

iCity: Intelligent City

Subproject 3.1: Increased efficiency through intelligent networking of producers and consumers in industrial estates (Bosch site Schwieberdingen)

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 Partners: Robert Bosch GmbH
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1. Background and problem definition

The Robert Bosch GmbH property at Schwieberdingen operates its own heating and cooling plants. The development of an approach for the continuous monitoring and optimization of all energy flows within the property is essential.

2. Procedure and methodology

The EMTool developed at HfT Stuttgart is used to retrieve sensor observations from various proprietary facility management systems currently in use at the Bosch property at Schwieberdingen. These observations are then imported into a SensorThings API server which provides a standardized means of interacting with and analyzing sensor observations.

Three-dimensional (3D) building information that is available in CityGML format is enriched with building metadata (such as building function, year of construction and net floor area) and then converted to 3DTiles and then visualized using the Cesium JavaScript library.

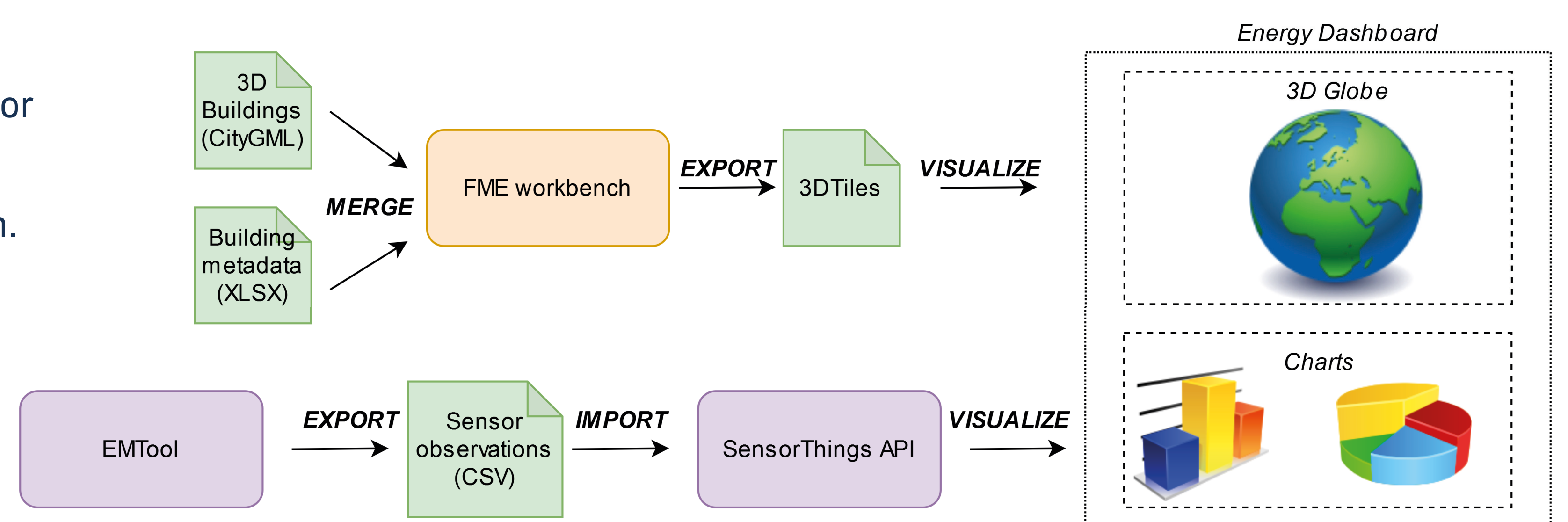


Fig. 1: Workflow steps.

3. Results

A prototype of a web-based interactive dashboard has been developed. It is made up of a 3D visualization of the buildings within the property as well as a variety of chart types.

The 3D visualization of the buildings is based on 3DTiles whereas the different chart types are created by retrieving sensor observations from the SensorThings API. The various charts provide different ways of visualizing and analyzing the temporal sensor observations, so as to gain new insights.

