



SAVE@Work4Homes

**Supporting European Housing Tenants
in Optimising Resource Consumption**

**SAVE4Homes energy awareness
services specifications**

Deliverable 2.3

(27th of February 2008)

<http://save.atwork4homes.eu>

Task 2.4 After evaluation of Release One field trials (see WP6), evaluation results are reviewed and the specification for each class of SAVE4HOMES Energy Awareness Services revised as required.

Intelligent Energy  **Europe**



Intelligent Energy  Europe

Grant agreement no. EIE/06/028/SI2.448227

SAVE@Work4Homes

**Supporting European Housing Tenants
in Optimising Resource Consumption**

Intelligent Energy – Europe (IEE)

SAVE - Key action: VKA2: "Retrofitting of social housing".

Due date: 31st of January 2008

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INTRODUCTION

Research into tenant energy behaviour, attitudes and information requirements is essential for selecting options in respect of service components, their design and **SAVE4HOMES** Energy Awareness Services specifications.

The service specifications must also meet requirements of provider organisations.

The objectives of this work package are therefore:

- To investigate tenant and organisational requirements for **SAVE4HOMES** Energy Awareness Services,
- To specify the components required for services,
- To draw up **SAVE4HOMES** Energy Awareness Services specifications,
- To specify any required modification for Release Two Services.

The specifications are based on analysis of requirements for the selected **SAVE4HOMES** Energy Awareness Services.

An investigation of tenant households has been designed to measure the characteristics of demand for energy awareness services and the requirements to be met including attitudes to information delivered by traditional means and first generation online services. The results have been published in the deliverable 2.1 and 2.1a.

Qualitative market research will be done in the evaluation process to complement the survey data. This consists of interviews carried out with appropriate samples of tenants but also local government staff and decision-makers, third party service providers and housing organisation employees, and focus groups to deal with the more unfamiliar aspects of the services to be delivered. The results will be published in a next deliverable of the work package 6.

This work done in this deliverable (D2.3) consists essentially in an update of the baseline for setting up effective field trial tests (pilots planned in the work package 3) and for initiating provision of common-framework Energy Awareness Services, and provides independent outputs for coordinating uptake in social housing across Europe.

On the basis of requirements information already known by each site, the second release of the specifications is composed of a selection of service components which will be used for the final implementation of the **SAVE4HOMES** Energy Awareness Services by each field trial.

The present document (D2.3) integrates the needed changes related the trial by each site and reports the final specifications.

These specifications represent an adaptation to the local peculiarities and have been selected from a pool of possible modules by the social housing companies from France, Ireland and Germany and the associated partners in the project.

- In Northern Ireland: Northern Ireland Housing Executive (in Belfast)
- In France: Le Toit Angevin (in Angers) and Moulins Habitat (in Moulins).
- In Germany: Nassauische Heimstätte (in Frankfurt am Main), Stadt und Land (in Berlin) and Volkswohnung (in Karlsruhe).

SAVE4HOMES GENERAL SPECIFICATIONS

The approach retained by the SAVE@Work4Homes consortium recognises the great variety of living conditions and cultures in European social housing and does not attempt to define a single best strategy.

Instead, the six partners will develop and test a complementary set of viable and effective Energy Awareness Services, based on a "toolbox" of components to be developed in the project.

This chapter describes the common context and objectives, and also the components used to solve the targeted issues addressing the tenant's energy behaviour.

1.1 Targeted user groups

The objective of the project is to enhance the environmental and energy behaviour of the tenants. Therefore the target groups are:

- The tenants themselves considered as persons ("individuals"),
- The tenants gathered in associations (tenant associations, consumer associations, thematic associations concerned by energy issues or sustainable development, ...),
- The customer advisors which are directly in contact with the tenants or in charge of communication for the housing company,
- The partners who could provide information useful for tenants or communicate own information to the tenants or information provided by the housing company (energy providers, Energy Service Companies, local authorities, etc.).

1.2 Media used to communicate between tenants, customer advisors and other partners:

If the **Save4Homes** services address a specific target group or a specific behaviour, it's necessary to choose the appropriate media for being efficient. The media should be known, user-friendly and easy to handle.

Each site (housing company and associated partners) can choose among the following media.

→ Paper media:

- Housing company brochure distributed to the tenants,
- Paper joined to the monthly bill of the rent,
- Paper in the building (posters with energy performance of the building)

→ Meetings with the tenants:

- Information meetings of adults with energy providers,
- Information meetings organised with schools or local authorities (with specific tools on environment and energy),

→ Internet connexion (ADSL, CPL, Cable, Wireless: Wi-Fi, Wimax, UMTS, GPRS),

→ Terminal for the Internet access:

- Home PC owned by the tenants,
- Play stations connected to Internet,
- Recycled PC provided by the housing company,

→ Other vectors more adapted to specific populations

- Blind people,
- Deaf people.

1.3 Sources of provided information (meters, values collected)

If they are adapted to their project, the sources of information used will be chosen, by each site, among:

- internal temperature,
- energy meter,
- electricity or gas meter,
- energy consumption provided by the energy provider,
- energy consumption measured by the housing company employees,
- energy consumption collected by the tenant on his own meter.

1.4 Presentation principles of the information towards the tenants

1.4.1 Content of the messages

The rough or calculated data provided will contain information about energy consumptions (space and water heating, temperatures), and will be chosen by each site to be appropriate to the specific project of the site.

