

Introduction

The increasing presence of plastic marine debris in the South Pacific Ocean is focusing attention on strengthening recycling policies and systems in the region. Unique challenges associated with shipping commodities of low value over long distances to recycling markets, however, reduce the economic viability to do so. This Territory profile includes the current technologies, material flow, logistics, public policies, institutional framework, financial mechanisms, and initiatives that are being designed or have been implemented to strengthen recycling systems in New Caledonia.

New Caledonia consists of a main island, Grande Terre, and various smaller islands that include the Loyalty Islands, Chesterfield Islands, Isle of Pines, Belep archipelago, and a number of remote islets. It is situated in the Melanesia region of the southwest Pacific, covering 18,576km², with a combined coastline of 2,254km.

New Caledonia is relatively mountainous and is surrounded by coastal plains. Coral reefs almost entirely encircle the main island. Noumea, the capital, is located on the peninsula of the main island.

Socioeconomic background

New Caledonia is a French territory that is governed by a Territorial Congress, a legislative body represented by members from three provincial assemblies. These are Northern Province, Southern Province, and the Loyalty Islands.

New Caledonia's population in 2014 was approximately 269,000. This included a rural population of approximately 77,700 or 30%. The population distribution across the largest cities of the three provinces is as follows (GoNC, 2014):

South Province	Population
Noumea, capital	99,926
Le Mont-Dore	27,155
Dumbéa	31,812
Païta	20,616
Loyalty Islands	Population
Lifou Island, capital	9,275
Mare Island	5,648
Ouvea Island	3,374
North Province	Population
Kone, capital	7,340
Poindimie	4,868
Houailou	4,240

Source: GoNC, 2014.

Prior to the end of World War II, the country's economy was largely based on the nickel mining industry. With the collapse of nickel prices in the 1970s, however, greater emphasis was set on developing a vibrant tourism sector. Nonetheless, the nickel industry remains primarily responsible for New Caledonia being one of the largest economies in the South Pacific. Visitors to New Caledonia in 2016 numbered 115,676, an increase of 1.4% compared to the previous year (SPTO, 2017).

New Caledonia's gross domestic product in 2011 was US\$36,405 per capita (SPREP, 2016). In 2015, it had a trade balance deficit of US\$1.42 billion, with exports at US\$1.48 billion (+0.8% annualised) and imports at \$2.91 billion (-0.4% since 2010).

The primary export market destinations for 2015 were Australia, the Republic of China, Japan, the Republic of Korea and various other Asian countries. The main import origins for the same year were Australia, the People's Republic of China, France, the Republic of Korea and the Republic of Singapore. (OEC, 2017).

Solid waste management

The regional study coordinated by PRIF models the potential recovery of 15 materials types. A defined set of recovery rates was applied to the urban, rural, and outer island population distribution to calculate New Caledonia's potential recovery tonnage. The PRIF study compares various data to establish the context for the 15 waste materials.

