Technical Assistance for Implementation of the Agence Française de Développement (AFD)

Regional Solid Waste Management Initiative For the Pacific

Background Paper on a Waste Oil Stewardship System

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HYDEA

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TABLE 1: SUMMARY OF PROJECT REPORTS

Report Name	Date Due	Date Submitted	Date Approved
Background Paper on a Waste Oil Stewardship System	30/06/12	19/06/12	

TABLE 2: DOCUMENT CONTROL TABLE

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EXECUTIVE SUMMARY

1. This report contains a brief background paper for Pacific Island governments on the implementation of a waste oil Stewardship System. This paper briefly compares Extended Producer Responsibility (EPR) and Product Stewardship (PS) systems, with a view to identifying a Stewardship System suitable for Pacific Island Countries (PICs), outlining the key activities necessary and the stakeholders involved in implementing a Stewardship System, and outlines the assistance available under the AFD Project to selected PICs for this purpose.

2. A review of various EPR and PS systems worldwide revealed that EPR and PS have been in existence in some form for many years. In the Pacific region, countries such as Australia and New Zealand have introduced Product Stewardship for waste oil management either through voluntary arrangements or through legislative measures. New Caledonia (Province Sud) introduced EPR in 2008, which includes management of waste oil. Japan's approach to EPR is in the form of "take back" legislation detailed in the Home Appliance Recycling Law.

3. Both New Zealand and South Africa have Stewardship Systems that are managed by the main oil and petroleum companies. Many of the systems rely on a Managing Agency that collects and disburses funds. These managing agencies (third party recycling organisations) such as TRECODEC in New Caledonia and PRO in Europe manage the collection and reuse of many different wastes on behalf of producers.

4. In the Pacific region both Kiribati and Fiji have introduced Container Deposit Legislation (CDL), and each country has established a managing agency for implementation and ongoing management.

5. Based on the review of existing Stewardship Systems, and conventional knowledge, this briefing document firstly strongly recommends that each PIC consider implementing a Stewardship System to ensure the sustainable management of waste oil that reduces environmental and health impacts, and maximises economic returns.

6. For PICs intending to establish a Stewardship System, it is further recommended to undertake the following key activities:

1. **Baseline Analysis.** Assess the lubricant situation in the country, including oil imports, principal users, current management practices, volumes of stored waste oil, and permitting systems.
2. **Political support.** Obtain Government/Cabinet support at the outset to introduce and implement a Waste Oil Stewardship System;
3. **Coordination.** Establish a steering group in each participating PIC that includes the regulators from both the environmental and fiscal sectors, to guide the establishment of the Stewardship System;
4. **Legislation.** Enact new legislation or specific regulations in respect to managing waste oil so that a Stewardship System can be developed, implemented and enforced;
5. **Management.** Establish a managing agency to oversee the daily operation of the Stewardship System. The Managing Agency should ideally be a third party Managing Agency consisting of relevant stakeholders who would include the fuel and/or lubricant companies, retailers, haulers, and construction companies.
6. **Sustainable Financing.** Establish a levy system to ensure sustainability such that Stewardship System is self-financing and the costs of collection, storage shipment and reuse are built into the cost of the original product.

7. **Awareness and Outreach.** Develop 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 logos. It is however essential that the disposal/storage facilities are made accessible for the public, in tandem with these awareness-raising activities.

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ACRONYMS

AFD TA	Agence Française de Développement – Technical Assistance
ABN	Australian Business Number
CDL	Container Deposit Legislation
CRT Television	Cathode Ray Tube Televisions
DIY	Do-It-Yourself
DSD	Duales System Deutschland
EHC	Environmental Handling Charge
EPA	Environmental Protection Agency
EPR	Extended Producer Responsibility
ERMA	Environmental Risk Management Authority
GEFPAS	Global Environment Facility Pacific Alliance for Sustainability
HARL	Home Appliance Recycling Law
JICA	Japan International Cooperation Agency
PRO	Project Responsibility Organisation
PRO Europe	Packaging Recovery Organisation Europe
PRO P	Product Stewardship Oil Program
PS	Product Stewardship
PSO	Product Stewardship of Waste Oil (Australia)
PVC	Polyvinyl Chloride
SPREP	Secretariat of the Pacific Regional Environment Programme
TEPA	Taiwan Environmental Protection Agency
ToR	Terms of Reference
UNEP	United Nations Environment Programme
USD	United States Dollar
US	United States
UK	United Kingdom
WEEE	Waste Electrical and Electronic Equipment
WMPCD	Waste Management and Pollution Control Division

INTRODUCTION

7. The primary goal of the Waste Oil Component of the AFD Solid Waste Management Initiative is to *"Develop a sustainable system of waste oil collection". The underlying goal is to reduce the negative impacts of waste oil on the environment while maximising any economic opportunities for the Pacific without requiring continued external financing."*

8. Economic opportunities from waste oil can be maximised through the implementation of a Stewardship System. Consequently, this background paper considered whether a Stewardship System is applicable in all PICTS, considered similar existing frameworks (e.g. container deposit legislation) and identified how it could best be applied. In preparing this paper, the following information was reviewed:

- AFD Regional Initiative for Solid Waste Management in the Pacific Region, Feasibility Study (Phase I, Component 2) September 2008;
- AFD Regional Initiative for Solid Waste Management in the Pacific Region, Feasibility Study (Phase II, Component 2: Scoping Studies) April 2009;
- UNEP/GEFPAS POPs Release Reduction Project documents;
- Applicable PICTS National Solid Waste Management Strategies and legislation;
- Waigani Workshop (July 2011) material; and
- Pacific Waste Oil Study (March 1996).

9. To prepare this paper we researched systems of Extended Product Responsibility (EPR) and Product Stewardship (PS) already introduced by other governments within the region including Australia, Japan and New Zealand and also worldwide particularly in Europe and the United States of America. We also examined EPR/Product Stewardship Systems in Small Island Developing States, or countries with similar socio-economic profile of the Pacific islands.

1. BACKGROUND

10. In response to the growing problem of excessive waste, several countries have adopted waste management policies in which manufacturers were made responsible for taking back their products from end users at the end of the products' useful life, or partially financing the collection and recycling infrastructure. These policies were necessary due to the lack of collection infrastructure for certain products that contained hazardous materials or due to the high costs to local governments of providing such collection services. The primary goal of these take-back policies therefore, was to partner with the private sector to ensure that all wastes are managed in a way that protects public health and the environment.

11. The earliest government-sponsored take-back initiatives began in Europe, and arose from concerns about scarce landfill space and potentially hazardous substances in component parts. The European Union adopted a directive on Waste Electrical and Electronic Equipment (WEEE) with the purpose of preventing the production of waste electronics and also encouraging reuse and recycling of such waste. The Directive requires the Member States to encourage design and production methods that take into account the future dismantling and recovery of their products. These take-back programs have now been adopted in nearly every OECD country.

