

Tugas UAS Topik Khusus | Auliya Maula Alqadrie 25218009



# LOKASI

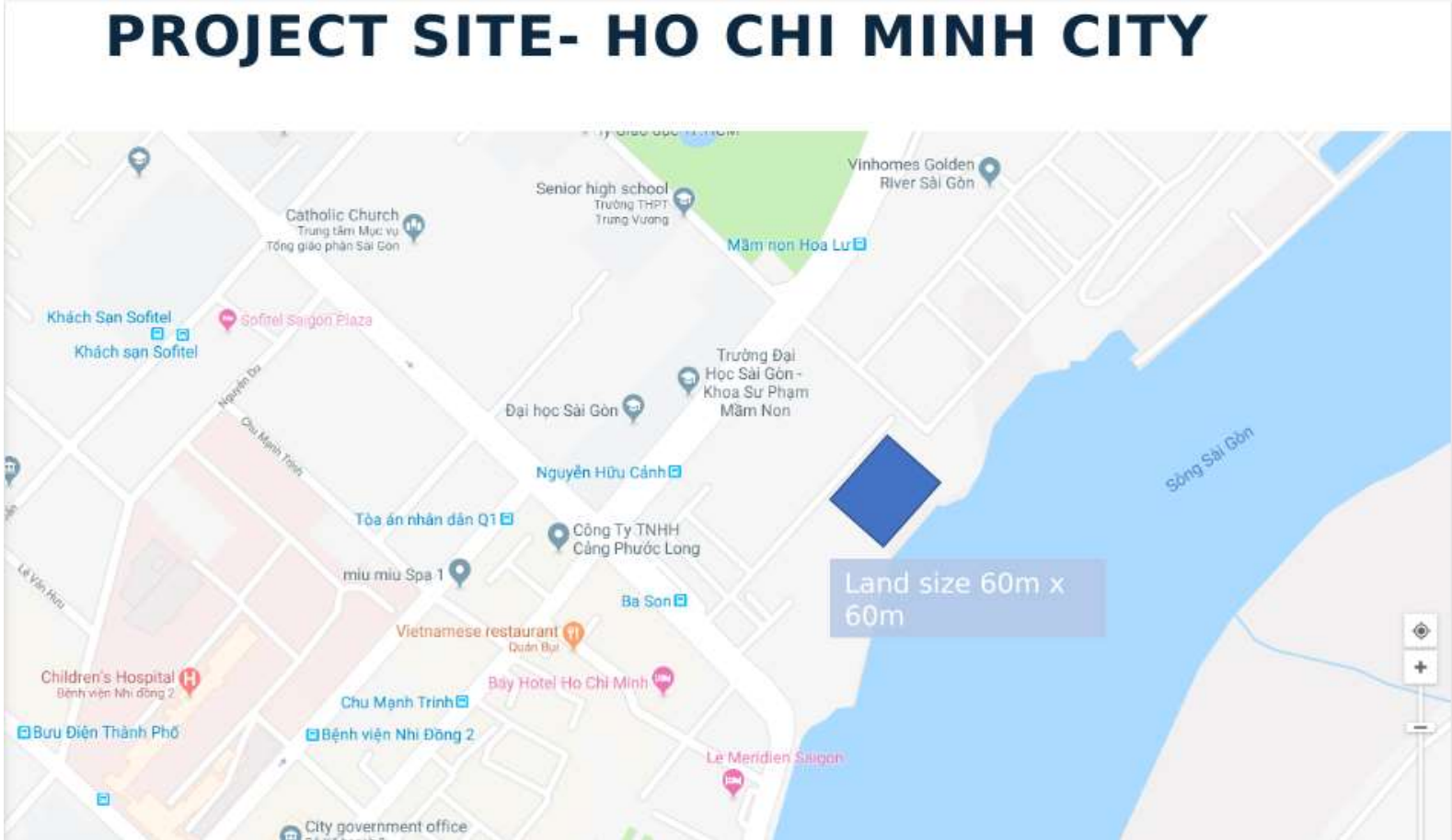




Fig. 1 Climatic zones in Vietnam according to Köppen-Geiger Climatic chart.

