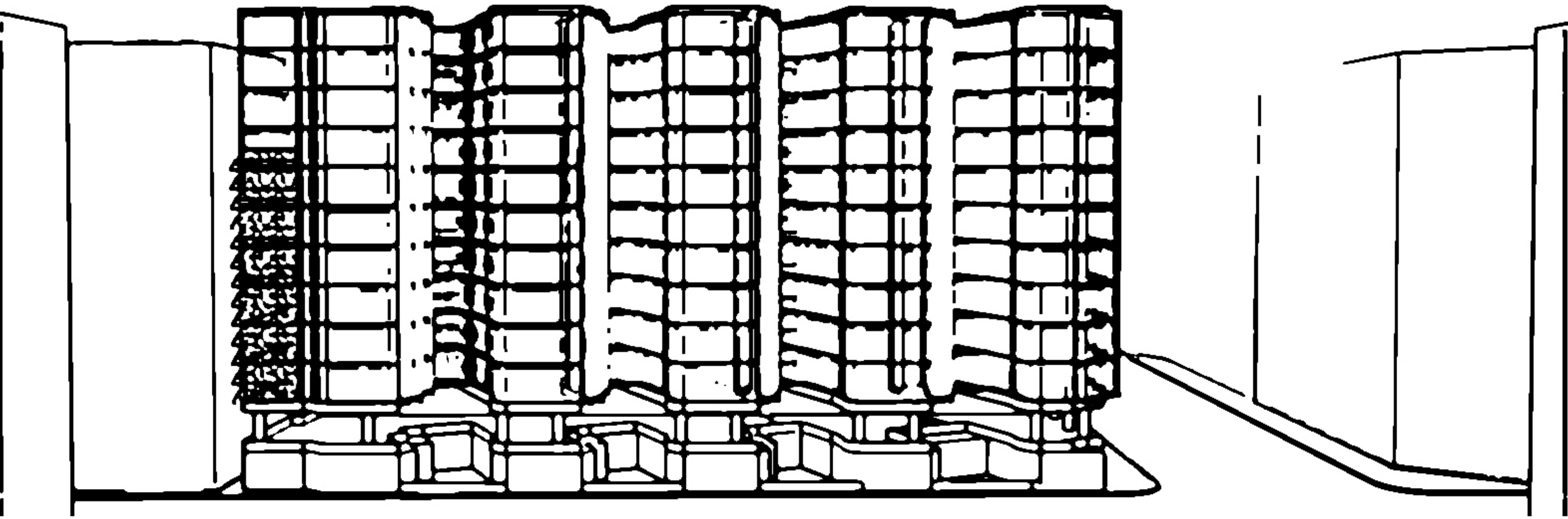


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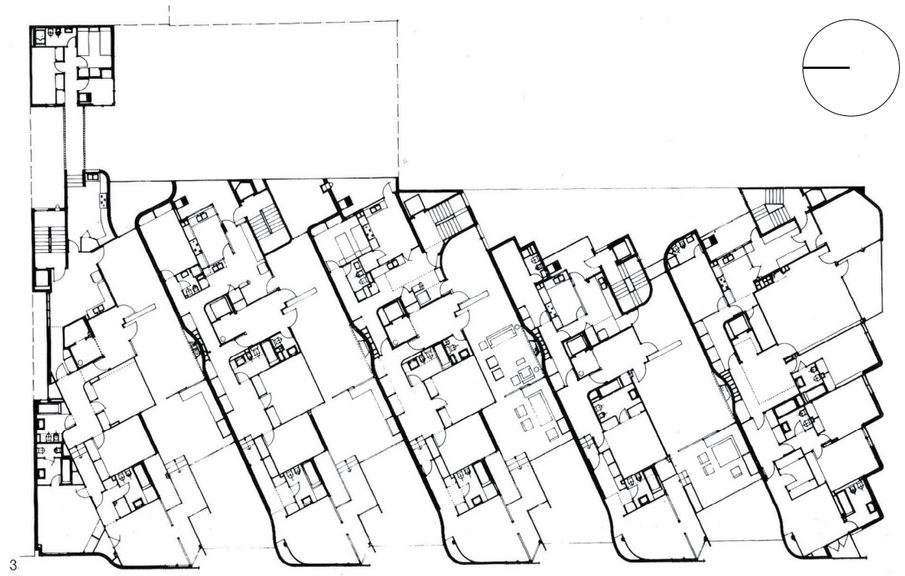
# EDIFICIO GIRASOL