1.1 STEWARDSHIP SYSTEMS EXPLAINED

12. Take-back policies or Stewardship Systems can generally take the form of Extended Producer Responsibility or Product Stewardship.

13. Extended Producer Responsibility (EPR) is a concept where manufacturers (producers) and importers of products bear a significant degree of responsibility for the environmental impacts of their products throughout the product's life-cycle, including upstream impacts inherent in the selection of materials for the products, impacts from the production process, and downstream impacts from the use and disposal of the products. EPR is based on the principle that producers (usually brand owners) have the greatest control over product design and marketing, and thus the greatest ability and responsibility to reduce toxicity and waste.

14. Responsibility (or stewardship) can take several forms including:

- **Liability** – the producer is responsible for environmental damage and negative public health impacts caused by the product in question.

- **Economic responsibility** – the producer covers all or part of the costs for collection, recycling or final disposal of products he manufactures, and may charge a special fee to carry out this obligation.

- **Physical responsibility** – the manufacturer is involved in the physical management of his products or their effects. This can include developing the necessary recycling technology, and managing the collection and disposal of products (for which he may charge a fee).

- **Ownership** – the producer or importer assumes both physical and economic responsibility.

- **Informative responsibility** – the producer is responsible for providing information on the product or its effects at various stages of its life cycle.

15. This policy approach attempts to relieve local governments of the costs of managing certain priority products by requiring that manufacturers include the cost of recycling within the product price.

16. Product Stewardship (PS) functions almost identically to EPR, except that it engages not only the producer but also the other stakeholders over the life of the product. Examples of types of products with product stewardship involvement include: packaging, oil, tyres, paint, computers (Dell Recycling programme), and cell phones.

17. As examples, the following are product stewardship schemes currently in operation in New Zealand:

- Agpac – take back of used farm wrap (plastic film for wrapping hay bales).
- AgRecovery – a product stewardship programme for agrichemical containers, silage wrap and chemicals.
- Dell New Zealand Ltd - take back of any computer equipment.
- Enviropaints Limited - take back and resale of recycled paint.
- Exide Technologies - take back of vehicle batteries.
- Fisher and Paykel Appliances Ltd - take back of whiteware
- Hewlett-Packard New Zealand - take back of computer equipment from their corporate clients.
- IBM New Zealand - take back of computer equipment from their corporate clients.
- New Zealand Packaging Accord - addresses packaging waste.
- Recovery - a trust set up to collect and destroy ozone depleting refrigerants.
- Paintwise - Resine Paints - take back of paint.
- Telecom New Zealand Ltd - take back of cell phones and accessories (any type of cell phone).
- Tyre Track - tracking of end-of-life tyres.
- Used Oil - used oil collection and disposal scheme.
- Vodafone New Zealand Ltd - take back of cell phones and accessories (any type of cell phone).

18. The advantages of implementing a Stewardship System (EPR or PS) are described below:

Better products: Since producers are held directly accountable for the end-of-life impact or recycling of their product, it is in their best interest to make it easier and less costly to recycle their product, or to design their product to be less toxic and to last longer.

Environmental benefits: Better designed products, and enhanced end-of-life recyclability reduces the volume and toxicity of waste sent for disposal, and promotes a more rational use of natural resources.

Less government intervention: The burden of responsibility for day-to-day management is placed on the producer and/or stakeholders along the supply chain, which limits the role of government to establishing the regulatory framework, which may include: determining the target products, the producer's basic obligations, performance indicators, and the monitoring regime. The producer may be free to choose its partners and the method to meet its obligations.

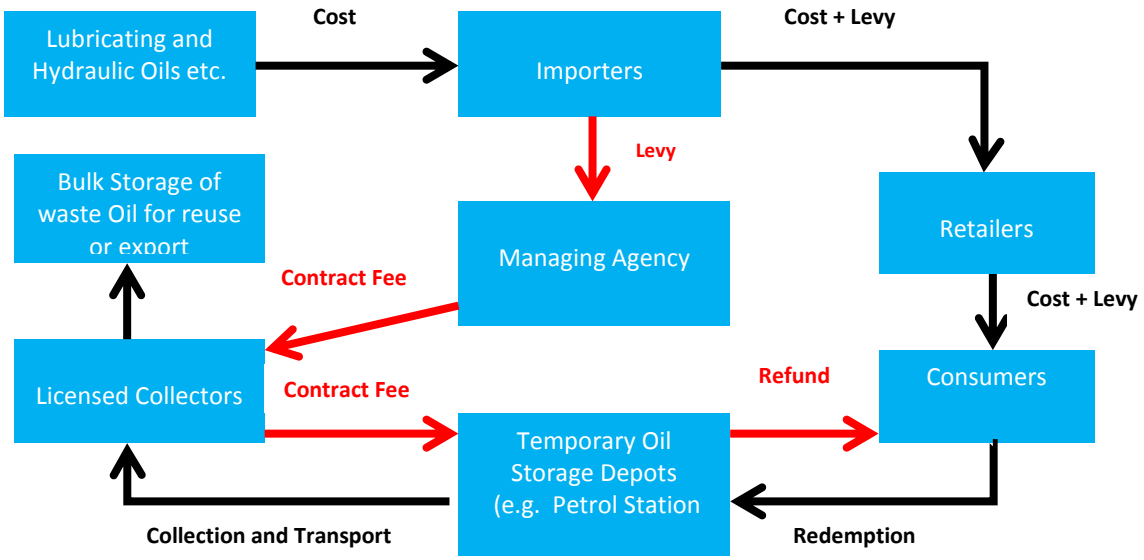
Equitable cost distribution: Producers are likely to pass on a portion of any financial costs arising from implementing their obligations onto consumers of those products. A Stewardship System removes the financial burden for end-of-life management from the entire body of taxpayers and distributes it to those who use the products. It is essentially an implementation of the Polluter Pays Principle.

1.2 HOW A STEWARDSHIP SYSTEM WORKS

19. In general, a Stewardship System for oil products would look something like this:

- Importers bring oil products into the country and are charged a levy which is passed to the Managing Agency/Producer Responsibility Organization (PRO).
- Producers report their imports to a Managing Agency/Producer Responsibility Organization (PRO) that oversees waste oil recovery within an industry and reports to the State government.
- Oil is sold to retailers and then sold to consumers who eventually produce waste oil.
- Waste oil collectors licensed by the Managing Agency/Producer Responsibility Organization (PRO) collect waste oil funds that can be used to encourage consumers to return waste oil through a refund fee.
- Waste oil collectors provide returns to the Managing Agency/Producer Responsibility Organization (PRO) and receive payment for each litre collected.
- Recovered waste oil is bulk stored for reuse within country or exported for utilisation.

