

Plastic Waste Free Islands



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PROOF OF CONCEPT

BOTTLE-TO-BOTTLE RECYCLING SAMOA

An initiative supported by Norad
managed by IUCN and
co-implemented by Searious Business

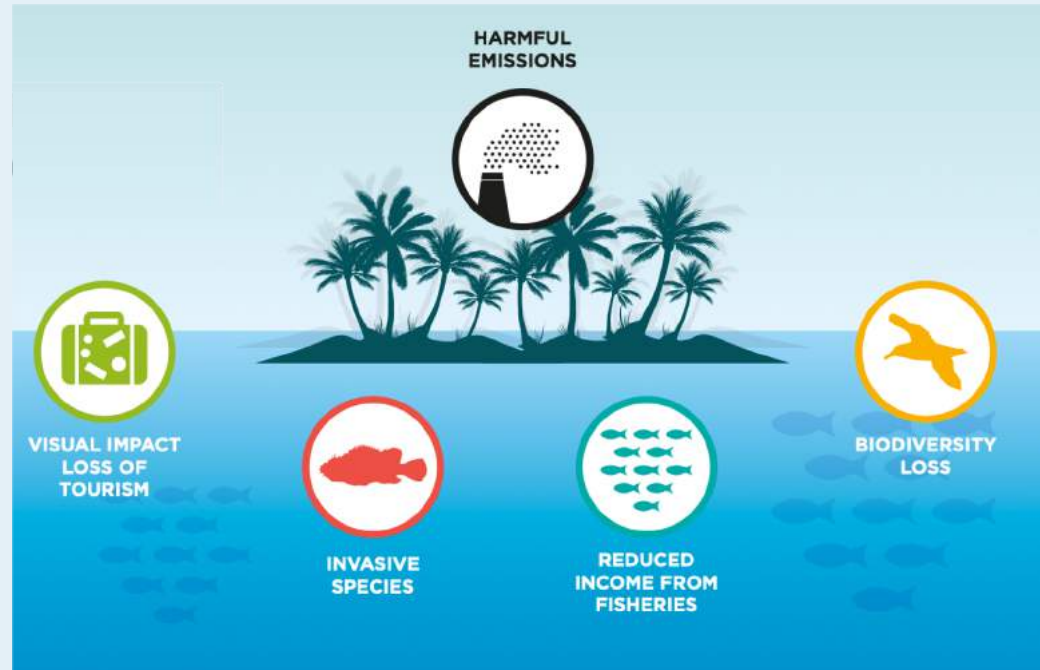


Samoa

GENERAL STATUS OVERVIEW & SECTORAL DATA



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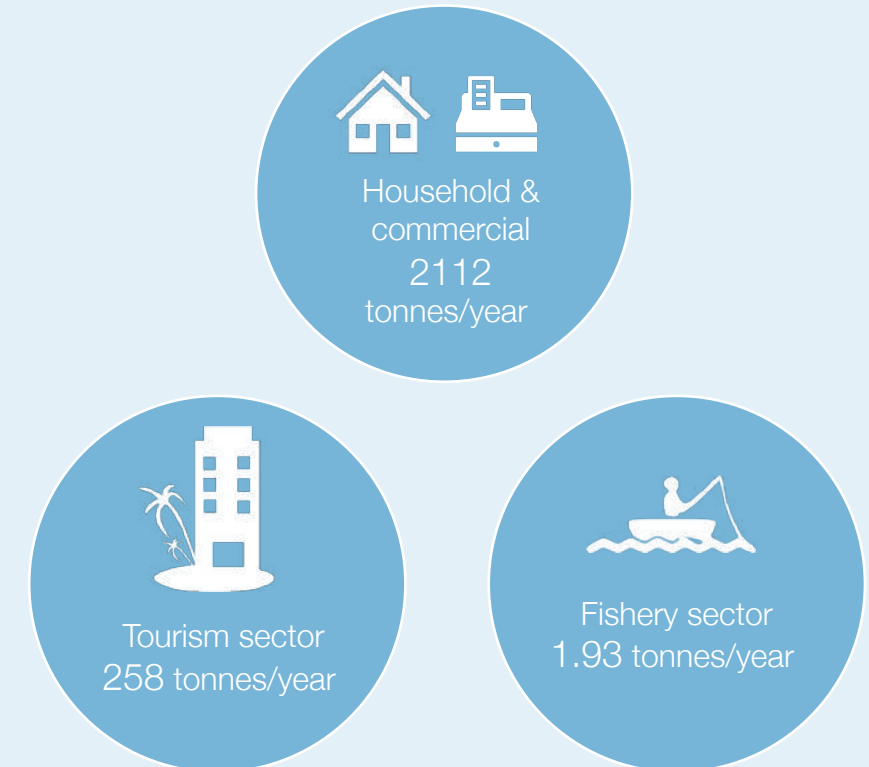
Polymer types	Annual imports 2018-2019	Total waste produced 2019	Leakage (t/y) – model-based estimate (95% credible interval)	Leakage percentage – model-based estimate (95% credible interval)
PET	549.31	465.27	84.04	15.1% (0-47%)
HDPE	429.37	353.82	138.55	28.1% (0-72%)
LDPE	474.02	392.20	81.82	17.2% (0-80%)
PP	548.03	488.68	59.35	10.8% (0-44%)
PVC	312.24	2.75	309.49	99.1% (27%-100%)
PS/EPS	343.50	278.10	65.39	19.0% (0-82%)
Other Plastic	1,501.30	389.75	1,111.55	73.9% (6%-74%)
Overall	4242.77	2370.58	1850.20 (1473-2241)	43.7% (35% - 53%)

National plastic waste generation & leakage data Samoa

Samoa

GENERAL OVERVIEW & SECTORAL DATA

- ❖ No central collection at source or segregation of plastics at landfill, no local plastics recyclers. So all plastics → landfill, or leakage
 - Except for PET → small scale collection for stockpiling
- ❖ Recyclers and relevant business partners united in the Samoa Waste Recyclers Management Association (SWMRA)
- ❖ National ambitions/initiatives/pipeline:
 - Collection of PET bottles by Manino Water/Samoa Pure Water, Waste Management Co. Ltd, and SWMRA
 - Advanced Recovery Fee system for recyclables, incl. PET and possibly HDPE
 - SWMRA and PWFI PET export trial to Visy, Australia
 - (Prepaid) bag system for source separation plastics and general waste is being considered, MNRE
 - Recycling of mixed plastics into concrete aggregate (UNDP, CDRC/Resin8)
 - PRESS-Recycling of plastics into products – educational (Precious Plastics)
 - Recycling of plastics into bricks and beams – SWMRA, regional support from JPRISMII, JICA within the 3R-programme



