

# Vanuatu Analysis Report

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



**SPREP**

Secretariat of the Pacific Regional  
Environment Programme

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

# **Vanuatu Analysis Report**



**July 2022**

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## Executive Summary

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

This particular project focuses exclusively on used oil and four countries have been chosen to benefit, namely Samoa, Solomon Islands, Tonga and Vanuatu. The main outcome of the project is a National Used Oil Management Plan for each country.

Each project will be done in five stages:

- Inception – introductory meetings and desktop study of available information
- Analysis – gathering current data and discussions with stakeholders
- Feasibility Study – preparation of a feasibility study report for consultation
- Draft Used Oil Management Plan – the plan will be based on the feasibility study and consultation
- Final Used Oil Management Plan – finalization of the plan after further consultation and feedback.

This report is the Analysis Report for the Vanuatu component of the work. This phase of work was essentially local data gathering and Mr Paul Mooney of Environmental Management Vanuatu interviewed a large number of people to gather the data, both in person and by phone.

The following conclusions were drawn as a result of the data gathering work:

- a) Based on information supplied by the Vanuatu Department of Customs and Inland Revenue, there was 637,606 kg lubricating oil imported in 2021. Smaller amounts of other types of oil would have also been imported that may have been disposed of as used oil.
- b) It has been calculated, taking into account used oil generation from all relevant oil products, and an increase in economic activity in 2022, that about 280,000 – 380,000 litres/year of used oil is being generated and not being managed properly.

- c) About another 60,000 litres per year is being generated that is being managed by the Societe De Services Petroliers.
- d) The Societe De Services Petroliers have storage capacity for 20,000 litres and OES is currently storing oil recovered from a ship salvage operation. There are various other small stockpiles from numerous used oil generators.
- e) Some used oil is being used for termite and timber rot control, dust suppression, corrosion control, as chainsaw bar oil, or in other ways that could generally be deemed to cause environmental and health risks.
- f) The remainder of the used oil is just being disposed of to land (including landfills) or to waterways.
- g) There are some potential local reuse /disposal options available that may be satisfactory, including at the COPSL Copra plant in Santo and the OES facility.
- h) There are clear government priorities for the management of used oil that require effective management to protect human health and the environment. These priorities are being met to a certain extent, primarily due the used oil recovery work undertaken by the Societe De Services Petroliers.
- i) The priorities set out in the recently prepared National Hazardous Waste Policy and Costed Implementation Plan, which is soon to be mandated in Vanuatu legislation, offer the best way forward at present for a used oil management legislative framework.
- j) This data gathering phase of the project has been difficult due to pandemic restrictions and the reluctance of some stakeholders to engage, but it is considered that sufficient information has been gathered to move on with some confidence to the next stage of the project, i.e. the Feasibility Study.
- k) The Feasibility Study will aim to come up with a clear direction, backed up with supporting evidence, for the preparation of a detailed National Used Oil Management Plan.

## Abbreviations

AFD	Agence Française de Développement
BPS	Bluescope Pacific Steel
BV	Biosecurity Vanuatu
COP	Code of Practice
CSA	Chemical Safety Act
DCIR	Department of Customs and Inland Revenue
DEPC	Department of Environmental Protection and Conservation
EPCA	Environmental Protection and Conservation Act
GDP	Gross Domestic Product
GEFPAS	Global Environment Facility - Pacific Alliance for Sustainability
GHS7	Globally Harmonised System Rev 7
MOH	Ministry of Health
NCPIP	National Chemicals Policy and Implementation Plan
NEPIP	National Environment Policy and Implementation Plan
NIP	National Implementation Plan
NHWPIP	National Hazardous Waste Policy and Costed Implementation Plan
NWMPCS	National Waste Management and Pollution Control Strategy
OES	Ocean Environmental Services
PCA	Pollution Control Act
PHA	Public Health Act
PE	Pacific Energy
PIC	Pacific Island Country
PICTs	Pacific Island Countries and Territories
POPs	Persistent Organic Pollutants
PPE	Personal Protective Equipment
SCL	Salters Cartage Ltd
SPREP	Secretariat for the Pacific Regional Environment Programme
SSP	Societe De Services Petroliers
SWAP	Committing to Sustainable Waste Actions in the Pacific
TT	Tanktainer
UNELCO	Union Electrique du Vanuatu Ltd
UNEP	United Nations Environment Programme
VUI	Vanuatu Utilities & Infrastructure Santo
WMA	Waste Management Act

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## 1.0 AFD Programme to Develop a Used Oil Management Plan

### 1.1 Project Background

Pacific Island Countries and Territories (PICTs) offer some of the richest areas of biodiversity on the planet. These areas, and their island communities, are under increasing pressure from development and growing human population, and the social and economic pressures associated with this growth.

Increased populations and urbanisation have led to increased product imports, production, and waste generation. Much of the waste generated through these imported products 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 most rely heavily on clean environments for agricultural activities and a vibrant tourism industry, therefore polluted and degraded environments pose a significant threat to PICTs.

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This particular project focuses exclusively on used oil, and four countries have been chosen to benefit, namely Samoa, Solomon Islands, Tonga and Vanuatu. The main outcome of the project is a National Used Oil Management Plan for each country. This report focuses on the Vanuatu component of the work.

### 1.2 Project Deliverables

The overall project deliverables are set out in Table 1 below:

**Table 1: Project Deliverables**

Deliverables	Task	Due Date
1. Inception Meeting	1.1 Participate in an initial meeting with the SWAP PMU organised by SPREP	Within two weeks of the project commencement on 10 January 2022
2. Inception Report	2.1 Host an Inception Workshop with National stakeholders 2.2 Undertake a detailed desktop review of existing legislation, policy, strategy and plans that address waste management, institutional frameworks, and other enabling frameworks relevant to waste management	Within 1 month following Inception meeting
3. Analysis Report	3.1 Undertake an analysis of used oil production and existing used oil collection, storage, treatment, disposal and export services 3.2 Analyse findings against government and stakeholder priorities	Within 2 months following approval of the Inception Report
4. Feasibility Study Report	4.1 Development of a feasibility study based on all the information gathered and data obtained through the consultations, interviews, and investigations 4.2 Feasibility Study Presentation	Within 2 months following approval of the Analysis Report
5. Draft National Used Oil Management Plans	5.1 Compile all the gathered information to develop a Draft National Used Oil Management Plan 5.2 National Stakeholder Presentation	Within 2 months following approval of the Feasibility Study Report
6. National Used Oil Management Plans	6.1 Final national used Oil Management Plans	Within 1 month following approval of the Draft National Used Oil Management Plans

### 1.3 Used Oil Background

Used oil is defined as any petroleum-based or synthetic oil or fluid that, through contamination or degradation, has become unsuitable for its original purpose due to the presence of impurities or loss of original properties. This covers all used oil consistent

with the classification of hazardous waste under the Waigani<sup>1</sup> and Basel Conventions<sup>2</sup>. This includes any semi-solid or liquid product consisting totally or partially of mineral oil or synthesised hydrocarbons (synthetic oils), oily residues from tanks, oil-water mixtures and emulsions. These may be produced from industrial and non-industrial sources where they have been used for lubrication, hydraulic movement, heat transfer, electrical insulation or other purposes and whose original characteristics have changed during use, thereby rendering them unsuitable for further use for the purpose for which they were originally intended.

Large volumes of used oil can potentially enter aquatic ecosystems in water runoff from urbanized areas. Typically, oil spilled on soil migrates downward by gravity into ground waters, and spreads laterally via capillary forces and soil heterogeneity. Once in the environment, oil hydrocarbons and associated metals may persist for years.

Ingested oil may adversely impact the ability of animals to digest food and damage their intestinal tracts. Oil also reduces the insulating capacity of animal furs and the water repellency of bird feathers, thus increasing morbidity and mortality due to exposure and eventual drowning.

There are also major community health considerations around the fate of used oil due to its toxicity. Used oils typically contain a range of compounds that may have adverse impacts when released into the environment. These compounds include polycyclic aromatic hydrocarbons (PAHs), heavy metals, additives and antioxidants, trace levels of chlorinated solvents, and polychlorinated biphenyls (PCBs). Exposure to these compounds can result in damage to the liver, kidneys, heart, lungs and nervous system. Poly-aromatic hydrocarbons are also potent carcinogens. Oil concentrations as low as one part per million (ppm) can contaminate drinking water.

## 1.4 Analysis Report

Under the terms of the contract, for the Analysis Report the Consultant is required to:

- **Document** used oil production and existing used oil collection, storage, treatment, disposal and export services to determine logistical issues and opportunities related to national used oil management; and to
- **Analyse** these findings with respect to government and stakeholder priorities determined at the inception stage of the project.
- **Provide a clear premise** for the product and geographical scope and likely services necessary to meet the stated government and stakeholder needs within a draft national Used Oil Management Plan.

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<sup>1</sup>Convention to ban the importation into Forum island countries of hazardous and radioactive wastes and to control the transboundary movement and management of hazardous wastes within the south Pacific region (1995).

<sup>2</sup>Basel Convention on the control of transboundary movements of hazardous wastes and their disposal and Annexes and Amendments (1998)

## 1.5 Assistance Provided

The following is acknowledged with grateful thanks.

- The local data gathering was carried out by Paul Mooney of Environmental Management Vanuatu. This was a very significant effort and a large number of stakeholders were approached (some on numerous occasions).
- Roselyn Bue and Ionie Bolenga of DEPC also provided considerable support and assistance at this data gathering phase of the project.
- In addition, numerous stakeholders, as recorded in Sections 6.0 and 7.0 below, also gave of their time to supply valuable information.

## 2.0 Background for and Procedures Used for Data Gathering

### 2.1 Used Oil Sources

Used oil can originate from many sources and the following sources were explored:

- Engine oil – typically includes crankcase oils from gasoline, diesel and LPG/CNG engines (often the main sources)
- Engine Oil Filters and how they are managed
- Brake fluids
- Gear oils
- Transmission fluids
- Hydraulic oils and fluids
- Compressor oils
- Refrigeration oils
- Industrial process oils
- Electrical insulating oil (Care must be taken to exclude oil likely to contain PCBs)
- 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 oil

### 2.2 Sources of Used Oil Contamination

It is important to note that some potential components of used oil should be excluded, mainly for safety reasons – flammability and toxicity. Checks were made to assess how these items can be screened out. These potential components included:

- Petroleum distillates used as solvents, such as turpentine, kerosene, parts-washing solvents
- Petrol and/or diesel (including biofuels) – including mixtures from refueling errors
- Antifreeze, radiator flushing, or other inhibitor packages
- Oils derived from animal or vegetable fats and oils – including those used as a lubricant
- Paint and paint brush washings



- Chlorinated oil or solvents
- Any virgin or used oil which may contain PCBs (> 5 mg/kg)
- Soluble cutting fluids

The occurrence of such items were, however, noted as other hazardous waste disposal solutions will be needed.

Any used oil suspected of containing PCBs will need to be tested. Testing can be carried out with test kits but the test kits contain sodium and cannot be imported by air freight. The alternative is to send samples to New Zealand or Australia for testing. PCB contamination arises from old transformer oils and most of this old transformer oil was removed as part of a SPREP Persistent Organic Pollutants (POPs) removal project in 2005. It is possible, however, that some may still remain as only out-of-service transformers were dealt with in 2005. The 2021 Vanuatu NIP Update Report<sup>3</sup> concluded that:

*UNELCO have indicated that all of their transformers potentially containing PCB contaminated oils have been disposed of, and no “out of commission transformers are in use or held in storage. Old transformers were disposed of to “Scrapmetal” and the fate of the transformer oil is unknown. VUI have approximately 54 old transformers in storage or still in use that potentially contain PCB contaminated oil. These transformers may contain up to a total of 12,500 Lts of contaminated oil.*

### 2.3 Inappropriate Uses of Used Oil

There are several methods for disposing of used oil that are inappropriate and examples of these are:

- disposal on the ground, or into watercourses, sewers or drainage systems
- burial
- using used oil for dust control, weed abatement, vegetation control, timber preservation by painting, staining or dipping,
- pest control or as a carrier fluid for agrichemicals (pesticides or herbicides)
- use as a marker, e.g. on playing fields
- placing used oil in rubbish bins to be collected as part of household waste
- open-air burning
- combustion in, for example, kerosene burners
- any other practices, in which the used oil may cause contamination of the ground and groundwater, migrate to watercourses, contaminate air or have negative impacts on humans, plants, animals or other organisms.

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<sup>3</sup> Vanuatu National Implementation Plan (NIP) Update for Persistent Organic Pollutants July 2021

## 2.4 Methods of Used Oil Management

Methods of used oil management, including collection and storage, were examined including considering the following matters:

- Where IBCs (intermediate bulk containers) are used for the collection, storage and transportation of used oil, these must be sound and of good quality. They should not be left in the sun as UV light will break them down.
- Steel drums will corrode and leak, especially where the used oil is mixed with water.
- Plastic drums will deteriorate, especially if left in the sun.
- Bulk storage facilities must be maintained in good condition, regularly inspected and have good secondary containment. They need proper spill control equipment, fire extinguishers and emergency response procedures in place.
- Long term storage may result in the accumulation of sludges that are difficult to remove by pumping.

## 2.5 Disposal Facilities

Local disposal facilities were assessed.

Overseas disposal facilities were assessed where possible, to ensure they were being operated properly. Some were well known, such as BlueScope Pacific Steel in Fiji and Salters Cartage in New Zealand.

## 2.6 Methods of Data Collection

Data collection was carried out through personal visits, emails and phone interviews. Phone calls were also made to follow up on personal visits. It was difficult to visit Santo due to Covid pandemic travel restrictions so all Santo data was gathered by emails and phone calls.

It was sometimes difficult to determine the sources and composition of used oil generated and used oil stockpiled. Source, quantities and composition were checked through questioning all parties involved, and care was taken to observe contamination from undesirable sources.

Inspection of storage facilities was sometimes difficult, due to possible burials and access problems, including access into tanks to assess sludge levels and characteristics. This was taken into consideration.

The list of questions asked of stakeholders are contained in Appendix 1. A form was also sent out by email and/or delivered personally. This form was accompanied by a letter from Paul Mooney and an endorsement letter from Department of Environmental Protection and Conservation (DEPC) and these letters are also contained in Appendix 2.

## 3.0 Relevant Policy and Legislation

### 3.1 Waste Management Act 2014

The Waste Management Act 2014 (WMA) commenced in June 2014 and provides for the protection of the environment by encouraging effective waste services and operations. It establishes specific responsibilities for identifying waste, collecting waste, disposing of waste, planning and reporting on waste management and managing hazardous waste. These responsibilities are shared between Department of Environmental Protection and Conservation (DEPC), municipal and provincial councils, the Ministry of Health (MOH) and Biosecurity Vanuatu (BV). Waste management responsibilities are assigned as follows in the Act (the Director is the Director of the DEPC):

- The Department is responsible for implementing International Conventions and Treaties that relate to the management of hazardous waste;
- A waste management operator designated under section 19 is responsible for providing waste collection services to residential and commercial premises;
- A waste dump or a waste disposal site is to be managed by each relevant Municipal Council or Provincial Government Councillor, the MOH or BV;
- The collection and disposal of waste that cannot be managed by the normal waste collection services to residential and commercial premises, is to be undertaken in accordance with any requirements imposed by the Director;
- The MOH has the responsibility to collect and dispose of all medical waste and on the request of the Director, is to prepare and submit a report relating to any aspect of waste management under its responsibility; and
- BV has the function to collect and dispose of waste that is designated under any written law to be biosecurity waste and on the request of the Director, and to prepare and submit a report relating to any aspect of waste management under its responsibility.