Figure 1 Stewardship System Flow Diagram



1.3 POLICY INSTRUMENTS FOR A STEWARDSHIP SYSTEM

20. A number of instruments are currently being employed to shift responsibility for waste products from government and taxpayers to producers and consumers. Four policy instruments and examples of each are as follows:

Table 3: Policy Instruments for a Stewardship System

Policy Instrument	Description	Issues to consider	Suited to PICTs?
Deposit refund systems	A deposit is charged on the product at the first point of sale or import and passed on to the consumer. A full or partial refund is issued when the waste or end-of-life product is returned for recycling (or disposal). Unclaimed refunds are used to support collection and recycling. Most commonly applied to beverage containers (aluminium cans, PET bottles), batteries (lead acid, dry cell), and other hazardous wastes.	The right amount of refund can encourage return of the waste by the public, which reduces collection costs. Success increases if the deposits are paid into a special account that can legally only be used for related recycling program activities. Simple to administer if done at the point of importation, and is easily incorporated into existing roles of Customs Officials.	Yes
Advanced disposal or recycling fees	The end-of-life management fee is charged upfront when the product is purchased.	The fee is sometimes refunded to consumers, but generally the consumer is unaware of the fee. Can generate substantial funds, which may or may not be used by government for environmental projects.	Yes
Voluntary agreements tied to mandatory regulations	These agreements are used to phase out undesirable materials, and encourage design to ensure high rates of reuse or recycling. Recycling targets for undesirable materials are set by governments, and if these targets are not met, then the use of these undesirable materials is subsequently banned.	As PICTs are principally importers of goods they are generally unable to influence the use of undesirable materials in manufacturing directly.	No
Financial Guarantee	This is usually implemented when a producer is mandated to take back and recycle their end-of-life products. The financial guarantee amount is usually calculated on the level of expected sales for a calendar year, and the unit costs for managing the waste. The guarantee is then adjusted at the end of the year based on actual sales. The financial guarantee typically covers a period of 1 year, which means that it must be calculated annually and adjusted for the following year. Should the producer go out of business or fail to do their share of the recycling, the financial guarantee can be used to cover the costs of collection and recycling.	Depends on reliable reporting by the producers of the amount of the product put on the market. Requires verification of producers' reports, and annual calculation and adjustment to financial guarantee amount for each producer.	No not in this format

2. WHAT CAN WE LEARN FROM OTHER COUNTRIES?

21. We have identified different Extended Producer Responsibility and Product Stewardship Systems in a number of countries for a range of wastes including waste oil.

22. In relation to waste oil we identified countries that have voluntary arrangements for the stewardship of waste oil such as South Africa and other countries that have introduced specific stewardship legislation such as Australia and New Zealand.

23. The state of Alabama in the USA started a project ROSE (Recycled Oil Saves Energy) in 1977 with a grant from Chevron. In 1994, the oil and petroleum companies established R.O.S.E (Recycling Oil Save the Environment), a voluntary foundation to collect, store and reuse waste oil financed by these companies. New Zealand became party to the R.O.S.E foundation and established R.O.S.E (Recovering Oil Saves the Environment – ROSE.NZ).

24. Each systems has some form of levy applied; whether it is a government applied levy directly on the sale of the product and collected via a managing agency or as a levy that oil companies as an association apply a fee to cover the costs of the recovery of waste oil.

25. As an example, a levy of 5.449 cents/litre was a huge help in Australia where waste oil recycling was increased through the levy.

26. Whilst there are many systems in place, the majority have been implemented through direct legislation that has specific Stewardship legislation, for example the Product Stewardship (Oil) Act (2000) in Australia.

2.1 SUMMARY OF STEWARDSHIP SYSTEMS

27. There are several examples worldwide of Stewardship Systems applied to waste oil and other types of waste. These are compared across six parameters and summarized in Table 6, with further details provided in Appendix 1.

28. The six parameters are defined as:

(a) ***Driver*** describes the motivation for implementing the Stewardship System;

(b) ***Management System*** describes the institutional structure established to oversee and manage the operation of the Stewardship System;

(c) ***Waste Type*** refers to the various types of waste to which the Stewardship System applies;

(d) ***Levy* System** describes the financial mechanism applied to sustain the operation of the Stewardship System.

(e) ***Waste Treatment*** identifies the fate of the collected waste.

(f) ***Regulation*** refers to specific legislation enacted such as the *Home Appliance Recycling Law* in Japan, or additional regulations that could be introduced for specific waste streams such as Waste Oil Regulations.

Table 4: Comparison of Waste Oil Stewardship Systems in Various Countries

Region or Country	Driver	Management System	Waste Type	Levy System	Waste Treatment	Regulation, Voluntary/ Mandatory
Australia	Direct Legislation by Government.	The Product Stewardship (Oil) Act 2000 establishes the general framework and benefit arrangements. The arrangements comprise a levy-benefit system that helps fund benefit payments to used oil recyclers. These arrangements provide incentives to increase used oil recycling in the Australian community.	Waste Oil and other wastes that can be recycled.	Levy of 5.449 cents is payable by all oil producers and importers for petroleum-based oils and synthetic equivalents.	Recycling in country.	Legislation underpins Product Stewardship with the Product Stewardship (Oil) Act 2000.
Canada	Directly Legislated Stewardship Programs.	Managed by each province (state) independently, each province has different systems and charges. Non-Profit Association.	Beverage containers, lead acid Batteries, paint, scrap tyres, waste oil, oil filters and solvents.	Deposit refund system for beer bottles One province levies 2 per cent tax on all beverage containers, uses funds for kerbside collection. Environmental Handling Charge.	Recycling in country.	Mandatory through Regulations. Also voluntary systems by industry.
Europe	Direct Legislation.	Varies by country but principally managed through municipalities.	Packaging, Waste oil, lead acid batteries.	A Landfill levy is a levy charged on all waste that goes to landfill, therefore the incentive is to reduce the quantity of waste to landfill by reducing, reusing and recycling waste.	Most recycling in home countries.	Mandatory through EU Directives.
Fiji and Kiribati	Direct Legislation.	Managing Agency.	Beverage containers.	Deposit payable on imported beverage containers, with partial refund on return of used container.	Returned containers are exported to Asia for recycling.	Mandatory through DoE Regulations.
Japan	Home Appliance Recycling Law (HARL).	Japan introduced take-back legislation to establish a material-cycle society in 2001.	All recyclable waste, including packaging, bulk waste, electrical goods, waste oil.	Retailers collect end-of-life products, consumers pay the expenses mandated for recycling and transportation, and producers recycle the products collected.	Products are recycled within the country.	Mandatory through HARL and five other specific laws aimed at sectors and products.
Korea	Korean Government introduced the Laws to drive EPR.	Korea Waste Movement Network KWMN was created to solve the social problems on wastes. KWMN are core	Plastics, styrofoam, cans, paper, light bulbs, batteries, glass.	Korea adopted a Deposit fund system, non-refundable product fees.	Most recycling in country.	Mandatory to drive EPR.