2372 tonnes plastic waste generated/year

Targeted material

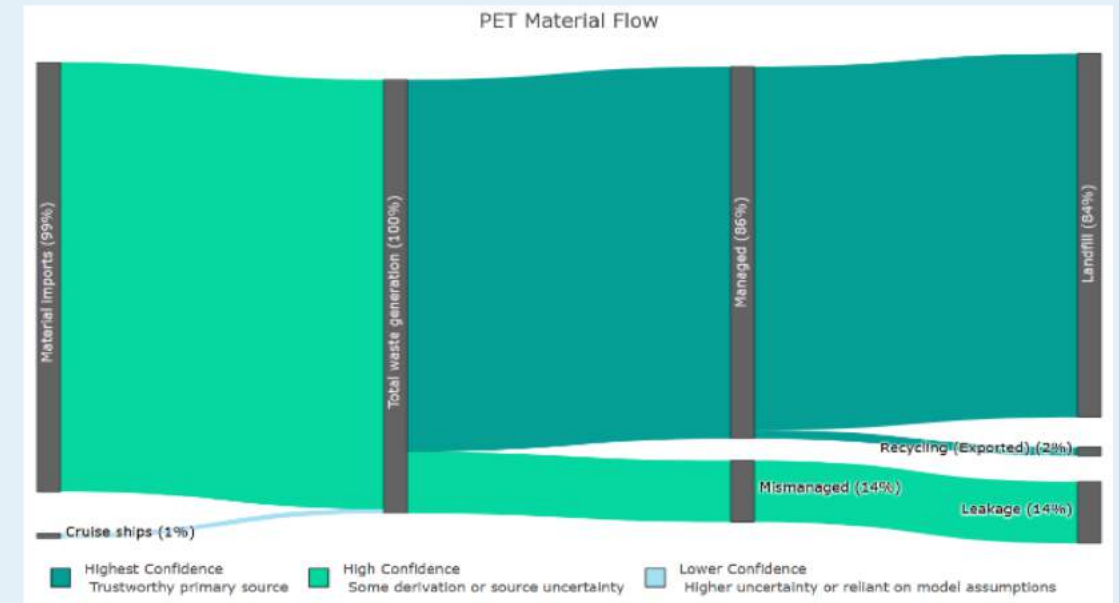
PET – CURRENT VALUE CHAIN



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	Plastic Waste Generation	Household (t/y)	Commercial (t/y)	Tourism (t/y)	Fisheries (t/y)	Total (t/y)
PET 1	beverage containers water pet	84,21	90,35	61,07	0,61	236,23
PET 1	cooking oil pet	8,26	4,51	6,52	0,00	19,29
PET 1	textiles clothing pet	112,51	34,17	3,36	0,00	150,04
PET 1	other pet	1,40	0,00	1,35	0,00	2,75
PET 1	food semi rigid containers e.g. trays pet	4,84	0,95	0,00	0,00	5,79
PET 1	beverage containers not water pet	2,23	0,03	0,00	0,00	2,27
PET 1	food flexible packaging pet	8,21	0,00	0,00	0,00	8,21
PET 1	shampoo body wash pet	1,52	0,00	0,00	0,00	1,52
PET 1	toothpaste packaging pet	1,26	0,00	0,00	0,00	1,26
PET 1	cleaning agent products pet	0,91	0,00	0,00	0,00	0,91
PET 1	laundry detergents bottles pet	0,88	0,00	0,00	0,00	0,88
PET 1	beauty and personal care pet	0,02	0,00	0,00	0,00	0,02

