Iecava – LV

SEC Tools

→ Good practice example

Pilot action community: Iecava – Zemgale region – Latvia

Type of energy consumption:

☑ heat energy ☐ hot domestic water ☐ electricity ☐ water

Use of renewable energy resources (potential or actual):

☐ biomass ☐ wind energy ☐ geothermal energy ☐ solar energy ☐ hydroelectric power station

Rational use of energy:

☐ sustainable building systems, low energy housing ☐ building thermal modernisation ☑ **modernisation and upgrading of the heating systems** ☐ modernisation of lighting ☐ balanced/sustainable transport

Iecava heating system development plan, targeted to reduce heating costs and fuel consumption, was implemented within 4 stages. The most efficient activities, like switching from 4 to 2 pipes networks and installation of individual heat substations were done during first stage. The most important results of the reconstruction were reduction of heat loses 6 fold, reduction of natural gas consumption by 30% and general improvement of service quality.

→ Community

Short description containing:

Geographical position	Central part of Latvia
Main profile of activity in the region	Agriculture
Number of inhabitants	9644
Important institutions	AS „Balticovo" – poultry farm and products; SIA „Iecavnieks" – food products (rape seed, flax, hemp oil and other products); SIA „Zemgales granulas" – wood briquettes; SIA „Latagra" – agricultural chemistry and mineral fertilizers; SIA „Jaunpagasts pluss" bio-ethanol production; SIA „Spals" – furniture; SIA „Skujenieki" – forest nursery

Energy data:

Energy supply (number of households or customers)	41 apartment house, 67 th.m2 + several municipal buildings and office buildings
Energy consumption [GJ]	54000
Total heated flat area [m²]	90 th.m²
Type of fuel (for heat energy)	natural gas

Climatic data: (selected data important for the described case)

Average yearly temperature	5,99 °C
Average of heating days per year	211
Average temperature during heating season	-1,4 °C
The lowest temperature (for calculations)	-25 °C

→ Context

Reconstruction of district heating system were started at the end of 90ths because of emergency situation in the networks and boiler houses. District heating system in Iecava at that time consisted from 2 boiler houses with separate networks (initially 4 pipes networks with separate system for hot water, look at picture). Total capacity of heating system at that time was 12,4 MW, utilized capacity – 10 MW. Length of heating networks 6 km, including 5 km in central boiler house and about 1 km in village boiler house. Annual heat production 18035 MWh, heat supplied to customers – 12165 MWh, looses in heating network – 3107 MWh (17%), looses in hot water network – 2764 MWh (16%) total looses – 5871 MWh (33% of produced energy). Expenditures of district heating – 338 th.EUR yearly (27,8 EUR/MWh supplied).

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Heating system development plan consisted from 3 priorities – improvement of district heating system efficiency, reduction of costs and share of municipal subsidies to heating sector. Priorities of the project were reconstruction of networks (conversion to 2 pipes networks with following full renovation), modernization of end user side (installation of individual heat substations) and improvement of heat production (reconstruction of existing gas boiler plants).

→ Experience of the city

Partnership process: The project was initiated by Iecava municipality. The first step was elaboration of district heating development plan and long term investment program. Project activities were placed in order by their economical effectiveness, because in nineteens it was wary important not only to approve environmental nature of the project, but also to make it economically viable. First and the most efficient step of reconstruction (switching to 2 pipes network) was implemented using long term state loan. During implementation of further steps municipality gained also state grants (30-50% of construction costs) and reinvested savings of previous steps. No EC grants were used in this project.

Technical data: Reconstruction of district heating system were divided into 4 steps, because of financial and technical reasons – municipality was not able to cover all costs and construction companies weren't able to implement such a big project within one summer between two heating seasons. In 2001 35 automated individual heat substations for heating and hot water preparation were installed in central boiler house system, switching 5 km of heating networks to two pipes system (costs 230 th.EUR). Second stage (2002) included reconstruction of 2,5 km of existing network in central system and reconstruction of central boiler house (installed water pre-treatment equipment, replaced furnaces in existing boilers and installed two new gas fuelled boilers, costs 390 th.EUR). Third stage included replacing of the rest 1,5 km of heating networks in central boiler house system (costs 320 th.EUR). Within the scope of fourth and the last stage 1,1 km of networks in village boiler plant system were replaced and 17 automated individual heat substations for heating were installed at customer side (costs 215 th.EUR).

→ Cost and benefits

Economical: Total costs of the heating system reconstruction project were approximately 1,16 mill. EUR. Current heat tariff for customers in the village is 32,86 EUR/MWh. Actual production and supply costs in heating season 2005/2006 were 31,17 EUR/MWh, but in last heating season (2006/2007) – 34,96 EUR/MWh. The highest share of costs is fuel – in 2005/2006 – 17,58 EUR/MWh (56% of total) and in 2006/2007 – 21,29 EUR/MWh (61% of total). Next position is salaries – in 2005/2006 – 6,86 EUR/MWh (22% of total) and in 2006/2007 – 7,29 EUR/MWh (21% of total). Total heating costs in 2006/2007 were 685 th.EUR, about twice more than in 1998/1999, when the project was initiated. If we take in account increment of gas price, salaries and inflation rate during this time, heating costs would be nearly twice higher than they are now, if the project would not be implemented. Payback period of different activities were 7-15 years.

Environmental: The most important result of the implementation of heating system development plan was reduction of heat looses in networks six fold, which consequently leaded to better quality of heating service and reduced gas consumption in boiler plant. In compare to heating season 1998/1999, natural gas consumption in 2006/2007 were about 20% less. Important result of the project was increasing of boilers' efficiency. Nowadays in central boiler house are installed 4 boilers with designed capacity 7,7 MW and peak load 6,5 MW. (RK-1.6 x 2, 1980, 1,86 MW x 2, efficiency 94%, TTKV-10-10, 2003, 1 MW, efficiency 95%, TTKV-30-30, 2003, 3 MW, efficiency 95%); in village boiler house boilers aren't reconstructed, but efficiency of these boilers is comparable good, which was the reason to exclude them from the primary activities plan (RK-1.6 x 2, 1996, 1,86 MW x 2, efficiency 92%).

→ Evaluation and Outlook

The project resulted in significant reduction of heat looses and stabilization of heating costs. Iecava municipality utilized the most of economical and environmental potential of reconstruction of heating system, but there are still lot of things to do especially at customer side, where investment costs are much higher, but potential savings – lower. The first stages of the project were implemented by heating company, which is responsible for heat production and distribution. Now house management companies and house owners should take initiative to improve situation at customer side, which includes rather simple activities, like education of customers to utilize individual heat substations, and costly activities, like energy efficiency improvements and energy management in apartment houses and installation of individual heat sources (solar collectors etc.). Municipality is planning to invest into energy efficiency improvements and energy management in public buildings, which consumes about 10% of total supplied energy.
Heat production still can be improved by diversification of energy sources and outputs, for instance, installation of gas co-generation (about 0,5 MWel), installation of economizer on exhausted gases, decentralized heat production with solar collectors on the roofs for hot water or to increase temperature of back-flow and switching to biofuel (wood chips, pellets). The most realistic future of heating system in Iecava is connecting of both networks and increasing capacity of central boiler plant keeping natural gas as main fuel to reduce salaries and other management costs.

Further information

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