Region or Country	Driver	Management System	Waste Type	Levy System	Waste Treatment	Regulation, Voluntary/ Mandatory
		group for networking various kinds of NGO groups against waste problems.				
New Caledonia	Direct EPR Legislation introduced on a Province basis.	Not-for-Profit company called TRECODEC.	Waste oil, Lead Acid Batteries, Tyres, Dry cell batteries and vehicles.	Levy system and rates itemised in Annex 2 Table 7	Waste oil and tyres re-used in country, Lead acid batteries to Australia and New Zealand, dry cell batteries to France.	EPR legislation implemented in South Province in 2008, to be introduced to North Province in the near future.
New Zealand	Direct Legislation.	Recovering Oil Saves the Environment" (ROSE) established to manage the system.	Waste oil, tyres, paint, computers and cell phones.	Self funded, waste oil was used to meet Dominion Oil Refinery's need for used oil and balance sent to Milburn Cement Ltd.	Most recycling in country.	Initially voluntary by industry but Government guidelines followed in the Form of Product Stewardship.
South Africa	Indirect Legislation.	Recycling Oil Saves the Environment (ROSE Foundation) 1994.	Waste Oil.	Voluntary levy on oil sales.	Recycling in country.	Voluntary by Oil Companies.
Taiwan	Taiwan Waste Disposal Act is the driver.	Taiwan Waste Disposal Act requires all Business to join a third party recycling organisation such as PRO.	Taiwan has mandatory take-back for lubricant oils. Other waste includes cars, motor cycles, batteries, televisions, white and electrical goods.	The government's measure of collecting recycling processing fees from manufacturing enterprises before shipping since 1989 is used as subsidies for recycling firms. Taiwan EPR policies include a deposit returns system.	Most recycling in Country.	Taiwan Waste Disposal Act.
USA	Direct PS Legislation.	Managed by each state independently, different states have different systems (e.g. ROSE (Recycled Oil Saves Energy) Project 1977) in the State of Alabama supported by Chevron).	Metals, nickel-cadmium batteries, electronics, packaging.	No levy but PS approach provides an economic incentive for producers.	Recycling in country.	Mandatory through state Laws and regulations, varies state to state.

3. ESSENTIAL STEPS TO IMPLEMENTING A STEWARDSHIP SYSTEM

29. Essential elements required to establish a successful waste oil Stewardship System are:
    a. researching local practices;
    b. coordinating the efforts of stakeholders;
    c. identifying the program's service area;
    d. determining the financing mechanism;
    e. designing the logistics for Waste Oil Management;
    f. publicising its existence; and
    g. educating consumers and retailers about the need and benefits of recycling.

Research Local Practices

30. Before developing a Stewardship System, a waste oil audit needs to be completed to establish the quantity of oil imports into the country, the principle users, current disposal practices, volumes of waste oils stored and existing permit systems.

31. The information gained from the review of the current import volumes of lubricating and hydraulic oils will enable an assessment of the overall requirements in terms of collection, storage, and potential reuses in country or exporting for re-refining or reuse.

32. Once these requirements have been established, the overall cost for collection, storage, and final usage can be determined, which in turn can inform the amount of cost that needs to be recovered, using a mechanism such as a levy.

33. A component of the waste oil audit should include a review of the existing permitting system, in order to help identify any additional legislation or regulation that might be necessary to implement and enforce a Stewardship System.

Coordinating the efforts of stakeholders

34. Coordinating the efforts of stakeholders will contribute towards smooth implementation of a Stewardship System. This coordination will require the establishment of a steering group of stakeholders. Typically, the steering group will comprise of the following minimum stakeholders: Legal, Finance, Foreign Affairs, Industry and Trade, Commerce Commission, Environment or Natural Resources, Customs Authority, Electricity producers and other major users, oil and fuel importers and Ports Authority.

35. The Stakeholder or Steering Group could be a sub-set of any existing National Waste Management Steering Groups, rather than creating an entirely new group.

36. A Managing Agency should be established to manage the operation of the Stewardship System. A Managing Agency is a not-for-profit corporation, either appointed by the State or established as a collaborative effort by the major oil companies. The role of the Managing Agency (see Section 1) is to control and administer the financing mechanism for the Stewardship System.

37. Some countries have already established Managing Agencies such as TRECODEC in New Caledonia and the Producer Responsibility Organization (PRO) in Europe.

Identifying the programs service area;

38. The programs service area should include the whole country, however initially it is envisaged that a Stewardship System would be introduced in the main urban area of each country where the volumes of waste oils will be greater and the implementation will be more beneficial. Once the system is established it can be rolled out progressively to more remote areas of the country in terms of collection, storage and reuse of waste oil.

Determining the financing mechanism

39. Ideally the Stewardship System should be voluntary and self-financing if oil companies and importers are prepared to do this. However, legislation that places a "Duty of Care" on everyone that produces or handles waste oil to "Manage their Liability" from producer to consumer, could be instrumental in developing safe collection storage and disposal/re-use of waste oil. Oil companies might then implement voluntary systems in PICs as the oil companies did in South Africa and New Zealand.

40. Whether the Stewardship System is voluntary or mandatory there will be an increased cost to the consumer for the collection, storage, shipping and reuse of waste oil.

How much?

41. There are costs associated with collecting, storing, transporting, shipping and utilisation of waste oil that needs to be recovered, ideally as a component of the sale price of the original product.

42. Specific items that should be included in the costing for a waste oil management system include:

a. Storage containers at designated points nationwide, to encourage return of waste oil from the general public;
b. Collection of waste oil from designated locations and transportation to a central storage facility;
c. A central storage facility with sufficient capacity for the storage of collected waste oil until shipment;
d. Shipping of waste oil which would include cost of tanktainers (otherwise known as ISO containers), documentation, insurance etc;
e. Transport costs at point of offloading and haulage to reuse facilities; and
f. Awareness and outreach.

43. The waste oil recovered might have a sale value that could offset some of the costs of recycling (collecting, storing, transporting, shipping and utilisation of waste oil).

44. These processes (collection, storage, etc.) are perhaps best managed by the major lubricant companies because they have the level of equipment, facilities and expertise to properly handle waste oil.

45. In the Small Developing Island States, the monthly volume of waste oil produced is relatively small. In these cases, it is important to accumulate sufficient quantities of waste oil prior to export, in order to reduce the shipping costs, which is a major element of the overall cost for collection, storage and transportation.

