Saleable passive house. Marketing activities in the context of passive sustainable principles

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ABSTRACT

The architectural product is influenced by a series of more general economical aspects such as people's living standard, which includes not only a relative stability of the prices but also that of the family income. Therefore, the architectural product much less free than another consumer good when the form in architecture for example has to perform functional, constructive and esthetical task.
Passive Houses are buildings which assure a comfortable indoor climate in summer and in winter without needing a conventional heat distribution system.
The saleable passive house thus provides us with the opportunity to reach extremely low levels of energy consumption by employing high quality, cost-efficient measures to general house components - such measures are in turn of advantage to the ecology and economy sector. The concept of sealable architectural produce takes in evidence a balance between the functional-constructive architectural quality and the economical aspects.

1. ENERGY IN ENVIROMENTAL DESIGN

1.1 Energy in microclimate

The first law of existing energy phenomena in ambient consider that the energy form cannot be creased or destroyed. Its form may be changed, but its magnitude persists. This is the essence of the first law of thermodynamics, more commonly known as the law of conservation of energy. According to the law of thermodynamics there is just as much energy left after it has been through the system as was supplied at the power point. As energy cannot be consumed in the strict sense of the term, it follows that it cannot be conserved or for that matter, wasted. The simplest measure of energy grade is temperature, and experience shows that the most common form of heat engines operate by taking in energy at a high temperature (called source temperature) and giving it out at a low temperature (called sink temperature). Changing of energy through temperature on ambient environmental can take three possible routes: conduction, convention and radiation.

1.2. Thermal comfort

Human thermal comfort is dependent on four thermal environmental parameters, dry bulb temperature, mean radiant temperature, relative humidity (vapour pressure), air velocity, and two personal parameters (clothing insulation, and activity level). All the parameters are interrelated in affecting the thermal comfort of an individual. If the activity level, clothing insulation, and air velocity were constant, increasing the temperature by 1.8 degree Fahrenheit requires reducing the relative humidity from 50% to 30% in order to maintain the same comfort level. The thermal comfort factor is the combination of all six variables. The activity level is the most important one factor that affects thermal comfort. Subjects that are engaged in the higher-met activity felt significantly warmer than those who were sedentary (1-met activity level). Even if the air velocity were increased from 30 fpm to 50 fpm, the thermal votes changed only slightly. When the air velocity was increased, the thermal sensation votes were reduced slightly at the 1-met level. No changes were observed for the 2.3-met level when the air velocity increased. (1)
The room temperatures of the permanently occupied terraced houses are right in the middle of the comfort range, with an average 21, 1°C in the middle of winter; the very slight deviation (20, 9°C) on the coldest day shows that comfort is guaranteed, independent of the climate conditions. The value of the average temperature lies clearly above the typical target temperature of 20°C. The calculated extra heating consumption for a representative terraced house in Hannover, for an increase in the room temperature from 20°C to 21°C, is 1,7 kWh/(m²a) or 15%
The internal environment of the house needs to feel comfortable. Comfort conditions will vary from person to person but field studies carried out throughout the world have shown a close relationship between the preferred indoor temperatures and the mean outdoor temperature. In essence the thermal comfort of an internal environment is tightly related to the combined and simultaneous action of four parameters of the environment acting upon human body. That is inside airing temperature, the relative humidity in the room, the speed of air movement in the

room, the temperature of the inside surface of the building elements. The thermal protection is materialized both at the spatial-volumetric outlook level and at the level of architectural details (lens shade and specific elements), the microclimate being improved by shadow-generating natural elements (vegetation, physic volume, etc.).

1.3. Passive house in optimal Situation

In process of changing our life ways, we should focus on the natural cleansing effect and the power of self-regeneration found in the world woodlands and rivers. Economic development that wastes limited resources and destroys the environment brings only momentary prosperity; it lacks sustainability and threatens the very existence of future generations. Now more than ever, it is time to return to our point of origin, to deepen our understanding of the environment and the correct our ways of mishandling the earth's forests and woodlands which play such an important role in shaping and developing the human spirit. Now is the time to change our consciousness in this regard and, focusing on earth energy, to come up with the appropriate means of utilizing our resources such as sunlight, wind, water, and so on. There are many objects and decisive factor involve in marketing investigation process that can create an adequate synchronization between marketing activity and passive house such architectural product;