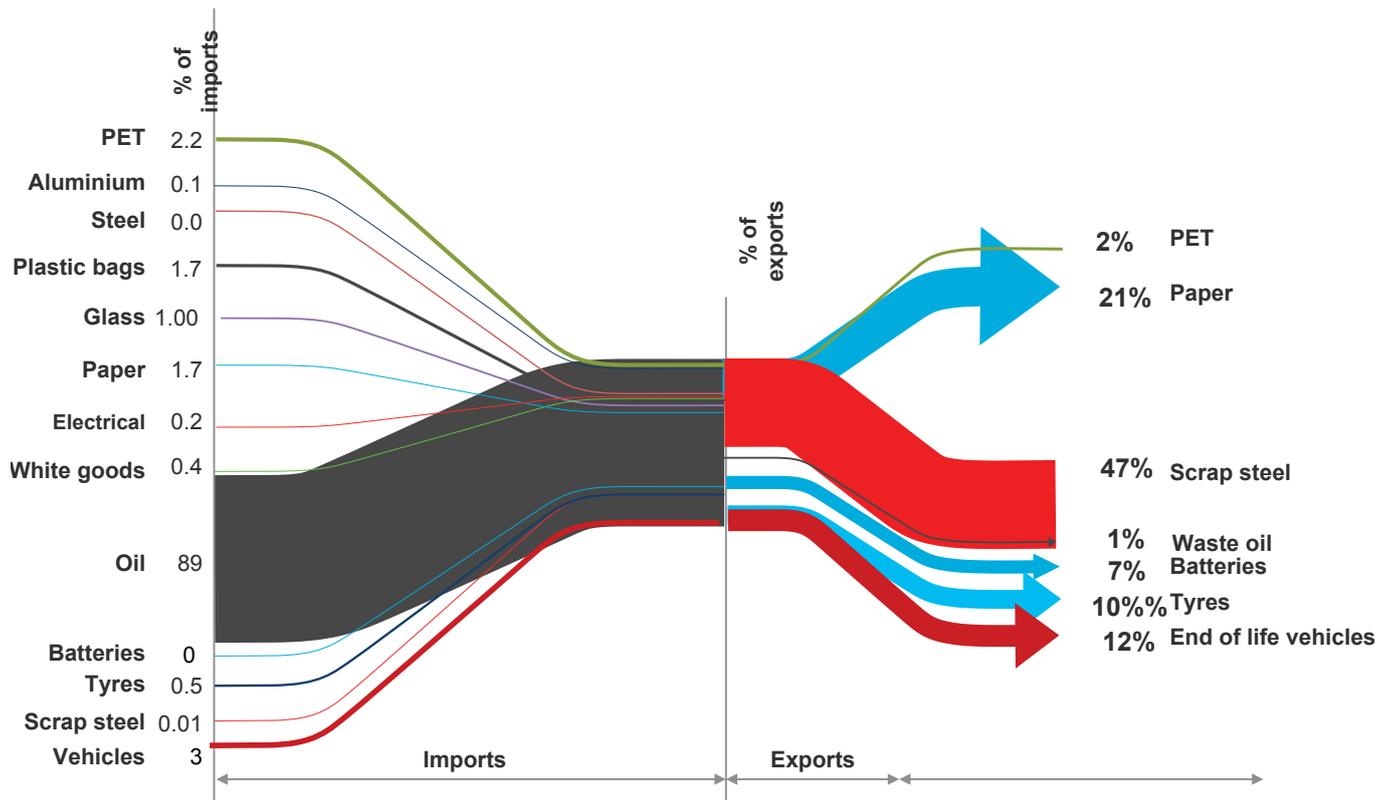
The material flow chart below is based on an analysis of New Caledonia's imports of the 15 material categories studied, averaged over a seven-year period to 2016, compared with exports of those recovered recyclable materials, averaged over a two-year period 2015-2016, presented as a percentage of the total of the 15 categories. (UN Comtrade, 2017).

New Caledonia imports large quantities of beverage containers, which have held steady over the course of the seven-year period under study. While similar trends were observed for plastic bags and paper, there was an increase in the number of whitegoods and the volume of crude oils. Import of general purpose vehicles has continued at the same pace, with specialised vehicles (e.g., large vans and tractors) showing a downward trend over the same period.

Export data was available for 13 of the 15 materials imported into New Caledonia. Data indicate that an average of 2,000 tonnes (t) of paper and cardboard, 4,000t of scrap steel, and 1,000t of vehicles were exported in 2014-16.

Modelling of potential recovery of recyclable materials, presented in the table below, is based on an estimated average daily per capita municipal solid waste generation of 2.1kg (World Bank, 2012). It also applies a range of location-specific estimated recovery rates that are based on a set of assumptions of existing or introduced incentive-based policies and programs, such as container-deposit schemes and import levies. The resulting ratios were used to estimate average annual tonnages that could be recovered for recycling. (JICA, 2013; SPREP 2016; Mobile Muster, 2013; DOEE, 2017; Jambeck et al., 2015; MFAT, 2016; UNIDO/ICSHP, 2013).

