BUSINESS PLAN 2019-2024

"POWERING THE SUSTAINABLE DEVELOPMENT FOR OUR KINGDOM"

REPORT BY SOSEFINA MAILESENI

TONGA POWER LIMITED

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1. CEO STATEMENT

I am happy to present the Tonga Power Limited (TPL) Business Plan for the period 2020-2024. The main objective of this plan is to deliver the Government's 50% Renewable Energy target by 2020 and this will be TPLs' main focus over the next years in order to achieve the Governments' core purpose of ***"reducing Tonga's vulnerability to oil price shocks and achieving an increase in quality access to modern energy services in a financially and environmentally sustainable manner.***

In order to achieve this objective, Tonga Power intends to invest more than TOP $7.0 million on various projects including renewable energy next year. 2020 is a very big year for Tonga Power and this has meant redirecting TPL's strategic focus and resources to ensure that priority projects are implemented by the end of 2020, which is not an easy task and comes with a lot of challenges. The contribution from various donors is a major contributing factor to achieving this major milestone and the Green Climate Funding (GCF) is the major sponsor of these RE projects.

The Tonga Renewable Energy Project proposal (TREP) submitted to the GCF in 2017 was approved in October 2018 to a total of about $53.20 million which will be provided through a combination of grant funding from the Asian Development Bank (ADB), Green Climate Fund (GCF) and the Government of Australia, all of which will be implemented before 2020. Promoting private sector investment was a key factor in the TREP negotiation phase and was well accepted by TPL. Significant contribution will come from the Private Sectors in order to lower the electricity tariff while at the same time drive TPL towards the 50% Renewable (RE) target which has started to show benefits. First was a 2 MW solar facility in Matatoa in 2017, the first IPP to be established in Tonga, privately funded by a Chinese Organization, Zhuhai Singyes Green Building Technology. The second will be a 6 MW Solar IPP, which has been awarded to Sunergise International, NZ in March 2020 with construction to commence later this year. A 3.8 MW Wind, is also planned to be installed before 2020 as part of the TREP package, however work on getting this project on the ground has not started yet. The Government of China is also looking to fund a 2.15 MW wind farm that is proposed to be located in the eastern side of Tongatapu. The expectation is once all these projects are completed, it will take TPL to 50% or more RE penetration by 2020.

A major challenging area is the intermittent nature of the Renewable projects, the integration of renewables with 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 constructing battery storages that will now be financed through the GCF, SCADA upgrades and a meshed-ring-communication philosophy to assist in accommodating RE generation to achieve the balance between electricity supply and demand. The installation of smart meters which started in late 2016 will assist in achieving fast and automated response in load management, energy loss reduction, system stability, and enhanced power quality and reliability. Having a combined control center for Distribution and generation is also another major task that would definitely be implemented this year, one that would definitely add value to resolving this issue.

In addition to the above projects, TPL will contribute an approximate TOP $7 million from its own balance sheet to fund various distribution network, power generation, IT, corporate and enterprise resourcing projects which are discussed precisely in this Business Plan.

Tonga Power will continue to successfully manage its major ongoing projects such as the Nuku'alofa Network Upgrade project (NNUP) Stage 1 and 2 funded mainly by the NZ Government which commenced in December 2018. The Niutoua Wind Project funded by the Japanese Government (scheduled to commission in June 2019), Smart Metering Stage 2, OIREP (Outer Island Renewable Energy Project) Stage 2 funded by ADB and the Enterprise Resource Planning (ERP) projects. Smart metering and the remaining work on the ERP are purely TPL funded.

A sizable amount of investment post 2020 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.

This Business Plan clearly describes how Tonga Power Limited will achieve the 50% renewable energy by 2020 with the above portfolio of projects in order to achieve the company six major objectives 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 for Tonga, a major initiative discussed during the Senior Management Strategic Workshop held in February of this year.

Due to the company holding of its power tariff going two years now, with aggressive investment on Renewable Power Generation projects target 2020, the company is only expecting to achieve a net profit after tax at the end of the 2019 financial year of about $1.1 million. Total revenue is forecasted to be maintained throughout. The ongoing increase in diesel prices however will result in a reduce profit at financial year end. With the combined utility initiative that is currently underway, it is expected that the targets will not be achievable despite shared services and cost cutting initiative as the major focus of this move. This is in relation to Government initiative of holding tariff at 70 seniti to all residential customers for two full years since April 2017, lowest tariff customers has paid over TPL last 10 years of operation.

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. Setitaia Chen
(CEO, Tonga Power Limited)

2. EXECUTIVE SUMMARY

This five-year Business Plan covering the period 2020-2024 was developed systematically and constructively to achieve Tonga Power Limited's mission of **"Providing safe, reliable, affordable and sustainable services for Tonga with at least 50% of electricity requirements through renewable sources by 2020 whilst remaining financially stable".** It also supports the Government 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 2020-2024. 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 generations from Renewable Energy generation by 2020 in order to achieve the government TERM target and realistic tariff reductions.***
ii. ***Adopting technologies to manage the complexities arising from a digitized and decentralized renewable future.***
iii. ***Improving the network by replacing ageing assets to improve safety, efficiency and reliability of supply.***
iv. ***Promote a hazard free safety environment to minimize any danger to both the public and staff.***
v. ***Improving our business processes to enhance customer/employee satisfaction while supporting a healthy and competent team.***
vi. ***Manage all external funding and internal financing sources successfully in order to increase 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 designed 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.
- Improved customer services.

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 as well as the supply and distribution of LPG through Tonga Gas and Homegas.

TPL activities are outlined below:

Generation Capacities:

As of December 2018, TPL had installed firm (diesel) generating capacity of 17.1MW in all four islands. Tongatapu capacity and its peak demand is about 9.7MW with a new record of 10.4MW peak demand during the month of February this year. 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). The 11kV switchboard in the Popua Power Station also helps to provide flexibility and reliability of supply. Vava'u also meets the N-1 security with a total of five generators. 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, 197 km overhead line, 9 km of underground cables, and 0.8 km of submarine cable, in addition to 567 km of low voltage lines (single and three phase). Vava'u has 6.6kV distribution network, 76 km of overhead line, 2 km of underground cables, and 95 km of low voltage lines (single and three phase). Ha'apai has 11kV distribution network, 14 km of overhead line, 2 km of underground cables, and 38 km of low voltage lines (single and three phase). 'Eua has 11kV distribution network, 13 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 more than 90% 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 of "*one tariff for all*" was adopted in 2009 through regulation which makes the tariff consistent across all the four island groups. Tonga electricity tariff (currently at 81.20 seniti/kWh) consists of two components: Fuel Component (38.53 seniti/kWh) and Non-fuel Component (42.67 seniti/kWh). However, in response to the high power tariff resulting from high fuel costs, Government approved in April 2017 to offer a lifeline support for all residential customers consuming power of up to 100kWh to maintain power tariff at 70 seniti/kWh and will continue up until end of June 2019, funded from Tonga Power Limited dividend payable to Government. This lifeline support is not available to commercial consumers.

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 10.4MW 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-conditioning 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 December 2018 was about 66 GWh. This quantity of generation was more than the quantity generated in the year ending December 2017 of 57 GWh reflecting a 16% growth in the demand for electricity. Out of the total power generated, 55 GWh was billed to customers with parasitic and line losses contributing 2 GWh and 7 GWh respectively. The overall system losses was reduced to 9.16% at end of December 2018.

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, six major solar plants were constructed including one (1) IPP: Maama Mai (1.4MW), Mata ‘o e La’a (1MW) and Matatoa Solar Farm IPP (2MW) in Tongatapu, La’a Lahi (420KW) in Vava’u, Huelo ‘o e Funga Fonua in ‘Eua (200kW) and Ha Masani in Ha’apai (550kW). 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.

