Plastic Waste Free Islands



BUSINESS PLAN

WASTE-TO-PRODUCT SAMOA

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



Mission

WHAT & WHY

What

- A successful business in Furniture and semi-finished products
 - Made from recycled plastic
 - Locally sourced and locally produced

Why

- Local business opportunity
 - Reduce Import-dependency
 - Enhance resource recovery options on-island
 - Job creation
- Reduce overfull landfills and high plastic leakage prevalence
 - Improved waste management
 - Lower environmental impact

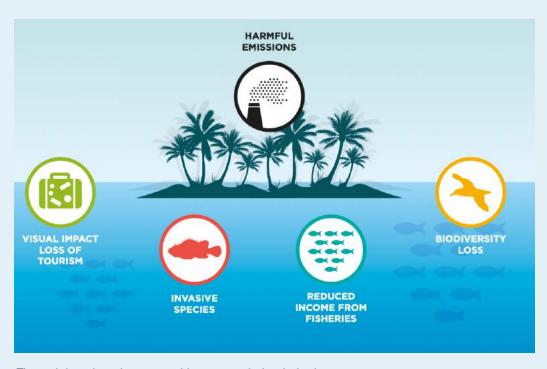




Why start this business

PLASTIC WASTE GENERATION & LEAKAGE





Financial and environmental impacts of plastic leakage

Polymer types	Annual imports 2018–2019 (T/y)	Total Disposed (T/y)	Recycled (T/y)	Leakage (t/y) – model-based estimate (95% credible interval)
PET (1)	549.31	465.27	11.2	90 (0-261)
HDPE (2)	492.37	353.82	0	140 (0-357)
PVC (3)	312.24	2.75	0	309 (85-312)
LDPE (4)	474.02	392.2	0	83 (0-383)
PP (5)	548.03	488.68	0	60 (0-242)
PS (6)	343.5	278.1	0	65 (0-282)
Other (7)	1501.3	389.75	0	1113 (94-1500)
Total	4242.77	1786.42	11.2	1862 (1473-2241)

National plastic waste generation & leakage data Samoa with polyolefins in blue. Source: Final quantification report – Executive summary APWC July 2021

Samoa

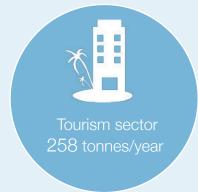
GENERAL STATUS OVERVIEW & SECTORAL DATA

- ❖ No central collection at source or segregation at landfill, no local plastics recyclers → landfill, or leakage
 - Except for PET→ small scale collection for stockpiling
 - Large volumes of rigid HDPE, PP and flexible LDPE waste that could be diverted quite easily from landfill
- 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, 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











2371.1 tonnes plastic waste generated/year

Source: Quantification report, Executive summary, APWC July 2021

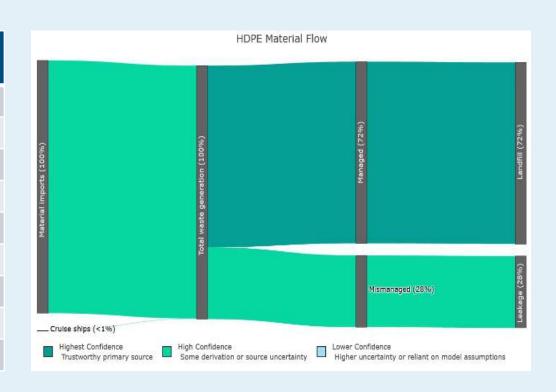
Targeted material(s)

