

<b>Thesis Title</b>	Design Concept for Low Energy Housing in Songkhla Province.
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## **ABSTRACT**

Residences in tropical area are always confronted with two problems: high temperature and humidity. If these problems are unable to be solved, the residents must be annoyed to live in houses with a lack of thermal comfort. Finally, they have to identify a solution.

One effective solution is an air-conditioning installation which can help reduce both problems. However, an air-conditioner can create other problems. It costs much higher expenditure monthly. Moreover, it is not prudent to waste energy in the time of energy crisis. Using an air-conditioner is not good for health as well.

This research is to study the strategies of architectural residence design with low energy consumption in Songkhla Province and to conduct an approach to the problems by using natural and active system which consumes the least energy.

The findings indicate that the main problems of the thermal comfort to the excess of the comfort zone derive from high temperature and humidity in Songkhla. To the extent of this issue, micro-climate is an approach that is analyzed in order to reduce the temperature and humidity, as well as to facilitate the solution. Furthermore, the building configuration, envelope components and appropriate systems for reducing the temperature and humidity inside the building are analyzed.

According to the findings, the procedure of micro-climate can greatly help reduce 3<sup>o</sup>C of temperature in that area. Using trees and plants in various forms is especially effective. For example: shades can decrease high temperature and heat reflex, control

wind direction and excellently refresh the surrounding. The importance of plants and building design can easily provide the residences with thermal comfort.

It is necessary to consider that building configuration for solving the two problems is related to wind current which helps hot air ventilation. If the residences are located to receive the wind from the west and the south-west and from the east in the uncomfot zone in April and June, most area of the building will confront direct sunlight. This will conduct too much heat. Building orientation must be comparable with direction of wind in order to receive the most wind. At the same time the reduction of the sunlight area, sun protection equipment, and shades of trees and plants should be concurrently considered.

To solve the high temperature problem, supporting system is suggested by installing the earth tube under the ground. This enables to get the wind cooler when passing through the tube and before reaching the building. In addition, using some materials to absorb humidity from the air before flowing into the building and stack effect technique enable to ventilate the heat from the residences.

In conclusion the findings of this research indicate that location which perfectly facilitates micro climate and careful thought of building design and thermal comfort will create comfort zone to the residences all year round without any air-conditioners. Otherwise, there will be only little expenditure for an electric fan in case of imperfect location for problem solving.