The commissioning of the Matatoa solar farm marked a new milestone in private sector investment in the development of renewable energy generation in Tonga. The project is the first large scale Independent Power Producer facility to be installed in the Kingdom. Although the Matatoa solar plant in Tongatapu adds 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 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. With Battery Energy storage a major component of the GCF; this allows for increased integration of additional renewable energy.

Furthermore, TPL owns 65kW’s of roof-top 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 7.0 million liters, which is equivalent to $10.0 million in cost savings passed directly to consumers.

Financial Strength:

TPL’s revenue is generated from more than 25,000 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 55GWh per annum despite rising costs. In the year 2018, the company generated approximately $46 million in revenue with $4.7 million net profit after tax (NPAT).

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

4.1 Ownership Guidelines

The Ministry of Public Enterprise Letter of Expectation, dated 23 January 2018, 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.
- The board, comprising all of the directors (unless otherwise required by legislation), must exercise their powers collectively. Powers should not be delegated unless a delegation is absolutely necessary to be made to a sub-committee of the board or a particular individual.
- Directors are reminded that expenditures, single or linked, that exceed 10% of equity or net assets - whichever is the lesser - can only be incurred when all of the directors of the Board authorize that expenditure.
- Directors are urged to work closely and collaboratively with the MPE in order to achieve the customer service and financial objectives required of all PEs. Timely, frequent and effective communication between Directors and the Ministry in all matters relating to the PE's performances, projects and developments is required.
- All out going directors will complete an Exit Interview, to be undertaken by the Ministry. I would request that your Board facilitate this as appropriate.
- A significant emphasis on quality of "service delivery'' to the people. In other words, social responsibility is a priority. Improving the quality and efficiency of services to the people is most essential. From the customer services at the counters to service delivery to customers around the country, services must be people-oriented and customer-friendly.
- Customer complaints and criticisms should be viewed as opportunities to improve performance and transparency rather than a barrier to development. A "Complaint and Suggestions Box" must be installed in areas at all PEs where customers can access and submit any complaints and/or suggestions on any issue.

Furthermore, section 18 of the MPE Act outlines 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 built 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.

Company Act

- TPL has its own Company Constitution which sets out the rights, powers, duties and obligation of the Board, each director, company secretary and the shareholder as required by the Act.
- It outlines the issue of shares and dividend requirement, administration of companies, audit and records requirement as well as incorporation and registration requirement under the Tonga Registrar of Companies.
- Directors roles include ensuring that companies meet the solvency test.

Electricity Act 2007

- Provides the governance framework for the electricity sector.
- The establishment of the EC was legally defined by the Act – established as the regulatory agency for grid- based diesel generated electricity supply, as the regulator.
- Establishes the role of the **Concession Contract** in producing and delivering electricity.
- 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.

Concession Contract

- The second concession contract came into force on 1st September 2015.
- Sets out the terms and conditions upon which the Concessionaire (Tonga Power Limited) will generate, distributed and supply electricity to consumers of electricity in the Kingdom of Tonga.
- Spell out tariffs, tariff adjustment formulas, operational efficiency benchmarks, consumer service standards and penalties which are specified between the EC, the Government and Tonga Power Limited.

Ministry of Public Enterprises Act 2010

- TPL is required to operate as a successful business and to be as profitable and efficient.
- The Act also requires TPL to report its performance on a periodical basis.

National Strategic Development Framework

- 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**).
- Puts greater emphasis on infrastructure that improves the everyday lives of the people and lowers the cost of business.
- The three main pillars of the TSDF includes "connecting Tonga, infrastructure for communities and reliable and affordable energy" which comes under the three main S's of the TSDF which are Sustainability, Safety and Resilience.

The Renewable Energy Act 2010

- 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.

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.

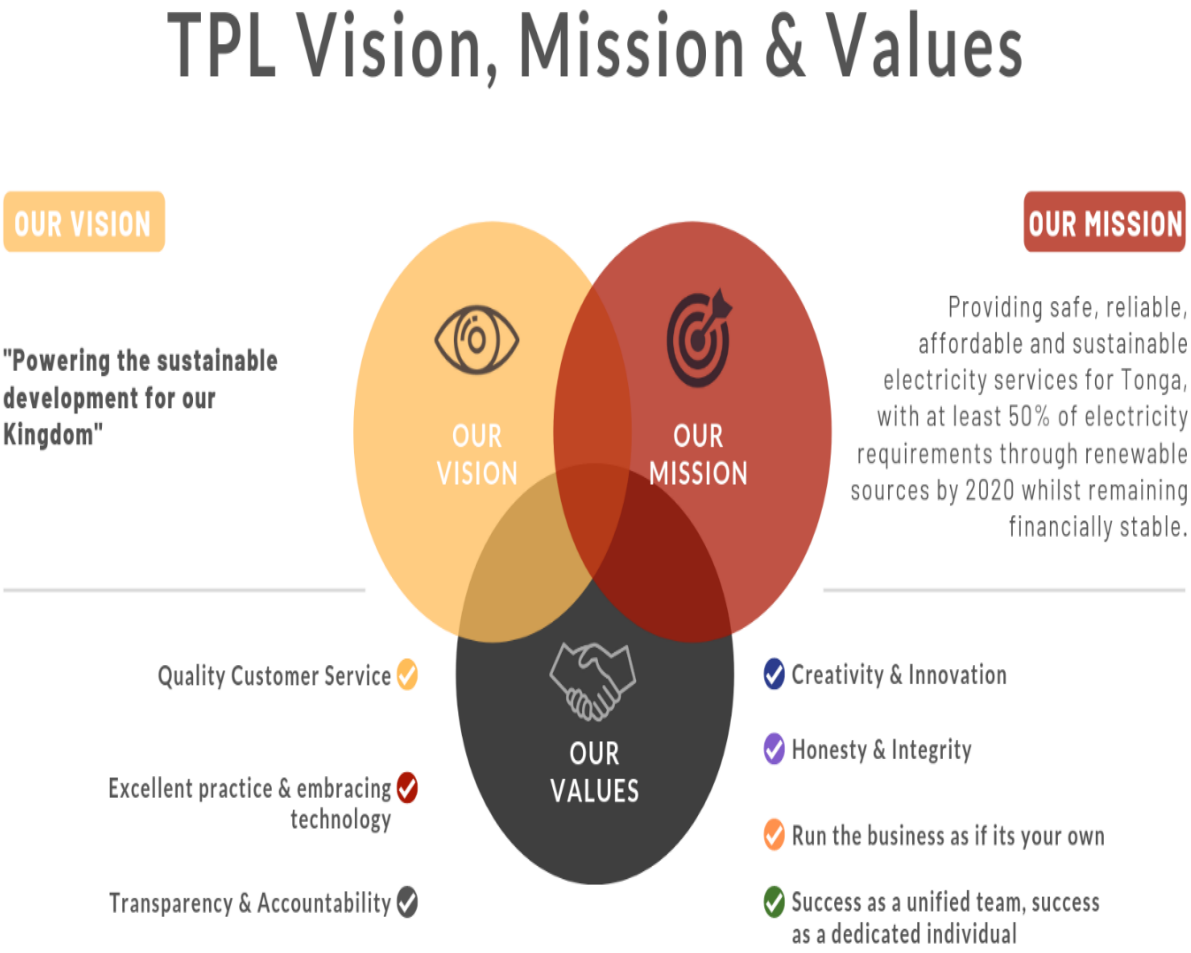
Combined Utility Board Policy Standardisation

- 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.

