PortFolio

Hossein Nazari
Architect and Sustainability Professional

CONTENT

Hossein Nazari

-Architect-
-Sustainablility Professional-
-Camputational Designer-
-Graphic Designer-

About Me

Hi, I am Hossein, an Iranian architect living in Tehran. In my childhood, we built a clay and wood house, then deconstructed and reconstructed it. This sparked my passion for architecture. Since I am interested in the history of art and architecture, I studied old architectural structures and tried to find native architecture solutions based on context and environment. As a result, I began working on sustainable architecture.

From history books I just read

- 1991 — October 21th: Born in Tehran
- 1997 — September: Primary school entry
- 2009 — June: Diploma in Mathematics & Physics
- 2012 — July: Undergraduate in Mechanical Engineering
- 2016 — September: Bachelor's degree Architecture Soore Art University
- 2019 — September: Start studying at Iran University of Science and Technologys Master of Sustainable Architecture program. (IUST)

Lets see what happens

Academic Ejucation

Diploma
Mathematics & Physics
Undergraduate
Mechanical Engineering
Bachelor
Architecture - Soore University
Master
Sustainable Architecture - Iran university of Science and technology

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hnazari.8983@gmail.com

Other Coarses

Participant of beginner Grasshopper Coarse
DR Morteza Rahber
Participant of Python Scripting Coarse
DR Morteza Rahber
Participant of Optimization Coarse
DR Morteza Rahber
Participant of beginner Daylighting Coarse
DR Peiman Pilechiha
Participant of Advanced Daylighting Coarse
DR Peiman Pilechiha
Participant of Advanced Grasshopper Coarse
DR Mahdiar Esmayilbeigy - Iranian Architecture Center
Participant of AI in Architecutre and Urban Design Coarse
DR Farhang Jaryani - Iranian Architecture Center

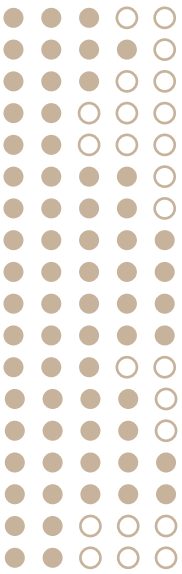
Competition Awards

Farmanieh Residential Complex-Tehran, Iran
1st Prize _ team work
Royal Tower Facade – Tehran, Iran
1st Prize _ team work
Sleeping Pods On A Cliff - Portugal
Energy-efficient design _ team work
The Oasis Cultural Center - Morraco
Sustainable Designing _ team work

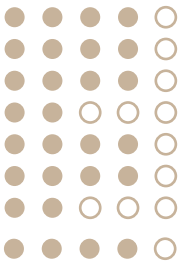
Language

Persian
English | C3A

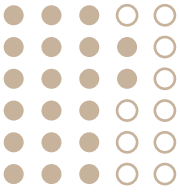
Software Skills



Design Skills



Programming Skills

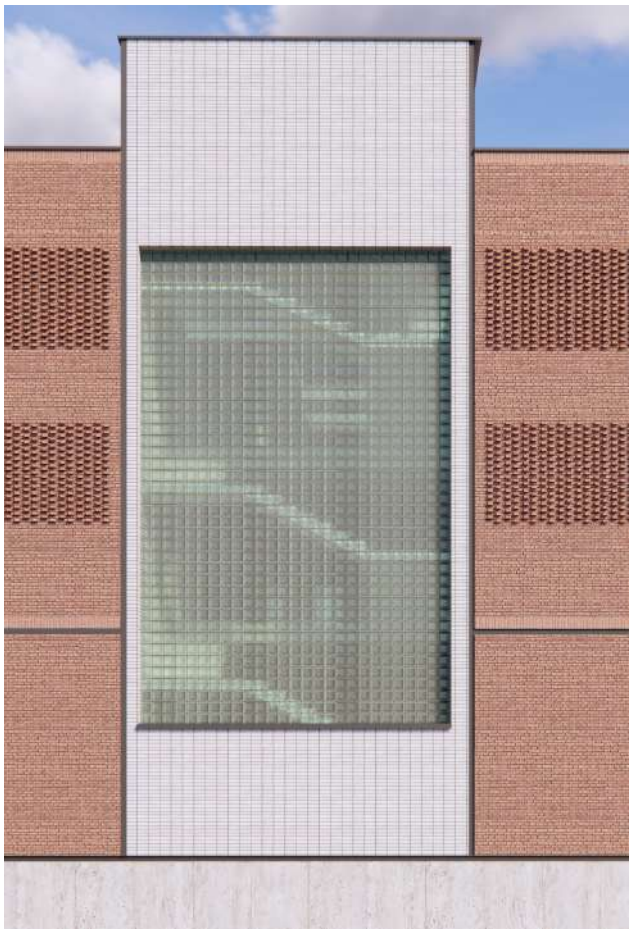


Motahari Green School - Tehran, Iran

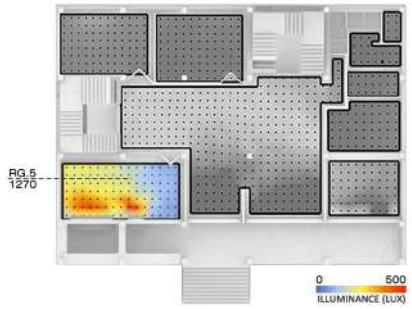
Design Refinment

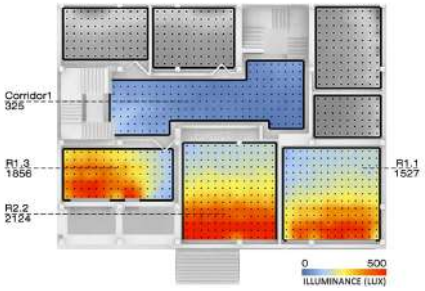
Profession

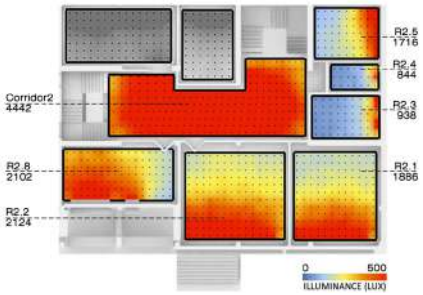
Motahari green school was a professional project which Tehran School Renovation Organization commissioned Iran University of Science and Technology to reduce the school›s energy consumption.
In this project the architectural design was done by another team, and when we entered the project, the construction had begun. We worked on improving the plans, façade, and tried to design some active and passive systems to reduce energy demand.
The complete energy report is available but in Persian.



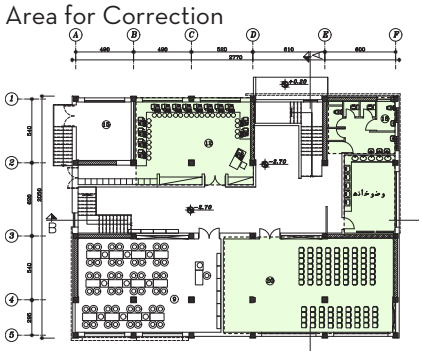
Before Correction

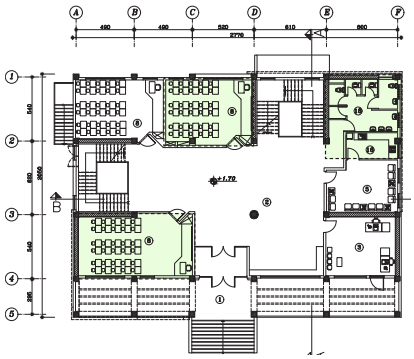


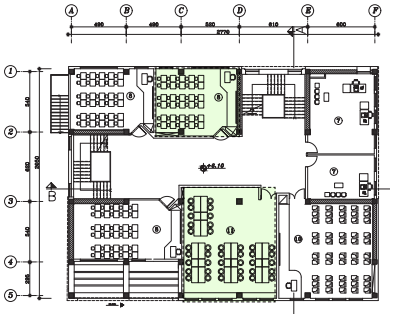




Area for Correction







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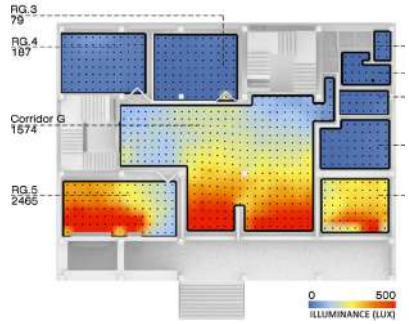
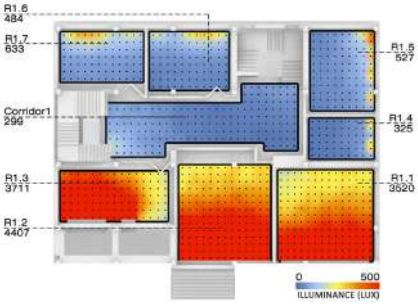
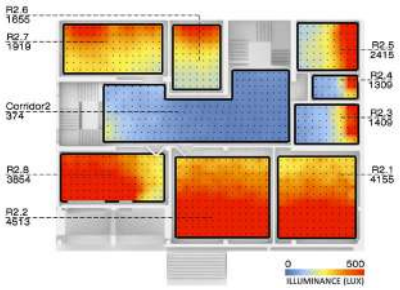
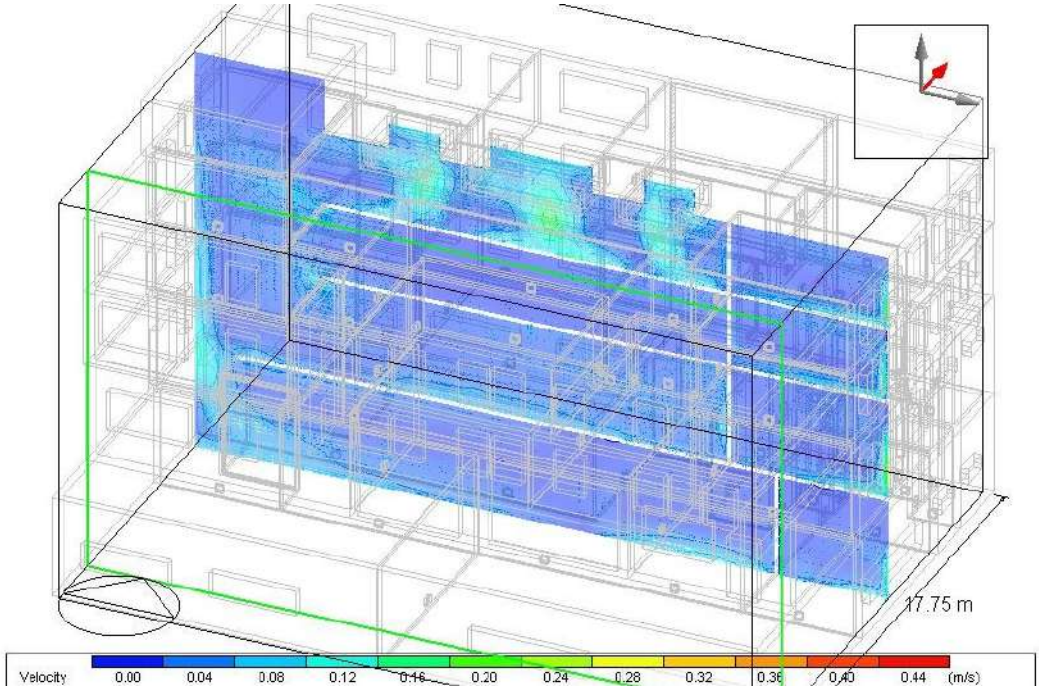


