



**Contract to Conduct a Feasibility Study and Develop a National
Used Oil Management Plan for Samoa, Solomon Islands, Tonga,
and Vanuatu**

Inception report (Tonga)



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May 2022

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1.0 Introduction to the AFD Programme to Develop a Used Oil Management Plan, 2022

1.1 Background to the Project

The natural environments of Pacific Island Countries and Territories (PICTs) are under increasing pressure from development and growing human populations, and the social and economic pressures associated with this growth. Increased populations and urbanisation have led to increased product importation and waste generation. Much of the waste generated cannot economically be managed due to issues of small and isolated populations; economic volatility; geographical isolation from large economies; limited institutional, financial and human capacity; and inadequacy of infrastructure to capture and process waste materials. Poor waste management poses risks to the economies of PICTs, as many rely heavily on clean environments for agricultural activities and tourism.

The project funded by the *Agence Française de Développement (AFD)*, referred to hereafter as “*Committing to Sustainable Waste Actions in the Pacific (SWAP)*”, aims to improve sanitation, environmental, social, and economic conditions in Pacific Island countries and territories through improved waste management. To achieve this, the project focuses on improving management of three waste streams: used oil, marine debris, and disaster wastes. Eight countries and territories will benefit from this project which include Fiji, French Polynesia, New Caledonia, Samoa, Solomon Islands, Tonga, Vanuatu, and Wallis and Futuna.

As part of this process, *Araspring Ltd* (New Zealand) in association with *Going Troppo Consulting* (Australia), *Pacific Reef Savers* (New Zealand) and *POPs Environmental Consultants Ltd* (New Zealand) were awarded a 9-month contract by SPREP/AFD to develop used oil management plans for Samoa, Solomon Islands, Tonga and Vanuatu in December 2021. As a result of a volcanic eruption and subsequent Tsunami in Tonga in January 2022 the Tonga sections of this work have been delayed until the people and Government of Tonga are better able to respond to the requests of the consultancy.

1.2 Contract of Services (Inception Report)

Under the terms of the contract, the consultant is required to:

- **Host an initial meeting** with key government stakeholders to confirm desired outcomes and identify key national contacts.
- **Provide Minutes of the government meeting** with confirmation of activities, and scope of work to be developed and agreed by meeting participants prior to commencement of any activities.
- **Host an Inception Workshop with National Stakeholders** to confirm desired outcomes and to identify key national stakeholders. A full list of key stakeholders is to be included noting their sector, and interest, and the plan for further engagement as the project is implemented.
- **Undertake a detailed desktop review** of existing national legislation, policy, strategy and plans relevant to waste management that will determine existing systems, confirm the legislative environment and identify key opportunities for used oil management and market for product
- **Prepare an inception report** that presents the findings of desktop research and the outcome and findings from the consultation inception meeting. The report shall articulate the Government’s priorities and any additional priorities identified by other key stakeholders and identify how these priorities will be addressed in the work plan

- **Provide a detailed Work-plan** of activities (including a timeline) and clearly identify any tasks or responsibilities of the government necessary to ensure project success

Extenuating Circumstances

This report is a preliminary assessment using information already available. Since the eruption, communications with Tonga have been severely restricted due to the severing of the fibre-optic cable connecting the country to the internet. In addition, the nation is focused on dealing with the aftermath of being covered in volcanic ash, as well as some areas hit by a tsunami. As a result, the Stakeholder consultations, with both Government and commercial stakeholders, will not take place until the consultants are told by the Government of Tonga that it is ready to engage in this project.

1.3 National Background for Tonga

The Kingdom of Tonga is comprised of three main island groups situated between 18° and 22° south and 173° and 175° west. The islands are tropical, limestone and volcanic islands of which about 50 are inhabited. The largest island is Tongatapu in the south, whilst the second largest is Vava'u in the north. A third island group lies between these two called Ha'apai. In January 2022 the country suffered from a major volcanic eruption in the Ha'apai group which caused a Tsunami and blanketed Ha'apai and islands to the south, including the capital Nuku'alofa, in volcanic ash, and was a significant natural disaster for the nation.

Tonga has the King as Head of State, with the parliament being a unicameral Legislative Assembly with a mix of appointed and elected members. The country has not been colonised in modern times by any of the colonial powers who operated in the Pacific in the past two centuries, but has a close relationship with New Zealand where many Tongans live today, and a large expatriate population also resides in the USA.

Density of population varies widely across the archipelago: whilst average population density is 155 people/km², this varies from 290p/km² in Tongatapu to 18p/km² in remote Ongo Niua.

The population at the 2011 census was 103,000 people, with an average household size of 5.7 people. The economy is rated as a lower middle income country, with a GDP per capita of US\$4,600 reported for 2020.¹ Trade has tended to be focused on New Zealand, although that has changed somewhat in the past few years. A large Asian community is prominent in the commercial sector. The capital, Nuku'alofa, is situated on the island of Tongatapu, where around 75% of the country's population reside. Tongatapu is the centre of government and economic activity in the country, and hosts the main port through which lubricating and other oils are imported, and any used oils might be exported.

¹ <http://data.worldbank.org/country/tonga>

2.0 Relevant Legislation

2.1 Overview

Tonga does have some specific waste legislation, which is an advantage. It has a Waste Management Act, and has regulations under that Act concerning a levy on plastic bags, plus a Hazardous Waste and Chemicals Act, and an Environment Act, largely providing the administrative framework to create and enact further environmental legislation. The Ministry that oversees this legislation is the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change & Communication.

