SITE ANALYSIS

MULTAN

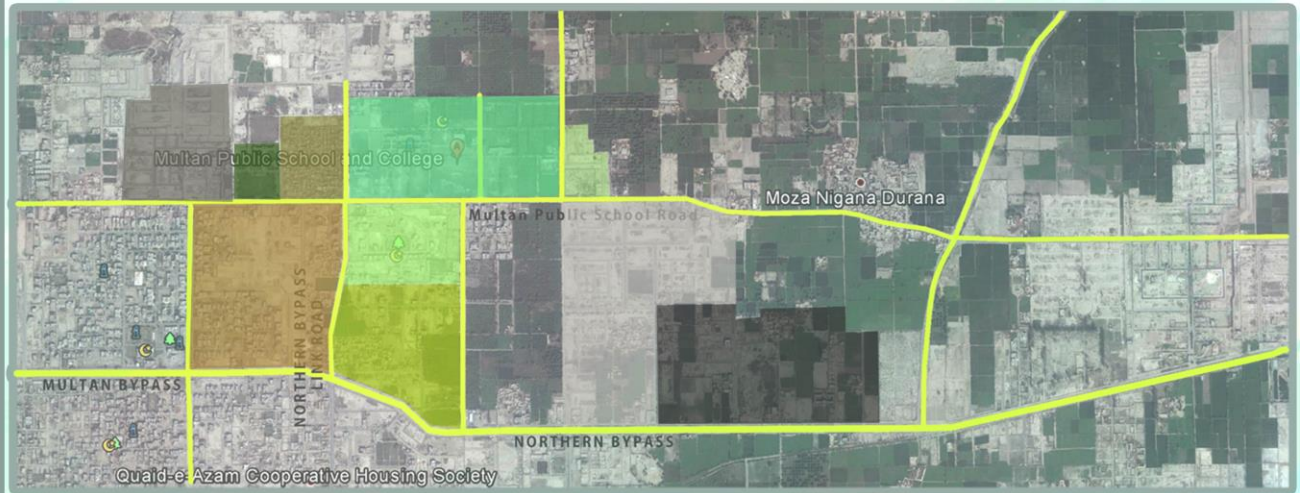|	
Coordinates:	30° 11′ 52″ N 71° 28′ 11″
Country:	Pakistan
Region:	Punjab
District:	Multan District
Autonomous towns:	6
Union councils:	4
Government	Nazim
Area	Total 331 km² (128 sq mi)
Elevation:	122 m (400 ft)
Population:	(1998): Total 6 million
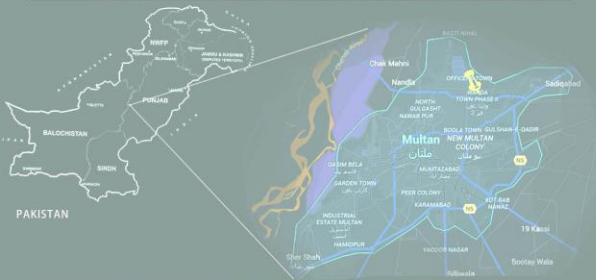
BRIEF

To design an innovative, affordable, environment friendly, and disaster resilient housing for low income community in urban and sub-urban areas.

Geography and Climate:

The area around the city is a flat, alluvial plain and is ideal for agriculture. There are many canals that cut across the Multan District, providing water from nearby farms. This makes the land very fertile. However land close to the Chenab River is usually flooded in the monsoon season. Multan features an arid climate with very hot summers and mild winters. The city witnesses some of the most extreme weather in the country. The highest recorded temperature is approximately 54° C (129° F), and the lowest recorded temperature is approximately −1° C (30° F). The average rainfall is roughly 186 mm (7.3 in). Dust storms are a common occurrence within the city.

■ Site	■ Girls Public School
■ Multan Public School & College	■ Agrics Town
■ Sunshine Housing	■ Gulshan Wahid