1.4.2 Type of messages

The presentation of the data will be adapted to the data provided and the objectives targeted: graphs showing the evolution of prices and of consumptions, sheet of compared data between previous year and current year, and to be as understandable as possible by each tenant stamp ("energy stamp") and explanation text to describe the main possible reasons for over consumption.

1.4.3 User interface specifications

The user interface may dramatically differs for each site in function of the age of the targeted persons (elderly people who do not have an Internet access or young people with a good awareness of Internet or accessibility specifications for blind or sound deficient).

1.4.4 Editing process and responsibilities

The process of production of information, which may differ among the sites, will be described in each situation. When the responsibility of the information provider is engaged, this responsibility is described with the law references.

1.5 Expected results on the behaviour of the tenants

1.5.1 Awareness improvement

The expected results in term of tenant awareness improvement will be described by each site in relation with the action led.

On this basis, the specification of **SAVE4HOMES** Energy Awareness Services will be drawn up by each field trial.

SAVE4HOMES ENERGY SERVICES PLANNED BY EACH SITE

The objective of this section is to show the adaptation to each specific or local situation planned by each site.

1.6 Description of the services tested by each site

Each site will focus its action in a direction which is described below:

1.6.1 ANGERS site

In its heating renovation programme as a whole, LTA is aiming to decrease the energy consumptions and costs, and to improve the comfort of the tenants in their dwelling. Within the project SAVE@Work4Homes, the pilot site is *La Roseraie* representing 300 dwellings. In the year 2006 a refurbishment there has begun, concerning the structure of the building as well as its equipments to improve most notably the monitoring of the heating systems.

Because of the appropriate information, which LTA will bring to the tenants, it will be possible to help the tenants in improving their energy behaviour.

The following aspects have then to be dealt with:

- Firstly, to collect the relevant data and information;
- Secondly, to make the tenants informed with these data:
 - to find the relevant means of communication which the tenants will be able to access easily;
 - and to identify the relevant way of introducing data so that the tenants may understand them.

❖ Collection of relevant individual energy consumptions data

In most cases, data are not available for the households but are hosted at the energy providers.

The objective of the LTA project is then - based on the setting of sensors in the dwellings - to collect temperature data.

Water and electricity consumptions data are collected out of the dwellings.

Of course these data have to be measured and transmitted automatically to LTA without any manual intervention. A set of components based on the use of PLC has been installed in the building and linked to the local network so that information can be transferred to LTA.

❖ **Means of communications: Tenant Energy Portal**

Different means of communications have to be combined to develop tenants' energy awareness and to help them adapt their behaviour.

Paper is one of the means of communication that can be used and will be certainly used by LTA:

- to create a specific chapter on energy consumptions within its tenant handbook,
- to create posters on energy consumptions to be put in the common parts of its dwellings.

Specific **Actions** regarding energy awareness will also be organised with tenants (adults and children), LTA staff and local associations.

Nevertheless, these positive means of communications are adequate to give general information but not always appropriate to give individual information.

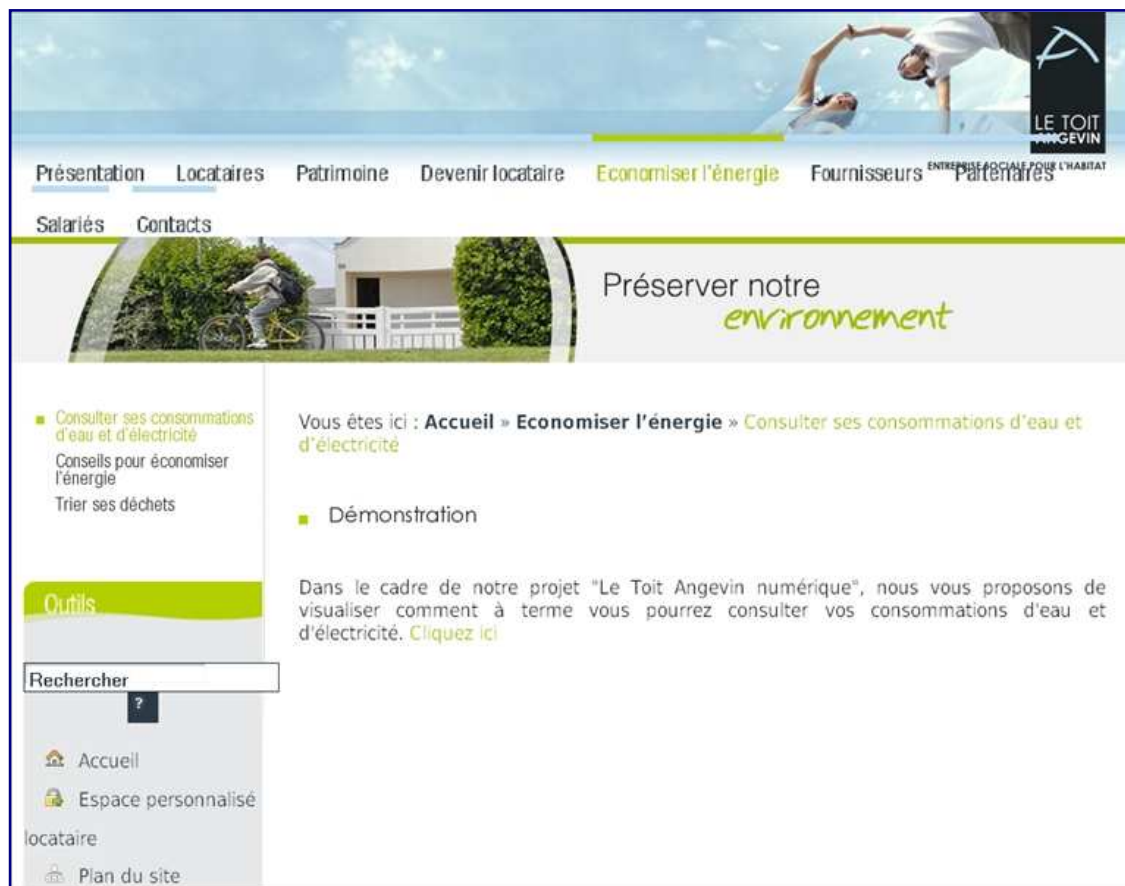
Certainly an **energy portal** should be more appropriate to transfer **individual information** especially if it is combined with a **day-to-day updated database**.