Tonga is a party to the Waigani, Basel and Stockholm Conventions, and all three have a bearing on the management of used oils for Tonga, and their potential export for overseas recycling.

Policy documents include the national Infrastructure Investment Plan, developed with assistance from the Pacific Regional Infrastructure Facility (PRIF), and the Tonga National Strategic Development Framework 2015-2025, both of which can have a bearing on expected used oil production resulting from use in power plants and vehicles.

2.2 Existing Legislation

In 2020 SPREP/PacWaste Plus produced a report Stocktake of Existing and Pipeline Waste Legislation in the Kingdom of Tonga, conducted by the Melbourne Law School at the University of Melbourne, and as this is a recent legislative review the relevant legislation detailed below is drawn from that report. However, the legislation itself has been looked at, and key points of interest for the case of managing used oil have been noted below.

There are potentially three pieces of legislation that might affect this issue: the Environment Management Act 2010; the Waste Management Act 2005; and the Hazardous Wastes and Chemicals Act 2010. The consultant studied all three pieces of legislation, and determined that the most potentially useful one is the Waste Management Act 2005. This Act's main content is to create the Waste Management Authority for Tongatapu, and provide for the Ministry of Health to be the prescribed waste management authority in other islands, although that function is now largely being taken over by the State-owned Enterprise (SOE) that has responsibility for Tongatapu.

2.3 Waste Management Act (2005)

The Waste Management Act (WMA) primarily creates Waste Management Service Areas², in which Approved Waste Management Authorities³ are responsible to carry out the functions of the Act. The Waste Authority Ltd. (WAL) was created by the Act to manage waste on Tongatapu, whilst that function was taken on by the Ministry of Health in all other islands at the time of the Act passing. Over the last four years, WAL has taken on the function of Approved Waste Management Authority in both Ha'apai and Vava'u. The WMA contains provisions regarding waste collections, disposal management, fees to be levied for waste management, Powers of the Minister of the Environment, regulations, Waste Service Areas, the operations of WAL, and other matters.

The Act contains both the power to make regulations (a power of the Minister of Environment) and also the power for the Approved Authorities to levy, at section 27 (e): *special levies on particular*

² Waste Management Act, Part II

³ *ibid*, Part III

goods the disposal of which is likely to have adverse effects on the environment. The Act charges the Approved Authorities with various functions, including: section 21 Recycling of Wastes: (1) *An approved Authority shall promote the recycling of wastes;* and also at section 13 Fees and Charges: (1) *An approved Authority may levy and vary the following fees — [for the collection and disposal of] (d) disposal of hazardous wastes.*

These various provisions, taken along with some of the provisions of sections 6 and 8 on the Functions and Powers of the Approved Authority, could be seen as potentially creating an existing legal framework to develop an Advance Recycling Fee (ARF) system for used oils. To do so would require at a minimum the development of Regulations specific to used oils.

The actual mechanics of any system for Tonga would need some researching and preparation, and this will be looked at in the subsequent Feasibility Study phase of the project, but it may well be that the Customs Service could be engaged to be the ARF collector under section 16 Collection of Fees and Charges: (3) *An approved Authority may, subject to any directions given by the Board, enter into arrangements for the collection of fees and charges by persons or organisations approved by the Board to be collection agents on behalf of the approved Authority.*

2.4 Waste Management (Plastic Levy) Regulations 2013

These regulations are created under the provisions of the WMA. They require importers of plastic bags to pay a levy of 10 percent of the customs value of the bags. Certain types of plastic bags are exempted. The Waste Authority Ltd. is designated as the levy collector. There is no specified use for the levies so paid.

These regulations use the powers of the WMA to collect levies for the purposes of waste management, and as such create a precedent that may be useful if some form of Advance Disposal Fee (ADF) or Advance Recycling Fee (ARF) were to be introduced to assist in the management and disposal of used oils.

2.5 Hazardous Waste and Chemicals Act (2010)

The Act controls import and export of hazardous materials, and has sections dealing with relevant international conventions - Waigani, Basel, Rotterdam and Stockholm - and specifically covers hazardous wastes. As such, the provisions of this Act will be important to consider in any used oil management planning. The Act does allow exports of hazardous wastes as long as they comply with the relevant conventions. It does require that management of hazardous wastes should conform to the National Implementation Plan developed under Tonga's obligations to the Stockholm Convention.

Part XV Miscellaneous does include the power to regulate, and the most important point in the list of these powers might be at (t) *the imposition of “user fees” and the “polluter pays” principle;* which could potentially be used to develop any ADF.

The Act does cite the Precautionary Principle as a guiding principle of the Act.

2.6 Environment Management Act (2010)

This Act largely enables the establishment of a Ministry of Environment and Climate Change (now called the Ministry of Meteorology, Energy, Information, Disaster Management, Environment,

Climate Change & Communication - MMEIDMECCC). The Act does allow the power to regulate at Part V:

(c) regulating or prohibiting the pollution of the air, water or land, and the depositing or dumping of litter, rubbish, or any substance of a dangerous, noxious or offensive nature;

A regulation under the Act exists concerning litter: the Environment Management (Litter and Waste Control) Regulations 2016. Part III of the regulations contain several offences that could be used to control the disposal of used oils as they prevent burning and pollution associated with hazardous wastes and burning dumpsites. S 10 Offence to Burn Noxious Wastes specifies 'waste oil' as a noxious waste.

