

## COMFORT IN LOW COST HOUSES: THEORITICAL FRAMEWORK DEVELOPMENT

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### ABSTRACT

*Housing has being identified globally as one of man's basic needs. Its role as a key element of urbanisation also makes it significant in sustainable development. Acknowledging the role it plays in urbanisation the government of Malaysia has since being concerned about the provision of houses for all strata. In view of these it has employed the services of private developers to achieve this aim. Various standard policies have being put in place by government in the construction of this building especially in the low cost houses. This is to ensure that the residents' needs and objectives are being met in the delivery of these housing projects. However most of these residents still tend to redesign these building even when new to suit their needs and in cases where they can't carry out any redesigns live with it. This research aims to look at the comfort of residents of this low cost houses, identify the relationship between these buildings and sustainability and also identify how well these are being accommodated in the standards set by the government. This will be carried out by identifying the physical and social facilities being provided for and how it meets up with the concept of sustainability.*

*Key words: comfort, low cost housing, residential satisfaction, sustainable housing*

### INTRODUCTION

The urbanisation rate in most developing countries has made the provision of houses a crucial issue to most governments. Housing has being identified undoubtedly as one of the basic needs of man asides food and clothing as with the attainment of a good shelter a great challenge has being resolved. Housing provides a necessary foundation for physical and social life. It goes beyond the provision of shelter, security, recreation, and wealth. As a home it is the foundation for family and domestic life, a place of refuge, relaxation from work and school and also serves as a private space for individuals. It is a place of nurturing the centre of one's affections, and where one finds refuge, rest, security and personal freedom. Subsequently sufficient provision of houses contributes to the work efficiency and the development of individual in any country which in turn leads to the attainment of the physical and moral health of a nation. Housing is one of the critical issues in global urbanization which has tremendous impact on the environment both during construction and throughout their lifespan (Abu Hassan Abu bakar et

al. 2007). As a consequence of this understanding ensuring that houses are as comfortable as possible meeting the needs of the present and future generation is highly important.

Most countries have come to a realisation that meeting the needs of their citizen is essential to their economic growth. Malaysia is also not left out of this trend considering the rapid rate of urbanisation. Efforts have been made by the government to ensure sufficient provision of housing especially for the low income group in the urban areas through the establishment of different housing development policies in the various five year Malaysian plans and the second outlined perspective plan (OPP2) (1991 – 2000). One of the major objectives is to ensure that the low income group of Malaysia in particular have greater access to adequate and affordable shelter and also related facilities. Low cost housing is a mandatory section of housing development in Malaysia abided by housing developers to provide 30% of their total housing development for low cost. A vigorous and buoyant housing sector is an indication of a strong program of national investment and is indeed the foundation of and the first step to future eco-growth and social development (Ajanlekoko 2007). However a housing sector can only be deemed as buoyant if the housing needs of the inhabitants are met.

It is essential to note that as a key element in urban development and due to its long lifespan, housing plays a significant role in attaining the goal of sustainable development. It is therefore essential to ensure they are as comfortable as possible meeting the needs of its inhabitants both for the present and future generation. The definition of low-cost, in a housing sense, depends greatly on the economic capacity of the target group (UN 2008). Low cost housing refers to affordable economic viable housing for low income earners either as individuals or families. The term Low-cost housing might mean different things to different people. For instance, in a developed country, USA, housing can be considered affordable for a low or moderate income earner if that household can acquire use of that housing unit (owned or rented) for an amount up to 30 percent of its household income (Miles 2000). This means that after the use of 30% household fund they can conveniently still cater for other basic needs such as food, clothing and their health without any hassles. But what then happens in a household where the earning power does not commensurate with what obtains to afford a house with the 30% of their earnings. This paper intends to identify the factors that determine the residents comfort especially in low cost houses and its environment which contributes to their general quality of life. As how well human housing needs are met determines to a large extent their overall quality of life.

## **THEORETICAL FRAMEWORK**

The issue is on comfort in low cost houses. The availability or none there of in low cost houses. Lack of comfort has many implications to it which includes health and safety problems, truancy at home which could lead to engaging in criminal activities and could also bring about low work output in workers. Sustainability advocates for comfort in houses. This research will be limited to the physical elements and the socio economic elements which lead to lack of comfort in a habitation. The aim is to improve the quality of life of which these are the factors that affects greatly the quality of life of any individual.

