



# SAVE@Work4Homes

Supporting European Housing Tenants  
in Optimising Resource Consumption

**SAVE@Work4Homes Service Introduction Guidelines**

## Deliverable 2.4

(22 December 2008)

<http://save.atwork4homes.eu>

Intelligent Energy  Europe

Methodological Guide For developing Energy Awareness Services for European Tenants

## Six European Platforms

ANGERS	BELFAST	BERLIN	FRANCFORT	KARLSRUHE	MOULINS
Le Toit Angevin	N.I. Housing Executive	Stadt und Land	Nassauische Heimstätte	VolksWohnung	Moulins Habitat
					

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***WARNING: This document is the first version of the methodological guide designed to help the renting housing companies to implement services similar to those described in this document (deliverable 2.4). At this stage of the project, it is too early to explain how the services have been used by the tenants. It will be done at the end of the first heating season (deliverable 2.5). The transferability issues will also be integrated in this document.***

# I – INTRODUCTION

## I – 1 General context

For several reasons, well known since some years, the reduction of the energy consumption and of other resources like water are now one of the major problems that the humanity as to solve urgently in housing sector which represents in Europe 40% of the energy consumption. This problem is specifically hard to solve in the social housing sector where the incomes of the tenants are already severely affected by the recent and strong increase of the fossil energies and where the capacity of the tenants to absorb the over costs of the works to reduce energy consumption is close by zero.

Many solutions exist, but, for many of them, the reimbursement of the investment costs to do, overcomes the reduction of the operating costs. Some solutions are applicable only on a very small part of the stock and their effect will not be visible before some dozens of years. For example, the reinforcement of the regulation of the new buildings that concerns only 1% of the stock will have a quite limited influence.

In 20 years, a division by a factor 4 of the consumption of this part of the stock will affect a reduction of only 12,5% of the mean of all the stock and the economical situation of the tenants living in the old stock will have not changed.

In the case of the refurbishment of the existing stock, the investment will be very heavy (a minimum of 20 k€ by dwelling will be necessary to reduce by a factor 2 the energy consumptions: from 240 kWh/m<sup>2</sup> to 120 kWh/m<sup>2</sup>). Therefore, it is not possible, for many reasons (financial, cultural: competence of actors), to treat each year more than 2% of the stock. The reduction of the energy consumption of the stock will be of only 20% at the end of a period of 20 years and more than the half of the tenants will always continue to live in the same conditions – if they have not been made worse by a new increase of the energy price.

Therefore, we have to consider urgently all the measures that permit to act, in a short time, on the whole stock and also on low investment measures, financially acceptable by the actors that will have to contribute to the costs of the actions (state, region, local authorities, social housing companies and tenants). We have also to consider that the energy consumption does not depend only of the composition of the walls and the efficiency of some equipment, but also of the behaviour of the persons who are living in their dwellings.

These considerations have been fully took into account by the project SAVE@Work4Homes when a consortium of six social housing companies has decided to propose to the European

Commission to help them to propose to their tenants the very new Energy Awareness Services related in this guide.

## I – 2 General approach of Energy Awareness Services

The social housing companies involved in the SAVE@Work4Homes project have developed and evaluated a complementary set of viable and effective Energy Awareness Services, based on a "toolbox" of components including:

- automatic monitoring of consumption and transmission of consumption data in respect of heating costs;
- analysis and presentation of consumption data for access by tenants via Internet or other methods;
- self-assessment scheme to assess the success of residents of a housing unit in reducing their energy consumption;
- improvement of heating controls and feedback to users of heating settings;
- tenant portals in the Internet;

The means used are:

- notebooks by property managers;
- Internet access by tenants with low-cost WebTV or their own PC or notebook;
- Design of print media for tenants such as a handbook for identifying possible changes in building use behaviour of all residents to save energy.

## II – IMPLEMENTATION OF SIX ENERGY AWARENESS SERVICES PLATFORMS

### II – 0 Presentation of the platforms

The consortium **@Work4Homes** is a group of six housing companies – assisted by some specialists of the treated topics - which is working regularly together to develop and evaluate new services for their tenants with the sponsoring of the European Commission. In a first and a second project, they have developed the easiness of the access to Internet by their tenants and they have used it for the enhancement of the communication between their teams and their tenants, when the tenants have, for example, a demand of repairs in their dwelling.

In a third project, the consortium has wished to use the ICT to save energy and has obtained the sponsoring of the SAVE program to do it. All platforms have the same goals and act in the same direction, but the implementation of these services can differ for a country to another for legal or cultural reasons and even in a same country for local, organisational or more simply for competitiveness reasons.

This guide describes the six implementations encountered in the project **SAVE@Work4Homes** and explains the motivations of each partner and the reasons and conditions of these different implementations.

### 1. Background

Le Toit Angevin (LTA) is a social housing company with a housing stock of 7 000 dwellings which are located mainly (92%) in the town of Angers and its closed surroundings.

- 80% of LTA stock is flats including low, medium and high-rise blocks and some 20% of dwellings are individual houses.
- 44% of LTA dwellings have a community heating system, which is centrally managed by LTA on behalf of tenants. Tenants provide renting charges each month complementary to their rent and LTA pays the heating bills to the supplier. Estimations of monthly renting charges are updated each year depending on the energy prices and tenants individual consumptions.
- The other 56% have individual heating systems for which tenants are responsible for paying their bills to the supplier directly.

### 2. Energy Management

The company has developed a large program of refurbishment of its housing stock that aims at reinforcing building insulation and renewing the equipments to decrease energy and water consumptions.

These new orientations requested by European and national regulations in the field of energy in housing, have also been applied to our new constructions. Norms requested by certifications such as (Very) High Energy Performance or Passive House are applied for some of our operations.

These developments on energy savings are a new field of intervention for Le Toit Angevin and their partners (architects, suppliers, technicians...) and each operation of refurbishment and construction contributes to improve our knowledge in these matters.

There is a necessity to balance on the one hand, the additional costs incurred by the new equipments and the new methods used for constructions and on the other hand, the expected energy savings. This balance depends not only on the characteristics of the dwellings but also on the behaviour of their occupants.

For this reason, it is obvious that the efforts made on the building structures and its equipments must be supported by a communication plan towards tenants to make them aware of the consumptions of their own dwelling.

### 3. Motivation of Landlord

Nowadays every citizen receives more or less general information on sustainable development and on the necessity to decrease energy consumptions as well as the production of waste and pollutants. But few people have accurate information on the level of their own energy consumptions compared to the average energy consumptions, except maybe through their bills (for individual heating systems) or their renting charges (for community heating systems).

Nevertheless, bills and renting charges receipts are not always suitable to give relevant information and to make people change their behaviour.

With the project developed in the suburb of La Roseraie, which represents about 500 dwellings, which have been recently refurbished, we experiment new means of communications towards tenants in the field of energy savings.

These new means consist in getting information on electricity and water consumptions as well as information on the temperature in the dwellings directly from the meters and to transpose the data on a portal. Connecting to this portal with their own login and password, tenants can have regular (daily, weekly, monthly or annual) information on their consumptions and the temperature in their dwelling.

### 4. Constraints on services

#### *Collection of data*

To obtain the data on electricity and water consumptions easily, meters have been replaced to be compatible with sensors which have been set thereafter.

In the same time, a set of components based on a PLC infrastructure has been installed in the building and linked to the local network so that information can be transferred to LTA as often as necessary and without any necessary human intervention in the building.

#### *Access to the Internet Portal*

Facilitating access to internet is a real issue to give a real impact to our pilot site.

For this reason, we support our pilot site by implementing access to Internet at a very low cost in our dwellings.

The access to Internet has been implemented without further equipments that those necessary to develop the PLC infrastructure which has been completed with the distribution of modems to the tenants.

### 5. Expected benefits

#### *Lower costs for tenants on the short run*

When replacing the meters LTA decided to buy the new meters instead of renting them. This decision combined with the low cost in maintenance and the fact that collecting data is now done for free (automatic collection through the sensors and the CPL infrastructure), enables a significant reduction in the renting charges.

### ***Lower costs for tenants and lower energy consumptions on the long run***

It is expected that having the possibility to follow their consumptions, tenants could reduce their consumptions from 20% to 40% of their current consumptions.

### ***Position of LTA regarding tenants, the township and the social housing sector***

This project of **LE TOIT ANGEVIN NUMERIQUE** contributes to improve the image of LTA as:

- a social housing company which looks for means to reduce the renting charges
- a company which uses new technologies
- a company, which is involved in sustainable development.

## **6. Partnership Service**

LTA works with several providers: EDF for the meters / Effineo (originally subsidiary of EDF) for the portal / Numericable as an operator.