2.7 Public Health Act (2016)

This Act has been reported⁴ as containing provisions relating to waste collection and waste containers, disposal of solid and hazardous wastes, and licensing recyclers. However, it appears that the latest version of the Act has removed those provisions, as they now appear in other legislation.

2.8 Pesticides Act (2016)

This Act specifically relates to pesticides, but could be involved in controlling irregular use of used oils where they are used as pesticides. Unless used oil was registered as pesticide under the Act, it cannot be used as such in Tonga. One use for used oil is to paint timber to discourage termites, and another on playing fields to kill grass so as to make out boundary lines.

2.9 Ozone Layer Protection Act

This is a standard piece of legislation which fulfils Tonga's obligations under the Montreal Protocol of the Vienna Convention on substances that damage the Ozone layer. It is not likely to have any direct relevance to control of used oils, but the systems the Act uses to control imports of Ozone Depleting Substances (ODS) could possibly provide a template if it was decided that certain oils were to be banned for import, or that importers of oil should be controlled in some way, or have to provide regular reports on their imports.

⁴ SPREP PacWaste Plus (2020). Stocktake of Existing and Pipeline Waste Legislation: TONGA p8

3.0 Relevant Policy and Planning

3.1 Tonga National Infrastructure Investment Plan 2013-2023

The National Infrastructure Investment Plan was endorsed in 2021. The two key areas of interest with regard to used oils are whether it is expected that there would be future investment in extra diesel powered electricity generation, and more roads. The plan clearly shows that investment in increased electricity generation is expected to be in solar power projects, so the current production of used oil from diesel generation plant can be expected to hold into the medium term future. For vehicles, the plan focuses on improvements and upgrades to outer island roads, which might be expected to encourage wider vehicle use in the outer islands, rather than new road networks.

However, the plan does note a strong urban drift, with Tongatapu island having 75% of the population and growing at a rate of 2.5% whilst the outer islands population is falling. This may tend to show increased use of lubricating oil in Tongatapu compared to the rest of the nation, and so encouraging the focus on Tongatapu as the island with by far the most used oil generation.

3.2 Tonga National Strategic Development Framework 2015 - 2025

The Strategic development framework does look at waste and recycling, and has a specific desired outcome in the table of National Outcomes, being:

Organisational Outcome 5.3: *Cleaner environments and less pollution from household and business activities building on improved waste management, minimization and recycling, making conditions safer, healthier and more pleasant for residents and visitors.*⁵ This is also expressed as a 'cleaner environment with improved waste recycling' in the outcomes table at 5.4.⁶

3.3 National Implementation Plan for the Stockholm Convention (2009)

The National Implementation Plan (NIP) for Tonga under their Stockholm Convention Obligations, was prepared in 2009, and updated in 2019 for the additional Persistent Organic Pollutants (POPs). The Stockholm Convention covers 28 POPs, and the NIP is required periodically under the Convention reporting requirements to plan out what actions are to be taken to reduce and if possible eliminate POPs from Tonga.

Whilst waste oil *per se* is not named on the list of POPs covered by the convention, there are oils, such as electrical insulating oils, which may contain the POP Polychlorinated Biphenyl (PCB). Waste and used oil management is often covered by national NIPs. The NIP reports note that a common source of POPs, transformer oil, is not present in Tonga as the transformers were all tested for the first NIP⁷. If the transformers in 2009 did not have PCBs then there are unlikely to be any present today as PCB oil in transformers is a legacy issue from old electrical equipment from many years ago.

The NIPs do have a plan of action that mentions waste oils, requiring the establishment of a land waste oil disposal regulatory regime⁸, with the key contributing agency being Ministry of Transport, as marine pollution was part of this action.

⁵ Tonga Strategic Development Framework , pillar 5 natural Resources and Environmental Inputs p. 21

⁶ *ibid*, p. 60

⁷ Tonga National Implementation Plan for the Stockholm Convention 2009. UNEP, p 6

⁸ *Ibid*, Table 3.3e, 6) p 52

3.4 Used Oil Audit (2014)

In 2014 SPREP conducted a Contemporary Used Oil Audit for Tonga, including a country visit in May 2014. The key points of the report were as follows:

- Total imports of lubricating and hydraulic oil equal approximately 450,000 L per year;
- 2 major companies (Total, and Pacific Energy) supply lubricating and hydraulic oil;
- The main consumer is the public power authority: Tonga Power Limited (TPL) and their Power Station located in Popua (Tongatapu);
- The main volume of used oil is generated by the TPL power station on Tongatapu. All the used oil (50,000 to 60,000 L estimation) from the power station is currently sold to local customers;
- Local customers are using the used oil as a poor quality lube oil for tractors, chainsaw, timber painting, sport field marking;
- Pacific Energy offers a take-back service;
- Considering the consistency of the national import figures, the total volume of waste oil to be potentially collected should be 225,000 L per year.

The report concluded that a Waste Oil Management Strategy could be a mix of the following options:

- Obligation of take-back services for major oil companies;
- Building a used Oil Storage Site to store the waste oil collected in the Islands;
- Shipping to Fiji or India, with the costs have to be paid by the final client;
- With the volume of potential waste oil in Tonga, it was recommended to study the feasibility of a treatment plant in Tongatapu;
- Recycling private companies exist in Tonga and should be involved in the process;
- The common approach to fund a used oil management programme is the introduction of a universal levy for all oil imports, which is the first principle of polluter-pays.

The report includes import statistics for the four years 2010 - 2013 which give a consistent picture for three of those years of around 418,000 litres per years (2011 was recorded as 528,000, with no explanation for the large jump that year).

