Solar Cabana

# Location and situation

This modular unit can is scalable and therefore, can be installed in a residential garden and a public park. The sizes in the design are suggestions based on a small group of people on an outing to the park. The angle position is important as it relies on the sun for most of its features – solar panels and the shadow art it creates.

This idea / design is different yet familiar. We know benches and gazebos and we know them together, but this one has a few extras. The movable seats create interaction, the lights create atmosphere, the hidden phases (in the grid) create character – makes the product relatable – all while the solar panels generate energy.

# Impact

The materials used in the concept is: dark wood; mild steel and concrete. There are a few concerns with the material choices when it comes to the amount of wood, the heavy components and gasses that the concrete slab excretes.

However, the materials could be substituted. The excess gasses are the biggest concern, the slab could be replaced with sleeper wood – no gasses, rougher texture and termite free but the downside is that it is more wood use. As for the other materials, there are adjustments that can be made to size and material, the reason they were chosen was that they have a certain reputation, like when people have wooden furniture compared to plastic.

One on the ideas that goes with the design is that the maintenance on it would be minimal. The wood is treated before assembly and installation, the lights are automatic, and it is an object that is outside, the dirt washes off with the rain or a hose. The only work is the installation, the switching of phases and the checking on the plants around it and the wood for infestations.

# Experiences

There are different experiences to be made / had, depending on the type of activity and atmosphere you are looking for.

Night-time date (romantic):

The lights are warm and soft, the bench seats are folded away, and a table is set up with food and flowers. The floor is concrete, but you are just two steps away from the cool grass. The ivy growing on the wall creates the illusion of privacy, making the evening even more intimate.

Day time picnic (peaceful):

The shade is just enough to not be too cold because of the pattern in the grid, the seats are all lowered to create seats for the children to sit after a splash in the pool, the plants growing on the wall absorbs some of the exited screeches coming from the children, and with the slots in the wall there is a cool breeze that flows over you.

# UN goals the solar cabana achieves

Goal 3 – ensure healthy live and promote well-being for all at all ages.

Goal 9 – Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Goal 16 – promote peaceful and inclusive societies for sustainable development, provide access to justice for all.

All these goals can be achieved by the carefully chosen phrases ‘written’ on the grid. The atmosphere the cabana creates is peaceful and makes you feel connected, which is what you want for a day in the park with the family.

# Features

Things it has:

* A bench
* Shelter
* Art
* Lights
* Solar panels

# Benefits of features

## Solar panels

The panels are in a unique shape because having a generic shape makes the pattern in the grid useless.

## Benches

With the bench seats being independent from each other, the user(s) can have a few up as to make more space for an activity, and the others down for seating space.

## Wall

The wall is there for some privacy. The units could be placed in a way that the two walls provide a ‘cubical’ of sorts.

## Lights

Lights are semi-essential at night, meaning you need them to see but they don’t need to be a permanent feature or even be bright. With the lights that are in the unit they induce a certain ‘vibe’, it gives an ambient feel to the area the unit is in.

## Phrases

This is what really makes this unit cool, these words are cut out of a sheet of metal that is placed on top of the frame of the unit. When the sun is up the words would be seen through the shadows of the grid.

## Patterned Grid

The rest of the grid is cut into a pattern (which could change with the words), this pattern works the same way with the sunlight. In this case the pattern chosen is to add to the mood the lights create, makes you feel like you are under a tree.

# MWh generated per year

The contributing factors for making the perfect conditions are normal and obvious; things like shade, direct sunlight, the longer the sunlight is on the panel the better, etc.

Orientation is important: the frame is tilted slightly to one side -make sure that is the side the sun is most likely to be following – the panels are mostly flat, and they curve with the sun’s movements somewhat to get maximum sunlight for the whole day.

The conditions for the calculations are based on South African times and temperatures. Also, the solar panels have a rate of 250-watt each.

Winter (May to August – 122 days):

Average hours of sunlight × solar panel watts x 75% (variables above) = daily watt-hours

7 hours x 250 watts x 0.75 = 1 312.5

Making it 1.3125 kilowatt-hours per solar panel, in winter (in RSA).

Which is 1.3125 x 20 (number of solar panels) = 26.25 kilowatt-hours per day.

Summer (September to April – 242 days):

10 hours x 250 watts x 0.75 = 1 875

Making it 1.875 kilowatt-hours per solar panel, in summer (in RSA).

Which is 1.875 x 20 = 37.5 kilowatt-hours per day.

Total per year = (122 x 26.25) + (242 x 37.5)

Total per year = 12 277.5 kWh

Which is 12.28 MWh per year.

# Who and how?

It is a cabana that can be used in a park or a residential garden, that provides solar energy.

Therefore, the people that would be using this product is:

* **The people in the public park**, can use the cabana as a sheltered picnic area, the concrete floor makes it easy to set up a table and the bench provides more seats. Or they could fold up the seats to make use of the whole space for something else. The lights provide a more ambient atmosphere which would make for a nice ‘date night at the park’.
* **People in the residential garden**, there people that install the cabana in their yard, would use it for similar reasons as the people at the park, biggest difference is they would have more privacy, as it is on private property. One other difference is that they could customise it to their liking, by having the LEDs in the top change colours, choose the words they want permanently, or have other solar panels attached to the grid.
* **Engineers / contractors / architects (**the people that would be doing the installing), would be providing a service as they are to install the cabana, by first insuring there is a stable foundation for the structure. They would throw the concrete, place the tiles, have the materials delivered to the site then assemble and secure the cabana.
* **People that do the maintenance.** The maintenance on this product is minimal. The lights turn on and off by themselves. The only maintenance needed is the seats might need oiling every now and again, the plants (if there are) would need trimming, the grid with the words could be swapped out with new sayings every month or so. The only thing that would need more effort is the wood needs to be treated and checked for bugs.

# Tech used

There are a few things that are needed to make the solar cabana, here are a few.

* A foundation (Concrete) – this does not have to be brand specific.
* Concrete tiles – also not brand specific but the size is important, 500mm x 500mm.
* Solar panels – the number of panels depend on the type of panels you are going to use, but with the unique shape there are 20 of them at the size of 600 diameter.
* A grid – that has the pattern and the words cut out, (in this case) mild steel with 30mm thickness.
* Lights – there should be a 16m strip of LEDs and an additional 8 light sheets, 200mm x 200mm.
* There are also plants [choice of the user(s)] that can be placed behind / let grow up the wall where the bench seats are, this creates more privacy.