieve 50% Renewable Energy Target by 2015, a strategic priority for the Government is to assess the feasibility and develop a strategy to achieve this goal. Given NUA's long term program to rehabilitate the current generators, the focus of the sector program is to maintain those gains. Improved maintenance will be facilitated by the development of an O&M workshop that includes a spare parts store. The store will stock critical and often used parts for the generator and associated equipment which will then need to be re-inventoried. A designated fund will be used to rapidly order infrequently-replaced critical parts rather than waiting for long administrative processes. The program will require dedicated support from NUA to ensure that there are the personnel, resources and security arrangements in place to complement the workshop. Government should ensure that tariffs and NUA subsidies are reviewed so that O&M funds are adequate to maintain the resourcing of the workshop and store. Also there is a need to assess the feasibility of purchasing oil spill response equipment as described in Annex A.

256. It is expected that given the current rehabilitation and maintenance program, the NUA generators will supply adequate reliable power for the next 10-15 years. However, given their substantial cost, future revisions of the infrastructure strategy should begin to

plan for funding and securing replacement. This should take the form of a comprehensive engineering assessment of the current power generation capacity given expected future demand, and to map out a long term strategy to address this issue.

Figure 7: Power Investment Program



D. Telecom

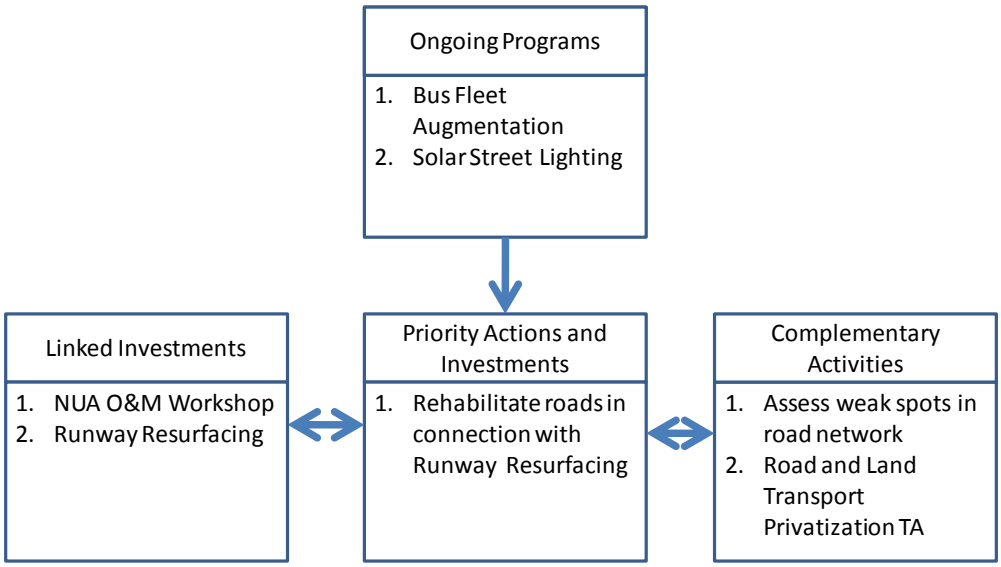
257. Nauru has a telecom system that, for a small island country, is reliable and efficient but relatively expensive. Given that there is a monopoly provider, the Government's main program is to develop policy and regulations to ensure that consumers are protected. It is envisaged that the policy will develop some form of consumer watchdog (such as a Telecom Ombudsman) that would be responsible for addressing service complaints and determining tariff structures and management.

E. Road & Land Transport

258. Figure 8 outlines the proposed road and land transport investment program. It is hoped that Transport will be able to purchase workshop time and space and service from NUA in order to assist with maintaining it's newly acquired buses and street lights.

259. Given the proposed airport runway resurfacing is a priority Government has decided to also prioritize road rehabilitation given its potential to be easily integrated and save costs. The Ministry of Transport is considering options for funding roadway upgrades utilizing the equipment that is due to be on-island during the runway resurfacing. This should be part of an overall road and land transport technical assistance that assesses the potential for private sector involvement in O&M and transport services; develops policy & governing regulations; and, facilitates the establishment of those mechanisms.