Material flow - New Caledonia



Source: Anne Prince Consulting, July 2017

Note: The percentage of imports and exports displayed relate only to the proportion of the 15 materials categories studied, not total imports/exports

New Caledonia	
Recyclable Materials Forecast	Estimated Metric Tonnes
Polyethylene terephthalate (PET) beverage containers	822
Aluminium cans	1,620
Glass beverage containers	1,143
Steel cans	1,286
Plastic shopping bags	533
End-of-life (EOL) renewable energy equipment	--
Paper/cardboard	5,383
E-waste	31
Whitegoods	176
Used motor/cooking oil	997
Used lead-acid batteries	180
Lithium batteries	254
Scrap steel/non-ferrous	1,929
EOL tyres	179
EOL vehicles	4,507
Total	19,040

Future waste management

New Caledonia aims to reduce the use of diesel by encouraging the implementation of reliable renewable energy resources. Over 95% of the population has access to electricity. One hydropower plant and three off-grid hybrid systems are being developed, representing 19% in renewable energy once completed (MFAT, 2016). These initiatives are expected to increase the presence of end-of-life renewable energy equipment in the waste stream.

Plastics marine debris

Mismanaged plastic waste eventually enters the marine environment by way of inland rivers and waste water outfalls or is transported by wind and tide. Rigid and light-weight plastic from products that are daily consumed or used become marine debris if not managed appropriately. An estimated 12% of New Caledonia's waste stream consists of plastic.

A recent study (Jenna et al., 2015) indicates that 64.7t of plastic waste is generated on a daily basis among communities that live within 50km of the coastline. An estimated 2% (or 1.3t) are mismanaged daily and are predicted to enter the marine environment through littering. Approximately 472t of plastic waste were released in New Caledonia's waters in 2010. If not addressed, the amount is expected to rise to 702t per year by 2025.



Of the 64.7t of plastic waste generated each day, approximately 80% may comprise polyethylene terephthalate (PET) and high-density polyethylene (HDPE) plastic that is eligible for recovery under a container deposit scheme (CDS) at the rate of approximately 42 t/year. The balance of over 430t of non-eligible plastic (e.g., plastic bags/film and rigid containers), however, will continue to enter the marine environment. A CDS that recovers 40% of HDPE and PET bottles in New Caledonia may achieve the following reductions in marine debris each year:

- 3t in floating plastic
- 15t in sunken plastic
- 3t in beach plastic.

Further benefits attributed to a CDS are possible with a reduction in annual damage cost to New Caledonia's 218 local fishing vessels (approximately US\$3,389). If beaches were cleaned up, over US\$10,606 would be saved, of particular relevance to the amenities of coastal communities and the tourism sector.

A scheme, known as Clean Island, is available for free for those citizens who pinpoint illegal dumping areas. As a result, several hundred illegal disposal sites have been tagged, from which key sites have been earmarked for rehabilitation. Implementation, however, has been slow in Northern Province and Southern Province. In any event, new waste management facilities have been developed, and the municipalities now are responsible for the monitoring and management of the facilities, with the exception of the Loyalty Islands, given limited capacity at the municipal level.

Other projects relating to the management of pollution include the following:

- Ocean Protection Initiative, developed by the Surfrider Foundation, aims to encourage an awareness of marine issues by integrating grassroots campaigns to promote responsible behaviour.
- Observatory of the Environment to monitor terrestrial and aquatic environments and to maintain a database on the state of New Caledonia's environment.

SOS Mangrove project to identify and restore degraded mangroves. A series of events under the banner of Clean Up the World, conducted between 2009 and 2014, identified the key types of waste as plastic bottles, ferrous metals, aluminium cans, glass, used cell phones, used batteries, end-of-life vehicles, inert waste, effluent discharge, and wastewater (SPREP, 2016).

