Social Capitalist Housing for Hanoi

Complex Projects - Vertical Cities Asia

P5 Graduation Presentation

2 - 7 - 2014

Jochem Joost Noorden

Laura Alvarez - Mauro Parravicini - Fred Hobma
<table>
<thead>
<tr>
<th>Type</th>
<th>3D Model</th>
<th>Average Plot Size</th>
<th>Average Floor Area</th>
<th>No. of Storeys</th>
<th>Height</th>
<th>Total Area</th>
<th>Households</th>
<th>No. of Residents</th>
<th>Monthly Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village House</td>
<td><img src="image" alt="3D Model" /></td>
<td>12 x 7.5 m</td>
<td>90 m²</td>
<td>1</td>
<td>4-5 m</td>
<td>90 m²</td>
<td>single</td>
<td>4</td>
<td>$ --</td>
</tr>
<tr>
<td>Tube House</td>
<td><img src="image" alt="3D Model" /></td>
<td>3.5 x 35 m</td>
<td>122.5 m²</td>
<td>1 - 2</td>
<td>7 m</td>
<td>122.5 m² - 245 m²</td>
<td>mostly multiple</td>
<td>± 10</td>
<td>$ --</td>
</tr>
<tr>
<td>Neo-Tube House</td>
<td><img src="image" alt="3D Model" /></td>
<td>4.5 x 20 m</td>
<td>90 m²</td>
<td>3 - 5</td>
<td>10 - 16 m</td>
<td>270 m² - 450 m²</td>
<td>mostly single</td>
<td>± 3-7</td>
<td>$ --</td>
</tr>
<tr>
<td>KTT</td>
<td><img src="image" alt="3D Model" /></td>
<td>10 x 60 m</td>
<td>600 m²</td>
<td>5</td>
<td>15 m</td>
<td>3,000 m²</td>
<td>multiple</td>
<td>250-300</td>
<td>$ --</td>
</tr>
<tr>
<td>French Villa</td>
<td><img src="image" alt="3D Model" /></td>
<td>10 x 12 m</td>
<td>120 m²</td>
<td>3</td>
<td>12 m</td>
<td>360 m²</td>
<td>single</td>
<td>± 5</td>
<td>$2500 - $3500</td>
</tr>
<tr>
<td>Standard Villa</td>
<td><img src="image" alt="3D Model" /></td>
<td>10 x 7 m (common)</td>
<td>70 m²</td>
<td>2 - 3</td>
<td>-- m</td>
<td>210 m²</td>
<td>single</td>
<td>± 5</td>
<td>$ --</td>
</tr>
<tr>
<td>Self-built “Freestyle” House</td>
<td><img src="image" alt="3D Model" /></td>
<td>4.5 x 8 m (common)</td>
<td>36 m²</td>
<td>1 - 4</td>
<td>3 - 14 m</td>
<td>36 - 144 m²</td>
<td>single / multiple</td>
<td>--</td>
<td>$ --</td>
</tr>
<tr>
<td>Highrise Apartment Building</td>
<td><img src="image" alt="3D Model" /></td>
<td>35 x 35 m (common)</td>
<td>1225 m²</td>
<td>15 - 30</td>
<td>50 - 100 m</td>
<td>18,375 m² - 36,750 m²</td>
<td>multiple</td>
<td>400-800</td>
<td>$1000 - $3000</td>
</tr>
</tbody>
</table>

Source: various articles, studies and own observations through Google Earth and photos.
Yearly mean PM$_{2.5}$ Air pollution Hanoi [µg/m$^3$]

<table>
<thead>
<tr>
<th>Level</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>Lightest Gray</td>
</tr>
<tr>
<td>20-40</td>
<td>Light Gray</td>
</tr>
<tr>
<td>40-60</td>
<td>Medium Gray</td>
</tr>
<tr>
<td>60-80</td>
<td>Dark Gray</td>
</tr>
<tr>
<td>80-100</td>
<td>Medium Dark Gray</td>
</tr>
<tr>
<td>100-120</td>
<td>Dark Gray</td>
</tr>
<tr>
<td>120-150</td>
<td>Lightest Blue</td>
</tr>
<tr>
<td>150-200</td>
<td>Light Blue</td>
</tr>
<tr>
<td>200+</td>
<td>Medium Blue</td>
</tr>
</tbody>
</table>

2005

2020

Sources:
HOUSING
Today Hanoi houses 6,500,000. By 2030 population will reach 9,000,000 and by 2050 11,000,000. New housing is needed, as are all other supporting city functions.

As of 2005, 54% of the city population in Hanoi, or **1.8 million** residents, are in need of new housing. Also **120,000** migrants move to Hanoi every year.
These migrants have the average age of 24, half of them come from urban areas and the other half from the rural highlands of northern Vietnam.
Social housing demand by 2015

\[ \text{m}^2 \times \text{million} \]

<table>
<thead>
<tr>
<th>Category</th>
<th>People</th>
<th>Households</th>
<th>( \text{m}^2 \times \text{million} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>250,000</td>
<td>82,000</td>
<td>1.6</td>
</tr>
<tr>
<td>Low-income</td>
<td>320,000</td>
<td>82,000</td>
<td>4.1</td>
</tr>
<tr>
<td>Workers</td>
<td>320,000</td>
<td>82,000</td>
<td>3.7</td>
</tr>
<tr>
<td>Resettlement</td>
<td>26,000</td>
<td>26,000</td>
<td>2</td>
</tr>
</tbody>
</table>

Social housing stock by 2015

- Students: 250,000 people, 1.6 million m²
  - 0.3 million m² for 82,000 low-income households
- Low-income: 82,000 households, 4.1 million m²
- Workers: 320,000 people, 3.7 million m²
  - 2.7 million m² for 26,000 resettlement households

Leftover demand

$m^2 \times$ million

- **Students**: 1.3 million
  - 250,000 people

- **Low-income**: 3.3 million
  - 82,000 households

- **Workers**: 1.0 million
  - 320,000 people

- **Resettlement**: 0.5 million
  - 26,000 households

“In Ha Noi alone, there are 720 licensed projects covering a total area of more than 300,000 hectares. It’s estimated that these could satisfy demand until 2050.”