### 3.2 Environmental Protection and Conservation Act 2011

The Environmental Protection and Conservation Act 2002 (EPCA) is the overarching environmental law of Vanuatu. It provides for the conservation, sustainable development and management of the environment and covers three main areas:

- **Administration** – Formally establishing the DEPC and outlining its roles and responsibilities.
- **Environmental Impact Assessment** – Providing a process for identifying and managing the impacts of a proposed project on the environment.
- **Biodiversity** – Recognising Community Conservation Areas and giving direction to communities considering registering their conservation areas at the national level; and providing for bioprospecting (research).

The Act originally started as the Environmental Management and Conservation Act in 2002 but its name was changed in 2011.

The Director of the DEPC is responsible for implementation of the provisions of the Act. Sections of the EPCA provide the Minister with the power to regulate (amongst other things) the environmental effects of importation and transportation of hazardous substances; pests and weeds; waste management; air and water pollution. These powers provide opportunities to strengthen the DEPC's capacity to monitor the environment for industrial waste (including used oil), pollution, and other chemicals or biological agents in relation to management of pests and weeds.

### 3.3 Pollution Control Act 2013

The Pollution Control Act 2013 (PCA) commenced in June 2014 and aims to control the discharge and emission of pollution in Vanuatu. Importantly, the PCA creates a framework for DEPC to develop and introduce pollution standards and permit systems and allows the Department to take compliance action when pollution is occurring. This includes the regulation of used oil.

### 3.4 Public Health Act 1994

This Public Health Act 1994 (PHA) makes general provisions for public health, including through regulating waste management, sanitation, and prohibiting water pollution. Part 8 of the 2006 consolidation, in particular, dealt with sanitation and waste disposal, with specific provisions on littering and inappropriate waste disposal (ss 65, 66 and 72). Part 8 was substantially amended by the 2018 amending legislation and the provisions on littering repealed.

Many provisions now relate to sewage sanitation systems. More relevant are ss 73H, 73I and 73J on the provision of rubbish bins and interference with rubbish bins and tips.

Healthcare waste is not specifically identified in the legislation. Other provisions relating to inappropriate waste disposal and litter management now fall under the Waste Management Act 2014.

### 3.5 Luganville Municipal Council Used Oil By-Law

Luganville Municipal Council has drafted a 'Used Oil Management By-Law, No XX 2019 regulating the storage treatment and disposal of used oil, which is still waiting to be gazetted by the State Law Office.

## 4.0 Policy, Strategy and Planning Documents

### 4.1 National Waste Management and Pollution Control Strategy 2016 – 2020

The National Waste Management and Pollution Control Strategy 2016–2020 (NWMPCS) addresses, among other things, used oil as a waste stream and through the support of SPREP, studies have been completed looking at generation rates and current and potential recyclability. These statistics however are from 2013/2014. The strategy also sets a goal of 2018 for a used oil stewardship system to be established and enforced. Unfortunately, this is yet to be completed.

The goal of the strategy is an environmentally sustainable Vanuatu, in which all types of wastes generated are reduced, collected, reused, recycled and treated by environmentally sound technologies suited to local conditions and waste going to landfill is minimized to the lowest possible amount.

The strategy covers all sources of solid wastes (residential, commercial, institutional, industrial, disaster waste, medical waste, e-waste and scrap metal, and quarantine wastes), hazardous wastes (such as used oil) and liquid wastes (mainly pollutants discharge to water sources – treated wastewater discharges) and gaseous wastes (mainly emissions from vehicles and other air pollution sources of emission).

The following wastes are not covered in this strategy:

- Liquid wastes (such as raw sewage and septic sludge).
- Gaseous wastes
- Hazardous wastes (such as Persistent Organic Pollutants, POPs)

### 4.2 National Environmental Policy and Implementation Plan (2016-2030)

The National Environment Policy and Implementation Plan 2016–2030 (NEPIP) is an overarching policy for the sustainable conservation, development and management of the environment of Vanuatu.

Policy objectives include reduced waste and pollution through effective waste management and pollution control including the identification and development of chemical and waste storage and disposal facilities. This includes the storage and disposal of used oil.

### 4.3 Waste Management Plans

The Municipal and Provincial Waste Management Plans acknowledge used oil under the broader topic of Hazardous Waste but aside from Luganville Municipality's specific Used

Oil By-law mentioned above there are no specific actions targeting this waste stream within the Plans.

#### 4.4 Vanuatu National Implementation Plan for Persistent Organic Pollutants

The Vanuatu National Implementation Plan (NIP) for Persistent Organic Pollutants (POPs) was developed in 2021 in connection with the Stockholm Convention which provides an international regulation system for POPs. The 2021 NIP was an update on a previous NIP.

The 2021 NIP sets out two goals for used oil:

- In the Contaminated Sites Action Plan to ‘Maintain and monitor used oil recycling activities and ensure regular shipment offshore of collected used oil for recycling’
- In the Public Awareness Information and Training Action Plan to ‘Conduct regular awareness campaigns on used oil recycling’.

#### 4.5 National Hazardous Waste Policy and Costed Implementation Plan (NHWPIP)

##### 4.5.1 Background

This report was prepared for the DEPC as a parallel report to the National Chemicals Policy and Implementation Plan” (NCPIP). These reports, together, form the first part of a UNEP-funded Special Programme project for the Vanuatu “institutional strengthening of chemical management and their wastes”.

The second part of the project has involved a review of existing legislation and the preparation of drafting instructions for new legislation. This work is almost complete and the draft instructions now need to be turned into legislation, followed by the implementation of the NCPIP and the NHWPIP.

The reforms proposed by the NCPIP are planned to be incorporated into a new Chemical Safety Act (CSA). The reforms posed by the NHWPIP are planned to be incorporated into amendments to the Waste Management Act 2014 (WMA).

Used Oil was seen by the NHWPIP as one hazardous waste stream among several, that all need to be managed in a unified way.

##### 4.5.2 Common Hazardous Wastes in Vanuatu

Common hazardous wastes identified by the NHWPIP in Vanuatu that can be directly related to their chemical and chemical product origins are used oil, expired laboratory chemicals, Persistent Organic Pollutant (POPs) chemical wastes, solvent and paint waste, and a variety of industrial wastes, including acid and alkali waste, mercury wastes and chemicals that are no longer required, including expired and unwanted pesticides.

Examples of common hazardous wastes in Vanuatu that are indirectly related to their chemical and chemical product origins are used batteries, including lead-acid batteries, Ni-Cd batteries and lithium batteries, many varieties of e-waste, and plastic waste.

There is also medical waste and asbestos waste.

#### 4.5.3 General Principles for Managing Hazardous Wastes

The NHWPIP concluded that the following general principles should govern the new system for managing hazardous wastes in Vanuatu:

- a. Simplicity – A complicated system will not be used and all the effort will be wasted.
- b. Usefulness – The system should be perceived as useful so that hazardous waste generators turn to it because it helps them.
- c. Inclusiveness - All hazardous wastes should be managed by the system, except for radioactive wastes. Radioactive wastes are a special class of hazardous waste that require management under separate legislation.
- d. Adherence to the waste hierarchy and promotion of cleaner production.
- e. Environmental protection – hazardous wastes should be contained and not escape into the environment.

#### 4.5.4 Overlaps with the NCPIP

There is considerable overlap with the arrangements proposed for managing hazardous wastes in the NHWPIP and with managing chemicals in the NCPIP and the proposed Chemical Safety Act. The following are important direct overlaps.

- a. Hazardous wastes that are not contaminated and retain their identity as individual chemicals or products should be subject directly to the provisions of the Chemical Safety Act.
- b. Hazardous wastes that are mixtures of chemicals or products, also need to be characterized and assigned Globally Harmonised System Rev 7 (GHS7) classifications and management requirements.
- c. There should be a reliance on existing resource documents (such as Codes of Practice and Standards) available internationally.
- d. A new Chemical Safety Information (CSI) website is proposed for hazardous substances and this website can also cover hazardous wastes.



#### 4.5.5 Policy Features for Managing Hazardous Waste, including Used Oil

The following are new policy features that are proposed by the NHWPIP for managing hazardous wastes:

- a. Ownership and responsibility concepts for waste need to be clarified including hazardous and non-hazardous waste. Ownership of waste is to be retained by the generator unless transferred under contract. Responsibility is borne by whoever has control at any particular time, and can be shared at any one time.
- b. Assignment of waste as either low hazard, medium hazard or high hazard will be required. These terms are described in the NCPIP and are quite specific in terms of distinguishing the different levels of hazard.
- c. Designated Waste Management Operators (DWMOs) (as defined in the WMA) are to characterize chemical wastes. Where wastes are a mixture of chemicals or products they are to be characterized, including assigning GHS7 classifications and management requirements. A guidance document will be prepared to assist DWMOs.
- d. Contracting of Private Waste Operators to store and transport waste once it has been characterized by a DWMO in accordance with the waste characterization and the assigned GHS classification. This will include special secure storage areas for CSA medium hazard or CSA high hazard waste.
- e. All exports of hazardous wastes are to be carried out in full accordance with the requirements of either the Basel Convention or Waigani Convention as appropriate.
- f. There needs to be a duty imposed on waste generators and waste service providers to protect human health and the environment.
- g. Special provisions are required for certain special classes of wastes, including e-wastes, used oil, asbestos wastes, old batteries and end-of-life vehicles. These requirements can be managed by Codes of Practice.
- h. Product stewardship schemes are required for some waste streams e.g. used oil, e-waste, batteries and end-of-life vehicles.

#### 4.5.6 Infrastructure Improvements

The NHWPIP proposed that some improvements in infrastructure will be required, including:

- a. All hazardous wastes are to be managed (stored and transported) in accordance with the requirements pertaining to their GHS7 classifications.
- b. Solid hazardous wastes with minor hazards (CSA low hazard) can be landfilled.
- c. Liquid hazardous wastes with minor hazards (CSA low hazard) can be collected and discharged to suitable treatment systems, none of which currently exist. The facilities for the reception of liquid waste at the Bouffa landfill needs to be upgraded considerably.
- d. Treatment of wastes is required for CSA medium hazard and CSA high hazard waste to bring them down to CSA low hazard or alternatively they will be exported for

treatment and disposal. Therefore treatment, facilities will need to be established where that is a practical option.

- e. Special secure storage areas are required for hazardous wastes awaiting export.

#### 4.5.7 Additional Elements of the New System

The following further elements should be part of the overall approach:

- a. The system should not place too much of a load on government officials as then inefficiencies and delays will occur, due to overwork.
- b. The system should not impose too much cost on users as it will then be by-passed and evaded. It is logical to have user-pay charges but they should not be onerous.
- c. There needs to be penalties and enforcement but emphasis should be placed on education and cooperation.
- d. The legislation can be largely general and simple rather than prescriptive. Detailed and prescriptive information can be placed in support documents. This is an extension of the “simplicity” principle.
- e. The new elements of the system will need to be phased in, probably over a two year period so everyone has time to learn, understand and assimilate the new ideas and requirements
- f. Extensive training will be required.

#### 4.5.8 Backup Support Matters

In addition to all the above, the following back-up matters will need to be attended to:

- a. Special provisions are to be prepared by end of 2024 for the following waste streams, by way of Codes of Practice:
  - Used oil
  - Used batteries, including used lead-acid batteries (ULABs), Ni-Cd batteries and lithium batteries
  - E-Waste
  - Plastic waste
  - Asbestos waste
  - Medical waste
  - Expired laboratory chemicals
  - End of life vehicles
  - POPs chemical wastes
  - Mercury wastes
  - Other chemical waste besides POPs wastes
  - Solvent and paint waste
  - Industrial wastes, including acid and alkali waste, expired chemicals or chemicals that are no longer required.
  - Expired pesticides

- b. A Code of Practice is also needed to explain the new management arrangements for generators, transporters and receivers of wastes.
- c. Product stewardship schemes are to be developed for used oil, e-waste, batteries and end-of-life vehicles, by the end of 2024.
- d. Legislative provisions will also be made to incorporate the Basel and Waigani Conventions into Vanuatu legislation.

## 5.0 Previous Used Oil Reports

### 5.1 Used Oil Audit 2013<sup>4</sup>

#### 5.1.1 Background

This report was commissioned by AFD and SPREP and was carried out by Bruce Graham and John O’Grady under Contract Environmental Ltd. This work was done in 2013. Bruce Graham visited Vanuatu and collected data from a wide range of sources. All practicable efforts were made to verify those sources.

#### 5.1.2 Oil Imports

Import data was obtained from the Vanuatu Customs Department and is summarised below. Table 2 lists the annual imports identified in 2013 by calendar year for lubricating oils, hydraulic fluids (including brake and transmission fluids) and diesel, while Table 3 provides a breakdown of the lubricating oil import data by importer.

**Table 2: Oil and Diesel Imports for Vanuatu, 2009-2011**

	Annual Imports for 2009, Kg	Annual Imports for 2010, Kg	Annual Imports for 2011, Kg	Total Imports over 3 years, Kg	3 year avge, Kg/year
Lubricating oils	737,664	572,382	625,058	1935104	645,034
Hydraulic fluids	16,979	10,262	4,511	31,752	10,584
Diesel	28,332,730	30,492,3976	30,686.150	89,511,276	29,837,092

As shown in Table 2, the annual average imports of lubricating oils and hydraulic fluids combined were just over 650,000 kg per year, or about 787,000 litres, assuming a density of 0.825, while the average annual diesel imports were almost 30,000 tonnes.

The distribution of the lubricating oil imports between different importers, as shown in Table 3, is based on the total imports over three years. Altogether, the eleven importers listed in the table accounted for 88.3% of the total, while the remaining 11.7% of imports were distributed across about 75 other companies.

As indicated in Table 3, Pacific Petroleum was the dominant importer of lubricating oil over the three-year period. However their imports may have declined in 2012, because of the increasing market penetration by Trade Tools Direct. The 5.5% market share in

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<sup>4</sup> Consultancy for In-Country Used Oil Audit May 2013, Prepared for AFD/SPREP by Contract Environmental Ltd

shown in the Table 3 was only based on their imports in 2011, which was when they started importing. Their estimate for 2013 was that they were then importing similar quantities to Pacific Petroleum.

*It should be noted that Pacific Petroleum (Pacific Petroleum and Services) was part of the Pacific Energy Group and acquired the Shell assets of French Polynesia, New Caledonia and Vanuatu in 2006. They then acquired Mobil Vanuatu in 2007 when the first Pacific Brand service station was opened in Vanuatu. Pacific Petroleum now trades in Vanuatu as Pacific Energy.<sup>5</sup>*

British Petroleum (BP) was the other significant importer over the three year period. However Pacific Energy acquired the Vanuatu assets of BP in May 2010.

