



## 1.1 Novel Solution #10 - Energy Consumption Monitoring and reporting to tenants (Paris pilot)

### 1.1.1 Location in building - Paris

Monitoring network equipment is located in several building areas:

- Inside the dwellings (meters and videophone screens showing consumptions)
- Inside technical sheaths at each floor (intermediate transmission units)
- Inside the caretaker lodge (main acquisition and transmission unit)
- In the basement (meters)

### 1.1.2 Existing Construction

- Only gas and electricity bills for common parts of the building are available for energy consumption monitoring
- The tenants also have their private electricity bills
- No particular attention is paid to tenants' energetic behaviour, nor action to modify it

### 1.1.3 Identified Problems

Identified problems of existing design are:

- Tenants are not aware of energy savings. Many use incandescent bulbs.
- The tenants have no way to adjust heating in their flat according to their needs. On the lower floors flat temperature is often too high; many keep windows opened to cool it down. They have no way to set heating differently between the rooms.

### 1.1.4 Solution

In order to maximise energy savings, a set of ICT (Information and Communications Technology) energy management systems are implemented in dwellings and common parts of the building.

This includes smart meters and automation for optimal control of energy devices: condensing boilers; waste water heat recuperation system; and dwellings radiators. The regular reporting of this energy metering will enable the building owner to run the property more efficiently regarding maintenance of energy devices. It will also enable a correct evaluation of refurbishment performances and allow the owner to guarantee energy savings to the tenants.

Using the room temperature unit, the tenant can control the indoor temperature in a range of 2 degrees Celsius around the building set point.

The following Siemens units are implemented in the dwellings:

- Room temperature unit QAW910
- Heating circuit controller RRV918
- Ultrasonic heat meters with impulse output UH50-A21-00
- Consumption data interface WRI982
- HVAC central unit with consumption data acquisition QAX903

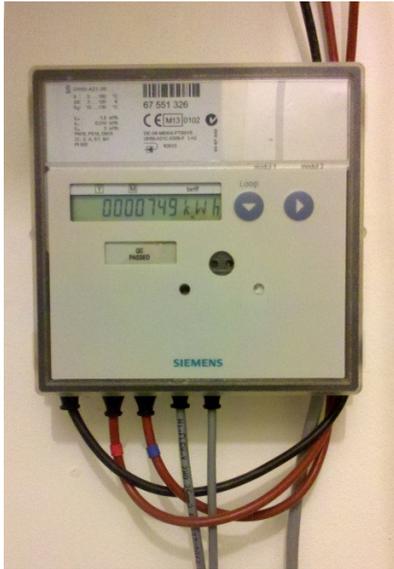


Figure 1: Heat meter



Figure 2: Heat sensor

The second part is dedicated to energy consumption report to the tenants. The measurements in each dwelling are displayed on the screen of a new videophone model from URMET. It displays heating, hot water, electricity and temperature charts weekly and also shows the data of the previous year. Then the tenants know their consumption and can modify their behaviour. They can also compare it to the previous year and thus avoid the rebound effect.

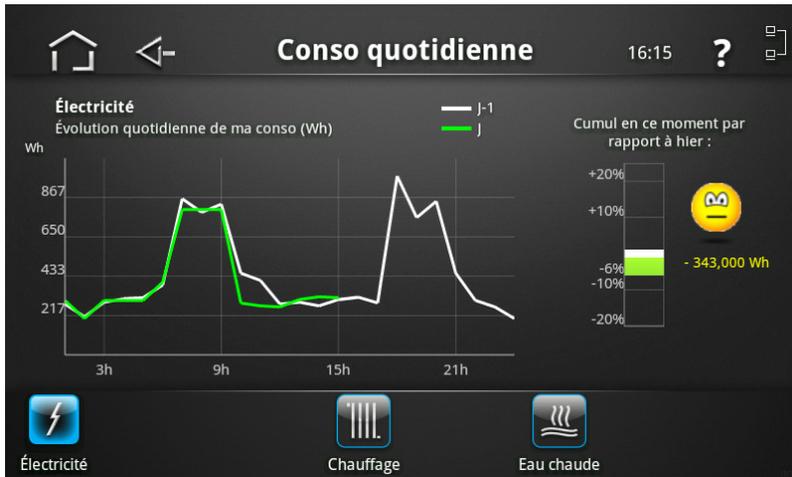


Figure 3: Videophone screen showing daily electric consumption for a dwelling. Measurements of current day showed in green compared with previous day in white.



Figure 4: Room temperature unit

### 1.1.5 Energy Experiences

This ICT solutions set is expected to achieve 15% reduction in energy consumption, about 7.5 kWh/m<sup>2</sup>/yr.

### 1.1.6 Lessons Learnt

This new technical solution was not fully defined at the beginning of the retrofitting. It was difficult to implement because we had to find the way to report the consumptions to the tenants during these works. This had consequences both in terms of costs and in the difficulty to control work delays.

Leadership failed to impose this measure as a priority for the project and facilitate the communication between the development stakeholders: Siemens, Urmet, Brezillon and Novédis. When the idea of reporting on the videophones rose, it took months to determine which kind of communication channels that were possible between Siemens and Urmet systems and to state this in the specifications.

Despite the fact that the solution isn't fully implemented yet, it can be expected to be a good way to keep the tenants informed in real time as the device is used daily for other purposes (door opener and communication channel with the housing owner). In order to insure the real use of the reporting system, several workshops has been carried out to teach it to the tenants. It has also been very important to determine who are responsible within the housing management for the monitoring and to train them.

The report system can be easily implemented in other sites with these videophones combined with any kind of monitoring system.