A basic assumption of the report is that only 50% of imported oil will become waste. It is not stated what is expected to happen to the other 50%, but it is assumed that this was expected to be burnt during normal engine operations.

The only bulk storage facilities for used oil noted in the report was 1,000 litre Intermediate Bulk Containers (IBCs) which can be handled by a forklift. There are no details regarding whether Pacific Energy or Total oil companies have any bulk storage tanks on their tank farms.

The report does not detail any proposals regarding how the waste oil would be collected, although the options and CBA tables do refer to a levy on lube oil, but there are no details of how that levy might be implemented, or any evaluation about what level of levy might be acceptable to the public.

3.5 Cost-Benefit Analysis of Used Oil Management Options for Tonga (2015)

Subsequent to the 2014 report, a Cost-Benefit Analysis (CBA) was conducted for Tonga in 2015. This report assumed that used oil represented 38% of the imported lubricating oil, and so taking a figure of 450,000 litres as imports, from the 2014 Audit, it predicted that 171,000 litres would be produced annually for disposal. It is not stated on what basis the 38% figure is derived.

The CBA report states that Pacific Energy, one of two lubrication oil importers, ships used oil to Fiji on its own ship, but does not state how much goes on that route, or what it is used for⁹.

The report has a list of 'Practical Options' for used oil management, being: recycling in Tonga for use as an industrial fuel; batch incineration in a specifically designed incinerator; blending with diesel fuel so as to use in large diesel engines ('black diesel'); and off-shore shipment. The first three in-country options were then investigated as to cost-benefit, and off-shore shipping (the only option currently in place at that time) was treated separately¹⁰.

All four options were evaluated as to the costs involved¹¹. The summary then put recycling in-country and use as black diesel in the same category for evaluation, as it appeared that the two options were in fact one. The summary then found that incineration would cost 4¢/litre, recycling/use as black diesel would be 12¢/l, and shipping off-shore as 26¢/l. The analysis did not include details of shipping costs.

The incinerator identified was quoted as having a capacity of 20 litres per hour. If total used oil in Tonga is 171,000 litres per year, this would require 8,550 hours to burn a year's worth of oil with this unit. 8,550 hours is 1,068 days at eight hours per day¹². Typical working days per year are around 240. At least four units would be required to work 8 hours per day during all normal working days to dispose of the amount of oil generated. This might be expected to require something like eight people, plus 256 kWh of electricity use per day¹³ (for four units) as a very basic running cost.

The analysis at the end of the report did not include these running costs broken down, simply costing the entire operation as \$40/day. The black diesel option appears to be predicated on the assumption that the recycled used oil could be mixed with diesel in an 80/20 mix of used oil to diesel, which would be surprising. The option was valued out as the 171,000 litres of used oil being available to displace some similar amount of diesel imports.

The incineration option was recommended as the most cost effective operation, after a suitable incinerator was costed out at a purchase price of around US\$10,000. No costs were described in any option for collection, storage or handling of the used oil prior to processing or shipment.

⁹ Cost-Benefit Analysis of Used Oil Management Options for Tonga (2015), Executive Summary, p 3.

¹⁰ Ibid, sections 3 & 4.

¹¹ Ibid, section 6 Cost Analysis, p 12

¹² Ibid, section 3 Disposal and Treatment Options, p 6

¹³ Ibid, section 6 Cost-Benefit Analysis table, p 12

4.0 Institutional Frameworks for Used Oil Management

4.1 Waste Authority Ltd.

Institutional solid waste management (SWM) in Tonga is now in the hands of the Waste Authority Ltd. (WAL) and in recent years WAL has extended its area of services from only on Tongatapu to both the Ha'apai and Vava'u island groups. The four local utilities (Power Authority, Water Authority, Waste Authority, and Gas Authority) are united by a single board of directors. WAL issues a regular Business Plan.¹⁴ WAL is an SOE that operates under the Ministry of Public Enterprises, and the Organisational Chart in the July 2020 Business Plan shows the Board as responsible to the Ministry. As such, the Ministry would be an important stakeholder to be consulted with on the issue of used oil.

WAL levies businesses and households according to a set tariff, and uses Tonga Power Authority or Tonga Water Authority utility bills to collect waste management levies from households and businesses. This provides an existing institutional basis for fee collection, as well as a steady revenue stream. However, flat rates for waste collection do not reward those who minimise their waste generation, or small households over larger ones. The current rates are as follows¹⁵:

TYPE	Fees(TOP)	
Residential/household collection & disposal	15	per month
Small businesses/Retail disposal	50	per month
Large businesses disposal	200 - 800	per month
Restaurants	128	per month
Accommodations	Individualized rates	Hotel
	80	Guest houses
Hospital waste disposal	390	per month
Septic waste disposal	180	Households
	280	Business
Bulky	100	WAL Truck 2 tons or less
	150	WAL Truck over 2 tons
Latex paint waste disposal	150	Per cubic meter
Demolition waste disposal	50	Per cubic meter

WAL operates three landfills or dumpsites in the country, an engineered landfill in Tongatapu, and dumpsites at Ha'apai and Vava'u. Given the central role of WAL in SWM in Tonga, WAL can be expected to play a central role in any used oil collection system, especially if such a system used any Advance Recycling Fee (ARF) or Advance Disposal Fee (ADF) as the approach to finance the collection, storage and processing or export of used oil. WAL has the institutional capacity to manage any levy system as it already uses such a system to collect its revenues for SWM.