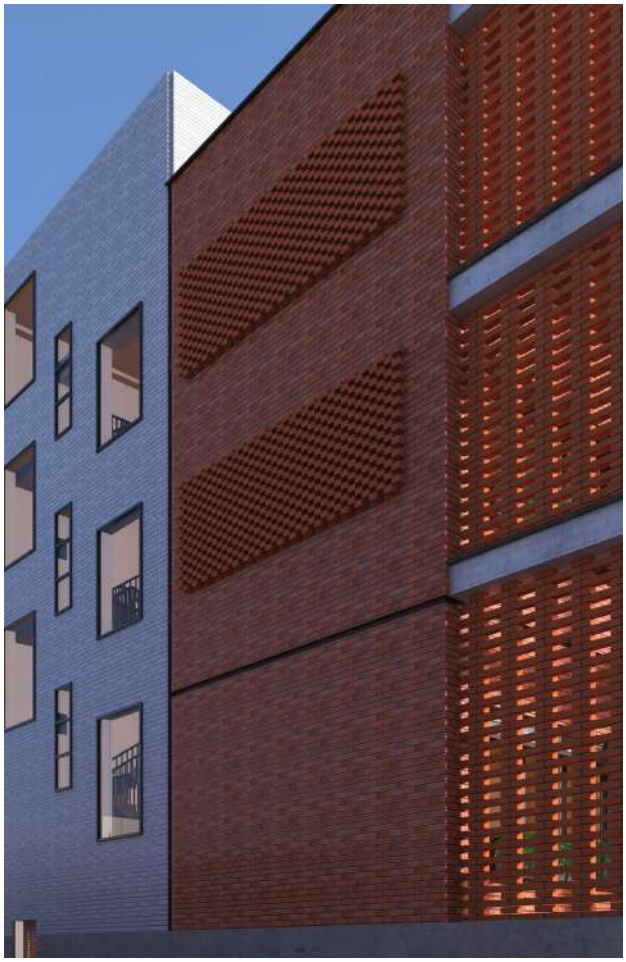




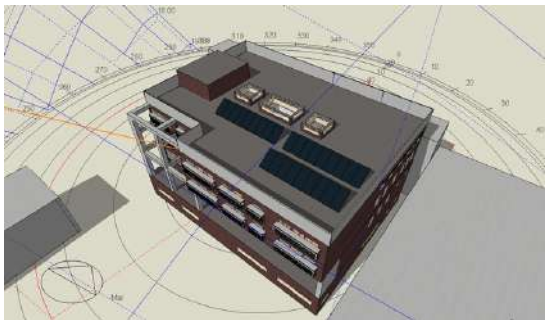
Natural Ventilation Model

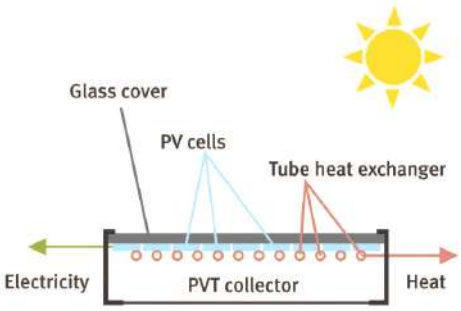
The design of a facade can impact natural ventilation, and we designed a porous facade to be a native solution for old buildings in Iran due to the hot and semi dry climate.





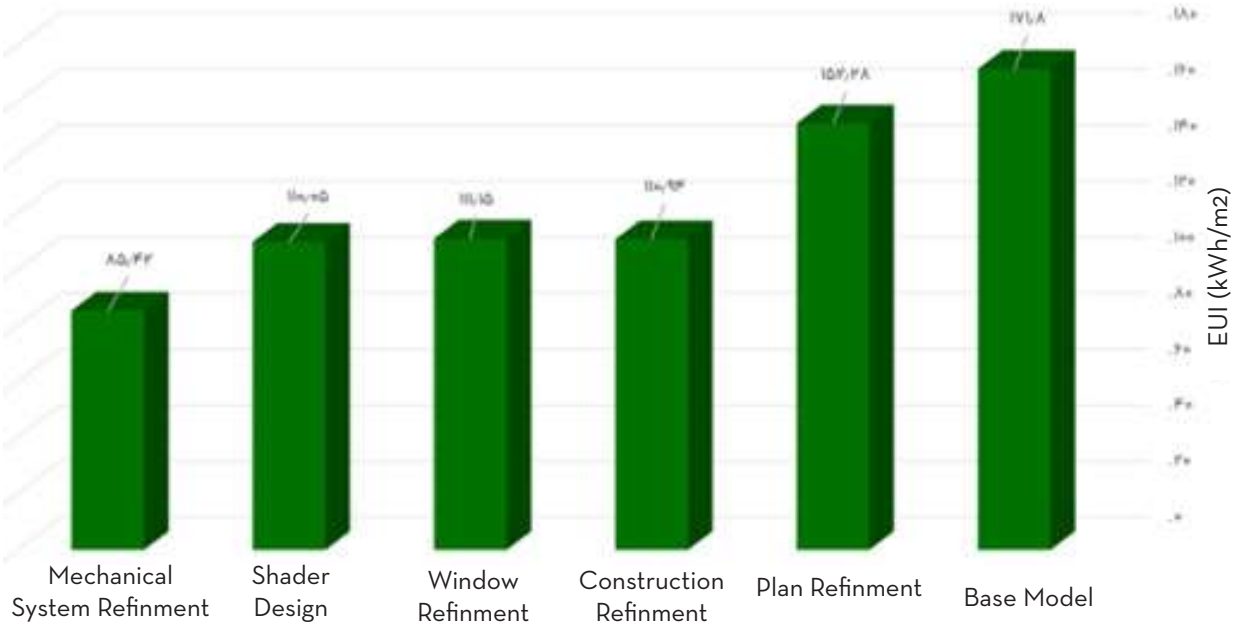
Solar System Model





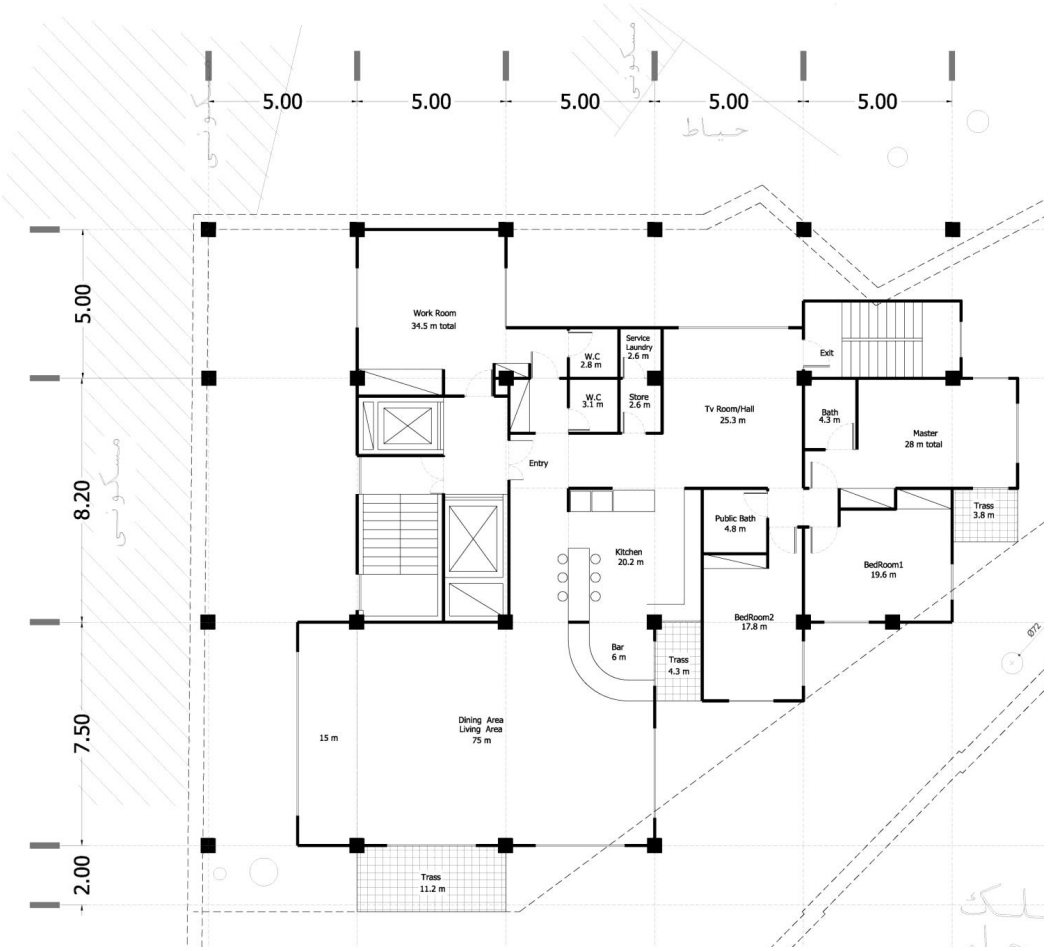
Due to the high radiation and illumination in Tehran, one of the best solutions is to design passive and active systems that use the sun. PV panels and solar hot water systems were our solutions.

