Objective 1

Identify the most promising product options for the veneer from coconut stems

Objective 1.2 – Value-chain proposal

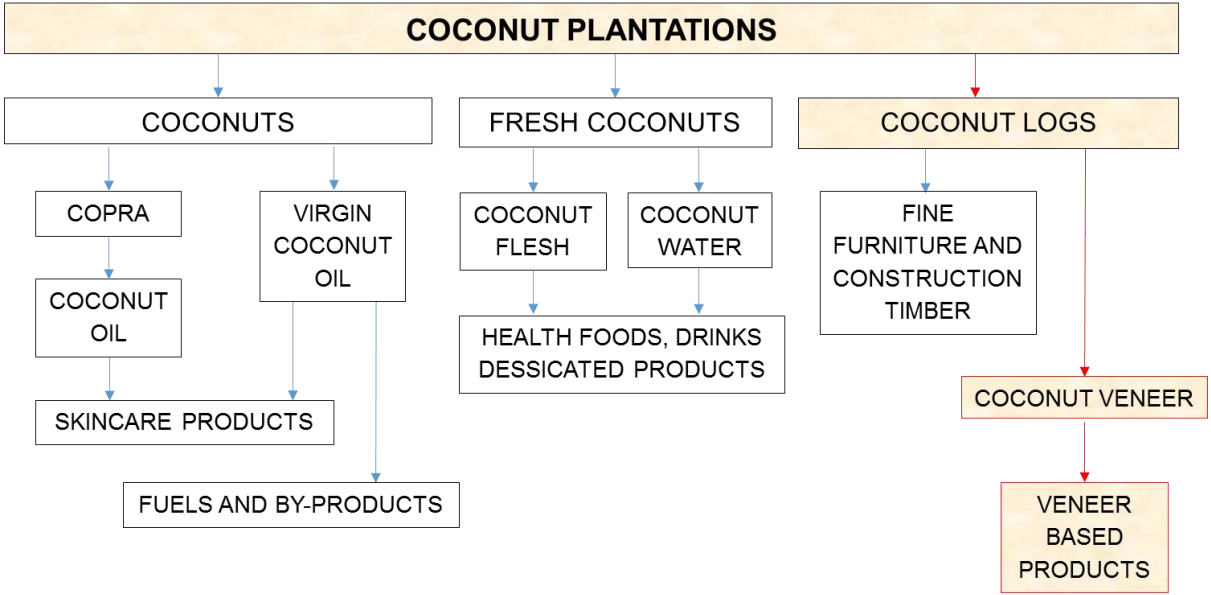
Objective 1 – Identify the most promising product options for the veneer from coconut stem