*BUILDING OS*

Sujal Kodamadanchirayil Suresh

Tutors: Vicente Guallart, Pep Salas, Elias Kateb

# EDIFICIO GIRASOL



**LOCATION:** MADRID,SPAIN

**ARCHITECT:** JOSE ANTONIO CODERCH

**BUILT**: 1966

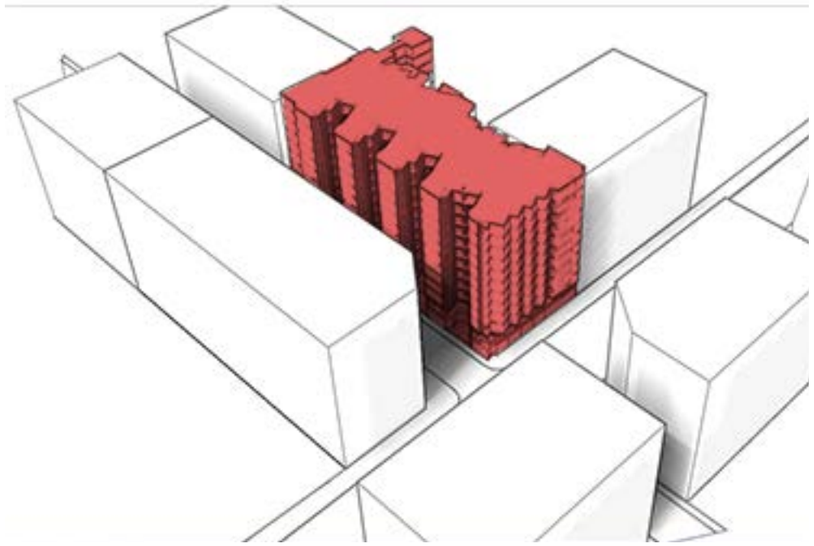


*The building can be seen as a unity of five contiguous blocks of high quality dwellings, above a two-story commercial complex, which constitutes its zocalo.*
*The dwellings are arranged diagonally to the facades, availing of the shape of the site and trying to find the best orientations. The dwellings are separated by thick, long and sinuous walls.*
*To ensure good lighting and sunlight in every room, the architect plans very deep terraces/patios, with wooden lattices that filter the light and also provide privacy.*
*The west facade to Lagasca Street is of special interest, because of a marked vertical rhythm, which is achieved by alternating large openings (the terraces/patios) with long curved blind walls.*









**FACTORS FOR THE DESIGN OF THE SOLAR PANEL**

*1. EXPOSED BRICK FACADE*

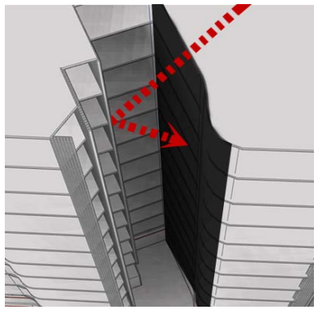
*2. SERIES OF COURTS TO LET IN MAXIMUM LIGHT INTO THE DWELLINGS*