How to recover the costs?

46. The costs of collection, storage, shipping, and other required activities can be recovered through an environmental management fee on each litre of new lubricating and hydraulic oils imported (or refined in country).

47. The environmental management fee (levy) can be established in a number of ways but each is on the basis of the volume of oil that is recovered for re-use. For example it could be assumed that 100% of imported oils subject to the levy are recovered. The overall cost of collection, storage, shipment and reuse is simply divided by the total volume of imports in litres giving a levy per litre. Alternatively a lower recovery rate could be used to set the levy.

48. The levy should be based on the cost to recover all imported oil as waste oil. The advantage of basing the levy on a recovery rate of 100% is that all the potential total cost of all recovered oil is covered; any surplus funds resulting from less than 100% recovery can be used to extend the system or to develop other recycling benefits. When considering the recovery rate the levy should be charged on both lubricating and hydraulic oils. (Recovery rates See Annex 1 Table 6)

Designing the logistics for waste oil management

Collection

49. Due to the hazardous nature of waste oil, the collection system is probably best carried out by companies that have the relevant expertise and equipment to safely handle, transport and store used oil. These companies may have re-refining capabilities and have outlets for selling the recycled oil for re-use.

50. In addition to providing collection for waste oil, used oil filters and the smaller empty plastic containers of 1litre and 5 litre capacities need to be managed. Lubricating oil supplied in 200 litre oil drums are very light gauge steel and intended for a 1 way trip, they are usually reused locally for storing of waste oil, and transporting diesel and petrol.

Oil Filters

Used oil filters must be properly drained to be recycled as scrap metal; otherwise they must be disposed of as hazardous waste. To properly drain used oil filters one of the following methods must be used:

- Puncturing the filters anti drain back-valve contained in most oil filters and then hot draining[1];
- Hot draining and crushing;
- Dismantling and crushing; and
- Pressurised air.

For the relatively small numbers of filters used in the PICs each of these methods would probably be too costly per unit to carry out any of these methods in country. Therefore a system to collect oil filters and storing them in suitably sized plastic drums capable of holding any residual used oil that may escape from the filter should be initiated. The collected waste oil filters would then be shipped to a specialist company where the residual oil would be properly drained and the filters recycled.

[1] Hot draining should occur for a period of at least 12 hours at or near the engine's operating temperature. Filters that immediately drip oil when picked up have not been drained properly.

The cost of collection, storage and shipment of waste oil filters could be an extension of the waste oil system paid for by the levy on waste oil or a separate levy applied to new oil filters.

Oil Containers

The smaller empty plastic containers, 5 litre capacities, can be used by the DIY mechanic to store the used oil. This can be deposited at several drop-off points so that the oil and the containers are collected.

Prior to bulk storage, waste oil would be collected from community and commercial collection/drop-off points. These first temporary storage locations could have IBC's or simply a contained area for the general public to drop-off 5 litre containers or similar.

Transport and Storage

51. Similar to collection, the hazardous nature of waste oil requires that waste oil is securely transported and stored; this includes the handling of both small containers such as one thousand litre IBCs and as well as bulk storage of waste oil prior to shipping or reuse. Ideally the companies mentioned above will also have suitable bulk storage tanks where the waste oil can be safely stored prior to loading into tanktainers for shipment.

Reuse

52. There are a number of possible re-uses for waste oil, the simplest being to use the oil as a supplementary fuel for firing a furnace, through to refining and resale of recycled waste oil. The most cost-effective option for many PICs would be to manage the re-use of waste oil in country thereby saving shipping costs.

53. However, if there is not an option to reuse within each PICT, then the option of collecting the waste oil and storing for future export for further processing/reuse is the only other viable option. The shipping costs would need to be included in the overall cost for re-using the waste oil.

Shipment

54. The ideal method for shipment is the use of a tanktainer; this is a tank that sits inside a normal container frame such that the tanktainer can be handled in the same way as a normal 20-foot container. The capacity of a standard tanktainer is about 24,000 litres, Alternatively IBC's could be loaded into a 20-foot container, and this would provide a capacity of about 18,000 litres. Therefore from a unit cost aspect, the tanktainer is the better option.

Raising Public awareness of the Stewardship System

55. The aim of any public awareness-raising programme will be to:

- Raise public awareness of the benefits of improved waste oil collection and disposal and the need to recycle;
- Engage stakeholders to ensure their co-operation and participation in the waste oil collection and disposal systems; and
- Provide information and manage expectations.

56. Depending on the messages and the target audience, a combination of various awareness-raising methods could be instigated, including community meetings, newspaper advertisements, poster campaigns including billboards, education activities in schools (e.g. plays, school competitions), use of local TV and radio, and recognised logos. It will be essential that the disposal facilities are made accessible for the public, in tandem with these awareness-raising activities.

57. To launch any awareness campaign, a press conference should be organised where all of the stakeholders involved in the project would be invited to attend. Advertising and media companies would broadcast the locations of collection points and these would be illustrated in newspapers, on posters and on billboards. Oil distributors, petrol forecourts, and other associated businesses would be requested to display awareness material, and provide oil recycling information with all oil sold. Initially the targeted audience for the awareness campaign should include mechanical workshops, bus/hauler companies, oil depots, and service stations.

58. Service stations that sell engine oils could also be targeted as a location for waste oil returns by providing a storage tank that is accessible to the public. The capital cost for providing these storage tanks could be borne by the oil companies and priced into the cost of the new oil. At present Fletcher Pacific Steel (Fiji) provide at their cost storage tanks at larger facilities that use greater volumes of oils. Oil importers in other PICTs could provide similar storage tanks that Fletcher Pacific Steel provide and also provide a collection service.

59. All international companies follow strict codes of practice for management of oil transportation, and waste oil storage facilities. A regional guide or code of practice could be developed such that all companies transporting and storing oil and waste oil operate to the same standards.

4. EXPECTED ROLE OF PARTICIPATING PICTS AND THE ASSISTANCE AVAILABLE

60. The underlying goal of the Waste Oil Component of the AFD Regional Solid Waste Management Initiative is to reduce the negative impacts of waste oil on the environment while maximising any economic opportunities for Pacific communities without requiring continued external financing.

61. As a result of funding limitations, the scope of this Component has been reduced to establishing Waste Oil Stewardships Systems in Fiji, Samoa, and Vanuatu, which will serve as models for establishing similar systems in other PICs. Future projects and funding will seek to replicate these models in other PICs.

62. The sustainability of the Waste Oil Activities will be enhanced through the development and adoption of the Stewardship System, which will be developed in this AFD Project.