Figure 8: Road & Land Transport Investment Program



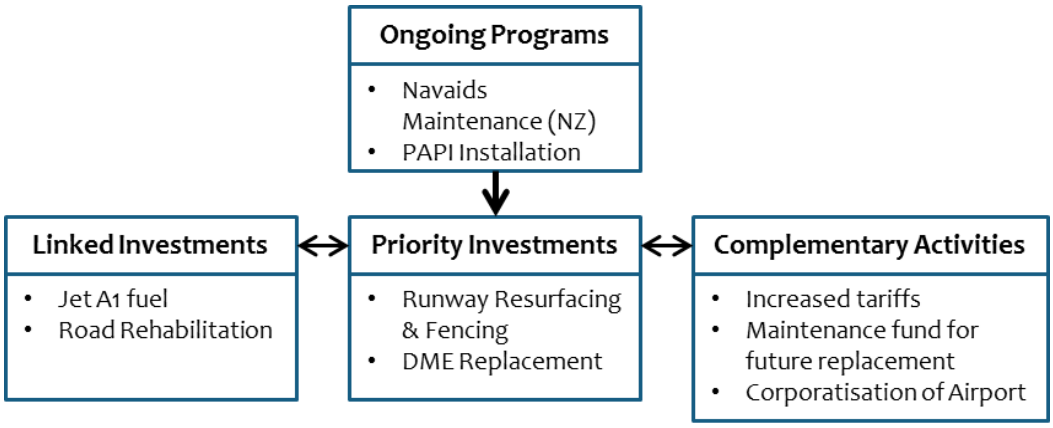
F. Air

260. Figure 9 outlines the proposed air transport investment program. The key for DCA is to maintain air safety to international standards. The provision of navigational aids will enhance landing safety, and the replacement of the DME equipment will ensure that high altitude airspace fees are maintained.

261. The critical infrastructure is the runway resurfacing and re-fencing, which needs to occur by 2013. That means planning for funding and procurement needs to begin immediately. While the runway is a relatively simple technical matter, the re-fencing will require significant community involvement in its design, including the style and siting of gates.

262. In the longer term, DCA needs to be able to sustain its investments in navigational aids, airport buildings and runway. It cannot let these items depreciate without having appropriate funding available for their eventual replacement. Consideration needs to be given to increasing fees and charges for aircraft movements, and placing these funds into a long term maintenance fund. The corporatization of DCA could be considered as a means to achieve these outcomes, and could draw upon the experience by many other airports in the Pacific. It could also utilize the experience gained in the current SOE reviews by ADB.

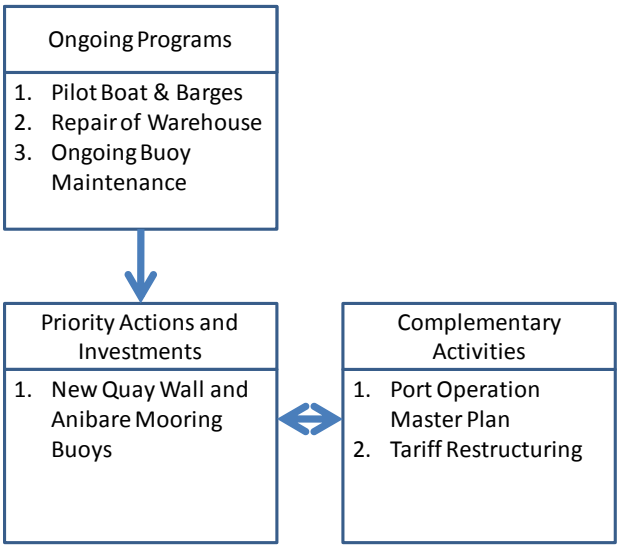
Figure 9: Air Transport Investment Program



G. Maritime

263. Figure 10 outlines the proposed maritime transport investment program. The critical program for this sector is the development of the new quay wall. While this is already in the planning stages, it has been ranked the highest priority for Government, but is still subject to donor support. The Government is considering the potential for multiple donors to support discrete sections of the wharf construction, or implementation process. To complement the wharf, significant institutional capacity and capability improvements need to occur. These include administration and finance sections, O&M capability and revised operations and tariff structures. While the development of these processes can be part of the detailed design, Government must commit to establishing and maintaining these functions in the long term.

Figure 10: Maritime Transport Investment Program



H. Government Buildings

264. Apart from the ongoing development of the police and youth centers, there are no plans for further rehabilitation or construction of new Government buildings. While the

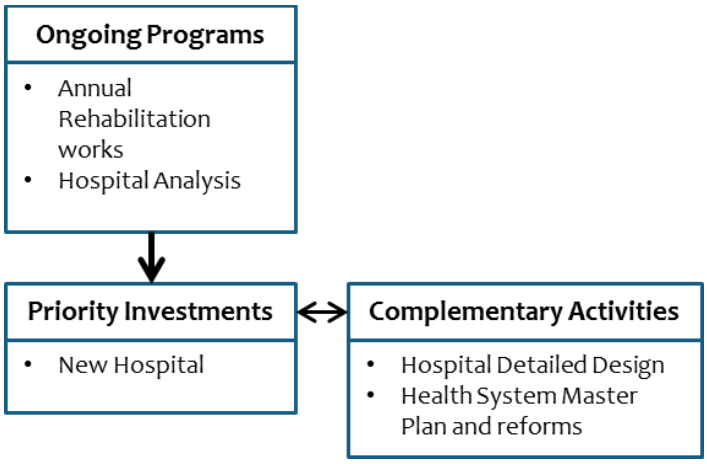
concept of an indoor stadium has some financial and public health merits, the need for infrastructure that strongly contributes to the economy is paramount.

