

CASE STUDY

LOW TEMPERATURE HEATING IN PUBLIC
SECTOR BUILDING IN ALUKSNE, LATVIA

*Aluksne county municipality, Vidzeme
Planning region*



The logo for Alūksne Oļņkšva consists of the word 'Alūksne' in a black, sans-serif font above the word 'Oļņkšva' in a blue, sans-serif font.

The logo for VIDZEME features a stylized graphic of three curved lines in yellow, orange, and green above the word 'VIDZEME' in a bold, black, sans-serif font. Below this, the tagline 'CEĻŠ VED AUGŠUPI' is written in a smaller, black, sans-serif font.

ALUKSNE COUNTRY MUNICIPALITY

- **The first pilot project in low temperature heating in public building – kindergarten**
- **4th generation heating system**
- **Effective usage of digital data on energy consumption**
- **Clear plans and priorities as the key for success of municipality**

PITCH-TALK SUMMARY

Aluksne municipality had installed data monitoring systems for several educational institutions in the city, collecting data on electricity, water, and heat consumption. However, the pre-school educational establishment “Pienenite” was the first which heating system was modernised to a low temperature which can be so-called as 4th generation heating system. These systems are characterised by the transfer of lower temperature heat in optimally insulated pipes with reduced pipe dimensions.

Aluksne county is one of the front-runners in Vidzeme planning region as very active supporter for energy efficiency initiatives and projects, which is also defined in Aluksne county Sustainable Energy and Climate Action Plan 2021-2030 (SECAP). One of the goals is to reduce by 20% energy spending in public buildings by 2030. This project was implemented as part of the Interreg “Low Temperature District Heating for the Baltic Sea Region” (LowTEMP) project. This project’s overall budget is 3.8 mil EUR, Vidzeme planning region’s share is 149 878 EUR.

CASE CONTENT AND ISSUE

There is significant number of public buildings in each municipality in Latvia, however available funding for renovation and modernisation of these buildings is limited. Climate goals set in each SECAP are in hand with the national and European climate neutrality goals and therefore each municipality are doing their best to implement variety of initiatives and projects towards energy efficiency. During the first EU funding period for Latvia 2006-2013 many public buildings were renovated – mostly insulated from outside which brought average 30% energy consumption decrease. In recent years energy costs and with climate goals have significantly raised so simple insulation and 30% reduce does not work anymore – more solutions are needed for energy efficient maintenance of public buildings such as effective heating system, monitoring, change of behaviours etc. Aluksne county is also shrinking in terms of inhabitants similarly to all other regions in Latvia so efficiency of using public resources is even more needed.

Aluksne is located in the coldest and snowiest part of Latvia during the winter The kindergarten “Pienenite” (in English dandelion) has about 140 children and it

works throughout the year without summer breaks, therefore the energy consumption is not small.

Aluksne municipality started these actions in 2018 with creating the energy action plan for five educational establishments in Aluksne city which are connected to the district heating network. They installed indoor climate monitoring bases, electricity intermediate meters for the lighting system, corrected heating automation controls, installed water meters for hot water usage, sensor-type water exchangers to control water consumption. Data on water, heat and electricity is sent directly to the Alūksne municipality.

The first conclusions about installed temperature, humidity and CO2 meters were interesting – it was quite understandable why children in the kindergarten are not dressed more than t-shirts and the shorts. The indoor temperature during the day reached up to + 27 °C, which indicates that there is a huge opportunity not only to improve indoor microclimate, but also reduce heating bills. Municipality together with the local central district heating company started evaluating the data, understanding energy processes in the building and finding solutions for improving the case. The next step was to use this data for realistic solutions to reduce overall heat consumption.

Public data on the financial aspects of the project and energy savings are not available.

SOLUTIONS APPLIED

Aluksne municipality is part of Vidzeme planning region which is RoundBaltic project partner.