The company are also obligated to comply with the following pieces of legislation:

- **Business Licenses Act**
- **Ombudsman Act**
- **Public Audit Act 2007**
- **Income Tax Act 2007**
- **Foreign Exchange Control Act 2018**
- **Land Act**
- **Public Health Act**
- **National Retirement Benefit Scheme**
- **Price and Wage Control Act**
- **Public Finance Management Act**

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. 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:

Policy Issues:

Government Policy (TERM)

Government issued the Renewable Energy Act in 2008 and a transition to renewable energy has been a stated national priority ever since. Further in 2009, Government issued the Tonga Energy Road Map, 2010 – 2020 (TERM) with a major objective to achieve 50% renewable energy penetration by 2020. Tonga Power therefore reprioritizes its resources and effort in ensuring the target is achieved and to rapidly transform the country to a low carbon, renewable-based energy Tonga.

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 – the GCF proposal was recently just approved in late 2018, with implementation starting this year. Very tight timeline to complete by 2020.
ii) Resource constraint – a 3.8 Wind IPP is part of the Tonga Renewable Energy proposal which is yet to be formalized mainly because there is extra resources required to get the project on the ground.
iii) Relative cost of RE is too high particularly initial investment considering TPL contributions to donor funded projects.
iv) The 50% RE 2020 Target put pressure on TPL commitments/obligation under various donor funds agreements.

TPLs response to the challenge is:

- Tonga Renewable Energy target is fully supported by the Government of Tonga at the highest level. TREP is a central and pivotal component of TERM, and the Government of Tonga has established a high-level Taskforce to implement TERM chaired by the Prime Minister.
- TPL has set promising and very strict deadline for the implementation of these renewable projects by end of 2020.

Regulations concerning IPP's

In order for Tonga to reach 50% by 2020, IPP will play a major role in taking Tonga towards its renewable energy goal. Rapidly transforming the sector requires substantial investments in a short period of time. The ability of Tonga to access public and private financing for such investments is limited therefore engaging private investment is encouraged.

With the company and shareholder limited debt-bearing capacity, the available resources are insufficient to finance the structural shift from diesel generation to renewable energy. Reaching the region's energy targets presents prospects for the private sector to deliver the technical solutions and financing models that will ensure their sustainability. Tonga has continuously working with development partners and other stakeholders to create an enabling environment for investors to continue investing in RE in Tonga. However, a major unappealing factor is that investors are often deterred by small project size, poor financial returns on investments, lack of previous experience and perceived risk, and incomplete data sets and analysis especially in a small country like Tonga. Specifically, the Foreign Exchange Control Act prohibits foreign contractors from coming and completing works for us here in Tonga as they have off shore accounts. Therefore they have to set up SPV company especially for the project however donors will not sign off on SPV's to complete works as they do not have any experience or financial history which is required by the donors for contract awards.

Developing appropriate Power Purchase (PPA) Agreements with IPP owners and managing outcomes will also present a challenge to TPL. 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.

With up to 11MW of renewable generation that could be provided by independent power producers, Regulatory reform and a donor-supported risk reduction facility are planned to enable investment.

TPLs response to the challenge is:

- The Green Climate Funding approved in late 2018, TREP will support potential IPP transactions and areas for IPP involvement (e.g. drafting and/or reviewing PPAs to be entered with IPPs).
- Without the proposed BESS under TREP taken in place, planned solar PV and wind farms to be developed by independent power producers (IPPs) would not be realized, because TPL's grid cannot fully observe intermittent electricity generated from those renewable energy generation facilities.
- Battery storage is required to allow increased integration of renewable energy, particularly from the private sector. Once the additional renewable energy is constructed, TPL will become reliant on battery storage for a significant proportion of its revenue, and therefore has a strong incentive for operating and maintaining battery storage.
- GOT is working toward reviewing and developing a coherent and robust National Energy Framework Bill. The Tonga Energy Efficiency Master Plan will set clear direction based on the need to address climate change and security of energy supply, supported by market instruments that encourage incentives to attract private sector investments in renewable energy.

Legal and Political Issues:

Government incentive to hold tariff at 70 seniti and impact on TPL

Government in response to the high cost and fluctuation nature of diesel has agreed after consultation with TPL to offer (through dividend subsidy) a lifeline tariff from April 2017 to all residential customers who uses less than 100 units of electricity each month to maintain an electricity tariff of 70 seniti per kwh. This tariff will continue until end of June 2019.

With the recent increasing diesel costs, this initiative has put pressure on TPLs bottom line and has resulted in the introduction of several cost cutting measures and reprioritization of the company CAPEX and OPEX until which time TPL is back to a more stable financial position. Contributions to major projects in its early years is also seen as a major set back to the company.

Once the transition to renewable energy is largely complete, it is expected that financing of upgrades or refurbishments of renewable energy assets will be covered by operational budgets of the company – a major challenges for TPL. TPL has established adequate management capacity and a tariff regime sufficient for full cost recovery, which allows for adequate operation and maintenance. However, this may not be appropriate given the lifeline subsidy currently offered to the public.

TPL response to the challenges:

- About $2 million cost cutting measures have already been implemented which has resulted in a 4 seniti reduction in the Non fuel component of the tariff.
- Dividend retention to cover the underecover costs of tariff hold which is estimated at around $3.2 million this financial year 2017/18.
- Aggressive debt collection (12 – 13 days debtors turnover).
- Prioritise pending on commitments to 50% RE projects and major generators overhaul.
- Tight cash management that resulted in unhealthy financial position for TPL.

Third Party Generation (on-grid)

Furthermore, 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:

- 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.
- GCF covers for two main sets of BESS for Tongatapu.
- Constructing a suitable agreement including various mechanisms such as charging a grid availability charge or setting up a multi tariff system.
- Adoption of smart grid technologies.

Limited safety regulations

Given the paramount consideration of both EC and TPL is electrical safety, they shall take all reasonable measures to prevent electrical hazards which may include disconnection from TPL network if required. The issue is when is electrocuted, parties responsible should be held accountable. The old By-Laws developed with the old Tonga Electricity Power Board Act are materially deficient in regard to electrical safety and a Safety Regulation was presented to Cabinet before to which they showed very little interest. Under the current regulations, TPL has the authority to disconnect customers when an electrical hazard is found or reported by a third party and is considered hazardous.

The role of the EC is clearly outlined in the Electricity Act and that all electrical contractors in Tonga adopts the international AS/NZS 3000/2007 Wiring Code to ensure electrical wiring safety as well as when doing other major electrical works.

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.

Furthermore, for tall building structures especially in the CBD area and newly constructed houses and buildings built too close to the lines, TPL again follows the growth limit zone requirement of two meters stated in TPL limit zone. TPL has been working in close collaboration with the Ministry of Infrastructure to raise awareness of the minimum clearance from TPL poles and conductors that run overhead next to the boundary. Problems arises when a house is also build right up to the boundary where our lines is built, where there is a high probability that the pole and conductor will touch the roof or some part of the house. It is a concern to TPL because once the design is approved by the Ministry of Infrastructure, construction will continue.

TPLs response to the challenge is:

ii) 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.
iii) 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.
iv) TPL was to seek legal assistance to amend the existing legislation/consider other relevant Act i.e. Road Reserve Act, if TPL is covered.
v) Under the NNUP, cables used are more secured and reliable.
vi) Ongoing Safety awareness programs/campaign.

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, a major task to do is 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 & Asset Management Module of Tech1 and replacing/maintaining them as per the AMP.
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) Implementing the 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, NNUP, 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 2017 for about 37 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.

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. Below are the top six major external risks.

