TONGA WATER BOARD

WASTE AUTHORITY LTD
Keeping Tonga Clean, Green & Healthy

HOMEGAS LTD
Distributors of LP Gas in Tonga

TONGA GAS

TONGA POWER LIMITED

Combine Utilities Business Plan 2018 - 2022

RETAIL SHOP OUTLET

CAFE& OUTDOOR DINING AREA

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BOARD OF DIRECTORS

Mr. Carl Sanft
Chairman

Mr. Sione Taione
Director

Mr. 'Aisake Tuiono
Director

Dr. Nailasikau Halatuituia
Director

Mrs. 'Fuiva Kavaliku
Director

Chairman's Foreword

It is my pleasure to present the very first Combined Utilities Business Plan 2018 to 2022 for the three major utility companies in Tonga which consists of Tonga Power Limited and its subsidiaries, Tonga Gas and Home Gas Ltd, Tonga Water Board and Waste Authority Limited. As Chairman of the Combined Utilities Board, it is a significant milestone to implement the long term vision by Government to reform State owned Enterprises by accommodating all of the Utility businesses into a single location in order to facilitate a number of shared services with a strong emphasis on improving bottom line results.

I am pleased the Utilities Board has taken the lead to create an atmosphere conducive to productivity and efficiency improvement focused on growth, driven through a combined Utility reform project that is currently underway. A number of common synergies across Utilities has been identified and implemented over the past year. A reflection of this was the establishment of a one-stop-shop at each of the Utilities offices where utility customers can pay their bills at a convenience location. A notable improvement included Waste Authority charges being included on the Tonga Power Bill to improve payment compliance and debt collection. During the past year, the Board also approved the construction of a Multi Utilities Complex Building at Matatoa, which will become the new headquarters for TPL, TWB, WAL, HGL and TGL operations.

As a result of the good efforts of the Utilities CEO's and management teams, the Utilities Board of Directors have seen a substantial improvement in the financial and operation performance of all Utilities and delivering to the major shareholder an impressive TOP $4.4 million dividend from its combined net profit last financial year. This is by far the highest Dividend ever paid to Government. This largely reflects the objective of the Government reforms which is to improve performance, reduce annual operating costs, improve operating efficiency and enhance service delivery through the achievement of synergies in the business processes across all the three utilities.

Over the coming year, the Board is looking at implementing many other combined and shared services across Finance, IT, HR and administration including common meter reading and bill distribution for Power and Water.

In support of this initiative, each of the Utilities has developed a comprehensive plan outlining the objectives and priorities set by the Board contained in the attached Business Plans. The latter provides a much more detailed explanation for each of the strategic objectives for the current and coming financial years, which are described more precisely in the reports.

Tonga Power Limited (TPL)

Tonga Power vision is to provide a *Safe, Reliable, Sustainable and Affordable service to the people of Tonga* and has therefore set six major objectives over the coming years as well as setting KPIs and targets to achieve those objectives. Some of the major projects TPL has set forth for the next two years include the following which are designed to reduce tariff and improved performance:

1) Renewable projects to be funded through the GCF at a total of USD 55.17 million
2) Enabling Power System (EPS) project estimated at TOP $34 million (TPL funded)
3) Smart Metering Project (Stage 2) of approximately $3.4 million (MFAT and TPL funded)

4) Nukualofa Upgrade project NZD 52 million ($5 million MFAT funding committed)
5) TVNUP Stage 2/3 at a cost of $32 million (MFAT funded)
6) Outer Island Energy Efficiency Project (OIEEP) Stage 2 of USD 5 million (ADB funded)
7) Utility Reform project at a cost of $5 million to build a mutli complex building at Matatoa
8) Generation other projects cost $2 million (TPL funded)

Tonga Gas & Home Gas Limited

As subsidiaries of Tonga Power Limited, Tonga Gas core business is to import LPG to the Kingdom while Home Has Limited is responsible for the distributing of TGL's imported LPG throughout Tonga. The following major projects will be implemented by both companies in the next few years:

1) Increase LP Gas storage capacity at Touliki at a cost of $430,000 (company funded)
2) Upgrade/build a new administration and maintenance building $210,000 (company funded)
3) Procure a Second road tanker at a cost of $300,000 (company funded)
4) New Browser to use in all vehicles for 2022 at a cost of $700,000 (company funded)
5) LPG Gas metering for the three main terminals, Touliki Vava'u and Matatoa (company funded)
6) Upgrade equipment and instrumentations at Vava'u terminal's filling platform (company funded)

Tonga Water Board (TWB)

The vision of Tonga Water Board is "*To be the most economical, reliable and environmentally friendly water service provider in the south pacific region "*and TWB has established the following projects for the coming years:

1) Nuku'alofa Urban Development Sector Project – Subproject: TWB01, TWB02 and TWB03 (ADB and DFAT funding (TOP$11.06 m)
2) Nuku'alofa NRW reduction (TOP$9.6 m) (an extension of 1 above)
3) Neiafu water supply upgrade (Currently discussed with donor partners) (TOP$15 m)
4) Smart Metering (water) project at a cost of $27 million (TWB funded)
5) Water Bottling project at 'Eua district to be externally funded
6) Establish an inventory store for plumbing materials and supplies (TWB funded)
7) Zonation program for Nuku'alofa area (ADB funded)

Waste Authority Limited (WAL)

Waste Authority Limited has prioritized the following projects for the next two years. These project set the strategic framework towards achieving the company's vision of a Clean, Green and Healthy Tonga. These projects consists of:

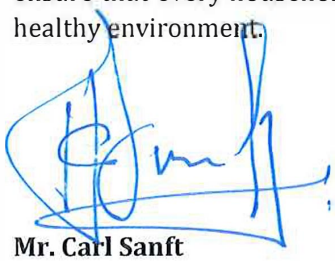
1) Waste to Energy Project – joint funded by Carbon Black Global (CBG) & WAL contribution $250K
2) Waste Management Services – Extension to Outer Islands (co funded by the Japan Embassy & WAL)
3) General facility upgrade (Tapuhia) - ADB & DFAT funded (NUDSP)
4) Tapuhia Landfill Operations (infrastructure development)
5) Waste collection system review
6) Community awareness
7) Revenue generation

Detail explanations of these priority projects is discussed in page 177-230 of the Combined Plan.

The Board of Directors and Management are mindful of the fact that funding remains the major challenge to achieve its objectives. Funds will need to be raised from Development Partners, Institutional lenders and Private Sector Investment. The Utilities Board will require strong Government support to meet the objectives outlined in this Combined Business Plan and I look forward to working in partnership with our Shareholder, the Minister of Public Enterprises together with the relevant stakeholders to achieve our combined objectives.

The strategies laid out in this Business Plan have taken the Board of Directors and the management for each of the operating Utility businesses, a considerable amount of time and effort in their preparation of a workable and achievable Business plans that I and my fellow Directors fully support. Over the coming years, the Utility operations will become even more efficient, especially through the implementation of the many projects outlined in this report which will be fully implemented by the end of the reporting year. Each utility will adopt a proactive approach to remove duplication of service operations while delivering our shareholder's vision by operating as successful business Enterprises.

I would like to convey my sincere appreciation to my fellow Directors and the management team across all four utilities for their significant effort over the past year and in preparing the following comprehensive Business Plans. There are exciting but challenging times ahead for all staff, but together we are committed to achieving the objectives and strategies of our common objectives to ensure that every household in Tonga has access to power, clean water and reside in a clean and healthy environment.



Mr. Carl Sanft
(Chairman)

Tonga Power Limited

Business Plan 2018-22

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CEO STATEMENT

Once again, it is an honor to present Tonga Power Limited (TPL) Business Plan for the period 2018-2022. The main objective of this plan is to deliver the Government's 50% Renewable Energy target by 2020 and this will be TPL main focus over the next five years in order to achieve the Government core purpoe of ***"reducing Tonga's vulnerability to oil price shocks by increasingly accessing to state-of-the art energy technologies in an affordable and environmentally sustainable manner."***

In order to achieve this objective, Tonga Power intend to invest more than TOP $13 million on various Renewable Energy (RE) plans over the next five years. A considerable amount of time and resources were spent on securing commitment of grant and concessional funding for these projects through the Green Climate Fund Proposal. TPL have worked collaboratively with Government and the Asian Development Bank (ADB) on a US$84.47 million proposal to be submitted to the GCF. Non-financing assistance is also being sought from other donor partners to finance these Renewable Energy Projects if the GCF is not approved in full or unsuccessful. This will mean redirecting TPL's strategic focus and resources to ensure that only the priority projects are implemented by the end of 2020, which is not an easy task and comes with a lot of challenges.

A major distinguished issue to note is that with the intermittent nature of the Renewable projects, the integration of renewables into the diesel engines requires careful planning to ensure the balance between electricity production and demand is properly managed and maintained. TPL intends to use a variety of technologies to solve the issues arising from intermittent renewable generation which includes acquiring an "Enabling Power Systems" (EPS) at an approximate cost of TOP $34 million consisting of a bulk energy storage, SCADA upgrades and a meshed-ring-communication philosophy to assist in accommodating RE generation to achieve the balance between electricity supply and demand. The company also intend to move to "Smart-Grid" technology to provide communication between generation plants and our network equipment to which TPL has already commenced the first phase of the smart-grid program; by installing smart meters at our customer premises in order to achieve fast and automated response in load management, energy loss reduction, system stability, and enhanced power quality and reliability.

In addition to the above projects, TPL will contribute an approximate TOP $38 million from its own balance sheet to fund various network upgrade projects, Power Generation, IT, Corporate and ERP project in the next five years which are discussed precisely in the Business Plan.

Tonga Power will continue to successfully manage its major ongoing projects such as TVNUP (Tonga Village Network Upgrade Project) Stage 2 and 3, Smart Metering Stage 2, OIREP (Outer Island Renewable Energy Project) Stage 2 and Enterprise Resource Planning (ERP) projects during the planning period. The second phase of the Niutoua Wind Generation Project have been signed between TPL and Kokusai Kogyo Co. Ltd and Tokyo Sekkei Co Ltd through JICA for the procurement phase of the project. We continue to work closely with MFAT for support towards the Nuku'alofa Network Upgrade Project of which the Government of New Zealand has pledged a generous contribution of NZD$5 million to kick start the project. A sizable amount of investment remains and although there is still hope that grant funds will be available because of the development gains that will result, TPL is well prepared in case a different investment model is required. The need for development partner assistance in funding TPLs projects cannot be underestimated particularly when we are moving towards renewable energy as our main source of power generation.

Another issue worth noted is that a significant contribution will come from the Private Sectors with the opportunities to work closely with Independent Power Producers (IPP) in an attempt to lower tariff and to push TPL closer to its 50% RE target. A 2 MW solar facility currently under construction at Matatoa is a project privately funded by a Chinese Organization, Zhuhai Singyes Green Building Technology. The Government of China is also looking to fund a 1.5 MW wind farm which consists of 2 sets of 750 kW wind turbines that is proposed to be located in Lapaha. Both projects will contribute towards Tonga's renewable energy target, however one is independently owned (Matatoa) and the one in Lapaha will be funded by the Government of China.

This Business Plan clearly describes how Tonga Power Limited will achieve the 50% renewable energy by 2020 with the above portfolio of projects to achieve the company six major objectives which are discussed in this plan. These six major objectives were developed to ensure that management and all staff of TPL have a common purpose to work towards in an attempt to achieve the company vision of a safe, affordable, sustainable electricity in Tonga.

TPL is expecting to achieve a net profit after tax at the end of the 2018 financial year of about $3.8 million. Total revenue is forecasted to be at $49.6 million at the end of 2018 and is expected to increase steadily from 2018 onwards. With the combined utility initiative that is currently underway, it is expected that these targets is achievable through shared services and cost cutting initiative as the major focus of this move.

Tonga Power Business Plan is a combination of TPLs strategic and operational plans. Strategically, it sets out TPL's current and future unique strategies for all business units including Generation, Distribution, Retail and Corporate Compliance in line with the long term goal of achieving TPL's vision. Operationally, project planning and implementation issues are discussed in order to provide the reader with an in-depth understanding of TPL's business activities and issues for the planning period.

Mr. Robert Matthews
(CEO, Tonga Power Limited)

TONGA POWER LIMITED

2. EXECUTIVE SUMMARY

This five-year Business Plan covering the period 2018-2022 was developed systematically and constructively to achieve Tonga Power Limited's vision **"to provide safe, reliable, sustainable and affordable service to the people of Tonga"** and to deliver the Government's core purpose for the Energy sector of "**Reducing Tonga's vulnerability to oil price shocks, and achieve an increase in quality access to modern energy services in an environmentally sustainable manner"**.

The plan takes into account international, regional and national developments in the energy sector, and in the electricity industry in particular. The plan forms the implementation phase of the company strategic direction for the period 2018-2022. It also contains detailed activities to be implemented in the next five years that will propel TPL to achieve the six strategic objectives of the Business Plan as outlined below:

i. *Achieving 50% electricity generation from RE generation by 2020 in order to achieve the government TERM objective and significant tariff reductions.*
ii. *Adopting technologies to manage the complexities arising from the increasing levels of RE penetration.*
iii. *Improving the network and replacing ageing assets to improve safety and reliability of TPL's services.*
iv. *Cultivating a hazard free safety culture to minimize any electrical hazards to both the public and staff.*
v. *Investing in leading business processes and systems to improve operational efficiency and quality of TPL's services to customers.*
vi. *Managing all external funding and internal financing sources successfully in order to maximise the shareholder value.*

This Business Plan adopts the above objectives that support the company vision and, through measures of success and key deliverables, details the concrete actions and tasks that will enable TPL to meet its vision. It is therefore design as a guide for TPL staff in the conduct of the company mandate during the next five years.

The Plan will be delivered by a team of qualified and dedicated staff whose performance will be underpinned by professionalism, integrity, innovation, transparency and accountability, equal and fair opportunity, stakeholder sensitivity and teamwork.

3. OVERVIEW OF THE BUSINESS

Tonga's electricity sector was re-structured in 2008 when the Government established the Electricity Commission (EC) through the Electricity Act 2007, and purchased the electricity assets from a privately owned entity. The functions of the EC include the regulation of tariffs, establishing consumer service standards, managing electrical safety, as well as the licensing of electricians, and creation of regulations for major electrical works. TPL operates under a strict regulatory framework through the Electricity Concession Contract (ECC) in which tariffs, tariff adjustment formulas, operational efficiency benchmarks, consumer service standards and penalties are specified between the EC, the Government and Tonga Power Limited. TPL has its own Company Constitution and also operates under the Public Enterprises Act 2010 which provides greater commercialization incentives for state owned corporate entities.

TPL has been established with an independent Board of Directors drawn from the commercial sector of Tonga. TPL's major objectives are to:

- Provide a safe, reliable, affordable and sustainable electricity supply throughout Tonga.
- Maximize shareholder value while maintaining prudent levels of exposure to operational and financial risks.
- Ensure sustained downward pressure on electricity tariffs.

The electricity sector in Tonga is characterized by the existence of a single vertically integrated electricity utility. Tonga Power's core business is generating, distributing and retailing electric power across our four-grid system within Tonga consisting of more than 25,000 customers. A complementary business is the provision of infrastructure services such as electrical lines services within Tonga. Tonga Power recently diversified into LPG supply and distribution businesses with the acquisition of Tonga Gas and Homegas in 2013, a subsidiary of TPL.

TPL activities are outlined below:

Generation Capacities:

As of March, 2017, TPL had installed firm (diesel) generating capacity of 17.1MW in all four islands. Tongatapu capacity and its peak demand is about 13.7MW and 9.5MW respectively. Tongatapu is well served from the Popua Power Station where there is sufficient capacity to meet current peak demand even with one of the diesel units out of service (N-1 reliability). Vava'u also meets the N-1 security with a total of five generators. A new 11kV switchboard was installed at the Popua Power Station in early 2016 to provide flexibility and reliability of supply. In Vava'u, two new 600 kW Cummins units are supported by smaller units (2x186kW + 1x320kW units). Ha'apai has 1x320kW + 2x186kW unit also provides N-1 security. Two 186 kW Cummins units + 1x420kW hired unit installed in 'Eua. The peak demand at 'Eua is such that for a relatively small number of hours, both Cummins generators need to be operational to meet the peak demand.

Distribution Network:

Tonga Power operates in four distinctly separate island grids. Tongatapu has 11kV distribution network, 187 km of overhead line, 12 km of underground cables, and 1 km of submarine cable, in addition to 452 km of low voltage lines (single and three phase). Vava'u has 6.6kV distribution network, 68 km of overhead line, 2 km of underground cables, and 97 km of low voltage lines (single and three phase). Ha'apai has 6.6kV distribution network, 15 km of overhead line, 2 km of underground cables, and 32 km of low voltage lines (single and three phase). 'Eua has 6.6kV distribution network, 14 km of overhead line and 42 km of low voltage lines (single and three phase). Low voltage reticulation for all islands is at 400/240 volts.

Tariff:

As 92% of the electricity on the TPL grid is supplied from diesel generation, the price of diesel fuel is the major component of the electricity tariff. The tariff structure changed in May 2009 through regulation and became known as the "one tariff for all" regulation which makes the tariff consistent across all the four island groups. Tonga electricity tariff (currently at 85.86 seniti/kWh) consists of two components: Fuel Component (41.51 seniti/kWh) and Non-fuel Component (44.35 seniti/kWh). With the high Fuel tariff, Government has approved to offer a lifeline support for all residential customers consuming power of up to 100kWh to maintain power tariff at 70 seniti/kWh.

The Concession Contract require changes to the fuel component of the tariff based on the cost of diesel as determined by Government through The Competent Authority. At intervals of three months (unless a shorter period is agreed), an independently developed pricing model sets the change of price for this component. The changes are recommended to the Electricity Commission for approvals in line with the Concession Contract. The non-fuel tariff will be reviewed and updated on a five yearly basis (also called regulatory period) as per the Concession Contract and subject to review on an annual basis based on inflationary changes.

Demand:

Tongatapu's peak load demand is about 9.5MW on average, and the electricity demand profiles reflect contributions from the commercial and residential sectors. In general, there are two (2) electricity peak demands on weekdays, i.e. late morning to early afternoon peak and then an evening peak. Analysis of the load profile shows that the major contributors to daytime load are commercial customers (primarily air-conditionin ng and lighting). The decrease in commercial sector activities in the afternoon (around 4pm) is replaced by the increase in the residential sector activities (primarily lighting and cooking) resulting in an evening peak at around 8pm. Unfortunately, solar generation is not able to address this timing of peak load without adding a substantial storage facility. In general, mid-day peak demands during weekdays are higher than weekends and the differences are estimated around 30% or more especially in the hot season. On Sundays, instantaneous solar penetration levels can reach 35% as requirement for diesel generation declines due to low demand usually on Sundays.

Energy Generation, Consumption and Losses:

Total generation (diesel plus renewables) on all four island groups for the year ending June 2016 was about 50.9 GWh. This quantity of generation was more than the quantity generated in the year ending December 2015 of 45.1 GWh reflecting a growth in the demand for electricity. Out of the total power generated, 46.8 GWh was billed to customers with parasitic and line losses contributing 0.91 GWh and 3.1 GWh respectively. The overall system losses reduced to 7.97% at end of December 2016.

Renewable Energy:

In 2009, the Government of Tonga approved a goal of 50% of electricity to be generated from renewable energy sources by 2020. Under Tonga Energy Road Map (TERM) and with TPL direct operational input, five major solar plants were constructed: Maama Mai (1.4MW) and Mata 'o e La'a (1MW) in Tongatapu, La'a Lahi (420KW) in Vava'u, and a two new constructed plants which is a 200kW and 550kW plant in 'Eua and Ha'apai which commenced operation in November 2016 and April 2017 respectively but are yet to be commissioned. The Mata 'o e La'a in Vaini and Maama Mai in Popua plants are supplied with short-term (60 seconds) energy storage to reduce the effects of power fluctuations. Vaini and Popua Solar facility incorporates a micro-grid controller, which automatically optimises the output from a mix of renewable energy and diesel generation whilst stabilizing the frequency. Ha'apai plant also has a 660kWh battery storage capacity which means much larger solar penetration can be achieved.

Although the 1.4 MW Maama Mai solar farm and the 1 MW Mata 'o e La'a solar plant in Tongatapu add to the existing generation capacity, the intermittency of the energy source means it cannot be relied on to provide firm capacity. Hence the solar facilities do not fully alleviate the requirement for replacement diesel generation capacity in the medium term. Additionally, the La'a Lahi 500 kW solar facility in Vava'u is controlled to curtail output when the diesel generator output falls to 30% of capacity which therefore limits the solar plant to 420 kW peak output.

Furthermore, TPL owns 65kW roof-top micro solar capacity with 510kW of third-party micro solar capacity owned by private customers. Total fuel savings from renewable projects from their inception dates was approximately 4.3 million liters, which is equivalent to $6.0 million in cost savings passed directly to consumers.

Financial Strength:

TPL's revenue is generated from our 22,000 customers from all four island groups with over 85% from Tongatapu. During the past five years there has been a significant increase in generation from 45GWh to 51GWh per annum despite an economic decline along with rising costs. In the year 2016, the company generated approximately $46 million in revenue with $5.4 million net profit after tax (NPAT) followed by a $2 million dividend which TPL has paid to the shareholder the Tonga Government. The Combined dividend paid by the 3 combined companies was $5.7 million.

Figure 1: Financial Highlights from 2010-2016

30-Jun-16	2010	2011	2012	2013	2014	2015	2016
Revenue	$36,321,524	$40,124,291	$44,038,707	$41,782,742	$48,505,746	$46,100,465	$46,007,798
Expenses	$31,915,137	$35,172,632	$40,782,045	$38,844,083	$44,991,917	$43,554,963	$38,681,938
Profit Before Tax	$4,406,387	$4,951,659	$3,256,662	$2,938,659	$3,513,829	$2,545,502	$7,325,860
Tax Expense	$1,524,510	$1,237,915	$780,314	$713,692	$878,457	$636,376	$1,831,46
Net Profit After Tax	$2,881,877	$3,713,744	$2,476,348	$2,224,967	$2,635,372	$1,909,126	$5,494,395

4. POLICIES AND GUIDELINES GOVERNING THE DEVELOPMENT OF THE BUSINESS PLAN

4.1 Ownership Guidelines

The Ministry of Public Enterprise Letter of Expectation, dated 8 April, 2015, states several guidelines from the Honorable Minister for Public Enterprises as to how they should operate to which TPL adopted in the development of this Plan. These expectation includes but not limited to the following listed below:

- The company should operate as a successful business and, to this end, to be as profitable and efficient as comparable businesses that are not state owned. In other words by practicing continuous improvement, profitability of the company is expected to progressively increase annually as efficiency and productivity increases.
- A great emphasis should be placed on quality of service delivery to the electricity consumers. From the customer services at the counters to households around the country, electricity supply services must be people-oriented and customer-friendly.
- All public fees and charges should be clearly justified and explained to all customers through public media which may include in weekly newspapers.
- Customer complaints and criticisms should be viewed as opportunities to improve performance and transparency rather than a barrier to development.
- There is an absolute requirement that Tonga Power advises the Ministry of anything of significance that arises or likely to arise and that has not been previously disclosed in the Business Plan or otherwise, particularly if the matter is likely to (i) be commented upon in the media; (ii) have political significance; or (iii) have a material impact on the performance of the company or (iv) have a material impact on the customers or other stakeholders.
- The company should prepare and submit to the Ministry a sound Asset Management Plan (AMP) and a Business Continuity Plan (BCP). These plans should be consistently reviewed and updated as the situations change.
- The company should develop and maintain a suitable Risk Management Framework. All the potential risks that the company is exposed to should be identified, assessed, evaluated and included in a Company Risk Register.

Furthermore, section 18 of the MPE Act outline matters that have been agreed to with the Responsible Minister which are as follows:

- Corporate Governance - The company is committed to the highest standards of corporate governance, with core values of accountability, probity and transparency. The company is adopting policies and procedures aimed at maintaining these standards.
- Anti – corruption - The Board, through the Chief executive will ensure compliance by the company with statutory and regulatory requirements including avoidance of any act that would or could be construed as an illegal, corrupt or unethical practices.
- Share subscriptions or purchases - Subscriptions for shares in any company or acquisition of interests in any other organization that involve equity investment will be subject to prior consultation with the Responsible Minister.
- Subsidiary companies - The establishment of subsidiary companies or sale of material interest in or assets of subsidiary companies will be subject to prior consultation with the Responsible Minister.

4.2 Obligations under the NSDF

The Government of Tonga has initiated a National Strategic Development Framework (NSDF) for creating a Tonga where enterprises can flourish, opportunity exists for all, there is confidence to face the challenges of global society, development builds on Tonga's strong cultural traditions and evolution takes place to address a rapidly changing world.

The NSDF aims to improve electricity generation and distribution systems and its safe operation in order to improve the living standards of all Tongans. The framework highlights a desire to improve services, accountability, and revenue collection, as well as the coordination of development partners, in line with the NSDF vision of *"a more progressive Tonga supporting a higher quality of life for all".*

Tonga Power's major obligations under the NSDF are:

- Maintaining and where possible expand the provision of reliable, safe and cost efficient power supplies using traditional and renewable options to all communities.
- Strengthening regulatory compliance and safety oversight of the utility sector to ensure compliance with international safety standards i.e. cost effective delivery, storage and distribution of LPG products.
- Investing in a healthy, well-educated, skilled and gender equal workforce.
- Enhancing staff development and training to increase the value added to our business.
- Fostering innovation and technological development.
- Maintaining good relations with development partners for mutual partnership, aid effectiveness and donor harmonization.
- Improving profitability, accountability, and return on equity of our public enterprise.
- Implementing the proposed priority projects outlined in the NIIP (National Infrastructure Investment Plan).

The company strategic objectives were also build in accordance with these requirements.

4.3 Boards expectations

The Board of Directors has a role to control and monitor management and take reasonable steps to ensure best practice governance and compliance. The Board also has a strategic and advisory role, which includes taking steps to ensure proper corporate performance and value creation. The key is avoiding being dysfunctional between the Board and executive management and to elevate poor and possibly fatal business decisions, but more importantly to set the stage for mutual benefit, respect and value creation.

The Board expectations from TPL are:

- *Maximise shareholder value:* The Board wants management to invest in value added projects that maximise shareholder wealth and enhances profitability.
- *Excellent customer services:* The art of good business is in achieving a high level of effectiveness (doing the right things) with efficiency - thereby delivering the right service for the customer, while remaining cost effective.
- *No surprises or spin:* There should not be any surprises for a Board. The CEO and senior management need to be proactive and advise the Board of the true state of affairs and without any spin.
- *Bad news must reach the board ASAP:* The Board needs to be the first to know of problems when they arise. Management needs to further develop the systems, processes and incentives within the organization that promote full transparency and reporting, right up to the Board and its committees.
- *Deep expertise in the business:* The Board requires expertise across the full management bench with no gaps.
- *Visibility of management thinking:* The Board should see proposed strategic options from management. Management's thinking and assumptions need to be fully transparent to the Board, in writing and open to critique.
- *Full access to information:* Information has five dimensions: quality, quantity, source, format and timeliness. There should be no information funneling or blockage to any dimension. In order to do its job, the Board will have reasonable access to TPL information as directed by the Chairman and ensuring the CEO is notified.

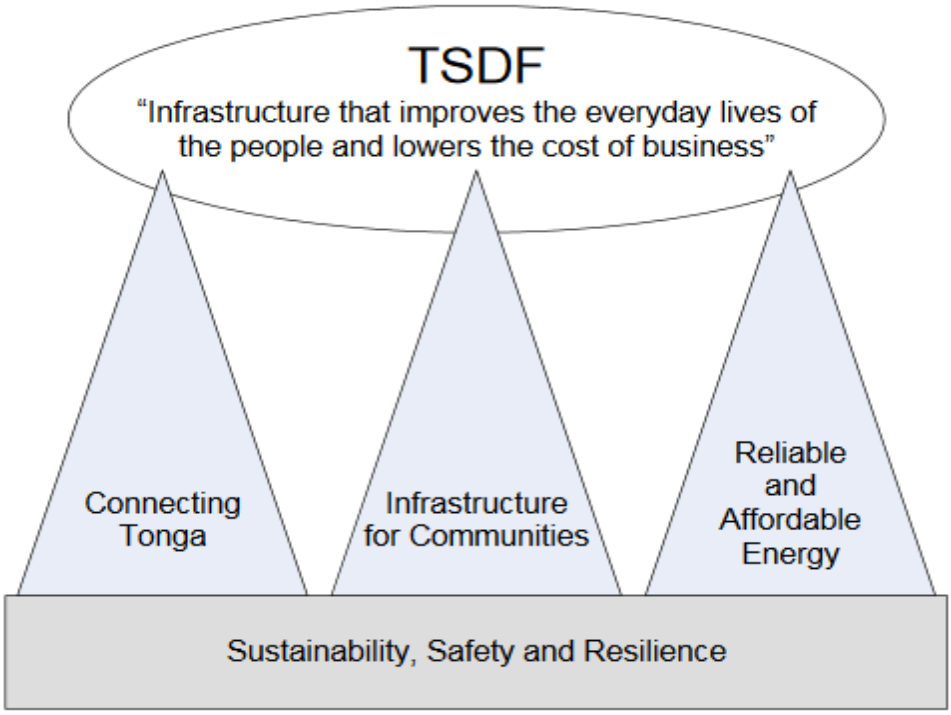
4.4 Mandate - Energy Policy, Law and Legislation

In recent years there have been several policy and legislative initiatives in Tonga aimed at improving the legal framework of the electricity sector and the implementation of fossil fuel (diesel) reduction programs and development of renewable energy projects.

In 2008, the Electricity Commission (EC) was established as the regulatory agency for grid- based diesel generated electricity supply, replacing the former Tonga Electric Power Board (TEPB) as the regulator. The EC is specifically involved in regulating the generation and sale of electrical power. The establishment of the EC was legally defined by the **Electricity Act 2007**. The Electricity Act 2007 provides the governance framework for the electricity sector. It defines the role of the EC in regulating the generation and sale of electricity and establishes the role of the **Concession Contract** in producing and delivering electricity. In addition, the Act provides the Ministry of Finance with the authority to be a signatory in the Concession Contract between the EC and the Concessionaire (TPL) and to establish regulations to ensure effective management of the electricity utility.

TPL is required to operate as a successful business and to be as profitable and efficient under the **Ministry of Public Enterprises Act 2010**. The Act also requires TPL to report its performance on a periodical basis.

The Department of Energy of MEIDECC (Ministry of Energy, Information, Disaster Management, Environment and Climate Change) is mandated to govern the energy strategy in Tonga under the NSDF (**National Strategic Development Framework**) as depicted in the figure below.



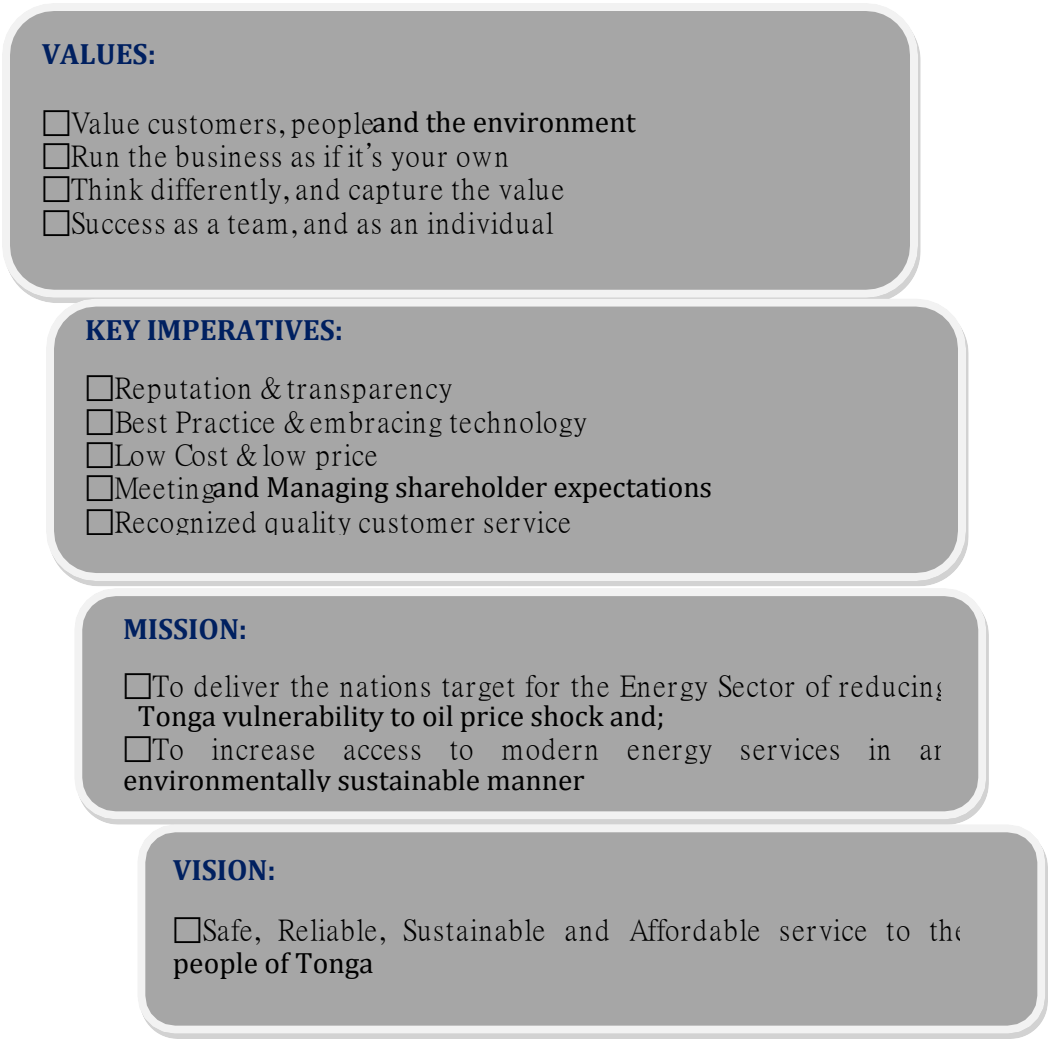
The Renewable Energy Act 2010 also creates a Renewable Energy Authority within the Department of Energy of MEIDECC to deal with matters concerning Renewable (off-grid RE), uses under the Tonga Energy Road Map (TERM) 2010-2020. TERM 2010-2020 was launched in June 2010. TERM consolidates the priorities highlighted in the National Infrastructure Investment Plan (NIIP) and **National Strategic Planning Framework (NSDF)** and sets out an aggressive set of targets for the electricity sector.

The NIIP outlines the Government of Tonga's priorities and plans for the major initiatives in the economic infrastructure sector (energy, telecom, water, waste and transport) over the next 5 to 10 years. Government's strategic framework for investing in developing the infrastructure sector is to connect people and business to social and economic opportunities; to provide the basic infrastructure services that support vibrant communities and the economy; and to provide access to reliable and affordable energy, in a way that is sustainable, safe and resilient.

Combined Utility Board Policy Standardisation

Given the Government initiative of having all utility companies headed by one combined BOD, TPL has led the initiative of developing a Company Policy Manual that are shared by each of the other two utility companies Tonga Water Board and Waste Authority Limited (WAL). The TPL Policy Manual was developed and form the basis for the development of TWB and WAL Company Internal Policies which gives each company a common understanding that all companies operated under one similar policy across the board.

4.5 Purpose of the Public Enterprise



TPL's core purpose is to deliver the Government of Tonga's vision for the energy sector and to deliver on the nation's target for energy via its strategies identified in this Business Plan. Government also calls for TPL to be financially sustainable. The values and key imperatives are the foundation to successfully achieve our Core Purpose. All these elements together achieving the broader energy outcomes at national level.

Key energy outcomes include the national security of supply of energy, Economic development- competitive energy pricing quality services, Standard of Living- making electricity available at every home, and Low carbon energy emission.

5. PLANNING INPUTS

5.1 External Elements

Legal, Policy & Environmental Issues:

A number of external factors may impact on the execution of our mandate. These factors include the following:

i) Legal and Political – laws, global issues, legislation and regulations which may have an effect on TPLs mandate either immediately or in the future.
ii) Environmental – Environmental issues either locally or globally and their associated social and political factors.
iii) Policy – policy issues which have an impact on TPLs mandate.
iv) External Business risks

Details of the specific factors considered in the external environmental scan, complete with TPL's response to the challenges are presented below:

Legal and Political Issues:

Third Party Generation (on-grid)

The Electricity Act 2007 allows third party generation both on-grid and off-grid. On-grid or grid-connected systems are also called Distributed Generation (small or large) where third parties generate their own electricity and connect to TPL's main network to inject surplus electricity or draw more electricity if there is deficit in the energy requirement. Distributed Generators connect to TPL's network mainly because they do not have energy storage facilities for night use, which might bring significant revenue losses to TPL. TPL in response to this problem has introduced the Gross Metering Policy which became effective in December 2016.

Other risks inherent in the distributed generation includes but not limited to the following:

i) *Loss of grid stability & security of supply:* The private investment in renewable electricity generation of capacity less than 160kW (i.e. SDG or small distributed generation) has impact on grid stability and security of supply in the medium and long run. The greater the degree of renewable penetration, the greater the impact on the centralised generation and distribution assets. This in turn imposes significant financial risks to TPL as it has to invest large amount of money on technologies such as smart technology which includes smart meters, storage facilities and micro-grid controllers to avoid grid instability.
ii) *Deterioration of generation assets:* Due to the intermittent nature of third-party renewable generation, TPL should still maintain a large spinning reserve, keeping existing firm (diesel) generation operating at inefficient levels. This would see TPL incur extra diesel or other fuel costs and likely an accelerated rate of deterioration of existing diesel and other firm generators.

iii) Renewable energy spillage: As more distributed generation are introduced to the network means that at some stage, TPL's own renewable generation would become redundant due to surplus energy in the system. This surplus energy will have to be curtailed somehow and perhaps battery storage will provide a solution moving forward.

iv) Export tariff charged are reasonable

TPLs response to the challenge is:

1) The new *Gross Metering Policy* which becomes effective in December 2016 was established mainly to recover the non- fuel revenue of the tariff that are lost as a result of this regulatory requirement. A requirement also established in the new SDG Policy where all SDG > 4Kwh requires a 3-phase connection to avoid grid instability.
2) Developing appropriate Power Purchase (PPA) Agreements with IPP owners and managing outcomes will present a challenge to TPL. Outsourcing energy from IPP owners' enables cost saving (both fuel and non-fuel). At the same time TPL has to incur additional expenses including the cost of automation to monitor IPP's RE generation facility to ensure safety and stability with fuel savings being passed through to customers.
3) Storage is also part of the GCF proposal.
4) Constructing a suitable agreement including various mechanisms such as charging a grid availability charge or setting up a multi tariff system.
5) Adoption of smart grid technologies.

Limited safety regulations

Building wiring is not the responsibility of Tonga Power as TPL's responsibility is up to the power entry point at the electricity meter only. House wiring is the responsibility of the Electricity Commission and qualified, licensed Electrical contractors. It is the responsibility of EC licensed electrical contractors to inspect the house wiring initially during construction of the building and conduct periodical inspections thereafter. There have been several deaths in Tonga over recent years due to poor electrical wiring. This reflects badly on TPL's reputation and the Electricity Commission not to mention the sector in general.

EC asserts that the old Wiring By-Laws developed and promulgated in 1985 are materially deficient in regard to electrical safety and a Safety Regulation was presented to Cabinet before to which they showed very little interest. The EC has argued that under the current regulations TPL has the authority to disconnect customers when an electrical hazard is found or reported by a third party. However, the paramount consideration of both EC and TPL is electrical safety and they shall take all reasonable measures to prevent electrical hazards which may include disconnection from TPL network. It is also worth noted that all electrical contractors in Tonga adopts the international AS/NZS 3000/2007 Wiring Code to ensure electrical wiring safety while the Regulation is still developed.

Additionally, vegetation clearance rests with TPL in accordance with the Growth Limit Zone outlined in the Customer Service Agreement. The problem arises when the vegetation/trees falls beyond the growth limit zone to which TPL considered as an electrical hazard but does not have the legal right to trim down trees/vegetation. TPL has put measures in place to address the issue.

TPLs response to the challenge is:

i) A provision in the new CC allows TPL to disconnect power from customers if there is a probable electrical hazard however TPL to consider seeking legal advise on these clauses if could be legally enforced.
ii) EC have drafted new safety regulations to replace the existing regulations in accordance with the New Zealand and Australian standards and submitted to the Government for promulgation which is still under consideration by the GoT.
iii) TPL was to seek legal assistance to amend the existing legislation/consider other relevant Act i.e. Road Reserve Act if TPL is covered.
iv) Residual Current Device (RCD) to be installed in every houses to avoid electrical shock – TPL to look for funding on behalf of the Electricity Commission (EC).
v) Ongoing Safety awareness programs/campaign

Policy Issues:

Aggressive TERM objectives

In order to reduce the country reliance on oil price volatility, one of the TERM objective is to achieve 50% renewable energy penetration by 2020. The target is considered aggressive but may be hampered by the following reasons:

i) High level of dependence on donor funding resulted in long lead times
ii) Government public debt make it difficult to obtain Government guarantees
iii) Relative cost of RE is too high particularly initial investment
iv) Time consuming – implementing donor funded projects
v) TPL insufficient borrowing capacity left the company with very little room to contribute to the RE projects to reach the 50% RE target
vi) Having a realistic and competitive proposal to the GCF – completeness and competitiveness

TPLs response to the challenge is:

i) Preparation of a US$55.17M renewable energy submission to the Green Climate Fund (GCF) Board, which include TPL-supported activities such as outer islands mini-grid investments across the Ha'apai Group; battery storage in 'Eua and Vava'u; mini-grids in both of the Niua's; 3 new on-grid solar farms in Tongatapu with a total capacity of 6 MW and associated battery storage and 3 new on-grid wind farms in Tongatapu with a total capacity 6.6 MW and associated battery storage. TPL is working closely with MEIDECC to complete preparatory works and will be responsible for the bulk of project implementation.

Environmental Issues

Tonga Climate: The climate in Tonga is attractive for certain forms of renewable power generation including solar, wind and bio-mass etc. However, the hot weather gives rise to formation of tropical cyclones in Tongan seas on an annual basis. Cyclones often destroy TPL's network and generation assets extensively. Even though insurance and surplus of donor funds are available to reconstruct the damaged network, this takes a considerable amount of time to bring the network back to a normal state of operation. This also imposes various economic and safety risks to the people of Tonga when the nation experiences prolonged outages.

Additionally, the four grids are exposed to extreme (cyclone, salt spray) weather conditions, primarily from strong winds that often cause indirect damage due to vegetation as well as falling coconuts given the island formation and structure. A significant amount of vegetation management is on-going however the networks are vulnerable to falling coconut palms. The grids do not feature any sub-transmission circuits or trunk feeders as one would see in larger and more densely populated areas internationally. This makes all of Tonga Power's grids largely radial in nature with little ability to interconnect or mesh the networks to provide multiple transmission routes to key customers or core areas of service. The only area where there is scope for interconnection and sectionalising of feeders is in and around Nuku'alofa.

TPLs response to the challenge:

i) Under the Nuku'alofa Upgrade Project, work is being planned for this financial year to overhaul and repair network switches to help manage interconnection issues.
ii) Under the Asset Management Plan, TPL has progressively introduced asset condition monitoring in order to enhance reliability of supply and safety.
iii) Identifying locations of old assets (insulators, transformers, recloses, street light control boxes, poles and undersized conductors etc.) through the GIS & Filemaker software and replacing/maintaining them as per the maintenance plan.
iv) Utilising innovative technologies such as Acoustic Inspections and Thermal Imaging Inspection on overhead distribution assets to identify defects such as corrosion, pitting, tree contact, overheating, contamination, cracks, loose connections, and electrical discharges etc. All of which contribute to network losses and when rectified will reduce network faults in the field.
v) Ongoing vegetation clearance plans.
vi) Having a reliable insurance plan in place.

Market Issues:

The major market issues can be summarised into the following four categories and they are discussed in detail below.

- *Fuel price volatility*
- *Rising electricity demand growth*
- *Flat overseas remittances*

Fuel Price Volatility:

Petroleum dependency makes Tonga highly vulnerable to oil price shocks, affecting the affordability of food, goods, electricity and transportation. The reliance on fossil fuels has been exposing the Tongan economy to high electricity tariffs linked to volatile oil prices over the last decade. More than 90% of Tonga's overall grid connected electricity demand was supplied by generators fueled by imported diesel. Linked to these fluctuations and the electricity tariff reached its peak in September 2008 at 102 seniti per kWh, and again in July 2011 at 98 seniti per kWh and then slowly dropping to 83 seniti per kWh in March, 2017 due to fluctuation in global fuel prices.

TPLs response to the challenge:

i) Introducing a Government lifeline subsidy in April 2017 (i.e. all power customers consuming < 100kWh of electricity is eligible for a special tariff of 70 seniti/kWh).
ii) Introduce a competitive hedging progamme to avoid the fluctuation in oil prices – still work in progress.
iii) Management seek to stablise its cashflows situation especially when there is time lags in passing fuel price volatility to customers.

Rising Electricity Demand Growth:

The two major sources of electricity demand growth are the addition of new customers and increased use by existing customers. Both are economically driven factors that may be expected to respond to economic change. For the coming years, electricity demand use by existing customers is likely to increase by about 3% to 5% due to economic growth factors such as TVNUP, expected ramping up of preparations for the 2019 South Pacific Games, increase of small businesses such as retail and fast-food outlets, increase in street lights, and increasing agricultural production and tourism activities.

Asian Development Bank (2016) has predicted about 3% increase in GDP growth for the years 2016 and 2017 mainly due to the increasing economic activities. Other domestic factors that drive demand for electricity supply are increases in household appliance numbers due to better quality of life aspirations, the return of wealthy Tongans from overseas and arrival of expatriates. Increased load is a risk to TPL especially in terms of network reliability and stability.

TPLs response to the challenge:

i) Install energy storage which is part of the GCF priority projects.
ii) Installation of energy saving light bulbs, the use of energy efficient appliances and off-grid renewable energy sources (e.g. Solar).
iii) The genuine growth opportunities mentioned above are subject to considerable uncertainty but may be slightly on an increasing trend for the next few years and depend largely on the effectiveness of energy efficiency campaigns over the coming years.
iv) Encourage IPP investment.

Flat Overseas Remittances:

Like many other Pacific island nations, Tonga has become economically dependent on migrant remittances and foreign aid as its major sources of revenue. At the national level, remittances are the major source of foreign exchange and accounted in 2015 for about 27 percent of GDP. At the village and household levels, remittances are an integral part of income and consumption. Seventy-five percent of all Tongan households report receiving remittances from overseas (mainly New Zealand, Australia and United States), making remittances the single most widespread source of income in Tonga.

After the Global financial crisis picked up in 2008, remittances saw a significant increase in the last year (to USD92 million) mainly as a result of the weakening of the TOP against USD as US economy picks up as well as family sending money for private affairs and family obligation. Most of the power customers rely on remittances for bills payment, as evident in online bill payments from overseas.

External Business Risks: The following risk analysis shows the risks inherent from the above legal, political, environmental, market and social issues. The suggested mitigation controls and the current level of control effectiveness are also shown in the table:

External Business Risks		
Risk Description	**Mitigation Control**	**Control Effectiveness**
Significant business continuity risk to TPL due to significant tariff increases hence economic inefficiency for poor customers if large customers move to off-grid renewable generation plus storage.	This is a rare risk. It is expected that tariff will decrease significantly by 2020 with the 50% RE penetration target preventing large customers going off-grid.	Partially Effective
Significant business continuity risk to TPL due to reduction in non-fuel revenue, poor fuel efficiency and increase in diesel generation maintenance costs (hence tariff increase) resulting from likely increase of on-grid distributed renewable generation.	TPL has put in place Gross Metering policy to protect its non-fuel revenue. Storage, smart-grid & smart-meter solutions will be used to address the technical risks.	Partially Effective
Significant financial and reputation losses to TPL due to public lawsuit taken against the company as a result of members of public getting electrocuted from poor house wiring. TPL may also be sued for vegetation clearance beyond the Growth Limit Zone of 1meter for LV and 2meter for HV.	TPL take all possible actions to increase safety awareness to public from electrical hazards. However, new safety regulations must be promulgated with the recommendation of Electricity Commission to hold parties accountable. CCII also gives TPL the power disconnect electricity if a probable electrical hazard is evident	Partially Effective
Significant business continuity risks to TPL due to hot weather in Tonga that forms tropical cyclones and destroy large portion of TPL distribution/generation assets. The recovering from a cyclone takes a considerable amount of time leaving people of Tonga without power.	Insurance and donor funds are available to reconstruct the network and power station assets. But TPL's Business Continuity Plan provides the speedy recovery.	Effective
Significant financial and reputation losses to TPL due to any public discontent resulting from unaffordable electricity tariffs through rising oil price.	Tonga's current electricity price has increased to 83.3s/kWh due to increase in global fuel price. The 50% RE penetration and engaging in effective fuel hedging strategies will also help reduce tariff. Government GPO also assist.	Effective
Significant business continue risk to TPL as a result of increased electricity demand growth in Tonga.	Government policy formation to encourage economic efficiency activities. Reduction of electricity tariff through global oil price reduction and introduction of RE sources. Introduction of energy storage through GCF.	Partially Effective

5.2 Internal Elements

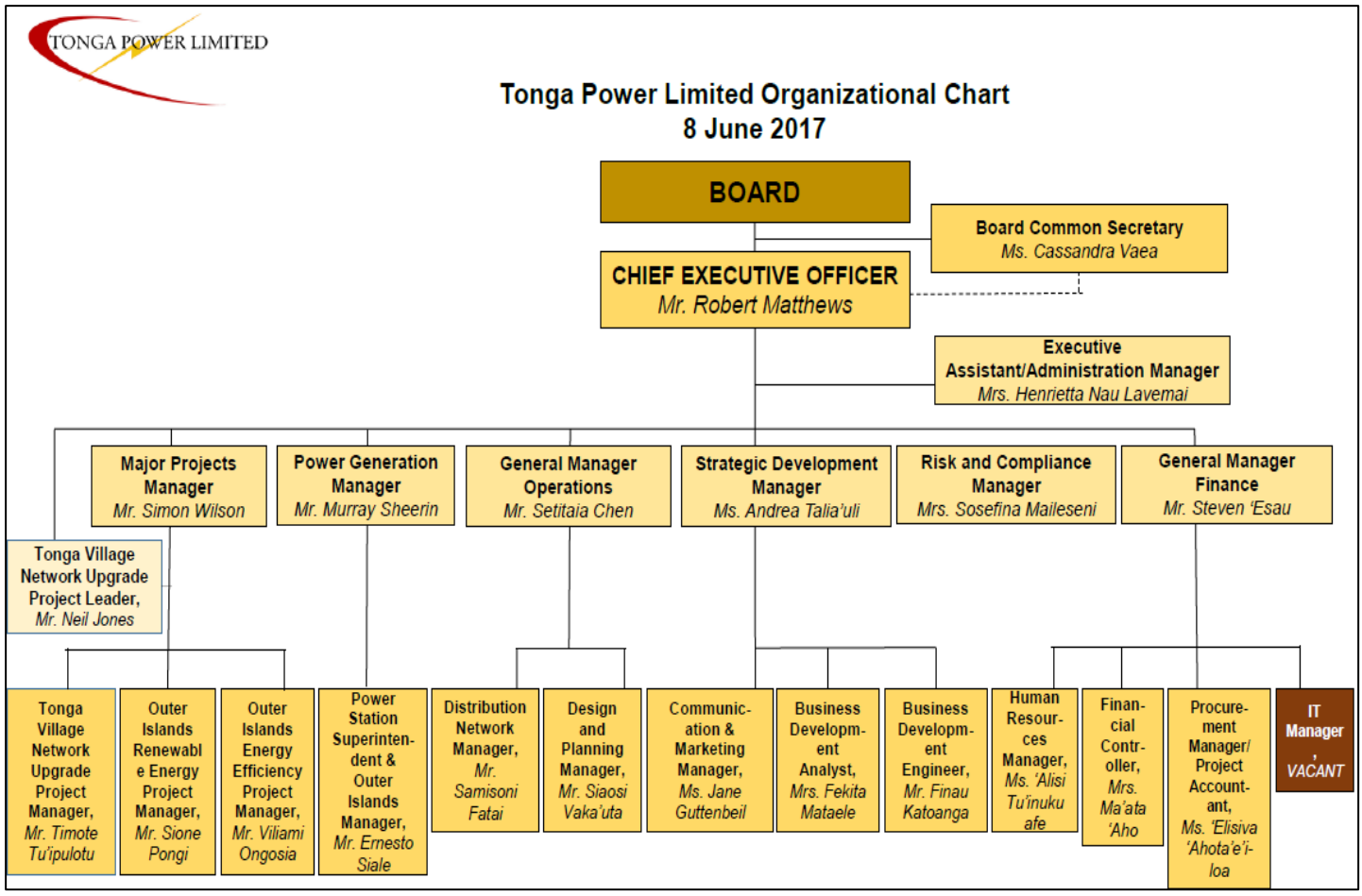
A number of internal factors may impact on the execution of our mandate. These factors include the following:

i) People Issues – staff issues which may have an effect on TPLs mandate either immediately or in the future.
ii) Physical Assets/Equipment Issues – Assets and Equipment Issues which may have an impact on the company operation.
iii) Product/Service and Supply Issues – Product/Service and Supply issues which have an impact on TPLs mandate.
iv) Business System and other resources – Business resources which might have an impact on the business operation and mandate.
v) Internal Business Risks

Details of the specific factors considered in the internal environmental scan, complete with TPL's response to the challenges are presented below:

People Issues:

Tonga Power has a skilled and experienced senior management team consisting both local and expatriate staff. The company structure below shows the CEO, senior managers and their subordinates in each business unit.



