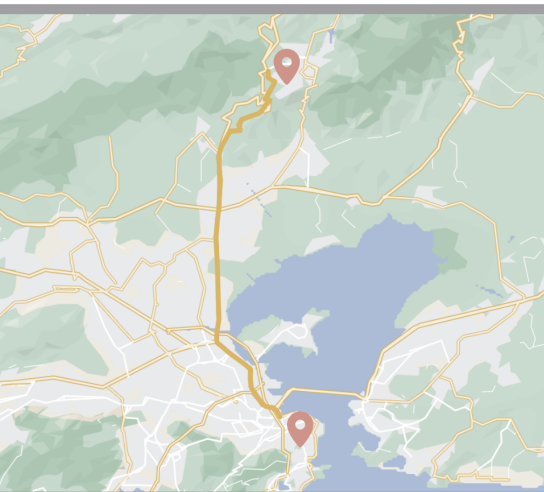


PETRÓPOLIS NEXT



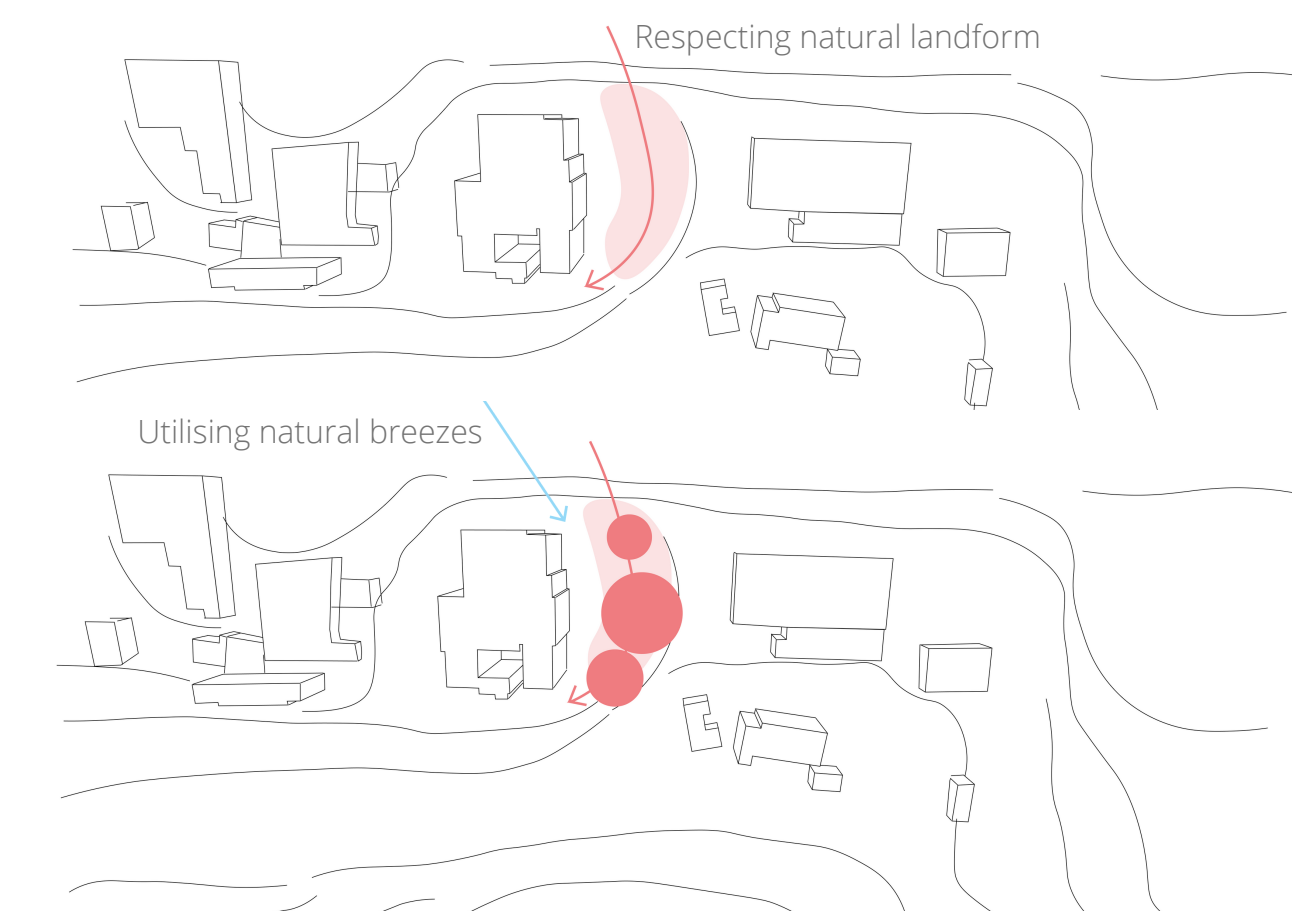
Location

70 km from Rio de Janeiro
838 meters above the sea level
306,678 population
Surrounded by Atlantic Forest