External Business		
Risk	**Mitigation Control**	**Control**
Significant financial and reputational risk to TPL due to the aggressive 50% Government policy target to be achieved by 2020. TPL highly dependent on donor funding which resulted in long lead times because the GCF proposal to fund the remaining RE projects to take the company to 50% was recently approved last year. Additionally, initial investment is too high.	Tonga Renewable Energy target is fully supported by the Government of Tonga and TPL has set promising and very strict deadline for the implementation of these renewable projects by end of 2020.	Effective
Significant financial and reputational risk if the company cannot achieve the 50% target given the limitations in the local regulatory regimes governing IPP – the current Act prohibits foreign contractor from completing work in Tonga as they have offshore accounts. Given IPP is the only option that will take TPL further to achieve its 50% target, IPP is encouraged given the company limited debt-bearing capacity.	The Green Climate Funding support potential IPP transactions and areas for IPP involvement. TREP includes BESS component to withstand additional planned Solar and Wind IPPs. GOT is also working toward reviewing and developing a coherent and robust National Energy Framework Bill as well as consider reviewing the legislation to promote private investment.	Partially Effective
Significant financial and reputation losses to TPL due to Government incentive of holding tariff at 70 seniti therefore put pressures on the company bottom-line.	1) Cost cutting measures have already been introduced. 2) Dividend retention to cover the under-recover costs of tariff hold. 3) Aggressive debt collection (12 – 13 days debtors' turnover). 4) Prioritise pending on commitments to 50% RE projects and major generators overhaul. 5) Tight cash management that resulted in unhealthy financial position for TPL.	Partially Effective
Significant financial and reputation losses to TPL due to any public discontent resulting from unaffordable electricity tariffs through rising oil prices couple with achieving the 50% RE target if there is no major changes to tariff.	It is expected that tariff will decrease significantly by 2020 with the 50% RE penetration target. Government GPO has also assisted.	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.	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 and deteriorated network/lines. 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. The network upgrade projects will definitely assists with relevant safety hazards/issues.	Partially Effective

5.2 Internal Elements

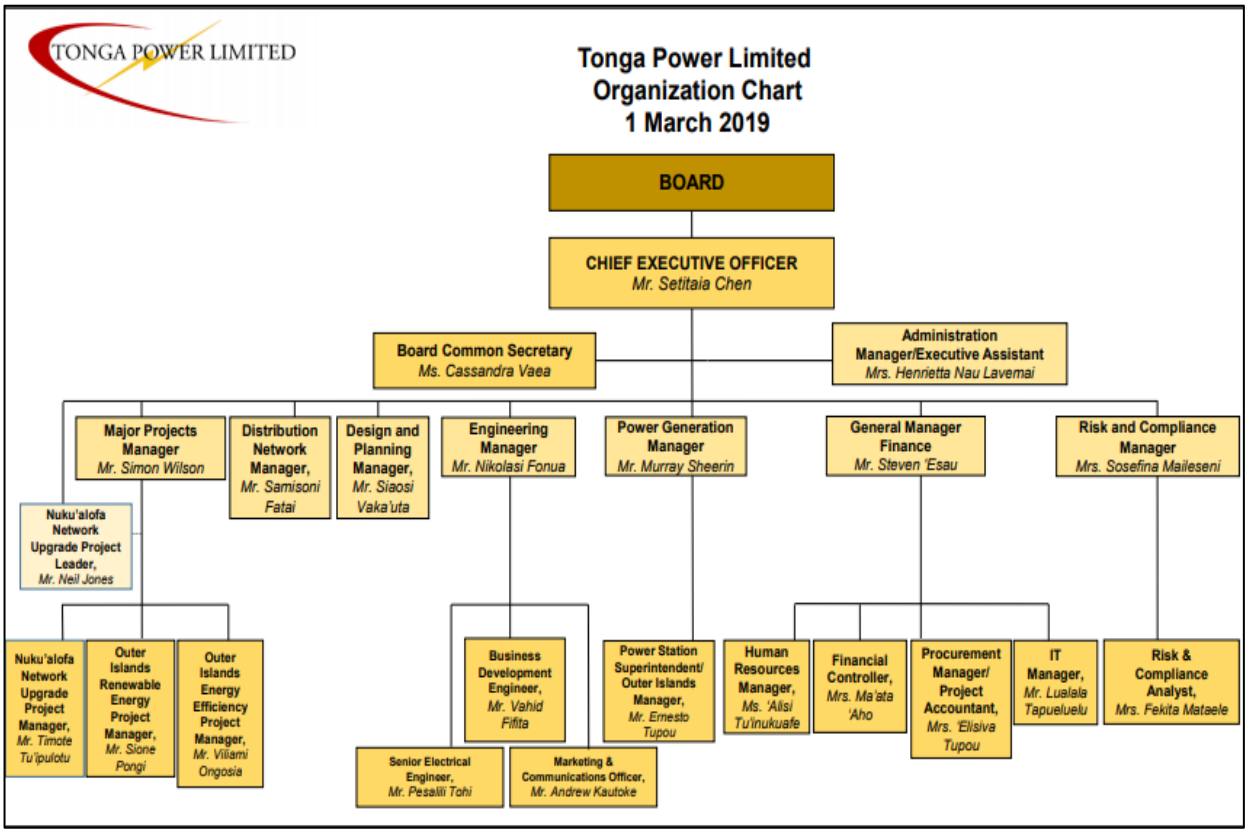
A number of internal factors may impact on the execution of our mandate. These factors include the following:

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 257. More than 30 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 Nuku'alofa project.

Below is a summary of TPL staff list as at March 2019.

		Tongatapu		Vava'u		Ha'apai		Eua		
	Department	**Permanent**	**Casual**	**Permanent**	**Casual**	**Permane**	**Casual**	**Permane**	**Casual**	**TOTAL**
1	CEO	1								
2	Senior Mangers	8								
3	Board Secretary	1								
4	**Operations**									
i	Distribution Network	48	12	6	5	5	4	5	3	
ii	Design & Planning	16	1	1						
5	**Major Projects**									
i	NNU	20	11							
ii	OIEE	6							2	
iii	OIRE	1								
6	Power Generation	17	4	4		3		2		
7	Strategic Development	2								
8	Engineering	2	4							
9	Risk & Compliance	1								
	Finance									
i	Accounts	7	1							
ii	Billing	14				1				
iii	Revenue	8		3		2		2		
iv	IT	5	2							
v	HR	4								
	Administration	1	2							
i	Security	6					1			
ii	Cleaners	1								
iii	Drivers	1								
	On Study Leave	1								
	Total	**171**	**37**	**14**	**5**	**11**	**5**	**9**	**5**	**257**

As more distributed and renewable generation is planned for the future, employee with a background in renewable will be required to work for the company going forward. The existing staff who has the expertise in diesel engines/operations is 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.

Ongoing trainings are 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 as a major risk to the company. More than 30 staff has been hired by NZ Power companies since 2015 given the high level of trainings and exposure offered by TPL to its staff.

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 NNUP, but it means strengthening its staff recruitment and training processes and managing the loss of key personnel.
ii. 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.
vi. 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.
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 poor quality network from prior 2008 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 recent successful completion of TVNUP, the NNUP and outer island network upgrades, total system losses has significantly improved to less than 11%.

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 NNUP started in late 2018, thanks to the generous ongoing support of the NZ Government, the major donor to 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 $5 million to kick start the Nuku'alofa Network Upgrade project in late 2018 which is currently underway.
ii) OIEEP (network upgrade to Vava'u) which commenced in 2016. Target is to complete by end of 2019.

***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.

On Tongatapu SCADA is used at Popua power station to monitor diesel generation at the station as well as monitoring solar generation at the 3 solar farms and the wind generators on the Island. The generation from the diesel generators and solar farms on Vava'u, Ha'apai and 'Eua are also telemetered to Popua however there has been difficulties in getting the data from the Other Islands due to communications difficulties. The existing SCADA will not support advanced generation and distribution management functionality such as automated generator dispatch, smart grid, outage management, demand response and smart meter applications.

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) Establish a combined control centre that combines the functions of generation monitoring and distribution monitoring and maintenance and fault crew dispatch at the new TPL offices.
ii) Procure a replacement SCADA or upgrade the existing SCADA and add to that functionality by purchasing generator dispatch and advanced distribution management modules to support remote control, load control, outage management, smart meter applications and fault crew dispatch.
iii) Re-establish the existing Popua control room into a Disaster Recovery site for the centralised control centre should that control centre be rendered in operable.
iv) Provide for comprehensive monitoring of the outer Island generation and distribution networks at the combined control centre.