**Table 3: Lubricating Oil Imports by Individual Importers, 2009-2011 Combined**

Importer	Total Imports, Kg	% Share of Total
Pacific Petroleum	1,290,638	66.7%
Trade Tools Direct	107,213	5.5%
British Petroleum (BP)	85,708	4.4%
Millennium Challenge	38,383	2.0%
Carpenter Motors	37,015	1.9%
Vanuatu Government	34,865	1.8%
Auto Right Spare Parts	32,238	1.7%
Santo Hardware	30,134	1.6%
King Motors	22,910	1.2%
Phillip Foster	20,499	1.1%
Flame Tree	8,800	0.5%

The total number of oil and fuel filters imported over the three year period (2009 – 2011) was 62,002 units, or an average of 22,067 per year. It was not possible to distinguish between oil and fuel filters because they were covered under the same Customs code. However, oil filters most likely accounted for the bulk of these imports

<sup>5</sup> <https://p.energy/profil-de-lentreprise/thumbnail/who-are-we/?lang=en>

because they would have normally been changed much more frequently than fuel filters.

The following was noted:

“It is interesting to compare the 2009-2011 Customs’ data with the individual import figures provided by the two key players. Pacific Petroleum indicated that their lube oil sales over the previous 12 month period (i.e. October 2011 to September 2012) had been approximately 280,000 litres for Efate and 100,000 litres for Espiritu Santo. This is down by about 25% on their annual average imports over the 2009 to 2011 calendar years.”

By comparison Trade Tools Direct stated that over the last year or so they had recorded sales volumes of 25,000 to 30,000 litres per month, or about 300,000 to 350,000 litres per year. This represents more than double their import volume in the 2011 calendar year (125,000 litres per year), and is consistent with their apparent current position as the main supplier to small volume users.”

### 5.1.3 Used Oil Recovery

Pacific Petroleum in 2013 had a virtual monopoly on the supply of petroleum-based fuels in Vanuatu and they also appeared to have the majority share of major users of lubricating oil. Their largest customer was UNELCO, which operated power stations on the main islands of Efate and Santo. Other large users included the two main vehicle distributors (ASCO Motors, Carpenter Motors), and other vehicle and boat servicing companies. There were no large industrial users.

Pacific Petroleum operated a used oil take-back scheme for their customers (but only for their customers), and they were then recovering up to around 125,000 litres per year, or about 30% of their past imports. The report noted that this was quite a respectable recovery rate because it was generally recognised that only about 50% of the oil sold will end up as waste. (This figure was also consistent with the information provided by UNELCO who indicated that about half of the lube oil used in their engines was actually consumed in the engines).

Pacific Petroleum had a 20,000 litre storage tank at their terminal in Port Vila and when this was full they arranged for the used oil to be shipped offshore. Prior to 2005 the oil was being sent to New Caledonia for use in a nickel smelter. However this practice was banned by the New Caledonia government. In 2007, Pacific Petroleum started back-shipping the oil to Singapore using its own tanker, with the oil being passed on to unidentified users. (The first shipment was a two year stockpile of around 200,000 litres). Then in 2011 they were contacted by a representative of an Indian company who offered to buy the used oil. Pacific Petroleum then commenced shipping the used oil in 200 L drums, in shipping containers, directly to India, where it was processed and on-

sold as an industrial fuel. They indicated that the costs of the operation were recovered through an increase in the price that they charged for oil.

The report noted that the shipments of used oil to India appeared to be in contravention of the Basel Convention, because Vanuatu was not then a party to that Convention. (It is a party to the Basel Convention now.) Neither Pacific Petroleum nor the DEPC were then aware that these shipments would fall under the Basel Convention controls. The same issue did not apply to the Waigani Convention because that deals primarily with trans-boundary waste movements within the Pacific Islands region.

The other major supplier, Trade Tools, sells oil to the retail trade and their customers are almost entirely individual users. They appear to have a very strong position in this part of the market because their oil was significantly cheaper than that offered by Pacific Petroleum. They had stores in Port Vila and Santo. They did not operate any sort of take-back scheme, but indicated in-principle support for a collection program, while also being sceptical about the chances of it actually working.

No other oil recovery programs were identified.

Based on the recovery rate of 30% achieved by Pacific Petroleum, the potentially recoverable oil in Vanuatu was estimated by the report to be at least 250,000 litres per year. In other words there was an estimated additional amount of at least 125,000 L of used oil which was currently not being recovered. However the confidence level for this estimate was reported as low.

#### 5.1.4 Other Matters

There were no known stockpiles. Pacific Petroleum exported their used oil as soon as the tank was full.

UNELCO, the dominant electricity generator, indicated that they were unable to use used oil as a supplementary fuel in their power stations.

There were no large industrial fuel users in Vanuatu, so in-country co-firing of used oil was not a significant option. However, there were several copra plants around the country, which may have had the potential for using small amounts of used oil. The report concluded that this option may be worth investigating further, especially on some of the minor islands.

The commercial/industrial sector in Vanuatu accounted for only 5% of total petroleum energy consumption, and the consumption by other sectors is transport, 52%, electricity, 33% and domestic, 9%.<sup>6</sup>

DEPC advised that they then had draft legislation before Parliament which should provide them with the necessary instruments to implement or enforce a used oil management program, most likely through requiring all oil import approvals to be linked to having an acceptable waste management programme in place. It was hoped that this legislation would have been passed during the last parliamentary session, but in 2013 it was still on the 'pending' list.

The report stated that there had been several instances in the previous few years of large volumes (i.e. tens of thousands of litres) of used oil being disposed at the Port Vila landfill. The DEPC lacked the regulatory powers to control these disposal operations and therefore found itself in the situation of having to simply act as an advisor on the possible remediation steps to be taken (e.g. use of oil dispersants) after the disposal operations were made public. Landfill disposal is not an appropriate method for dealing with large quantities of used oil but apparently at the time of these incidents it was the only option available.

#### 5.1.5 Discussion and Recommendations

The report estimated that in 2013 there were at least 250,000 litres per year of potentially recoverable oil in Vanuatu. Approximately half of this volume was currently being collected in a well-managed system operated by Pacific Petroleum. The collected oil was shipped to India for processing and use as an industrial fuel, and the costs of collection and shipping were incorporated into the sale price of new oil.

The primary barrier to including all other used oil into the Pacific Petroleum system was reported as cost – other importers would have needed to increase their prices and pass the additional revenue on to Pacific Petroleum, assuming that Pacific Petroleum continued to take the lead in this area. Alternatively, the programme could have been funded through a universal levy on all oil imports, which was then collected and administered by an independent agency.

The report concluded that one possible advantage of having the programme managed by an independent agency would be that the levy could be set at a rate that allowed funding of other support activities such as public awareness programmes and the development of a network of used oil collection depots.

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<sup>6</sup> Overview of Potential CDM Project Opportunities in Vanuatu, Department of Meteorology and Climate Change, Ministry of Infrastructure and Public Utilities, Port Vila, Vanuatu, May 2012



The report also conclude that another aspect needing assessment was the provision of appropriate storage and processing facilities for the used oil, prior to shipping. The 20,000 litre storage tank currently being used by Pacific Petroleum would likely be inadequate if the total quantities of oil being collected were doubled.

## 5.2 Vanuatu Used Oil Management Plan 2014<sup>7</sup>

### 5.2.1 Background and Summary

This report was prepared by Hydea for AFD/ SPREP, a year after the 2013 report described in 5.1 above. This report made no reference to the 2013 report and differs to some extent in the figures it quotes. It would have benefited by a study of the 2013 report.

The 2014 report stated that it was introducing and implementing a *Used Oil Stewardship System in Vanuatu*. It outlined the roles and responsibilities of a proposed *Managing Agency* to be established, based on *Model Regulations* it presented. These regulations covered the enforcement and monitoring of the collection and storage of used oil for its reuse, recycle or export.

This *Used Oil Management Plan* identified:

- a National Regulatory Framework on which a Stewardship System was based,
- the structure and functioning of a Proposed Managing Agency
- the necessary Implementation Stages for collection, storage, disposal and re-use of used oil and
- Monitoring and Evaluation Measures.

A *Cost Benefit Analysis* study was also undertaken that looked at the options available to Vanuatu to manage used oil. The study concluded that the privately operated collection system needed to be extended or duplicated until legislation was in place to cover the costs of collection, storage, and shipment of used oil for recycling.

The report proposed that in the longer term the costs of collection, storage, and shipment or reuse would be recovered from the oil purchaser through a levy placed on the oil when it was imported into the country. Also in the longer term reuse of used oil in country should be researched as a supplementary fuel source or diesel fuel extender which the report claimed was the most cost-effective and environmentally sustainable solution.

The report stated:

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<sup>7</sup> Used Oil Management Plan for SPREP, March 2014, Hydea

- Development of a collection system for used oil on Efate and the outer islands needed to be examined in detail in consultation with the stakeholders, including temporary storage sites with plastic drums and/or IBC's.
- Containers should be stored under cover and placed in a bunded area to contain any spillages.
- Collection locations would be sited at service stations, hauliers/bus companies, construction companies, port authorities, and power generators.
- Bulk storage for collected oil would be established at Pacific Petroleum. (It was not noted that Pacific Petroleum had agreed to this measure.)

The report further noted that the establishment of a Product Stewardship System was needed that would be supported by National public awareness campaigns to:

- provide accurate information concerning the relative risks posed by used oil to Vanuatu's natural environments and public health;
- provide accurate information on best practices that individuals and businesses can adopt to better manage used oil at a local scale; and
- provide training on the safe handling and storage of used oil.

### 5.2.2 Current Uses of Used Oil

The report stated that disposal of used oil was still a significant issue for Vanuatu. If used oil is not managed correctly, it can cause major impacts to both the local environment, drinking water and food resources.

The report also said that current methods of disposal or re-use are environmentally unacceptable and include:

- Inclusion in general rubbish;
- Poured directly into storm water drains etc;
- As a weed killer;
- Burnt with other waste;
- Ground marking of sports field;
- Preservative use in timber;
- Dust suppression; and
- Rust prevention.

### 5.2.3 Benefits of sustainable used oil management

The report stated that financially sustainable used oil management in Vanuatu requires the establishment and operation of an appropriate framework that improves national management of used oil, and promotes shared used oil management responsibility by all stakeholders.

The following benefits of sustainable used oil management were listed:

- Minimising the unnecessary, untimely, and uncontrolled generation of used oil in Vanuatu;
- Minimising the adverse effects of used oil on the environment and people of Vanuatu;
- Ensuring that management of used oil in Vanuatu conforms and complies with all relevant national and international conventions and legal requirements;
- Ensuring that the costs associated with used oil treatment/final disposal in Vanuatu are met by those responsible for generating the used oil; and
- Increasing the capacity of stakeholders to promote effective used oil management in Vanuatu

#### 5.2.4 Quantities of Used Oil

It is estimated that approximately 750,000 litres of lubricating oils are imported into Vanuatu on an annual basis. The source of this figure was not referenced but it accords quiet well with the Customs-based figure in Table 1 above of 645,034 kg, based on an average of the three years 2009-2011. The Table 1 figure equates to a volume of about 780,000 litres at an average lubricating oil density of 0.825 kg/litre.

The contribution of hydraulic fluids is not taken into account in the 2014 report figure.

The major uses of this oil are in power generation (UNELCO), shipping, land transport by bus and haulage operators, construction industry, and private and company vehicle fleet servicing. Other minor users include the local commercial fishing fleet, the manufacturing industry, and taxi operators.

It was concluded that of the 750,000 litres of lubricating oils imported in Vanuatu annually, approximately 40% resulted in used oil (i.e. 300,000 litres per annum) that needs to be appropriately managed to avoid environmental and human health impacts<sup>8</sup> It was further concluded that between 50% and 60% of all lubricating oil imported into Vanuatu could eventually be recycled annually (i.e. up to 450,000 litres).

#### 5.2.5 Options for Managing Used Oil

A Cost Benefit Analysis was prepared which looked into the various options of used oil reuse/recycling or disposal. This developed two possible options to manage used oil:

- Used oil added as a diesel fuel augmenter; and
- Used oil shipped off-shore for disposal or reuse.

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<sup>8</sup> An unpublished report to SPREP by Envirocare Engineering Consult Ltd in 2012 *Used Oil Audit Survey for Vanuatu*

***(N.B. It should be noted here that used oil cannot be added as a diesel augmenter into UNELCO diesel as per Section 5.1.4 above, and is generally not possible to add used oil to diesel because of guarantee issues for the diesel engines.)***

The report described the process needed to establish a Stewardship System:

- *Baseline Analysis:* Completion of an audit to assess the oil and lubricant situation in Vanuatu, including oil imports, principal users, current management practices, volumes of stored used oil, and permitting systems;
- *Coordination:* Establishment of a Steering Group that includes the regulators from both the environmental and fiscal sectors, as well as industry such as fuel and/or lubricant companies, retailers, haulers, and construction companies, to guide the establishment of the Stewardship System;
- *Cost Benefit Analysis:* Completion of a detailed *Cost Benefit Analysis* of likely used oil disposal options;
- *Legislation:* Preparation of Model Used Oil Regulations for Vanuatu;
- *Sustainable Financing:* Identification of a levy system to ensure sustainability such that the Stewardship System is self-financing and the costs of collection, storage, shipment and reuse are built into the cost of the original product; and
- *Option for Re-use/Disposal:* Identification of the preferred option to re-use the used oil in country as a fuel extender.

It was further added that the next necessary activities needed to include:

- *Political support:* Obtaining Government support to introduce and implement a *Used Oil Stewardship System*;
- *Management:* Establishment of a *Managing Agency* to oversee the daily operation of the Stewardship System. The Managing Agency should be a non-profit government entity with input from the Steering Group;
- *Awareness and Outreach:* Development of an awareness program of various awareness-raising methods. These may include industry body meetings, community meetings, and newspaper advertisements, poster campaigns including billboards, education activities in schools, use of local TV and radio, and recognised used oil logos. It is however essential that the disposal/storage facilities are made accessible for the public, in tandem with these awareness-raising activities; and
- *Collection System Infrastructure:* The development of collection system for used oil on Efate and the outer islands must be examined in detail in consultation with the stakeholders.

#### 5.2.6 Model Used Oil Regulation

The report presented detailed and useful Model Used Oil Regulations that had been developed through consultation between the DEPC and SPREP. The objectives of the Regulations are to:

- identify a product stewardship arrangement for used oil that promotes the sharing of responsibility by importers, retailers, consumers and users of oil;
- provide an arrangement for managing used oil that is financially sustainable;
- ensure that management of used oil complies with relevant international conventions and national legal requirements;
- ensure that users of oil contribute to the costs associated with exporting or otherwise managing used oil in an environmentally sustainable manner; and
- ensure management of the export of used oil in an environmentally sound manner.

### 5.2.7 Structure and Responsibility of the Managing Agency

The 2014 Report stated that the first step in developing a Product Stewardship System in Vanuatu was to establish a Managing Agency responsible for administering the Model Regulation, once enacted, to promote the sharing of responsibility of used oil management among importers, retailers, consumers and final users.

The proposed Product Stewardship System, as presented in the report, to ensure the financial sustainability of the collection, storage and re-use/disposal of used oil, consists of the following steps<sup>9</sup>:

- Importers bring oil products into the country and are charged a small levy which is passed on to a Used Oil Managing Agency. The used oil levy can be used to encourage consumers to return used oil through a possible refund mechanism;
- Oil is sold to retailers and then, in turn, to consumers who eventually produce used oil. Used oil is returned by the consumer to a licensed site for a possible partial refund of the original purchase levy;
- Licensed used oil collectors provide returns to the Managing Agency and receive a contracted payment for each litre collected;
- Recovered used oil is stored for reuse within country or exported; and
- Unclaimed funds and the balance of the import levy are used to support used oil collection, storage costs, and the administration of the Managing Agency and support awareness campaigns.

