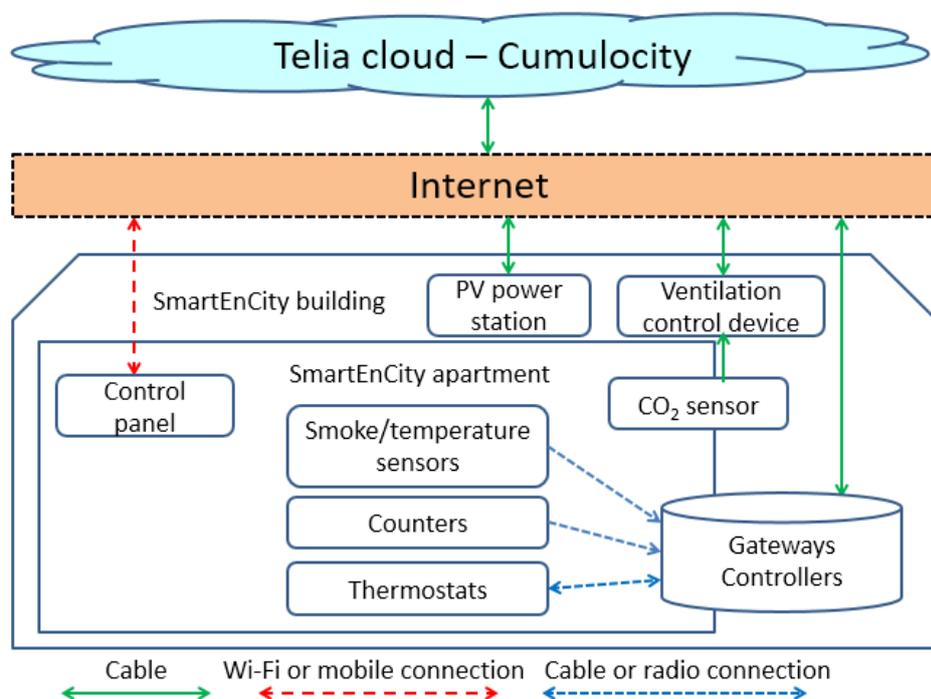# Smart Home Solution

Main sector

- Smart buildings
- ICT urban platform

Overview

One of the additional measures besides fully retrofitting Tartu's pilot area apartment buildings is installing smart home systems in each of the apartments. Generally speaking, the smart home system consists of a gateway (or several), a control panel as well as various sensors and meters that all exchange data through cable or radio communication. More specifically, the smart home solution includes the following elements:

- Gateway – communicates with the meters, sensors and devices installed in the apartments through cable or radio communication;
- Control panel – a tablet computer that is used to control the devices and run the smart home app developed by Telia;
- Smoke detector – will be mounted on living room ceilings;
- Impulse counter – will be mounted on electricity meters and transmit energy consumption data;
- Smart thermostats – to control room temperature;
- Smart water and gas meters – to monitor consumption;
- CO_2 detector – to control ventilation.

The smart home system will be connected to the Cumulocity cloud platform, which will be used to exchange data between various stakeholders (residents, housing associations, city of Tartu, University of Tartu, Tartu Regional Energy Agency), devices and platforms. This data will be the basis of empowering the consumers, leading to better decision-making and more energy-efficient behavior. Good data will also help service providers to make better investments and improvements in their value offers.

The collected energy consumption data will thus mainly be used in three ways. Firstly, the data will be used for automatically fine-tuning the parameters of heating and ventilation in the renovated buildings. Secondly, the data will be used for providing end users with direct feedback about their consumption habits. Finally, the data will also be accessible to third parties like SMEs and startups for building up innovative services. The privacy of the end users will have key importance in this process.
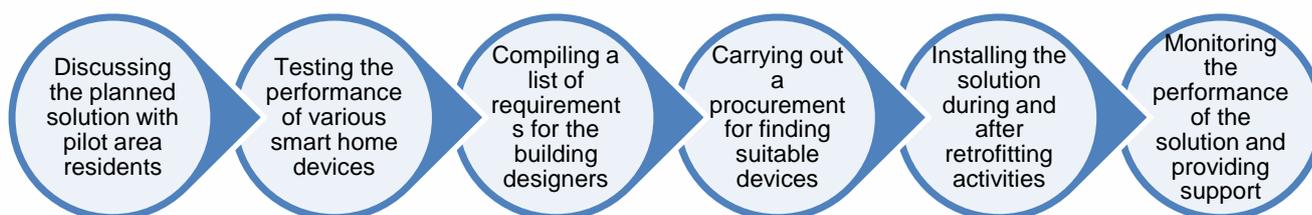
Business model

The gateways, controllers, control panels, smoke detectors, impulse counters and smart thermostats will be obtained through a separate public procurement and the housing associations will not pay for these devices. The water and gas meters and CO_2 detectors are directly related to retrofitting activities, so these devices will be included in the construction projects, obtained through a construction procurement and installed during the renovation works. The winner of the procurement in cooperation with Telia will set up and manage the systems and Telia will provide the smart home service free of charge until the end of the project, after which the residents can continue using the service based on a monthly fee.

Citizen engagement

The smart home solution that will be adopted in the pilot area apartments has been a continuous source of discussion at citizen engagement events and information meetings (see more under citizen engagement solutions). Communicating the solution's requirements, functionalities, risks, benefits and privacy issues to the pilot area residents has thus had key importance, especially as ca. 20% of these residents are 65+ years old and generally more cautious towards new technologies. Tartu's local website that addresses the project activities (http://tarktartu.ee/eng/) has also seen many questions asked about the smart home solution in the forum. People's concerns have mostly been related to the process of installing the solution, the functionality of the devices, the associated risks (e.g. electromagnetic radiation rate of the devices) and the related health hazards. As such, citizen engagement has been a natural part of planning and developing the smart home solution.

Process

Discussing the planned solution with pilot area residents → Testing the performance of various smart home devices → Compiling a list of requirements for the building designers → Carrying out a procurement for finding suitable devices → Installing the solution during and after retrofitting activities → Monitoring the performance of the solution and providing support

Benefits

- Monitoring and adjusting energy consumption
- Improved data availability and new business opportunities
- Increased comfort and control over the indoor climate
- Behavioral change related to consuming energy
- Increased energy efficiency and reduced energy bills
- Greater transparency of urban processes
- Better management of service providers

Stakeholders

Owner of the solution	Pilot area residents
Service/technology provider	Telia as the service provider, devices tbs
Users	Pilot building residents, service providers, entrepreneurs, universities
Investors	H2020, Telia

Investment/Finance

Ca. 400,000 €

Potential for replication

There are several components of the smart home solution that are novel and will be tested through the SmartEnCity project. Most notably, the central ventilation system that can be managed on the apartment level (including the CO_2 level) is something new and by the end of the project, the cost-benefit and performance of this solution can be assessed for further replication purposes. In addition, as both radio and cable solutions will most likely be used in the pilot area buildings depending on the housing associations' preferences, good knowledge will be gained about the reliability and performance of each of the options. As additional cable works will make up a significant part of the costs of setting up the smart home solution in Tartu, the availability of these connections should be taken into consideration when planning and implementing retrofitting activities even if initially, there is no intention of installing and integrating smart home devices in the apartments. Besides the technical expertise that will be gathered through implementing the smart home solution in Tartu, knowledge about how the pilot area residents accept the new solution, how they use it and how it changes their consumption patterns and behavior will also be available.

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