LTA works with La Roseraie Cybercentre and the town's services of Angers to promote the portal and other websites as well, which give access to existing familial, cultural (...) services in the suburb of La Roseraie. What's more, the Cybercentre is in charge of training tenants desirous of learning how to use internet and the energy portal.

To support this project, The Region of Pays de La Loire has become financial partners to propose tenants recycled computers to be bought at a very low price.

Our project has an impact at the national level since LTA got the **PRICE OF INNOVATION** in October 2007 and was presented at the governmental level (Christine BOUTIN, Minister of Housing) within the work group on the development of the use of numerical techniques in social housing.

## **7. Description of Service**

### ***Operating service***

Tenants can access to the portal with a login and a password through the address of the website [www.efficonso.com](http://www.efficonso.com) or through the link which has been included in LTA website [www.letoitangevin.com](http://www.letoitangevin.com).

This link appears within a specific page dedicated to energy savings including already advice on the energy awareness behaviours; information on the waste treatment and a specific page on energy consumptions. A link will also be included to the energy performance certificate of the dwellings.

Tenants will thus not only have information on their individual consumptions but also know about the energy performance of the buildings.

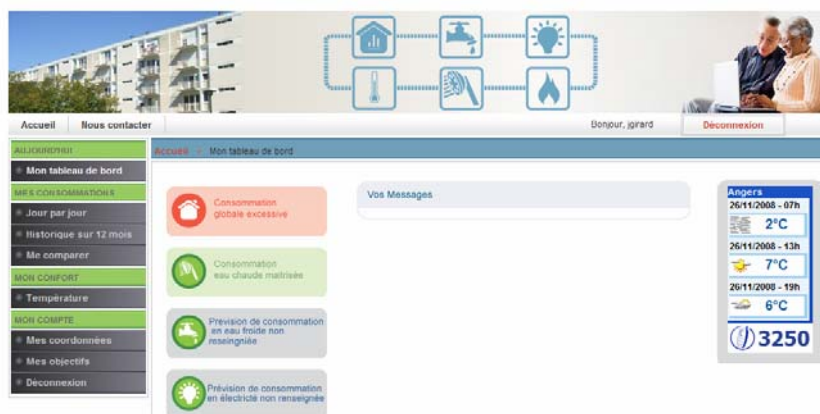
Our provider on this project **Effineo** had already a portal but we asked for some developments and changes, so that our portal can suit our tenants' needs.

*The portal gives the following information.*



This first page gives *ALERTS* on the level of electricity and water consumptions of the tenants in the form of squares with different colours: **GREEN** if normal / **ORANGE** if high / **RED** if excessive.

The alerts appear when the objectives of consumptions fixed by the tenants himself are passed. There is an objective for hot-water consumption, one for cold-water consumption and one for electricity consumption, and logically a synthesis of the whole. In case of water leak, an other kind of alert would appear by an email or SMS message for the tenant and an email message for the social housing company.



This page includes also messages from the social housing company and some news about the suburb, the town...



For instance, in this case the tenant has completed a hot water consumption of 11 Euros / month and has not complete any objective for his hot-water and electricity consumption, so that the

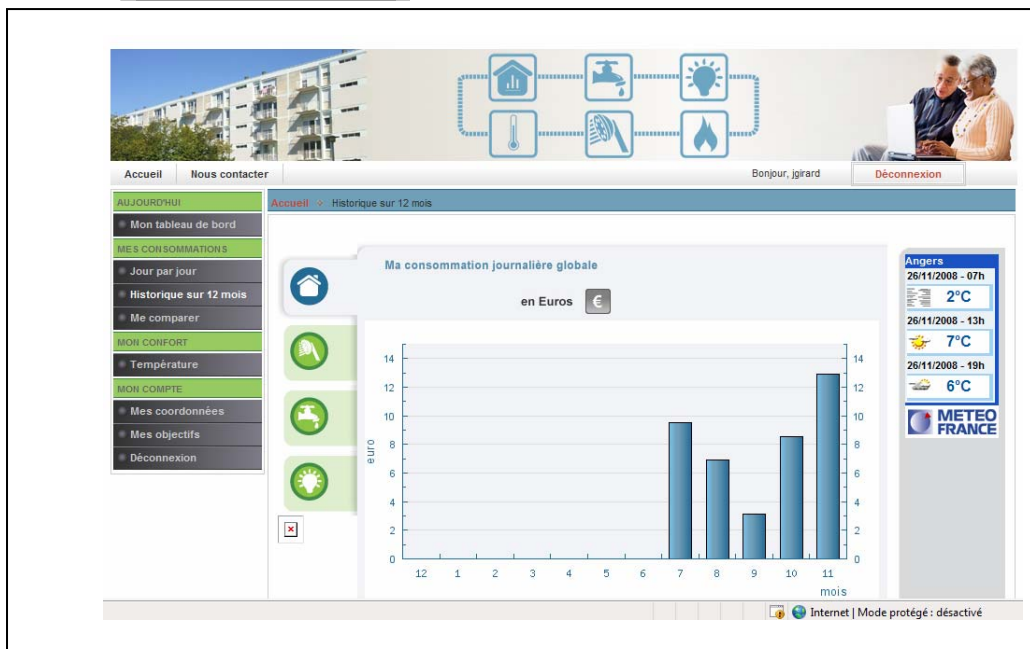
expectations are considered as zero. Consequently, on the left, the synthesis of his consumptions has passed his objectives, but in the right side, his hot-water consumption is widely underneath the objectives.

## MY CONSUMPTIONS

Day after day

This page gives precise information on the consumptions day after day in m3 or kWh or Euros.

Last 12 months



There are the consumptions of the last 12 months.

Given the data of consumptions in the building profiles of consumptions can be done depending on the size of the family

for example, and the consumptions of each tenant are presented in comparison with the consumptions of these profiles.

## MY COMFORT

Temperature

Temperatures inside the dwelling of the tenant are presently daily for each month.

## MY ACCOUNT

My address

My objectives

The tenant can here define his/her objectives in terms of monthly consumptions in Euros either separately for water and electricity or for a global amount.

These objectives are used to define the alerts presented on the first page (**My reporting**).

### *Financial and Economic framework*

The investment (without taxes):

- For the internet equipments:

- road works for the optical fibre for 585 accommodations : 40 k€ -  
68 € / Accommodation
  - installation of the optical fibre to connect 12 buildings (585 a.) : 120 k€ -  
205 € / Accommodation
  - To put standard the Coaxial on the 47 risings main (585 a.) : 29 k€  
- 50 € / Accommodation
  - To connect the 585 Accommodations at the network : 18 k€  
- 30 € / Accommodation
- 207 k€

- 383 € /

Accommodation

- For reading the data automatically:

- PLC equipments for 585 accommodations: 115 k€  
- 196 € / Accommodation

- Replacement of 585 electrical meters: *Free, included in the offer of the subcontractor of EDF*
- Replacement of 86 hot-water and 86 cold-water meters : 26 k€
  - 302 € / Accommodation
- Replacement of 508 hot-water and 86 cold-water meters with sensor meters : 145 k€
  - 285 € / Accommodation
- Installation of 86 sensors of meters (hot-water, cold-water, temperature) : 7 k€
  - 81 € / Accommodation
- Installation of 508 sensors of temperature : 46 k€
  - 90 € / Accommodation
- Installation of 585 electric sensors : 84 k€
  - 144 € / Accommodation

423 k€

- 1 098 € /

Accommodation

630 k€

- 1 481 € /

**Accommodation**

- For maintenance

- Maintenance of the PLC Infrastructure for 2 years : 10 k€
  - 17 € / Accommodation
- Maintenance of the sensors for 2 years : 14 k€
  - 23 € / Accommodation

- For the computer equipments:

- Purchasing of 60 computers (half new, half second-hand): 10 k€
  - 166 € / Accommodation

▪ sold to tenants at 66 €

-66 € / Accommodation

- For the free internet access

- Free internet access (512 ko, 60 television channels, fixed phone to be called) : 2 €  
/ month / tenant

The tenant has to pay each month 2,5 € / month / Accommodation for getting data automatically transmitted and using the internet energy portal. This is less than the past service charge that included a higher number of collects of data and was made by hand.

For this part, the project has been financed by LTA (62%) and a contribution of the Urban Renovation National Agency (38%).

The investment for the project of energy awareness services Save@Work4Homes has been evaluated to the sum of 337 K€. For this part, the contribution of the European commission covers 50% of the costs and is dedicated to the following aspects: research and development for energy awareness services, cooperation with tenants, evaluation and dissemination.