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<sup>9</sup> HYDEA SpA (2012). *Background Paper on a Waste Oil Stewardship System*. Unpublished report to SPREP. 31pp

### 5.2.8 The Role of the Managing Agency

The report explained that the role of their proposed Managing Agency is to administer the Used Oil Regulations. In summary the Managing Agency should:

- be a non-profit entity;
- manage its funds in accordance with the requirements of the Department of Finance [or other government body] ensuring sufficient funds are allocated to pay the collectors and recyclers;
- ensure accurate accounting;
- with respect to importers ensure that the levy is paid;
- review and approve applications from collectors and /or recyclers;
- enter contract agreements with approved collectors and /or recyclers;
- conduct audits of collectors and recyclers to ensure compliance with permits;
- provide audit documentation;
- carry out inspections;
- design and implement awareness campaigns; and
- ensure that funds deposited into the Managing Agency Fund are used to:
  - Contract licensed collectors and recyclers;
  - Administration of the Agency;
  - Awareness campaigns for used oil and other recycling activities; and
  - Ensure that used oil is recycled or reused or exported.

### 5.2.9 Implementation of the Proposed Reforms

The report proposed that there were two principal stages of the proposed management model that can be developed independently. These two stages are described below.

#### *Stage 1 Collection and Storage*

Collection shall be carried out by competent licensed carriers with the appropriate equipment. The licensed carriers may collect used oil by road tanker or smaller suitable containers such as steel or plastic drums.

Intermediate temporary storage prior to re-use, recycling or shipment shall include bulk storage via vertical or horizontal tanks with appropriate bunding and drainage.

Temporary storage via drums should be in a concrete, sheltered and bunded area. The collection and storage shall be supported by legislation of either used oil or Stewardship Regulations so that there is a legal requirement for used oil to be collected and stored in an environmentally acceptable manner. All collected used oil shall be transported and stored in compliance with the provisions concerning the transport of

dangerous goods and hazardous wastes including relevant regional and international conventions such as Waigani and Basel Convention.

### *Stage 2 Off-shore Disposal or In-country Re-use*

Disposal is considered to be the shipment/export of used oil to neighbouring countries where the used oil could both be re-refined and sold as new lubricating oil, or in some locations simply burnt as a supplementary furnace fuel oil. In most circumstances there will be a cost for the shipment of used oil, however some companies from Asia (such as Jhoola from India) might be interested in purchasing it.

Re-use in-country includes the use of the used oil as a fuel extender either for the generation of electrical power or as a supplementary furnace fuel as is the situation in Fiji.

The report explained that there are two principal options for the re-use/disposal of used oil for Vanuatu which are re-use in country or shipment from Vanuatu. The preferred option of the Vanuatu Used Oil Steering Group (the report did not explain this steering group) is to continue with the existing private collection system and export the used oil as this system works well for them, although the option of re-use in-country was of interest and the steering group would examine possible re-use options. There are three practical options to reuse oil in Vanuatu:

- Power generators use the used oil as a fuel extender by simply filtering the used oil and injecting into the engine diesel fuel lines at a mix of about 1% (*not acceptable to UNELCO, based on the 2013 Report*);
- Use the used oil as a boiler fuel; and
- Continue with and expand existing collection, storage and export system.

It was noted that each system was sustainable including the export of used oil, although with the move to renewable energy the power generator option might only be short to medium term solutions. Therefore the use as a boiler fuel needs to be examined as a priority.

In the short to medium term, the continued shipping of used oil from Vanuatu was noted as inevitable, although it was concluded that this was an expensive option.

## 5.3 Used Oil Report on Fiji, Niue, Kiribati, Vanuatu, and SCL<sup>10</sup>

### 5.3.1 Background

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<sup>10</sup> Used Oil Report – Fiji, Niue, Kiribati, Vanuatu, SCL, April 2018, Araspring Ltd

This report was prepared in April 2018. This report covers the visit to Fiji, as part of the consultancy engaged by SPREP under the Global Environment Facility Pacific Alliance for Sustainability: Integrated Management of Solid and Hazardous Wastes and Persistent Organic Pollutants (GEFPAS POPS) project. Fiji has long been seen as a potential receiving country for used oil in the Pacific. The company that was identified as being able to receive this used oil was Bluescope Pacific Steel (Fiji) Pty Ltd (BPS) in Suva.

The main purpose of the visit was:

- a) To assess the capability and willingness of BPS to receive used oil from various Pacific countries as appropriate.
- b) If BPS is capable and willing to receive used oil from Pacific countries, then to update the audit of BPS that was carried out in 2012, to ensure that BPS is environmentally suitable to receive used oil from the Pacific.

John O'Grady of Araspring Ltd was the compiler of this report and he was at the time also undertaking audit work for MFAT throughout the Pacific. He was therefore able to carry out some additional used oil investigations in Kiribati, Niue and Vanuatu, which were countries he visited during the time the investigations were being carried out for this consultancy. It should be noted that the investigations carried out in these countries were not initially structured as part of the overall consultancy investigations and should be viewed as supporting information that can be drawn on as appropriate.

When it became clear part way through the investigations that Salters Cartage Ltd (SCL) was currently being used to receive used oil from the Pacific and was a likely receiver of Pacific used oil on a regular basis, information was also sought from them regarding their suitability as a potential recipient of used oil from the Pacific.

### 5.3.2 2018 Report Conclusions

The report drew the following conclusions in relation to Pacific Energy in 2018. Further conclusions were also made in relation to Bluescope Pacific Steel in Fiji and Salters Cartage in New Zealand and these are presented in Section 8.4 below.

- a) Pacific Energy (PE) runs an effective used oil take-back scheme throughout the Pacific, including Vanuatu. This is based on the need to do this under French Law and they have extended it throughout the Pacific in the numerous locations where they are operating.
- b) In Vanuatu, they currently send all the used oil they collect to the Copra Plant in Espiritu Santo. This is a somewhat insecure outlet for their used oil, however, and they would appreciate an alternative.
- c) No other company importing lubricating and other oils into Vanuatu has a take-back policy although it should be noted that they are all much smaller than PE Vanuatu.



- d) PE Vanuatu would be very interested in participating in any scheme that offered them the ability to export used oil at a reasonable cost to a suitable receiving country.
- e) If such an opportunity arose then they would also be interested in setting up a collection system for all Vanuatu used oil at their Service Stations throughout Vanuatu.

### 5.3.3 2018 Meeting with Pacific Energy regarding Used Oil

A meeting was held by John O’Grady with Nicolas Leflon, General Manager, Pacific Energy (PE), Vanuatu, on 6 April 2018. The following is a summary of this meeting.

PE Vanuatu take back used oil and send it to the Copra Facility in Espiritu Santo to be burnt locally. The copra facility only takes drums so it is a nuisance having to decant from the Tanktainer (TT) where the oil is collected, into drums.

PE has a policy throughout the Pacific of taking back used oil from everyone that receives their virgin oil. PE Vanuatu realizes that the Copra Plant outlet for the collected used oil is an insecure one and they would value finding an alternative as a back-up.

PE Vanuatu obtains their fuel from Singapore and South Korea and they recognize the logic of sending used oil to these destinations by back-loading the TTs that come loaded with the fuel. There is no suitable outlet in these countries, however. They were sending their used oil to a reprocessing plant in Singapore but the reprocessing company was badly hit by the drop in oil prices a few years ago.

PE Vanuatu receives back about 60,000 – 80,000 litres per year and they sell about 200,000 litres per year. They were reluctant to give the exact figure. Other parties in Vanuatu also sell lubricating oil, including Trade Tools, but PE is the only company that takes back used oil.

It is easy to collect the used oil from the larger generators such as the Utilities company UNELCO and car dealers, etc. It is more difficult with smaller customers who often just throw their used oil away. It was PE’s view that small players and their customers just do not care about collecting used oil. They stressed that there is a clear need to consider the whole system including suppliers.

There are some minor uses of used oil in Vanuatu such as putting on roads to keep dust down. Such practices are, however, environmentally unacceptable as well as using only very limited amounts of used oil.

PE Vanuatu would be keen to take part in a SPREP-organized collection scheme and to send their used oil to New Zealand if that was the outcome of such a scheme. PE may also be interested in tendering for used oil management in places they operate from.

PE Vanuatu also confirmed that if they had a good outlet for used oil such as New Zealand, PE would consider setting up collecting facilities at PE Service Stations to receive used oil from the public, including used oil generated from customers of their competitors. They would do this as a public service.

PE would also be interested in combining used oil collection with the collection of used batteries and they would also do this as a public service.

PE operate in French Polynesia and in ten other countries – New Caledonia, Vanuatu, Fiji, Papua New Guinea, Cook Islands, Tonga, American Samoa, Solomon Islands, Kiribati and Tuvalu. Their Head Office is in Tahiti and they also have major offices in New Caledonia and Fiji. They are strong in most but not all of these countries. Under French Law, they must collect used oil from all their customers and they have extended that practice to everywhere they operate.

PE owns a shipping company “Petrocean”. They own two medium range tankers, and others are available as needed.

It is interesting to note that the main Pacific countries they do not operate in, namely Palau, FSM and RMI are the ones that have mainly accumulated large stockpiles of used oil. They also do not operate in Niue, which also has some serious used oil problems.

#### 5.3.4 2018 Meeting with Roselyn Bue of DEPC

John O’Grady met with Roslyn Bue of the Department of Environmental Protection and Conservation, Vanuatu and briefed her on the meeting with Nicolas Leflon. Roslyn Bue was keen to learn about used oil initiatives and was complimentary about what SPREP had been doing in this area. She wanted a copy of the 2013 Used Oil Report prepared by Contract Environmental and John O’Grady supplied her with one. She agreed to follow up on the smaller generators of used oil that were independent of PE, to see if she could stimulate some interest in collecting and returning this used oil.

The 2018 report concluded that the problem would be that such an initiative would lack a focal point independent of PE and funding would be needed to organize such collections and reuse. It was thought that it may be useful to fund PE to collect all the used oil and ensure that an option was available for receiving the used oil.



## 6.0 Used Oil Import Information

### 6.1 Customs Information

The following (Table 4 below) is the information obtained from Vanuatu Department of Customs and Inland Revenue (DCIR), regarding the import of lubricating oil and related products.

**Table 4: Quantities of Hydrocarbon Products Imported into Vanuatu**

HS Code	Item	Net Weight (kgs) 2019	Net Weight (kgs) 2020	Net Weight (kgs) 2021
27101211	Aviation Fuel	365473	461233	296236
27101219	Petrol	13574827	11330882	15519973
27101220	Diesel	81128358	58530688	71717416
27101911	Jet Fuel	18497922	7490721	6008743
27101912	Kerosene	1476	6512	72781
27101920	Grease	11328	11534	13653
27101930	Lubricating Oil	627377	528213	637606

### 6.2 Societe De Services Petroliers (Pacific Petroleum – SSP)

The Societe De Services Petroliers (Pacific Petroleum) (SSP) is the current name for the Pacific Energy Franchise in Vanuatu.

Mr Glenn Niowenmal the SSP Operations Manager for Vanuatu confirmed the following:

- They are largest importer of oil and lubricant products to Vanuatu. Their main clients are Unelco Engie (UNELCO), VUI, Au Bon Marche (ABM) and their various retail outlets along with SSP's extensive network of vehicle refueling stations across Vanuatu.
- They do take back large volumes of used lubricant oil from the majority of their customers where this can easily be recovered, these include Unelco Engie, VUI and multiple larger vehicle servicing workshops like Intraco, Asco and Carpenter Motors etc.
- Large volumes of other types of oils are also imported that are also not suitable for recycling or are burnt in the operation of the engines like 2 Stroke Outboard motors, Brush cutters and Chainsaws and other lubricating oils such as Chainsaw Bar oil and hydraulic oil etc.
- SSP offers a take back service of the used oil to their customers as a unique selling proposal and SSP is not aware of other oil and lubricant importers offering this service to their customers. This service assists a number of their customers with their sustainability Key Performance Indicators.

- In the past large volumes of recovered used oil has been exported to places like Saudi Arabia and India for reprocessing but more recently they have been providing this used oil to the Copra processing plants in Santo to burn as fuel for the drying process. Up to 40,000 liters has been sent to Santo for this purpose this year.

Glenn Niowenmal also made the following points about a potential overall used oil management system for Vanuatu.

- If a used oil management system is going to be developed for the whole of Vanuatu, then there has to be a level playing field for all importers and perhaps this would involve a license being issued before these products could be imported by the various companies to show that they have a sustainability process in place to take back the used oil and deal with it according to agreed environmental guidelines.
- The recovery of the used oil is not an easy process. Used oil coming back from the large customers like Unelco Engie and VUI is generally reasonably clean, but the used oil from smaller customers such as motor vehicle workshops often contains contaminants such as other products, dirty rags and water. Semi-processing is therefore needed before storing and reuse.
- Vanuatu needs to find a way to self-fund the scheme to make the process achievable and sustainable but it is also necessary to keep in mind the problem of adding further costs to the importing of oil products as recent price increases world-wide have already significantly increased the price of fuels and oils.
- If there is consideration from this study for application of an increased import charge or similar, then this should be implemented carefully to make sure that the system is fair and that the money is available to make sure the system works in the long term.
- The cost and availability of shipping has led SSP to look at what they can do with the used oil long term and that potentially if a national scheme was developed for all oil importers in Vanuatu and there was a larger percentage of oil recovered then a program like the Swire Shipping Moana Taaka scheme could be an option to reduce shipping costs to a suitable location for processing.
- There could be opportunities to request International Donors for funding to assist with the purchase of standard equipment for the collection, handling, local transport, storage and potential processing the waste oil in Vanuatu.

SSP were, however, despite repeated requests, unwilling to disclose how much oil they imported. This may be because of the imminent arrival of competition into their market in Vanuatu – see Section 6.7 below. It was also difficult to get from them an estimate of used oil collected, although as stated above, by the time of the interview in June 2022, they had sent about 40,000 litres to the copra plant in Santo. It is not known how long

this quantity was collected for, but in 2018 (see Section 5.3.3 above) they advised that they were collecting 60,000-80,000 litres per year, so perhaps there is some correlation.

Advice had also been obtained from others, that SSP were at present only collecting back from generators, used oil above a certain volume, and were refusing pick-ups that did not meet this volume threshold.

### 6.3 Trade Tools

Advice was provided by Mr Bob Radanovich that Trade Tools import and sell through their retail store approximately 170,000 litres of oil products annually. He also advised:

- They currently do not take back any used oil but would consider this in the future with their new location having a lot more space for potentially storing used oil. He suggested that there would need to be a common storage and collection method to supply oil producers with receptacles that could easily be exchanged or serviced.
- He also commented that a lot of the oil they sell is 2 stroke oil for use in Chainsaws or 2 stroke engines in brush cutters and this oil is burnt in the process of running the engine.
- Much of the oil they sell is also destined for Outer Islands in Vanuatu. It would be difficult to get back any used oil from these Islands to a central location such as Port Vila for storage or processing.
- Trade Tools and Santo Hardware have shared ownership and work together for the ordering of oil products mainly from Lubrimax Oils and lubricants based in Malaysia.