265. Of critical importance for all buildings, including those newly constructed, are adequate maintenance capacity and funds. Even if these are available, there must be some designated authority within Government that ensures critical maintenance regularly occurs. Donors are now less willing to replace infrastructure that has deteriorated due to inadequate care. Given the primacy of other key infrastructure, no significant proposals for building rehabilitation or climate change adaptation have been considered at this time.

I. Health Buildings

266. Figure 11 outlines the proposed Health buildings investment program. A detailed assessment of hospital development options is already underway. Although, AusAID has given in-principle support for its eventual funding and development, this will be heavily reliant on a realistic, efficient and cost-effective option being developed and agreed. In the interim, the proposed annual rehabilitation funding program by AusAID is not necessarily a foregone conclusion, requiring instead annual justification and demonstrated achievement of performance targets (including routine maintenance, funding, operations etc).

Figure 11: Health Buildings Investment Program

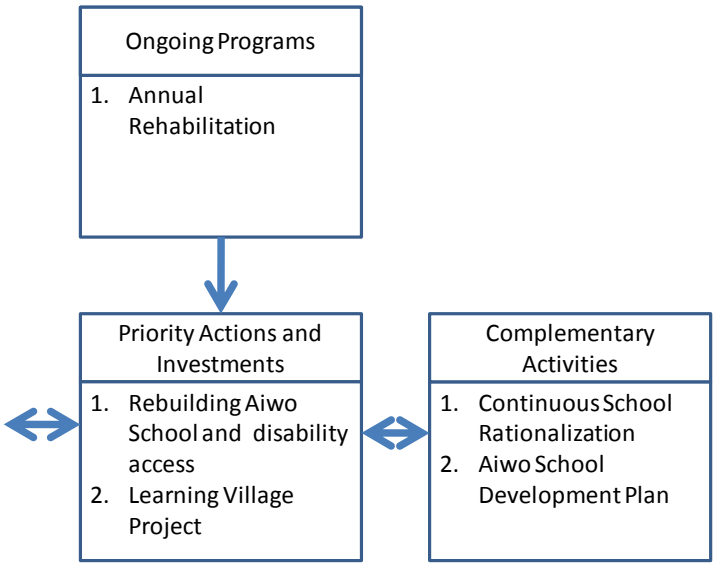


267. The detailed design of the hospital would provide a good juncture to re-examine and develop a sustainable health sector program that would address issues of staffing, funding and revenue raising. This should form an integral part of the new hospital design, so that it can achieve the large cost savings that are projected over the current situation.

J. Education Buildings

268. Figure 12 outlines the proposed education buildings investment program. The Aiwo School rebuilding is due to begin in 2012 together with the Learning Village Project. Planning is already occurring, including the rationalization of classes and schools across the island, ensuring that a regionally appropriate curriculum is delivered, utilizing appropriate infrastructure and following relevant regional and local standards.

Figure 12: Education Investment Program



VII. THE WAY FORWARD

269. Apart from the integrated planning and cross sectoral investments, the overall infrastructure sector requires additional development. This section outlines the key supporting activities that Nauru needs to undertake to plan, manage and deliver the infrastructure over the short to medium term.

A. Improved Coordination

270. Government heads of Department formed a steering committee to guide the development of the NEISIP. This group was an unofficial reformation of the National Infrastructure Coordinating Committee, which has not met for over 18 months. The value this group has provided advising the coordinated technical development of the NEISIP was immense and indicates the need for the NICC to be officially reformed. The NICC should meet at least quarterly and comprise ministerial/ministry decision makers supported by relevant technical heads of department. The NICC would be responsible for monitoring progress of the NEISIP, ensuring that it is regularly reviewed, and guide its integration with national planning and the annual budget process.

271. Specialist sub-sector groups of the NICC would be tasked with developing sector master plans, overseeing complex infrastructure planning and development processes, and ensuring that sector baseline information and performance targets are collected and reviewed. The sub-committees would comprise a policy / decision maker group, supported by a technical working committee. The working committee would become the first meeting contact for any donors or researchers when they arrive in Nauru – thereby ensuring continuity and cooperation within the sector.

272. The secretariat to the NICC and sub-committees should be PAD who would ensure support for the coordination and planning activities. PAD's key achievement over 2011/12 would be to ensure coordination at the sector and sub-sector level, and re-establish their mission as the manager of aid. This would entail Government requiring ***all*** agencies to coordinate any donor contact through AMU; and specifying that Foreign Affairs ensures ***all donor and research missions*** are first coordinated and managed by AMU prior to their entry into the country.

