Integrating Urban Energy Systems into a Mixed-Use Urban Redevelopment

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Background of the Project
The consequences of the rapid rate of urbanization brings about an increase in poverty and environmental degradationin the urban fabric of cities. These factors greatly contribute to worsening the negative effects of climate change, cities contribute to the issue.

Statement of the Problem
And so due to urbanization, the issue of environmental degradation and impoverished communities continue to propagate in existing urban communities such the Vitas Tenement Housing area.

Vitas Tenement Housing
It is a housing project by the National Housing Authority which completed its construction in September 1991 consisting of 1,664 housings units in 27 – 4storey – buildings. Some of its initial beneficiaries were the families relocated from the Smokey Mountain, while some units were placed on sale for the public. It consists of 18 square meter and 36 square meter housing units.

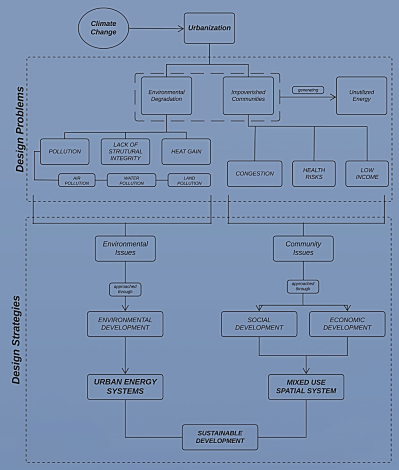
CONGESTION
heat gain, fire hazards

POLLUTION
polluted sewages, exposed drainage and plumbing system

LACK OF STRUCTURAL INTEGRITY
exposed rebars and slabs, corroded staircases without railings

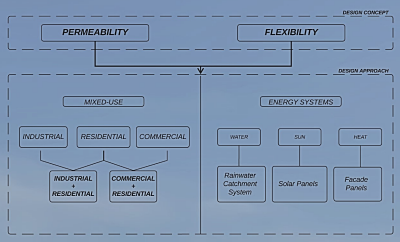
RELOCATION ISSUES
out city locations, far from source of income

Project Objectives
Thus, my project aims to create a redevelopment that would cater to the needs of an informal settlement community by providing spaces for socio-economic opportunities whilst tackling environmental issues. It will address the fragility experienced by the community and its environment by Integrating mixed-use spaces and revitalize the site by providing its users with opportunities of have shelter, livelihood and recreation whilst building a more natural and energy efficient environment.



Design Concept
Permeability will manifest itself in the form of the structure which will aid in the integration of energy systems in the development. While in flexibility, Spaces would be designed to have multiple functions and cater to the varying demographics of the users.

Design Approach
First part includes the combining of the commercial, residential, and industrial spaces. The integration of various spaces of different uses generally aims to provide the users with basic services in proximity. Second part includes infusing the urban energy systems to the development. The incorporated environmental solutions and strategies will focus on three main resources: water, solar, and heat.

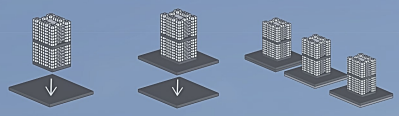


Final Design Developement
The design takes into form through 3 scale levels: private dwelling, shared neighborhood and building spaces.It began by creating 3x3 meter space modules of the necessary spaces in one housing unit – kitchen, living room, bathroom, and bedrooms. These spaces were put together to form the housing unit module with an area of 36 sqm.

Moving on, the housing unit modules are then laid out in order to create a typical residential floor plan. In order to let natural ventilation within the floor, the modules spaced out generating the corridors in between the housing units as well as open spaces.

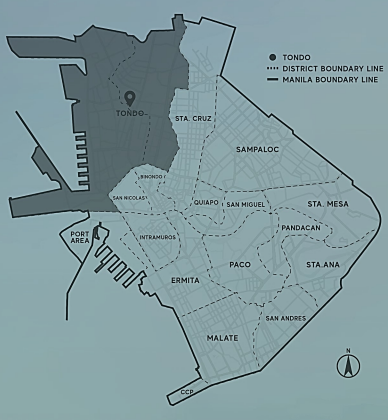
The building complex level, with this programming you can see the industrial and commercial spaces allocated below and the residential spaces above in towers. These spaces are connected by one open multi- level space and a green roof public open space.