1.1 – Market assessment and product development

1.2 – Coconut Veneer Value-chain Proposal

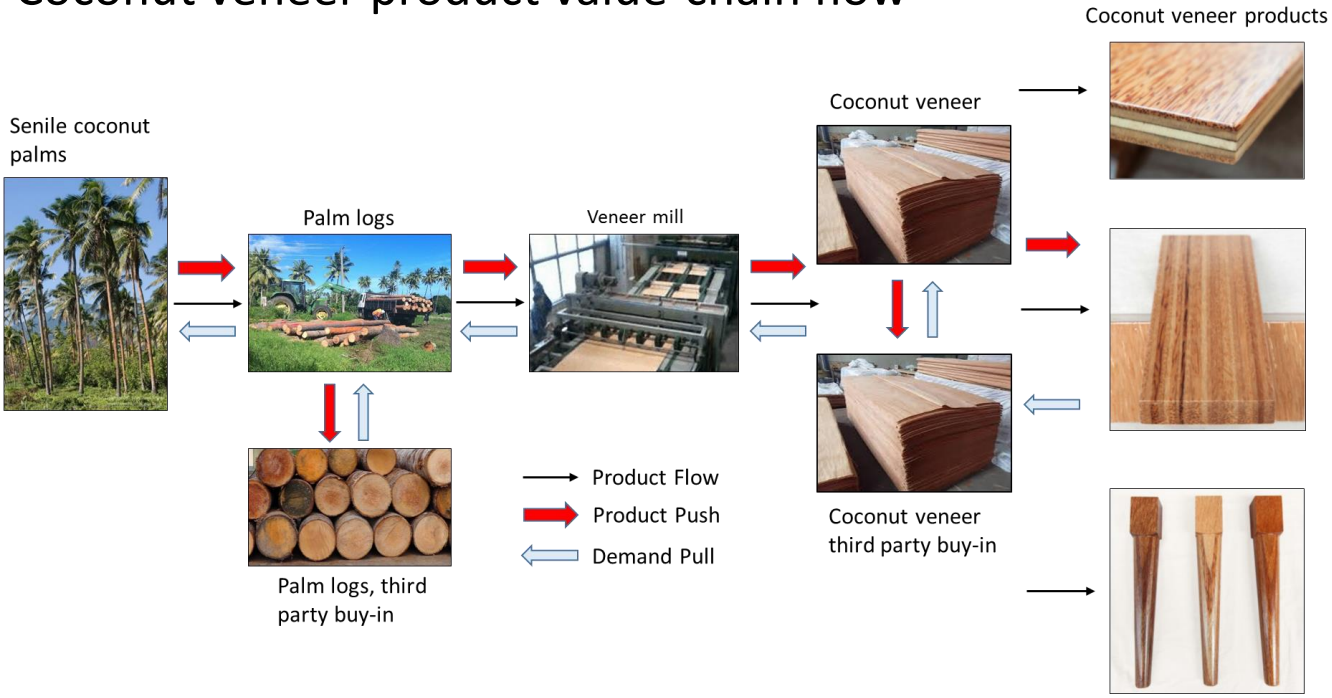
1.3 – Stakeholder engagement

Objective 1.2 Value-chain proposal



Objective 1.2 Value-chain proposal

Coconut veneer product value-chain flow



Objective 1.2 Value-chain proposal

Potential products in the value-chain

Coconut veneer face on plywood

Coconut veneer
multi-laminar section

Coconut veneer
multi-laminar parts

Product development and photographs:
Queensland Department of Agriculture
and Fisheries

Objective 1.2 – Value-chain proposal

Reasons for this value-chain proposal:

- Key product development findings in this project
- Availability of technology for production
- Large resources and available labour

Objective 1.2 Value chain proposal

Value proposition = Value-chain growth

Objective 1.2 Value chain proposal

A value proposition assessment for a coconut veneer product industry will:

- Define potential operation models
- Estimate the costs and returns
- Evaluate the potential market rates of return
- Consider potential price changes