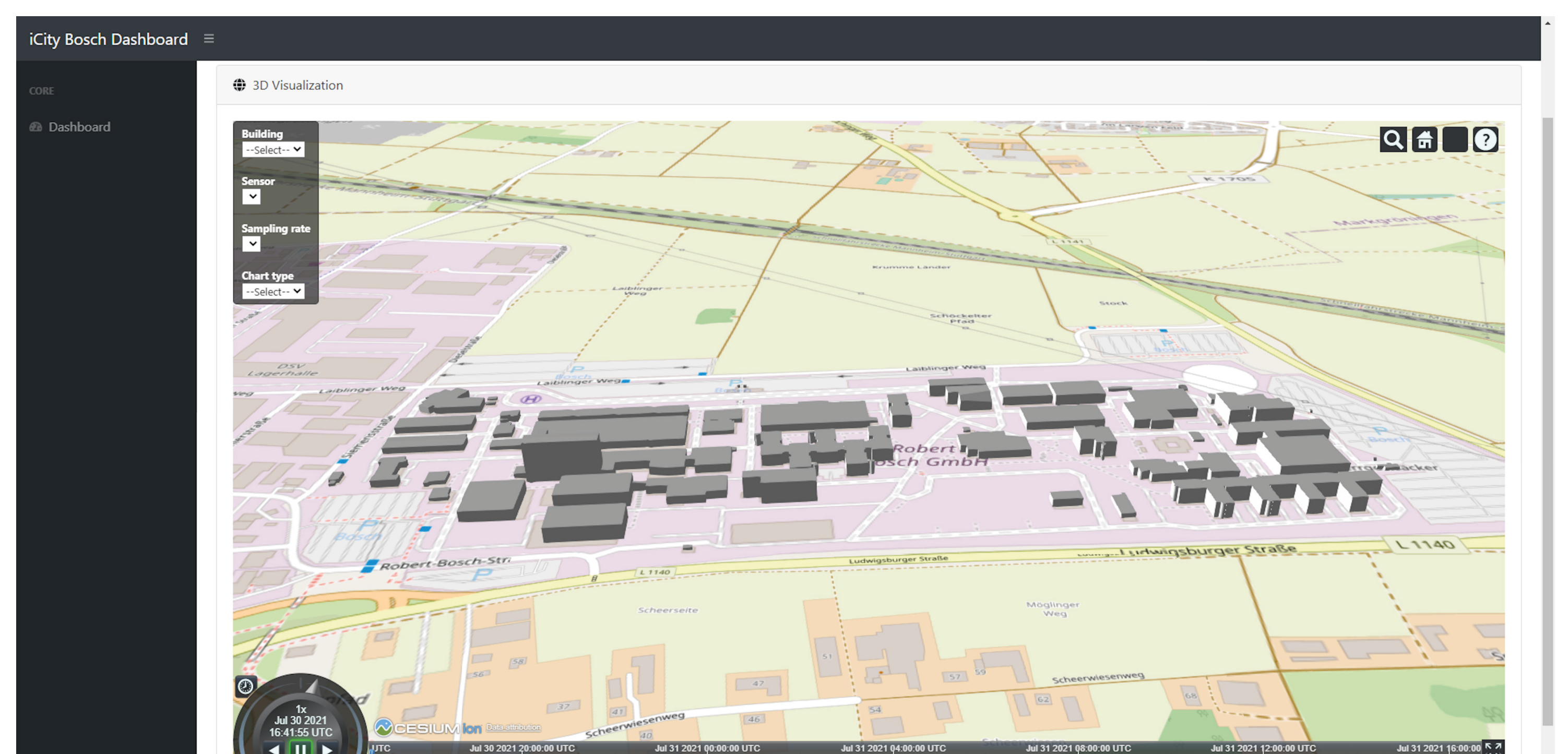


Abb. 2: The top part of the energy dashboard that contains the 3D visualization of buildings and selection options for the different sensors and charts.

Conclusio

The analysis of observations from a variety of energy sensors may be useful for increased energy efficiency of the Bosch Schwieberdingen property.