Energy Strategies and impact on EUI



Note : Access to the complete report is available

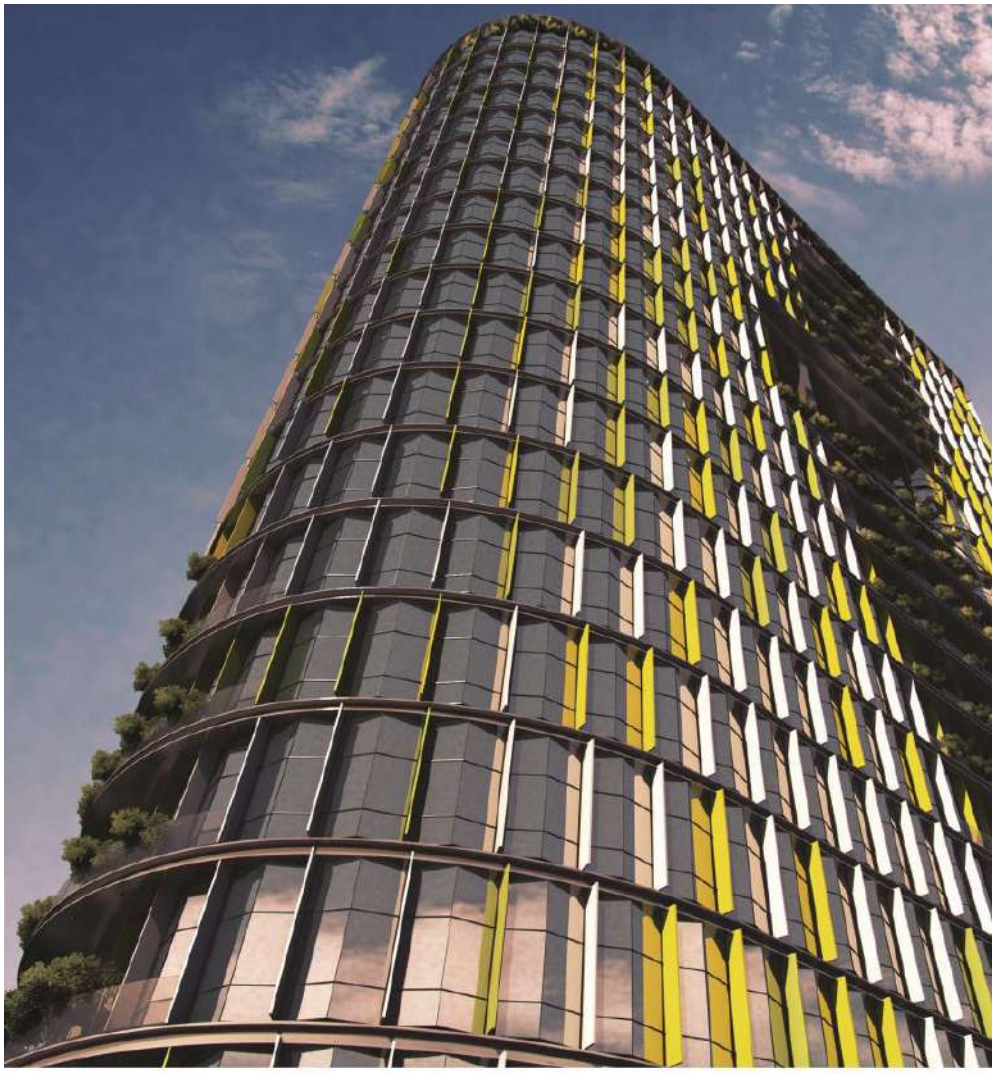
Prima residential complex
Tehran, Iran



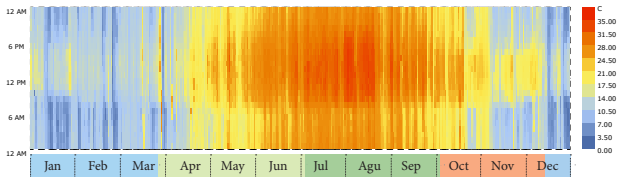
Alternatives

Royal Tower Facade Design – Tehran, iran
1st Prize

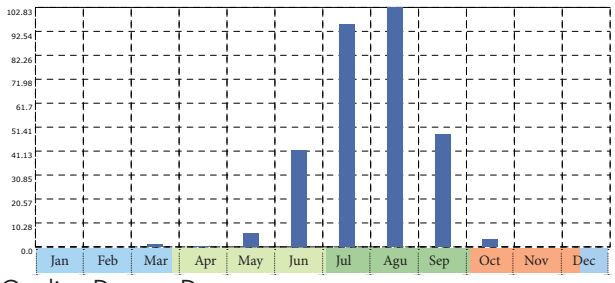
Competition



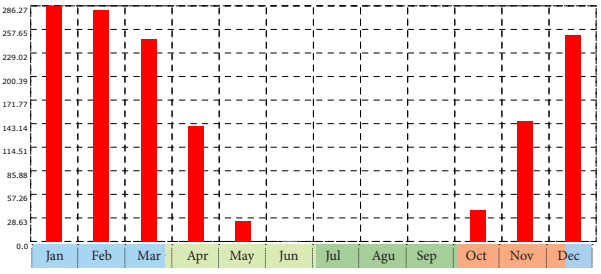
The Royal Tower is a famous building in Tehran. Few years ago a rich man bought it and decided to reface the building. When we were invited to participate in the competition, we decided to transform the lobby and design shaders to control light. All towers are offices, so the essence of activity and movement should be included.