### 6.4 Vanuatu Agricultural Supplies

The Business Development Manager, Aaron Prendergast provided import figures that shows the VAS average imports over the previous 4 years is approximately 10,000 litres per year. The majority is sold as 2 Stroke Engine Oil or Chainsaw bar oil.

### 6.5 Top Signs & Vanuatu Mecanique Generale (VMG) and Vanuatu Refuelling Services (VRS)

These businesses are owned and operated by Julien Lenglet. They import fuel and vehicle additives into Vanuatu, as well as a range of oil products.

VMG service a significant number of small vehicles which generates used oil. Julien Lenglet is a member of the Vanuatu Recycling and Waste Management Association (VRWMA) and is an advocate for the correct disposal and processing of these used oil products.

Currently they have approximately 1200 litres stored onsite awaiting a suitable and sustainable solution to deal with this volume of stored waste oil. The Oil is stored in 1000 litre IBC tanks.

## 6.6 Paradise Petroleum

It is understood that Paradise Petroleum is owned by SSP, although the ownership structure is not clear. Individual stations operate under the Paradise Petroleum banner and enquires at their outlets were directed to the SSP Head Office in Port Vila.

## 6.7 Total Energies Fiji

Total Energies Fiji will soon be building a fuel depot in Vanuatu, initiated by the Vanuatu National Provident Fund (VNPF) in partnership with the Government.<sup>11</sup>

This was confirmed recently by the Director General of the Vanuatu Ministry of Finance and Economic Management, August Letlet. Mr Letlet has advised that Total Energies Fiji had been selected through a bidding process. Mr Letlet has also advised that the signing of a Memorandum of Understanding with the successful bidder will be formalized soon in Fiji. The MOU will detail the responsibilities of the two parties.

It is understood that the new entrant into the fuel supply market will help address the rising fuel prices in Vanuatu.

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<sup>11</sup> [https://www.dailypost.vu/news/totalenergies-to-build-fuel-depot-august/article\\_6e533fc5-c9c0-529d-b79b-235e28fdabc7.html](https://www.dailypost.vu/news/totalenergies-to-build-fuel-depot-august/article_6e533fc5-c9c0-529d-b79b-235e28fdabc7.html)

## 7.0 Used Oil Generation

*NB The sections below also cover a number of companies that also import small volumes of used oil as well as generate used oil.*

### 7.1 Estimate of Used Oil Generated

Very little useful information has been obtained about the quantity of used oil generated in Vanuatu. The statistical information provided by the DCIR (Section 6.1 above) gave a figure of 637606 kg lubricating oil imported in 2021. The 2013 Vanuatu used oil audit report<sup>12</sup> provided a “rule of thumb” that about 50% of lubricating oil added to engines ended up as used oil. Based on the 2021 figure, it could therefore be expected then that about 319,000 kg of used oil is generated per year.

There are other sources of used oil besides lubricating oil, such as hydraulic oil, heat transfer oil and a range of others as per Section 2.1 above. Some used oils also contain water, often as an emulsion that does not readily separate. These factors may add another 5% to the quantity of used oil, which would bring the figure up to around 335,000 kg.

The figure for 2022 may be higher than that for 2021 with an increase in economic activity in the nearly post-covid environment. This may add another 10% going forward. This brings the quantity of used oil up to about 369,000 kg/year.

The density of lubricating oil (see Section 5.2.4 above) is about 0.825 kg/litre. It is likely that the density of used oil is higher due to heavier impurities, including water, so probably a figure of 0.85 kg/litre could be chosen. This means that the volumetric annual quantity of used oil generated in Vanuatu is about 435,000 litres per year.

By comparison, the 2014 Hydea Report (Section 5.2.4 above) concluded that of the 750,000 litres of lubricating oils (their estimate that was unsupported) imported into Vanuatu annually in 2014, approximately 40% (compared with the 50% figure in the 2013 report) resulted in 300,000 litres per annum of used oil.

The average GDP growth rate for Vanuatu for the period 2015-2021 (World Bank<sup>13</sup>) has been 1.8% per year. If this is used to compare used oil generation in 2013 with 2022, the 2014 Hydea figure of 300,000 litres in 2013 would be equivalent to about 340,000 litres in 2022.

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<sup>12</sup> Consultancy for In-Country Used Oil Audit May 2013, Prepared for AFD/SPREP by Contract Environmental Ltd, P4

<sup>13</sup> <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=VU>



Given all the uncertainties above, the used oil generation per year could therefore be taken as being within the range of 340,000 – 440,000 litres per year. If SSP is currently collecting about 60,000 litres per year, that means that about **280,000 – 380,000 litres/year is being generated and not being managed properly**. A small amount is being stored awaiting a solution – see the sections that follow.

The above is summarized in Table 5 below.

**Table 5: Used Oil Generation Calculation**

Calculation Step	Lube Oil (kg)	Used Oil (kg)	Used Oil (litres)
DCIR Lube Oil Import Figure	637,606		
Used Oil based on 2013 Report 50% rule of thumb.		319,000	
Plus 5% to account for other used oil sources		335,000	
Plus 10% to account for increase in economic activity		369,000	
Conversion to litres at a density of 0.85 kg/l			435,000
2014 Hydea Report			300,000
Hydea figure adjusted for GDP Growth Rate of 1.8% per year to 2022			340,000
Estimate based on above calculations			340,000-440,000
Amount collected and managed properly by SSP			60,000
<b>Probable quantity not being managed properly</b>			<b>280,000-380,000</b>

## 7.2 Government Departments

Roselyn Bue of DEPC surveyed the main government departments that were listed as potential stakeholders. While she was not able to provide back any individual figures in the information she provided, she did however mention that the Public Works Department (PWD) was the largest user of oil products for the Government departments listed. PWD mainly service their own large equipment including trucks, excavators, rollers and graders etc.

The oil is purchased from SSP and waste oil is collected by SSP on an ad hoc basis when they deliver new oil products.

The Government also has a substantial mixed fleet of smaller vehicles spread across all of the various departments. The fleet of vehicles is serviced by various servicing agents where the vehicles were purchased and these figures for used oil volumes will be included in the overall summary for the individual providers of these small vehicle services based on the make of the vehicle. These servicing agents would include Carpenter Motors, Asco Motors and Intraco as the largest suppliers of fleet vehicles in Vanuatu including brands like Toyota, Nissan, Ford, Suzuki and Isuzu.

### 7.3 Mechanical Workshops and Rental Cars

#### 7.3.1 Garage Express

Oil is purchased locally and they are currently sitting on a stockpile of approximately 4000 litres of used oil that has been stored for about 18 months. The Oil is used for servicing small vehicles and motorbikes onsite.

Some of the used oil is taken by people for painting untreated fence posts and Garage Express is happy to support a locally based solution for collection and processing. They currently have a stockpile of approximately 4000 litres, which is stored in a variety of containers – drums and smaller 40 litre, 20 litre and 5 litre containers.

Stephane Rivier the owner was aware that SSP would take back the used oil if it was one of their products purchased. He mentioned that previous owners of the automotive workshop location tipped used oil in the vegetation area behind the workshop as he has found evidence of this practice.

#### 7.3.2 Carpenter Motors (Isuzu & Nissan vehicles)

The Service Department Manager confirmed that they purchase their oil from SSP in Vanuatu and their used oil goes back to SSP. Numerous attempts were made to get an estimate of the volume of oil purchased and used oil generated for the Carpenter Motors operations. They are a significant provider of vehicles and servicing to the various Government departments, rental car agencies and private motor vehicle users. As they purchase their Oil from SSP the overall figures will be included in the import volumes and SSP figures.

#### 7.3.3 ASCO Motors (Toyota Vehicles)

The Vehicle service department confirmed that they purchase their oil for servicing vehicles and retail sales. The source of their oil is SSP.

They generate approximately 400 litres per month of used motor oil that is delivered back to SSP, i.e. 4800 litres per annum.

#### 7.3.4 Intraco Motors (Ford & Suzuki Vehicles)

The Intraco Service Department Manager explained that they currently purchase all of their lubricant products through SSP. They have a rolling stock of about 1200 litres of new oil on hand, and SSP will take away approximately 400 to 600 litres per month of used motor oil that is stored onsite in 205 litre drums each month, i.e. approximately 6000 litres per annum.

#### 7.3.5 Prestige Autos (Chevrolet & KIA Vehicles)

Prestige Autos are currently going through a large redevelopment of their two dealership locations do not appear to be operating or servicing vehicles currently onsite. They did not respond to requests for information.

#### 7.3.6 Wong Garage

They import small volumes of specialist oil but most oils and lubricants are locally sourced. Used oil from servicing vehicles was normally given away free of charge to people who used it as a replacement for chainsaw bar oil or painting untreated fence posts.

#### 7.3.7 Top Signs & Vanuatu Mecanique Generale (VMG) and Vanuatu Refuelling Services (VRS)

They are covered in Section 6.5 above as an oil importer.

#### 7.3.8 Europcar Rentals

They have a fleet of 31 vehicles. Their servicing is carried out by the various service providers located in Port Vila dependent on the brand of vehicle.

#### 7.3.9 Hertz Rental Cars

Servicing of their fleet is carried out by Asco Motors and the figures for used oil for their fleet of vehicles is included in the ASCO Motors summary.

#### 7.3.10 Budget Rental Cars

They operate a fleet of approximately 30 vehicles. The servicing of these vehicles is carried out by Carpenter Motors and the used oil volumes is included in the Carpenter Motors summary.

### 7.3.11 World Car Rentals

They operate a fleet of approximately 35 vehicles. The servicing of these vehicles is carried out by Carpenter Motors and the used oil volumes is included in the Carpenter Motors summary.

## 7.4 Construction and Haulage

### 7.4.1 Bodium Engineering

Bodium Engineering service and carry out repairs on large machinery and trucks in Port Vila. They purchase their various oils from SSP.

The used oil from servicing these machines is collected by SSP monthly. The used oil is stored onsite in empty 205 litre drums and they generate approximately 6 drums per month (1200 litres).

### 7.4.2 Dinh Van Tu Enterprises

They purchase a combination of different oils and lubricants for their fleet of trucks, earthmoving machinery and cement production equipment. They purchase approximately 410 litres per month for their operations and the used oil that is recovered from servicing the fleet and equipment goes back to SSP.

### 7.4.3 Vanuatu Glass & Aluminium (VGA)

They do not import or retail oil products. Damien Smith the owner and manager confirmed that no oil is used in the current production of glass and aluminium window and door products or in the machinery used for the manufacturing of these products.

### 7.4.4 Santo Earthworks

They purchase their oil from Santo Hardware. They could not confirm numbers but these will be included in the Santo Hardware figures. Any used oil from servicing their equipment is given to Santo locals for fence post treatment.

## 7.5 Electricity Utilities

### 7.5.1 Vanuatu Utilities & Infrastructure Santo (VUI)

Approximately 4000 litres of Oil is purchased annually from SSP for servicing the power generators.

When the generators are serviced the used oil is stored in the 205 litre drums that the lubricating oil is delivered in, and stored onsite until approximately 5 drums or 1000 litres can then be sent back to SSP in Port Vila.

## 7.5.2 Unelco Engie

Unelco Engie is the biggest supplier of Electricity and Water in Vanuatu. They are a long-term supporter of PV solar and other renewable energy developments. Unelco Engie (formerly UNELCO) Vanuatu is jointly owned by Engie at 51% and the Vanuatu National Provident Fund at 49%. They are large consumers of Oil through their engines for the generation of Electricity. At the time of writing this summary they were not comfortable in providing their figures for the Volumes of Oil they purchase from SSP. The used oil generated is returned to SSP and the quantities for the last four years are shown in Table 6 below

**Table 6: Used Oil Generated by Unelco Engie**

Year	2018	2019	2020	2021
Volume of Used Oil Generated per year (litres)	26094	27499	25122	38040
How is the Used Oil Stored?	Drum	Drum	Drum	Drum

Unelco Engie also confirmed the following:

- Approximately 5000 litres of used oil is accumulated in drums before each collection.
- Care is taken to avoid contaminating the used oil with other chemicals and impurities.
- There are no used oil filters generated as they use a different filtration mechanism.
- Used oil has always been picked up by the lubricating oil provider.
- The used oil is picked up free as a service.
- There is no treatment of used oil on site.
- Any spillages are mopped up with absorbent and sent off for disposal at the landfill.
- There is training provided in oil spill management.
- Used oil storage areas are bunded.

## 7.6 Aviation

### 7.6.1 Unity Airlines

Tony Deamer the Unity Airlines CEO stated that they import approximately 900 litres per year of lubricating oil for their own use. Approximately half of the oil is burnt in the normal usage of the planes.

When they service the aircraft the used oil is stored onsite in drums until someone has a use for it or is disposed of to Bouffa landfill. Generally they give the used oil away to people who want to use it as a timber preservative.

### 7.6.2 Air Taxi

They import through SSP approximately 800 – 1200 litres of non-synthetic aviation piston engine oil a year for a fleet of 5 single and twin engine aircraft. Oil is changed on the aircraft every 50 hours. Volumes of oil usage has dropped due to reduction in tourist numbers and charter flights.

The used oil goes back to SSP in 205 litre drums. Excess oil from oil filters are drained out over a period of time to ensure they are "dry", and then the oil filters are discarded in garbage which is sent to Bouffa landfill. Both Air Taxi, and Airports Vanuatu have oil/fuel spill kits located onsite for any potential oil spillages.

### 7.6.3 Air Vanuatu

The usage of oil for Air Vanuatu's two aircraft is minimal. The Boeing 737-800 is utilised for international flights has mainly been operating for flights between Santo and Port Vila when not required for international repatriation and cargo flights. This plane is required to be serviced in Australia so no oil is imported or disposed of in Vanuatu.

Air Vanuatu also operate an ATR 72 aircraft for inter-island flights. This is a turbo prop aircraft and has had limited usage in the previous two years due to the drop in passenger numbers and with the Boeing 737 – 800 being utilised for the route between Port Vila and Santo.

## 7.7 Hardware

### 7.7.1 Port Vila Distribution and Hardware (Vila Distribution)

Vila Distribution is a supplier of power tools and gardening machines including brush cutters, lawn mowers and other petrol driven equipment. They supply equipment powered by either 2 stroke engines or small 4 stroke engines in addition to battery and electric tools. As part of the service of supplying these tools and equipment, they also sell the consumables for this equipment.

In the case of the petrol driven machines which are relevant to this discussion, they sell 2 stroke oil and also bar oil in the case of chainsaws. Both these oils are consumed in the process of operating the equipment, so there is no requirement to consider recycling nor any appropriate disposal solution because there is nothing remaining after use.

In the case of the small 4 stroke engines, they also supply the engine sump oil for these machines. Most would use less than 1 Liter and invariably are topped up during the life of the equipment. When replaced it is very small quantities and most users would do that at their own premises or business location. They do not provide any disposal service for these used oils.

In summary, the small machines Vila Hardware generally supply and sell consume their lubricants, with consumers purchasing their lubricant requirements either from them or elsewhere. This type of equipment is very different from motor vehicles for example where the oils are changed and discarded in large amounts and usually by service providers specializing in this service on a regular basis.