In addition, 3D modelling of buildings is useful for maintaining an inventory of existing buildings as well as making it possible to perform energy simulations at the building level such as the PV potential of buildings.

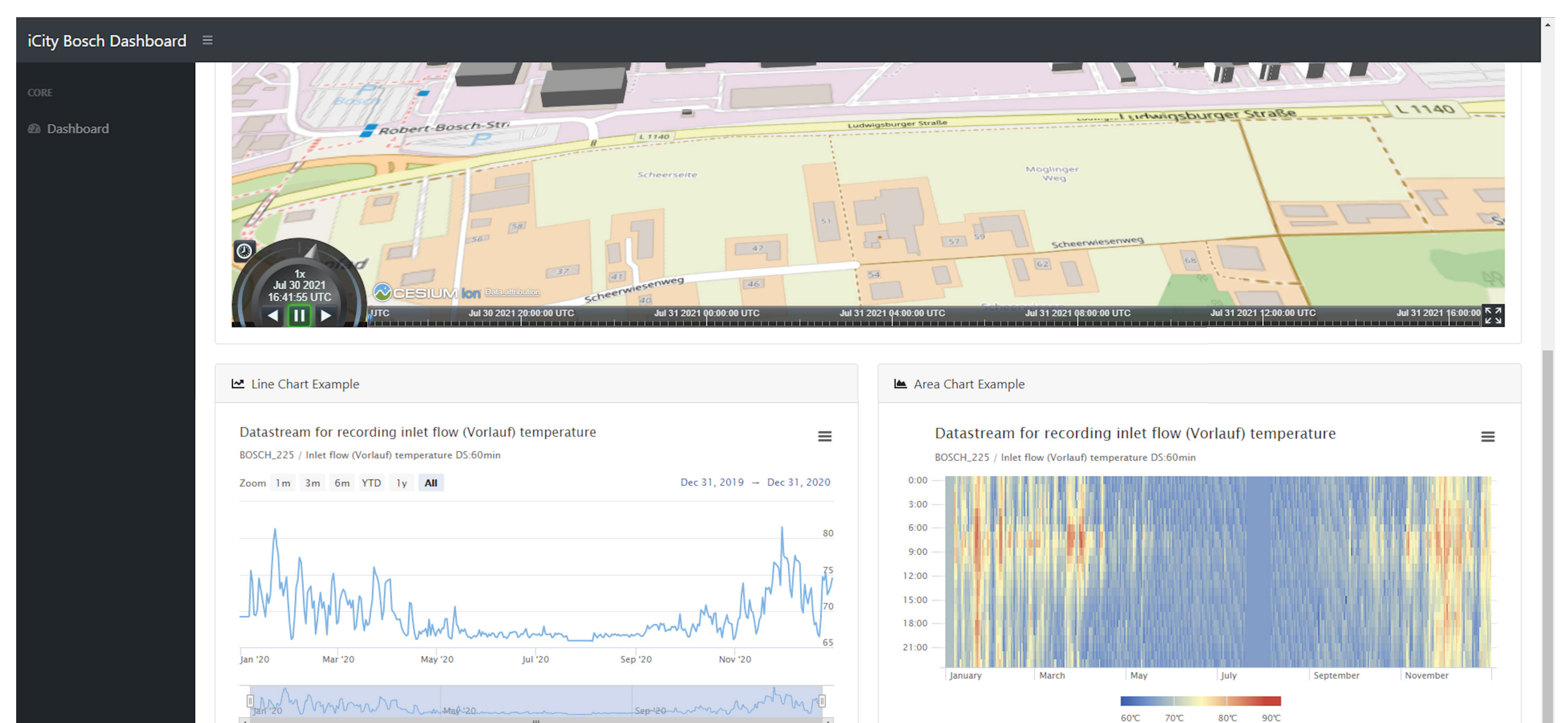


Fig. 3: The bottom section of the dashboard that contains different chart visualizations (line chart and heatmap) corresponding to the selected sensors.

