
Graphical User Interface for plus energy multiple dwellings

Development of a Graphical User Interface for the user´s energy management in plus energy multiple dwellings



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Short report

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Graphical User Interface for plus energy multiple dwellings - Short report

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Project title

Development of a Graphical User Interface for the user's energy management in plus energy multiple dwellings

Project term

06.10.2014 until 15.02.2016



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1. Occassion I status quo

The user habits outline a key factor for the energy demand of energy efficient multiple dwellings. Integrating it into the energy management could help to reduce the energy consumption and to increase the usage of regenerative self-sufficient power. The User Interface in the form of a touch panel serves a playful information tool; among other things it discloses energy consumption and production. A first prototype went into operation in the Aktiv-Stadthaus in Frankfurt am Main.

2. Subject of the project

Which information encourage energy conservation? Which information might patronize the user or are counterproductive? In which way should the data be provided? These key questions require an interdisciplinary cooperation. A team, consisting of experts in architecture, energy and building technology, programming, graphics, socio-science and housing industry carries the development of the User Interface. The web based system for energy management could be used via an app.

The process consists of working packages which reflect the chronology.

WP [1] Conception

The present project emerges from the past project „Aktiv-Stadthaus“. Within that framework, inter alia initially ideas for functions were formulated. The first step was to check them for technical and software-based feasibility. A further issue was to examine which information in which depth of detail the user require in order to be encouraged to an energy saving behaviour.

In principle, there are three user modes which provide different levels of information and functions. Every user owns a sufficient „energy budget“ for his need for electricity and warmth. The User Interface shows the current and the past consumption accumulated to the budgets. It also announces the time or the period within which regenerative-based self-sufficient power is in surplus available. Further functions support inter alia to evaluate the handling with the budget or permit to compare anonymously with other users. An integrated manual is intended to support.

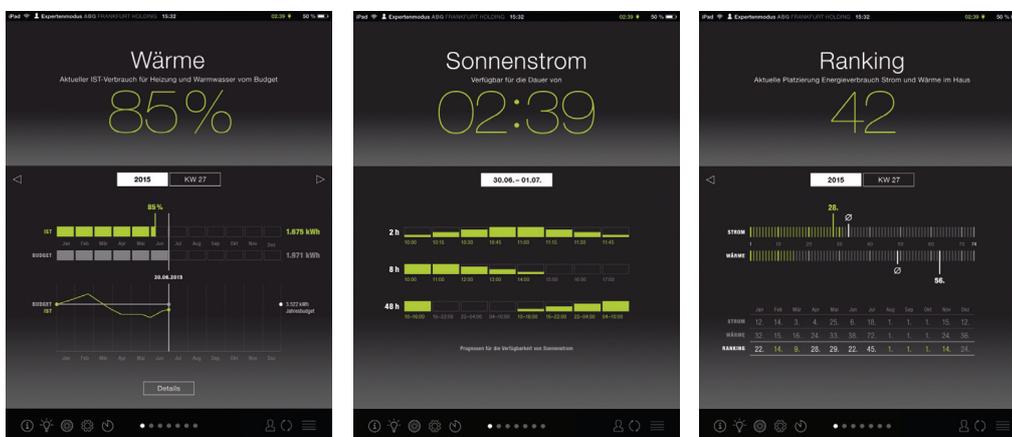


Fig. 1: Current information on the demand for warmth

Fig. 2: The announcement of surplus available regenerative self-sufficient power

Fig. 3: The Ranking serves the possibility to compare the own demand of energy anonymously to that of other users.

A clear presentation and handling constitute the substantial demands for the research project. A large degree of functionality is guaranteed through a timeless, aesthetic high-quality design which is reduced to the essentials and nevertheless shows the most important information. The modular structure promotes a general transferability.

The display is built up from three sections of which the content area (including head and floor field) comprises the largest part. A status and a function bar are located above and below.

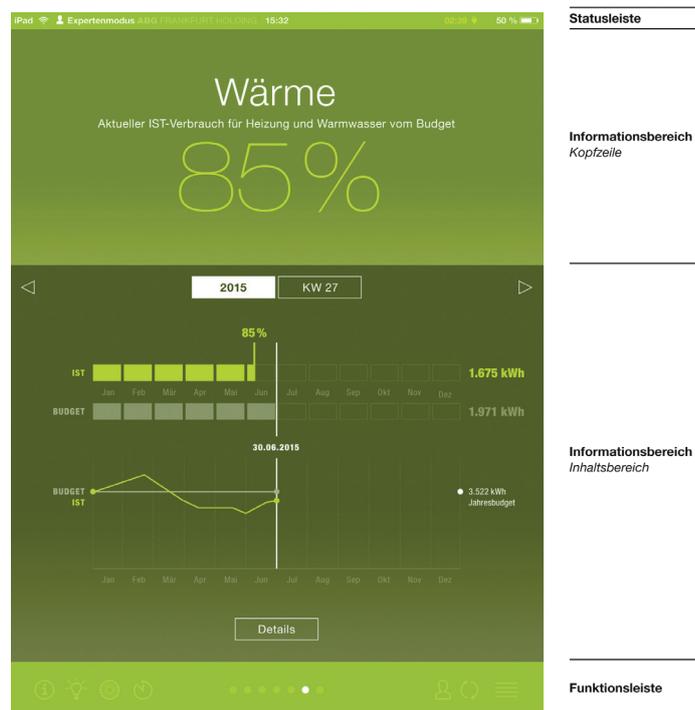


Fig. 4: A consequently performed layout guarantees both user-friendliness and transferability to upcoming projects.