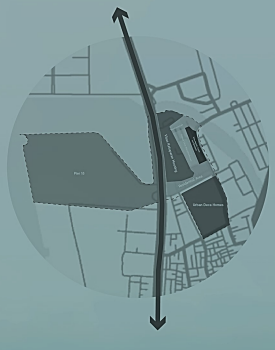
The residential tower is then connected to the industrial and commercial spaces on the ground floor, forming the hwole complex development of the project.



Site
My chosen site is located in District I, Tondo Manila which includes Vitas Tenement Housing Site area with a total land area of 35,351 square meters.

Target Users
In the existing 9,000 people in 1,709 housing units, 4-7 people are the most common number of people living per unit. And a 7% of the units have 11 people and/or up residing in a unit. So my project targets to cater to residential, commercial and industrial spaces.

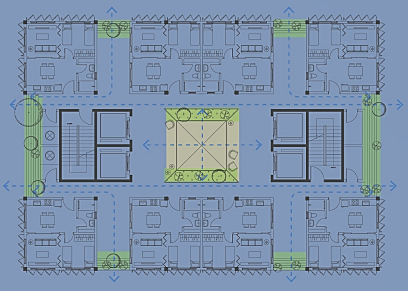


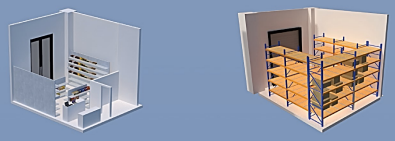


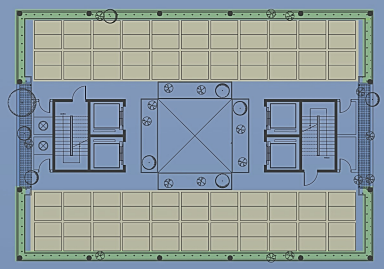
Residential Space
As the existing structures on site will be cleared out, the redesigned project will be its replacement. Majority of the user market would be the displaced families; the residential aspect of the project will take up majority of the space. The housing units will provide its users with shelter consisting of the basic spaces in a dwelling.

Commercial Space
The commercial spaces below are arranged around the core of the residential tower. Both permanent and temporary commercial stalls are allocated in the space. The corridor of the commercial area creates a commercial strip of varying businesses. The commercial space also provides livelihood oppurtunities for the residents.

Industrial Space
The industrial area of in the northern part of the site accommodates light industrial operations. The space consists of a drop off and pick up areas for trucks and other vehicles, a sorting station, general dry storage modules and some cold storage rooms.



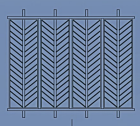




Indoor Basketball Court
This space is a recreational space to promote community and social development.

Vegetable Garden
This space as an allocated greenery space elevated to produce crops that would be an additional source of food and livelihood for the residents.

Passive Systems
The designated vegetation spaces helps in filtering the existing dirty air pollution in the site. It contributes to the air quality within the development as well as mitigates the polluted air breathed within the vicinity.



Alternating spaces of housing unit and open space, creating a loose and permeable plan greatly contributes to creating natural ventilation and daylight. The open spaces become an inlet and outlet for wind and sunlight to pass through the spaces. the courtyard in the middle serves as lightwell and allows for stack effect to occur.

Facade Panels
Four 650mm x 2500mm panels are grouped together in a module and allocated in front of the windows of the housing units. The panels can twist in both directions in order to adjust to the angle of the sun. The main purpose of the panels would be for sun shading purposes.

Rainwater Harvesting
Rainwater will be harvested through a catch basin located in the rooftop of every residential building. Water will gather in the catch basin and a pipeline will lead the water down to the rainwater cistern where it can be stored to be reused.

Solar Panel
Each panel has the dimensions of 2300mm x 1200mm. One panel is able to generate 500 watts per day. Every roof top consists of 88 of these solar panels, being able to generate 44 kilowatts of electricity per day and 1320 kilowatts of electricity per month. This aid in reducing traditional electricity consumption and would provide a more renewable source of electricity for the building.