



## **Info-package 2**

***Energy maps in real-time for  
citizens***



# **ICTs**

## Introduction

The energy maps in real time REMOURBAN solution represent the ability of the citizens to visualise the energy consumption of the controlled region in real time.

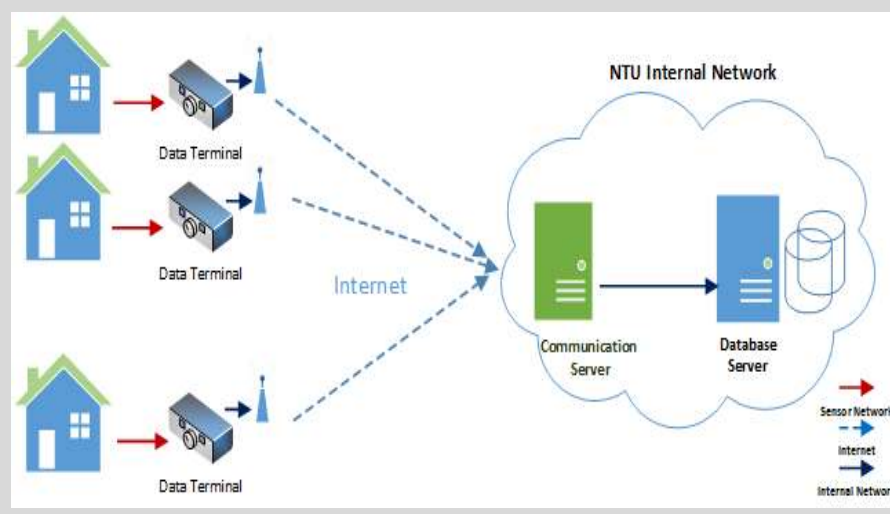
The solution is a mix of data collection, data store and aggregation and data visualisation (interpretation).

- Data Collection – starts with installing sensors in the dwellings. Typically REMOURBAN project aims at installing several temperature sensors (usually – 4) for controlling the temperature in the rooms. These sensors are also humidity sensors typically. Also there is general gas consumption sensor and overall electricity sensor. All this data are collected on regular basis intervals – typically 15 minutes to 1 hour. The more frequently these data are collected the better correspondence of the real time energy maps can be achieved.
- Data Store and Aggregation – Each site has its own data store. For Nottingham this store is located at the Nottingham Trent University premises and consists of Data Store Disk, Data Server machine and externally facing web server machine.
- Data visualisation is a software specially prepared for the REMOURBAN project and representing software package which is able to accept all incoming data, store them on the Data Store Disk and accept queries in real time which are served by the software and delivered to the citizens as web pages. Essential part of the energy in real time package is the ability to extrapolate data since not all properties in the project will be monitored. Altogether for the project in Nottingham only 25% of the properties will be entirely monitored, and for the rest will be extrapolation.

The software implemented to integrate data from Open Energy Monitoring equipment. The Data Format used is JSON which is easy to implement and can support multiple technologies.

## Description

The figures explaining the architecture of the system are below:



**Figure 1**  
Architecture  
of the  
software  
system

## Goals

The overall aim of this package is to increase the awareness of the citizens for their individual consumption and for the overall consumption of the controlled region.

In delivering this solution we are aiming to achieve the following goals:

- Energy usage awareness – overall aim
- Reduction in consumed energy – the citizens will be able to appreciate the energy usage and reduce their usage for helping reduce the impact on the environment
- To influence behavioural change – by being able to visualise the energy usage citizens will be able to take steps for better control of their energy consumption
- Create a sense of participation in the preservation of the environment
- Create new ways of the aggregation and data storage and preparation for the benefit of the citizens benefiting from the project's actions
- Achieving better comfort in their dwellings
- Improving the air quality – by monitoring the CO2 emission and humidity REMOURBAN is able to advice on the air quality of the controlled region
- Achieving greater energy efficiency by utilising energy sources which are more environmentally friendly
- Potentially useful for planning purposes

## Progress

Describe here the overall progress of the development of the solution.

In Nottingham the server side and the data collection side of the architecture are in place. Currently the installation of the sensors is under way and connecting them to the central repository. The development of the visualisation software is advancing and will be ready in the next couple of months.



## Lessons learnt

- |    |  |
|----|--|
| 01 | Variety of sensors exist – careful choice of sensors is a must so that the system has a reliable base for data connection.   |
| 02 | The hardware ICT architecture is straight forward; the only drawback might be the scalability of the web access which will be addressed after all users start to connect to the system for real. |
| 03 | The ease of use of the mobile phone application for energy visualisation is essential for the energy saving actions.   |
| 04 | Citizens' engagement is essential in data collection and visualisation.  |
| 05 | Use of open standards is essential because there is need for interoperability between different systems and computerised equipment.  |
| 06 | Necessary steps must be taken to ensure privacy of data for households.  |





**Produced for REMOURBAN by:**

*Evtim Peytchev*  
*Nottingham Trent University*  
[Evtim.peytchev@ntu.ac.uk](mailto:Evtim.peytchev@ntu.ac.uk)



[www.remourban.eu](http://www.remourban.eu)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 646511