The WAL business plan includes the collection of scrap vehicles, and the intention to set up an end of life (EOL) vehicle processing program¹⁶. When created, this would potentially have a role to play as a used oil collection point, as vehicles scrapped would require oil to be drained prior to crushing. The plan also contains the development of a recycling centre for other materials, which would again provide a useful collection point for used oils.

¹⁴ WAL Business Plan FY 2020/2021

¹⁵ Waste Management Service Expansion to Outer Islands, J-PRISM II, 2022, p2

¹⁶ WAL Business Plan 2020/2021 Executive Summary p 5

4.2 Private Sector Participants in Used Oil

Pacific Energy has been reported in the 2014 Audit as operating a 'take back' service, with used oil being shipped to Fiji on the company vessel. It is not known at the time of this report if that service has been maintained over the last two years of the Covid 19 pandemic.

GIO Recycling has exported used oil to India in the past decade, but details have been unable to be obtained at this time due to the disruption in Tonga. However, information will be available once things get back to normal in Tonga. Details sought will involve where the oil came from, how it was packed for shipping, shipping route, handling issues in Tonga, and other operational details that may cast light on how used oil might be handled in the future.

4.3 National Used Oil Markets

Historical information from the 2014 Audit suggests that used oil is given away to businesses and the public that can find a local use for it, although the Executive Summary says it is sold to locals. The 2015 Cost-Benefit analysis noted no on-sale value for used oil in Tonga, stating at several instances in that used oil is given away to local people who have a use for it.

It is known that used oil can be processed in New Zealand and Australia. Fiji has some processing capacity at the Bluescope Pacific steel works, but it is not known at this stage if the company is prepared to take on more used oil than it currently manages from local markets. A report for SPREP/GEFPAS in 2018 on managing used oil in Micronesia indicated that at that time Bluescope Pacific could not accept more used oil¹⁷.

Bulk used oil exports have taken place in the past, the oil being sold to India by a private recycling company in Tonga, i.e. GIO. Quantities and other information will be obtained in the future.

4.4 National Used Oil Management Opportunities

With WAL now operating, or intending to operate, across the country with a dedicated managed landfill and dumpsites, it is likely that WAL is best placed to operate any used oil collection system to the general public and small scale generators such as small workshops, especially outside of Tongatapu.

For larger generators of used oil, the question is likely to turn on who has the infrastructure to hold bulk used oil. As a flammable liquid, there are constraints that will already be found in place on existing bulk oil or fuel tank farms. These may exist either with the two oil companies, or at the power plants. This is information that needs collecting and addressing in the Feasibility study phase of the overall project.

¹⁷ Used Oil Report: Fiji, Nuie, Kiribati, Vanuatu, SCL, Executive Summary, p ii

5.0 Inception Meetings and Local Stakeholders

The Inception Phase requires initial consultation with key stakeholders in Tonga. A list of key stakeholders was compiled in cooperation with MEIDECC that involved both private sector and government. It is important to note the significant role of SOEs in this issue in Tonga. Meetings and minutes are detailed below and in Annex 1, and the main stakeholder meeting was very fruitful with a lively discussion of the issue, after a presentation by the consultant on the key points of the project.

At the end of the meeting, the question was posed as to where, after the presentation and discussion of the current situation in Tonga, where both government and private sector partners saw that the solution to the used oil problem might lie. Whilst the meeting showed that there were clearly some re-use options for used oil in Tonga, and that these are all catered for currently, and they would like that situation to continue, there was a unanimous agreement that export of waste oil for processing overseas was the solution for the vast majority of used oil generated today in Tonga. It was noted that a local enterprise had tried to re-refine oil in Tonga, but it had failed. The idea of Product Stewardship and Advance Recycling Fees was offered during the presentation, and this was accepted in principal as a sound way forward. It was recognised by the meeting that a financially sustainable system was important.

5.1 Inception Meetings

Two inception meetings have been held in Tonga. Holding meetings has been held up by both the volcanic eruption and tsunami clean-up, and then the Covid-19 pandemic that arrived with the relief effort. The first was a meeting with the Government of Tonga focal point Mafile'o Masi, Chief Environmentalist, Department of Environment, MEIDECC. Minutes are provided below at Annex 1. This meeting provide some useful background from MEIDECC and set the scene for the stakeholder meeting held on Friday 13 May. The delay was largely caused by the ongoing restrictions from Covid-19 in Tonga.

The second meeting was for the stakeholders. Minutes of the second meeting are provided at Annex 1. To summarise, after a first session presentation of the issue by the New Zealand based consultant, a second session was conducted of questions and answers with key local stakeholders. These questions provided the picture on the current state of affairs, and gave the participants a clear idea of the detailed questions they will be asked in the Analysis phase to come next. Whilst some exports had taken place, largely by Pacific Energy, not much was happening right now. Total Oil company had storage on a tank farm for waste oil, which was useful to know. Also a key finding was that the outer island power plants operated by TPL had a ready market for their used oil from gensets to local users who struggled to buy oil at retail in remote places. Oil from gensets is a consistent product and useful in old farm machinery etc, and can even be used as hydraulic oil in old equipment.

The concept of a used oil Advance Recycling Fee or some such financial device was mentioned in terms of a potential way to deal with the issue. Financial sustainability of any proposals was clearly an essential component.

5.2 Key National Contacts

5.2.1 Government of Tonga

There are two lead Ministries, one through its role in overseeing WAL, and the other being responsible for relevant legislation and enforcement. Focal point personnel for the study will be defined by the Government once they are ready to interact with the project.