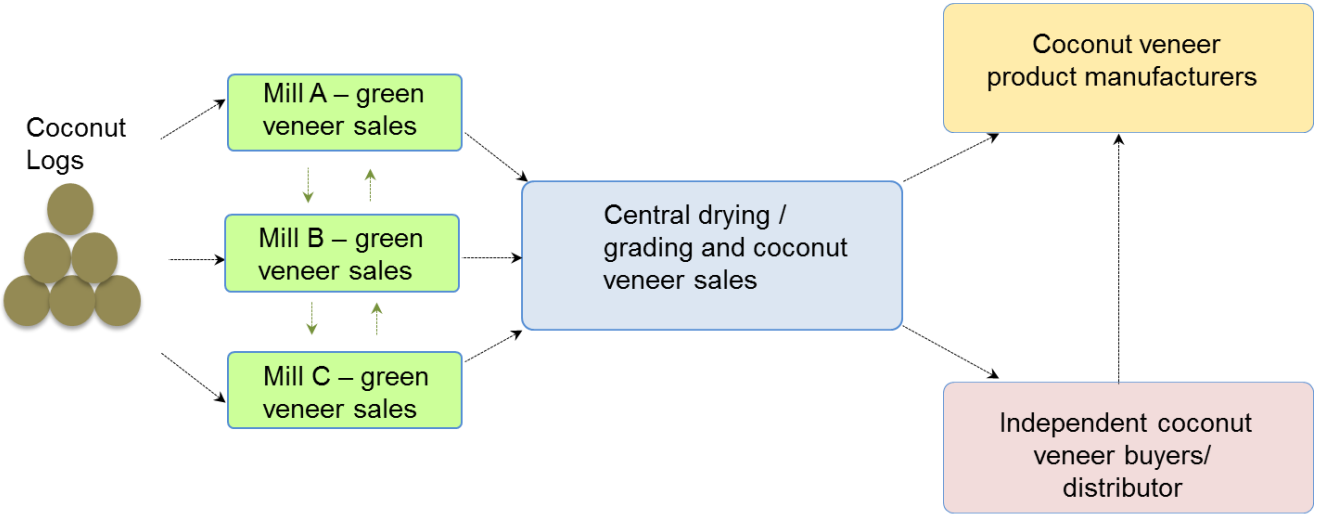
Objective 1.2 Value chain proposal

- Define potential operation models

Operation Options
Option 1. A low cost Spindleless lathe and green veneer processing line installed at an existing sawmill operating on a single day-shift.
Option 2. One 8-foot (2.4 m) and one 4-foot (1.2 m) high-grade Spindleless green veneer processing line installed at an existing sawmill and operating on two day-shifts.
Option 3. Independent veneer drying and grading facility. At an existing peeler mill, with a new continuous veneer dryer and upgraded heat plant operating one day shift.
Option 4. An extra shift at an existing peeler mill. Costs have been included for staff night shift loadings and upgrading of the heat plant and buildings for the additional production output.
Option 5. Included mainly for the Solomon Island and Samoa. A new integrated mill with an 8-foot (2.4 m) and a 4-foot (1.2 m) high-grade Spindleless lathe RPV line, a new heat plant and a continuous veneer dryer. Operating two shifts for peeling and one shift for drying.

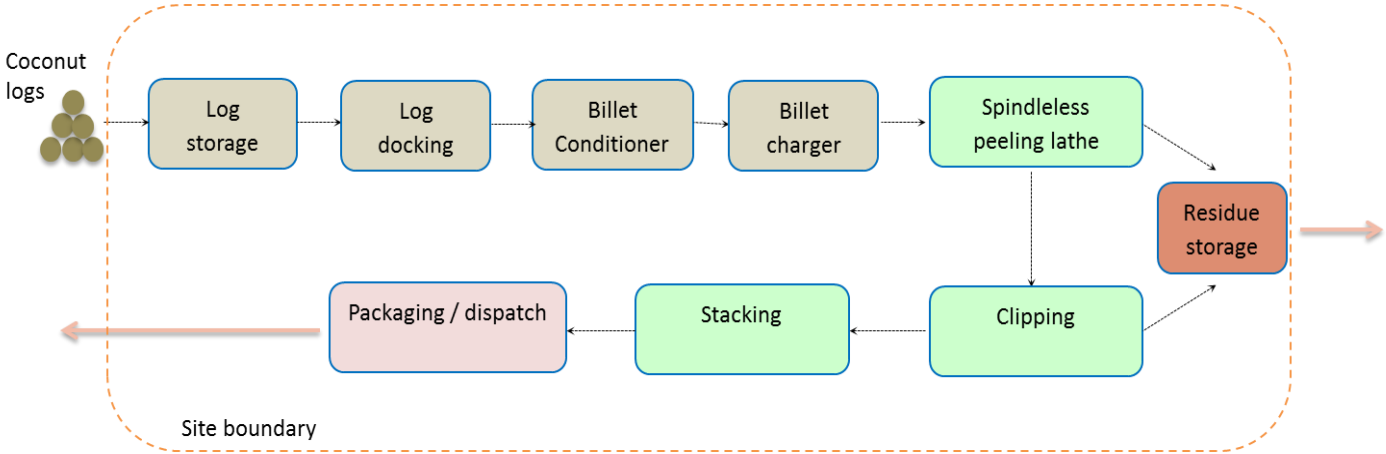
Objective 1.2 Value-chain proposal

Options 1 & 2. Green coconut veneer peeling operations
Option 3. Central coconut veneer drying grading operation