*3. BUILDING ORIENTATION*

*4. CONTEXT*

*LOCATION CONSIDERED:*
*BARCELONA, SPAIN*
*41.3851° N, 2.1734° E*





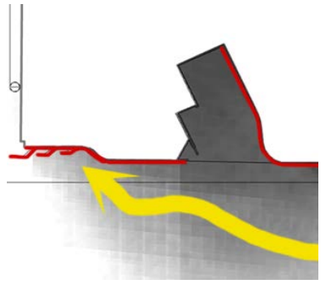
**ANALYSIS OF THE BUILDING:**

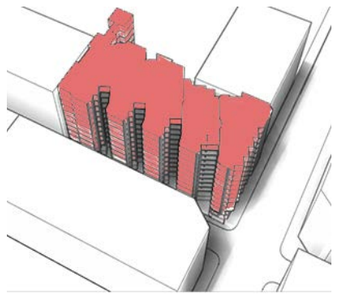
*1. COLOURED SOLAR PANELS WHICH COMPLEMENTS THE EXISTING FACADE OF THE BUILDING*

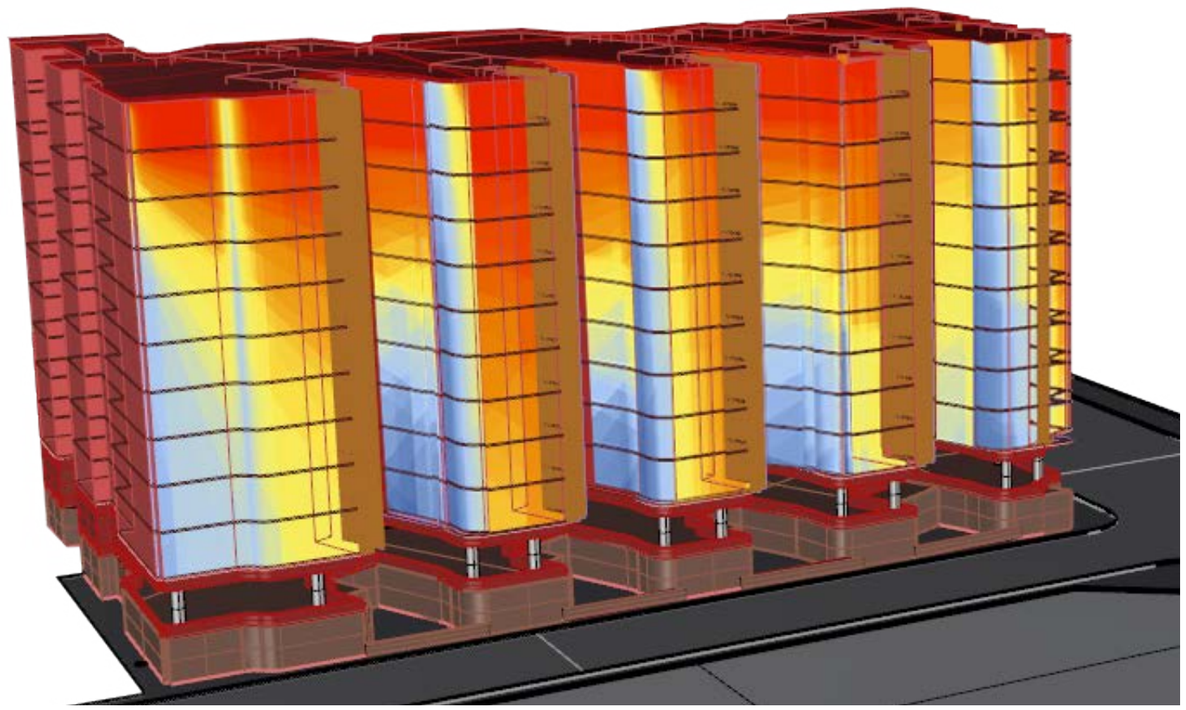
*2. THE COURTS WILL SERVE AS A WIND AND LIGHT CHANNEL TO THE DWELLINGS. THE BALCONIES WALL OPOSITE THE BALCONIES COULD HAVE PANELS WHICH RECIEVES THE REFLECTED SUNLIGHT.*

