



Energy Efficiency and Heat Demand Response With the Customers
2.6 CONSUMER FEEDBACK THROUGH ICT
22.3.2018 / Perttu Lahtinen

HELEN IN BRIEF

- Finland's second-largest energy company.
- Over 400.000 customers throughout Finland.
- Main services for homes and enterprises: district heat, district cooling and electricity,
- Helen Group's turnover EUR 805 million (2017), number of employees 1,144.
- In the Helsinki region: three power plants, more than ten heating plants and the world's largest heating and cooling plant of its kind.
- Holdings in energy production in various parts of Finland and in Sweden.
- Helen Ltd is owned by the City of Helsinki.
- Aiming for climate neutral energy production.

HELEN

OUR NEW SERVICES



Solar panels



Small and large electricity storages



District cooling



Renewable district heat



Charging points for electric vehicles



Demand response solutions



SunZEB building solutions

HELEN



THE HELEN MODEL: WORLD'S MOST EFFICIENT TRIGENERATION AND RECYCLING OF ENERGY

HELSINKI: IT CAN BE COLD IN WINTER...



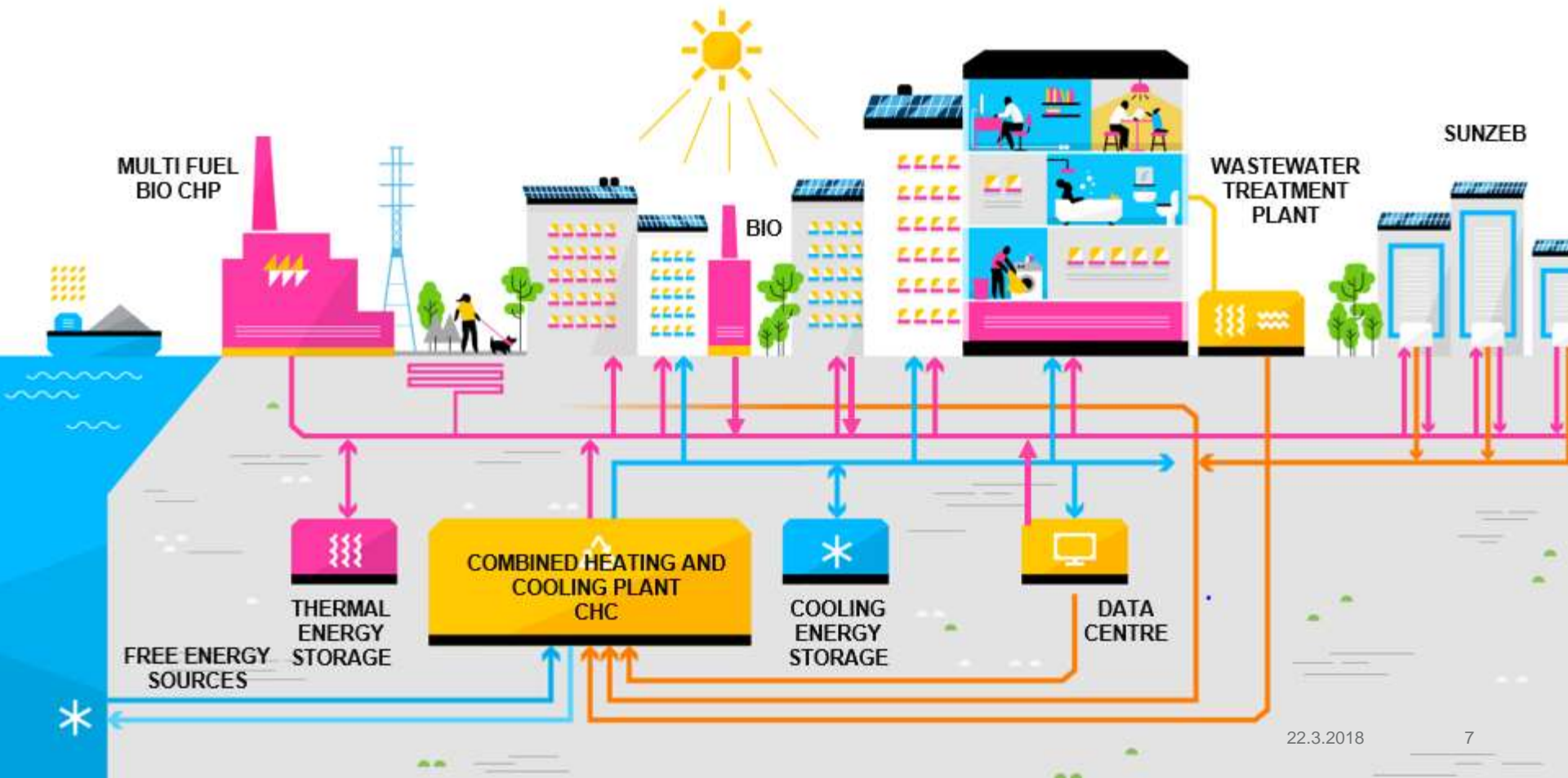
HELEN

**Average temperature
in February 2018:
- 8.2 Celsius**

**...AND LOTS OF LIGHT
AND EVEN WARMTH
IN THE SUMMER TIME!**

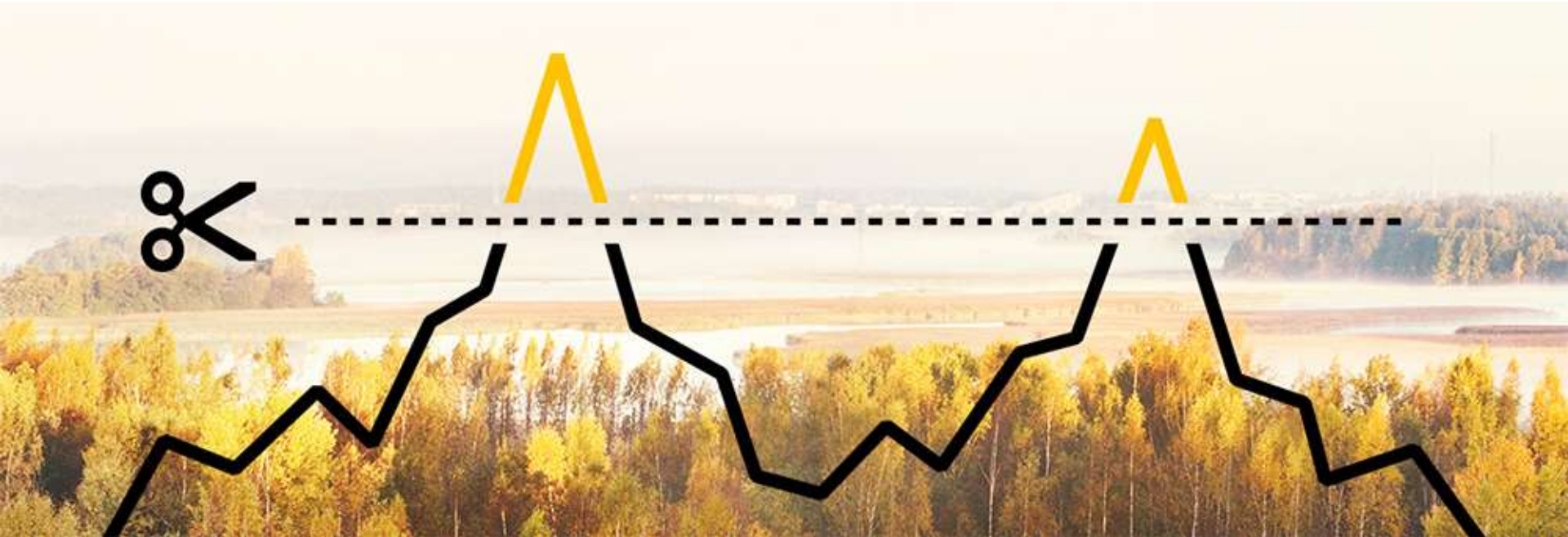
**Midsummer in Helsinki
23.6.2018
Sunrise: 03:52
Sunset: 22:52**