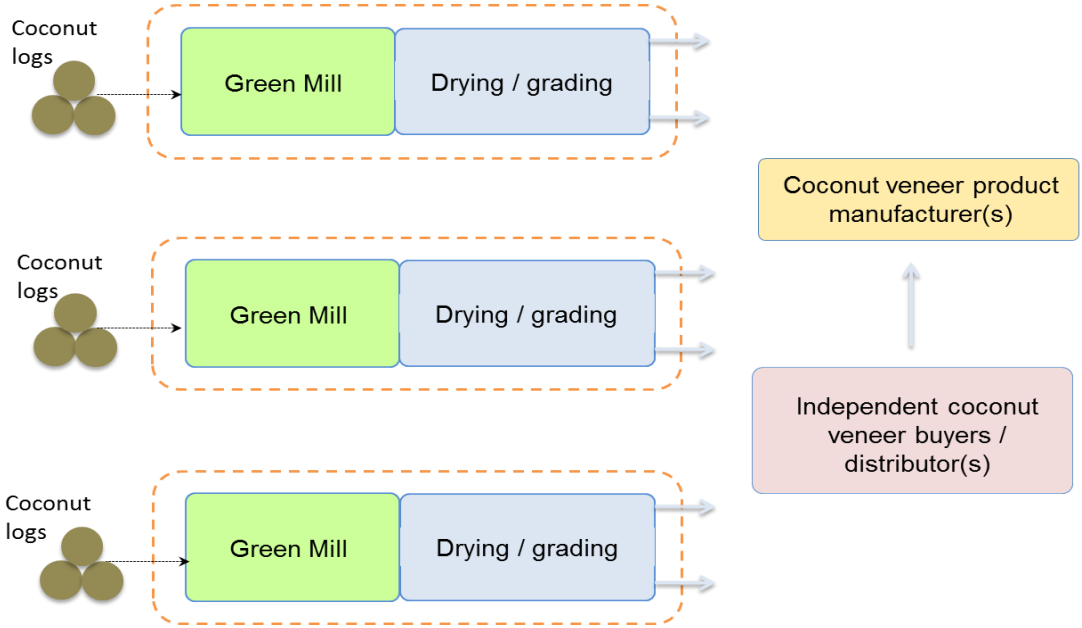
Objective 1.2 Value-chain proposal

Options 1 & 2. Green coconut veneer peeling mills



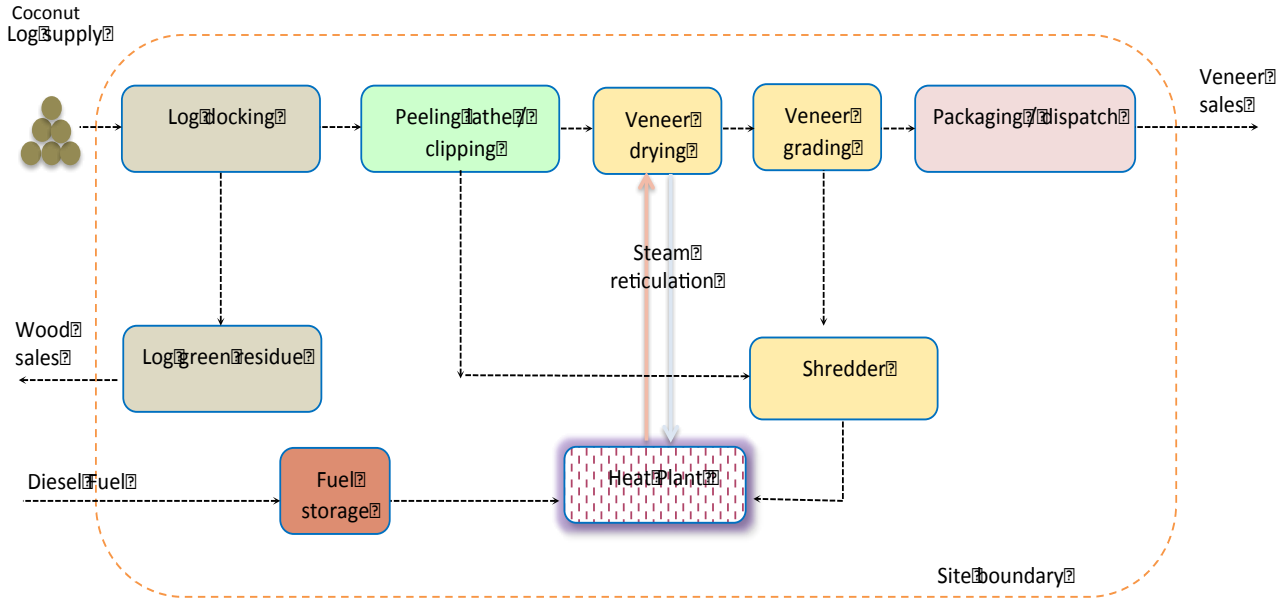
Objective 1.2 Value-chain proposal

Options 5 & 6. Larger-scale coconut veneer integrated operations



Objective 1.2 Value-chain proposal

Options 5 & 6. Larger-scale Integrated coconut veneer peeling mill



Objective 1.2 Value-chain proposal

- Estimate the costs and returns

CAPITAL COSTS, LOWER COST OPTION RPV LINE SAUD		
Log docking station	$	50,000
Billet transporter	$	10,000
Log deck/peeler charger	$	38,000
Log LPG heating preconditioning unit	$	50,000
Waste conveyors	$	12,000
RPV spindleless lathe	$	54,000
Veneer conveyor	$	20,000
Clipper	$	10,000
Stacker	$	6,000
Site preparation	$	25,000
Upgrade to Australian Codes	$	9,000
Line installation and establishment	$	25,000