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 NNUP.

TPLs response to the challenge

i) Asset Management Plan to be updated with Power Generation Maintenance Plan.

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:

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 focus now is to implement the GCF projects to reach the 50% target by 2020 and/or when TPL decides to go further to 100% RE target.

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. ARC GIS software – Geographical interface system
5. Sincal Software – Load flow analysis
6. Xsol Software – Business process redesign and mapping
7. Technologyone (Techone) – ERP System
8. Spiceworks – IT Helpdesk and Support System
9. SCADA – Manage, view and extract live data from Generators
10. Skytron – Manage, View and extract live data from Solar Systems

All softwares are working well for the purpose it was procured for and there are no issues with it to date. However there are ones which requires update including SCADA and some will be replaced by the newly ERP system once its fully operational. Software such as Filemaker and Quickbooks.

TPLs response to the challenge:

TPL newly Enterprise Resource Planning (ERP) project will unify most of the above software systems into one single software platform. The ERP has GONE live on most of its Modules (Finance, Asset, Payroll, and HR) however the Assets Module is not yet fully functional. 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		
Risk Description	**Mitigation Control**	**Control Effectiveness**
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.	Partially 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. NNUP is currently underway.	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. This has also caused unnecessary power outages mainly in Tongatapu and Vava'u.	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. AMP needs also to be updated and should be a living document to guide Operation staff in prioritizing its CAPEX and OPEX.	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 reputation and HSE risks to TPL due to lack of both staff and public awareness of TPL products and services i.e. power outages resulting from load imbalances without proper consultation with the regulator, smart meter complaints, removing of transformer and pole covers and vehicle accidents.	Ongoing safety awareness campaigns on the go as well as talk back radio shows on a monthly basis. Customer awareness days offered to the larger public on TPL services and processes.	Effective
Significant financial and reputational risk to TPL due to unreliable reports and information generated from the different software the company uses. This makes company making incorrect decisions.	New ERP system will replace the existing computer softwares. Until then, systems users have been trained to manage the system accurately. SCADA upgrade as well as a new Control system is also planned for the next FY.	Partially Effective

5.3 Summary and SWOT analysis

Strengths	Weaknesses
• Good Leadership structure • Healthy Balance Sheet • Compatible profitable business • Competent/dedicated Team • Internal Control System • Centralize ERP System • Very high debt collection & highly committed to collection targets • High investment on Informal System • Well established business processes • Great Teamwork • Payroll - fortnightly • Leave Management • Employee Services - CIA, forms, letters • Matured/Experienced Team - long serving staff • Confidentiality of Information • Filing of Personal Files - physical files and work in progress for e-filing • Reports Submission - Tax, Annual Report and Board Report (rooms for improvement) • Staff Communications - staff issues, policies, procedures, induction • Annual Staff Performance Review - annually • Availability of Data/Information • Annual Audit • Recruitment Process • Punctual with staff related issues • high level of loyalty to TPL • Relationship with Agility • Relationship with Donors • Meeting Targets • Dealing with multiple resources • Communicating project success • Maintaining of resources • Implementing Health & Safety procedures • Ability to work remotely • Well documented policies and procedures • Compliance with regulatory requirements • Recruitment of R&C analyst • Government interferences	• Lack of Budget Awareness • Billing Errors & supporting services • Meter Management • Customer awareness • Manage customers' expectations • Overtime management & staff idle times • Asset Management Program • Aligning of staff career paths with company's goals • Training of existing staff & staff retentions after sponsored training • Care for tools, plant and equipment • Limited practical engineering experience & knowledge • Relationships with outerislands networks • Leadership Succession Plan • Gap between outer island & Tongatapu leadership • Access to ICT • HR Capacity & Skills for RE integration • HR Policies and Procedures a. Exit Checklist b. 6-months review/KPI for everyone - quarterly review for managers c. Resignation contractual clause • Limited Capacity - Training Officer for Staff Training and Development • Staff Training - on the job training lowers the importance of this item • HR Audit - Staff Survey • Data Integrity - work in progress on accuracy of data both on system and excel databases • Disciplinary Procedures - consistency and follow up on improvements • Internal Procedures - Staff Medical Assistance, Delegation of Authority (letters to sign, approval of study leave) • Policy Role Model - Lateness to work • Succession Plan • No rewards and recognition policy • Inexperienced Team • Staff Turnover • Project Ownership • Qualification • No formal project management training • No formal project management processes and procedures • No formal hand-over with operations • Emotional Intelligence

	• lack of awareness & appreciation of internal policies • actioning audit recommendations • lack of understanding R&C roles • non conformance to the annual review of policies • managers feedback on compliance reports, risk reviews, etc. • Time management
Opportunities	**Threats**
• Building customer trust • E-Bill awareness • TPL Customer E-Notifications • Diversify of power generation investments • Hire Purchase Arrangement with Tonga Gas to sell much needed households appliances to boost electricity & cash sales. • Process Automation • Ability to work remotely • Well documented policies and procedures • Compliance with regulatory requirements • Recruitment of R&C analyst • teamwork & experienced dedicated senior managers EC & Government interferences • International Contracting • Outer Islands Maintenance & Operation • Public Awareness • Electricity Contractors Association CAD Line Design • Tech One Asset Management Module • Outer Islands Maintenance & Operation • Public Awareness • Staff responsibilities • Business Intelligence reporting & Analytics to be moved in house • Online Payment Platform • Gender Equality • Team Growth • Third Party Contracting	• Technology/Communication failure • Changing Solar IPP environment • Divisional Budget over-run • Political intervention/high dividend/holding of power price • Tight Cash Flows & high leverage • Over committing to fully funded & partial funded capital projects • High Fuel Price Volatility • Thefts of company's assets – cash or non-cash • Unclear Multi Utilities Goals • Multiple strong cyclone hit at one or all sites. • Demarcation with Electricity Commission/Contractors • Natural Disasters • Skilled Line Mechanics leaving • HR Shortage in the field of SCADA • Government Intervention/ Political Change - Employment Bill • Culture • Budget Constraints - Training • Gender equal workforce target - National Target • Rogue Recruitment Process / Displinary Actions • Emotional Intelligence (EQ) - islanded department • Transfer of retirement funds to Government Retirement Fund Bodies • Over-staff after projects • High turnover Rate due to better paid jobs elsewhere e.g.: NZ qualified mechanics Staff jobs once network projects are completed • Multi-Utility pipeline of Projects • Project Ownership • Cyber-security • Big Project Pipeline • Inappropriate projects pursued Multi-Utility • Limited Storage & Unwanted Distractions at new Depot

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 six key objectives that drive the company into achieving its major purpose of a safe, reliable and affordable electricity supply.

TPL in trying to meet this 50% target has faced a lot of challenges which includes but not limited to the followings as tabulated below:

Strategic Objectives	Challenges/risks faced
1. Achieving 50% electricity generation from Renewable Energy generation by 2020 in order to achieve the government TERM target and realistic tariff reductions.	• Fast tracking of project development and pre-emptive implementation does not come without risk and will need to be properlymanaged by TPL. • Building relationships with development partners remains a priority but is also a challenge to TPL. • 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. • Regulation concerning IPP's – investors are often deterred by small project size, poor financial return on investment and incomplete analysis especially in small island like Tonga.
2. Adopting technologies to manage the complexities arising from a digitized and decentralized renewable future.	• 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.
3. Improving the network by replacing ageing assets to improve safety, efficiency and reliability of supply.	• 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. • TPL funding capacity constraint.
4. Promote a hazard free safety environment to minimize any danger to both the public and staff.	• 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.