Infrastructure and services

A number of well-established recycling initiatives is provided by SIGN, the Inter-Council's association of Greater Noumea, responsible for providing waste services. In most council areas, household collection services are limited to waste materials. Voluntary waste drop-off bins for segregated recyclable materials are available at waste facilities and at specific roadside locations throughout Noumea.

SAEML Mont-Dore Environnement is a public/private partnership in the city of Mont-Dore, with 72.7% equity. Nine of the partners are private investors. The firm provides household waste and recycling services in Mont-Dore only, with a commercial waste collection service twice a week in Grande Noumea and twice per month basis.

SAEML Mont-Dore Environnement operates a fully equipped material recovery facility, constructed in 2014, with undercover storage for incoming and baled materials, shipping container loading areas, an elevated, enclosed sorting station, and a weighbridge. The site operates front-end loaders and a forklift, and processes materials collected from households and businesses, as well as from public drop-off receptacles in the city and across Grand Noumea. These ultimately are exported to Australia.

A partnership between Mont-Dore and Maroochydore in Queensland, Australia, organises the export of recyclable items (e.g., paper/cardboard, plastic, and aluminium cans). SAEML Mont-Dore Environnement also provides educational activities relating to the development of renewable energy sources in Mont-Dore.

There are various private sector recycling businesses in New Caledonia, one of which was established in 2005 to recycle ferrous and nonferrous packaging material. It processes approximately 3,000t for export to Australia and New Zealand or to supply the local market. Since 2007, another firm has been buying, collecting, and cleaning nonferrous materials (e.g., copper, aluminium, brass, lead, inox and zinc) for export. Another has recycled plastic bottles since 2013, purchasing materials that have been cleaned for shredding and export to Australia.

In the Loyalty Islands, a public/private partnership focuses on renewable energy, having installed a generator of 300 units of apparent power (kVA), powered by coconut oil as a biofuel. In Southern Province, a computer reprocessing initiative provides retraining for people for re-entry into the workforce.

End-of-life vehicles of over 3.5t are not recycled. Recovery of tyres is limited to those less than 1.2 metres in diameter.

Logistics

New Caledonia's six seaports are located on the main island of Grande Terre. The principal international port and container terminal is in Noumea and, together with the port of Poro, is operated by the Port Autonome de Nouvelle-Calédonie. The ports of Kouaoua, Thio, and Nepoui are operated by the private sector firm, Societe Métallurgique Le Nickel.

The terminal at the Port of Noumea is approximately 27 hectares with facilities of high standard, including a main quay (750 metres long by 9.4-10 metres deep) and a warehouse. While there are no shore cranes, private stevedore services are available.

The Port of Noumea has an annual handling capacity of 180,000 twenty-foot equivalent units (TEU), and manages a yearly throughput of 110,000 TEU containers, comprising 55,500 import, 2,000 export, and 5,000 transshipment containers. The remaining 53,000 containers return empty and provide potential backload.

The Port of Noumea is serviced by various international shipping lines. Estimated TEU shipping container rates, presented below, are based on the cargo of non-hazardous goods, inclusive of un/loading and a bunker adjustment factor, although they do not account for customs clearance, duties, and quarantine inspection.

New Caledonia: Shipping Lines

Swire Shipping; Kyowa Shipping Co. Ltd.; AUSPAC Consortium; Polynesia Line

Destination	Schedule	Est. USD per TEU
Australia	14-day	1,900 to 4,600
SE Asia	14-day	2,500 to 3,330
Fiji	14-day 21-day	1,950 to 3,000
New Zealand	14-day 21-day	1,900 to 4,600
North Asia	14-day	2,400 to 3,600

AMSTEC Pty Ltd

Notes: USD = U.S. dollar; TEU = twenty-foot equivalent unit.