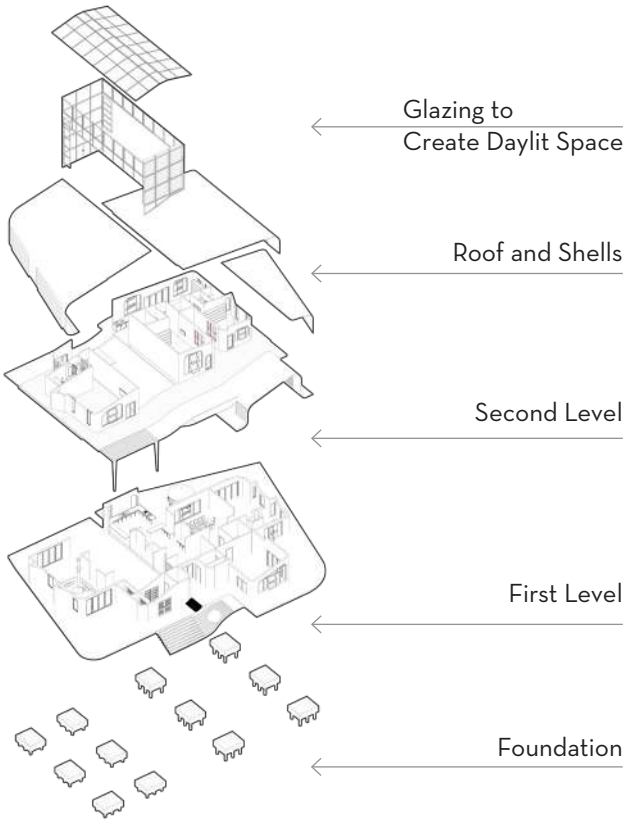
Dry Bulb Tempreture

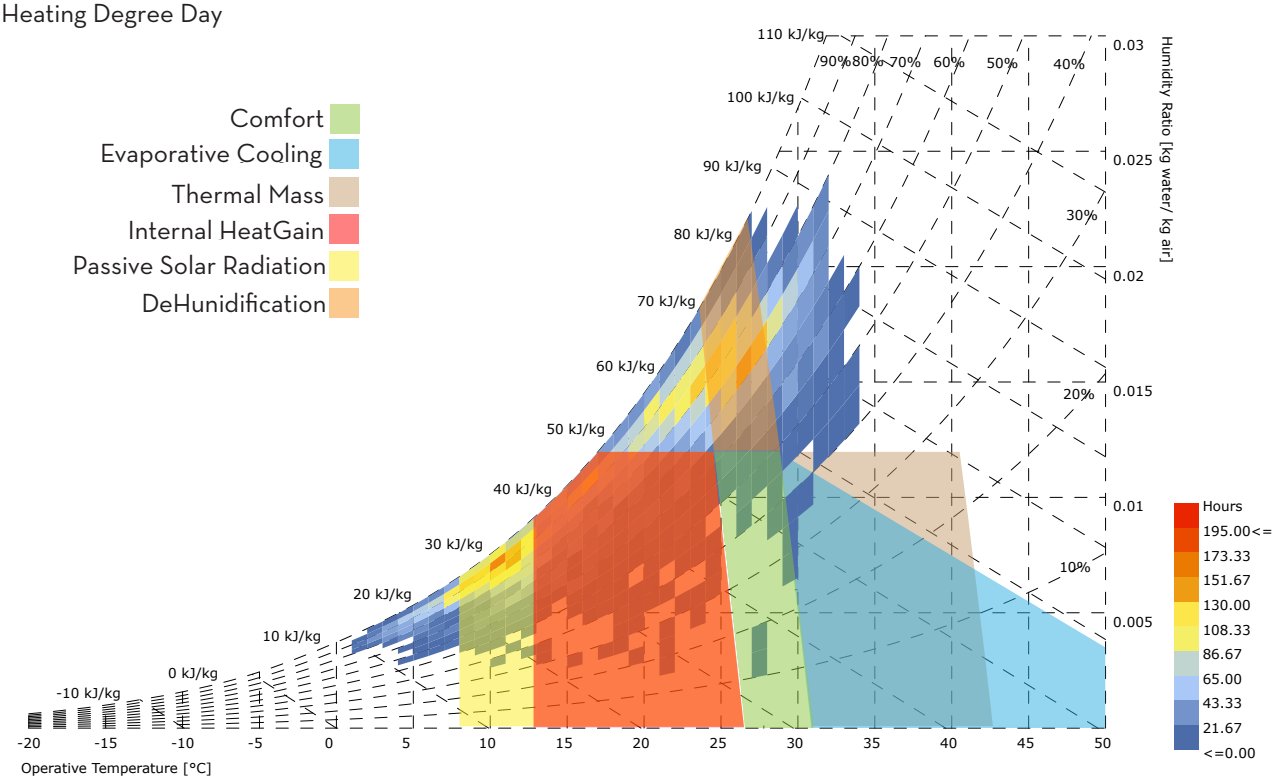


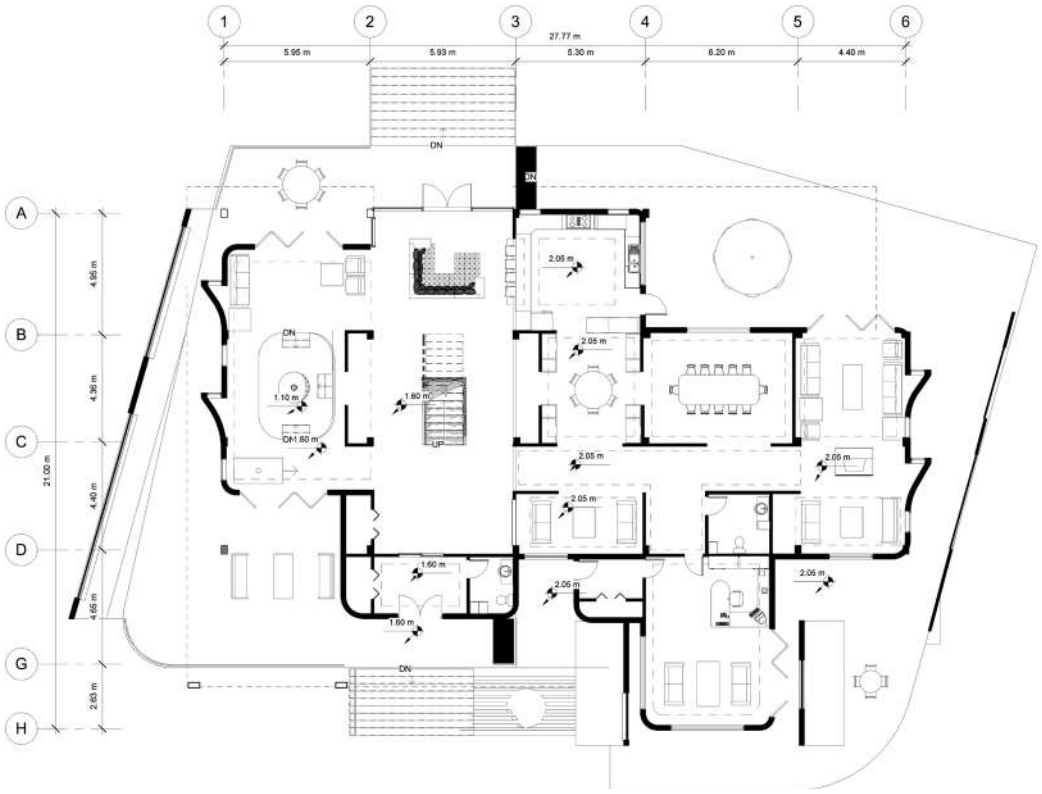
Cooling Degree Day

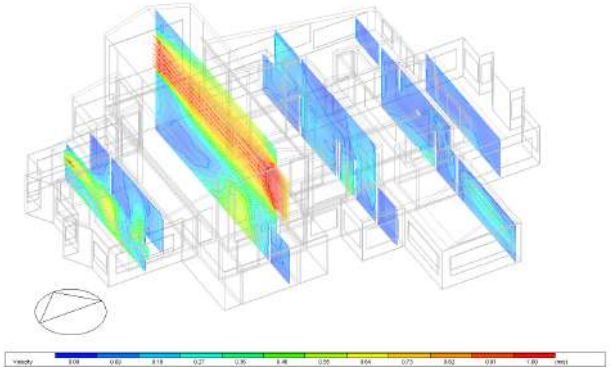


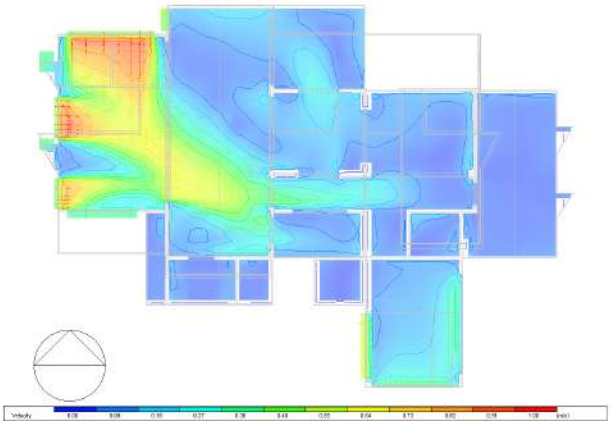
Heating Degree Day

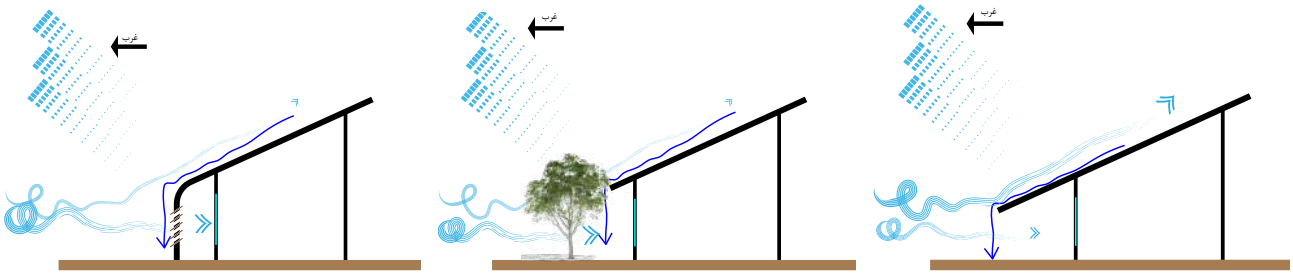




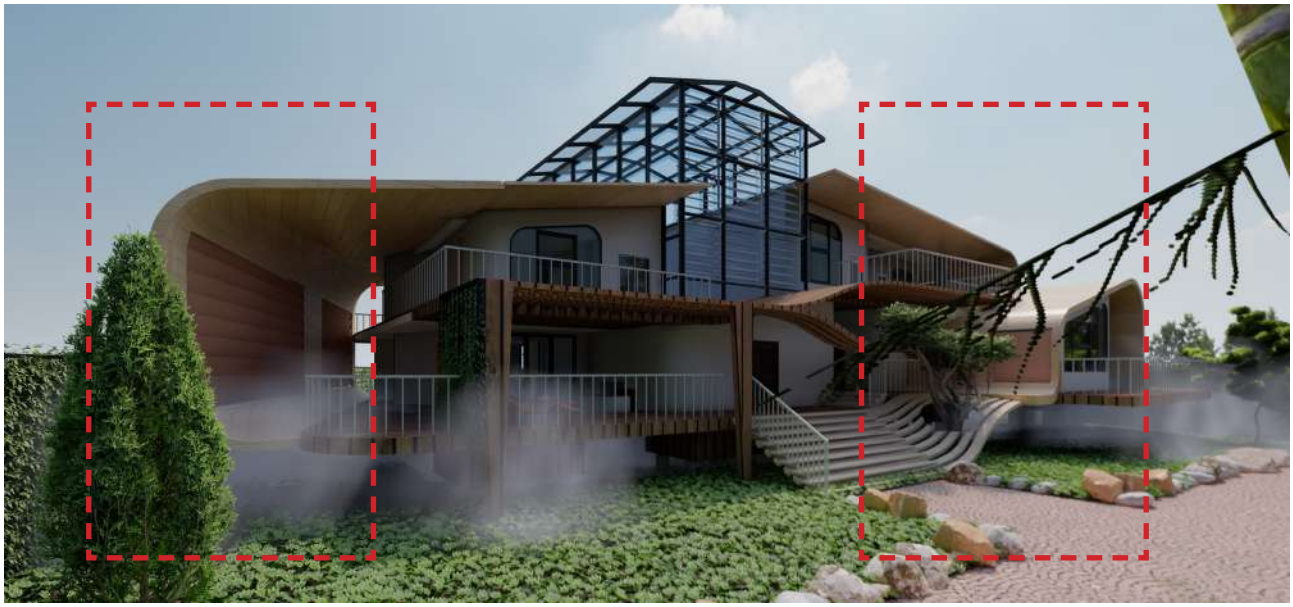

1
2
3
4
5
6
27.77 m
5.95 m
5.93 m
5.30 m
6.20 m
4.40 m
A
B
C
D
G
H
21.00 m
4.95 m
4.30 m
4.40 m
4.65 m
2.63 m
UP
DN
2.05 m
1.60 m
1.10 m

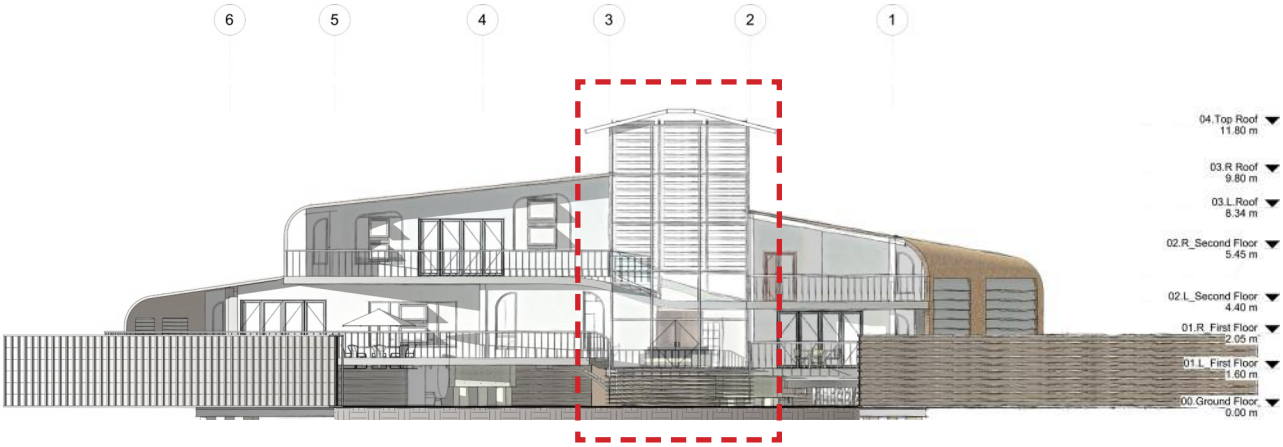


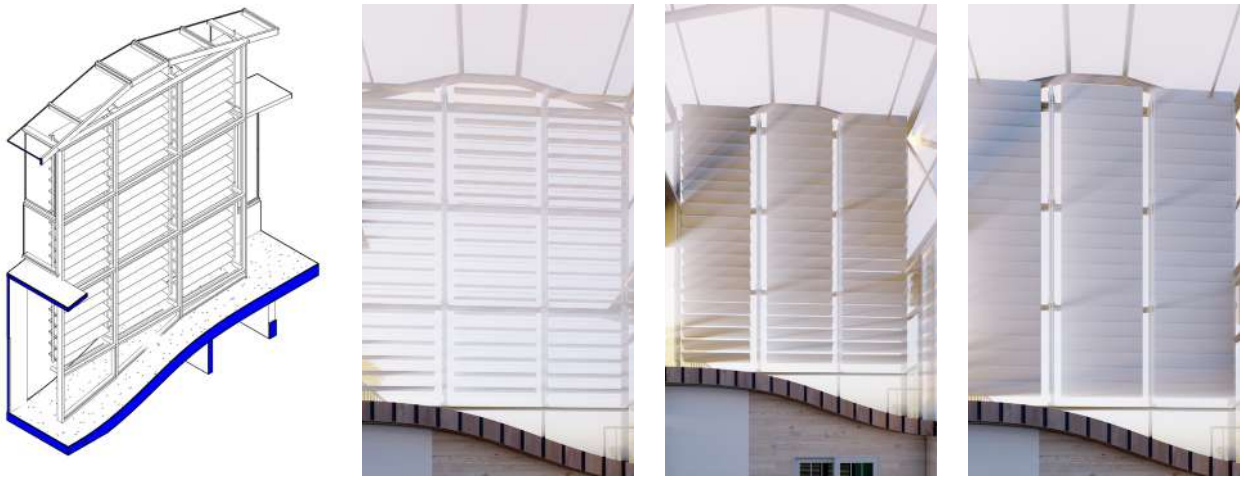




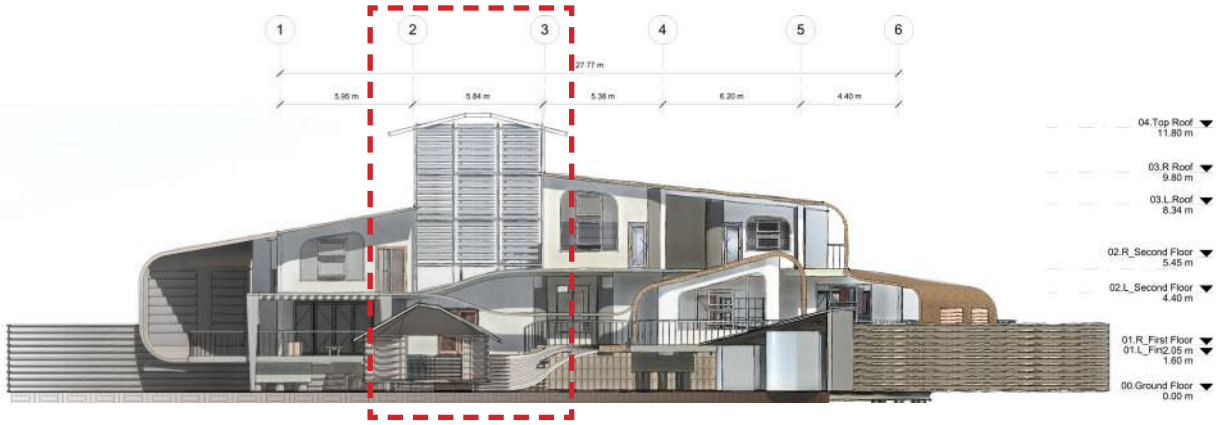
Dynamic Louver Rotation Based on Wind Speed and Relative Humidity Level







Dynamic Shader Rotation Based on Illuminance Level

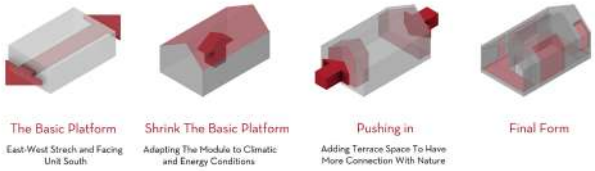


Note : Access to the complete report is available

Sleeping Pods On a Cliff
Portugal

Competition

Design Process

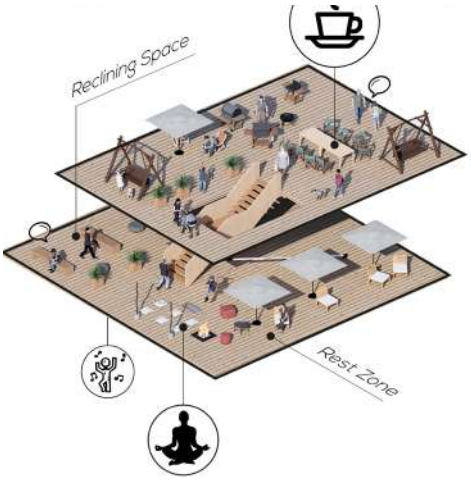


The Basic Platform
East-West Strech and Facing Unit South

Shrink The Basic Platform
Adapting The Module to Climatic and Energy Conditions

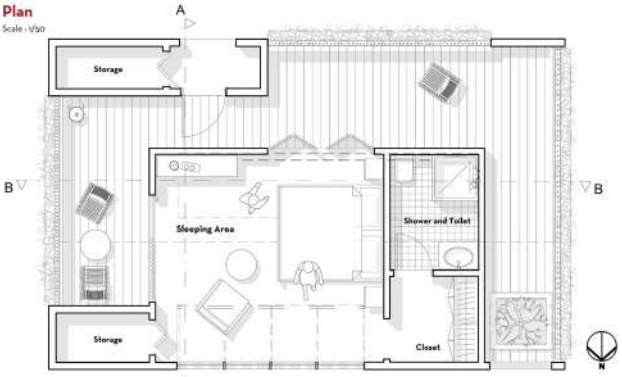
Pushing in
Adding Terrace Space To Have More Connection With Nature