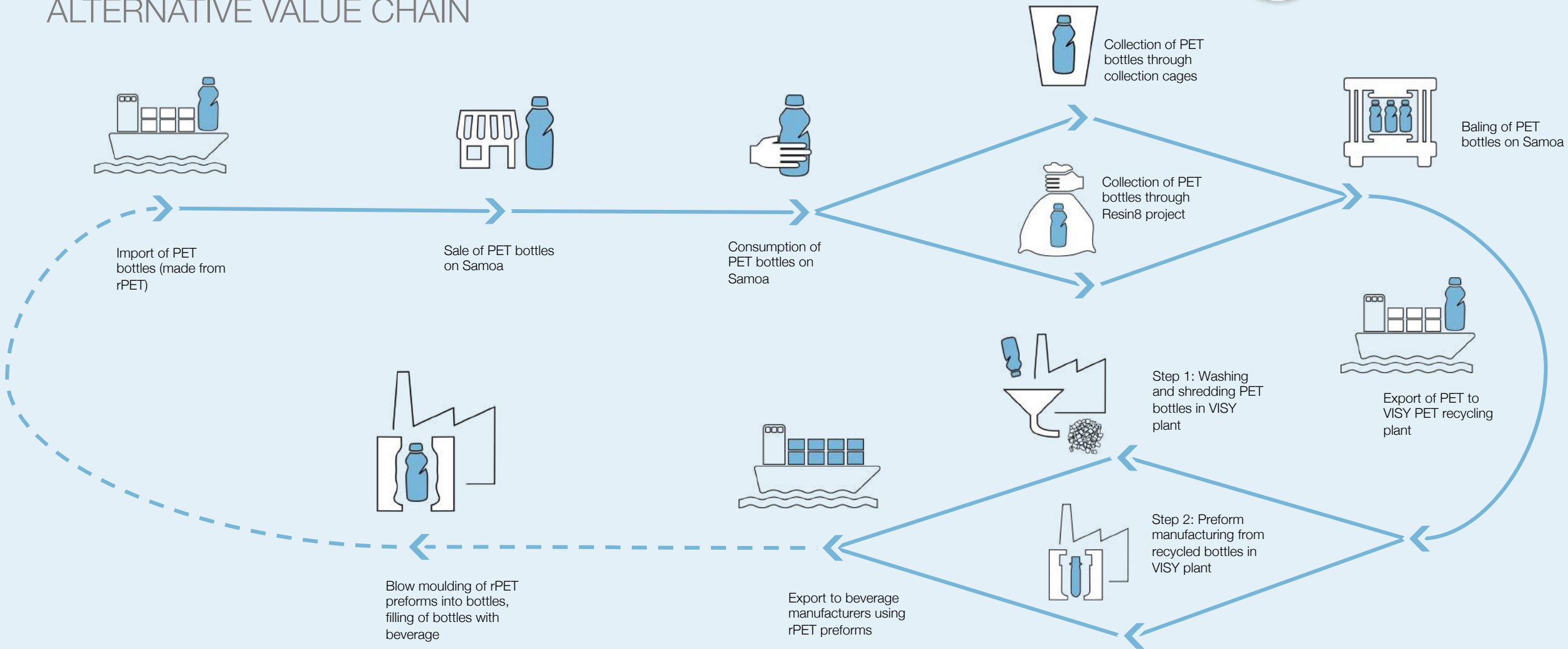


Outline Bottle to Bottle Recycling

ALTERNATIVE VALUE CHAIN



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Outline Bottle to Bottle Recycling



RECYCLING PROCESS

COLLECTION



- Manned collection points to ensure high level of efficiency and quality – combine with deposit return scheme including other materials used for beverage containers like HDPE, aluminum, liquid paper board etc.
- Separation of PET at source – distinction based on colors (transparent – light blue – other)
- Tracking of collected PET through log sheet, validation by weight and four-eye principle

TRANSPORT



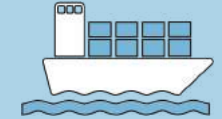
- Transportation by truck/van to processing facility
- Transportation is part of the value chain – therefore part of the tracking and validation
- If combined with deposit return scheme, high return rates can be expected – required transport on daily basis
- Could possibly be combined with SWRMA activities

PROCESSING



- PET gets baled (preferably with high-density baler), alternatively with metal compactor (optional: shredding of PET –possible when recycler has built trust in material)
- No liquids can stay in the bottles
- Caps and labels can stay on if they meet Design for Recycling Guidelines (no toxic adhesives in glues, no metal in labels/caps)
- Density goal of bales: 284 kg/m²
- Costs of labor and material

EXPORT



- Export to food grade recycling plant, e.g. VISY in Australia
- Ensure stable, high quality to avoid negative business case because of high export costs
- Export to Australia: Biosecurity standards really strict –comply with all requirements (fumigation/quarantine) is crucial
- Import of preforms made from recycled content to close the loop (incentivize incorporation of recycled %)

➔ KEY ENABLING FACTORS: Container deposit scheme, high-quality material, food-grade recycling plant