5. Improving our business processes to enhance customer/employee satisfaction while supporting a healthy and competent team.	• 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. Manage all external funding and internal financing sources successfully in order to increase shareholder value.	• 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. • Government lifeline subsidy has put downward pressures on TPL financial stance and cash flow given the increasing diesel costs – TPL has implemented cost cutting measures since late 2018.

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 $52 million and expected to be funded through the Green Climate Fund (GCF). TPL contribution to these projects is estimated to be around $6 million, to cover for expenses such as land, fencing, and others.

Under objective number 1, the following projects will be implemented this year and before 2020 to achieve the objective of "achieving 50% electricity generation from RE sources by 2020".

Year 1	Year 2	Year 3+
1. 6MW IPP	1. Wind IPP 3.8 MW	1. Biomass
2. China Wind	2. 300 KW Vava'u	2. Heat Recover
3. Wind IPP 3.8MW	3. 300 KW 'Eua	3. Coconut
4. 300 KW Vava'u		4. Tidal
5. 300 KW 'Eua		5. Wave
		6. Geothermal
		7. More Customer Owned Solar and Wind

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". Most of the projects in Year 1 will be funded through the GCF.

Year 1	Year 2	Year 3+
1. BESS #1	1. Reporting, Data Analytics & Business Intelligence (In House)	1. More reclosers and sectionalisers
2. BESS #2	2. Smart grid (distribution and generation automation) platform	2. EV as a form of BESS
3. BESS VAVA'U	3. SCADA upgrade or replacement	

4. BESS 'EUA	4. Backhaul Communication Network	
5. Combined Control Center	5. Data Warehousing(Reporting Server)	
6. Communication of O&M technicians	6. Tongatapu ring feeder/ fourth feeder	
7. Communication Platform	7. Niutoua to Haveluliku HV LINK	

Strategic Objective 3

Under objective number 3, the following projects will be implemented to achieve the objective of "improving the network and replacing ageing assets to improve safety and reliability of TPL's services".

Year 1	Year 2	Year 3+
1. Refurb CAT 2	1. Refurb CAT 3	1. Refurb CAT 4,5,6
2. UPDATE AMP'S (Master Plan) **Must include ICT & Retail/Financial Assets*	2. RE O &M	2. HV Upgrades for Outside Nuku'alofa (underground).
3. OIREP (Vava'u remaining 40%)	3. Proactive Maintenance (AMM)	3. Vehicle/Plant Improvement
4. OIEEP	4. HV Upgrades for outside Nuku'alofa(Underground)	4. Streetlights
5. NNUP (Area 1&2 funded)	5. Vehicle/Plan improvement plan	

Strategic Objective 4

Under objective number 4, 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".

Year 1	Year 2	Year 3+
1. Safety Flyers	1. Safety regulation	1. Update safety manual
2. Safety Trainings		
3. Replace faded safety signs		
4. First Aid Kit		

5. Outer island offices safety needs (alarms, hydrants, etc.)		
6. EC/TPL Working relationship & awareness		
7. Review and Formalize Training Development (Requirements and update competency register)		
8. Formal Succession Management Plan		

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.*

Year 1	Year 2	Year 3+
1. HR-ERP system	1. Energy Efficiency Campaign	1. E-FILLING
2. Website upgrade	2. Renewable Energy Generation Forecast	2. Email Marketing
3. TPL smartphone App	3. Grid Integration Studies	3. Reserve management Tool
4. Policy Training	4. Weekly Generation Dispatch	4. Unified Communications
5. Bill Payment Options Policy	5. Automated process streamlining	5. BI System Integration
6. Social Media Platform	6. Unified comms across head office	
7. Training Register	7. ICT Security	
8. Formal Succession Plan	8. Business information System Integration	
9. Generation & Distribution Master Plan	9. High Availability	
10. Upgrade GIS system	10. Disaster Recovery of IT Systems	

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".

Year 1	Year 2	Year 3+
1. Fuel strategy	1. New Profit Formula (service Fees)	1. Full control of generations
2. Full Tariff Review	2. PPP Policy	2. Social responsibility vs Profitability
3. Finance Processes & Internal Control Reviews	3. Integrate off-grid power	
4. Orion Common Billing		
5. Divisions realignment – HR to be transferred from Finance and report directly to CEO		
6. Staff numbers		
7. ERP Integrated Budgets		
8. Funding for NNUP & OIEEP Projects		
9. Tariff subsidies – GPO/Dividends		

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 Performance Targets for the Planning Period 2019 -2020

ID	Strategic Objective	Staretic Measures	Business Unit	Targets	
				2019	2020
1	Achieving 50% electricity generation from RE generation by 2020 in order to achieve the government TERM target and realistic tariff reductions.	Accumulated Fuel Displacement (%)	Generation	40%	50%
		Tariff Reduction (%) due to RE	Generation	10%	12%
		RE Penetration (%)	Generation	50%	60%
2	Adopting technologies to manage the complexities arising from a digitized and decentralized renewable future.	Voltage fluctuations	Distribution	+/-10	+/-10
		Frequency fluctuation	Generation	+/-1.5%	+/-1.5%
		System Losses (%)	Distribution	10%	10%
		Fuel Efficiency (kWh/L)	Generation	4	4
		Reliability (SAIDI) (Minutes)	Distribution & Generation	900	850
		Number of outages (SAIFI)	Distribution & Generation	3	3
		Reduction in Maintenance Cost (%)	Generation	5%	5%
		Reduction in Material Cost (%)	Distribution	5%	5%
3	Improving the network and replacing ageing assets to improve safety, efficiency and reliability of supply.	Load factor (%)	Generation	54%	54%
		N-1 Security Policy Compliance	Generation	100%	100%
		Rework Cost (TOP$)/Annum	Distribution	< 5,000	< 5,000
		Capex Jobs Audited/Annum (%)	Distribution	>80%	>80%
		Firm Installed Capacity (KW)	Generation	16,416	17,276
		Installed Capacity (KW) (All Sources)	Generation	21,522	22,382
		Update Asset Management Plans	Distribution & Generation	YES	YES
4	Promote a hazard free safety environment to minimize any danger to both public and staff.	Incident Rate	Risk & Compliance	< 8	< 8
		Loss Time Injuries	Risk & Compliance	0	0
		Numbe of Incidents Reports	Risk & Compliance	160	175
		Safety Awareness Activities/Annum	Marketing	3	3
		Safety Committee Meeting Attendance	Risk & Compliance	100%	100%
		Number of Emergency Drills/Annum	Risk & Compliance	2	2
5	Investing on world-class business processes and systems in order to satisfy shareholder expectations and to enhance customer/employee satisfaction.	Staff Retention (%)	Administration	> 90%	> 90%
		Customer Complaints	Risk & Compliance	30	20
		Exercise BCM Plan/Annum	Risk & Compliance	1	1
		Number internal audits/Annum	Risk & Compliance	3	3
		Compliance with Company Policies	Risk & Compliance	100%	100%
		Compliance with ECC & Applicable Legilation	Risk & Compliance	100%	100%
		Staff Training Register	Administration	> 90%	> 90%
		Staff Absentiesem (%)	Administration	< 5%	< 5%
		Staff turnover rate	Administration	5%	5%
		Staff satisfaction rate	Administration	>90%	90%
		Performance management rate	Administration	>80%	>80%
6	Managing all your external funding and internal financing sources successfully in order to achieve sutainability and growth and thereby maximise the shareholder wealth for the best interest of the company.	Revenue	Finance	$49M	$50M
		NPAT	Finance	$3.6M	$4.0M
		Debt Ratio	Finance	< 50%	< 50%
		ROE	Finance	10%	10%
		Debtor Days	Finance	20	20
		Liquidity Ratio	Finance	1.5	1.5
		Opex Reduction (%)	Finance	3.0%	3.0%

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 the CBD areas.