Final Form



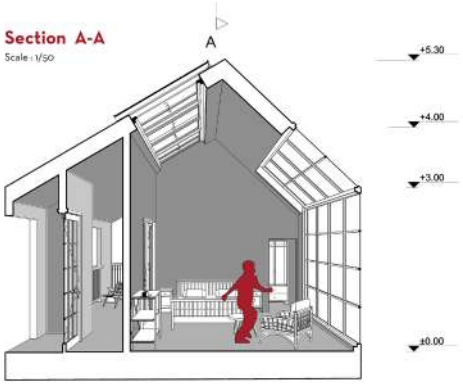
Plan

Scale : 1/50



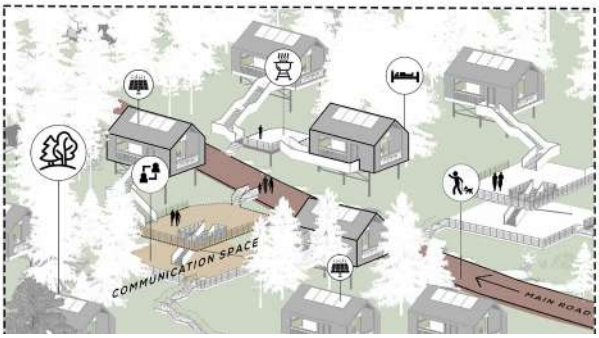
Section A-A

Scale : 1/50



Intention

We Try To Show Our Intention Considering All Of The Parameters :



Section B-B

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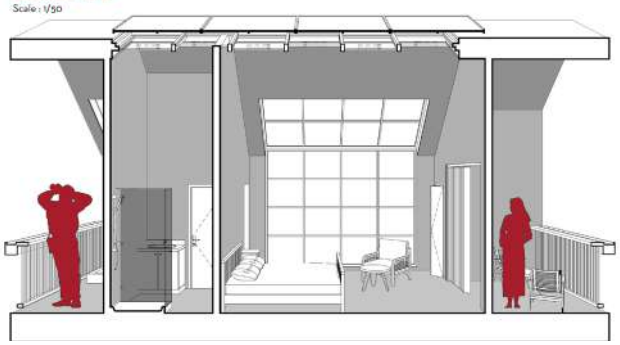
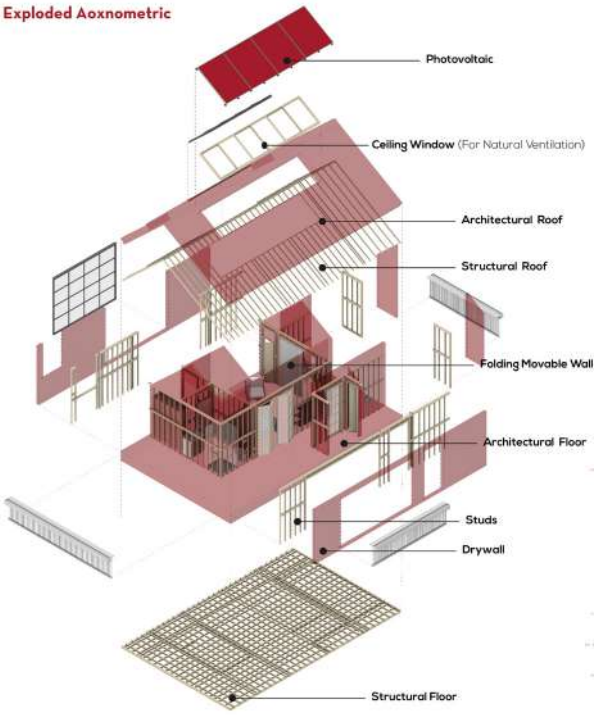


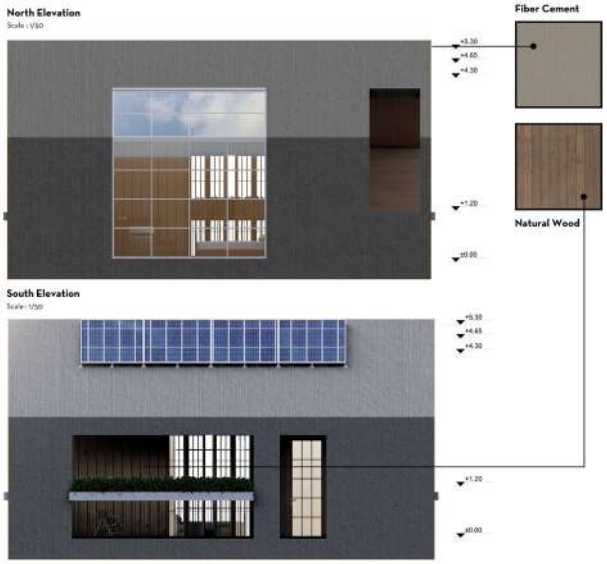
Perspective

Exterior - Site Location

Exploded Aoxnometric

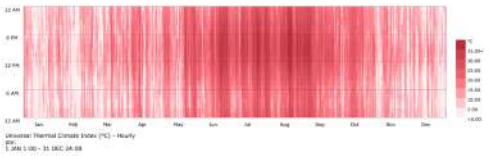


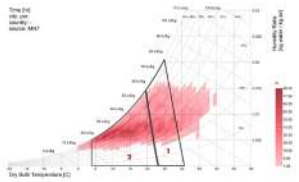
Elevations



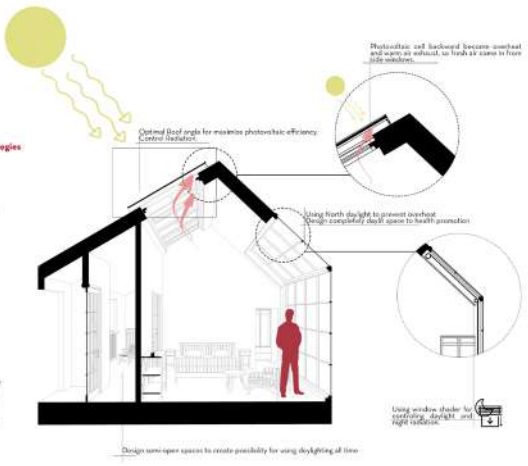
Universal thermal climate index is an indicator which can describe comfort human condition. We use strategies like natural ventilation and passive solar heating and the result can show how these strategies could help human comfort.

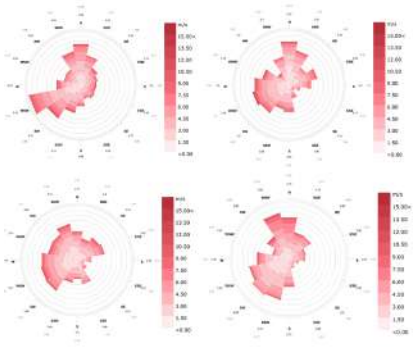
78% of time , comfort condition
4% of time heat stress
8% of time cold stress



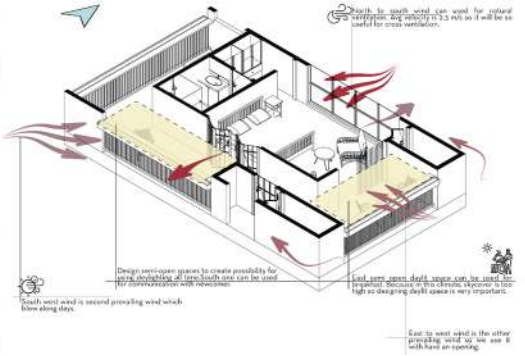


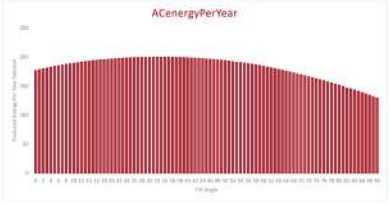
1.Based Comfort Zone
2.Extented Comfort Zone with using natural ventilation and Passive Solar Sterategies





s mentioned before , humidity is an important parameter that should be controlled. One the passive strategies which can solve this problem effectively, is using natural ntilation. The average of wind velocity is 2.5 m/s and it could be very useful. fe have some strategies for using this idea.





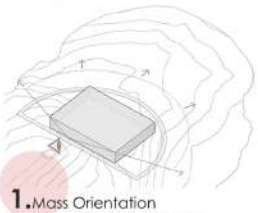
st Roof Angle foor Controling Radiation and Maximize Photovoltaic Energy Efficiency

Circulation Diagram

Show Routes

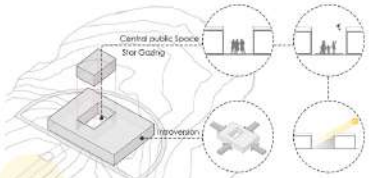
ECOASISTEM

Oasis, a word that brings so many concepts to one's mind in climatic, social, lifestyle, historical, and financial fields. An oasis is a place in a desert that contains water, supplied by a spring or another underground water source. This word is a symbol of both fear and hope. Fear of desert, dehydration, wild nature, and hope in surviving, Safety, paradise, and life.
Oasis reminds us that harmonizing with the surroundings is not always the solution. Sometimes being in contrast with the context, while it has an extreme climate, might be a more efficient way. This place embraces everybody like a kind mother embraces her children and protects them against the wild nature and harsh conditions.
Morocco, due to its history and strategic position, has always been a place where people gathered together despite their differnet and various races, religions, and cultures. Oasis cultural center is a symbol of the Morocco and the oasis itself that have always turned the fear and darkness to hope and light during the human's most severe challenges. In this project, we have tried to create a peaceful gathering place, a place where people can visit their hopes and their fears, their future and their past, their roots and their branches. We have also promoted a green and sustainable future for the Moroccans by defining new methods of dealing with climatic difficulties and increasing usage and manufacturing of local materials and productions.



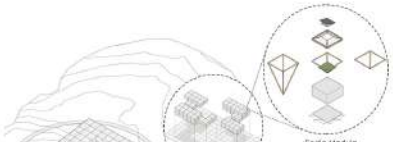
1.Mass Orientation

North-South Orientation for minimum lake view and compability with topography.



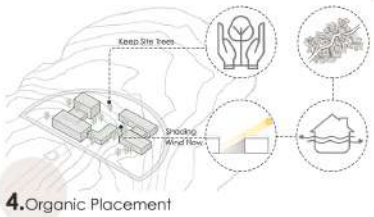
2.Applying The Central Yard

According to moroccan traditional architecture, central courtyard is used to create a microclimate and a nostalgic for native people.



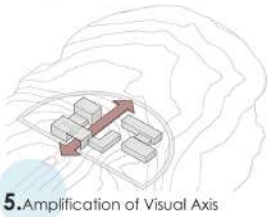
3.Using Modular Design

Using Modular Design For Easier Future Development, using endemic materials and easy maintenance which native people can afford.



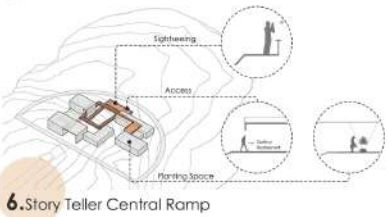
4.Organic Placement

Keeping All Of the Site's Vegetation Intact, Increasing Outdoor Air Quality,Shading And Designing Between Spaces and Respecting the Site's History.