HELEN'S CITY ENERGY SYSTEM

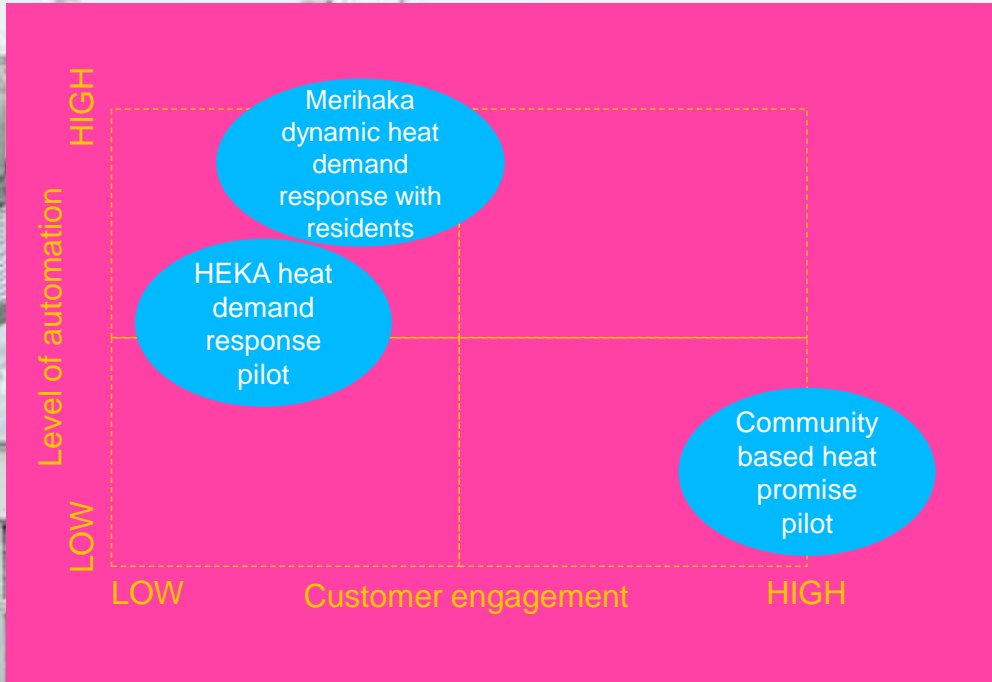


HEAT DEMAND RESPONSE WITH THE CUSTOMERS

DEMAND RESPONSE



THREE CASE PILOTS FOR THE DEMAND RESPONSE WITH THE CUSTOMERS



COMMUNITY BASED HEAT PROMISE PILOT

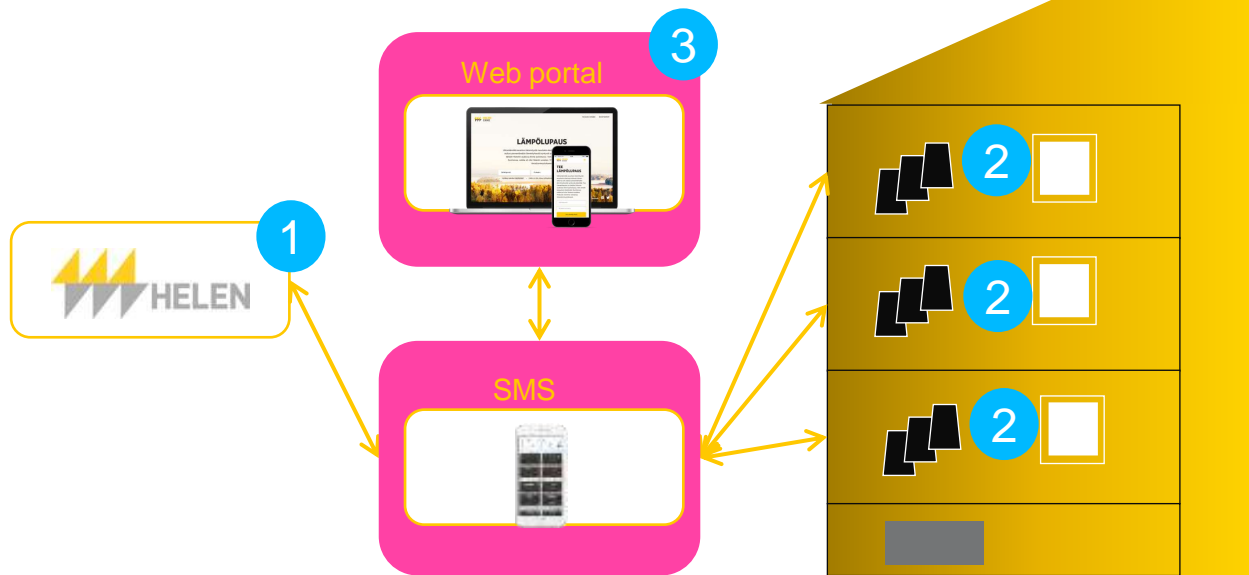
COMMUNITY BASED HEAT PROMISE PILOT

- Helen campaign to activate customers during the heating season 2016/2017
- Activated more than 3000 individuals to give their promise to lower their own heat consumption during the peak hours in heat production
- More than 50 000 visitors in a campaign page
- Increased the awareness of the demand response and gave people an easy access to make their contribution towards environment