63. The countries participating in the project (Fiji, Samoa, and Vanuatu) will be required to formally commit to adopting a Stewardship System for waste oil as a mandatory pre-requisite to receiving assistance and guidance from SPREP. Formal commitment entails Government endorsement of the Stewardship System through respective Cabinet procedures and signing of a Memorandum of Understanding with SPREP.

64. Countries that have committed to adopting a Stewardship System will be guided and assisted by SPREP to identify the relevant stakeholders who need to be involved and consulted during the development of their Stewardship System.

65. The stakeholders would need to establish a steering group comprising the stakeholders; we envisage that the steering group could consist, but necessarily be limited to representatives from the following institutions;

- Legal.
- Finance.
- Price Commission.
- Industry and Trade Commerce Commission.
- Health.
- Environment.
- Customs Authority.
- Electricity producers and other major users.
- Oil and fuel importers.
- Ports authority.

66. Where a country elects to introduce a legislated Stewardship System rather than a voluntary system, SPREP will assist with Model Stewardship Legislation to support regional waste oil management.

67. Each PIC will also be assisted with development of an education programme on waste oil collection, disposal and pollution effects. It is important to raise awareness of the effects of poor disposal practices relating to waste oil such as dumping and burning. The aim of the public awareness-raising programme will be to:

- Raise awareness of the benefits of improved waste oil collection and disposal and the need to recycle;
- Engage stakeholders to ensure their co-operation and participation in the waste oil collection and disposal systems; and
- Provide information and manage expectations.

Summary of Recommendations

68. The overarching recommendation is for each PIC to establish a Stewardship System for waste oil management.

69. The recommended procedure to establish this Stewardship System for waste oil in any of the PICs is as follows:

- Review quantities of oil imports and potential sources of waste oil to establish volume of waste oil available;
- Obtain Ministerial or Government endorsement to tackle the waste oil issue;
- Form steering group to develop Stewardship System for waste oil;
- Identify any potential users for waste oil in country;
- Identify new legislation or regulation that are required;
- Determine collection and temporary storage costs;
- Determine shipping costs;
- Define sustainable financing system for sustainable waste oil collection and disposal. (i.e. levy system);
- Define levy per litre of imported lubrication and hydraulic oils;
- Carry out awareness campaign;
- Establish Managing Agency;
- Establish collection points;
- Register licensed waste oil collectors; and
- Commence levy collection.

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ANNEX 1 – OVERVIEW OF WASTE OIL PROGRAMS IN LARGER COUNTRIES

WESTERN CANADA

70. *Western Canada used oil program:* in the 1980s, the environmental problems caused by improper disposal of used oil drew attention in western Canada and, as a result, the oil industry set up a task force to address the problem. The task force devised an industry-run program in which sales and imports of oil, oil containers, and oil filters would be subject to a fee referred to as an Environmental Handling Charge (EHC). Authorised collectors, transporters, and processors of used oil and filters would be paid a return incentive for every litre of oil, container, and filter that was recycled or reused. Used oil could be used for re-refining into lubricating oil, reprocessed into other petroleum products, or used as heating oil for industrial plants, asphalt plants or space heaters. Filters are recycled at steel recycling mills, and used plastic containers are recycled into new oil containers or other plastic goods.

71. By most measures, the programs have been a considerable success. Recovery rates have risen every year. The percentage of used oil collected and processed in 2004 was 75 percent; this amounted to 47 percent of motor oil sales. A study comparing the western Canada results with those of 14 other countries including the US found that the Canadian program achieved higher recovery rates than any other program with the exception of the program in the UK. The UK recovery rate was 76 percent compared to 75 percent in Canada. A significant fraction of Canadian used oil is re-refined – 30 percent in 2004 – whereas used oil in the UK is all burned for energy recovery.[2]

Table 5: Recovery Rates for Used Oil, Filters and Containers in Alberta, Canada[3]

	Recovery rate percentage of used oil, filters and containers collected		
Year	*Used Oil*	*Used Oil Filters*	*Used Oil Plastic Containers*
1997	52	58	12
1998	66	70	19
1999	67	78	34
2000	67	78	38
2001	71	86	43
2002	73	89	45
2003	75	82	51
2004	77	84	50

72. Good information is available on costs of the Canadian program, since the non-profit associations in each province must file annual reports with balance sheets and other financial information. Vanderpol[3] reports that in Alberta the pre-program industry estimate of the annual cost of removing used oil materials was approximately $13 million. This was an estimate of the costs that generators incurred to have used oil legally removed and managed. Total EHC payments collected are around $13 million per year, thus the cost of the program is no greater than pre-program costs incurred by generators. The administrative costs were around 4 percent of total EHC collections.

[2] There is a significant tax advantage in the UK for heating oil made from waste oil (see Fitzsimons 2005)

[3] Source: Vanderpol (2004); Alberta Used Oil Management Association (2003, 2004, 2005)

SOUTH AFRICA

73. In South Africa used oil is managed by the ROSE Foundation (http://www.rosefoundation.org.za),[4] a non-profit company owned by all the oil companies, and funded through a voluntary levy on oil sales. The Foundation was established in 1994 with the participation of eight major oil companies. All 17 significant suppliers of lubricating oil are now members.

74. Through contractors, the Foundation undertakes the full range of oil recovery activities: education of the public and operators, provision of storage tanks, organisation of transport and a storage network, development of quality standards, and supply to approved recyclers. The Foundation aims to add value to the used oil, while still meeting necessary environmental standards. Preference is given, therefore, to the recycling processes judged to provide the highest environmental return.

75. The Foundation collected 29 million litres in 1996/97, and 36 million litres, or 70 percent of all lubricating oil available for collection in South Africa, in 1998/99. The Foundation operates without any Government involvement.

NEW ZEALAND

76. Used oil is the single largest non-watery liquid waste stream in New Zealand. An estimated 30 million litres are generated each year. (Approximately 60 million litres of lubricating oil are sold each year. About 50 percent is leaked, burned or otherwise lost during use.)

77. Used oil recovery programs have been in place for some years. The major oil companies operate nationwide collection networks and supply used oil to Milburn, New Zealand's Westport cement kiln, where it is burned at high temperatures.

78. The Ministry for the Environment has worked on several projects dealing with used oil:

a) It has developed Guidelines for the Management and Handling of Used Oil. The Guidelines clarify the status of used oil under the Dangerous Goods Act 1974, and provide guidance on handling used oil for do-it-yourselfers, managers of public collection sites, and commercial workshops, transporters and processors. The Guidelines came into force on 1 April 2001.

b) In December 2000, the Ministry released a discussion document, *Used Oil Recovery, Reuse and Disposal in New Zealand*, which addressed:

- recovery issues including deficiencies in present recovery programs, and options for improvement. Options include compulsory take-back programs and voluntary or regulated levy-based recovery schemes;

[4] ROSE: Recovery of Oil Saves the Environment http://www.rosefoundation.org.za/

- options for stronger environmental controls on used oil including the environmental impacts of low temperature burning and road oiling, and options for stronger environmental controls.