#### 7.7.2 Trade Tools

See Section 6.3 above for the Trade Tools situation regarding the collection of used oil.

#### 7.7.3 Santo Hardware

Santo Hardware Imports approximately 120,000 litres of mixed Oil products per annum. This consists of engine oil - 90,000 litres, brake fluid - 3000 litres, gear oils - 11,000 litres & Hydraulic fluid - 16,000 litres.

They explained that they do not currently take back used oil from their customers. As the major hardware retailer and tractor sales agent in Santo they sell their oil products across a diverse market of users including 2 stroke engine Oil for outboard motors, 2 stroke engine oil for use in chainsaws and brush cutters, diesel engine oil and hydraulic fluid for use in agricultural equipment.

#### 7.7.4 Wilco Hardware

Wilco hardware sell lubricating oil to private garages, vehicle owners, and various machine users. They did not have any quantity figures and do not operate a take back scheme for use oil. The oil they sell is retailed in small containers – 200 ml, 1 litre, 4 litres, and 5 litres.

Most oil is purchased locally, but they do import small amounts from Australia, linked to certain products they sell.

#### 7.7.5 Vanuatu Agricultural Supplies

The Business Development Manager - Aaron Prendergast provided figures that show their average lubricating oil imports over the previous 4 years is approximately 10,000 litres per year. The majority is sold as 2 Stroke Engine Oil or Chainsaw bar oil.

They do not operate a used oil take back scheme and most of the oil they sell is consumed.

#### 7.7.6 Esqual Plumbing & Hardware

The Manager stated that only small volumes of oil were locally sourced for servicing their generators they sell. They understood that oil could be taken back by SSP, but they did not use that service.

#### 7.7.7 Port Vila Hardware

The Manager confirmed that they did not import lubricating oil. Small volumes of top up size oil products are sold that are sourced from SSP.

#### 7.7.8 Discount Hardware

They do not import or retail oil products. They specialise in the sale of construction supplies including cement, timber, paint and other building products.

#### 7.7.9 Thaviet Hardware

They import and sell tractors, motorbikes, cement mixers, solar products and kitchen cookware. They import and sell a model of Kubota tractors that is built for the Chinese domestic market. As this model is not a recognised export model, they are subject to warranty conditions and servicing requirements so therefore Thaviet Hardware do not service these tractors or import or retail lubricating oil products.

#### 7.7.10 Leon Hardware

The Sales Manager advised that they import a total of approximately 400 litres of 2 stroke and general purpose engine oil. The oil is sold as a retail item and sale volumes are not recorded. They do not offer a take back scheme for used engine oil and as the majority sold is 2 Stroke mainly for brush cutter and chainsaw use, and recycling of used oil is not needed.

### 7.8 Fishing Fleet and Other Marine Vessels



### 7.8.1 Nicon Shipyard Santo

Approximately 1000 litres per year of used oil is generated onsite from servicing of small ships. They store the used oil in drums and the used oil is provided to various users for painting untreated fence posts and other uses.

The Manager assumed that there would be some value in the used oil and he was considering selling it.

### 7.8.2 Vila Marine

The Manager stated that they import volumes of 2 and 4 Stroke Engine Oil for servicing Outboard engines. Both products are sold as retail items to individual purchasers. For onsite servicing of 4 Stroke Outboard engines the used oil is stored onsite but he estimated that volumes would be less than 200 litres per year and it is disposed of to landfill if no other use for it could be found.

Small volumes of Gear Oil are also imported.

### 7.8.3 Port Vila Boat Yard

Small volumes of lubricating oil are purchased locally from SSP. In a busy season they estimate they would only generate 2 x 205 litre drums of used oil that that goes back to SSP.

### 7.8.4 Ocean Logistics / Ocean Environmental Services (OES)

See Section 8.2.1 below for a description of Ocean Logistics / OES.

## 7.9 Other

### 7.9.1 FR8 Logistics

FR8 Logistics do not import or retail oil products. Chris Kernot the National Manager is happy to support the project in whatever capacity they can. They could potentially assist in coordinating the export of used oil products through their shipping contacts.

### 7.9.2 Origin Gas

Origin Gas not import or retail oil products. They specialise in the importing, distribution and sales of LPG gas products and other gas products and hardware.

### 7.9.3 Rapid Electrical

Rapid Electrical do not import or retail oil products. Their main business is the retail sales of electrical goods, kitchen appliances and white-ware.

### 7.9.4 Recycle Corp

Recycle Corp not import or retail oil products. Used oil from site machinery is returned to SSP following servicing of their excavator or small fleet of vehicles.

Discussions were also held with Andrew Hibgame of Recycle Corp about any interest from them in becoming a used oil collector as an addition to their recycling services. He has looked at it previously but at this stage he has a lot of other projects underway and said he might consider in the future.

His concerns were the financial viability of the project, the potential competition from Pacific Energy and the risk around the storage of bulk hazardous used oil.

### 7.9.5 Titanium Rent a Tool

Titanium Rent a Tool do not import lubricating oil or generate used oil from their operations of their rental tool business. They rent mostly electric powered construction equipment.

### 7.9.6 TIVR Timber

The business owner confirmed that they do not import or retail oil products, although they use small volumes for the servicing of their vehicles and the oil is purchased locally. They were aware that SSP take back used oil. The small amount of used oil they generate is used locally on untreated locally sourced timber as a pest and timber rot protectant.

### 7.9.7 Mok Stores

Mok Stores have a number of outlets in Port Vila. They do not generally import or retail oil products. They operate general stores that sell a variety of household items, kitchenware, cloth for sewing, footwear, tools and hardware.

### 7.9.8 Marine Aerospace Survival Systems Vanuatu (MASSV)

MASSV use small volumes of 2 stroke oil and 4 stroke oil for servicing outboard engines. For servicing the Massey Ferguson tractors they sell in Vanuatu the servicing is normally completed on the client's site and the used oil is left with the client for their disposal.

They also mentioned that they sometimes utilise used oil to paint on farm implements in coastal locations to prevent salt water corrosion.

#### 7.9.9 Bluescope

Bluescope do not Import or use oil products in the production of their roofing iron and steel products.

#### 7.9.10 South Pacific Suppliers

South Pacific Suppliers imports large volumes of general cleaning and pool servicing products but no volumes of oil products are imported or sold as retail products.

#### 7.9.11 Vate Industries

Vate Industries have a number of businesses in Vanuatu under the Vate umbrella. These include construction, window and door imports and sales, steel imports including roofing, engineering workshop and fabrication, electrical equipemnt retail and servicing, retail fastening sales and farm operating equipment including cattle and aquaculture.

Across their various businesses they do not import any oil products. Lubricating oil required for the operation of their fleet of vehicles is purchased locally and servicing is carried out onsite. The used oil is utilised on their farm operations for the treating of timber fence posts.

#### 7.9.12 Vanuatu Maritime College Santo

This is an education facility for the training of seamen and they do not import or purchase oil products or generate used oil from their operations.

#### 7.9.13 South Pacific Electrics (SPE)

It is understood that South Pacific Electrics do not import or retail any significant quantities of oil products, although this was not confirmed.

They are a leading electrical contracting business in Vanuatu. The have a large wholesale and retail shop that sells electrical and light fittings along with having a team of electricians conducting residential and commercial electrical work. They hire some accessing equipment that they use for their electrical contracting work.

#### 7.9.14 Vanuatu Brewing Ltd

Vanuatu Brewing Ltd are not importers or users of oil products to any significant extent. They may have a boiler which could potentially use used oil as a fuel, but this needs to be confirmed.

## 8.0 Used Oil Management

### 8.1 Used Oil Storage Facilities

SSP have a bunded 20,000 litre used oil storage tank at their terminal in Port Vila. This is the only large used oil storage facility in Vanuatu except perhaps for OES. OES also stores used oil but the details were not able to be obtained.

Apart from the SSP and OES storage, used oil is stored in IBCs, drums and smaller containers, generally in un-bunded areas. Two photos below show typical unsatisfactory used oil storage.



Unsatisfactory Used Oil Storage

### 8.2 Used Oil Collection and Disposal Facilities

#### 8.2.1 Societe De Services Petroliers (SSP)

SSP is the only organization that collects used oil and arranges for its reuse. It does this as it is the Pacific Energy (PE) agency in Vanuatu and PE operate under French Law, which requires them to provide a used oil take-back service to their customers.

#### 8.2.2 Ocean Environmental Services (OES) a division of Ocean Logistics

Ocean Logistics Limited has been based in Port Vila since 2010 and provides various marine services including freight handling and transportation, marine construction, emergency response, marine salvage, project support, and equipment hire as well as tugs, landing craft, and barges.

In 2014 they developed a second business called Ocean Environmental Solutions (OES), an oil recovery and processing business, partly to manage used oil recovered from the wrecked vessel "Solomons Trader". As part of the insurance recovery of the ship, OES

was engaged for recovery up to 700 tonnes of fuel oil from the coastline and the wrecked ship. Some of this oil was transported to Santo to be used in a Copra drying process (see Section 8.2.2 below) but the retraction of the Copra prices led to the suspension of the Copra processing in Santo and significant quantities of used oil needed to be stored at OES pending the reopening of the Copra drying process or other sustainable uses for this type of used oil product.

This led to OES manufacturing and trialing a few different models of used oil burners that had the potential to burn used oil to improve the drying process of Copra and other food products. OES have continued to trial different high temperature burners and are interested in potentially expanding their services and possible infrastructure investment or partnerships if this SPREP /AFD Used Oil Project indicated that there could be a potential to fund the storage and collection of Vanuatu's used oil volumes for processing within the country.

OES has a secured one-hectare property located near the airport which houses their equipment.

It should be noted that the current Waste Management Act legislation states that any business that collects and transports waste must apply for a permit with the DEPC to become a Licensed Waste Operator. OES currently see this as a barrier to their business, and this matter needs to be discussed with DEPC.

### 8.2.3 Other Local Disposal

The copra processing company COPSL in Santo burn used oil in their furnace to produce hot air for drying Copra. They receive used oil mainly from SSP and have recently taken used oil from OES. Recently their operation has been intermittent, due to the Covid 19 Pandemic and a downturn in the economy. A check also needs to be made to ensure that the burning of the used oil at COPSL does not cause air emissions problems.

There may be other industrial reuse options available with industries that need fuel to generate steam or hot air, and this could be explored. Burning unprocessed used oil may, however, raise air pollution issues.

It is clear, however, that using used oil as a fuel in existing generators for power generation, even at a low percentage blend with diesel, will not be acceptable. This is because of generator warranty issues.

### 8.2.4 NuFuels Option for Remote Communities.

In 2018 the NZ Government (MFAT) funded a pilot project in the Solomon Islands delivered by three partners – the Solomon Islands Association of Rural Vocational Training Centres, Nufuels NZ Ltd (the developer of the system) and Caritas Aotearoa who undertook the work in the Solomon Islands during 2018-2020. Nufuels has

indicated their wish to establish similar initiatives in other Pacific Island Countries, including Vanuatu.

The Solomon Islands project report is included in Appendix 3. The focus of the Solomon Islands work has been on plastic waste, which is also a problem in Vanuatu. The system can, however, be readily adopted to process used oil.

The pilot project has been well received by local communities in the Solomon Islands and the results indicate that the NuFuels process also offers a viable option for rural and small communities in Vanuatu.

### 8.3 Unsatisfactory Use / Disposal Practices

#### 8.3.1 Use as a Timber Preservative

The following article is from USA magazine Pest Week<sup>14</sup>, which was publicized in Vanuatu and presents one side of the debate regarding using used oil as a timber preservative.

*Termites cannot eat wood that has been sprayed or painted with motor oil because the oil will form a protective coat over the wood particles. The wood will also absorb motor oil and this will become tasteless and less attractive to termites since the original wooden scent that attracts them will not be there. They will move on to other locations to look for fresh wood that has not been contaminated.*

*Termites eat wood by breaking it down into cellulose. They have a special enzyme that is known as the protozoa which break the wood into the nutrients they need. When this enzyme tries to break down wood that is laced with motor oil, it will be toxic and this will kill the termites. When used in small amounts, motor oil is safe to use at home to repel and kill termites. However, it is advisable to use new or used oil for an engine that is run by diesel when killing termites. This is because those two have low carcinogenic concentrations as compared to used oil from gas or petrol engines.*

*When treating wood in quantities for termites out in the field, be careful not to pour motor oil on the soil in large quantities because it can be toxic to it. It is therefore a good idea to keep motor oil on your farm since termites will tend to nest on the poles or wooden fence. Motor oil does not mix with water and this is an added advantage when dealing with a termite infestation during the rainy seasons.*

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<sup>14</sup> <https://pestweek.com/motor-oil-kill-termites/>

*This is a simple permanent way of controlling termites on wood because oil does not evaporate easily. When the painted wood is rained on, water will evaporate and the oil will still be left behind on the wooden surface. It is also safe to use motor oil for termites in wood because the oil will act as a stabilizer and this will keep the wood from rotting.*

*This means that your wooden structures will last longer and will be durable. It is also safe to use motor oil on wooden floors and shades at home as long as you apply them during the day when the sun is up and there is no activity in those areas.*

Termites are a significant problem in Vanuatu and it is understandable that used oil is sought after for termite control. Used oil is, however, toxic to humans and the environment, and should not be used for pest control, despite the Pest Week article. Possibly it may be acceptable in small quantities for outside use such as fence posts although it then becomes an environmental problem. It should not be used, however, for indoor use.

### 8.3.2 Use on Coral / Dirt Roads to Prevent Dust

Vanuatu has a large number of unsealed roads and in dry periods these roads become very dusty. It is tempting to make use of used oil to control this dust and on occasions this does happen in Vanuatu, especially close to residents' houses.

This is, however, not a common practice and normally the residents do not have access to the sufficient quantities of used oil to have a significant environmental impact. It is a practice that should be discouraged as applying the used oil to the unpaved roadway may have adverse impact on vegetation, soil, and water supplies and systems.

### 8.3.3 Use as a Replacement for Chainsaw Bar Oil

Many Vanuatu households rely on wood for everyday cooking and villages collect and sell large volumes of wood for Custom cooking purposes. A lot of construction of basic houses, outdoor kitchens and Nakamal structures is from wood gathered from bush land close to villages.

Due to the requirement for cut wood, the ownership and use of chainsaws would be much higher than many developed countries that are not reliant on wood for cooking or building these types of structures.

Used Oil is sometimes given away to people to use for chainsaw bar oil. Whilst used oil can be used as a replacement for chainsaw bar oil, used motor oil is thinner in viscosity



than formulated chainsaw bar oil and it does not stick to the bar and chain. Also the oil ‘burning’ on the bar due to friction can cause damage to a person’s lungs through inhaling fumes that contain harmful properties. Such a practice can also invalidate warranties. These problems are discussed further on “[thehometoolspro.com](http://thehometoolspro.com)” website.<sup>15</sup>

#### 8.3.4 Painting on Farm Implements to Protect from Salt Water Corrosion.

It is mentioned in Section 7.9.8 above that Marine Aerospace Survival Systems encourage some of the purchasers of their Massey Ferguson tractors to use used motor oil to paint onto the metal surfaces of their tractor implements to prevent salt water corrosion in coastal areas.