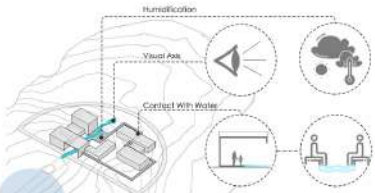
5.Amplification of Visual Axis

As a Main Idea, Creating an Axis From Entrance to Lake Can Impress Visitors. People Who Pass a Desert and Get to Oasis can see the Blue Scene at the First Glance.



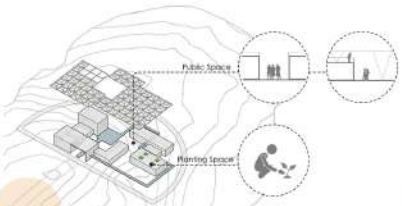
6.Story Teller Central Ramp

This Ramp Is Designed To Create A Circular Path Around Water, Create Sightseeing, Access To Gallery, Restaurant And Planting Space.



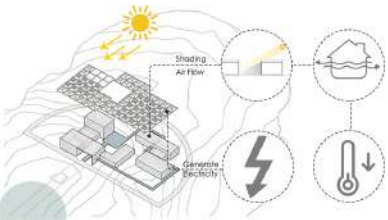
7.Adding Water Loop

The Body Of Water Is Designed As A Symbol Of The Oasis In A Closed Loop, Which Increases The Humidity And Amplificates The Visual Axis Towards The Lake.



8.Designing Fabric Structure

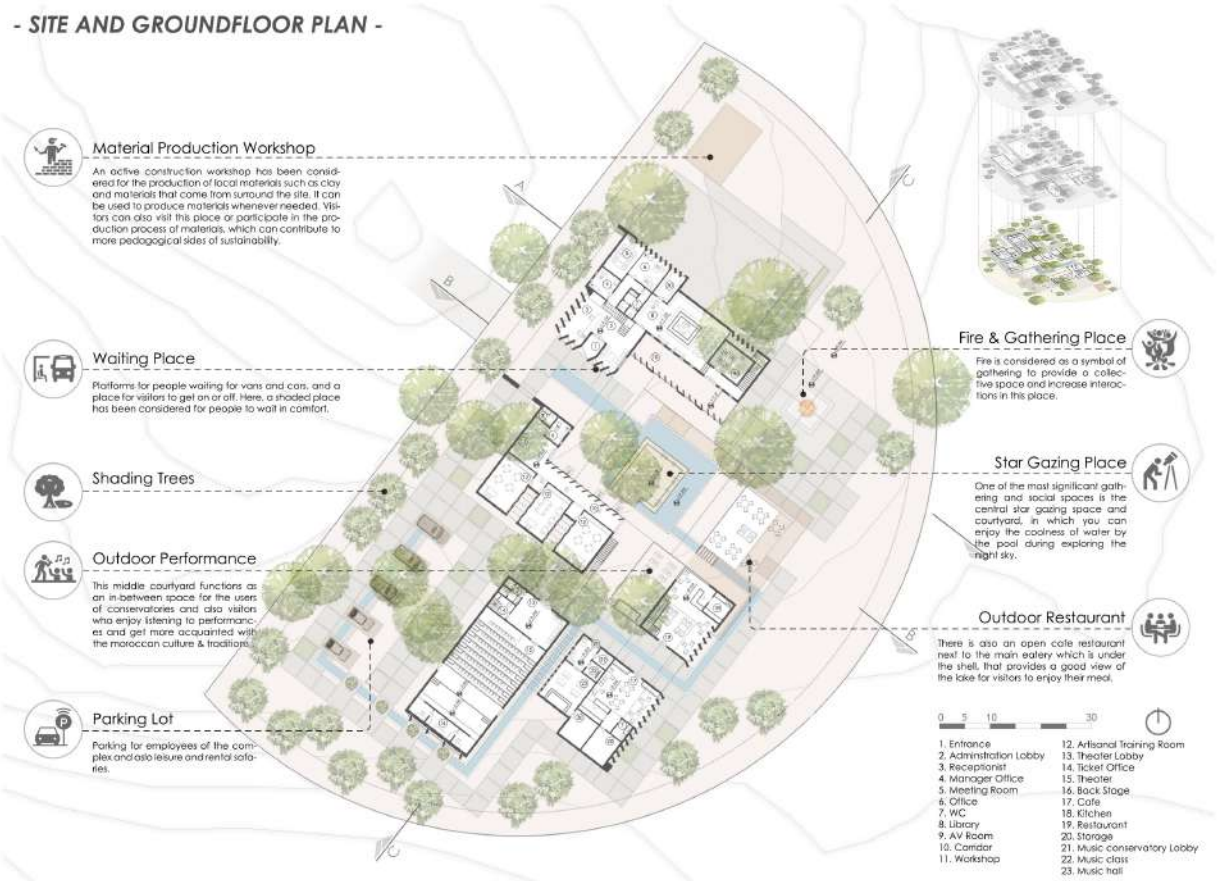
Structure Design Is Inspired By The Common Fabric Structures In The Traditional Moroccan Bazzars Which Create Public Spaces.



9.Applying PV Panels

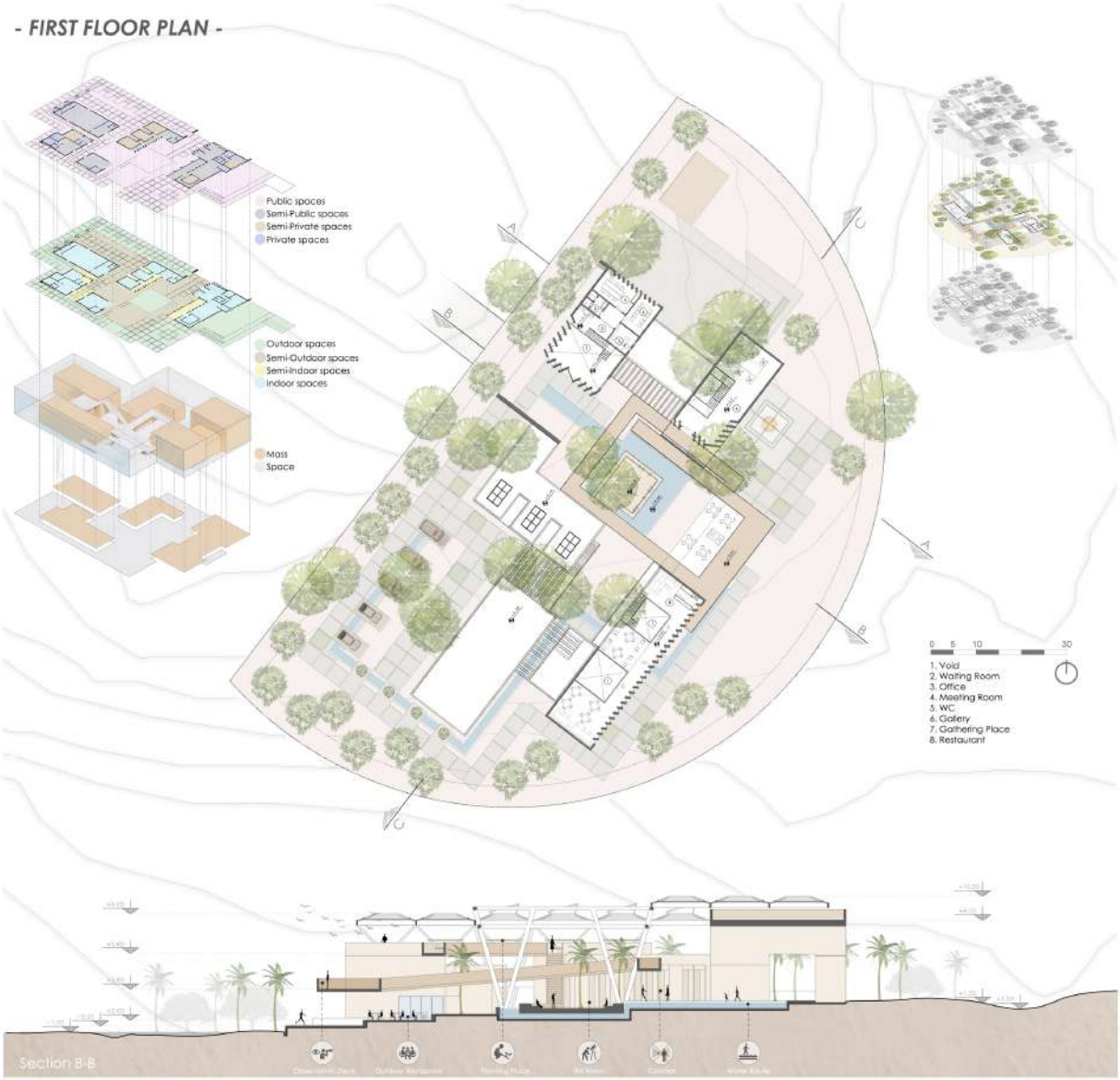
With Applying PV Panels In Addition to Generating Electricity, We Can Also Control The Radiation, Shading And Reduce The Temperature.

- SITE AND GROUNDFLOOR PLAN -



- PERSPECTIVES OF THE RESTAURANT AND ARTISANAL TRAINING ROOMS -

- FIRST FLOOR PLAN -

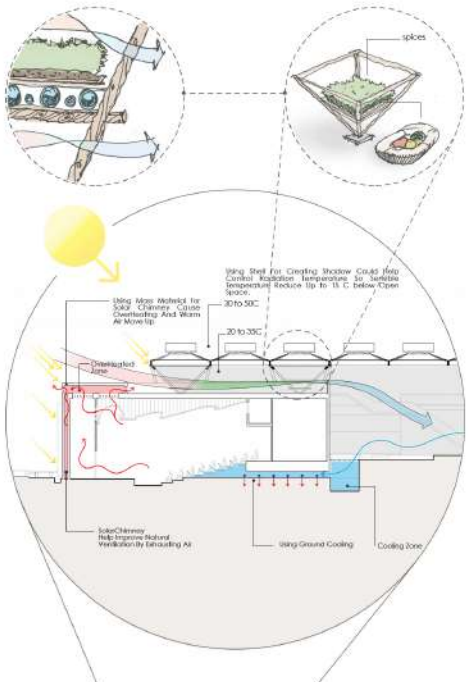


- GALLERY AND ART EXHIBITIONS SPACE -

- PERSPECTIVE VIEWS -

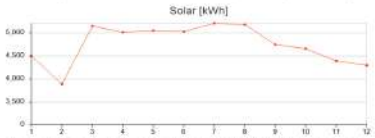
- MULTI-FUNCTIONAL MODULS DESIGN -

One of the most important aspects of sustainability is multifunctionality. The shell structure can provide a micro-climate with controlled radiation and reduce sensible temperature down to 15°C. evaporative cooling was one of our climatic strategies which this shell could help us create a shadow on the building and save vapor in a hot-dry climate, therefore we can install a humidification system to the shell. Based on analysis one of the best potentials of our site is high radiation so we need a structure for installing PV panels. The modular shell which can extend for installing more PV panels can do this. Using airflow was also an opportunity since the height of the shell can direct airflow to human height. Designed Structural and Climatic modules not only provide us with the beneficial strategies mentioned above but also make a sustainable planting place and direct airflow to spread Moroccan spices' aroma everywhere to the complex.

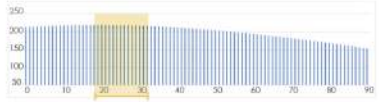


- **PV Panel**

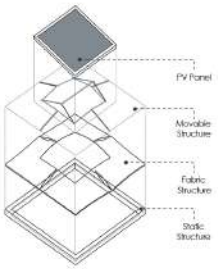
Photovoltaic (PV) Panels are used to Produce Electricity Directly From Sunlight. PV Technology Will Produce Enough Affordable Sustainable Energy To Help Mitigate Global Warming Caused By CO_2 . It Will Be A Constant Unlimited Energy Source. The energy produced by PV panels used in this project is almost 4500 kWh per month.
The monthly chart of the amount of electricity that PV panels can provide By developing the shell can be increased.



