ENERGY LOOP

Majority of Fiji's agriculture relies on sugarcan, root crops, bananas and livestock. Contributing to 11.73% GDP whilst relying much on the island's the limited water and energy resources.

Food/Agriculture

70%

Human consumption /Cooking

Over 90% of agriculture produce are consumed locally. Waste from cooking and food preparation accounts to approx. 30%, 70% of which goes to biogas domes, and 30% back as fertilisers.

~70%

~50%

20%

10%

Livestock feed

By-products from agriculture can be used as livestock feed to cut reliance on feed imports.

Agriculture waste

Waste and by-products from agriculture can be used again as fertilisers alongside becoming feed for biogas domes.

Fertiliser

~50%

~30%

~40%

~30%

Food waste > fertliser

As Heat & Electricity

Fiji currently relies of 90% surface water and 10% groundwater from aquifers. To keep up to demand, other ways of capturing and storing water is needed.

Water

Total usage 30k L/day

~70%

Household use

Water in households, although treated potable, all of its becomes greywater after use, and such must be treated before stored in local retention ponds.

~65%

~5%

Human consumption

Human consumption accounts for only 5-6% of total water usage.

Greywater treatment

Greywater recycling systems are put to place with bio, sand and gravel filters before feeding back into the retention ponds within the site. The water at this stage is non-potable, and needs to be further purified.

For agriculture & irrigation

Fijians consume around 60% of total energy output, whilst 40% of the is expended for agricultre and irrigation use.

Energy

Total usage ~91.7kW/day

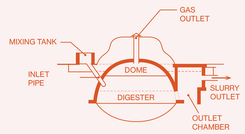
~60%

Household use

40% of Fiji relies on fossil fuels and natural gas as source of energy, and 50-60% on hydroelectric power. However, Naviti island solely relies on fossil fuels. Renewable sources must be able to replace 91.7kW of energy demand in Marou.

PROPOSED SOLUTIONS

Biogas domes



Total output for 8 modules (200L cap per drum):

240kW

Fog harvester

Collection capacity per module:

5.3-13.4 L/day

Total modules:

46x

Max total capacity:

616.4 L /day

Retention pond

Two retention ponds are fed via the natural streams from the hills behind the project site. The river intake supply ranges from 20,000-50,000 L/day.

Total capacity:

100,000 L

Wind shear modules

OUTPUT/module:

Small

500W x8

Large

1kW x7

Total output:

11kW

Photovoltaic modules

OUTPUT/module:

1.2kW

Total modules:

52x

Total output:

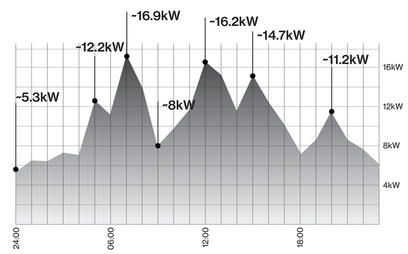
62.4kW

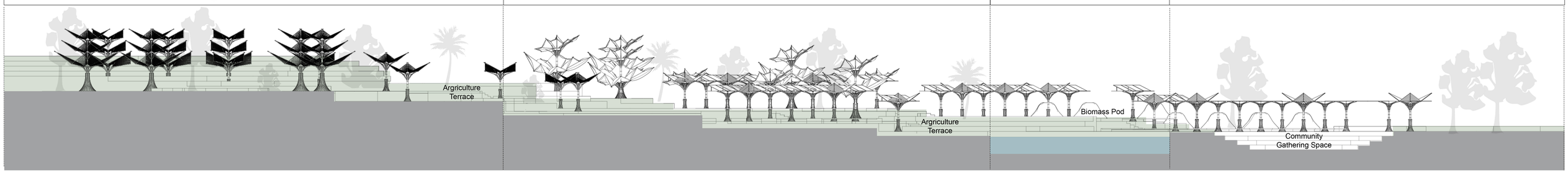
Daily-use of resources in Marou, Fiji

40-60L Bathing & Hygiene	30-50L Laundry & Cleaning	3 - 5L Drink
10-50L Gardening/Agriculture	25-40L Sanitation (Toilets etc.)	10-15L Cooking

WATER: Avg 30, 000 L/day (100-150 per person)

~30kW Irrigation	~20kW Lights	~20kW Power Tools
~15kW Home Appliances	~10kW Cooking	~5-10kW Personal Devices



~91.7 kW per day

ELECTRICITY: Aniticipated Demand