Inter-island shipping services are provided by a ferry service twice a week between Noumea and Isle of Pines, and Lifou and Mare.

The country is a major cruise line and pleasure craft destination. A 2015 review of the port waste reception facilities identified a number of essential improvements for the port to achieve the standards of the International Convention for the Prevention of Pollution from Ships (MARPOL), of which New Caledonia is a signatory (SPREP, 2015).

This study recommends incorporating ship waste into the waste management systems of the provinces, providing daily waste services to ships at port, and including batteries and oil waste under the Tredecod Initiative as an extended producer responsibility (EPR). Further recommendations include the collection and management of data on ship waste; communicating MARPOL requirements and the contact information of disposal services among shipping agents and crew; and taking into account the refining of used oil waste and an extension to the sewerage system so that it is able to accept cruise ship wastewater (PacII, 2017; ECOLEX, 2017).

Institutional framework

New Caledonia has a complex waste management and pollution control framework, involving five levels of intervention. The Government of France is responsible for hazardous and radioactive waste and for providing technical and financial support to improve waste management. Furthermore, the environmental guardianship principles expressed in the French Environment Chart and Environment Code are incorporated into the Environment Code, adopted by the Northern Province and Southern Province of New Caledonia.

Part 4 of the Environment Code provides a regulatory framework for environmental protection and waste management. The Government of New Caledonia is responsible for healthcare waste and the safe management of

waste materials such as asbestos and polychlorinated biphenyls (PCB). The Government of New Caledonia imposed an import tax on 27 March 2003, to support activities relating to waste and pollution management. Each of the three provinces is responsible, within their context, for developing their own policies and strategies.

The polluter-pays principle is embedded in the Environment Code for Northern Province and Southern Province, and it requires producers to establish waste management plans. This is supported by an EPR regulatory mechanism, known as chains. The mechanism would require producers to collect and treat used oils, end-of-life vehicles, lead-acid batteries, cell phones, and tyres.

The Loyalty Islands adopted Resolution No. 2007-60/API on August 30, 2007, relating to the elimination of used lead-acid batteries and waste oil. An objective of the EPR scheme is to increase private sector opportunities to recycle such materials, thus enabling firms to minimise their environmental impact. To date, there are two schemes in place on the outer islands.

Additional regulations relating to electrical and electronic waste were implemented in Southern Province in 2014. Agenda 21 was adopted by the City of Noumea Municipal Council in 2013, setting five-year targets. One such target is a 7% reduction in household waste by 2018 (SPREP, 2016).

Tredecod, a stewardship initiative, was created by producers in 2008 as a collective response to EPR regulations to oversee the waste management plans for each of the 15 material types of waste that are the focus of this study. A network of voluntary drop-off receptacles has been developed in each of the provinces.

Used oils, cell phones, lead-acid and other batteries are collected in all provinces. The gathering of e-waste is limited to Southern Province and Northern Province. The collection of radioactive legacy was funded by an anti-pollution tax before becoming a self-sustaining EPR.

In urban Noumea, Grande Noumea is the only waste treatment authority. The four urban municipalities of Noumea, Le Mont-Dore, Dumbea, and Paita responsible for waste collection services in their respective area. These, in a number of cases, are implemented with a joint municipal approach under the inter-council authority SIGN.

New Caledonia is a party to various multilateral environmental agreements and conventions through France as the signatory. These are listed in the table below.