The monthly chart of the amount of electricity that PV panels can provide By developing the shell can be increased.

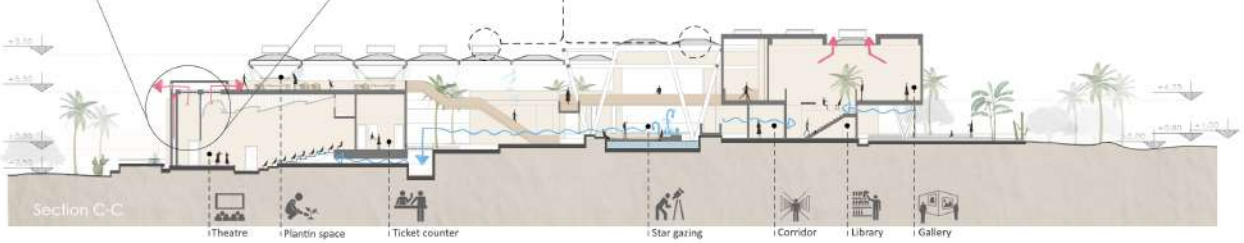


AC Power Output (kWh) - Hourly



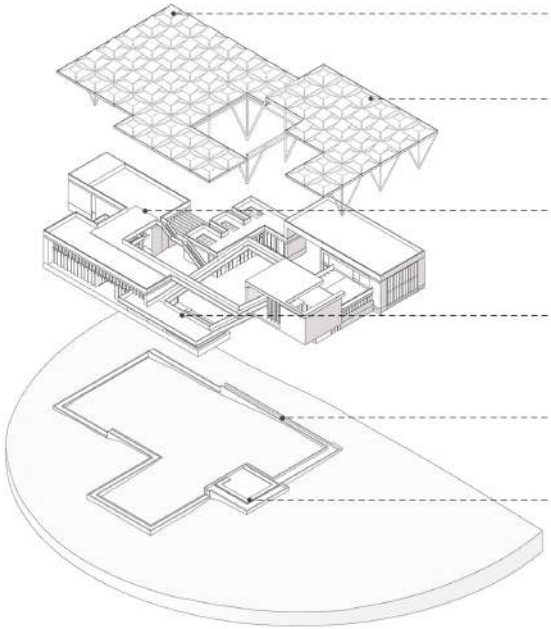
- **Shell breathing and mechanism**

We design the shell module as a living mechanism that can reform itself based on climate. The panel creates electricity and the overheated air behind it starts moving up and a constant air circulation starts. We called this phenom a breathing animal. When the wind speeds up to 4 m/s the shell starts to reform and panels rotate to prohibit high speed and warm air comes in. but this reform does not stop air circulation, just changes its direction and controls wind speed with its angle.



- OASIS AXONOMETRIC PROJECTION -

Historically, architecture has always given responses to stimuli and elements of the natural environment. The historical architecture of Morocco, which is the result of the interaction of Islamic and southern European architecture, is composed of distinct and recognizable layers that formed the basis of our design.
From a phenomenological point of view, the roof has always been a metaphor for the sky. In designing the shell of the complex, efforts have been made to control not only radiation and environmental factors, but also to see the sky as an important element in the desert. To achieve this, local fabrics are used and a hole is made in the center of the shell.
The design of the masses on the ground is also a metaphor of life in the historical perspective, so we tried to create interaction between the masses together and with the components of the site such as plants and the visitors of the complex.
The hierarchy of site-to-building access, as well as space-to-space routes, was defined to lead us through the storytelling ramp that brings the various components together. This ramp creates movement and pause spaces, and in addition to access to the gallery, restaurant, sustainable planting space, provides various perspectives to the desert, lake, and horizon skyline.
The issue of building-land interaction has also been the interest of architects throughout history. In desert life, rainfall is rare and, unlike humid climates, water is obtained from the ground. Desert land provides water, food, building materials, and livestock feed. Therefore, our attention to the earth was formed by preserving the topography and the current state of the earth, preserving existing vegetation, and designing a water circulation path that reaches all semi-open spaces.



PV Panel

Photovoltaic (PV) Panels are used to Produce Electricity Directly From Sunlight. PV Technology Will Produce Enough Affordable Energy Sustainably To Help Mitigate Global Warming Caused By CO2 . It Will Be A Constant Unlimited Energy Source.

Fabric structure

The structural module which is maden of locally manufactured materials which can easily be found the region traditionally, function both as a shading that controls sunlight and reduces temperature. They're able to reduce the sensible temperature down to 15C and can also create a micro-climate under their shell.The traditionally produced fabrics help the building to control relative humidity thus increasing comfort time.

Sustainable agriculture laboratory(SAL)

SAL is a public planting space for learning green and modern methods of agriculture. Visitors can plant herbs and spices which play an important role in Moroccan culture and cuisine and economy. It can additionally function as a green roof for the amphitheater.

Ramp

Vertical Connection That gives to Access People To the sightseeing space, Restaurant, Gallery and SAL. This Part Works As A Storytelling Object Which Creates A Communication Between Inside and Outside And takes the visitors to many places offering them a Moroccan adventure.

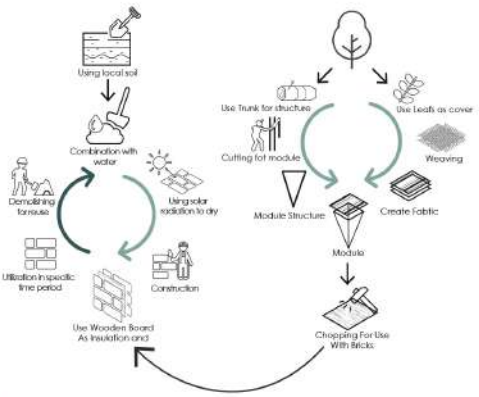
Water Loop

The Body of Water Is Designed as A Symbol of The Oasis. Which Increases The Humidity And Amplification of The Visual Axis Towards The Lake.

Star Gazing Space

It is a Public Space To Watch Oasis Night Stars. One Of The Forgotten Views In Modern life Is the Sky. Specially Observing The Desert Sky Will Be a Pleasant experience And Create an Exciting Time For the visitors.

- SUSTAINABLE ECO-MATERIALS CYCLE -



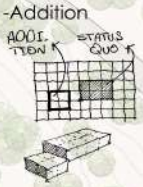
The use of indigenous materials and traditional methods reduces carbon emissions, eases access to materials, reduces pre-use material processing, eliminates the need for transportation, and is prepared by indigenous people. These are all the reasons that encouraged the designers to study indigenous manufacturing methods. In this method of construction, there is practically no waste and the materials are constantly recycled and reused in an endless cycle.

- FUTURE DEVELOPMENT PLAN -

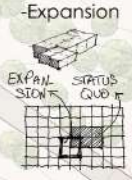
Modular Development Methods

Two Different ways of development are suggested, each suitable for a unique purpose. In the first method, Addition, the skin functions as a joint, while in Expansion the joint is the mass itself.

-Addition



-Expansion

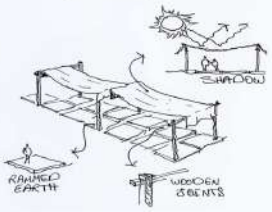


•Water Sports and Entertainments

The Oasis provides our site with many unique opportunities, among which water sports and entertainments might come to mind first.
Since sailing and water-related activites have always been traditionally practiced in Morocco, it fits our cultural center the best.

• Walking Path to Oasis

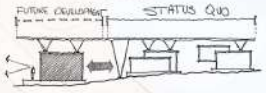
Suggesting solutions for connecting the cultural center with the oasis and water itself in a way that provides the users with qualities such as enough shadow, proper view and flooring is of utmost importance.



• Parking Lots for Safari Cars

• Oasis Boutique Hotel

This temporary accommodation is suggested since it can provide tourists and visitors with a place to stay and embrace the oasis life style more and deeper.

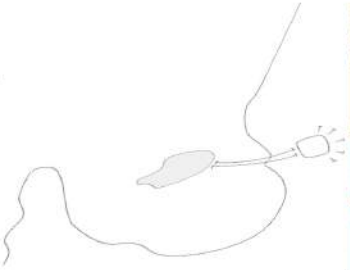


•Safari and Off-roading Trail

Safari and off-road driving is now a significant part of the desert culture and it was our decision to suggest design solutions to overcome the challenges facing the off-roaders by designing parking lots, a safari trail and other facilities.

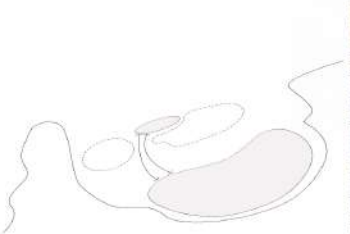
Path to Water Sports and Entertainments Space

The Oasis Cultural Center is connected to the Oasis with a walking path.
Users can access the water sports and activities center with a properly shaded path which provides shadow by easily changeable fabrics which are locally crafted on wooden structural frames that are made of trees that grow in the region. These shadings can be removed and reused if needed through the year.
In the water activities space people can swim, do fishing, sail boats and jet ski.



Facilities for Safari and Off-roading

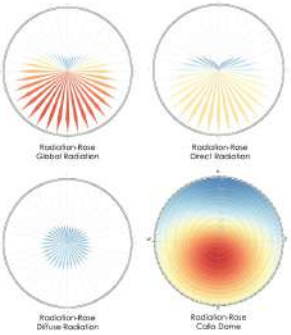
The safari trail can be connected to the main parking lots via an off-road way that goes through the cultural center and temporary accommodation (boutique hotel) zone.



- WEATHER AND CLIMATIC DATA OF THE SITE -

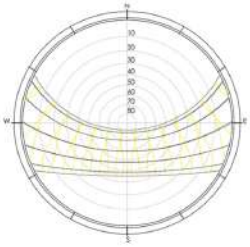
Rose Radiation And Calla Dome

Radiation roses give a sense of how much radiation comes from the different cardinal directions, which will give an initial idea of where glazing should be minimized, shading applied, or solar collectors placed.
The Calla Dome can be understood in three different ways:
1) The Calla Dome a 3D representation of all possible radiation roses for a given sky since it includes all vertical angles from 0 to 90.
2) The Calla Dome is the reciprocal of the Tergenza Sky Dome since the Calla Dome essentially shows you how the radiation from the sky will fall onto a hemispherical object.
3) The Calla Dome is a smart radiation analysis of a hemisphere. Your results would effectively be the same if you made a hemisphere in Rhino and ran it through the "Radiation Analysis" component but, with this component, you will get a smoother color gradient and the component will automatically output the point (or vector) with the most radiation.



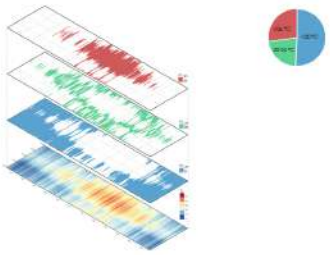
Sun Path Diagram

Sun path diagrams can tell you a lot about how the sun will impact your site and building throughout the year. Stereographic sun path diagrams can be used to read the solar azimuth and altitude for a given location.



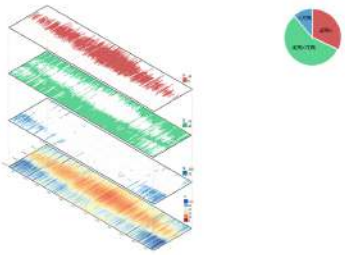
Dry Bulb Tempreture

The Dry Bulb Temperature Refers Basically To The Ambient Air Temperature. It Is Called "Dry Bulb" Because The Air Temperature Is Indicated By A Thermometer Not Affected By The Moisture Of The Air.