Outline Bottle to Bottle Recycling

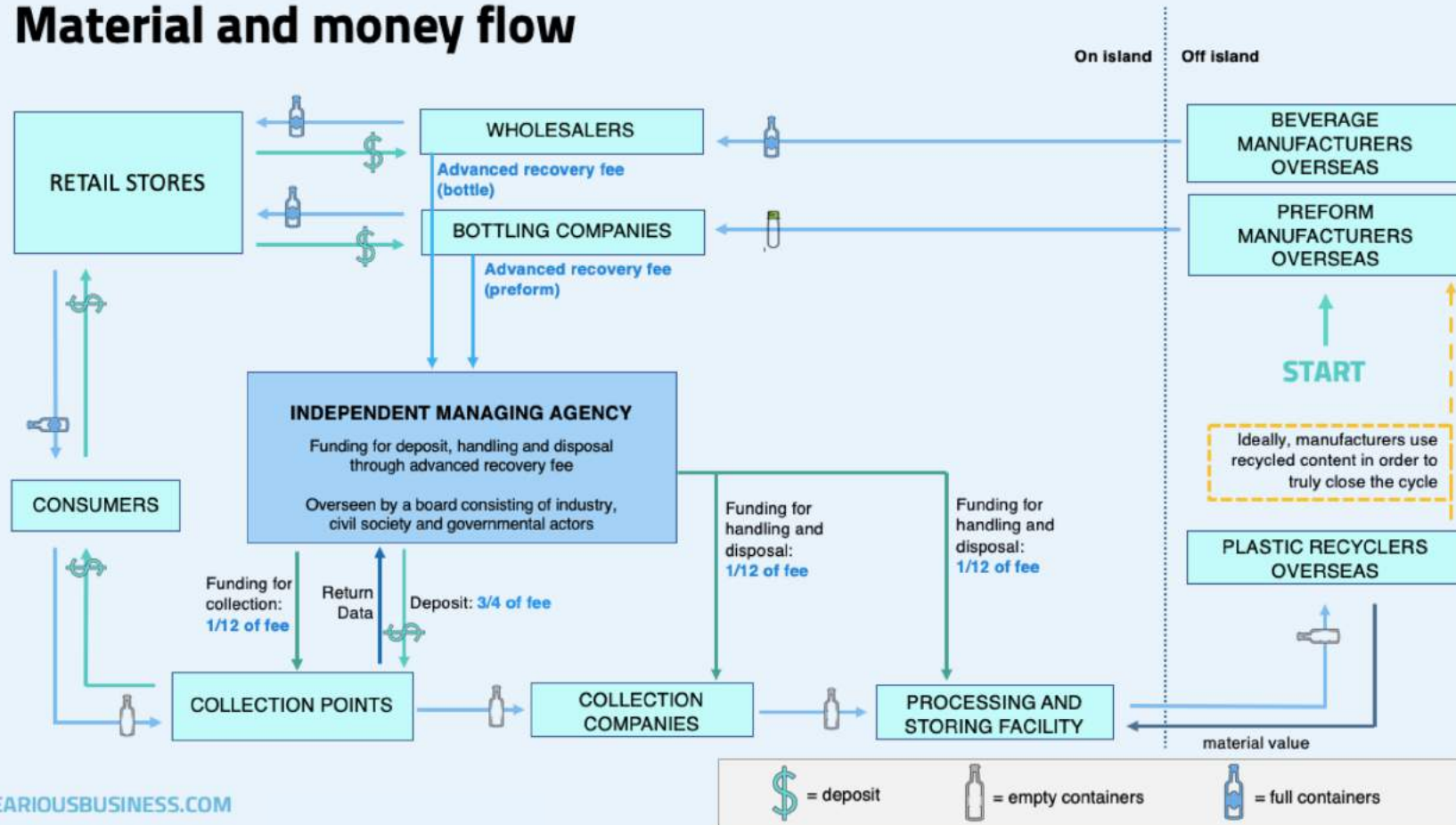


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DESCRIPTION ADVANCED RECOVERY SCHEME