CAPITAL COSTS, HIGH-GRADE PEELING LINE $AUD		
Buildings & site infrastructure	$	45,000
Log docking station	$	100,000
Billet transporter	$	40,000
8' (2.4 m) Peeler. Round-up + RPV	$	858,000
4' (1.2 m) Peeler. Round-up + RPV	$	612,500
Waste conveyors	$	36,000
Site preparation	$	15,000
Installation and establishment	$	125,000
Knife grinder	$	90,000
Installation and establishment	$	75,000

CAPITAL COSTS, DRYER and GRADING OPERATION $AUD		
Delivered waste fuel hopper	$	150,000
Wood Shredder	$	330,000
New biofuel heat plant and boiler	$	8,250,000
Second hand biofuel heat plant and boiler	$	4,100,000
Boiler/Heat Plant refurbishment for a new dryer	$	1,000,000
Boiler/Heat Plant refurbishment -existing plant	$	500,000
4-deck Jet-Box continuous Drying System	$	6,000,000
2-deck Jet-Box continuous Drying System	$	4,500,000
Wood shredder conveyors	$	180,000
Installation and establishment	$	210,000
Wrapping unit	$	20,000
Control room upgrade for new dryer	$	50,000
Racking/Storage	$	150,000
Sales and admin facility upgrade	$	45,000

WEEKLY LEASE COSTS $AUD		
Front end loader - large	$	3,500
Front end loader - small	$	1,800
Forklift	$	250

STAFFING cost p.a. $AUD		
Loader operator	$	5,667
Forklift operator	$	4,133
Shredder operator	$	4,133
Peeler lathe operator	$	5,667
Dryer operator	$	4,133
Log docking	$	5,667
Clipping/stacking, trainee line assistants	$	4,133
Wrapping/Stores/Despatch	$	4,133
Supervisor/leading hands	$	6,333
Maintenance Staff		
Sales, Admin & Acc		
General Manager		

SALARY LOADING
Employer on costs
Employer night shif
Salary adjustment f

OPERATING COSTS
Log resource per m
Packaging per m^3 g
Fiji Electricity Tariff
Solomons and Samo
Av. Rates Premises
Consumables per m
Wrapping/Packagin
LPG Fuel Av. per Lt
Freight to wharf per
Wood residual for b

GENERAL EXPENSE		
Auditing and Legal per m^3 veneer	$	0.3
Insurance per m^3 veneer	$	3.0
Water Rates per m^3 veneer	$	0.5
Office Equipment per m^3 veneer	$	0.1
Phone/Communications per m^3 veneer	$	0.1
Training start-up per m^3 veneer	$	1.0
Training ongoing per m^3 veneer	$	0.2

CAPITAL COSTS, LOWER COST OPTION RPV LINE SAUD		
Log docking station	$	50,000
Billet transporter	$	10,000
Log deck/peeler charger	$	38,000
Log LPG heating preconditioning unit	$	50,000
Waste conveyors	$	12,000
RPV spindleless lathe	$	54,000
Veneer conveyor	$	20,000
Clipper	$	10,000
Stacker	$	6,000
Site preparation	$	25,000
Upgrade to Australian Codes	$	9,000
Line installation and establishment	$	25,000

Objective 1.2 Value-chain proposal

- Estimate the costs and returns

CAPITAL COSTS, LOWER COST OPTION RPV LINE $AUD		
Log docking station	$	50,000
Billet transporter	$	10,000
Log deck/peeler charger	$	38,000
Log LPG heating preconditioning unit	$	50,000
Waste conveyors	$	12,000
RPV spindleless lathe	$	54,000
Veneer conveyor	$	20,000
Clipper	$	10,000
Stacker	$	6,000
Site preparation	$	25,000
Upgrade to Australian Codes	$	9,000
Line installation and establishment	$	25,000