Le Toit Angevin has thus created in its web site, a specific page dedicated to the energy savings. Since mid January, this page includes already advice on the energy awareness behaviours; information on the waste treatment and a specific page on energy consumptions.

The screenshot shows the website interface for 'Le Toit Angevin'. At the top, there is a navigation menu with items: 'Présentation', 'Locataires', 'Patrimoine', 'Devenir locataire', 'Economiser l'énergie', 'Fournisseurs', and 'Partenaires'. Below this is a secondary menu with 'Salariés' and 'Contacts'. A banner features a light bulb and the text 'Réduire ses consommations'. The main content area includes a breadcrumb trail: 'Vous êtes ici : Accueil » Economiser l'énergie » Conseils pour économiser l'énergie'. A sidebar on the left contains a 'Liens' section with links to 'Ademe', 'Ministère de l'Ecologie', and 'Angers Loire Métropole'. The main text discusses energy consumption and provides a list of tips, starting with 'Utilisez des lampes "basse consommation" : leur durée de vie est multipliée par dix par'.

To launch the pilot site, Le Toit Angevin begins working with the company **Edelia** which proposes a web site where the tenants (login with an individual password) can access to their actual water and electricity consumptions on a daily, monthly and annually basis with a reference to a unit price and a comparison made with a budget which they have defined. These consumptions are obtained thanks to the sensors located in the flats and specific meters (see above).

The link to this web site has been included in Le Toit Angevin's web site. Tenants have just to enter their password and they can have day after day information on their consumption, the data being updated automatically on a daily basis thanks to the sensors, the meters and the PLC network.



A meeting took place on the 5th of February gathering the general manager of Le Toit Angevin, the LTA project SAVE@Work4Homes coordinator, the LTA technical experts working on the project, 4 representatives of tenants (living in the residences concerned by the pilot), the 2 caretakers working there and their managers.

The project was completely accepted and considered as really innovative.

Le Toit Angevin will work also with DomData, partner in the project, to develop an energy portal such as the one proposed by Edelia. LTA should benefit from its experience with the portal of Edelia to improve some aspects depending on the demands of tenants.

Within the tenant portal, a link will exist to the energy performance certificate of the dwellings, the calculation of these certificates being compulsory from July, the 1st 2007 for rented dwellings. In this context, tenants will also know about the energy performance of the buildings.

Available information will be thus on:

- energy consumption data,
- environmental and climatic data,
- energy performance of the buildings.

These three types of data should help tenants understanding the level of their consumptions and identify the part linked to their own behaviour.

- Finally, the portal proposed by Dom Data will integrate a self-assessment tool which will be presented on user-friendly manner: tenants will be able to rapidly and easily assess their behaviour and to receive short advices.

❖ **The social digital divide: provision of an access to the Internet**

Previous tenant surveys show that a small part of LTA tenants have access to the Internet. In this context, the project is not reliable if LTA do not take into account the social digital divide. For this reason, LTA has included access to the Internet combined with the pilot site. This will be done rather easily without much further equipments thanks to the components which will have been installed to collect energy data. Under these conditions, access to Internet will be possible at a very low price and Le Toit Angevin is working at the moment to find some partnerships and collect recycled computers to be sold at a low price to the tenants. More generally, in the energy and other areas (employment, school, medical services...), Le Toit Angevin wishes to contribute to the development of the use of Internet so that tenants may benefit from information and services available through Internet.

1.6.2 BELFAST site

BELFAST will focus its action on the self-assessment tool and heating controls.

Only 2 tenants out of 100 referred to in the above survey have access to the Internet. This confirmed the view from other surveys that there is a relatively low level of Internet use among NIHE tenants probably due mainly to the fact that they tend to have relatively low incomes.

So, BELFAST will focus its action the self-assessment tool and heating controls.

❖ Tenant Energy Portal:

The Tenant Energy Portal is not planned in BELFAST because of a lack of use of Internet by the tenants.

❖ Self Assessment Tool:

The Housing Executive do, however, employ Neighbourhood Wardens within many of its housing estates. The Neighbourhood Wardens provide a range of on-site services to residents in the most disadvantaged estates.

They carry out daily inspections of vacant properties, provide accompanied viewing of dwellings to prospective tenants, check for abandoned dwellings, take repair requests and provide advice and assistance on a range of housing related matters including home safety, service standards and energy conservation. Some neighbourhood wardens use a Personal Digital Assessor (PDA) in their work.

