Webinar Summary

Developing ICT Tools for District-Scale Smart Energy Management

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Webinar Summary

In this third section of the AREA 21 webinar series, the aim was to discuss ICT Tools for district-scale smart energy management. Guests from 20 countries and 43 separate organisations were registered.

Antti Roose, Tartu Regional Energy Agency, introduced urban energy planning and was the moderator of the whole webinar. The next session was dedicated to a short guide, lessons learnt and critique of the ICT tools developed in AREA 21: Marten Saareoks gave an insight on the Benchmarking tool, Kari Kallioharju on the Energy monitoring tool ENAP and Henrik Gadd on the Energy Improvement Circle tool.

The webinar ended with a fruitful discussion with experts involved in the on-the-ground implementation of the tools: Andrzej Siwek (City of Lublin), Yury Nurulin (Peter the Great St. Petersburg Polytechnic University) and Ilari Rautanen (City of Tampere). In order to actively include the guests, a poll was launched where everyone could express their own opinion on ICT tool features.

Agenda

As conducted on 15th Sept, 2020

14:00 - 14:10	Introduction on urban energy planning *Antti Roose , Tartu Regional Energy Agency*
14:10 - 14:40	AREA 21 tools on urban energy planning and management: a short guide, lessons learnt and critique 1. Benchmarking tool - *Martin Saareoks, Tartu Regional Energy Agency* 2. Energy monitoring tool - *Kari Kallioharju, Tampere University of Applied Sciences* 3. Energy Improvement Cycle Tool - *Henrik Gadd, Öresundkraft*
14:40 - 15:00	Conceptual and practical reflections on energy planning tools in BSR Regions *Andrzej Siwek, City of Lublin* *Yuri Nurulin, Peter the Great St. Petersburg Polytechnic University* *Ilari Rautanen, City of Tampere*
15:00 - 15:30	Discussion Session *Moderated by Antti Roose, Tartu Regional Energy Agency*

Moderation

Antti Roose

Tartu Regional Energy Agency

Project Manager

Antti (PhD geoinformatics) joined Tartu Regional Energy Agency in 2016. Much of his work is devoted to environment and energy nexus in urban areas, spatial planning and climate adaptation. He has contributed to numerous urban plans and local agendas.

Assisted by:

Kimberly Tatum

HafenCity University Hamburg

AREA 21 Project Coordinator

Kim is an experienced research associate, who has worked on a range of EU-level projects on sustainable development, climate change and mobility topics.

AREA 21 Key Facts

Funding Programme: Interreg Baltic Sea Region

Duration: 10. 2017 – 09. 2020

Priority: Natural resources

Spec. objective: Energy efficiency

Aim: To pilot Energy Improvement Districts through the strategic planning and implementation of energy efficient solutions

Partner consortium

- HafenCity University Hamburg (DE) (Lead Partner)
- City of Hamburg | District Wandsbek (DE)
- Kohtla-Järve Town Government (EE)
- Tartu Regional Energy Agency (EE)
- Tampere University of Applied Sciences (FI)
- City of Tampere (FI)
- City of Lublin (PL)
- St. Petersburg Polytechnic University (RU)
- Region Skåne (SE)
- Öresundskraft AB (SE)

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Introduction on urban energy planning

Antti Roose from Tartu Regional Energy Agency described the latest trend in the ICT marketplace, incl. climate and carbon tools adressing GHG reductions, tools for climate neutrality, integration of green buildings with the smart city concept and the like. He addressed several discourses and approaches in designing and developing energy management tools. This also includes end-user needs and their role in the development of ICT tools. In this context it is essential to follow a customer-centered approach which at the same time supports social innovation and the activation of citizens. At the same time, cutting energy costs, improving energy efficiency and smart building technologies play a crucial role from the hardware and engineering side. The example of the Kalda Energy Improvement District in Tartu (Estonia) was presented as a good example for the integration of ICT tools into energy planning.

Energiamonitor, the benchmarking tool

Marten Saareoks from Tartu Regional Energy Agency introduced Energiamonitor as a benchmarking tool, designed for energy monitoring, analyses and energy consumption reduction. It visualizes consumption data for individual users and activates end-users to reflect their energy consumption habits. The two key questions to answer are: (1) what can I do to optimize the energy usage in my house and (2) how much energy can I save?

The tool integrates many features such as monitoring dashboard, energy labelling, energy performance, benchmarking and sharing models. Energiamonitor allows ist users to see and understand the current energy consumption and the energy costs that he or she has to pay in a year.