- Marketability, market surveys repeatedly have shown that homebuyers appreciate some of the characteristics of sustainable design, such as energy efficiency and good indoor air quality, enough to pay extra for them.
- Affordability, there is a common perception that sustainable building is more expensive than conventional building, but in this research we have to work in direction more cheap passive house by using marketing research principles and operation research models.
- Ameliorate environment that have directly effect in architectural elements, forms and functions.
- Energy efficiency, the benefits from the energy-efficient sitting and design of buildings are economic (saving money), social (reducing fuel poverty); and ecological (reducing resource exploitation and emissions). Every new development ideally should have an explicit energy strategy, setting out how these benefits are to be achieved. The amount of energy use in a building is a direct result of the climate, the building's use and the building's form.
- Renewable energy, it refers to those "clean" and endless (they renew) energies. Renewable energy refers to energy resources that occur naturally and repeatedly in the environmental and can be harnessed for human benefit.
- Regional Design, regional design adapts a house to perform well and endure in its particular location by:
- Designing for climate and microclimate.
- Considering regional vernacular architecture.
- Conforming to applicable local building codes.
- Durability Sustainable design incorporates durable materials, properly assembled to comprise a durable system. Using durable materials avoids the expense and resource consumption of materials that fail sooner, requiring replacement and potentially damaging other systems and components.

The human comfort parameters that influence the overall comfort can be grouped into three categories:

Physical parameters, which include the air temperature and the thermal conditions of the environment, the relative humidity of the air, the local air velocity, the odors, the colors of the surroundings, the light intensity and the noise level.

Physiological parameters include age, sex and specific characteristics of the occupants.

External parameters include human activity, clothing and social conditions.

- Healthy environment**,** behind the health of construction site workers involves choosing less-toxic material alternatives and providing worker training in specialized installation procedures.
- Material efficiency. There are three principal approaches to improving the material efficiency of home construction: Reducing the amount of material used in construction.
- Using recycled materials that otherwise would have been waste.
- Reducing waste generated in the construction process.

Passive design is not a power-generating technology. It can be implemented with little or no additional cost. Alternatively it can involve more expensive and complex design and special features or components. Consequently there are no hard and fast rules relating to the general cost of applying passive design, or to the likely benefits.

Passive design should offer a number of benefits:

- Careful integration of passive design and energy efficiency measures can give rise to houses that have a lower conventional energy demand.
- Passive houses need not cost more than their conventional counterparts, but will cost less to run.
- Passive houses require fewer building services and are, therefore, simpler and less costly to maintain.
- Occupants of well designed passive houses often prefer this type of building to those that are highly controlled and conditioned.

2. MARKETING ACTIVITY

2.1 Overview

All businesses, big and small, old and new, need to do market research. A common feeling of many small business owners is that they don't need to do market research

as they already have a feel for their customer market, given their long experience. However, experience, though useful, can lead to a false sense of knowing. Be careful as information gathered arbitrarily over the years may be out of date, vague, biased or of a folk tale nature.
It's impossible to sell people what they don't want. That's obvious. Just as obvious is the fact that nothing could be simpler than selling people what they do want. Market research is essential in helping you find out what people want. Market research provides what you need to get sound information about your new product, service or market so you can develop good marketing and business strategies.
High quality of passive house brings housing comfort primarily up-to-date and durable products to the house user with lowest current energy costs. The solution of technical requirements behind it and the creation of a good price-performance ratio is task of the product manufacturers of passive houses.

2.2. Passive house in context of marketing activity
The architectural product and the quality index of passive house and cycle life of produce for passive house, from launching phase to declining phase to secure a sustainable house function.
The price represents the mechanism that provides the balance between requests / offers and represents the quantity of money solicited for a produce, on a winder sense. The price is the sum of all the values offered by the consumers in the exchange for the advantage of having or using the product.
The new orientation to determine the qualities of the architectural product by using cybernetics-economical system of analysis and evolution is a step towards the creation of estimation methods by using an efficient branch of the operational researches in order to materialize the cost-quality relation the best possible.