The number of established staff at Tonga Power Limited has increased to 239. Approximately 25 of our staff are dedicated to implementation of the projects, including development of new generation, customer and network initiatives as well as the trainee linesmen and women working on the village project.

Below is a summary of TPL staff list as at June 2017.

TONGA POWER STAFF LIST SUMMARY – 8 JUNE 2017

	Tongatapu		Vava'u		Ha'apai		Eua		TOTAL
	Permanent	*Casual*	*Permanent*	*Casual*	*Permanent*	*Casual*	*Permanent*	*Casual*	
CEO	1								1
Senior Managers	7								7
Board Secretary	1								1
Operations									
(i) Distribution Network	56	9	8	6	4	5	4	1	93
(ii) Design & Planning	16								16
Major Projects									
(i) TVNU	23	5							28
(ii) OIEE	1			2				3	6
(iii) OIRE	1								1
Power Generation	14	2	3	1	2		2		24
Strategic Development	3								3
Finance	1								1
(i) Accounts	5								5
(ii) Billing	16	1							17
(iii) Revenue	6	2	3		2		2		15
(iv) IT	4	1							5
(v) HR	3								3
Administration	2								2
(i) Security				4		1		2	7
(ii) Cleaners	1				1				2
(iii) Drivers	1								1
On Study Leave	1								1
TOTAL	163	20	14	13	9	6	8	6	
TOTAL per ISLAND	**183**		**27**		**15**		**14**		**239**
TOTAL NUMBER OF CASUAL STAFF				45					
TOTAL NUMBER OF PERMANENT STAFF				194					

As more distributed and renewable generation is planned for the future, operation staff will have the advantage of understanding both generating units and network response. Staff with a background in diesel engines/operations will be pivotal to the continuing smooth operation of our power stations but may lack the technical expertise and needs further trainings. High intermittent renewable penetration levels (50% +) on grids the size of Tongatapu's is a very new concept, and for TPL to manage such a system will require TPL to have very qualified and well trained personnel. Increased Health and Safety requirements may also need to be adhered to.

Ongoing trainings are also provided to all field staff. Training brings all field staff to a level where they will have qualifications (New Zealand Qualification Accreditation or NZQA) that will be recognised internationally, and will be certified by the Electricity Supply Industry Training Organisation (ESITO). Line staff will become increasingly sought after by New Zealand and potentially Australian line companies and contractors which is seen a risk to the company.

Given the high level of trainings and exposure that TPL offered to its Distribution team, a team of linesmen were funded by ADB to assist in the network restoration work after cyclone Ian hit Fiji in 2016. A lot of excellent feedback received that the lines technicians are obviously working to a high level of workmanship which is beneficial to get continued work from a multinational organization like ADB who have the ability to pull resources from anywhere including Tonga.

Furthermore, given the direction the company is moving such as the RE target focus and the combined utility changes, TPL needs staff that are well equipped to handle change, committed and have the right mix of knowledge and experiences. Trainings will also be a top priority needs.

TPLs response to the challenge:

i. Tonga Power wants to facilitate training opportunities funded through TVNUP, but it means strengthening its staff recruitment and training processes and managing the loss of key personnel.
ii. Trainings and development programs are planned in order to keep operations safe as well as maintaining reliability of TPL network. Developing staff to monitor and control the network from a central control perspective will also be a priority given the RE glide path.
iii. Tonga Power to develop both new capacities within the core business and undertake new business opportunities for which will require to introduce new skills and resources. Examples include increasing our involvement in the gas and fuel sectors, financial reporting, communications and marketing skills, engineering design expertise, and project and commercial management.
iv. Ongoing refresher training in first aid and fire safety / control keeps staff aware of managing a safe working environment.
v. Our zero accident target has helped change working habits. The health & safety officer acts as the watchdog. Staff are encouraged to report near misses, hazards, and accidents which are seen as a means to drive continuous improvement. This is a difficult transition, as the natural response to a near miss or accident is not to report it. Increased focus on safety as the number one priority, coupled with monthly Health and Safety meetings will help deliver and operations around a culture of continuous improvement. Respective department KPIs are also aligned to this.
vi. Specific HSE initiatives are managed by the individual business unit managers. In addition, Risk & Compliance division administers the compliance reporting and monthly HSE committee meetings.
vii. Appropriate succession planning in place.

Physical Assets/Equipment Issues:

Both Generation and Distribution Asset Management Plans address issues regarding network or power station assets. Some of the major issues are highlighted below.

Deteriorated network assets:

The condition of the network assets was very poor in all four island grids since TPL acquired the business in 2008. Most of the poles were 'stick poles', distribution lines were low hanging so low that the public were able to touch, pole top equipment were run down, the connectors at the transformer were loose and too many loads were connected to one transformer. The poor quality network presented several risks including high level of line losses, estimated to be up to 20%, voltage fluctuations causing damages to household appliances and safety hazard to the public. With the TVNUP and outer island network upgrades, total system losses has significantly improved to less than 12%.

Nuku'alofa CBD and Vava'u network status still require further improvement. The poor state of equipment on these networks include de-rated cables, broken insulators, weak poles, broken air-break switches, incorrect HV/LV fuses, over utilized transformers and connectors and much more. Vava'u is currently work in progress and is target to be completed in 2019, while TPL is looking to secure funding for the CBD upgrade, to which the NZ Government has committed a NZD $5 million to kick start this project.

TPLs response to the challenge:

i) The New Zealand Government through the New Zealand Aid Program has generously donated a total of NZD$32 million to finance the Tonga Village Network Upgrade Project (TVNUP) with $7.5 million as TPL's contribution. The final stage of the project is expected to be completed in May, 2018.
ii) OIEEP (network upgrade to Vava'u & 'Eua) which commenced in 2016. 'Eua network upgrade was completed in May 2017.
iii) The company is still seeking donated funds for the Nuku'alofa Upgrade Project 2017, however NZ Government has promised a NZD $5 million to kick start this project.

***SCADA (Supervisory Control and Data Acquisition) System*:**

The SCADA systems installed at Tongatapu (Popua) and Vava'u has been a useful tool for generation (for ongoing monitoring of the engines and generators) and distribution network planning. In the Power Station, each generator can be monitored on a shift by shift basis for fuel use and efficiency. The data is helpful in monitoring any fuel losses including theft as well as engine condition monitoring. However, there are limitations to TPL's current SCADA capabilities such as the absent of a supervisory control in each SCADA as well as integration of the existing systems.

Ha'apai and 'Eua do not have SCADA systems; these power stations use utility metering with logging capabilities to capture electrical parameters, with the engine parameters monitored locally. In addition, SCADA parameters cannot be monitored from the Tongatapu main Power Station due to lack of remote communication capabilities.

TPLs Response to the challenge

i) Approximately $2 million SCADA upgrade planned for the next financial years as well as about $0.2 million allocated for extension work to the existing SCADA system.
ii) TPL monitors outer island power station equipment performance however waiting to use either Satellite or Fiber communication links to enhance efficiency.

Security of supply (N-1):

TPL's Security of Supply Policy ensures enough FIRM (diesel) generation capacity is available at short notice to cover faults or to meet sudden changes in consumer demand. In other words, if the largest capacity generator is out of action due to a breakdown, other generators in the fleet must be able to continue to supply power to meet the consumer demand at any time of the day. The solution for the N-1 redundancy policy is to duplicate the largest generator in each of TPL's four power stations. The policy assumed intermittent generation (solar and wind) cannot be relied on at any time and are excluded. Currently Tongatapu and all three outer islands meet the N-1 security policy; however, there is slight ambiguity of maintaining the reliability of supply due to potential load growth as a result of the TVNUP and preparation work for the upcoming Pacific Games in 2019.

TPLs response to the challenge

i) TPL is planning to purchase a 1.4MW containerized Genset in the 2018/19 year at a cost of approximately TOP $2.5 million which will definitely resolve this issue.

Bulk Diesel Storage Tank:

TPL currently has only one bulk storage tank installed at the Popua Power Station. The present storage tank has a capacity of 250,000 liters and supplies fuel to diesel generators for 10 days (25,000 liters supply per day). However, in case of catastrophic damage to the present tank due to a disaster (e.g. earthquake, fire etc.), the power station does not have any redundancy plan for storage of fuel for generation of electricity.

TPLs response to the challenge:

i) TPL will build a second storage tank with the same capacity, but not in the very near future. This project is expected to cost TOP $0.5 million and is schedule to be installed in 2020.
ii) A major new project planned for the future is for Government in collaborative work with TPL to build a new tank farm in Tonga which will definitely resolve this issue.

Generator Replacement:

Tongatapu (Popua) power station has six CAT generators (3516B) and two MAK generator (6CM32). All six 1400KW CAT generators have come to their end of their economic lives, hence, requires replacement. TPL have put in place plans to retire existing CAT generators and replace them with new generators or refurbish them at low costs. The risk is not that significant as long as the old generators are replaced or refurbish at regular intervals in the future in accordance with the manufactures' recommendations. Outer island generators, however, have been overhauled in a timely manner, thus have no such risks.

However, it should be noted that TPL is moving towards the 50% renewable energy (including energy storage solutions) penetration by 2020. In this case, these generators will not be made operational on a continuous basis but will be used as future backup firm generation. It is important to note that the majority of the engineering and planning for the incorporation of renewable energy into the electricity grid has been based on the current diesel generation portfolio.

TPLs response to the challenge:

i) The refurbishment of the existing generators would be beneficial with continuity of the future development plans and for upkeeping of the existing generators within the next five years. This work is estimated to cost the company approximately TOP $0.8 million however this may change given the additional RE projects to be implemented in the 2-3 years and/or when TPL decides to go further to 100% RE target.

Product/Service and Supply Issues:

Services standards: TPL's service standards to consumers are regulated through the Electricity Concession Contract. Any violations of these standards contribute to rule breaches and payment of penalties by TPL to affected customers. A summary of these services standards are described below:

- Maximum time for new connection (<30 meters – 4&10 days, >30 meters – 10&20 days)
- Minimum notification time prior to disconnection (5 days)
- Reconnection after payment of arrears & reconnection fee (1 day –rural, 2 days – urban)
- Maximum time for first bill to be delivered (50 days)
- Maximum time between bills (45 days)
- Respond to customer queries (5 days)
- Maximum time for power supply connection – maintenance works (5 days advertise in the wider media)
- Temporary disconnection of supply for maintenance (2 days)
- Response time to emergency or faults calls (2 days)
- Voltage stability standards (240V +/- 10% & 415 +/-5%)
- Response to voltage test requirements (5 days)
- Fuel efficiency target (4.0kWh/L)
- System loss target (12%)

TPL is in compliance with all the above requirements except the voltage stability standard. Occasionally, breach of this standard occurs due to poor quality networks. In these occasions TPL pays compensations to the affected customers upon completion of an investigation conducted by TPL engineers and if necessary by independent sources.

It is expected that we will see almost none of this once all the network in the country are fully upgraded.

Customer complaints:

TPL manages all customer complaints through its Customer Complaints Management Policy. All complaints are reported to the Board on a monthly basis. There are on average about 50 customer complaints from all four island groups per month, and mainly relation to: incorrect meter reading, not receiving a power bill, incorrect bill received, over/under voltage, meter error, over charge, high consumption, and power not connected after disconnection for non- payment etc. Risk and Compliance Manager monitor TPL Complaints portal through a monthly reporting to the Board as well as follows up with responsible Managers on the status of each underlying reported complaint.

Reliability of supply:

Reliability measures indicate the average interruption time (in minutes) that a customer experiences power outage due to a network failure for a certain period, which can be for up to a month or more. The key reliability measure TPL uses is SAIDI (System Average Interruption Duration Index), which measures the average total duration of interruption per connected customer. During the last 2015/16 financial year, on average a connected customer has experienced about 1309 minutes (about 1.1 hours per month) power outage. This value is quite high when compared with countries such as New Zealand or Australia but quite acceptable for pacific island countries like Tonga. However, it is important to note that about 50% these outages have been caused by planned events mainly for the network upgrade projects.

Business Systems and other Resources:

TPL uses various software systems for different purposes by different business units. A summary of software systems used by TPL are:

1. Orion Billing System – Billing and customer relations management
2. Filemaker Asset Management Software – Asset Management, maintenance and networking audit
3. QuickBooks Accounting Software – Accounting and reporting
4. Quantate Risk Management software – Risk analysis and reporting
5. GIS software – Geographical interface system
6. Sincal Software – Load flow analysis
7. Xsol Software – Business process redesign and mapping

There are issues associated with the use of the above softwares where most of it requires upgrade (GIS and Sincal) and the Filemaker software are good but staff do not fully utilize the benefit the system can produce.

TPLs response to the challenge:

i) TPL has started an Enterprise Resource Planning (ERP) project which will unify some of the above software systems into one single software platform. The ERP has GONE live on most of its Modules (Finance, Asset, Payroll, HR) starting in late 2016. Once the system is fully LIVE, TPL will continue to pay annual support fee for the ongoing support on using the system.

Internal Business Risks: The following risk analysis shows the risks inherent from the above internal issues. The suggested mitigation controls and the current level of control effectiveness are also shown in the table.

Internal Business Risks		
Risk Description	**Mitigation Control**	**Control Effectiveness**
Significant financial and reputation losses to TPL due to payment of high penalties to customers when customers' household appliances are damaged or when they receive serious electrical shocks from voltage surge resulting from loose neutral connections at the transformers.	Expedite transformer inspection program to identify loose neutral connections at the transformers. TVNUP and OIEEP project also help mitigating this risk.	Effective
Significant revenue loss to TPL due to poor state of the Nuku'alofa and some of the outer island distribution networks that contribute to high voltage fluctuations.	Nuku'alofa have been planned. OIEEP would cover all the outer islands upgrade. TPL is waiting to receive funds from potential development partners for NUP.	Partially Effective
Significant revenue and reputation loss to TPL due to non-achievement of N-1 security policy as a result of ageing generators which could go out of actions any time of the day due to sudden breakdowns.	Generators must be maintained and replaced as per the manufactures' recommendations. A generator replacement plan is in place for all four island power stations however this should be done at very low cost given the RE glide path now in place. A major containerized Gen Set is also planned to be procured in the next FY.	Partially Effective
Significant business continuity risk as a result of loss of key staff trained on international standard qualification (i.e. ESITO)	Strengthening of TPLs staff recruitment and training processes and managing the loss of key personnel.	Partially Effective
Significant business continuity risk as a result of staff lacking the technical expertise to implement the RE projects	Staff to be trained on RE related courses through on the job trainings and overseas courses. Operation Managers to put in plans in place on how to manage projects staff given we will be focusing on RE projects in the next coming years	
Significant financial and reputation risks to TPL due to public fatality or serious injury to a member of the public by touching low hanging live LV conductors.	Survey non TVNUP villages and outer island networks to identify and fix low hanging LV conductors or conductors close to buildings.	Partially Effective
Significant financial, reputation and HSE risks to TPL due to injury, death, or public legal action against TPL as a result of staff carrying out unsafe working practices and installation of incorrect equipment.	Safety and network construction training provided to all staff ESITO and NZQA standards, L2, L3 and some L4 (not enough certified equipment for all L4 certification). Update the existing design and construction manual to be used by staff during installations.	Effective
Significant financial and reputational risk to TPL due to incorrect reports generated from the File Maker software and unreliable information produced from the SCADA software. This makes company making incorrect decisions.	New ERP system will replace the existing File Maker software. Until then, systems users must be trained to manage the system accurately. SCADA upgrade is also planned for the next FY.	Partially Effective

5.3 Summary and SWOT analysis

Strengths	Weaknesses
• TPLs good reputation with donor partners • Electricity Commission (EC) intervention • Projects are delivered on time and within budget • Reasonable gender balance workforce • Good relationship with customers • Experienced and skilled senior management team • Good working relationship with relevant stakeholders • Strong support from Government and enhanced collaboration • Leading Pacific in state of the art technology • Much improved distribution network to provide reliability of supply • TPL compliance with regulatory requirements • Adapting to the changing working environment (50% RE target in 2020, new ERP system, PPA) • Working according to plan • Experienced, Positive attitude and knowledgeable staff • Low staff turnover • Great teamwork • Improved/Stabled network • Successful company in terms of profitability and operation	• Staff constraint (especially having succession planning for near to retired experienced Generation personnel • Communication breakdown within TPL • Public perception/understanding of TPL's operation • Deteriorated network and ageing generation assets in some areas • Loose or broken neutral connections at the transformers cause some customers to experience line voltages (i.e. 415V) instead of phase (230V) voltage causing damages to household appliances. TPL paying significant amount of compensation for these damaged appliances. • Crews conduct unsafe working practices on the network • Reliability of supply measured in minutes of supply interruption time (SAIDI) getting worst shown through the rising SAIDI min's trend • Reports generated from File Maker software are sometimes inaccurate due to incorrect input data • GIS/SCADA to be upgraded and updated • Obsolete network design & construction manual • Wasting considerable amount of time on researching technologically unproven project initiatives (e.g. bio-diesel, wave technology, water to power etc.) • Increasing workload on existing senior management due to company growth

Threats

- Electrical and the Renewable Energy Acts allow third parties to self-generate (off-grid or on-grid) renewable energy causing revenue reduction to TPL and as a result tariff could increase further
- Increasing RE penetration to achieve the TERM objectives leads to loss of grid stability, safety, reliability of supply and increase generation asset maintenance cost
- Increasing off-grid RE penetration by large customers leads to economic inefficiency and leaving poor people more vulnerable to further tariff increases
- Increasing RE penetration causes fuel efficiency to decrease due to increase in load factors from their intermittent operations.
- Lack of safety regulation in Tonga makes it impossible to hold parties accountable when there is an electrical accident
- Tonga's vulnerability to tropical cyclones means that it takes a considerable amount of time to restore the electricity network once destroyed by a cyclone
- Highly volatile fuel prices expose to high electricity tariff in Tonga
- Possible reduction in migrant remittance causes people to use less electricity and exposes people to disconnection when they are unable to pay their bills on time
- Donors reluctant to fund money on projects due to various reasons

Opportunities

- Rapidly changing environment
- Availability of GCF to fund the 50% RE projects
- Increasing RE penetration provides TPL an opportunity to embrace smart-grid technologies to provide grid stability and reliability.
- Seek cheaper IPPs who sell electricity to TPL at lower rates than cost of supply
- Non regulated revenue
- Opportunity to look for multi-tariff structures with increased RE penetration (e.g. life-line tariff, demand based tariff at the peak time, RE use tariff etc.)
- MFAT Partnership with TPL on TPL projects
- Share services (IT)
- Common Utility Board
- Ministry of Public Enterprise support
- Private Sector Investment
- Achieving the TERM objective of 50% RE leads to Tariff reduction
- Electricity Commission Tariff Reset
- High RE penetration could reduce the diesel generators base load requirement. This enables opportunity to draw donor funds to replace them with small generators.

6. PLANNING PERIOD STRATEGIC OBJECTIVES & CHALLANGES

Tonga Power Limited faces significant challenges especially when the energy sector globally is facing a changing landscape. Key drivers include the increasing costs of fossil fuels and renewable energy technologies, given the country effort to move away from imported fossil fuels in an effort to gain greater energy security. As mentioned earlier, while there is increasing focus and effort being placed on the 50% RE target by 2020, there is no denying that the dependence on fossil fuel cannot be removed overnight. TPL has therefore established the six key objectives that drive the company into achieving its major purpose of a safe, reliable and affordable electricity supply.

These strategic objectives are discussed in detail below:

6.1 Strategic Objective 1

In-order to deliver the Government's renewable energy target of 50% electricity generation from renewables by 2020 as well as applying sustained downward pressure on the electricity tariff for all customers, TPL plans to complete the following projects during the 2018-2023 planning period (Figure A). All of these projects are assumed to be funded through the Green Climate Fund. The majority of TPL's investment in these projects will likely increase the non-fuel component of tariff but overall a net reduction in tariff will result due to a greater off-set resulting from the substitution of fuel through the fuel component of the tariff.

Priority Project to reach 50% RE Penetration	
2.3MW and 1.15MWh Battery Energy Storage System, Scada Control & Mini Grid Controller	$7,081,920
2 MW Solar PV Farm (Central West Tongatapu), including Energy Storage of 700kW and 350kWh Battery	$5,311,440
2MWSolar PV Farm (South West Tongatapu) including Energy Storage of 700kW and 350kWh Battery	$5,311,440
Long term Energy Storage of 2.3MW and 16MWh Battery in Tongatapu	$11,065,500
400kW Solar PV Farm and 500kWh battery storage	$2,500,000
500kW Solar PV Farm (Vavaú) and 1.1MW and 1.5MWh battery storage in Vava'u to achieve 50% RE penetration	$2,655,720
1.3 MW Wind Farm (Tongatapu, Niutoua village)	$5,311,440
2 MW Wind Farm (Extension for Niutoua Phase 3 towards Tongatapu, Lapaha village) including Energy Storage of 900kW and 450kWh Battery	$7,967,160
2 MW Wind Farm (Lapaha village) including Energy Storage of 900kW and 450kWh Battery	$7,967,160
TOTAL	**$55,171,780**

Key challenges faced by the objective are:

- High reliance on GCF to fund the above projects
- Fast tracking of project development and pre-emptive implementation does not come without risk and will need to be properly managed by TPL.
- Building relationships with development partners remains a priority but is also a challenge to TPL.
- Most donor-funded projects have a very strict policy on the origin of equipment that may not be optimal for Tonga's climate.
- The cost of electricity generation from renewable energy sources relative to generation from tradition energy sources still tends to be higher although costs continue to decline.

6.2 Strategic Objective 2

TPL's distribution system traditionally comprised of radial circuits fed from a centralised power station and designed to supply load based on customer demand while maintaining an adequate level of power quality and reliability in compliance with the Electricity Concession Contract. Protection is based on relays and fuses that use nested time delays to clear faults by opening the closest protective device to a fault and minimise interruptions. It is designed to safely clear faults and get customers back in service as quickly as possible. Sectionalising switches are manually controlled to restore load in un-faulted sections downstream from the failure.

TPL's current distribution systems are generally considered to be ready to support small DG sources without change, however, with increasing RE penetration, TPL's current power distribution system may experience complications in connecting to RE sources.

Therefore, as aggregations of RE continue to grow, changes in design and control practices will eventually be required at all levels of the power system.

The limitations of TPL's current system are:

☐ Current voltage control is achieved with devices that have localised controls. These schemes work well for today's radial circuits (where flow is outward from the power station to loads) but do not handle circuit reconfigurations and voltage impacts of locally distributed intermittent RE systems well.

☐ Similarly, for radial distribution systems, fault current protection is predicted on the principle that current flows from the power station to the loads. The presence of distributed RE sources introduces new sources of fault currents that can change direction of flow, introducing new fault current paths, increase fault current magnitudes, and redirect ground fault currents in ways that can be problematic for certain types of overcurrent protection schemes.

☐ Minimal communication and metering infrastructure is in place to aid in restoration following faults on the system.

☐ Limited communication infrastructure exists to facilitate control and management of distributed RE and storage resources. Without communication and control, the high penetration of RE generation on most circuits will be limited.

☐There is no communication to customer facilities to allow customers and customer loads to react to electricity price changes during on/off peak times.

☐ Some automation schemes are being implemented to reconfigure circuits to improve reliability, but these schemes do not achieve the coordinated control needed to improve energy efficiency, manage demand and reduce system losses.

☐ High penetration of RE can cause a reversal of power flow direction on the primary feeders leading to lack of coordination or sensing in protection devices.

☐ Increasing RE sources can significantly stress network equipment such as transformers due to its cyclic output variations.

To directly address the issues related to connecting large amounts of RE sources in the distribution system, smart-grid technological requirements in three key areas are required:

Category	Smart Grid Technological Requirements
Power Generation	All Diesel and RE generators should communicate with each other in a manner that ensures adequate load sharing, system stability, proper frequency and voltage control, and optimal system performance in terms of efficiency and energy production cost.
	Energy storage devices should be used to correct temporary load/generation mismatches, regulate frequency, mitigate flicker, as a result of fluctuating RE sources and assist advanced islanding functions and service restoration.
	RE sources should be made to participate actively in the scheme by adjusting reactive or real power levels as needed. Transformers, voltage regulators, local inverter regulators and switched capacitors should be interactive with each other by means of communication links with a control point to ensure voltage stability and required reactive power flow.
	Inverters should be used to prevent unacceptable voltage conditions in the local RE unit.
	Advanced inverters/controllers and energy management systems (EMS) should be sophisticated enough to interface with smart-grid technology to maximise efficiency, quality and reliability.
Distribution	The distribution systems should include more extensive use of directional relaying, communication based transfer trips, pilot signal relaying, and impedance-based fault protection schemes to work effectively with multiple distributed RE sources on the distribution system.
	Sectionalising schemes for interactive service restoration should enable distributed RE systems to pick help pick load during the restoration process.
	Distributed RE and distribution devices should address grounding incompatibilities among power system sensing, protection and harmonic flows.
	Over current protection should involves coordinated operation of many devices including circuit breakers, relays (differential or directional), reclosers, sectionalising switches, and various types fuses.
	Increasing RE sources can significantly stress network devices such as transformers. Through advanced status monitoring of network assets a replacement can be scheduled before the device fails or causes an outage.
	Monitoring voltage profiles (and power factors) at various points of the distribution lines and loads to assess impacts on the customers and take corrective actions to avoid any voltage regulation breaches.
	Automatic fault location and restoration by reconfiguring feeders to identify fault locations and route around fault locations.
	Smart meters should be installed at the customer supply point in order to manage customer loads remotely.
Customer Supply	Smart metering technology helps to provide consumers with information that allows them to use electricity only when it is available from renewable at cheaper price.

Key challenges faced by the objective are:

- High cost associated with the implementation of smart-grid technology means TPL has to turn to donors for funding.
- Difficult to gain Board approval on high-tech projects because the high cost of implementation can often outweigh the economic benefits from the project. Additionally the economic benefits are not always as direct as compared to say introduction of renewable energy and therefore take time to adequately appraise and provide to the Board for decision.

6.3 Strategic Objective 3

Strategic objective 3 focuses on successful asset management activities such as procuring, maintaining and renewing/replacing network and generator assets in order to improve the asset condition to enhance power quality, safety and reliability. Most of the inefficient network assets the company inherited from the previous owner are being replaced by donor and TPL funded projects. The deficient assets exposed TPL for non-compliance with frequency, fuel efficiency and line loss targets set in the Concession Contract. TPL strives to achieve a future asset management strategy that enhances the efficiency of our network and generation assets and this is explained in the next section in detail.

Key challenges faced by the objective are:

- There are a number of projects in the pipeline of which TPL has a limited amount of ability to fund. Seeking funding for selected projects may also be a challenge especially as many donors prefer to invest in RE projects to reduce tariff rather than asset improvement projects that enhances safety and reliability.
- Continuous review and updating of asset management plans continues to be a challenge to TPL due to limited skilled staff in house and staff commitment to other priority projects.
- With all the improvement plans currently set in motion, TPL is still facing challenges of meeting standards stipulated in the Electricity Concession Contract. One of the major challenges TPL faces is meeting voltage standards. Poor quality transformer connections and service lines results in supply voltage fluctuations outside the regulatory limits. TPL usually pays a significant amount of compensation and penalties to affected customers when their household appliances are damaged from high/low voltages.
- TPL funding capacity constraint

6.4 Strategic Objective 4

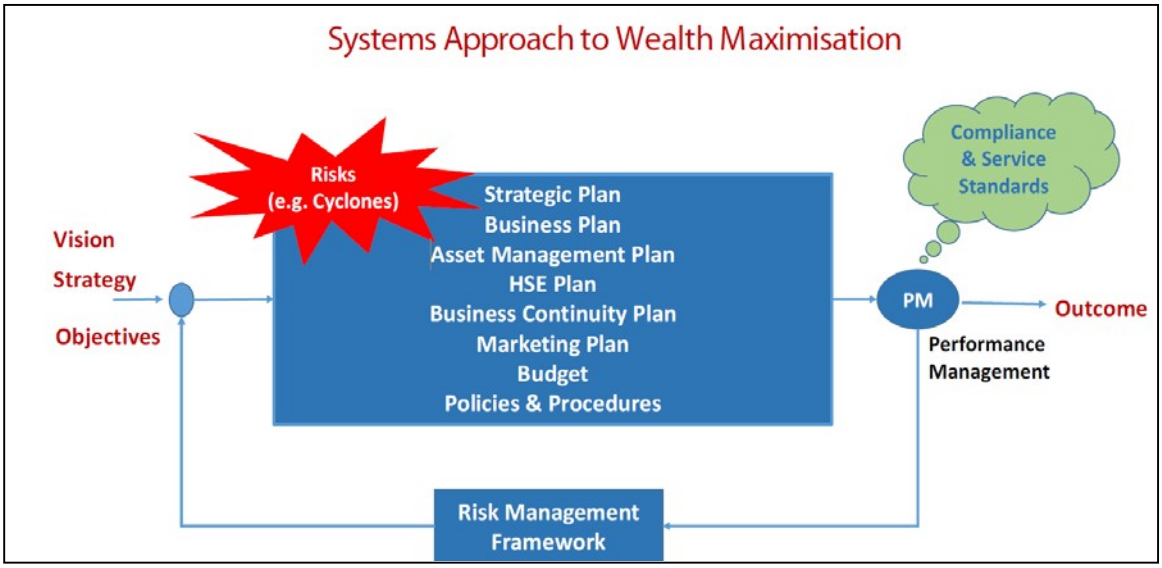
Cultivating a hazard free safety culture to minimize any electrical hazards to both the public and staff is one of the top strategic objectives for Tonga Power Limited. The key deficiency in Tonga is the need for increased safety regulations which must be approved by Cabinet. The current safety regulations are largely outdated and materially deficient. It is EC's responsibility to develop safety regulations and forward them to Parliament for promulgation. The company however, uses ESITO safety standards in electrical network construction and largely leads the pacific when it comes to safe work practices.

Key challenges faced by the objective are:

- EC's capacity to develop and promoting safety regulations. Given TPL is always in the forefront in the event of fatality and hazard from electrocution, TPL is looking at amending the existing legislation to allow for the promotion of electrical safety in the country.
- Safety regulations are to be approved by the Cabinet before they become legally effective. This process normally takes a long period of time.
- Adoption of safety regulations by all staff and employees of TPL as well as industry members such as electrical contractors.

6.5 Strategic Objective 5

As shown in the diagram below, Tonga Power uses a 'Systems Approach' to achieving continuous improvement and therein maximising profits to our shareholder. During our annual strategic planning meeting, the long-term vision is translated into tangible strategic objectives. The strategies are then developed in order to achieve these objectives. The strategies are delivered through our comprehensive five year business plan. TPL's Performance Management Plan identifies if the objectives have not been achieved for the year due to any disturbances (or risks). The objectives are then reviewed and readjusted for the following year.



Investing in leading business processes and systems in order to improve the operational efficiency and quality of TPL's services to customers is vital to TPL's long term success. The company has already engaged in a number of systems such as risk management, GIS, asset management, business continuity management, HSE management, process redesigning, and billing and payroll activities.

The relationship between TPL and the community is critical if TPL is to achieve its core purpose of providing reliable, safe, sustainable and affordable electricity to the people of Tonga, while satisfying its shareholders requirement for the public good.

TPL's customer strategy aims to build solid customer relations and satisfaction through the implementation of activities such as enhanced communication with customers, pre-payment metering, electronic bill payment services, energy efficiency education and the eventual introduction of 'multilevel' tariffs to manage the costs for the most vulnerable in the community.

Key challenges faced by the objective are:

- Systems and processes can sometimes overburden the existing staff when adequate staffing levels are not available. When the staffing levels are reduced, the existing staff can find it difficult to comply with processes and systems which in turn can lead to inaccuracies and/or poor quality outputs.
- The lack of key staff availability to perform some major business functions leads the company to outsource expertise at a generally higher cost.
- Design and development of multi-tariff systems to satisfy all classes of customers.
- Change management is a key problem because staff are reluctant to change (ERP software).

6.6 Strategic Objective 6

Managing external funding and internal financing sources successfully in order to maximise the shareholder value is a key TPL focus. The external capital funds can be provided from various sources: free capital from donors at no cost, debt finance from banks and debt finance from development partners at low cost. Internal funds are expended from the company's revenue earned through selling electricity to customers or from company's retained earnings. TPL conducts comprehensive economic analysis in order to ensure funds are invested on selected value added projects that maximise shareholders' value. TPL has established a number of financial policies and procedures when it comes to capital or operational expenditure. Controls are in place for verification and approval by another party as necessary.

Key challenges faced by the objective are:

- Scarcity of capital funding for investment on all the available projects is a key issue for TPL. The challenge for TPL is to choose a portfolio of projects that fits the best available funds for implementation as a number of potentially good projects may be forced outside the five year planning period.
- In order to manage the diesel price volatility risk successfully, the Concession Contract allows TPL to undertake 'fuel hedging' to ensure price stability. However, the challenge for TPL is to use the right hedging instrument at the right time, which neutralises profit prospective that requires external advice and expertise at some cost.
- Unfavorable economic activities also challenge TPL's profit prospective. This in turn reduces investment funds for TPL funded projects resulting in TPL having to rely heavily on donors to fund future projects. The economic activities such as poor economic growth, high oil prices, low overseas remittances and higher than desirable inflation also has an impact on TPL's ability to deliver a lower electricity tariff to the people of Tonga

7. STRATEGIES/ACTIONS TO SATISFY OBJECTIVES

Consistent with the Government and other relevant government initiatives of a safe, affordable and reliable electricity supply, TPL will pursue six strategic objectives during the next five years. On each objective, TPL has established key initiatives that will be implemented under each of these objectives.

A major focus of this year's Plan is focusing on driving TPL's strategic objective number one which is "Achieving 50% electricity generation from RE sources by 2020".

Strategic Objective 1

There are nine projects specially designed to achieve the 50% RE penetration with an estimated total capital cost of about USD 55.171 million and expected to be funded through the Green Climate Fund (GCF). TPL contribution to these projects is estimated to be around USD 6 million, to cover for expenses such as land, fencing, and others.

Priority Project to reach 50% RE Penetration	
2.3MW and 1.15MWh Battery Energy Storage System, Scada Control & Mini Grid Controller	$7,081,920
2 MW Solar PV Farm (Central West Tongatapu), including Energy Storage of 700kW and 350kWh Battery	$5,311,440
2MWSolar PV Farm (South West Tongatapu) including Energy Storage of 700kW and 350kWh Battery	$5,311,440
Long term Energy Storage of 2.3MW and 16MWh Battery in Tongatapu	$11,065,500
400kW Solar PV Farm and 500kWh battery storage	$2,500,000
500kW Solar PV Farm (Vavaú) and 1.1MW and 1.5MWh battery storage in Vava'u to achieve 50% RE penetration	$2,655,720
1.3 MW Wind Farm (Tongatapu, Niutoua village)	$5,311,440
2 MW Wind Farm (Extension for Niutoua Phase 3 towards Tongatapu, Lapaha village) including Energy Storage of 900kW and 450kWh Battery	$7,967,160
2 MW Wind Farm (Lapaha village) including Energy Storage of 900kW and 450kWh Battery	$7,967,160
TOTAL	**$55,171,780**

A detail explanation of the RE projects to be implemented to achieve the 50% RE penetration are described below:

Solar PV Generation (2x 2MW & 1x400kW & 1x500kW):

Solar PV is the most proven form of renewable energy electricity generation in the Kingdom of Tonga today. The Tongatapu electricity grid and power system can manage the instantaneous loss of 1.3MW of generation due to a diesel generation trip. If PV generation is limited to 1.3MW plants and dispersed geographically then fluctuations caused by cloud impacts have less impact than a power plant trip and will therefore be manageable. Each large scale (approximately 1MW) solar plant should be located at least 4km from the nearest large scale solar plant and each solar plant should be smaller than 1.3 MW. Total project costs are estimated at approximately USD 10.47 million and it is expected that it will have a major positive impact on tariff.

Wind Farm Generation (2x2.2MW & 1x1.3MW):

Electricity generation using energy from wind is still relatively unproven in Tonga, only two small wind turbines (11kW) have been installed and are operational in the country. Another 1.3MW Wind is also to be installed later this year at a cost of TOP $40 million fully funded by JICA. However comprehensive data collection and analysis has taken place with numerous pre-feasibility studies being completed and now a full feasibility close to completion. The latest studies show a relatively good wind resource averaging slightly more than 7m/s at 30m to 50m heights.

It is highly recommended that an approximate balance between the total installed capacity of wind and solar be maintained as much as possible as this achieved the highest levels of renewable energy electricity productions shares. There are simple rules that guide the introduction of wind turbine generators to the Tongatapu electricity grid, they must be pitch regulated turbines with frequency governor and must NOT have a vertical cut out profile at high wind speeds.

Total project costs are estimated at USD 21 million and it is expected that it will have a major positive impact on tariff.

Bulk Energy Storage:

Currently, TPL uses 16kWh (2x8kWh) small storage systems (i.e. 2x500KW designed to last for 60 seconds) only for the purpose of frequency and engine ramp controls required to stabilize the system from the fluctuating 2.4MW solar PV pants (1MW plant at Vaini + 1.4MW plant at Popua). However, current solar storage capacity is very minimal. Bulk storage capacity is required to use for such functions as: correcting temporary load/generation mismatches, regulating frequency, mitigating flicker, as a result of fluctuating RE sources and assisting advanced islanding functions and service restoration.

The project investment cost is estimated at USD 18.14 million and consists of the following milestones:

- 16 MWh of Energy Storage Capacity
- Battery Building Construction
- Battery System integration to SCADA and power management systems

Due to the falling costs of solar and energy storage, the line between implementing additional solar, large battery storage or both is blurred. However what is clear is that all efforts should be made to optimise the electricity produced from renewable energy sources. This means that spilling or curtailing the output of renewable electricity generating plant is not an optimized solution. Additionally, a system with only renewable energy generating plants of a significant portion overall of the generation mix will cause network instability and power quality issues. Given the falling costs of energy storage in particular it makes sense to plan to introduce bulk energy storage as an enabler that will also optimize and translate the investment in renewable energy generating plant to greater electricity tariff reductions.

The existing projects that are contributing to achieving this objective are described below:

Outer Island Renewable Energy & Energy Efficiency Project:

ADB has generously approved a $16 million funding (with $600,000 TPL contribution) for installation of 550kW of solar with 660kWh storage on Ha'apai and 200kW of Solar on 'Eua and fine tuning of existing TPL SCADA system on Vava'u. This is called the "Phase 1" or "on- grid" scope. Phase 1 (on-grid) has already completed. The Project also comprise the rehabilitation of the existing grid network through the replacement of electricity cables; electricity poles; distribution transformers; switchgear and other associated grid network equipment in Vava'u and 'Eua. There is also a separate "Phase 2" or "off-grid" scope that contains 350kW PV with 670kWh of storage spread across 4 Ha'apai outer island mini grids and the associated 4 mini-grid network upgrades. In addition, a new mini-grid and centralised PV and diesel generation on Niuatoputapu combined with 25kW of solar home systems on Niuafo'ou will be installed. The Phase 2 (off-grid) will be started this year and completed in January 2018.

Zhuhai Singyes Solar Project

This 2MW project is funded entirely by Zhuhai Singyes (Independent Power Producer) with the following objectives:

- To assist in complying with the TERM target of 50% RE by 2020
- To utilize 3rd party private sector finance for renewable electricity generation.
- Reduce the reliance on imported diesel fuel for power generation.
- Achieve sustainable, affordable and reliable electricity for the nation.
- Maintain TPL financial viability.
- Support the strategic direction of lowering electricity tariffs for the nation.

Singyes will pay TPL up to US$30,000 pa fixed for 25 years to cover land lease costs and to reimburse TPL for grid connection, approvals and surveys. Tariff has also been agreed at a much lower rate for the next 25 years.

Strategic Objective 2

Under objective number 2, the following projects has been put forward to achieve the objective of "adopting technologies to manage the complexities arising from the increasing level of RE penetration".

Enabling Power System (EPS) – Projects A, B, & C:

TPL's current distribution systems are generally considered to be ready to support small DG sources without change, however, with increasing RE penetration, TPL's current power distribution system may experience complications in connecting to RE sources. Therefore, as aggregations of RE continue to grow, changes in design and control practices will eventually be required at all levels of the power system. The EPS projects are expected to provide the following changes to the current generation and distribution systems in line with the 'smart- grid' technology:

- Phase A: Feeder 4, Ring Feeder Lines (moving from radial 11kV network to a ring or meshed network), starting with the Eastern Ring Feeder Switching, Differential protection, Generator Circuit Breakers and Comms, Existing RE generator tuning, power quality metering and short term energy storage (Villa and Popua 2.3MW, 1.15MWHR)
- Phase B: Western Ring Feeder Switching, Generator Circuit Breakers and Comms, Eastern Ring Re-conductor, SCADA upgrade /replacement, Tune Voltage support controls, bulk energy storage (Villa 2.3 MW, 16MWh), and capacitor banks.
- Phase C: Generator Circuit breakers and Comms, capacitor banks.

Once a ring philosophy is adopted it will provide adequate power quality and reliability particularly through improved fault clearance times which most renewable generation plant can ride through if certain generation connections requirements are followed. The network's reliability will also improve overall as feeder faults will no longer result in the loss of all load on that feeder. The real benefit is that the network will be able to absorb renewable energy and the main challenge will be upskilling and up sourcing human resources to manage the changed philosophy of asset operation and maintenance. In total the enabling power systems (EPS) projects will cost an estimated $34 million.

The existing projects that support this objective include the followings:

Smart & Prepay Metering Project – Stage 1:

The Smart Metering and Prepay Project deploys 3000 meters to the most disconnected customers and 500 three phase meters for industrial customers plus network monitoring. TPL has offered the 3000 customers with a selection of post- paid or the newly installed pre- paid service. The 500 meters has enabled Tonga Power to adequately monitor large industrial customers as well as monitor the electrical network.

The Smart Metering and Pre-pay infrastructure are provided by Agility CIS and Itron. It includes three high end back-office systems, Itron's Openway Headend system, Meter Data Management (MDM) system, and the Pre-payment system. There is also a field area network (FAN) platform which is a private Access Point Name (PAPN) provided by Digicel Tonga, Connected Grid Routers (CGR) and Smart Meters manufactured by Itron.

The total cost of the project is $4.1 million of which $3.0 million has been spent as at end of March 2017.

Smart Metering Project – Stage 2:

The smart metering project discussed above only manages installation of 3,000 prepay meters and respective radio-mesh and head-end communication systems. However, there are about 17,000 customers residing in Tongatapu. The Stage-2 of the project manages installation of the balance or 14,000 smart meters. The project cost is expected to be about $3 million, which has commenced.

A similar project to be implemented in collaboration between the Tonga Water Board, Tonga Power Ltd and the technology suppliers Itron Global Trading and Agility CIS Ltd. Tonga Power has commenced installing Itron smart electricity meters and will remotely read the water meters using a radio mesh network supplied by Itron. Tonga Power currently uses Agility for meter data management and billing and will use these same systems to provide a meter reading and billing service for Tonga Water Board.

Generation (Other) Projects:

In addition to the generator replacement plan discussed above, the following auxiliary systems will be dealt with during the planning period. The allocated budget for the work is about $2 million.

- Repairing MAK/CAT Load sharing communication module
- Replacing new flow meters to improve fuel reconciliation
- Installation of a separate Day Tank for G8
- Installation of lagging CAT exhaust pipe
- Painting Power Station piping
- Attending to sea water cooling pump improvements
- Installation of additional over-speed protection device (air-flap)
- Procuring a waste oil disposal system (boiler/steam engine)
- Upgrading SCADA in all three outer island and enable communications between outer islands and Tongatapu
- Replacement of station transformers
- Repairing MAK gantry crane in the oil power house

Strategic Objective 3

Under objective number 3, the following projects has been put forward to achieve the objective of "improving the network and replacing ageing assets to improve safety and reliability of TPL's services".

The Village Network Upgrade Project (TVNUP) Stage 2/3:

Having completed the first 17 villages in Stage-1 for $11 million, an additional $32 million funding has been provided by NZ MFAT for a new project to complete another 33 villages on Tongatapu, which is stage 2/3 of the project. TPL contribution towards the project is about $10 million. The project provides an upgraded low voltage reticulation network and the service line connections to each premise in the villages. The project includes installation of over 5,370 LV poles, 1,330 HV poles, 215Km of LV cables, 118 transformers and 7,640 customer connections. TPL's responsibility is to provide the high voltage network and transformers which in most cases are relocated to meet the location of the loads. New transformers are installed or upgraded where power quality demands such works.

Nuku'alofa Network Upgrade Project:

The Nuku'alofa Network Upgrade Project (NNUP) will follow the same model as the NZMFAT funded Tonga Village Network Upgrade Project (TVNUP). The estimated cost of the NNUP is $52 million. The project deliverables include renewing 8,472 customer connections, upgrading 64 km of high voltage lines, upgrading 283 km of low voltage lines, and replacing 11,645 power poles (1,944 LV and 9,701 HV poles), 1,000 new connections, and advanced prepayment meters to cater for new low usage connections. TPL contribution to the project is estimated at TOP $3 million mainly for labour and transport. NZ has also promised a NZD 5 million to kick start this project.

The NNUP is expected to provide the following benefits:

- Improved access to electricity (improved business environment, improved quality of life for people with positive impact on education, health, etc.)
- Improved quality of supply (improved business environment enabling new businesses to operate in Tongatapu; small businesses able to install larger rated plant, previously not possible due to excessive voltage drops and capacity constraints in the network)
- Improved safety of the supply (results in reduced faults, accidents, loss of life and hospitalisation owing to electric shock and house fires)
- Improved reliability of supply (fewer interruptions).
- Cost savings from the installation of pre-pay meters. Consumers with inconsistent income will find it easier to buy credit when they have money rather than having to pay for electricity at the end of every month.
- Loss reduction benefits (less generation costs and diesel, less greenhouse gas emissions as externality, etc.)
- Improvement in Tonga's economy in the long run. These include sustainable economic development
- Provide improved grid stability, reduce capacity constraints and enable the introduction of more renewable energy onto our grid to meet the GoT target of 50% RE by 2020.

The project is expected to reduce diesel consumption by 1.9Gwh (500,000 liters or $800,000) per annum.

Outer Islands Network Upgrade Project – Stage 2:

The Ha'apai network upgrade has been 100% completed under the Ha'apai Cyclone Ian Recovery Project and operating at 50% and has reached 50% RE penetration. However, Vava'u and 'Eua network upgrades estimated at about USD $4.7 million are not fully completed yet. The ADB funded Outer Island Network Upgrade Project only upgrades 20% of Vava'u's Network and 80% of 'Eua's Network. The balance of the 25% of 'Eua distribution network and another 40% of Vava'u upgrade will be completed under stage 2 of the project. Tonga Power have received an additional funding of about USD $5 million to take 'Eua to 100% and Vava'u to 60%.

Project scope for the Vava'u and 'Eua Upgrade include replacement of HV poles, HV/LV network equipment and service lines. The project ensures enhanced public safety, reduced system losses and reliability of supply. It is expected to start in June this year.

Tongatapu Village Upgrade Project – Stage 4:

The New Zealand Government funded TVNUP project discussed completes 70% of the Tongatapu distribution network upgrade. In addition, Nuku'alofa Network Upgrade project completes about 25% of the Tongatapu network. However, there is still 5% of the total Tongatapu network is left out from being upgraded. These are five remote villages where a small number of customers reside. Under the Stage-4 project, TPL intends to upgrade both HV and LV networks of these five villages at TPL's own cost of about $3 million or cost savings from the TVNUP State 2&3.

Strategic Objective 4

Under objective number 5, the following initiatives has been established to achieve the objective of "Cultivating a hazard free safety culture to minimize any electrical hazards to both the public and staff".

1. A fully integrated Safety Health and Environment Management System that addresses key risks and is aligned with best practices and international standards
2. Increased awareness of safety practices in the workplace – Our people understand and actively demonstrate safety leadership in everything they do
3. Equipment meets design standards, is fit for purpose and maintained – AS/NZS standards
4. Critical risks and controls are identified, rigorously applied and monitored
5. Improved public awareness on safety campaign
6. Continuous monthly HSE meetings
7. Safety risks associated with the protection, operation and management of the network are understood and managed through engaging a network auditor to undertake monthly audits
8. Compliance with relevant regulatory requirements
9. Quarterly risk review of TPL risk register
10. Network upgrade projects

The above are already incorporated into each Division line of work however the majority of the identifying and monitoring work will be done at the Risk and Compliance function. All related costs have all been budgeted for within each respective Unit OPEX and CAPEX budgets.

Strategic Objective 5

Under objective number 5, the following projects were developed to achieve the objective of "*Investing in leading business processes and systems to improve operational efficiency and quality of TPL's services to customers.*

IT Virtual Environment & Disaster Recovery Project:

The proposed new IT architecture includes a SAN (Storage Area Network) Server connecting to three other physical servers.

These three physical servers hold ten virtual servers which represents TPL's all application servers (e.g. Orion, email, SCADA, IMS/HR, ERP, SMS servers, etc.) This architecture enables high availability where if one physical server fails, the two other physical servers pick up the application servers instantly in the virtual environment.

A similar system will be duplicated at the Distribution Centre or at the Popua Power Station as a disaster recovery solution. If both head office and DR sites were destroyed in case of a disaster, the applications will be made accessible from the cloud. This project is still in discussion stage.

Enterprise Resource Planning Project (ERP):

The new ERP system that is currently implemented is near completion. ERP system's database integrates and unifies information from different business units enabling a single source of truth which is the foundation for business intelligence (BI) and analytics. In other words, The ERP system integrates and automates internal and external information across all the business units and functions embracing procurement, inventory management, finance & accounting, billing & revenue collection, payroll, human resources management, customer relationship management, and project management. The system will provide improved governance, the ability to cope with growth and diversification and facilitate cost reductions.

The budget for this project is $1.915 million. The project was officially kicked off at the end of March 2016, and work on site began in late April. All modules are expected to be live by the end of this year.

