

ELITH Project Progress Report

(TH: July-Sept 2013)

ENERGY AND LOW INCOME TROPICAL HOUSING

**Research Programme on Reducing Energy Consumption Cost and GHG
Emission for Tropical Low-income Housing:
Thailand Contribution**

Submitted to

WARWICK UNIVERSITY

By

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July-September 2013

Executive Summary

Thailand is a partner country of the international research collaboration project on “*Energy and Low-income Tropical Housing*”. Under Thailand’s context, the main contribution from Thai partner to the principal project goal is to develop an energy labeling scheme for promotion of low carbon houses.

In this first quarterly-progress report (July-September 2013), the overall work plan of the Thai contribution in the project is presented in Chapter 1 (the work plan was separately attached with this report). The work plans comprises (1) Operational Energy and Architectural/Urban Design, (2) Embodied Energy and Building Materials, and (3) Disseminating Good Energy Practice Relating to Tropical Housing.

In Chapter 2 of the report, the activities performed during the first three months of the project run from July to September 2013 are summarized. At this period, the project activities are weekly meeting among the project team, contacting with National Housing Agency for research collaboration, preparing experimental houses for future research and dissemination. Preparation of project website is in progress.

CHAPTER 1

SUMMARY OF PROJECT WORK PLANS AND OUTPUTS

The overall project work plan is attached as an output of this report. There are 3 individual work plans for this project.

Activities in Work Plan 1 "Operational Energy and Architectural/Urban Design" involves in (i) surveying the low income houses in Thailand, (ii) conducting several researches on technology improvement of the house envelope, daylight application in the houses, appropriate means for air-conditioning and ventilating to achieve comfort in the house, and (iii) developing an energy labeling scheme for low income houses in Thailand using research results and insight gained from activities (i) and activities (ii). Concepts of life cycle costing and total carbon emission are expected to be adopted for the labeling scheme to be developed.

In Work Plan 2 "Embodied Energy and Building Materials", research activities focus on embodied energy of the low income houses and how to reduce the embodied energy and GHG emission from the houses. The researches in Work Plan II are complementary with those in Work Plan I.

Activities in Work Plan 3 "Disseminating Good Energy Practice Relating to Tropical Housing" are disseminations of the results from the project. In the plan, the dissemination will be done through the project website, annual workshops among the project teams from Thailand and other partner countries that include Uganda, Tanzania, China, and the United Kingdom, presentations of project results in national and international conferences, publications in national and international journals, and training of personnel of project partners. Demonstration facilities developed from this project will continued to be utilized even after the project terminates.

CHAPTER 2

PROJECT PROGRESS

According to the project plans described in Chapter 1, the activities performed and its progress are summarized as followings. The activities of the project during the first three months are involved in Work Plans I and II.

3.1 Activities during July-September 2013

a) Weekly project meeting

The project meeting has arranged for the team members to participate and to report the progress of their assignments. The meeting is scheduled on every Monday 9:00-12:00. Following table exhibits the past meetings and topics of discussion.

Table 3.1 Project meeting

No	Date	Topics
1	22 July 2013	Inaugural meeting in Uganda (reported by Dr. Pipat)
2	29 July 2013	Overall discussion on suitable definition of low income house for Thailand
3	2 September 2013	Review the projects relating to low income houses by National Housing Agency
4	9 September 2013	Review the projects relating to low income houses by National Housing Agency
5	16 September 2013	Research activities in project work plan I (Energy conservation in low income houses)
6	23 September 2013	Research activities in project work plan II (Embodied energy of low income houses)
7	7 October 2013	Research activities in project work plan II (Embodied energy of low income houses)
8	14 October 2013	Development of project work plans and experimental set up for research on low income house
9	21 October 2013	Development of project work plans and the first progress report
10	28 October 2013	Development of project work plans and the first progress report

Figure 3.1 is a photograph taken during the meeting on 28 October 2013.



Figure 3.1 A project meeting on 28 October 2013

From the picture, the team members in the meeting are as follows.

No.	Name	Position
1	Prof. Dr. Surapong Chirarattananon	Principal Investigator
2	Asst. Prof. Dr. Pattana Rakkwamsuk	Researcher
3	Asst. Prof. Dr. Siriluk Chiarakorn	Researcher
4	Dr. Pipat Chaiwiwatworakul	Researcher
5	Dr. Surawut Chuangchote	Researcher
6	Ms. Hathairat Loyprakhon	Research assistant
7	Mr. Preecha Tammu (taking photo, not appear in the photo)	Research associate

b) Preparation of the experimental house

The outdoor experimental house shown in Fig. 2.1(a) is being modified to support the researches activities in E&ID project. The house was a single-story, cross-shape building with gable roofs constructed at an outdoor area reserved for energy researches in Bang Khun Tien campus of the university. The house itself was located at latitude 13.57°N and longitude 100.44°E in a suburban area, southwest of Bangkok.

Figure 3.2 exhibits a detailed plan of the building. The building had a common room at its center and had four identical side rooms situated on north, east, south and west orientations. All side rooms had the same internal dimensions of 2.4 m. width by 2.8 m. length and a height from the floor to the ceiling of 2.4 m. Each of the side rooms also had one exterior windowed-wall facing the main cardinal orientations (N, S, E, and W).

For E&ID project, Room 1 of the house will be designed and equipped with energy efficient technologies such as insulated roof and wall, shading design for daylight application, etc. Room 4 of the house will be constructed with the traditional design of the low income house. In the research the energy consumption and thermal comfort conditions of the two rooms will be measured and compared. Modeling and energy simulation of the two rooms will be performed.

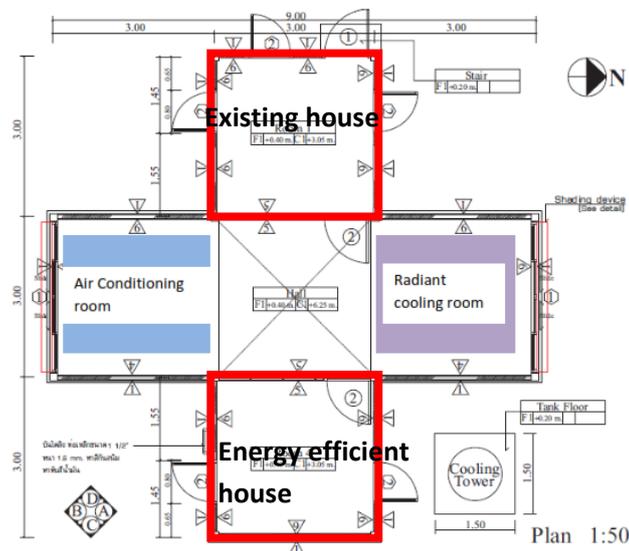


Figure 3.2 The floor plan of the experimental house

Figure 3.3 shows photographs of the house which is being reconstructed for the researches. It is expected the preparation of the house will be completed before the end of year 2013.



Figure 3.3 The experimental house being reconstructed for researches in E&ID project

The outdoor experimental room shown in Fig. 2.1(b) is being modified as well to support the researches on daylighting. The window of the room is now equipped with external shading slats that can be altered its direction to shade effectively the direct sunlight. The preparation of the

experiments was finished and ready to study the research on daylighting for house. Figure 3.4 illustrates the window of the experimental room that already equipped with shading.



Figure 3.4 Preparation of daylighting research in E&ID project