Again this is an understandable practice and but only a temporary fix and most of the oil will end up in the soil as a harmful soil and water pollutant.

### 8.4 Used Oil Export

SSP is the only party that has been exporting used oil to other countries and exports to India and Saudi Arabia have been noted. Such exports must be done in accordance with Basel Convention requirements, and it has also been noted that these requirements may not always have been followed.

Possible destinations to be recommended for export of used oil from Vanuatu are Bluescope Pacific Steel in Fiji and Salters Cartage Ltd in New Zealand, although others will be recommended. The following information is from the 2018 Used Oil Report – Fiji, Niue, Kiribati, Vanuatu, SCL, April 2018, Araspring Ltd

#### ***Bluescope Pacific Steel, Fiji***

- a) Bluescope Pacific Steel (BPS) collect and burn used oil in their steel processing plant in Suva.
- b) They are very proactive in the local market in collecting used oil for this purpose and they operate a professional collection and storage system.
- c) They have quite a large storage capacity (see the front cover photo) but not sufficient to take very large amounts of used oil. They have a limited capacity to manage sludge and they do not have a tank cleaning capacity.
- d) The local market keeps them well supplied to meet their used oil needs and their core business is steel making and not used oil.
- e) They are therefore not interested in importing used oil directly into Fiji from overseas countries.

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<sup>15</sup> [Can You Use Used Motor Oil For Chainsaw Bar Oil? \(thehometoolspro.com\)](http://thehometoolspro.com)

- f) They do receive used oil from other countries indirectly if they have the capacity – for example from Pacific Energy shipments from other countries.
- g) The BPS operation is sound and meets audit criteria for health, safety and environmental impact, with the possible exception of the air emissions, which BPS is working to address now.
- h) BPS may be willing to take part in plans to import used oil from other countries in the future but only as an indirect partner, and only if they have the capacity and resources to manage the used oil.

***Salters Cartage Ltd (SCL)***

- a) SCL is a company based in Auckland New Zealand that receives and processes used oil. Their main outlet for the used oil is the two main Oji plants in New Zealand.
- b) SCL has been receiving used oil from various Pacific countries for many years and are keen to continue and expand this source of used oil.
- c) They receive not only used oil, but also used oil filters, oily rags, oily sludge, and hydrocarbon-contaminated soils.
- d) They take used oil in a variety of containers, drums, IBCs, pallets and TTs.
- e) They are well set up to receive used oil from Pacific countries and they offer a good option as a recipient for any Pacific used oil exporting scheme.
- f) They fully accord with all the consent conditions imposed on them by Auckland Council.

## 9.0 Known Government and Stakeholder Priorities

### 9.1 Government Priorities

**The NWMPCS** addresses, among other things, used oil as a waste stream and through the support of SPREP, studies have been completed looking at generation rates and current and potential recyclability. These statistics however are from 2013/2014. The strategy also sets a goal of 2018 for a used oil stewardship system to be established and enforced. Unfortunately, this is yet to be completed.

**The NEPIP** is an overarching policy for the sustainable conservation, development and management of the environment of Vanuatu. Policy objectives include reduced waste and pollution through effective waste management and pollution control including the identification and development of chemical and waste storage and disposal facilities. This includes the storage and disposal of used oil.

**The Municipal and Provincial Waste Management Plans** acknowledge used oil under the broader topic of Hazardous Waste but aside from Luganville Municipality's specific Used Oil By-law there are no specific actions targeting this waste stream within the Plans.

**The 2021 NIP Update for POPs Management** sets out two goals for used oil:

- In the Contaminated Sites Action Plan the goal is stated to 'Maintain and monitor used oil recycling activities and ensure regular shipment offshore of collected used oil for recycling'
- In the Public Awareness Information and Training Action Plan the goal is stated to 'Conduct regular awareness campaigns on used oil recycling'.

Used Oil was seen by the **2021 NHWPIP** as one hazardous waste stream among several, that all need to be managed in a unified way.

The NHWPIP concluded that the following general principles should govern the new system for managing hazardous wastes, including used oil:

- Simplicity – A complicated system will not be used and all the effort will be wasted.
- Usefulness – The system should be perceived as useful so that hazardous waste generators turn to it because it helps them.
- Inclusiveness - All hazardous wastes should be managed by the system, except for radioactive wastes. Radioactive wastes are a special class of hazardous waste that require management under separate legislation.
- Adherence to the waste hierarchy and promotion of cleaner production.

- Environmental protection – hazardous wastes should be contained and not escape into the environment.

The following are new policy features are proposed by the NHWPIP for managing hazardous wastes, including used oil:

- Ownership and responsibility concepts for waste need to be clarified including hazardous and non-hazardous waste. Ownership of waste is to be retained by the generator unless transferred under contract. Responsibility is borne by whoever has control at any particular time, and can be shared at any one time.
- Assignment of waste as either low hazard, medium hazard or high hazard will be required. These terms are described in the NCPIP and are quite specific in terms of distinguishing the different levels of hazard.
- Designated Waste Management Operators (DWMOs) (as defined in the WMA) are to characterize chemical wastes. Where wastes are a mixture of chemicals or products they are to be characterized, including assigning GHS7 classifications and management requirements. A guidance document will be prepared to assist DWMOs.
- Contracting of Private Waste Operators to store and transport waste once it has been characterized by a DWMO in accordance with the waste characterization and the assigned GHS classification. This will include special secure storage areas for CSA medium hazard or CSA high hazard waste.
- All exports of hazardous wastes are to be carried out in full accordance with the requirements of either the Basel Convention or Waigani Convention as appropriate.
- There needs to be a duty imposed on waste generators and waste service providers to protect human health and the environment.
- Special provisions are required for certain special classes of wastes, including e-wastes, used oil, asbestos wastes, old batteries and end-of-life vehicles. These requirements can be managed by Codes of Practice.
- Product stewardship schemes are required for some waste streams e.g. used oil, e-waste, batteries and end-of-life vehicles.

There are therefore clear government priorities for the management of used oil that require effective management to protect human health and the environment. These priorities are being met only to a small extent, primarily due the used oil recovery work undertaken by SSP.

It should be noted that the priorities set out in the NHWPIP, which is soon to be mandated in Vanuatu legislation, offer the best way forward at present for a used oil management legislative framework.

## 9.2 Non-Government Stakeholder Priorities

Non-government stakeholders were involved in the preparation of the NWMPCS and NEPIP, and extensive stakeholder consultation was part of the NHWPIP process, so it can be fairly said that the priorities of non-government and government stakeholders will coincide.

The consultation with various non-government stakeholders that has been described in Sections 6.0 and 7.0 above also highlighted concerns that, apart from the SSP collection system, little was being done to manage effectively the used oil problem in Vanuatu. The priorities that emerged were that a proper collection system was needed with effective storage and satisfactory end uses. It was also clear, however, that the preference was for the burden of payment for such a system not to rest too much on those that produce used oil.

## 10.0 The Feasibility Study

As per the contract, the Feasibility Study needs to address:

- a) Products to be included in the Used Oil Management Plan
- b) Sectors to be serviced by the Used Oil Management Plan
- c) Recommendations for options on how to best deliver the Used Oil Management Plan and services
- d) Identification and specifications of any equipment and materials required for the establishment of used oil collection, storage, treatment and disposal stations, including cost estimates.
- e) Assessment of the capacity-building needs of government and the oil and waste industry to effect the implementation and operation of the proposed Used Oil Management Plan.
- f) Identification of the system data capture and monitoring necessary to effectively manage service contracts, report to the community, and assist the country to report on its obligations under international conventions (monitoring system details, including any technological requirements, should be detailed).
- g) Provision of recommendations for national engagement and education of the oil / used oil sector and community to assist with the implementation and success of the National Used Oil Management Plan.

There are clear gaps in the information gathered at the Analysis Report stage and described above. It is believed, however, that these gaps can be filled at the Feasibility Study stage and that there is now enough information to move to this stage.

Important inputs into this stage will be:

- The entry into the market of a new major fuel, oil and related products supplier, Total Energies Fiji.
- The report prepared by MRA Consulting Group for SPREP/ADF on Technology Options for Used Oil.<sup>16</sup>
- The upcoming used oil SWAP pilot project whose activities include piloting proper storage of used oil from major waste generators by constructing a proper storage facility, monitoring of activities, awareness & education, and training of staff in-country. In Vanuatu this pilot study is awaiting the outcome of the Feasibility Study.
- Analysis of the options for exporting used oil from Pacific countries to other countries where it can be properly reused. This needs to include consideration of costs and carbon footprint. This analysis will be conducted by Consultant Team member Boyne Drummond.

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<sup>16</sup> "Used Oil Management Technology Options Report" April 2022. MRA Consulting Group

- Assessment of the potential for imposing an Advanced Disposal Fee on imported lubricating oil. This analysis will be conducted by Consultant Team member Alice Leney.
- The adoption of legislation setting in place the provisions of the NHWPIP. This will include measures impacting on used oil management.

## 11.0 Conclusions

- a) Based on information supplied by DCIR, there was 637,606 kg lubricating oil imported in 2021. Smaller amounts of other types of oil would have also been imported that may have been disposed of as used oil.
- b) It has been calculated, taking into account used oil generation from all relevant oil products, and an increase in economic activity in 2022, that about 280,000 – 380,000 litres per year of used oil is being generated and not being managed properly.
- c) About another 60,000 litres per year is being generated that is being managed by SSP.
- d) SSP have storage capacity for 20,000 litres and OES is currently storing oil recovered from a ship salvage operation. There are various other small stockpiles from numerous used oil generators.
- e) Some used oil is being used for termite and timber rot control, dust suppression, corrosion control, as chainsaw bar oil, or in other ways that could generally be deemed to cause environmental and health risks.
- f) The remainder of the used oil is just being disposed of to land (including landfills) or to waterways.
- g) There are some potential local reuse /disposal options available that may be satisfactory, including at the COPSL Copra plant in Santo and the OES facility.
- h) There are clear government priorities for the management of used oil that require effective management to protect human health and the environment. These priorities are being met to a certain extent, primarily due the used oil recovery work undertaken by SSP.
- i) The priorities set out in the NHWPIP, which is soon to be mandated in Vanuatu legislation, offer the best way forward at present for a used oil management legislative framework.
- j) This data gathering phase of the project has been difficult due to pandemic restrictions and the reluctance of some stakeholders to engage, but it is considered that sufficient information has been gathered to move on with some confidence to the next stage of the project, i.e. the Feasibility Study.
- k) The Feasibility Study will aim to come up with a clear direction, backed with supporting evidence, for the preparation of a detailed National Used Oil Management Plan.



## Appendix 1: List of Questions

### 1. National Government

- What are the government priorities for national used oil management?
- Is there a Government Policy on used oil management?
- What are the regulatory considerations for used oil management?
- What is the current government capacity to manage used oil and what assistance is needed?
- What are the government responsibilities for used oil management?
- Who are the National used oil management stakeholders?
- How would used oil carriers be licenced?
- How would used oil storage facilities be licenced?
- Who would train used oil handlers/carriers?
- How would the government set up and manage an advanced recycling fee for used oil management?
- What sort of monitoring and evaluation programme would be required?
- How would International Convention requirements be managed and what, if any, additional assistance would be required by Government to ensure requirements were met?
- Is improved community education needed? (What is done now)?
- Is improved data collection needed? (What is done now)?

### 2. Customs

- What volume of different oil (lubricant) types (litres/kg) is imported annually into Vanuatu (2018-2021)?
- What categories of lubrication oils are separated out in Customs records?
- Are they reported in kg or lts?
- Is this data available for 2018-2021 inclusive?
- Could the data be supplied in an electronic spreadsheet?

### 3. Oil Importers

- If not commercial in confidence, what volume of different oil types (litres) is imported annually into Vanuatu (2018-2021)?
  - Engine oil
  - Brake fluids
  - Gear oils
  - Transmission fluids
  - Hydraulic oils and fluids
  - Compressor oils
  - Refrigeration oils
  - Industrial process oils
  - Electrical insulating oil (Care must be taken to exclude oil likely to contain PCBs)
  - Metalworking fluids and oils
  - Heat transfer oils
  - Machining oils
- Who are the lubricants sold to and in what annual quantities (ie who are the end users)?
- Where are the different lubricating oils sourced from (ie Singapore, USA, Aust, NZ etc)?

#### **4. Oil Retailers**

- What volume of each oil type is sold annually?
- What are the major user groups and volumes purchased?
  - Power generation (EPC)
  - Shipping
  - Construction companies
  - Bus and haulage operators
  - Car fleets (including service stations and taxis)
- How are the different oil types retailed (in what volume and in what type of container)?
- Do you have a take back scheme for used oil and/or oil containers?
- What % of oil (what annual volume) is sold to customers for home DIY oil changes?

#### **5. Used oil generators**

- What volume of each used oil type is generated annually at your business?
- How is the used oil collected and stored (ie drums, IBCs, bulk storage etc)?
- Please specify the short term storage type and capacity, long term storage type and capacity, how long is the used oil is usually stored for before disposal?
- How are other chemicals (petrol, paint, antifreeze) stopped from contaminating the used oil?
- How much used oil is currently stored on site (and how long approximately has it been stored for)?
- How are used oil filters managed?
- How have you disposed of used oil in the past?
- What is the cost to dispose of the used oil?
- How is the used oil disposed of now?
- Are there any other (unsatisfactory) oil disposal practices still carried out and what might be required to prevent this in the future?
- Is there any treatment of the used oil on site (eg water separation....)?
- How are oil spills managed?
- Is there any training in oil spill management?
- Are storage areas bunded?
- Is there any practical use for used oil in Vanuatu?
- Are there any options for a local recycling oil processing plant for Vanuatu?
- What government regulations are in place for used for used oil management?
- What is the stakeholders priority actions for a national used oil management scheme?
- What can the used oil generator commit to doing under a national used oil management scheme?
- What assistance is required (training, funding, equipment) to enable this to occur?

#### **6. Car Registration**

- How many registered cars in Vanuatu (private and commercial users)?
- How many registered trucks (private and commercial users)?
- How many registered buses (private and commercial users)?

#### **7. Used oil Transporters**

- Annual used oil volumes transported per year?
- Major sources of used oil transported by the carrier?
- Transport container and truck description?
- Details of spill response equipment and training?
- Details of national licence/certification for used oil transport?
- Logistical issues connected with used oil transportation?
- What is the stakeholders priority action for a national used oil management scheme?
- What can the used oil transporter commit to doing in the scheme?
- What assistance is required to enable this to occur?

#### **8. Marine**

- How is used oil from boats managed?
- How much used oil from boats is disposed of on shore per year
- How is collection, transport and disposal managed?
- What are the costs incurred/charged

#### **9. Used oil storers**

- Landfill has storage capacity?
- Is there storage capacity elsewhere?
- What are the quantities of each existing stockpile of used oil?
- How is the used oil received and stored?
- What is the annual acceptance rate of used oil at the site?
- How is this financed?
- How is the collected used oil disposed of?
- What are some safety measures put in place for the above storage facilities? Are there any OHS tools applied?
- It there spill equipment, training etc at the site?