Utility Reform Project:

As part of the Tongan government's ongoing restructuring and reform programme to improve operational efficiency and profitability, Tonga Power Ltd, Waste Authority Ltd and Tonga Water Board combined Board have established the Utility Reform Project at a cost of about $5 million which will be implemented in stages as key milestones towards achieving the shareholders expectation for the Combined Utility Companies reform programme.

It is further anticipated that this reform will reduce up to 10% of annual costs and enhance service delivery (e.g. on-time delivery, safety & quality). Tariff is also anticipated to reduce as a result of the reduction in annual costs.

Strategic Objective 6

Under objective number 6, the following initiatives has been prioritized to achieve the objective of "Managing all external funding and internal financing sources successfully in order to maximise the shareholder value".

1. Improving coordination with key partners such as the Government of Tonga, aid donors and other business units in TPL to ensure progressive implementation of the TPL Business Plan 2018-2022.
2. Securing commitment of grant and/or concessional financing for high priority projects in the TPL business Plan 2018-2022 in order to maximize shareholder value.
3. Ensure shareholder and client awareness of TPL's proactive service oriented approach to the provision of power services and delivery of shareholder's vision.

8. PERFORMANCE MEASURES & TARGETS

The effectiveness of the strategic objectives will be measured on an annual basis and compare with the actual values against the annual targets shown in the table below. The variances between the actual and target values will be used to review and update the Business Plan in the next year.

Strategic Actions and Milestones to Satisfy Objectives for the Planning Period 2018 -2020

ID	Strategic Objective	Strategic Measures	Business Unit	Actual Dec 2016	Targets 2016/17	Targets 2017/18	Targets 2018/19	Targets 2019/20	Comments
1	Achieving 50% electricity generation from RE generation by 2020 in order to achieve the government TERM objective and significant tariff reductions.	Accumulated fuel Displacement (%)	Generation	12%	20%	30%	40%	50%	need more RE
		Tariff reduction (%) due to RE	Generation	4%	5%	8%	10%	12%	need more RE
		RE Penetration	Generation	9%	25%	40%	50%	60%	need more RE
2	Adopting technologies to manage the complexities arising from increasing RE penetration.	Voltage fluctuations	Distribution	Not Met	+/-10%	+/-10%	+/-10%	+/-10%	non upgrade vilages
		Frequency fluctuation	Generation	Met	+/-1.5%	+/-1.5%	+/-1.5%	+/-1.5%	
		System Loss (%)	Distribution	10.70%	11%	11%	10%	10%	
		Fuel efficiency (kWh/L)	Distribution	4.13	4	4	4	4	
		Reliability (SAIDI) (minutes)	Distribution	780.42	950	925	900	850	
		Number of outages	Distribution	>4	4	3	3	3	planned outage for TVNUP
		Reduction in maintenance cost (%)	Generation	Met	5%	5%	5%	5%	
		Reduction in material cost (%)	Distribution	Met	5%	5%	5%	5%	
3	Improving the network and replacing ageing asstes to improve safe and reliability	Load factor	Generation	72%	59%	54%	54%	54%	
		N-1 Security Compliance	Generation	Met	100%	100%	100%	100%	
		Rework cost (TOP$)/annum	Distribution	$100	<$5000	<$5000	<$5000	<$5000	
		Capex Jobs Audited/Annum (%)	Distribution	Met	>80%	>80%	>80%	>80%	
		Firm Installed Capacity (KW)	Generation	17236	16270	16444	16416	17276	
		Installed Capacity (KW) (All sources)	Generation	20636	21376	21550	21522	22382	
		Data Quality in File Maker (%)	Distribution	Not Met	100%	100%	100%	100%	wrong/incomplete - ERP will address
		Update Asset Management Plans	Distribution	Yes	Yes	Yes	Yes	Yes	
4	Cultivating a hazard free safety culture to minimize any electrical hazards to both public and staff.	Incident rate	Corporate	Met	<9	<9	<8	<8	
		Loss Time injuries	Corporate	Not met	0	0	0	0	2 injuries this year
		Number of incident reports	Corporate	<140	140	150	160	175	less incidents reported
		Safety awareness activities/annum	Corporate	20	3	3	3	3	
		Safety Committee Meeting Attendance	Corporate	<100%	100%	100%	100%	100%	work commitments
		Number of emergency drills/annum	Corporate	3	2	2	2	2	
5	Investing on world-class business processes and systems in order to improve operational efficiency and quality of TPL's services to customers.	Staff Retention (%)	Corporate	99%	>90%	>90%	>90%	>90%	
		Customer complaints	Corporate	>40	40	30	30	20	working to improve
		Exercise BCM Plan/Annual	Distribution	1	1	1	1	1	
		Number internal audits	Corporate	1	3	3	3	3	ERP transition period
		Compliance with ECC & other legislation	Corporate	100%	100%	100%	100%	100%	
		Compliance with company policies	HR	100%	100%	100%	100%	100%	
		Staff Training Register	HR	7%	>90%	>90%	>90%	>90%	
		Staff Absenteeism	HR	2%	<5%	<5%	<5%	<5%	
		Staff Turnover Rate	HR	1%	5%	5%	5%	5%	
		Staff Satisfaction Rate	HR	100%	>90%	>90%	>90%	>90%	
		Performance Management Rate	HR	84%	>80%	>80%	>80%	>80%	
6	Managing all external funding and internal financing sources successfully in order to maximise the shareholder value.	Revenue	Retail	$23M	$50M	49M	49M	50M	End of Dec 2016 figure
		NPAT	Retail	$2.4M	$3.8M	$3.80	$3.60	$4.00	End of Dec 2016 figure
		Debt ratio	Retail	55%	<50%	<50%	<50%	<50%	End of Dec 2016 figure
		ROE	Retail	4%	10%	10%	10%	10%	End of Dec 2016 figure
		Debtor Days	Retail	11	20	20	20	20	End of Dec 2016 figure
		Liquidity Ratio	Retail	1.26	1.5	1.5	1.5	1.5	End of Dec 2016 figure
		Opex Reduction	Retail	+11%	3%	3%	3%	3%	End of Dec 2016 figure

9. STATEMENT OF COMPLIANCE(S)

Statement of compliance with relevant Government Policies:

***Electricity Act 2007*:** All requirements including payment of regulatory fees and other levies, offences, Concession Contract etc. are met.

***Electricity Concession Contract*:** TPL complies with all the reporting requirements, efficiency, technical and services standards sets forth in the Concession Contract II effective September 2015 except for voltage standards. There are occasional situations where the 230V (-/+10%) standard is not met due to the poor state of the network equipment (e.g. transformers) in some areas of the network, mainly in non upgraded areas.

Ministry of Public Enterprise Act: All the requirements including reporting requirements, directors' requirements, Board meeting requirements, and auditing requirements are met.

***Companies Act*:** All the requirements including constitution, share register, shareholder rights, directors' duty of care, disclosure interest, keeping accounting records, appointment of auditors, annual report, and annual return requirements are met.

Pursuant to Section 18 (4) (j) of the Act, the following matters have been agreed with the Responsible Minister and TPL fully complied with:

a. *Corporate governance*: The company is committed to the highest standards of corporate governance, with core values of accountability, probity and transparency. The company is adopting policies and procedures aimed at maintaining these standards.
b. *Anti-corruption*: The Board, through the Chief Executive will ensure compliance by the company with statutory and regulatory requirements including avoidance of any act that would or could be construed as an illegal, corrupt or unethical practice.
c. *Share subscriptions or purchases*: Subscriptions for shares in any company or acquisition of interests in any other organisation that involve equity investment will be subject to prior consultation with the Responsible Minister.
d. *Subsidiary companies*: The establishment of subsidiary companies or sale of material interest in or assets of subsidiary companies will be subject to prior consultation with the Responsible Minister.

Other legislation requirements to which TPL complies with are: ***Renewable energy Act, Business Licenses Act, Public audit Act, Public health Act, National retirement benefit Scheme, Price and wage control Act, Anti-corruption commissioner Act, and Public finance management Act.***

Statement of Community Services, claims for GPO

TPL has spearheaded the implementation of projects that align with the following GPO.

Under the TSDF: Outcome Objective 3 (11) – Maintaining and where possible expanding the provision of reliable and cost efficient power supplies, using traditional and renewable options, to all communities. The results to date, a 11% system losses down from 18% in 2010, Average total duration of power interruption per customer has significantly declined and about 9.0% of energy coming from renewable energy source in 2016.

Outcome Objective 5 – Appropriately skilled workforce to meet the available opportunities in Tonga and overseas. The TVNUP project upskilled TPL lines staff to an internationally recognized standard of line mechanic. The results to date, 10 lines staff have been recruited by overseas company to help satisfy opportunities that are available there for skilled lines staff.

Enabling Theme C – Ensuring Public Enterprises are sustainable and accountable, and where appropriate moved into the private sector.

***Under the NIIP*:** Priority projects E11 and E16 – Results to date, a 1.2MW of Solar PV have been added on Tongatapu with support of JICA, Outer Islands On-Grid RE funded.

***Under TERM*:** Minimizing the need for imported fuels by transitioning to a renewable energy based system. Seeking to achieve greater efficiencies in customer use and distribution through improving network efficiency and energy efficiency awareness campaigns.

***Specific GoT GPO*:** Tariff – TPL is currently offering a 70 seniti/kWh power tariff for all customers who uses less than 100kWhrs per month under GoT GPO.

Statement of Support from Government and/or Development Partners

Below are the list of projects which has been funded by donor partners:

1. Smart & Prepay Metering – partially funded by MFAT. Estimated total project cost of TOP $4 million.
2. Tonga Village Upgrade Projects Phase 2/3 – majority of the total project cost of TOP $42 million is funded by MFAT.
3. Tonga Police Project – Total project cost of TOP $2.5 million which was fully funded by DFAT.
4. OIREP & Energy Efficiency Project – Total project cost of approximately TOP $16.0 million is fully funded by ADB.

The donor funds for the future priority projects have not been confirmed yet.

Statements of Financial capacity in regard to dividends

TPL's dividend policy is that 35% of Net Profit After Tax is paid as dividend to the government. However, TPL has paid a dividend of $3.2 million in the year 2016. The estimated dividend stream for the next five years are discussed in more detail in the attached Financial Statement.

10. FINANCIAL FORECAST

10.1 Profitability

	2018	2019	2020	2021	2022
	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun
Total Revenue	49,604,288	50,858,987	52,102,006	53,353,267	54,634,481
Total Expenses	35,846,173	34,611,260	35,194,950	35,959,094	36,404,622
EBITA	13,758,116	16,247,727	16,907,057	17,394,173	18,229,859
Depreciation	7,438,452	8,906,328	9,074,918	9,515,688	9,818,611
Interest	1,196,539	1,058,293	919,437	774,292	622,791
Income Tax	1,280,781	1,570,776	1,728,175	1,776,048	1,947,114
NPAT	3,842,343	4,712,329	5,184,526	5,328,145	5,841,342
Variance		22.64%	10.02%	2.77%	9.63%

TPL is expecting to achieve a net profit after tax of $3.8 million at the end of the 2018 financial year. Profitability level of the company is stabilised as it is projected that the company will continue to be profitable in the years to follow.

Total revenue is forecasted to be at $49.6 million at the end of 2018 and is expected to increase steadily from 2018 onwards.

Total expenses is expected to remain generally stable at $35 million from 2018 to 2022.

Even though TPL is proposing a dividend of 35% of its Net Profit after Tax, the final amount will always be negotiated between the TPL Board and the Minister at end of each financial year. The estimated dividend for 2018 financial year will be $3,000,000.

10.2 Liquidity

	2018	2019	2020	2021	2022
	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun
Projection	T$m	T$m	T$m	T$m	T$m
Net Cash From Operations	10,114,241	9,260,591	10,732,558	12,172,094	12,836,650
Current Ratio	2.6	2.7	3.0	3.1	3.4
Liquidity Ratio	2.4	2.5	2.8	2.9	3.2

Liquidity position of the company is at a satisfactory level at around 2.0 to cover current liabilities. It is expected to improve slightly in subsequent years. Liquidity Ratio is above 1.1 sufficient to cover its short term debt as they fall due.

10.3 Stability

	2018	2019	2020	2021	2022
Projection	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun
	T$m	T$m	T$m	T$m	T$m
Debt ratio (= Total Debt/Total Assets)	0.47	0.46	0.44	0.43	0.41
Gearing ratio (= Longterm Debt/Total Equity)	0.31	0.27	0.23	0.19	0.15
Debt to equity ratio (=Total Liability/ Total Equity)	0.46	0.44	0.43	0.42	0.41
Interest Cover Ratio (= EBIT/ Interest Expense)	11.4	13.9	16.7	20.4	26.7

TPL is projecting debt to be 47 cents of every dollar of its assets in 2018 financial year, and will generally decrease over the years. Debt to equity ratio will remain generally decrease from 47% to 41% throughout the 5 years. Times interest earned ratio shows adequate cover for the entire period 2018 – 2022.

The main causing factor is that TPL is projecting to invest in Renewable Energy Projects in addition to its commitments from Generation, Distribution and Retailing operations.

11. PROFORMA FINANCIAL STATEMENT

Pro Forma Financial Statements for Tonga Power Limited

Table 1

Year ending 30 June Millions of pa'anga	2018 1 Jul-30 Jun1	2019 Jul-30 Jun1	2020 Jul-30 Jun1	2021 Jul-30 Jun1	2022 Jul-30 Jun1	2023 Jul-30 Jun1	2024 Jul-30 Jun1	2025 Jul-30 Jun1	2026 Jul-30 Jun1	2027 Jul-30 Jun
	T$m	T$m	T$m	T$m	T$m	T$m	T$m	T$m	T$m	T$m
Statement of Financial Performance										
Revenue										
Fuel	23.4	24.0	24.6	25.1	25.7	26.3	27.0	27.6	28.3	28.9
Savings from Renewables	-1.9	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2
Net Fuel Revenue	21.6	20.8	21.4	21.9	22.5	23.1	23.8	24.4	25.1	25.7
Non-fuel	24.3	26.4	27.0	27.6	28.3	29.0	29.7	30.4	31.1	31.8
Other revenue	3.7	3.7	3.7	3.8	3.8	3.8	3.9	3.9	3.9	4.0
Total Revenue	49.6	50.9	52.1	53.4	54.6	55.9	57.3	58.7	60.1	61.5
Expenses										
Fuel	21.6	20.8	21.4	21.9	22.5	23.1	23.8	24.4	25.1	25.7
Renewables costs	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Non-fuel										
Repairs & maintenance	2.2	1.9	2.0	1.9	1.8	2.1	1.8	1.8	1.9	2.1
Salary & wages	5.8	5.6	5.7	5.7	5.8	5.8	5.9	6.0	6.0	6.0
Materials	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Operating overhead	2.0	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2
Administration	3.6	3.5	3.5	3.6	3.5	3.5	3.5	3.6	3.7	3.6
Bad debt	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total non-fuel expense	14.2	13.7	13.7	13.9	13.8	14.1	14.0	14.1	14.4	14.5
Total expense	35.8	34.6	35.2	36.0	36.4	37.4	37.9	38.6	39.6	40.3
EBITDA	13.8	16.2	16.9	17.4	18.2	18.5	19.4	20.1	20.5	21.2
Depreciation	7.4	8.9	9.1	9.5	9.8	10.2	10.8	11.4	12.1	12.9
Interest	1.2	1.1	0.9	0.8	0.6	0.5	0.4	0.3	0.3	0.2
Net profit before tax	5.1	6.3	6.9	7.1	7.8	7.8	8.2	8.3	8.1	8.2
Income tax	1.3	1.6	1.7	1.8	1.9	2.0	2.1	2.1	2.0	2.0
Net profit after tax	3.8	4.7	5.2	5.3	5.8	5.9	6.2	6.2	6.1	6.1
Provision for dividend	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Transfer to retained earnings	0.8	1.7	2.2	2.3	2.8	2.9	3.2	3.2	3.1	3.1

Year ending 30 June Millions of pa'anga	2018 1 Jul-30 Jun	2019 1 Jul-30 Jun	2020 1 Jul-30 Jun	2021 1 Jul-30 Jun	2022 1 Jul-30 Jun	2023 1 Jul-30 Jun	2024 1 Jul-30 Jun	2025 1 Jul-30 Jun	2026 1 Jul-30 Jun	2027 1 Jul-30 Jun
	T$m	T$m	T$m	T$m	T$m	T$m	T$m	T$m	T$m	T$m
Table 2 Statement of Financial Position										
Current assets										
Accounts receivable & Other Receivables	9.6	10.1	10.3	10.6	10.8	11.1	11.3	11.6	11.9	12.2
Inventory	1.2	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5
Cash	1.9	1.9	2.7	3.2	4.4	5.7	4.1	6.4	7.9	12.3
Short Term Investments	4.0	4.0	5.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0
Total current assets	16.6	17.2	19.3	20.1	21.6	23.2	21.9	25.5	27.2	31.9
Current liabilities										
Accounts payable & Other Payables	5.1	5.4	5.5	5.7	5.8	5.9	6.0	6.2	6.3	6.5
Current portion of term debt	1.2	1.1	0.9	0.8	0.6	0.5	0.4	0.3	0.3	0.2
Total current liabilities	6.3	6.5	6.4	6.4	6.4	6.4	6.5	6.5	6.6	6.7
Net working capital employed	10.3	10.7	12.8	13.7	15.2	16.8	15.4	18.9	20.6	25.3
Term assets										
Opening fixed assets	134.5	140.2	136.3	132.9	130.6	128.3	127.2	127.3	126.9	126.0
Capital expenditure	13.1	5.0	5.6	7.2	7.5	9.1	10.9	11.0	11.2	10.1
Depreciation	7.4	8.9	9.1	9.5	9.8	10.2	10.8	11.4	12.1	12.9
Fixed assets	140.2	136.3	132.9	130.6	128.3	127.2	127.3	126.9	126.0	123.2
Total term assets	140.2	136.3	132.9	130.6	128.3	127.2	127.3	126.9	126.0	123.2
Non current liabilities										
Debt	25.9	22.8	19.5	16.1	12.8	10.7	6.6	6.8	4.8	3.8
Deferred Tax Liability	7.4	7.6	7.8	8.0	8.2	8.4	8.6	8.8	9.0	9.2
Deferred Income	32.0	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2
Total Non Current liabilities	65.3	60.6	57.5	54.3	51.2	49.3	45.4	45.8	44.0	43.2
Net assets	85.2	86.4	88.1	89.9	92.3	94.7	97.3	100.0	102.6	105.2

Year ending 30 June	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Millions of pa'anga	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jur	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun	1 Jul-30 Jun
	T$m	T$m	T$m	T$m	T$m	T$m	T$m	T$m	T$m	T$m
Table 4 Statement of Cash Flows										
Cash from operating activities	0.8	1.7	2.2	2.3	2.8	2.9	3.2	3.2	3.1	3.1
Adjusted by:										
Depreciation	7.4	8.9	9.1	9.5	9.8	10.2	10.8	11.4	12.1	12.9
Change in working capital	1.8	-1.4	-0.5	0.3	0.2	0.0	-2.2	1.1	-0.2	-0.3
Increase in Term Investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash from operations	10.1	9.3	10.7	12.2	12.8	13.1	11.7	15.7	15.0	15.7
Long term assets										
Cash from (used by) long term assets	-13.1	-5.0	-5.6	-7.2	-7.5	-9.1	-10.9	-11.0	-11.2	-10.1
Long term liabilities										
Incr in long term debt	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decr in long term debt	-4.1	-4.3	-4.3	-4.3	-4.1	-2.7	-2.4	-2.4	-2.4	-1.3
Incr (decr) in capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cash from (used by) liabilities and capit	0.9	-4.3	-4.3	-4.3	-4.1	-2.7	-2.4	-2.4	-2.4	-1.3
Net incr (decr) in cash	-2.1	0.0	0.8	0.6	1.2	1.3	-1.6	2.3	1.4	4.4
Opening cash	4.0	1.9	1.9	2.7	3.2	4.4	5.7	4.1	6.4	7.9
Cash at year end	1.9	1.9	2.7	3.2	4.4	5.7	4.1	6.4	7.9	12.3

Final Budget 29 June 2017

KEY PERFORMANCE INDICATORS

Year ending 30 June	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Returns to shareholders (%)										
Return on Assets (EBITDA/Total Assets)	9%	11%	11%	12%	12%	12%	13%	13%	13%	14%
Return on Assets (NPAT/Total Assets)	2%	3%	3%	4%	4%	4%	4%	4%	4%	4%
Return on Equity (NPAT/Equity)	1%	2%	2%	3%	3%	3%	3%	3%	3%	3%
Return on Shareholder's Funds (Net Profit/Share Capital)	11%	14%	15%	16%	17%	17%	18%	18%	18%	18%
Profitability (%)										
Rate of Return (NPAT/Sales)	2%	3%	4%	4%	5%	5%	6%	5%	5%	5%
Capital structure (%)										
Loan Finance Only [Loan/Total Liabilities]	38%	36%	32%	28%	23%	20%	14%	14%	10%	8%
Loan Finance as a % of Sources of Funds [Loan/ (Liabilities + Equity)]	17%	16%	13%	11%	9%	7%	5%	5%	3%	3%
Debt Ratio [Debt/ (Debt+Equity)]	46%	44%	42%	40%	38%	37%	35%	34%	33%	32%

Year ending 30 June (TOP $m)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Forecast dividend (T$m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Dividend as % of NPAT (%)	78%	64%	58%	56%	51%	51%	49%	48%	49%	49%
Six weeks of normal operating & debt service exper	0.3	0.2	0.2	0.2	0.1	0.6	0.5	0.4	0.3	0.2

Year ending 30 June (TOP $m)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Capital structure (%)										
Debt Ratio [Debt/ (Debt+Equity)]	46%	44%	42%	40%	38%	37%	35%	34%	33%	32%
Interest cover (X)										
EBIT/interest	5.3	6.9	8.5	10.2	13.5	16.7	20.6	25.3	32.2	42.3

Year ending 30 June	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Customer service levels										
Meets 2015 Concession Contract requirements	TO MEET	TO MEET	TO MEET	TO MEET	TO MEET	TO MEET	TO MEET	TO MEET	TO MEET	TO MEET
Available capacity										
- INSTALLED CAPACITY (FIRM CAPACITY ONLY)	15550	15310	15484	15670	15316	15316	15316	15316	15316	15316
- INSTALLED CAPACITY (INCL AS AVAILABLE SOURCES)	20716	22576	22750	23122	23982	22982	22982	22982	22982	22982
Generating capacity utilisation										
Load factor (%)	56% - 61%	35% - 62%	36% - 60%	37% - 61%	38% - 62%	40% - 64%	40% - 64%	40% - 64%	40% - 64%	40% - 64%
Distribution efficiency1,2										
Line loss (%)	11%	11%	10%	10%	9%	9%	109%	209%	309%	409%
Efficiency of generation1,3										
KwH Generated per Litre of Fuel (L)	4.15	4.13	3.95	3.95	3.95	4.13	5.13	6.13	7.13	8.13

THE GAS GROUP BUSINESS PLAN

2018 - 2022

Tonga Gas

(Subsidiaries of Tonga Power Ltd)

HOMEGAS LTD
Distributors of LP Gas in Tonga

Table of Contents

1. EXECUTIVE SUMMARY

The 2018 to 2023 business plan herewith outlines the vision of the gas group to providing and improving Tonga's access to a low carbon, clean and environmentally friendly alternative fuel. It is this vision that should drive the gas group to engage the government of Tonga, to have a discussion on the environmental benefits of LPG to the Kingdom.

The various uses for liquefied petroleum (LPG) is well established around the globe. The ability to expand out to other markets, other than the domestic and hospitality sector, is *greatly limited by the price of LPG.* Finding a pathway to lowering the cost of LPG, therefore is a priority.

The business plan takes into account matters that were noted in the 2016 research study provided by the Pacific Region Infrastructure Facility (PRIF) on "LPG and Natural Gas as an alternative energy sources for the Pacific".

Tonga Power Ltd, the shareholder of the gas group, is acknowledged as a strategic partner in this plan. Its contribution to the success of the business plan cannot be underestimated. And equally so, with the other utility companies, such as water and waste.

As will be noted, power generation remains a sector that can enable a speedy uptake of LPG. But it has certain hurdles that should at first be investigated, as will be note later on.

The transportation sector is another, that has proven to work well in Tonga and in particular, islands like Fiji. Uptake in this sector can be improved on, as soon as possible.

The Gas group's approach however, will be prioritised below. This is summarised in Appendix A: Our strategy 2017…2018.

i. *Priority 1*: Tightening stock control and monitoring with more rigid processes. Additionally, introducing branch accounting attention to identifying profit performance, increase accountability and responsibility by each branch.
ii. *Priority 2*: Domestic market - adding value to an already established market through newer initiatives as well as further developing older ones.
iii. *Priority 3*: Autogas for the transportation sector, targeting larger vehicles such as buses and trucks
iv. *Priority 4*: LPG power generation or more appropriately, co-generation - generating electrical power and recycling heat for heating and / or cooling using LPG. The targeted market have been identified and is limited to sites such as the LDS Temple at Liahona, Vaiola Hospital and Hotels because of the potential to recycle heat.

Additionally, featured in this plan are a set of objectives that should serve to guide the gas group.

1. Investigate ways of reducing the cost of LPG to the market
2. Increase share in the current market (domestic and hospitality)
3. Improve systems efficiency through investment in Technology One's Enterprise Cash Receipting
4. Improving logistics and distribution of LPG to agents
5. Improving staff safety awareness through ongoing training and cultivating a hazard free working environment
6. Improve the company's reputation and focus on customer awareness

7. Maximising shareholder value through growth in future LPG markets, profitability and investments

The plan will be delivered by the management and staff of the gas group, whose performance is directly coupled to a set of performance indicators that can measure the success of each objective.

2. INTRODUCTION

While we have set objectives to guide the gas group into the future, the Board of Directors of the Gas group have set out an immediate requirement for management in January 2017. That is, to secure LPG stock on all terminals and restore the company's reputation. The major capital expenditure set out in the budget for 2017-2018 addresses these concerns. In essence, it is categorised into:

- LPG gas metering for the three main terminals, Touliki, Vava'u and Matatoa
- Upgrade equipment and instrumentations at Vava'u terminal's filling platform

The business plan's focus is on:

- Investigating areas of growth
- Reducing LPG pricing and
- Encouraging a safe working environment

But in order to realise this, the gas group's accounting practises will have to improve. That is:

- A complete migration to Technology One's Management Information System platform to ensure more reliable financial reporting
- A shift from a company-wide centralised accounting to branch accounting. This should draw attention to identifying profit performance, increase accountability and responsibility by each branch.

3. OVERVIEW OF THE BUSINESS

Tonga Gas Ltd (TGL) was purchased from Fiji Gas Ltd in 2015 by Tonga Power Ltd (TPL). Its core business is to import LPG to the Kingdom of Tonga. TGL currently holds a 10-year supply contract with Fiji Gas Ltd that will expire in year 2024.

Prior to this, Tonga Power Ltd introduced itself to the world of LPG when it purchased Home Gas Ltd two years earlier in 2013. Home Gas Ltd is responsible for distributing TGL's imported LPG throughout the Kingdom. Recently, it has met some competition when a local company, GoGas Ltd started selling LPG. As it stands now, Home Gas Ltd's share of the LPG market currently stands at 97%.

Both TGL and HGL are mentioned herewith as the gas group and are wholly owned subsidiaries of Tonga Power Ltd.

The Chairman of the Board of the Utilities selects member of the Board of Directors that comprises of members of the Utilities Board and Executives from Tonga Power Ltd. The Board provides governance for the gas group.

The gas group activities are as follows:

3.1 Our product and services

Fiji Gas Ltd (FGL) supplies to Tonga Gas Ltd, butane C4.

FGL is supplied by GeoGas Australia, who in turn, ships LPG on behalf of FGL customers across the Pacific. Butane C4 supplied to Tonga is mostly sourced from the BHP / Esso facilities at Westernport, Victoria, Australia.

Because LPG is a highly flammable product, safe use and storage by the end user, is paramount. In order to maintain a safe environment for users, Home Gas Ltd provides LPG end user consultation, installation as well as maintenance and repair of appliances for customers.

3.2 LPG storage capacity

Tonga Gas Ltd owns the LPG terminals responsible for LPG bulk storage.

	Terminal	Bulk storage capacity	Storage capacity as % of Monthly sales
1	Touliki LPG terminal	180 tons	95%
2	Vava'u LPG terminal	60 tons	45%

In addition to the bulk storage, Tonga Gas Ltd owns various sizes of LPG containers and cylinders, that is used by Home Gas Ltd's LPG customers. The majority of the cylinders come in the 13kg form. But it ranges from the smallest 4.5kg up to 1,000kg skid tanks.

Home Gas Ltd is present in both Ha'apai and 'Eua. Its main reason for being there is to ensure, price of LPG kept low - a major concern for the locals in years past, where price gouging was a real problem.

3.3 LPG distribution network

Home Gas Ltd is responsible for distributing LPG throughout Tonga from Tonga Gas Ltd's terminals. LPG is mostly sold off on credit through its network of reselling agents, where it accounts for around 58% of total sales volume.

Users are categorised as such:

	Customer type	Sales type	Description
1	Retail	Cash Only	Walk in customers who refill LPG cylinders from the terminals - partial fill or full fill
2	Agents	Available on Cash on delivery and 14-day credit term	A network of LPG cylinder resellers, selling LPG via the cylinder exchange program
3	Bulk users	Available on Cash on delivery and 14-day credit term	High volume LPG users, topped up using the 1-ton road tanker truck

Each terminal operates differently and can only cater for certain types of customers, as is noted below:

	Terminal / Outlet	Island	Customer type
1	Touliki LPG Terminal	Tongatapu	Retail / Agents / Bulk users
2	Matatoa Filling station	Tongatapu	Retail
3	Vava'u LPG Terminal	Vava'u	Retail / Agents / Bulk users
4	Ha'apai Outlet	Ha'apai	Retail
5	'Eua Outlet	'Eua	Retail

Home Gas Ltd also owns three (3) delivery trucks and a 1-ton road tanker to provide LPG top-up for the reselling agents and bulk users. One of the delivery trucks operate out of Vava'u. Utilising each truck is noted below:

Vehicles	Terminal Serving	Bulk users & Stock transfers	Agents	Home Deliveries	Office Use
J7323 Road tanker	Tongatapu	To large stationary LPG tanks	No	No	No
L18635 delivery truck	Tongatapu	Up to 200kg	Yes	Yes	Yes
J7719 Hino delivery truck	Tongatapu	Up to 200kg	Yes	Yes	No
Vava'u truck	Vava'u	Up to 200kg	Yes	No	Yes

3.4 Land Lease

The gas group operates out of leased land, as summarised below:

	Terminal	Land lease holder	Expiry date
1	Touliki LPG Terminal	Home Gas Ltd	10 October 2065
2	Matatoa Filling station	Tonga Gas Ltd	Tonga Power Ltd sub-lease, 2065
3	Vava'u LPG Terminal	Tonga Gas Ltd	23 June 2021
4	Ha'apai Outlet	Tonga Power Ltd	Tonga Power Ltd lease, provided under a service agreement with HGL
5	'Eua Outlet	Tonga Power Ltd	Tonga Power Ltd lease, provided under a service agreement with HGL

Management is investigating options for the Vava'u terminal as it is up for renewal in 2021. The estate owner has expressed his intentions for his land and is open for a renewal of the lease.

3.5 LPG Pricing

The Ministry of Labour and Commerce's Tonga Competent Authority is mandated to regulate the price of LPG in both Tongatapu and Vava'u. Similar to diesel and petrol price, Tonga Gas Ltd's landed price is exposed to market trends set by the Saudi Aramco Contract Price (CP).

On the other hand, Ha'apai and 'Eua's LPG price is unregulated. While their prices are derived from Tongatapu's LPG price, Home Gas Ltd has to add cost of shipping and handling LPG and administration, in order to recover its expenses.

3.6 Current demand for LPG

As noted, Home Gas Ltd is responsible for selling on LPG to the end users, which are then categorised as follows:

	Category	LPG use	% of Total Sales
1	Domestic	Home cooking, water heating	80.0%
2	Commercial	Restaurants, commercial catering, tourism & hospitality, non-profit organisations	13.6%
3	Industrial	LPG air conditioning, plastic tank manufacturing, construction	6.3%
4	Transportation	LPG vehicle	0.1%

Domestic and commercial users, are only differentiated by the fact that latter are registered businesses. But in general, both use LPG the same way - that is for cooking.

Industrial and transportation users are miniscule is comparison. But, they are areas that have potential for future development for the gas group.

3.7 Competitors

Tonga customers' perception of LPG utilisation is cooking and heating mostly, despite its many application around the globe. Because of that, biomass, or more appropriately, firewood becomes its main competitor.

Firewood is readily available and almost free of charge to the masses. In recent years, the price of firewood sold commercially has risen but still its standing as the gas group's main competitor has remained unchanged. It will remain as such for the foreseeable future.

Another competitor who is new to the market is GoGas Ltd. GoGas is a subsidiary of Jones Industries and is an independent importer of LPG to Tonga. Its LPG market share currently stands at 3%.

In developing this business plan, management has identified areas for future development. Business as usual still has room for improvement. Transportation and power generation have been mentioned in previous business plans and will be investigated further. There is currently a small number of vehicles running on LPG. But as noted above, its impact is inconsequential. On the other hand, LPG for power generation has not been established as yet.

LPG as a fuel substitute is in competition with diesel and petrol. And more recently battery systems on hybrid vehicles.

3.8 Financial strength

Tonga Gas Ltd's revenue is generated from Home Gas Ltd's ability to sell on LPG to its network of reselling agents around Tonga, bulk users and walk in customers.

The gas group sales in the 12 months to April 2017, saw an increase of 18%. Its budgeted target for the financial year 2016/2017 of 1,950 tons is likely to be surpassed by end of June 2017.

	2017 Forecast	2017 Budget
Total revenue	**6,773,816**	**7,232,592**
Total expenses	6,145,596	6,486,019
EBITDA	**628,221**	**746,573**
Depreciation	299,789	300,000
EBIT	**328,432**	**446,573**
Interest	(20,073)	(66,684)
NPBT	**308,359**	**379,889**
Income tax	(77,090)	(94,972)
NPAT	**231,269**	**284,917**

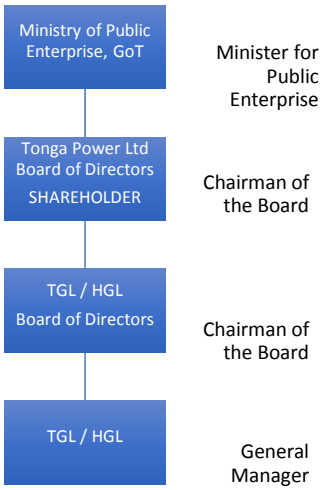
Note:

1. The budget recognised substantial 2017 other income of T$315,696 arising from new investment projects which did not eventuate during 2016/17. This compares to forecast other income of T$26,905.
2. Parent company loan repayments have been in lieu of dividends

4. POLICIES AND GOVERNING GUIDELINES UNDERLYING THE BUSINESS PLAN

Tonga Gas Ltd and Home Gas Ltd, were both purchased by Tonga Power Ltd in 2015 and 2013, respectively. Both company must adhere to guidelines set out by the shareholder, as noted in the letter of expectation from the Chairman of the Board of Directors in December 2015.

The gas group's governance structure is depicted below:



The business plan is structured to reflect the expectations of the shareholder and the Board of Directors of Tonga Power Ltd, the Tonga Competent Authority and the general public. The guidelines set out is noted herewith:

4.1 Operational profitability

The gas group will be shifting from company-wide centralised accounting to branch accounting. This should draw attention to identifying profit performance, increase accountability and responsibility by each branch. A summary of the gas group's statement of financial is as below. A more detailed report is noted on Appendix 2. Revenue is based on an 11% increase in volume for the first year, and then 12% from then on. Autogas is featured heavily in this forecast.

Tonga Gas Group Statement of Financial Performance							
	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
	2017	2018	2019	2020	2021	2022	2023
Revenue	**6,746,911**	**7,406,448**	**8,517,415**	**9,795,027**	**11,264,282**	**12,953,924**	**14,897,012**
Gross profit	2,020,012	2,221,934	2,555,225	2,938,508	3,379,284	3,886,177	4,469,104
Gross margin	*29.9%*	*30.0%*	*30.0%*	*30.0%*	*30.0%*	*30.0%*	*30.0%*
Other income	26,905	30,941	35,582	40,920	47,058	54,116	62,234
Total income	**2,046,918**	**2,252,876**	**2,590,807**	**2,979,428**	**3,426,342**	**3,940,294**	**4,531,338**
Total expenses	1,418,697	1,449,000	1,566,975	1,696,871	1,840,029	2,029,566	2,244,075
EBITDA	**628,221**	**803,876**	**1,023,832**	**1,282,557**	**1,586,313**	**1,910,728**	**2,287,263**
Depreciation	299,789	343,309	368,817	421,473	436,933	472,603	484,714
EBIT/ operating profit	**328,432**	**460,567**	**655,015**	**861,084**	**1,149,380**	**1,438,125**	**1,802,549**
Finance charges	(20,073)	(85,000)	(99,499)	(86,407)	(72,609)	(58,067)	(42,740)
NPBT	**308,359**	**375,567**	**555,516**	**774,677**	**1,076,771**	**1,380,058**	**1,759,808**
Profit margin	*4.6%*	*5.1%*	*6.5%*	*7.9%*	*9.6%*	*10.7%*	*11.8%*
Income tax	(77,090)	(93,892)	(138,879)	(193,669)	(269,193)	(345,014)	(439,952)
NPAT	**231,270**	**281,675**	**416,637**	**581,008**	**807,578**	**1,035,043**	**1,319,856**

4.2 Adherence to international and local safety standards

There is no denying, safety is *the* top priority.

The gas group is uncompromising in its adherence and pursuance of health and safety for its employees, company assets, reselling agents and the public in general.

In pursuit of continuity, the gas group signed a technical support agreement with Fiji Gas in 2015 that ensures the business continues to adhere to international standards.

Health and safety performance is monitored daily and reported on a monthly basis. Along with decision making processes, performance is discussed as part of the monthly HSE meeting. As a key performance indicator, the gas group has adopted a zero-total recordable injury frequency rate (TRIFR). This ensures the gas group can measure itself against similar workplaces around the world.

The TRIFR initiative, unlike LTI (loss time injury) will ensure transparency in reporting incidents and accidents. It forces the HSE committee and the employees to address the issues and ensure they are corrected.

The gas group has set its target to achieve the following:

The Way Forward	Target	Objective	TGL HGL
Customer	Customer, Stakeholder & Reputation	Ensure Customer retention and growth, every financial year	Establish a service line for customers & sign on more LPG agents (>6)
HSE	Zero harm	TRIFR, every financial year	TRIFR = 0
	Training	Ensure workplace competency	>90% month on month
	Leading Indicators	Action Closure	>90% month on month
	Leading Indicators	Focus on behavior	2,000 observations >90% behavioural, per financial year
	Governance	Level 1 Assurance in place	All actions closed out by end of financial year
	Compliance	Planned Maintenance complete by due date	>80% comply by end of financial year

From a fixed asset point of view, the gas group has scheduled in its 5-year forecast, as a non-discretionary capital expenditure, maintenance and audit work on bulk tanks and its associated pipelines.

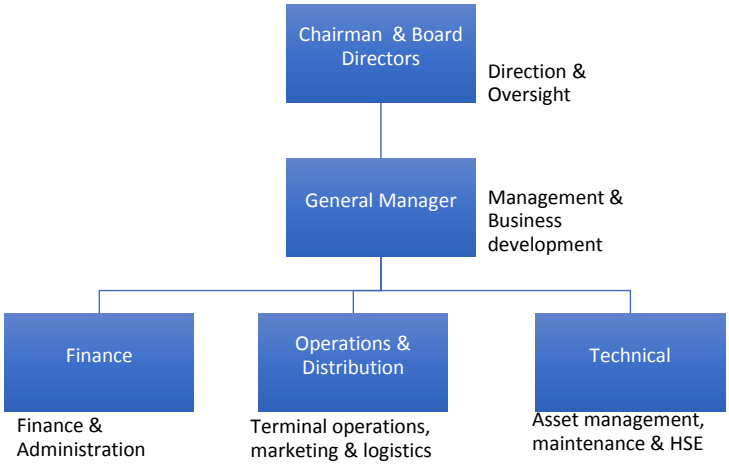
It is noted that in its pursuit for more reselling agents, Home Gas Ltd, must comply with the government of Tonga's, Petroleum Act 1960 and AS/NZS 1956:2014.

As is noted in this document, the gas group relies on Fiji Gas Ltd for support in many aspects of its business. However, it is a goal for the gas group to investigate and work towards achieving an ISO 9001 quality certification.

4.3 Human resource development

The dynamics of the business remains stable despite recent changes to key management positions. The gas group has in its disposal, experienced and capable staff who continue to meet the requirements of the business.

The gas group's organisational structure is as follows:



In the 2016 business plan, a business development manager was proposed. This task will now fold into the General Managers role, which will be complemented by the Finance Manager.

Key performance indicators (proposed)

The core functions of the business are defined accordingly in each staff's job description. Each and every staff will be exposed to a performance monitor that is set out below, with each target being weighted according to each staff's responsibility.

The Way Forward	Target	Objective	TGL HGL
Customer	Customer, Stakeholder & Reputation	Ensure Customer retention and growth, every financial year	Establish a service line for customers & sign on more LPG agents (>6)
Market Share	Competing with GoGas	Limiting market share erosion	Restore to 100% by 2019
Operational Excellence	Total Opex per Tonne	Manage Operational expenses	$829 per ton per year
	Debtors Days	Ensure Fiji Gas invoice is paid on time in accordance with Supply contract	<15 Day Sale Outstanding (DSO) per month

The Way Forward	Target	Objective	TGL	HGL
	Governance	Close all Internal and external audit issues from the prior financial year	100% of the total (Internal & External) issues are closed	
Gross Profit	Gross Profit % of Sales	Grow & Retain Total Margin, at end of each financial year	12%	20%
Profitable Growth	Volume growth	Grow the business	2,211 tons for 2017/2018 financial year	
Capital Discipline	ROCE	Restrictive capital expense, at end of each financial year	16%	

Training and upskilling

The gas group relies heavily on support from Fiji Gas Ltd on technical trainings. And will continue on to do so for the duration of the LPG supply contract with Fiji Gas Ltd. In addition to this, it has in its disposal a very experienced Technical manager who continues to support this aspect of the business.

- ***Overseas Training - partnership with Fiji Gas Ltd***

Managerial and operational training is provided from time to time by Fiji Gas Ltd in Suva, Fiji. Staff have taken advantage of these training in the past and will continue to do so in the future.

- ***Technical staff (gas fitters)***

As a minimum, staff fulfilling this role must qualify as a mechanical fitter from the local technical institute.

Fiji Gas Ltd has also provided training on specific terminal equipment from electronic scales up to the road tanker's ancillaries. As gas fitters providing services (maintenance and installation etc) for customers, Fiji Gas Ltd has certified some of the staff to carry out the work in accordance with international standards.

- ***Terminal officers - in house training***

Terminal Officers form the majority of the staff at the terminals. The minimum qualification required is a pass in form 6 high school.

As part of the technical support agreement with Fiji Gas Ltd, the gas group are provided access to Origin's Learning Management System (OLMS). The online learning tool was developed by Origin Energy with LPG terminal staff in mind. To become a fully certifiable LPG terminal staff, all the modules must be completed with scores better than 80%.

In addition to the OLMS modules, staff must learn and portray a good understanding of the processes set out by the company.

There are 67 modules in total. Each is ranked according to the requirement of each terminal officer position:

	Terminal Officer	Rank of learning module	Summary of learning modules to complete
1	Terminal Officer Grade 2	Basic	o Company processes related to the LPG terminal Must complete and pass: o 21 OLMS training modules that deals with: o General filling, handling and testing of cylinders o Hazard awareness o Terminal operations, fire and emergency response o From confined space entry to heavy vehicle driving
2	Terminal Officer Grade 1	Intermediate	Must complete and pass: o 14 OLMS training modules that deals with: o from LPG appliances to dispensing the road tanker o Dangerous goods license to fork lift license o First aid to maintaining HSE register o Environmental awareness and incident investigation level
		Advance	Must complete and pass: o 19 OLMS training modules that deals with: o Risk management to HSE planning o Incident investigation level 3 to asset management & Preventive maintenance o HSE committee to enterprise trainer & assessor o transferring LGP between tanks using the air compressor o Gas fitting license to Permit authority representative o Unloading & Loading the road tanker at terminals to Journey management o LPG foundation to fatigue management
3	Terminal Supervisor	Expert	Must complete and pass: o 19 OLMS training modules that deals with: o Fire safety advisor to authorised gas tester o Installing & Inspecting cylinders & terminals o Incident investigation level 1 o LPG tank to tank transfer o Depressurising vessels o Vehicle inspection o Ship to shore transfer o Manual handling skills

Succession plan

The Technical manager will be retiring from work soon. He has brought to this business a wealth of experience and expertise. His role, amongst others, looks at safety assurance and preventative maintenance, which are of utmost importance to continuity of the business. A *succession plan* is required to address this.

While training is provided internally from safe handling of LPG to risk awareness and management to discharging LPG ships, there is concern with areas of managing pressure vessels. Other than the technical manager, there is no one within the organisation certified to carry out such work. A certified, knowledgeable candidate with years of experience in handling and managing flammable liquids is required.

The succession plan will look at:

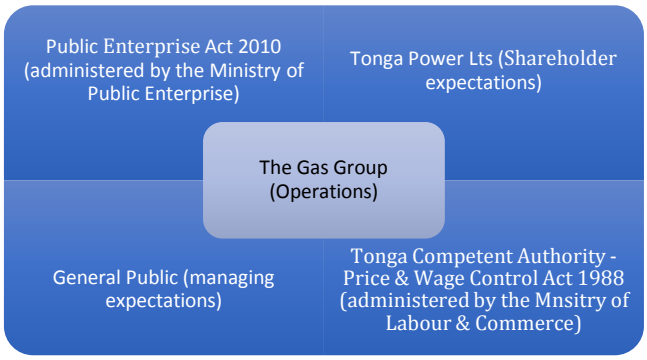
- Training and upskilling capable staff
- Investigate appropriate candidates from the industry
- Secondment from Fiji Gas Ltd, that will involve training, capable individuals within the organisation.

4.4 Governance landscape

The gas group is a public enterprise under the Public Enterprise Act 2010. It is wholly owned by another public enterprise, Tonga Power Ltd.

And with the Public Enterprise Act 2010, the company is required to commit to the highest standard of corporate governance, with core values of accountability, probity and transparency. The company is adopting policies and procedures aimed at maintaining these standards.

Notwithstanding that, the gas group is accountable to various stakeholders as is depicted below:



- ***Public Enterprise Act 2010***

  The Act requires the Gas Group to operate as a successful business by creating shareholder value, operating profitably and efficiently.

- ***Tonga Power Ltd (Shareholder)***

  The Shareholder's expectation was outline in the letter of expectation of December 2015. As with the Public Enterprise Act 2010, the shareholder expects profitability, uncompromising adherence to safety standards, human resource development, operational governance, the merger of Tonga Gas Ltd and Home Gas Ltd, growth creation development and others.

- ***General public relationship***

  The Gas Group's relationship with the general public, especially its reputation must be managed properly. This is crucial as shareholder's reputation is also attached to it always.

  As a company, it is our intention to work with the community in to provide a reliable, safe, sustainable and affordable LPG throughout Tonga. The benefit goes both ways, in that the Gas group should consider giving back to the community where it can.

- ***Tonga Competent Authority (TCA)***

  The regulatory body, operating under the Ministry of Labour, Commerce and Industries. The TCA sets the LPG price separately for Tonga Gas Ltd and Home Gas Ltd, every quarter and is based on several factors:

  - LPG landing costs that is verified by an external consultant for TCA
  - Sales volume
  - The gas groups externally audited operational expenditure.
  - Return on Capital employed (ROCE).

Furthermore, the Gas Group has adopted several policies previously approved by its shareholder Tonga Power Ltd for its use, to ensure it is in line with the shareholder's expectations.

Several processes were also created to ensure operational efficiencies are continuously monitored and managed properly.

4.5 Merger of TGL and HGL

The shareholder has requested that management seek to merge the two companies into a single entity. There is an inherent operational inefficiency in maintaining the status quo, but it has operated as such because of the pricing structure, mandated and regulated by the Tonga Competent Authority.

Dialogue has commenced with the Tonga Competent Authority to evaluate price control implications arising from the merger of the two companies.

4.6 Future development

Since 2015, the Gas Group has seen marked improvement in sales of LPG. With the latest data for April 2017 seeing a 18% increase year on year. For a business that is currently maintaining the status quo and carrying out business as usual, the turnaround is substantial and is attributed to:

- improvement in operational processes within the company.
- the shareholder, Tonga Power Ltd's reputation as a reliable and dependable company has also changed public perception of the Gas Group.
- increase in commercialising firewood use.
- an improved gross domestic product.

While it can be sustainable to operate business as usual, it is the shareholder's expectation that the gas group show initiative by creating growth and improving customer relations.

Management's view of the business is summarised in the analysis below:

Our strong points:	Our weaknesses:
• LPG is a clean, low carbon alternative energy • Being a member of the Utility Group of companies, and its ties to Tonga Power Ltd • Well-known brand name, with years in service • Strong management focus in health, safety and environmental issues • Growing network of reselling agents • Experienced technical team • Strong debt collection performance	• High loan repayment claims against free cash flow generation • Vulnerable to LPG price movement • High LPG landed price due to high freight costs • Government regulated LPG price • Competitive biomass price (fire wood) • Good weather lowers LPG sales • LPG's high reliance on cooking application • Small volume relative to high capital investments • Vulnerable to high ferry costs to outer-islands
Opportunities that can make positive changes to the business:	**Threats that can undermine the business:**
• Autogas or LPG for vehicles • LPG power generation (combined heat and power application) • Liberal credit initiative, targeting the high number of partial fills • Under-developed customer awareness initiatives	• Stock misappropriation • Disruption to shipment due to natural disasters, causing a stock runout • Competition with GoGas • Falling LPG price, lowering gross profit

i) Further developing the core business

Reselling agents

Home Gas Ltd will continue to take LPG cylinders closer to the customers, and increasing Home Gas Ltd's footprint around the Kingdom, by signing on more reselling agents.

Cylinder buyback initiative (4.5kg to 13kg cylinders)

Tonga Gas Ltd has bought since 2013, small cylinders in various sizes (up to 13kg sizes) to a total capacity of 68-ton. However, it is believed this is miniscule compared to that bought before 2013.

Cylinder buyback looks at returning "inactive" cylinders back into rotation. It is a more economical alternative to purchasing new cylinders from Thailand and Singapore.

The initiative will purchase second-hand cylinders from customers for 50% of the original cost. Conditions will apply for buyback is outlined but not limited to below:

- Buyback only applies to 4.5kg up to 13kg cylinders.
- Second-hand cylinders owned by Fiji Gas Ltd or Tonga Gas Ltd
- The condition of each cylinder will be assessed by TGL and accepted if it is reusable
- Cylinders assessed to be unserviceable will be condemned and disposed of safely by TGL
- In order to avoid theft of cylinder, ID of those returning the cylinders will be required and recorded for future reference

Cylinder capacity exchange program

The program is ongoing but is quite slow because changing customer perception proves to be difficult. Customers overwhelmingly prefer the larger 13kg sizes over the smaller ones, even when they are aware they can avoid the partial fill fee when ordering a partial fill.

It is planned for the last quarter of 2017, Touliki will cease to sell and dispense partial fill cylinders to customers. Instead will only sell full cylinders in various sizes as part of this program, in a push to turn Touliki into a distribution terminal.

The result of this change will mean that Matatoa Refilling station will take in more walk-in customer in the future. Matatoa will eventually succumb to the same fate as we slowly push for more control over partial filling using the exchange program more. Vava'u, on the other hand, will continue on as normal but will eventually follow what transpires in Tongatapu in the future.