CAPITAL COSTS, HIGH-GRADE PEELING LINE $AUD		
Buildings & site infrastructure	$	45,000
Log docking station	$	100,000
Billet transporter	$	40,000
8' (2.4 m) Peeler. Round-up + RPV	$	858,000
4' (1.2 m) Peeler. Round-up + RPV	$	612,500
Waste conveyors	$	36,000
Site preparation	$	15,000
Installation and establishment	$	125,000
Knife grinder	$	90,000
Installation and establishment	$	75,000

CAPITAL COSTS, DRYER and GRADING OPERATION $AUD		
Delivered waste fuel hopper	$	150,000
Wood Shredder	$	330,000
New biofuel heat plant and boiler	$	8,250,000
Second hand biofuel heat plant and boiler	$	4,100,000
Boiler/Heat Plant refurbishment for a new dryer	$	1,000,000
Boiler/Heat Plant refurbishment -existing plant	$	500,000
4-deck Jet-Box continuous Drying System	$	6,000,000
2-deck Jet-Box continuous Drying System	$	4,500,000
Wood shredder conveyors	$	180,000
Installation and establishment	$	210,000
Wrapping unit	$	20,000
Control room upgrade for new dryer	$	50,000
Racking/Storage	$	150,000
Sales and admin facility upgrade	$	45,000

WEEKLY LEASE COSTS $AUD		
Front end loader - large	$	3,500
Front end loader - small	$	1,800
Forklift	$	250

STAFFING cost p.a. $AUD		
Loader operato	$	5,667
Forklift opera		
Shredder ope		
Peeler lathe		
Dryer operato		
Log docking		
Clipping/stac		
Wrapping/Sto		
Supervisor/le		
Maintenance		
Sales, Admin		
General Mana		

SALARY LOA		
Employer on		
Employer nig		
Salary adjustr		

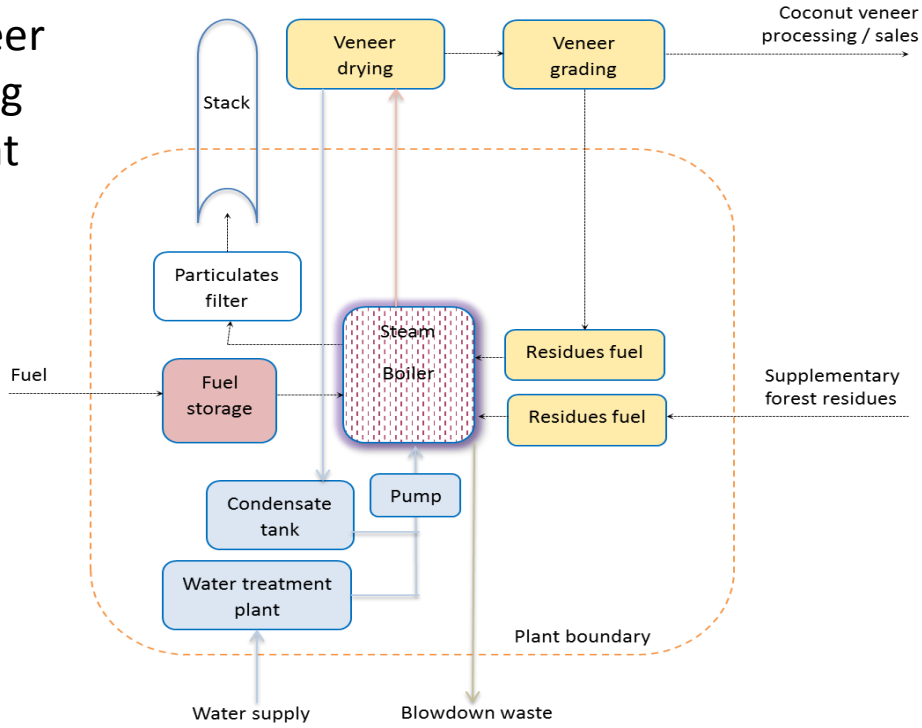
OPERATING		
Log resource		
Packaging pe		
Fiji Electricity		
Solomons and		
Av. Rates Pre		
Consumables		
Wrapping/Pa		
LPG Fuel Av.		
Freight to wharf per m^3 veneer	$	12.0
Wood residual for biofuel delivery /tonne	$	12.5