❖ Heating Controls

One way that the Housing Executive achieves its energy efficiency objective is by replacing both coal fired and electric central heating systems in individual dwellings with natural gas systems or, where gas is not available, with oil fired systems. Both the gas and oil systems include a full range of heating controls to help tenants to manage the system in the most efficient way. The controls include:

- Programmer and Timer
- Room Thermostat
- Hot Water Cylinder Thermostat
- Thermostatic Radiator Valves

Feedback from tenants suggests that some of them have difficulty in understanding how to use the controls effectively. NIHE recently carried out a survey of 100 tenants to ascertain their knowledge on the effective use of their heating controls. The survey confirmed that 38 of them need more in depth advice on this. It has been decided that the most effective way of delivering this is face to face with a qualified energy advisor.

It is proposed under WP3, subject to technical feasibility, to make the Self Assessment Tool available to a number of tenants in Belfast through the use of PDAs. Another option that could be considered is the use of Tablet PCs if the SAVE@Work4Homes budget permits their purchase. As highlighted above, very few NIHE tenants have access to the Internet. Using either the PDAs or Tablet PC would allow the Neighbourhood Wardens to bring the technology to the tenants. It is more likely that we would get a response this way than by suggesting tenants come to a local office to complete the Self Assessment Tool.

1.6.3 BERLIN site

BERLIN will focus its action on special information to the tenants on one side by the energy portal with various specificities like the self-assessment tool and on the other side by traditional information like paper bulletins. The aim is to inform the tenants about their individual energy consumption and by this way to activate them to control continuously their consumption and to change their behaviour. It should be a process to learn the coherence between saving energy and saving costs.

In the project SAVE@Work4Homes SUL use as pilot about 112 dwellings, in which it is possible to collect the energy data monthly.

The following aspects have then to be dealt with:

- Firstly, to collect the relevant data and information;
- Secondly, to prepare the data for presentation;
- Thirdly, to find tenant-partners, who act in the pilot;
- Fourthly, to make the tenants know these data.
- Collection the relevant data and information

Therefore SUL collaborates with an energy meter-reading company as partner. The collection based on the setting of sensors in the dwellings to collect consumptions data for heating and cold and warm water.

- Preparation the data for presentation

SUL plans to prepare the presentation of individual data for the pilot tenant-partners and also to compare the data in order to receive information on the global acceptance. In the best case, SUL can show the individual development in energy consumption. Also it will be evident to show the development of costs and the benefits to save energy.

- Find tenant-partners, who act in the pilot

As the analysis of the questionnaire shows, only a few tenants are willing to use the Internet for this pilot. Therefore, SUL has to find special methods to convince the tenants of the advantages of the internet portal. SUL plans a direct acquisition of tenant-partners.

- Means of communications, to make the tenants know these relevant data

Different means of communications have to be combined to develop tenants' energy awareness and to help them to adapt their behaviour. On the one side the communication informs about the individual behaviour based on the data and on the other side general information should be available, like an energy handbook with general information.

- Collect the Energy consumption

To support the planned services, automatic consumption measurement and consumption data transmission for heating costs (cooperation between housing

company and meter-reading company) will be installed at Stadt und Land's own expense.

(The consumption of electricity in buildings will be evaluated, focussing on corridors, cellars and roof spaces. The data will be collected only once a year). As appropriate, tenants will be provided with information on energy performance certification of their apartment block, again financed outside the project.

❖ **Tenant Energy Portal**

The Tenant energy portal is a first trial in order to define the relevant ways of communication. SUL has to test which kind of information is suitable for a presentation and how it wants to present it (for example with numbers or graphics). The Internet portal offers flexible possibilities to adjust the information presented and to get a feedback from the users. Beside consumption results the portal will provide general information, personal information like contract data, rental conditions, etc. and furthermore a messaging system to send complaints or requests to the landlord.

Tenants will be provided with accurate information about their own consumption, set in comparison with a predicted energy use based on climate data. To complement this service, information in operating cost invoicing will be improved and made more detailed in a comprehensible way (to be tested and optimised in the project).

The development of this energy portal will be made in collaboration with DomData.

❖ **Self Assessment Tool**

Services will include a self-evaluation template showing a rating of tenant success in decreasing energy consumption - tenants will provide behaviour parameters themselves. A key component of tenant energy awareness services will be detailed information on building and dwelling status and energy consumption.

This tool should be prepared for using by the Internet portal and to use by paper. The development of the Self Assessment Tool will be made in collaboration with IWU.

❖ **Traditional information like paper bulletins**

Regarding the tenants who doesn't possess any internet access or doesn't want to use this kind of communication, SUL is able to provide the relevant information by print media. The results of the first site trial will be used to define an appropriate form of providing the information especially the monthly energy consumptions.

1.6.4 FRANKFURT site

FRANKFURT will focus its action on the tenant energy portal, the self-assessment tool and an energy awareness brochure.

❖ **Tenant Energy Portal**

In some 350 dwellings being connected to Nassauische Heimstätte broadband cable network data will be collected. In all of these dwellings there are meters for gas and individual – per dwelling - heating consumption installed. All heating systems are equipped with meters for the total heating consumption.

The major part of the selected dwellings was modernized within the last years with heat insulation and retrofitting of the heating systems. A smaller number of dwellings were selected without modernization for comparison with the other group.

Data from the individual meters will be kept monthly and provided to the tenant portal which is accessible via any Internet connection. The tenant will be able to receive accurate information about the individual energy consumption. Providing the data to the tenant portal requires a high qualified validation before publishing due to the fact of measurement and data transmission errors.

In a second step, a comparison/benchmarking will be done with data being made normalized by degree-days numbers. Costs from former periods will be provided with explanations about trends. If possible/available the consumption of coldwater will be integrated what is secondly in context with the running costs billing.