Source: Article, accessed April 2013 at: http://vietnambreakingnews.com/2013/03/ministry-urges-cuts-to-real-estate-projects/#.UX0m07XwmBQ.
Location of abandoned housing projects
THE ‘IDEAL’ GRID

CBD grid: increased length by 60m to fit pedestrian alleyways and service roads

(Case study: Melbourne CBD)
THE IDEAL CLUSTER

2030

50,000 people
Area: 500,000 m²
GFA: 2,500,000 m²
FAR 5

2% INDUSTRY 50,000 m²
2% HEALTHCARE 47,250 m²
3% EDUCATION 63,000 m²
3% CULTURE 75,000 m²
18% RETAIL 450,000 m²

50% RESIDENTIAL 1,250,000 m²

2050

1% HOTEL 25,000 m²
4% HEALTHCARE 87,250 m²
4% CULTURE 100,000 m²

19% OFFICE 472,500 m²
18% RETAIL 450,000 m²

50% RESIDENTIAL 1,250,000 m²
AMBITION

To develop a high dense residential block with affordable housing to accommodate prosperity for its inhabitants and the neighbouring village.
SOCIAL SUSTAINABILITY

Giving the social class opportunities by encouraging:
- local markets and craft
- Community making
- Influence on their environment
A Pattern Language
Towns · Buildings · Construction

Christopher Alexander
Sara Ishikawa · Murray Silverstein
WITH
Max Jacobson · Ingrid Fiksdahl-King
Shlomo Angel
I 3 SUBCULTURE BOUNDARY

man-made boundaries

meeting places

natural boundaries

✦ ✦ ✧ ✦
max. population of 500

max diameter of 300 yards
MASSING
BUILDING
‘Build half of a good house’

The basic infrastructure to go up the social ladder

Social Housing, Alejandro Aravena, Santiago, Chile
134 m
40 stories
18 clusters
236 dwellings
650 inhabitants
STRUCTURE
CLIMATE
PSYCHROMETRIC CHART
Adaptive Comfort

LOCATION:
HANOI, - VNM
Latitude/Longitude: 21.02° North, 105.8° East, Time Zone from Greenwich 7
Data Source: IWEC Data, 488200 WMO Station Number, Elevation 6 m

LEGEND
- COMFORT
  72% ■ COMFORTABLE
  28% □ NOT COMFORTABLE

DESIGN STRATEGIES: JANUARY through DECEMBER
2.0%
1. Comfort - California Energy Code Model (179 hrs)
2. Sun Shading of Windows (0 hrs)
3. High Thermal Mass (0 hrs)
4. High Thermal Mass Night Flush (0 hrs)
5. Direct Evaporative Cooling (0 hrs)
6. Two Stage Evaporative Cooling (0 hrs)
42.3%
7. Adaptive Comfort Ventilation (3733 hrs)
8. Fan-Forced Ventilation Cooling (0 hrs)
20.7%
9. Internal Heat Gain (2900 hrs)
10. Passive Solar Direct Gain Low Mass (0 hrs)
11. Passive Solar Direct Gain High Mass (0 hrs)
12. Wind Protection of Outdoor Spaces (0 hrs)
13. Humidification Only (0 hrs)
14. Dehumidification Only (0 hrs)
15. Cooling, add Dehumidification if needed (0 hrs)
16. Heating, add Humidification if needed (0 hrs)

72.4% Comfortable Hours using Selected Strategies
6344 out of 8760 hrs

MODEL: PLUS California Energy Code
PLOT: COMFORT
- Hourly
- Daily Min/Max
- All Hours
- Selected Hours
- All Months
- Selected Months
- Nov
- Through May
- One Month
- Jan
- Next Month
- One Day
- t
- Next Day

TEMPERATURE RANGE:
- 50 to 40°C
- Fit to Data

Display Design Strategies
Show Best set of Design Strategies

Click on Design Strategy to select or deselect.
LEGEND

72% COMFORTABLE
28% NOT COMFORTABLE

DESIGN STRATEGIES: JANUARY through DECEMBER

2.2% 1. Comfort - California Energy Code Model (171 hrs)
      2. Solar Shading of Windows (0 hrs)
      3. High Fan Speeds (0 hrs)
      4. High Humidification Only (0 hrs)
      5. Direct Evaporative Cooling (0 hrs)
      6. Two Stage Evaporative Cooling (0 hrs)
      7. Adaptive Comfort Ventilation (5703 hrs)
      8. Fan Forced Ventilation Cooling (1 hr)
      9. Internal Heat Gain (2580 hrs)
     10. Passive Solar Direct Gain Low Mass (0 hrs)
     11. Passive Solar Direct Gain High Mass (0 hrs)
     12. Wired Protection of Outdoor Spaces (0 hrs)
     13. Humidification Only (0 hrs)
     14. Dehumidification Only (0 hrs)
     15. Cooling, and Dehumidification if needed (0 hrs)
     16. Heating, and Humidification if needed (0 hrs)

72.4% Comfortable Hours using Selected Strategies
(5341 out of 6780 hrs)
QUESTIONS