*3. IN AREAS OF FACADE WHERE THE RADIATION OF LIGHT IS NOT MUCH, THE PANELS COULD ORIENT TO AN OPTIMUM ANGLE TO INCREASE THE PRODUCTION.*

*4. KEEPING IN MIND THE ANGLE OF THE SUN AND THE BUILDINGS SURROUNDING EDIFICIO GIRASOL, ANALYISIS USING LADY BUG WAS DONE TO GET THE BEST POSSIBLE ORIENTATION.*







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## SOLAR PANEL

**TYPE:** *POLI CRYSTALLINE SILICON SOLAR CELL*

**TYPE:** *72 CELL PRODUCING 24V*

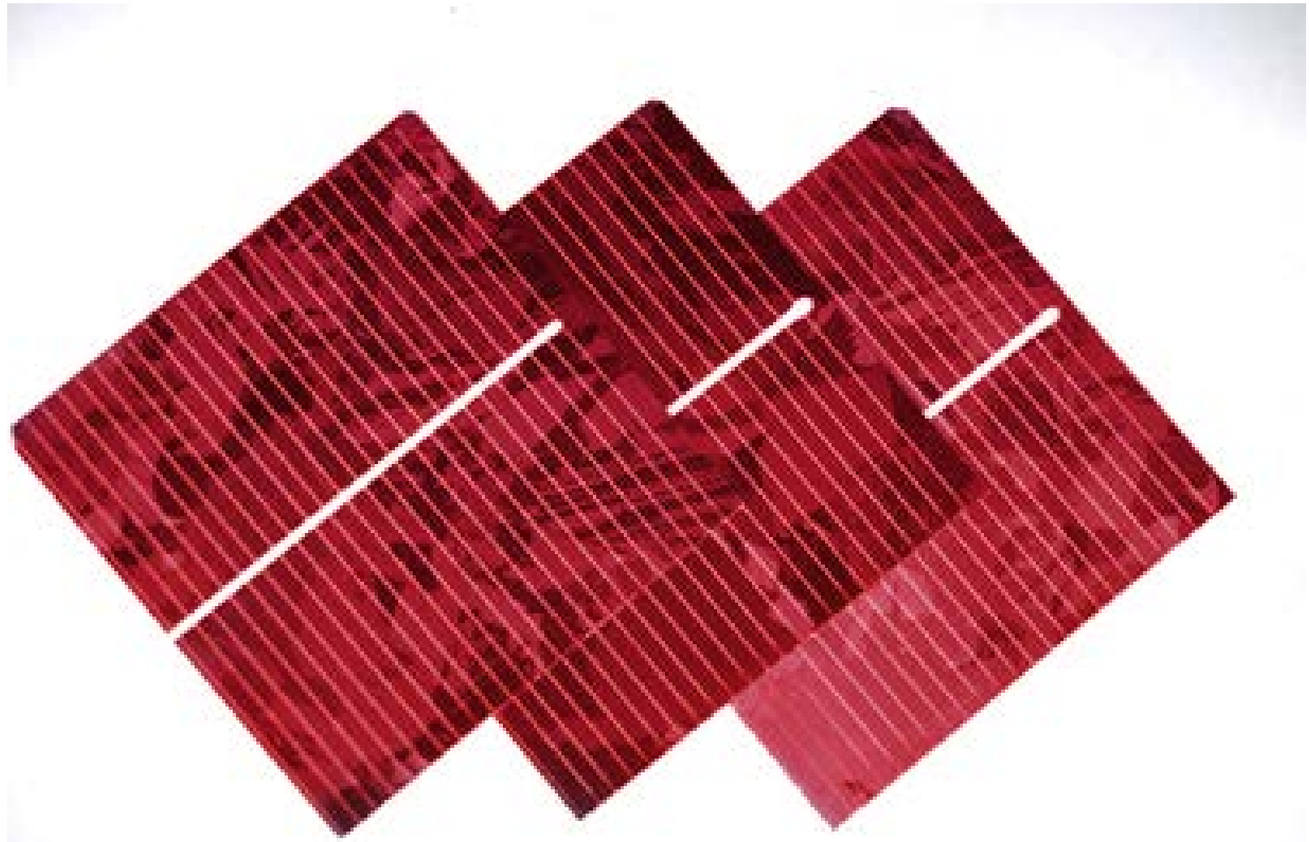