79. In 1992, New Zealand was believed to be consuming about 60 million litres of oil a year. At the recovery rate of 50 percent, 30 million litres should have been available for recovery, but only 10–12 million litres were being recovered. The lack of collection, temporary storage, and disposal facilities for used oil, and a lack of demand for re-refined oil were identified as problems.

80. In 1992 the Government announced its Waste Policy. This highlighted the waste reduction hierarchy (reduction, reuse, recycling, recovery and residual management), placed responsibility on the generators of waste for waste reduction, and identified specific industries, including oil suppliers, with which the Ministry for the Environment was to negotiate waste reduction targets.

81. The major oil companies, except for Mobil, had already formed themselves into an industry group and developed a proposal for a co-ordinated national collection system. The program was to meet the Dominion Oil Refinery's need for used oil, and the remainder was to be sent as fuel to Milburn Cement Ltd. The Used Oil Recovery Programme was launched in 1996, with the aim of recovering 50 percent of recoverable used oil in its first year and 95 percent by 2000. Mobil Oil established its own recovery program. Both programs have provided free pick-ups for clients (such as workshops), and provided plastic drums/collection containers on some service station forecourts for the home mechanic.

82. Concerns about the viability of used oil recovery programs was raised in 1998, when the Chief Inspector, Explosives and Dangerous Goods, declared used oil a Dangerous Good, Class 3A under the Dangerous Goods Act 1974. The declaration was made because of the discovery of oil contaminated with highly flammable products. There followed a set of guidelines in October 1998, which if implemented would have required garages, petrol stations, landfill operators and others to undertake expensive upgrades of storage facilities.

83. The ensuing discussions highlighted a range of problems with the storage of used oil. These included unsupervised and poorly sited igloos on service station forecourts (perched beside storm water drains) and containers in workshops that hold all liquids in addition to oil, which posed environmental and safety risks.

84. In 1999 a working group was set up to develop guidelines for the handling of used oil. The purpose of the guidelines was to ensure the safe management of used oil, without recourse to the expensive provisions that applied to Class 3 Dangerous Goods. The working group included oil companies, the Motor Trades Association, Environmental Risk Management Authority (ERMA), an oil transporter, and a Chemicals Industry Association representation.

85. The guidelines implicitly adopt a Stewardship System. They identify the responsibilities that apply to different groups, from the home mechanic and forecourts attendant, to managers of commercial workshops and transporters. While the guidelines may not be legally binding on all these groups, they do reinforce the principle that all those handling used oil have a "Duty of Care".The

"Guidelines for the Management and Handling of Used Oil" are available on the New Zealand Ministry for the Environment's web site,
http://www.mfe.govt.nz/publications/waste/used-oil-guide-dec00.html

AUSTRALIA

86. The Product Stewardship for Oil Program (PSOP) was introduced by the Australian Government in 2001 to provide incentives to increase used oil recycling. The Program, administered by the then Department of the Environment, Water, Heritage and the Arts, aimed to encourage the environmentally sustainable management and re-refining of used oil and its re-use.

87. The Product Stewardship (Oil) Act 2000 establishes the general framework and benefit entitlements of the PSOP arrangements. The arrangements comprise a levy-benefit system, where a 5.449 cent per litre levy on new oil helps fund benefit payments to used oil recyclers. These arrangements provide incentives to increase used oil recycling in the Australian community.

88. There are three parts to the arrangements:

- Product Stewardship Levy;
- Product Stewardship Benefits; and
- Transitional Funding (which included transitional assistance grants).

Product Stewardship Levy (excise)

89. The product stewardship levy is payable by oil producers and importers for petroleum-based oils and their synthetic equivalents. The levy currently stands at 5.449 cents per litre (or kilogram for greases).

90. The levy offsets the costs of benefits paid to oil recyclers as an incentive to undertake increased recycling of used oil. This ensures that some of the costs of used oil recycling are borne by the markets that gain the benefit from the production and use of that oil, rather than from public monies or other markets. In economic terms, it 'internalises the externalities'.

91. No oil is levied twice, no 'eligible' lubricant escapes the levy, imported and domestically produced oils are treated equitably (to the extent possible), and exported oil is not levied. Levied oil, which is incorporated into products that are subsequently exported, may be subject to drawback arrangements.

Product Stewardship Benefits

92. The Product Stewardship for Oil Program (PSOP) encourages increased collection and recycling of used oil in Australia by providing oil recyclers with product stewardship benefits. These volume-based benefits support existing appropriate recycling activities, and provide incentives to maintain a diverse range of recycling options for used oil.

93. In order to be eligible for benefits, a recycling operation must:

- have an ABN (Australian Business Number) or provide evidence of having applied for an ABN;
- have an excise manufacturing licence under the Excise Act 1901*;* and

- comply with relevant Australian and State/Territory legislation and requirements (particularly environmental criteria).

94. Recycling operations claiming benefits must be *both*:

- recycling used oil; and
- either directly using the recycled product, or selling that recycled product for end use.

95. To be considered for benefits, the recycler must undertake the final processing (recycling) stage prior to end use *and* the product must be used by that recycler or sold for end use (i.e., not just processed and stockpiled).

Transitional Funding

96. Transitional assistance funding of $34.5 million was provided for strategic initiatives to increase used oil recycling and ensure a sustainable oil recycling industry. This funding commenced in July 2000 and ceased in June 2007.

97. Interim transitional assistance encouraged change that would underpin the long-term viability of the oil recycling industry. It complemented the stewardship levy-benefit arrangements. The funds were used to:

- ensure a sustainable used oil recycling industry;
- accelerate the uptake of used oil from urban and rural Australia;
- facilitate industry and community involvement to achieve the objectives of the PSO; and
- to the extent possible, address special difficulties that remote Australia has in the recovery and management of used oil for recycling.

Transitional Assistance Grants

98. Grants awarded under the Transitional Assistance mechanism included funding for public awareness campaigns, oil recycling technologies, and establishment of more than 950 used oil collection facilities across Australia.

ANNEX 2 – OVERVIEW OF STEWARDSHIP SYSTEMS IN SMALLER COUNTRIES

SMALL ISLAND DEVELOPING STATES

KIRIBATI AND FIJI

99. Kiribati and Fiji both have container deposit legislation that is essentially targeted at beverage containers. The legislation was implemented in Kiribati in February 2005 and in Fiji in January 2012 (see http://www.bottlebill.org/about.htm). Current information on the Fiji system is very limited at present, although we do know that there will be a partially refunded deposit, the balance being retained as a handling fee.

