UN- HABITAT TINY HOUSE

Sustainable Living Unit in the Tropics

Meeting shelter needs through Low Carbon Pathways

This sustainable living unit in the Tropics is a prototype of an affordable house provided with all basic services including: clean energy, food production, onsite waste management, natural lighting and ventilation and many more sustainable design principles.

- Building orientation
- Daylight and opening
- Building envelope and materials
- Renewable energy
- Water conservation and efficiency
- Sanitation
- Solid waste management
- Food production
- Incremental housing unit

Cost of UN-Habitat tiny house:	
Building materials	8,000 $
Solar system	3,000 $
Vertical farming	2,000 $
Biogas system	650 $
Solar hot water system	850 $
Labour	4,000$
Total:	**18,500 USD**
Car charging facility:	3,900 USD

Features of the UN-Habitat Tiny House

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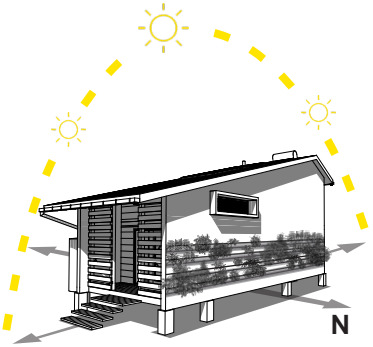
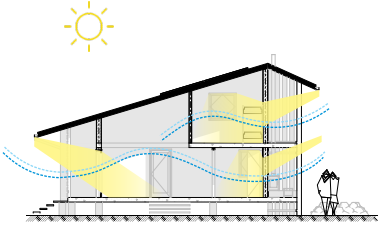
Building orientation and allocation of spaces within the house



- The long axis of the building is along East- West to minimize direct solar radiation penetration in the building and reduce heat gain;
- The veranda and the kitchen are located on the East and West facing walls to act as buffer zones against heat gain but benefitting from daylighting;
- Space is optimized to make it the most efficient use e.g. the staircase provides spaces for storage with a mobile bed.
- Beds provide additional storage spaces.
- The building occupies a total space of 56m^2 to minimize the foot print.

Daylight, opening and natural ventilation



- Window to wall ratio does not exceed 20 % and are mainly placed on North and South facades;
- Sun shading are provided from the roof overhangs;
- The vegetation wall in the north (vertical farming - aquaponic) are utilized to produce food while minimizing heat gain;
- Roof vents and openings are utilized to enhance natural ventilation and lighting.

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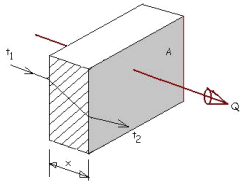
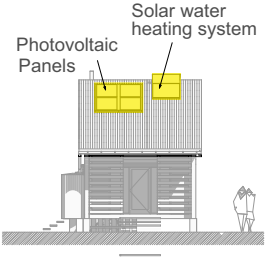
Building envelope materials



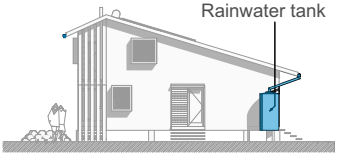
- Local available building materials are used to minimise the cost and reduce carbon footprint;
- Laminboards, used as wall, are made of recyclable and re-usable materials with low toxic emissions;
- Light colour exterior reflect solar radiation and light coloured interior finishing enhance natural lighting;
- The walls and floor are made of locally available recyclable materials

Renewable energy



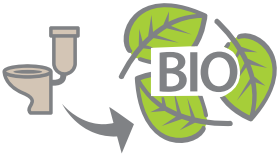
- A photovoltaic system is placed on the roof to generate clean energy (2 kilowatt);
- A solar hot water system provides hot water for the occupants
- A biogas digester provides the home with gas for cooking and natural fertilizer for farming.

Water conservation and efficiency

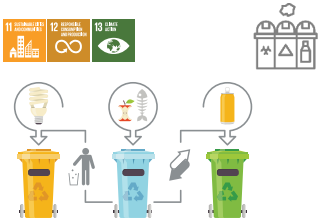


- Rainwater harvesting systems is utilized to collect and store water.
- Water efficient appliances and water-saving fixtures are included in the design

Sanitation

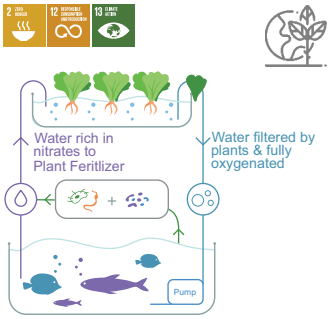


- on-site waste water treatment system is installed to produce biogas and natural fertilizer
- The toilet (WC) is connected to the biogas system.



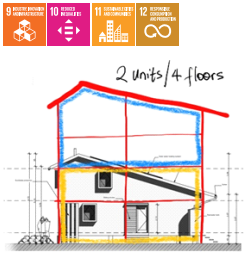
Solid waste management

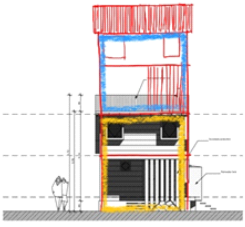
- Waste segregation bins are available in the house to promote waste separation at source



Food production

- Self-sufficient vertical aquaponics system provides fruits, vegetable and fish increase food security and a balanced diet for the family





Incremental housing unit

- "Incremental Housing" is a strategy to satisfy housing demand in rapidly urbanizing context.
- This feature is included in the UNHTH which has been designed to stand alone or configured in a modular connected layout. This will allow its inhabitants to expand their sustainable living unit according to the spatial needs and budget of the family.

Designed and executed by the Urban Energy Unit of UN-Habitat under the framework of the program "PROMOTING ENERGY EFFICIENCY IN BUILDINGS IN EAST AFRICA" with funding from the Global Environment Facilities.

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