■ Sahara Housing	■ Pace City
■ BZU Employers Colony	
■ PIA Employee Housing	

CONCEPT

Site options given in the brief is the central region of Pakistan that is Multan 5th largest city which lies in the province of Punjab. Multan is known as the City of Sufis or City of Saints and Madinat-ul-Auliya because of the large number of shrines and Sufisaints from the city. There is a saying in Persian that Multan is the 'City of Saints, Sufis and Beggars' (Gard, Garma, Gada o Goristan). It is one of the main cities in the southern Punjab province of Pakistan. The city has been a focal point for many religions, in particular becoming a central abode for Sufism, the mystical side of Islam. It has attracted Sufi saints from far places of the globe. Today, Multan is known as the 'City of Sufis'. Multan is one of the oldest cities in South Asia, with many tombs, shrines, temples, cathedrals and mausoleums, as well as a historical fort. The city multan is rich in culture of Sufism or Islamic mysticism and influenced the overall city and it's architecture. The concept for this design project is derived from the concept of Sufism i.e. Islamic mysticism. The lexical root of the word is traced to Safā , which in Arabic means "purity". It discusses the purity of soul through ritual purification. The teaching of Sufism is based on simplicity, forgiveness, peace and purity of mind and soul. In architecture purity refers to the purity of form and material. Purity in architecture can also be attained by simplifying the process or by incorporating nature in design as nature and its attributes are the examples of purity. Visually purity can be sense through symmetry, form, material and natural light. While relation can be established through open spaces and by incorporating light and wind in to the space.
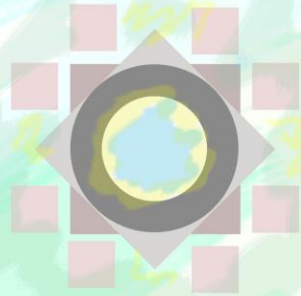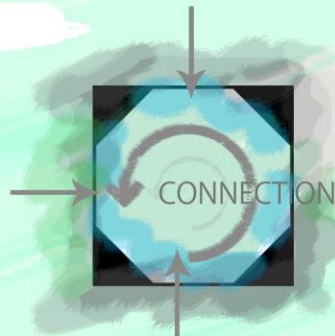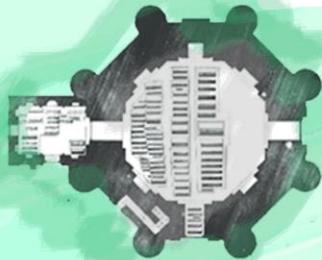
PURITY OF FORM
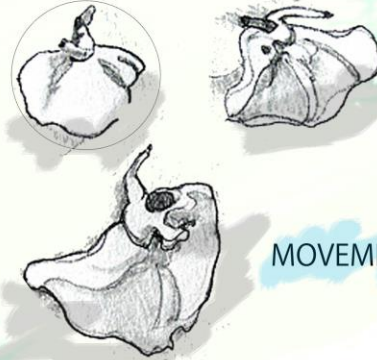
MOVEMENT