B. Improved Sector Planning

273. Nauru has virtually no comprehensive sector planning, apart from the privatized telecom, Digicel. The remainder have a very brief overviews of needs, driven by the NSDS, but no detailed agreement on planning, investment and implementation. The NEISIP has outlined a range of sector plans that are necessary and complementary to proposed investments, however each sub-sector should also develop a rational and defined master plan.

274. The plans should include:

- Detailed asset register and management plans
- Key baseline and performance data
- 10 year infrastructure strategy that addresses NSDS targets
- 3 year rolling investment plan that outlines capital, operational and R&M costs, versus incomes, tariffs and subsidies.

275. Better planning will ensure that project investment is more rational and supported by a sound business case. The development of this NEISIP and enhancement of the NPP's

(using the Project Outline Briefs – See Annex B) is a first step. Government will require that all projects submitted for its funding or support are presented in the new format with full and adequate explanations for each section. The project briefs provide information that supports the ability for the NICC to undertake future MCA processes and re-define sector priorities. This is expected to produce a more systematic approach to project preparation and allow better comparisons to be made between proposed projects.

C. Strategic Asset Management

276. As part of the overall sector planning processes, Government will be initiating the development of asset management programs, providing forward estimates of rehabilitation and maintenance activities and costs. While this will aid the budget cycle, it will also provide transparency in service performance and sustainability.

277. While there is an emphasis in this NEISIP on facilitating improved supply-side, asset management (maintenance, operations management and billing), there is considerable scope for improving demand-side asset management. Already EU and SOPAC are addressing rainfall harvesting, water and waste conservation methods; all of which influence consumer behavior to reduce demand. In addition to direct education and regulation, Government can also manage demand through the transparent and careful re-allocation of subsidies (such as to water supply) so that they encourage more economic asset demand. This has been effective in the Energy and telecom sectors, and a number of donors are willing to support further demand-side management studies in the water, sanitation and transport sectors.

278. Another area that is to be considered for improved infrastructure management is the exhausting of all other alternatives to the current situation. Too often services are decayed and Government and Donors provide new capital, without thought to improved institutional, planning, regulatory or financial alternatives. Often there are other structures that could be rehabilitated, alternative ways of delivering services or optimizing the use of existing infrastructure through technology and infrastructure management.

279. Each of these alternatives are now incorporated in the revised project briefs.

D. Streamline Processes

280. Government is committed to ensuring that the NEISIP priority program is delivered as quickly and effectively as possible. With current administrative blockages, and poor inter and intra-sector cooperation, this will prove to be a challenge. The re-establishment of planning and coordinating mechanisms as outlined above will go some way to addressing this problem.

281. However, the capacity and capability in PAD and the systems that are currently in place are not adequate. Procedures need to be reviewed, clarified and simplified, without forgoing relevancy and completeness. As DPPD is the central agency for managing proposals for funding support and dialogue with development partners about support for economic infrastructure projects, this is an area that should attract additional support. Consideration of planning capacity building, procurement process support and strategic re-structure of aid management processes should be undertaken. It would link closely with the reformation of the NICC and improved coordination processes outlined earlier.

282. The NEISIP (and its regular review) is also a means for Government to streamline the development of economic infrastructure by providing a clear direction and information about its infrastructure development priorities to its own department, the private sector and donor community. It provides a starting point for dialogue with donors, who have their own

development agenda, and provides strength for productive discourse and negotiation. The involvement by sector decision makers and planners in the NEISIP development process has already ensured that sub-sector planning is broader and more encompassing of cooperative initiatives. The NEISIP itself will provide further clarity to sector decision makers, and provide a defined means for incorporating new projects within a rational and balanced investment process.

E. NEISIP Review

283. As part of the ongoing Government commitment to improving infrastructure development it will be important to update this NEISIP on a regular basis to align with the revised planning and budget priorities, and reflect implementation progress.

284. The NEISIP 2011 has highlighted the development of a few sector master plans, particularly in the water and sanitation sectors. With their completion expected in early 2012, it would provide an ideal opportunity for Government and DPPD to undertake a “soft” revision and re-ranking of projects based on any newly identified and prioritized sector investments. This would provide information regarding the appropriate timing and interval for a more detailed “hard” NEISIP review and revision.

285. In any case, Government agencies and Public Enterprises will be required to annually report project implementation progress and changes in sector performance. This information, together with consultation with community representatives, the private sector, and development partners, will help to shape future updates of the NEISIP and allow DPPD to monitor progress and performance. It is expected that this will be facilitated and coordinated by the NICC.