Material and money flow



Advanced Recovery Scheme

HOW TO FINANCE THE INDEPENDENT MANAGING AGENCY

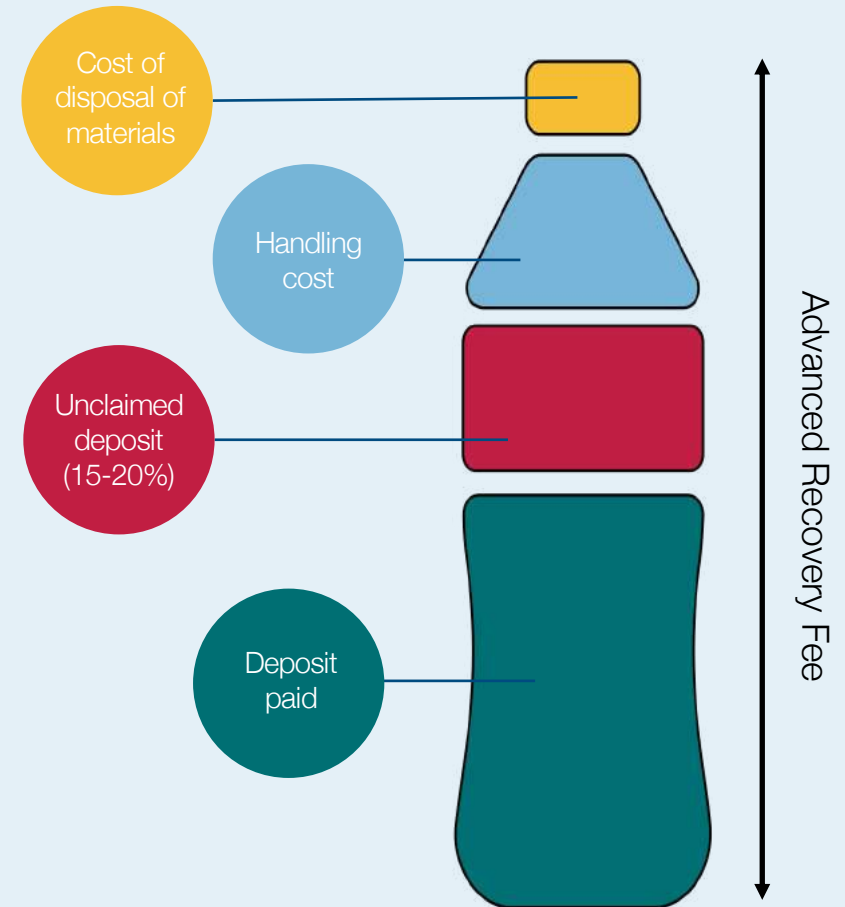
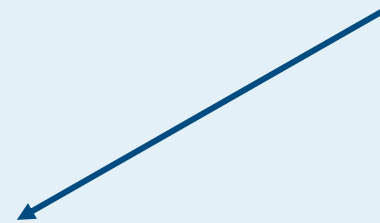


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- ❖ For the implementation and viability of the system on Samoa, we suggest to adjust the current levy tax.
- ❖ It needs to cover all the costs of activities necessary to uphold the system, while not putting too much pressure on local manufacturers and importers of items falling under the levy

Usually, about 15 – 20% of bottles are not getting returned. These unclaimed deposits can additionally finance the managing agency



Factsheet



MARKET ANALYSIS, COST OVERVIEW, USP

Major applications and markets

- Major market: Preforms made from 50% to 100% recycled PET - Food-grade PET bottle have highest revenues
- Alternative markets: non-food PET bottles, strapping, sheets
- Markets for used PET bottles: Australia (e.g. VISY), New Zealand (through Broker)
- Markets for rPET preforms: rising global demand through changing legislation in multiple countries

Volumes to be exported

- 40ft container
- e.g. VISY requires at minimum one full 20ft container of baled PET bottles, but prefers to 40ft container (16 tons)

Source

- Used transparent and light blue PET beverage bottle, blow-molded. Manned sorting and cleaning for stable and consistent flow of PET bottles

Costs and capacities

- Revenue: 500 AUD/ton of PET, 180 tons/year. See costs & revenues per stakeholder on next slide
- Collection: 34 h / month
- Transport: 7 h / month
- Processing: (washing, sorting, shredding: 40 h / month
- Export: once per month

Unique selling points

- Meeting recycling targets of beverage manufacturers
- Concept allows for high-standard export of valuable materials
- Meeting circularity/sustainability targets of governments
- Scalability: e.g. VISY Australia processes 80-100 tons of PET per day – room for more.
- Marketability: Completely circular product, based on high readiness level from key stakeholders
- Risk & compliance: health and safety compliant local setup of processing