CONNECTION

CONNECTION
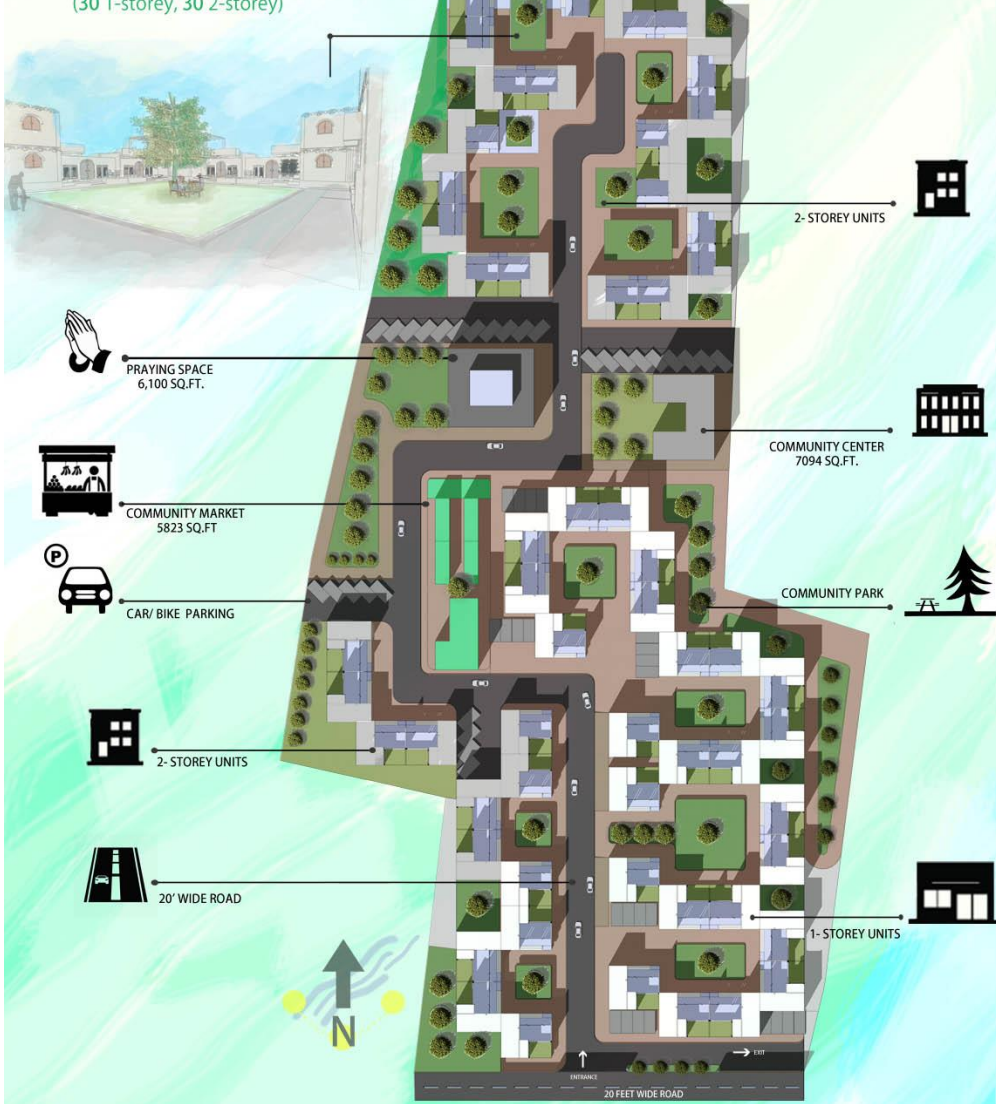
COURTYARD
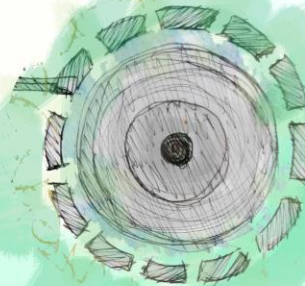
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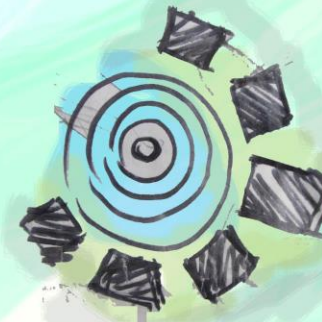
MASTER PLAN

SITE: 5.1 ACRE/ 20,80SQM
NO. OF UNITS: 60 units
(**30** 1-storey, **30** 2-storey)

2- STOREY UNITS

PRAYING SPACE
6,100 SQ.FT.

COMMUNITY CENTER
7094 SQ.FT.

COMMUNITY MARKET
5823 SQ.FT

CAR/ BIKE PARKING

COMMUNITY PARK

2- STOREY UNITS

20' WIDE ROAD

1- STOREY UNITS

N

ENTRANCE

EXIT

20 FEET WIDE ROAD

MODULAR (TYPE A)

MODULE : TYPE A
NO. OF MODULES: 30
NO. OF STOREY: 1- STOREY

PLOT AREA: 1100.5 SQ.FT.
BUILT UP AREA: 408SQ.FT
MATERIAL: SOLAR BAKED BRICK

31'-0"

ROOM
10'-0"x12'-0"

bathroom
5'-0"x6'-0"

toilet
5'-0"x6'-0"

ROOM
10'-0"x12'-0"

courtyard

kitchen
9'-0"x6'-0"

35'-6"

Kitchen garden
16'-0"x11'-0"

WINDOWS WILL OPEN INSIDE
BECAUSE OF FREQUENT DUST
STORM

WATER POTS AND SHADE
FOR SITTINN

INFORMAL SPACE
SITTING SPACE

N

GROUND FLOOR

SCALE: 1/8"=1"-0":

SPACE FOR WORKSHOP
LIKE TRIDITIONAL POTTERY
HANDICRAFT & FURNITURE

SPACE FOR KITCHEN GARDEN

SPACE CAN BE UTILIZED FOR
ANIMAL STORAGE OR SMALL BUISNESS

FRONT ELEVATION

REAR ELEVATION

1'-1"

2'-0"

10'-0"

7'-0"

4'-0"

SECTION A-A

Flooring
limeconcrete
Cement Concrete
Fill (1:2:4)
Mid Steel
tie-rod
Plaster
Brick
Arch
R.S.J.