City was founded by emperor Pedro II
Petro + Pólis = Peter's City

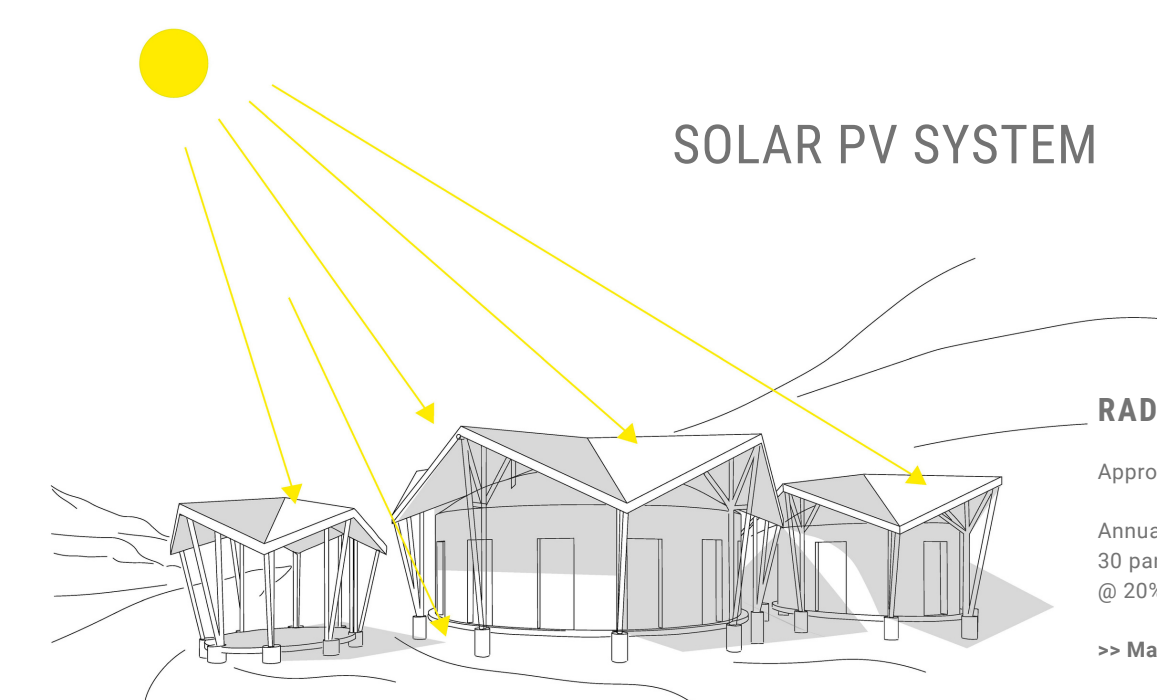


Existing Building

UERJ Petrópolis
Architecture &
Urban Design campus
Heritage building
150 students
Underutilised outdoor space