Liberal credit initiative (Gas on credit)

The gas group is fully aware that customers some of the time is strapped for cash. Given that, it is the main reason why customers choose partial filling.

Surprisingly, customer purchase behaviour is very much alike at each terminal. On an average day, just under 50 x 13 kg cylinders are filled with around 7kg of LPG.

This information suggests that if all partially filled cylinders, where filled to the brim, Home Gas Ltd is likely to see an increase in volume of at least 10 tons a month.

Easier access to LPG can be provided by a line of credit to approved customers. It is an obvious channel that the gas group will further investigate.

The initiative is open ONLY to those who have a Tonga Power Ltd electricity bill. The fact that electricity has become a necessity, its availability to a far-reaching customer base, its excellent credit control mechanisms proves the shareholder, Tonga Power Ltd is the obvious choice for partnership on this initiative.

However, certain mechanisms need to exist before this can be properly proposed:

- *Credit service agreement between "Home Gas Ltd and the Credit customer"*: the customer MUST agree his/her electricity connection will be disconnected if his gas bill account is outstanding. The service agreement will need to be endorsed by the Electricity Commission, to ensure it does not violate existing regulation.

- *Tonga Power Ltd is a willing partner*, for credit checking potential customers and willingly to assist the gas group in the initiative.

- *Technology One's Enterprise Cash Register (ECR)* is properly configured for credit sales, and setup at all the terminals, where gas on credit will be available to the general public - Touliki, Matatoa and Vava'u.

- A suitable candidate to coordinate with TPL, accounts receivable and ensure the correct processes are in place and followed.

Gas hot water heaters

The gas group will be re-introducing gas hot water heaters to the market. Already there are businesses selling the units. However, the quality has been a let-down for users, giving a bad reputation for gas hot water heaters.

The gas group will source a more robust system at a competitive prices – units that are serviceable by the gas group's experienced technical staff. Reputation is of utmost importance.
While hot water, in many cases, seasonal, gas hot water cylinders can be introduced as a permanent fixture for residential homes. An awareness program can be developed with enablers such as architects, plumbers and electricians in mind, as they can easily push the units to homeowners.

Gas fitting – servicing and installation

This service also remain a priority for the company.

Customer awareness

Creating customer awareness programs remain as important as ever.

- *Media:* The gas group will continue to use media - radio and newspapers - to push its agenda on the public. Facebook will be utilised from time to time as it is a very popular medium.

- *Partners:* Creating relationships with companies enabling or encouraging gas use, such as architects, builders, gas appliance resellers.

  Creating a business directory of bulk users, reselling agents and gas use enablers, and sharing that with the general public. It should hopefully position the gas group as an intermediary for potential customers.

- *Community awareness:* The gas group is open to sponsor community activities. It is a way to show customers the gas group continues to support social initiatives.

- *Community service:* Propose to install heavy duty gas fired BBQ facilities at secured public areas such as the Popua swimming pool area, which is owned by the Ports Authority. It stands as a very popular spot for family activities.

The gas group's logo can be advertised on the facility. Families can opt to rent the BBQ facility and utilise their own LPG cylinders. The facility can be securely locked and checked from time to time by the technical staff.

- *LPG cylinder rental:* investigate possibility of renting cylinders to one-off users. Such users contribute to the problem of creating "inactive" cylinders. Renting is a way to lowering this number and providing a better cylinder turnaround figure for the gas group.
- *Utility bills* - sharing services in an attempt to create a one-stop shop for LPG customers, Home Gas Ltd is open to collect utility bills on behalf of the utilities.

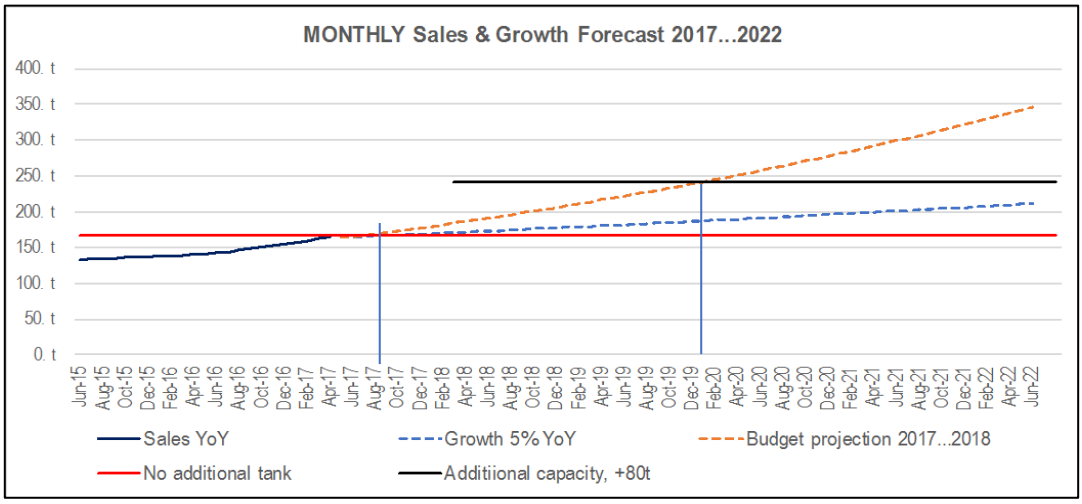
Additional LPG storage at Touliki LPG terminal

Touliki LPG terminal's remaining stock has decreased to levels below the alarming state, of less than a week's supply.

Several factors contribute to this but chief amongst it, is the fact that monthly LPG drawn (through sales and stock transfer) from the terminal has increased to account for 95% of storage capacity. With a projected growth of +10% year on year, Tonga Gas Ltd is likely to create more inconvenience to the LPG shipper. The risk of running out of LPG stock in Nuku'alofa stands to become more pronounced as time passes.

A second-hand 80 ton LPG tank is now available from BP Bulwer Island Pty, Queensland, Australia that comes with the pipes and fittings, ladder and deluge pipes for AUD30k. This additional capacity will certainly resolve the issues mentioned above (see graph below), and push out the risk of running out of stock to:

- December 2019, if the gas group continues to experience a growth of 12% year on year, as per budgeted forecast.



A business case will be submitted to the Board for appraisal and approval.

ii) Expanding to other businesses

The shareholder expects the gas group to investigate the possibilities of furthering growth by exploiting, potential markets. In the 2016 business plan, LPG vehicles and LPG power generation are mentioned as candidates.

Expanding the gas groups reach is a necessary trajectory given that LPG is a low carbon, clean and environmentally friendly alternative fuel. Exploiting these highly lucrative markets is not only necessary but a goal.

As is previously mentioned, the shareholder, Tonga Power Ltd is perceived as the catalyst for creating growth for the gas group. Its willingness to support the gas group remains as crucial as ever.

Power Generation

Branching into the shareholder's core business is crucial part of this business plan. However, the gas groups focus remains in supplying LPG rather than the business of supplying of power to the grid. To an extent, the plan to extending LPG to power generation rests wholly on the shareholder's willingness to embrace LPG power generation.

In general, a LPG generator, generating 1MW with 80% load factor will add 150 tons of LPG to the gas group's monthly sales.

But, there are hurdles to overcome:

- ***LPG currently available for the gas group's customer is butane C4. Propane is preferable for 100% gas generators.***

With the exception of Tank #1 and Tank #2, Tank #3 is propane rated. Any additional LPG tank in the future such as the second-hand tank proposed by BP Bulwer Island Pty is propane rated.

- ***LPG price comes up against a cheap government subsidised power generation diesel price.***

Saudi CP propane price is historically cheaper than butane. The difference is however, quite volatile.

In case, this is a possibility, the ship provided by GeoGas that services Tonga and the Pacific region are all propane rated. Given the possibility of increasing sales at an astounding level, the Gas Group will:

- Engage and work to convince Tonga Power Ltd that LPG is an option to an already crowded power generation portfolio
- Engage and create dialog with MEIDECC on the advantages of LPG to the environment and explore the possibility of providing duty free import for LPG utilised, as a fuel alternative.
- Analyse likelihood of future volume use for propane and renegotiate LPG supply contract with Fiji Gas Ltd.
- Explore the possibility of procuring LPG from other suppliers to the Pacific, such as GeoGas and Origin Energy
    - As an alternative to Fiji Gas Ltd.
    - As a standalone supplier of propane for power generation.

- ***LPG powered generators are generally more expensive than diesel generators***

Tonga Power Ltd's focus is its commitment to the government of Tonga's 50% renewable energy target by 2020.

While LPG is environmentally friendly; being classified as a renewable energy is far from the truth. Its advantage is similar to diesel power generation. In that it can provide a firm, despatchable output, that is grid friendly and free of noise.

While LPG price is comparatively expensive to diesel power generation price, the fact that it can efficiently provide high quality heat for a combined heat and power (CHP) application, gives it a fighting chance. Such application can increase efficiency from the usual 30% to >80% depending on the CHP application. The increased efficiency can be monetised through sale of heat for example, that adds value to an electrical only based, power generation.

Potential sites:

The Vaiola Hospital is a likely candidate for CHP in that power and hot water can be easily provided 24/7 for disinfecting purposes, cooking and general hot water. The latter is something that is currently, non-existent at this stage at the Hospital.

But a more lucrative site would be the Latter-Day Saints temple at Liahona. In addition to general light and power, the Temple's requirements for air conditioning is non-compromising. Power is an absolute, top priority for the Church and is the reason why the temple provides a 1MW standby diesel generator on site. It should be noted that most of the necessary ancillaries for CHP or co-generation are already available the Liahona site.

The Hilton Group is also a potential site in that a 5-star rated hotel would expect the best in services. Situated at Fua'amotu, a gas turbine can easily provide electricity and relieve pressure off of Tonga Power Ltd's grid, at the same time provide heat for cooling or heating.

Given the shareholder's power generation focus, it is possible that an engine manufacturer will be open for a BOOT contract to provide a CHP purchase agreement with Tonga Power Ltd. Manufacturers such as Capstone Microturbines, have already approached the Gas group on several occasions.

<u>Auto Gas or LPG vehicle</u>

As noted previously, there already are LPG vehicles on the island. But the numbers have not improved since they were introduced to Tonga. While the gas group will focus on individual users, the plan can be jump started with involvement of the utilities. Providing each with an alternative option to their vehicle replenishment / replacement program.

With more awareness of the savings compared to diesel and petrol (bowser price), the gas group is predicting LPG vehicles can easily peak at 25% of total annual LPG sales for LPG vehicles by 2020. It will however, be a gradual increase at first, as vehicles are introduced to Tonga.

Tonga's transportation sector's fuel use on an annual basis is just over 900,000 mmBtu. To put that into perspective, a 25% share in the gas groups LPG sales figures, attributed to LPG vehicles, is the equivalence of 2% of Tonga's total fuel use. In a sense, LGP vehicles is not a threat to the oil companies.

As is now, LPG butane C4 is already competitive against diesel and petrol price at the bowser. It would be doubly advantageous if the government of Tonga considers a duty subsidy.

Similarly, to power generation the price of LPG should be investigated because of the environmental benefits it brings:

- Engage and create dialog with MEIDECC on the advantages of LPG to the environment and explore the possibility of providing duty free import for LPG, utilised as a fuel alternative.

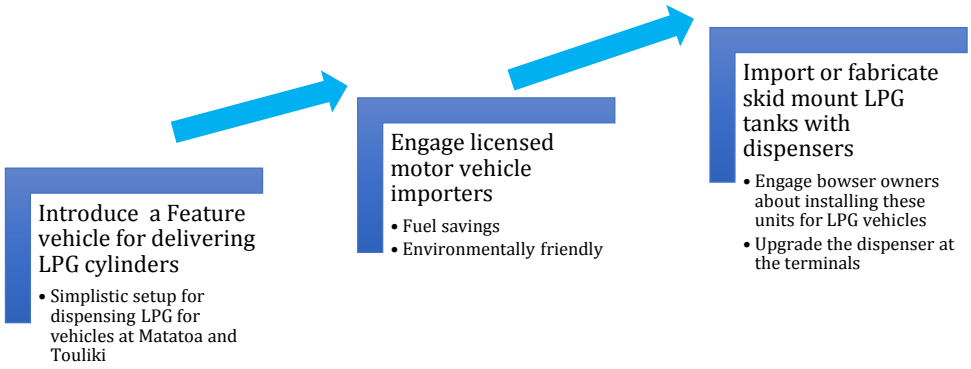
- ***Re-introducing LPG for vehicles***

As noted previously, the target is to introduce LPG to larger vehicles such as buses and trucks. It has been noted that the auto gas market is shrinking overseas, in countries like Australia and New Zealand because of an uptake in electric cars. That in itself, is a blessing for Tonga in that auto gas vehicles can be easily found and introduced to Tonga.

The Gas Group's initial intention is to purchase a second-hand auto gas delivery vehicle for use on Tongatapu. The vehicle will feature Autogas and the gas group's logo. An awareness program will also take place to advertise benefits such as savings on fuel consumption and the fact that it is a low carbon alternative to diesel fuel and petrol oil.

Additionally, engage the utilities and offer LPG vehicles as an alternative to their vehicle replacement program.

In general, a plan may look similar to below:



- ***Importing LPG vehicles***

  Engage and encourage licensed motor vehicle importers to import new and / or second-hand LPG vehicles to sell to the general public.

  Alternatively, the gas group can import to Tonga, a couple of vehicles to sell.

- ***Dispensing from LPG terminals, at first***

  A simple set up can be made at first. By installing piping from the main LPG outlet line and hosed off at the end, connected to a compatible dispenser for vehicles. A Neptune meter will be used to measure LPG dispensed.

  As sales surpass the 200kg per day mark, it is appropriate then to install a proper dispensing unit, such as those available at the bowsers, to replace the Neptune meter.

- ***Dispensing LPG from bowsers, as sales increases***

Transportable units such as those below can be constructed and delivered to any bowser for dispensing LPG to vehicles. The gas group plans to engage bowser owners at strategic locations, provide a supply contract to them to continue supply to LPG vehicle owners.

This skid mounted 3-ton LPG tank unit come with a dispensing pump that is metered and is priced at USD50k each. Price can be much lower if the tank is second-hand.

5. RISK MANAGEMENT AND MITIGATION

It is important to note, that the financial risks reported within the business plan are actually subject to annual financial settlement audit commentary, where external auditors comment on the financial risks and quantifies the impact of these on the respective companies within the group.

Operational risks are noted and are related to the management of the terminals.

Refer Appendix C for the financial risks and the operational risks that are identified as *severe.*

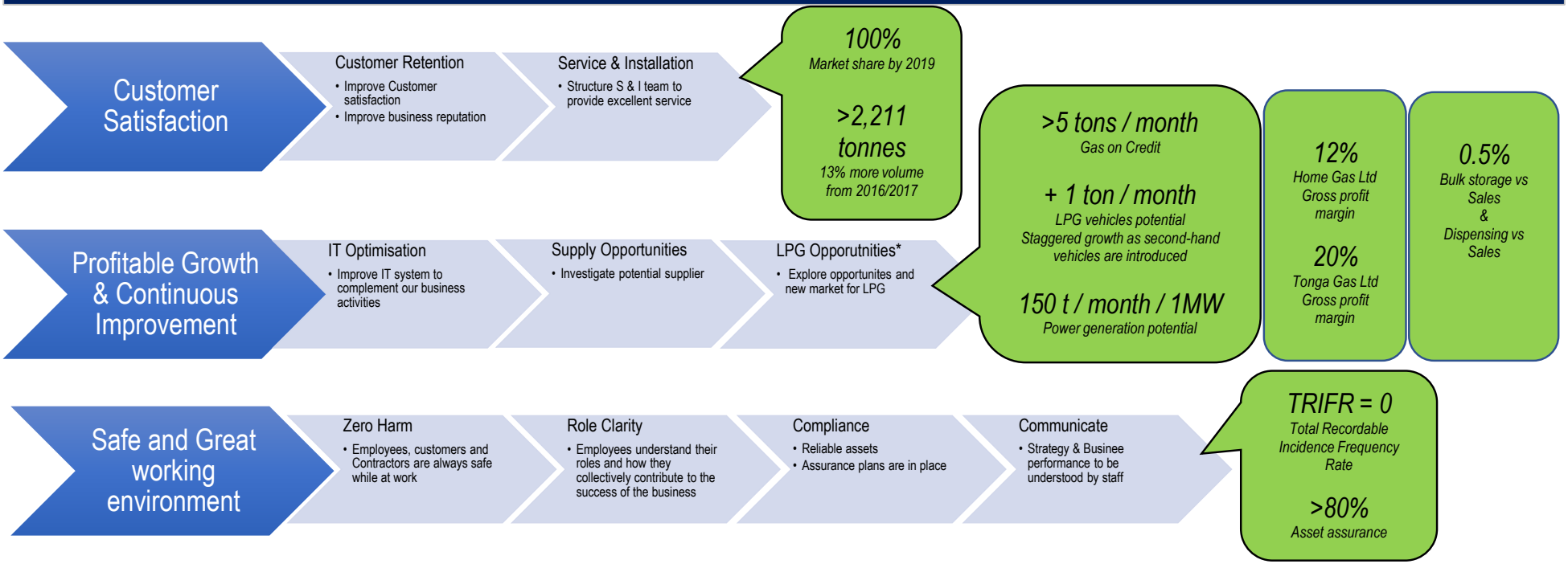
6. APPENDIX

6.1 Appendix A: Our Strategy 2017 -

6.2 Appendix B: The Gas Group's Statement of Financial Performance (with Capex Plan: non-discretionary and discretionary)

6.3 Appendix C: Risk management and mitigation

Our Strategy.....2017..2018.....



Appendix B: The Gas Group's Statement of Financial Performance, with Capital Expenditure plan

A	**Tonga Gas Group Statement of Financial Performance**							
		Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Note		**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
(i)	**Revenue**	**6,746,911**	**7,406,448**	**8,517,415**	**9,795,027**	**11,264,282**	**12,953,924**	**14,897,012**
(ii)	Gross profit	2,020,012	2,221,934	2,555,225	2,938,508	3,379,284	3,886,177	4,469,104
	Gross margin	*29.9%*	*30.0%*	*30.0%*	*30.0%*	*30.0%*	*30.0%*	*30.0%*
(iii)	Other income	26,905	30,941	35,582	40,920	47,058	54,116	62,234
	Total income	**2,046,918**	**2,252,876**	**2,590,807**	**2,979,428**	**3,426,342**	**3,940,294**	**4,531,338**
(iv)	Total expenses	1,418,697	1,449,000	1,566,975	1,696,871	1,840,029	2,029,566	2,244,075
	EBITDA	**628,221**	**803,876**	**1,023,832**	**1,282,557**	**1,586,313**	**1,910,728**	**2,287,263**
(v)	Depreciation	299,789	343,309	368,817	421,473	436,933	472,603	484,714
	EBIT/ operating profit	**328,432**	**460,567**	**655,015**	**861,084**	**1,149,380**	**1,438,125**	**1,802,549**
(vi)	Finance charges	(20,073)	(85,000)	(99,499)	(86,407)	(72,609)	(58,067)	(42,740)
	NPBT	**308,359**	**375,567**	**555,516**	**774,677**	**1,076,771**	**1,380,058**	**1,759,808**
	Profit margin	*4.6%*	*5.1%*	*6.5%*	*7.9%*	*9.6%*	*10.7%*	*11.8%*
25%	Income tax	(77,090)	(93,892)	(138,879)	(193,669)	(269,193)	(345,014)	(439,952)
	NPAT	**231,270**	**281,675**	**416,637**	**581,008**	**807,578**	**1,035,043**	**1,319,856**

Appendix B: The Gas Group's Statement of Financial Performance, with Capital Expenditure plan

B	**Tonga Gas Group Statement of Financial Position**							
		2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	Current assets							
	Cash and cash equivalents	376,081	1,087,036	609,008	46,664	55,513	96,448	641,187
	Related party receivable from TPL	977,791	977,791	977,791	977,791	977,791	977,791	977,791
4.00%	Trade receivables (net of impairment)	269,876	296,258	340,697	391,801	450,571	518,157	595,880
	Other receivables	118,529	118,529	118,529	118,529	118,529	118,529	118,529
1.39%	Prepayments	93,542	102,686	118,089	135,802	156,173	179,599	206,539
0.35%	Current tax asset	23,898	26,235	30,170	34,695	39,900	45,885	52,767
2.94%	Inventories	198,129	217,497	250,121	287,639	330,785	380,403	437,464
	Total current assets	**2,057,847**	**2,826,031**	**2,444,405**	**1,992,922**	**2,129,262**	**2,316,812**	**3,030,157**
	Current liabilities							
	Trade payables	532,585	585,555	670,759	768,639	881,092	1,010,298	1,158,768
	Related party payable to TPL	235,584	235,584	235,584	235,584	235,584	235,584	235,584
	Dividend payable to TPL	280,000	280,000	280,000	280,000	280,000	280,000	280,000
3.00%	Other payables and accruals	147,485	162,154	185,749	212,854	243,995	279,775	320,889
	Current tax liability	77,090	93,892	138,879	193,669	269,193	345,014	439,952
	Employee entitlements	15,607	15,366	17,210	19,275	21,588	24,826	28,550
	Total current liabilities	**1,288,350**	**1,372,551**	**1,528,181**	**1,710,022**	**1,931,451**	**2,175,498**	**2,463,743**
	Working capital	**769,497**	**1,453,481**	**916,223**	**282,901**	**197,811**	**141,314**	**566,414**

Appendix B: The Gas Group's Statement of Financial Performance, with Capital Expenditure plan

	Non current assets	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	Property plant & equipment							
	Opening fixed assets carrying amount	2,941,057	3,121,268	3,489,959	3,697,142	4,151,669	4,270,736	4,574,133
	Current year capital expenditure	480,000	712,000	576,000	876,000	556,000	776,000	576,000
	Current year depreciation	(299,789)	(343,309)	(368,817)	(421,473)	(436,933)	(472,603)	(484,714)
	Closing fixed assets carrying amount	3,121,268	3,489,959	3,697,142	4,151,669	4,270,736	4,574,133	4,665,419
	Intangible assets	6,113	6,113	6,113	6,113	6,113	6,113	6,113
	Deferred tax asset	17362	17362	17362	17362	17362	17362	17362
	Total non-current assets	3,144,743	3,513,434	3,720,617	4,175,144	4,294,211	4,597,608	4,688,894
	Non current liabilities							
	ANZ Term loan	725,000	2,000,000	1,757,288	1,501,485	1,231,884	947,740	648,270
	Deferred tax liabilities	58,273	58,273	58,273	58,273	58,273	58,273	58,273
	Total non-current liabilities	783,273	2,058,273	1,815,561	1,559,758	1,290,157	1,006,013	706,543
	Net assets	**3,130,967**	**2,908,642**	**2,821,279**	**2,898,287**	**3,201,865**	**3,732,909**	**4,548,765**
	Capital & reserves							
	Capital	110,100	110,100	110,100	110,100	110,100	110,100	110,100
	Retained earnings							
	Opening retained earnings	2,789,597	3,020,867	2,798,542	2,711,179	2,788,187	3,091,766	3,622,809
	Current year net profit after tax	231,270	281,675	416,637	581,008	807,578	1,035,043	1,319,856
	Dividend	0	(504,000)	(504,000)	(504,000)	(504,000)	(504,000)	(504,000)
	Closing retained earnings	3,020,867	2,798,542	2,711,179	2,788,187	3,091,766	3,622,809	4,438,665
	Shareholders' equity	**3,130,967**	**2,908,642**	**2,821,279**	**2,898,287**	**3,201,866**	**3,732,909**	**4,548,765**

Appendix B: The Gas Group's Statement of Financial Performance, with Capital Expenditure plan

C	**Tonga Gas Group Statement of Cash Flows**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	EBIT	328,432	460,567	655,015	861,084	1,149,380	1,438,125	1,802,549
25%	Tax on EBIT	(82,108)	(115,142)	(163,754)	(215,271)	(287,345)	(359,531)	(450,637)
	Net operating profit after tax	246,324	345,425	491,261	645,813	862,035	1,078,593	1,351,911
	Addback depreciation	299,789	343,309	368,817	421,473	436,933	472,603	484,714
	(Increase)/ decrease in working capital investment	(148,706)	26,971	59,229	70,979	93,939	97,432	119,639
	Capital expenditure	(480,000)	(712,000)	(576,000)	(876,000)	(556,000)	(776,000)	(576,000)
	Free cash flow	**(82,593)**	**3,705**	**343,308**	**262,265**	**836,907**	**872,629**	**1,380,264**
	Financing cash flows							
	Repayment of TPL advance	0						
	TGL ANZ Term loan Interest expense	(20,073)	(85,000)	(99,499)	(86,407)	(72,609)	(58,067)	(42,740)
25%	Tax shield on interest	5,018	21,250	24,875	21,602	18,152	14,517	10,685
	Net after tax interest payments	(15,055)	(63,750)	(74,624)	(64,805)	(54,457)	(43,550)	(32,055)
	Term loan principal payments							
	TGL ANZ loan principal received/ (repaid)	725,000	1,275,000	(242,712)	(255,803)	(269,601)	(284,143)	(299,470)
	TPL ANZ loan payments (classified as dividend paid 2018-23)	(580,000)	(504,000)	(504,000)	(504,000)	(504,000)	(504,000)	(504,000)
		145,000	771,000	(746,712)	(759,803)	(773,601)	(788,143)	(803,470)
	Total financing cash flows	**129,946**	**707,250**	**(821,336)**	**(824,609)**	**(828,058)**	**(831,694)**	**(835,525)**
	Current year change in cash	47,353	710,955	(478,028)	(562,344)	8,849	40,935	544,739
	Cash brought forward	328,728	376,081	1,087,036	609,008	46,664	55,513	96,448
	Cash carried forward	**376,081**	**1,087,036**	**609,008**	**46,664**	**55,513**	**96,448**	**641,187**

Appendix B: The Gas Group's Statement of Financial Performance, with Capital Expenditure plan

D	ASSUMPTIONS	2017	2018	2019	2020	2021	2022	2023
Note (i)	**Revenue/ sales**							
12%	2018 year-on-year growth in sales volume							
15%	2019 - 23 Long term sales volume (tonnes) growth rate assuming auto-gas is 4% of 15% growth							
	Tonnes sold	1,974	2,211	2,543	2,924	3,362	3,867	4,447
3,350	2018 - 23 average sell price per tonne	3,418	3,350	3,350	3,350	3,350	3,350	3,350
	REVENUE	**6,746,911**	**7,406,448**	**8,517,415**	**9,795,027**	**11,264,282**	**12,953,924**	**14,897,012**
Note (ii)	**Gross profit**							
30%	2018 - 23 Long term gross profit %	29.94%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
	GROSS PROFIT	**2,020,012**	**2,221,934**	**2,555,225**	**2,938,508**	**3,379,284**	**3,886,177**	**4,469,104**
Note (iii)	**Other income**							
15%	2018 - 23 Long term other income growth rate	**26,905**	**30,941**	**35,582**	**40,920**	**47,058**	**54,116**	**62,234**
Note (iv)	**Total expenses**							
4.0%	2019 - 23 Long term expenses growth rate (other than personnel)							
12.0%	2019 - 21 Long term personnel expense growth rate							
15.0%	2022 - 23 Long term personnel expense growth rate							
	Personnel costs (wages & oncosts)	761,945	750,190	840,213	941,038	1,053,963	1,212,057	1,393,866
	Directors fees and expenses	116,932	102,000	106,080	110,323	114,736	119,326	124,099
	Rent	9,659	23,042	23,963	24,922	25,919	26,955	28,034
	Selling & distribution expenses	62,756	72,169	75,056	78,058	81,181	84,428	87,805
	Other overheads	467,405	501,599	521,663	542,529	564,231	586,800	610,272
	Total operating expenses	**1,418,697**	**1,449,000**	**1,566,975**	**1,696,871**	**1,840,029**	**2,029,566**	**2,244,075**
Note (v)	**Depreciation**	**299,789**	**343,309**	**368,817**	**421,473**	**436,933**	**472,603**	**484,714**
	Based on capex additions over plan period. Impacts profit							
	but not cash flow							

Note (vi)	**Finance Charges & Loan payments**							
	(a) Tonga Gas Group activated a 7-year ANZ bank term loan during March 2017 with first 2 years being interest only payments @ 4.25% until December 2018 and thereafter @ 4.5% when installments are combined (principal and interest) and amortised over the remainder of the loan. The loan agreement has installments at T$28433.93 per month.							
	(b) Repayment of TPL loan, used to acquire the Tonga Gas Group was reset @ T$42k per month or T$504k per annum							
	Gas Group loan payments	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	TPL ANZ bank loan repayments	580,000	504,000	504,000	504,000	504,000	504,000	504,000
	Tonga Gas Group ANZ bank loan repayments	20,073	85,000	99,499	342,210	342,210	342,210	342,210
		600,073	**589,000**	**603,499**	**846,210**	**846,210**	**846,210**	**846,210**
	Capital expenditure Refer GM Report		**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	Discretionary		81,000	460,000	150,000	480,000	700,000	500,000
	Non-discretionary		631,000	116,000	726,000	76,000	76,000	76,000
			712,000	**576,000**	**876,000**	**556,000**	**776,000**	**576,000**
E	**KEY PERFORMANCE INDICATORS**							
	Profitability	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	Gross profit % (Gross margin)	30%	30%	30%	30%	30%	30%	30%
	Net profit before tax % (Profit margin)	5%	5%	7%	8%	10%	11%	12%
	Return on capital employed (NPAT/ Equity)	7%	10%	15%	20%	25%	28%	29%
	Return on invested capital (EBIT - tax on EBIT/ Interest bearing debt+equity)	6%	7%	11%	15%	19%	23%	26%
	Dividend Payout ratio (as % of NPAT)	0%	179%	121%	87%	62%	49%	38%
	Revenue per tonne	3,418	3,350	3,350	3,350	3,350	3,350	3,350
	Other income per tonne	14	14	14	14	14	14	14
	Cost of sales per tonne	(2,395)	(2,345)	(2,345)	(2,345)	(2,345)	(2,345)	(2,345)
	Operating costs per tonne	(871)	(811)	(761)	(724)	(677)	(647)	(614)
	Operating profit per tonne	**166**	**208**	**258**	**294**	**342**	**372**	**405**
	Liquidity	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	Free cash flow	(82,593)	3,705	343,308	262,265	836,907	872,629	1,380,264
	Current ratio	1.00	1.60	2.06	1.60	1.17	1.10	1.07
	Stability/ Capital finance structure	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	Debt ratio [Debt/ (Debt+Equity)]	19%	41%	38%	34%	28%	20%	12%
	Interest cover ratio	16.36	5.42	6.58	9.97	15.83	24.77	42.17
	EBITDA to Interest bearing debt ratio (1.2x)	0.87	0.40	0.58	0.85	1.29	2.02	3.53

Appendix B: The Gas Group's Statement of Financial Performance, with Capital Expenditure plan

Tonga Gas Ltd / Home Gas Ltd
5 Yr asset management plan / discretionary

Item #	Terminal	Capex	Responsible Company	Estimated Life of asset	Discretionary or Non-discretionary	Project description	Yr 1 2018	Yr 2 2019	Yr 3 2020	Yr 4 2021	Yr 5 2022
	Main Office	TM vehicle	HGL	10	Discretionary	As per vehicle replacement program	$50,000.00				
	Main Office	TA vehicle	TGL	10	Discretionary	As per vehicle replacement program		$50,000.00			
	Main Office	GM Vehicle	HGL	10	Discretionary	As per vehicle replacement program			$50,000.00		
	Touliki	2T truck	HGL	10	Discretionary	As per vehicle replacement program				$30,000.00	
	Touliki	3T truck	HGL	10	Discretionary	As per vehicle replacement program		$50,000.00			
	Touliki	Service vehicle	HGL	5	Discretionary	New vehicle - addition to the vehicle fleet	$25,000.00				
	Touliki	Pipeline Upgrade	TGL	50+	Discretionary	Upgrade to pipes from the open sea				$150,000.00	
	Touliki	Marine manifold	TGL	50+	Discretionary	Inlet connection to ship, is underwater when tide is high.			$100,000.00		
	Touliki	New office / Sales office, add LP gas inspection shed	HGL	30+	Discretionary	Upgrade and build a new administration and maintenance building		$210,000.00			
	Touliki	Second road tanker 1 ton	HGL	10	Discretionary	Relieve pressure off the existing road tanker				$300,000.00	
	Matatoa	LP gas isotainer - Matatoa reliever	TGL	30+	Discretionary	Additional storage - mobile - relieve pressure off the existing road tanker		$0.00			
	Ha'apai	Steel cage LP gas cylinder	TGL	20+	Discretionary	For transporting cylinders to outerislands	$3,000.00				
	'Eua	Steel cage LP gas cylinder	TGL	20+	Discretionary	For transporting cylinders to outerislands	$3,000.00				
	Others (Tongatapu)	New Bowser	HGL	30+	Discretionary	Supplementary income: Fully furnished bowser for vehicles. Selling LP Gas, diesel, petrol, lubricant oil.					$700,000.00
	Others (Tongatapu)	Fuel storage preparation	TGL	n/a	Discretionary	Supplementary income: Preparing Touliki for a possible expansion to storing diesel, petrol, lubricant oils as well as LP Gas.		$100,000.00			
	Others (Tongatapu)	LPG power generation generation	TGL	n/a	Discretionary	Supplementary income: Investigate the possibility of injecting LP Gas to existing TPL diesel generators.		$50,000.00			
							$81,000.00	$460,000.00	$150,000.00	$480,000.00	$700,000.00

Appendix B: The Gas Group's Statement of Financial Performance, with Capital Expenditure plan

Tonga Gas Ltd / Home Gas Ltd
5 Yr asset management plan / non-discretionary

					Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Responsible Company	**Estimated Life of asset**	**Non-discretionary**	**Project description**	**2018 Priority**	**2018**	**2019**	**2020**	**2021**	**2022**
TGL	50+	Non-discretionary	Increase LP Gas storage capacity at Touliki. Discharge days has shortensomewhat, putting pressure on delivery schedule for FijiGas to deliver on time to Tonga. TGL and HGL exposed to medium risk of running out of LP Gas.	High	**$430,000.00**				
TGL	10	Non-discretionary	Provide stock for new customers and potential new agents. As well as providing stock for recurring purchases of LP Gas, by existing customers. Additionally, maintain stock level for each delivery truck threby improving supply chain efficiency.	High	**$70,000.00**	$70,000.00	$70,000.00	$70,000.00	$70,000.00
TGL	30+	Non-discretionary	Upgrade existing Neptune LP gas meter. Improve stock count - secure sales			$40,000.00			
TGL	1	Non-discretionary	Annual inspection	High	**$6,000.00**	$6,000.00	$6,000.00	$6,000.00	$6,000.00
TGL	10	Non-discretionary	10 Yr tank inspection				$150,000.00		
TGL	30+	Non-discretionary	Improve stock count - secure sales	High	**$40,000.00**				
TGL	15	Non-discretionary	Improve stock count - secure sales	High	**$25,000.00**				
TGL	99	Non-discretionary	Lease running out				$500,000.00		
HGL	15	Non-discretionary	Improve stock count - secure sales	High	**$45,000.00**				
TGL	10	Non-discretionary	Improve stock count - secure sales	Low	**$7,500.00**				
TGL	10	Non-discretionary	Improve stock count - secure sales	Low	**$7,500.00**				
					$631,000.00	$116,000.00	$726,000.00	$76,000.00	$76,000.00

Appendix C: Risk management and mitigation

Risk ID	Risk Event	Element	Risk	Cause	Consequences	CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	RISK CONTROLS	RISK TREATMENT PLAN ACTIONS	RESIDUAL RISK RATING WITH EXISTING CONTROLS OR TREATED PLAN ACTION				COMMENTS AS OF JUNE 2017
											CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	Responsible Person	
1	Credit Risk	Finance	Exposure as at March 2017 remains high at T$1.7m gross T$1.4 m (net after payable set-off) receivable representing approx 3 - 3.5 months DSO (days sales outstanding)	(i) Credit Risk is the risk of financial loss if HGL fails to meet its contractual obligation. TGL has one debtor therefore all eggs one basket risk	HGL Related Party profit management and better debtor cashflow management	Improbable_1	Critical_5	Low	To work with HGL to lower DSO from 3 months to 1.5 months	Review Policy	Improbable_1	Serious_3	Low	Finance Manager	Accept Risk: Likelihood of occurance remains moderate - high while HGL provides high monthly dividend payments to TPL to cover TPL ANZ bank borrowings to fund acquisition of TGL
2	Liquidity Risk	Finance	TGL has managed to bring DPO (days purchases outsanding) down from 2 months to 1 month but this is technically in breach of the 7-day payment requirement to Fiji Gas Limited. Liquidity risk has increased with a new ANZ bank term loan commenced in March 2017	(ii) Liquidity risk is the risk the company will not be able to meet its financial obligations as they fall due	To ensure, as far as possible, that the company will always have sufficient liquidity to meet its liabilities when due.	Possible_4	Serious_3	Medium	To work with HGL to lower DSO from 3 months to 1.5 months	Review Policy	Improbable_1	Moderate_2	Low	Finance Manager	
3	Market Risk	Finance	The company is required to pay interest only (T$80k per annum) for 2 years ending March 2020. Thereafter principal and interest einstallments	(iii) Market risk is the risk that changes in market prices such as foreign exchange rates, interest rates and equity prices will affect the Company's income - *Interest rate risk has increased significantly as the company during 2017-18 reactivated a BSP Bank T$300k overdraft facility and has a ANZ bank term loan facility.*	Daily monitoring of cash flow position	Possible_4	Moderate_2	Medium	Disciplined efficient and effective profit cash flow management to maintain BSP overdraft at minimum levels	Review Policy	Improbable_1	Minor_1	Low	Finance Manager	

Appendix C: Risk management and mitigation

Risk ID	Risk Event	Element	Risk	Cause	Consequences	CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	RISK CONTROLS	RISK TREATMENT PLAN ACTIONS	RESIDUAL RISK RATING WITH EXISTING CONTROLS OR TREATED PLAN ACTION				COMMENTS AS OF JUNE 2017
											CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	Responsible Person	
4	Foreign Exchange Risk	Finance	TGL has reduced the DPO and month-end liability to Fiji Gas. Current exchange rate during May 2017 is 0.440. Average USD exposure at month end is USD 200k @ .44 = T$454k therefore a + or (-) 10% exchange rate movement will equal a forex gain/ loss of T$45k depending on the movement of the exchange rate	Foreign exchange risk is restricted to gas purchases which are denominated in USD	No controls the company pays spot and does not use forward cover	Likely_5	Moderate_2	Medium	Movements in exchange rate are covered in TCA price adjustments	Review Policy	Likely_5	Moderate_2	Low	Finance Manager	
5	Capital Risk	Finance	Financial gearing of TGL has increased with T$725k ANZ term loan borrowing during March 2017	(iv) Capital management	Prudent financial gearing and dividend policy	Likely_5	Moderate_2	Medium	To maintain a strong capital base so as to maintain creditor and market confidence and to sustain future development of the business	Review Policy	Improbable_1	Moderate_2	Low	Finance Manager	
6	Operational Risk	Finance	Low opex high capex	Operational risks of fraud and business model failure	Internal controls	Likely_5	Moderate_2	Medium	Avoidance of manual override of internal controls	Review Policy	Likely_5	Moderate_2	Low	Finance Manager	
TG_001_12	Tank Storage 3 X 60 tonne	Storage	1. Gas leak. 2. Liquid leak. 3. Potential fire/explosion. 4. Asset damage. 5. Impact on personnel/contractors/neighbouring companies and employees.	1. Lack of training. 2. Lack of maintenance. 3. Emergency procedure not followed. 4. Work permit filled incorrectly. 5. Tank inspection not done correctly.	1. Injury/Loss of life. 2. Damage to assets. 3. Loss of product. 4. Civil action. 5. Heavy fines	Critical_5	Likely_5	Severe	1. All personnel/contractors trained/inducted. 2. Inspections done regularly. 10 yearly inspection. 3. ERE done regularly. Terminal ERP. 4. Insurance policy. 5. Deluge and	Emergency Response Plan	Critical_5	Highly Unlikely_2	Medium	Terminal Team Leader	Noted

Appendix C: Risk management and mitigation

Risk ID	Risk Event	Element	Risk	Cause	Consequences	CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	RISK CONTROLS	RISK TREATMENT PLAN ACTIONS	RESIDUAL RISK RATING WITH EXISTING CONTROLS OR TREATED PLAN ACTION				COMMENTS AS OF JUNE 2017
											CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	Responsible Person	
									ESD systems in place						
TG_002_12	Tanker Load Point	Loading	1. Gas / Liquid leak. 2. Potential fire hazard/explosion. 3. Impact on personnel.	1. Lacking SSOP knowledge. 2. Lack of training. 3. Lack of maintenance. 4. Emergency procedure not followed.	1. Potential for injuries. 2. Loss of product. 3. Damage to assets.	Critical_5	Likely_5	Severe	1. All personnel trained 2. Inspections done regularly. 3. Familiar with terminal ERP. 4. Deluge and ESD systems in place.	Emergency Response Plan	Critical_5	Highly Unlikely_2	Medium	Terminal Team Leader	Ongoing
TG_003_12	Platform Filling	Cylinder Filling	1. Gas/Liquid leak. 2. Potential Fire hazard/explosion. 3. Impact on personnel. 4. Under filling.	1. Malfunctioning electronic scale. Incorrect weight input. 2. Lack of training. 4. Emergency procedures not followed.	1. Loss of product. 2. Under filling: 3. Overfilling(SRV Discharge) 4. Overcharging. customers	Major_4	Likely_5	Severe	1. All personnel trained. 2. Deluge, ESD and alarm system in place. 3. Fire fighting equipment at strategic points. 4. Scale maintenance/calibration.	Emergency Response Plan	Major_4	Highly Unlikely_2	Medium	Terminal Team Leader	Cybill report is checked against POS sales on a dialy basis
TG_006_12	Lack of LPG Storage to Supply Nukua'lofa Terminal	Ship product storage Hold	1. Ship discharge not on time. 2. Low supply from supplier.	1. Ship Delayed. 2. Not scheduled. 3. Lack of communication.	1. Reputation. 2. Business Loss. 3. Loss of Customers. 4. Loss of Revenue. 5. Financial implications	Major_4	Likely_5	Severe	1. Shipping schedules. 2. Gas stock procedures. 3. Communication between buyer and supplier.	Emergency Response Plan	Major_4	Highly Unlikely_2	Medium	Terminal Team Leader	Noted
TG_009_12	ESD alarm	Electronic/Electrical/pneumatic	1. Faulty ESD's. 2. ESD not adequate.	1. Flaw in the system. 2. Lack of testing. 3. Faulty air compressor 4. Improper documentation 5. By passing safety system	1. Potential threat to personnel/customers/public 2. Potential threat to assets.	Critical_5	Likely_5	Severe	1. Scheduled testing and maintenance. 2. Personnel familiar with terminal ERP. 3. Regular ERE's conducted.	Emergency Response Plan	Critical_5	Highly Unlikely_2	Medium	Terminal Team Leader	Noted
TG_011_12	Sabotage	Anger/Hatred/Jealousy/Disgruntled Employee	1. Impact on personnel. 2. Asset damage.	1. Termination. 2. Competitor conspiracy. 3. Low morale. 4. Insecurity.	1. Damage to assets. 2. Injury/Loss of life.	Critical_5	Likely_5	Severe	1. Both live and desktop ERE's. 2. Terminal ERP. 3. Employees welfare.	Emergency Response Plan	Critical_5	Highly Unlikely_2	Medium	Operations Mnger/ All Team Leaders	Noted

Appendix C: Risk management and mitigation

Risk ID	Risk Event	Element	Risk	Cause	Consequences	CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	RISK CONTROLS	RISK TREATMENT PLAN ACTIONS	RESIDUAL RISK RATING WITH EXISTING CONTROLS OR TREATED PLAN ACTION				COMMENTS AS OF JUNE 2017
											CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	Responsible Person	
TG_003_12	Cyclones	Cyclone season: November - April	1. Asset damage. 2 Impact on personnel. 3. Business interruption.	1. Impact of cyclones on the terminal.	1. Injury/Loss of life. 2. Asset damage. 3. Sales/Supply Loss.	Major_4	Likely_5	Severe	1. Both live and desktop ERE's. 2. Terminal ERP. 3. ESD in palce. 4. Asset insurance/Public liability. 5. Updates from CEO. 6. Updates from Government Authority. 7. Cyclone window shutters.	Emergency Response Plan	Major_4	Unlikely_3	Medium	Operations Mnger/ All Team Leaders	Ongoing
TG_004_12	Electric Storm	The higher the number of tall trees, the higher the risk.	1. Asset damage. 2. Potential for fire/explosion. 3. Business interruption. 4. Impact on personnel. 5. Proper earthing for all buildings and storage tanks.	1. Impact of electric strike on the terminal.	1. Injury/Loss of life. 2. Asset damage. 3. Sales/Supply Loss.	Major_4	Likely_5	Severe	1. Both live and desktop ERE's. 2. Terminal ERP. 3. ESD in palce. 4. Asset insurance/Public liability. 5. Updates from CEO. 6. Updates from Government Authority.	Emergency Response Plan	Major_4	Unlikely_3	Medium	Operations Mnger/ All Team Leaders	Ongoing
TG_005_12	Bushfire	Proximity to bushland/trees/vegetation. Terminal is close to a neighbouring property with these elements.	1. Asset damage. 2 Impact on personnel. 3. Business interruption.	1. Fire on the neighbouring land spreading to the terminal.	1. Injury/Loss of life. 2. Asset damage. 3. Sales/Supply Loss.	Major_4	Likely_5	Severe	1. Both live and desktop ERE's. 2. Terminal ERP. 3. Deluge and ESD in place. 4. Regular inspection of terminal boundary. 5. Fencing made of non combustible materials. High fence to prevent fire from breaching the boundary.	Emergency Response Plan	Major_4	Unlikely_3	Medium	Operations Mnger/ All Team Leaders	Ongoing

Appendix C: Risk management and mitigation

Risk ID	Risk Event	Element	Risk	Cause	Consequences	CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	RISK CONTROLS	RISK TREATMENT PLAN ACTIONS	RESIDUAL RISK RATING WITH EXISTING CONTROLS OR TREATED PLAN ACTION				COMMENTS AS OF JUNE 2017
											CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	Responsible Person	
									6. Asset insurance.						
TG_007_12	Ship Discharge	Discharge - ecosystem	1. Gas/Liquid leak. 2. Reliability/integrity of pipeline.	1. Lack of training. 2. Infrastructure not up to standard. 3. Corrosion of pipes, flanges, valves.	1. Gas leak into atmosphere. 2. Liquid leak into sea. 3. Potential fire explosion. 4. Potential Injuries/fatalities.	Major_4	Likely_5	Severe	1. Stringent Manual Handling procedures followed. Ship Safety measures followed strictly (ESD,ERE,ERP). 2. Infrastructure used in accordance with the Aust. Standard 1496. 3. Preventative maintenance plans are in place.	Emergency Response Plan	Major_4	Remote_1	Medium	Terminal Team Leader	Noted
TG_001_12	Working Under Confined Space	Tank 1-3 - Hazardous Atmosphere	1. Flammable Atmosphere. 2. Oxygen Deficiency. 3. Dust/iron oxide Hazard. 4. Dark Atmosphere.	1. Lack of training. 2. Lack of PPE	1. Injury/Loss of life	Critical_5	Likely_5	Severe	1. All relevant / required personnel trained and competent. 2. Confined space entry permit and relevant work permit filled. 3. Purge through inert gas to air. Entry hatches to remain open. 4. Continuous air sampling. 5. No entry till atmospheric conditions is confirmed. 6. Continuous mechanical ventilation whilst occupied. 7. Safety harness to be worn.	Emergency Response Plan	Critical_5	Highly Unlikely_2	Medium	Terminal Team Leader	Noted

Appendix C: Risk management and mitigation

Risk ID	Risk Event	Element	Risk	Cause	Consequences	CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	RISK CONTROLS	RISK TREATMENT PLAN ACTIONS	RESIDUAL RISK RATING WITH EXISTING CONTROLS OR TREATED PLAN ACTION				COMMENTS AS OF JUNE 2017
											CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	Responsible Person	
									8. First aider on stand-by. Fire Authority alerted. 9. Two stand-by person available. 10. Regular servicing of the fire extinguisher and gas detector. (calibration) 11. Relevant PPE. 12. Approved fixed lighting.						
TG_002_12	Working Under Confined Space	Road Tanker - Hazardous Atmosphere	1. Flammable Atmosphere. 2. Oxygen Deficiency. 3. Dust/iron oxide Hazard. 4. Dark Atmosphere.	1. Lack of training. 2. Lack of PPE	1. Injury/Loss of life	Critical_5	Likely_5	Severe	1. All relevant / required personnel trained and competent. 2. Confined space entry permit and relevant work permit filled. 3. Purge through inert gas to air. Entry hatches to remain open. 4. Continuous air sampling. 5. No entry till atmospheric conditions is confirmed. 6. Continuous mechanical ventilation whilst occupied. 7. Safety harness to be worn. 8. First aider on	Emergency Response Plan	Critical_5	Highly Unlikely_2	Medium	Terminal Team Leader	Noted

Appendix C: Risk management and mitigation

Risk ID	Risk Event	Element	Risk	Cause	Consequences	CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	RISK CONTROLS	RISK TREATMENT PLAN ACTIONS	RESIDUAL RISK RATING WITH EXISTING CONTROLS OR TREATED PLAN ACTION				COMMENTS AS OF JUNE 2017
											CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	Responsible Person	
									stand-by. Fire Authority alerted. 9. Two stand-by person available. 10. Regular servicing of the fire extinguisher and gas detector. (calibration). 11. Relevant PPE. 12. Approved fixed lighting.						
TG_002_12	Working Under Confined Space	Road Tanker - Hazardous Atmosphere	1. Flammable Atmosphere. 2. Oxygen Deficiency. 3. Dust/iron oxide Hazard. 4. Dark Atmosphere.	1. Lack of training. 2. Lack of PPE	1. Injury/Loss of life	Critical_5	Likely_5	Severe	1. All relevant / required personnel trained and competent. 2. Confined space entry permit and relevant work permit filled. 3. Purge through inert gas to air. Entry hatches to remain open. 4. Continuous air sampling. 5. No entry till atmospheric conditions is confirmed. 6. Continuous mechanical ventilation whilst occupied. 7. Safety harness to be worn. 8. First aider on stand-by. Fire Authority alerted. 9. Two stand-by	Emergency Response Plan	Critical_5	Highly Unlikely_2	Medium	Terminal Team Leader	Noted

Appendix C: Risk management and mitigation

Risk ID	Risk Event	Element	Risk	Cause	Consequences	CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	RISK CONTROLS	RISK TREATMENT PLAN ACTIONS	RESIDUAL RISK RATING WITH EXISTING CONTROLS OR TREATED PLAN ACTION				COMMENTS AS OF JUNE 2017
											CONSEQUENCE	LIKELIHOOD	LEVEL OF RISK	Responsible Person	
									person available. 10. Regular servicing of the fire extinguisher and gas detector. (calibration). 11. Relevant PPE. 12. Approved fixed lighting.						
TG_001_12	Tank Storage 3 X 60 tonne	Storage	1. Gas leak. 2. Liquid leak. 3. Potential fire/explosion. 4. Asset damage. 5. Impact on personnel/contractors/neighbouring companies and employees.	1. Lack of training. 2. Lack of maintenance. 3. Emergency procedure not followed. 4. Work permit filled incorrectly. 5. Tank inspection not done correctly.	1. Injury/Loss of life. 2. Damage to assets. 3. Loss of product. 4. Civil action. 5. Heavy fines	Critical_5	Likely_5	Severe	1. All personnel/contractors trained/inducted. 2. Inspections done regularly. 10 yearly inspection. 3. ERE done regularly. Terminal ERP. 4. Insurance policy. 5. Deluge and ESD systems in place	Emergency Response Plan	Critical_5	Highly Unlikely_2	Medium	Terminal Team Leader	Noted
TG_002_12	Tanker Load Point	Loading	1. Gas / Liquid leak. 2. Potential fire hazard/explosion. 3. Impact on personnel.	1. Lacking SSOP knowledge. 2. Lack of training. 3. Lack of maintenance. 4. Emergency procedure not followed.	1. Potential for injuries. 2. Loss of product. 3. Damage to assets.	Critical_5	Likely_5	Severe	1. All personnel trained 2. Inspections done regularly. 3. Familiar with terminal ERP. 4. Deluge and ESD systems in place.	Emergency Response Plan	Critical_5	Highly Unlikely_2	Medium	Terminal Team Leader	Ongoing

TONGA WATER BOARD

BUSINESS PLAN

FOR THE PERIOD 2018 – 2022

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CEO STATEMENT

It is a great privilege to present the TWB *'Business Plan'* 2017 – 2022

This plan identifies TWB work programs and priorities for the coming year. It explains how TWB will meet its four operational objectives of improving of profitability, improvement of infrastructure development, improvement of HR development and improvement of customer Service Quality to meet its overarching strategic goal of operating as a successful Government business enterprise. To realize its key objectives, the TWB has to overcome critical challenges facing its operation. Ensuring that it has sufficient infrastructural capacity to meet the growing water demand, is always a challenge for the Board. The current project for NUDSP (ADB and DFAT funding - TOP$11.06 m), which focuses on improving water production services at Mataki'eua and Tongamai well field by up to 2,280m3 per day and additional raw water storage capacity by 4,000m3, is in good progress. Works for pumps installations, electrification and laying of rising mains are at their final stage.