WP [2] Programming

The system is built up from various components with regard to maintainability and transferability. The core of it is the web server which is hosted central in a computer centre in Germany. The data collected here are visualized through a web browser. Thereby, the User Interface is not specified on a certain device, format or manufacturer and can be integrated in an app. A gateway forms the cut surface between the data of real energy, user and system in the building and the server. It collects information of the building service, converts them into the format of the User Interface and sends the cryptographically secured to the central server.

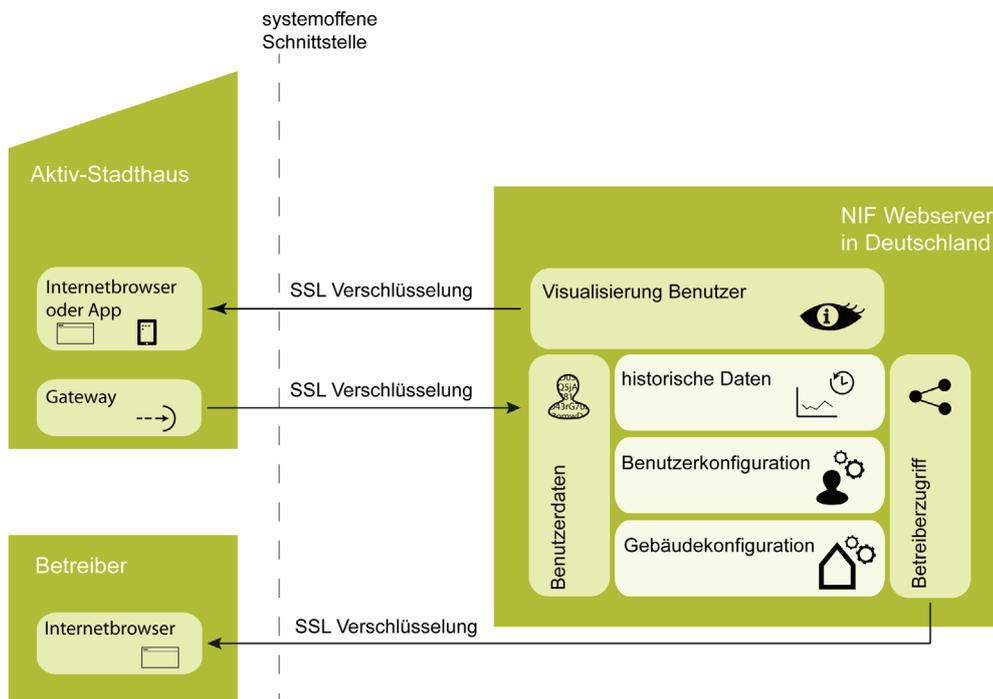


Fig. 5: The system design of the User Interface

Source: TU Darmstadt, FG ee, modified according to mondayVision

WP [3] Evaluation

A first evaluation basing on a programmed prototype took place in form of a socio-scientific study via focus groups. 24 people (average age: 39 years), valued contents and graphics regarding user-friendliness. The feedback was mainly positive. The test users could well imagine to utilize the User Interface in the daily life in order to save energy.

WP [4] Revision and finishing

The references from the evaluation significantly determined the revision with regard to operability and comprehensibility. In the framework of the opening of the eight-storey pilot building Aktiv-Stadthaus the final prototype of the User Interface went into operation. From now on, permanently installed and removable tablets support the tenants in the energy management.



Fig. 6: The menu on the start page is inspired by a „bulletin board“ and provides first information on energy production and consumption.

WP [5] Cut surface monitoring

The effectiveness of the User Interface is evaluated by a socio-scientific long-term monitoring. Additional questions on acceptance and relevance for the user habits in the daily life are formulated in the frame of the project.

3. Conclusion

With regard to an increasing relevance of the user behavior concerning the energy demand in plus energy houses, methods were identified, which enable the user to reflect his own energy-related acting and to adapt it accordingly. A playful information tool via touch panel helps to optimize the individual energy consumption. Therefore, functionality and a positive appearance are decisive. The announcement of energy efficiency is focused in order to support the user in a subtle way. The essence lies in knowledge transfer and sensitization. The freedom of choice is granted to the user. The first prototype is put to the test in the Aktiv-Stadthaus in Frankfurt am Main.

4. Basic information

Short title

User Interface for Plus energy multiple dwellings

Project management

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150.137,03 €

Project period

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