A significant number of tenants of the "Nassauische Heimstätte" are from very different countries and German language is very often a barrier for them. It is planned to provide the Internet portal in 6-8 major languages to ease this burden.

Beside consumption results the portal will provide general information, personal information like contract data, rental conditions, book-keeping data, etc. and furthermore a messaging system to send complaints or requests to the landlord.

❖ **Self Assessment Tool**

The tenant portal will include a self-evaluation template to show a rating of tenant success in decreasing energy consumption.

❖ **Energy awareness brochure**

A new brochure will be developed to give the tenant information about parameters for optimizing the personal energy consumption and reducing costs. An existing brochure about preventing of mildew will be included and focuses to energy awareness behaviour. The major aspect of the content is to find the right balance between saving energy and prevent raising mildew damages.

This brochure will be released in 6-8 major languages of the tenants and provided to the tenants by the branch offices or will be in the download area of the tenant portal.

1.6.5 KARLSRUHE site

KARLSRUHE will focus its action on the improvement of the tools developed in the TRUSTED@Work4Homes project.

❖ **Tenant Energy Portal**

The tenant's portal that has already been developed in the project TRUSTED@Work4Homes will be improved and adapted to the new services planned in this project.

❖ **Energy consumptions services**

Since 2003, Volkswohnung has equipped more than 8.000 dwellings with an "electronic assignment of heating costs", a device that measures room temperature and the radiator temperature at a characteristic point of the radiator and calculates the heat flux from the radiator into the room using the characteristic heat transfer of the radiator (further details are described elsewhere). This system has replaced similar devices during recent years that were using the evaporation rate of specific liquids. These electronic devices, though still not "measuring" devices, are much more precise and safe against external influences that may cause wrong readings. Using radio signals to send their measurements to the central server of Volkswohnung, an automatic data acquisition and evaluation to provide annual heating energy bills can be made. After initial problems, the system is now working satisfactorily.

So far, consumption data are collected only annually. But the system is also capable to provide energy data over shorter periods, such as months. This is important if an intermediate need of consumption data is given, e.g. when a tenant moves away and needs an exact energy bill. This capability can also be used to generate an energy balance on a monthly basis for every dwelling, thus allowing for a quick feedback to the consumer that, unlike annual energy billing that provides only a delayed feedback, provides the actual information for the households that is necessary to influence consumer behaviour. Whereas in this case no exact billing is necessary, the energy balance information has to be prepared in a way that the tenant is able to understand the message and draw conclusions on his behaviour. This is the aim of the “energy awareness service” that is to be developed during this project in combination with different communication approaches.

In the starting phase of the project, Volkswohnung is trying different approaches in 4 almost identical buildings with 136 dwellings altogether. 2 of them have been refurbished in 2002, the two other ones in 2006. In these buildings, we are trying different approaches and will have the opportunity to compare their results. There can be made energy balances for all four buildings (heating and DHW as well) and also for individual dwellings using radiator devices that measure the heating demand of every room and by one or two heat-meters measuring the domestic hot water consumption. The 2 buildings have different control devices and 10 dwellings in one of the 2 buildings have an additional measurement system of Karlsruhe University of Applied Sciences to provide behavioural data such as room temperatures and ventilation rates and also electricity consumption¹ (see deliverable 3.1 for more information).

In the first phase of the project, measurement results are communicated directly (evaluation papers, bilateral talks with the tenants about the results) to the tenants in order to make experiences on both sides, the tenants and the energy experts, on what and how to communicate in an efficient way. These experiences will be used to provide individual information on energy balances by a tenant portal that has been developed recently in Volkswohnung and will be used as a central means of communication in the

¹ Measurement of household electricity consumption is made only in the case of these 10 dwellings that have a comprehensive measurement system. Usually, electricity consumption is not measured by the housing companies but by the utilities. Consumption data are therefore usually not available (which does not necessarily mean that advice on electricity saving is not being done within the project).

future. Our modern energy consumption data acquisition system and the availability of a broad band system that will be capable of all Internet functions (bi-directional) will be the backbone of Volkswohnung's communication strategy on energy issues in the future.

❖ **Energy awareness brochure**

A brochure has been developed in the first phase of the project to give the tenant information how to control the new technical equipment after refurbishment, which usually is unfamiliar to the users to be able to influence his energy consumption. Since different buildings may have quite different installations, up to 10 of these brochures will be necessary to meet the requirements of individual tenants in different (refurbished) buildings. Two of the brochures have been already finished and printed; the other will be prepared until next year.

1.6.6 MOULINS site

Moulins Habitat is not only involved in the SAVE@Work4Homes project but furthermore in the more general project "Urban Renewal" on the districts of Moulins-South and Yzeure-Le Plessis (program supported by the National Agency for the Urban Renovation), in which about 2000 flats has to be refurbished. In this context, Moulins Habitat emphasises on the sustainable development by favouring a retrenchment policy of energy and acting on the awareness of its tenants.

The south districts of Moulins were thus appointed as main experimental site to achieve the project of telemetry and follow-up of consumption of energy set up within the framework of the project SAVE@Work4Homes:

- ✓ Champins (242 flats);
- ✓ Ilot Thonier (229 flats);
- ✓ Champmilan (555 flats);
- ✓ Nomazy (574 flats).