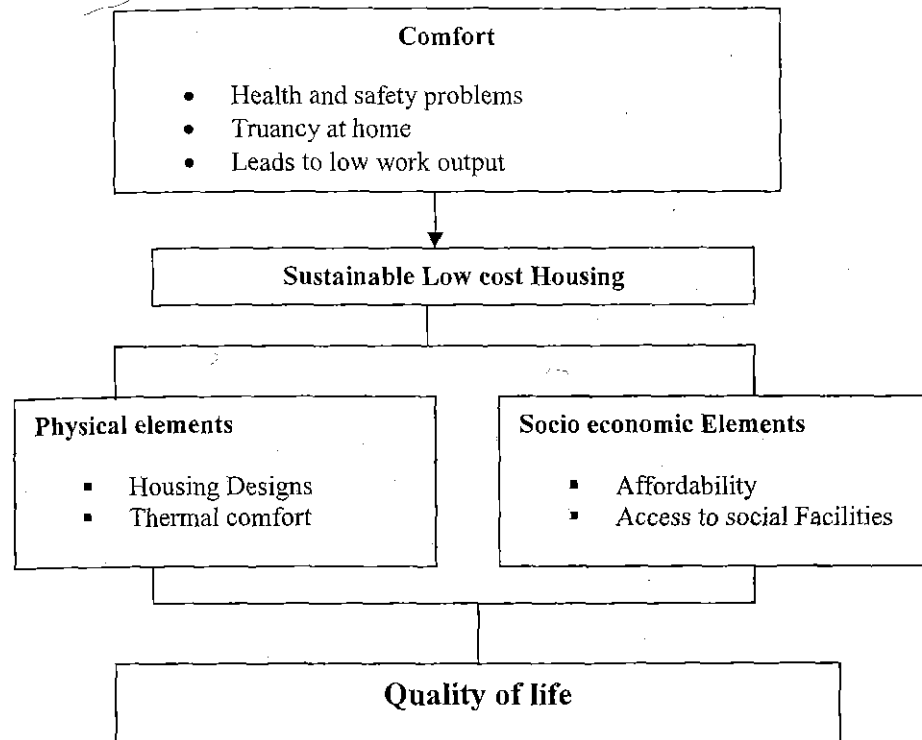


Figure 1. Theoretical framework

## Comfort

Comfort has been said to be a state of satisfaction with something. It can be cause or matter of relief or satisfaction. It can also be said to be a state of ease, with freedom from pain and anxiety. It is the state of being pleased with something. Comfort is relative to individual purposes and needs, as what can be said to be comfortable for one individual might bring about the opposite for another. Previous studies on residential comfort have analysed many variables such as housing, neighbourhood, and user's characteristic as that which affects residential comfort. Building features, such as number of bedrooms, size and location of kitchen, designs and quality of housing units are strongly related to residential comfort. Being comfortable with a neighbourhood has been identified to be an important factor of housing comfort. These include neighbourhood facilities such as schools, clinics, shops and community halls.

Quality housing feature includes physical and non-physical characteristics. The physical characteristic comprises of location, housing design, types of housing and the residents comfort level. On the other hand, non physical characteristic comprise of the aspect of socio economic, people mixture and level of crime of that area. As comfort is a state of satisfaction with something the word comfort and satisfaction will be used interchangeably in this paper.

### *a. Effects of Lack of Comfort in Low cost houses*

Some research suggests that customizable products that fulfil customers' specific needs and expectations will be the best answer for current trends in the housing market. As houses plays a central role in the health and well-being of its occupants and also supports their employment and educational endeavours, making it as comfortable as possible for its occupants will, go a long way. The lack of comfort in a building could bring about various effects including;

- ❖ Health problems
- ❖ Spending less time at home
- ❖ Less input at work
- ❖ Could lead to crime for the youths

It brings about the movement of residence from such buildings to finding a better and more suitable one which meets their aspirations and needs. Some of the negative impacts are the residents moving away, poor neighbourhood and community development and under-achievement in the children's education. Because housing is central to the social and economic needs of all people, it is not surprising that national policy has long proclaimed the provision of "decent home and a suitable living environment, for all level of the economy. The reflection of an inhabitant needs will go a long way at making the building a satisfying place to stay for the residence. Recently, elevating customer satisfaction and highlighting unique value for customers have become important business strategies. Comfort standards are 'social constructs which reflect the beliefs, values, expectations and aspirations of those who construct them'. Emphasizing the understanding of customer experience has become fashionable approach to innovation in professional domains, including the housing industry.