PLINTH 2'
LIME:CEMENT:SAND
1:1:5

CEMENT MORTAR
1:4
BRICK
CEMENT CONCRETE
1:2:4

SPAN RATIO 1:6

JACK ARCH FOUNDATION
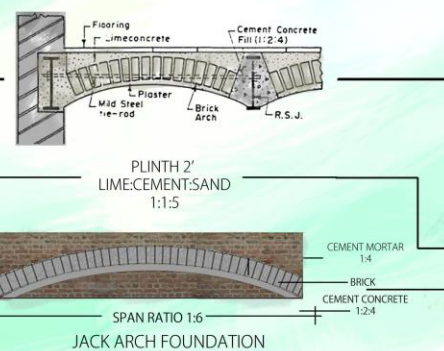
8'-0"

SECTION B-B

04

VIEWS

RIGHT ELEVATION

LEFT ELEVATION

MODULAR (TYPE B)

MODULE : TYPE A
NO. OF MODULES: 30
NO. OF STOREY: 2- STOREY

PLOT AREA: 1100.5 SQ.FT.
BUILT UP AREA: 811SQ.FT
MATERIAL: SOLAR BAKED BRICK

GROUND FLOOR

31'-0"

ROOM
10'-0"x12'-0"

bathroom
5'-0"x6'-0"

toilet
5'-0"x6'-0"

ROOM
10'-0"x12'-0"

courtyard

kitchen
9'-0"x6'-0"

UP →

3'-0"

Kitchen garden
16'-0"x11'-0"

35'-6"

N

SCALE: 1/8"=1"-0":

WINDOWS WILL OPEN INSIDE BECAUSE OF FREQUENT DUST STORM

WATER POTS AND SHADE FOR SITTINN

INFORMAL SPACE SITTING SPACE

SPACE FOR WORKSHOP LIKE TRIDITIONAL POTTERY HANDICRAFT & FURNITURE

SPACE FOR KITCHEN GARDEN

SPACE CAN BE UTILIZED FOR ANIMAL STORAGE OR SMALL BUISNESS

N

FIRST FLOOR

31'-0"

ROOM
10'-0"x12'-0"

COURTYARD
14'-0"x18'-0"

courtya

Kitchen garden
16'-0"x11'-0"

35'-6"

SCALE: 1/8"=1"-0":

SECTION A-A

10'-0"

1'-1"
2'-0"

10'-0"

7'-0"

4'-0"

Flooring
Limeconcrete
Plaster
Mild Steel tie-rod

Cement Concrete Fill (1:2:4)

Brick Arch

R.S.J.

