EDUCATIONAL PROJECT IN THE FIELD OF HOUSING RENOVATION

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Abstract
The Hague University of Applied Sciences has set up a new education called Climate & Environment, dealing with climate change in the built environment. The four year Bachelor education is as we call it project based. Every term comprises one project with supporting lectures and three courses. During the first year the students familiarize themselves with the discipline. In the second year they take a professional role in each project. The paper will go into detail about a housing renovation project in which the student take the role of consultant. The students are given the assignment to advise a housing association in The Hague about the options for renovating a block of four galleried flats. The students have to deal with standard requirements in the field of housing projects and a CO2-emission reduction of 30 % must be achieved. In addition to technical aspects, the financial and social aspects of the project are taken into account. In this project the students communicate with professionals of the housing association and with municipal officials responsible for granting the permit and the possible subsidy. The project concludes with a final meeting with the principal in which the students present their advice and take questions.

Keywords
Bachelor education, housing renovation, CO2-emission.

1. Introduction
In The Netherlands renovation of existing buildings gets high priority. It is clear to everyone that a stock of about 7 million homes requires a tailored approach. The bulk of the existing stock is over thirty years. In those thirty years, much has changed. We faced economic growth and linked to it the individualization of our society. There are new demands for appliances and comfort. In addition, the insight about the impact of housing on health increased and thus increased the demands placed on air quality in homes. Finally, the
energy becomes scarcer and more expensive and there is an increasing concern about the climate and environment. It’s obvious that energy saving should be pursued. Building services and physical properties of the building largely determine the comfort, health, indoor climate and energy consumption. The climate and sustainability requirements that are now proposed to buildings are of a different order than thirty years ago.

This project involves a specific type of dwelling in the Stieltjesstraat, The Hague. In this case galleried flats from 1970 owned by Vestia housing association. The whole complex consists of four blocks. Vestia formulated a future vision for this block. It is concluded that demolition and new construction is not addressed. These homes are therefore eligible for renovation.
2 Problem definition

The pursuit of sustainability includes not only technical and financial aspects but also social. Experience shows that technologies only succeed when they are valued by residents and properly used. This requires much attention to be drawn to the involvement of residents. The challenge in the field of residential environment lies in the question: How can -with the involvement of neighborhood residents- the neighborhood be adapted to sustainability goals while the environment of the residents improves?

For most residents, a pleasant living environment is more important than the climate issue. Climate Ambitions should therefore preferably be translated into actions that fit their needs. Moreover, there is a gap between the management level, where climate-related high ambitions are formulated and on the other hand the practical level, where these ambitions have to be put into practice. It is therefore important that local aspirations are worked out in detail in specific plans. The development of these plans is best done in close collaboration between local authority, housing association and residents.

In this particular case home improvement is needed because there are problems with:

- **Energy and environment**
  - Energy consumption in comparison with modern homes is too high, it leads to unnecessarily high CO2 emissions
  - The relationship between the amount the tenants spent on energy and rent is out of control because of the rise of energy prices

- **Maintenance**
  - There are problems with the central heating boilers
  - There are problems with the facades on the sides of the buildings
  - There are various problems in the homes like leaking showers, old kitchens and toilets
  - The homes have open gas fired geysers
  - The existing ventilation may not meet current requirements

- **Plan / Future Value**
  - The living room is relatively small, the layout of the flat can be changed if rent ability benefits

With every investment there must be clarity about investment opportunities. Investment opportunities can be determined in different ways, partly depending on legal frameworks.
The principles of the financial support of this project have to be determined in consultation with the client.

3 Project goals
The students receive an assignment of Vestia to advise on technical opinions for the housing renovation project Stieltjesstraat. This advice focuses on energy use of homes with a prerequisite to good performance in environmental, health, quality and future use value.

It must meet the following requirements:

- Required CO2 reduction is minimum 30%, as the savings potential is large more savings may be realized. This refers to the new Vestia approach “to optimize energy savings within potential investment”.
- The Hague may subsidize the project, the Municipal Practice Directive (GPR in Dutch) must be used as decision-making tool for sustainability and quality.
- Effectiveness and frugality are conditionally
- The investment opportunities are not fixed: the main point is to stabilize energy costs in the operation. In consultation with the client, the principles of the financial basis for the advice should be provided
- The layout of the flats can be changed if rent ability benefits, important here is the quality of the property and its surroundings in relation to residential areas in the city

4 The desired result
The end product of the student advisory group is a technical advice in the form of the decision document on which the client can decide how to renovate the block of four galleried flats. The decision document should contain sufficient information for the next phase (detailed) design to be drawn. For this purpose a collection of data of possible measures is needed. These measures can be summarized in a matrix in which for each measure is indicated what the costs are and how much CO2 is saved. From this overview, scenarios for renovation will be derived. Each scenario should be evaluated on the basis of cost versus investment opportunities and the issues of energy, environment, health, quality and future use value.

To make sure the process heads in the right direction in the initial phase a project contract is made. This project contract has to be presented to the customer for approval.
It is important that individual students from the student consultancy team take their own responsibility for the entire project in an early stage of the project. Individual students are asked to work out their individual proposal for a project definition. These proposals are evaluated in the peer group, subsequently the group develops a collective proposal for the project definition. Finally, individual students write a personal evaluation.

There is a need for proper arrangements within the group. Therefore the group is asked to make a co-operation contract.

For personal development in the group process, individual students choose one or two aspects of behavioral skills at the beginning of the project. For these aspects of behavioral skills, a baseline measurement is made, then a plan for improvement is made for the first semester. At the end of this project, the students report the intermediate results.

5 The approach
The students form a student advisory. Within this student advisory functions and duties are divided. There are four competencies related to professional capacity derived from the profile “Bachelor of Built Environment” of our education. The corresponding four stages of their professional capacity, in principle, in each task (ie, several times in the project) through:
1. Understand

This phase includes analyzing the situation, orient, reflect and reflect on the situation. The problem is analyzed. Questions are raised - and answered - like "what is the problem?", "What is the environment?", "Who (and who does not) have an interest in a solution?", "What were the previous experiences?." Results of this phase is understanding and possibly reformulated problem.

2. Design

In this phase, based on the insight obtained an inventory of solutions is made. The students employ the substantive knowledge and skills to achieve solutions within the constraints.

3. Plan

In this phase, the feasibility of achieved solutions is further investigated. The result is a decision on the progress of the project. If the project continues the students commit themselves to the project results to be obtained. All necessary project activities are identified and elaborated. Next, a detailed plan is created.

4. Implement

The proposed solution approach is developed and all project results are delivered (reporting). During the preparation students continuously check whether the result of the action meets the quality requirements and applicable regulations. Also, the predetermined assumptions (mainly planning) are continuous critically considered and adapted.
6 The results of last year’s group

After the survey of single measures was completed this was integrated into the required scenarios for renovation. It was important that the composition of simple measures resulted in an effective series of complementary measures. This has resulted in the following three concepts:

1. Minimum investment: This concept requires the least investment and meets all minimum requirements. All challenges are fulfilled at low level of ambition;
2. Optimal ratio between investment and output: In this concept there is an optimization of CO2 reduction (and energy). In the longer term is easy to recoup the investment. The ambition level is significantly higher than in the first concept;
3. Highest sustainability objective: This concept is an example of what is possible in terms of sustainability in renovations. The CO2 reduction is maximized, the investment under the current circumstances are not fast enough to recover.

7 The results of the current group

The presentation will focus on the preliminary results of this year’s group. If possible, the students give a short presentation and contribute to the discussion.

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