GENERAL EXPENSES p.a.		
Auditing and Legal per m^3 veneer	$	0.5
Insurance per m^3 veneer	$	3.0
Water Rates per m^3 veneer	$	0.5
Office Equipment per m^3 veneer	$	0.1
Phone/Communications per m^3 veneer	$	0.1
Training start-up per m^3 veneer	$	1.0
Training ongoing per m^3 veneer	$	0.2

CAPITAL COSTS, DRYER and GRADING OPERATION $AUD		
Delivered waste fuel hopper	$	150,000
Wood Shredder	$	330,000
New biofuel heat plant and boiler	$	8,250,000
Second hand biofuel heat plant and boiler	$	4,100,000
Boiler/Heat Plant refurbishment for a new dryer	$	1,000,000
Boiler/Heat Plant refurbishment -existing plant	$	500,000
4-deck Jet-Box continuous Drying System	$	6,000,000
2-deck Jet-Box continuous Drying System	$	4,500,000
Wood shredder conveyors	$	180,000
Installation and establishment	$	210,000
Wrapping unit	$	20,000
Control room upgrade for new dryer	$	50,000
Racking/Storage	$	150,000
Sales and admin facility upgrade	$	45,000

Objective 1.2 Value-chain proposal

Coconut veneer drying/grading and heat plant



Objective 1.2 Value-chain proposal

- Evaluate the potential market rates of return

				YEAR	0	1	2	3	4	5	6		20
EXPENSES													
CAPITAL COSTS					1475000								
WORKING CAPITAL FOR START-UP					1787221								
OPERATING COSTS						6957916	6957916	6957916	6957916	6957916	6957916		6957916
VEHICLE LEASES						39000	39000	39000	39000	39000	39000		39000
GENERAL EXPENSES						20300	20300	20300	20300	20300	20300		20300
STAFFING						130667	130667	130667	130667	130667	130667		130667
TRAINING AND DEVELOPMENT					2500	1000	1000	1000	1000	1000	1000		1000
SUB-TOTAL EXPENSES (Incs. Inflation p.a. @ 2.5%)				1.025	3264721	7148882	7327604	7510794	7698564	7891028	8088304		11428562
DEPRECIATION (10% straight-line)					0	147500	147500	147500	147500	147500	147500		0
			TOTAL EXPENSES		3264721	7296382	7475104	7658294	7846064	8038528	8235804		11428562
DRY VENEER REVENUE													
	$/m3	m3 p.a.											
SUB-TOTAL REVENUE $	**291**	**28000**			0	8148000	8351700	8560493	8774505	8993867	9218714		13025802
(Incs. Price Increase p.a. @ 2.5%)				1.025									
			EBIT		-3264721	851618	876596	902198	928441	955339	982910		1597240
			NET CASH FLOW		-3264721	999118	1024096	1049698	1075941	1102839	1130410		1597240
		CUMULATIVE CASH FLOW			-3264721	-2265603	-1241507	-191809	884131	1986970	3117380		22257400
DISCOUNT RATE	5%		**NPV 5%**							**$633,158**			**$10,879,735**
DISCOUNT RATE	10%		**NPV 10%**							**$139,099**			**$5,905,792**
INTERNAL RATE OF RETURN			**IRR**							**12%**			**29%**
PAYBACK PERIOD			**PAYBACK YEAR**	**5.0**									

Objective 1.2 Value chain analysis

- Evaluate the potential market rates of return

REVENUE	VOLUME		YEAR	0	1	2	3	4	5
$/m3	m3 p.a.								
291	28000			0	8148000	8351700	8560493	8774505	8993867
		EBIT		-3264721	851618	876596	902198	928441	955339
		NET CASH FLOW		-3264721	999118	1024096	1049698	1075941	1102839
	CUMULATIVE CASH FLOW			-3264721	-2265603	-1241507	-191809	884131	1986970
		NPV 5%							**$633,158**
		NPV 10%							**$139,099**
		IRR							**12%**
		PAYBACK YEAR	**5.0**						

Objective 1.2 Value-chain proposal

- Evaluate the potential market rates of return

Model Option	Variable	Base Cost Year-5 IRR 12%, Year-10 IRR 25%
Option 1	Log volume processed	15000 m^3
	Green veneer product price $/$m^3$	**$174.50**
Option 2	Log volume processed	50000 m^3
	Green veneer product price $/$m^3$	**$176.50**
Option 3	Green veneer volume processed	35000 m^3
	Dry veneer product price $/$m^3$	**$355.00**
Option 4	Green veneer volume processed	35000 m^3
	Dry veneer product price $/$m^3$	**$291.00**
Option 5	Log volume processed	50000 m^3
	Dry veneer product price $/$m^3$	**$396.00**