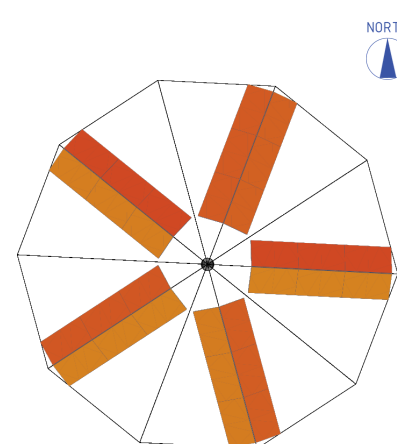


SOLAR PV SYSTEM



RADIATION ANALYSIS

Approx. 1150 kWh/m2 per year
Annual Radiation
30 panels = 53m2 = 60.950 kWh
@ 20% efficiency = 12.190 kWh/yr
>> Matches our requirement

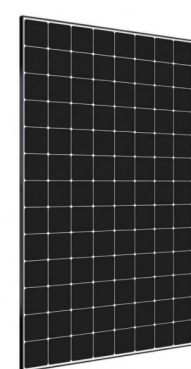


PV OUTPUT

Require approx. 12,000 kWh per year
= 1,000 kWh / month

12kW PV system
Requires 83.3 hours / month
= 19.23 hours / week (2.75 hours/day)

Assuming 0.75 system efficiency
= 3.66 hours / day



PV SELECTION

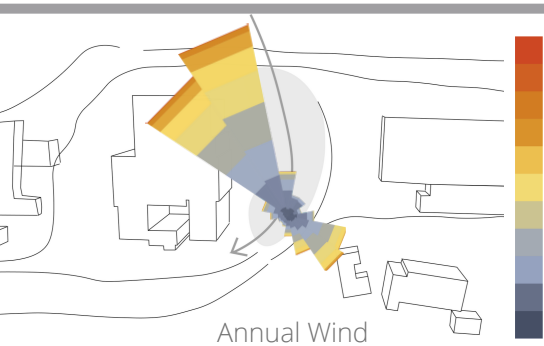
Maxeon 3 PV panels: 400W
Size: 1690 x 1046 x 40mm = 1,77m2
30 panels on the main pavilion (12kW nominal)

- High power per square meter (226W/m2)
- 92% power production assurance in year 25
- Expected useful life of 40 years

SOLAR BATTERY

Tesla Powerwall
13.5 kWh capacity each
x 2 units = 27 kWh total

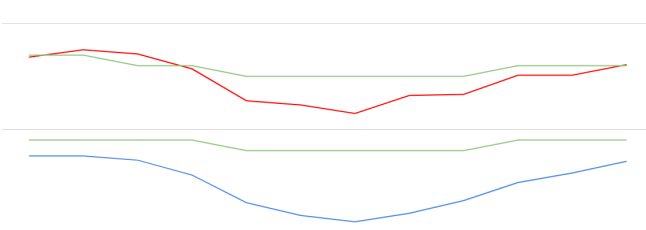
- Use energy at night
- Store energy for low-production days
- Time our power export to the grid (maximise potential return)



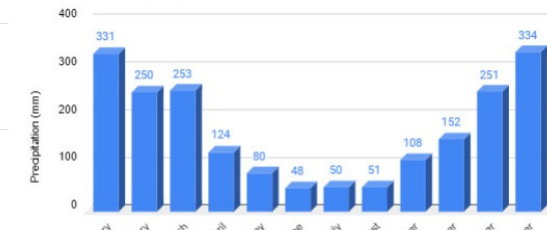
Climate

Average Temperature
11 - 27 degrees
Comfort Band
18 - 27 degrees
Relative Humidity
Typically >80%

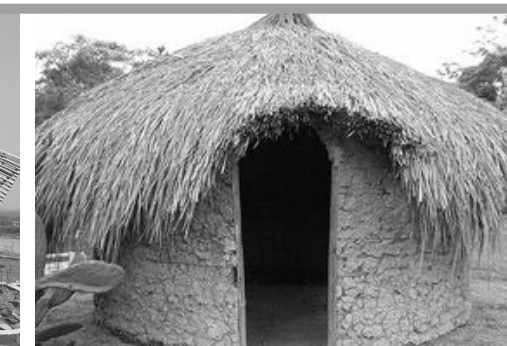
Monthly Temperature (Celsius)