HDPE - CURRENT VALUE CHAIN





Class	Item name	Household (T/y)	Commercial (T/y)	Tourism (T/y)	Fisheries (T/y)	Total
HDPE 2	food containers hdpe	55.14	22.53	0.03	0.11	77.80
HDPE 2	beauty and personal care hdpe	17.56	0.00	5.82	0.00	23.38
HDPE 2	cleaning agent products hdpe	10.70	41.11	0.05	0.00	51.87
HDPE 2	shampoo body wash hdpe	8.04	40.89	0.04	0.00	48.98
HDPE 2	laundry detergents bottles hdpe	12.41	40.89	0.00	0.00	53.31
HDPE 2	other hdpe	24.40	18.15	0.00	0.00	42.55
HDPE 2	home care hdpe	31.00	0.00	0.00	0.00	31.00
HDPE 2	beverage containers pvc hdpe	23.29	0.00	0.00	0.00	23.29
						352.16



Source: Quantification report, Final data, All sectors plastics breakdown, APWC July 2021

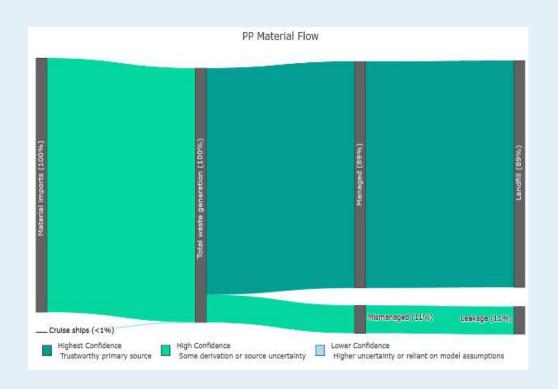
Targeted material(s)

PP - CURRENT VALUE CHAIN





Class	Item	Household (T/y)	Commercial (T/y)	Tourism (T/y)	Fisheries (T/y)	Total
PP 5	food containers pp	1.60	0.00	3.36	0.00	4.96
PP 5	other pp	2.62	143.07	0.00	0.00	145.68
PP 5	medicine bottles pp	0.94	143.07	0.00	0.00	144.01
PP 5	bags resusable supermarket bags pp	4.87	125.81	0.00	0.00	130.68
PP 5	food semi rigid containers e.g. trays pp	2.36	17.25	0.00	0.00	19.61
PP 5	food flexible packaging pp	22.05	0.00	0.00	0.00	22.05
PP 5	container lids pp	3.96	0.00	0.00	0.00	3.96
						470.96



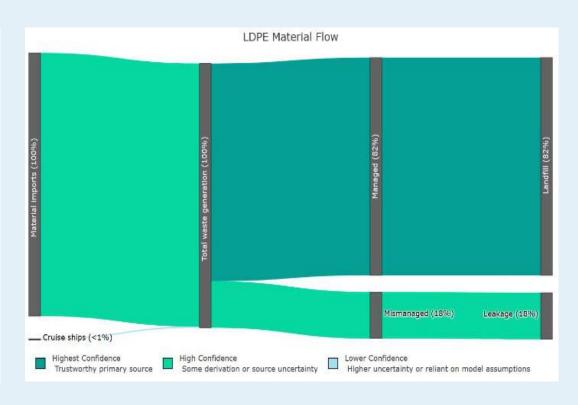
Source: Quantification report, Final data, All sectors plastics breakdown, APWC July 2021

Targeted material(s)

LDPE - CURRENT VALUE CHAIN



Class	ltem	Household (T/y)	Commercial (T/y)	Tourism (T/y)	Fisheries (T/y)	Total
LDPE 4	container lids Idpe	2.83	0.00	0.00	0.02	2.84
LDPE 4	wrap foils cling films ldpe	184.55	144.25	31.64	0.00	360.45
LDPE 4	food containers ldpe	11.67	0.00	0.00	0.00	11.67
LDPE 4	bin bags ldpe	8.37	0.00	0.00	0.00	8.37
LDPE 4	bubble wraps foils Idpe	5.52	0.00	0.00	0.00	5.52
LDPE 4	other ldpe	2.47	0.00	0.00	0.00	2.47
						391.32