PLINTH 2'
LIME:CEMENT:SAND
1:1:5

CEMENT MORTAR
1:4

BRICK

CEMENT CONCRETE
1:2:4

SPAN RATIO 1:6
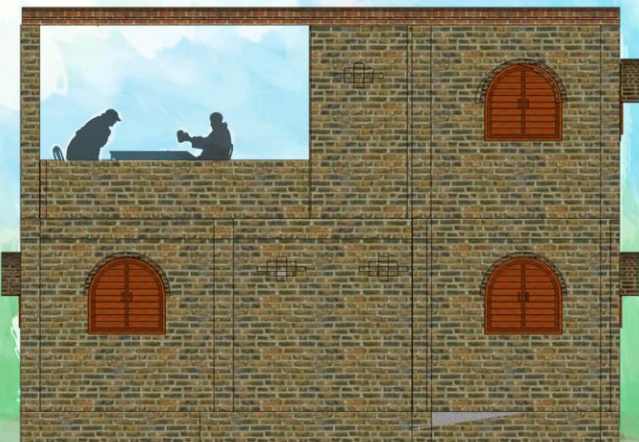
JACK ARCH FOUNDATION

SECTION B-B

FRONT ELEVATION

REAR ELEVATION

RIGHT ELEVATION

LEFT ELEVATION

VIEWS

STAIRS TO 1ST FIRST FLOOR & KITCHEN GARDEN

COURTYARD ON GROUND FLOOR

OPEN SPACE ON FIRST FLOOR
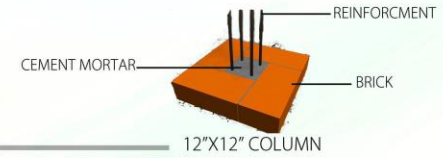

UNITS SHARING EXTERNAL COURTYARD

PAVED PATHWAYS

SHARED GREN SPACE/ KITCHEN GARDEN

ARCHED OPENING FOR DOOR & WINDOWS REDUCE THE COST OF LINTEL & FRAMING

REINFORCMENT

CEMENT MORTAR

BRICK

12"X12" COLUMN

ARCH ROOF 12" IN HEIGHT FOR HOT CLIMATE AND PROVIDE SHADE TO VENTILATOR

VENTILATORS ARE MADE BY REMOVING BRICKS SAVE THE COST OF WOODEN FRAME & GLASS

WOODEN FENCE IS MADE WITH USED SHUTTERING WOOD

VINE ON WOODEN FRAME WHICH CREATE VISUAL BARRIER AND CAN BE USED TO GROW VEGETABLES

24" HIGH PLINTH TO RESIST FLOOD AND SAVE THE FOUNDATION

ARCH FOUNDATION

DESIGN:
Design is derived from the concept of sufism which is the core aspect of Multan city which is also known as city of saints. Multan is the 5th largest city and central region of Pakistan. There are more than 50 Mausoleums in the city which connect the people all over the country and creates layer within the city. Sufism as the design concept I analyze the teachings and simple life of sufi , from where I derived the architectural design elements like connection, simplicity yet detailed, symmetry, unity, movement, purity of form and material.

MASTERPLAN:
In master plan the central part of the site is dedicated to community space, market and a praying space which connects the people and revives neighborhood culture. Praying space is located at the center of the site as which brings people closer and connects them in informal way. The Bazaar/market is located in the center of the site. The Bazaar is a concept similar to an open market or a barter system where everyone has equal opportunity to acquire any space and sell their products. Market can be organized on a weekly basis by local residents' buyers from the outside the community will be allowed to come. Every resident have a space which enables them to setup a small cottage business so they can sell their products in Bazaar/market or grow enough food for themselves.

MARKET SPACE

CENTRAL PART OF SITE CONTAINING COMMUNAL SPACE

Units are connected in clusters to reduce the service and construction cost, create shared space and courtyards and bring harmony in the design. Each cluster contain 5 or 7 units and connected in way that share walls, columns and kitchen garden space that will multiply the productivity. In a cluster of 7 and 5 walls are being shared. There will be single over head water storage tank for each cluster which will provide water to 7 units. This will reduce the cost of electricity and construction as the single water pump will fill the over head tank and then the water will supply to each unit as the force of gravity will do the rest of job.

MODULAR:
Unit has the total 1100sq.ft with the dimension of 31'-0"x35'-6" comprises of 2 bedrooms, kitchen, bathroom, toilet, multi-purpose courtyard and a space for business activity or kitchen garden. Majorly material used for construction is solar baked red brick. Solar baked brick is my concept for low cost material as clay in city of Multan is in abundance and a cheap material for construction. Any material other than brick will become more costly as lack of trained professionals. Typical baked brick cost 0.05-0.08$ so as to reduce the cost of unit material cost should be cut down as 50-70% cost of unit is of material. Unbaked brick is a green material as it has very low percentage of carbon foot prints and the cost is 0.01$. In order to get the right product I observed the brick making process which make me realize the price of unbaked brick is 7 times low as compare to baked brick. The carbon footprints caused by the baking process in the form of fuel used for burning, pollution and material wastage is much more then unbaked brick and solar baked brick. Baking process also damage the health of kiln workers.

MATERIAL:
Solar baked brick is a simple brick which is baked or fired with the help of sunlight. Sunlight in normal circumstances cannot attain 900 ° C to1200 ° C which is required to bake a brick. In order to attain this temperature concept of converging sunlight through lens is used for example paper can caught in fire if sunlight is focus on the paper with the help of magnifying glass same concept is being used in the making of solar baked brick. Instead of magnifying glass old T.V dish or Fresnel lens is being used. Take an old T.V dish paste small square pieces of mirror in way it covers whole dish and now place another concave lens which focused the beam on a brick to bake it. Larger the diameter of a T.V dish higher will be the temperature. Same system can be build with the help of an old T.V Fresnel lens and mount it on a wooden frame that will converge enough sunlight. This system will be more beneficial if it's installed in a hot climate area under a controlled environment and maximum number of solar kiln installed to utilize maximum daylight. This system will reduce the cost by 60% - 70% and has almost 0% carbon footprint and fossil fuel consumption.

