

Pilot Energy Strategies – Examples

1 Introduction [1]

- Main definition and purpose of Pilot Energy Strategies (PES) described in module “Pilot Energy Strategies – Aims and Conditions”
- In LowTEMP, three PES were developed, namely for
 - Gulbene (Latvia)
 - Ilmajoki (Finland)
 - Tartu (Estonia)
- PES shown in this module: Gulbene and Ilmajoki

2 Implementation

2.1 PES Gulbene

2.1.1 Involved institutions

Involved institutions which created PES: Ekodoma Ltd. (Energy consulting company), Gulbene municipality and Riga Technical University [2]

2.1.2 Content and planning steps [2]

- Evaluation of preconditions
- Strategic directions for implementation of 4th generation low-temperature DH
- Evaluation of alternatives for low-temperature DH implementation, incl. technical solutions, cost and benefit analysis, SWOT and risk analysis, etc. for each analysed parish
- District cooling systems
- Monitoring of implemented projects and evaluation of results
- Conclusions and recommendations
- Appendices

2.1.3 Aim of PES Gulbene [2]

- PES Gulbene = strategy for LTDH-System implementation in Gulbene Municipality
- Aim: improving the existing district heating (DH) and cooling systems in order to achieve max. energy efficiency
 - defining main directions of DH development, determining the current situation

as well as forecasting the long-term changes in heat consumption

- Recommending specific technical DH solutions for six parishes and for Gulbene city DH
- development alternatives have been subjected by a risk-benefit analysis

2.1.4 Evaluation of preconditions [2]

Evaluation of several preconditions was done, incl. existing planning documents, regulatory framework, stakeholder evaluation, institutional and organizational structure of heat supply, climatic and geographical conditions.

2.1.5 Strategic directions and technical development scenarios [2]

Based on the evaluation, three different strategic directions for the LTDH implementation are defined

- Energy efficient heat production from renewable energy sources
- Lowering grid temperature
- Integration of waste heat

Based on the strategic directions, three technical development scenarios are described

- Scenario 1 - All heat is produced in boiler house with woodchips. Operation with current temperature mode. Solar panel field for electricity generation as addition.
- Scenario 2 - All heat is produced in a boiler house with woodchips. Operation at reduced temperature mode. Solar panel field for electricity generation as addition.
- Scenario 3 - Base load is covered by "Konto" Ltd., the rest of the heat is produced in the boiler house with woodchips. Operation at reduced temperature mode.

All scenarios were considered in a cost-benefit and a SWOT and risk analysis. Based on the results of these analyses, conclusions and specific recommendations for technical improvement, costs and management of the DH system can be given.

2.1.6 Monitoring of implemented projects and evaluation of results [2]

- Monitoring of pilot testing measure "Bellava"
- Main results
 - Importance of careful monitoring system shown due to technical problems
 - Supply flow temperature not controlled by outdoor air temperature → need for improvement of boiler operation
 - No use of cheaper plastic pipes which would reduce total investment costs → consideration for other pilot projects still recommended

- internal heating system of buildings play crucial role in overall DH system performance

2.1.7 Conclusions and recommendations for Gulbene [2]

- Developments in Gulbene regarding LTDH exceed average indicators of Latvian municipalities
- Necessary: information campaigns on the main aspects, costs and development opportunities of DH to attract new consumers and new external sources
- Long term process of lowering DH grid temperature - gradually identifying small districts where LTDH divisions can be created
- Need of strategic plan for energy efficiency measures at end-user side – i.e. building's retrofitting measures

2.2 PES Ilmajoki

2.2.1 Involved institutions

Involved institutions which created PES: Kurikan Kaukolämpö Oy (DH company), Thermopolis Oy. (Development and consulting services company providing energy advising) [3]

2.2.2 Content and planning steps [3]

- Analysis of Finnish energy system
- Analysis of Regional energy system South Ostrobothnia
- Urban preconditions in Ilmajoki municipality
- Strategic directions for implementation of low-temperature district heating
- Analysis of future developments, incl. LCA, SWOT and risk analysis and pilot testing measure
- Conclusions and recommendations

2.2.3 Aim of PES Ilmajoki [3]

- PES Ilmajoki = strategy for LTDH-System implementation in Ilmajoki municipality
- Aim: improving the existing district heating (DH) system in order to achieve max. energy efficiency under the challenge of a low settlement density
 - defining main directions of DH development, determining the current situation as well as forecasting the long-term changes in heat consumption
 - specific technical DH solution considering use of surplus heat (jointly with neighbouring community Kurikka)

2.2.4 Strategic directions [3]

- Lowering grid temperature
- Replacing peat by integrating alternative energy sources, e.g. surplus heat, heat pumps
- Improving energy performance of buildings

All scenarios were considered in a cost-benefit and a SWOT and risk analysis. Based on the results of these analyses, conclusions and specific recommendations for technical improvement, costs and management of the DH system can be given.

2.2.5 Conclusions and recommendations for Ilmajoki [3]

- Reducing grid temperature by eliminating deficiencies in generation and distribution but also by integrating new technical solutions, e.g. IoT-technology
- Industrial low temperature surplus heat from Koskenkorva is main alternative energy source (in connection with heat pump unit)
- Due to its extend, biomass is still another alternative
- Improving energy performance of buildings goes hand in hand with Finland's housing policy

3 Conclusion

- Two examples show PES with different emphases
- Not all planning steps that are recommended by PES methodology (seminar module "Methodology of Development of Energy Strategies) have to be elaborated
- PES methodology gives guidance and recommendation on planning steps that are useful for further plannings

Sources

[1] Pilot Testing Measures [Online]. Available at <http://www.lowtemp.eu/map/> [Last access on 25th March 2021].

[2] Ekodoma, Gulbene municipality, RTU Riga Technical University (2019) Pilot Energy Strategy Gulbene, Latvia [Online]. Available at <http://www.lowtemp.eu/what-we-do/> [Last access on 25th March 2021].

[3] Thermopolis Oy. (2020): Pilot Energy Strategy Ilmajoki [Online]. Available at <http://www.lowtemp.eu/what-we-do/> [Last access on 25th March 2021].