#### *b. Concept of Residential Comfort*

A resident's response to the environment says a lot about how comfortable the environment is and also determines the quality of life of the resident. A comfortable environment will attract more time in the building. Individuals' evaluations of housing and neighbourhood determine the way they respond to residential environment.

Resident satisfaction is not only an important component of individuals' quality of life but also determines the way they respond to residential environment. Theories on residential satisfaction are based on the notion that residential satisfaction measures the differences between households' actual and desired housing and neighbourhood situations. Housing satisfaction is a significant factor in the choice of housing since it is one of the factors that determine residents' quality of life.

Theories of residential satisfaction are based on the notion that residential satisfaction measures the difference between households' actual and desired housing and neighbourhood situations. They further state that residents make their judgements about residential conditions based on their needs and aspirations. A constructive judgement about a house will as such be dependent on what the residence expectations are about a home.

Satisfaction with their residential conditions indicates the absence of complaints, which most likely indicates that their needs meet their aspirations. Previous studies on residential satisfaction have analysed many variables such as housing, neighbourhood and residents' characteristics that affect residential satisfaction. The studies shows that buildings features, such as number of bedrooms, size and location of kitchen and also quality of housing units are strongly related to residential satisfaction .

#### *c. Health and Safety Problems*

Health is considered to be a state of optimal physical, mental and social well being of a person and not merely the absence of disease and infirmity. This is considered as one of the most important factors when looking at the comfort of inhabitants in a building. The elements of health and safety are listed as the main occupant preferences by various scholars. There are various signs, which signifies health and safety elements this includes but are not limited to:

- ❖ Cleanliness
- ❖ Fire safety

- ❖ Safety from criminals
- ❖ Public safety

Housing conditions affect people's health. Inadequate housing causes or contributes to many preventable diseases and injuries, including respiratory, nervous system and cardiovascular diseases and cancer.

- ❖ Poor design or construction of homes is the cause of most home accidents. In some European countries, they kill more people than do road accidents.
- ❖ Use of proper building materials and construction could prevent indoor pollutants or mould, causing asthma, allergies or respiratory diseases.
- ❖ About every tenth lung cancer case results from radon in the home. Appropriate design can prevent both exposure and the risk to health.

The world health organization also recognizes four different dimensions to housing. It is of the opinion that each of these four dimensions has the potential to have a direct or indirect impact on physical, social and mental health, and two or more of them combined can have an even larger impact.

### Sustainable Low Cost Housing

Sustainability is commonly defined as development that meets the needs of the present without compromising the ability of the future generation to meet their own needs. Sustainability is concerned with protecting environmental quality, enhancing social prosperity and improving economic performance. "A sustainable house is cost efficient over time, comfortable, cheap to maintain and complements our unique environments. Inevitably sustainability supports strongly making a house comfortable to its residents, future or present. As far as sustainability is concerned there is no basis for compromising the comfort of the residence in any way. The increasing awareness of sustainability in construction projects worldwide and its contribution towards saving the environments, improving building performance, achieving clients satisfaction and providing better value for money is evident (Thomson et al. 2003). Sustainable development can also be said to be development that meets the needs of the present without compromising the ability of future generations to meet their own needs". *Meeting the needs of the present* refers to the development component of sustainable development which includes, and that is important; economical, social, cultural, health and political issues. The second phase of the definition...*without compromising the ability to meet those of the future*...is mostly referring to the environmental issues. Despite the development of new technologies to complement current practices in creating greener structures, sustainable buildings still are designed generally to achieve the objective of reducing the overall impact of the built environment on human health and the natural environment by:

- ❖ Efficiently using energy, water, and other resources
- ❖ Protecting occupant's health and improving employee productivity
- ❖ Reducing waste, pollution and environmental degradation

Ensuring that low cost houses are sustainable will make it easier to maintain and ensure that it satisfy the user's needs both in the now and in the future. This is evident in that there will always be low income earners in the world; there is therefore no possibility of it not being useful.