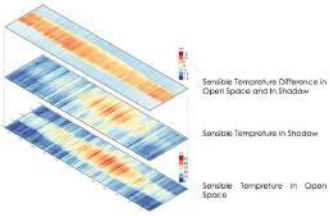
Relative Humidity

Relative humidity (RH) refers to the moisture content (i.e., water vapor) of the atmosphere, expressed as a percentage of the amount of moisture that can be retained by the atmosphere (moisture-holding capacity) at a given temperature and pressure without condensation



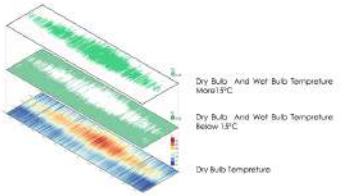
Univeral Thermal Climate Index(UTCI)

UTCI is this temperature of what the weather "feels like" and it takes into account the radiant temperature (sometimes including solar radiation), relative humidity, and wind speed. UTCI uses these variables in a human energy balance model to give a temperature value that is indicative of the heat stress or cold stress felt by a human body in the



Dry Bulb VS. Dew Point Tempreture

This chart could show how is the potential of adding humidity to air, humidity could always reduce sensible tempreture.

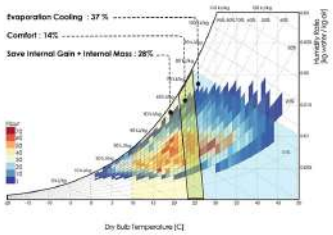


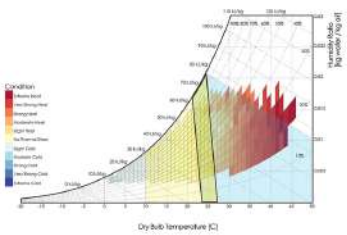
- PSYCHROMETRICS CHART AND PASSIVE METHODS -

The specific human energy balance model used by the psychrometric chart is the Predicted Mean Vote (PMV) model developed by P.O. Fanger. PMV is a seven-point scale from cold (-3) to hot (+3) that is used in comfort surveys. Each interger value of the scale indicates the following:
-3:Cold, -2:Cool, -1:Slightly Cool, 0:Neutral, +1:Slightly Warm, +2:Warm, +3:Hot.
The range of comfort is generally accepted as a PMV between -1 and +1 and this is what defines the range of the comfort polygon on the psychrometric chart.
Accordingly, this component will also output the PMV of the occupant for the input conditions as well as an estimated percentage of people dissatisfied (PPD) in the given conditions.

A comfort zone is a psychological state in which things feel familiar to a person and they are at ease and (perceive they are) in control of their environment, experiencing low levels of anxiety and stress.
Selected Methods Based On Increase Comfort Zone:

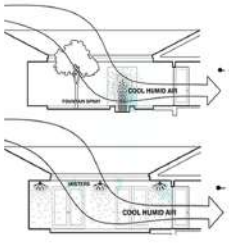
1. Evaporative Cooling
   Extend Comfort Zone up to 37%
2. Radiation Control
3. Shading Design
4. Save Internal Heat Gain & Using Internal Mass
   Extend Comfort Zone up to 28%
5. Base Comfort Zone
   Include 14% Comfort Zone





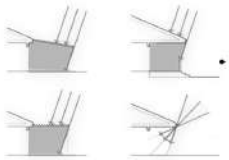
1 EVAPORATIVE COOLING

An evaporative cooler (also evaporative air conditioner, swamp cooler, swamp box, desert cooler and wet air cooler) is a device that cools air through the evaporation of water. Evaporative cooling differs from other air conditioning systems, which use vapor-compression or absorption refrigeration cycles. Evaporative cooling uses the fact that water will absorb a relatively large amount of heat in order to evaporate (that is, it has a large enthalpy of vaporization). The temperature of dry air can be dropped significantly through the phase transition of liquid water to water vapor (evaporation). This can cool air using much less energy than refrigeration. In extremely dry climates, evaporative cooling of air has the added benefit of conditioning the air with more moisture for the comfort of building occupants.

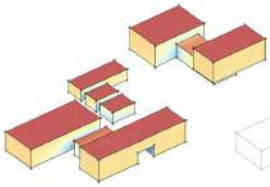


2 RADIATIOTTN CONTROL

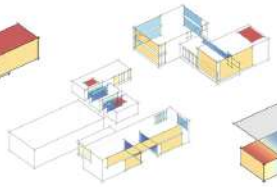
Shade Systems fabric shade structures, covers, tents, awnings, umbrellas, and shade canopies are perfect for playgrounds, pools, schools, and other outdoor spaces where people and children seek protection from the sun's harmful U.V. (Ultra Violet) rays which have been shown to cause skin cancer.
A microclimate (or micro-climate) is a local set of atmospheric conditions that differ from those in the surrounding areas, often with a slight difference but sometimes with a substantial one.



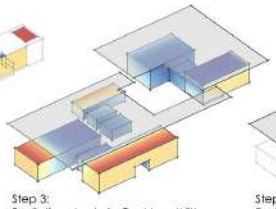
3 SHADING DESIGN



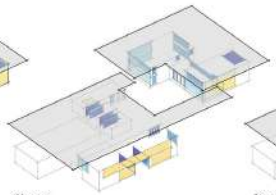
Step 1:
Base Model Radiation Analysis On Mass.



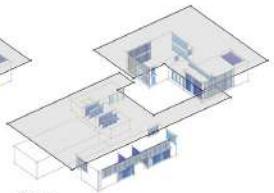
Step 2:
Base Model Radiation Analysis On Glazing.



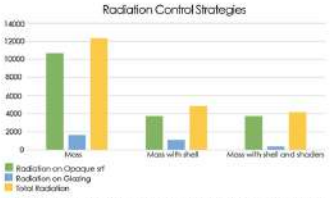
Step 3:
Radiation Analysis On Mass With Shell.



Step 4:
Radiation Analysis On Glazing With Shell.



Step 5:
Radiation Analysis On Glazing With Shell and Static Shader.

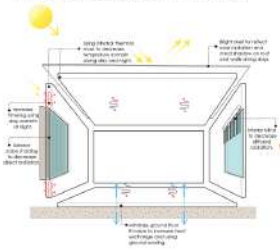


Exterior shading systems have a big advantage over interior systems: they significantly reduce unwanted solar heat gain by eliminating one of the sources of that gain. Solar radiation is absorbed by shading material, whether installed inside or outside a building. The short-wave solar energy that is absorbed by the shading system is converted into long wave energy (i.e., heat). With an exterior system, this heat is radiated outside the building and never reaches the glazing, contribute to lower HVAC demand, which in turn can contribute to a downsized HVAC system, lower capital costs, and lower operational costs over time.
Shading Methods Reduce Recieved Raiation up to 70%.

4 SAVING INTERNAL HEAT GAIN AND USING INTERNAL MASS

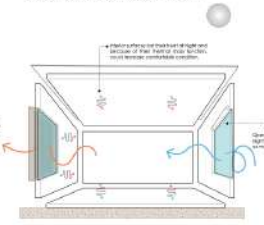
Day Scenario

Using internal thermal mass to decrease temperature domain along day & night. This improve comfort situation and increase using time of material.



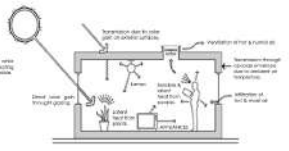
Night Scenario

Interior surfaces lost their heat at night and because of their thermal mass function, could increase comfortable condition.



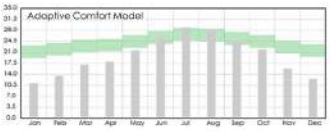
Internal Mass

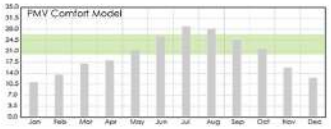
Internal thermal mass defined in this way is used to specify the construction and area of items within the space that are important to heat transfer calculations but not necessarily important geometrically. For example, furniture within the space – particularly for large spaces.



5 COMFORT MODEL

Comfort Model



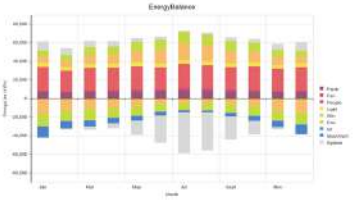


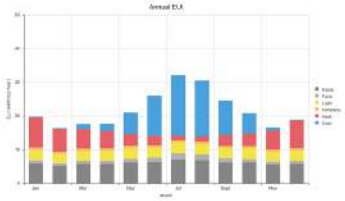
- ASHREA BASELINE AND ENERGY PERFORMANCE -

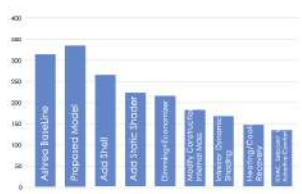
Performance path
In the performance approach, a baseline energy cost budget (ECB) is established, based on the building size and program. This baseline ECB is established using building performance simulation to model a building with the same size and program as the project building, built according to the prescriptive requirements of ASHRAE 90.1 (sections 5-10). The ECB is expressed in units of dollars.

A building performance simulation is then performed on the proposed building design. The proposed energy cost budget must be less than or equal to the baseline energy cost budget to achieve compliance.

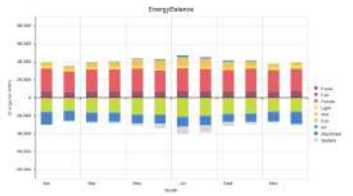
The performance approach is also used to demonstrate design energy efficiency, often expressed as percent better than ASHRAE Standard 90.1. Building designs will stated their performance as "40% better than ASHRAE 90.1-2007" or "20% better than ASHRAE 90.1-2010". Percent improvement over ASHRAE 90.1 is the basis for awarding energy points within the LEED rating system.

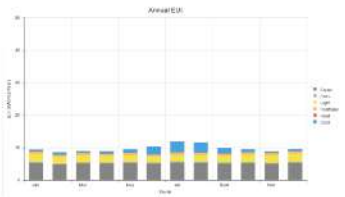






Energy Demand Reduced

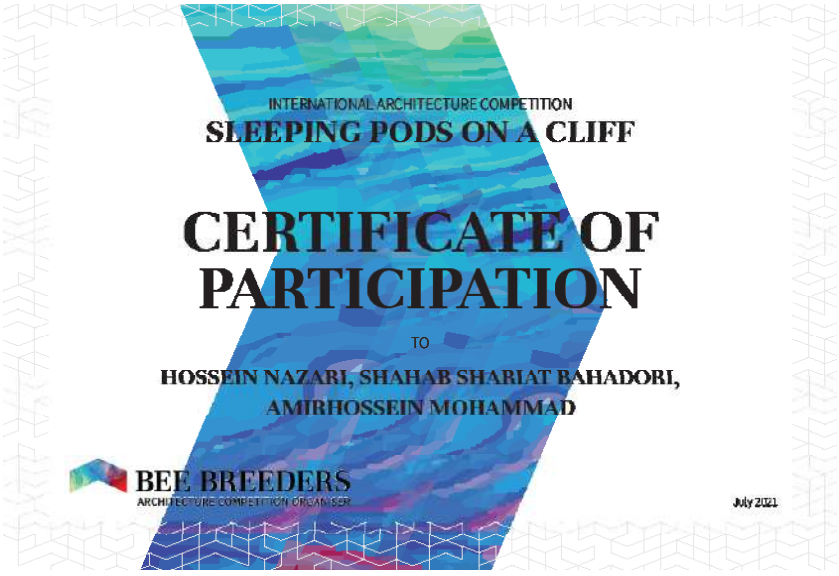




Photography

Qeshm Island, Iran, Native Buildings

Certificates



PortFolio

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