- Ministry of Public Enterprises; this is the lead Ministry for both the Waste Authority and Tonga Power Ltd;
- Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change & Communication (MMEIDMECCC); this is the environmental legislation regulator;
- Tonga Power Ltd.;
- Waste Authority Ltd.;

5.2.2 Private Sector

Main private sector partners at this stage will be the two oil companies who import and sell lube oils, plus large retailers of oil and workshops servicing vehicles. Also, any companies collecting used oil, or who have previously collected used oil, for recycling and/or export. These main private sector stakeholders are:

- TOTAL, an oil company;
- Pacific Energy, an oil company;
- ASCO Motors Tonga, vehicle sales and servicing;
- EM Jones Limited
- Vaitohi Enterprises
- Autozone Tonga
- GIO Recycling

5.3 Stakeholder List

This list can be expected to be added to significantly once stable communications can be resumed to Tonga

Stakeholder	Sector	Interest	Mechanism for future engagement
Total	Oil Company	importer	Stakeholder meeting and questionnaire
Pacific Energy	Oil Company	importer	Stakeholder meeting and questionnaire
ASCO Motors Tonga	Mechanical workshop	Used oil producer	Stakeholder meeting and questionnaire
EM Jones	Mechanical workshop	Used oil producer	Questionnaire and follow-up meetings
Vaitohi Enterprises	Mechanical workshop	Used oil producer	Questionnaire and follow-up meetings
Autozone Tonga	Mechanical workshop	Used oil producer	Questionnaire and follow-up meetings
Customs	Government regulator	Management	Import data query request
Tonga Power Ltd	Electricity Utility	Used oil producer	Stakeholder meeting and questionnaire
Waste Authority	Waste Management	Oil collector	Stakeholder meeting and questionnaire
MMEIDMECCC	Government regulator	Management	Ongoing consultation
JICA	Environmental	Management	Data and report request
Min. Public Enterprise	Government regulator	Management	Consultation when required
LTA	Government regulator	Management	Query on vehicle registrations

5.4 Government Priorities

As a result of the Stakeholder meeting on May 13th that included both Government regulators and SOE operators, the priority expressed by that meeting was clearly that of a viable export mechanism for used oil, as that had been the process in the past where possible. There are clearly some local re-

use options for used oil from TPL power station gensets on outer islands that are very useful to the local population where lube oil can be hard to buy retail, and given that power plant maintenance is regular, the oil is reasonably good after a 1,000 hour change. Clearly these viable local re-use options should be retained. But the bulk of used oil is in excess to local requirements and should be exported for processing overseas.

6.0 Detailed Work Plan

Due to the national state of emergency caused by the effects of the volcanic eruption, the timing at which the study can proceed in Tonga is uncertain. It is likely to be some months away yet. Stakeholder meetings need to be held with both private sector and government.

The Terms of Reference and contract for the study have three main outputs after the inception phase: an Analysis Report, a Feasibility Study, and a National Oil Management Plan. The following tasks will be required to feed into firstly the Analysis Report, which will then inform the Feasibility Study, which will inform the Management Plan.

6.1 Obtain import data

Obtaining recent import data, ideally for the last five years, and including at least three years pre-pandemic, is essential to get the overall picture of new lube oil imports. Having several years data can show up if any anomalous years are present, with quantities that do not match a typical trend without explanation.

As oil is a regularly used product which should be either changed or burnt on a consistent basis, The overall scale of the issue should be apparent from this data. The tariff can be used to obtain data on vehicle imports, as well as vehicle registration data. The ten year old data from the Audit of 2014 will also be useful.

6.2 Determine Major Sources of Used Oils

Lube oil figures from the major users, such as Tonga Power from generating plant, will be best gained directly from the users if possible. In addition, some investigation of vehicle numbers can be useful to get a picture of the amount of used oil generated from that sector.

There are many different sources of used oils, and in Tonga some will be far more important than others. Some used oil generators may have significant quantities of a similar oil, but smaller generators, such as vehicle workshops, will generate mixed oils. Some determination of the pattern of oil generation is important, and this can be determined by looking at sales and import data.

Types of used oils typically include:

- Engine oil –includes crankcase oils from gasoline, diesel and LPG/CNG engines
- Brake fluids
- Gear oils
- Transmission fluids
- Hydraulic oils and fluids
- Compressor oils
- Refrigeration oils
- Industrial process oils
- Electrical insulating oil
- Metalworking fluids and oils
- Heat transfer oils

- Machining oils
- Ship's slops, bilge water, tank cleanings produced by vessels during normal shipboard operations
- Bottom clean-out waste from virgin fuel storage tanks, virgin fuel oil spill clean-ups, or other oils.

6.3 Assessment of Local Practices Around Used Oil

It will be important to determine current local practices of workshops who conduct oil changes and repair work, along with an indication of the number of workshops and the scale of this work.

Commercial vehicles from bigger businesses can be expected to conform to regular maintenance schedules. Construction companies, and government public works activities are all likely to have their own workshops.

6.4 Collection Points

There will likely be two main types of used oil generators: large businesses, who operate large machines and produces significant quantities from maintenance operations, and small generators such as individuals and small scale vehicle repairers, who generate smaller amounts. These need identifying in general terms and scale.

6.5 Analysis of Legal and Policy Framework

The legal framework will be looked at for the potential to use existing legislation for any Management Plan actions that are proposed, or if there is a need for new primary or secondary legislation (i.e. acts or regulations).