COMMUNITY BASED HEAT PROMISE PILOT

- 1 Helen sends the sms to all individuals who had made a heat promise – signal to reduce heat consumption
- 2 Person will adjust the thermostat or heating manually and later confirm his/her action by sms
- 3 Helen has a web portal to communicate results of the actions and give some energy saving tips to the community




MERIHAKA DYNAMIC HEAT DEMAND RESPONSE WITH RESIDENTS

MERIHAKA DYNAMIC HEAT DEMAND RESPONSE WITH RESIDENTS

- Helen and its MySmartLife project partners equipped 167 apartments with smart thermostats to control heat radiators
 - Installation completed Q1/2018
- Resident will have a user friendly interface to control room temperature
 - Possibility to add other smart devices to system
- Estimated 10-20 % energy savings on a house level
- Cloud based integration to pilot heat demand response

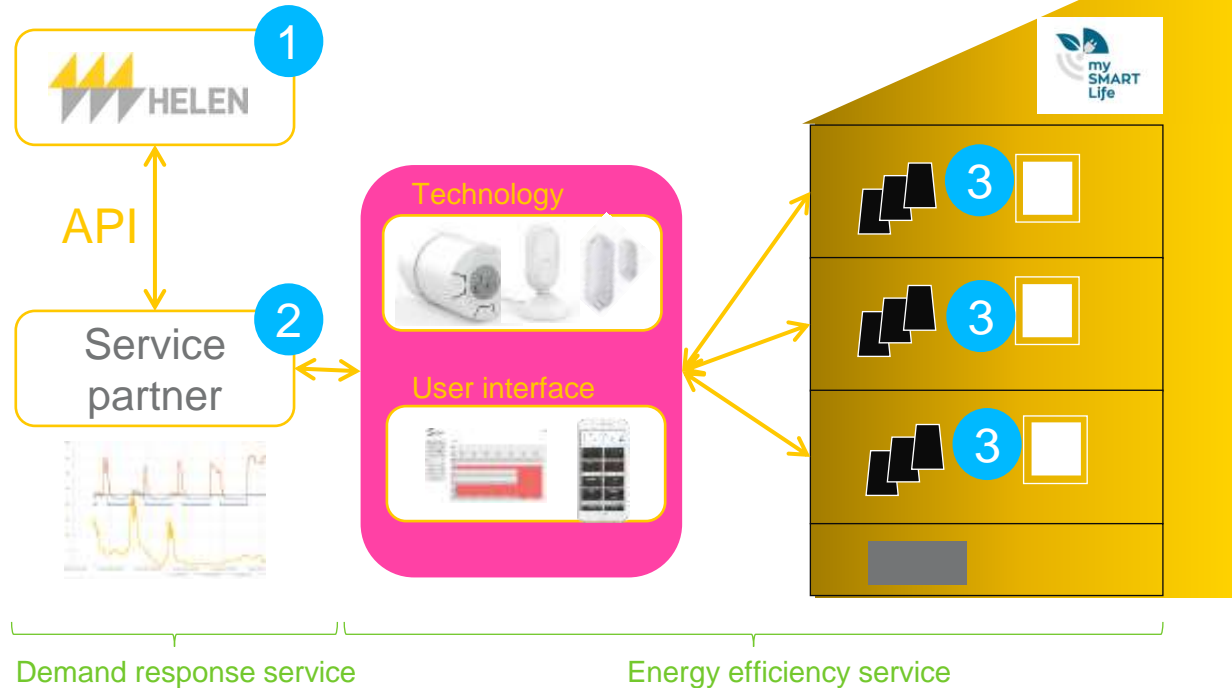


 This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731297.



