

Emission Monitoring at Ikuri School's Construction Site

Summary of the pilot report 5/2023, the CO₂ DataHub project

Name of the pilot	Emission Monitoring at Ikuri School's Construction Site
Project team	Vastuu Group Oy, Platform of Trust, Sitowise Oy, Onway Oy
Participants	City of Tampere, Rakennusliike Lammi construction company

Finland aims for carbon neutrality by 2035.

The CO₂ DataHub research and development project supports this goal by developing methods for the gathering, evaluation and data-based management of carbon dioxide emissions in the supply chains of companies and cities.

In the CO₂ DataHub project, Sitowise and Vastuu Group executed a pilot project for the following five cities: Espoo, Lohja, Porvoo, Tampere and Raisio. The construction site of Ikuri School and Daycare (Ikurin koulu ja päiväkoti) and its emission monitoring was chosen as the use case of the pilot project to be completed in the City of Tampere. The pilot project examined how the data transmission process could be automated from Tampereen Tilapalvelut and their software used for electricity and district heat consumption monitoring to Sitowise's Louhi system, where the CO₂ calculation is executed and visualized. Additionally, part of the pilot project was to investigate what kind of data the contractor would be able to deliver regarding the use of machinery and their fuel consumption.

Tampereen Tilapalvelut Oy will have a new building for 150 pupils and 160 daycare children of Ikuri School and Daycare built. The construction process began in April 2022 and the building should be ready by June 2023. A Green Deal agreement regarding carbon neutral construction sites (Sitoumus 2050 service) was supposed to be piloted and applied at the Ikuri School construction site at the same time as the pilot project. According to this deal, the fuel used at the construction site should be non-fossil in origin and the energy used renewable. The mandatory practices of this deal include, for example, having a shared

emission monitoring method and committing to the development of more efficient monitoring methods.

The City of Tampere and Tampereen Tilapalvelut want to receive site-specific data on fuel, district heat and electricity consumption and an emissions calculation based on this consumption data. The building phase is one of the four steps of assessing the building's life cycle according to the method for the whole life carbon assessment of buildings (Ministry of Environment, 2019). The modules of buildings' building phase emissions calculations and the emission sources included in them are the electricity and fuel consumption of construction site transportation, electricity and fuel consumption of machinery and other energy consumption of the site. The pilot's emissions calculation is based on this data and the scope of the assessment was the main contractor's machinery and devices.

Before starting the pilot project, the available data on the pilot site and the data usable for the needs of the prototype as well as the data needs were mapped. The site's electricity and district heat consumption and sales data were provided by Tampereen Tilapalvelut. The possibility to receive data on the machinery used at the construction site and their working hours and fuel consumption was also discussed with the site contractor Rakennusliike Lammi. In these discussions, it was found out that data that could be used for emissions calculations is already collected at construction sites. However, the contractor's obligation to deliver this data had to be dropped as the workload at the construction site was significantly higher than expected.

The automation process was piloted with a prototype based on the site's district heat and electricity consumption data received via Tampereen Tilapalvelut's EnerKey system. The calculations and visualization of emissions of transportation and machinery were demoed in the prototype with imaginary data.

The pilot examined how the data transmission process could be automated from Tampereen Tilapalvelut's emissions calculation software. It was possible to automate the data regarding the construction site's district heat and electricity consumption into the EnerKey system. The pilot also studied how the achievement of the Green Deal parameters could be monitored with the collected data. As a result of this pilot project, the City of Tampere obtained information about how construction site emission monitoring and visualization can be automated and what kind of challenges and issues could there be regarding the collection of data from contractors.

The pilot taught that in order to receive the required data from the contractor, it requires some planning ahead and that the obligation to document the data should be included in the contract as well as the quotes of the project. The Green Deal pilot project of Ikuri School and Daycare was not known during the quotation phase of the project, hence it was not possible to include the data collection obligation in the procurement criteria of the project. The discussion with the contractor revealed that data applicable for emissions calculations is already collected at construction sites, but, as the obligation for it had not been agreed on soon enough, the contractor could not be obliged to deliver the data for the purposes of this pilot project. If there is also a wish to include data from subcontractors in the calculations, in addition to the data from the main contractor, it would require developing guidelines and tools as well as documenting these requirements in the contract documents.

The data flow possibilities should be further examined, together with contractors, as this pilot did not manage to examine the format of the fuel consumption and the machinery usage data that the contractors would be able to deliver. In the future, instructions on how to deliver this data should be created for contractors and the first steps for this were already taken during this pilot project.

The pilot case report was prepared in co-operation by Vastuu Group Oy and Sitowise Oy. In accordance with the principles specified by the project steering group, the full report is only available to the organizations that participated in the research and development project.

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