### ***Legal and Institutional***

Concerning the legal aspect of the project, there is a point to clarify: how the social housing company can use tenant's personal data?

The LTA social housing company is still working on this problematic in order to appreciate the different laws:

- no way of using the personal data without a written authorization
- the realization of the legitimate interests persuaded by the controller or by the recipient, subject not to underestimate the interest or the fundamental rights and freedoms of the person concerned.

### ***Return on investment***

There is no real financial return on investment for the benefit of LTA since every reduction of charges benefit to the tenant. The aim of this operation is to reduce energy consumption and tenant's financial contributions by giving them:

- a precise vision of their consumptions and costs, so that they can linked it to their behaviours,
- their consumptions compared with the other tenant's consumptions of same category

- a fine analyse of their behaviour and advices for improvement linked thinks to a self-assessment tool

Others interests of this projects:

- to presents one's image of our company by developing multimedia services,
- to keep this accommodations of a potential vacancy
- to reduce the numerical gap between the haves and have-nots in society

## 1. Background

The Housing Executive is the major social housing landlord in Northern Ireland with a housing stock of 93,000 dwellings. The breakdown of the housing stock is as follows:

House Type	No.	%
Bungalows	20,774	22.2 %
Terraced Houses	46,808	50.1 %
Semi-detached House	7,180	7.7 %
Flats/Apartments	18,664	20.0 %

As can be seen above, 80% of NIHE stock is single or two-storey individual houses and all with individual gas, oil or coal fired heating systems,. Some 20% of dwellings are flats including low, medium and high-rise blocks but all have individual gas, oil or electric heating systems. None of the NIHE stock including the flats has a community or district heating system or any system that is centrally managed on behalf of tenants. All NIHE tenants are responsible for paying their heating and electricity bills to the supplier directly – the landlord has no role in this. The landlord’s role is simply to provide the heating or electricity system, repair and maintain it, but takes no role in billing or metering.

With nearly 75% of Northern Ireland’s households owning their own home, the tenants of the NIHE tend to be households who cannot afford home ownership. All NIHE tenants tend to have low incomes with around 80% of NIHE tenants living on some form of social welfare benefits. The stock is generally well insulated with high efficiency boilers for heating with 35% of tenants using oil, 25% using natural gas, 20% coal and 13% using electricity for heating.

## 2. Energy Management

Irrespective of what type of fuel used, tenants have always been responsible for managing their own energy consumption. Gas and electricity are metered fuels and tenants receive quarterly statements on consumption but this data has never been shared with the landlord by the utilities and more recently, cannot be shared for Data Protection reasons. Coal and oil are non-metered fuels so tenants using these fuels must manage their own consumption data by retaining records of invoices when they buy fuel – in practice the vast majority of tenants do not do this and, if

asked how much fuel they use, would have to estimate their annual fuel consumption. Tenants often rely on energy efficiency advice from their landlords, fuel supplier or energy advice centre on how they can conserve energy.

### **3. Motivation of Landlord**

NIHE is the Home Energy Conservation Authority for NI with the aim of assisting all householders including tenants to save energy. We also wish to help prevent or minimise fuel poverty. We do this by improving the energy efficiency of the stock by switching from inefficient heating systems like coal and electricity to more efficient systems like gas or oil, installing high efficiency boilers, enhancing insulation levels and by providing advice to tenants. In this project, we provided more in-depth advice to 38 tenants who did not understand how to use their heating controls efficiently. Also in an attempt to use new technology we brought the Self Assessment Tool to 160 tenants via Personal Digital Assessors (PDAs) as only a tiny minority of our tenants have internet access.

### **4. Constraints on services**

The internet portal services offered in France and Germany were inappropriate for NI given the extremely low level of internet access among NIHE tenants. Internet access in NI is not provided by landlords but is a private arrangement with the householder and supplier – as most NIHE tenants are on low incomes they cannot afford this expensive service. These services were also constrained by the fact that utilities in NI do not share energy consumption data with landlords and the housing stock in NI, unlike many European countries, does not have communal heating systems.

### **5. Expected benefits**

By providing more in-depth advice on use of heating controls, providing the self-assessment tool through the PDA service, the Housing Executive helps tenants to save energy. This is in line with our responsibilities under the Home Energy Conservation Act and helps to develop our image as a responsible landlord.

### **6. Partnership Service**

The services provided by the NIHE under the project were delivered by in-house staff (PDA service) as part of a pilot exercise on the use of wireless technology by Neighbourhood Wardens and our partners in the N. I. Energy Agency (heating controls advice).

### **7. Description of Service**

*Technical Framework* – for delivery of the PDA Service, a key piece of equipment is the PDA itself. It also requires internet access. The direct advice service on heating controls is face-to-face.

*Financial/Economic Framework* – There would be a financial cost to NIHE in making a wireless PDA service more widely available to staff who are in daily contact with tenants. For face-to face advice on heating controls, the average cost negotiated with Heatsmart staff was £10 per tenant visit (around €12 at the exchange rate available at that time).

*Legal & Institutional Framework* - NIHE would manage and market many services provided by its staff using PDA's but it could also use the facility to market services by other organisations.

*Socio-cultural framework* - Until cheaper internet access is made available to low income households, the onus would remain on landlords to continue to provide advice to tenants via its own technology or by more traditional means of communication (face-to-face, phone, letter, etc...).

## **8. Description of the Service Operating Conditions.**

The service operating conditions will be redefined at the end of the first heating season after a complete evaluation of the services delivered.

## **9. Problems encountered.**

Any initial technical issues with the PDA were resolved prior to the Neighbourhood Wardens taking part in the pilot scheme.

However, during the course of the pilot scheme, there were issues for the organisation around the security of wireless PDA devices – the future use of the facility was reviewed within the organisation. The Neighbourhood Wardens had been using PDA's in 'synchronise mode' only. A small pilot was also developed to address the security implications of an 'always on' wireless solution. It wasn't possible however to get a stable set of security products (firewall , encryption etc ) for the PDA model being used in NIHE which also met the tight technical security measures imposed by government. Since the real business benefits to the Neighbourhood Wardens could only be realised with the implementation of the wireless feature it was felt that there was little merit in progressing with the use of the devices in 'synchronise mode'.

### 1. Background of the housing stock of social housing

Founded in 1924, STADT UND LAND is one of the six largest housing companies in Berlin, owner of nearly 48,000 flats mainly in the south and east of the city.

The types of buildings are varied - as the social and economic status of tenants. STADT UND LAND attaches great importance to a respectful behaviour towards the environment. The company was able to achieve the European EMAS certification, certificate which strictly controls the use of all resources.

### 2. Recognition of the situation of energy management by the tenant:

The tenants of STADT UND LAND are fully responsible for their electricity and gas. They are able to choose their supplier and pay their bills directly without intervention the property owner. In the case of heating and hot water, STADT UND LAND is responsible for facilitating the service and perception of consumption on an annual basis. Tenants can control their consumption by temperature regulators on each radiator. STADT UND LAND supports tenants by providing information on how to use resources.

### 3. The reasons and motivations for social housing to act in the field

STADT UND LAND defines sustainable use of resources as a corporate goal. To support the tenant to save energy falls in the logic of the company policy.

To address the question how to provide the necessary information to the tenant, we chose a technical solution (Portal on the Internet - including the possibility of a paper version) to be able to extend the service to the greatest number of tenants, easily and without additional cost.

### 4. The constraints of the proposed service implementation

Necessary condition for the development of services is the implementation of a radio metering system to read the consumption of heating and hot water in each apartment.

In the present context, there are only two buildings that are equipped this way, which is limiting our tests significantly.

In addition, our tenants need Internet access and compulsory equipment (PC) to access the tenant portal.

However, this is not an obstacle to participate in the project because the tenant can choose the paper as a source of information. However, each tenant must agree that the data is reported more than once a year for data security reasons and protection of information.

## 5. Expected benefits

We consider this project as a test by giving more detailed information to the tenant.

Our goal is that the tenant: a) understands better its energy consumption and b) is able to reduce his consumption. As stated in paragraph 3, the advantage for the company is better attainment of our company objective.

In addition, the project is an additional service to the tenant which - if successful - will guarantee satisfaction of our customer and therefore less fluctuation. The fluctuation is for the company synonymous with extra costs.

## 6. Partnership in the context of available services:

The services we offer are made possible through cooperation with the company Brunata that installs the radio system readers and delivers monthly data. On the other hand, the Polish software company DomData has developed the tenant portal and the possibility of delivering a paper version.