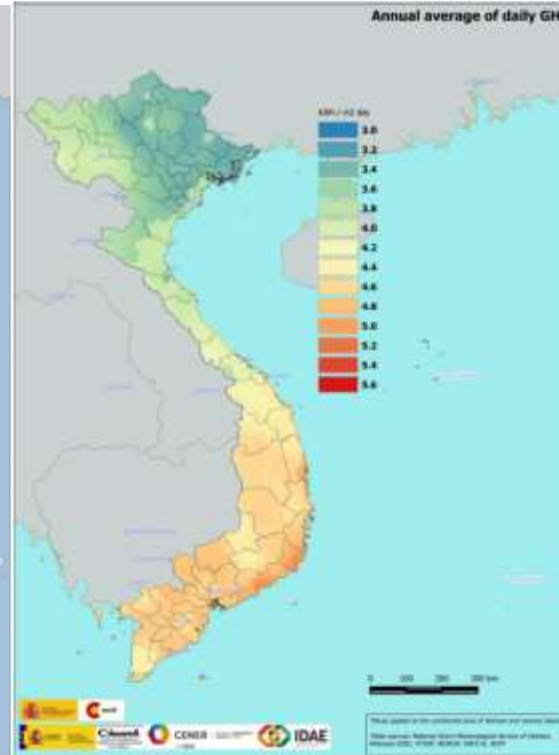


Fig. 5 Map of annual average of daily global horizontal irradiation (kWh m<sup>-2</sup> day<sup>-1</sup>) in Vietnam.

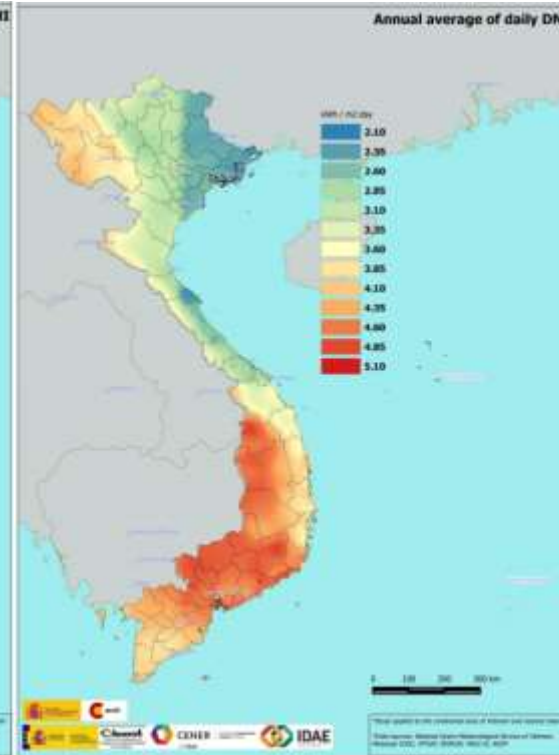


Fig. 6 Map of annual average of daily direct normal irradiation (kWh m<sup>-2</sup> day<sup>-1</sup>) in Vietnam.

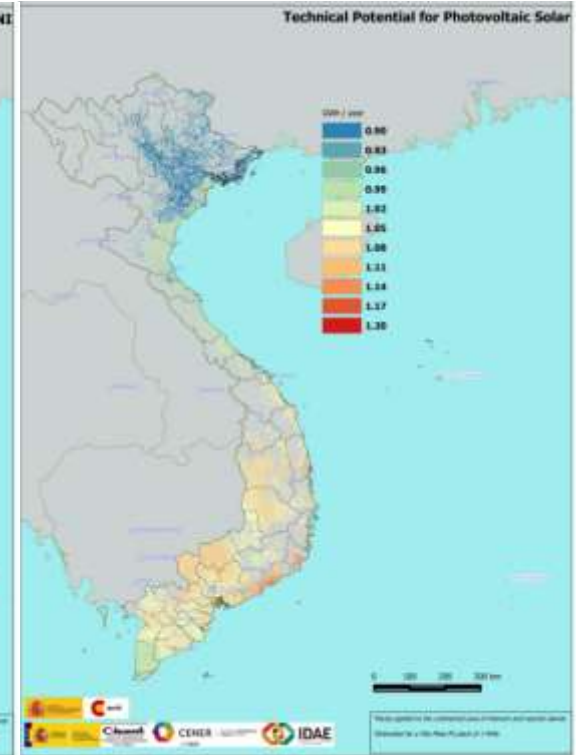


Fig. 9 Technical potential for PV systems

# Data Iklim dan Potensi

In order to promote renewable energy, the government of Vietnam has approved the Master Plan for renewable Energy development for the period up to 2015, with vision towards 2025 (Khanh Toan et al., 2011).