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 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.

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.

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 $1.2 million in the year 2018. The estimated dividend stream for the next five years are discussed in more detail in the attached Financial Statement.

10. PROFORMA FINANCIAL STATEMENT

TPL : BUDGET 2020-2029
Profit and Loss Account (TOP '000s)
Version 3.0

Year Ended 30 June	Audited						Projected										
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
							(forecast)										
ELECTRICITY OPERATIONS																	
Regulated Revenue																	
Fuel Revenue							21,790	21,582	21,053	21,649	22,443	23,154	23,771	24,285	24,689	24,976	25,165
Non Fuel Revenue							28,583	30,158	31,799	33,468	35,193	36,829	38,354	39,747	40,988	42,061	42,990
Regulated Revenue	40,513	44,173	41,767	40,922	45,610	45,363	50,372	51,740	52,852	55,117	57,636	59,983	62,124	64,032	65,678	67,037	68,154
Non- regulated Revenue	1,270	1,805	1,543	2,452	2,847	1,088	3,008	1,290	1,317	1,374	1,437	1,495	1,548	1,596	1,637	1,671	1,699
Electricity Cost of Sales																	
Power Generation Source Costs																	
Fuel Cost	22,133	23,583	19,768	15,347	19,197	21,463	27,761	19,583	12,296	13,091	13,963	14,742	15,416	15,975	16,410	16,714	16,908
Power Purchase Cost							1,349	3,386	3,947	3,948	3,948	3,948	3,948	3,949	3,949	3,949	945
Total Fuel & IPP Costs							29,110	22,969	16,243	17,038	17,911	18,691	19,365	19,924	20,359	20,663	17,853
Salaries	2,933	2,829	2,746	3,122	3,446	4,603	4,772	4,961	5,173	5,404	5,681	5,966	6,277	6,598	6,947	7,306	7,695
Maintenance	1,505	2,441	2,092	2,820	1,350	3,157	5,172	3,198	3,535	3,885	4,255	4,631	5,013	5,401	5,796	6,197	6,604
Depreciation - Generation	1,725	1,264	987	1,181	1,246	1,254	1,265	1,502	1,864	2,342	2,555	2,601	2,657	2,734	2,813	2,891	2,968
Third Part Costs	681	777	1,740	2,232	2,151	809	1,813	822	830	840	853	867	881	895	909	924	938
Other	1,506	1,491	1,476	1,541	1,565	2,020	2,075	4,044	6,696	7,865	7,865	7,865	7,865	7,865	7,865	7,865	7,865
	30,483	32,384	28,810	26,243	28,955	33,305	44,207	37,498	34,341	37,374	39,120	40,620	42,058	43,417	44,690	45,846	43,925
Gross Profit from electricity operations	11,300	13,594	14,500	17,130	19,501	13,146	9,173	15,532	19,829	19,116	19,953	20,858	21,615	22,211	22,625	22,862	25,928
Other Income	75	2,219	2,718	2,425	2,860	10,426	7,470	6,446	9,097	10,267	10,267	10,267	10,267	10,268	10,268	10,268	10,268
Selling & Distribution Expenses																	
Depreciation - distribution network	2,377	2,853	4,156	4,840	5,000	5,211	5,257	6,242	7,746	9,731	10,614	10,805	11,041	11,361	11,687	12,010	12,332
Repairs & Maintenance	-	1,552	801	-													
Other	62	1,553	69	56	301	1,065	100	1,149	1,159	1,173	1,192	1,211	1,230	1,250	1,270	1,290	1,311
	2,439	5,958	5,025	4,896	5,301	6,277	5,357	7,391	8,905	10,904	11,805	12,016	12,271	12,610	12,957	13,300	13,642
Administrative & Other Expenses																	
Salaries	1,166	1,550	1,958	1,875	2,239	2,173	2,253	2,342	2,442	2,551	2,682	2,816	2,964	3,115	3,280	3,449	3,633
Depreciation & Amortization	841	1,092	1,058	938	1,097	1,529	1,542	1,831	2,273	2,855	3,114	3,170	3,239	3,333	3,429	3,524	3,618
Electricity Commission fees	554	518	531	528	493	561	564	567	572	579	588	597	607	617	627	637	647
Legal & Professional Fees	780	768	412	437	485	1,592	795	799	806	816	829	842	856	870	883	898	912
Other	2,073	1,855	2,757	2,737	3,814	4,352	3,432	3,449	3,480	3,522	3,578	3,636	3,694	3,753	3,813	3,874	3,936
	5,414	5,783	6,716	6,516	8,129	10,207	8,587	8,989	9,573	10,323	10,792	11,062	11,360	11,687	12,032	12,381	12,746
Operating Profit from electricity operations	3,522	4,073	5,477	8,144	8,932	7,088	2,700	5,597	10,448	8,156	7,623	8,047	8,251	8,180	7,904	7,449	9,808
Finance Income	96	308	73	209	114	132	133	133	134	136	138	140	143	145	147	150	152
Finance Cost	(679)	(867)	(3,004)	(1,027)	(1,287)	(1,159)	(1,300)	(1,362)	(1,247)	(1,131)	(1,016)	(901)	(786)	(671)	(555)	(440)	(369)
Profit before tax from electricity operations	2,939	3,514	2,546	7,326	7,759	6,062	1,533	4,369	9,336	7,161	6,745	7,287	7,608	7,655	7,496	7,158	9,592
Income Tax	(714)	(878)	(636)	(1,831)	(2,233)	(1,354)	(383)	(1,092)	(2,334)	(1,790)	(1,686)	(1,822)	(1,902)	(1,914)	(1,874)	(1,789)	(2,398)
PROFIT AFTER TAX - UTILITY OPERATIONS	**2,225**	**2,635**	**1,909**	**5,494**	**5,526**	**4,708**	**1,150**	**3,277**	**7,002**	**5,371**	**5,059**	**5,465**	**5,706**	**5,741**	**5,622**	**5,368**	**7,194**