Besides, Moulins Habitat widened its field of experiment to hundred of expansion slots located in city center as well as in its offices to make sensitive the entire staff of the

Office in energy savings. So the entire staff of Moulins Habitat will contribute to the sensitization of the tenants.

In this context, offices and expansion slots will be equipped with sensors allowing to record and to follow all the consumptions (electricity, gas, water, heater). To note however that all the concerned expansion slots will not be equipped for the moment as far as the experiment of this system will be made at two times:

- ✓ A first test of a duration of three months for 7 expansion slots as well as the head office of Moulins Habitat;
- ✓ At the conclusion of these first three months will be started the second phase aiming at widening the field of study to 80 expansion slots, for a duration of 36 months.

To note that this method joins in a long-term step having for objective to generalize, on the whole housing stock of Moulins Habitat, the data collection relative to the various consumptions of energy, not only, to make sensitive the tenants in energy savings in sight to reduce maintenance costs but also to allow the services of Moulins Habitat to have a global view of the whole housing stock, to oversee it and to estimate the energy efficiency of the various modes of construction and rehabilitation used.

❖ **Data collection relative to the various consumptions of energy with various scales**

At first, Moulins Habitat worked in partnership with EDF and its EDELIA subsidiary on the implementation of an experimental system of telemetry and follow-up of consumption in the profit not only tenants but also to that of Moulins Habitat. This first study ended with a call for tender at the conclusion of which Moulins Habitat opted for the company VIZELIA to achieve this project. Indeed, the offer of VIZELIA answered better the expectations of Moulins Habitat in term of performance, flexibility and of capacity to be enhanced.

The set up system will allow to measure and to record all the data relative to the various consumptions of energy for each of the concerned buildings, and the data so collected will then be transmitted in Moulins Habitat. So can be estimated the performance of each of the concerned buildings and can also be detected possible problems of leak and/or decrease.

At the same time, all the data relative to the various consumptions of energy will be also collected expansion slot by expansion slot and can then be transmitted automatically not only in Moulins Habitat as indicated above and for the calculation of maintenance costs but also, in a individual way, to every tenant who wishes it. These can then follow, in real time, their level of consumption and compare it with the previous consumptions. So the tenants can better manage their energy budget in a concern of decrease of maintenance costs.

❖ **Foreseen communications**

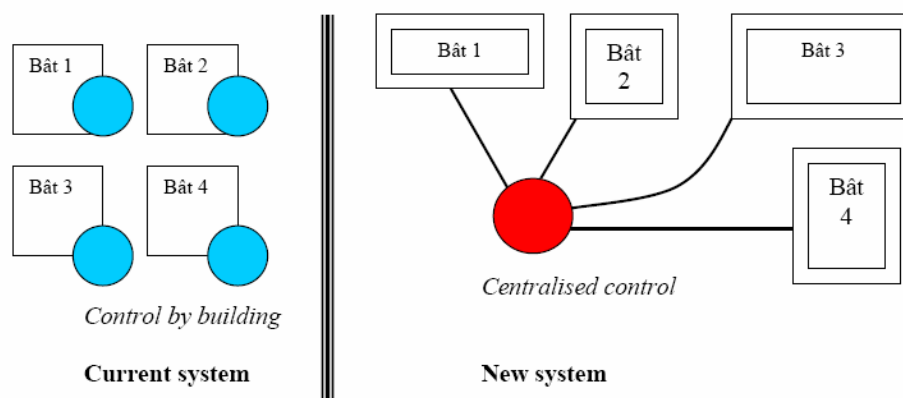
Further to the inquiry realized with its tenants at the beginning of the project SAVE@Work4Homes, Moulins Habitat defined a set of additional communications to make sensitive them in energy savings.

- Articles on energy savings to appear regularly in «La Vie des Quartiers», magazine of Moulins Habitat distributed to all the tenants;
- Distribution to all the tenants of a guide to master better its consumptions and save the energy (electricity, gas, water) drafted in association with EDF.
- Posters will take place in the whole of the common parts of each of the concerned buildings.
- Moulins Habitat is also going to organize an exhibition with the cooperation of numerous professionals, an exhibition opened to the tenants as well as to the schools, to expose materials and hardware which can be used within the framework of the operations of retrofitting or new constructions in a step of sustainable development and energy saving.

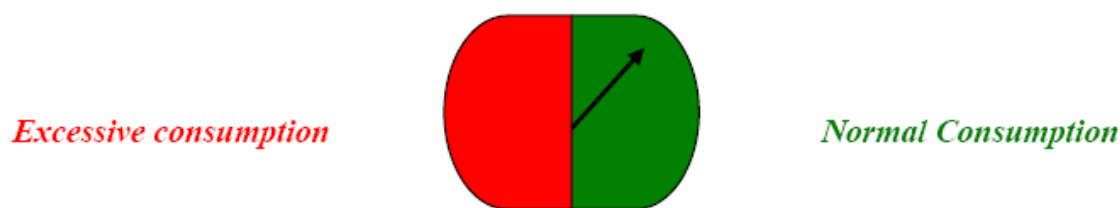
❖ **Tenant Energy Portal**

For memory, the three essential points of the Moulins Habitat field trial are the reorganisation of boiler room control, the installation of heat consumption displays in apartments and the awareness-raising measures to be launched based on this infrastructure. The work takes place within the framework of a substantial ongoing sustainable urban development programme.

The diagram below shows how control of heating and domestic hot water is to be centralised in the chosen districts, enabling improved temperature control, providing alarms in case of fault and introducing remote management.