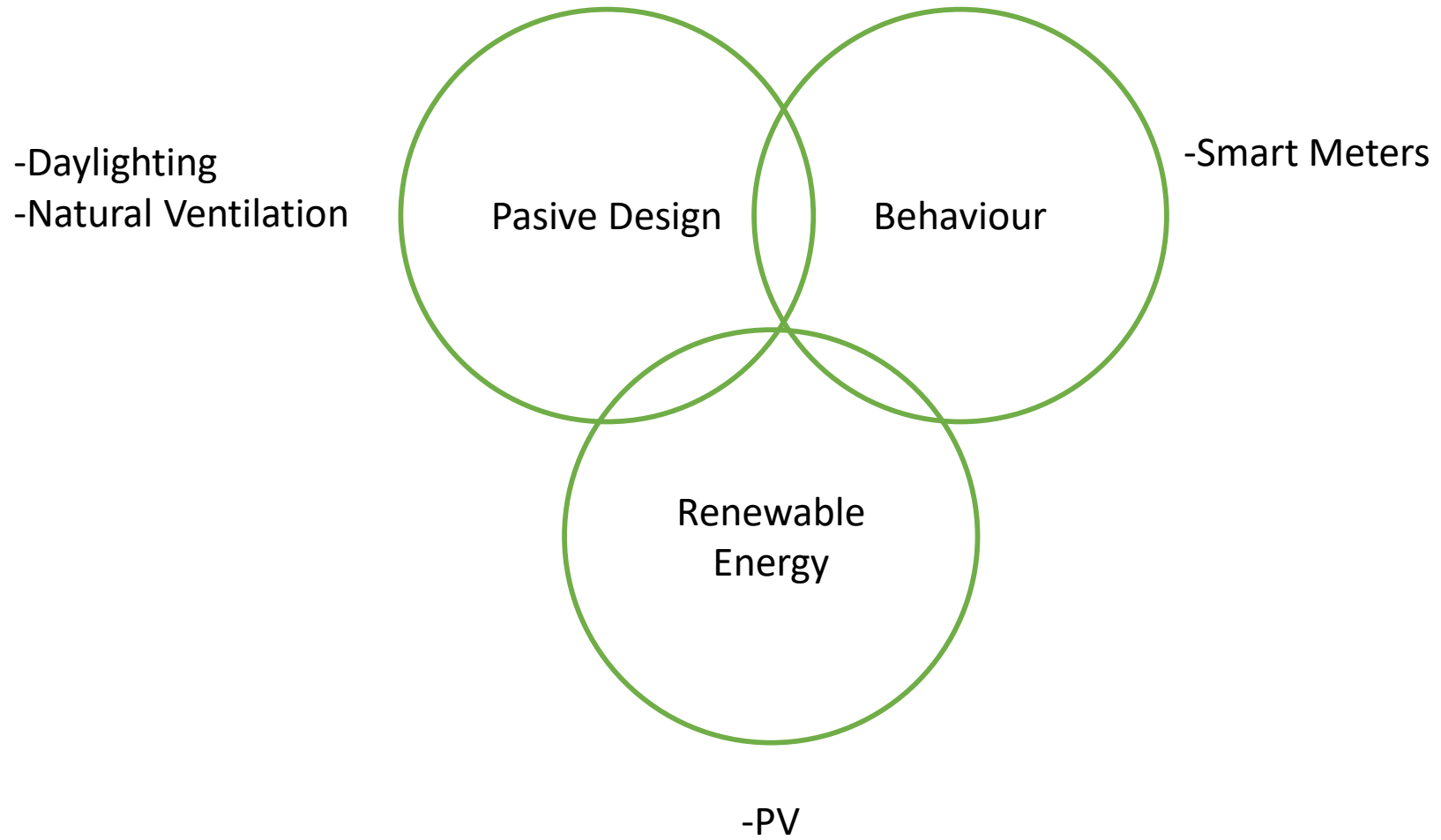
Vietnam is considered a nation with high solar potential, especially in the central and southern area of the country. Solar energy intensity on the average could reach 5 kWh / m<sup>2</sup>

Residential, 100 units for low income families (4 person/unit)

# Pendekatan



- Daylighting
- Natural Ventilation
- Photovoltage



# SHADING DEVICES

The EDGE User Guide (available free to download) can be used as a handy reference tool to estimate the impact of shading on windows located on different orientations of the walls, for different latitudes.