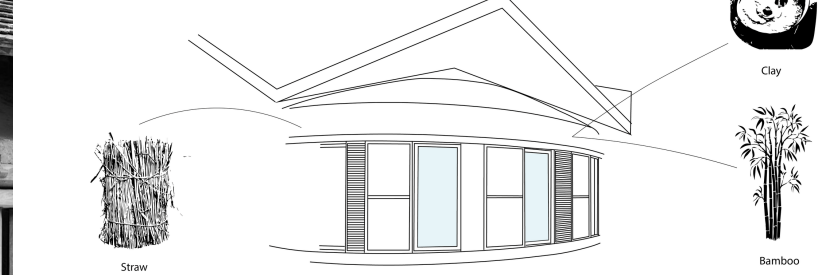
Monthly Precipitation (mm)



Inspiration

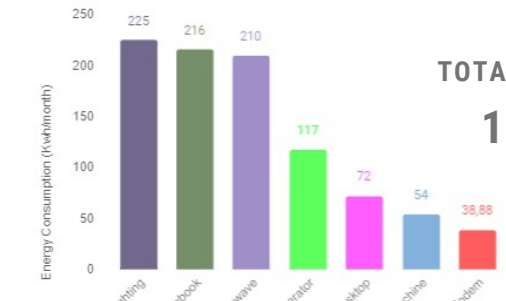


Materials



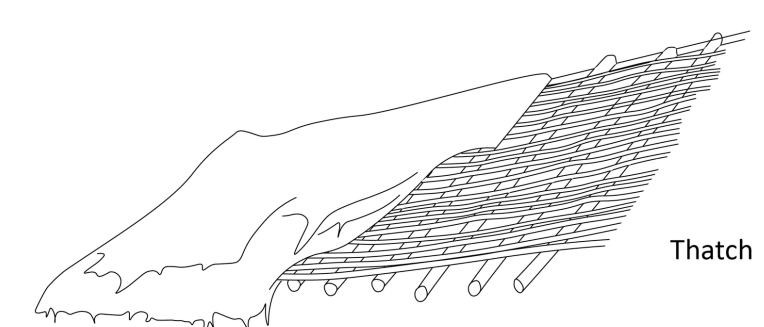
CALCULATION OF ENERGY DEMAND

Energy Consumption (Kwh/month) versus Device

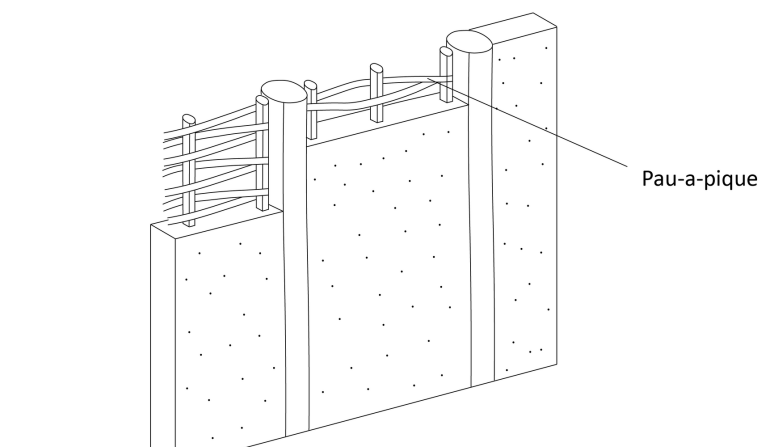


TOTAL ELECTRICAL ENERGY DEMAND
11.473 kWh per year

CONSTRUCTION DETAILS



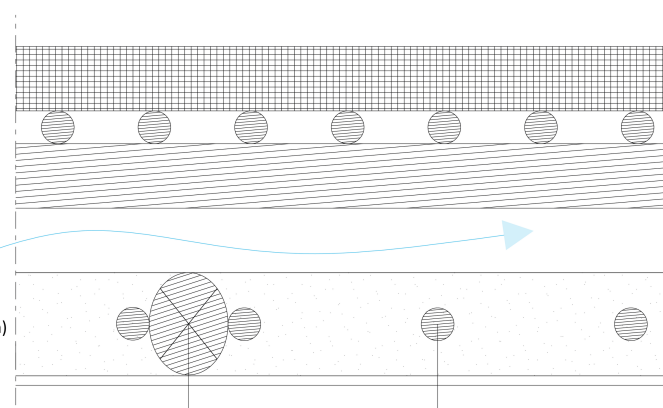
Thatch



Pau-a-pique

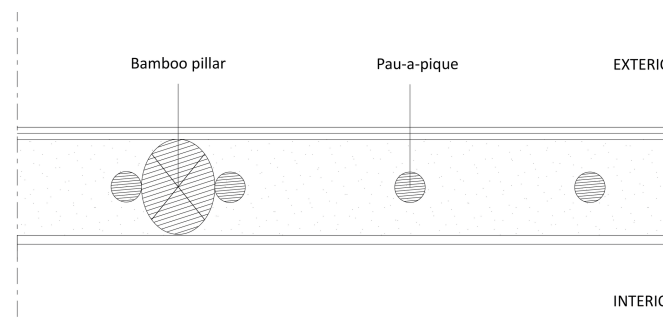
Roof construction 525 mm

100 mm Thatch/ Straw
50 mm Bamboo batten