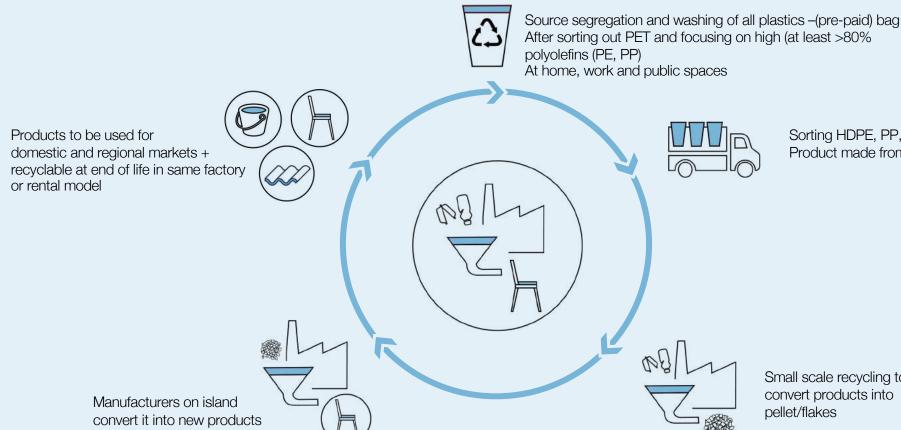
Source: Quantification report, Final data, All sectors plastics breakdown, APWC July 2021

Outline Waste to Product





ALTERNATIVE VALUE CHAIN



Sorting HDPE, PP, mixed plastics at redemption centre Product made from HDPE, PP, mixed

Small scale recycling to convert products into pellet/flakes

Concept description

MIXED EXTRUSION PRODUCTS

- Beams, planks, tiles and parts (semi-finished product)
- Outdoor furniture (end product)
- Example Prototype: Park bench (mainly polyolefins)
 - Dimensions: L650 x W1520 x H825 mm
 - · Weight: 75 kg
 - Intended use: Garden, park, wharf, public space (outdoor)
- Other potential products
 - Lumber/timber, planks, posts
 - Purlin, rubbing styles
 - Street furniture, benches, picnic tables
 - Decking, cladding, siding
 - · Fencing, bollards, palisade, edging
 - · Shed foundation blocks, water side sheeting
 - Bridges, wharfs
 - · Signage, litter bins, planters, raised waste platforms
 - Pergola, dog house
 - Garden, patio, terrace furniture
 - Exercise equipment
 - Traffic control: Wheel stops, speed humps, and rumble bars



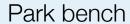




User scenarios

EXAMPLES





- Modular, repairable
- Produced locally
- Durable: Weather & climate-proof
- Comfortable





Wharf bench

Unique Selling Points

SUSTAINABLE & DURABLE



Technology

- Producibility: can process flakes directly so no high machine investments needed
- Scalability: Semi-finished products can be stored, and once machines reach their maximum capacity, an extra machine can be added
- Risk & compliance: Quality performance, with health and safety compliant setup

Product performance

- Sustainability longer life: material vs wood based sheet
 - Lifespan: 40+ years r-plastic lumber vs 20 years hardwood
- Sustainability: green image local waste converted
- Sustainability: easily repaired / parts replaced / recyclable
 - Recyclable: r-plastic sheets 7x recyclable
- Superior performance: weather proof / termite proof / UV-resistant
- · Convenience: easily cleaned
- Superior Design: high end product/ distinctive design / high quality surface finish

Market

- Marketability: Completely circular product
- Marketability: Different furniture for different markets; tourism (i.e. hotels, restaurants), public (schools), private
- Marketability: Locally made vs imported
- Flexibility: Semi-finished products which can be sold directly or made into different end products with existing wood working techniques

Differentiation from competition

CHEAP AND HARDWOOD CONSTRUCTION SECTOR



Hardwood lumber / timber



Stilt builds



Patio furniture



Street furniture



In/outdoor furniture



Park/picnic furniture



- More durable and longer lasting than wooden alternatives
- Easy repair with local service and parts from producer
- Added sustainable image value

