

Case Study 1: IKEA Solar-Powered Flat Pack Shelter

From: <http://www.bettershelter.org/>



This flat pack, easy to transport shelter was developed in collaboration between the IKEA Foundation and the United Nations High Commissioner for Refugees (UNHCR). True to IKEA's expertise in flat packing and assembly, this 188-square foot emergency shelter is easy to assemble and can be built in just four hours. It is twice the size of a regulation refugee tent and can sleep five people comfortably. The shelter comes with solar-powered roofing, eliminating the need for candles or kerosene lamps, which can pose a danger of fire. Plus, the roof deflects solar heat gain by 70%, keeping the interior cool during hot weather.

PV System

Electricity is scarce in many refugee camps, making it difficult to read, cook and socialise during the hours of darkness. Better Shelter features a solar panel which is installed on the roof, and charges an LED light inside the shelter. When fully charged, this can be used for 4 hours during the night time. The light output is between 20-100 lm and the system can charge a mobile phone through a USB port in the lamp.

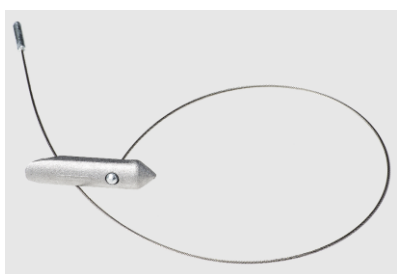
- 4 hours of light
- Ability to charge a mobile phone



Door

Lack of safety is a great concern in refugee camps. Better Shelter has a door that is lockable from the inside and the outside, which can be secured with a padlock. The door is robust and has an opening size of 0.7×1.65 m. Thanks to the shelter's modular design, the door can be placed either on the shelter's long side or on the gable wall.

- Location of the door is flexible
- Door is lockable and provides higher level of security



Ground Anchoring

Better Shelter is equipped with anchors, which keep the shelter firm and secure on the ground in windy weather.

- Secure and steady structure

Windows and Ventilation



The shelter has 4 windows and 2 ventilation openings. The windows have hatches, which can be opened for light and closed for privacy. All windows and ventilations have mosquito nets, which prevent vectors and mosquitos from coming in. The ventilations let clean air come in and ventilate out hot air. The ventilation hatches can control the level of ventilation.

- 4 windows
- 2 ventilation openings

Panels

The shelter walls and roof feature a number of polyolefin foam panels, which protect residents from elements such as the sun, wind, rain and snow. The

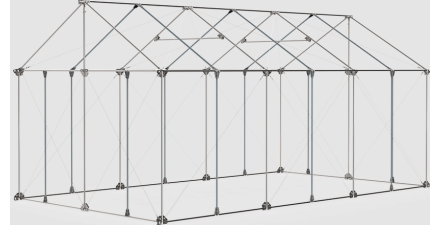


panels are interchangeable and light weight, yet tough and durable.

- Modular
- Lightweight yet durable

Frame

The shelter's light-weight yet sturdy foundation is made of a strong galvanised steel, and firmly anchored to the ground. The frame is modular and parts are interchangeable, and the shelter can thus easily be dismantled and remounted again. Thanks to its optimized design, the shelter can withstand strong wind, rain, snow and heavy impact. Its estimated lifespan is 3 years.



- Modular and robust
- Easily assembled and reassembled
- Weather resistant



Safe and dignified

Better Shelter is designed to help the millions of people worldwide who have fled armed conflicts, persecution or natural disasters, who have often been through traumatic experiences, and who face an uncertain and extremely vulnerable future.

The Better Shelter becomes their home away from home in temporary settlements, transitory sites and camps – a place where they can close the door and get a little privacy and calm.

The shelter resembles a house, with semi-hard, non-transparent walls. It has four windows and a high ceiling, enabling residents to stand upright inside. The door, lockable both from the inside and the outside, lets everyone – and women and children especially – feel safer when they are at home. A solar powered lamp provides light during the hours of

darkness. The shelter allows residents a higher level of safety, security and dignity than a tent.

Sustainable

The Better Shelter's lightweight yet robust frame is made from strong galvanised steel. It can be anchored to the ground and will withstand rain, snow and strong winds. The roof and walls are made of polyolefin panels treated with UV protection to reduce deterioration caused by strong sunlight. The steel frame is modular, and many of the structure's components are interchangeable. The shelter can easily be dismantled, moved and reassembled. Unlike tents, which may require the entire structure to be changed if any part is damaged, components on Better Shelter units can be replaced individually. The expected lifespan of the structure is three years in moderate climates. The roof and wall panels are made from polymer plastic and can be recycled.

Easy to assemble

Assembling a 17,5 m² Better Shelter requires a team of four people and takes around four hours depending on experience, conditions and location.

The shelter is delivered in two cardboard boxes which have been packed to reflect the order in which components will be used in construction. The two boxes can be lifted by four people and also contain all necessary tools and instruction manuals.

The shelter is constructed in three stages:

- 1 – steel foundation
- 2 – roof with ventilation and solar panel
- 3 – walls with windows and door



Cost efficient

Better Shelter is safer, more dignified, longer lasting and more cost-efficient than the tents traditionally used in disaster relief. Its design is optimised for high volume production and flat pack logistics, which make it even more efficient and affordable.

Modular and adaptable

The modular design of the Better Shelter makes it adaptable for different uses and locations, as can be seen from the real world applications our partners and end users are creating for themselves.

The windows and door can be placed in a number of configurations to suit location, use and preference, allowing the layout to be adapted to personal needs. The vertical walls and high ceiling allow beds, tables, shelves and medical equipment to be housed in the shelter, while sections can be added and removed to create shorter or longer structures. The frame can be clad with local materials as desired and available, and damaged components can be replaced without having to dismantle or replace the entire structure.



Tested and evaluated

Prototypes have been tested and evaluated by UNHCR with respect to the personal, social and cultural expectations of the people that it aspires to rehabilitate, as well as the environmental, logistic and financial framework it is designed for.

The shelter is 17.5 sq. m (188 sq. ft.) (L: 5.68m, W: 3.32m, H: 2.83m), and provides a family of five a covered floor area of 3.5 sq. m per person (in compliance with the Sphere shelter and settlement standard).

In numbers

- 2 One shelter is delivered in 2 flat pack boxes, which each way about 80 kg.
- 4 It takes 4 persons 4-8 hours to build a Better Shelter. No additional tools are required and most components are assembled by hand.
- 4 The shelter kit includes a solar panel, which charges an LED light during the day. Once fully charged, the light can be used for 4 hours and also charge a mobile phone through a USB port.
- 5 One shelter is designed to host 5 persons.
- 17,5 The shelter is 17,5 square metres.



68 One shelter consists of 68 unique parts, including manuals and spare parts. The shelter is modular and can be adapted to different fields of application.

169 One Better Shelter weighs 169 kilograms.

10 000 In 2015, Better Shelter delivered more than 10 000 units for humanitarian operations worldwide.