Columns used in the units are of 12"x12" brick is placed in square form 4 reinforcement is placed in center and filled with cement mortar structure will help the unit to sustain during disasters. Arch foundation is used in the unit which is 24" deep and save up to 40% construction cost. Plinth used in the design is 24" high as to make building sustainable against floods and plinth slab is made up of brick which reduce the cost 35%. Jack arch roof is being used because of hot climate and save cement and steel.
All the openings in the building are in arch form which reduce the lintel and frame cost and ventilators are made by removing the bricks that will save frame and material cost.
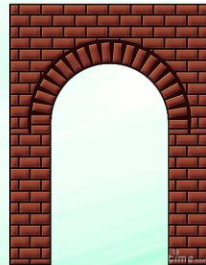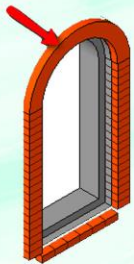
COLUMN DETAIL
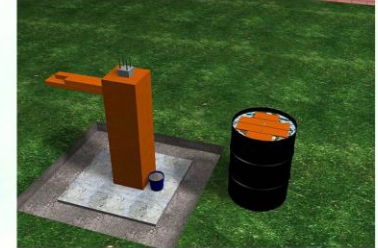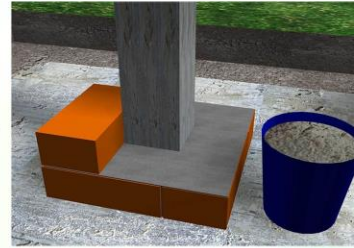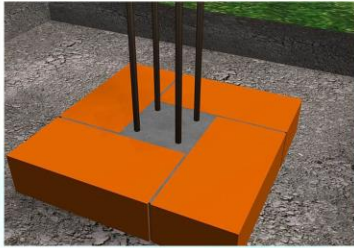
ARCHED FOUNDATION

ARCHED OPENINGS/ VENTILATOR
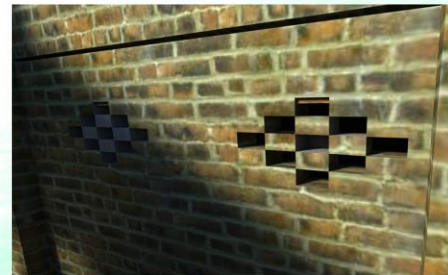
BRICK MAKING PROCESS

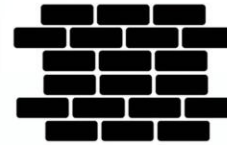|				
Winning - Digging For Clay	Moulding preparing the clay for shaping	Shaping moulding of the bricks by hand	Drying in open air and in kilns	Firing baking brick upto 1000 ºC

.0.0/brick ————————————————— Rs. 0.75-1/brick ———————— Rs. 5-8/brick

UNBAKED BRICK · BAKED BRICK

ALTERNATE METHOD

Winning - Digging For Clay	Moulding preparing the clay for shaping	Shaping moulding of the bricks by hand	Drying in open air and in kilns	Firing baking brick upto 1000 ºC
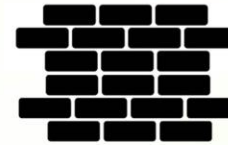
.0.0/brick ————————————————— Rs. .75-1/brick ———————— Rs.2-3/brick
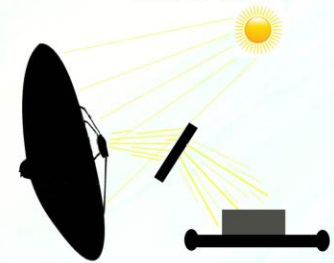
UNBAKED BRICK · **SOLAR** BAKED BRICK

SOLAR KILN

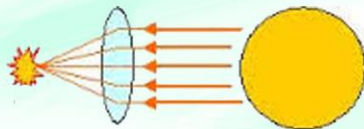|					
Old dish	Mirror pieces	Paste mirror pieces on old dish	Mirror pieces will converge the sunlight to one point	FRESNEL LENS FROM AN OLD TV	MOUNTED IN A WOODEN FRAME	SAME TEMPERATURE CAN BE ACHIEVED BY CONVERGING SUNLIGHT

Converging sunlight through solar reflector can attain tempreture upto 600° C (54cm) into 1cm area but temprature, position and area can be changed by changing the size of the dish and distance between focal point and object. The solar ray can be deflected and made more powerful by adding concave lenses. This system can be used in baking bricks under controlled environment which reduce the cost about 60%. System can be more beneficial if designed properly with atleast 15-20 solar klin which reduce the labour cost and carbon emmission caused by typical klin