It can be expected that a suitable outcome may involve some form of Advance Disposal Fee or Advance Recycling Fee. Given the small scale of the country, environmentally acceptable in-country processing of used oils may not likely to be the case, and export to a suitable large scale processing facility, possibly in New Zealand where two such facilities exist, is a potential outcome. How to pay for the collection and shipment will be a fundamental question to answer, along with international convention obligations.

6.6 Processing Options

Satisfactory disposal of used oil is expected to be mainly to off-shore destinations although some local end uses may be deemed acceptable. Off-shore disposal is generally the preferred option throughout the Pacific although there are other local end use options in some countries such as BlueScope Pacific Steel in Fiji.

There are other potential options detailed in the 2015 CBA report, but the options were not properly costed out, or evaluated for disposal of sludges, collection and storage costs, which are all very significant factors. The contention that mixed used oils could be used to replace 80% of diesel fuel is a fallacy.

6.7 Local Stakeholder Interactions

A series of questions will be developed that will gather detailed information about the above life cycle stages to inform project reporting and examine ways to:

- Increase collection
- Improve transport methods
- Seek satisfactory disposal methods
- Assess means for improvements
- Assess costs for improvements
- Assess training and capacity-building needed
- Target needs to each country's requirements.
- Determine potential pathways to develop Advance Disposal Fees for lubricating oils
- Review existing waste legislation and relevance to waste oils

6.8 Timelines

Project timelines will be as described in the amended Contract

Annex 1: Stakeholder Meeting minutes

a) Government MEIDECC Stakeholder Only, March 2022

A meeting with the Government of Tonga focal point was arranged and held on March 17th by Zoom, 11am - 12.30pm.

Present: Mafile'o Masi, Chief Environmentalist, Department of Environment, MEIDECC

Julie Pettit, SWAP project Coordinator;

John O'Grady, Aspring Consulting Ltd, Team Leader;

Alice Leney, Consultant (based in NZ) for Tonga National Plan

The meeting opened with introductions. It was noted that the local consultant for Tonga, Ms. 'Ofa Tu'ikolovatu was unable to join (she is stranded in the United States at this time). There was a brief discussion that another local consultant might be required in order to take the work forward. Alice to look into this. Also noted that Tonga has local transmission of Covid 19.

Alice presented a PowerPoint that covered off the overall aims of the project, with some specifics regarding Tonga. After the presentation, Mafile'o provided some very useful background and supporting information:

- Both oil companies are required to collect waste oil from oil they import under Petroleum Act provisions;
- Largest single source of used oil is Tonga Power Ltd. and their stockpile is expected to go to Pacific Energy periodically for export;
- Pacific Energy periodically exports used oil to Fiji;
- Used oil in Tonga has been used as mixed with Bitumen for road repairs;
- Oil companies in Tonga have tank farm capacity to store used oil;
- There should be no need to build any new storage facilities to take used oil in Tonga;
- Small workshops store used oil in drums;
- Gas stations run by the two oil companies would be likely best Collection points rather than WAL dumpsites and facilities;
- Used oil disposal needs to be free for the public and small business to make sure that it is used in Tonga.

Other notes from participants:

- Fiji, Blue Scope Steel Ltd., has a limited capacity to take used oil from outside the country (John);
- Treated waste oil is not usually acceptable for diesel engine use, although the 2015 CBA says it is (John and Alice);

Mafile'o advised that the next Stakeholder meeting should focus on a small group of key players to keep proposals focused at this stage, and include:

Marine and Ports Authority; Pacific Energy Ltd.; Total Ltd.; Waste Authority Ltd.; Tonga Power Ltd.; Dept of Environment.

Actions: 1) Alice to determine if 'Ofa can continue or if a new local consultant needs to be engaged.

A replacement local consultant was subsequently engaged, A.L.T Consultants of Tonga

2) Set up a Zoom meeting with stakeholders listed above.

This took place on May 13, delayed by Covid Restrictions.

b) Main Stakeholder Meeting, May 2022

A meeting was held with a wider stakeholder group on Friday 13th May, starting 10 am. The meeting was held in the MEIDECC Conference Room.

Both John O'Grady and Alice Leney joined by Zoom from New Zealand, and Julie Pillet from Samoa via Zoom. All the other participants were present in the Conference Room, and this worked well as the meeting moved to an open discussion in the latter half between the local stakeholders. This Interventions Brainstorming session was conducted mostly in Tongan, and then provided the Consultants with an overview of the discussions at the end. The local consultant took notes during the brainstorming session.

The Agenda was as follows:

Time	Activities	Responsible Person
10:00am	Opening Prayer Welcome	TBC Ms .Mafile'o Masi , Department of Environment
10:15 am	Introduction of participants	All
10:20 am	Project Overview Describe the key requirements of the project, and some indication of where the solution might lie.	Mr. Alice Leney NZ based Waste Oil Consultant
10:40 am	Data Requirements and Discussion (who , where, contact point) a) How much lubricating oil is imported annually? We hope that Customs and the importers can help with this; b) Is any waste oil currently being exported from Tonga, or has been in the last five years? c) What local uses for waste oil are there in Tonga? What do big producers of waste oil do with it currently? d) Current bulk storage capacity and other existing infrastructure and logistics of moving oils and fuels around Tonga.	ALL (facilitator : Mr.Alice Leney)
11.30	Interventions Brainstorming Ideas and opinions from the meeting participants as to what they see as viable solutions to this problem. Are businesses currently involved or planning to get involved in used oil export or local processing? What sort of commercial incentives might be required to get business interested?	ALL (facilitator: Mr Alice Leney)

12.30 pm	Wrap up and Closing	Department of Environment
1.00 pm	Lunch will be served	

The first session presentation outlined the purpose of the project and the project stages, and provide a scene-setting approach to the Analysis Phase, where the stakeholders would be asked for specific information. This prepared the stakeholders for the questions to follow in the second session, which then moved into the third session open discussion around the table.