As part of energy awareness service provision, each flat will be provided with a display showing the state of consumption of heating and domestic hot water in real time. Information will be gained from sensors on the rising feeds.



As across the project, the goal of the visualisation of the consumption's state of domestic hot water and heating in the apartments is to make the tenants aware of the necessity to control their energy consumption. The meters installed will be connected in real to consumption measures. The display will be simple and visual and indicate if consumption is excessive or not. Information on consumption can also be added to the dialogue box that each tenant has at his disposal via the intranet. The services to tenants will also include communication on the dangers of excess energy consumption.

The field trial will also be linked to Moulins Habitat new buildings which are in progress in sustainable development (geothermic energy, solar domestic hot water, insulation...).

The necessary investment in modernisation and metering reinforced are included in the regeneration project, which is already in operation, and not in this proposed project.

So the tenants will be able to visualize the consumption of their dwelling in relation to the established standard consumption (heating, sanitary hot water, electricity, gas, drinking water).

After collecting data about the energy consumption to heating and domestic hot water from the substation and from control dwellings, an adequacy of the different data will be realised to make a comparative and to make some correction if necessary.

This system permits to have a real knowledge of the energy or water consumption and also to manage the energy budget.

Note, that the tenant energy portal will include the self assessment tool, which is realised by Domdata. So the tenant will be able to estimate their habit of consumption.

1.7 Synthesis of SAVE4Homes features by site

1.7.1 Targeted user groups

| Site | SuL | NIHE | NH | LTA | MH | VoWo |
|----------------------|-----------------|---------|-----------------|-------------------------------------|---|--|
| Targeted user groups | Tenants, staffs | Tenants | Tenants, staffs | Tenants, staffs, local associations | Tenants and associations, staffs, schools | Tenants, staffs, other housing companies |

Figure 1: Targeted user groups in each site

1.7.2 Medias used by targeted users

| Site | SuL | NIHE | NH | LTA | MH | VoWo |
|----------------------------------|---|----------------------------------|--|---|---|--|
| Media used by tenants | Personal Internet access, Paper (letters, posters, handbooks) | Face to face tenants/NIHE staffs | Personal Internet access, Paper (brochure) | Personal Internet access, Paper (letters, posters, handbooks) | Web TV, Personal Internet access, Paper (magazine, posters, guides) | Brochures, personal advice, e-mails, portal (prepared) |
| Media used by householders staff | Intranet, Tablet PC, Mobile devices | PDA's by staff | Intranet | Intranet, Tablet PC, Mobile | Intranet | Existing portal |
| Media used by partners | Not planned | Not planned | Not planned | Not planned | Not planned | Paper, e-mails, portal |

Figure 2: Media used by targeted users by site

1.7.3 Sources of information

| Site | SuL | NIHE | NH | LTA | MH | VoWo |
|------------------|---|------|--|----------------------------|----------------------------|---|
| Sensors | Sensors for warm and cold water, heating | | Sensors for gas, heating, cold water | Sensors to define | Meters | Temperature, humidity, CO2 concentration, ventilation rate, heat meters |
| Tenants | Tenant portal, self assessment | | Tenant portal, brochure | Energy portal | Energy portal | Personal advice, brochures, e-mails, portal |
| Energy providers | Heating and water measuring company (Brunata) | | Energy and water providers and measuring companies | Electricity provider (EDF) | Electricity provider (EDF) | Not planned |

Figure 3: Sources of information by site

1.7.4 Presentation principles

| Site | SuL | NIHE | NH | LTA | MH | VoWo |
|------------------------|--|----------------------|-------------------------------------|---|--|---|
| Content of the message | Consumptions, costs of former years, general information | Not planned (F to F) | Consumptions, costs of former years | Temperatures, consumptions converted in euros | Temperatures, consumptions, cost in € per month and per year | Energy balances, comfort quality (temperature, humidity, CO2 concentration) |
| Type of message | Numbers and graphs, words | Not planned (F to F) | Numbers and graphs, words | Numbers and graphs, words | Numbers and graphs, words, potential savings | Comparison of real consumptions with potential savings |
| User interface | Internet, paper | Not planned (F to F) | Web browsers | Not defined at this stage | Not defined at this stage | Measurement results combined with explanations |
| Editing process | Not defined at this stage | (F to F) | Not defined at this stage | Not defined at this stage | Not defined at this stage | Not defined at this stage |
| Editing responsibility | Not defined at this stage | (F to F) | NH staff | Not fully defined | Not fully defined | Energy deputy |

Figure 4: Presentation principles by site

1.7.5 Information, awareness and behaviour expected improvement

| Site | SuL | NIHE | NH | LTA | MH | VoWo |
|--------------------|---|---|---|---|---|---|
| Information | Individual consumptions, building characteristics (Energy performance certificates), appropriate general behaviours | (F to F) | Individual consumptions, general consumption in the house or settlement | Individual consumptions, building characteristics (Energy performance certificates), appropriate general behaviours | Individual consumptions, general consumptions, buildings characteristics, ... | Meaningful evaluation of measured individual consumption |
| Awareness | Information on behaviour | Information on behaviour | Using equipments, reducing costs, better living in well heated and ventilated dwellings | Good temperature, ventilation, way of using equipments (how and when) | .Not planned for the moment | Connection of own pattern of energy consumption to general sustainability targets |
| Behaviour | Knowledge of the impact of individual behaviour | Knowledge of the impact of individual behaviour | Knowledge of the impact of individual behaviour, transmission to the children | Knowledge of the impact of individual behaviour, transmission to children, good citizenship | Citizenship, knowledge of the impact of our behaviour; information to the children... | Individual information on saving possibilities |

Figure 5: Information, awareness and behaviour expected improvements by site

SAVE4HOMES ENERGY AWARENESS SERVICES

The SAVE4Homes Energy awareness services can be classified in three families:

1.8 STEP: Simple Tenants Energy Portal

DomData will develop a common application to facilitate the communication between tenants and the housing companies' teams.