*a. Physical elements*

**Housing Design Comfort:** Design is a word which can be related to different fields. Design a related to this paper will be concerned with the aspect of residential environment dwelling unit and the planning of their accommodation and of site layouts. Design stage of buildings is usually carried out by architects with respect to the client's needs and aspiration of such buildings. This stage precedes the construction stage of a building. This is viewed as an important aspect of construction, because here a picture of what will suit the client is captured and effectively reproduced on paper. At this stage corrections can also be effected to suit the client's needs without incurring much expense.

Design comfort is a residents feeling of satisfaction with the way a building is planned to meet their needs and desires. It is not uncommon that a house buyer needs to remodel the dwelling unit even if it is just newly built and in prime condition. In view of the important role housing plays in the lives of residents, it is important for architects and planners to work together with residents of low cost houses to build a better perception of the needs of the occupants. There are three ways that architects, planners and social scientists can work together in developing a framework for the provision of good housing design. Firstly, it is recognized that at the beginning of the process, the architect or planner must gather information which eventually will be synthesized and integrated through his design talents to produce an environment consonant with the wish and aspirations of the occupants. Secondly, at the other end of the planning process there are several instances where Architects and social scientists have collaborated in the evaluation of a residential environment from the point of view of the users. Finally, architects, planners and social scientists should begin to pool their talents in efforts to determine those salient dimensions of housing and residential areas which contribute to the overall quality of life experience.

The extent to which human needs are satisfied within this environment will become an equally important indicator in the future, because housing is a major component of the urban environment, better designed houses contributes to the physiological and psychological well being of the inhabitants.

Encarta stated that despite wealth of greater variety of materials available to urban-based residents, urban-based housing in developing countries is generally lower in quality and less spacious than housing in developed countries. To unravel the problem, housing providers have increasingly been searching for ways to reengineer the process and product to better conform to the demands of customers.

The increasing recognition of clients as the core of the construction industry and a vital driving force for improvement necessitated the importance of achieving their satisfaction. Until recently, organizations in the construction industry focused primarily on their internal functions and placed relatively little emphasis on their customers and other organizations within their supply chain network. The construction industry has to make every effort to improve client satisfaction through continual improvement and flexibility in responding to clients requirements, meeting end-users' needs, coping with changes to regulations, exploiting business opportunities, adapting to technology improvement and providing best value for money.

Clients blame the construction industry for delivering products that do not achieve their objectives or meet their expectations. Meeting the resident's desires and needs especially in the design stage not only eliminates lack of comfort but also saves the residence the problems of remodelling to suit their needs which ultimately eliminates unnecessary loss of funds.

The construction industry is concerned with satisfying its clients through delivering projects that achieve their objectives, meet their expectations and provide them with best value for money. There are three basic elements that provide value to the user – function, quality and cost. Where:

- ❖ Function is the specific purpose or work that a design/item must perform
- ❖ Quality is the client's or user's needs, desires and expectations
- ❖ Cost is the total life cycle cost of the product.

Value is the most cost-effective way to accomplish a function that will meet the user's needs, desires and expectations. Best value can be accomplished via end-user satisfaction, sustainable and high performance construction, reliable and effective after construction services such as maintenance management. It can also be achieved through active communication and sufficient co-ordination between concerned parties, updated standards and specifications, collaborative arrangement with suppliers and service providers, and facilities management. Making the occupants' of low cost houses comfortable is ultimately achieved when they are fully involved in the design stage of the building, since what is planned is what is expected to finally be constructed.

**Lighting:** Lighting is considered as one of the basic needs in all building. It is highly prioritised in buildings. Lightings were really emphasized in new construction, and also namely as the physical environment that influences mental health, in addition lack of that will contribute to mental disorder. Lighting indicators includes;

- ❖ Natural lighting
- ❖ Artificial lighting
- ❖ Quality of lighting

Natural lighting is the sufficient distribution of daylight within the dwelling units. This is primarily achieved by introducing openings and placing them in places where light can easily pass through. . Position and size of openings helps to optimize natural sunlight, through clever design positioning of glazing during the day such that heat gain is reduced in summer while heat loss is reduced in winter. Natural light should always be introduced into our designs. Daylight should never be taken for granted. This is especially so when we are trying to reduce our dependence on carbon fossil based electricity and when we need to calm down from our daily stresses.