MERIHAKA DYNAMIC HEAT DEMAND RESPONSE WITH RESIDENTS

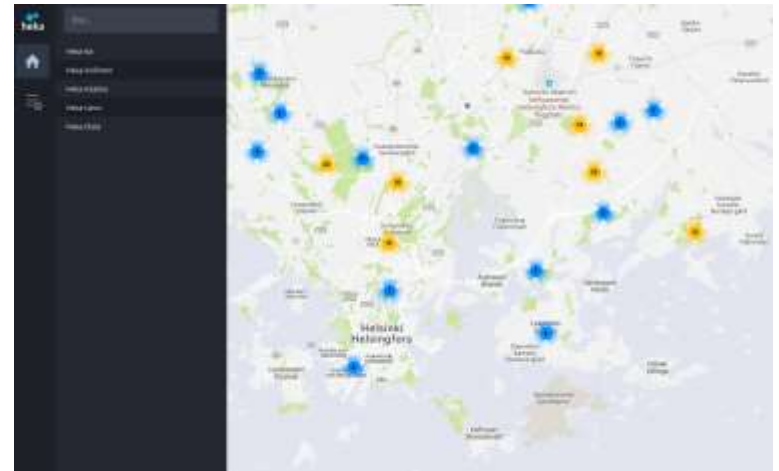
- 1 Helen will have an open interface to give a dynamic heat demand response signal based on its flexibility need
- 2 Service partner will read the signal (cloud based integration) and use it as a one optimization parameter to provide actual service to the end customer
- 3 Customer will benefit from better living comfort, cost saving, energy efficiency and environment – no need to participate actual DR



HEKA HEAT DEMAND RESPONSE PILOT

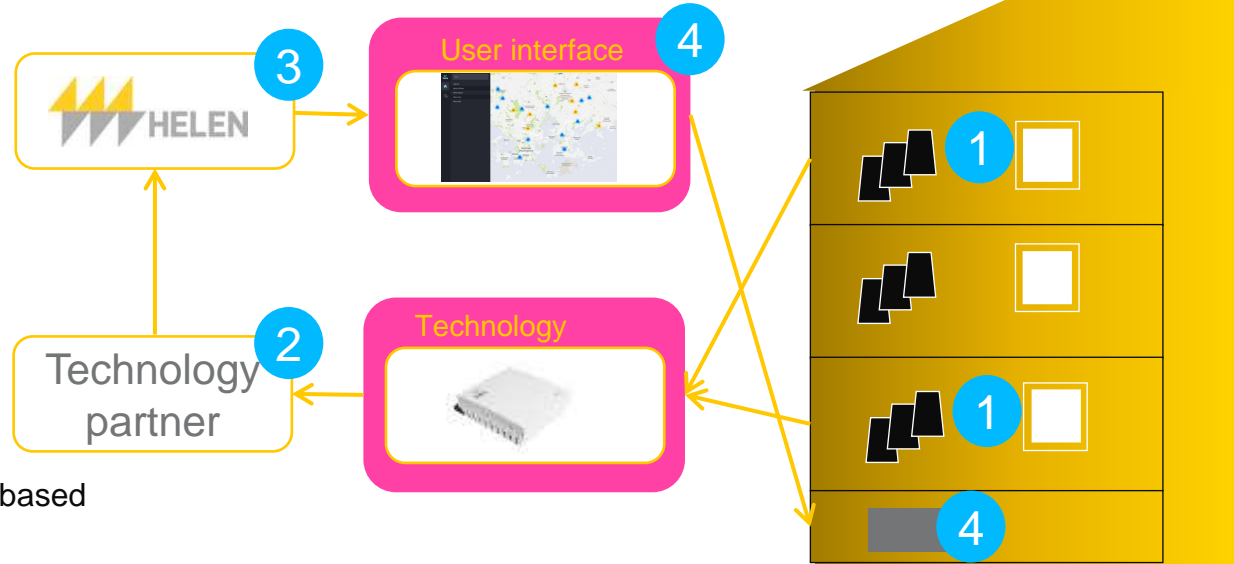
HEKA HEAT DEMAND RESPONSE PILOT

- Helen and Heka started a heat demand response pilot project 06/2017
- Helen will provide a new service to enable energy savings and demand response to all Heka apartment buildings in Helsinki
 - Close to 50 000 apartments
- Service is moving forward in phases and currently 500 apartment houses are equipped with smart IoT sensors to collect heat and moisture level of selected apartments.
- Data is used
 - To optimize heat control in terms of energy savings and demand response – 5-10 % savings expected
 - To bring a better living conditions to tenants