Concept Description

MIXED PLASTIC EXTRUSION BASED



- Machines: shredder and/or agglomerator, extruder, press + molds, intrusion moulds, or continuous extrusion line
- Woodworking equipment: Saw table / crosscut saw, mill, hand tools.
- Types of plastic converted:
 - High end product: HDPE sorted & washed
 - Lower end product: Mixed unwashed plastics with >70% PE/PP
- Amount of plastics used: e.g. 8.53 kg per 40x80x2800 beam, or 4.59 kg per 18x130x2800mm HDPE plank, or 75 kg per Bench
- Source of input materials: Collection of HDPE, PP, LDPE or all mixed plastics
 - · through (pre-paid) bag with all plastics collection and after sorting
 - Island wide stimulation through Advanced Recovery Fee scheme / Container deposit Legislation (CDL)
- Impact: up to 150t/y = 12.35% of total PE/PP stream, 6.33% of total plastic generated

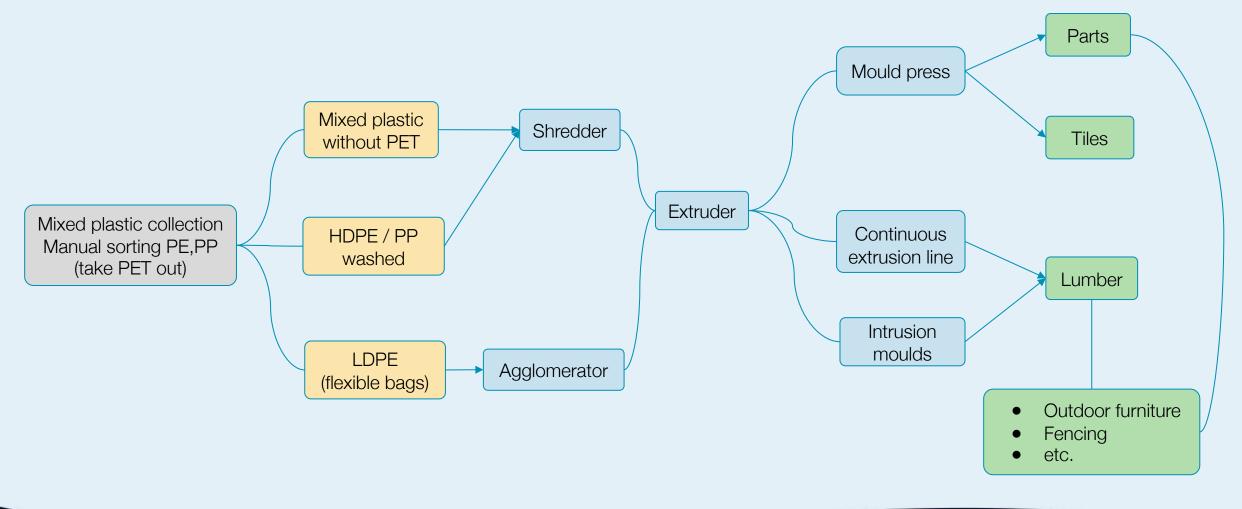




Extrusion based

RECYCLING PROCESS





Machinery

Machines	USD 49.000	
Shredder, 5 kW	USD 5.000	
Optional: shredder with washer		At a capacity of 250 kg/h 80kW is needed and will cost around 30.000 USD
Agglomerator	USD 5.000	
Extruder, 35 kW	USD 15.000	Spare parts like heating element and screw removal tool included
Intrusion moulds, on cart system	USD 10.000	
Press, 3 kW	USD 7.000	
Two moulds	USD 7.500	Mould costs are estimated because they depend on product design, and related production method (mill/laser/waterjet)
Optional: For 220V3P or 440V3P there will be extra costs (estimate) USD 2.00		Standard voltage of the machines is 380V, 50 or 60Hz.
Shipping (CIF) estimate	USD 14.000	Shipping cost are hard to predict due to fluctuations from china. Shipping costs of moulds not included; depends on local or remote production
Support at distance by Technical partner (3 years)	USD 10.000	
Detailed machine specification		
Support RFQ process		
Verification Factory acceptance test (FAT)		
Mould drawings		
Remote support for setting up facilities incl. unpacking and installing equipment		
Remote training and support machines start up		
Provide manuals, maintenance and user instructions		
Support on input mix and additives		
Total	USD 73.500	