Moreover, Energiamonitor provides an overview of future scenarios:

- If renovations are done, how much energy would be saved?
- How much financial savings would be possible?
- How much CO2 emissions would be reduced?

Energiamonitor

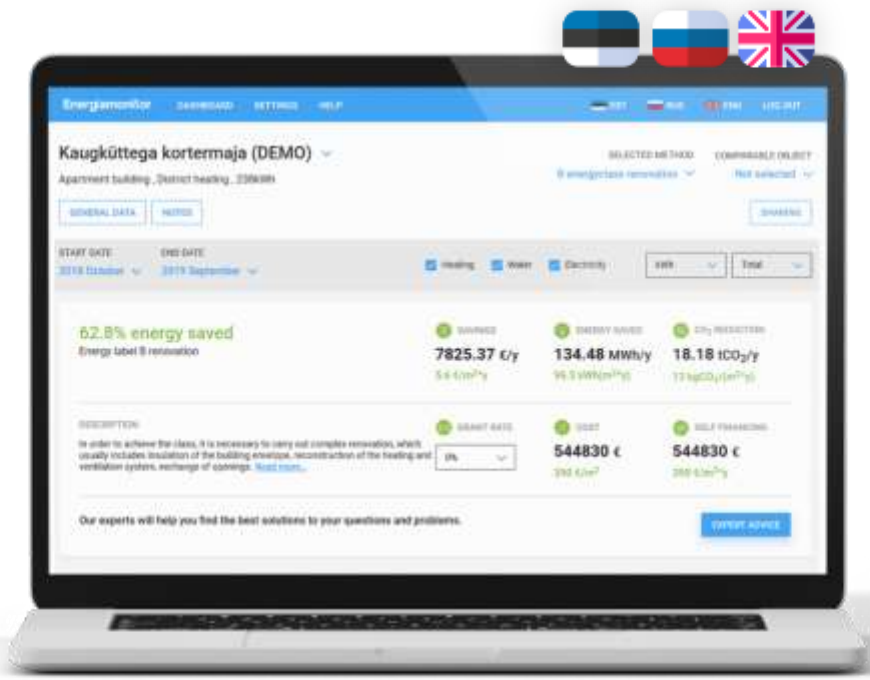
Is a benchmarking tool.

Energiamonitor is designed for

energy monitoring

analyses

reduction



Tool stores and analyses
building's energy consumption
and costs.