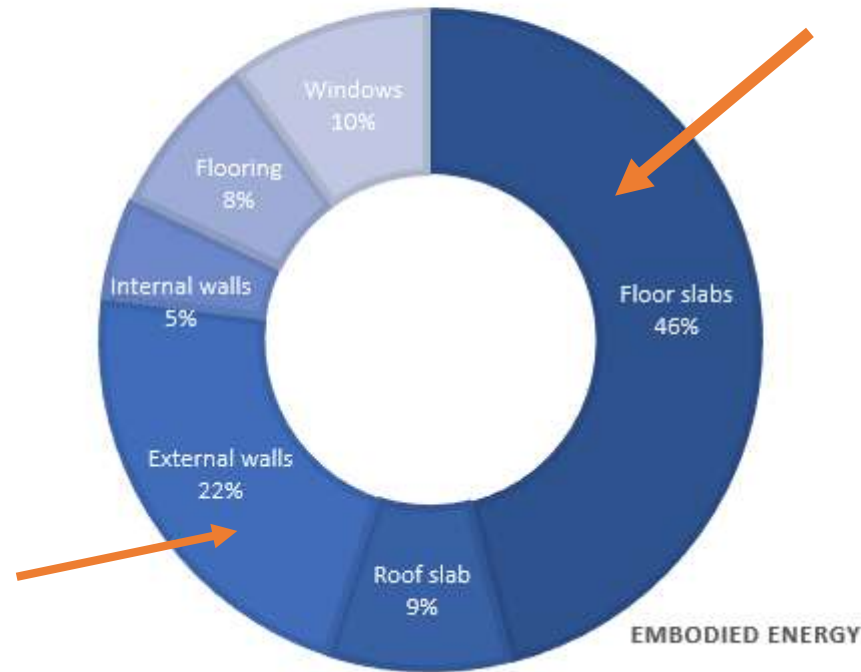
Shading Type	Image
Horizontal shading devices (overhangs):	
Vertical shading devices (fins):	
Combined shading devices(egg crate):	
Moveable shading devices – louvres or shutters	

HORIZONTAL - SHADING FACTOR* (Shading Coefficient)										
* N (North), NE (North East), E (East), SE (South East), S (South), SW (South West), W (West), NW (North West)										
Latitude	Shading Proportion	Shading Factor								
Northern Hemisphere		N	NE	E	SE	S	SW	W	NW	Average
Southern Hemisphere		S	SE	E	NE	N	NW	W	SW	
0° - 9°	D <sub>v</sub> =H/1	0.49	0.46	0.49	0.50	0.50	0.51	0.52	0.48	<b>0.50</b>
	D <sub>v</sub> =H/2	0.44	0.38	0.38	0.40	0.40	0.43	0.41	0.41	<b>0.43</b>
	D <sub>v</sub> =H/3	0.39	0.34	0.32	0.33	0.33	0.36	0.34	0.35	<b>0.35</b>
	D <sub>v</sub> =H/4	0.35	0.28	0.27	0.28	0.33	0.31	0.28	0.30	<b>0.30</b>
10° - 19°	D <sub>v</sub> =H/1	0.47	0.44	0.47	0.51	0.51	0.52	0.49	0.47	<b>0.48</b>
	D <sub>v</sub> =H/2	0.42	0.36	0.36	0.40	0.43	0.42	0.41	0.41	<b>0.40</b>
	D <sub>v</sub> =H/3	0.36	0.31	0.31	0.32	0.33	0.35	0.34	0.35	<b>0.34</b>
	D <sub>v</sub> =H/4	0.32	0.26	0.26	0.27	0.30	0.29	0.28	0.30	<b>0.29</b>
20° - 29°	D <sub>v</sub> =H/1	0.47	0.44	0.47	0.50	0.51	0.52	0.50	0.48	<b>0.48</b>
	D <sub>v</sub> =H/2	0.41	0.36	0.37	0.38	0.41	0.41	0.40	0.41	<b>0.40</b>
	D <sub>v</sub> =H/3	0.36	0.31	0.31	0.32	0.34	0.34	0.34	0.35	<b>0.33</b>
	D <sub>v</sub> =H/4	0.31	0.26	0.26	0.26	0.29	0.29	0.28	0.31	<b>0.29</b>
30° - 39°	D <sub>v</sub> =H/1	0.47	0.43	0.46	0.49	0.51	0.51	0.49	0.48	<b>0.48</b>
	D <sub>v</sub> =H/2	0.41	0.37	0.36	0.38	0.40	0.40	0.39	0.40	<b>0.39</b>
	D <sub>v</sub> =H/3	0.36	0.32	0.29	0.30	0.32	0.32	0.32	0.35	<b>0.32</b>
	D <sub>v</sub> =H/4	0.31	0.26	0.25	0.25	0.28	0.27	0.28	0.31	<b>0.28</b>
40° - 49°	D <sub>v</sub> =H/1	0.46	0.39	0.40	0.43	0.46	0.46	0.45	0.44	<b>0.44</b>
	D <sub>v</sub> =H/2	0.40	0.34	0.32	0.32	0.36	0.36	0.37	0.39	<b>0.36</b>
	D <sub>v</sub> =H/3	0.35	0.29	0.25	0.26	0.29	0.29	0.30	0.31	<b>0.30</b>
	D <sub>v</sub> =H/4	0.31	0.25	0.21	0.21	0.23	0.24	0.26	0.29	<b>0.25</b>
50° - 60°	D <sub>v</sub> =H/1	0.33	0.30	0.29	0.28	0.40	0.29	0.30	0.31	<b>0.35</b>
	D <sub>v</sub> =H/2	0.29	0.23	0.20	0.20	0.28	0.26	0.28	0.24	<b>0.25</b>
	D <sub>v</sub> =H/3	0.19	0.18	0.18	0.19	0.20	0.19	0.19	0.19	<b>0.19</b>
	D <sub>v</sub> =H/4	0.15	0.14	0.14	0.15	0.16	0.15	0.15	0.15	<b>0.15</b>
D <sub>v</sub> =H/2		0.18	0.18	0.18	0.19	0.20	0.19	0.19	0.19	<b>0.19</b>
D <sub>v</sub> =H/4		0.15	0.14	0.14	0.15	0.16	0.15	0.15	0.15	<b>0.15</b>
D <sub>v</sub> =H/4		0.15	0.14	0.14	0.15	0.16	0.15	0.15	0.15	<b>0.15</b>
D <sub>v</sub> =H/3		0.18	0.18	0.18	0.19	0.20	0.19	0.19	0.19	<b>0.19</b>
D <sub>v</sub> =H/4		0.15	0.14	0.14	0.15	0.16	0.15	0.15	0.15	<b>0.15</b>