TPL Budget 2020 - 2029
Balance Sheet (TOP '000s)
Version 3.0

As at 30 June	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
							(forecast)	Projected									
CURRENT ASSETS																	
Cash and Cash Equivalents	1,729	3,339	2,261	3,499	3,740	3,215	917	490	997	3,011	4,025	4,492	2,819	1,363	315	(513)	9,156
Trade & Other Receivables	6,077	5,693	5,452	6,226	6,842	8,029	8,079	7,922	7,806	7,951	7,991	8,082	8,139	8,203	8,251	8,294	8,328
Inventories	1,092	1,386	936	1,279	1,069	603	603	603	603	603	603	603	603	603	603	603	603
Held to maturity financial asset		1,558	1,392	1,423	3,317	322	322	322	322	322	322	322	322	322	322	322	322
Current Tax Asset	122	175															
Donor Reserve Funds										4,000	8,000	12,000	16,000	20,000	24,000	28,000	32,000
	9,020	12,151	10,041	12,428	14,967	12,169	9,921	9,337	9,728	15,887	20,942	25,500	27,883	30,491	33,491	36,706	50,409
NON CURRENT ASSETS																	
Intangible Assets and Goodwill	508	399	290	182	2,501	2,029	1,529	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029
Property, Plant & Equipment	59,503	79,607	111,889	114,572	117,364	124,016	147,395	185,781	237,243	250,476	240,298	231,235	224,506	217,486	209,871	201,705	192,980
Held to maturity financial asset	1,030	500	700	1,700	1,700	1,171	1,171	1,171	1,171	1,171	1,171	1,171	1,171	1,171	1,171	1,171	1,171
Investment in Subsidiary	513	513	3,670	3,670	3,670	3,950	3,950	3,950	3,950	3,950	3,950	3,950	3,950	3,950	3,950	3,950	3,950
Deferred Tax Asset	70	70	145	140	215	378	378	378	378	378	378	378	378	378	378	378	378
	61,623	81,088	116,694	120,263	125,450	131,544	154,423	192,310	243,772	257,005	246,826	237,763	231,034	224,015	216,400	208,234	199,509
TOTAL ASSETS	**70,642**	**93,240**	**126,735**	**132,691**	**140,418**	**143,713**	**164,344**	**201,646**	**253,500**	**272,892**	**267,768**	**263,263**	**258,917**	**254,505**	**249,891**	**244,940**	**249,918**
CURRENT LIABILITIES																	
Bank Overdraft	-	-	-	-	-	125											
Trade & Other Payables	4,107	4,373	5,117	5,473	7,590	11,203	13,775	12,836	10,659	11,426	11,859	12,265	12,639	12,980	13,283	13,547	12,817
Employee Entitlements	187	211	411	441	750	759	787	818	853	891	936	983	1,035	1,087	1,145	1,204	7,630
Deferred Income / Donated Assets	11	729	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853
Borrowings	337	710	1,581	1,914	2,710	2,607	2,693	2,693	2,693	2,693	2,693	2,693	2,693	2,693	2,693	656	-
Financial Instruments	163	45	160														
Provision for Dividend	779	1,000	1,900	2,800	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300
Tax		-	136	866	2,525	1,929	383	1,092	2,334	1,790	1,686	1,822	1,902	1,914	1,874	1,789	2,398
	5,584	7,067	11,158	13,346	18,728	21,775	22,791	22,591	21,692	21,953	22,327	22,916	23,422	23,827	24,148	22,350	27,999
NON CURRENT LIABILITIES																	
Deferred Tax Liability	5,279	6,704	7,104	8,064	7,848	7,436	7,436	7,436	7,436	7,436	7,436	7,436	7,436	7,436	7,436	7,436	7,436
Deferred Income / Donated Assets	142	7,841	32,720	31,818	29,965	28,112	41,069	77,986	126,430	142,883	135,018	127,153	119,288	111,423	103,558	95,693	87,828
Borrowings	10,348	15,983	20,099	21,215	23,871	24,977	30,486	27,793	25,101	22,408	19,715	17,022	14,329	11,636	8,944	8,288	8,288
	15,769	30,528	59,923	61,097	61,684	60,525	78,990	113,215	158,966	172,727	162,169	151,611	141,053	130,495	119,937	111,416	103,551
TOTAL LIABILITIES	21,352	37,595	71,081	74,443	80,412	82,300	101,781	135,806	180,658	194,679	184,496	174,526	164,475	154,322	144,085	133,766	131,550
EQUITY																	
Share Capital	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784	33,784
Asset Revaluation Reserve	7,815	12,566	12,112	11,661	11,215	10,789	10,789	10,789	10,789	10,789	10,789	10,789	10,789	10,789	10,789	10,789	10,789
Retained Earnings	7,691	9,295	9,758	12,803	15,007	16,841	17,991	21,268	28,270	33,640	38,699	44,164	49,870	55,612	61,234	66,602	73,796
	49,290	55,644	55,653	58,248	60,005	61,413	62,563	65,840	72,842	78,212	83,271	88,736	94,443	100,184	105,806	111,174	118,368
	70,642	**93,240**	**126,735**	**132,691**	**140,418**	**143,713**	**164,344**	**201,646**	**253,500**	**272,892**	**267,768**	**263,263**	**258,917**	**254,505**	**249,891**	**244,940**	**249,917**

TPL Budget 2020 - 2029
Cashflow Statement (TOP'000s)
Version 3.0

Year Ended 30 June	Audited							Projected										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
								(forecast)										
Cashflows from Operating Activities:																		
Receipt from Customers		40,088	46,857	43,960	43,069	47,993	54,898	56,827	52,686	54,285	56,345	59,033	61,386	63,616	65,564	67,266	68,665	69,819
Payments to Suppliers and Employees		(33,334)	(39,284)	(34,545)	(30,703)	(34,702)	(39,607)	(47,486)	(44,210)	(43,077)	(42,868)	(44,956)	(46,669)	(48,326)	(49,894)	(51,388)	(52,780)	(45,699)
Income Tax Paid		(420)			(136)	(866)	(2,525)	(1,929)	(383)	(1,092)	(2,334)	(1,790)	(1,686)	(1,822)	(1,902)	(1,914)	(1,874)	(1,789)
Interest Received		30	36	67	66	114	166	133	133	134	136	138	140	143	145	147	150	152
Interest Paid		(667)	(867)	(1,089)	(915)	(1,287)	(1,242)	(1,300)	(1,362)	(1,247)	(1,131)	(1,016)	(901)	(786)	(671)	(555)	(440)	(369)
	-	5,696	6,743	8,392	11,381	11,253	11,690	6,245	6,865	9,004	10,148	11,409	12,271	12,826	13,243	13,556	13,721	22,115
Cashflow from investment activities																		
Acquisition of Plant, Property & Equipment		(5,630)	(10,406)	(10,273)	(9,087)	(8,127)	(15,439)	(31,443)	(47,962)	(63,344)	(28,162)	(6,104)	(7,513)	(10,208)	(10,409)	(10,314)	(10,259)	(10,193)
Investment held to maturity		(30)		(34)	(1,000)	(1,893)	3,523	2,395	2,401	2,402	2,402	2,402	2,402	2,402	2,402	2,403	2,403	2,403
Donor Funds Received			2,524		951													
Proceeds from sale of equipment		33	10	6	25													
Acquisition of Subsidiary		(513)	(1,028)	(3,157)			(280)											
Acquisition of Intangibles						(2,175)	(192)											
Dividends Received					100	100	280											
Funds set aside to replace donor funded assets									-	-	(4,000)	(4,000)	(4,000)	(4,000)	(4,000)	(4,000)	(4,000)	(4,000)
Loan to Waste Authority Limited / Loan to subsidiary		(70)			(200)													
Contribution to TVNUP Project					(446)													
	-	(6,209)	(8,900)	(13,458)	(9,658)	(12,095)	(12,108)	(29,048)	(45,561)	(60,943)	(29,760)	(7,702)	(9,111)	(11,806)	(12,006)	(11,911)	(11,856)	(11,790)
Cashflow from financing activities																		
Proceeds from borrowings		4,278	6,406	5,798	2,081	5,350	3,696	8,288										
Repayment of borrowings		(763)	(1,279)	(811)	(632)	(1,898)	(2,693)	(2,693)	(2,693)	(2,693)	(2,693)	(2,693)	(2,693)	(2,693)	(2,693)	(2,693)	(2,693)	(656)
Grants received								15,031	40,962	55,139	24,319	-	-	-	-	-	-	-
Dividends paid		(866)	(1,360)	(1,000)	(2,000)	(2,379)	(1,200)											
	-	2,649	3,767	3,987	(551)	1,073	(197)	20,626	38,269	52,447	21,626	(2,693)	(2,693)	(2,693)	(2,693)	(2,693)	(2,693)	(656)
Net Change in Cash and Cash Equivalents	**-**	**2,135**	**1,610**	**(1,078)**	**1,171**	**231**	**(615)**	(2,176)	(427)	507	2,014	1,014	467	(1,673)	(1,456)	(1,048)	(828)	9,669
Effect on Exchange rate movements on cash held					67	9	(34)											
Cash and Cash Equivalents at the beginning of Year		(406)	1,729	3,339	2,261	3,499	3,739	3,090	917	490	997	3,011	4,025	4,492	2,819	1,363	315	(513)
Cash and Cash Equivalents at the End of Year		**1,729**	**3,339**	**2,261**	**3,499**	**3,739**	**3,090**	**917**	**490**	**997**	**3,011**	**4,025**	**4,492**	**2,819**	**1,363**	**315**	**(513)**	**9,156**