## 7. Technical description of implementation

**Technical infrastructure** - As indicated above, a radio system reader of consumption is a prerequisite for the implementation of the project. The second tool is the portal developed by DomData, where the tenant has access to his data consumption on a monthly basis. Even if the tenant opts for the paper version, the evaluation of data, generation of graphics and layout for printing are made in the framework of the portal.

**Economic and financial** - the implementation of the radio system is supported by STADT UND LAND and Brunata in equal shares. The development of the portal is an integral part of the European project and is therefore in the objective and the costs of all partners.

**Legal and institutional framework** - As the owner - STADT UND LAND - is not supposed to deal with consumption data of tenants more often than once a year for reasons of data security. Tenants must sign an agreement to access to the service. Brunata provides the raw data once a month. STADT und LAND manages the list of participating tenants, filters, formats the data and sends to DomData.

DomData evaluates the data and presents the data on the portal or through the portal to the paper version.

*Socio-cultural context* - Many of our tenants have no access to the Internet - because of their age or their economic situation - and therefore they are not able to use the portal. That is why another means of communication had to be put in place - in our case: the paper version - to reach every customer, even if it means an extra effort and a less detailed presentation.

## **8. Description of service and operating conditions**

The service STADT UND LAND offers consists in providing monthly information on the personal heating and water consumption data to the tenants. This information will be brought to them via a password-secured internet portal. Besides of their actual consumption, they can see their consumption history and a benchmark tool, where they can compare their actual consumption with an estimation which is based on their consumption history and climate data. The Self Assessment Tool developed by IWU is also part of the portal.

In release 2 STADT UND LAND will publish a paper version in addition to the tenant portal. This means that the same information will be printed on paper and sent by mail on a monthly basis to the tenants who do not have access to the internet.

## **9. The problems encountered in the implementation phase and during the operational phase**

The major problem is that the project is possible only in the two buildings that are equipped with radio system readers, and unfortunately have a tenant's structure rather unfavourable to the use of the Internet.

Therefore, it was very difficult to find participants for version 1 with only the establishment of the portal. We hope that the version 2 with the paper version will have a considerably higher impact. This hope is especially based on the results of the tenant survey at the beginning of the project, which indicated a strong interest in environmental issues and an interest in receiving information from the housing company.

### 1. Background

NH as a company group of Nassauische Heimstaette and Wohnstadt has a stock of some 63800 social housing dwellings and is landlord to 150000 to 180000 inhabitants in the state of Hessen in central Germany. The housing estates are located in 167 cities and communities as well in urban as rural regions. The type of buildings and heating are shown in the table below:

Construction style	Company Group total	Nassausiche Heimstaette	Wohnstadt
Terraced/Semi Detached Houses / etc.	2.217	1.105	1.112
Rowed houses	5.779	3.295	2.484
Perimeter block development	394	283	111
High-rised blocks > 6 floors	115	82	33
<b>Total</b>	<b>8.505</b>	<b>4.765</b>	<b>3.740</b>
Type of Heating	Company Group total	Nassausiche Heimstaette	Wohnstadt
Very good condition, Central heating aged less 10 years	2.557	1.242	1.315
Good condition, Central heating or individual gas fuel heating	4.276	2.070	2.206
Substandard, single heating with gas or electrical night storage	1.442	1.317	125
Poor, individual oil or coal stoves, unheated rooms	230	136	94

## **2. Former situation of energy management by the tenant:**

In former times, the tenant was able to heat individual. This caused high costs and/or poor quality of life. The temperature in the flats was individual but humidity and mildew was usual. Tenants had to care by themselves for coals or oil. To improve the quality of the flats they were modernized within the last decades by modern, efficient heating systems which provide low energy consumption and less effort in “operating” them.

## **3. Reasons and motivation for the social housing organisation**

The major shareholder of Nassauische Heimstätte is the State of Hesse.. The federal Republic of Germany is supporting a lot of activities to save the climate and to reduce CO2 emission. To realize these targets e.g. activities were broken down to companies be owned by states and communities.

The management of NH provided a strategy for next 10 years work plan to the supervisory board. One of the major columns in this is a chapter about energy saving. An interdisciplinary internal team created this part. Besides the joining of economic and ecological aspects also as technical improvement of buildings being build new or modernized to so called “50-70 litre houses” support to the tenants is qualified as an important spot to reduce energy consumption.

NH is driven by several issues to offer methods and opportunities to the tenant to save energy.

On the one hand, site a certain responsibility and offering a service to the tenant is driving this aim. This could cause the tenant to save money and improve lifestyle. Alternatively, it could offer better possibilities to increase the basic rental fee for the future.

On the other hand, the shareholders from public government organisations promised to participate in public climate protection contracts being signed on EU bases. This was understood to participate in efforts to save energy and reduce consumption.

## **4. Constraints on implementation of the proposed service**

In case of collective heating, some constraints are that German laws and regulations say that only half of the energy costs can be billed directly to the tenant. The other half of the cost is billed as an average to all participants.

Giving internet access to the tenants is getting more and more easily and low of cost but to raise the attitude of using it is the major problem. The mental skill of social housing tenants is not easily to arrange with aims of changing their behaviour to save safe energy.

## **5. Expected Benefits**

In terms and times of raising energy costs, we expect to improve our image as a landlord giving our tenants assistance to save money, to increase quality of life and improve our image from

housing provider, providing some "hardware" to people, to a service provider offering a choice of services in combination with the offer of living.

## **6. Partnership Service**

In terms of trust and confidence to our tenants, it is our aim to have control over all activities. The provision of services shall be done by our company group under the responsibility of subsidiary MET, which will use some cable network providers and external metering services as contractual partners. The decisions of how and the way of doing will be taken by NH. Energy provision is mostly done by MET to the tenants.

## **7. Description of service implemented:**

### ***- Technical framework***

The most important aspect is to prevail the metering data for energy consumption and outside the project as well as for water consumption too. The data is metered by an external service partner but computed and calculated exclusively in IT systems of the company group. There are no burdens in getting the data.

The (to the tenant portal) provided data will be generated from existing ERP System (SAP) and third party metering services. The data will be compressed to a web server with software provided by consortium partner DomData.

For the tenant only an access to internet via a usual browser will be needed. For the future we think about the opportunity to install touch screen displays in some flats to avoid the usage of PCs

### ***- Financial and Economic Framework***

Not all the costs have been compiled at this stage of the project. It will be done in the final document.

### ***- Legal and institutional framework***

The service will be provided by NH as a NH Service and not as an external service. We will be the owner of idea, serve and manage it including of all circumstances like introduction, training, and service provision..

## **8. Description of the service operating conditions**

An internet portal will be provided to the tenant, giving access to energy consumptions data, benchmarking and access to some contractual and bookkeeping data of his/her contract.

A self-assessment tool to improve energy consumption will part of the portal as well as a brochure to reduce energy consumption and reduce mildew that can be provided in paper form as well.

The data is provided for all tenants of the settlement. For those tenants who are not able or willing to access via internet to the data we decided, like the Berlin site did, to produce the output in paper. The property managers will use this to inform the tenants about this new service and to campaign for it. The printout is very similar to the website.

Some examples of the web pages:

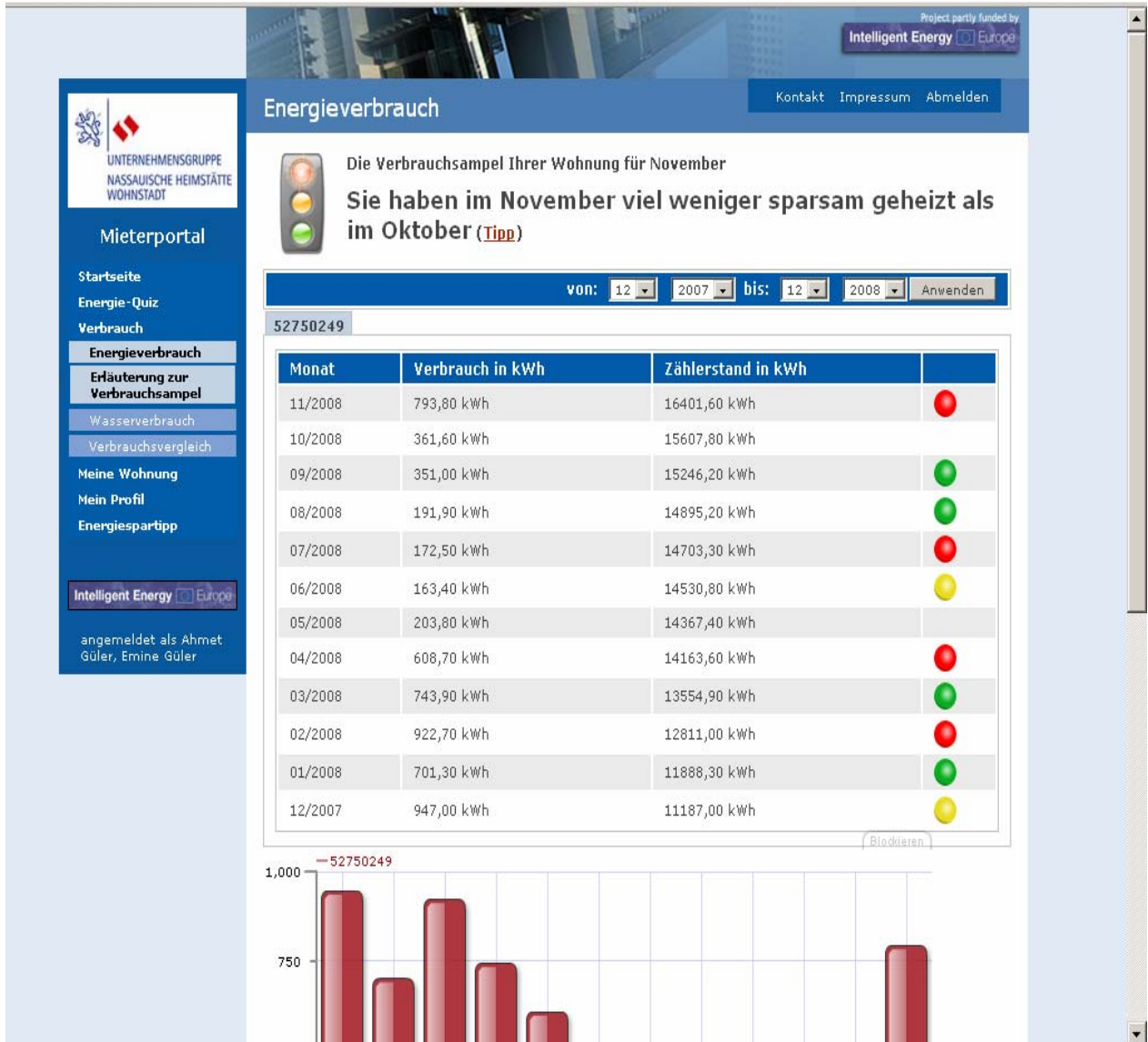
Start page after login.

The screenshot shows a tenant portal interface. On the left is a navigation menu with options like 'Startseite', 'Energie-Quiz', 'Verbrauch', 'Meine Wohnung', 'Mein Profil', and 'Energiespartipp'. The main content area is divided into four sections:

- Willkommen...:** A welcome message and a bar chart titled 'Energieverbrauch' showing energy consumption in kWh from 12/07 to 10/08. The consumption starts high (around 900 kWh) and generally decreases over the period.
- Energiespartipp:** A tip titled 'Wie trocknen Sie Ihre Wäsche?' (How to dry your laundry?) with text explaining that line drying is more energy-efficient than using a dryer.
- Wasserverbrauch:** A bar chart titled 'Kaltwasserverbrauch in Kubikmeter' showing cold water consumption in cubic meters from 12/07 to 10/08. Consumption is low until 04/08, then increases significantly, peaking around 12 cubic meters in 08/08.

At the top right, there is a logo for 'Intelligent Energy Europe' and a note 'Project partly funded by'.

Energy consumption with build in "traffic light" showing a change of energy behaviour



Comparison of energy consumption



Energy saving tips

Project partly funded by  
Intelligent Energy Europe

Kontakt Impressum Abmelden

**Energiespartipp**

1. [Wie lüften Sie Ihre Wohnung?](#)  
2. [Wie hoch ist die durchschnittliche Raumtemperatur in Ihrem Wohnzimmer?](#)  
3. [Drei Maßnahmen, die bares Geld wert sind!](#)  
4. [Wo liegen die größten Einsparpotentiale beim Energiesparen?](#)  
5. [Verwenden Sie Energiesparlampen in Ihrem Haushalt?](#)  
6. [Achten Sie beim Kauf neuer Haushaltsgeräte auf das EU-Label?](#)  
7. [Wie trocknen Sie Ihre Wäsche?](#)  
8. [Drehen Sie die Heizung in nicht genutzten Räumen ab, machen Sie das Licht, das Radio, den Fernseher aus, wenn Sie den Raum verlassen?](#)  
9. [Fernsehgeräte](#)

**1. Wie lüften Sie Ihre Wohnung?**  
Kippfenster bei eingeschalteter Heizung ist die teuerste Art der Lüftung. Gekippte Fenster bringen wenig frische Luft, bedeuten aber große Wärmeverluste. Da sich die Heizkörper zumeist unterhalb der Fenster befinden, wird die Wärme sofort abgegeben, ohne die Raumtemperatur zu erhöhen. Bei der Stoßlüftung wird die verbrauchte Raumluft in kürzester Zeit ausgetauscht, ohne dass die Wände auskühlen. In den Wintermonaten sollten die Fenster für etwa 4-6 Minuten ganz geöffnet werden. Bei einer Querlüftung genügen sogar schon drei Minuten. Vor allem im Winter kühlen bei längerem Fensteröffnen die Wände aus, so dass viel Energie nötig ist, wieder eine angenehme Raumtemperatur zu erreichen.

**2. Wie hoch ist die durchschnittliche Raumtemperatur in Ihrem Wohnzimmer?**  
Eine Raumtemperatur von 20°C ist nur im Kinder- und im Wohnzimmer nötig. Die Schlafräume sollten für einen erholsamen Schlaf eine Temperatur von etwa 16-18°C haben, für Flure genügen etwa 15°C. Eine Temperatur von 18 bis 20°C stellt i.A. das gesündeste Raumklima für den Menschen dar. Die Nutzung der einzelnen Räume ist unterschiedlich, weswegen auch die Raumtemperatur unterschiedlich sein kann. Der Flur und das Schlafzimmer sollten kühler als das Wohn- oder Kinderzimmer sein. Nachts und bei längerer Abwesenheit, kann die Temperatur durch Zurückdrehen der Thermostatventile an den Heizkörpern abgesenkt werden.

Zwar sind die Wahrnehmungen, wann eine Raumtemperatur als angenehm empfunden wird, subjektiv sehr verschieden, eine durchschnittliche Raumtemperatur von mehr als 25°C liegt jedoch deutlich über den Temperaturen, die als gesundes Raumklima angesehen werden. Durch eine Absenkung der Raumtemperatur um ein Grad, können die jährlichen Heizkosten um 6 % eingespart werden.

**3. Drei Maßnahmen, die bares Geld wert sind!**  
Die Dämmung der Heizkörpernischen mit wärmereflektierender Silberfolie reduziert die Heizkosten um etwa 4 % (jährlich etwa 30,-€). Die Anschaffungskosten haben sich nach einer, spätestens aber nach zwei Heizperioden bezahlt gemacht.

Die Senkung der Raumtemperatur um ein Grad spart etwa 6-8 % Heizenergiekosten (jährlich bis zu etwa 60,-€).

Die Absenkung der Wohnungstemperatur nachts auf 16-18 C spart etwa 5-10 % Heizkosten (jährlich bis zu etwa 30,-€).

Intelligent Energy Europe  
angemeldet als Ahmet Güler, Emine Güler

## 9. Problems encountered in the implementation phase and during the operation phase

- Release changes on ERP System including changing of the data structure)
- General heavily increasing energy costs and many several discussions about the handling of them.
- Lot of tenants which are not using internet (for these things)
- Extremely different energy consumption data caused doubt and internal evaluation to validate the metered data.

### 1. Background of the housing stock and the social housing organization

Volkswohnung GmbH is the municipal housing company of Karlsruhe, founded in 1922 by the city administration to overcome the shortages in municipal dwellings after WW I. The city of Karlsruhe is still the main shareholder of the company.

The main responsibility of Volkswohnung is to provide affordable dwellings of good quality to the citizens of Karlsruhe and to contribute to the urban performance by high quality of architectural and urban planning.

At present, over 16.000 dwellings are rented. Two third of them have been constructed by Volkswohnung, the others purchased. In addition, a major number of buildings are managed for third parties by commission.

After the big construction program between 1950 and 1970, the current objectives are focused on refurbishment and quality improvement. Among this, energy conservation and efficient generation of energy for heating and tap water preparation is the essential part of retrofit measures, using cogeneration and waste heat utilization and including also the use if renewable energies where available.

Volkswohnung is continuously looking for new approaches and technologies to support its aims to increase the sustainability of its building stock. During its retrofit program that is under way since about 20 years with almost 200 mills. € spent so far the average consumption of primary energy has already been reduced by about 50 %, with a cut by another 50 % of the present value viable.