Energiamonitor

Answers to two key questions

1. What I can do to optimize the energy usage in my house?
2. How much can I save energy?

Monitoring dashboard

Energy labelling

Energy performance

Bench-marking

Sharing

Conlusion

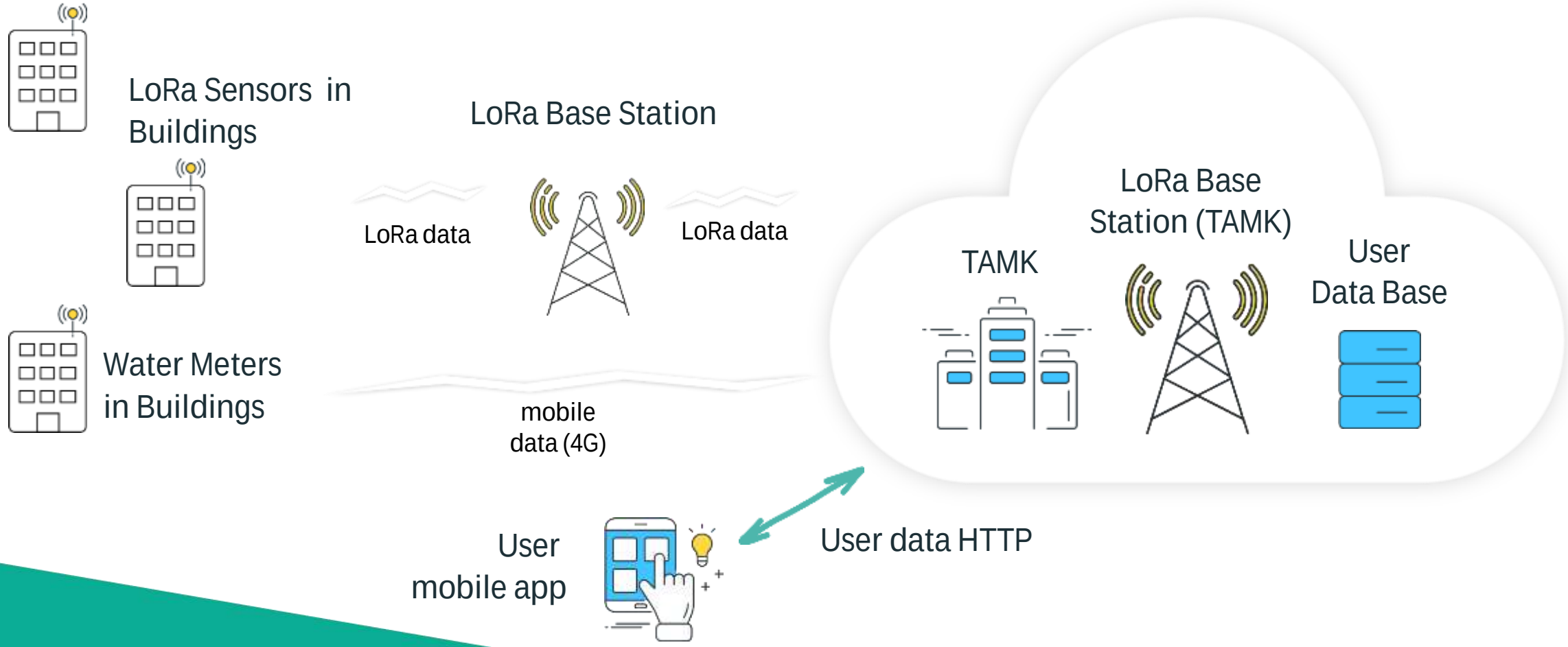
Key messages

- Energiamonitor as a benchmarking tool.
- It is designed for energy monitoring, analyses and energy consumption reduction.
- It visualizes consumption data for individual users and activates end-users to reflect their energy consumption habits.
- Tool‘s features are: monitoring dashboard, energy labelling, energy performance, benchmarking and sharing models.
- It gives an overview of future scenarios.

Holistic System Tool ENAP

Kari Kallioharju from Tampere University of Applied Sciences provided information regarding the Holistic System Tool ENAP developed in Tampere. ENAP is a real-time monitoring tool for residential apartment houses or single-family homes. The aim of the tool is to make residents understand their energy and water consumption and influence their habits to reduce their energy consumption in the future. It is a web-based, user-friendly and budget-friendly tool. ENAP is planned for existing buildings and it connects also historic use data. The first test was applied in 15 apartments with volunteers from the student community. Sensors were installed inside the apartments. The servers and data are handled at Tampere University, collecting data from the apartments via LoRa network which is then transferred to the user interface.

Holistic System Tool ENAP



Energy monitoring tool

Pilot buildings in Härmälä EID (Tampere, Finland)

Residents (tenants) are students and young people.

Sensors were installed in 15 apartments (all the volunteers we got).

Conlusion

Key messages

- Users wished to receive more instructional features from the tool.
- It is easy to install, modify, scale and budget friendly.
- It is perfect for existing buildings, but it is still a developing technology. It needs to be updated.
- Faced technical problems with the sensors and batteries.
- Actually, rather than a tool it is a service and work is therefore on-going.

Energy Improvement Circle Tool

Henrik Gadd discussed the Energy Improvement Circle Tool, which describes a method rather than a specific technology. The purpose of this tool is to decrease energy cost and CO2 emissions by using the right energy at the right time, rather than to reduce overall energy consumption. The basic idea is to use day-ahead data for electricity, district heating and CO2 emissions and change the behaviour for the next coming day. The method aims at decreasing energy use during times with high demand (i.e. when energy is expensive). The method was applied in the Helsingborg EID (hospital area) with data from 2018 as an example. It can be applied to any kind of energy supply, not only electricity and district heating.