A great challenge for our water operation is non-revenue water (NRW). The plan to implement smart metering project in the second half of this year would be a crucial step for the overall reduction of NRW. Also, the zonation program with the ADB for Nuku'alofa area would enable the TWB to regularly quantify the leakage level in each District Metered Areas thereby enabling continuous monitoring of water flows and demands. The TWB also continue to seek financial assistance from development partners for its other long-term development projects.

The TWB continues to seek alternative sources of income to supplement its revenue earnings. The TWB is now seeking a donor partner to undertaken a water bottling project at 'Eua district targeting export markets. This is a great opportunity as 'Eua water is considered to have a high standard of quality. TWB will also provide a more aggressive debtor recovery strategies and effective internal control system. It has also extended its distribution services for repair and maintenance works to cover domestic properties. It also intends to operate an inventory store that concentrates on selling plumbing materials and supplies to supplement its revenue income.

With the implementation of new smart water metering on the second half of this year, TWB expects a huge saving and benefits, from the reduction of NRW. Smart metering will significantly benefit both TWB and the customers. Smart metering allows immediate detection of leaks which could be crucial for the reduction of operating costs by fixing the infrastructure that leaks thereby minimizing consumption energy costs.

It is a high priority for the TWB to minimize the risks from natural hazard and climate change, which has been a major environmental issue for the island in recent times. Two additional boreholes have already been drilled in 'Eua to supplement their surface water supply and minimize the effect of climate change. Three pump stations have also been installed at Neiafu to improve their production capacity. Other donor funded projects for the outer-islands are yet to be confirmed, but remain in the TWB portfolio, all of which are designed to push our way forward.

On behalf of the TWB staff and Management, I wish to express my sincere gratitude for the continuing support from the Directors of the Common Utilities Board, Ministry of Public Enterprises and our shareholders. I am confident that this plan will help transform our organization and deliver our vision.

Mr. Sione Tutulu Finau
(Acting CEO)

TONGA WATER BOARD

1. EXECUTIVE SUMMARY

The Business Plan 2018 – 2022, is in accordance with section 18 (amendment) Act 2010 of the Principal Act of the Public Enterprises; "to operate as a successful business and to be as profitable and efficient in comparison with non-state owned business".

Government utility cluster reforms project

The main objective behind Government of Tonga's reform is to increase operational efficiency, reduce costs and improve customer service through achievement of synergies in the business processes across three utilities. The following reforms are expected to be implemented through this project.

- Common office building for TWB, TPL and WAL
- Common billing
- Joint meter reading in villages
- Common fuel supply, vehicle maintenance and common opportunities
- Inter-company assistance, training & development
- Common Tariff (fuel & non-fuel components)

The four major objectives that the Business Plan will focus on in the FY 2017-18:

i) The improvement of profitability requires the following strategies:

- Improvement of revenue by seeking alternative sources of revenue.
- Improving revenue earnings by sourcing a donor partner for a water bottling project at 'Eua District.
- Improvement of Debt Collection through regular review of its strategies to enhance debt recovery program and to maintain level of current debtors at no more than 70%.
- Improving water sales through effective internal control measures to ensure accuracy of meter reading and through effective meter replacement program.
- Improving procurement activities to ensure all expenses are within the current budget
- Review TWB Tariff to accommodate current and future financial commitments and obligations.

ii) The improvement of infrastructure development is based on the following strategies:

- Improvement of water production capacity by increasing the number of operational pumps from 36 to 51.
- Drilling of 3 new boreholes at 'Eua district to supplement their freshwater resources
- Improvement of water quality service delivery to meet WHO Guideline 2003.
- Improvement of water demand management to reduce non-revenue water (physical & commercial losses) and implementation of smart metering technology.
- Design appropriate Asset Management Plan (AMP) to review the operating, maintenance and capital expenditure procedures.
- Seeking donor partner for TWB Infrastructure Investment Plan.

iii) The improvement of HR development and plan is based on the following strategies:

- Standardizing TWB Policy to meet current process and procedures
- Regular review of TWB staff management structure
- Review staff retirement package, benefits and incentives

iv) The improvement of Customer Service Quality

- Implementing Customer Management System to ensure customer complaints are handled and resolved on a timely manner
- Implementing Public Awareness Programs to foster closer relationship with community through workshop, meeting with town & district officers and radio program
- Improving standard of workmanship in all services of the Board.
- Develop services fee policy and guideline.

Tonga Water Board's cash flow projection for the next five years:

- Currently under stable financial position
- Inflation is forecasted to increase by 3%

Tonga Water Board Financial Performance forecast for FY 2017 - 2018:

- Derive revenue of $8,375,089
- Expenditure of $7,000,143
- Net Profit before Tax $1,374,946
- Net Profit after Tax $1,031,210
- Return on Investment (ROI) of 10%

2. POLICIES & GUIDELINES GOVERNING THE DEVELOPMENT OF THE BUSINESS PLAN

2.1 Ownership guidelines

In accordance with Public Enterprises amendment Act, section 18 (4) 2010 the TWB is committed to the following:

2.1.1 **Corporate governance.** The Tonga Water Board is committed to the highest standards of corporate governance, with core value of accountability and transparency. The Tonga Water Board is adopting policies and procedures aimed at maintaining these standards.

2.1.2 **Anti-corruption.** The Board, through the Chief Executive Officer will ensure compliance by the Board with statutory and regulatory requirements, including avoidance of any act that would or could be constructed as an illegal, corrupt or unethical practice.

2.2 Obligation under the Tonga Strategic Development II Framework 2015 – 2025

Under five (5) of the twenty-nine (29) of the TSD Framework Oganisational Outcomes, TWB is committed to the following:

2.2.1 TSDF Organisational Outcome 1.2 – "Closer, more effective public / private partnership with business, consumers and other community groups across the Kingdom to help better identify and address contrainsts to more inclusive, sustainable and resilient economic growth".

TWB contributes to this Oganisation Outcome by fostering closer relationship with our stakeholders to meet customer expectations.

2.2.2 TSDF Organisational Outcome 1.3 – "Strengthened enabling environment for business, encouraging broad-based investment and more sustainable and inclusive employment and profits, while protecting the rights of the consumer and being sensivity to the environment".

TWB contributes to this objective by ensuring cultural awareness, environmental sustainability, disaster risk management and climate change adaptation measures are effectively integrated into planning and implementation programs.

2.2.3 TSDF Organisational Outcome 1.4 – "Improved public enterprises performance to generate appropriate returns on government investment while supporting inclusive, sustainable development and the growth of businesses and communities".

TWB contributes to this objective by operating as a successful and profitable business Enterprise.

2.2.4 TSDF Organisational Outcome 5.4 – Improved national and community resilience to the potential disruption and damage to wellbeing, growth and development from extreme natural events and climate change, including extreme weather, climate and ocean events, with a particular focus on the likely increase in such events with climate change.

TWB contributes to this objective by providing a business continuity planning and disaster management planning.

2.3 Board's Expectations

The Board will continue to uphold a high standard of corporate governance in the conduct of its business operations and relationship with all its stakeholders within a framework of accountability and good business practice.

2.3.1 Role of Directors

The Board is responsible for the management of all operations of the TWB undertaking the following roles:

(1) "A director of a public enterprise and subsidiary shall act in good faith and in the best interests of the public enterprise, and shall –

(a) ensure that the public enterprise and subsidiary conducts its business and all decisions made by the board are in accordance with its principal objective;
(b) not act, or agree to the public enterprise and subsidiary acting, in a manner that contravenes the law or the constitution of the public enterprise;
(c) not agree to, cause or allow the business of the public enterprise and subsidiary to be carried on in a manner likely to create a substantial risk of serious loss to the public enterprise's creditors; or
(d) Not agree to the public enterprise and subsidiary incurring an obligation unless the director believes at the time on reasonable grounds that the public enterprise shall be able to perform the obligation when it is required to do so.

(2) Sections 138 to 144 of the Companies Act ("Transactions Involving Self-Interest") shall apply to all directors of a public enterprise and subsidiary whether or not the public enterprise is registered under the Companies Act, and a reference in those provisions to a company shall be deemed to be a reference to a public enterprise and subsidiary."

2.4 Mandate

The Business Plan of the Tonga Water Board (TWB) is prepared in accordance with the Public Enterprise Amendment Act 2010, Part V Section 18 (4). The Board is responsible for the review of the TWB Business Plan annually before its submission to the Ministry of Public Enterprises.

The TWB is guided by the following Acts:

- *Public Enterprises (Amendment) Act 2010*
- *Tonga Water Board Act 2000*
- *Tonga Consumption Tax Act 2002*
- *Tonga Income Tax Act 2007*
- *Public Health Act 1992*

The TWB was established by the Tonga Water Board Act (Cap 92) and its existence is subject to the provision of Tonga Water Act 2000. The commercial obligations of the TWB are the driving forces that sustain its long-term viability as a successful business entity.

2.5 Purpose of the Tonga Water Board

Our Vision

To be the most economical, reliable and environmentally friendly water service provider in the south pacific region.

Our Mission

- *To provide in an economically and environmentally sustainable way, a clean, reliable and adequate supply of water that satisfy our customers' expectations.*
- *To be supportive of community development and recreational activities.*

Our Values

Our decisions and actions are guided by the following values:

- *Integrity: Always be truthful and honest in all of our business relationships with our stakeholders*
- *Customer focus: Deliver services at a competitive price, with high level of reliability and with the speed and quality of service that satisfies our customer needs*
- *Accountability: Acknowledging and assuming responsibility for the actions, products, decisions, and policies and to disclose the results in a transparent manner.*
- *Team environment: Providing support to one another, working co-operatively, respecting one another's views, and making our work environment enjoyable.*
- *Transparency: Removal of undesirable barriers and facilitate disclosure of the essential conditions to which agreements, dealings, practices, and transactions are open and free for verification.*

Core Business

To provide in an economically and environmentally sustainable way a clean, reliable and adequate supply of water to the people in the urban centers of Nuku'alofa, Vava'u, Ha'apai & 'Eua and provide technical assistances and infrastructural improvement services to village water schemes.

3. PLANNING INPUTS

3.1 External Elements

i. Legal Issues

There are unwarranted activities that may have caused negative impacts on the underground water table and our water resources. Over extraction of water supplies of water supplies may have negative impact on the quality and quantity of our water table. As such, domestic water drilling should be more controlled and managed appropriately. There is also a need to control the use of agricultural pesticides and chemicals in the nearby area surrounding water sources. This may cause harmful effects on our water quality as these substances can be absorbed directly to the underground water resource causing health hazard. A closer working relationship between TWB and Government agencies will help minimize these undesirable activities.

ii. Environmental Issues

In the event of a natural disaster such as a cyclone, the TWB has taken precautionary measures to eliminate the risks of power shutdown. The TWB has invested on an underground high voltage electrical wiring for Mataki'eua standby generator to ensure that the water supply operation will not be disrupted. The TWB has also installed standby generators at our centers at Neiafu and Pangai-Hihifo to prevent the impact of power failure. However, the TWB remains vulnerable in the event of an earthquake, as our water reticulation system may be permanently damaged whereby recovery works take an extended period of time. As a precaution, the TWB is currently working on risk reduction plans to cope with such occurrence in the future.

Climate change has also been a major environmental issue for the operation of the Board, especially in the island of 'Eua. The risk of El-Nino has become evident in the past twelve months where the amount of rainfall fell below average level as compared to the previous years. The impact of El-Niño has convinced the Board to turn to underground water as a more stable alternative source for 'Eua water supply. Not only that underground water is more reliable and abundance, but the impact of turbidity will no longer be an issue in times of heavy rainfall. To ensure that 'Eua has a stable and reliable supply of water, two extra boreholes have already been drilled in the island of 'Eua.

Groundwater monitoring is also another issue of concern for the TWB. There are no data and information available for the TWB to determine the actual quality and quantity of groundwater resources apart from the data collected from the TWB well fields. Without such data, it is difficult for the Board to be consistent in its monitoring methodologies for its water delivery process. It is now important to foster a close working relationship with Government agencies, especially the Ministry of Health who is administering village water schemes, to collect relevant data acquired from monitoring activities and build a shared database accessible to all parties.

iii. External Business Risk

Risk	Mitigation
Natural Hazard such as cyclone and earthquake	TWB has invested on an underground high voltage electrical wiring for standby generators to minimize power supply disruption for Nuku'alofa, Neiafu and Pangai-Hihifo.
Political influence	To support and adhere to the economic, socio-political and environmental policies of the Government.
Climate Change – below average rainfall (El-Nino)	Utilise underground water resources by drilling extra boreholes as a supplementary water source.
Inappropriate underground water monitoring	Improve co-ordination between Government Agencies responsible for monitoring of quantity and quality of ground water resources.

3.2 Internal Elements

i. People Issues

The total number of all TWB staffs is 82 including the Outer Islands (Vava'u, Ha'apai and 'Eua); 24% are female and 76% are male; 17% are daily paids and 83% are permanent staffs.

TWB is currently involved with the Mid Coast Water of Australia through Twinning Program funded by Asian Development Bank. This program was arranged through the Pacific Water and Waste Association (PWWA). The main purpose of this program is to share the skills and experiences between the two organizations through in – house training and other activities.

The twinning program currently focuses on the following areas of services:

- Distribution – Non-Revenue Water
- Finance – Water Tariff & Billing
- Administration – Customer Service & Water Quality

The TWB customer services are facing great challenges on how to effectively co-ordinate and facilitate customer complaints due to the absence of appropriate customer handling policy and procedures. To improve the quality of our service, the TWB is now implementing customer management system to effectively deal with customer complaints and inquires. To boost staff morale, Management has approved to provide 'best of the month' award for high performers based on the monthly performance appraisal results.

The TWB has also made plans to revise the existing management structure in order to be in line with the changing work environment. Reviewing staff job description , post and salaries in comparison to their performance appraisal review to identity areas of weakness and provide training through local institution or in-house training to improve staff skills and experiences required to effectively undertake their dutiies and responsibilities.

The short-term project with Mid-Coast Water has greatly contributed to the enhancement of our staff skills and experience through in-house training and development support being offered. They have also set codes of workmanship standards for the distribution and production services.

Plans have also been made to develop an Occupational Health and Safety guidelines for staffs in the distribution and production divisions to guarantee a safe working environment.

Acknowledging outstanding staff performance (Bonus and Incentive Reward Funds)

People are employed to perform a specified range of activities to an acceptable level or standard. Employees, in turn, receive rewards in line with their employment agreements and contracts. The TWB believes that good performance should be recognised without waiting for nominations for formal awards to be solicited. The TWB accepted the view that failing to reward strong performers can cause a negative effect, such as a decrease in productivity and morale. It is therefore crucial to ensure that outstanding performers are recognised through financial and non-financial rewards.

Directors of Board professional development scheme (Profession Development Fund)

For the long term viability of any business, it is crucial to optimize the effectiveness of the board. Board of Directors has to acquire the necessary skills and experience to drive corporate success.

As a requirement, the Directors have to involve in some professional development training to update their abilities in order to effectively drive the organisation.

ii. Physical Asset / Equipment Issues

The Board of Directors and Management have identified the various crucial areas that the Board urgently needs investment of TWB major capital development project.

The TWB currently managed more than $1 million of public capital assets; which provide exceptional service and require capital assets that support excellent service outcomes, including facilities, base infrastructure and special equipment.

Long Term Project period of 2017 – 2022 are stated as follows:

Current Donor Funded Project

a. Nuku'alofa Urban Development Sector Project – Subproject: TWB01, TWB02 and TWB03 (ADB and DFAT funding (TOP$11.06 m).

   Effective, efficient, and sustainable water supply services in Nuku'alofa (core subproject). The subproject will:

   (i) increase water production at the Mataki'eua, Tongamai Well field by up to 2,280m^3 per day;
   (ii) increase raw water storage capacity by 4,000m^3;
   (iii) improve the management of the water supply network through the creation of supply zones and improved bulk supply metering;
   (iv) reduce unaccounted for water (UFW) from the current level estimated at about 50% to less than 25%;
   (v) develop consumer water meter replacement policies and replace up to 2,000 defective consumer meters,
   (vi) develop asset management within TWB; and
   (vii) capacity improve revenue collection, billing and financial management capacity enabling TWB to improve the delivery of water supply services.

Proposed Donor Funded Project

b. Nuku'alofa NRW reduction (TOP$9.6 m)

The project will be an extension of NUDSP Subproject TWB02 above. The overall objective is

(i) reduce non-revenue water to 25% or less;
(ii) Capacity building in all areas;
(iii) Instrumentation and equipments;
(iv) Public awareness campaign;
(v) Asset management,
(vi) develop asset management within TWB; and
(vii) capacity improve revenue collection, billing and financial management capacity enabling TWB to improve the delivery of water supply services.

c. Neiafu water supply upgrade (Currently discussed with donor partners) (TOP$15 m)

To improve effective, efficient, and sustainable water supply services in Neiafu (core subproject).

The subproject will:

(i) increase water production at the Neiafu by about 130m^3 per day and reduce pump extraction rate by 1.5 litres per second by spreading out the well field into a much wider surface area;
(ii) increase raw water storage capacity by 1000m^3;
(iii) improve the management of the water supply network through the creation of supply zones and improved bulk supply metering;
(iv) reduce unaccounted for water (UFW) from the current level estimated at about 50% to less than 25%; (v) replacement of 4.3 km of asbestos cement pipes; and
(v) instrumentation and equipment to improve data collection , monitoring and service delivery. The total capital expenditure for the financial year 2017 - 2018 is forecast to be $3,578,000 for asset replacement, maintenance and installation.

Tonga Water Board physical assets and equipment for period 2017 – 2018

TONGA WATER BOARD

PROPOSED CAPITAL ITEMS FOR 2017 - 2018

Description	**Total (Capital)**
Smart Water Meters – (8000 meter) Nuk	$2,700,000
Vehicles (4 – Nuk, 1 'Eua)	$ 200,000
NRW Pilot (2 Zones Nuk– Umusi, 'Anana, Houmakelikao & Fangaloto; Neiafu)	$70,000
New pumps (3 Nuk, 2 Neiafu, 1 Pangai, 1 'Eua)	$180,000
Special works – Nuk (Ha'amoko)	$35,000
Computers Nuk & Outer Islands (10)	$30,000
Fittings & Spares	$110,000

Dewatering Pump & Compactor (Nuk)	$8,000
Tractor & Mowing equipment	$30,000
Leak Detection Equipment	$10,000
Bike (Neiafu-1, 'Eua-1)	$5,000
Contingencies	$200,000
Total	**$3,578,000**

The TWB has been committed to the execution of the following projects:

a) Replacement of faulty and aging water meters using smart metering technology

Approximately 40% of all the TWB water meters, which are currently in use by our customers are considered faulty. It is now a priority to replace all faulty water meters as the aging infrastructure have put an increased burden on the operation of the Board. Plan has been made to replace all faulty water meters within the next twelve months period. TWB is also looking at capitalizing on the smart technology to reduce non-revenue water and billing activities.

b) Replacement vehicles

TWB shall replace all aged vehicles in its fleet as a cost-saving measure. It is estimated that the costs for the full repair and maintenance of our aged vehicles may exceed their existing market value. The removal of these vehicles from our fleet, in the past, has been delayed due to financial constraints. To improve efficiency of operation, plan has been made to order four (4) vehicles for Nuku'alofa and one (1) for 'Eua.

c) Tools and Equipment

To effectively undertake works on monitoring water flow rate and water pressure, it would be convenient for the Engineering division to have appropriate tools and equipment such as water pressure gauge and flow loggers to effectively monitor and control water distribution area. Acquiring these tools would improve our data-collection activities and will contribute a lot to building a reliable data accessible to all.

d) Office equipment

It is also a priority that appropriate tools and equipment for the office environment are available for the convenience of our staff. Ten(10) new computers are required to improve data input operations of the Billing section. Also, GIS & Hydraulic Model software are in urgent need for monitoring and data collection purposes and to build a reliable database for the convenience of the Engineering division.

e) Special improvement works

Special improvement works have been planned for the duration of the period covered in the Plan. Such projects include the; upgrading of mainlines at Ha'amoko; and a pilot project for the NRC (Zone 1 Nuk– Umusi, 'Anana, Houmakelikao & Fangaloto and Neiafu). It is anticipated that these improvement works will contribute effectively to our current operation. Works have also been planned to upgrade residential water reticulation system.

iii. Product / Service and Supply Issues:

The Tonga Water Board is a public water utility that provides water delivery services to the urban centers of Nuku'alofa, Neiafu and Pangai-Hihifo. The TWB is accountable for delivering quality water services that are responsive to the needs of its staff, clients and stakeholders.

The TWB, on a number of occasions, cannot supply a water service that meets the expectations of our customers due to a number of reasons. Domestic and mainlines leakages are serious problem encountered by the Board. Not only that it causes loss revenue for the Board but it often disrupt customer water supplies. To effectively deal with this problem, a permanent leak detection team has been formed to effectively undertake repair and maintenance works for leakages.

Low pressure conditions are also another issue of concern for the Board. Although low pressure conditions can be attributed to different factors, most common complaints come from the people living at higher altitude areas where water pressure is not strong enough to reach higher ground.

To resolve this problem, booster pumps have already been installed in those higher altitude areas such as Pili, Halaleva and Ha'amoko, to improve water pressure.

Another issue of concern for the Board, is the inability of our meter readers to have access to the water meters in the household properties. Many properties have locked gates, thereby preventing meter readers from access to their water meters. It is now a priority for TWB to relocate all water meters to a secured location in front of the property which is accessible to the water meter readers.

It is a great challenge for the TWB to replace all its aging water meters. It will be cost-saving measure for the Board to replace all mechanical water meters with smart meters technology as a large portion of our water meter are aging and not functioning accurately, at our own cost. It is expected that smart metering will improve water sales and reduce non-revenue water.

Customer service is always a priority for the Board and a great measure of our performance. Counter-active measures have been put forward to improve the quality of our service to the customers. A computerised customer complaint management system has now been installed for our customer service section. Regular training has also been offered to the staff on how to effectively implement this program. The result of our customer service survey is a great boost for staff morale as it indicated a high level of customer satisfaction in our services. Continuous improvement will be the key to perfecting this area.

Extension of distribution service to cover domestic household properties

In the meantime, the Board only deals with repair and maintenance works that occur between the water meters onto our main distribution lines; any problem that occurs between the water meter and the individual property is the responsibility of the owner. It is now critical that the TWB effectively undertake this role, as no other private company which is undertaking this responsibility for our consumers. Not only that the extension of our service would be a source of income for the Board but it will help preserve and control water wastage. Our plumbing services would undertake domestic repair and maintenance works at the customers own costs.

iv. Business System and other Resources

Internal Control

The Board is responsible for ensuring that it has an effective internal control system in order to safeguard its shareholders' investment and assets. The existing Board's Audit Committee is responsible for reviewing the effectiveness of the TWB's system of internal control and report to the Board.

In broad terms, the Board's Audit Committee review covers everything that controls risks to the TWB including financial reporting, operational effectiveness and efficiency, risk management systems and compliance with laws, regulations and policies. It is the responsibility of the Committee to submit its compliance report to the Board on a quarterly basis in compliance with the regulatory requirements.

Risk Management, Compliance & Control

The TWB is currently in the process of designing a Risk Management System for identifying, analysing, monitoring and managing risk factors throughout the organization, in order to determine the needs required to control risks.

The main objective of the Board's Audit Procurement Committee is assessing compliance and control process. The Committee has access to management and departments to seek information, records and other relevant documents needed for their review. To ensure objectivity in their report, the Committee reports directly to the Board.

The TWB also plans to establish a Staff Relation Committee to deal with staff grievances and complaint to ensure fair treatment of all staffs. Selection of Committee Members will depend on the nature of each case.

Responsible decision-making

The 'Code of Ethics' and employee 'Code of Conducts' documents are the guidelines issued to promote ethical behaviours and responsible decision-making for the staff and management. These documents are expected to help them conduct their actions in accordance with the primary values and ethical standards. Administration section is responsible for ensuring that staff and Management are well-aware of these guidelines.

The main purpose of the 'Code of Conduct' and 'Code of Ethics' is to demonstrate to our stakeholders that the TWB is fully committed and dedicated to ethical practices.

v. Internal Business Risk

The TWB is currently developing a risk management system to identify, assess, monitor and control risks throughout the organisation.

	Risk – Water Resources	**Mitigation**
1.	Water pumps efficiency	Ensure that pumps are in good conditions by maintaining an appropriate maintenance and repair program
2.	High level of water salinity	Increase number of operational pumps in a larger surface area to reduce abstraction rate.
3.	Water pollution and contamination	To provide operational guidelines and public awareness program; to prevent undertaking unwanted activities that may have adverse effects on water resources.
4	Ineffective Water Treatment practices	Ensure that the Water quality treatment is carried out on a regular basis to ensure the water quality standard is within the WHO guideline.
5.	Water illegal connections	Establish a task force to trace and police illegal activities and take legal actions when necessary
6.	Non-Revenue Water	Establish zonation program to enable leakage level in each zone to be quantified on a regular basis. Develop non-revenue water strategy team to ensure all components of NRW are effectively addressed Expand the scope for investment on NRW programs.
7.	Quality of Services	Ensure quality standard codes for materials and workmanship are being complied with; to develop an effective policy and procedures to improve work performance
8.	Customer Relation	To improve the way TWB communicates and interacts with the public to gain and retain customers. It is necessary to cultivate good customer relations by developing a good customer service policy and customer complaint handling procedure
9.	Staff Relation	Improve staff interpersonal skills through appropriate training to improve staff attitudes and behaviours
10.	Human Resource Development	Provide training and development to improve staff performance Develop. TWB Work Policies to help improve HR conditions and personnel requirements.
11.	Computerised system	To ensure that all of our operational systems are computerized and up-grated to the standard of requirements.
12.	Staff Performance monitoring	Improve staff performance through the effective implementation of Performance Management system Management to support the execution of the System Acknowledge and recognise staff accomplishments through financial and non-financial reward/incentives to boost morale
13.	Business & Work planning	To ensure that we follow the logical sequence of work planning and budget process. Work planning should drive budget rather than budget driving work planning.
14.	High level of aging debtors	Maintain current level of debtors at no more than 70% Review recovery policies and form a debt collection team Write off uncollectable debtors to reduce amount of debtors
15.	Procurement	To develop an effective procurement control policy to improve the procurement process in acquiring sufficient fund To update the procurement system to ensure expenditure is within budget
16.	Accounting & Billing System	To ensure data security and access to the system is strictly controlled To ensure that the input data is verified. To ensure that the system provides accurate reports on a timely manner

17.	Revenue	To ensure accurate recording of meter readings and effective meter replacement programs To categorise types of revenues in order to facilitate collection activities Revise all service fees and other charges To seek other sources of revenue (expand the scope of plumbing services, drilling activities and consultancy services)

3.3 Summary and SWOT analysis

Strengths	**Opportunities**
➢ Operate as a near monopoly service ➢ Own office building in prime location convenient to customers ➢ Strong financial position ➢ Ability to comply with the WHO guidelines ➢ Appropriate control of expenses ➢ Good basis for a strong Management team ➢ Ability to adapt to political and economic change	➢ Extension of services to other areas in community ➢ Advanced technologies are available to foster more effective human resources ➢ Collaborate with community partners ➢ Partnering with donor development agencies – JICA & ADB ➢ Member of the Pacific Water and Waste Association (PWWA) ➢ Utility cluster reforms project
Weakness	**Threats**
➢ Lack of mapping information on reticulation system. ➢ Insufficient equipment and tools of production ➢ Poor conditions of vehicles ➢ Ineffective performance management system ➢ Lack of documented systems and procedures ➢ Inappropriate flow of communication	➢ Natural disaster ➢ Power shutdown ➢ Vandalism, sabotage or unpredicted side effect. ➢ Increase in prices of electricity and fuel ➢ Inflation ➢ Political influences ➢ Increased demand from shareholders ➢ Impact of Climate Change ➢ Illegal water connection ➢ Resistance to change ➢ Loss of information and filing documents

3.4 Focus of Planning period

- ❖ Mapping out of the water reticulation system is now in progress
- ❖ New production equipment and tools are now being sourced and procured.
- ❖ Three vehicles have been purchased; four extra vehicles are yet to be acquired.
- ❖ Works to upgrade TWB filling system are now in progress; a Filing Officer has been recruited.
- ❖ Effective communication program is now implemented as part of TWB overall training program.

4. PLANNING PERIOD OBJECTIVES

4.1 The TWB Business Plan will focus on the following objectives:

a. Improve Profitability

The TWB has operated with a reasonable measure of success for the last three years, and there is no doubt that it will continue to do so in the foreseeable future. The weaknesses, threats and risks identified above have posed some constraints on the efficient operations of the TWB. To control those risks, the TWB has introduced procedural reforms and system improvements needed to upgrade and quarantee the quality of its service delivery thereby improving profitability. Despite the increase in the dividend to the Government, the TWB is quite determined to find other sources of income to supplement its revenue earnings.

The TWB also focuses on improving its accounting and billing areas by developing its Financial Plan in conjunction with the Business Plan to provide effective systems and procedures. These include: formulating effective disconnection strategies; writing off of bad debts; improving debt recovery through court procedures; elimination of illegal connections; introduction of automated meter reading procedures; replacement of aging water meters; and improvement of job costing procedures. Training will also be provided for meter readers to improve their skills in the new system. Plan has also been made to upgrade the Finance section computerized accounting and billing systems where appropriate.

b. Improve Infrastructural Development

The basic objective for the TWB is to achieve infrastructural development through the process of business planning, budgeting and organisational development supported by a carefully planned and managed human resource development and infrastructure development program. These activities will be supported by the provision of necessary equipment and facilities for the effective management and operation of the organisation. The program for infrastructural development will be developed to provide practical training in technical areas and to further support the training program. It is emphasised that the infrastructure program is intended to support and reinforce the training program and that it is not intended to be a separate or standalone program for development of TWB infrastructure.

c. Improve service quality

The TWB is currently developing good relationships with consumers and the local communities. There is a lack of public awareness about the roles and responsibilities of the TWB as a service provider. This has urged the TWB to implement public awareness programs to foster closer relationship with customers through workshop meeting with town, district officers and radio programs. There is also a need to raise community awareness in areas such as water supply and resources, demand management, and environmental management aspects of water usage, to name a few.

The TWB is developing an effective customer service framework to improve the quality of its services. A new computerised customer management system has been introduced to its operation. This system will allow complaints to be handled with a high level of reliability and with the speed and quality of service that satisfies our customer needs. The TWB is also developing an effective customer handling policy and procedure for our customer service. A customer service training program will also be conducted for all staffs who are involved in that particular area.

Improving standard of workmanship in all services of the Board and also development service fee policy and guideline.

d. Improve HR development and plans

It is critical for the TWB to identify its current and future human resources needs in order to be able to achieve its strategic goals and objectives.

In order to meet all the requirements for its technical needs, the TWB has provided equipment and materials and offer staff training staff to effectively implement infrastructural support projects. The development program will include:

- water supply systems design and operations;
- monitoring of water quality and quantity;
- maintenance and repair techniques;
- development of asset and work management systems;
- development of environmental strategies for water and wastewater;
- demand management options; and
- up-grading of computer systems and facilities.
- standardizing TWB Policy to meet current process and procedures
- regular review of TWB staff management structure
- review staff retirement package benefits and incentive

The TWB short-term strategies will include on the job training in such fields as pipe jointing and laying, pump and motor maintenance, system operation and maintenance, meter repair and maintenance, water resource and supply monitoring, asset management, and leak detection and control.

Long term strategies will include further job training in selected fields such as hydraulic analysis, asset replacement planning, and sustainability of the water supply systems and resources. An Engineering and Technical Support plan will be developed as part of the Business Plan and a structured training program will be developed to provide appropriate training in technical areas.

4.2 Statement of Objectives to be accomplished by the end of the Planning Period

- Improve Profitability
- Improve Infrastructure development
- Improve HR development and plan.
- Improve service quality

a. The improvement of profitability is dependent on the following strategies:

- Improvement of revenue by reviewing billing system, daily reconcile of debtors, enforcing meter readers working program and additional sources of revenue – plumbing, drilling and consultation services
- Improvement of Debt Collection is an on-going review of debt collection strategies to retain high value customers, maintain current debtors of more than 70%, enhancing debt recovery program by home visit to long disconnection customers
- Improvement of water sales by providing internal control to ensure accuracy of meter reading and customer received water bills timely basis, ensure to take immediate response to reported meter leakages.
- Improvement of procurement activities by optimizing operational cost and ensuring that all expenses are within the current budget
- Expand market penetration

b. The improvement of infrastructure development is based on the following strategies:

- Improvement of water production capacity by maintaining levels of operational pumps in at least 36, through effective preventative maintenance program.
- Improvement of water quality service delivery by ensuring testing of water samples is carried out on a monthly basis by providing an effective water quality program to meet the WHO guideline.
- Improvement of water demand management by ensuring that the assets are maintained and replaced.
- Set Asset Management Plan (AMP) by reviewing the operating, maintenance and capital expenditure procedures.
- Upgrade residential water reticulation system to improve water pressure.

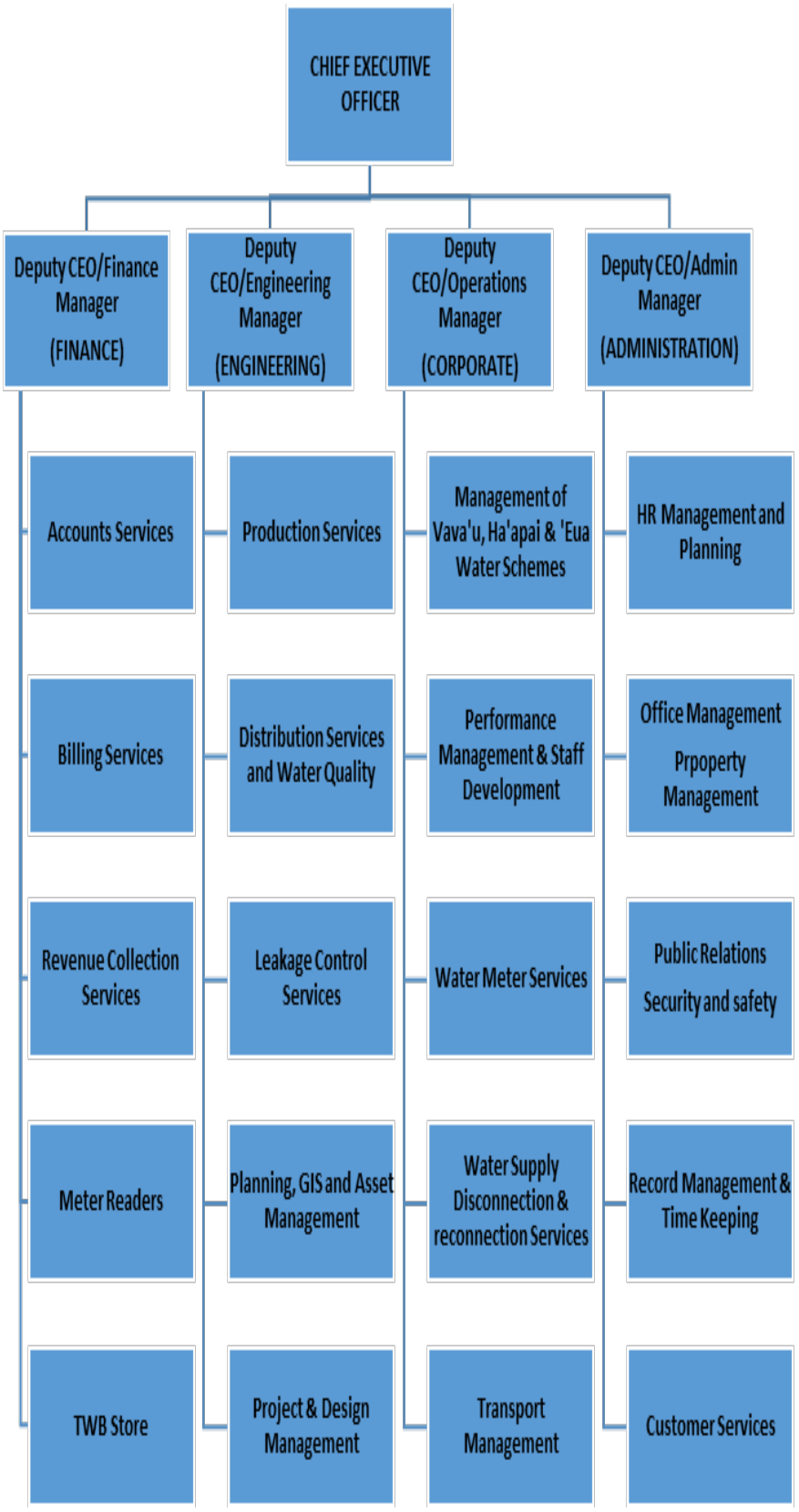
c. The improvement of HR Development Planning based on the following strategies:

- Review and update TWB Policy to meet current process and procedures
- Review TWB staff structure based on employees' posts and salary scales
- Review staff retirement package to achieve 10% of the TWB contribution by 2018
- Review TWB workmanship standard in all divisions and provide manual guidelines to improve quality services.
- Review TWB Training Policy to improve staff capacity

d. The improvement of Customer Service Quality:

- Installing Customer Management System to ensure customer complaints are responding and resolved within two working days.
- Enhance Community and Public Awareness Program to foster closer relationship with customers through workshop and radio program.
- Enforcing illegal connection program to ensure more than 50% are returned to the system.
- Improve working relationship to improve staff interpersonal skills to improve desired values and staff behaviour through in house training external profession training.
- Improve customer service policy to provide customer training on ways to handling procedures to improve customer relationships.
- Upgrade technology and IT systems to meet the standard of requirements.

4.3 Tonga Water Board Operational Structure



5. STRATEGIES/ACTIONS TO SATISFY OBJECTIVES

5.1 Key Strategies Summary

TONGA WATER BOARD - PLANNING PERIOD OBJECTIVES										
No.	Objectives	Strategies	Responsible	Resources Budget	Measures KPI	Current 2017-2018	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-2022
1	Improve	Improve Revenue	CEO, FM	Revenue	$8,072,738	8,375,089	8,559,796	8,512,044	8,708,000	8,909,834
	Profitability	Improve Debtor	CEO, FM, RC	Reduce by 10%	Reduce by 10%	700,000	700,000	700,000	700,000	700,000
		Improve Profitability	CEO, FM, BS, MS	NPAT	1,090,066	927,710	987,340	1,058,461	1,152,230	1,233,407
		Improve procurement activities	CEO, FM, AO, SC	Expenses	$6,619,317	6,900,143	7,008,343	7,100,763	7171693	7265291
		Return on Equity	CEO, FM	ROE	10%	10%	10%	10%	10%	10%
		Debt Ration	CEO, FM	Debt	< 50%	< 50%	< 50%	< 50%	< 50%	< 50%
2	Improve	Improve water production	CEO, ME,FM	1,754,920	All service area	> 95%	> 95%	> 95%	> 95%	> 95%
	Infrastructure	Improve water demand management	CEO, ME,FM	263,929						
	Development	Improve water quality service	CEO, ME,FM	62,100	> 95%	> 95%	> 95%	> 95%	> 95%	> 95%
		Reduce Non-Revenue Water	CEO, ME, FM, MA,	70,000	15%	55%	35.0%	25%	20%	15%
					Zone 13 blocks	zone 1-2	zone 3-4	zone 5-6	zone 6-7	zone - 8-13
				2,700,000	Smart Meter	100%	100%	100%	100%	100%
3	Improve HR	Review staff retirement benefit	CEO, MPA, MA,ME,FM	20,000	10% TWB contribution	7.5%	10%	12.5%	15%	18%
	Development	Review staff post and salary scale	CEO, MPA, MA,ME,FM	300,000	100%	100%	100%	100%	100%	100%
	Planning	Review TWB Policy & Training Policy	CEO, MPA, MA,ME,FM	10,000	100%	100%	100%	100%	100%	100%
		Develop an effective performance management system	CEO, MPA, MA,ME,FM	20,000	100% satisfaction	100%	100%	100%	100%	100%
4	Improve	Enhance customer management system	CEO, MPA, MA,ME,FM	ADB	> 95%	> 95%	> 95%	> 95%	> 95%	> 95%
	Quality Service	Provide in house training	CEO, MPA, MA,ME,FM	10,000		> 95%	> 95%	> 95%	> 95%	> 95%
		Enforce customer survey program	CEO, MPA, MA,ME,FM	10,000	> 95%	> 95%	> 95%	> 95%	> 95%	> 95%
		Enhance Public Relation program	CEO, MPA, MA,ME,FM	20,000	100%	100%	100%	100%	100%	100%
		Enforce TWB Policy and Code of Ethics	CEO, MPA, MA,ME,FM		100% compliance	100%	100%	100%	100%	100%
		Upgrade TWB Lab & Water quality	CEO, ME, FM, MA,HC	10,000	within WHO guideline	<2500ms	<2500ms	<2500ms	<2500ms	
		Review illegal connection fee	CEO, FM, AM, CS		$500	$500	$500	$500	$500	$500

5.2 PERFORMANCE MEASURES – KPI'S

KRAs	OBJECTIVES	STRATEGIES	*ACTIVITIES/ACTION*	KPI
Production	Improve Infrastructure Development	Improve Water Production Improve Water Quality Service	Maintain Required Level of Operational pumps **Nuk -Ensure at least 40 operational pumps** **Vava'u – Ensure at least 7 operational pumps** **Ha'apai – Ensure at least 3 operational pumps** *Set effective preventive maintenance program* *Stream-line and produce effective work program for the production crew.* **Set effective water quality program** *Sampling & Testing monthly basic* *Operators must record pump operation hourly.* *Provide service pump maintenance on a daily basis; and report pump status weekly.* *Provide water treatment on a daily basis* *Operators must record pump operation hourly.* *Provide service pump maintenance on a daily basis; and report pump status weekly.* *Provide water treatment on a daily basis*	**Water Level Target** **ALL CENTRES– 1.5 meters** - Supply water 24 hours 7 days a week IN ALL AREAS **- Production (24hrs)** **-Maintain Water Quality as per WHO guideline**
Distribution		Reduce unaccountable water loss	Implementing Smart Metering Program **Replacement all meter with smart meters** *Prioritize and provide meter replacement based on water consumption* *Provide effective disconnection & reconnection program* *Provide an efficient and effective plumbing program* Reduce unaccountable water loss by continuously improving mainline repair and maintenance **Provide effective leak detection program**	**Replace <u>all</u> meter with smart meter w.e.f October 2017** **Budget Target** Water Loss Target: < 45% to all four centers

			Prioritize and fix Leakages *Provide repair and maintenance program* *Water Supply Development Work* Provide report on impact meter smart metering replacement per block Disconnect & reconnected all water as per the list provided Ensure all JOB are complete on a timely basis -1st Priorities – mainline repair 2nd Priorities – water meters Special Work -'Umusi, Anana, Houmakelikao & Fangaloto.	Supply water to all area of services including high ground areas.
Engineering		Improve Water Demand Management	Set Asset Management Plan (AMP) Reviewing the operating, maintenance and capital expenditure procedures **Implement Asset Management Program** *Establish Asset Management Plan based on growth & demand; Level of Service and Regulatory Compliance;* **Implement GIS Program** *Replacement and renewals; Operation and Maintenance* -Assets are planned; designed, constructed, acquired, maintain, operated, rehabilitated & dispose for present and future customers -Managing the TWB water assets in a cost effective to achieve sustainable strategic goal	**Cost effective, timely maintenance and replacement of assets** (within 6months) **Efficient service provided**
TWB Project	Water Supply Improvement Project – Outer Island	Water Supply Improvement Project – Nuku'alofa	**Improvement Production facility Nuku'alofa** *Collective mains replacements* *Upgrading Treatment facility (Mataki'Eua)*	**Improvement water production in Nuku'alofa & Outer Island**

	Vava'u Haapai 'Eua	Long Term Project Nuku'alofa Long Term Project' Outer Island	**Demand Management area (Zoning)** *12 Wellfield development & additional storage tank (ADB/ Aus Aid Funded)* *Set and undertake a leakage detection program by zoning of work Section* **Upgrading Water Production & Distribution Outer Island: (Fund by JICA)** *Upgrading Treatment facility 'Eua* *Wellfield re-habilitation (Ha'apai)* *Replace 7 existing diesel driven pumps with submersible pumps (Vava'u)* *Replacement of AC mains at Neiafu (Vava'u)*	
Human Resource	Improve Human Resource Development Planning Develop an effective performance management system	Human Resource Development Review TWB Policy & Training to standardized with TPL and WAL Policy and Training Review staff post and salary scale	Staff contract three years, renewable annually based on performance **Staff Performance Assessment on a monthly basis** *Provide Staff Performance Assessment last week of every month* Review employee performance expectations and goals *Provide feedback to Supervisor & Staff on ways of improvement* -Closely monitor staff performance with comparison to monthly report **Enforce – TWB Policy and Code of Ethics & Staff Contract** *Provide Disciplinary action to staff according to TWB Policy & Code of Ethics & Staff Contract* Provide warning to staff and further disciplinary action for not complying with TWB Policy and Code of Ethics & Staff contract Review staff incentive programs and reward systems **Staff Development** *Provide staff training: in-house and local training & Twinning program* *Cooperate with each department in setting staff goals and expectations*	**Customer and stakeholders are satisfied** **Staff performance targets are met:** **Providing quality services** **No complaint** **Customer satisfactory to services provided** **Services are provided on time**

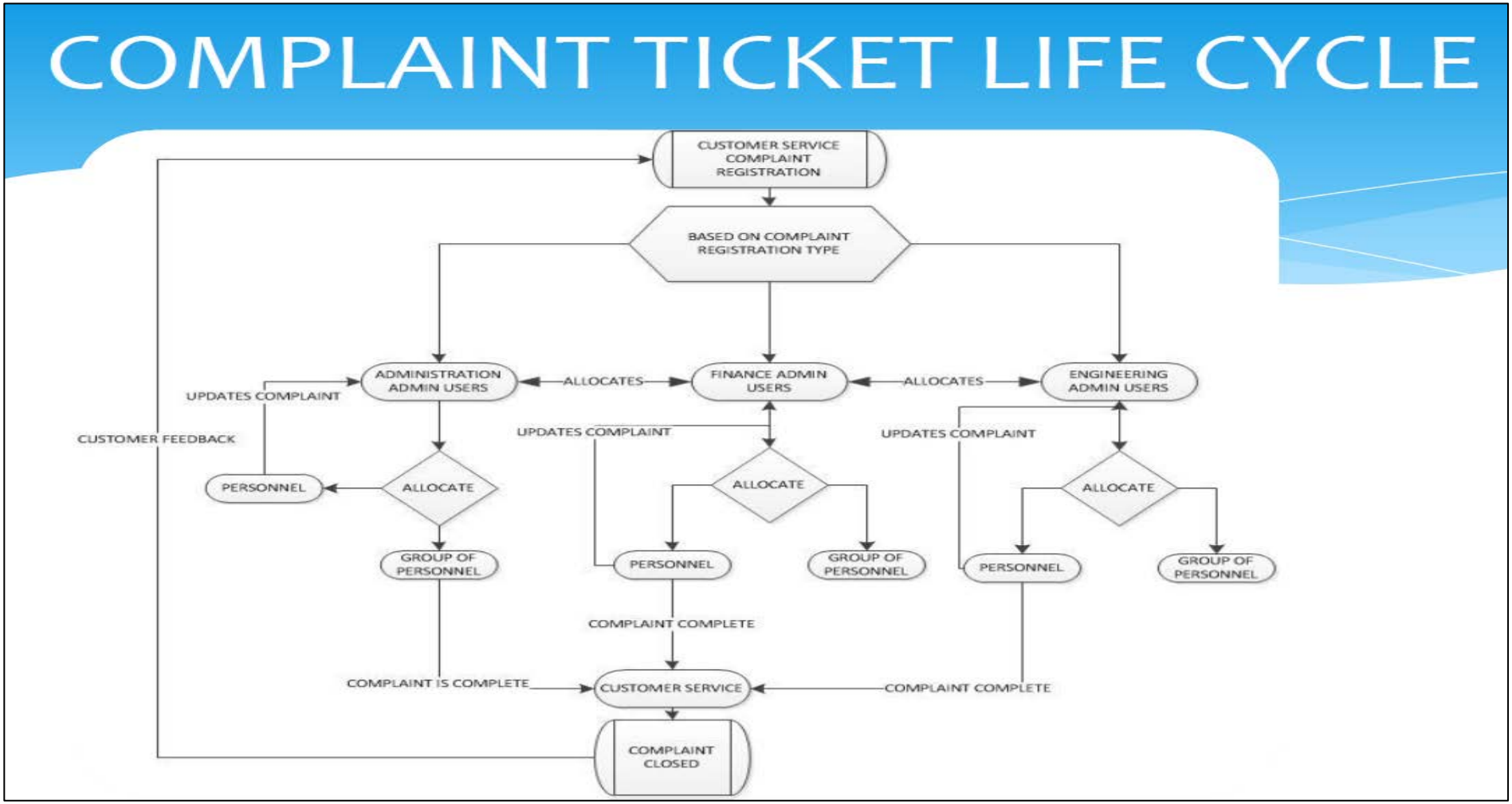
		Develop an effective performance management system	Monitoring progress and performance continually to create desired results **Develop improvement plans for poor performers.** *Track staff progress against set goals and tackle obstacles on a weekly basis* Commit supervisors to provide ongoing staff coaching and feedback *Improve staff's ability to perform through training and workshops* Review staff performance appraisal forms for monthly review of staff. **Perform job analysis and develop clear job descriptions for all staff** *Develop appropriate formats for performance appraisal forms* *Train supervisors on how to conduct effective staff review* Recognised good performance and acknowledge the results	**to meet customer expectation.** **Customer and stakeholders are satisfied** **Staff performance targets are met:** **Providing quality services** **No complaint** **Customer satisfactory to services provided** **Services are provided on time to meet customer expectation.**
Customer Service	**Improve Quality Service**	Enhance customer management system	Strengthening Delivery of Service **Comply Customer Complaint Mechanism** *Record all customer complaint with contact detail* *Direct complaint to necessary Division for appropriate action* *Follow up complaint; ensure timely resolution & respond to customer*	**Complaint within set target *(monthly basis)*** Constantly follow up all complaints and respond within 24 hrs

		Enhance Public Relation program Enforce Customer survey program Review illegal connection fee	**Education & Community Awareness Program** *Foster closer relationship with customer through home visit* *Inform public TWB activities and timeline* **Carry out customer survey on a quarterly basis** *Carry out customer survey to all four centers; Nuku'alofa, Vava'u, Ha'apai and 'Eua* *Survey is carried out based on low pressure areas to identify the problem and provide resolution* **Illegal Reconnection** *Deliver demand letters from legal Advisor to the customer* Review illegal fee from $200 to $500 to prevent illegal connection.	1 day Respond and Resolve complaint. Carried out a Customer Survey on a Quarterly basis (Nuk. Vv, Hp & 'Eua) Provide result survey with feedback to all Four Centre's (Nuk, Vv, Hp & 'Eua **95% Customer Satisfaction Services Provided** **More than 80% customer return to the system**
	Tackling Complex Issue through Alliances & Co-operations	Continue to work together with the Ministry of Public Enterprises	**Communication between TWB and the Ministry of Public Enterprises** *Comply with the Public Enterprise Act – 2002 with amendments Acts No.40 of 2010.*	***September** ***February** ***April**
Government Policy Obligation	**Continue Government Policy Obligation**	Comply Government Policy Obligation	**Fire Hydrant** *Provide free water to Fire Hydrant for emergency purposes* **Village Water Scheme** *Provide design; documentation village water Project*	**Post natural disasters recovery Plans**

Revenue	Improve Profitability	Improve Revenue Improve Debtor	Improve Water Sales **Review Billing System** *In-house training (Input Data), Daily Reconcile Debtor Enforce Meter Reading Program* Improve Debt Collection **On-going Review Debt Collection strategy** *Improve Debt Collection (Home Visit), Retain high value customer* *Weekly meeting Financial Accountant with Supervisor Billing; Meter Reader; Revenue Collector* Improve Customer Retain **Review Billing and Meter Reading Strategies** *Weekly meeting and Identify legal issues* -Directly responsible for all Billing main activities. -Debtors are reconciled daily; provide adjustment as necessary -Directly responsible for the Meter Readers main activities -Provide program to ensure accuracy of meter reading; customer received a water bill on a timely basis; water sales target is met. Enhance Revenue Collection activities; to carry an aggressive debt collection program; revenue target are met Follow up daily program on weekly meeting; provide feedbacks of way forward for improvement and provide report on a monthly basis	**Budget Target TO ALL FOUR CENTRES:** **Revenue – Budget target** **Debtors - target** *(*Follow up and maintain set targets on a quarterly basis) **20% Return Aging Debtor Recovery** **70 - 80% current debtor retain on a monthly basis**
Expenditure Accounting Services		Improve Procurement Activities Optimize Procurement Continue review accounts payable system & procedures	Optimize Operational Cost **On-going carry out a budget management program to support improving of NPAT; ROE and Debt Ration** *Strickly control of expenses, Expense budget must be realistic* *and Monthly reconciliation of accounts* Improve Accounting Services **& Upgrading Accounting Packages** *Carry*	**Budget Target Nuk:** **Expenditure – Budget Target NPAT–$1,090,066 ROE – 10%** Effective and timely maintenance and replacement of assets

		Continue Review Accounting procedures	*out monthly stock take of assets, Upgrade Accounting System Monthly records all Accounting Services.* -All orders and major expenses order must be within the current budget -Provide a progress report on the monthly reconciliation of account (Nuk. Vv, Hp & 'Eua).	Completed within six months Complete no later than the first 7 working days

5.3 TWB CUSTOMER SERVICE COMPLAINT MECHANISM



6. STATEMENT OF COMPLIANCES

6.1 Statement of compliance with relevant Government Policies

Major Requirements	Timeline	Ministry of Public Enterprises
• Business Plan		
To submit a Business Plan	*End of April*	*Comply*
• Half Year Report		
To submit a Half Year Report	*End of February*	*Comply*
• Annual Report & Audit Account		
To submit Annual & Audit Account	*End of September*	*Comply*
• Dividends		
Hon. Minister & Board of Directors	*Annual General Meeting*	*Comply*
• Income Tax		
Payment of Taxation	*End of Financial Year*	*Comply*
• Consumption Tax		
Payment Consumption Tax & PAYE	*Monthly*	*Comply*

6.2 Statement of Community Services, claims for GPO

The Board may erect hydrants in any area for the supply of water for fighting fires.