Artificial lighting is powered by electrical energy. It is a common feature these days to find artificial lightings everywhere in dwelling units such as in living room, bedrooms, toilets and even outside the building. Both natural lighting and artificial lighting were giving quality of lighting in dwelling units. It will influence both occupants' physical and mental fatigue.

**Thermal comfort:** When a person does not feel cold or hot and can maintain its body temperature with ease the person is said to be comfortable. Thermal comfort is defined in British Standard BS EN ISO 7730 as: '*that condition of mind which expresses satisfaction with the thermal environment.*' This can be affected by various perceptions of the environment which includes radiant temperature, air temperature, relative humidity, air velocity, activity and clothing. In warm humid tropics, overheated building interior is common due to solar penetration through the building envelope and windows and lack of ventilation (Rajapaksha et al. 2003). There is no absolute standard for thermal comfort as the comfort varies from different environment to different personal factors.

Echoing Heschong's (1979) experiential account of 'thermal delight', a number of respondents elaborated on the complexity of people's perceptions of comfort and challenged the view that these could be reduced to a bundle of variables including temperature, humidity, air quality, etc.

Various environmental factors have being said to influence comfort of which there is standard for which these factors are expected to remain for comfort to be achieved. These various factors includes;

- ❖ Air temperature
- ❖ Air movements
- ❖ Humidity
- ❖ Radiation exchange with hot and cold surfaces
- ❖ Symmetry

A brief discussion of the various factors will be done below;

**Air Temperature:** We human beings are warm-blooded in nature. As specie, we are biologically able to keep a constant body temperature of 37 degree centigrade, in spite of the temperature of the air around us. For us to be truly comfortable in our environment however, it is desirable that the temperature of the air around us is maintained at around 10Â° - 20Â° centigrade, depending upon what state we are either we are active or at rest. It is very important that this fact should be bore in mind when planning and constructing buildings for human habitation that a pleasing thermal environment is an important function of excellent building design.

Describing comfort in the physiological terms, it can be said to be what we experience when the body functions well, with a core temperature of around 37°C and skin temperature of 32-33°C. It is important to note that temperature itself is not a measure of comfort. It has being observed that there are relations connecting climate, inhabitant's behaviour, building design and heating, cooling and insulation technologies. Most of these houses have limited openings both in the front and at the back of the house also the building materials used tend to be accumulating heat most times.

A study of the potential impacts of climate change on human health notes the trend towards higher temperatures in all four scenarios and calculates that, without adaptation, there could be a rise to 2,800 heat related deaths per year by the 2050s under a medium-high climate change scenario. The major points to be considered in this climate to achieve a relative measure of thermal comforts are heat and humidity.

For an acceptable thermal environment to be reached the comfort of people using the building as well as the requirements of objects stored in them needs to be considered. Humans and buildings relate with the heat that surrounds them; the quantity of excess heat generated by a human body is directly proportional to the level of activity in which the body is engaged. Accordingly; the temperature of a room may limit the level of human activity that occurs within. For example, a room temperature of 19C may be comfortable for a person who is watching a movie, but somebody using an exercise machine in that room would soon become overheated.

Improving the energy efficiency of the houses supplied as well as elevating comfort levels also provides cost, health and environmental benefits, both for individuals and society at large. Most buildings do not fulfil the desired comfort level as a result of the building blocks and crowded dwellings.

**Air movement:** Movement of air in a building affects the thermal comfort of occupants by influencing the rates of heat gain or loss through the building envelope and it determines whether good-quality indoor air will be present.

The nature and magnitude of subsequent air movement in a building will be highly influenced on how an architect lays out a building, chooses materials, defines building details, and participates in the construction process. Air movement can induce significant heat exchange through the building envelope. A prerequisite to maintaining a healthy and comfortable condition is the supply of good-quality air to building spaces.

It is essential that the air within a building should be free of dust, dirt, allergens, and any potentially toxic substance; it should be clean-smelling and free from possibly offensive odours; and its humidity should be within acceptable ranges, so that stuffiness will not be



experienced by occupants. Further, this good-quality air should be circulated uniformly and at acceptable velocity rates throughout each occupied space.