## SELECT MATERIALS WITH LOW EMBODIED ENERGY

Select options that are practical and realistic depending on the city or country where the project is located and the materials that are available, as well as the size and scale of the building.



MATERIAL	EMBODIED ENERGY	
	MJ/kg	MJ/m <sup>3</sup>
Aggregate	0.10	150
Straw bale	0.24	31
Soil-cement	0.42	819
Stone (local)	0.79	2030
Concrete block	0.94	2350
Concrete (30 Mpa)	1.3	3180
Concrete precast	2.0	2780
Lumber	2.5	1380
Brick	2.5	5170
Cellulose insulation	3.3	112
Gypsum wallboard	6.1	5890
Particle board	8.0	4400
Aluminum (recycled)	8.1	21870
Steel (recycled)	8.9	37210
Shingles (asphalt)	9.0	4930
Plywood	10.4	5720
Mineral wool insulation	14.0	139
Glass	15.9	37550
Fiberglass insulation	30.3	970
Steel	32.0	251200
Zinc	51.0	371280
Brass	62.0	519560
PVC	70.0	93620
Copper	70.6	631164
Paint	93.3	117500
Linoleum	116	150930
Polystyrene Insulation	117	3770
Carpet (synthetic)	148	84900
Aluminum	227	515700

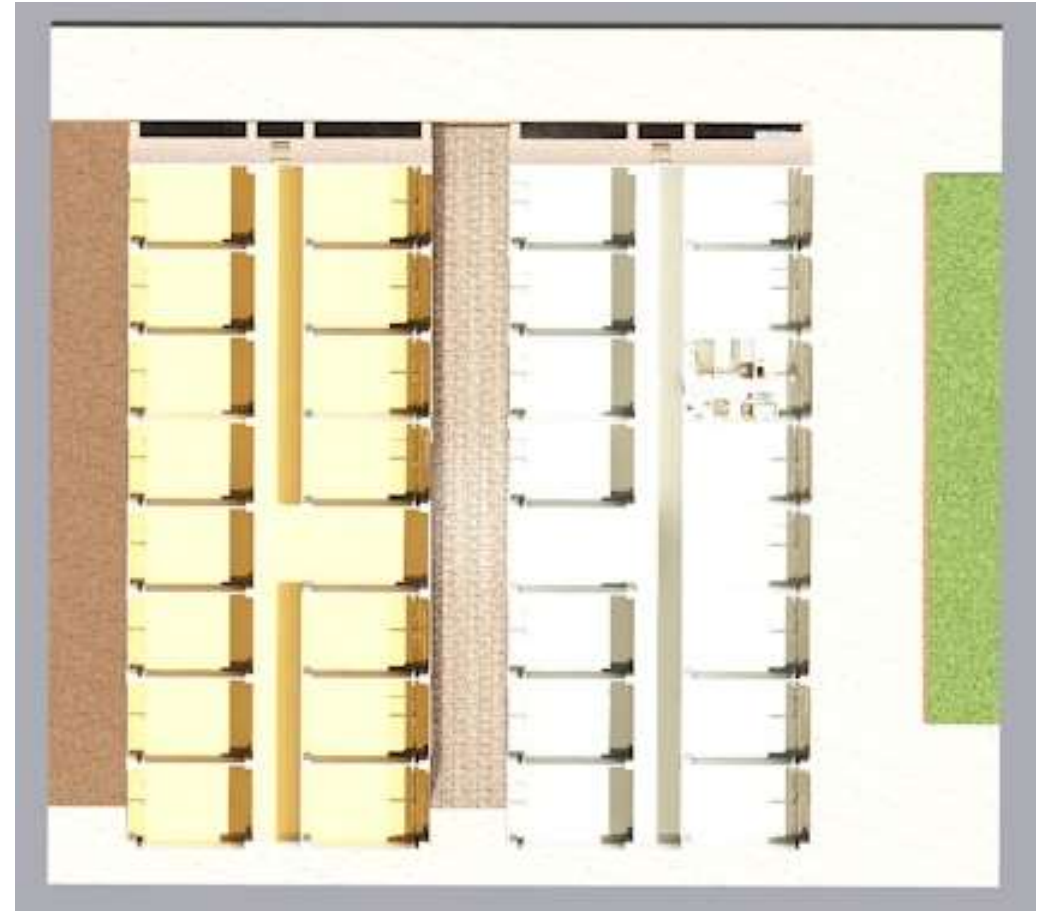
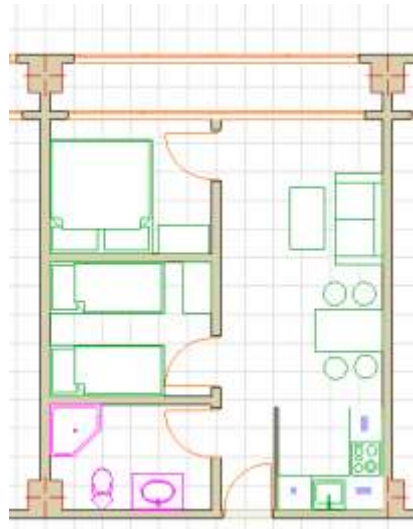


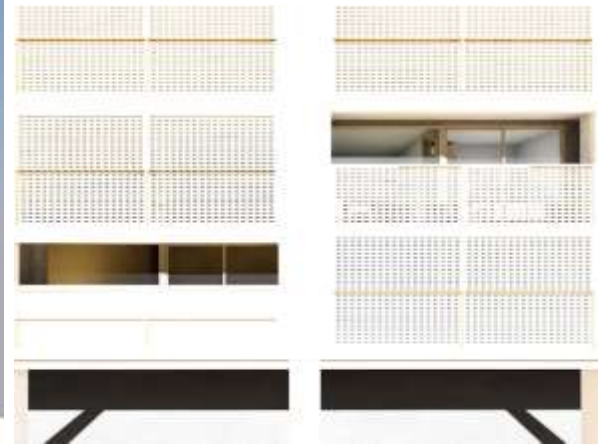
# Unit

Residential, 100 units for low income families (4 person/unit)

Ukuran unit: 6m x 8m tipe 48

Terdapat dua kamar tidur, satu kamar mandi, dapur, ruang tengah, area makan, dan teras.





# RESULTS

Final Energy Use	128.58 kWh/Month/Unit	Operational CO <sub>2</sub> Savings	0.86 tCO <sub>2</sub> /Year...	Base Case Utility Cost	564481.61 VND/Month...	Incremental Cost	22,256,041 VND/...
Final Water Use	8.66 kL/Month/Unit	Embodied Energy Savings	27631.02 MJ/Unit	Utility Cost Reduction	224,494.64 VND/Month...	Payback in Years	8.26 Yrs.



- Cooling Energy -10%
- Lighting -23%
- Shower -8,2%
- Kitchen -12,1%
- Floor Slab -10%
- Walls External -3%