Factsheet



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COST BENEFIT ANALYSIS ALL STAKEHOLDERS

➔ Calculations based on **9,538,000 PET bottles** being released into the Samoan market per year. Envisioned recovery rate: **75% (7,153,500 PET bottles)**

	Step	Description	Costs / annual PET bottle release (in WST)	Costs / annual PET bottle release (in USD)	Costs per bottle (in USD)	Comments	Paid / received by					
							bottlers / importers	collection point operators	transport companies	processing companies	managing agency	
Levy imposed on responsible producers			1461422,25	599279,8	0,083	this translates to an advanced recovery fee of 0,16 West Samoan Tala per PET bottle	-599279,8					599279,8
Costs covered by Advanced Recovery Fee	First part: Deposit	Deposit on each bottle of 0,1 WST	715350	286140	0,04			286140				-286140
	Second part: Collection	operating collection points (labour)	345600	138240	0,019	In order to achieve the envisioned collection rate, 19,600 PET bottles must be collected per day. If 20 collection points are being established, each has to collect 980 PET bottles per day (123 PET bottles per hour per collection point). 115,200 hours of work are needed for collection (based on 2 persons per collection point, 8 hour shift every day). 115,200 hours * 3 WST (above minimum wage)			138240			-138240
	Third part: Transport	Pick-up from collection points	15504	6460	0,0009	One 40ft truck fits 42000 PET bottles. In order to achieve the envisioned collection rate, 170 truck trips are needed annually. Assumption: 30 km one-way between collection point and recycling facility: costs for gasoline: USD 18; costs for labour: USD 20 (2 hours). This totals up to 38 USD for one truck trip from collection point to recycling company				6460		-6460
	Fourth part: Processing	Handling costs - unloading vehicle	7993,125	3937,5	0,0006						3937,5	-3937,5
		Sorting & Baling - labour	228912	91564,8	0,013	Based on input from WRFL and compared to Antigua and Barbuda scheme, Labour costs of WST 3/hour. Bale size is 1 m3 and the density requirement is 284 kg/per m3					91564,8	-91564,8
		Sorting & baling - supplies	53287,5	26250	0,004						26250	-26250
		stockpiling costs	39965,625	19687,5	0,002						19687,5	-19687,5
		export costs	36540	18000	0,003	based on 1500 USD per 40ft container (fits 16 tonnes of baled PET bottles) 12 containers per year are required for 75% recovery rate						
	Management	Personnel costs for managing agency	12180	6000	0,00084	2 people in charge, full time						6000
		Promotion (material costs)	6090	3000	4,2E-04	for radio/TV ads, information material						
Total costs			1461422	599280	0,083		-599280	286140	138240	147900	33000	




Factsheet

BENEFITS



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Financial benefits 	Environmental benefits 	Social benefits 
Revenues: 500 AUD/ton of PET	Lower landfill pressure for government. Divert 178 tonnes/year = 38% of all PET waste generated on Samoa	Develop domestic recycling market - Create more jobs in island in collection, sorting, cleaning, recycling – 40 FTE when converting 38% of all PET
Attracting sustainable investors/investments	Around 30% reduction of global warming, fossil resource scarcity and terrestrial acidification compared to landfilling PET bottles	Contribution to cleaner island and attractiveness for local population and visitors
Lower waste disposal and clean-up costs for government	Marine ecotoxicity reduced by > 50% compared to landfilling PET bottles	Human toxicity reduced > 50% compared to landfilling plastics
	Reduced amount of plastic waste that might leak into the environment. 178 tonnes/year = 38% of all PET waste generated on Samoa	

Plastic Waste Free Islands

Let's catch the circular wave together



IUCN_Plastics



plastics@iucn.org



<https://www.iucn.org/theme/marine-and-polar/our-work/close-plastic-tap-programme>

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#CloseThePlasticTap



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SeariousBusiness



connect@seariousbusiness.com



<https://www.seariousbusiness.com/islands>

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#PlasticWasteFreeIslands #CloseThePlasticTap



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