#### **10. Used oil exporters (SWIRE, Matson, NPDL, Pacific Forum Line)**

- What are the export destination options for used oil recycling (eg Fiji BlueScope Steel, New Zealand, Australia, India, Saudi Arabia, South Korea etc)?
- What volume of used oil is exported annually?
- How frequently is the oil shipped?
- Where is the used oil sourced from?
- What containers/systems are used to ship the oil?
- How much does it cost to export the used oil?
- How much is the used oil sold for?
- What International Conventions are used to ship the used oil?
- Is training in international conventions procedures needed?
- Any specific logistical issues?
- OHS issues and training required or currently carried out?
- Site bunding and spill response planning details?

#### **11. Export destination**

- Which destination?
- What is known about how the used oil will be managed in the receiving country?

- How much has been exported to the destination over the last 3 years?
- What were the financial details of the export?
- International Convention requirements and training required?
- Cost recovery system details?
- Which Shipping Lines are currently involved in shipping used oil from Vanuatu

## Appendix 2: Information Sent to Potential Stakeholders

Good Afternoon,

I am currently assisting the Department of Environmental Protection and Conservation (DEPC) and Araspring Ltd with the development of the National Used Oil Management Plan. Someone from your organisation may have attended some of the earlier workshops relating to this. A letter of support from the DEPC is attached to this email.

At this stage of the project we are gathering the Data and would like your assistance with pulling together some of the Mass Balance numbers for Importation verses Quantities used and sold etc.

I understand that your business is unique in that you may be spread across a number of the categories as a Stakeholder, and potential Importer and Generator of used oil and lubricants throughout your business operations.

I have attached a sheet that outlines some of the details we need to put together this Mass balance calculation and we will be receiving information from the Vanuatu Customs Department about the mass numbers of importation of these products.

We would appreciate if you could complete the sheet for the various years relating to volumes and also answer any of the related questions. The numbers and answers you provide will only be used to formulate this mass balance equation and give the project team an idea of other types of lubricants and Oil products that are in circulation across Vanuatu.

Please feel free to add additional lines if you need more space for the comments and we understand if you may not have all the data freely available to you on the various categories and in that instance you can complete the sheet as a total number.

I am happy to meet with you if you are available to discuss in further detail at your convenience.

Kind Regards  
Paul Mooney  
Environmental Management Vanuatu

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Ref: ENV 303/5.4.4/VLA

14/04/2022

Ref; Vanuatu National Used Oil Management Plan.

To whom it may concern,

The Department of Environmental Protection and Conservation (DEPC) is working in collaboration with the consultant team Araspring Ltd who are conducting a Feasibility Study which shall be used to develop a National Used Oil Management Plan for Vanuatu. The project is funded by Agence française de Développement (AFD) through Sustainable Waste Action in the Pacific (SWAP) and is located with the South Pacific Regional Environmental Program (SPREP) in Samoa.

As you may be aware, used oil contains a variety of harmful substances and therefore is harmful to human health and the environment. Vanuatu's major importer of oils and other fuels, Pacific Energy does collect used oil from its clients and exports for reuse somewhere, however, there is now a large number of smaller importers who also import types of oils and don't have a system to collect the used oil from their clients resulting in careless disposal of the used oil in the environment.

There was an Inception meeting conducted in February 2022 with a number of the Key stakeholders and at this meeting a list of local Oil & Lubricant Importers, Retailers and other industry players was identified. You or your business has been identified as a stakeholder in the development of this National Plan.

Paul Mooney from Environmental Management Vanuatu has been engaged to assist Araspring Ltd as the locally based consultant to gather data and conduct further investigation within Vanuatu. There has been a list of questions developed for different industry actors and we would appreciate your support and assistance in providing further information for the completion of this study.

Donna Kalfatak  
Department of Environmental Protection and Conservation  
Ministry of Climate Change

Oil Importers	2018	2019	2020	2021
<b>If not commercial in confidence, what volume of different oil types (litres) is imported annually into Vanuatu (2018-2021)?</b>				
Engine oil				
2 Stroke oil				
Brake fluids				

<b>Oil Importers</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
Gear oils				
Transmission fluids				
Hydraulic oils and fluids				
Compressor oils				
Refrigeration oils				
Industrial process oils				
Electrical insulating oil (Care must be taken to exclude oil likely to contain PCBs)				
Metalworking fluids and oils				
Heat transfer oils				
Machining oils				
Who are the lubricants sold to and in what annual quantities (ie who are the end users)?				
Where are the different lubricating oils sourced from (ie Singapore, USA, Aust, NZ etc)?				
<b>Oil Retailers</b>				
What volume of each oil type is sold annually?				
What are the major user groups and volumes purchased?				
Power Generation				
Shipping				
Construction Companies				
Bus & Haulage Operation				
Car Fleets ( Including Service Stations & Taxis)				
How are the different oil types retailed (in what volume and in what type of container)?				
Do you have a take back scheme for used oil and/or oil containers?				
What % of oil (what annual volume) is sold to customers for home DIY oil changes?				

## Appendix 3: NuFuels - Solomon Islands Plastic Waste to Energy Programme

### A2.1 History of Project Concept

The NZ Government (MFAT) funded a pilot project delivered by three partners – the Solomon Islands Association of Rural Vocational Training Centres, Nufuels NZ Ltd (the developer of the system) and Caritas Aotearoa who work in the Solomon Islands which took place during 2018-2020. The project was set up to create an incentive/ value for local people to collect plastic waste by being able to easily process the plastics into usable energy in a way that saves them money.

This allows local people to substitute the energy they recover from the plastics for the purchase of gas, or diesel or burner fuel. This energy can be used in homes or cooking huts, to use as heat for small businesses (e.g. drying of foods for markets) or boiling clean water. The gas produced can be used in small petrol generators (e.g. to run lights or electric tools).

As much as possible the build is to be local (either Don Bosco or other RTCs), with the idea that a small business in partnership with Nufuels in NZ could be created.

Alongside the actual build and costed into the systems is:

- project co-ordination – locals would work along with NZ project members, to identify how the energy could be used. The NZ co-ordinator would work with each community to monitor operator safety and look for wider applications.
- training
- a minimum of a year-long commitment from NZ to really get the full benefits from the system. This support in the first year is very important

### A2.2 How it Works: The Retort and Condenser

The process used is pyrolysis – the cracking of hydrocarbons in the absence of oxygen. Plastic waste is put into a closed chamber surrounded by a firebox which can be fuelled by wood. Can process biomass and tyres, used lube oil and plastics coated in aluminium.

A formula of PE and PP plastics to a ratio of PET allows PET bottles to be processed.

The chamber is heated up and the hydro-carbons are cracked turning it into gas. It is not incineration. Depending on the system design, the gases can be flared off directly for heat with a small amount going through a condenser and becoming liquid fuel. If



more liquid fuel is wanted rather than mainly gas, then more liquid fuels can be produced.

### A2.3 What is Produced

Gas with a similar profile to LPG or natural gas is produced, together with a liquid fuel and a very small amount of solid fuel. The current two systems in the Solomon Islands produce about **20%** gas in real time and **80%** waxy liquid fuel which can be used in burners. The waxy liquid fuel while usable in burners is not easy to use in the oven that has been developed.

Recent development work back in NZ now removes most of the wax and produces a more 'runny' liquid fuel which makes it easier to use in the oven and 'rocket' burner that have also been designed by Nufuels for the community.

The further development work since late 2019 has also resulted in the ability to produce **80% gas** with the remainder a liquid fuel. This gives more flexibility to communities around what kind of energy they want. A flare burner has also been produced which can use the gas to temperatures of up to 800 degrees. As these improvements are developed they will be provided back to the communities who have systems.

At present the gas would be used virtually real time alongside a cook but there is potential to design a simple storage system (under minimum pressure).

With simple adaptations to small petrol generators the gas can be used to produce electricity.

### A2.4 Unit Design

The unit is designed:

- to be easily transportable, including by small boats. The NZ government who part funded the project for the two systems at Henderson and Munda, was particularly interested that the systems around Munda and places like Gizo could be used to keep the lagoon water clean.
- for easy use by women as well as men.
- so simple tools can be used for repairs.

### A2.5 Rocket Burner and Oven

The rocket burner and oven were developed by Nufuels to provide options for using the energy for households' end use, or small businesses.

This simple burner was developed from adapted LPG bottles to take either the waxy liquid fuel or a dripped fuel into the burner.

These items can be built locally.

## A2.6 Environmental and Health Impacts and Benefits

### A2.6.1 Waste Diversion

The current adopted design delivers the following waste diversion results<sup>17</sup>:

- One system can deliver between 2-3 cooks per day, each taking about 120 minutes (followed by a cool down period)
- Each cook will process 5-6 kgs of soft plastics and about 2-3 kgs of plastic bottles, or up to 21 kgs per day.<sup>18</sup>
- On average each person from a low-income household in Honiara produces about 0.1 kgs of plastic per day, or 36.5 kgs of plastic waste per year.<sup>19</sup>
- One system will remove the following waste quantities annually from the environment under low, medium and high use scenarios<sup>20</sup>:

Use Scenarios	Annual Waste Diverted (kg)
<b>Low (1 daily cook)</b>	1827
<b>Medium (2 cooks)</b>	4382
<b>High (3 cooks)</b>	7665

- One system will divert the household waste of the following number of households:

Use scenarios	Number of households with full plastic waste diversion (Average Household size <sup>21</sup> )	Number of low-income households with full plastic waste diversion <sup>22</sup>
<b>Low</b>	11	9
<b>Medium</b>	23	18
<b>High</b>	35	26

<sup>17</sup> These metrics are calculated using Honiara City waste data which identified approximately 0.86kg of waste per capita per day overall. Low income households generate about 0.81kg. Of this about 12% is plastics. Per capita and household waste produced is likely to be lower in provincial communities. These smaller communities will also have commercial and some small-scale industrial waste plastics which these systems can also process. A key issue will be processing waste plastic washed in on ocean currents.

<sup>18</sup> Measurement by volume can be undertaken but is less useful as compression will vary.

<sup>19</sup> Honiara City Council Waste Characterisation Study 2011 and National Waste and Pollution Control Strategy 2017-2026

<sup>20</sup> Low scenario: 1 cook 5 days a week. Medium scenario: 2 cooks 6 days a week. High scenario 3 cooks 7 days a week.

<sup>21</sup> Based on Solomon Islands average household size – urban areas. Solomon Islands Statistics 2007

<sup>22</sup> Honiara City Council Waste Characterisation Study 2011 – average household size for low income household sample.

Note: the current design may be adapted in the future to perhaps take up to 10-12 kgs per cook.

#### A2.6.2 Waste management

- Plastics do not have to be clean or sorted but if retrieved from the sea or beaches a simple wash down in the rain to remove salts would prolong the life of the system.
- The systems can be used for people to revisit into old dump sites and clean up plastics – e.g. at Ranadi tip or illegal dump sites.

#### A2.6.3 Emissions and Climate

- The energy produced is still from fossil fuels so there will continue to be impacts.
- The benefit lies in the fuel substitution which avoids greenhouse gas emissions associated with oil extraction, transportation to the Solomon Islands etc. We estimate a 20% net reduction.
- The technology can be used for other sources, e.g. used oil and biomass such as copra waste.
- Discharge of toxic gases and particulates are avoided from burning of plastics as a disposal method.

#### A2.6.4 Nature of Emissions

- There will be emissions from the wood fuel charging the retort
- The emissions from the fuel produced have a similar profile to LPG or natural gas, and diesel/ kerosene like fuels. These have been independently tested in New Zealand against New Zealand discharge to air standards. That data can be provided.
- The combusted gases burn cleanly with no particulates at temperatures rising up to 500-800 degrees Celsius.
- There are health benefits from avoided exposure to the burning of plastics

### A2.7 Social and Economic Benefits

A simple calculation of the value of the energy as a substitution fuel is shown below. The tables are based on a 20% gas production rate: with recent improvements an 80% gas production rate can be achieved. It shows the benefit from imported fuel substitution – through measurement of recovered energy (liquid and solid) generated per annum, and the net of energy used to power on-going batch pyrolysis.

The table below shows the conversion of the annual energy produced relative to standard purchasing units for four energy types (LPG, diesel, kerosene and wood) across the three cook scenarios. In effect this illustrates the level of substitution for commercial fuels that is achievable from one system.

<b>Annual Energy Produced by One System Calculated as Substitute Energy Type – Usual Unit of Purchase</b>				
<b>Substitution for Commercial Fuels for One Year</b>				
	<b>LPG No. of 9kg gas bottles</b>	<b>Diesel Litres</b>	<b>Kerosene Litres</b>	<b>Wood No. of 6kg bundles</b>
<b>Cook Scenarios</b>				
<b>Low (1 cook per day)</b>	141	1,352	1,339	623
<b>Medium (2 cooks)</b>	338	3,244	3,214	1,496
<b>High (3 cooks)</b>	591	5,678	5,625	2,618

The substitution value for wood is shown as an example and for information. However, the focus in the pilot is on substitution of liquid fuels and gas.

The table below show the potential income arising from fuel substitution from one system, under the more conservative processing scenarios. Whether this is realised as avoided energy costs or as revenue from fuel sales will depend on decisions by communities as to how they want to use the fuel and disperse the benefit.

<b>Table 5: Financial Value of Annual Energy Produced buy One System Expressed as Energy Type (Usual Unit of Purchase) - SD\$ (2019)</b>				
	<b>LPG No. of 9kg gas bottles</b>	<b>Diesel Litres</b>	<b>Kerosene Litres</b>	<b>Wood No. of 6kg bundles</b>
<b>Cook Scenarios</b>				
<b>Low (1 cook per day)</b>	\$21,095	\$11,439	\$10,995	\$93,572
<b>Medium (2 cooks)</b>	\$50,627	\$27,452	\$26,388	\$224,573
<b>High (3 cooks)</b>	\$88,598	\$48,042	\$46,179	\$393,002

Benefits are potentially greater in rural locations due to the higher cost of fuel. This has the potential to be used as a proxy for calculating direct financial return on investment. (NB It does not include any multiplier effect from the energy use – e.g. use in small business development.)

It also indicates a significant financial incentive for people to be involved in collecting and processing waste – which would also avoid the need for a collect and transport system.

## A2.8 Usefulness in Outer Islands

The central idea of this concept and programme is that small local and remote communities are self-sufficient in converting their plastic, tyres (if any), and biomass to usable energy locally. (Nufuels is passionate about the idea of dispersed waste recycling and resource recovery systems which avoid collection and transportation costs and complexities.

The units can be used locally with the benefits going back to the local communities. For example, the heat from a system could be used to melt tin cans and even create new objects from them, or to process food, or reduce the energy costs of the local Rural Training Centre, or produce electricity on a small scale.

The idea is to avoid the need to collect and transport the waste over any distance. The systems themselves can be transported on the back of a truck or by small boat to other communities so that any local village-based waste can be processed. They can also be transported to areas where there is significant marine pollution.

The model we were working to before Covid 19 was to get local businesses (e.g. tourism businesses at Munda) to help with the transportation of the system between communities, but there are other ways of making this happen.

The key thing for each remote community, or grouping of communities is to have a waste stream size that makes processing on a regular basis worthwhile. Other waste streams can also be included. Very small communities who produce little plastic or other waste may not benefit to the same degree from systems of the size designed here. However, we can build smaller systems – as small as a large cooking pot, which may be useful.



**SPREP**

Secretariat of the Pacific Regional  
Environment Programme