**SIZE OF THE EACH PANEL:** 196 X 99 mm

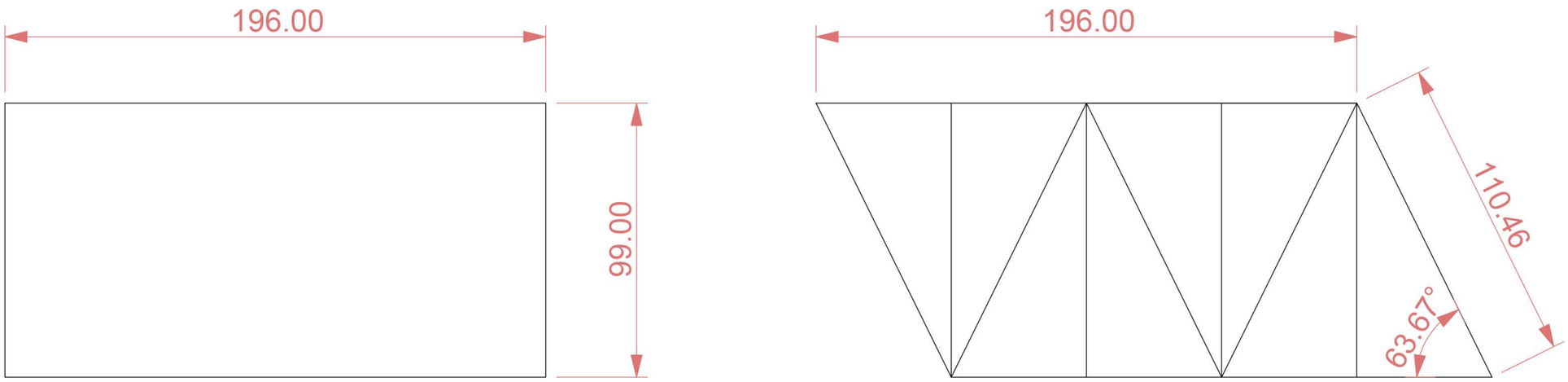
*Economical*

*Is better when used over a larger area span*

*High temperature ratings are slightly lower than those for monocrystalline panels*

*The manufacturing process produces little waste, and the technology allows for a cost-effective panel.*






*Panel Design Transformations*

## Total Consumption

Number of Dwellings: 60
Energy consumed by each family per year: 3500

Total number of inhabitants: 240

Total Energy by al the Dwellings:

3500 x 60= **2,10,000 KWh**

## Total Consumption Power Density

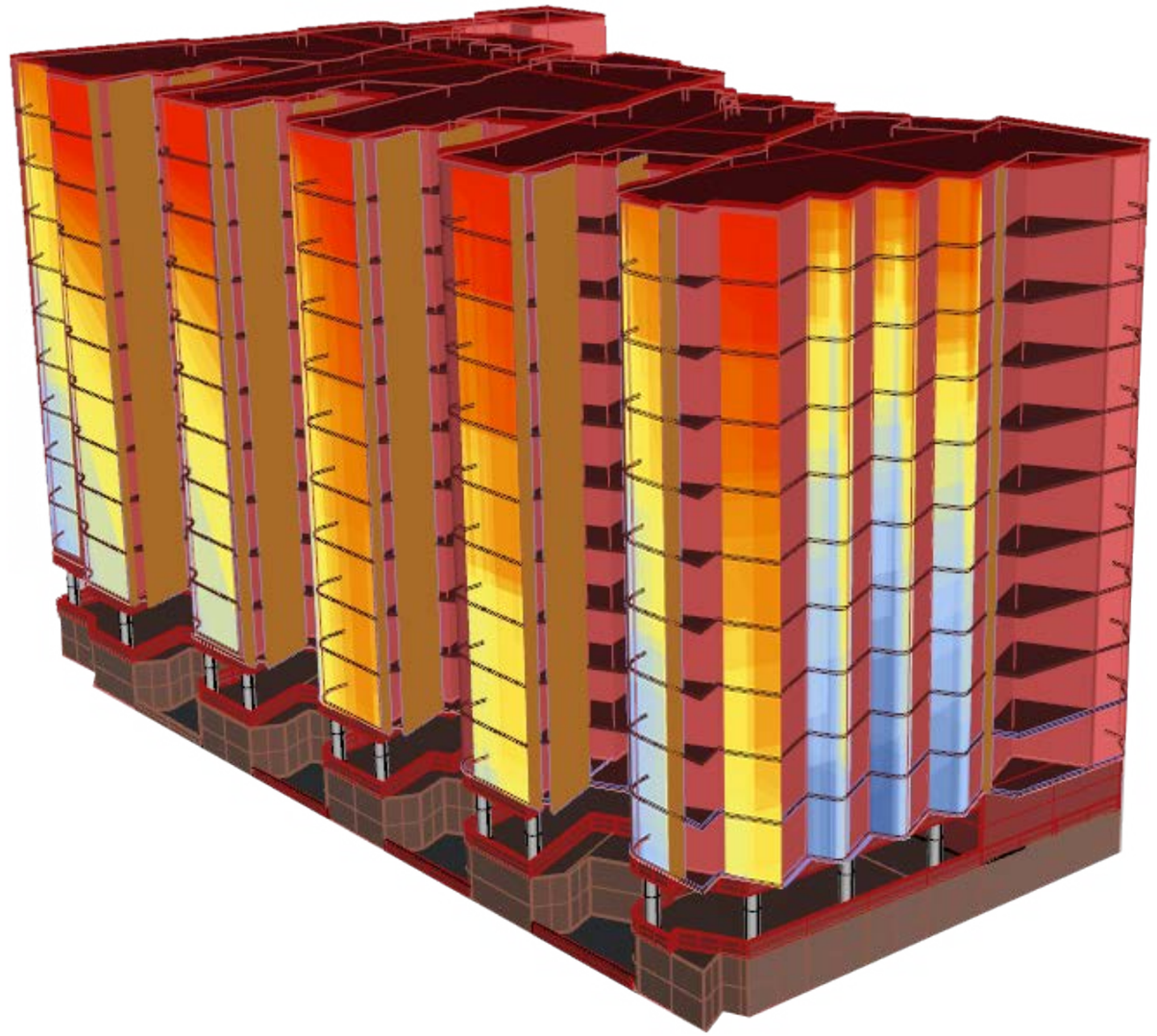
Single Floor area of 5 dwellings: 2,774.16 $m^2$

Total Energy by all the Dwellings: 33,289 $m^2$

Consumption Power Density
= Total Consumption/Total Floor area
=210000 / 33289
**=6.3 KWh/$m^2$**

## Total Consumption Per Capita

Consumption Per Capita
= Total Consumption/Total no. of inhabitants
= 210000/ 240
**= 875 KWh/person**



## Total Production

Total Radiation : 19,53,611.43 KWh/$m^2$

Area of the facade with panels: 3299.9 $m^2$

Efficiency of the foldable policrystalline panel: 18%

$P_v$ = Radiation x $PV_p$ x PR(%)