Modular production hall layout example

Selection factors

TECHNIQUE AND PRODUCT



Impact

- (semi-) Industrial set-up and machinery to
 - Convert enough plastic to keep from landfill and (ocean) leakage
 - Get quality output that can compete with existing products
 - Create durable business
 - Create local employment



Flexibility

- Create different (mix of) semi-finished and end-products
- Create output material for different markets
- Enable sector-specific contribution to reduce waste
- Enable to convert different plastics







Viability

- Durable business plan / calculation
- Fitting the volumes on the island
- Ready for investors to step in
- Scalable: capacity aim is 150 tonnes / year

Complementarity to existing initiatives

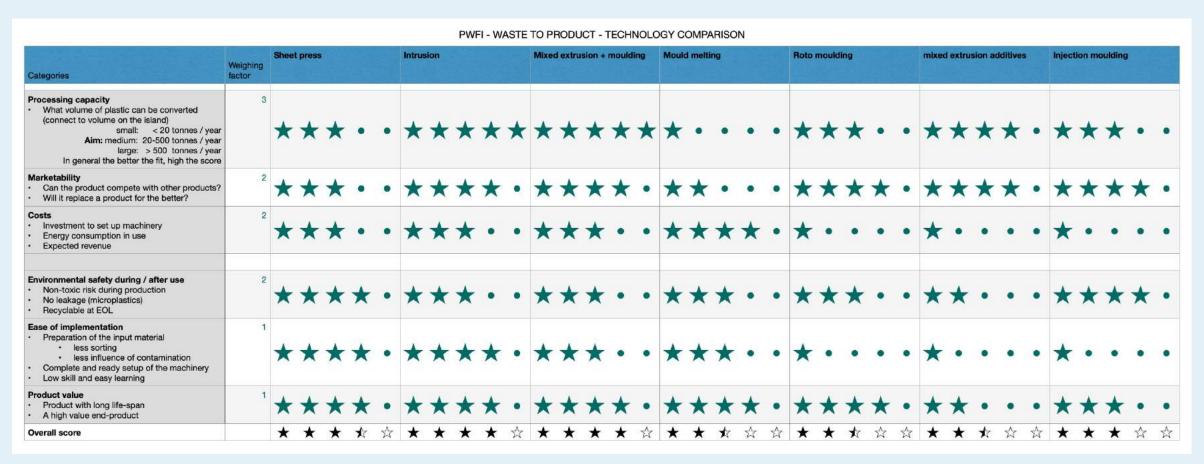


- Utilizing local recycler's machinery, if compatible
- Tailor-made for local situation and market

Technology comparison



MATRIX



This is a general comparison example used for the technology selection - Island specific factors are of influence for the end choice

Market Analysis

HOSPITALITY



Primary market

• Tourism - Hospitality Outdoor furniture and Construction, i.e. dinner chairs, fencing, plastic lumber

Secondary markets

- B2C: High-end consumer design furniture has similar product characteristics and demands (overlap villas and apartments)
- B2B: semi-finished products, i.e. Timber, lumber, Sheets for furniture makers. i.e. countertop
- Public: governmental, school furniture
- Public works, Infrastructure + construction: governmental, public furniture,
 e.g. park bench, picnic table, signage, fencing

Market size hospitality furniture

±130 hotels, resort, with over 3000 apartments and rooms

Estimated annual expenditure on furniture

 USD 210,000 (3,000 rooms and accommodations with a average spending of \$70/year/room on outdoor furniture)