In turn Aluksne municipality partnered with Vidzeme Planning Region which took part in INTERREG Baltic Sea region project LowTEMP pilot project on low-temperature district heating which was implemented in 2018-2020. They decided to improve the heating system of Aluksne municipal pre-school educational establishment “Pienenite” as pilot project in the frame of project LowTEMP. This project modernised the heat supply in the kindergarten and collected data on indoor temperature, humidity in each group and CO2 levels in the gym. Through a monitoring system, the indoor climate can be daily monitored in order to evaluate the effectiveness of the modernised system. Such heating system can be defined as 4th generation.

In summer 2019, construction work was carried out in the kindergarten heating unit room and, with the beginning of the heating season, the heat supply to several groups of rooms is provided in low-temperature mode. That means instead of the usual 70/50 degrees, the radiators flow was turned to 46/36 degrees. The control unit monitored the indoor temperature in the kindergarten building and controls the flow temperature in the radiators accordingly.

Along with the modernization of the heat supply, a data

monitoring system was installed to collect data on indoor temperature and humidity, heat, electricity and water consumption in the building. Data visualization made it easy to view and compare indoor temperature fluctuations across different groups of rooms.

In addition, the heat supply was adjusted so that the indoor temperature is lower at night, on weekends and holidays. On working days at 5:30 in the morning, the system automatically starts raising the flow temperature in the radiators. At 7:00 am, the indoor temperature reaches 20 degrees. Several groups of rooms are located on the south side of the building and heat up much faster on sunny days. Collected data in October showed that in one of the groups at 9:00 am the indoor temperature reached 23 degrees. By 3:00 pm it was already 26 degrees, which can be even too warm. So, the flow temperature in this group was reduced in the radiators. Such data analysis and control help to provide the best indoor climate for kindergarten children and staff.

In addition, data from an installed CO2 sensor in a sports room that measures indoor air quality and reveals which parts of the day require more frequent ventilation.

Technical staff and teachers of pre-school were trained – introduced the modernized heating system to the staff and to demonstrate how an energy consumption data monitoring system can help to improve the indoor climate.

RESULTS

The collected data helped to justify the necessary energy efficiency measures in the building and attract additional funding.

In addition, the use of data provides accurate information on which systems (water, heat, electricity) operate efficiently over a specified period of time, as well as data analysis and energy efficiency solutions for specific groups of rooms.

Such low-temperature heating system can be implemented in other public buildings and could also be developed on a district heating level. Efficient district heating systems are an important component in achieving sustainable energy supply structures and thus contribute to reduced energy waste and greenhouse gas (CO₂) emissions.



LESSONS LEARNED

The project as a whole confirms that there are much greater possibilities for increasing energy efficiency in public buildings, not only traditional insulation measures. Innovative solutions and data analysis in this educational institution “Pienenite” will be a visible example that will help educate other municipal employees and residents.

For implementing low temperature heating system, the existing infrastructure was not fully changed, only adapted so the main investment made was in data monitoring and management system. If municipality can adapt the pilot project system to other public buildings huge energy savings in total can be made.





NEXT STEPS

Together with the improved heating system, data monitoring and analysis, performed works, there is an opportunity to identify other existing problems in “Pienenite”, which should be solved together with the municipality in order to reduce energy consumption and increase the energy efficiency of the kindergarten. Educational activities about energy efficiency activities and measures with staff and children should be regularly maintained.

On municipal level more investment in public buildings should be made in order to improve energy efficiency starting with monitoring, finding the best individual solutions for heating systems and financing their

implementation. How to bring results of the pilot project on bigger scale, so they – data monitoring and building management systems – can be used in other public buildings.

In RoundBaltic Vidzeme regional roundtable 2023 Aluksne municipality representative Una Tetere-Teterovska introduced with the next steps conducted, on how in other municipal educational institutions monitoring systems have been installed and analysed which means - Aluksne municipality is on the right track with energy efficiency.

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This Case Study was elaborated as part of the RoundBaltic project bringing together representatives of the financial and energy efficiency sectors at regional and national roundtables to discuss and find solutions to the challenge of energy efficiency finance in the three target countries Poland, Latvia and Denmark.

Key focus areas have been to ensure an investment friendly framework along designing of financing instruments in accordance with the EU financial pillars more effective use of public funds, aggregation and project development assistance and de-risking.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 967051.