$P_v$= 19,53,611.43 x 0.18 x 0.75
**=2,63,737.54 KWh**

## Total Production Power Density

Single Floor area of 5 dwellings: 2,774.16 $m^2$

Total Energy by all the Dwellings: 33,289 $m^2$

Consumption Power Density
= Total Production/Total Floor area
=263737.54 / 33289
**=7.9 KWh/$m^2$**

## Total Production Per Capita

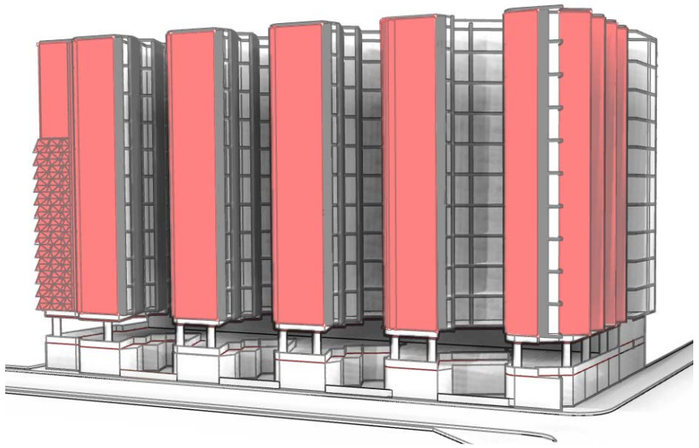
Production Per Capita
= Total Production/Total no. of inhabitants
= 263737.54 / 240
**= 1098.9 KWh/person**

## Total Efficiency

Efficiency = Production/ Consumption
= 263737.54/210000
**= 1.37**

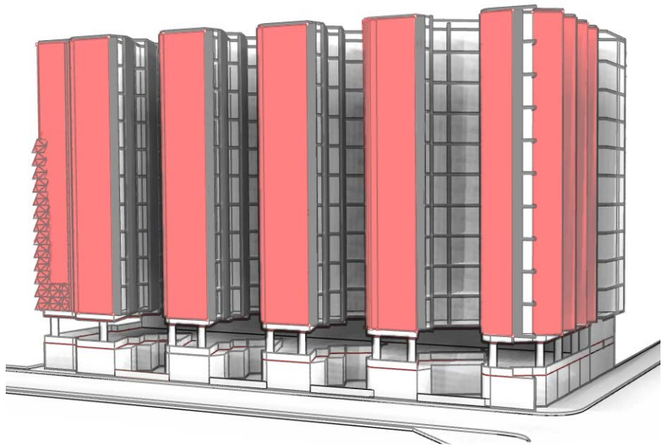


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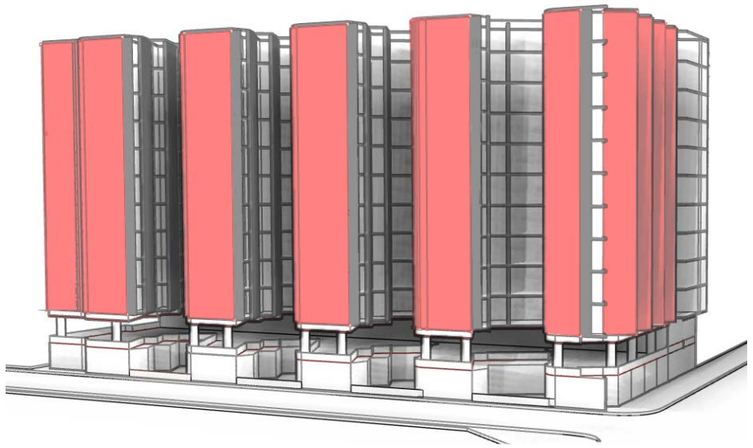
*Facade Panel with angled Panels*