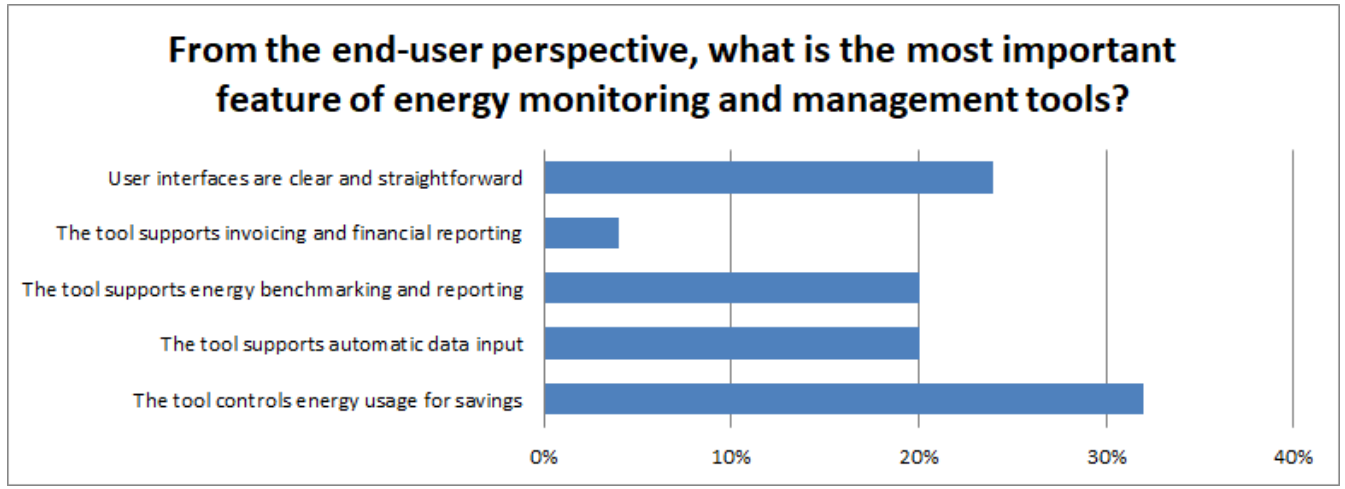
The model is designed to support professional users (i.e. facility managers and administrative leaders) in deciding how to optimise energy use in economical and environmental terms. Through the visualisation of energy data, the tool raises awareness among end-users about energy usage and supply dynamics.

Conlusion

Key messages

- The aim is to decrease energy cost and CO2 emissions by using the right energy at the right time and not to reduce energy consumption as such.
- Usage of day-ahead data for electricity, district heating.
- Electricity has a national market, while district heating a local one, so management and negotiation conditions differ
- Day-ahead data is not free of charge.

Results of the audience poll



The tool controls energy usage for savings	32%
The tool supports automatic data input	20%
The tool supports energy benchmarking and reporting	20%
The tool supports invoicing and financial reporting	4%
User interfaces are clear and straightforward	24%

Discussion session

After the participants voted on the poll, the discussion grew further, with three other experts presenting their experiences with ICT tools in AREA 21

- Andrzej Siwek described the process of testing ENAP and Energiamonitor in the City of Lublin. He underlined the need to make the tools appealing for end-users. When trying to implement ENAP (see slide 11) in the Lublin context, the main difficulty was the lack of the right infrastructure for the tool – which was eventually the reason to cancel the transfer of ENAP to Lublin. In a second attempt, the transferability of Energiamonitor (see slide 7) has been assessed. Here, the lack of building efficiency labeling in Poland decreased the tool's full potential. Standards are not the same as in Estonia, moreover legal obligations, paperwork, data processing and the need for consents presented obstacles. Eventually, these obstacles prevented the team from making the tool public and free of charge for everyone. Currently, all activities related to the tool are frozen, yet still the journey was valuable and provided insights on opportunities and barriers.

- Yuri Nurulin shared the experience from St. Petersburg. He went into detail about the role of end-users, functions of the tool and its interface in terms of user-friendly design. He highlighted that while data in itself is not interesting for end-users, converting it to user-friendly information allows users to understand choices and make better decisions – which is the main goal of Energiamonitor in the St. Petersburg EID.

- Ilari Rautanen from SMART Tampere discussed the test case in Tampere. There, the energy data is owned by the energy consumers, which makes it difficult to share. Utilities lack interfaces to share information, and the needed technology is expensive and difficult to integrate. Data organization is also an issue. Energy storage systems are being used more and more nowadays, which complicates energy data tracking.

How did you get end-users motivated to participate?

Kari Kallioharju, Tampere University of Applied Sciences

Communicating with e-mails, papers, organizing info meetings with students were the main attempts to activate end-users. Getting volunteers was difficult. Students are not motivated enough for „green thinking“, as in the student dorms they are not paying for their energy; therefore there is no financial profit if they change their habits.

Yury Nurulin, Peter the Great St. Petersburg Polytechnic University

Andrzej Siwek, City of Lublin

The rules on data protection in Russia and Poland are not different from the rest of EU countries, but they are applied differently. The policy of „better to be safe than sorry“ was the main barrier in Lublin.

How do we handle data management in ICT tools?

Henrik Gadd, Öresundkraft

The type of data is decisive. For instance, with disctrict heating, where there is a monopoly, it is less problematic to collect data than for electricity.

Ilari Rautanen, City of Tampere

Currently, data organization is one of the main problems that SMART Tampere is facing. Combining all the data which comes in different forms is not an easy task.

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