### 2. Former situation of energy management by the tenant

Most of our buildings are supplied by a central heating system, based on district heating or gas central stations. Some of them still have decentralized supply, in most cases gas-boilers for individual dwellings or gas stoves for room heating. In these cases, tap water is prepared decentralized by boilers operated either with gas or with electricity. Oil or other fuels are not used in our buildings any more. By Volkswohnung's current renovation program, decentralized heating systems are regularly replaced by central heating stations.

Tenants with decentralized energy supply are billed by the energy supplier (the city works of Karlsruhe) once a year, usually in January. In these cases, the annual consumption of gas or electricity per dwelling is measured by gas or electricity meters. In contrast, tenants with central supply of heating energy and domestic hot water get their invoice on annual energy costs by Volkswohnung, regularly about 6 months after completion of the billing period. In this case, the total energy consumption of the whole building is "distributed" to the individual dwellings according

either to measurements by heat meters, if installed, or by certain calculation rules, which are prescribed by regulation, if meters are not available in the dwellings. Accordingly, the information on energy consumption is rather imprecise and, in any case, too late for a direct feedback from consumption to behaviour.

From detailed measurements, we know that there are very large differences in the energy consumption in dwellings, even within one building, due to different user habits (and due to other reasons). There are estimates that there is an energy saving potential of 20 % or even more, by setting the room temperatures correctly, improving ventilation habits and shutdown of heating when not needed. Due to a lack of information, this potential is not realized in practice. The need of user habits feedback was also confirmed by the survey.

In the dwellings of Volkswohnung, almost all radiators are equipped with thermostats to control the room temperature. Some newly refurbished buildings have an extended possibility to regulate the temperature: Instead of the normal thermostat, a wireless thermostat is adapted to the radiator. This wireless thermostat is controlled by a central programmable unit. Heating times and the room temperatures for every room in the dwelling can be programmed for each weekday by the tenants. In these buildings, automatic ventilation systems are used which replaces natural ventilation with windows.

The survey has shown that only a part of the tenants is able to use this modern equipment correctly, despite information brochures, which are handed to the tenants after refurbishment. 40% of the asked tenants feel badly informed about possibilities to save energy. Around 35% feel also badly informed about their own energy consumption. To realize saving potentials, new approaches have to be found to overcome the existing barriers.

### **3. Reasons and motivation for the social housing organisation**

Volkswohnung's motivation is to reduce energy costs for their tenants both by building refurbishment and by enabling the tenants to save energy without reducing comfort as part of a long-term sustainability strategy. The aim is to achieve a maximum of energy conservation by a minimum of expenditure.

### **4. Constraints on implementation of the proposed service**

This service is reserved for building with collective heating, internet connection to broadband, equipment of tenants with an Internet terminal, need of an individual or collective agreement of tenants, etc...

The energy awareness service as planned by Volkswohnung (introduction of tenants portal with regular information of consumption and saving potentials) is restricted to buildings with automatic measurement and transfer of consumption rates (heating energy, DHW, fresh water, eventually also electricity, when smart meters become available), which means that only buildings with

central heating supply are eligible for such services. Currently, over 60 % of Volkswohnung's buildings can make use of that. In the mid-term, almost all of our buildings can be connected to the portal, due to comprehensive modernization program that requires a big investment program for Volkswohnung.

Another constraint is the ability of our tenants to make use of the service, in terms of technical equipment available (internet access, use of PC) and of readiness to use and understand the service and draw the benefits it provides. It is the aim of SAVE@Home4Energy to learn how to design the energy awareness service to achieve the best acceptance and use possible.

## **5. Expected Benefits**

The primary benefit expected is cost reduction due to reduced energy consumption. 200 €/a per household as potential average savings have been estimated. For low-income households, which are the customers of Volkswohnung, this is a substantial saving. A second benefit is the contribution to the municipal GHG abatement goals of the city of Karlsruhe, which have been decided in 2007 and which are also valid for Volkswohnung as a municipal company, achieved by economically efficient investments, compared to other measures like "passive house" standard for existing buildings or solar energy and the like. An additional advantage is created by the contribution to Volkswohnung's image as a modern and customer friendly company, which is broadly communicated because of the broad attention that is given to this service in the region.

## **6. Partnership Service**

The service installed is using the energy data collected by KES, a subsidiary of Volkswohnung for energy billing purposes. These data, so far collected on an annual basis, are collected by KES monthly instead of annually for buildings that are offered the portal's service. An external software company is commissioned with programming the portal's interface according to the wishes of Volkswohnung and the experiences made with the service during the implementation phase, using the tenants' management data base being used by Volkswohnung. The service is installed and operated by own personnel of Volkswohnung.

## **7. Description of service implemented:**

The service is only served in buildings where the necessary installations for energy metering and electronic data transfer are available. Therefore, no additional field hardware is necessary. The software used for data evaluation and presentation in the portal is developed by an external software developer under commission of (and in co-operation with) Volkswohnung. It is then the property of Volkswohnung. The continuous operation, hot line, debugging and updating is provided by own personnel.

The service is free for Volkswohnung's tenants.

## 8. Problems encountered in the implementation phase and during the operation phase

During the pilot phase, using hardware that is already well functioning, there are three problems to be solved:

- organizing data acquisition from different sources (dwellings, heating stations, weather stations),
- designing tenants portal and providing meaningful information to the tenant,
- educating tenants for proper access and use of the portal.

Being still in the learning phase, the service is functioning in principle but is currently in a continuous improvement process.

### 1. Background

Moulins Habitat, public office of social housing in the city of Moulins, has a stock of nearly 4 000 flats spread across the metropolitan area of Moulins.

Moulins Habitat: a participatory approach:

Moulins Habitat registered for several years in a reduction of energy consumption and therefore rent on the existing stock with a desire to involve tenants, the ultimate consumers of energy and main beneficiaries of any gains.

In this context, MOULINS HABITAT participates in the European Save @ work4homes project to develop evaluation tools and measurement to allow tenants of public housing to optimize and better manage their energy consumption.

The project currently leads by three actions for tenants:

1 - A communication strategy for tenants who relies on:

The meetings discussions around the theme of sustainable development for children and adults,

The development of an interactive document explaining the challenges of sustainable development and available on the website of the organization.

2 - Setting the system of data viewing energy consumption of housing via Internet access, with tools for comparison with consumption of housing standard. This information will be provided by the supplier of energy that will ensure this service.

3 - The establishment of an interactive system linking the tenants and the landlord to raise awareness to save energy and prevent possible deviations of consumption relative to consumption standard and make corrections if necessary.

This project is part of a broader rehabilitation of nearly 2000 dwellings within the urban renewal projects in the neighbourhoods of Moulins- south and Yzeure-Le Plessis. Under this project,

Moulins Habitat has focused on sustainable development by promoting a policy of saving energy and awareness of its tenants to these savings.

In this context, the south neighbourhoods of Moulins were designated as the primary pilot site to complete the Save@work4homes project:

- Les Champions (242 units);
- Îlot-Thonier (229 units);
- Champ-Millan (555 units);
- Nomazy (574 units).

In addition, Moulins Habitat has decided to extend the scope of study, still in a sustainable development approach, to a hundred dwellings in the city centre and its offices to sensitize the staff to energy savings and to contribute to the awareness of our tenants.

Moreover, ultimately, Moulins Habitat wants to generalize the data collection of energy consumption (electricity, gas, heating, hot water) to all of its assets not only to educate its tenants to save energy for lower rent but also to assess different methods of construction or rehabilitation used.

## 2. Description of the Service

### *Objectives*

In the current increase in prices of energy, it is necessary to better control all expenses related to the different energy consumption in an effort to reduce rental costs for our tenants. Nevertheless, this objective can be achieved only if the landlord and the tenants work in the same direction. The only political will is not sufficient, Moulins Habitat wishes therefore involve tenants in the process making them aware of the necessity to adopt new behaviours and to better monitor not only the expenditure related to water consumption but also the all expenses related to energy (electricity, gas, heating).

The basis for reflection by Moulins Habitat is the search for a tool designed not only to educate tenants to save energy and to work towards the reduction of rental expense and a fairer distribution of the latter but to provide the services of the Office with a veritable tool for supervision.

First, regarding the service offered to tenants is to allow regular access and virtually real-time consumption of water (cold water and hot water, electricity, heating and gas, if necessary). This will allow access to the volume of consumption and enabling tenants to manage their "energy" budgets in bringing the volume of consumption in Euros. Note that the history of consumption will be retained to allow a monitoring with a possibility of comparison to assess the effects of individual effort to change behaviour.