*Radiation of panel: 70500KWh/m²*



*Facade Panel with limited angled Panels*

*Radiation of panel: 66075 KWh/m²*

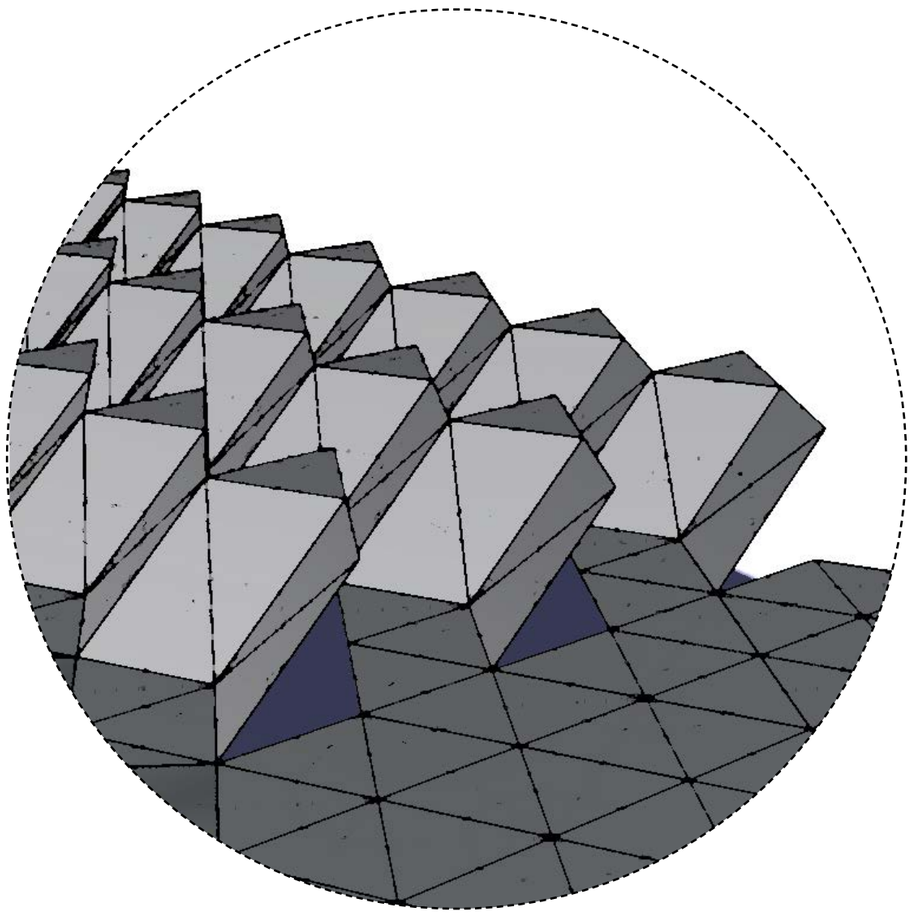


*Facade Panel Plane*

*Radiation of panel: 56590.75 KWh/m²*

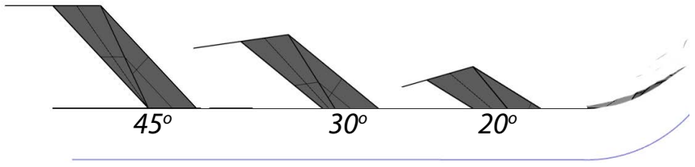
*There is an increase in efficiency placing the projected angled panels towards the sun direction to increase the radiation value.*

*With different series of angles of the the panels also there is an increased radiaton value.*

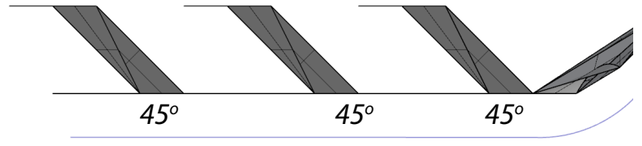


**Section of the panels**

*Radiation of panel: 71655 KWh/m²*




*Radiation of panel: 70500KWh/m²*




*Radiation of panel: 56594 KWh/m²*

