Comment on
An Approach to a Sustainable Home

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The paper describes a wonderful application of the use of energy efficient design techniques for hot and humid climate. The author provides a useful perspective for thinking about efficiency improvements in building. He makes very general suggestions to improve the energy consumptions. I challenge the detail of the proposed methodology presented by the author. I am concerned if the author has more specific methodologies on how these results and goals can be achieved? My comments shall start with general to a more realistic and reasonable approach to assess alternatives.

I agree that today, increasing number of people are migrating to urban area and new ways of life has changed the nature of housing. Higher urban density is its result which reduces greatly the potential for good air quality or natural ventilation as well as quality of acoustical and visual comfort. His idea of incorporating the modern life style and six important issues affecting architecture into a concept of "Energy Conserving Home" and "Ultimate Sustainable for the Future" is good. My questions rose with what would be the rough definition of "Quality of Life" one of the six issues he stated? Can "Energy Conservation" be combined with "Environmental Preservation"? Let us compare his idea with the table shown here. The table presents building performance variables, developed by Hartkopf, Loftness, and Mill. The difference between the two is the way to organize such issues. This table organizes all issues in a simple way which is easy to learn from.

Although the idea is not new in this area of study but the author claims that this is a new concept for hot and humid climate architecture, especially adapted for Thai environment. What I am impressed is that the author has built and/or has attempted to build these concepts into real projects. Only a few architects living in hot and humid region have opportunities to build like him due to the limitations of affordability and their clients' value.

	Physiological Needs	Psychological Needs	Sociological Needs	Economic Needs
Spatial Quality	ergonomic comfort handicap access functional servicing	habitability. beauty, calm. excitement, view	wayfinding functional- adjacencies	space conservation first cost, operating cost, and maintenance
Thermal Quality	no numbness no drawsiness no heat stroke	sense of warmth or cold individual control	flexibility	energy conservation first cost, operating cost, and maintenance
Air Quality	air purity, no rashas no lung problems no outgassing	no synthetics not stuffy	no irritation from of to neighbors smoke, smells	energy conservation first cost, operating cost, and maintenance
Acoustical Quality	speech clarity no hearing damage music enjoyment	quiet, soothing, or active, exciting. alive	privacy communication	first cost
Visual Quality	good task illumination no glare, visual noise way finding, no fatigue	orientation, cheerfulness calm, intimate/spacious alive	status of window sense of territory	energy conservation first cost, operating cost, and maintenance
Building Integrity	strength and stability fire safty weathertightness	durability sense of stability, image	status/appearance quality of construction	material/labor conservation all costs
	Performance Criterial to All Human Senses. In The Integrated System			
	Physical comfort Health Safty Function Appropriateness	Psychological comfort Mental health Psychological safty Aesthetic Delight	Privacy Security Community Imaga/status	Space conservation Material conservation Time conservation Energy conservation Money conservation

Performance Criterial for Evaluating the Integration of Systems

(Hartkopf, Loftness, and Mill)

Figure 2, proposed by the author, is a good conceptual illustration which presents effect of different strategies in the design processes determining how these strategies would enhance building performance in order to achieve comfort zone. In Graph 1, the author claims that the temperature distribution for energy efficient design house is uniform across the day and is relatively low compared to the traditional Thai house and ordinary house. The author failed to specify the construction specification, other building performance aspects as well as embodied energy used to build and to operate each type of house. Thermal comfort is only one of many factors that determine whether this design will ever become successful.

The author gathered available information on the possibility of energy producing home in part 4. In this task, when he evaluated each alternative technology (gas, solar, water, etc.), he did not evaluate boundary conditions, limitations, and methods based on the potential of that one technology alone for providing useful resource. In contrast, a realistic and sensible approach would be to consider a portfolio of technology alternatives and implementation strategies, with each technology contributing only a fraction of a portfolio total. The author has suggested an innovative solution to the water usage. This is an interesting solution and I wonder how to make the roof temperature lower than the dew point outdoor temperature? There must be energy input in order to lower the roof temperature. If this is the case, what would be the trade off between the energy input and the water output from the roof?

In section 5, the comparison among energy usage from different houses, he did not to mention about what factors and/or variables make the energy usage different. All presented information is results. Further, the author notes that about 875 m2 of a south-facing roof would be required to generate the electricity solely from photovoltaic for a typical house, without noting that sufficient area for this purpose may already exist on residential and commercial building roofs. Let us take a closer look at numbers declared in section 5, Table 1. 315 kWH is total energy used in one hour or 315,000 J in 3600 seconds which should be 87.5 J/sec or 87.5W, NOT 87.5kW. There might be an error about unit and calculation. Another example, 1kW flow of energy, if calculated for one hour, then the total energy is equal to 1000 W x 3600 seconds or

3,600 kWH, NOT 3.6 kWH. Therefore, the areas of the proposed roof are much more than reality. However, the proportion of the area would be the same as the energy usage.

It would be better if he could show his work and process in addition to its results. Figure 3 is very useful for hot and humid climate indicating that major energy used to control indoor condition is through dehumidification process rather than cooling air temperature process. A good analysis should include mathematical modeling of alternative technologies and strategies in careful balance, with the results then compared with the initial aims. This kind of analysis is not present in this paper, which means that the realistic potential of alternative technologies and strategies was not addressed.

Conclusion

The paper presents multi-disciplinary area of study which is a good sign for the next generation. The author fully understands ways of life and work that have changed over time. Design strategies alone will not make the intention successful. The time has come to recognize that the public interest must weigh first in their priorities, and that costs of construction and energy are only a portion of the valuations of alternatives. The article's role is to serve the public and the economy with maximum overall benefits, not to dictate preferred solutions. It is the hope that this comment will give readers different view point. It is time for the government and public sectors to help lead the way toward a transition for Thai away from the present economically and strategically dangerous dependence on imported fossil fuel resources and toward sustainability with indigenous, clean resources.