Note that to ensure continuity of service and its use by tenants, an effort will be made on monitoring and updating of information. In this context, information and advice will be regularly distributed to users and will be adapted to different generations of users.

Similarly, it is important to work on the interactive service to enable an exchange between the tenants and the landlord.

Furthermore, Moulins Habitat wants to develop a tool for supervision. Thus the application "Facility Green Building" offers to Moulins Habitat the possibility, firstly, to have an overall view of energy consumption of its buildings stock and of its tenants but also, secondly, to establish a tool which will allow:

- To work to reduce rental costs and a better distribution;
- To identify potential problems of over consumption, of too important losses and any problems of leakage;
- To compare the energy efficiency of all buildings which constitute its stock;
- To compare and analyze the results of rehabilitation campaigns;
- To compare the effectiveness of different methods of construction used.

Ultimately, the potentiality of the service offered by VIZELIA allows Moulins Habitat to build a management tool automatically generating alerts and orders given to the services of Moulins Habitat and to holders of maintenance. Note that for concern for efficiency, this tool offers the possibility to model in three dimensions model the whole housing stock of Moulins Habitat, particularly to precisely identify problems requiring intervention.

Similarly, Moulins Habitat wants to extend the scope of the application to remote management of heating including with regard to all housing facilities of its housing stock.

The offer of VIZELIA was chosen following the call for tender because of its potentiality and scalability of the service. In a first step, it is just to have a tool and remote monitoring of consumption for the tenants but, ultimately, Moulins Habitat will be equipped with a monitoring tool and management of its assets within the logical continuation of the European project AGIR.

### ***Service implementation***

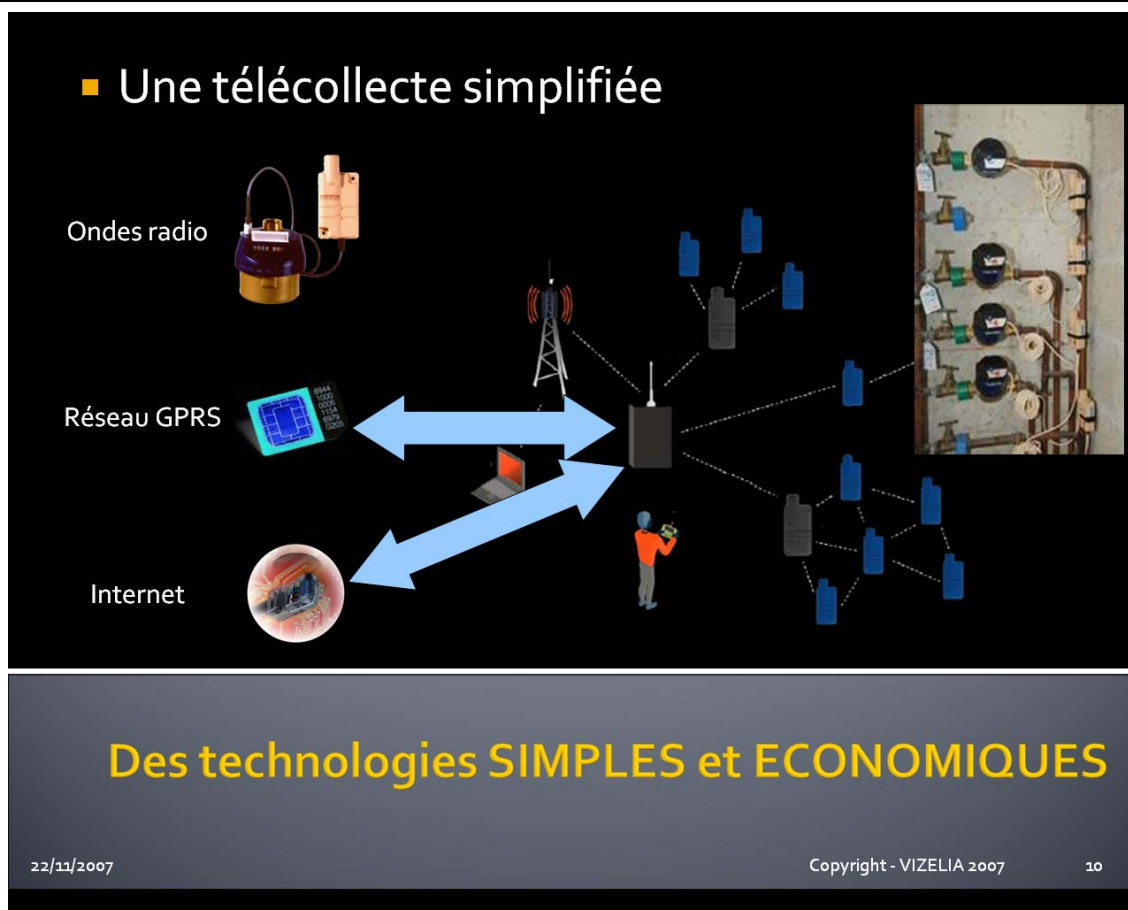
In a first step, we will offer a service of remote monitoring of consumption for the benefit of tenants of Moulins Habitat. This service will enable tenants to follow in almost real time their water consumption and energy:

- In Moulins-South, tenants will monitor their consumption of electricity, cold water, hot water and the temperature of their dwellings;
- In downtown, tenants will, in turn, access to their consumption of electricity, gas and water and the temperature of their dwellings.

These data will be cross them and, where appropriate, for heating for example, with statements of outside temperature.

The implementation of all services requires an investment to equip all housings with needed sensors and pulses transmitters to the communication of collected data. The architecture of the project is as follows:

## ■ Une télécollecte simplifiée

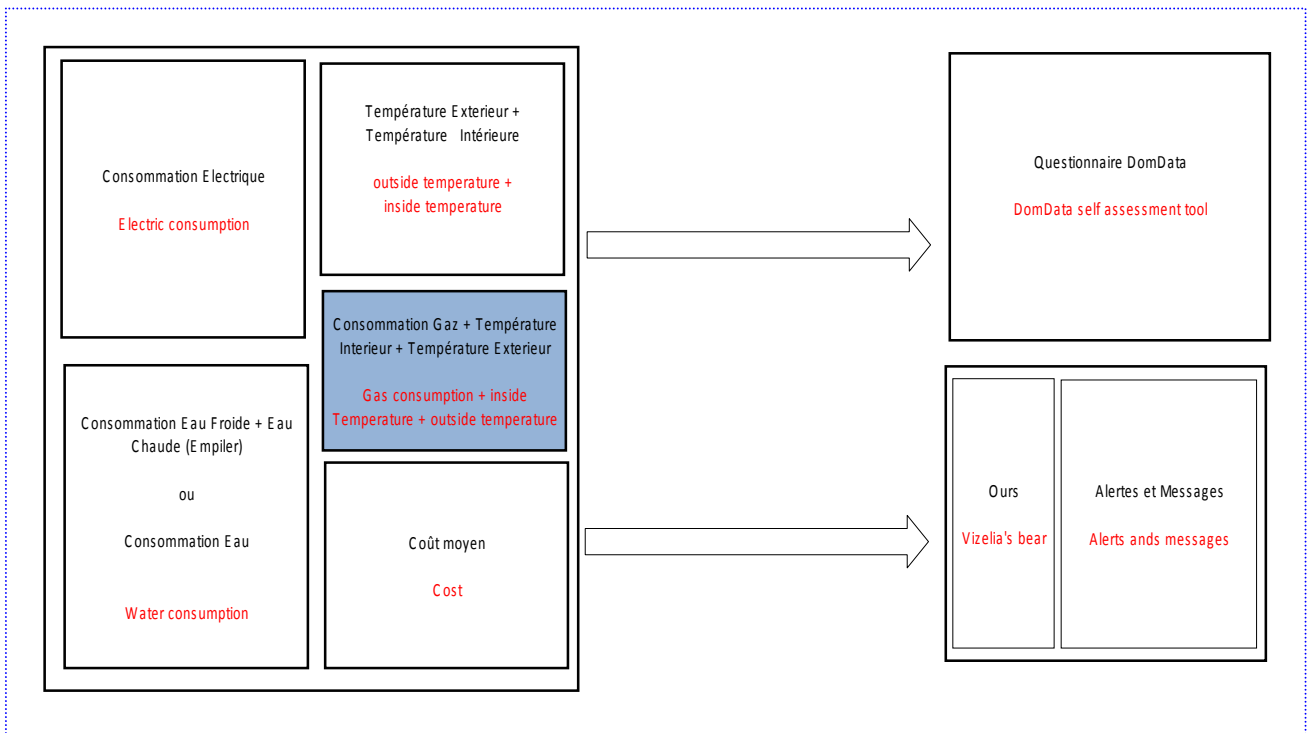


The  
data

collected will be processed for their communication to tenants who will be able to access via a web portal.