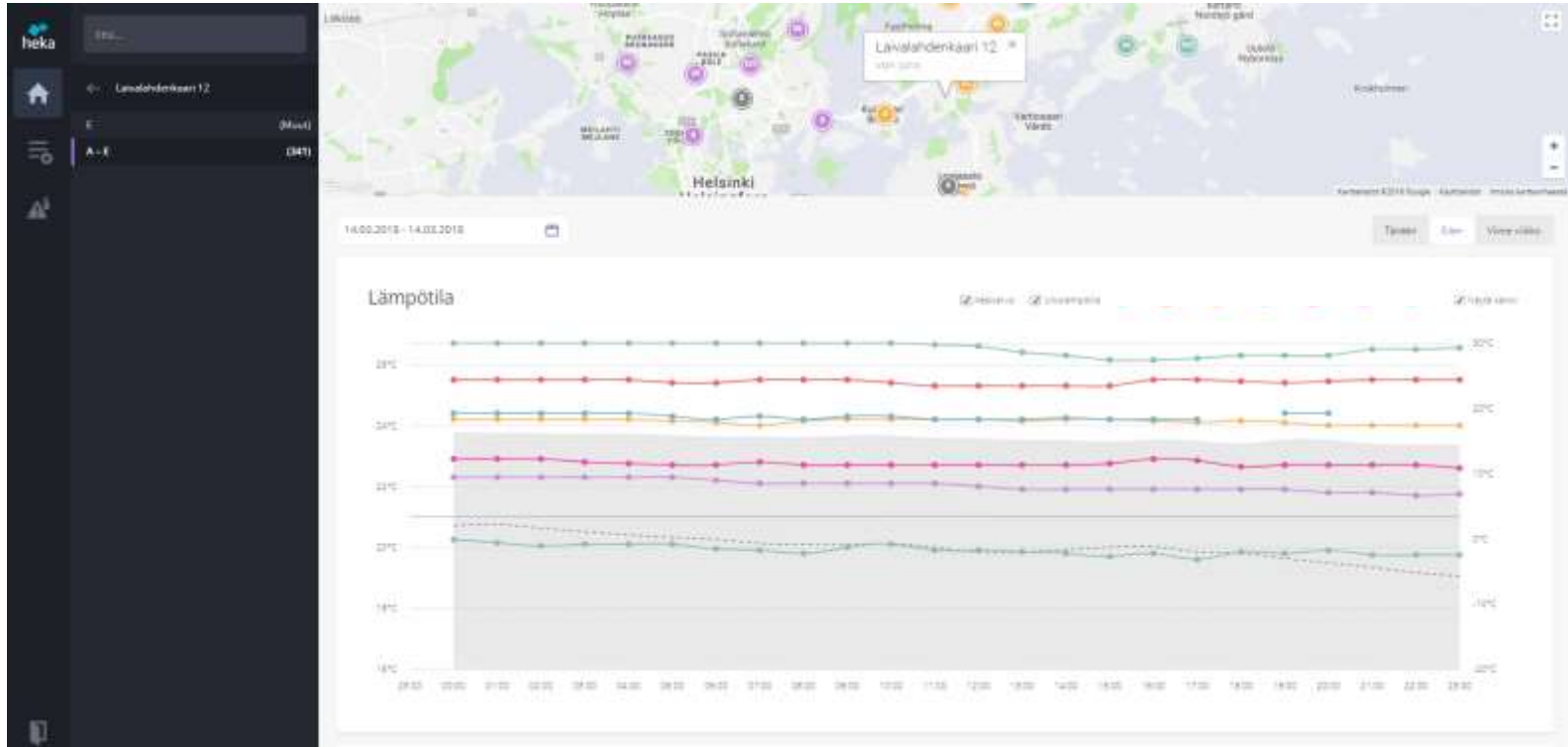


HEKA HEAT DEMAND RESPONSE PILOT

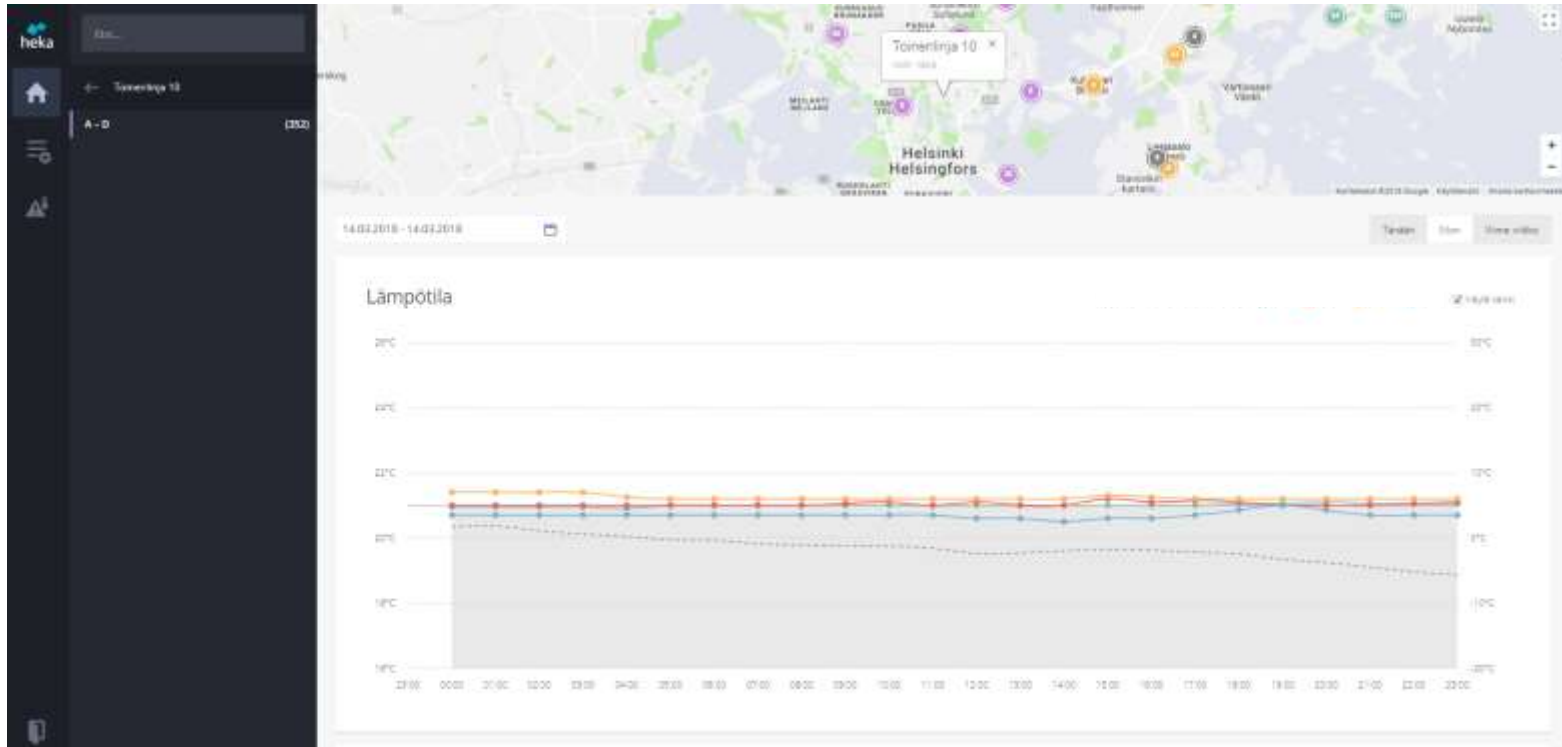
- 1 Heat and moisture data will be collected from the selected apartments – no active role for tenant
- 2 Technology partner (Sigfox technology) will aggregate data to Helen cloud
- 3 Helen will provide a user interface and analysis on living conditions based on data. Signal for the demand response to be added system
- 4 Heka will adjust heat exchanger based on data and Helen heat demand response signal (when building automation integrated to Helen cloud)



THE EXAMPLE OF UNBALANCED HEAT DISTRIBUTION NETWORK



THE EXAMPLE OF BALANCED HEAT DISTRIBUTION NETWORK



CONCLUSIONS

- Energy efficiency and heat demand response are needed towards climate neutral energy system
- Customers demand response functionality can be built together with the actual energy efficiency service.
- From our experience in heat demand response, the customer engagement is most likely low whereas the role of automation powered by IOT integration is high.
- Energy efficiency services are market driven and energy utility can be an active service provider.

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