Global expected CAGR (Compound Annual Growth Rate) tourism after Covid-pandemic

• 3.1% (2021-2026)

Longer term market fundamentals

- Shorter supply chains decrease need for imports
- Less pressure on landfill

Demand-drivers

- Showing green/sustainable focus
- durable products
- Locally produced

Market Analysis

HOSPITALITY



Locations of potential customers

Mostly coastal area

Specify domestic vs export markets

- Domestic: Local distribution network (stores, DIY markets, furniture makers)
- Export potential:
 - Caribbean region with the option of expending for processing waste locally

Launching customers:

- Accommodations who collect material themselves
- Governmental bodies

Market needs

- Durable furniture
- Easy to maintain / high quality
- Indoors and outdoors application
- Sustainable/green
- High end design

Buying patterns

current yearly renew due to poor quality and extreme weather conditions (market research)









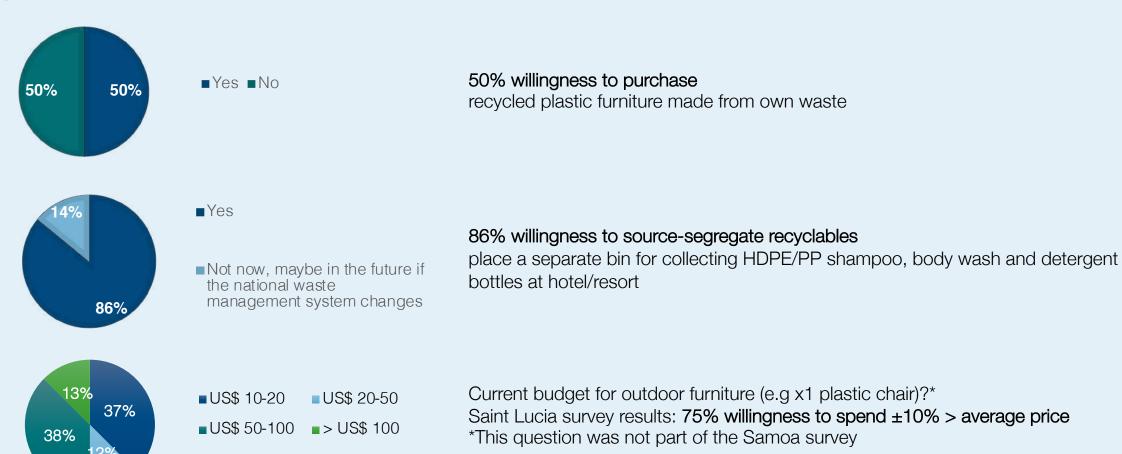


Business drivers





HOSPITALITY



Business drivers

INDUSTRY SUPPORT - INNOVATION AWARDS

rHDPE dining chair made from Caribbean plastic waste streams: shortlisted for the prestigious **Plastics Recycling Awards Europe 2021**

- Household and Leisure products category









Market introduction plan





FROM FUNCTIONAL PROTOTYPE TO MARKET INTRODUCTION

Timeline for key milestones of product development

PHASE 1- has been completed

- Extrusion testing
- Feedstock preparations
- Product interest inventory
- Design concept for products
- Engineering
- Prototyping
 - assembly testing
 - impression and use testing
- Improving based on feedback

PHASE 2

• Securing finances; procurement of machinery; staff recruitment

PHASE 3

- Production testing
- Production procedures development
- Packaging development
- Commercial production based on staged approach

Engagement & Sales

- Sales approach
 - Personal sales contact
 - Online order and service website
- Sales channels
 - Sales person
 - Web shop
 - Furniture Stores
 - DIY stores
 - Workshop showroom/store
- Engagement (communication with target groups)
 - Sales person
 - Website
 - Showroom
 - Exhibition