The TWB continues to assist the fire service by providing water free of charge for fire-fighting and training throughout Tonga. It is one of the Government services to protect the people and their properties.

6.3 Statement of Support from Government or Development Partners and details of contracts, obligation and financial impact on business

TWB current project to be completed at the end of year 2016

- Nuku'alofa Urban Development Sector Project – Subproject: TWB01, TWB02 and TWB03 (ADB and DFAT funding (TOP$11.06 m)

TWB propose project currently under-discussion with Donors partners:

- Nuku'alofa non-revenue water reduction (Currently discuss with donor partners ADB / DFAT) (TOP$9.6 m) The project project will be and extension of NUDSP Subproject TWB02 above.
- Neiafu water supply upgrade (Currently discuss with donor partners JICA) (TOP$15 m) for efficient, and sustainable water supply services in Neiafu (core subproject).

6.4 Statement of Financial capacity in regards to external borrowing and dividends

The Board investment on upgrading the 'Eua Water Treatment by borrowing $600,000 from the Tonga Development Bank (TDB); and will be completed in 2019.

The TWB dividend payment to be approved by the Minister of the Public Enterprises and the Board of Directors the amount payable by the Board based on the Net Profit after Tax achieved at the end of every Financial Year.

7. FINANCIAL FORECAST

7.1 Projection Financial Statement 2017 - 2022

TONGA WATER BOARD

PROJECTION FINANCIAL STATEMENT

AS AT 30TH JUNE 2017-2022

ITEMS	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22
***REVENUES**	**$ 5,533,100**	**$ 5,686,202**	**$ 5,856,788**	**$ 6,032,492**	**$ 6,213,466**
Disconnection fees	**$ 200,000**	**$ 210,000**	**$ 210,000**	**$ 210,000**	**$ 210,000**
Drilling	**$ 150,000**	**$ 150,000**	**$ 150,000**	**$ 150,000**	**$ 150,000**
Distributing Services	**$ 120,000**	**$ 126,000**	**$ 129,780**	**$ 130,000**	**$ 140,000**
Others Revenue	**$ 63,476**	**$ 76,372**	**$ 89,463**	**$ 106,620**	**$ 114,519**
Reduction)	**$ 328,324**	**$ 328,324**	**$ 328,324**	**$ 328,324**	**$ 328,324**
Service Revenue	**$ 1,980,189**	**$ 1,980,189**	**$ 1,980,189**	**$ 1,980,189**	**$ 1,980,189**
Total Revenue	**$ 8,375,089**	**$ 8,557,087**	**$ 8,744,544**	**$ 8,937,625**	**$ 9,136,498**
EXPENSES:					
Board Expenses	**160,000**	**185,000**	**185,000**	**185,000**	**185,000**
Corporate / Administration	767,212	782,556	798,207	814,171	830,455
Outer Island Services (Nuk.)	68,410	62,191	69,032	63,060	64,321
Finance	636,738	649,473	662,463	662,463	675,712
Administration/Finance (Is)	295,107	301,010	307,030	313,170	319,434
Technical	171,936	175,374	178,882	182,460	186,109
Production	1,754,920	1,790,018	1,825,819	1,862,335	1,899,582
Distribution	263,929	269,207	274,591	280,083	285,685
Water Quality	62,100	63,342	64,609	65,901	67,220
Special Expenses (Project / Disaster)	75,000	80,000	85,000	90,000	91,800
Smart Meter Project fee	438,000	442,380	447,380	452,380	461,428
TOTAL OPERATING EXPENSES	**$ 4,693,352**	**$ 4,800,552**	**$ 4,898,013**	**$ 4,971,023**	**$ 5,066,744**
Depreciation	**$ 2,306,791**	**$ 2,306,791**	**$ 2,306,791**	**$ 2,306,791**	**$ 2,306,791**
TOTAL EXPENSES	**7,000,143**	**7,107,343**	**7,204,803**	**7,277,814**	**7,373,534**
NET OPERATING Profit/(Loss)	**$ 1,374,946**	**$ 1,449,744**	**$ 1,539,741**	**$ 1,659,811**	**$ 1,762,964**
Less Provision for Taxation	343,737	362,436	384,935	414,953	440,741
NET PROFIT (LOSS) AFTER TAX	**$ 1,031,210**	**$ 1,087,308**	**$ 1,154,805**	**$ 1,244,858**	**$ 1,322,223**
DIVIDEND 100%	**$ 1,031,210**	**$ 1,087,308**	**$ 1,154,805**	**$ 1,244,858**	**$ 1,322,223**

Noted : Decrease Revenue due to 6% Tariff Reduction

TONGA WATER BOARD

BUDGET SUMMARY 2017- 2018

	NUKU'ALOFA	VAVA'U	HA'APAI	EUA	TOTAL
REVENUES	$ 4,423,140	$ 670,060	$ 220,000	$ 219,900	**$ 5,533,100**
PROFIT FROM TRADING	$ 103,000	$ 7,000	$ 5,000	$ 5,000	$ 120,000
RECONNECTION & PENALTY FEES	$ 171,000	$ 15,000	$ 6,000	$ 8,000	$ 200,000
SUNDRIES	$ 12,976	$ 5,500	$ 3,000	$ 7,000	$ 28,476
DRILLING REVENUE	$ 150,000				$ 150,000
INTEREST INCOME	$ 35,000				$ 35,000
	$ 4,895,116	$ 697,560	$ 234,000	$ 239,900	$ 6,066,576
GOT SUBSIDIES	$ 328,324				$ 328,324
Service Revenue	1,670,189			$ 310,000	$ 1,980,189
TOTAL REVENUE	**$ 6,893,629**	**$ 697,560**	**$ 234,000**	**$ 549,900**	**$ 8,375,089**
EXPENSES					
BOARD EXPENSES	$ 72,000				$ 72,000
ADMINSTRATION	$ 384,531				$ 384,531
CORPORATE SERVICES	$ 461,191				$ 461,191
METER SERVICES	$ 785,470				$ 785,470
OUTER ISLAND SERVICES	$ 68,410				$ 68,410
FINANCE	$ 636,738				$ 636,738
ADMINSTRATION / FINANCE (Is.)		$ 177,759	$ 71,600	$ 74,588	$ 323,946
TECHNICAL (ENGINEERING)	$ 381,936				$ 381,936
PRODUCTION	$ 1,668,208	$ 329,672	$ 102,285	$ 416,039	$ 2,516,204
DISTRIBUTION & METER SERVICES	$ 1,133,917	$ 35,470	$ 28,300	$ 34,930	$ 1,232,616
WATER QUALITY	$ 62,100				$ 62,100
SPECIAL EXPENSES (Project / Disaster)	$ 75,000				$ 75,000
TOTAL OPERATING EXPENSES	**$ 5,729,501**	**$ 542,901**	**$ 202,185**	**$ 525,556**	**$ 7,000,143**
EXPECTED NET OPERATING PROFIT/(LOSS)	$ 1,164,128	$ 154,659	$ 31,815	$ 24,344	$ 1,374,946
LESS PROVISION FOR TAX	$ 291,032	$ 38,665	$ 7,954	$ 6,086	$ 343,737
NET PROFIT (LOSS) AFTER TAX	**$ 873,096**	**$ 115,995**	**$ 23,861**	**$ 18,258**	**$ 1,031,210**

NUKU'ALOFA WATER SCHEME		
BUDGET FOR FINANCIAL YEAR 2017 - 2018		
	ANNUAL BUDGET FY 2017-2018	
I. REVENUE		
WATER SALES	$	4,423,140
Profit from Trading	$	103,000
RECONNECTION & PENALTY FEES	$	171,000
SUNDRIES	$	12,976
DRILLING MACHINE	$	150,000
INTEREST INCOME	$	35,000
SUBSIDIES - GOT	$	328,324
GRANT -SERVICE REVENUE	$	1,670,189
TOTAL REVENUE	**$**	**6,893,629**
II. EXPENSES:		
(A) BOARD EXPENSES:		
BOARD MEMBERS ALLOWANCE	$	72,000
TOTAL BOARD EXPENSES	**$**	**72,000**
(B) ADMINISTRATION SERVICE		
SALARIES AND WAGES	$	153,894
OVERTIME	$	1,704
ACTING ALLOWANCE	$	1,704
GRATUITY	$	8,500
OFFICE SUPPLIES	$	10,907
TRAVEL AND TRANSPORT	$	15,338
VEHICLE FUEL	$	2,500
OFFICE ELECTRICITY	$	7,158
TELEPHONE / FAX	$	12,726
LAND LEASE	$	3,409
OFFICE CLEANING	$	682
SUNDRIES	$	6,817
DEPRECIATION	$	87,138
VEHICLE MAINTENANCE	$	2,727
SUPERANNUATION	$	7,158
LEGAL EXPENSES	$	5,000
HOSPITALITY	$	1,363
UNIFORMS	$	1,704
TRAINING MANAGEMENT & BOARD	$	682
OFFICE EQUIPMENT MAINTENANCE	$	1,363
PUBLIC RELATION	$	3,481
OFFICE REPAIRS AND MAINTENANCE	$	2,045
RATIONS	$	341
INSURANCE	$	30,000
OFFICE WATER EXPENSE	$	852
DONATION	$	1,704
STAFF REDUNDANCY	$	13,634
TOTAL ADMINISTRATION	**$**	**384,531**

(C). CORPORATE SERVICES		
SALARIES AND WAGES	$	138,350
OVERTIME	$	1,532
ACTING ALLOWANCE	$	1,532
GRATUITY	$	11,000
OFFICE SUPPLIES	$	9,806
GENERAL PURPOSE FUND	$	98,000
TRAVEL AND TRANSPORT	$	13,789
VEHICLE FUEL	$	1,500
OFFICE ELECTRICITY	$	6,435
TELEPHONE / FAX	$	12,275
LAND LEASE	$	3,064
OFFICE CLEANING	$	613
SUNDRIES	$	6,128
DEPRECIATION	$	113,842
VEHICLE MAINTENANCE	$	2,451
SUPERANNUATION	$	6,435
HOSPITALITY	$	2,637
UNIFORMS	$	1,532
TRAINING MANAGEMENT & BOARD	$	613
OFFICE EQUIPMENT MAINTENANCE	$	1,226
PUBLIC RELATION	$	6,731
OFFICE REPAIRS AND MAINTENANCE	$	1,839
RATIONS	$	306
OFFICE WATER EXPENSE	$	766
HOUSING ALLOWANCE	$	5,000
DONATION	$	1,532
STAFF REDUNDANCY	$	12,257
TOTAL CORPORATE	**$**	**461,191**
(D) METER SERVICES		
SALARIES AND WAGES	$	159,256
OVERTIME	$	1,764
ACTING ALLOWANCE	$	1,764
GRATUITY	$	8,500
OFFICE SUPPLIES	$	11,287
TRAVEL AND TRANSPORT	$	15,873
VEHICLE FUEL	$	7,000
OFFICE ELECTRICITY	$	7,407
TELEPHONE / FAX	$	5,000
LAND LEASE	$	3,527
OFFICE CLEANING	$	705
SUNDRIES	$	7,055
DEPRECIATION	$	90,000
VEHICLE MAINTENANCE	$	2,822
SUPERANNUATION	$	7,407
HOSPITALITY	$	1,764
UNIFORMS	$	705
TRAINING MANAGEMENT & BOARD	$	1,411
OFFICE EQUIPMENT MAINTENANCE	$	2,116
OFFICE REPAIRS AND MAINTENANCE	$	353
OFFICE WATER EXPENSE	$	882
DONATION	$	1,764
STAFF REDUNDANCY	$	9,109
SMART METER FEE	$	438,000
TOTAL METER SERVICES	**$**	**785,470**
(E) WATER QUALITY	$	62,100
TOTAL ADMINISTRATION	**$**	**1,693,292**

(F) OUTER ISLAND SERVICES		
OFFICE SUPPLIES	$	12,000
TRAVEL AND TRANSPORT	$	6,000
VEHICLE FUEL	$	3,500
VEHICLE MAINTENANCE	$	1,500
GRATUITY	$	12,500
CHEMICALS	$	32,910
TOTAL OUTER ISLAND SERVICE EXPENSES	**$**	**68,410**
(G)FINANCIAL SERVICES		
SALARIES AND WAGES	$	383,359
OVERTIME	$	17,000
ACTING ALLOWNANCE	$	5,800
DISCOUNT ALLOWED	$	20,000
GRATUITY	$	12,500
OFFICE SUPPLIES	$	30,000
TRAVEL AND TRANSPORT	$	8,000
VEHICLE FUEL	$	6,410
MAINTENANCE OF OFFICE EQUIPMENT	$	4,000
DEPRECIATION	$	1
VEHICLE MAINTENANCE	$	2,000
BAD DEBTS	$	40,000
SUPERANNUATION	$	19,168
INSURANCE	$	4,000
AUDIT FEES AND ACCOUNTING EXPENSES	$	11,000
SOFTWARE SUPPORTING AGREEMENT	$	70,000
BANK CHARGES	$	3,500
TOTAL FINANCIAL SERVICES	**$**	**636,738**
(H) ENGINEERING SERVICES **ENG. 1 TECHNICAL**		
SALARIES AND WAGES	$	137,280
OVERTIME	$	3,000
ACTING ALLOWANCE	$	1,500
OFFICE SUPPLIES	$	1,000
TRAVEL AND TRANSPORT	$	7,000
DEPRECIATION	$	201,375
VEHICLES FUEL	$	8,000
VEHICLE MAINTENANCE	$	3,000
RATIONS	$	500
SUPERANNUATION	$	6,864
PROTECTIVE CLOTHING	$	1,500
TOOLS & EQUIPMENTS MAAINTENANCE	$	500
GRATUITY	$	10,417
TOTAL ENG. 1 TECHNICAL	**$**	**381,936**

ENG. 2 PRODUCTION		
SALARIES AND WAGES	$	201,572
OVERTIME	$	20,000
ACTING ALLOWANCE	$	1,500
OFFICE SUPPLIES	$	3,000
TRAVEL AND TRANSPORT	$	9,000
PUMP ELECTRICITY	$	832,640
PUMP FUEL	$	90,000
SPARE PARTS - PUMP UNITS	$	10,000
REPAIR PUMP HOUSE	$	2,000
VEHICLE MAINTENANCE	$	2,000
VEHICLE FUEL	$	7,000
DEPRECIATION	$	424,917
SUPERANNUATION	$	10,079
WATERSHED MAINTENANCE	$	30,000
CHEMICALS	$	6,000
TOOLS AND EQUIPMENT	$	2,000
LAND LEASE	$	1,000
RESERVOIR MAINTENANCE	$	5,500
LEASE AMORTIZATION	$	10,000
TOTAL ENG. 2 PRODUCTION EXPENSES	**$**	**1,668,208**
ENG. 3 DISTRIBUTION		
SALARIES AND WAGES	$	137,619
OVERTIME	$	7,000
ACTING ALLOWANCE	$	1,500
TRAVEL EXPENSES	$	5,000
DEPRECIATION	$	929,182
VEHICLE FUEL	$	10,000
VEHICLE MAINTENANCE	$	2,000
TOOLS AND EQUIPMENT	$	1,235
R & M PIPES SYSTEM	$	30,000
R & M WATER METERS	$	1,000
PROTECTIVE CLOTHING	$	2,500
SUPERANNUATION	$	6,881
TOTAL ENG. 3 DISTRIBUTION EXPENSES	**$**	**1,133,917**
TOTAL ENGINEER EXPENSES	**$**	**3,184,061**
(I) SPECIAL EXPENSES		
PROJECT DESIGN & FEASIBILITY		
PROJECT COTRIBUTION	$	20,000
SPECIAL DEVELOPMENT WORK	$	55,000
TOTAL SPECIAL EXPENSES	**$**	**75,000**
TOTAL EXPENSES	**$**	**5,729,501**
NET OPERATING PROFIT	**$**	**1,164,128**
GOVT TAXATION PROVISION	$	291,032
NET PROFIT AFTER TAX	**$**	**873,096**

VAVAU WATER SCHEME
BUDGET FOR FINANCIAL YEAR 2017 - 2018

		ANNUAL BUDGET FY 2017-2018
1. REVENUE		
WATER SALES	$	670,060
GROSS PROFIT	$	7,000
RECONNECTION & PENALTY FEES	$	15,000
SUNDRIES	$	5,500
SERVICE REVENUE	$	-
TOTAL REVENUE	**$**	**697,560**
11. EXPENSES:		
11. (A) ADMINISTRATION / FINANCE		
SALARIES AND WAGES	$	97,650
OFFICE SUPPLIES	$	5,000
TELEPHONE / FAX	$	3,500
ELECTRICITY	$	19,350
TRAVEL AND TRANSPORT	$	1,575
VEHICLE FUEL	$	7,000
VEHICLE MAINTENANCE	$	5,000
OFFICE & EQUIPMENT MAINTENANCE	$	1,000
OFFICE REPAIRS & MAINTENANCE	$	2,000
LAND LEASE	$	4,300
ACTING ALLOWANCE	$	1,550
DEPRECIATION	$	18,950
SUPERANNUATION	$	4,883
UNIFORM	$	2,000
INSURANCE / LEGAL	$	2,500
OFFICE CLEANING	$	500
SUNDRIES	$	500
BAD DEBTS	$	1
RATION	$	500
TOTAL ADMINISTRATION	**$**	**177,759**
11. (B) PRODUCTION		
SALARIES AND WAGES	$	51,231
OVERTIME	$	3,200
PUMP FUEL	$	29,400
REPAIR & MAINT. PUMPS	$	44,938
WATERSHED MAINTENANCE	$	3,000
PUMP ELECTRICITY	$	142,000
SUPERANNUATION	$	2,562
DEPRECIATION	$	51,292
REPAIR & MAINT. PUMP HOUSES	$	1,050
CHEMICALS		
TOOLS AND EQUIPMENT	$	1,000
TOTAL PRODUCTION	**$**	**329,672**
11. (C) DISTRIBUTION		
SALARIES AND WAGES	$	23,711
OVERTIME	$	800
REPAIR & MAINTAIN PIPE SYSTEM	$	6,870
TOOLS & EQUIPMENT	$	854
DEPRECIATION	$	2,050
SUPERANNUATION	$	1,185
TOTAL DISTRIBUTION	**$**	**35,470**
TOTAL EXPENSES	**$**	**542,901**
NET OPERATING PROFIT BEFORE TAX	**$**	**154,659**
GOVERNMENT TAX	**$**	**38,665**
NET PROFIT AFTER TAX	**$**	**115,995**

HA'APAI WATER SCHEME		
BUDGET FOR FINANCIAL YEAR 2017-2018		
	ANNUAL BUDGET FY2017-2018	
1. REVENUE		
WATER SALES	$	220,000
GROSS PROFIT	$	5,000
RECONNECTION FEE	$	6,000
SUNDRY	$	3,000
TOTAL REVENUE	**$**	**234,000**
11. EXPENDITURE		
11. (A) ADMINISTRATION/FINANCE		
SALARIES AND WAGES	$	42,000
OVERTIME	$	500
ACTING ALLOWANCE	$	500
OFFICE SUPPLIES	$	2,500
TRAVEL AND TRANSPORT	$	300
TELEPHONE / FAX	$	1,200
LAND LEASE	$	8,000
SUNDRY	$	100
DEPRECIATION	$	6,000
VEHICLE FUEL	$	2,700
VEHICLE MAINTENANCE	$	1,000
SUPERANNUATION	$	2,100
UNIFORM	$	1,000
OFFICE ELECTRICITY	$	2,000
OFFICE REPAIR & MAINTENANCE	$	500
RATIONS	$	200
BAD DEBT EXPENSES	$	1,000
TOTAL ADMINISTRATION	**$**	**71,600**
11. (B) PRODUCTION		
SALARIES AND WAGES	$	31,705
OVERTIME	$	3,000
PUMP FUEL	$	10,000
PUMP ELECTRICITY	$	30,000
REPAIR AND MAINTENANCE PUMPS	$	1,500
ACTING ALLOWANCE	$	500
SUPERANNUATION	$	1,585
DEPRECIATION	$	21,500
TOOLS & EQUIPMENT	$	500
R&M PUMP HOUSE	$	1,995
TOTAL PRODUCTION	**$**	**102,285**
11. (C) DISTRIBUTION		
SALARIES AND WAGES	$	20,000
OVERTIME	$	1,500
ACTING ALLOWANCE	$	1,100
TOOLS/EQUIPMENT	$	500
R & M PIPE SYSTEMS	$	3,700
DEPRECIATION	$	500
SUPERANNUATION	$	1,000
TOTAL DISTRIBUTION	**$**	**28,300**
TOTAL EXPENSES	**$**	**202,185**
TOTAL NET OPERATING PROFIT / (LOSS)	**$**	**31,815**
GOVERNMENT TAXATION	**$**	**7,954**
NET PROFIT /(LOSS) AFTER TAX	**$**	**23,861**

EUA WATER SCHEME		
BUDGET FOR FINANCIAL YEAR 2017 - 2018		
	ANNUAL BUDGET FY 2017 -2018	
WATER SALES	$	219,900
PROFIT FROM TRADING	$	5,000
RECONNECTION FEES	$	8,000
SUNDRY	$	7,000
GRANT	$	310,000
TOTAL REVENUE	**$**	**549,900**
11. (A) ADMINISTRATION / FINANCE		
SALARIES AND WAGES	$	30,874
OFFICE SUPPLIES & EQUIP. MTNCE	$	1,300
TRAVEL AND TRANSPORT	$	500
VEHICLE MAINTENANCE	$	2,000
VEHICLE FUEL	$	10,000
TELEPHONE / FAX	$	2,500
ACTING/DUTY ALLOWANCE	$	1,000
DEPRECIATION	$	8,970
SUPERANNUATION	$	1,544
LAND LEASE	$	3,100
OFFICE ELECTRICITY	$	3,200
OFFICE REPAIRS	$	800
REPAIR RESIDENCE (BM)	$	600
UNIFORM	$	1,000
SUNDRY	$	200
INSURANCE/LEGAL	$	1,500
RATION	$	500
BAD DEBTS	$	5,000
TOTAL ADMINISTRATION	**$**	**74,588**
11. (B)PRODUCTION		
SALARIES AND WAGES	$	43,610
PUMP ELECTRICITY	$	7,000
PUMP FUEL	$	1,424
R & M PUMPS	$	3,000
CHEMICALS	$	3,000
TOOLS & EQUIPMENT	$	1,000
WATERSHED MAINTENANCE	$	4,000
DEPRECIATION	$	350,824
SUPERANNUATION	$	2,181
TOTAL PRODUCTION	**$**	**416,039**
11. (C) DISTRIBUTION		
SALARIES AND WAGES	$	29,314
OVERTIME	$	400
R & M PIPE SYSTEM	$	2,500
TOOLS AND EQUIPMENT	$	500
ACTING ALLOWANCE	$	500
DEPRECIATION	$	250
SUPERANNUATION	$	1,466
TOTAL DISTRIBUTION	**$**	**34,930**
TOTAL EXPENSES	***$***	***525,556***
NET OPERATING PROFIT	***$***	***24,344***
GOVT. TAX PROVISION	***$***	***6,086***
NET PROFIT/(LOSS) AFTER TAX	**$**	**18,258**

7.2 Financial Position Projection as at 30TH June 2017 – 2022

TONGA WATER BOARD FINANCIAL POSITION PROJECTION AS AT JUNE 2017-2022						
FINANCIAL YEAR	**FY 2016-17**	**FY 2017-18**	**FY 2018-19**	**FY 2019-20**	**FY 2020-21**	**FY 2021-22**
CAPITAL & RESERVE						
Capital	2,065,040	2,065,040	2,065,040	2,065,040	2,065,040	2,065,040
Sinking Fund Reserve	528,692	528,692	528,692	528,692	528,692	528,692
Asset Replacement Reserve	68,290	68,290	68,290	68,290	68,290	68,290
Retained Profit	**4,222,762**	**4,921,465**	**5,673,521**	**6,474,422**	**7,339,289**	**8,261,776**
Total Capital & Reserve	**$ 6,884,784**	**$ 7,583,487**	**$ 8,335,543**	**$ 9,136,444**	**$ 10,001,311**	**$ 10,923,798**
CURRENT ASSETS:						
Cash Float	50	50	50	50	50	50
Bank Account	**665,279**	**557,926**	**628,860**	**553,074**	**573,448**	**676,284**
Internet Banking	9,000	9,000	9,000	9,000	9,000	9,000
TWB Project Fund	-	-	-	-	-	-
Petty Cash	250	250	250	250	250	250
Account Receivable Control	940,500	893,475	848,801	770,951	724,158	678,522
Accrued Income	15,855	15,062	14,309	13,594	12,914	12,268
Sundry Debtors	-	-	-	-	-	-
Provision for Doubtful Debt	- 182,351	- 164,115	- 147,704	- 132,934	- 119,640	- 107,676
Inventory	255,569	242,790	230,651	253,716	268,153	250,797
Stock Spareparts	-	-	-	-	-	-
Prepayments	450,000	404,100	362,790	325,611	292,150	262,035
Sinking Fund	558,899	575,666	592,936	610,724	629,045	647,917
Asset Replacement Fund	165,130	170,084	175,187	180,443	185,856	191,431
Total Current Assets	**$ 2,878,181**	**$ 2,704,288**	**$ 2,715,130**	**$ 2,584,479**	**$ 2,575,383**	**$ 2,620,877**
LESS CURRENT LIABILITIES:						
Sundry Creditors	133,081	119,773	125,761	138,337	152,171	167,388
Accrued Payables	129,500	116,296	93,041	26,543	21,864	18,143
Consumption Tax Payable	24,864	23,124	24,048	25,010	26,011	27,051
Deposit Held	42,545	39,545	38,945	39,245	39,545	39,545
Provision for Audit Fee	10,000	10,000	10,000	10,000	10,000	10,000
Provision for Income Tax	533,639	449,352	376,028	400,450	432,433	461,244
Total Current Liabilities	**$ 873,629**	**$ 758,089**	**$ 667,824**	**$ 639,586**	**$ 682,024**	**$ 723,371**
WORKING CAPITAL	**$ 2,004,552**	**$ 1,946,199**	**$ 2,047,305**	**$ 1,944,892**	**$ 1,893,359**	**$ 1,897,506**
ADD INVESTMENT:						
Long Term-Deposit	1,288,703	1,327,364	1,367,185	1,408,201	1,450,447	1,493,960
Total Investment	**$ 1,288,703**	**$ 1,327,364**	**$ 1,367,185**	**$ 1,408,201**	**$ 1,450,447**	**$ 1,493,960**
ADD NON-CURRENT ASSET						
Provision for Defferred Tax Assets	55,000	52,800	50,688	48,660	46,714	44,845
Property, Plant and Equipment	24,414,320	25,376,034	23,547,901	22,042,695	21,162,489	20,283,782
Total Non Current Asset	**$ 24,469,320**	**$ 25,428,834**	**$ 23,598,589**	**$ 22,091,355**	**$ 21,209,203**	**$ 20,328,627**
ADD INTANGIBLE ASSET						
Capital Work in Progress	-	-	-	-	-	-
	$ 27,762,575	**$ 28,702,397**	**$ 27,013,079**	**$ 25,444,449**	**$ 24,553,009**	**$ 23,720,094**
LESS NON-CURRENT LIIABILITIES:						
Provision for Deferred Tax Liabilities	-	-	-	-	-	-
Tonga Development Loan	**331,200**	**196,800**	**62,400**	**-**	**-**	**-**
Retirement Fund Board Loan		**2,365,200**	**2,030,400**	**1,695,600**	**1,360,800**	**1,026,000**
Superannuation Fund	5,700	5,415	5,144	4,887	4,643	4,411
Board Members Retirement Fund	82,070	72,863	81,149	89,264	98,191	108,010
Defer Income (Special Reserve)	20,458,821	18,478,632	16,498,443	14,518,254	13,088,065	11,657,876
Total Long Term Liabilities	**$ 20,877,791**	**$ 21,118,910**	**$ 18,677,536**	**$ 16,308,005**	**$ 14,551,698**	**$ 12,796,296**
TOTAL NET ASSETS	**$ 6,884,784**	**$ 7,583,487**	**$ 8,335,543**	**$ 9,136,444**	**$ 10,001,311**	**$ 10,923,798**

7.3 Statement of Cash flow Projection as at June 2017 – 2022

TONGA WATER BOARD STATEMENT OF CASH FLOWS PROJECTION FOR THE YEAR ENDING JUNE 2018 -2022						
	June 2017	June 2018	June 2019	June 2020	June 2021	June 2022
CASH FLOW FROM OPERATING ACTIVITIES:						
Cash was provided from:						
Receipts from Customers	$ 6,471,878	$ 6,536,597	$ 6,601,963	$ 6,667,982	$ 6,734,662	$ 7,071,395
Plant Hire	$ 600	$ 700	$ 700	$ 700	$ 1,000	$ 1,000
Drilling Machine	$ 200,000	$ 100,000	$ 105,000	$ 110,250	$ 115,763	$ 121,551
Other Income	$ 11,036,400	$ 38,240	$ 40,151	$ 42,158	$ 44,264	$ 46,477
Total	**$ 17,708,878**	**$ 6,675,537**	**$ 6,747,814**	**$ 6,821,090**	**$ 6,895,689**	**$ 7,240,423**
Cash was applied to:						
Payment to Employees	$ 1,400,415	$ 1,680,497	$ 1,764,522	$ 1,940,974	$ 2,038,023	$ 2,119,544
Payment to Suppliers	$ 2,278,599	$ 1,682,670	$ 2,480,723	$ 2,580,723	$ 2,422,651	$ 2,325,745
Payment to Board Members	$ 97,594	$ 97,594	$ 97,594	$ 97,594	$ 97,594	$ 97,594
Consumption Tax	$ 233,021	$ 256,323	$ 281,955	$ 310,151	$ 341,166	$ 375,283
Other Operating Expenses	$ 1,256,687	$ 1,083,410	$ 954,073	$ 989,801	$ 970,660	$ 1,041,444
Total	**$ 5,266,315**	**$ 4,800,494**	**$ 5,578,867**	**$ 5,919,243**	**$ 5,870,093**	**$ 5,959,609**
NET CASH FROM OPERATING ACTIVITIES	**$ 12,442,563**	**$ 1,875,043**	**$ 1,168,947**	**$ 901,847**	**$ 1,025,596**	**$ 1,280,814**
CASH FLOW FROM INVESTING ACTIVITIES:						
Cash was provided from:						\
Proceeds from sale of Assets	$ -	$ -	$ -	$ -	$ -	$ -
Sinking Fund Savings Account	$ 2,660	$ 2,726	$ 2,794	$ 2,864	$ 2,936	$ 3,009
Interest on Investment	$ 56,650	$ 58,350	$ 60,100	$ 61,903	$ 49,522	$ 39,618
Asset Replacement Fund Savings Account	$ 405,653	$ 5,795	$ 5,940	$ 6,088	$ 6,241	$ 6,397
Term Deposits Withdrawn	$ -	$ -	$ -	$ -	$ -	$ -
Total	**$ 464,963**	**$ 66,871**	**$ 68,834**	**$ 70,856**	**$ 58,699**	**$ 49,024**
Cash was applied to:						
Term Deposits	$ -	$ -	$ -	$ -	$ -	$ -
Sinking Fund (Service Fees)	$ 43,135	$ 43,997	$ 44,877	$ 45,775	$ 46,690	$ 47,624
Asset Replacement Fund	$ 60,956	$ 62,175	$ 63,418	$ 64,687	$ 65,981	$ 67,300
Superannuation Fund	$ -	$ -	$ -	$ -	$ -	$ -
Inventory Store	$ 201,400	$ 310,000	$ 320,000	$ 320,000	$ 320,000	$ 320,000
Acquisition of Property, Plant and Equipment	$ 12,000,000	$ 2,520,500	$ 206,000	$ 192,000	$ 180,800	$ 309,644
Total	**$ 12,305,490**	**$ 2,936,672**	**$ 634,296**	**$ 622,462**	**$ 613,471**	**$ 744,568**
NET CASH FROM INVESTING ACTIVITIES	**-$ 11,840,527**	**-$ 2,869,801**	**-$ 565,461**	**-$ 551,606**	**-$ 554,772**	**-$ 695,544**
CASH FLOW FROM FINANCING ACTIVITIES:						
Cash was provided from:						
Loan	$ -	$ 2,700,000		$ -	$ -	$ -
Total	**$ -**	**$ 2,700,000**	**$ -**	**$ -**	**$ -**	**$ -**
Cash was applied for:						
Income Tax	$ 360,154	$ 344,595	$ 349,352	$ 376,028	$ 400,450	$ 432,433
Dividend	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000
Loan Repayment (TDB)	$ 133,200	$ 133,200	$ 133,200	$ -	$ -	$ -
Loan Repayment (RFB)		$ 334,800	$ 334,800	$ 334,800	$ 334,800	$ 334,800
Loan Building Repayment (TPL)		$ -	$ 217,320	$ 217,320	$ 217,320	$ 217,320
Board Retirement Fund	$ 50,000	$ -	$ 50,000	$ 50,000	$ 50,000	$ 50,000
Total	**$ 1,543,354**	**$ 1,812,595**	**$ 2,084,672**	**$ 1,978,148**	**$ 2,002,570**	**$ 2,034,553**
NET CASH FROM FINANCING ACTIVITIES	**-$ 543,354**	**$ 887,405**	**-$ 532,552**	**-$ 426,028**	**-$ 450,450**	**-$ 482,433**
Net Increase (Decrease) in Cash Held	$ 58,682	-$ 107,353	$ 70,934	-$ 75,786	$ 20,374	$ 102,836
Cash and Cash equivalents at 1st July, 2016-2022	$ 606,597	$ 665,279	$ 557,926	$ 628,860	$ 553,074	$ 573,448
Cash and cash equivalents at 30 June, 2017-2022	**$ 665,279**	**$ 557,926**	**$ 628,860**	**$ 553,074**	**$ 573,448**	**$ 676,284**

SMART WATER METERING BUSINESS CASE

April 2017

Confidential to Tonga Water Board

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Table of Contents

1. Executive Summary

This report is the business case for Tonga Water Board to install a smart ultrasonic water metering solution to replace faulty existing meters and to provide data that will enable water losses to be significantly reduced.

Smart metering affords not only significant reduction in both Real and Apparent Losses but it provides a foundation from which TWB can support a variety opportunities such as the implement of demand side management or time-of-use tariffs. Moreover the ultrasonic meters will be more accurate over a wider range of flows.

Power Business with the assistance of TWB have established that the benefits of approximately TOP1m pa can be realised essentially from the reduction in Non-Revenue losses and well as the avoided cost of meter reading. The only real risk to the venture is not realising the benefits evaluated.

Two options are considered: Use Tonga Power Itron RF Mesh and Agility Meter Data Management system and replacing existing Kent water meters Option 1 and Option 2 to retain existing Kent water meters and build a new LoRa radio network and contract a smart water meter reading service from AD Riley. The most economic and low risk option is to utilise the Tonga Power radio mesh network and back office IT systems used for electricity meters and to install Itron ultrasonic smart meters.

The capital cost required is TOP2.6m and of this cost TOP1.9m is the costs of meters. The only other large capital cost is the TWB cost of deploying the smart meters. A 10% contingency has been provided for on TWB costs as the Itron and Agility costs have been quoted.

Ongoing operational costs are assessed at TOP438,000 all payable apart from some minor maintenance cost, to Tonga Power. A 15% contingency has also been provided for operational costs which excludes the Itron and Agility costs as they have been quoted.

The financial returns are considered good. The NPV of the venture post tax is assessed at TOP2.4m and the IRR is 22.7%. The return can be improved by gearing to make the venture more tax efficient. At 30% gearing the IRR post tax becomes 29.0% and at 50% gearing the return is assessed at 37.2%. Sensitivity studies have shown that if only 69.5% of the projected financial benefits are realised the venture will still breakeven.

From the work completed it is clear that the financial benefits are sufficiently large to enable TWB to transform the existing network to that of a modern smart network and at the same time improve the commercial performance of the business for the benefit of both TWB and its customers. Itron have offered a free trial of smart ultrasonic water meters connected to the Tonga Power radio mesh network in Nukualofa and the project will not proceed unless TWB is completely satisfied with the results of the trial.

8 Introduction

Tonga Water Board (“TWB”) has some 7,510 residential and 1,040 business customers on its water supply network on the island of Tongatapu. The TWB network is suffering relatively

high losses and smart metering offers the means to identify and reduce those losses by use of time-of-use data logging of water consumption.

TWB needs to purchase additional water meters in the near future and wants to consider a smart water metering solution that leverages off of the smart electricity metering solution being implemented by Tonga Power. Tonga Power has installed an Itron RF Mesh network that covers Tongatapu and which could readily be utilised to read water meters. However TWB want to consider other options as well to ensure that the most cost effective option is selected.

2.1 Terminology

Terminology used in this report:

Smart Meter – a meter with in-built telecommunications module that provides for remote reading of the meter and also with inbuilt data logger that is capable of Time of Use (TOU), consumption amongst other functionality.

Legacy Meter – conventional Kent volumetric meters as currently installed on TWB's network

MDMS – Meter Data Management System that is used for processing and storing data collected from the Smart Meters

9 Scope of this report

TWB has engaged Power Business Limited (PBL) to determine the viability of implementing smart water metering using the Tonga Power Itron Radio Mesh network and back office IT systems as well as to investigate other alternatives for future and replacement water metering.

Accordingly the scope of this work is to:

9.1 Determine TWB's existing business requirements together with those it anticipates in the foreseeable future;
9.2 Describe the solution that would enable TWB to meet those requirements;
9.3 Determine a deployment plan in association with TWB;
9.4 Estimate the costs utilising the Tonga Power/Itron option based on pricing from Tonga Power, Tonga Power's vendors and PBL's experience of implementing these solutions;

10 Investigate and price alternative options to using Tonga Power's RF Mesh and Itron ultrasonic meters;
11 Identify and quantify the likely benefit streams associated with each of the solution options using cost data and asset management knowledge provided by TWB; and

12 Present a business case comparing the solution options and a recommendation of which option best meets TWB needs.

4. TWB Requirements

TWB's requirements are to:

- reduce the Real and Apparent Losses;
- increase the revenue by adding additional customers; and to
- improve the commercial viability of TWB's business.

5. Network Losses

The main benefit of smart water metering is to aid in the identification and reduction of water losses. The diagram below depicts how water supplied into the network is accounted for by consumption grouping. The percentage figures have been supplied by TWB.

<table>
<tr><td rowspan="5">Water Input [100%]</td><td rowspan="3">Authorised Consumption [45%]</td><td rowspan="2">Billed Authorised Consumption [44%]</td><td>Billed Metered Consumption</td></tr>
<tr><td>Billed Unmetered Consumption</td></tr>
<tr><td rowspan="2">Unbilled Authorised Consumption [1%]</td><td>Unbilled Metered Consumption</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="3">Water Losses (55%)</td><td rowspan="2">Apparent Losses [31%]</td><td>Unauthorised Consumption</td></tr>
<tr><td>Meter inaccuracies, billing errors etc</td></tr>
<tr><td>Real or Technical Losses [24%]</td><td>Water leakage</td></tr>
</table>

Whilst the 55% losses may seem high this level of loss is not uncommon in many developing country networks. Forty percent of TWB's water meters are more than 20 years old and the accuracy of volumetric meters decrease with age due to ware. It is estimated that meters can under-record by 3% to 5% due to ware. TWB also estimate that about 40% of the installed meters are faulty that could be due to wear but also due to particulates becoming lodged within the meters.

There have been many very successful programmes to reduce water losses in recent years such as in East Manila where losses were reduced from 63% to 11% and West Jakarta where losses were reduced from 57% to 39%.

The lowest loss country supplies include:

13 Singapore - 5%
14 Denmark - 6%
15 Netherlands - 6%

16 Germany - 7%
17 Japan - 7%

Closer to Tonga in New Zealand, WaterCare in Auckland has losses of about 14% and Dunedin City has about 18% water loss.

For this business case conservative targets of Real Losses at 12%, a reduction of 12%, and Apparent Losses of 10%, a reduction of 21% have been assumed. If TWB achieve these targets it will have reduced total losses from 55% down to 22%. This is discussed in greater detail in the benefits section 9.3.

Benefits of Non Revenue Water (NRW) reduction, in particular of leakage reduction, include:

18 financial gains from increased water sales or reduced water production;
19 potential delay in expansion of additional capacity;
20 increased knowledge about the distribution system;
21 increased fire fighting capability due to increased pressure;
22 reduced property damage;
23 reduced risk of contamination; and
24 better stabilized water pressure throughout the system.

6. Metering for Water Flow Measurement

There are two proven classes of water metering technologies – mechanical (volumetric) and solid state technologies. The volumetric meters use a disc or piston transducers and have been the traditional device for measuring water consumption. Solid state technologies include ultrasonic, magnetic and fluidic oscillator.

Benefits of Solid State Technology over Volumetric:

- no moving parts resulting in improved longevity;
- significantly better accuracy over low and high flow ranges - for example at very low flows volumetric meters will barely record any flow and some customers will knowing this avoid or minimise water charges;
- significantly better accuracy over low and high water temperature ranges;
- reduced pressure losses;
- not subject to particulate clogging and better accuracy in poor water quality situations;
- no maintenance; and
- with a smart communications module, can meter time-of-use consumption,

tampering, pipe/tap leakage, no flow and pipe empty states.

It must be acknowledged that solid state meters are more expensive the volumetric meters but generally the benefits outweigh the additional cost. Furthermore, for the purposes of this

business case, only smart ultrasonic water meters will be considered as an alternative to continued use of the Kent volumetric meters. The reason for this is that Itron only produce a solid state ultrasonic meter as an alternative to their volumetric water meters. Magnetic and fluid oscillator solid state water meters have not been developed to the same extent as ultrasonic meters and are not used in the South Pacific.

25 Water Metering Options

There are essentially four options for water metering available to TWB:

25.1 continue with Kent volumetric water meters that are manually read;

25.2 use Kent volumetric water meters with a smart-read clip-on;

25.3 use Itron ultrasonic water meters; or

25.4 use smart Itron ultrasonic water meters.

Two primary options have been evaluated:
Option 1: Use Tonga Power Itron RF Mesh and Agility Meter Data Management system and replace existing Kent water meters

Option 2: Retain existing Kent water meters and build a new LoRa radio network and contract a smart water meter reading service from AD Riley.

Both Itron and AD Riley provided proposals to TWB with their smart water meter and meter reading service costs. To obtain the data to enable the water losses to be reduced, time of use water data is required and this is achieved by the use of remote reading of the water consumption.

- **Tonga Power and Itron Water Meters Option 1 Summary**

  - Iron Ultrasonic meters and replace existing Kent volumetric meters
  - Tonga Power Itron Radio mesh
  - Tonga Power Agility Meter Data Management System
  - TPL IT & Back Office service to TWB on a marginal cost basis at TOP60,000 pa
  - Project over 2 years
  - 8,550 meters

- **AD Riley and Kent Water Meters Option 2 Summary**

- Install Elster clip-on pulse counters on to meters
- AD Riley SAAS meter reading headend
- Project over 1.5 years
- Replace Kent meters that are not working or are thought to be running slow
- 8,550 meters total

7.3 Secondary Options

A set of secondary options were also considered that were:

1a Option 1 but with proportional (to the total number of Tonga Power and TWB meters) Tonga Power capital cost recovery and marginal TWB operating costs

1b Option 1 but with proportional Tonga Power capital cost recovery and Tonga Power service cost recovery at TOP24/meter pa.

2a Option 2 but with Itron Network Interface Cards in the Elster Kent clip-ons so that the Tonga Power Itron Mesh and Agility MDMS can be used. Itron have advised that they do not currently produce a clip-on radio module that would count pulses produced by the Kent volumetric meters but they could supply radio mesh network interface cards that Kent could possible fit into their clip- on modules.

Special Notes for Option 2a:

7 Itron only provided indicative cost of the Network Interface Card (NIC) at USD85

8 Cost of Elster NIC for Clip-on pulse counters unknown but assumed to be USD80

9 Elster clip-on will require re-tooling and testing – assumed to be USD100,000

TWB could conceivably use Itron volumetric meters and an Itron clip-on radio mesh pulse counter however the combined cost of the Itron volumetric meter plus the radio mesh module would be greater than the Itron fully integrated smart ultrasonic water meter.

TWB could also consider alternative smart water metering solutions to those of Itron and Kent but given the relatively small number of meters, the cost of alternatives would almost

certainly be substantially greater.

26 Deployment Plan

TWB has assumed that the metering project will commence 1st June 2017 and that the replacement of existing meters and metering for customers currently supplied and those not metered will occur over an 18 month period. This period is the "mass deployment" period. New customers of 120 per annum are assumed. The following figure depicts the cumulative deployment of meters for the first 7 years.

0

TWB Smart Meter Deployment Plan

27 Financial Evaluation

27.1 Cost of Water Supply

From the 2015 Annual Accounts, the total expenses of TWB are TOP5.38m and setting aside the Outer Island expenses, the cost of production for Tongatapu is calculated at TOP1.54/m3.

The costs related specially to water supply are those of engineering, production and distribution services and amount to some TOP3.6m which work out at TOP0.93/m3.

27.2 Price of water

TWB charges water at TOP1.88mm3 plus a 44% fuel tariff that relates to the cost of pumping water. Thus the water tariff is TOP2.71/m3.

27.3 Benefits

There are variety of benefits that can be quantified and several that are difficult to evaluate but in the latter case, expert opinion has been provided by TWB or PBL staff.

- **Reduced Real Losses**

Real water losses that is, pipe and or reservoir leakages are estimated at 24% by TWB. With smart water metering it is estimated that these can be halved to 12%. This can be achieved by identifying the sources of leaks by undertaking service main reconciliation studies using the time-of-use data available from the smart water meters. TWB will be able to differentiate between Real and other losses by undertaking the reconciliation water balance using the time-or-use data for low or no use times – typically the early hours of the morning.

Real Losses are 24% of the total production of water for Tongatapu which is 24% of 3.4m cubic metres or some 823,000m3 pa. As discussed in section 5, a reasonable target for real losses is 12%. However TWB cannot reasonably attribute all of the saving to smart water meters because it would be possible to make some reductions by installing some data loggers as points in the network and under taking water balance reconciliations using those devices. So for the purposes of this business case PBL has assumed that 80% of the savings can be attributed to the smart water meters. Thus the percent of savings expected with respect to the total water supply is 9.3% or some 324,000m3.

The value of the reduced Real Losses can be assessed in terms of the cost of the cost of production. Using the figure in 8.1 calculated by PBL the value of the reduced losses can be calculated by multiplying the Real Losses volume savings by the cost of production and the estimated savings is TOP71,000 pa.

- **Apparent Losses Reduction**

Apparent Losses are assed at 31% and these include unauthorised consumption and metering inaccuracies. A reasonable target for Apparent Losses is 10% given the relatively small network and customer base of Tongatapu. Of the 21% reduction planned, PBL has assumed that 80% of this can be attributed to identification of unauthorised consumption and the replacement of faulty meters. Thus the percent of savings expected with respect to the total water supply is 16.7% or some 582,000m3.

The value of the reduced Apparent Losses can be assessed in terms of the cost of the revenue lost. Using the tariff figure in 9.2 the value of the reduced losses can be calculated by multiplying the Apparent Losses volume savings by the tariff and the estimated savings is TOP486,000 pa.

- **Field Related Savings**

Savings accrue through the use of the communications module in the smart meter to reduce the need for travel to consumers' premises. As well as routine meter reads, network operators and engineers can interrogate a consumer's meter remotely in real time undertake consumption checks and special reads.

There are three categories of Field Savings:

- Meter Reading

  There are currently some 5,100 meters to read on Tongatapu for billing purposes.

The remaining meters are faulty and unreliable for billing purposes. Residential customer's meters are read fortnightly and commercial once each month.

Nine TWB staff are required to read the meters and TWB provided the hour rates for each and the average hourly rate is TOP7.01. It takes 5 days to do meter reading round and thus is takes about 665 person-hours per month. The staff use vehicles and although TWB did not provide a cost per hour for vehicle usage PBL had previously calculated a cost for Tonga Power and this cons should be similar. The cost used is TOP12.50/hour.