Legislation Implemented in Kiribati

100. The Special Fund (Waste Materials Recovery) Act 2004, which was implemented in February 2005, was a project to provide access to solid waste services and improve Kiribati's ability to deal with water and land pollution caused by uncollected waste. It enabled the recovery of beverage containers. Each container has a refundable deposit of 5¢ – only 4¢ is returned to the consumer, and the Kaoki waste operator keeps 1¢ per container for operating costs.

101. Unredeemed deposits remaining in the Special Fund will slowly accrue to provide capital for equipment replacement over time. The Act allows the Special Fund to use excess funds for waste management. The success of the program has been monitored by measurements of the landfill in December 2005, which indicated that waste had reduced by 60 percent over the quantities measured in a waste survey in March 2004.[5] Both organic wastes, and wastes recyclable through the Project recycling system, have been reduced to residual levels, or around 1 percent in the landfill waste stream.

Legislation Implemented in Fiji

102. The Fiji Government has approved the Environment Management (Waste Disposal and Recycling) (Amendment) Regulations 2011, and the Environment Management (Container Deposit) Regulations 2011. The implementation date was set as the 1st of January 2012. The purpose was to put a value on aluminium cans and PET bottles to encourage recycling. All beverage containers are included in the scheme. A deposit of 10¢ is charged on each beverage container, and a partial refundable deposit is paid for returns to licensed collectors.

103. This program is in the early stages of implementation with the establishment of a Managing Agency. A lesson learnt from a similar system introduced in Kiribati was that the deposit had to charge in advance of the refund scheme for a period of six months to one year to ensure there are sufficient funds accrued. If this is not done there is a real possibility that the Managing Agency will be bankrupt owing to paying returns on containers that have not had a deposit raised on them.

[5] Impact of the Greenbag on Waste Generation in South Tarawa, IWP Kiribati, January 2006

OTHER SMALL ISLAND DEVELOPING STATES

104. There is very little information for any type of Stewardship System in Small Island Developing States, or countries with a similar socio-economic profile as the Pacific islands.

Palau

105. In April 2011 Palau implemented similar legislation to both Kiribati and Fiji for beverage containers. Here 10¢ is paid by the manufacturer or importer, and 5¢ is paid to the consumer upon redemption through authorised redemption centres.

106. Palau has also instigated other recycling schemes whereby containers are provided for the deposit of other recyclables such as glass, aluminium cans, etc. A separate system is used to collect these materials, which are then bulked up for shipment to Asia for recycling.

RMI (Kosrae)

107. RMI (Kosrae) also has a recycling and container deposit system. A disposal fee is charged when certain products are imported, but no refunds are issued.

NEW CALEDONIA

108. Extended Producer Responsibility (EPR) has been implemented in the Province Sud, New Caledonia; it is likely that in the near future EPR will be introduced by the Province Nord and the Islands Province. EPR will be more difficult and more costly to implement in both Provinces owing to the smaller population and therefore smaller waste quantities, greater transportation distances and shipping from islands, and subsequently higher unit costs.

109. TRECODEC is a non-profit private company, which was established in 2008 with the aim of assisting manufacturers and companies in the implementation of the EPR rules enforced in the Province Sud since 2008. The Province Sud represents about 65 percent of the New Caledonia population and special waste production, with Province Nord accounting for 25 percent and the Island Province 10 percent.

110. TRECODEC is instrumental in establishing collection systems for each of the five wastes that were initially targeted under the EPR rules. These are: Tyres, Waste Oil, Lead Acid Batteries, Dry Cell Batteries, and End of Life Vehicles (Table 7). The company started its system in the Province Sud, and has begun to extend it into Province Nord ahead of the impending legislation. TRECODEC works with the manufacturers and companies that either manufacture or supply through import the goods that produce these wastes.

Table 6: List of Materials and Collection Rates in New Caledonia

Material	2011 tonnage (ton)	Collection rate (%)	Unit cost (XPF) €1 = XPF 119.3	Destination
Vehicles	1600	15%	2500/unit	Scrap metal to Asia
Tyres	2500	70% of the small tyres only (cars and trucks); the larger tyres are not collected	20/kg €167/tonne	Used as landfill liner protection and a proportion shredded and used as drainage material at Paita landfill
Dry Cell Batteries	15	15%	150/kg, started from 100/kg; negotiations are being made to set the price down to 60kg/year with SCRELEC	Previously NZ, under new agreement France www.screlec.fr
Lead Acid Batteries	700	70%	11/kg started from 33/kg	NZ and Australia
Waste Oil	2000	66%	30/l started from 15/l	Burned in SLN, a mining company, furnace in New Caledonia. SLN has spare capacity but would not be interested to expand imports
NB: The Unit Cost includes the full management (collection, packaging, export).				

Roughly the cost for the service is on average 3 percent of the price of the relevant goods.

NEW ZEALAND

111. The New Zealand Government has also chosen to use the term “product stewardship” for two reasons. First, the Government believes that parties other than producers have a role to play – in some cases they may play a greater role than the producers. Many products consumed in New Zealand are produced overseas, and the producer may have little or no presence in New Zealand. It may be more effective and efficient for the importers, retailers or service providers to take the key role in a product stewardship scheme. A good example of this is how both Telecom and Vodafone operate cell phone take-back schemes, even though they do not manufacture handsets. However, the manufacturers still have a role in ensuring the cell phone design is environmentally friendly, and by supporting Telecom and Vodafone in other ways.

112. Second, the Government wishes to reduce the total lifecycle environmental impact of a product, rather than just focus on reducing the impact from disposal. This would ensure that action to reduce the disposal impact doesn’t lead to a larger increase in the impact at another point in the lifecycle of the product. For instance, the environmental impact from energy consumption during the

use of a refrigerator is a significant part of its overall impact. Over the past decade, the energy efficiency of refrigerators has increased significantly, so it may be environmentally better to replace very old refrigerators with newer, more efficient models.

113. Product stewardship schemes are a 'cradle-to-grave' tool that helps reduce the environmental impact of manufactured products. In product stewardship schemes, producers, brand owners, importers, retailers, consumers, and other parties accept responsibility for the environmental effects of their products from the time they are produced until they are disposed of.

114. New Zealand already has a number of existing product stewardships schemes, all voluntary and industry led, and would like to encourage more. Product stewardship scheme participants take responsibility for the environmental effects of their products and take these costs into account when making decisions about the production, purchase and disposal of their products. This means more efficient and responsible use of resources, rather than dealing with the waste problem at the point the product is thrown away. "Upstream" initiatives (such as material selection, design changes, packaging choice and buying habits) can all help to make disposal – whether it be through reuse, recycling or landfill – much less of a problem. Existing schemes in New Zealand focus on products including packaging, waste oil, tyres, paint, computers (Dell Recycling program), and cell phones.