Tenants will have access via the Internet portal for all their consumption of water and energy. In view of a concern for relevance, some data can be cross them to highlight, for example, the correlation between temperature housing, the outside temperature and the consumption of gas in the case of buildings with an individual boiler.

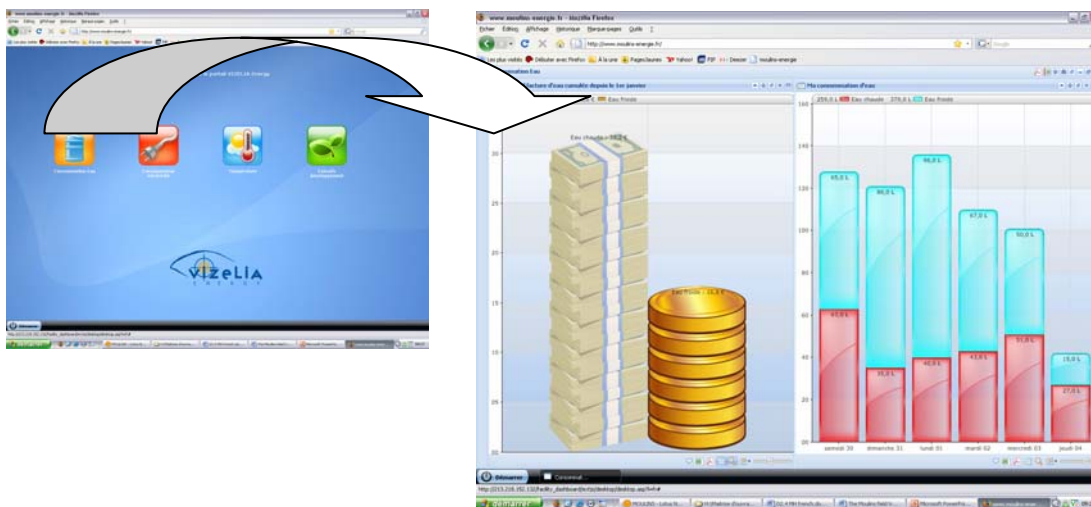
The architecture of the page viewable by tenants will be built on the principles outlined below:



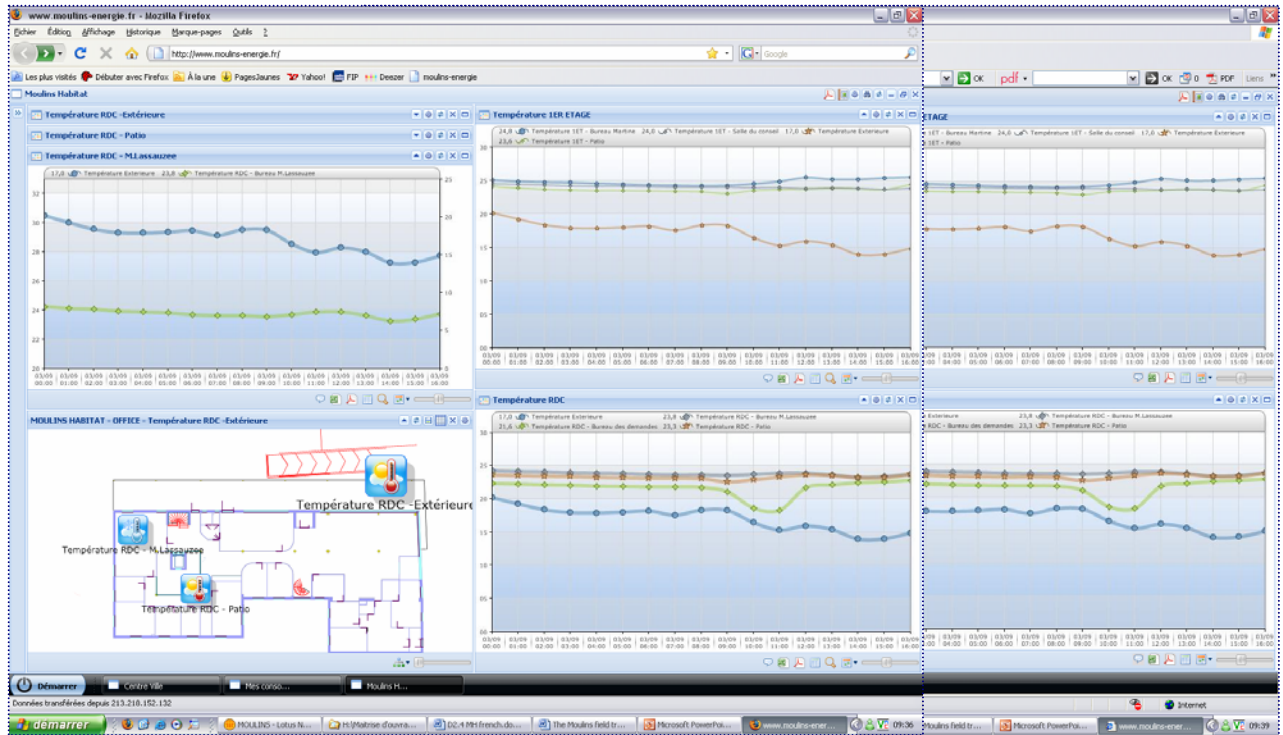
The data collected will be processed and then displayed in graphical form simple, legible, clearly understandable and accessible to all.

Access to the Internet portal will be so individualized. Each tenant will have a username and a password. The data, for each housing, will be available only by occupants. Note, however Moulins Habitat, under the supervision of its stock, will also have access to all consumers to identify potential problems and to generate the necessary alerts.

The ergonomics of the site will allow a quickly and simply grip of all the features of the site.

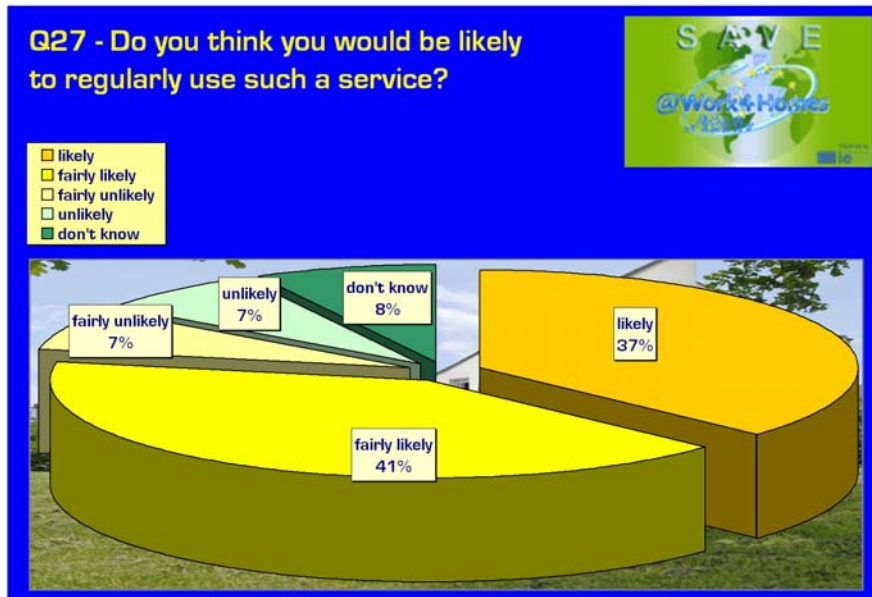


The willingness of Moulines Habitat is not only put up a simple portal of consultation, the solution proposed by Vizelia is, for the services of the landlord, a management tool of its building stock:



### III – GENERAL LEARNINGS OF THE PROJECT

The first lessons of the project concern the results of the tenant survey about their environment and energy knowledge.



From the answers to this large survey, we may conclude that there is a strong interest from the tenants of European social housings to get qualified information on their energy consumption and an obvious need of advice on saving potential measures that are possible for them.

Social housing companies are considered by tenants as the appropriate actor to provide this kind of information.

Therefore, due to increasing electronic metering, the necessary information on energy consumption pattern on a monthly basis will be available to housing company, either already today or in the near future. This fact shall be used to develop a qualified information service for the tenants, using adequate information channels (paper, posters in the building entrances, letters and Internet tenant portal).

This guide will be completed with the feedback of the use by tenants of the Energy Awareness Services when the evaluation will be done (end the heating season 2008-2009) and the issues of the transferability in other countries will be treated in the final guide.