Given the topology of Tongatapu Island it is assumed that 95% smart meter connectivity can be achieved and the remaining meters will continue to be read manually.

The cost savings of being able to remotely read the smart water meters is of this activity is the product of the number of hours of labour and vehicle usage and the rate for each times 95% and this equates to some TOP62,000 pa.

28 Special Reads
Meter readers have to revisit consumers' premises to re-read meters when accounts are queries or when a consumer relocates to another address. Currently TWB advise there are about 5 special reads undertaken each month. Using the same costs as above and assuming 1 hour per read this equates to a saving of $1,200 pa.

29 Reduced Consumer Fault Visits
TWB advise there is currently 96 consumer fault visits pa. Of these visits there are PBL believes that approximately 25% of these visits can be saved by remote interrogation of the meter. The resulting saving assuming 1 hour per visit and using the costs in (i) above is calculated at TOP500 pa.

- **Back Office and Data Processing Savings**

Because in this business case Tonga Power's Radio mesh or AD Riley's LoRa network will read meters and the respective Meter Data Management systems will verify meter data and process it for billing, there will be equivalent savings in TWB's back office. TWB has not provided the costs related to back office meter reading processing and billing so PBL has assessed these costs from the TWB 2015 Annual Accounts. PBL has conservatively estimated that 20% of Administration Services and 15% of Financial Services will be saved. Applying these percentages to the respective costs in the accounts a saving of some TOP357,000 pa is calculated.

- **Other Benefits Not Evaluated**

The following benefits have been identified but not evaluated because there was insufficient technical, financial or market information available:

- Reduced operational costs

7 Reduced network planning costs

9.3.6 Benefits Summary

The benefits identified above and as will be utilised in the cost-benefit analysis are summarised in the table below. Details of the benefits calculations are provided in the appendix. It must be emphasised that the assumptions around the assumed reduction on Real and Apparent Losses and the savings in TWB Administration and Financial Services costs are crucial to the business case – the viability of the venture succeeds or fails based on these assumptions that have been presented to TWB.

Benefits	Value (TOP pa)
Reduction in Network Losses	
Reduced Apparent Losses	486,214
Reduced Real Losses	71,131
	557,345
Field Related Savings	
Meter reading savings	60,987
Special Reads	1,171
Reduced Customer fault visits	468
	62,626
Reduced Admin, Data processing and Finance staff costs	356,539
Total	**976,510**

The number of new connections has been assessed by TWB at 120 per annum and the benefit attributed to the new connections has been valued at TOP14,000 pa.

9.4 Costs to Implement Smart Water Metering

There are two main components of cost namely the TWB costs of purchasing and installing meters and the Tonga Power meter reading and back office service costs or the AD Riley costs of meter reading.

9.4.1 TWB Costs

Itron Smart Meters:

To utilise the Tonga Power radio mesh, TWB will need to purchase smart meters from Itron. The Itron smart ultrasonic meter has a fully integrated Network Communications Card that will connect to the Tonga Power mesh without any field work by Tonga Power. Itron also produce a RF Mesh clip-on for their ultrasonic meters but the fully integrated smart meter is the assumed purchase option from Itron.

Itron has advised that the average cost (for various sizes of pipe) of a smart water meter will be AUD158 which, at current exchange rates (24 March 2017), equates to TOP273.39/meter.

Kent meters is currently NZD79 which, at current exchange rates (24 March 2017), equates to TOP125.75/meter. Thus there is a notional avoided cost by using smart meters of some TOP173,000 but this has not been factored into the calculations based on advice from TWB.

Kent Smart Meters:
AD Riley advised in their proposal that the clip-on remote reading modules for the Kent volumetric meters cost USD129 which equates to TOP221.82 (exchange rate as at 24 March 2017).

Itron/Kent Smart Meter comparison Summary:

Meter Costs (TOP)

Smart Meter	Meter	Clip-on	Total
Itron	273.39		273.39
Kent	125.75	265.15	390.90
		Difference	**117.51**

Meter Deployment:
The cost of installing Itron meters has been estimated by TWB at TOP30/meter allowing for some additional fittings.

The cost of installing new Kent meter plus clip-on is the same as the Itron smart meter installation but where a clip-on meter is fitted to a working existing Kent meter the cost is assumed to be TOP15.

The management of the deployment of meters over the 18 month mass-deployment period has been estimated at TOP120,000 for the Itron option and TOP85,715 for the AD Riley option. The AD Riley option is less cost than Itron because 60% of the existing Kent meters are retained which will require less management effort.

9.4.2 Itron/Tonga Power Capital Costs

Itron Configuration:
Itron have advised that the cost to upgrade the Tonga Power RF Mesh Headend, upgrade the firmware in the CGRs and over-the-air load new firmware into the existing Tonga Power electricity meters add TWB meters will be AUD58,740 which equates to TOP101,638. Iron will also provide two field engineers to oversee the commissioning and to train TWB staff and including Itron project management this will cost AUD47,380 which equates to TOP81,982 using 24 March 2017 exchange rate conversion. The total Itron costs to smart water metering is TOP183,619.

Agility Configuration:
Agility provided Tonga Power a budget number of hours for the tasks in the table below at

a rate of NZD145 giving a midpoint Agility cost of NZD66,918 which equates to TOP106,519 using 24 March 2017 exchange rate conversion. This option provides for separate TPL and TWB invoicing.

Phase	Activity	Hours	Rate	Total
1	Scoping & Design *3 days of on-site workshops and follow up documentation.*	49		$7,105
2	Data Migration *Migration of the water customers into Tonga Power instance of Orion and data matching and merging. Splitting out the Waste customers into their own accounts.*	TBD		TBD
3	AM Module Configuration *This phase is optional depending whether raw interval data for the water meters is received. IF aggregated data is received, existing interfaces can be used.* *Migration of the water customers into Tonga Power instance of Orion and data matching and merging.*	70-120		$10,150 - $17,400
4	Orion Configuration: *Orion is configured with price plans, GL accounts and other water specific configuration.*	50-75	$145	$7,250 - $10,875
5	Orion Customisation *Specific reports and other requirements raised during scoping and design. This would also incorporate invoice branding changes and manual invoice allocation for cashiers..*	TBD		TBD
6	Orion System Testing & Training *Internal system testing of the solution before delivery.*	55		$7,975
7	Mobile Application *The mobile application is configured to meet branding requirements, 'pre-payment' new pages created, the ability for customers to choose their invoice they are paying and tight integration with a payment gateways.*	110		$15,950
8	Testing Support & Training	90		$13,050
	3 days onsite training for new users of Orion and support through the User Acceptance Process.			
	TOTAL	**364 - 439**		**$61,480 - $72,355**

Tonga Power:
No capital costs have been assumed for Tonga Power because with the vendor configuration Tonga Power costs will essentially be operational.

Contingency:
A contingency of 10% on all TWB capital costs has been assumed as Itron and Agility have quoted costs.

- **AD Riley Capital Costs**

AD Riley's costs for system design and headend and MDMS implementation are USD60,000 and for on-site training and implementation USD60,000 which together equate to TOP271,788 using 24 March 2017 forex exchange rates.

AD Riley will supply a LoRa radio network and it is assumed that 20 concentrators will be required at a cost quoted by AD Riley of TOP5,015 each and an installation cost of TOP2,893 each.

Contingency:
A contingency of 12.5% of all capital costs has been assumed as TWB has not received a binding proposal from AD Riley otherwise the contingency could be reduced.

- **Capital Costs Summary**

The following table summarises the capital cost assumed for each option.

Option 1 Itron/Tonga Power Capital Costs	TOP
Cost of Meters	1,928,153
Avoided cost of replacing Kent meters	0
Itron system setup	183,619
Agility system setup	106,519
Field Installation costs (TWB)	256,560
Freight, warehousing, tools	38,000
TWB programme management	80,000
Contingency @8%	37,456
Total	**2,630,308**

Option 2 AD Riley Capital Costs	TOP
Cost of Meters & Clip-ons	2,697,779
LoRa concentrators	117,775
AD Riley system design & implementation	271,788
TWB back office IT setup	22,922
Field Installation costs (TWB)	179,595
LoRa concentrators installation	67,947
Freight & warehousing	20,000
TWB programme management	88,652
Contingency @12.5%	433,307
Total	**3,899,765**

9.5 Tonga Power/TWB Operational Costs

Tonga Power will provide a meter reading and bill processing service for TWB. The extent of bill processing is assumed to be the preparation of an electronic file that can be used by TWB to prepare invoices. Tonga Power can provide additional services such as invoice preparation and issue and also electronic payment options if required by TWB?

PBL calculated the Tonga Power costs and Tonga Power have agreed with those calculations that are detailed below however as Tonga Power and TWB have the same governance, the Tonga Power Capital costs may be considered as sunk costs?

- **Basis of Calculations**
  - Tonga Power and TWB are both State Owned Enterprises that have a common Chairman
  - Neither company shall profit from the other but both shall seek to benefit from the economy of scale that an electronic water meter reading service could provide
  - In providing the service to TWB, Tonga Power shall have all of its cost reimbursed and shall also have a proportion of its capital investment in the Itron Mesh and the Agility Meter Data Management system reimbursed
  - The basis of the proportional charging between the companies shall be the number of smart meters that each company has or intends to install.

Numbers of Meters:
Tonga Power intends to install about 14,660 smart electricity meters.
Tonga Water Board intends to install about 8,550 smart water meters.
The percentage of TWB meters as a percent of the total of both Tonga Power and TWB meters is 37%.

- **Capital Contribution**

The Capital contribution is costed based upon the establishment cost of the Itron RF Mesh and the Agility meter data management system. The costs used below come from the Tonga Power business case and may not necessarily agree with the actual costs incurred by Tonga Power. However, for the purpose of determining a base case, costs below have been used which can be adjusted at a future date for any variation if agreed by the parties.

Itron PM costs	680,000
TPL first year PM costs	214,000
Itron Mesh field costs	225,000
Backhaul network	90,000
Itron Headend	1,200,000
Agility Advanced Meter module	70,000
Total	**2,479,000**
TWB share/meter	883,955
It is assumed that TWB will pay an annual charge:	
Annuity (10 years @8.5% DR)	**TOP134,722**

- **Tonga Power Operations Costs**

Tonga Power back office staff service costs have been agreed between Tonga Power and

TWB at **TOP60,000** pa.

Data costs associated with reading water meters once per month are assumed to be TOP2.00 per meter pa.

- **Vendor Licence Costs**

Itron Licence fees are USD1.29 per meter per month, resulting in a base cost of TOP299,839 pa.

Agility Advanced Meter Module Licence fees are NZD0.13 per meter per month, resulting in a base cost of TOP21,236 pa.

- **Meters Maintenance Costs**

The Itron water meters will be very reliable however a provision has been assumed to repair/replace faulty meters. A meter fault rate of 2% pa has been assumed and an average repair/replacement cost of TOP150/fault. The results in a maintenance cost of TOP25,656 pa.

- **Tonga Power Operational Costs Summary**

A contingency of 8% of all operational costs has been assumed because most costs known including the charges from Tonga Power.

O&M Costs pa (Base meters)	Cost TOP/pa
TPL Service costs	60,000
Contribution to TPL capital (base case)	0
Itron meter licence costs	299,839
Backhaul costs	17,104
Agility Meter licence costs	28,826
Field Maintenance	25,656
Contingency @ 5%	6,414
Total	**437,838**

- **AD Riley/TWB Operational Costs**
  - **Meter Data Management System**

AD Riley quoted a MDMS licence fee of USD0.029 per meter per day which equates to TOP205,025 pa.

- **Service costs per meter**

The TWB service costs for data validation, reconciliation are assessed at TOP20/meter pa equating to TOP171,040 pa and the AD Riley MDMS is not a fully functioned.

- **Backhaul Network Costs**

Meters would be read by the AD Riley LoRa network of concentrators and each concentrator would be connected to a 3G telco network (TCC or Digicel)to

backhaul the meter data to the TWB central office. AD Riley provided SIM card costs and PBL estimated the data backhaul cost. The annual backhaul cost calculated at TOP29,555.

- **Meters Maintenance Cost**

Based upon the current faulty meter population of 40% it is expected that the failure of Kent meters will be 5% and the average repair/replacement cost will be TOP150/meter. The calculated annual field maintenance for meters is TOP64,140.

- **AD Riley/TWB Operational Costs Summary**

O&M Costs pa (Base meters)	Cost TOP/pa
TWB Service Costs	171,040
Backhaul Network Costs (TWB, TCC)	30,523
MDM System (AD Riley)	205,025
Field Maintenance	64,140
Contingency @ 12.5%	58,841
Total	**529,569**

- **Cost-Benefit**

- **Discounted Cash Flow**

The smart metering options are evaluated using a discounted cash flow (DCF) model over a 15 year period post installation that is assumed to be the economic life of the smart meters. The economic model appropriately models the time value of money, depreciation on a diminishing value basis and taxation.

The nominal economic life of the smart meters is 15 years in the Tongan environment and that time the meters are assumed to be scrapped with no salvage value.

The base economic parameters assumed for the DCF model are set out in the following table.

Discount rate	8.5%
Inflation Rate	3.0%
Economic life – meters	15 years
Tax depreciation rate	10%
Taxation rate	25%
Debt funding	0%
Project start	1 June 2017
Present value date	1 June 2016

- **Economics of Smart Metering**

Applying a discounted cash flow, using the parameters in 9.7.1, to the capital costs, operational costs and the projected benefits (revenues) streams, the IRR and net present value figures for the smart metering business case are derived.

Economics	Option 1	Option 2
Venture IRR (pre tax)	28.2%	13.6%
Venture NPV (pre tax)	TOP3.22m	TOP1,12m
Equity IRR (post tax)	22.7%	12.1%
Equity NPV (post tax)	TOP2,43m	TOP0.89m

Clearly the Itron/Tonga Power Option 1 is preferred over the AD Riley Option 2.

The DCF model for the Tonga Power/Itron Option 1 is presented in the attached Appendix.

Discount Rate Sensitivity – Option 1:
Tonga Power assumed a discount rate of 8.5% but TWB may care to use a different rate – figures for 7% and 10% are presented in the table below.

	7%	10%
Venture IRR (pre-tax)	28.2%	28.2%
Venture NPV (pre-tax)	TOP3.88m	TOP2.66m
Equity IRR (post tax)	22.7%	22.7%
Equity NPV (post tax)	TOP3.02m	TOP1.94m

Debt Financing Sensitivity:
Gearing the venture will improve the tax efficiency and the figures below show the returns for 30% and 50% debt financing.

	30%	50%
Venture IRR (pre-tax)	28.1%	28.1%
Venture NPV (pre-tax)	TOP3.21m	TOP3,21m
Equity IRR (post tax)	29.0%	37.2%
Equity NPV (post tax)	TOP2.53m	TOP2.60m

Secondary Options:
The secondary options as outlined in section 7 are evaluated as follows:

Economics	1a	1b	2a
Venture IRR (pre tax)	19.4%	9.7%	15.1%
Venture NPV (pre tax) TOP	TOP1.80m	TOP0.18m	TOP1,757,005
Equity IRR (post tax)	16.4%	9.4%	13.2%
Equity NPV (post tax) TOP	TOP1.36m	TOP0.14m	TOP1,380,866

These options show that for the preferred option 1, even with a proportional contribution by TWB to Tonga Power capital establishment cost, the venture is still viable. Option 2a with Itron network interface cards inserted into the Elster clip-on has a slightly better NPV than Option 2 but is still as viable as Options 1 and 1a.

Benefits:
The projected benefits provide the return on the investment for TWB and the table below shows the return for realising only 80% of the benefits and breakeven at 67.5%.

	80%	69.5%
Venture IRR (pre-tax)	15.7%	6.9%
Venture NPV (pre-tax)	TOP1.1m	-TOP0.22m
Equity IRR (post tax)	13.6%	8.5%
Equity NPV (post tax)	TOP0.84m	TOP0.00m

Given the benefits were evaluated reasonably conservatively the sensitivity above shows that even if only 69.5% of the value of benefits are realised there is no loss to TWB from undertaking the venture. Moreover there are several unquantified benefits likely to arise from the venture.

30 Risks

10.1 Tonga Power-Itron Option 1

Low Risk because:

30.1 Radio Mesh already established (Tonga Power)

30.2 Meter data Management System already established (Tonga Power)

30.3 Meters are at a contracted price

30.4 Installation under the control of TWB

30.5 Ongoing operations at a contracted price with sister company - Tonga Power

30.6 Itron have agreed to provide a free trial of 30 water meters installed in Tongatapu and connected to the Tonga Power RF Mesh network and data back to the Tonga Power back office. Unless this trial is successful and meets TWB's expectations, TWB will not proceed with the project. This Trial will significantly reduce the risk of the integration of the water meters reading with the electricity meters reading. An added bonus of the trial will be the opportunity to test of 20 remote controlled water restrictors (cut off valves) at no cost to TWB.

Possible Risks:

31 95% water meter connectivity not achieved

32 Delays in delivery of meters

- **AD Riley Option 2**

High Risk because:

- LoRa yet to be established in Tongatapu
- Uncertainty over how proven LoRa is with AD Riley
- Uncertainty over 433, 868MHz spectrum availability
- No Meter data Management System
- New service relationship with AD Riley

3. 95% water meter connectivity not achieved
4. Delays in delivery of meters

The biggest risk to both options is not realising the benefit streams but based upon international experience TWB should make substantial reductions in the Non-Revenue Losses through the use of the smart water metering data.

11. Conclusion

The analysis within this business case has shown that the best option for TWB is to leverage off of the radio mesh and back office IT systems recently established by Tonga Power. Both companies would benefit from the economy of the additional scale should TWB proceed with this business opportunity.

The implementation risks to TWB are very low and the only real risks are that TWB will not realise the benefit streams assumed. Itron has offered a free of 30 meters trial to prove the smart water meters solution significantly reduces the risks to TWB as unless the trial is successful, TWB will not proceed with the project.

The financial returns are considered good. For a capital investment of TOP2.6m and an annual operations cost of TOP438,000, TWB can potentially realise TOP1m in benefits pa. The NPV of the venture post tax is assessed at TOP2.4m and the IRR is 22.7%. It is noted that some 3,500 of the existing legacy water meters are running slow or are otherwise faulty and would need to be replaced in the near future at a current cost of

approximately TOP430,000 and for an incremental cost of TOP110,000 gets 40% of its water meters with greater accuracy and with remote (smart) reading capability.

From the work completed it is clear that the network benefits are sufficiently large to enable TWB to transform the existing network to that of a modern smart network and at the same time improve the commercial performance of the business for the benefit of both TWB and its customers.

John McCutcheon
Power Business Ltd
28 April 2017

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12. Appendix A: Benefits

TONGA WATER BOARD METER BENEFITS CALCULATIONS

Benefit	**Reduced customer fault visits**			Notes:	
Components	(i) Customer faults				
Benefit Calculation					
(i) Customer faults	Number of Meters	6,847	A	Source: CFO, TWB	
Parameters/Assumptions					
	Number of customer callouts pa	96	B	Source: CFO, TWB	
	% of calls not attended through smart water metering	25%	C	Source: TWB to advise, PBL estimate meantime	
	Duration of a Customer callout (hours)	1.0	D	Source: TWB to advise, PBL estimate meantime	
	Average labour rate (TOP/Hr)	7.01	E	Source: CFO,TWB 12/7/16	
	Vehicle Mileage (TOP/hr)	12.50	F	Source: TWB to advise, PBL assumption based upon calcs for TPL	
	Cost of customer callout (TOP)		G=D*(E+F)		19.5
	Number of visits saved		G=B*C		24
	TWB benefit (TOP pa)		H=F*G		
	468				

			Notes:	
Total Water Supplied pa (m3 pa)	3,486,288	A	Source: TWB - Quddus	
Non technical + Unbilled Authorised loss %	32%		Source: TWB - Quddus	
Unbilled metered consumption (m3 pa)	35,673		Source: TWB - Quddus	
Unbilled unmetered consumption (m3 pa)	1,399		Source: TWB - Quddus	
Unbilled authorised consumption (m3 pa)	37,072			
Unbilled authorised consumption %	1.1%			
Non technical + Unbilled Authorised loss %	31%	B		
Water Loss (m3 pa)		C=A*B		1,076,012
Target Non-Technical Loss % (Unauthorised consumption + meter inaccuracies)	10%			
Target reduction %	21%	D		
Estimated reduction in Non Technical losses attributable to smart metering (%)	80%	E	Source: TWB to advise, PBL estimate meantime. Reduction is based upon the identification of theft through accurate reconciliation and analysis of customer TOU consumption patterns.	
Reduction due to Smart Metering	16.7%	F=D*E		581,907
TWB Water tariff (TOP/m3)	2.71	G	Source: CFO, TWB, includes fuel charge	
Cost of Non Technical losses (TOP pa)		G=C*G		2,912,980

TWB benefit (TOP pa)	H=D*G	**486,214**

	Total Water Supplied pa (m3 pa)	3,486,288	A	Source: TWB - Quddus	
	Technical loss %	24%	B	Source: TWB - Quddus	
	Water Loss (m3 pa)		C=A*B		823,236
	Target Technical Loss % (leakage)	12%			
	Target reduction %	12%	D		
	Estimated reduction in Technical losses attributable to smart water metering (%)	80%	E	Source: TWB to advise, PBL estimate meantime. Reduction is based upon the identification of pipe losses through accurate reconciliation.	
	Reduction due to Smart Metering	9.3%	F=D*E		323,905
	TWB Water tariff (TOP/m3)	0.93	G	Source: PBL calculated from TWB 2015 Annual Accounts	
	Cost of Technical losses pa (TOP pa)		G=C*G		765,609
	TWB benefit (TOP pa)		H=D*G		**71,131**

Benefit: **Field Services Savings**

Benefit: **Reduced Technical Losses**

Network Leakage losses - (identified by better TOU reconciliation)

Components (i) Special reads

(for Distributors providing these services) (ii) Meter Reading

Notes:

Benefit Calculation

(i) Special reads

Number of Meters	6,847	A	Source: CFO, TWB	
No of special reads (moving house or new customer) per month	5	B	Source: TWB to advise, PBL estimate meantime	
Duration of a Customer callout (hours)	1.0	C	Source: TWB to advise, PBL estimate meantime	
Average labour rate (TOP/Hr)	7.01	E	Source: CFO,TWB 12/7/16	
Vehicle Mileage (TOP/hr)	12.50	F	Source: TWB to advise, PBL assumption based upon calcs for TPL	
Cost of customer special read (TOP)		G=C*(E+F)		19.5
TWB benefit (TOP pa) 1,171		H=B*G		

(ii) Avoided Cost of Meter Reading

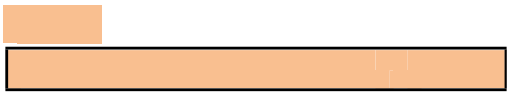
Number of Meters	6,847	A	Source: CFO, TWB	
Number of Business customers	1,039	B	Source: CFO, TWB.	
Residential reads per month	2	C	Source: CFO, TWB.	
Business reads per month	1	D	Source: CFO, TWB.	
Number of staff used to read meters	9	E	Source: CFO, TWB.	
Number of days to read meters	5	F	Source: CFO, TWB.	
Labour hours to read meters (hours/month)	665	G=F*E*8*(1+(A-B)/A)		
(Note: excludes special reads above)				
Average labour rate (TOP/Hr)	7.01	H	Source: CFO,TWB 12/7/16	

Vehicle Costs for meter reading (TOP/hr)	12.50	I	Source: TWB to advise, PBL assumption based upon calcs for TPL	
Assumed vehicle hrs for Business reads /mth	55	J=(B/A)*F*E*8		
Total Cost of meter reading (TOP pa)		K=12*(G*H+J*I)		64,196
Connectivity of Smart Water meters %	95%	L		
TWB benefit (TOP pa)		M=K*L		**60,987**

Total Benefit pa (Field Services)
62,157

Benefit: **Back Office Admin and Data Processing Savings**

Administration services costs 2015	1,237,453	A	Annual accounts
Financial Services Costs 2015	726,991	B	Annual accounts
Estimated Administration Services savings %	20%	C	PBL gestimate, TWB to confirm
Estimated Financial Services savings %	15%	D	PBL gestimate, TWB to confirm



TWB benefit (TOP pa)
356,539

E+A*C+B*D

Grand Total Benefits (TOP pa) **976,510**

13. Appendix: Economic Model Option 1 Itron/Tonga Power

Investment	Jun-18	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25	Jun-26	Jun-27	Jun-28	Jun-29	Jun-30	Jun-31	Jun-32	Jun-33	Jun-34
Capital	1,424,371	1,244,156	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110
Equity	1,424,371	1,244,156	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110
Debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Statement of Financia
Financial Year Ending

Performance	Jun-18	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25	Jun-26	Jun-27	Jun-28	Jun-29	Jun-30	Jun-31	Jun-32	Jun-33	Jun-34
Operating Revenues	470,442	1,034,032	1,079,590	1,126,950	1,176,181	1,227,351	1,280,533	1,335,801	1,393,232	1,452,907	1,514,909	1,579,323	1,646,239	1,715,749	1,787,947	1,862,933	1,940,809
Salvage Value																	0
Gross Revenue	470,442	1,034,032	1,079,590	1,126,950	1,176,181	1,227,351	1,280,533	1,335,801	1,393,232	1,452,907	1,514,909	1,579,323	1,646,239	1,715,749	1,787,947	1,862,933	1,940,809
Operating Costs	256,085	472,052	491,724	512,151	533,361	555,383	578,247	601,982	626,621	652,197	678,743	706,295	734,889	764,563	795,356	827,309	860,463
Net Revenues	214,357	561,980	587,866	614,799	642,820	671,968	702,286	733,819	766,611	800,711	836,167	873,029	911,351	951,186	992,591	1,035,624	1,080,346
Interest Payment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	71,219	197,523	240,934	218,752	198,788	180,820	164,649	150,095	136,996	125,208	114,598	105,049	96,455	88,721	81,760	75,495	69,856
Fixed Asset Disposal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	638,261
	71,219	197,523	240,934	218,752	198,788	180,820	164,649	150,095	136,996	125,208	114,598	105,049	96,455	88,721	81,760	75,495	708,117
Net Profit/(Loss) before Tax	143,138	364,457	346,932	396,048	444,032	491,148	537,637	583,724	629,615	675,503	721,569	767,980	814,895	862,465	910,831	960,129	372,229
Less Tax	35,785	91,114	86,733	99,012	111,008	122,787	134,409	145,931	157,404	168,876	180,392	191,995	203,724	215,616	227,708	240,032	93,057
Cumulative Tax Losses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Equity																	
Equity at Beginning of Year	0	1,353,153	2,446,618	2,226,951	2,029,554	1,852,211	1,692,930	1,549,918	1,421,561	1,306,407	1,203,151	1,110,618	1,027,750	953,598	887,307	828,108	775,309
New Equity Contributed	1,424,371	1,244,156	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110
Net Profit/(Loss) for Year	107,354	273,343	260,199	297,036	333,024	368,361	403,228	437,793	472,211	506,627	541,176	575,985	611,171	646,849	683,123	720,097	279,172
Less Dividend Paid	-178,572	-424,034	-498,976	-513,543	-529,477	-546,752	-565,350	-585,260	-606,475	-628,993	-652,820	-677,962	-704,433	-732,250	-761,433	-792,006	- 1,711,852

Statement of Cash Flows																	
Net Profit before tax	143,138	364,457	346,932	396,048	444,032	491,148	537,637	583,724	629,615	675,503	721,569	767,980	814,895	862,465	910,831	960,129	372,229
Tax	-35,785	-91,114	-86,733	-99,012	-111,008	-122,787	-134,409	-145,931	-157,404	-168,876	-180,392	-191,995	-203,724	-215,616	-227,708	-240,032	-93,057
Add Depreciation	71,219	197,523	240,934	218,752	198,788	180,820	164,649	150,095	136,996	125,208	114,598	105,049	96,455	88,721	81,760	75,495	708,117
Add Loss on Disposal of assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	638,261
Less Increase Working Capital	0	46,832	2,157	2,244	2,335	2,429	2,527	2,628	2,733	2,842	2,955	3,072	3,193	3,320	3,450	3,586	-86,302
Less Capex	1,424,371	1,244,156	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110
Add Loan Debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Add Equity	1,424,371	1,244,156	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110
Less Cash Out (+ = out, - = in)	178,572	424,034	498,976	513,543	529,477	546,752	565,350	585,260	606,475	628,993	652,820	677,962	704,433	732,250	761,433	792,006	1,711,852
Less Loan debt Retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Year Ending

	Jun-18	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25	Jun-26	Jun-27	Jun-28	Jun-29	Jun-30	Jun-31	Jun-32	Jun-33	Jun-34
Working Capital	0	46,832	48,989	51,233	53,568	55,997	58,524	61,152	63,884	66,726	69,681	72,752	75,946	79,265	82,716	86,302	0
Fixed Assets	1,353,153	2,399,786	2,177,962	1,978,320	1,798,643	1,636,933	1,491,394	1,360,409	1,242,523	1,136,425	1,040,937	954,998	877,653	808,042	745,392	689,007	0
Total Assets	1,353,153	2,446,618	2,226,951	2,029,554	1,852,211	1,692,930	1,549,918	1,421,561	1,306,407	1,203,151	1,110,618	1,027,750	953,598	887,307	828,108	775,309	0
Closing Equity	1,353,153	2,446,618	2,226,951	2,029,554	1,852,211	1,692,930	1,549,918	1,421,561	1,306,407	1,203,151	1,110,618	1,027,750	953,598	887,307	828,108	775,309	0
Loan Debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Liabilities	1,353,153	2,446,618	2,226,951	2,029,554	1,852,211	1,692,930	1,549,918	1,421,561	1,306,407	1,203,151	1,110,618	1,027,750	953,598	887,307	828,108	775,309	0
	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

Venture Valuation (pre tax)	Jun-18	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25	Jun-26	Jun-27	Jun-28	Jun-29	Jun-30	Jun-31	Jun-32	Jun-33	Jun-34
Unlevered Cash Flow																	
Net Profit before Tax	143,138	364,457	346,932	396,048	444,032	491,148	537,637	583,724	629,615	675,503	721,569	767,980	814,895	862,465	910,831	960,129	372,229
Add Interest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total	143,138	364,457	346,932	396,048	444,032	491,148	537,637	583,724	629,615	675,503	721,569	767,980	814,895	862,465	910,831	960,129	372,229
Add Depreciation	71,219	197,523	240,934	218,752	198,788	180,820	164,649	150,095	136,996	125,208	114,598	105,049	96,455	88,721	81,760	75,495	69,856
Less Increase Working Capital	0	-46,832	-2,157	-2,244	-2,335	-2,429	-2,527	-2,628	-2,733	-2,842	-2,955	-3,072	-3,193	-3,320	-3,450	-3,586	86,302
Less Capex	-1,424,371	-1,244,156	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110	-19,110
Total Unlevered Cash Flows	-1,210,014	-729,008	566,599	593,445	621,375	650,429	680,649	712,081	744,768	778,759	814,102	850,847	889,047	928,756	970,030	1,012,928	509,277
Discounted Cash Flow	-1,070,646	-594,508	425,865	411,099	396,725	382,742	369,148	355,940	343,114	330,667	318,593	306,888	295,545	284,558	273,920	263,626	122,161
Venture IRR	28.2%																
Venture NPV	3,215,438																
Post Tax Investor CashFlow																	
Equity Investment	1,424,371	1,244,156	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110	19,110
Dividends	178,572	424,034	498,976	513,543	529,477	546,752	565,350	585,260	606,475	628,993	652,820	677,962	704,433	732,250	761,433	792,006	1,711,852
Less WHT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Investor Cash Flow	-1,245,799	-820,122	479,866	494,433	510,367	527,642	546,240	566,150	587,365	609,883	633,710	658,852	685,323	713,140	742,323	772,896	1,692,742
Discounted Cash Flow	-1,102,309	-668,812	360,675	342,510	325,851	310,489	296,251	282,995	270,598	258,961	247,998	237,638	227,821	218,496	209,620	201,155	406,041
IRR	22.7%																
Equity NPV	2,425,979																

WASTE AUTHORITY LTD

Keeping Tonga Clean, Green & Healthy

Business Plan

2018-2022

Contents

CEO STATEMENT

I am pleased to present this Business Plan to the Ministry of Public Enterprises. We have confidence, given the ongoing commitment of the Board of Directors, management and staff of Waste Authority Limited (WAL), that the mix of strategies presented in this Plan, will enable WAL to provide better waste management services and at the same time move WAL into a more sustainable position.

Of the three utility companies, the Waste Authority continued to be the most challenging. Whilst there have been many achievements to date, to deliver waste services is challenging without a secure revenue base. Landfill operations are capital intensive, and to mitigate environmental risk requires resources. A waste collection fleet must be reliable. WAL continued to be fortunate to receive donor support, but our challenge is to ensure all these assets are fully utilised so that adequate maintenance and replacement can be funded.

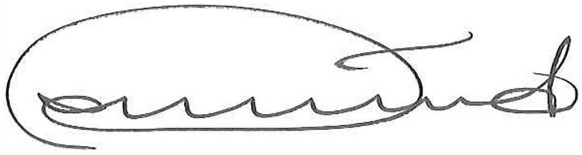
Reaching this position of financial sustainability continued to be challenging given that a large percentage of the population do not wish to pay for the service. Unlike power and water supply, cutting waste service to a household is not an incentive for behavioural change when people continue to dump and burn waste, despite the environmental and health impacts. External levies such as the plastic import levy and the cruise ship passenger environmental levy have made a significant contribution to cash flow. However, getting people to do the right thing with their waste and paying for this service remains the core challenge for WAL.

Placing waste charges on the Tonga Power bill is the first step in the strategy to improve payment compliance. Determining effective penalties for continued non-payment is the strategy that is critical to this Business Plan. This will be concurrent with enforcement of penalties for dumping, littering and burning waste that will be introduced under the Environmental Management Act as from April 2017. It is no longer good enough to allow people not to pay for this essential service or to allow them to pollute the environment through poor waste disposal practices.

The Clean Green Tonga campaign is also critical to our strategy for change. Penalties need to sit within a framework of effective awareness raising and motivation for behaviour change. We need to celebrate our successes, and highlight the efforts of every day champions for a clean and green future.

We are also mindful that WAL need to expand its waste collection and disposal services delivery, as the outer islands are also in great need of proper and systematic waste management services. This expansion will be done carefully and strategically, ensuring that WAL are properly resourced to do the job right in a sustainable manner. We are pleased that this expansion to the outer islands is jointly co-ordinated with JICA and the Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in the Pacific Island Countries Phase II (JPRISM II).

We look forward to a good year for the Waste Authority Ltd and we are also confident that the people of Tonga will work together with us to make Tonga a clean and green country that all will be proud of.



Malakai Lomu Sika
CEO

EXECUTIVE SUMMARY

This Business Plan sets out a clear pathway for Waste Authority Ltd, with a focus on business sustainability.

Throughout these years, WAL continues to be in a firm position making a real difference by contributing to a more cleaner and greener Tonga with its service. Also by working closely and co-operation with other utility enterprises with a focus on maintaining payment compliance throughout Tongatapu.

The following table provides a brief overview of the objectives, strategies, and KPIs for WAL; giving a clear indication of the leadership and actions required.

Objective	Strategies	Key Performance Indicators
To reach financial sustainability through raising payment levels throughout Tongatapu using the co-billing system and appropriate penalties.	Co-billing with TPL, effective penalties, test cases, awareness raising, implementation of Litter & Waste Control Regulations 2016.	Payments increase of 80% on current levels, no of penalties applied for non-payment, number of community engagements
To enhance financial position through continued implementation of cruise ship passenger environmental levy, a broadened base for the plastic import levy and hiring of Portaloos.	Information brochure to passengers, approval and implementation of regulation amendment to broaden base of plastic levy,	Number of brochures printed and distributed - amendment in place, increased revenue from indirect levies.
To continue to invest in infrastructure that improves waste collection and treatment, enhances service levels, and ensures that operations are conducted efficiently and with minimal environmental risk.	Upgrade water treatment pumps at Tapuhia. Implement and investigate bulk bin order for customer purchase. Continued assessment of fleet needs, ongoing water testing program at Tapuhia.	Assets purchased, no of bin contracts established with customers, waste collection data shows increased service, water testing data shows no environmental issues.
To educate and engage communities in good waste management practices through the Clean Green Tonga programme, and the implementation of penalties for poor waste management behaviours	Establish community grant fund, complete and distribute information kits. Establish waste education programmes for schools. Publish success stories and promote waste heroes, work with partner agencies to effectively enforce new waste and litter regulations.	Grant fund established. No of information kits distributed. Number of schools demonstrating good waste management practices. Number of stories published on website, Facebook, and traditional media. Number of notices issued and number of fines issued under new regulations.
To expand waste operations in Vava'u, and explore the feasibility of operating in Ha'apai and 'Eua.	Feasibility planning, community dialogue, government approvals. Establish JPRISM II project in Vava'u – open office, take over landfill, commence waste collections and co-billing.	WAL operations successfully established in Vava'u. Feasibility work commenced to Ha'apai and 'Eua.

	Explore business case for 'Eua and Ha'apai.	
To explore ways of improving waste minimisation through Carbon Black Global (CBG) Waste to Energy (WTE) Project. Investigate other Companies who have similar technology on WTE for comparison purposes with CBG technology.	Establish waste to energy project in Tapuhia. Partner discussion with donor to explore appropriate recycling solutions for Tonga	Implementation of waste to Energy Project with CBG.
To strengthen internal technical and management capacity in order to meet the challenges of the increasing workload.	Staff recruitment (Gender Equality), OH&S plan, improved skill level for drivers and machinery operators, improved management system for fuels and spare parts.	Equal gender opportunity demonstrated through the number of staff, OH&S procedures for each work area, number of trainings, improved system and documentation.
WAL to work closely with the other two utility companies (Tonga Power Ltd and the Tonga Water Board) to improve service delivery and achieve significant savings through collaborative efforts. Sharing resources will improve financial returns and strengthen WAL as a public enterprise.	A more detail explanations of joint and standardized services among the three Utilities which include: • Share costs of the new Joint Utility Complex. • Formally begin investigating the requirements for WAL to benefit from the TechnologyOne solution recently implemented by TPL. • Work together with TPL to have WAL financial system incorporated to ERP.	Cost savings through efficient shared services. Improve revenue collection through WAL/TPL Joint billing system. One stop billing payment system works conveniently for customers. Better and timely reporting system.
Staff Rem and benefits review plus implementation of new incentive and bonus system in line with performance based system.	New remuneration system approved by board and implemented as from 1 july 2017. Allocate bonus budget in the financial plan.	Clear rewarding system implemented. Number of complaints from staff as new system clearly explained to all affected.
Seek cabinet's approval on Government Policy Obligation (GPO) to be given to WAL on all waste management activities in all public areas.	Cabinet submission prepared.	Cabinet approval obtained

Profitability

Results	2016	2017	2018	2019	2020	2021	2022
Revenue	1,784,055	2,354,331	2,602,106	2,862,316	3,148,548	3,463,403	3,809,743
Net Profit After Tax	229,652	368,740	441,438	532,631	609,269	691,070	783,802
RoE	85%	191%	58%	58%	60%	44%	43%

2. POLICIES AND GUIDELINES GOVERNING THE DEVELOPMENT OF THE BUSINESS PLAN

2.1 Obligations under the Tonga Strategic Development Framework (TSDF) 2015 - 2025

The vision of the Government of Tonga is –

"To develop and promote a just, equitable and progressive society in which the people of Tonga enjoy good health, peace, harmony and prosperity in meeting their aspirations in life".

The delivery of the TSDF has five enabling pillars, one of which is directly relevant to this business plan.

> ***Pillar 5, Organizational Outcome 5.3: Cleaner environment with improved waste recycling***
>
> *Traditional societies produced limited waste and pollution, most of which was bio-degradable. Modern trade and consumption generates vast amounts of waste that can easily lead to the pollution of our sensitive environment. There is a serious lack of commitment to managing waste disposal with wide dumping of waste in inappropriate and unsightly ways. Poor waste management also creates conditions which increases the risk of communicable disease. Opportunities for landfill are limited. Efficient management, minimization and recycling or wastes are essential.*
>
> ***TSDF Organizational Outcome 5.3:***
>
> *Cleaner environments and less pollution from household and business activities building on improved waste management, minimization and recycling, making conditions safer, healthier and more pleasant for residents and visitors.*

The Waste Authority Ltd is obligated to further improve its sustainability, whilst ensuring it retains a commitment to accountability. In the last business plan year, significant progress was made in achieving this, with the current Business Plan seeking to build and consolidate this position. WAL is currently not in a position to move services to the private sector. However, once the service standards are met and real sustainability has been achieved, contracting out options can be explored in the future. However, to move in this direction within this Business Plan period is viewed as premature.

From a broader perspective, the achievements of WAL in environmental improvement make a direct contribution to the health and prosperity of the people of Tonga.

2.2 Boards expectations

The Board has a strong expectation that WAL will work closely with the other two utility companies (Tonga Power Ltd and the Tonga Water Board) to improve service delivery and achieve significant savings through collaborative efforts. Sharing resources will improve financial returns and strengthen WAL as a public enterprise. A more detail explanations of joint and standardized services among the three Utilities is discussed later in this business plan.

The Board also expects that WAL will continue to improve service delivery, responsiveness, cost effectiveness, workplace safety, profitability and sustainability.

2.3 Mandate

Under the Waste Management Act 2005, WAL has the mandate to establish, improve, maintain, operate and manage the collection and disposal of all waste in the declared waste management service areas in the Kingdom.

WAL's Legislative Framework include: -

- Tonga Companies Act, 1995
- Public Enterprises Act, 2002 (as amended 2005 and 2010)
- Environment Management Act, 2010
- Waste Management (**Plastic Levy**) Regulations, 2013
- Environment Management (Litter and Waste Control) Regulations, 2016
- Income Tax Act
- Consumption Tax Act

2.4 Purpose of Waste Authority Limited (WAL)

Vision

Clean, Green and Healthy Tonga

Mission

*T*o deliver reliable and efficient waste collection services to all households, businesses and institutions in the waste service area, and to dispose of waste effectively and with no harm to people or the environment.

Values

- Business sustainability
- Environmental protection
- Safe work practices
- Reliable and efficient service for our customers
- Continual improvement in the way work is undertaken
- Building expertise and knowledge in individuals and in WAL

CORE business

- Waste collection
- Landfill management
- Liquid waste collection and management
- Community engagement and motivation for a clean green Tonga
- Policy and actions to encourage the 3Rs – *reduce, reuse, recycle*

3. PLANNING INPUTS

3.1 External Elements

Legal & Environmental Issues

The sustainability of WAL is directly linked to the legal operating context, and is a priority issue for this Business Plan. The three key legal issues are:

- The legal right of WAL to charge households for waste management services
- Penalties for those who do not pay
- Penalties for those who do not dispose of their waste appropriately (i.e. dumping, burning, littering).

The legal right for WAL to levy charges is stated in the Waste Management Act, 2005. This gives WAL the right to levy service charges, and to treat unpaid charges as a debt to be recovered. However, it is the implementation of this right that has been weak to date.

The strategy to strengthen payment compliance is to co-bill waste services on the Tonga Power bill. This has been implemented and it gives access to nearly all households on Tongatapu which has strengthened compliance. However, it is clear that there have been some who say they do not want the service and therefore refuses to pay. The legal options are to either treat this as an unpaid debt to be recovered through the court process, or to introduce new penalties that are more direct, namely the disconnection of power services if the waste charge arrears accumulate. There needs to be a regulatory review to determine the most effective means to introduce this so that it has a firm legal basis when it is challenged.

The third directly related legal issue is the penalties for burning, dumping and littering. The new Environmental Management (Litter and Waste Control) Regulations 2016 have been implemented and approved by the Cabinet Law Committee. These Regulations have given appointed officers (such as police, health inspectors, environmental officers and WAL officers) the right to issue clean up notices, or on the spot fines for a range of offences. The regulation was implemented in April 2017 and awareness raising, and consistent application of the regulations to drive real behaviour change on the ground.

The key environmental issue for WAL is to ensure that environmental risks are minimized in the provision of waste services. Critical to this is the ongoing quarterly water monitoring programme at Tapuhia, as well as ongoing staff awareness and training as a component of health and safety training.

Market & Competitor Issues

The market for waste services in Tonga is under-developed. There is only one licensed landfill site in Tongatapu, and it is unlikely another site will be developed until this site is towards the end of its life cycle. Therefore, WAL has an effective monopoly on the provision of waste disposal services.

Where WAL does have competitors is in waste collection services, with the private sector providing both liquid and solid waste collection. However, the private sector capacity is limited, and is unlikely to be able to compete with WAL who can reach sustainability provided there is universal collection of the mandated monthly fee. It is important that WAL continue to monitor competitors and their pricing to ensure WAL remain competitively priced.

A. Target Market and Market Positioning

WAL is currently positioned as the key waste service provider in Tongatapu. In this Business Plan period, WAL plans to expand service provision to Vava'u, as well as explore the options for service provision in Ha'apai and 'Eua islands.

B. Market Segmentation

The following is an overview of the market segmentation for WAL.

1. Urban households, Tongatapu
2. Rural households, Tongatapu
3. Churches
4. Schools
5. Other Institutions
6. Businesses
7. Vava'u
8. Ha'apai
9. 'Eua

C. Marketing Strategy

- **Product:**

The product is universal waste collection and safe waste disposal services. The selling point is a clean, green and healthy environment for all.

- **Place:**

Universal waste services are currently offered throughout Tongatapu. Under this Business Plan period, the plan is to expand into Vava'u, as well as explore opportunities in Ha'apai and 'Eua. This would depend on availability of waste management equipment and infrastructure for use in the outer islands.

- **Price:**

The current price for universal waste collection and disposal services is TOP$10 per household per month. It is noted that WAL intend to continue discussions with Internal Revenue to convince them that charging Consumption Tax on waste charges is not consistent with Government policy. With essential services of power and water supply largely tax-free supplies, it makes sense to also exempt waste charges. The fact that this is not exempt reinforces a view that waste services are optional, and not a core essential service for the health and environmental safety of Tonga. If WAL are successful in these negotiations, the Board have an intention to lower the monthly waste charge to customers.

There is also a schedule of fees for commercial and institutional collections, special waste services, and liquid waste collection. These prices are to be reviewed on an annual basis. When exploring the opportunities on the outer islands, it is important to undertake a local need and cost analysis. It is expected that the model offered in the outer islands may be a reduced fee in line with customer expectations.

- **Promotion:**

Promotion for waste services is essentially a campaign for behaviour change. With traditional practices of burning and dumping still entrenched in the rural areas and outer islands, it requires significant efforts to raise awareness and change people's mindset. Ultimately people need to be mobilized in a movement for change. The Clean Green Tonga campaign provides an over-arching framework for this promotion work, with its focus on work in schools, communities and businesses.

- **Process:**

The universal waste collection relies on 2 core elements:

1. Reliable service provided to every house in every village
2. Revenue collection through a high level of compliance with the new system of adding waste charges to the Tonga Power bill.

Landfill management services use processes of landfill management planning, waste layering, compaction, covering, water management, septage waste management, leachate treatment, site management and groundwater testing.

External Business Risks

Risk	***Mitigation***
Unwillingness to pay from rural areas in Tongatapu	Encouragement through Clean Green Tonga, and penalties for non-payment, and for poor waste practices.
Political interference	Continual reinforcement of the message of the need for, and benefits of, a clean environment. Regular discussions and clarifications for Government Ministers as issues arise.

3.2 Internal Elements

People Issues

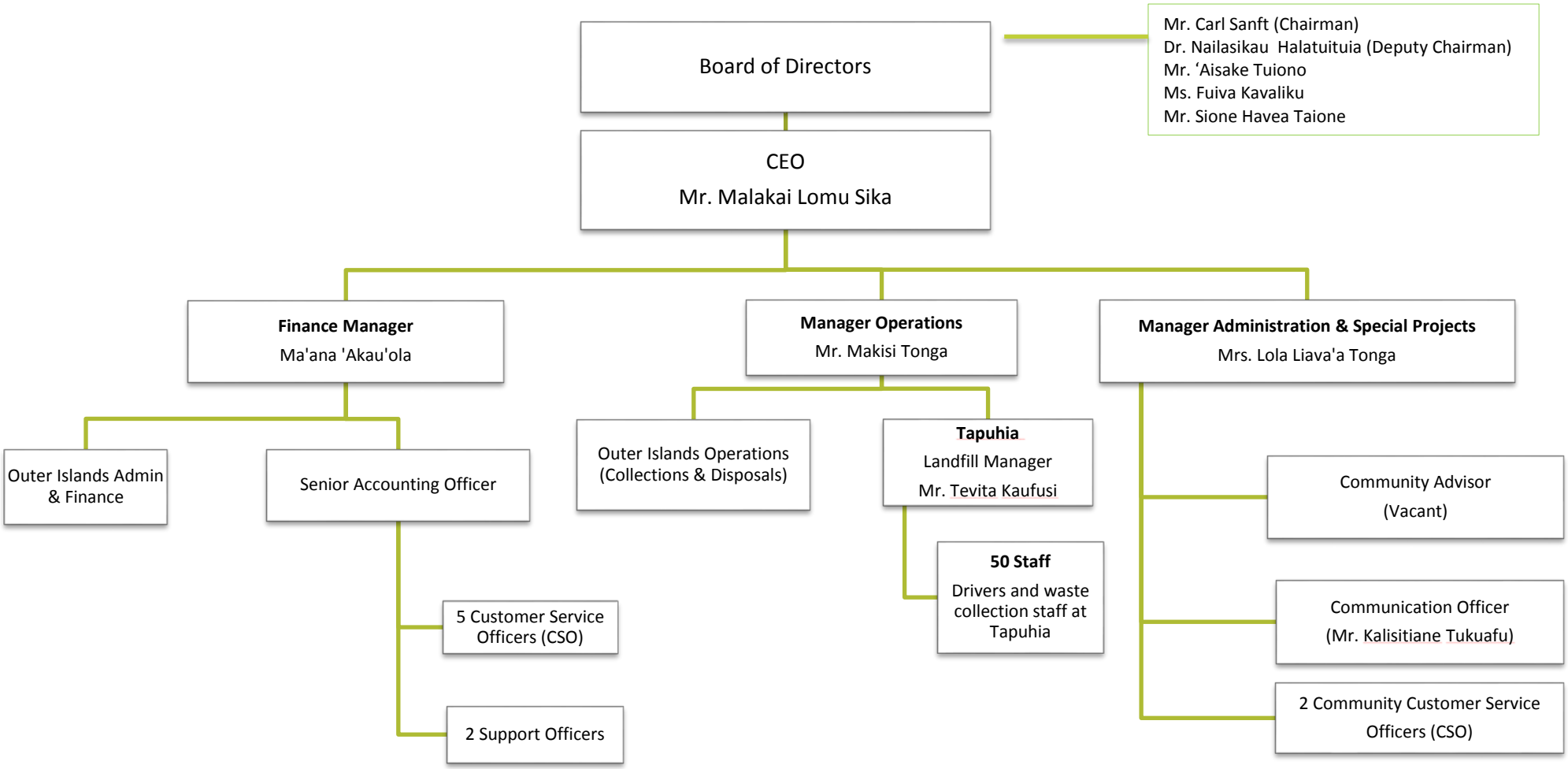
Human Resources are critical to WAL's performance and their ability to effectively deliver waste services. For this planning period, the following new positions are proposed within WAL in addition to the roles in the existing structure:

- Middle Management – Supervisory Roles
- Accountant (qualified)
- Support Services Officer
- 3 junior staff

The following structure is critical to achieving this business plan. Historically, WAL had been operated under capacity. This was mainly due to insufficient cash flow to fund the required and appropriate staffing level. Management considers that the following structure is appropriate to service effectively the business plan. The vacant positions will be prioritised and recruitment will be progressively managed subject to sufficient cash flow available.