New Caledonia	
Multilateral Environmental Agreements and Conventions	Status
Stockholm Convention on Persistent Organic Pollutants	Ratified
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	Ratified
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	Ratified
Montreal Protocol	Ratified
MARPOL 73/78: International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (Annex I, II, III, IV, V, and VI)	Ratified
1997 Amendment (Annex VI)	Ratified
London Convention on the Prevention of Marine Pollution by the Dumping of Wastes and Other Matter 1972	Ratified
1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Protocol)	Ratified
Intervention on the High Seas in Cases of Oil Pollution Casualties (Intervention 1969)	Ratified
Protocol 1973	Ratified
International Convention on Civil Liability for Oil Pollution Damage 1969 (renewed 1992)	Ratified
Protocol 1976	
International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971	
Protocol 1976	Ratified
Protocol of 1992	Ratified
Protocol 2003	Ratified
International Convention on Oil Pollution Preparedness, Response and Co-operation Convention 1990	Ratified
Convention on Hazardous and Noxious Substances by Sea, 2000	Ratified
International Convention on Civil Liability for Bunker Oil Pollution Damage (BUNKER)	Ratified
International Convention on the Control of Harmful Anti-fouling Systems in Ships (AFS Convention) 2001	Ratified
International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) 2004	Ratified
Hong Kong Convention	Ratified
Noumea Convention:	Ratified
Protocol on Dumping	Ratified
Emergency Protocol	Ratified

Source: SPREP, 2016.

Financial mechanisms

Currency: franc (CFPF)

The implementation of user fees for waste management is increasing across New Caledonia and is funding the newly regulated dumpsites and waste drop-off facilities. User fees have been increased to take into account new facilities, with households levied on a quarterly basis. Fees are settled electronically or in person at town halls.

EPR schemes are funded by an eco-tax on the sale of materials included in the programmes, paid by the consumer. Revenue is collected by Trecodec partners and returned to the central administration to cover waste management costs.

An anti-pollution import tax is applied to lubricant oils, tyres, rubber inner tubes, food packaging, aluminium cans, bottle caps, cell phones, batteries, and e-waste. The tax is collected at Customs and recovered by the Treasury. Taxes are distributed to a fund that is allocated to the management of waste and pollution, established under Resolution No. 365 in 2003 that draws financial resources from the private and public sectors.

The fund is managed by a committee comprising the president of the local government, as well as congressional and provincial presidents, with the Department of Industry, Mines and Energy acting as Committee Secretariat. The fund is used to help finance such projects as contaminated site rehabilitation and the construction of disposal facilities. Applications are submitted to the provinces prior to approval by the committee (SPREP, 2016).

Conclusions

User-pays and EPR schemes, as well as recycling systems are well established in Noumea. They have the potential to build on in-country recycling and the remanufacture of recovered materials. The Government of New Caledonia is investigating alternative treatment options, such as energy from waste.

There appears to be significant private sector involvement in waste management and recycling through the Trecodec EPR initiative and SAEML Mont-Dore Environnement. So too are supermarkets making efforts to reduce single-use plastic bags by selling solid plastic, reusable bags.

Noumea is one of two ports in the Pacific considered to have an excellent standard of facilities. Since it is not managing the 180,000 TEU/year that it is designed for, the port has the capacity to handle increased cargo movements, given that it is located on a cost-effective shipping route.

Abbreviations

CDS	Container deposit scheme	PCB	Polychlorinated biphenyls
CFPF	French colonies of the Pacific franc	PET	Polyethylene terephthalate
DOEE	Department of Environment and Energy (Australia)	PRIF	Pacific Region Infrastructure Facility
EOL	End of life	SAEML	New Caledonian scrap company
EPR	Extended producer responsibility	SE	South east
GoNC	Government of New Caledonia	SIGN	Syndicat intercommunal du Grand Nouméa (SIGN)
ICSHP	International Centre on Small Hydro Power	SPREP	Secretariat of the Pacific Regional Environment Program
kg	kilogram	SPTO	South Pacific Tourism Organisation
km	kilometre	t	Tonne
km ²	square kilometres	TEU	twenty-foot equivalents
kVA	Kilo volt amps	UNIDO	United Nations Industrial Development Organisation
MARPOL	International Convention for the Prevention of Pollution from Ships	USD	United States dollar
MFAT	Ministry of Foreign Affairs and Trade (New Zealand)		

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