2.3. Passive house in market research
It's impossible to sell people what they don't want. That's obvious. Just as obvious is the fact that nothing could be simpler than selling people what they do want. Market research is essential in helping you find out what people want.
Market research provides what you need to get sound information about our long life product, service or market so we can develop houses marketing and business strategies. As with any business activity, our market research should be carefully planned, written down and carried out. If our business is already up and running, we probably do market research every day in our routine management activities without even realizing it. Market research simply makes the process more orderly and ensures no bias. For an adequate investigation we have to follow the following steps:
- State the situation we are facing.
- Well definition of our product.
- State the objective(s) of your market research.
- What do we need to find out?
An objective may be identifying or verifying a target market, identifying or verifying customer needs and wants, finding new opportunities and new markets, or estimating the size of markets.
- A well-written objective is clear, concise, complete, realistic and commercially worthwhile. One objective may be to find out whether working people in the community are interested in more nutritious midmorning snacks. Another objective may be to learn whether or not your nutritious muffins appeal to the taste buds of these people. A third objective may be to discover whether the local high school will sell them in its snack shack.
- Look at the information you already have. Research may simply mean organizing and analyzing existing information. Check sales receipts for your Saskatoon cranberry muffins from the past three years. They may show a steady increase in sales, indicating your market is ready for more muffin varieties.
- Collect additional information if needed. Begin by doing some indirect market research. Find information that is already available such as government or nutrition studies which look at peoples
- Organize and analyze the information collected. Make sure your research answers the questions who, what, where, when and why, so you don't jump to conclusions
- Make decisions based on what you have learned.
- Watch the results of your decision and learn from them.
The intention towards an economical passive house can be improved to become a more cheap and efficient. Many of the prerequisites of a passive house must take in concordance with necessary of standard models.

3. INFORMATION AND DATES REQUIRES FOR THE STUDY

3.1. Thermal energy on passive sustainable house
To find out a natural sources of energy for cooling and/or heating is a sustainable architectural concept, and to activating those sources of energy by a fine architectural perception and integrate those systems in houses form by more than one cooling system is the intelligent form of sustainability. The house heats and cools itself, hence "passive". Passive bioclimatic design principles include orientation of windows relative to the position of the sun, thermal mass, natural ventilation, sunlight, and shading areas
The development of passive houses has shown that buildings with energy consumption below 15 kWh / m².a can already be built today economically. Besides energetic and economic criteria house -ecological criteria

find increasing consideration. Thus the passive house currently represents the most consistent concept of sustainable building. The spreading of the passive house brings an enormous increase in quality of planning and workmanship as well as the housing comfort with itself and is seen by participants as a new dimension within the domain of building houses. In order to reach a substantial energy-saving building method, it is obvious to further pursue the passive house concept.

- Energy in external environment and rebuilding of environment
- Local microclimate and topography (A local microclimate is the climate of a small geographic region considered with reference to the general climate. Every residential site is site definite as to its location, organisms, vegetation, solar access, and its microclimate).
- Emplacement and orientation.
- Rebuilding of local microclimate.
- Energy saving and environmentally friendly
- In plan, section and volume (Energy in the house must be allocate throughout regarding of thermal zones in the house by utilized the energy in diverse house functional spaces such as cascade)
- Energy allocate in correspondence to human activity
- Improve of energy saving concept;
- By plants and vegetation on external elements
- By house in house concept and double skin façade
- By ventilation with heat recovery systems
- By Heat break transfer concept

-Application of competent energy requires for cooling and heating

3.2. Windows emplacement, form and size

To get a light in the house is the essential function of windows, consequently windows are a vital part of any house they permit natural light into the house as long as views and fresh air. Windows are an extremely influential factor in climatic design, as the weakest climatic element of the building envelope.

Well designed and protected windows improve comfort year round and reduce the need for heating in winter and cooling in summer. During summer, all windows receive net heat gains, but especially those facing east and west. East and West windows receive substantial solar radiation in the morning and afternoon. East and west-facing windows receive little winter, autumn and spring sunlight, but excessive summer sunlight. They should consequently be kept small, especially those facing west, and be well shaded. Every cardinal point has own characteristic.

The west orientation for example, is badly in afternoon, which the sunlight becomes horizontal in the summer. The north direction is totaling different and it's without a direct sunlight. Consequently the lighting in this orientation is very constant such light and temperature. In supporting of a perfect working of a different function of house that need's;

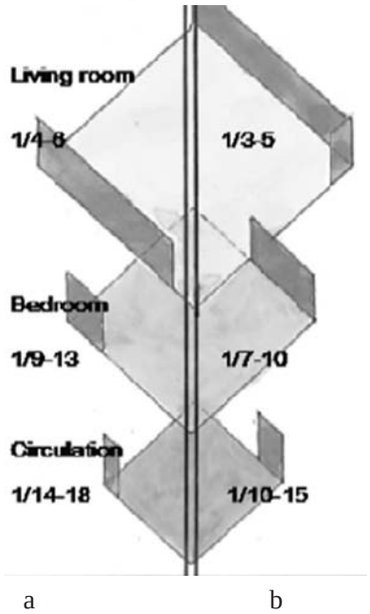
3.2.1.. Optimal orientation for houses in cold climate (southeast)

- Bedrooms, living room and other spaces which include the same activity, have a preference orientation towards southeast, east and south.
- Eating space and children plays spaces have preference orientation towards south and southwest
- Circulation spaces, and auxiliary functional spaces, have preference orientation towards west and northwest.
- Spaces which needs a constant level of lighting such as kitchen, bathroom, have preference orientation towards North, northeast, northwest.