In the second session the following points arose from discussions between the consultants and the participants, and they key points are noted here:

Asco Motors

The company has workshops that service vehicles. They buy their oil from Pacific Energy, and P.E. takes the used oil back from Asco Motors.

Pacific Energy

In 2008 initiated an awareness program with customers around waste oil and started to address issue by offering to take back used oil from their customers. But they only do this for their own customers. PE currently has an annually renewed Waigani permit to ship 160,000 l/yr to Fiji, which goes to Bluescope Steel, and has typically shipped around 120,000 l/yr in recent years. Most of this oil came from Tonga Power Ltd. but TPL have now recently shifted to Total as the supplier of lube oils, so this will no longer happen.

Typical shipment size to Fiji has been 10,000 l/shipment, and this is transported by IBC on the coastal tanker that PE operates to bring fuel to Tonga. The IBC are one that were used to import lube oil, and are then back-filled. However, only TPL was buying lube oil in the bulk sizes that used IBC. Things now changed with the change of contract with TPL to Total.

PE Imports around 300,000 l/yr lube oil; PE does not import fuel in ISO TT unless they run out of bulk fuel for some reason, which is unusual.

Tonga Power Ltd

Currently is storing waste oil in an ISO Tanktainer. TPL has 6 gensets which use 750 litres per 1,000 hours, or about 40,000 litres per year used oil produced.

Only Tongatapu plant produces used oil because used oil from outer island power plants oil is sold to locals as lube oil because it is consistent and reasonably clean as changed regularly. Quantities are not large, around 300 litres per month from a typical outer island power plant. This used oil is used in tractors, farming and local equipment, for example as a replacement for hydraulic oil. It is valuable to outer islanders as oil is often not readily available retail, or expensive, especially for old machines that may use a lot of oil through engines burning it.

Waste Authority Ltd

WAL has used oil in the landfill on Tongatapu, as people who change their oil and want to do the right thing with it take it to landfill. However, there is no pathway for this oil stockpile to be re-used or recycled or exported. Stockpile quantity in the landfill is not known at this time. WAL are in favour of finding a system to take the used oils off their hands.

Ports Authority

PA has a stockpile of waste oil from boats. There are 30,000 litres at the Ports Authority stored in drums and IBC. May have lost some of stockpile in Tsunami, not know as they are still cleaning up, and they need to do a new stock take.

Total

Has stockpile in their tank farm, where they have two tanks for used oil, one 50,000 l and one 70,000 l, being 120,000 litres in total. They have no outlet for stockpile right now. Having taken over TPL contract recently, they now need a system to get rid of the used oil. They have the capacity to pump from IBC into tanks and also could pump out into ISO TT.

A Brainstorm Open Discussion followed around the table, and this went for about one hour, with the meeting finishing about a half hour later than expected. The discussion was based on the need to collect and export waste oil, increase storage capacity and public awareness and education.

At the end of this discussion, which was held in the vernacular, the consultant asked the participants if, in the light of what had been discussed, and in the light of previous suggestion for local processing being non-starters, did they feel that the solution might lie with an export option? This was universally agreed that export was likely to be the way forward. The consultant noted that they would be going back to each stakeholder with some detailed questions in the next few weeks as part of the Analysis Phase data collection.

Workshop Invitees for Used Oil Management Stakeholder Workshop

Department of Environment - MEIDECC	Government	Lupe	Matoto	Director	lupe.matoto@gmail.com
Waste Division - MEIDECC	Government	Mafile'o	Masi	Head of Division	mafileo.masi@gmail.com
Waste Authority	Public Enterprise	Malakai	Sika	CEO	malakaisika@gmail.com
	Public Enterprise	Lola Liava'a	Tonga	SM	lola.liavaa.tonga@gmail.com
Tonga Power Limited	Public Enterprise	Murray	Sheerin	Generation Division Manager	msheerin@tongapower.to
	Public	Lani	Ahokava	Generation	mahokava@tongapower.to

	Enterprise			Division	
	Public Enterprise	Ernesto	Siale	Generation Division	esiale@tongapower.to
Ports Authority	Public Enterprise	Alo	Maileseni	CEO	amaileseni@portsauthoritytonga.com
Land Transport(LT) - MOI	Government	Tevita	Lavemai	Director	tlavemai2020@gmail.com
Marine and Ports Division (MPD)	Government	Kelela	Tonga	Director	ktonga20@gmail.com
	Government	Meliame	Tu'alau	SM	meliamek@gmail.com
Statistics Department	Government	Viliani	Fifita	CEO	vfifita@stats.gov.to
Pacific Energy Limited	Oil Company	Ifalemi	Ma'u	Terminal Operation Manager	lfalemi.tauheluhelumau@p.energy
Total Limited	Oil Company	Jese	Tikomailepanoni	CEO	jesetikomailepanoni@total.com
Asco Motors	Major Oil Retailer	Tonga	Po'oi	CEO	TPooi@asco.com.to