Objective 1.2 Value-chain proposal

- Consider potential price changes – Sensitivity Analyses

Model Option	Variable	Base Cost Year-5 IRR 12%, Year-10 IRR 25%	Negative Cost change	New 5-Year IRR	New 10-Year IRR	Positive Cost change	New 5-Year IRR	New 10-Year IRR
Option 1. A single low cost spindleless RPV line installed at an existing sawmill operating a single day shift. Processing 15,000 m^3 logs p.a. for green veneer.	Log volume processed /m^3	15,000	-10%	3%	18%	+10%	20%	32%
	Log cost $/$m^3$	$60.00	+5%	0%	16%	-5%	23%	34%
	Operating cost p.a.	$1,098,753	+5%	-3%	15%	-5%	25%	36%
	Staffing labour cost p.a.	$60,320	+5%	11%	25%	+3%	11%	25%

Variable	Base Cost Year-5 IRR 12%, Year-10 IRR 25%	Negative Cost change	New 5-Year IRR	New 10-Year IRR	Positive Cost change	New 5-Year IRR	New 10-Year IRR
Log volume processed /m^3	15,000	-10%	3%	18%	+10%	20%	32%
Log cost $/$m^3$	$60.00	+5%	0%	16%	-5%	23%	34%
Operating cost p.a.	$1,098,753	+5%	-3%	15%	-5%	25%	36%
Staffing labour cost p.a.	$60,320	+5%	11%	25%	+3%	11%	25%
Green veneer product price $/$m^3$	$174.50	-5%	-7%	10%	+5%	28%	38%

Option 4. Upgrade and use of existing boiler, heat plant and veneer drying and grading facilities at an existing peeler mill operating one shift (i.e. night shift) Processing 35,000 m^3 of green- to graded dry coconut veneer.	Green veneer volume processed /m^3	35,000	-10%	7%	22%	+10%	15%	28%
	Green veneer cost $/$m^3$	$180.00	+5%	-5%	12%	-5%	26%	37%
	Operating cost p.a.	$6,957,916	+5%	-7%	11%	-5%	28%	39%
	Staffing labour cost p.a.	$137,200	+5%	11%	25%	+3%	11%	25%
	Dry veneer product price $/$m^3$	$291.00	-5%	-10%	8%	+5%	29%	39%
Option 5. A new processing plant with an 8 and 4' peeling lines installed at a greenfield site with new heat plant and drying facilities. operating on three shifts for peeling and one day shift fro drying. Processing 75,000 m^3 of logs p.a. for graded dry coconut veneer.	Log volume processed /m^3	50,000	-10%	6%	21%	+10%	17%	30%
	Log cost $/$m^3$	$38.00	+5%	11%	24%	-5%	13%	26%
	Operating cost p.a.	$3,596,204	+5%	10%	24%	-5%	13%	27%
	Staffing labour cost p.a.	$158,336	+5%	12%	25%	+3%	11%	25%
	Dry veneer product price $/$m^3$	$396.00	-5%	8%	22%	+5%	16%	29%

Objective 1.2 Value-chain proposal

Objective 1.1 – Market assessment and product development

Eco-Core®

BRIGGS VENEERS

Natural Timber Veneer from around the world

Advanced veneer and other product from coconut wood

Objective 1.2 Value-chain proposal

Objective 1.1 – Market assessment and product development

Briggs Veneers –
'impressed with the darker coloured veneer'

Eco-core –
'at least \$6 AUD /m^2 sheet'

<u>\$8 AUD /m^2 3 mm sheet = \$2,640 /m^3</u>

Objective 1.2 Value-chain proposal

Costs vs. potential market rate of return

Model Option	Variable	Base Cost Year-5 IRR 12%, Year-10 IRR 25%	
Option 1	Green veneer product price $/m^3	**$174.50**	
Option 2	Green veneer product price $/m^3	**$176.50**	
Option 3	Dry veneer product price $/m^3	**$355.00**	
Option 4	Dry veneer product price $/m^3	**$291.00**	→ **$2,640 /m^3**
Option 5	Dry veneer product price $/m^3	**$396.00**	

Value-chain proposal – Questions