The sites involved are:

❖ **ANGERS, BERLIN, FRANKFURT, MOULINS**

The global specifications of the application developed by DomData are described in annex. Karlsruhe will use its own portal already in function.

1.9 SEPT: Self-assessment Energy consumption Personalised Tool

IWU will develop a common application to facilitate the self-assessment by the tenants of their energy consumption and the influence of their behaviour in this fact and the capacity to change it in a better way.

This tool will be adapted to each local situation (Simple of multi-family houses, individual or collective space heating system, well insulated house or not).

The sites involved are:

❖ **ANGERS, BELFAST, BERLIN, FRANKFURT, KARLSRUHE, MOULINS**

The global specifications of the application developed by DomData are described in annex.

1.10 PETS: Personalised Energy Tools for Specific local needs

Each site will develop some other applications dedicated to specific local needs they have identified.

The sites involved in this type of action are:

❖ **ANGERS, BELFAST, BERLIN, FRANKFURT, KARLSRUHE, MOULINS**

The specifications of each application developed for each site is fully described in the chapter 3 of this deliverable.

ANNEX

SIMPLE TENANT ENERGY PORTAL (STEP) AND SELF ASSESSMENT ENERGY CONSUMPTION PERSONALISED TOOL (SEPT) COMMON SPECIFICATIONS

Within the SAVE@Work4Homes project, DomData will implement the following tools on a common base for each site. So, this annex describes the general specifications of the tools which will be adapted in a second stage by each site:

❖ **Simple Tenants Energy Portal (STEP)**

(See Figure 6)

❖ **Self assessment Energy consumption Personalised Tool (SEPT)**

(See Figure 7)

Both tools will work differently for a tenant and for a housing company employee (referred to as 'employee' below). Administration of the self assessment will be possible using general functions for managing surveys.

❖ **Simple Tenants Energy Portal (STEP)**

| Tenant / Employee | Function | Remarks | Possible extensions / versions |
|-------------------|---------------------------------------|---|---|
| Tenant | Utility consumption benchmarking | The flat benchmarking status will be presented based on data imported from ERP system. For each utility its consumption or the consumption factor ² will be presented in relation to the average / minimum / maximum on the level of community (building). Change over time will be presented as well. | Utility consumption broken down by room could be displayed. Tenant will enter additional information influencing the utility consumption in the flat (e.g. average time spent at home). Consumption forecast and estimated expenditures could be presented. |
| Employee | Utility consumption report / analysis | General benchmarking report will be displayed. It will contain flats, utility consumption and utility consumption factor ² in relation to the average, minimum and maximum values (like in BekoBench ³) at the level of community (building) as well as the change over time. Mass printing of flat benchmarking reports will be possible. As an extension, benchmarking data with the structural data could be put into the OLAP cube for further analysis. | |

Figure 6: Common specifications of the Simple Tenant Energy Portal

² e.g. consumption divided by dwelling space

³ accessible for tests under www.bekobench.de. English and French descriptions are available.

❖ **Self assessment Energy consumption Personalised Tool (SEPT)**

| Tenant / Employee | Function | Remarks | Possible extensions / versions |
|-------------------|---|--|---------------------------------|
| Tenant | Utility consumption behaviour self assessment | Tenant will be asked a set of questions referring to his utility consumption behaviour. The results accompanied by explanations prepared by employees will be presented. | Tenants' answers will be saved. |
| Employee | Utility consumption behaviour self assessment | Employee will see the self assessment as it is presented to a tenant. | |
| Employee | Survey administration | Employees will enter questions, answers, scores and explanations of results. Printing questionnaires to be filled in manually will be possible. | |
| Employee | Conducting a survey | Employees will be able to ask the questions directly and enter the answers manually (using mobile platforms i.e. PDA or paper print-outs). | |
| Employee | Survey analysis | Report on survey results will be presented. Mass printing of survey reports for individual tenants will be possible. | |

Figure 7: Common specifications of the Self assessment Energy consumption Personalised Tool

Both tools will be multilingual, i.e. all fixed texts will be displayed according to the selected language version.

The tools will be developed based on open source solutions⁴. Housing companies will not bear any additional costs.

Preparing import data is excluded from the current specification⁵. The interface is required for each ERP system unless clients handle it themselves.

It will be possible to import data from ERP system manually or automatically. Data will be imported in CSV (UTF-8) or XML format.

⁴ PHP, Propel, MODx, MySQL

⁵ necessary for Simple Tenants Energy Portal only

The import module will allow easy configuration, i.e. for each interface an administrator will determine what data are to be imported (no need to adapt the software).

Housing companies will decide if they want

- to use the tenant portal made by DomData containing SAVE tools⁶
- to use SAVE tools only with no other tenant portal functions⁷
- to integrate SAVE tools into their own solutions.

In each case the solutions will be put into operation at a housing company. Its administrators will be able to manage it on their own.

⁶ The complete specification of the DomData tenant portal is contained in a separate document.

⁷ Except for the ones who have to administer the portal (as e.g. User management).