Operations

KEY RESOURCES, ACTIVITIES, PEOPLE



- Shredder
- Optional agglomerator if collection is expanded for flexibles processing
- Extruder
- Intrusion moulds
- Press + press moulds
- CNC mill
- Woodworking tools
- Pick up truck

Space & Permits

- 20 sqm stock
- 50 sqm production
- 20 sgm wood workshop

Key Tasks /activities

- Feedstock preparation
 - Collection
 - Washing
 - Shredding / agglomeration
- Production
 - Extrusion + intrusion + press moulding
 - Machine maintenance
- End product making
 - Cutting
 - Edge routing
 - CNC milling
 - Finishing
 - Packing
 - Servicing and repairs
- Sales and Distribution
 - Sales contact
 - Transportation: pick up and delivery





People

- Personnel: 7.5 up to 10 FTE
 - Sales person
 - Technician
 - Admin + online
 - Collection & Distribution Transport
- Collaborators
 - Retailers, stores
 - Tourism sector
 - Government
 - IUCN/Searious Business

Running costs

- Space rent
- Electricity, water
- Staff costs
- Transport

Financials

SUMMARY AND SALES OVERVIEW



Summary				
Strating capital	179,649.43			
Months to Pay Back Investment	30			
Full Time Employees Needed	7.5			
Revenue Earned Per Month	29,545.00			
Fixed Costs Per Month	1,560.00			
Material Costs Per Month	17,639.83			
Total Wages Paid Per Month	4,112.60			
Total Profit Earned Per Month	6,232.57			

Sales Overview							
Products & Services	Selling Price Per Unit	Number of Expected Sales Per Month	Total Product Cost	Profit Margin			
50 kgs of Medium Shredded Plastic	0.00	166.7	10.61	-100.00%			
mixed Beam 2800 x 40 x 80 mm	15.50	300.0	14.02	10.52%			
mixed Plank 2800 x 28 x 130 mm	17.50	180.0	15.69	11.55%			
Pavement tile	10.00	460.0	9.00	11.11%			
wide HDPE plank 2800 x 18 x 130 mm	13.50	180.0	12.02	12.29%			
narrow HDPE plank 2800 x 18 x 65 mm	9.00	90.0	7.94	13.35%			
Bench parts	0.00	12.0	33.48	-100.00%			
Park bench	160.00	12.0	88.56	80.67%			
Trash nest	230.00	30.0	126.98	81.13%			
Lounge chair	48.00	30.0	26.13	83.71%			
Side table / foot bench	31.00	15.0	17.01	82.27%			
Dining chair	36.00	60.0	19.70	82.78%			
Dining table	68.00	15.0	37.52	81.24%			

Financials







CASH FLOW

Cash Flow

A cash flow analysis shows that you have enough money throughout your first year to buy materials. pay your employees. or make an investment into a new machine.

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Money In Bank (Beginning of Month)	179,649.43	30,768.25	38,224.07	45,679.89	53,135.71	60,591.53	68,047.35	75,503.17	82,958.99	90,414.81	97,870.63	105,326.45
Initial Investment	179,649.43											
Revenue	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00
Total Cash In	209,194.43	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00	29,545.00
Investment Costs	(156,337.00)											
Variable Costs	(20,529.18)	(20,529.18)	(20,529.18)	(20,529.18)	(20,529.18)	(20,529.18)	(20,529.18)	(20,529.18)	(20,529.18)	(20,529.18)	(20,529.18)	(20,529.18)
Fixed Costs	(1,560.00)	(1,560.00)	(1,560.00)	(1,560.00)	(1,560.00)	(1,560.00)	(1,560.00)	(1,560.00)	(1,560.00)	(1,560.00)	(1,560.00)	(1,560.00)
Total Cash Out	(178,426.18)	(22,089.18)	(22,089.18)	(22,089.18)	(22,089.18)	(22,089.18)	(22,089.18)	(22,089.18)	(22,089.18)	(22,089.18)	(22,089.18)	(22,089.18)
Net Cashflow	30,768.25	7,455.82	7,455.82	7,455.82	7,455.82	7,455.82	7,455.82	7,455.82	7,455.82	7,455.82	7,455.82	7,455.82
Money In Bank (End of Month)	30,768.25	38,224.07	45,679.89	53,135.71	60,591.53	68,047.35	75,503.17	82,958.99	90,414.81	97,870.63	105,326.45	112,782.27