3.2.2. Optimal orientation for houses fin hot climate is (northeast)

- Bedroom, living room and other living spaces which include the same activity, have a preference orientation towards, northwest, north, northeast, east.
- Eating space and children plays spaces, and other spaces which include the same activity, have a preference orientation towards, northwest, west,
- Circulation spaces, and auxiliary functional spaces, have preference orientation towards, south, west, and southwest
- Spaces which needs a constant level of lighting such as kitchen, bathroom, south, southwest

The standard triple glazing with one low emission shield and argon fill has a glazing U-value of 1.0.



a b

Figure 1: Widows size in rapport to functional house area
a. hot climate b. cold climate

Taking into account the heavy timber frame, the average U-value for an operable 12-12 sized window is 1.15 W/m2C°. We notice a little loss of

light-transmission and a slight brown tinting of the light due to the second layer of low energy coating.

3.3. External doors

Typical door has a U-value of 0.99 W/m2C°. This can be improved by adding an extra internal door swinging into the room. Otherwise doors with U-value of 0.8 W/m2C° must be sourced. As with all components making up a passive house, the total performance of the house must be considered. A large house with many doors will have much larger heart gain and losses and this must be compensated by significant improvement of all components

3.4. External walls

To get a maximum day light and minimum energy loss, we have to take in evidence percent area windows on external walls. The optimal percent can be 20-30% for hot climate and 30-40% for cold climate

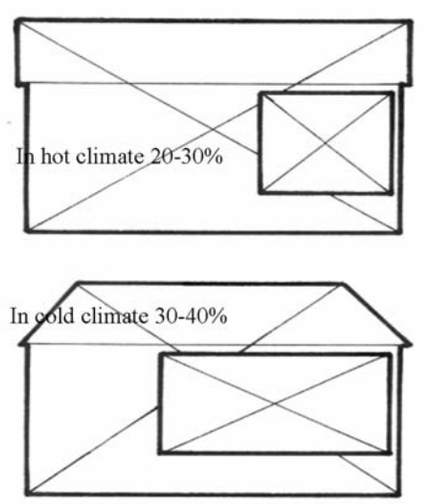


Figure 2: Windows percent size

A well insulation of external wall can be the optimal result for passive house. The regular wall insulation consists of U-value less than is 0.20 W/m2C°

3.5. Suitable roof

Single storey houses are the ideal situation when building to fully passive specification. Roof must be efficient, simple and cheap.

Green roofs are optimal solution for passive houses. U-value can be less than 0.080 W/m2C°

Floor: The standard base unit provides good insulation of the circumference of the foundation.

3.6. Air tightness

The complete building envelope must be totally airtight. The vapour barrier must be overlapping 550mm and sealed everywhere. All windows and doors must meet the required air-leakage standards. < 0.5 air changes / h at n50. Another motive for why this is of paramount importance is the risk for condensation within the wall. The temperatures within the outer layers of a super-insulated wall are quite low. If moist warm air from the interior migrates into the wall the dew point will be met and condensation will happen in the insulation.

3.7. Cross ventilation

The cross ventilation can be set to slightly lower speed for a passive house. The ventilation system can be designed for a 0.5 air-exchange per hour necessary.

3.8. Cold bridging

Building element functions: A complete thermal bridge free construction is needed. The linear thermal transmittance to exterior must be below 0.01W/mK° One drawback with the super-insulated wall is the loss of floor area.

4. CONCLUSIONS

Marketing used the general trend to wellness and health, high living quality and modernity. A further marketing argument for house companies could be the good building quality - and thus avoiding the occurrence of mould damage and resulting complaints completely. A promoted demo project within the city area as descriptive passive house in this type of housing could contribute substantially to the introduction on the market.

The vital objective of saleable passive house is to outline attributes and put them into a clear, sensible, organized format so developers, designers, planners, and architects can learn about the importance of a connection to the natural environment in all their building projects.

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