100 mm Bamboo beam
100 mm Ventilated level (varies because of roof construction)
160 mm Bamboo beam
Pau-a-pique Clay and straw (in between)
15 mm Clay stucco

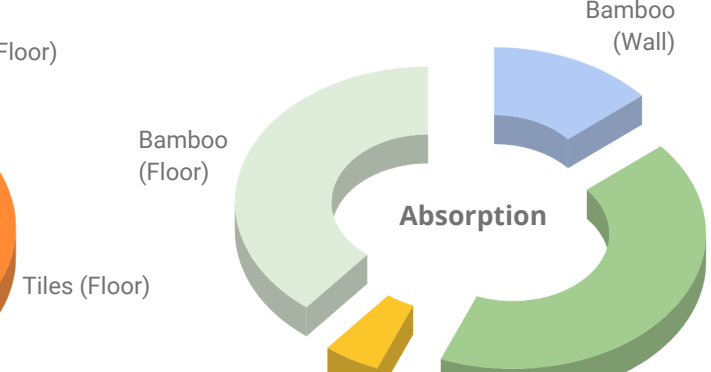
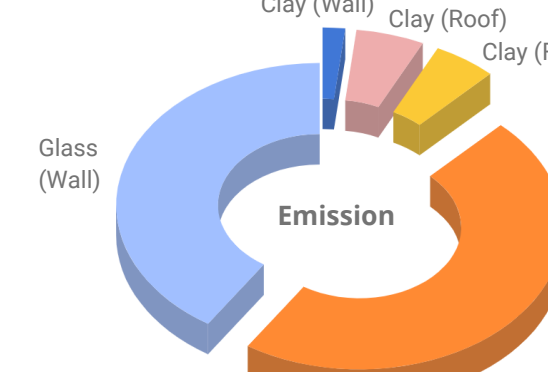


Wall construction 200 mm

20 mm Clay stucco
160 mm Bamboo pillar
50 x 50 mm Pau-a-pique
15 mm Clay stucco



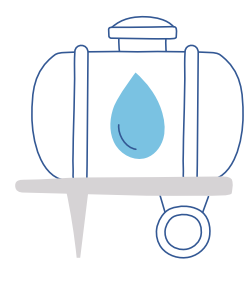
CARBON DIOXIDE



Total Gain
1500kg/m2

WATER PUMP

Collected rainwater used for bathroom



WATER TANK

V = 0.0042 x Pa x A x T
V = 714 L