FINANCIALS

PROFIT. LOSS





Profit and Loss

This table is to show how much money the company is projected to make each year. It assumes that you paid yourself for the hours you worked. so the "Net Income" at the bottom is the remaining profit made by your company. It is greatly influenced by the "Monthly Sales Improvement Rate" on the Dashboard page. This table is also useful to show your bank or include in grant applications.

	Year 1	Year 2	Year 3
Revenue	354,540.00	389,994.00	428,993.40
Cost of Sales	246,350.15	270,985.17	298,083.68
Net Revenue	108,189.85	119,008.83	130,909.72
Fixed Costs	18,720.00	18,720.00	18,720.00
Gross Income from Operations	89,469.85	100,288.83	112,189.72
Business Taxes	24,156.86	27,077.99	30,291.22
Net Income	65,312.99	73,210.85	81,898.49

Yearly Growth Rate

10%

(conservative scenario)

Business Tax Rate

27.00%

Financials

FUNDING & ROI

Starting capital: US \$ 179,000 ROI 30 months

Mostly machines and personnel



PAYBACK ANALYSIS



Financials

FUNDING PLAN

- Private money
- (Development) Bank loans: de-risking partner, e.g. offering loan guarantees) Incl. ADB, IFC, CEB
- Investors/business accelerators ((pre)-seed, angel investment, early stage)
 - Blue Bio Value
 - Blue Natural Capital Finance Facility
 - Ennovent
 - For Good Venture
 - SAGANA
 - Sky ocean ventures
- (Governmental) grants
 - Development Cooperation partners, incl. UK, Norway, Italy, US, Germany, Swiss, France, China, Japan,
 - UNDP Innovation Fund
 - World Bank ProBlue. NGOs could become a third party within a governmental program
 - IUCN
 - WWF





- Alliance to End Plastic Waste
- Ocean Foundation
- Plastic Solutions Fund
- Bill & Melinda Gates Foundation
- Minderoo, no 'Plastic Waste'-programme
- Australian National Product Stewardship fund
- Commonwealth Clean Ocean Alliance
- Dow Business Impact Fund
- Handelens Miljofond
- Plastics Solutions Fund
- Gallifrey foundation
- Oak Foundation
- PRIMAT (Didier and Martine Primat Foundation)
- The Fondation SUEZ
- Waitt Foundation
- For Good Foundation
- Onepercentfortheplanet

Factsheet

Norad (iuch



BENEFITS

Financial benefits	Environmental benefits	Social benefits
ROI – 30 months	Lower landfill pressure for government: 150 tonnes / year or 12% of HDPE/PP/LDPE waste diverted from landfill/dumping sites	Develop recycling market - Create more jobs in island in collection, sorting, cleaning, recycling – 10 FTE when converting 6% of all plastic waste generated
Better license to operate for construction and furniture market. And allows for green/circular public procurement	Approx. 164.7 tonnes of CO2 emissions saved by redirecting plastic waste into products	Contribution to cleaner island and attractiveness for local population and visitors
Customer loyalty for producers	Reduced amount of plastic waste that might leak into the environment. 150 tonnes / year diverted from potential leakage	
Lower waste disposal and clean-up costs for government: Approx. savings WST 24,832		

Plastic Waste Free Islands Let's catch the circular wave together









IUCN Plastics



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



#ClosethePlasticTap



SeariousBusiness



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https://www.seariousbusiness.com/islands

#

#PlasticWasteFreeIslands #CloseThePlasticTap

Plastic Waste Free Islands

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