**Humidity:** This is another major contributing factor to body comforts. Extremely low humidity contributes to the drying of respiratory passages which directly raises the possibility of respiratory illness and disease. It's being observed that harmful bacteria and virus grows best in either high or low humidity. There has being cases of people who develop a particular ailment while staying in a particular environment, but discover that once they are out of the said environment the ailment's symptoms reduces drastically. Therefore making a house less humid as possible will go a long way in enhancing the good health and comfort of the people living in such houses.

### **Socio Economic Elements**

Affordability can be said to be purchasing something believed to be within one's financial means. In housing it is not totally different. As 'Affordable Housing' is usually used to describe housing which is "appropriate for the needs of a range of low and moderate income households; and priced so that households are able to meet other essential basic living costs." With a number of economic, social and infrastructure factors determining housing affordability, affordable housing can be a complex issue. Affordability of housing involves many issues of concern to different stakeholders. Recent literature indicates that the issue of affordability has broader implications that goes beyond building economics and include environmental, cultural, social, and legislative aspects.

In Malaysia low cost housing or affordable housing is defined according to its selling price of RM25,000 per unit. Ministry of Housing and Local Government has further laid down the following guidelines for this category of housing:

- ❖ The target group consists of household with monthly incomes not exceeding RM750
- ❖ The type of houses may include flats, terrace or detached houses
- ❖ The minimum design standard specifies a built-up area of 550-600 square feet, 2bedrooms, a living-room, a kitchen and a bathroom.

However how affordable these houses are to the low income earners still remains questionable. As with an income of below RM750 can all their needs be catered for to also include the purchase of a house that is slated for that price. Rose (2002) states that people can only own a house at an affordable price if it will only take an amount of 30% of the overall house hold income.

### **Access to social facilities**

One of the good qualities of a well planned community is the easy accessibility to most social facilities. It is the responsibility of the town planer to design the community in a way that all social facilities are accessible to all. States that appropriate location and accessibility of housing to effective service delivery and infrastructure are the key attributes to making sure the house is adequate and meets the community need. The ease with which social facilities are accessed will bring tremendous advantages to owners as well as users because their daily activities will be easily carried out and it also will add to a better living condition.

Accessibility to educational institution such as primary and secondary school and health institution, for instance, clinic and hospital is a crucial indicator that influences user preference in environmental quality. The conception of the neighbourhood unit provides for houses, infrastructure, utilities, green parks, school, shops, places of worship, employment

opportunities, clinics, other social and public facilities. These provisions are planned to promote cohesion of residents and therefore the well-being of residents. Ensuring that these neighbourhood facilities are easily accessible especially to low income dwellers is essential to improve their overall quality of life.

### Quality of life

Human wellbeing or quality of life can be defined as the subjective life satisfaction of an individual. Quality of life may be regarded only for a certain section of life or for life as a whole. In this instance it is focused on comfort in low cost buildings. An increasing body of evidence points to the role housing plays as an essential platform for human and community development. According to recent Euro barometer studies, conducted by the European Commission in 28 European countries, having a good job and adequate accommodation are viewed, on average, as the most necessary requirements for having a good life (Delhey, 2004). The concept of adequate accommodation involve one that fulfils the needs and aspiration of its inhabitants. This research is of the opinion that when comfort is included in the planning stage of a building occupants of said building are more satisfied with life in general and this will lead to a more positive contribution to society and to the development of their nation.

### CONCLUSION

Housing undoubtedly is very important in the life of human. As with the attainment of shelter one of the basic human needs has being met. It is an established fact that low cost housing is one of the common means of housing people with low income in the world. Malaysia is not left out of this trend after identifying that one of the best ways to bring about economic growth is in the provision of houses especially to the low income earners. The residents of this building are undoubtedly more in the country contributing largely to the economic growth of the country through hard work and dedication. They are the largest in the human resources that contribute to nation's growth. The residents of low cost houses should be accorded a comfortable living environment as with comfort comes a good quality of life. The living condition for the lower income group in the low cost flats should not be negotiated in any way. Having identified the different roles housing plays in the lives of an individual, making it as comfortable as possible for its inhabitants cannot be overemphasised. It is an established fact that comfort in the life of any individual is essential in the contribution to humans' quality of life.

The planning policies and design of low cost housing environment should extend beyond just the provision of buildings it should include important factors such as the quality of life which will inevitably create an environment that is comfortable, safe and convenient for the people to live in.

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