Waste Authority Limited (WAL) – Organizational Structure

(Update 1st July, 2017)



Physical Assets/Equipment Issues

Under the Nuku'alofa Urban Development Sector Project (NUDSP), funded by ADB and the Australian Aid Programme, WAL will receive a further TOP $360,000 in investment. The focus of the assets is in improving WAL's capacity for liquid waste treatment, and additional investment in site infrastructure at Tapuhia. The following items of plant and equipment will be supplied:

- New septage drying beds ($160,000)
- 3 Public Toilets ($200,000)

The Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in the Pacific Island Countries Phase II (JPRISM II), funded by Japan International Cooperation Agency (JICA) will provide further asset investments to improve the waste collection. The project will focus on extending the collection service to Vava'u Island and provide technical support. A foundation of sustainable solid waste management is built in the outer islands of Tonga, with the emphasis on practical implementation.

The main challenge in expanding to any of the outer islands is the requirement to purchase additional vehicles and infrastructure. This will be costed carefully in each of the scenarios, ensuring that WAL have the physical assets necessary to provide the essential service of waste collection and disposal.

Business Systems and other Resources

Internal Control

WAL have successfully implemented a number of internal control systems to ensure transparency and accountability in the way the enterprise is managed. All accounts are now fully audited, and financial accounting records up to date.

Further improvements are planned this year in order to continue improving internal management systems, including:

- Improving records and management of workshop stocks and fuel
- Internal management reporting
- Fleet maintenance records

Risk Management, Compliance & Control

A major area of risk management to be tackled in this Business Plan year is occupational health and safety. There have been significant improvements in the last year, particularly with the wearing of appropriate protective clothing. However, further training is planned to ensure procedures are adopted and rigorously followed. These procedures include:

- Safe lifting practices (especially for waste collectors);
- Hazardous waste awareness and procedures;
- Fire safety and response;
- Safe driving
- Wastewater treatment plant safety.

Customer Complaints

Customer Service has become a major focus during this phase and we are constantly seeking opportunities to improve our service and raise customer satisfaction. All customer complaints are investigated and documented. It is tracked, then acted on through an electronic Customer Management System, which records all details and follow up actions until each case is closed. This data-base have utilised more effectively this year. A full-time staff have also been recruited to monitor this complaint system data base. This was required given the joint billing with TPL recently implemented where a lot of enquiries which required to be addressed more promptly. According to information recorded by our system, there is an improvement with the number of complaints lodge and positive feedback from customers.

Objective of the Utility Reform Project-

To reduce up to 10% of annual costs and enhance service delivery (e.g. on-time delivery, safety & quality) through the following key initiatives:

1. Achieving synergies and cost reductions through shared services
2. Implementing a systems approach across all three Utilities

The above initiatives are expected to contribute to efficiency improvement, cost reduction, improved governance and better service delivery. Cost reductions in turn are expected to reduce tariff charges and increase shareholder return

1. Achieving Synergies through Shared Services

1.1 Common billing

• Common bill payments
• Customers Feedback
• Common billing between TWB & TPL
• Public Consultation of common billing

1.2 Joint meter reading in villages

• Hiring process -Trial before hiring
• Phase 1 –All meter readers will be advertised internally
• Phase 2 –Assessment period
• Phase 3 -Relocation

1.3 Common building facilities to house all three utilities

• Build a common building will house Power, Water, Waste and Gas under one roof.
• Facilities to be located on a land already produced by TPL.
• Cost of the new building will be derived from the rental of the existing Power/Water/waste/Gas office and building facilities
• Economies of scale will reduce operating costs all businesses and provide common centralized service for customer payment, centralized board meetings and so forth.

1.4 Common fuel supply, vehicle maintenance and common opportunities

• Tonga Gas/Homegas Ltd a subsidiary of Tonga Power Limited, is working out the best way to incorporate this matter

1.5 Inter-company assistance, training & development

• Common Secretariat
• Combined procurement
• Common/Shared IT service

1.6 Common Tariff (fuel & non-fuel components)

1.7 Implementing a Systems Approach

- Implementing systems approach includes developing systems, plans and procedures for TWB and WAL as well as TPL. The systems approach will provide utilities a foundation on which the company operational practices are carried out. These systems include:

    - Strategic Planning
    - Business Planning
    - Asset Management
    - HSE management
    - Disaster Recovery management
    - Marketing plan
    - Risk Management
    - Performance Management and development of policies and procedures.

- The benefits from the systems approach are: cost reduction in the long run through elimination of errors, regulatory compliance, and best operational practices across all departments.

Responsible decision-making

Internal Business Risks

Risk	***Mitigation***
Major injury or casualty through workplace accident	Safety planning, training, and implementation compliance
Major and costly breakdowns in fleet	Ongoing daily checklist for each machine, weekly supervision and maintenance by external contractor. Installation of fuel tank to reduce risk of contaminated fuel from drums.
Service interruptions or unreliability due to breakdowns	The strategy is to always have 2 trucks on stand-by to cover routine maintenance of break-downs. In addition, WAL will identify contractors who are available to hire trucks on short notice.
Landfill fire	Tapuhia Emergency Response Plan is in place. These procedures are to be followed and strict instructions.

3.3 SWOT[1] analysis

Strengths	Opportunities
- Good governance - Improved operational efficiencies through cooperation between the 3 utility companies - Improved reach of billing through co-billing with Tonga Power Ltd - Improved revenue streams with Environmental Levy for cruise ship passengers, Plastic Import Levy and hiring of Portable loos - Improved systems for fleet maintenance and asset management - All equipment needs for waste collection and disposal in Tongatapu have been met - Improved service delivery through universal waste collection policy - Clean Green Tonga as a framework for community change - Enforcement of Environment Management (Litter and Waste Control) Regulations 2016	- Ongoing cost efficiency improvements through working cooperatively with other utility companies. - Expansion of services to Vava'u - Expansion of services to Ha'apai and 'Eua - Recycling and waste to energy (WTE) projects - Additional assistance from NUDSP - Additional assistance from JICA through training and technical support ie. JPRISM II - Australia volunteer to work on Tapuhia operational processes - Broadening the existing plastic import levy to include filled plastic containers (ie water and soft drink bottles) - Providing cheap (subsidized) customers low cost 240 litre Mobile Garbage Bins for Tongatapu and outer islands, both households and businesses - Investing on portable loos to hire which can bring more revenue to the company - Review remuneration structure and staff benefits - Outsource waste collection service in Tongatapu - Introducing plastic and cruise ship passengers on outer islands - Merging of the Pes under the Utilities sector to form one company.
Weaknesses	**Threats**
- Lack of technical expertise - Limited training particularly for machinery operators and drivers. - Implementation of new Litter and Waste Regulations – needing to strengthen coordination and actions of all appointed officers - High numbers of customers still refuse to pay waste bills.	- Lack of support from people who do not want to pay for the service (particularly in rural areas) - Legal challenge of WAL's right to charge waste fee when service not used - Challenged by public with the enforcement of current regulation – Environment Management (Litter & Waste Control) 2016 - Political interference if waste charges prove too unpopular - Injury or fatality through workplace accident

[1] Business Strengths, Weaknesses, Opportunities and Threats

3.4 Leading to Specific Challenges and Focus of Planning Period

The specific challenges of the planning period are:

1. Managing cash flow in the transition from user pays to universal waste collection system
2. Ongoing lack of compliance leading to poor revenue and ongoing environmental degradation
3. Extra investment required to continue to improve infrastructure and expand services to outer islands
4. Limited capacity for WAL at a technical and middle management level

The four key focus areas are:

1. Building financial sustainability through increased payments from waste customers and improved revenues from indirect levies
2. Improving waste management behaviours throughout the Kingdom
3. Ongoing investment programme to improve service levels and expansion of waste services to outer islands
4. Further strengthening of WAL human resources and business systems to improve business performance, safety, and communications with stakeholders and customers.

4. PLANNING PERIOD OBJECTIVES

4.1 Reconciling Key Challenges and Risks, Formulating Planning Period Objectives

This planning period is crucial for WAL to move firmly onto a sustainable footing as a public enterprise. By utilizing effective communications and engagement, the aim is to move from the current system of low payment compliance and poor waste behaviours in the rural areas to a scenario of high payment compliance and a clean and green Tonga. The co-billing initiative with Tonga Power brings the issue of waste payments to the forefront of discussion in the community, and the expectation is that there will be increased payments. Backing up this arrangement with a strong penalty system for non-payment or poor waste behaviours will be critical to behaviour change. It is also critical to continue to improve service reliability and responsiveness to customer requirements. Once the universal waste collection and co-billing is firmly established, WAL will explore opportunities to expand services to outer islands. Concurrently, they will continue to build their internal capacity through improved cooperation with other utilities, continued upgrade of infrastructure for waste collection and disposal, and a focus on enhancing technical capacity, business systems and safety.

4.2 Statement of Objectives

1. To reach financial sustainability through raising payment levels throughout Tongatapu using the co-billing system and appropriate penalties.
2. To enhance financial position through continued implementation of cruise ship passenger environmental levy, and a broadened base for the plastic import levy.
3. To continue to invest in infrastructure that improves waste collection and treatment, enhances service levels, and ensures that operations are conducted efficiently and with minimal environmental risk.
4. To educate and engage communities in good waste management practices through the Clean Green Tonga programme, and the implementation of penalties for poor waste management behaviours.
5. To expand waste operations in Vava'u, and explore the feasibility of operating in Ha'apai and 'Eua.
6. To explore ways of improving waste minimisation through recycling initiatives.
7. To strengthen internal technical and management capacity in order to meet the challenges of the increasing workload.

5. STRATEGIES/ACTIONS TO SATISFY OBJECTIVES

5.1 Key Strategies to meet each Objective

OBJECTIVE	STRATEGIES	RESOURCE	WHO
1. To reach financial sustainability through raising payment levels throughout Tongatapu using the co-billing system and appropriate penalties.	1.1 Implementation of co-billing system with TPL, ensuring that problems are effectively resolved as they arise. 1.2 Develop policies and procedures to effectively penalise those who do not pay waste charges 1.3 High publicity test cases 1.4 Ongoing awareness raising and community discussion on the new system and its rationale	1.1 Accounting systems 1.2 Legal advice 1.3 Legal advice 1.4 Radio talkback, television programme, advertising campaign	1.1 Finance sections of WAL and TPL 1.2 CEO to present options and Board decide 1.3 CEO 1.4 CEO, Community section
2 To enhance financial position through continued implementation of cruise ship passenger environmental levy, and a broadened base for the plastic import levy.	2.1 Continued liaison with shipping agents and cruise line companies to implement levy payment 2.2 Liaison with Tourism Authority to prepare small information pamphlet for passengers and inform them of the good their money is achieving 2.3 Cabinet submission to gain approval for review and amendment of Plastic Import Levy Regulation 2.4 Present amendment to Crown Law and assist with the review and justification process 2.5 Once approved, implement	**1.1** Meetings, regular communication **1.2** Meetings, design layout, printing and distribution **1.3** Preparation of papers to Cabinet (regulation amendment already drafted) **1.4** Papers as required **1.5** Expansion of current system in liaison with Customs	2.1 CEO 2.2 Community Section, Tourism Authority 2.3 CEO 2.4 CEO 2.5 CEO and Finance Department
3 To continue to invest in infrastructure that improves waste collection and treatment, enhances service levels, and	3.1 Upgrade liquid waste treatment infrastructure and procure septage collection truck, green waste chippers, weighbridge, and site machinery shed 3.2 Investigate and implement bulk bin purchase to sell back to consumers through a payment plan on waste bill.	3.1 Funding through NUDSP 3.2 Initial capital for purchase, storage area, publicity, and system establishment	3.1 NUDSP team 3.2 CEO and management team 3.3 CEO

OBJECTIVE	STRATEGIES	RESOURCE	WHO
ensures that operations are conducted efficiently and with minimal environmental risk.	3.3 Continue discussion with donors on further waste collection fleet upgrades, dependent on performance of current infrastructure and needs analysis 3.4 Continue water monitoring programme at Tapuhia 3.5 Hiring of Portable loos to increase revenue for WAL	3.3 Waste collection data 3.4 New water testing reagents	3.4 CEO, water testing task force
4 To educate and engage communities in good waste management practices through the Clean Green Tonga programme, and the implementation of penalties for poor waste management behaviours.	4.1 Establish small grant fund for applications for Clean Green Tonga initiatives 4.2 Implement waste education programmes and complete Information Kits for schools, communities and businesses 4.3 Bring together National Commission to assist with distribution of ideas and encouragement of their communities 4.4 Use CGT Taskforce to administer grant programme 4.5 Publish success stories regularly – e.g. annual awards scheme 4.6 Participate in task force planning, implementation and training, and regular monitoring and support 4.7 Publicise stories on effective penalties	5.1 NUDSP support, donors, and 50,000 capital from WAL 5.2 DFAT funding secured for printing 5.3 Meeting costs 5.4 Meeting costs 5.5 Facebook, website, and use of tv and radio to spread success stories 5.6 Meeting costs. NUDSP to support. 5.7 Facebook, website, and use of tv and radio to let people know the risks in poor waste management	4.1 NUDSP, CGT Taskforce 4.2 NUDSP, CGT Taskforce 4.3 CEO, NUDSP, CGT Taskforce 4.4 NUDSP, CGT Taskforce 4.5 Community Section and CGT Taskforce 4.6 NUDSP / CEO 4.7 Community Section
5. To expand waste operations in Vava'u, and explore the feasibility of	5.1 Undertake detailed planning and business case for expanding to Vava'u 5.2 Commence community dialogue in Vava'u	5.1 Planning 5.2 Radio talkback, community meetings, find key supporters in	5.1 CEO 5.2 CEO / community section

OBJECTIVE	STRATEGIES	RESOURCE	WHO
operating in Ha'apai and 'Eua.	5.3 Legal process (ie designating Vv as waste service area) 5.4 Open WAL office and take over landfill site operations 5.5 Initiate waste collection service 5.6 Introduce waste charges on TPL bill 5.7 Awareness raising through Clean Green Tonga 5.8 Commence dialogue and detailed planning for introducing waste services in Ha'apai and 'Eua	community 5.3 Letter to appropriate authority 5.4 Office building, takeover landfill assets 5.5 Collection trucks 5.6 Existing Billing infrastructure 5.7 CGT resources (information kits, small grants, success stories) 5.8 Planning and communication resources	5.3 CEO 5.4 CEO and management team 5.5 CEO and management team 5.6 CEO and Finance from WAL and TPL 5.7 CGT Taskforce and WAL community section 5.8 CEO, Board
6 To explore ways of improving waste minimisation through recycling initiatives.	6.1 Implement green waste composting initiative at Tapuhia 6.2 Continue dialogue with JICA to explore appropriate technologies for recycling products in Tonga.	6.1 Purchase chippers, publicity, develop procedure, implement 6.2 Research, training, business analysis	6.3 NUDSP, WAL community section, landfill staff. 6.4 JICA, WAL designated staff
7. To strengthen internal, technical and management capacity in order to meet the challenges of the increasing workload.	7.1 Recruit new staff for the middle management roles and additional waste collection and landfill staff 7.2 Improve occupational health and safety planning and procedures 7.3 Improve recruitment and training processes to increase skill level of drivers and machinery operators (thereby improving asset management) 7.4 Improve management system of spare parts, fuel, lubricants at new machinery shed in Tapuhia	7.1 Planning, recruitment, resources for new salaries 7.2 External safety consultant for hazard mapping and development of procedures. 7.3 Additional equipment as required. 7.4 Improved storage areas, stock and inventory systems	7.1 CEO and Board 7.2 WAL management team and Board 7.3 CEO and management team 7.4 CEO and designated staff at Tapuhia

OBJECTIVE	STRATEGIES	RESOURCE	WHO
8. Explore and implement Waste to Energy (WTE) Project with Carbon Black Global (CBG) or any investor who has the appropriate technology fits for Tonga's situation.	8.1 Explore Private Sector Investors and engage with the most cost effective investor on WTE 8.2 Identify land and sublease to successful investor 8.3 Liaise with Government of Tonga and get approval on compliance issues, environment requirement, registration, business license, taxes, etc. 8.4 Work together with Tonga Power Ltd on implementation plan and Tripartite Agreements	8.1 Planning and implementation schedule and per agreed Term Sheet.	8.1 CEO of WAL an TPL and WAL Management Team

5.2 Link of Strategies with Existing Business Operations

All the strategies described in Section 5.1 are strengthening the existing business of WAL. The actions outlined will enhance WAL's business sustainability whilst increasing the reach of their services. This will make a real contribution to Tonga becoming a clean and green nation. With the gains made in the last Business Plan year, and the establishment of the co-billing system, it is believed that WAL will continue to move to a fully sustainable footing with the ongoing strong leadership from the board and management team.

6. PERFORMANCE MEASURES

6.1 Key Performance Indicators and Timeframe

Key Objective No. 1	**Measure**	**When**
1 To reach financial sustainability through raising payment levels throughout Tongatapu using the co-billing system and appropriate penalties.		
Strategic Action 1.1 – Continue to improve joint-billing system with TPL, ensuring that problems are effectively resolved as they arise. Implement Vava'u co-billing with TPL	Complaints logged and resolved within 5 working days All households with power connection to be billed through TPL system	Ongoing 31/12/2017
Strategic Action 1.2 – Develop policies and procedures to effectively penalise those who do not pay waste charges	Number of cases of non-payment decreasing over time	Monthly data demonstrating downward trend over the year
Strategic Action 1.3 – High publicity test cases	Number of cases of non-payment decreasing over time	Monthly data demonstrating downward trend over the year
Strategic Action 1.4 - Ongoing awareness raising and community discussion on the new system and why	Number of talkback radio shows, TV shows, media stories	Monthly data
Key Objective No. 2	**Measure**	**When**
2 To enhance financial position through continued implementation of cruise ship passenger environmental levy, and a broadened base for the plastic import levy.		
Strategic Action 2.1 – Liaison with Tourism Authority to prepare small information pamphlet for passengers and inform them of the good their money is achieving	Pamphlet produced and numbers distributed	December 2017
Strategic Action 2.2 – Cabinet submission to gain approval for review and amendment of Plastic Import Levy Regulation	Regulation amended	September 2017
Strategic Action 2.3 –	Regulation amended	December 2017

Present amendment to Crown Law and assist with the review and justification process		
Strategic Action 2.4 – Once approved, implement	Increased revenue from plastics levy	March 2018
Key Objective No. 2	**Measure**	**When**
3 To continue to invest in infrastructure that improves waste collection and treatment, enhances service levels, and ensures that operations are conducted efficiently and with minimal environmental risk.		
Strategic Action 3.1– Public toilets. Septage beds	Infrastructure constructed	June 2018
Strategic Action 3.2– Implement bulk bin purchase to sell back to consumers through a payment plan on waste bill.	Bins purchased. No. of customers who enter into purchase contracts	March 2018
Strategic Action 3.3– Continue discussion with donors on further waste collection fleet upgrades, dependent on performance of current infrastructure and needs analysis	Ongoing monitoring of collection fleet. Further investment if required	Ongoing
Strategic Action 3.4 – Continue water monitoring programme at Tapuhia	Quarterly testing reports	Ongoing
Key Objective No. 4	**Measure**	**When**
4 To educate and engage communities in good waste management practices through the Clean Green Tonga programme, and the implementation of penalties for poor waste management behaviours		
Strategic Action 4.1 – Establish small grant fund for applications for Clean Green Tonga initiatives	Grant fund established with application and assessment procedures	Ongoing

Strategic Action 4.2 – Run waste education programmes and complete Information Kits for schools, communities and businesses	School visits and information kits distributed	December 2018
Strategic Action 4.3 – Work together with MIA to assist with distribution of ideas and encouragement of their communities	Number of discussion forums	Ongoing
Strategic Action 4.4 – Publish success stories regularly – e.g. Clean Green Tonga hero of the month, annual awards scheme	Number of stories published, Facebook and website posts	ongoing
Strategic Action 4.5 – New waste regulations already in place, form implementation task force for planning and training, and regular monitoring and support	Number of workshops and implementation discussion forums	Ongoing
Strategic Action 4.6– Publicise stories on effective penalties	Number of stories, Facebook and website posts	ongoing
Key Objective No. 5	**Measure**	**When**
6. To expand waste operations in Vava'u, and explore the feasibility of operating in Ha'apai and 'Eua.		
Strategic Action 5.1 – Undertake detailed planning and business case for expanding to Vava'u	Detailed plan	Sept 2017
Strategic Action 5.2 – Commence community dialogue in Vava'u	Number of community forums and opportunities for discussion and input	Sept 2017 – October 2017
Strategic Action 5.3 – Legal process (ie designating Vava'u as waste service area)	Formal agreement with Ministry of Health to commence waste management services in Vava'u.	July 2017

Strategic Action 5.4 – Open WAL office and take over landfill site operations	Office open Landfill assets handed over	August - September 2017
Strategic Action 5.5 – Commence waste collection service	Number of waste collection households / businesses	April 2018
Strategic Action 5.6 – Introduce waste charges on TPL bill	Number of bills with charges added	ongoing
Strategic Action 5.7– Awareness raising through Clean Green Tonga	No. of radio shows, Facebook and website postings	ongoing
Strategic Action 5.8 – Commence dialogue and detailed planning for introducing waste services in Ha'apai and 'Eua	Number of discussions with key stakeholders	May 2018
Key Objective No. 6	**Measure**	**When**
6. To explore ways of improving waste minimisation through recycling initiatives.		
Strategic Action 6.1 – Implement green waste composting initiative at Tapuhia	Green waste processes established Number of tonnes produced	Start by end of 2017
Strategic Action 6.2 – Continue dialogue with JICA to explore appropriate technologies for recycling products in Tonga.	WAL representative to training in Japan Follow up research	June 2018
Key Objective No. 7	**Measure**	**When**
To strengthen internal technical and management capacity in order to meet the challenges of the increasing workload.		
Strategic Action 7.1 – Recruit new staff for the following positions - Middle management roles, additional waste collection and landfill staff	Staff recruited	September 2017
Strategic Action 7.2 – Improve occupational health and safety planning and procedures	OH&S plan for WAL	July 2017
Strategic Action 7.3 –		Ongoing

Improve recruitment and training processes to increase skill level of drivers and machinery operators (thereby improving asset management)	Number of trainings conducted Number of recruitments using advertising and minimum standards	
Strategic Action 7.4 – Improve management system of spare parts, fuel, lubricants at new machinery shed in Tapuhia	Improved shelving / storage system in place	September 2017
Key Objective No. 8	**Measure**	**When**
Strategic Action 8.1 – Undertake waste study- quality and quantity.	Study completed	Based on getting funding in place, CBG can begin this study in early to mid-June. This window moves to August if delayed past June.
Strategic Action 8.2 – Draft waste supply contract for free supply to CBG of its daily MSW collection.	Contract prepared and signed	July 2017
Strategic Action 8.3 – CBG and WAL to agree on contribution of waste collection equipment and trucks	CBG and WAL agreement finalised.	July 2017
Strategic Action 8.4 – Select land at Tapuhia for WTE plant. Obtain Lease for minimum of 25 years. Provide draft sub-lease.	Draft sub-lease processed.	July 2017
Strategic Action 8.5 – Complete waste study and address water usage and disposal	Study completed	July/August 2017

6.2 Timeframe for KPIs

Refer to last column of Section 6.1 for timeframe of KPIs.

6.3 Financial and Non-financial KPIs

Year ending 30 June	2016 Actual	2017 Forecast	2018 Plan	2019 Plan	2020 Plan	2021 Plan	2022 Plan
Return on Assets (EBITA/Total Assets)	-2%	2%	3%	5%	6%	8%	9%
Return on Assets (NPAT/Total Assets)	5%	8%	9%	11%	12%	14%	15%
Return on Equity (NPAT/Equity)	85%	191%	58%	58%	60%	44%	43%
Return on shareholders' funds (NPAT/Share Capital)	26%	41%	34%	41%	47%	53%	60%

7. STATEMENT OF COMPLIANCE(S)

7.1 Statement of compliance with relevant Government Policies

WAL legislative compliance required by Government Acts and Regulations listed is Section 2.2.3 of this business plan has been observed. However, the publishing of WAL's financial statements (audited) in local newspapers as required by Public Enterprises Act was overlooked in previous financial year but necessary arrangement is now in place to get this published asap.

7.2 Statement of Community Services, claims for GPO

Under Waste Management Act 2005-

"Performance of community obligations

(1) An approved Authority shall undertake community obligations at the direction of the Board, which may involve any activity aimed at keeping public areas clean and free of wastes, including —

(a) street and foreshore cleaning and other activities to maintain the cleanliness of public areas; and

(b) providing waste receptacles in public areas and other appropriate facilities for minimizing and dealing with wastes on public roads and reserves, and other areas accessible to the public.

(2) An approved Authority shall only be obliged to perform a community obligation under this section if the Government undertakes to pay to the approved Authority the agreed cost of providing the necessary services and undertaking the required activities".

It should be noted that WAL has performed and is currently performing community services at its own costs but which Government should be paid for under the Waste Management Act. This FY2017/18 appropriate claims will be made from Government should these community services are to be continued to be provided by WAL.

Disposal of wastes at the Tapuhia landfill under emergency clean-up such as national special waste collections due to national disasters and emergency clean-up for health reasons were historically provided free by WAL. Again these services will be subject to appropriate waste fees during FY2017/18.

Government Policy	Value
WAL Community obligations in providing waste collection services in public areas such as road sites, water front, hospital areas, etc. Waste Management Act 2005, Sections 7 (1) & (2)	$350,000

7.3 Statement of Support from Government and / or Development Partners and details of contracts, obligations and financial impact on business:

WAL's operations had been subsidized by Government up to 2014. WAL is now financing its operations from the fees and levies on waste management services.

WAL waste management equipment and infrastructure is funded by the Nuku'alofa Urban Development Sector Project (NUDSP) funded by Asian Development Bank and AusAid. These assistances will continue in this plan period FY2017/18.

7.4 Statements of Financial capacity in regard to external borrowings and dividends.

WAL has borrowings from the following local Public Enterprises:

- Ports Authority Tonga (PAT) $450,000 (original loan $500,000)
- Tonga Power Ltd $200,000

7.5 Dividend Policy

WAL dividend policy is dividend to be paid after the retained losses of $2.2 million (as at 30 June 2015) it has sustained from previous years is cleared.

Notwithstanding the above, should operating results exceed forecast (and EBITA exceed depreciation) dividends should be paid at the earliest opportunity.

8. FINANCIAL FORECASTS

8.1 WAL - Statement of Financial Performance Budget for FY2017/18 (plus next 4 years)

_	Actual YTD Mar-17	Projected Jun-2017	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
REVENUES							
SOLID WASTE COLLECTION & DISPOSAL FEES							
HOUSEHOLDS/DOMESTIC							
Domestic Joint Billing (Nuku'alofa Urban)	523,810	756,614	832,276	915,503	1,007,054	1,107,759	1,218,535
Households - Domestic West	156,381	225,884	248,472	273,320	300,652	330,717	363,789
Households - Domestic Eastern	222,443	321,307	353,437	388,781	427,659	470,425	517,468
Households - Central District	103,783	149,909	164,900	181,390	199,529	219,482	241,430
TOTAL DOMESTIC	**1,006,417**	**1,453,714**	**1,599,086**	**1,758,994**	**1,934,894**	**2,128,383**	**2,341,221**
BUSINESSES/LARGE ORG - NON-DOMESTIC							
Non Domestic Small Business	21,699	28,932	31,825	35,008	38,509	42,360	46,596
Non Domestic Medium Business	47,084	62,779	69,057	75,962	83,559	91,914	101,106
Non Domestic Large Business	103,937	138,582	152,440	167,684	184,453	202,898	223,188
Non Domestic Hospital	6,104	8,139	8,953	9,848	10,833	11,916	13,108
Non Domestic Special Waste	48,391	51,390	56,529	62,182	68,400	75,240	82,764
TOTAL NON DOMESTIC	**227,215**	**289,822**	**318,805**	**350,685**	**385,754**	**424,329**	**466,762**

	Actual YTD Mar-17	Projected Jun-2017	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
OTHER							
Educational Institutions/Schools	12,603	16,805	18,485	20,334	22,367	24,604	27,064
Churches	36,143	48,190	53,010	58,310	64,142	70,556	77,611
Levy (all)	302,638	368,638	405,501	446,052	490,657	539,722	593,695
Septage	81,532	108,710	119,581	131,539	144,693	159,162	175,078
Tapuhia Gate Collections	18,922	23,420	25,762	28,338	31,172	34,289	37,718
Bin hiring & Sales	6,052	8,070	8,877	9,764	10,741	11,815	12,996
TOTAL OTHER	**457,890**	**573,832**	**631,216**	**694,337**	**763,771**	**840,148**	**924,163**
TOTAL COLLECTN & DISPOSAL FEES	**1,691,523**	**2,317,369**	**2,549,106**	**2,804,016**	**3,084,418**	**3,392,860**	**3,732,146**
MISCELLANEOUS INCOME							
Other Income	36,463	36,962	50,000	55,000	60,500	66,550	73,205
Bad Debt Recoveries	0	-	-	-	-	-	-
Gain(Loss) on FA Disposal	2,100	-	3,000	3,300	3,630	3,993	4,392
TOTAL REVENUE	**1,730,086**	**2,354,331**	**2,602,106**	**2,862,316**	**3,148,548**	**3,463,403**	**3,809,743**

	Actual YTD Mar-16	Projected Jun-2016	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
LESS EXPENSES							
MANAGEMENT, ACCOUNTING & TECHNICAL							
STAFFING COSTS							
Salary - HO	285,401	393,401	465,464	512,010	563,211	619,533	681,486
Superannuation- HO	11,748	15,664	31,840	32,000	35,200	38,720	42,592
Travelling	25,247	28,752	35,000	38,500	42,350	46,585	51,244
Staff insurance	0	-	15,000	16,500	18,150	19,965	21,962
Other	0	-	-	-	-	-	-
TOTAL H/OFFICE STAFFING COSTS	**322,396**	**437,817**	**547,304**	**599,010**	**658,911**	**724,803**	**797,283**
REVENUE COLLECTION COSTS							
Commission on Collections	42,205	63,205	33,000	10,000	10,000	10,000	10,000
Printing Receipts & Orders	250	570	2,500	2,750	3,025	3,328	3,660
Rubbish Bags & Stickers	0	-	-	-	-	-	-
TOTAL COLLECTION COSTS	**42,455**	**63,775**	**35,500**	**12,750**	**13,025**	**13,328**	**13,660**
COMMUNICATION EXPENSES							
Telephone	13,346	17,850	18,400	20,240	22,264	24,490	26,939
Internet	6,990	10,280	14,200	15,620	17,182	18,900	20,790
TOTAL COMMUNICATION EXPENSES	**20,336**	**28,130**	**32,600**	**35,860**	**39,446**	**43,391**	**47,730**

	Actual YTD Mar-17	Projected Jun-2017	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
BOARD EXPENSES							
Directors Remuneration	39,375	52,500	52,500	57,750	63,525	69,878	76,865
Meeting Fees Board	6,200	7,910	6,840	7,524	8,276	9,104	10,014
Travel	4,183	7,500	10,000	10,000	10,000	10,000	10,000
Other Board Expenses	1,111	1,482	3,000	3,300	3,630	3,993	4,392
TOTAL BOARD EXPENSES	**50,869**	**69,391**	**72,340**	**78,574**	**85,431**	**92,975**	**101,272**
FINANCIAL MANAGEMENT SERVICES							
Hired Services	11,429	13,350	15,000	16,500	18,150	19,965	21,962
Audit Fees	0	7,500	7,500	10,000	10,000	12,500	12,500
Legal Expenses	3,700	3,700	11,250	12,375	13,613	14,974	16,471
TOTAL FINANCE MANAGEMENT SERVICES	**15,129**	**24,550**	**33,750**	**38,875**	**41,763**	**47,439**	**50,933**

	Actual YTD Mar-16	Projected Jun-2016	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
OFFICE EXPENSES							
Bank Charges	1,397	1,862	2,000	2,200	2,420	2,662	2,928
Computer Repair	3,930	7,340	7,500	8,250	9,075	9,983	10,981
Printing & stationery	8,441	11,255	12,000	13,200	14,520	15,972	17,569
Business expenses and promotions	21,944	29,259	30,000	33,000	36,300	39,930	43,923
Electricity	8,924	11,898	13,200	14,520	15,972	17,569	19,326
Donation	4,015	6,000	8,000	8,800	9,680	10,648	11,713
Office Rent/Lease	0	600	600	660	726	799	878
Other Office Expenses	7,931	15,416	18,000	19,800	21,780	23,958	26,354
Attache license renewal	13,268	17,690	20,000	22,000	24,200	26,620	29,282
GPS tracking system quarterly fee	5,087	6,783	7,000	7,700	8,470	9,317	10,249
Staff amenities	10,456	16,000	21,000	23,100	25,410	27,951	30,746
Staff Uniforms	261	3,200	2,000	2,200	2,420	2,662	2,928
Office signage	0	-	1,000	3,000	3,300	3,630	3,993
Motor Vehicle Registration	4,165	5,090	5,100	5,610	6,171	6,788	7,467

	Actual YTD Mar-17	Projected Jun-2017	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
Motor Vehicle Repairs	5,996	8,000	8,500	9,350	10,285	11,314	12,445
Repairs & Cleaning - office	6,525	9,500	10,000	11,000	12,100	13,310	14,641
Motor Vehicle Fuels	7,745	10,122	10,150	11,165	12,282	13,510	14,861
Staff Training	570	1,500	3,500	3,850	4,235	4,659	5,124
Water Rates	1,545	2,060	2,100	2,310	2,541	2,795	3,075
Clean Green Tonga - Exp	2,276	3,035	5,000	5,500	6,050	6,655	7,321
Performance Remuneration	0	-	63,000	69,300	76,230	83,853	92,238
TOTAL OFFICE EXPENSES	**114,476**	**166,610**	**249,650**	**276,515**	**304,167**	**334,583**	**368,041**
COMMUNITY AWARENESS EXPENSES							
Advertising and Promotion	**865**	**2,500**	**3,500**	**3,850**	**4,235**	**4,659**	**5,124**
Printing and Publication	**0**	**-**	**1,000**	**1,100**	**1,210**	**1,331**	**1,464**
Traveling	**0**	**-**	**2,500**	**2,750**	**3,025**	**3,328**	**3,660**
TV and Radio Program	**4,222**	**6,722**	**8,000**	**8,800**	**9,680**	**10,648**	**11,713**
Community Training & Meetings	**0**	**-**	**1,000**	**1,100**	**1,210**	**1,331**	**1,464**
Public Bins	**7,619**	**10,159**	**5,000**	**5,500**	**6,050**	**6,655**	**7,321**

	Actual YTD Mar-17	Projected Jun-2017	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
Public Convenience	1,185	3,500	3,500	3,850	4,235	4,659	5,124
Cleaning Materials	1,726	2,301	2,500	2,750	3,025	3,328	3,660
TOTAL COMMUNITY AWARENESS	15,617	25,182	27,000	29,700	32,670	35,937	39,531
LANDFILL OPERATION AND MANAGEMENT							
Salaries-Landfill	86,803	119,800	143,966	158,363	174,199	191,619	210,781
TOTAL TAPHIA STAFFING COSTS	86,803	119,800	143,966	158,363	174,199	191,619	210,781
Electricity	5,612	7,483	8,500	9,350	10,285	11,314	12,445
Internet & Computer	1,406	2,300	1,188	1,307	1,437	1,581	1,739
Tools and Equipment	2,425	4,225	5,000	5,500	6,050	6,655	7,321
Plant Maintenance Expenses	0	-	2,000	2,200	2,420	2,662	2,928
Cleaning Materials	1,165	1,553	500	550	605	666	732
Septage Beds Maintenance	0	-	2,260	2,486	2,735	3,008	3,309
Landfill Cover Costs	0	-	4,500	4,950	5,445	5,990	6,588
Motor Vehicle Fuel	3,782	5,043	8,500	9,350	10,285	11,314	12,445
Motor Vehicle Repairs	6,088	8,118	7,500	8,250	9,075	9,983	10,981

	Actual YTD Mar-17	Projected Jun-2017	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
Staff Amenities	32	300	600	660	726	799	878
Staff Uniform	0	2,000	25,000	27,500	30,250	33,275	36,603
Staff Training	0	-	5,000	5,500	6,050	6,655	7,321
Telephone	654	872	1,000	1,100	1,210	1,331	1,464
New Compactor Fuel	8,610	11,480	12,000	13,200	14,520	15,972	17,569
New Compactor Repair	0	500	7,000	7,700	8,470	9,317	10,249
Loader HL 740-7 Fuel	6,478	8,638	10,000	11,000	12,100	13,310	14,641
Loader HL 740-7 Repairs	654	2,000	8,000	8,800	9,680	10,648	11,713
Loader HL 1900 Fuel	17,435	23,246	15,000	16,500	18,150	19,965	21,962
Loader HL 1900 Repairs	7,975	10,633	12,000	13,200	14,520	15,972	17,569
Crane truck Fuel - J8040	7,207	9,610	10,000	11,000	12,100	13,310	14,641
Crane truck Repairs - J8040	4,911	9,844	9,500	10,450	11,495	12,645	13,909
Other Maintenance Costs	2,205	4,500	5,000	5,500	6,050	6,655	7,321
TOTAL LANDFILL OPERATION & MAN	163,443	232,143	304,014	334,415	367,857	404,643	445,107
TOTAL OPERATING EXPENSES	1,230,232	1,714,210	1,956,921	2,125,940	2,335,533	2,568,587	2,822,196

EBITDA	499,854	640,121	645,184	736,377	813,014	894,816	987,547
	Actual YTD Mar-17	Projected Jun-2017	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
Depreciation	421,301	561,734	500,000	500,000	500,000	500,000	500,000
E B I T	78,553	78,386	145,184	236,377	313,014	394,816	487,547
Interest expense	6,117	8,430	8,430	8,430	8,430	8,430	8,430
TOTAL INTEREST	6,117	8,430	8,430	8,430	8,430	8,430	8,430
PROFIT/(LOSS) BEFORE TAX	72,436	69,956	136,754	227,947	304,584	386,386	479,117
PROFIT AFTER TAX	72,436	69,956	136,754	227,947	304,584	386,386	479,117
EXTRA-ORDINARY ITEMS(INCOME)							
Amortization	234,162	298,784	304,684	304,684	304,684	304,684	304,684
PROFIT AFTER TAX&EXTRAORDINARY ITEMS	306,598	368,740	441,438	532,631	609,269	691,070	783,802

8.2 WAL - Statement of Financial Position Budget FY2017/18 - FY2021/2022

	Actual YTD Mar-17	Projected Jun-2017	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
ASSETS							
Non-current assets	4,204,444	4,000,000	4,125,000	4,000,000	4,000,000	4,000,000	4,000,000
Plant and equipment							
Current assets							
Debtor	223,830	100,000	100,000	100,000	100,000	100,000	100,000
Cash and cash equivalents	241,145	300,000	300,000	530,000	583,000	641,300	705,430
GPO & Other Claims	196,082	100,000	100,000	100,000	200,000	200,000	300,000
Other	47,986	50,000	50,000	55,000	60,500	66,550	73,205
TOTAL CURRENT ASSETS	**709,043**	**550,000**	**550,000**	**785,000**	**943,500**	**1,007,850**	**1,178,635**
TOTAL ASSETS	**4,913,487**	**4,550,000**	**4,675,000**	**4,785,000**	**4,943,500**	**5,007,850**	**5,178,635**
LESS LIABILITIES							
Current Liabilities							
Trade Creditors	91,675	49,500	50,000	50,000	50,000	50,000	50,000
Other Sundry Creditors	4,629	14,000	14,000	14,000	14,000	14,000	14,000
Clearing Accounts	5,384	10,000	10,000	10,000	10,000	10,000	10,000
Accrued Expenses	32,490	25,000	25,000	25,000	25,000	25,000	25,000

	Actual YTD Mar-17	Projected Jun-2017	Budget FY2017/18	Budget FY2018/19	Budget FY2019/20	Budget FY2020/21	Budget FY2021/22
Provisions for dividend	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Provision for Audit Fees	7,000	7,500	7,500	10,000	10,000	12,500	12,500
NET CT (PAYABLE)	133,790	50,000	55,000	60,500	66,550	73,205	80,526
TOTAL CURRENT LIABILITIES	**324,968**	**206,000**	**211,500**	**219,500**	**225,550**	**234,705**	**242,026**
Long term Liabilities							
Borrowings	429,375	450,795	-	500,000	500,000	300,000	200,000
Loan From TPL	200,000	200,000	200,000	150,000	100,000	-	-
Deferred Income	3,485,493	3,500,000	3,500,000	3,000,000	3,097,627	2,910,265	2,931,925
TOTAL LIABILITIES	**4,439,836**	**4,356,795**	**3,911,500**	**3,869,500**	**3,923,177**	**3,444,970**	**3,373,951**
NET ASSETS	**473,651**	**193,205**	**763,500**	**915,500**	**1,020,323**	**1,562,880**	**1,804,684**
Equity							
Share Capital	900,000	900,000	1,300,000	1,300,000	1,300,000	1,300,000	1,500,000
Retained Earnings	(732,947)	(1,075,536)	(977,938)	(917,131)	(584,361)	(41,804)	-
Current year Profit	306,598	368,740	441,438	532,631	304,684	304,684	304,684
TOTAL EQUITY	**473,651**	**193,205**	**763,500**	**915,500**	**1,020,323**	**1,562,880**	**1,804,684**

8.3 Waste Authority Limited Cash Flow Forecast

Cash Flow Forecast for FY2017/18 - FY2021/22

	30-Jun-17	30-Jun-18	30-Jun-19	30-Jun-20	30-Jun-21	30-Jun-22
Cash at Beginning of Year	250,000	300,000	300,000	530,000	583,000	641,300
Operations						
Cash receipts from customers	2,354,331	2,602,106	2,862,316	3,148,548	3,463,403	3,809,743
Cash paid for						
Management and administrative expenses	(437,817)	(547,304)	(599,010)	(658,911)	(724,803)	(797,283)
Revenue collection expenses	(63,775)	(35,500)	(12,750)	(13,025)	(13,328)	(13,660)
Communication expenses	(28,130)	(32,600)	(35,860)	(39,446)	(43,391)	(47,730)
Board expenses	(69,391)	(72,340)	(78,574)	(85,431)	(92,975)	(101,272)
Financial management services	(24,550)	(33,750)	(38,875)	(41,763)	(47,439)	(50,933)
Office expenses	(166,610)	(249,650)	(276,515)	(304,167)	(334,583)	(368,041)
Collection and transportation	(666,611)	(654,763)	(720,240)	(792,264)	(871,490)	(958,639)
Contractor payments	-	(4,000)	(4,400)	(4,840)	(5,324)	(5,856)
Community awareness	(25,182)	(27,000)	(29,700)	(32,670)	(35,937)	(39,531)
Landfill operation & management	(232,143)	(304,014)	(334,415)	(367,857)	(404,643)	(445,107)
Income taxes	-	-	-	-	-	-
Net Cash Flow from Operations	**640,121**	**641,184**	**731,977**	**808,174**	**889,492**	**981,691**

	30-Jun-17	30-Jun-18	30-Jun-19	30-Jun-20	30-Jun-21	30-Jun-22
Investing Activities						
Cash receipts from						
Sale of property and equipment	-	-	-	-	-	-
Cash paid for						
Purchase of property and equipment	(232,172)	(236,684)	(571,977)	(325,174)	(151,192)	(437,561)
Other payments	(89,574)	(80,000)	(80,000)	(80,000)	(80,000)	(80,000)
GPOS	(200,000)	(200,000)	(200,000)	(200,000)	(200,000)	(200,000)
Net Cash Flow from Investing Activities	**(521,746)**	**(516,684)**	**(851,977)**	**(605,174)**	**(431,192)**	**(717,561)**
Financing Activities						
Cash receipts from						
Borrowing	-	-	500,000	-	-	-
Cash paid for						
Repayment of loans	(18,375)	(24,500)	(50,000)	(50,000)	(300,000)	(100,000)
Dividends	(50,000)	(100,000)	(100,000)	(100,000)	(100,000)	(100,000)
Net Cash Flow from Financing Activities	**(68,375)**	**(124,500)**	**350,000**	**(150,000)**	**(400,000)**	**(200,000)**
Net Increase in Cash	**50,000**	**0**	**230,000**	**53,000**	**58,300**	**64,130**
Cash at End of Year	300,000	300,000	530,000	583,000	641,300	705,430

8.4 WAL - Statement of Financial Performance Monthly Budget for FY2017/

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
REVENUES	**2017**						**2018**						**FY2017/18**
Domestic - Households	99,943	106,606	114,220	123,007	135,874	145,371	145,371	145,371	145,371	145,371	145,371	145,371	1,599,086
Non Domestic - Businesses	19,925	21,254	22,772	24,523	27,268	28,982	28,982	28,982	28,982	28,982	28,982	28,982	318,805
Other Institutions, schools & churches	4,468	4,766	5,107	5,500	6,176	6,500	6,500	6,500	6,500	6,500	6,500	6,500	71,495
Septage	7,474	7,972	8,541	9,199	10,344	10,871	10,871	10,871	10,871	10,871	10,871	10,871	119,581
Tapuhia Gate Collections	1,610	1,717	1,840	1,982	2,186	2,342	2,342	2,342	2,342	2,342	2,342	2,342	25,762
Levies	25,344	27,033	28,964	31,192	35,184	36,864	36,864	36,864	36,864	36,864	36,864	36,864	405,501
Bin hiring & sales	555	592	634	683	824	807	807	807	807	807	807	807	8,877
Other income	3,125	3,333	3,571	3,846	4,168	4,545	4,545	4,545	4,545	4,545	4,545	4,545	50,000
Gain asset disposal	188	200	214	231	251	273	273	273	273	273	273	273	3,000
TOTAL REVENUE	**162,632**	**173,474**	**185,865**	**200,162**	**222,274**	**236,555**	**236,555**	**236,555**	**236,555**	**236,555**	**236,555**	**236,555**	**2,602,106**
LESS EXPENSES													
Head Office staff costs	34,207	36,487	39,093	42,100	47,008	49,755	49,755	49,755	49,755	49,755	49,755	49,755	547,304
Revenue collection costs	2,219	2,367	2,536	2,731	3,049	3,227	3,227	3,227	3,227	3,227	3,227	3,227	35,500
Communication Expenses	2,038	2,173	2,329	2,508	2,763	2,964	2,964	2,964	2,964	2,964	2,964	2,964	32,600
Board expenses	4,521	4,823	5,167	5,565	6,229	6,576	6,576	6,576	6,576	6,576	6,576	6,576	72,340

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Finance management expenses	2,109	2,250	2,411	2,596	2,878	3,068	3,068	3,068	3,068	3,068	3,068	3,068	33,750
Office expenses	15,603	16,643	17,832	19,204	21,203	22,695	22,695	22,695	22,695	22,695	22,695	22,695	249,650
Collection staff expenses	25,819	27,540	29,507	31,777	35,073	37,555	37,555	37,555	37,555	37,555	37,555	37,555	413,100
Collection Trucks Fuel	7,258	7,742	8,295	8,933	9,976	10,557	10,557	10,557	10,557	10,557	10,557	10,557	116,130
Collection Trucks Repairs	7,846	8,369	8,967	9,656	10,700	11,412	11,412	11,412	11,412	11,412	11,412	11,412	125,534
Community awareness	1,688	1,800	1,929	2,077	2,444	2,455	2,455	2,455	2,455	2,455	2,455	2,455	27,000
Landfill staff costs	8,998	9,598	10,283	11,074	12,279	13,088	13,088	13,088	13,088	13,088	13,088	13,088	143,966
Landfill Operations costs	10,003	10,670	11,432	12,311	13,669	14,550	14,550	14,550	14,550	14,550	14,550	14,550	160,048
TOTAL OPERATING EXPENSES	**122,308**	**130,461**	**139,780**	**150,532**	**167,272**	**177,902**	**177,902**	**177,902**	**177,902**	**177,902**	**177,902**	**177,902**	**1,956,921**
EBITDA	**40,324**	**43,012**	**46,085**	**49,630**	**55,002**	**58,653**	**58,653**	**58,653**	**58,653**	**58,653**	**58,653**	**58,653**	**645,184**
Depreciation	**41,667**	**41,667**	**41,667**	**41,667**	**41,667**	**41,667**	**41,667**	**41,667**	**41,667**	**41,667**	**41,667**	**41,667**	**500,000**
E B I T	**(1,343)**	**1,346**	**4,418**	**7,963**	**13,336**	**16,986**	**16,986**	**16,986**	**16,986**	**16,986**	**16,986**	**16,986**	**145,184**
TOTAL INTEREST	**703**	**703**	**703**	**703**	**703**	**703**	**703**	**703**	**703**	**703**	**703**	**703**	**8,430**
PROFIT/(LOSS) BEFORE TAX	**(2,045)**	**643**	**3,715**	**7,260**	**12,633**	**16,284**	**16,284**	**16,284**	**16,284**	**16,284**	**16,284**	**16,284**	**136,754**
PROFIT AFTER TAX	**(2,045)**	**643**	**3,715**	**7,260**	**12,633**	**16,284**	**16,284**	**16,284**	**16,284**	**16,284**	**16,284**	**16,284**	**136,754**
Amortization	**25,390**	**25,390**	**25,390**	**25,390**	**25,390**	**25,390**	**25,390**	**25,390**	**25,390**	**25,390**	**25,390**	**25,390**	**304,684**
PROFIT AFTER TAX & AMOR	**23,345**	**26,033**	**29,106**	**32,651**	**38,024**	**41,674**	**41,674**	**41,674**	**41,674**	**41,674**	**41,674**	**41,674**	**441,438**

8.5 CAPITAL EXPENDITURE PLAN FY2017/18 - TONGATAPU

A. FUND LOCALLY

ITEM	APPROX. COST
• Four (4) Waste Trucks – Dump Long open Tray	$200,000
• Two (2) white office cars (used for Tapuhia and HO community	$ 40,000
• CBG Waste to Energy Project	$250,000
• Tapuhia general facility upgrade	$ 80,000
• Water treatment pumps replacement	$ 30,000
• Heavy machinery and collection vehicles spare parts stock	$100,000
• Office equipment/computers	$ 50,000
• Trailers	$100,000
• Water Tanks	$ 5,000
• 10 Portable loos	$100,000
• Excavator/digger (Septage beds)	$100,000
• WAL's share in Multi Utility Office Complex	$250,000
• Technology one implementation	$395,000
Total:	**$ 1,450,000**

These capital expenditures will be acquired only subject to cash flow availability or borrowing if necessary.

B. FUND BY DONOR FUNDED PROJECTS (NUKU'ALOFA URBAN DEVELOPMENT SECTOR PROJECT)

• New septage drying beds	$160,000
• 3 Public toilets	$200,000

C. FUND BY OTHER DONORS

• Waste collection compactor truck Ha'apai (Japan Gov't)	$ 50,000
• Household bins (based on 15,000 households @ $160 per bin total cost of bin is approx.. $260 per bin). Subject to availability of donor(s).	$2,400,000

Total finance by donor funded projects	$2,810,000
TOTAL TONGATAPU CAPEX	**$4,260,000**

8.6 CAPITAL EXPENDITURE PLAN FY2017/18 – VAVA'U

A. FUND LOCALLY

ITEM	APPROX. COST
• Two (2) Open tray used trucks	$ 70,000
• One (1) used car	$ 20,000
• One (1) Ute 4 wheel van	$ 50,000
• Office upgrade	$ 20,000
• Office furniture's & equipment	$ 15,000
• Computers	$ 5,000
Subtotal:	**$ 180,000**

These capital expenditures will be funded subject to availability of cash flow. Borrowing will be considered as an option.

B. FUND BY DONORS (JAPAN GOVERNMENT)

• Waste collection vehicles (2 compacter trucks, one septage truck, 1 dump truck)	$200,000
• Kalaka landfill upgrade	$ 50,000
Subtotal:	**$250,000**
Total Vava'u Capex	$430,000